



# Tableau Desktop Help

This PDF Help contains the complete documentation for Tableau Desktop. View this document electronically to take advantage of search and bookmarks. You can also print this document for hard copy reference. Please download the updated PDF Help regularly.



A large, abstract graphic at the bottom of the page consists of several overlapping, wavy bands of varying shades of blue. The bands create a sense of depth and motion, resembling a landscape or a series of data points. The overall effect is professional and modern.

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# Getting Started

## Getting Started

Welcome to Tableau Desktop. Learn more about the product and what it can do. Then explore the Tableau workspace to get familiar with the environment. Finally, follow a step-by-step tutorial that guides you through connecting to data and building your first view.

- [What is Tableau Desktop?](#)
- [The Tableau Environment](#)
- [Learning to Use Tableau](#)

# What is Tableau Desktop?

Index > [Getting Started](#) >

## What is Tableau Desktop?

Tableau Software provides software applications for fast analytical and rapid fire business intelligence.

Tableau Desktop is a data visualization application that lets you analyze virtually any type of structured data and produce highly interactive, beautiful graphs, dashboards, and reports in just minutes. After a quick installation, you can connect to virtually any data source from spreadsheets to data warehouses and display information in multiple graphic perspectives. Designed to be easy to use, you'll be working faster than ever before.

Tableau Server is a business intelligence solution that provides browser-based visual analytics anyone can use at just a fraction of the cost of typical BI software. With just a few clicks, you can publish or embed live, interactive graphs, dashboards and reports with current data automatically customized to the needs of everyone across your organization. It deploys in minutes and users can produce thousands of reports without the need of IT services — all within your IT infrastructure.

Tableau Reader is a free viewing application that lets anyone read and interact with packaged workbooks created by Tableau Desktop.

The company is one of the 50 fastest growing software companies in the U.S. Our applications are being used by over 30,000 people worldwide. Customers include companies as diverse as Google, Cleveland Clinic, GM, Microsoft, Wells Fargo, the District of Columbia, Allstate, Cornell and Harvard.

- [What can I do with Tableau Desktop?](#)
- [What data can I analyze with Tableau?](#)
- [How Does Tableau Work?](#)

## What can I do with Tableau Desktop?

### What can I do with Tableau Desktop?

*Imagine being able to answer virtually any business question by dragging-and-dropping your data into a free-form visual canvas. You create beautiful graphs, reports and dashboards. You then share those results in just a few clicks. Using Tableau Desktop, you can build and interact with views of data. These views allow you to query, display, analyze, filter, sort, group, drill down, drill up, calculate, organize, summarize, and present data faster and more efficiently than ever before. With Tableau Server and Tableau Public you can share and embed your live, interactive views, reports, and dashboards so that colleagues can interact, customize or monitor them.*

*The various ways that Tableau can help you get more from your data are discussed in more detail below.*

- [Visually Analyze Data Rapidly](#)
- [Build Interactive Dashboards](#)
- [Share and Interact](#)

## Visually Analyze Data Rapidly

### *See and Understand*

*People need effective views of data to understand results, discover relationships, find patterns, locate outliers, uncover structure, and summarize findings. How well can you see what is going on in your business?*

*Tableau lets you ask rapid questions of your data by letting you iteratively create and modify live, interactive charts, reports and dashboards in minutes. These views are fundamentally more useful for analysis than those provided by pre-canned reports and traditional dashboards. Tableau gives you interactive visual tables, picture-perfect data displays, side-by-side comparisons, and graphic encodings using color, size and shape. Without any programming or training, users can see and understand data like they've never been able to before.*

### *Browse and Explore*

*Tableau is the world's leading exploratory browser for databases. A key step in the analysis process is the ability to start with "big picture" summaries of data and then quickly focus on detailed areas of interest.*

*To conduct effective analysis, it is crucial for people to quickly change what data they are viewing and how it is being viewed. Tableau's flexible interface enables this free form exploration. Exploratory analysis is further supported with unlimited undo and redo, allowing people to surf their databases much like they surf the web.*

## Build Interactive Dashboards

### *Build Dashboards People Can Understand*

*Use Tableau to build dashboards that communicate clearly and directly. Each element of a dashboard presents information in the most effective way possible, based on the latest research in human perception. Tableau provides the display type that best expresses the data—bar and line charts, maps, tables, scatter plots, and more. Tableau helps you build dashboards that inform and impress.*

### *Monitor and Measure*

*Use Tableau to build analytical dashboards that compare information and track performance against goals. These dashboards can be based on multiple data sources. They are fully interactive, allowing you to drill into and explore information directly from the dashboard. You can also apply common filters to all the worksheets, allowing you to change the filter and watch an array of visual displays update simultaneously.*

### *Interact and Drill-down*

*Sometimes you need to answer additional questions within a dashboard. With Tableau, viewers can dynamically filter, highlight, drill-down and link across multiple views in one dashboard. This essentially creates an interactive visual analysis application on the fly.*

## Share and Interact

### *Present*

*Imagine pasting Tableau's vivid multi-dimensional results into Microsoft Office applications and sharing them with others. Our users have a reputation for producing high-impact presentations that are easy to understand.*

### *Publish and Embed*

*Share your graphs, reports, and dashboards by publishing them with Tableau Server. Anyone with proper data credentials can view and interact with those visualizations using just a browser. They can even save custom views, make comments, or even tag favorites. Don't want people to visit a specific URL destination for their views? No problem—embed them in virtually any web application with just a few lines of code.*

## What data can I analyze with Tableau?

*Your data needs to be in a database, spreadsheet or structured text format before you can analyze it with Tableau. Databases include relational databases and multidimensional OLAP databases. The specific databases your copy of Tableau can connect to depends on your purchase options. Refer to the [Technical Specifications](#) on our website for a complete list of supported data sources.*

*To see which data sources your copy of Tableau can connect to, select Data > Connect to Data. Any data source that is not supported by your version of Tableau is greyed out. Contact Tableau to upgrade your database accessibility options.*

## How Does Tableau Work?

*While Tableau lets you analyze databases and spreadsheets like never before, you don't need to know anything about databases to use Tableau. In fact, Tableau is designed to allow business people with no technical training to analyze their data efficiently.*

*Tableau is based on three simple concepts:*

1. *Connect - Connect Tableau to any database that you want to analyze. Note that Tableau does not import the data. Instead it queries to the database directly.*
2. *Analyze - Analyzing data means viewing it, filtering it, sorting it, performing calculations on it, reorganizing it, summarizing it, and so on.*

*Using Tableau you can do all of these things by simply arranging fields of your data source on a Tableau worksheet. When you drop a field on a worksheet, Tableau queries the data using standard drivers and query languages (like SQL and MDX) and presents a visual analysis of the data.*

3. *Share - You can share results with others either by sharing workbooks with other Tableau users, by pasting results into applications such as Microsoft Office, printing to PDF or by using Tableau Server to publish or embed your views across your organization.*

# The Tableau Environment

## The Tableau Environment

*This section will introduce you to the Tableau environment including how to open and close the application, the workspace in the general, and how your work is organized and stored.*

- [Opening and Closing the Application](#)
- [Start Page](#)
- [The Tableau Workspace](#)
- [Workbooks and Sheets](#)
- [Files and Folders](#)

## Opening and Closing the Application

*The first thing to understand is how to open and close the application.*

### *Open Tableau*

*There are many ways to open Tableau from your desktop computer. Open the application by doing one of the following:*

- *Double-click the Tableau icon on your desktop.*
- *Select Start > All Programs > Tableau.*
- *Double-click a Tableau workbook or bookmark file. Tableau files are typically stored in the My Tableau Repository folder of your My Documents folder.*
- *Drag a data source such as an Excel or Access file onto the Tableau icon or the application window. Tableau automatically makes a connection to the data source.*

### *Close Tableau*

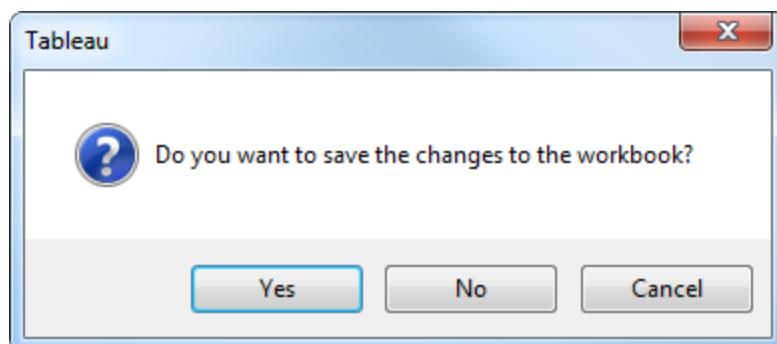
*When you are done working in Tableau you should save your work and close the application. Close the application by doing one of the following:*

- *Click the Close icon located in the right corner of the application title bar.*



- *Select File > Exit.*

*If your workbook has not been saved, you will be asked whether you want to save it.*



## Start Page

When you first open Tableau, the Start Page opens to help you get started quickly. The Start Page contains many different resources that are useful whether you are first learning or very experienced.

Open the start page by doing one of the following:

- Open Tableau by double-clicking the icon on your desktop.
- From an open workbook, click the third tab in the top right corner of the workbook.



The start page is split into following sections:

- Data – The data section lets you either connect to a new data source or quickly open a saved connection. By default sample data source connections are available. As you continue to create and save connections they'll be added to the list. The start page lists any data source connections that are saved in your repository.
- Workbooks – The workbooks section shows thumbnail images for workbooks you've recently opened. Click a thumbnail image to open the workbook. When you open Tableau for the first time, the Workbooks section will be blank. As you create and save new workbooks, the nine most recently opened are available on the start page.

You can pin workbooks to the start page by clicking the pin icon that shows in the lower left corner when you hover the mouse over the workbook image. Pinned workbooks will always show on the start page even if they weren't opened recently. Remove the workbook by clicking the red "x" icon. The workbook is removed immediately but will be shown again with your most recently used workbooks the next time you open the workbook.

- *Getting Started – The getting started section contains links to resources that can help you learn how to use Tableau. You can watch a short flash video that introduces you to the workspace or browse more in-depth training videos on the Tableau website.*
- *Samples – The samples section contains several sample workbooks that show off the types of views you can create with Tableau Desktop. Click on a thumbnail image in the samples areas to open a sample workbook.*

## The Tableau Workspace

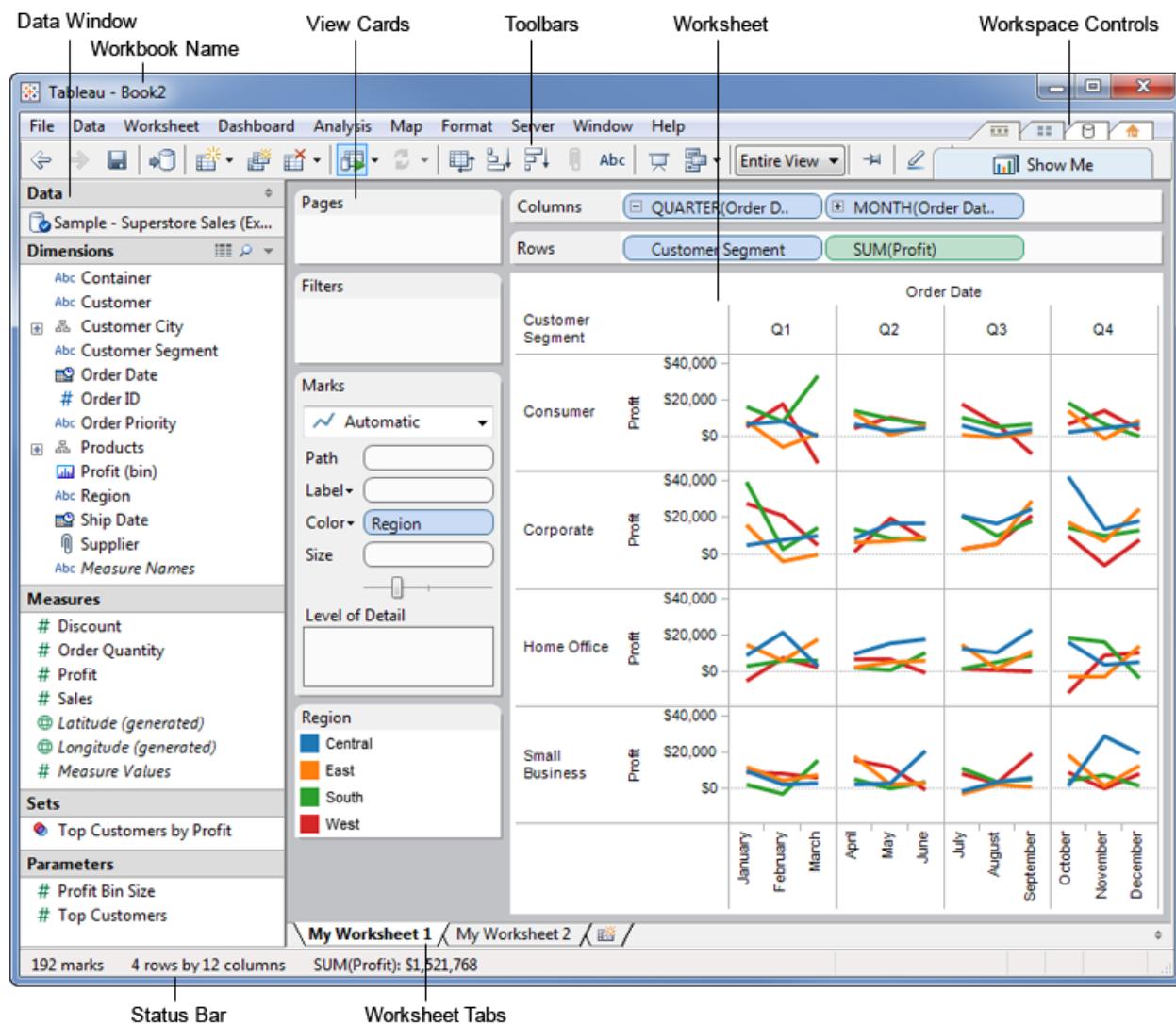
### The Tableau Workspace

*The Tableau workspace consists of menus, a toolbar, the Data window, cards that contain shelves and legends, and one or more sheets. Sheets can be worksheets or dashboards.*

*Worksheets contain shelves, which are where you drag data fields to build views. You can change the default layout of the shelves and cards to suit your needs, including resizing, moving, and hiding them.*

*Dashboards contain views, legends, and quick filters. When you first create a dashboard, the Dashboard is empty and all of the worksheets in the workbook are shown in the Dashboard window.*

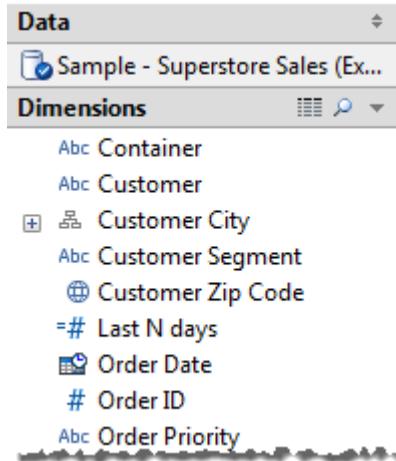
## Tableau Desktop Help



- [Data Window](#)
- [Toolbar](#)
- [Tooltips](#)
- [Status Bar](#)
- [Cards and Shelves](#)
- [Reorganizing the Workspace](#)
- [Language and Locale](#)

## Data Window

*Data fields appear on the left side of the workspace in the Data window. You can hide and show the Data window by selecting Window > Show Data Window. You can also click the minimize button  in the upper right corner of the Data window.*



*You can search for fields in the Data window by clicking the magnifying class icon and then typing in the text box. Right-click the fields in the Data window to access important commands.*

*Click the View Data icon at the top of the Data window to see the underlying data.*

## Tableau Desktop Help

The screenshot shows the Tableau Desktop interface. On the left, the Data pane is open, displaying a list of dimensions and measures. A red circle highlights the 'Dimensions' tab, which is currently selected. An arrow points from the Data pane to a preview window on the right. The preview window shows a portion of the 'Sample - Superstore Sales (Excel)' data, including columns for Order ID, City, Customer, Customer Segment, and Order Date. The data is as follows:

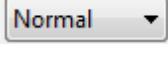
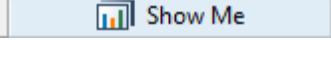
Order ID	City	Customer	Customer Segment	Order Date
42	Highland Park	Muhammed MacI...	Small Business	10/13/2011
53	Edmonds	Ruben Dartt	Corporate	2/20/2012
57	Elk Plain	Liz Pelletier	Corporate	7/15/2011
57	Elk Plain	Liz Pelletier	Corporate	7/15/2011
57	Elk Plain	Liz Pelletier	Corporate	7/15/2011
167	High Point	Liz Pelletier	Corporate	7/15/2011
68	Ames	Julie Creighton	Corporate	10/22/2011
68	Ames	Julie Creighton	Corporate	10/22/2011
57	Albany	Sample Company A	Home Office	11/2/2011
287	Pflugerville	Tamara Dahlen	Corporate	3/17/2011
1074	Santa Fe	Arthur Gainer	Consumer	1/19/2009
939	Garner	Jonathan Doherty	Corporate	6/3/2009
939	Garner	Jonathan Doherty	Corporate	6/3/2009

## Toolbar

*Tableau's toolbar contains commands such as Connect to data, New Sheet, and Save. In addition, the toolbar contains analysis and navigation tools such as Sort, Group, and Highlight. You can hide or display the toolbar by selecting Window > Show Toolbar.*

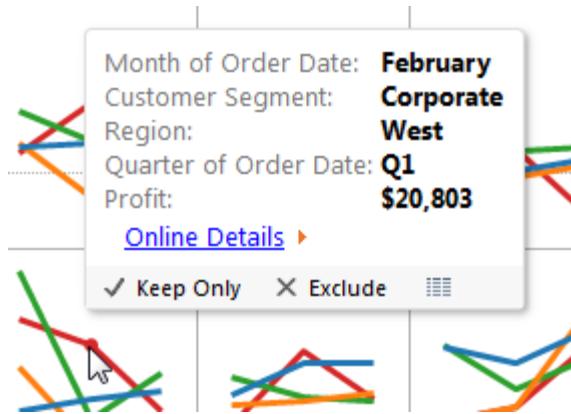
*The toolbar helps you quickly access common tools and actions. The table below explains the functions of each toolbar button.*

Toolbar Button	Description
	Undo: undoes the last task you completed.
	Redo: repeats the last task you canceled with the Undo button.
	Save: saves the changes made to the workbook.
	Connect to Data: opens the data page where you can create a new connect or select one from your repository.
	New Sheet: creates a new blank worksheet.
	Duplicate Sheet: creates a new worksheet containing the exact same view as the current sheet.
	Clear: clears the current worksheet. Use the drop-down list to clear specific parts of the view such as filters, formatting, and sizing.
	Automatic Updates: controls whether Tableau automatically updates the view when changes are made. Use the drop-down list to automatically update the entire sheet or just quick filters.
	Run Update: runs a manual query of the data to update the view with changes when automatic updates is turned off. Use the drop-down list to update the entire sheet or just quick filters.
	Swap: moves the fields on the Rows shelf to the Columns shelf and vice versa. The Hide Empty Rows and hide Empty Columns settings are always swapped with this button.
	Sort Ascending: applies a sort in ascending order of a selected field based on the measures in the view.
	Sort Descending: applies a sort in descending order of a selected field based on the measures in the view.
	Group Members: creates a group by combining selected values.

Toolbar Button	Description
 Abc	Show Mark Labels: toggles between showing and hiding mark labels for the current sheet.
	Presentation Mode: toggles between showing and hiding everything but the view.
 ▾	View Cards: shows and hides the specified cards in a worksheet. Select the cards you want to hide or show from the drop-down list.
 Normal ▾	Fit Selector: specifies how the view should be sized within the application window. Select either a Normal fit, Fit Width, Fit Height, or Entire View.
	Fix Axes: toggles between locking the axes to a specific range and showing all of the data in the view.
 ▾	Highlight: turns on highlighting for the selected sheet. Use the options on the drop-down list to define how values will be highlighted.
 Show Me	Show Me!: displays alternative views of the data, in addition to the best view according to best practices. The options available depend on the selected data fields.

## Tooltips

*Toolips are additional data details that display when you rest the pointer over one or more marks in the view. Toolips also offer convenient tools to quickly filter or remove marks or view underlying data. Toolips consist of a body, action links, and commands.*



### Body

*The body of a tooltip contains details about a specific mark or a selection of multiple marks. For example, in a bar chart showing sales by region, the tooltip body may include the actual sales amount and the region name. The default tooltip is based on the fields used in the view. You can customize what is shown in the tooltip and how it is formatted by selecting Worksheet > Tooltip. Refer to [Toolips](#) to learn more about formatting the body of the toolips.*

### Action Links

*If the sheet has any actions, the action links will be listed below the body of the tooltip. An action adds context and interactivity to your data through filters, highlighting, and links to external resources. Refer to [Actions](#) to learn more.*

### Commands

*The bottom of the tooltip lists commands for quickly filtering data and viewing the underlying data. For example, you can use the tooltip to quickly remove an outlier in a scatter plot. Each of the commands are described below.*

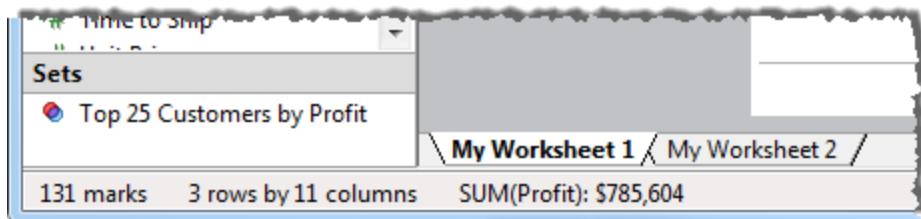
- *Keep Only - creates a filter that removes all other data.*
- *Remove - creates a filter that removes the selected data.*

- *View Data - opens a window displaying the data. You can view the summarized data or the underlying data. Refer to [View Data](#) to learn more about this command.*

*These commands are visible by default. You can disable the commands in the Edit Tooltip dialog box. Select Worksheet > Tooltip and then clear the Include command buttons checkbox in the bottom left corner. Tooltip settings only apply to the active worksheet.*

## Status Bar

The status bar is located at the bottom of the Tableau workbook. It displays descriptions of menu items as well as information about the current view. For example, the status bar below shows that the view has 131 marks shown in 3 rows and 11 columns. It also shows that the SUM(Profit) for all the marks is \$785,604.



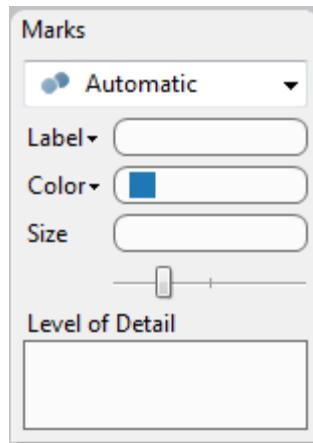
You can hide the status bar by selecting Window > Show Status Bar.

Occasionally, Tableau will display warning icons in the bottom right corner of the status bar to indicate errors that have or may occur. Below are the possible warning icons and what they mean.

Warning Icon	Description
	Cancel Query Indicator: When you cancel multiple queries, an indicator appears to show you how many queries are still running on the database and using resources.
	Precision Warning: Some fields are more precise in the database than Tableau can model. When you add these fields to the view a precision warning is displayed in the status bar. For more information about this warning refer to Precision Warnings.
	Special Values Indicator: If your data contains null values, geographic data for an unknown locations, or negative values on a logarithmic axis; the values will be shown with an indicator in the lower right corner of the view. Click the indicator for options for handling these values.

## Cards and Shelves

*Every worksheet contains a variety of different cards that you can show or hide. Cards are containers for shelves, legends, and other controls. For example, the Marks card contains the mark selector, the size slider, the mark transparency control, and the shape, text, color, size, angle, and level of detail shelves.*



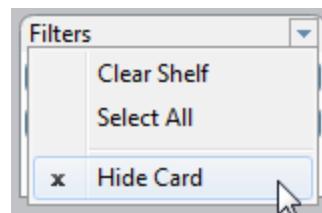
*Cards can be shown and hidden as well as rearranged around the worksheet.*

*The following list describes each card and its contents.*

- *Columns Shelf - contains the Columns shelf where you can drag fields to add columns to the view.*
- *Rows Shelf - contains the Rows shelf where you can drag fields to add columns to the view.*
- *Pages Shelf – contains the Pages shelf where you can create several different pages with respect to the members in a dimension or the values in a measure.*
- *Filters Shelf – contains the Filters shelf; use this shelf to specify the values to include in the view.*
- *Measure Values Shelf – contains the Measure Values shelf; use this shelf to use multiple measures along a single axis. This shelf is only available when there is a blended axis in the view.*
- *Color Legend – contains the legend for the color encodings in the view and is only available when there is a field on the Color shelf.*

- *Shape Legend – contains the legend for the shape encodings in the view and is only available when there is a field on the Shape shelf.*
- *Size Legend – contains the legend for the size encodings in the view and is only available when there is a field on the Size shelf.*
- *Map Legend - contains the legend for the symbols and patterns on a map. The map legend is not available for all map providers.*
- *Quick Filters – a separate quick filter card is available for every field in the view. Use these cards to easily include and exclude values from the view without having to open the Filter dialog box.*
- *Parameters – a separate parameter card is available for every parameter in the workbook. Use these cards to modify parameter values.*
- *Marks – contains a mark selector where you can specify the mark type as well as the Path, Shape, Text, Color, Size, Angle, and Level of Detail shelves. The availability of these shelves are dependent on the fields in the view.*
- *Title – contains the title for the view. Double-click this card to modify the title.*
- *Caption – contains a caption that describes the view. Double-click this card to modify the caption.*
- *Summary – contains summary of each of the measures in the view including the Min, Max, Sum, and Average.*
- *Map Options - allows you to modify the various labels and boundaries shown in the online maps. Also you can use this card to overlay metro statistical area information.*
- *Current Page – contains the playback controls for the Pages shelf and indicates the current page that is displayed. This card is only available when there is a field on the Pages shelf.*

*Each card has a menu that contains common controls that apply to the contents of the card. For example you can use the card menu to show and hide the card. Access the card menu by clicking on the arrow in the upper right corner of the card.*



## Reorganizing the Workspace

### Reorganizing the Workspace

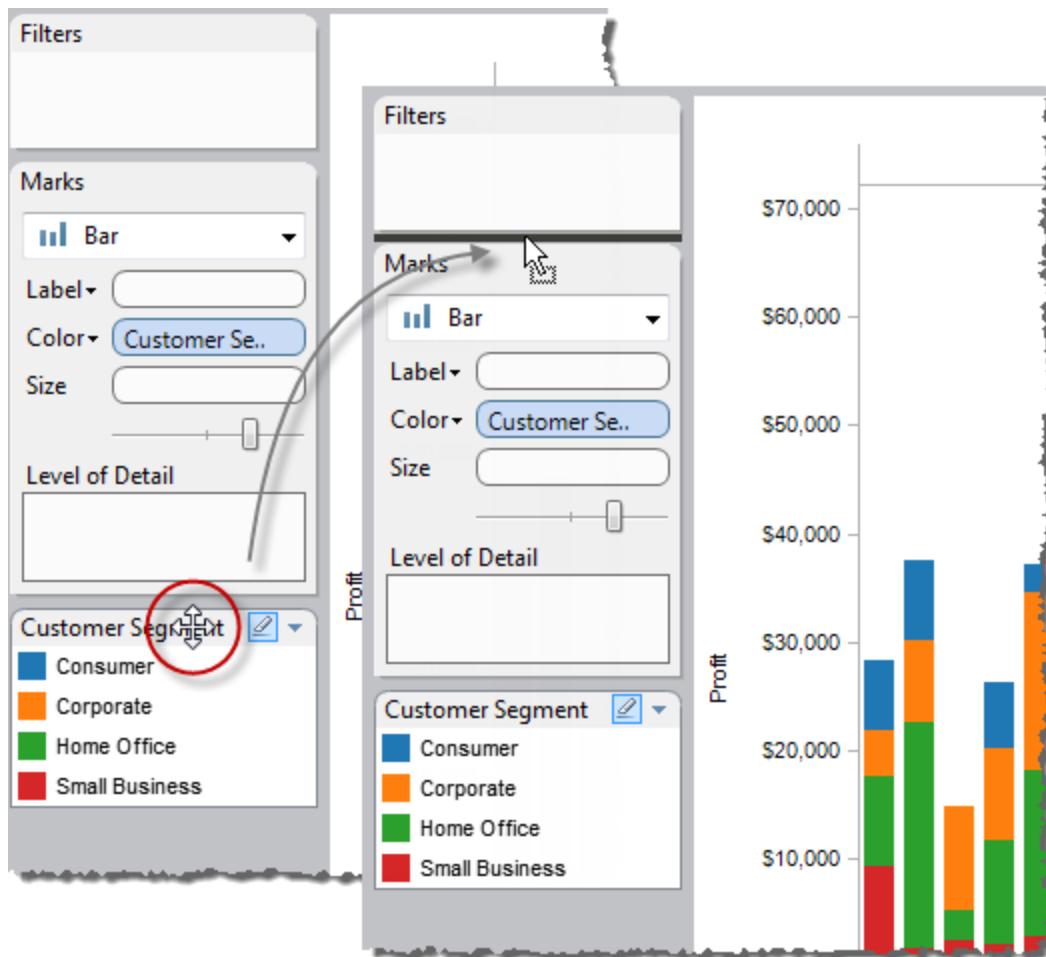
*You can rearrange and hide cards, legends, shelves, and more.*

- [Rearranging Cards](#)
- [Showing and Hiding Parts of the Workspace](#)
- [Presentation Mode](#)

## Rearranging Cards

A worksheet contains several cards that contain shelves, legends, and other controls. Each card can be rearranged to create a custom workspace.

To move a card, point the cursor at the title area of the card you want to move. When the cursor becomes the move symbol , click and drag the card to a new position. As you drag the card around the worksheet, the possible positions for it are highlighted with a black bar.



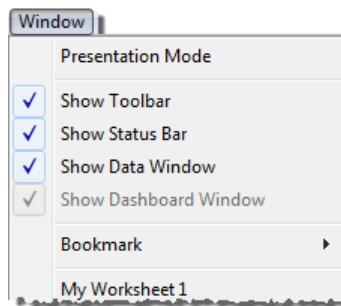
### Note:

You can restore the worksheet windows to their default state by selecting Reset Cards on the Show/Hide Cards toolbar control.

## Showing and Hiding Parts of the Workspace

*Just about everything in the workspace can be turned on and off so you can avoid cluttering the worksheet with unnecessary cards, shelves, etc.*

- *To show and hide the Data window, toolbar, or status bar, select Window and then select what you want to hide.*



- *To show or hide a card click Show/Hide Cards  on the toolbar and then select the card you want to show or hide.*

*You can restore the worksheet windows to their default state by selecting Reset Cards on the Show/Hide Cards toolbar control.*

## Presentation Mode

*Sometimes you may want to use Tableau for presenting your findings. Rather than hiding each card or shelf one at a time, you can switch into Presentation Mode. Presentation Mode hides everything on the sheet except for the view and its associated legends, quick filters, and parameter controls.*

*To toggle in and out of Presentation Mode, click the Presentation Mode  button on the toolbar or select Window > Presentation Mode.*

## Language and Locale

*Tableau Desktop workspace is localized into several languages. You can set Tableau to display the user interface (menus, messages, etc.) in one of the supported languages. The language you select is your User Interface (UI) Language. By default, when you install Tableau, the language is set to an automatic setting that recognizes your computer locale and uses the appropriate language if it is supported. If you are using an unsupported language, the application will default to English.*

*When you run the application, you can change the UI Language by selecting Help > Choose Language. After you change this setting, you'll need to restart the application for the changes to take effect. You do not need to change this setting for every workbook.*

*When you change the UI Language, the workbook will automatically use the corresponding locale for number formatting, maps, dates, and so on. By default, the locale is set to Automatic, which means the locale will match the locale when the workbook is opened. This can be useful if you are authoring a workbook that will be viewed in many different languages and you want the dates and numbers to update accordingly. You can override the locale setting for the workbook by selecting File > Workbook Locale. When you select a specific locale, the workbook will not change regardless of who opens it.*

*Tableau cascades through the following settings to determine locale:*

- *Workbook Locale*
- *Windows Locale*
- *UI Language*
- *English*

*Each feature in Tableau may start at different levels in the above hierarchy. For example, when opening a workbook that has a map view, Tableau will determine the correct map tiles by first looking at the Workbook Locale setting. If it is set to Automatic, it will then look at the Windows Locale setting. If that cannot be determined, it will fall back to the UI language. And finally, if all else fails, it will use English.*

## Workbooks and Sheets

### Workbooks and Sheets

*Tableau uses a workbook and worksheet file structure, much like Microsoft Excel.*

- [Workbooks](#)
- [Sheets](#)

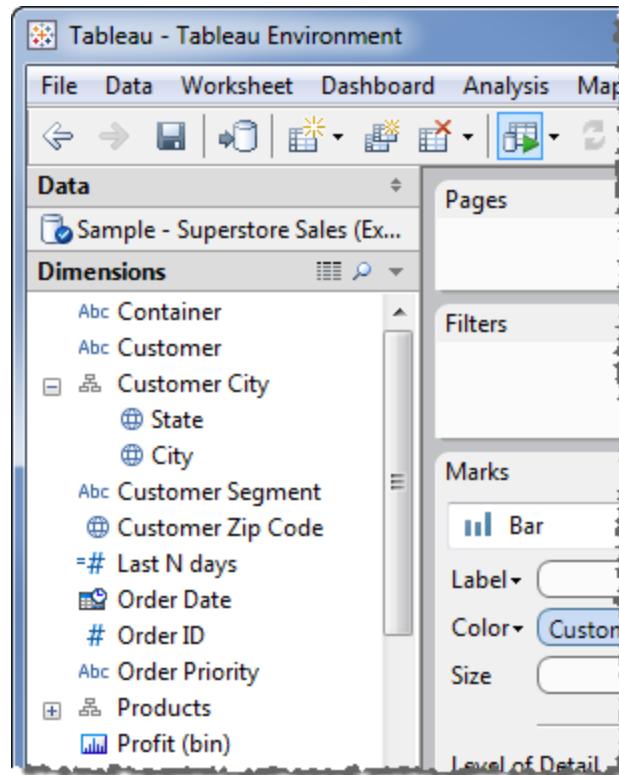
## Workbooks

Tableau workbook files are much like Microsoft Excel workbooks. They contain one or more worksheets or dashboards and hold all of your work. They allow you to organize, save, and share your results.

When you open Tableau, a blank workbook is automatically created. You can also create a new workbook by selecting *File > New* or by pressing *Ctrl + N* on your keyboard. You can open an existing workbook by doing one of the following:

- Double-click the thumbnail image of the workbook on the start page. The start page shows workbooks that you've recently used.
- Select *File > Open* and navigate to the location of your workbook using the *Open* dialog box. Tableau workbooks have the *.twb* or *.twbx* file extensions.
- Double-click on any workbook file.
- Drag any workbook file onto the Tableau desktop icon or onto the running application.

The workbook name is displayed in Tableau's title bar.



*You can open multiple workbooks simultaneously. Each workbook is shown in its own window.*

## **Sheets**

### **Sheets**

*Each workbook can contain worksheets and dashboards. A worksheet is where you build views of your data by dragging and dropping fields onto shelves. A dashboard is a combination of several worksheets that you can arrange for presentation or to monitor. The sheets, whether worksheets or dashboards, display along the bottom of the workbook as tabs. In this section you'll learn how to create, open, duplicate, hide, and delete sheets as well as how to organize sheets in a workbook.*

- [Creating New Sheets](#)
- [Undo, Redo, and Clearing Sheets](#)
- [Duplicating Sheets](#)
- [Hiding and Showing Worksheets](#)
- [Deleting Sheets](#)
- [Organizing Sheets](#)

## Creating New Sheets

*Create a new worksheet by selecting Worksheet > New Worksheet or by pressing Ctrl + M on your keyboard. Tableau inserts a new worksheet into the current workbook.*

*Create a new dashboard by selecting Dashboard > New Dashboard. Tableau inserts a new dashboard sheet into the current workbook.*

*Tableau automatically generates sheet names. The first worksheet is named Sheet 1, the second worksheet is named Sheet 2, and so on. You can rename a sheet by right-clicking the sheet tab and selecting Rename Sheet. Alternatively, double-click the name of the sheet on the sheet tab and type a new name.*

## **Undo, Redo, and Clearing Sheets**

*Every Tableau workbook contains a history of steps you have performed on the worksheets or dashboards. To move backward through the history click Undo  on the toolbar or press Ctrl + Z on your keyboard. Similarly, move forward through the history by clicking Redo  on the toolbar or by pressing Ctrl + Y on your keyboard.*

*You can remove all fields, formatting, sizing, axis ranges, filters, and sorts in the sheet by clicking Clear  on the toolbar. You can also use the Clear drop-down list on the toolbar to clear specific aspects of the view such as clear all formatting, sizing, filters, or sorts.*

### **Note:**

*Using the clear commands on the toolbar does not clear the history. If you decide that you didn't want to clear the sheet, click the Undo button.*

## Duplicating Sheets

*Duplicating a sheet allows you to easily make a copy of a worksheet or dashboard. You can then modify the view without losing the original version. To duplicate the active sheet, right-click the sheet tab and select Duplicate Sheet.*

*A crosstab (sometimes referred to as a Pivot Table) is a table that summarizes data in rows and columns of text. It is a convenient way to display the numbers associated with the data view.*

*In Tableau, you can quickly create a cross-tab from a worksheet by right-clicking the sheet tab and selecting Duplicate as Crosstab. You can also select Worksheet > Duplicate as Crosstab. This command inserts a new worksheet into your workbook and populates the sheet with a cross-tab view of the data from the original worksheet. Dashboard sheets cannot be duplicated as crosstabs.*

*There are other ways to see the numbers behind the data views. For example, you can mouse-over any mark to display the associated numbers in a tooltip. Click the View Data command at the bottom of the tooltip to view underlying data. You can copy and paste the data into Excel.*

## Hiding and Showing Worksheets

A worksheet that is used in a dashboard cannot be deleted, but it can be hidden. You may want to hide a worksheet if you are sharing the dashboard with others and don't want to clutter the workbook with all the supporting worksheets.

You can hide the worksheets that are used in a dashboard by right-clicking the worksheet tab and selecting Hide Sheet. Keep in mind that someone viewing the dashboard can still access the hidden worksheet.

You can show a hidden sheet by navigating to the dashboard that uses it. Select Go to Sheet on the dashboard view menu. The hidden sheet is shown until you switch to another sheet. When the hidden sheet is showing, you can right-click the sheet tab and select Unhide to unhide it permanently.

## **Deleting Sheets**

*Deleting a sheet removes it from the workbook. You can delete the active sheet by right-clicking the worksheet or dashboard tab along the bottom of the workbook and selecting Delete Sheet. Worksheets used in a dashboard cannot be deleted, rather you can hide the worksheet. Refer to [Hiding and Showing Worksheets](#) to learn more.*

### **Note:**

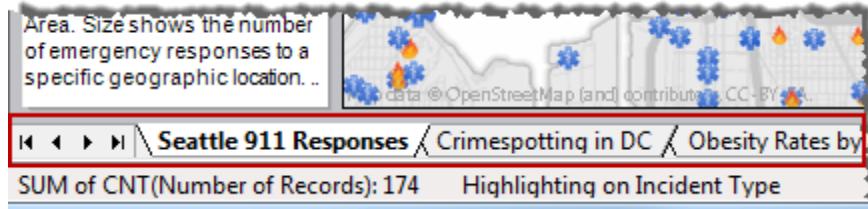
*There must always be at least one worksheet or dashboard in a workbook.*

## Organizing Sheets

*There are three ways to navigate and view the sheets in a workbook: the tabs at the bottom of the workbook, the filmstrip, and the sheet sorter. The tabs are useful for quickly navigating between a small number of sheets. If your workbook has a large number of sheets, you may find that the sheet sorter makes it easier to navigate them all.*

### Sheet Tabs

*Each sheet, whether worksheet or dashboard, is represented as a tab along the bottom of the workbook. Simply select the tab for the sheet you want to show in the workspace. On the left side of the tabs there are several controls that you can use to advance through each sheet or quickly jump to the first or last sheet in the workbook.*



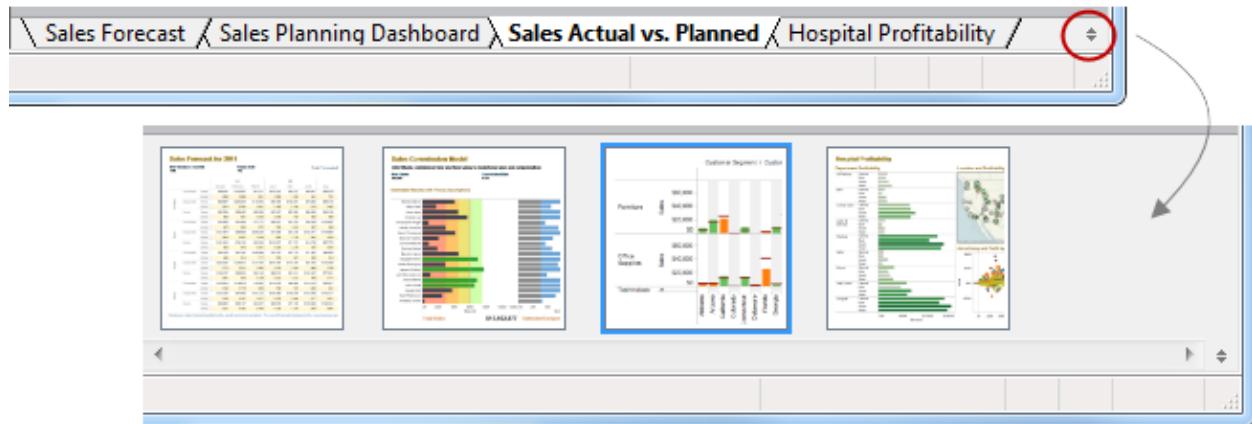
*You can also navigate between sheets using the Window menu or move through the multiple worksheets by pressing **Ctrl + F6** on your keyboard.*

*You can also right-click these tabs to specify commands that apply to the entire selected sheet. For example you can create new sheets, duplicate sheets, copy formatting, and delete the sheet entirely. Finally, you can hold the control key when selecting to select and apply settings to multiple sheets all at once.*

### Filmstrip

*Similar to the sheet tabs, the mini sheet sorter displays along the bottom of the workbook. However, instead of sheet names, the filmstrip shows a thumbnail image of each sheet. The filmstrip is useful when you are using Tableau to present your analysis and works well when you are working in Presentation mode.*

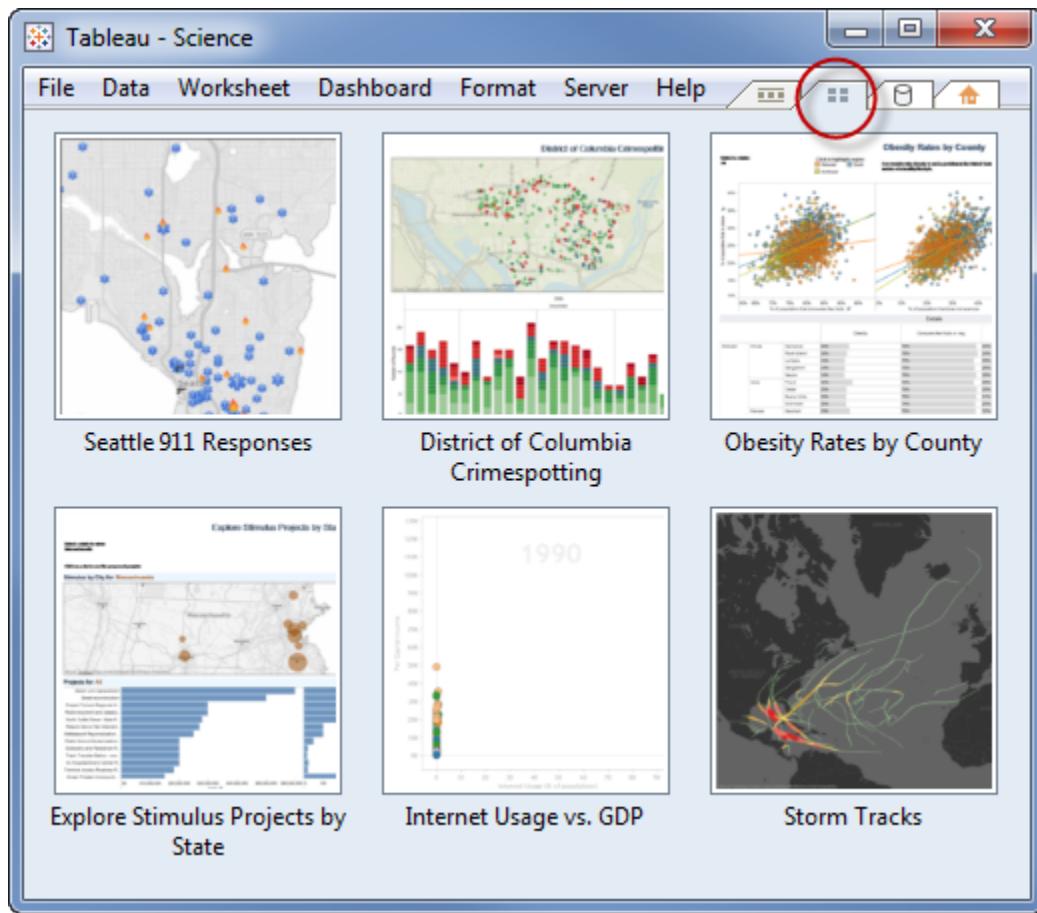
*Open the filmstrip by clicking the arrows on the far right side of the sheets tabs at the bottom of the workbook. Just like with the tabs, select the thumbnail image for the sheet you want to open. You can right-click the images to specify command that apply to each sheet.*



### Sheet Sorter

The full sheet sorter shows all sheets in a workbook as thumbnail images on a single page and is similar to the slide sorter in Microsoft Power Point. The sheet sorter is really useful when you have a large number of sheets in a workbook. Open the sheet sorter by clicking the sheet sorter tab in the upper right corner of the workbook.

## Tableau Desktop Help



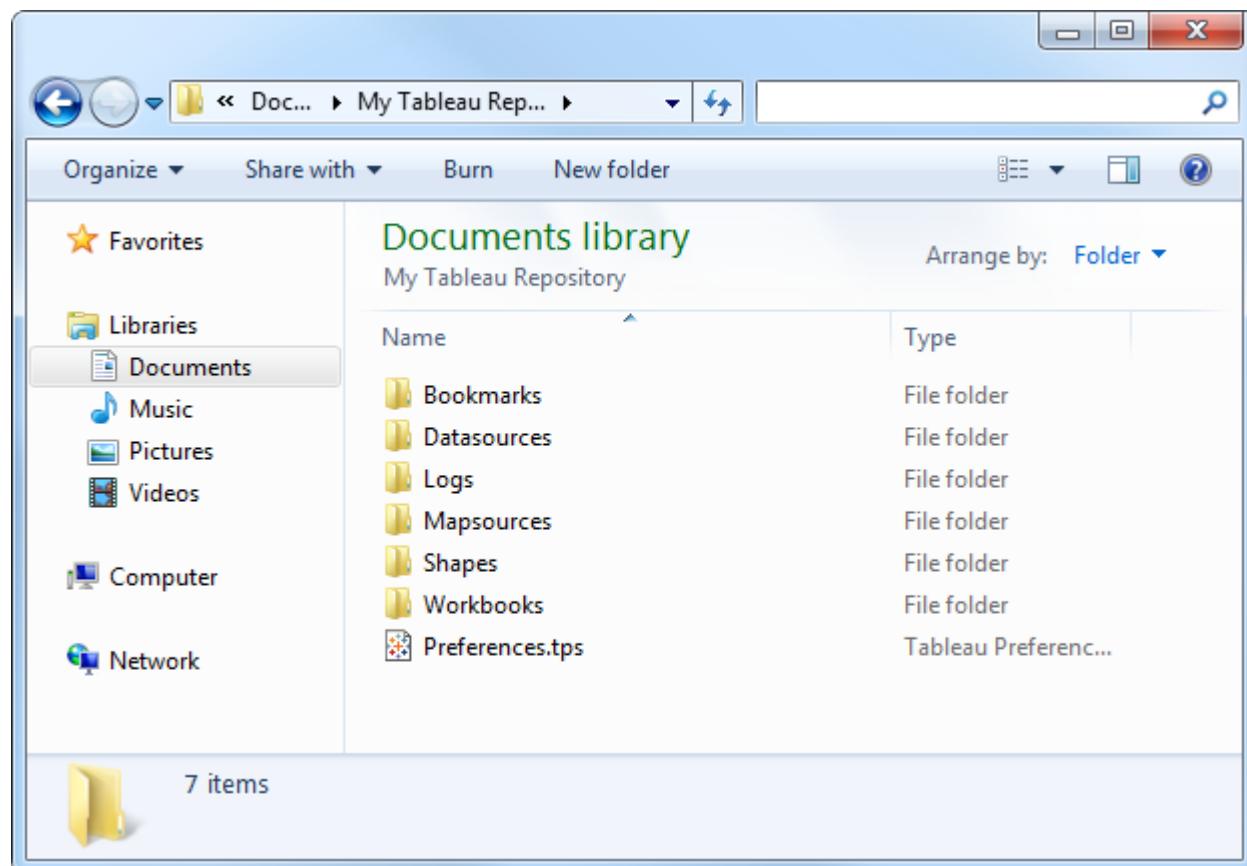
*From the sheet sorter you can drag and drop to reorder the sheets, create new sheets, and duplicate or delete existing sheets. Right-click a sheet to see these commands. You can also right-click to refresh the thumbnail image of a particular sheet or Refresh All Thumbnails at once.*

## Files and Folders

You can save your work using several different Tableau specific file types: workbooks, bookmarks, packaged data files, data extracts, and data connection files. Each of these file types are described below.

- *Workbooks – Tableau workbook files have the .twb file extension and are marked with the workbook icon. Workbooks hold one or more worksheets and dashboards.*
- *Bookmarks – Tableau bookmark files have the .tbm file extension and are marked with the bookmark icon. Bookmarks contain a single worksheet and are an easy way to quickly share your work.*
- *Packaged Workbooks – Tableau packaged workbooks have the .twbx file extension and are marked with the packaged workbook icon. Packaged workbooks contain a workbook along with any supporting local file data sources and background images. This format is the best way to package your work for sharing with others who don't have access to the data.*
- *Data Extract Files – Tableau data extract files have the .tde file extension and are marked with the extract icon. Extract files are a local copy of a subset or entire data source that you can use to share data, work offline, and improve database performance.*
- *Data Connection Files – Tableau data connection files have the .tds file extension and are marked with the data connection icon. Data connection files are shortcuts for quickly connecting to data sources that you use often.*

*These files can be saved in the associated folders in the My Tableau Repository directory, which is automatically created in your My Documents folder when you install Tableau. Your work files can also be saved in other locations, such as your desktop or a network directory.*



### *Changing the Repository Location*

*You can specify a new location for the Tableau repository if you are not using the default location in your Documents folder. For instance, if you are required to have your data on a network server instead of on your local machine, you can point Tableau at the remote repository.*

1. Select *File > Repository Location*.
2. Select a new folder that will act as the new repository location in the *Select a Repository dialog box*.
3. Restart Tableau so that it uses the new repository.

*Changing the repository location does not move the files contained in the original repository, rather it creates a new repository where you can store your files.*

# Learning to Use Tableau

## Learning to Use Tableau

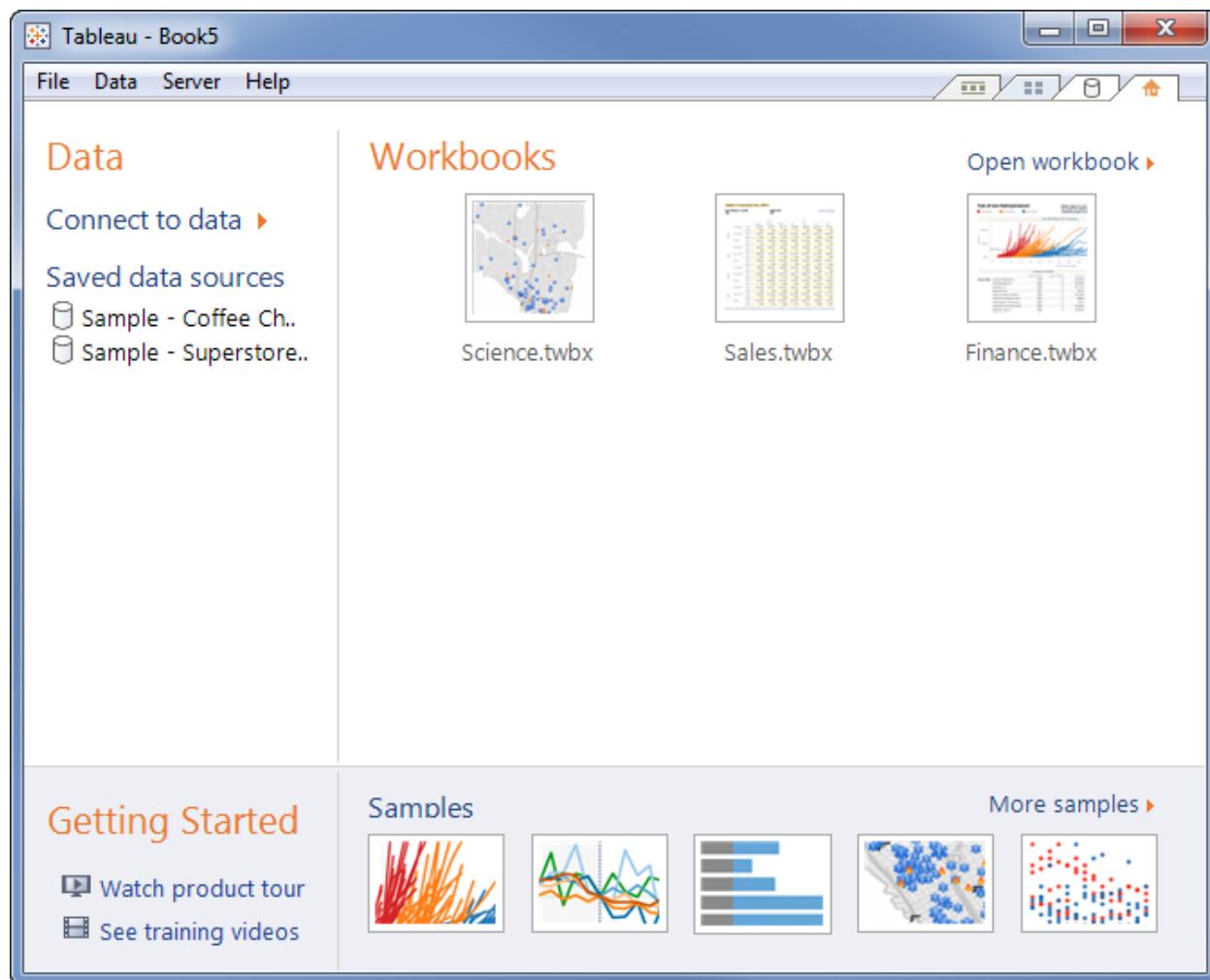
*The purpose of this section is to get you started with Tableau by presenting a simple example. The exercises takes you through all the basic steps you would use for your own work.*

- [Open Tableau](#)
- [Open Data](#)
- [Building Views \(Manually\)](#)
- [Building Views \(Automatically\)](#)
- [Save your Work](#)

## Open Tableau

You can open Tableau by selecting All Programs > Tableau 7.0 on the Windows Start menu or by double-clicking the desktop shortcut.

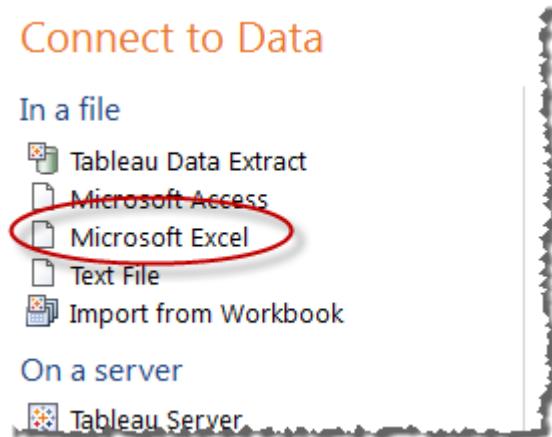
Tableau opens showing the start page. The start page contains recently used workbooks, saved data connections, sample workbooks, and some other getting started resources. Although the start page shows when you first open Tableau, you can always return to the start page after you start working by clicking the start page tab in the upper right corner of the workbook.



## Open Data

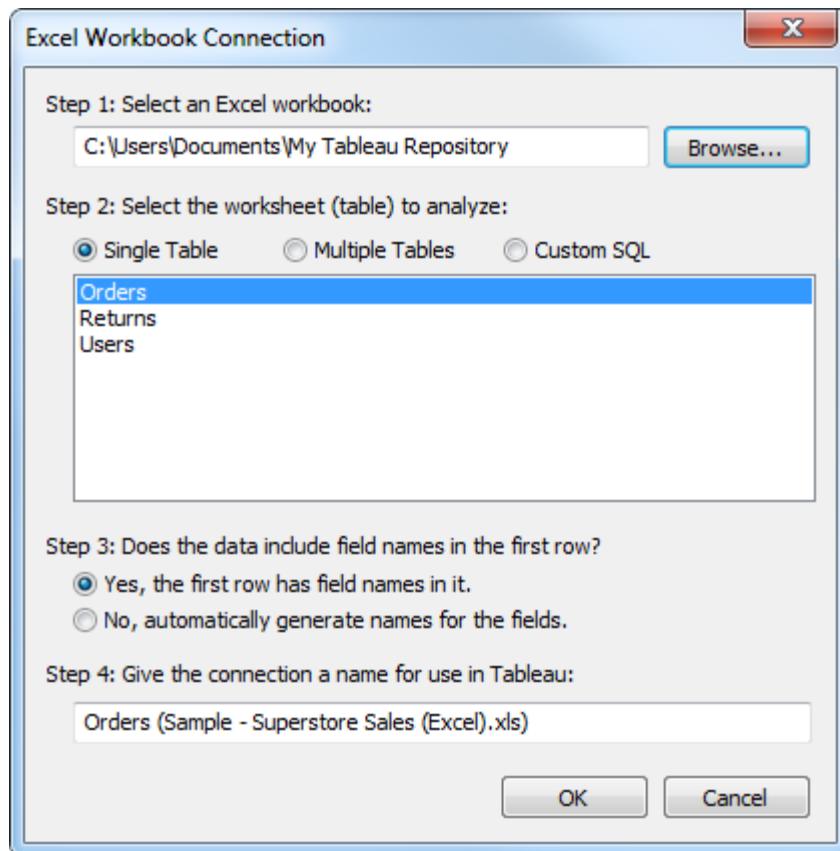
The first step to getting started with Tableau is to connect to the data you want to explore. For this example, you will connect to the Sample - Superstore Sales (Excel) data source that is installed with the application. There are many ways to connect to data, for example you can use the start page, the toolbar, or the Data menu. Follow the instructions below to connect to an Excel workbook from the start page.

1. Click Connect to Data on the left side of the start page.
2. The Data page opens showing the types of data sources you can connect to. For this example, select Microsoft Excel.



3. Navigate to an excel file on your computer and open it. Then complete the Excel Workbook Connection dialog box and click OK.

The Excel data for this example is located in the Data sources directory of your Tableau Repository. By default, your Tableau Repository is created in your My Documents folder when Tableau is installed.



4. Select how you want to connect to the data. You can select from the following options:
  - Connect live – Creates a direct connect to your data. The speed of your data source will determine performance.
  - Import all data – Imports the entire data source into Tableau’s fast data engine as an extract. The extract is saved with the workbook.
  - Import some data – Imports a subset of your data into Tableau’s fast data engine as an extract. This option requires you to specify what data you want to extract using filters.

Once connected, the columns from the data source (e.g., Customer Name, Order Date, and Total Sales) are shown on the left side of the workbook in the Data window. Each column is shown as a separate field that you can drag and drop to start exploring your data.

The fields are organized into two sections: dimensions and measures. Dimensions typically hold categorical data such as product types and dates, while measures hold numeric data such as sales and profit.

*An important concept to understand in Tableau is that you can build views of your data by dragging fields from the Data window to the shelves in the view.*

## Building Views (Manually)

### Building Views (Manually)

*You can build data views by dragging fields from the Data window and dropping them onto the shelves that are part of every Tableau worksheet.*

*This section presents five data views using the Sample-Superstore Sales (Excel) data source that is installed with the application.*

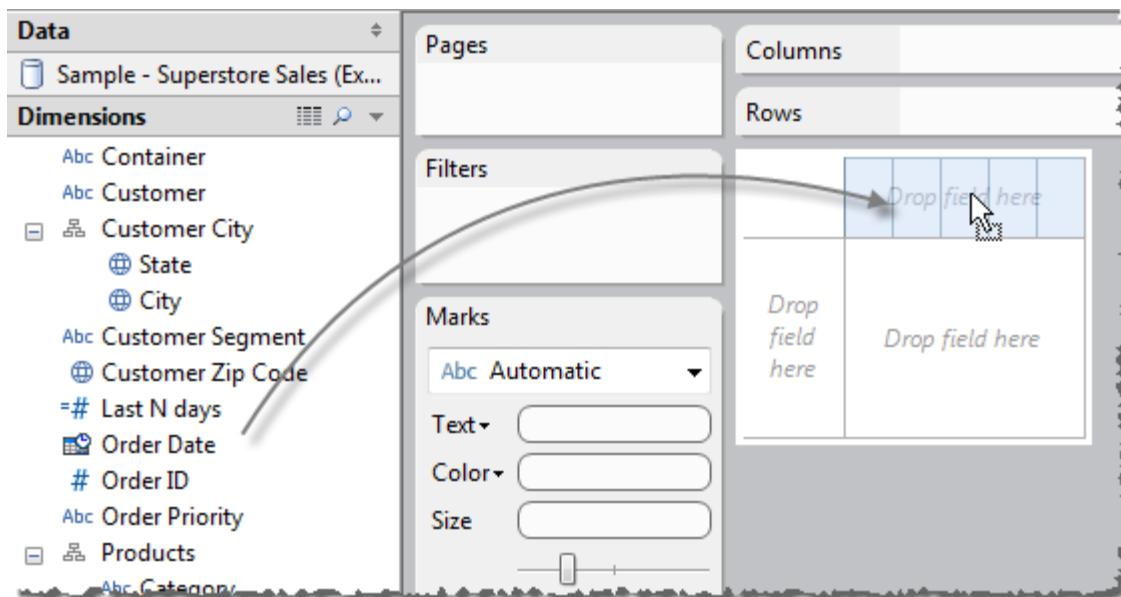
- [Example 1 – Basic View](#)
- [Example 2 – Nested Table](#)
- [Example 3 – Small Multiples](#)
- [Example 4 – Filter Data](#)
- [Example 5 – Color Encoding](#)

## Example 1 – Basic View

In this example, you will build a basic view that shows yearly profits. Follow the steps below to build this view.

1. Click and drag the Order Date field from the dimensions area of the Data window to the Columns area of the view.

When you place a field on the columns area of the view it is also added to the Columns shelf. You can also drag directly to these shelves. When you drag a field over a shelf, a blue arrow indicates that the shelf can accept the field.



The resulting table has four columns and one row. Each column header represents a member of the Order Date field (2009, 2010, 2011, and 2012). Each cell contains an “Abc” label, which indicates that the current mark type for this view is text.

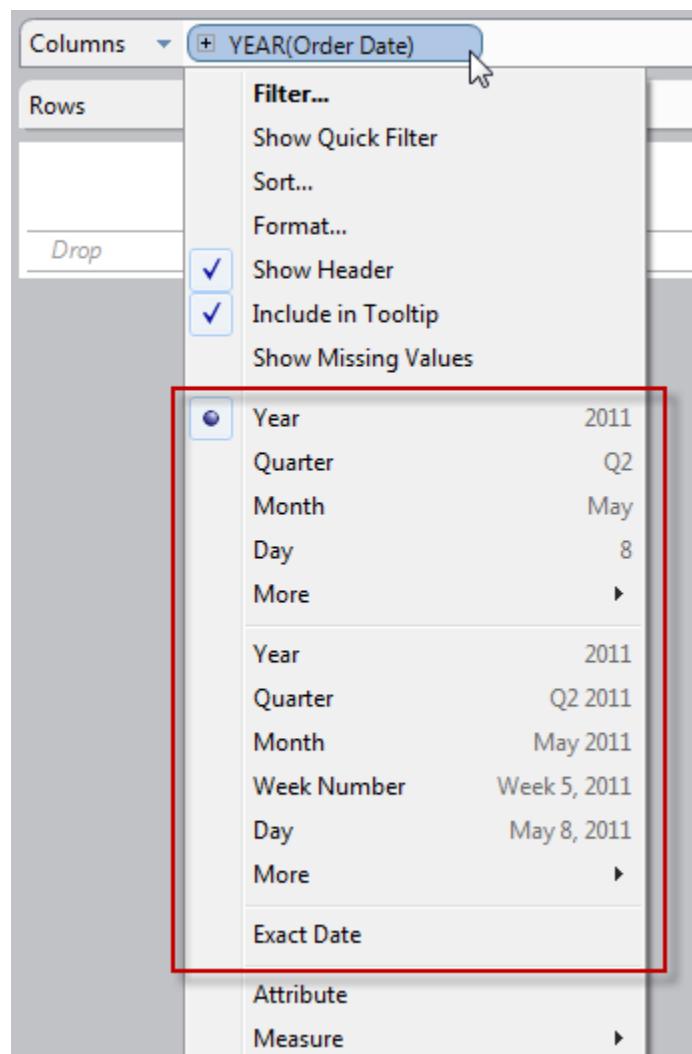


The screenshot shows the Tableau desktop interface. In the top left, there's a 'Columns' button with a '+' sign and the text 'YEAR(Order Date)'. Below it is a 'Rows' button. A data grid is displayed with a header row 'Order Date' and four columns labeled '2009', '2010', '2011', and '2012'. The first column has a 'Drop' label above it. All columns contain the value 'Abc'.

	Order Date			
	2009	2010	2011	2012
Drop	Abc	Abc	Abc	Abc

**Note:**

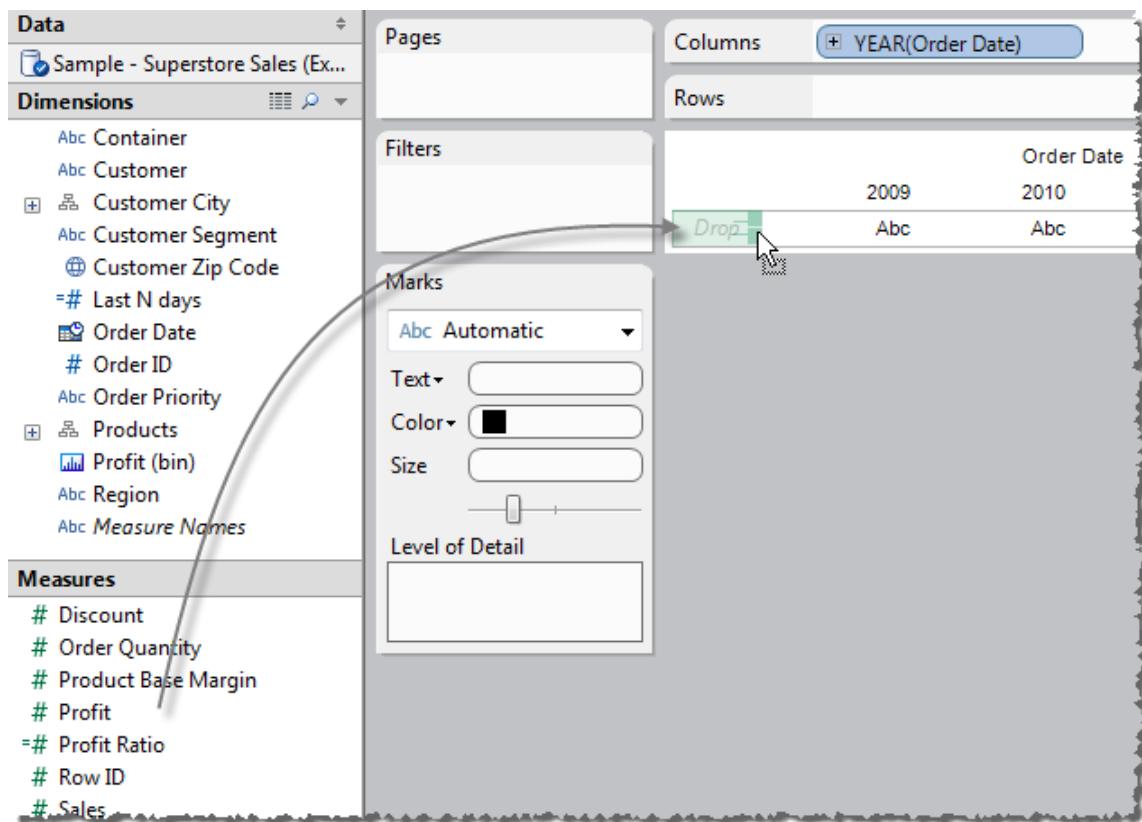
*Notice that the field is colored blue indicating it is a dimension. Also, the field name changed to YEAR(Order Date) because year is the default date level for this field. The default date level is determined by the highest level that contains more than one distinct value (e.g., multiple years, multiple months, etc.). That means that if Order Date contained data for only one year but had multiple months, the default level would be month. You can change the date level using the field menu.*



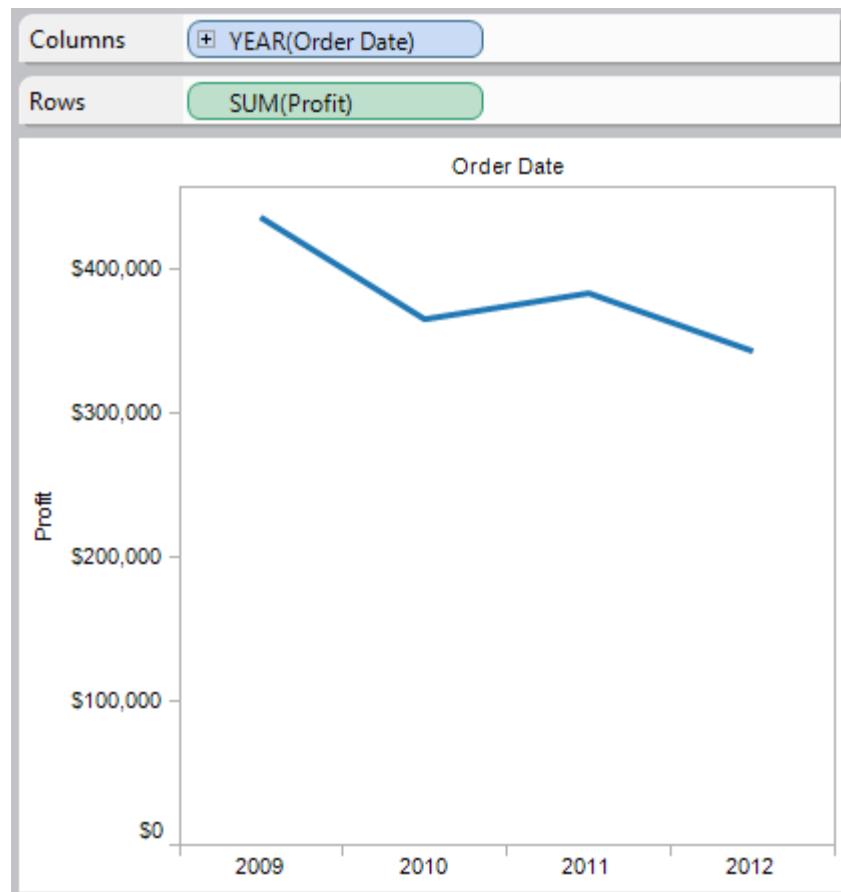
2. Drag the Profit field from the Measures area of the Data window and drop it on the Rows area of the view.

*The table is automatically transformed into a line chart and a vertical axis is created for the measure. A line is used as a great way to compare data over time, and allow you to visually compare data and identify trends effectively.*

## Tableau Desktop Help

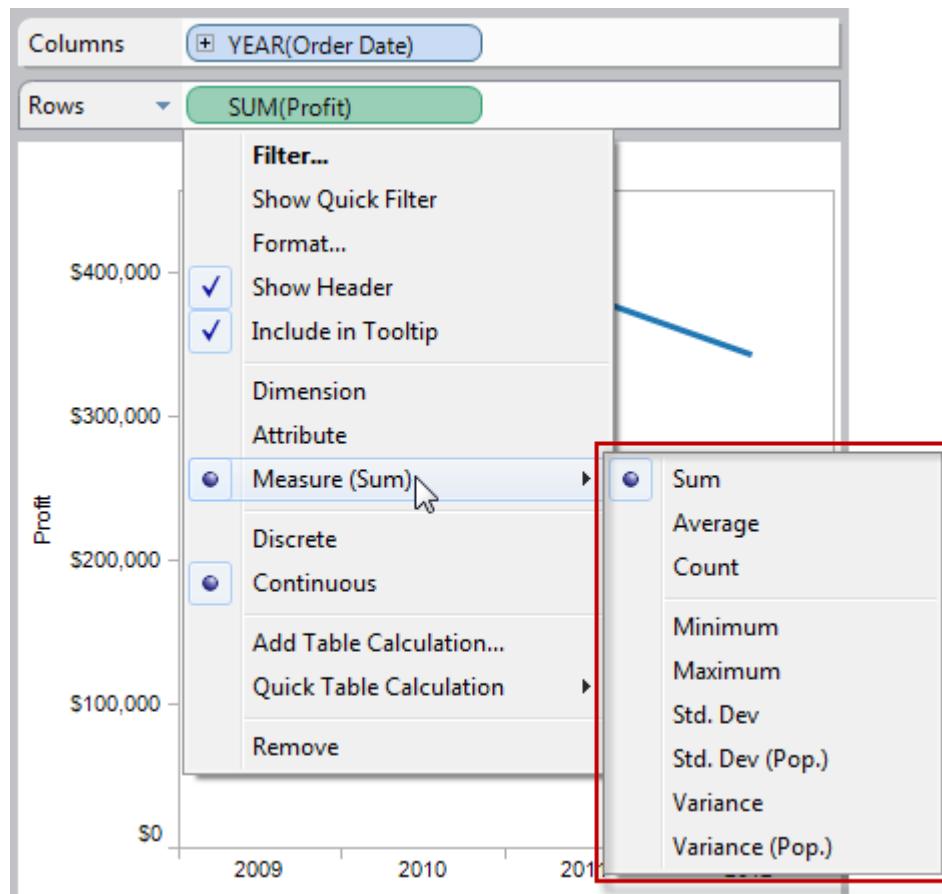


*The line chart shows profit over time. Each point along the line shows the sum of profit for the corresponding year.*

**Note:**

*The Profit field is colored green, indicating that it is a measure. Also the field name changed to SUM(Profit). That's because the default aggregation for measures in a relational database is SUM. You can change the aggregation using the field menu.*

## Tableau Desktop Help



## Example 2 – Nested Table

In this example you will modify the view from [Example 1 – Basic View](#) to show quarters in addition to years. Follow the steps below to build this view.

Show quarters using one of the following methods:

- Drill down on the Year(Order Date) field by clicking the plus button  on the right side of the field.

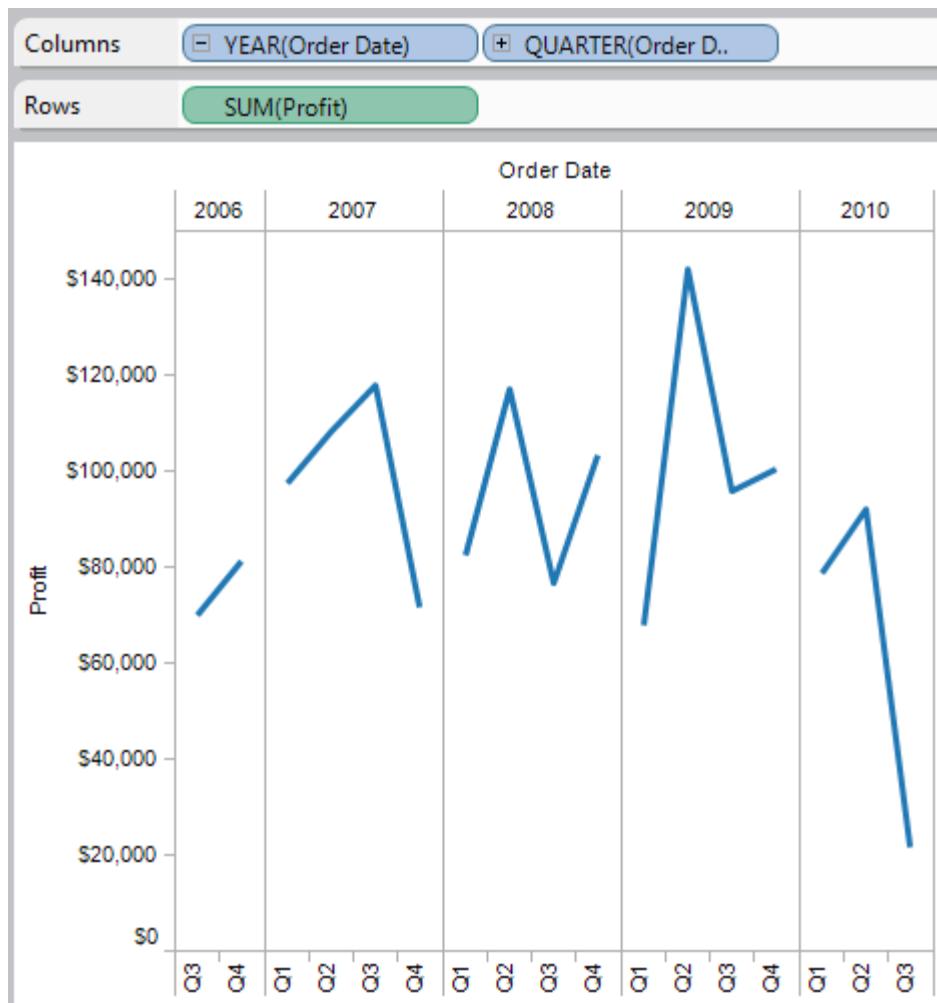


- Drag the Order Date field from the Data window and drop it on the Columns shelf to the right of the Year(Order Date) field.



The new dimension divides the view into separate panes for each year. Each pane has columns for the quarters of the given year. This view is called a nested table because it displays multiple headers, with quarters nested within years.

## Tableau Desktop Help



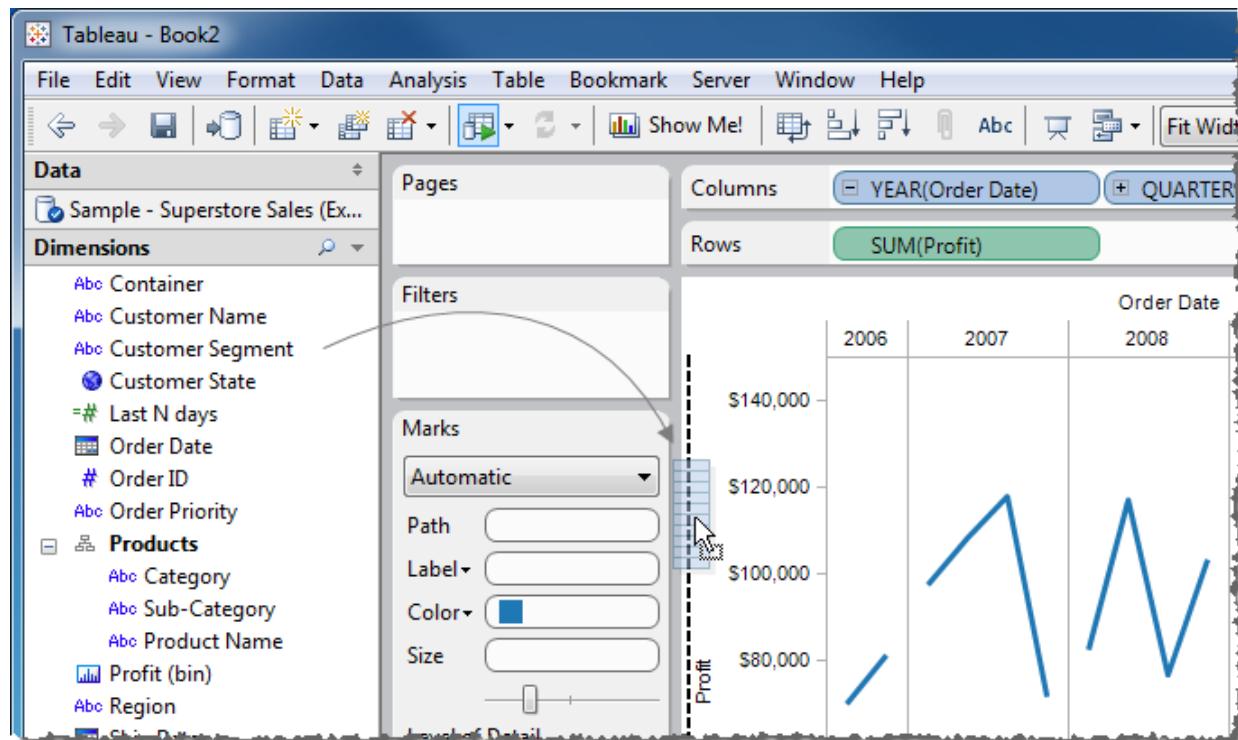
### Example 3 – Small Multiples

In this example you will modify the view from [Example 2 – Nested Table](#) to show quarterly profit by year and customer segment.

Drag the Customer Segment dimension from the Data window and drop it just to the left of the Profit axis in the view.

The field is added to the rows shelf and row headers are created. Each header represents a member of the Customer Segment field.

Tableau does not allow you to place a dimension to the right of a measure on either the Rows or Columns shelves.



The new dimension divides the view into 20 panes: one for each combination of year and customer segment. This view is a more complex example of a nested table and is often referred to as a small multiples view.

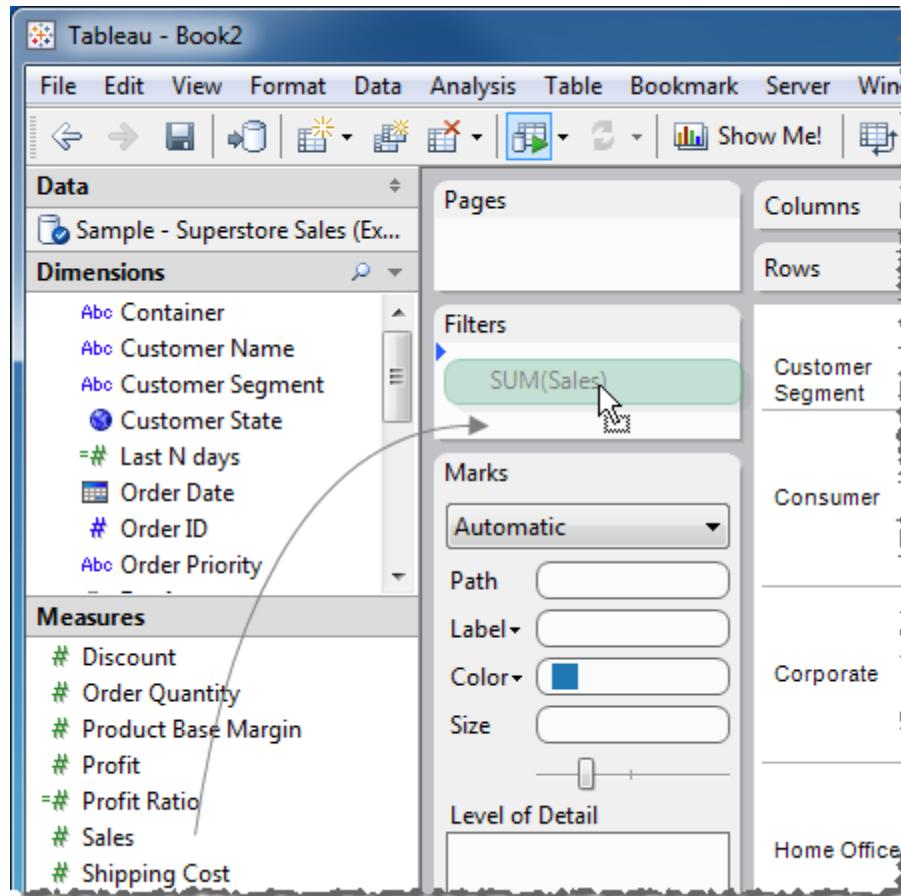
## Tableau Desktop Help



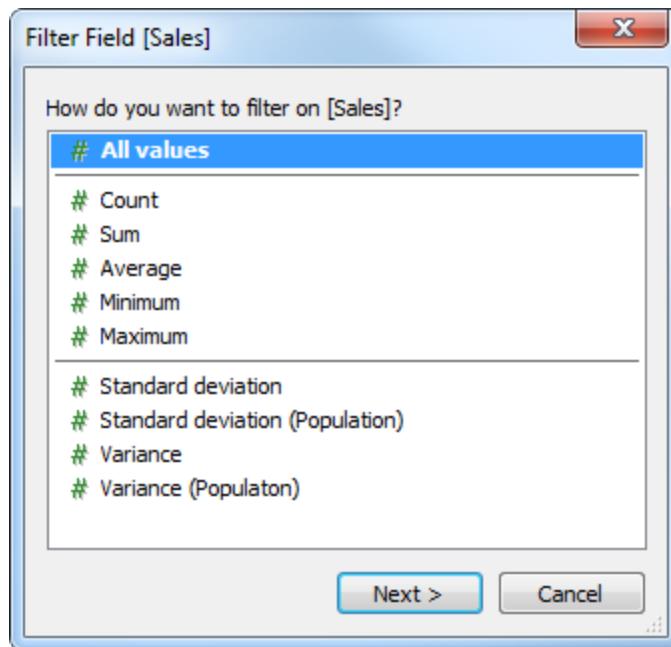
## Example 4 – Filter Data

In this example you will modify the view from [Example 3 – Small Multiples](#) to only show data for orders in 2009 and 2010 where the sale amount was greater than \$10,000.

1. Drag the **Sales** measure from the Data window and drop it on the Filters shelf.

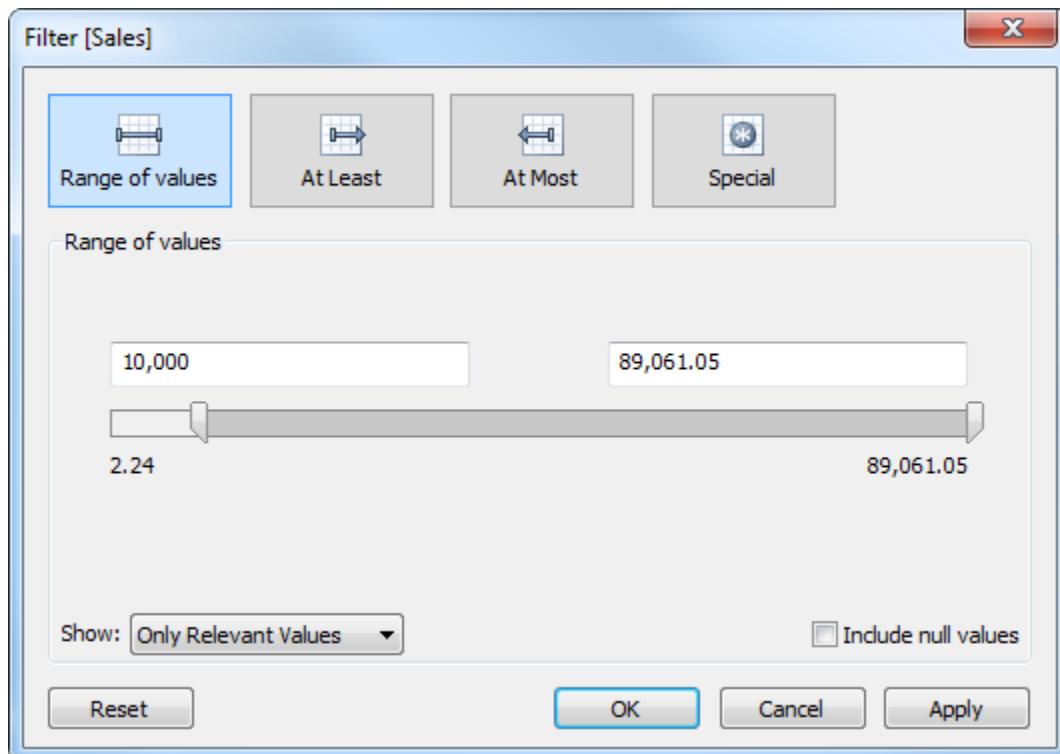


2. Select the aggregation you want to use for the filter. For this example, select All Values to create a filter on the disaggregated data.



*Filtering aggregated data means that the selected aggregation function (sum, average, etc.) is applied to the data and then it is filtered. Filtering disaggregated data means that the individual data rows are filtered before any aggregation function is applied. Aggregations do not apply to multidimensional data because the data has already been aggregated in the database.*

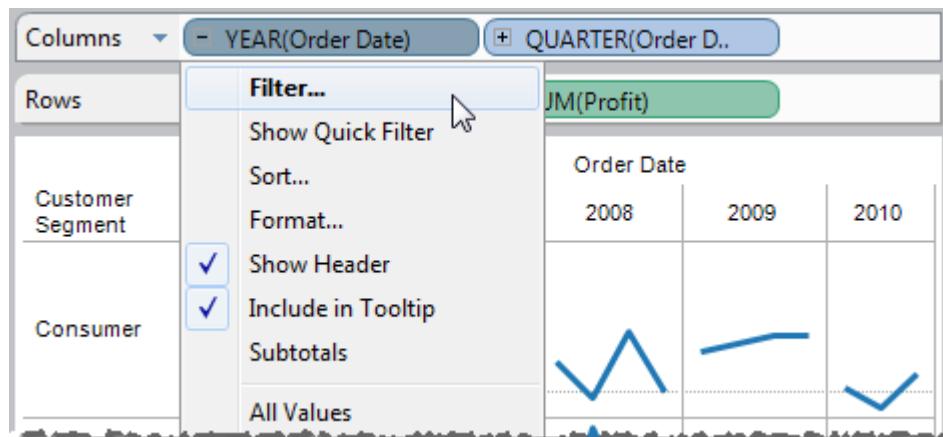
3. In the Filter dialog box, use the sliders or type into the text box to change the lower limit on the range of values to 10,000.



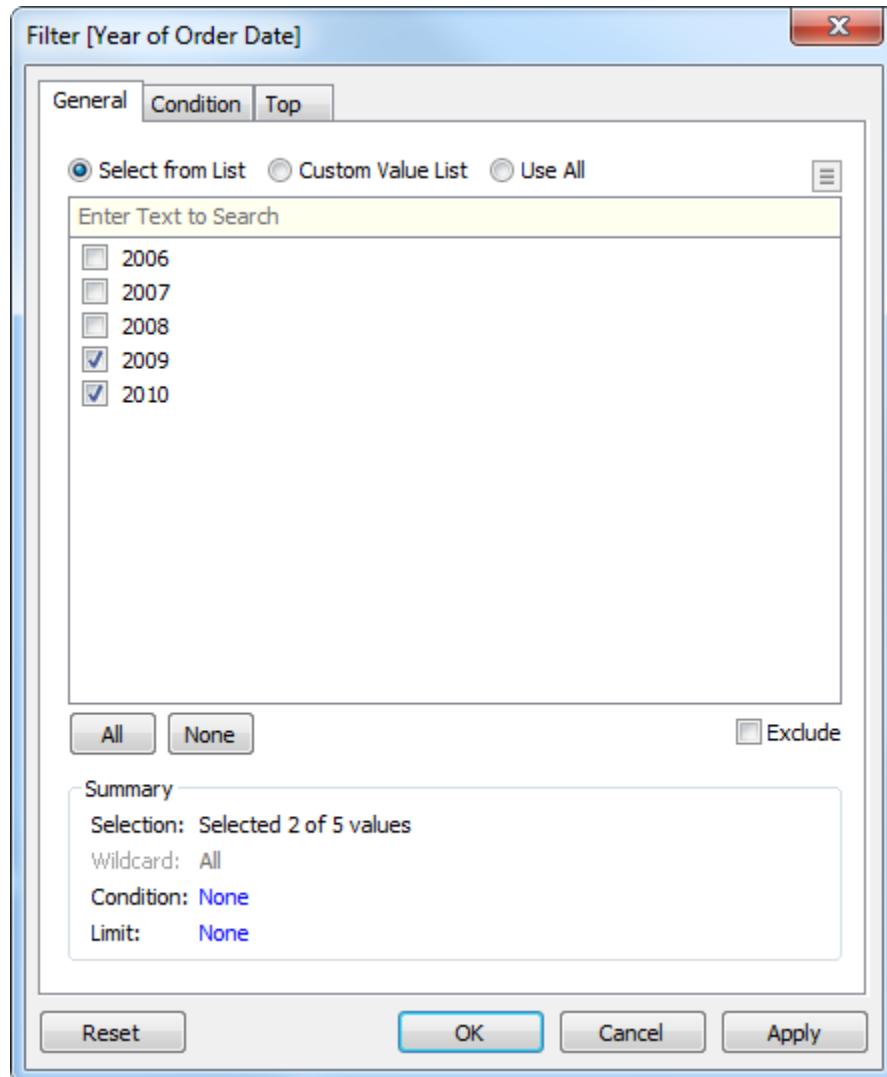
4. When finished, click OK.

The view updates to only show profit for orders that were over \$10,000. No new axes were created because the field was not added to the Rows or Columns shelves.

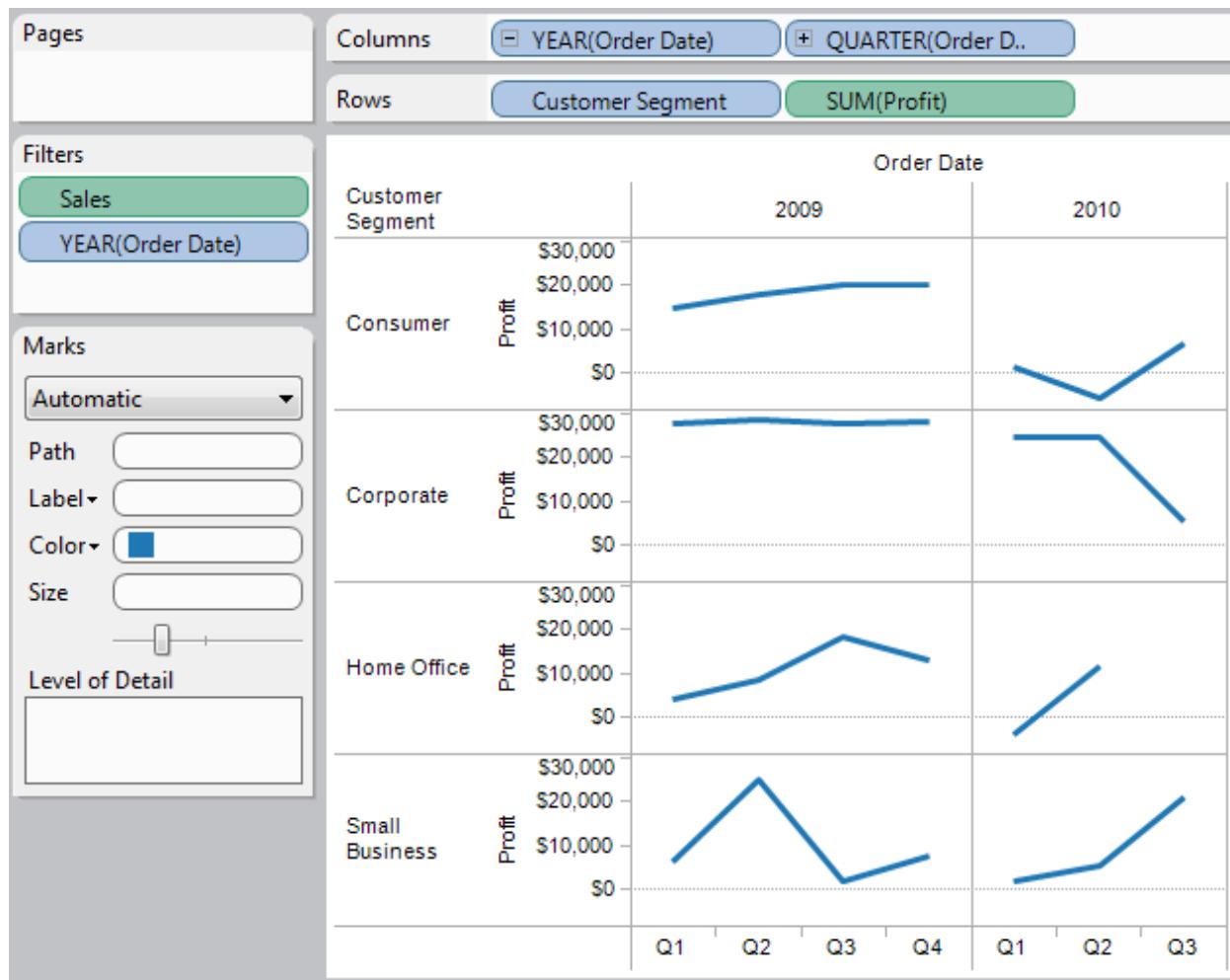
5. Select Filter on the Year(Order Date) field menu.



6. In the Filter dialog box, deselect all years except 2009 and 2010 and then click OK.



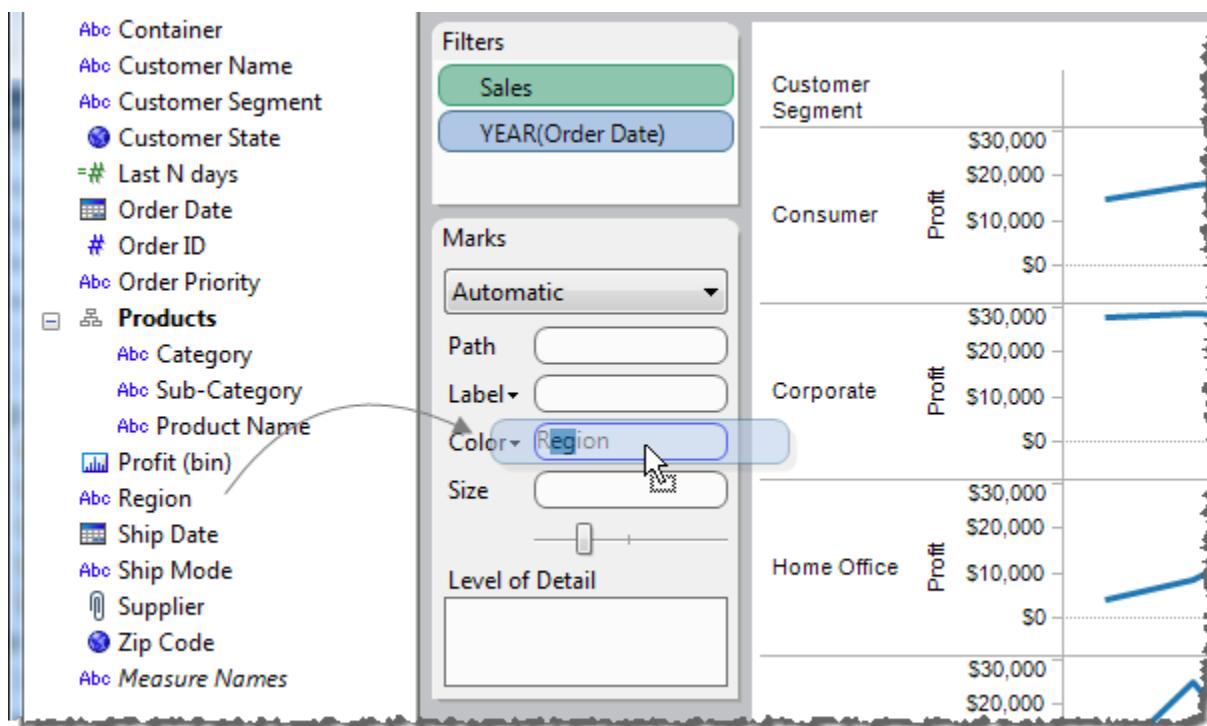
The  $\text{SUM}(\text{Profit})$  is calculated only for data rows where sales is greater than or equal to \$10,000 and Order Date is 2009 or 2010.



## Example 5 – Color Encoding

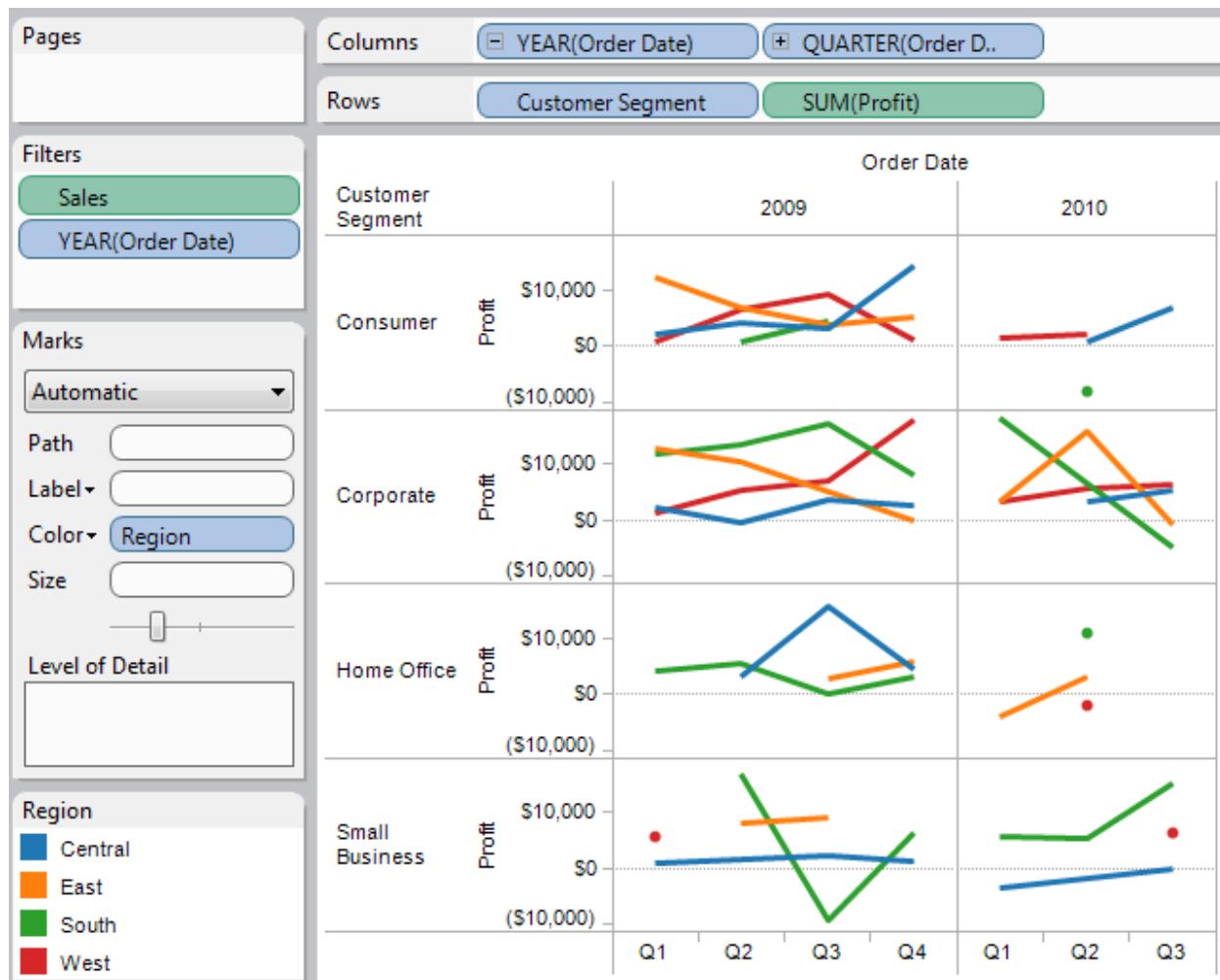
In this example you will modify the view from [Example 4 – Filter Data](#) to color the marks by region. Follow the steps below to build this view.

Drag the **Region** dimension from the Data window and drop it on the Color shelf.



Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

Each pane now has four lines, one for each region. This view now shows profit for each customer segment and region for 2009 and 2010 orders with sales greater than or equal to \$10,000.



## Building Views (Automatically)

### Building Views (Automatically)

*Rather than building views by dragging and dropping fields, you can use Show Me!™ to create views automatically.*

*This section presents two examples using the Sample-Superstore Sales (Excel) data source that comes with the application.*

- [Example 1 – Show Me! with Two Fields](#)
- [Example 2 – Show Me! with Many Fields](#)

## Example 1 – Show Me! with Two Fields

In this example, you will create a line chart that displays profit as a function of time. Follow the steps below to create this view.

1. Select **Order Date** and **Profit** in the Data window. Hold the Control key (Ctrl) on your keyboard to select multiple fields.

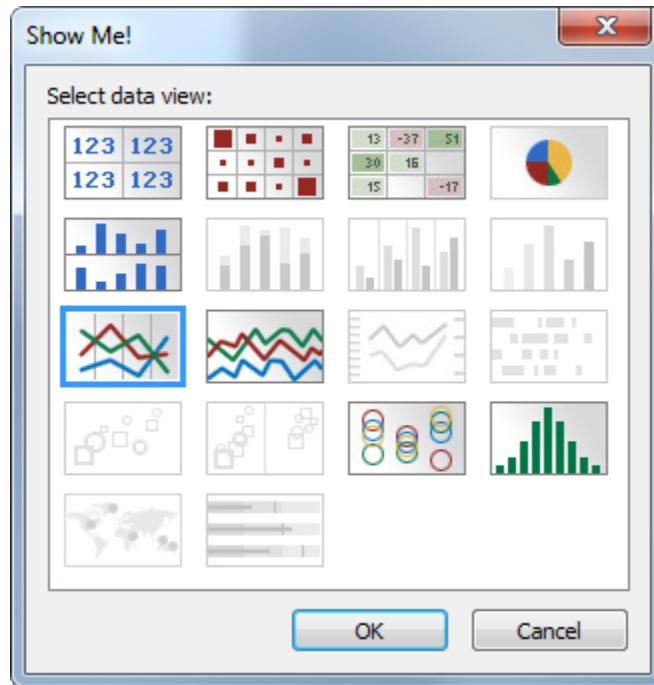
The screenshot shows the Data window with the following selection:

- Dimensions:** Order Date (selected), Profit (selected)
- Measures:** Profit (selected)
- Sets:** Top 25 Customers by Profit

2. Click **Show Me!** on the toolbar.

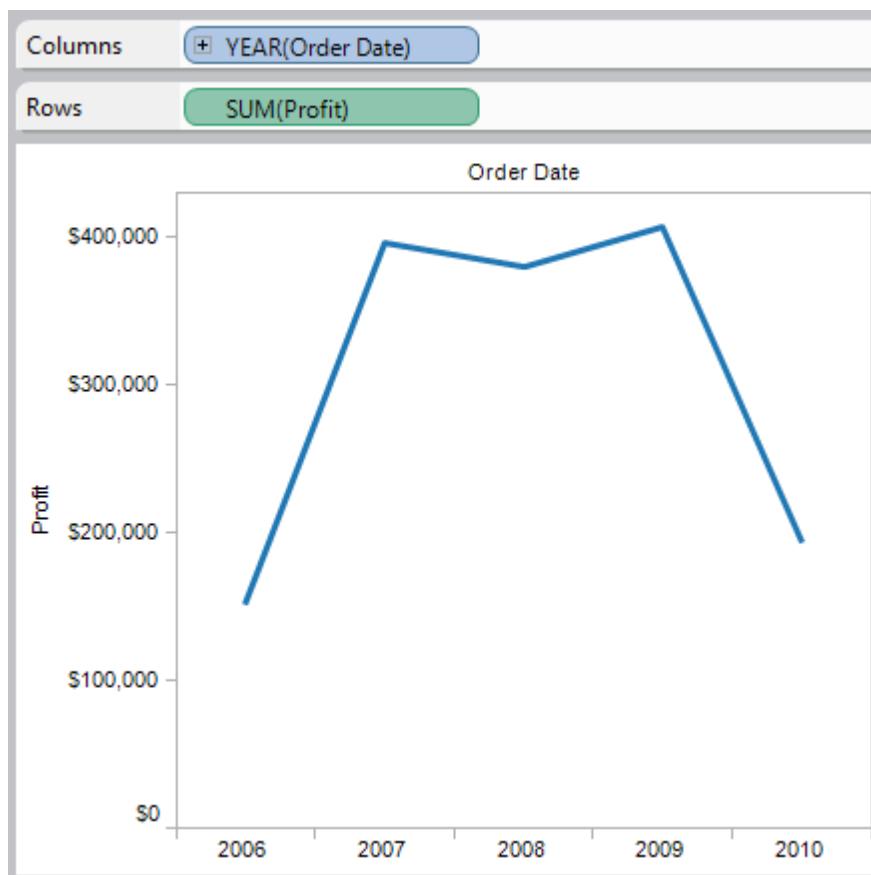


3. In the Show Me! dialog box, select the type of view you want to create and click OK.



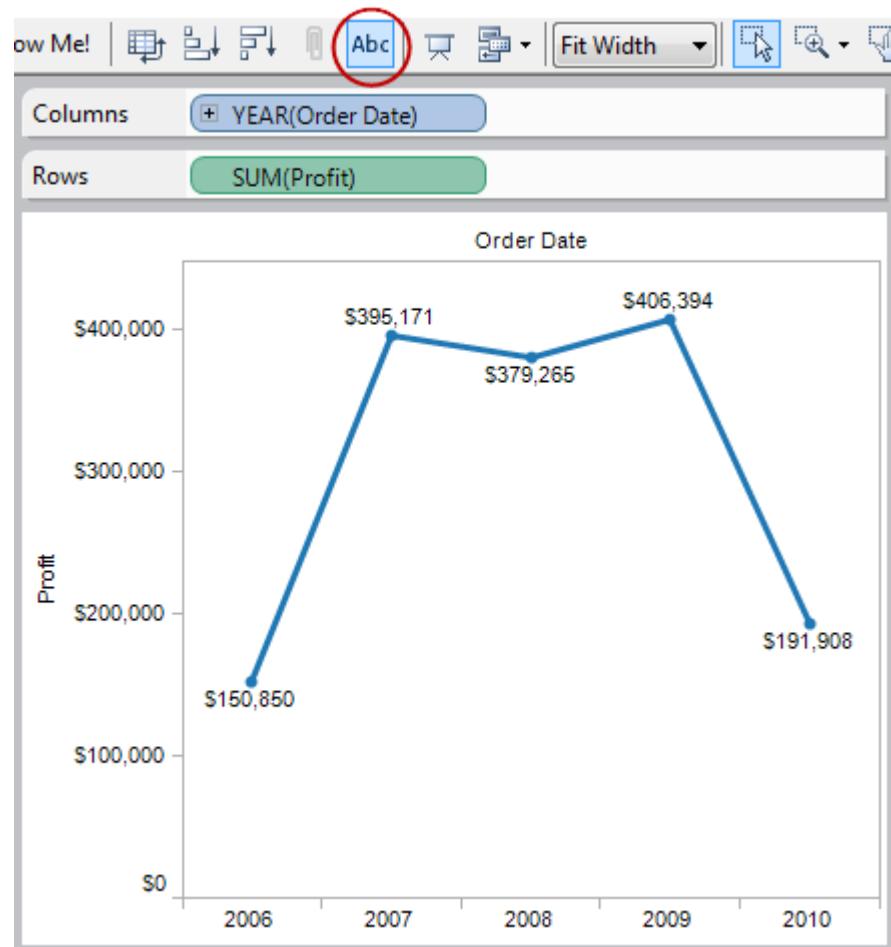
Because a date dimension and a measure are selected, Tableau suggests you build a line view, which is generally the best way to look at measures over time.

The view shows SUM(Profit) over time. Each point on the line represents the sum of profit for the corresponding year.



You can see the values for each year by turning on *Mark Labels*. Click the *Mark Labels* button on the toolbar.

## Tableau Desktop Help



## Example 2 – Show Me! with Many Fields

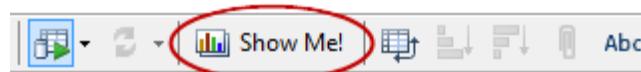
In this example you will use Show Me! to build a scatter plot that shows sales versus profit for each product and customer.

1. Select **Sales, Profit, Product Name, and Customer Name** in the Data window. Hold the Control key (Ctrl) on your keyboard to select multiple fields.

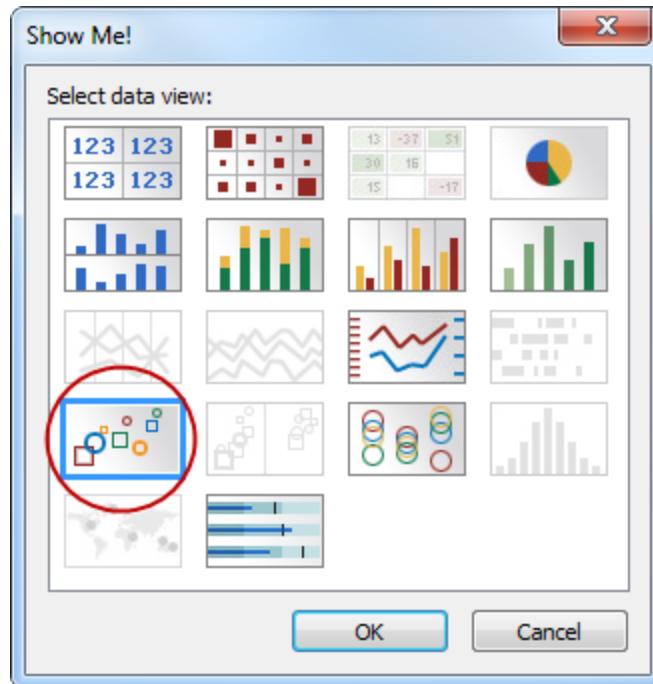
The screenshot shows the Data window in Tableau with the following selected fields:

- Dimensions:** Customer Name, Customer Segment, Customer State, Last N days, Order Date, Order ID, Order Priority, Products, Category, Sub-Category, Product Name.
- Measures:** Profit, Sales, Profit Ratio, Discount, Order Quantity, Product Base Margin, Shipping Cost, Time to Ship, Unit Price, Latitude (generated), Longitude (generated), Number of Records, Measure Values.
- Sets:** Top 25 Customers by Profit.

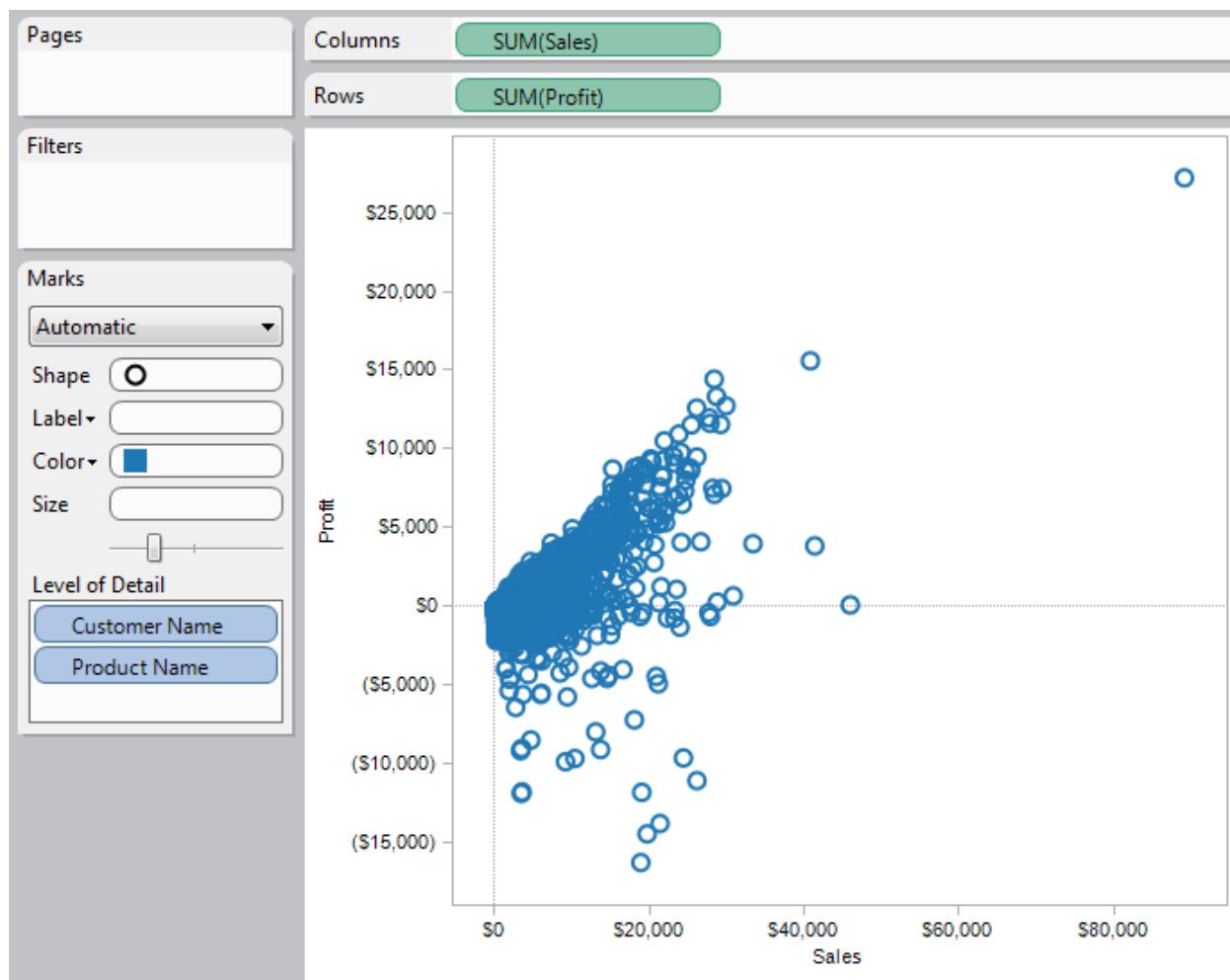
2. Click Show Me! on the toolbar.



3. In the Show Me! dialog box, select the scatter view and click OK.



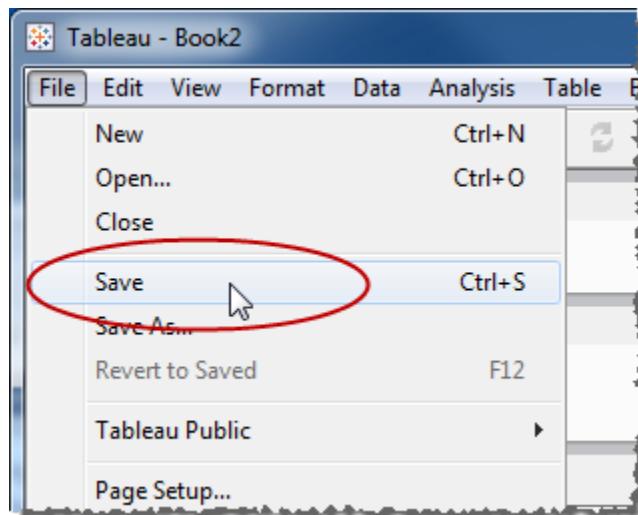
Show Me! automatically creates a scatter plot with the fields you selected. You can now manually start dragging fields to further refine the view.



## Save your Work

After you have created all the desired views of your data, you should save the results in a Tableau Workbook. Saving a Tableau workbook allows you to save all your worksheets for later use. It also allows you to share your results using a convenient file. Follow the steps below to save your workbook.

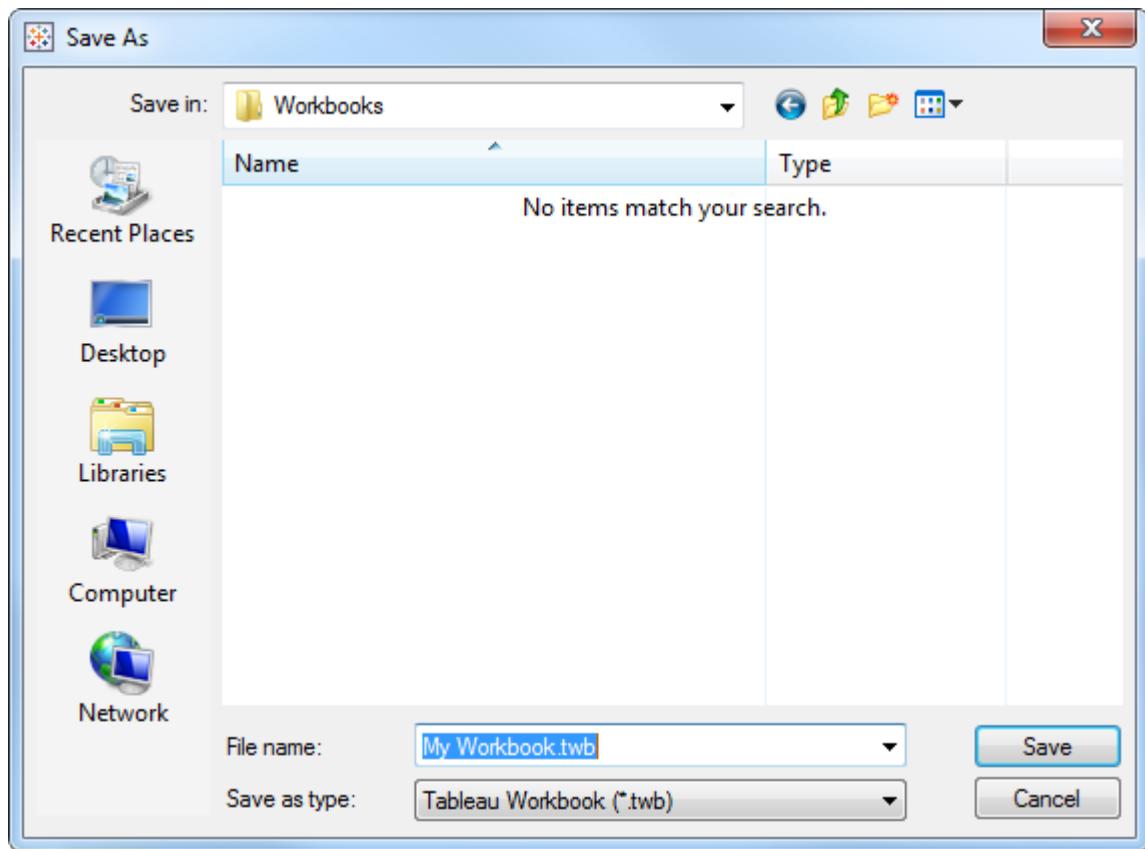
1. Select File > Save or press Ctrl + S on your keyboard.



2. Browse to a file location to save the workbook.

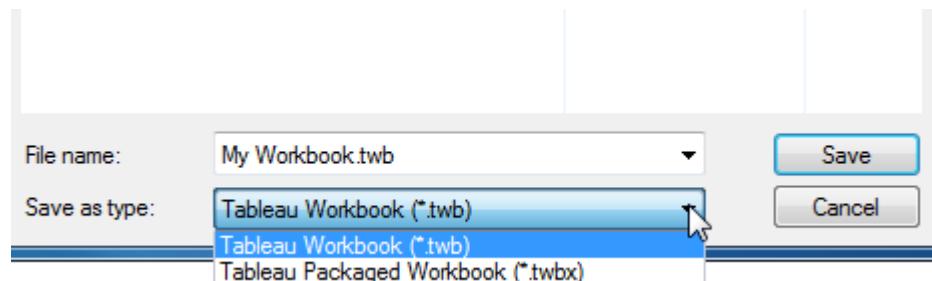
By default, Tableau saves workbooks in the Workbooks directory in the Tableau Repository.

3. Specify a file name for the workbook.



4. Specify a file type. You can select from the following options:

- *Tableau Workbook (.twb)* – Saves all the sheets and their connection information in a workbook file. The data is not included.
- *Tableau Packaged Workbook (.twbx)* – Saves all the sheets, their connection information and any local resources (e.g., local file data sources, background images, custom geocoding, etc.).



5. *When finished, click Save.*

# Connect to Data

## Connect to Data

*This section explains how to create and manage both basic and advanced connections to all of the supported data sources. Follow a step-by-step tutorial for connecting to each data source. Also, learn how to paste data into Tableau, join new tables, create and manage extracts, and monitor queries.*

- [Basic Connection](#)
- [Clipboard Data Sources](#)
- [Working with Multiple Connections](#)
- [Joining Tables](#)
- [Extracting Data](#)
- [Managing Queries](#)
- [Understanding Data Fields](#)

## Basic Connection

### Basic Connection

To begin analyzing your data, first connect Tableau to one or more data sources. A data source can be as simple as an Excel workbook, or as elaborate as a SQL Server or Oracle data warehouse. After connecting, the data fields become available in the Data window on the left side of the workbook. This section describes the types of data supported and how to create and maintain a basic connection.

- [Supported Data Sources](#)
- [How to Connect to a Data Source](#)
- [Examples - Connecting to Data Sources](#)
- [Connecting to a Custom SQL Query](#)
- [Editing the Connection](#)
- [Renaming the Connection](#)
- [Duplicating the Connection](#)
- [Replace Data Source](#)
- [Exporting the Connection](#)
- [Refreshing the Data](#)
- [Closing the Connection](#)

## Supported Data Sources

*Tableau supports a wide variety of data sources, including Microsoft Office files, SQL databases, comma delimited text files, and multi-dimensional databases.*

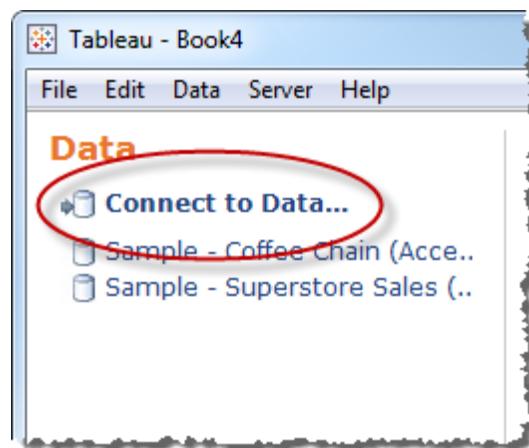
*The data sources supported by your copy of Tableau are determined by the version purchased. Refer to the [Products](#) page of the Tableau Web site for more information on data source compatibility requirements.*

## How to Connect to a Data Source

*To build views of your data, you must first connect Tableau to a data source.*

*You can connect to any supported data source with the Connect to Data dialog box.*

1. *Select Data > Connect to Data or press Ctrl + D on your keyboard. You can also select the Connect to Data option on the start page.*



2. *On the Connect to Data page, select the type of data you want to connect to. You can also select a saved data connection (TDS files) open a Tableau Server Data Source.*

## Connect to Data

### In a file

- Tableau Data Extract
- Microsoft Access
- Microsoft Excel
- Text File
- Import from Workbook

### On a server

- Tableau Server
- Aster Data nCluster
- Cloudera Hadoop Hive
- Firebird
- Greenplum
- IBM DB2
- InterSystems Caché
- Microsoft Analysis Services
- Microsoft PowerPivot
- Microsoft SQL Server
- MySQL
- Netezza
- OData
- Oracle
- Oracle Essbase

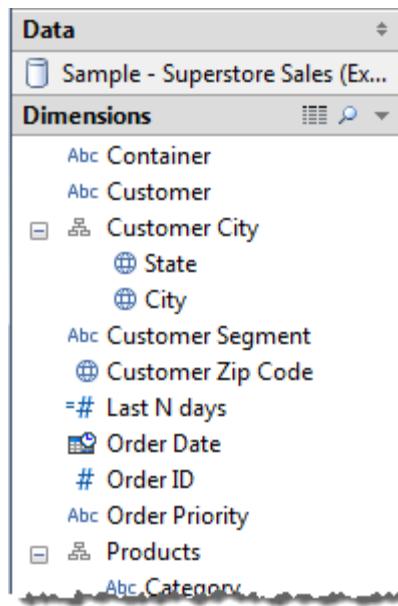
### Saved data sources

- Sample - Coffee Chain (Access)
- Sample - Superstore Sales (Excel)

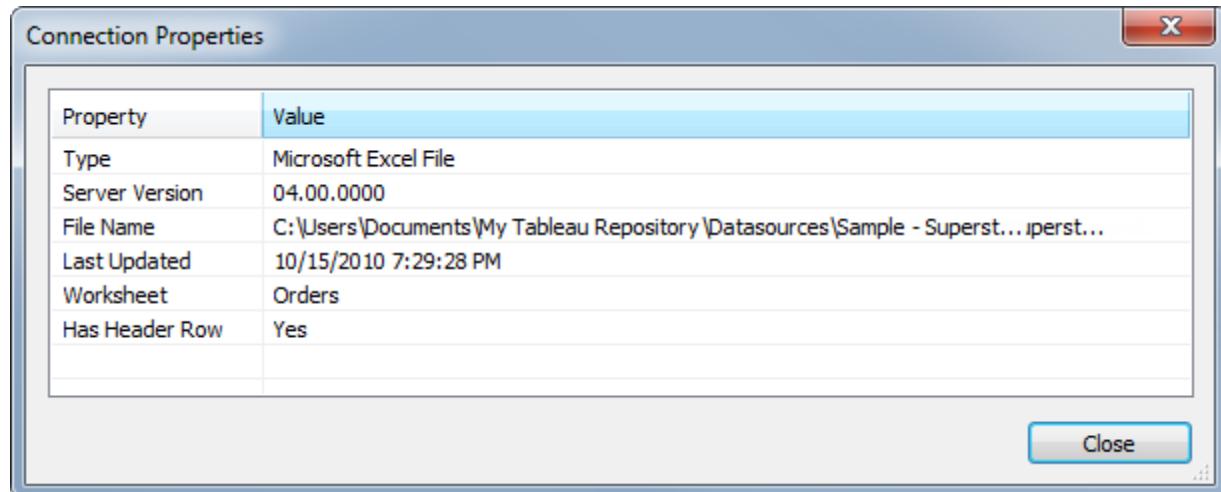
3. A data source-specific dialog box opens that allows you to complete the connection process.

Another way to connect to data is to import from a workbook. A workbook can contain multiple worksheets, each of which can be connected to a different data source. To import a connection from a workbook click the Import from Workbook button at the bottom of the Select Saved Connection tab in the Connect to Data dialog box.

After the connection is established, the data source fields display on the left side of the workbook in the Data window.



You can display information about the connection by selecting the data source on the Data menu and then selecting Properties. The properties of an example data source are shown below.



## Examples - Connecting to Data Sources

### Examples - Connecting to Data Sources

*This section contains examples that show you how to connect to the following Relational and Multidimensional specific data sources.*

- [Tableau Data Extract File](#)
- [Microsoft Access Database](#)
- [Microsoft Excel Workbook](#)
- [Text File](#)
- [Tableau Server](#)
- [Aster Data nCluster](#)
- [Cloudera Hadoop Hive](#)
- [Firebird Database](#)
- [Greenplum Database](#)
- [IBM DB2 Database](#)
- [InterSystems Caché Database](#)
- [Microsoft Analysis Services Database](#)
- [Microsoft PowerPivot](#)
- [Microsoft SQL Server Database](#)
- [MySQL Database](#)
- [Netezza Database](#)
- [OData](#)
- [Oracle Database](#)
- [Oracle Essbase Database](#)
- [ParAccel Database](#)
- [PostgreSQL Database](#)
- [Progress OpenEdge Database](#)
- [Sybase IQ Database](#)
- [Teradata Database](#)
- [Vectorwise Database](#)
- [Vertica Database](#)

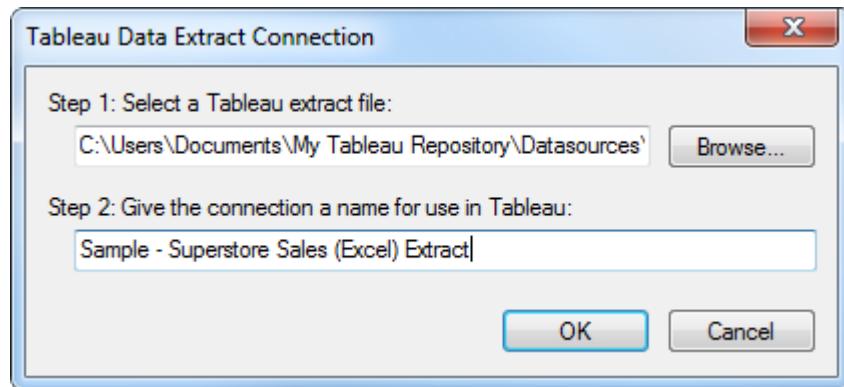
## Tableau Data Extract File

*This example discusses how to connect Tableau to a Tableau Data Extract file.*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Tableau Data Extract.
3. Follow the steps in the Tableau Data Extract Connection dialog box to complete the connection.
  - a. Step 1 – Select a Tableau Data Extract file using the Browse button.
  - b. Step 2 – Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated.*

*A completed Connection dialog box for Tableau Data Extract files is shown below.*



## Microsoft Access Database

This example discusses how to connect Tableau to a Microsoft Access database. Tableau supports all Access data types except OLE Object and Hyperlink.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Microsoft Access.
3. Follow the steps in the Microsoft Access Connection dialog box to complete the connection.
  - a. Step 1 – Select a Microsoft Access database file by typing its name or by navigating to the file. Access database files have the .mdb file extension.

Select Use workgroup security when connecting when you are connecting to a password protected Access file or a file that is protected by workgroup security. When you select this option, a logon dialog box opens where you can enter your password or select Use Workgroup Security. If the file is protected by workgroup security, type the System Database, User, and Password into the corresponding text fields.

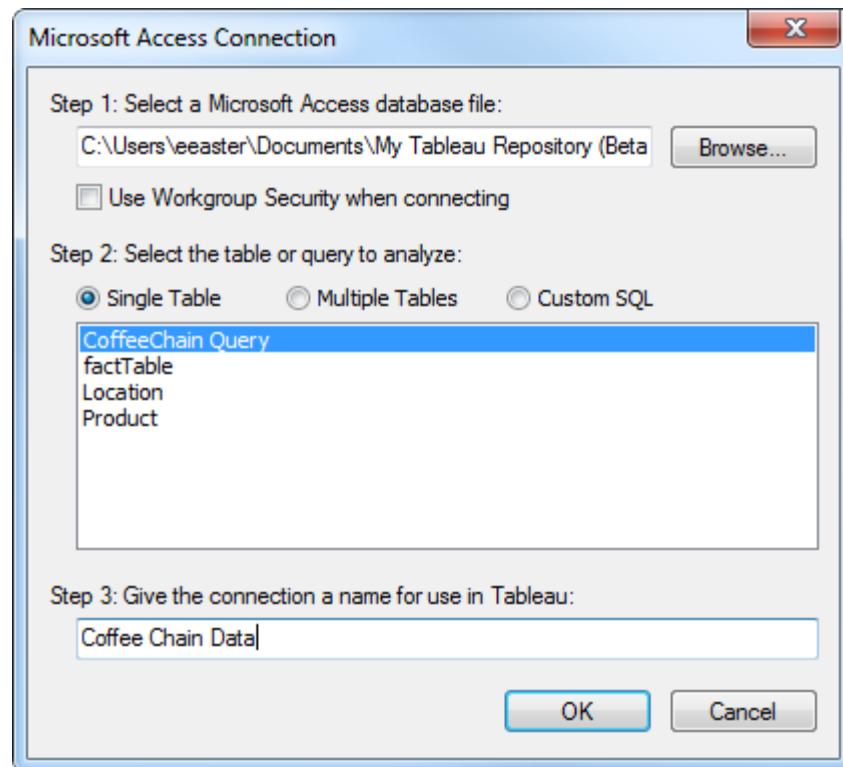
- b. Step 2 – Select the table or query to analyze.

You can connect to a Single Table or query. Alternatively, you can connect to a set of relational tables that are related by join conditions. Select either Multiple Tables or Custom SQL when you are connecting to multiple tables. You can also add joins later.

- c. Step 3 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based on the table or query name.

A completed Connection dialog box for Microsoft Access is shown below.



**Note:**

*If the Access file contains columns that are more than 254 characters wide, Tableau will not be able to sue these fields. Either remove the columns from the table or modify them to fit within 254 characters prior to connecting with Tableau.*

## Microsoft Excel Workbook

*This example discusses how to connect Tableau to a Microsoft Excel workbook.*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Microsoft Excel.
3. Follow the steps in the Microsoft Excel Connection dialog box to complete the connection.
  - a. Step 1 – Select an Excel workbook by typing its name or by navigating to the file. Excel workbooks have the .xls or .xlsx file extensions.
  - b. Step 2 – Select the data range or worksheet to analyze.

*You can connect to a single worksheet or a named range. Named ranges allow you to connect to just a specific portion of an Excel worksheet. You can create a named range in Excel by highlighting a range of cells and then selecting Define Name on the Formulas tab. Then give the range of cells a name. You can now connect to this named range in Tableau in the same way you can connect to a worksheet.*

*You can also connect to a set of relational tables that are related by join conditions. To do so, select the Multiple Tables option. You can also add joins later.*

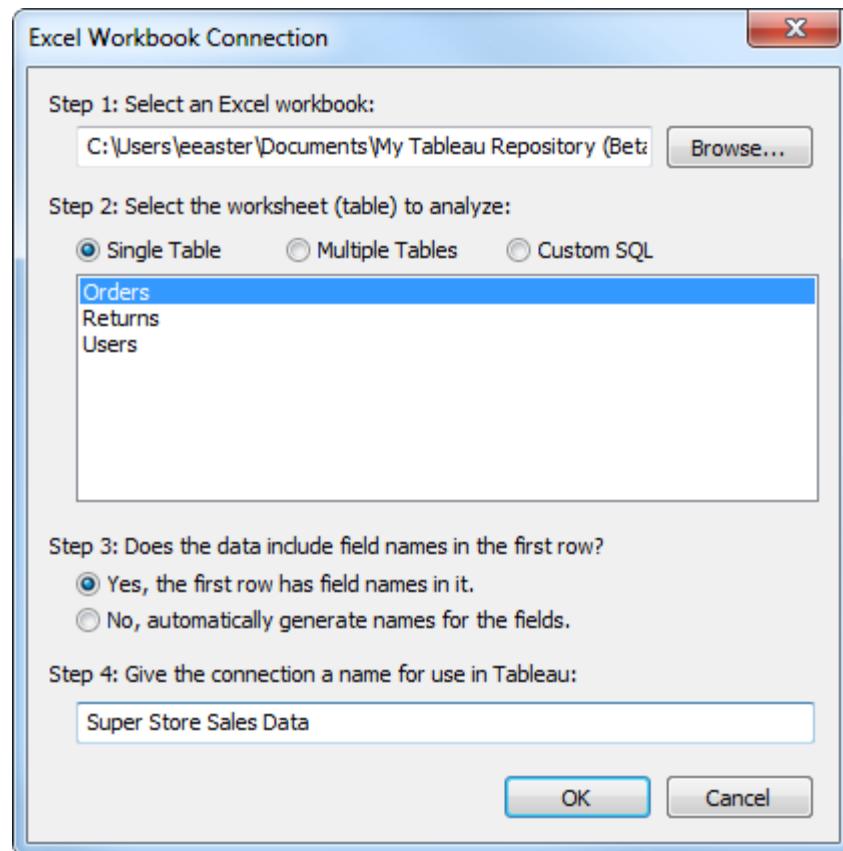
- c. Step 3 – Select whether the data includes field names in the first row.

*These names will become the names of the fields in Tableau. If column names are not included, they will be automatically generated by Tableau. You can rename the fields later.*

- d. Step 4– Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based on the table or query name. You can connect to multiple Excel worksheets at the same time as long as each worksheet has a unique connection name.*

*A completed Connection dialog box for Microsoft Excel is shown below.*



**Note:**

*If the Excel workbook contains columns that are more than 254 characters wide, Tableau will not be able to use these fields. Either remove the columns from the table or modify them to fit within 254 characters prior to connecting with Tableau.*

## Text File

This example discusses how to connect Tableau to a Text File. Tableau connects to delimited text files.

### Connecting to the Data Source

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Text File.
3. Follow the steps in the Text File Connection dialog box to complete the connection.
  - a. Step 1 – Select the text file by typing the file path or by clicking Browse to navigate to the file.
  - b. Step 2 – Specify the options for the text file.

There are three options that you can specify to define the type of text file you are connecting to.

- Select whether the first row contains column names. This option is selected by default. Alternatively you can have Tableau generate names when you connect. These names can be changed later.
- Select the character that is used to separate the columns. Columns can be separated by a Comma, Tab, Space, Colon, Vertical Bar (also known as the pipe character), or another character as defined in a schema.ini file.
- Select a Character Set that describes the text file encoding. You can select ANSI, OEM, UTF-8, UTF-16, or Other. When you select Other you must specify the character set in the provided text field. This value will be verified when the connection is attempted.

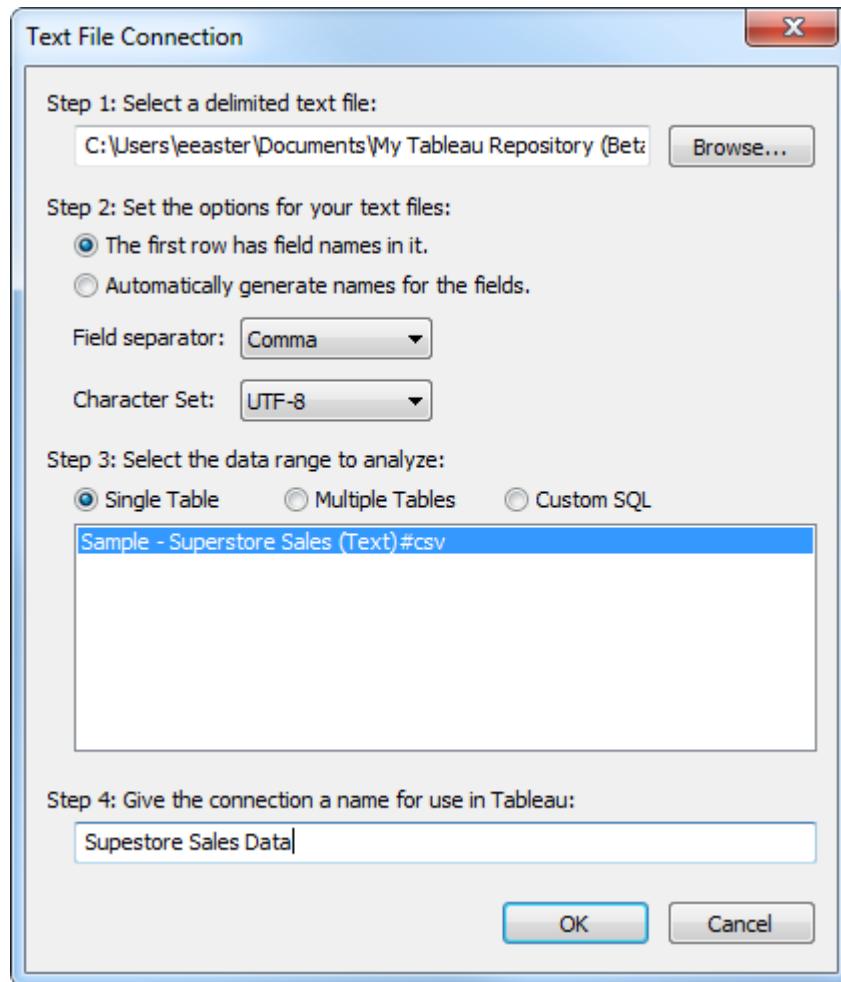
- c. Step 3 – Select the data range to analyze.

You can connect to a single file or a set of relational tables that are related by join conditions. To do so, select the Multiple Tables option. You can also add joins later

- d. Step 4 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based.

A completed Connection dialog box for Text is shown below.



**Note:**

If the text file contains columns that are more than 254 characters wide, Tableau will not be able to use these fields. Either remove the columns or modify them to fit within 254 characters prior to connecting in Tableau. Large text files often perform poorly as a data source, because the queries are slow. If Tableau determines the file is too big to perform well, you will be prompted to create an extract.

**Using Alternate Delimiters**

You can connect to text files that are delimited by commas, tabs, spaces, colons, or vertical bars using the Text File Connection dialog box. If your text file is delimited by an alternate character you must first create a schema.ini file that defines the delimiter. Then you can use the Other option when connecting in Tableau.

- Create a new text file (using Notepad or another text editor) and type the following: [Your\_Datasource.txt] Format=Delimited(delimiter character)

Substitute the name of your data file for “Your\_Datasource.txt” and the character used to separate the columns for “delimited character.” For example, if you use the asterisk character as a delimiter in a file called Sales-Data.txt you would type the following into the schema.ini file:

For example, if you use the asterisk character as a delimiter in a file called Sales-Data.txt you would type the following into the schema.ini file:

[Sales-Data.txt]

Format=Delimited(\*)

- Save the file in the same directory as the data file and call it schema.ini
- Return to Tableau and connect to the data file using the Text file instructions outlined above. Select Other as the Field Separator.

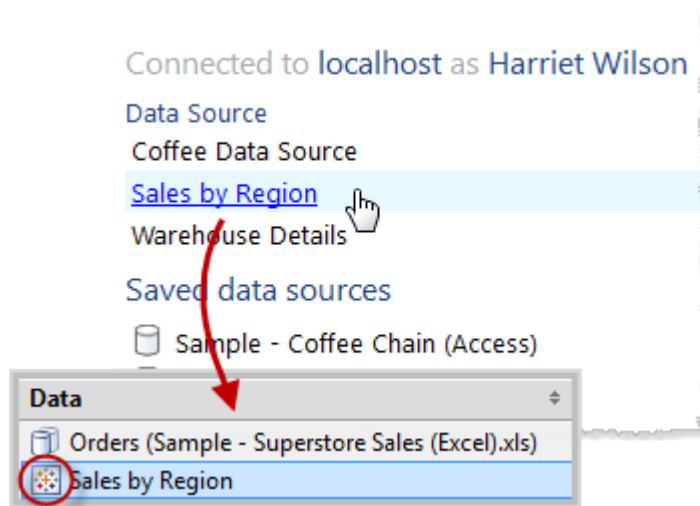
## Tableau Server

This example discusses how to connect Tableau to a Tableau Server data source.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Tableau Server.
3. Type the name of the Tableau Server along with your Username and Password to log into the server.



4. Select a data source in the list of published data sources. Tableau Server data sources are shown in the Data window with a Tableau icon.



You can sort the list by clicking on the headers in the table. Alternatively, search for a data source using the search box in the upper right corner. Click the Refresh button to refresh the list and show any new data sources.

*When you're connected to a Tableau Server data source, you can download a local copy by selecting the data source on the Data menu and then selecting Create Local Copy. A duplicate of the data source is added to the Data window.*

## Aster Data nCluster

*This example discusses how to connect Tableau to an Aster Data nCluster database.*

1. Select Data > Connect to Data to open the connect to Data page.
2. Select Aster Data nCluster.
3. Follow the steps in the Aster Data nCluster Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Enter the database name that you want to connect to.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Test the connection.

*If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

- e. Step 5 – Select a schema on the server.
- f. Step 6 – Select a table or view from the database.

*Aster Data nCluster databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- g. Step 7 – Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based on the database and table.*

## Cloudera Hadoop Hive

This example discusses how to connect Tableau to a Cloudera Hadoop Hive data source. Refer to the [Connecting to Cloudera Hadoop Hive](#) knowledge base article for a more detail discussion of connecting to Hadoop data.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Cloudera Hadoop Hive.
3. Follow the steps in the Cloudera Hadoop Hive Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 4 – Establish the connection.

If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

- c. Step 5 – Select a schema on the server.
- d. Step 5 – Select a table or view from the database.

Hadoop databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- e. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based on the database and table.

## Firebird Database

This example discusses how to connect Tableau to a Firebird database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Firebird.
3. Follow the steps in the Firebird Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Specify the location of the database. Use the Browse button if necessary.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

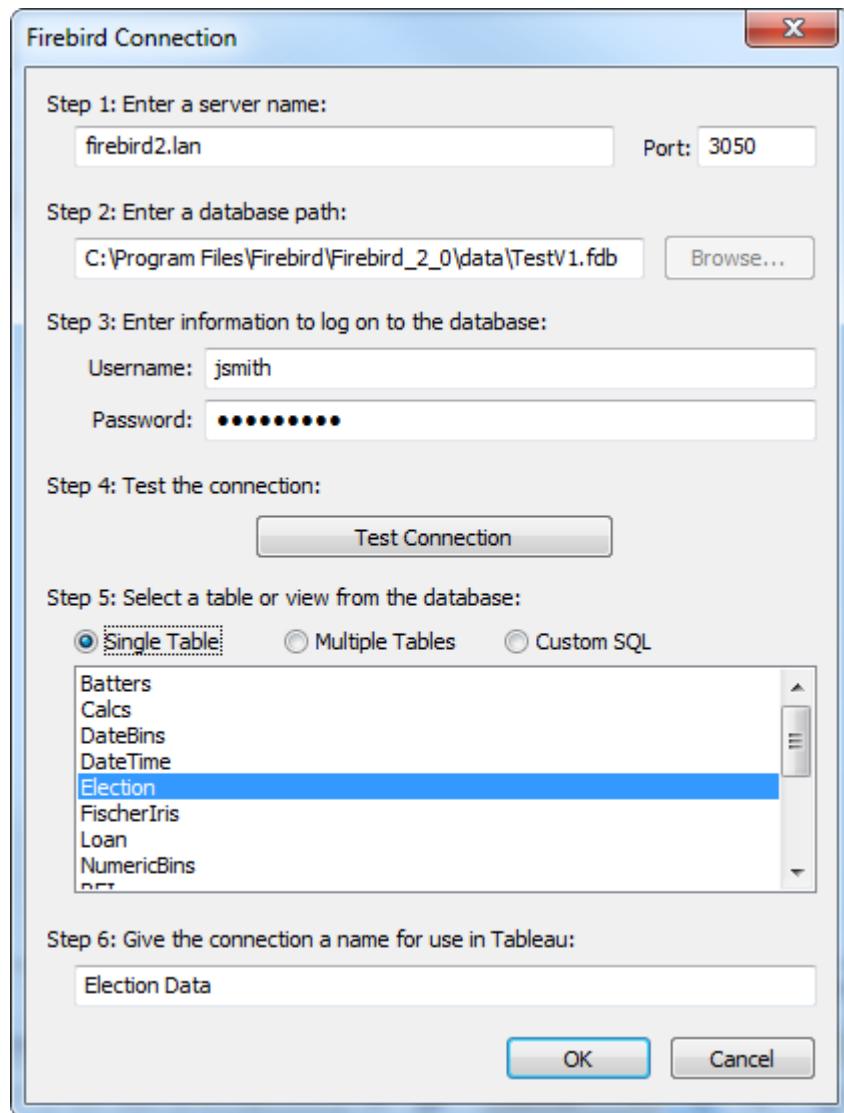
- e. Step 5 – Select a table or view from the database.

Firebird databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- f. Step 6– Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based.

A completed Connection dialog box for Firebird is shown below.

**Note:**

In order to take full advantage of the calculation language in Tableau, you need to load some extra functions into your Firebird database. These functions are located in three .dll files in the \bin\udf folder of the install directory. Load the files using **DEFINE FUNCTION** commands. You can use the .sql script files located with the UDF dlls along with iSQL to load the function definitions into your server. Keep in mind that the scripts load all of the functions in the corresponding udf libraries, so if you have existing functions you may need to cut and paste.

## Greenplum Database

*This example discusses how to connect Tableau to a Greenplum database.*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Greenplum.
3. Follow the steps in the Greenplum Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Enter the database name that you want to connect to.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Test the connection.

*If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

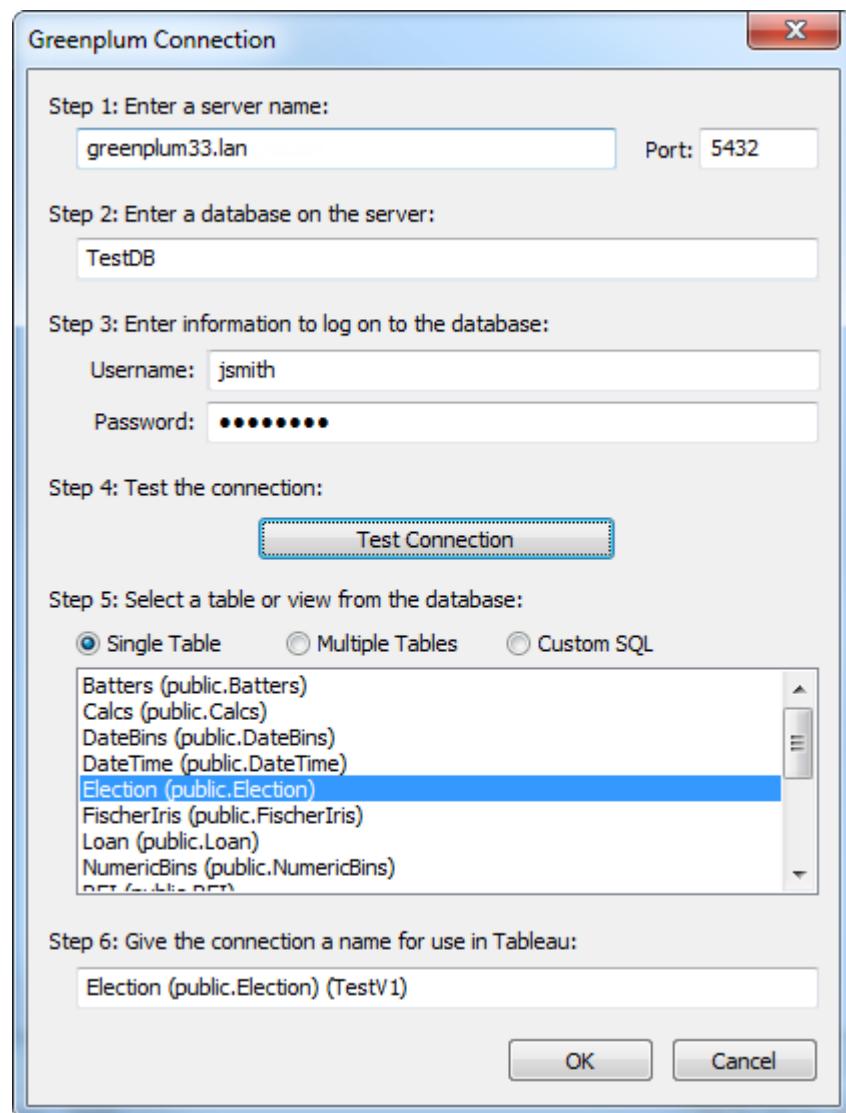
- e. Step 5 – Select a table or view from the database.

*Greenplum databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- f. Step 6– Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based.*

A completed Connection dialog box for Greenplum is shown below.



## IBM DB2 Database

This example discusses how to connect Tableau to a IBM DB2 database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select IBM DB2.
3. Follow the steps in the IBM DB2 Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.

*The port is dependent on the type of server you are connecting to and whether you are connecting to an encrypted port. Generally, use 50000 for a non-encrypted port and 60000 for an encrypted port. It is possible that your server is configured to use a non-standard port. Contact an administrator if you don't know which port to connect to.*

- b. Step 2 – Enter the database name that you want to connect to.
- c. Step 3 – Enter your username and password to log on to the server.
- d. Step 4 – Test the connection.

*If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

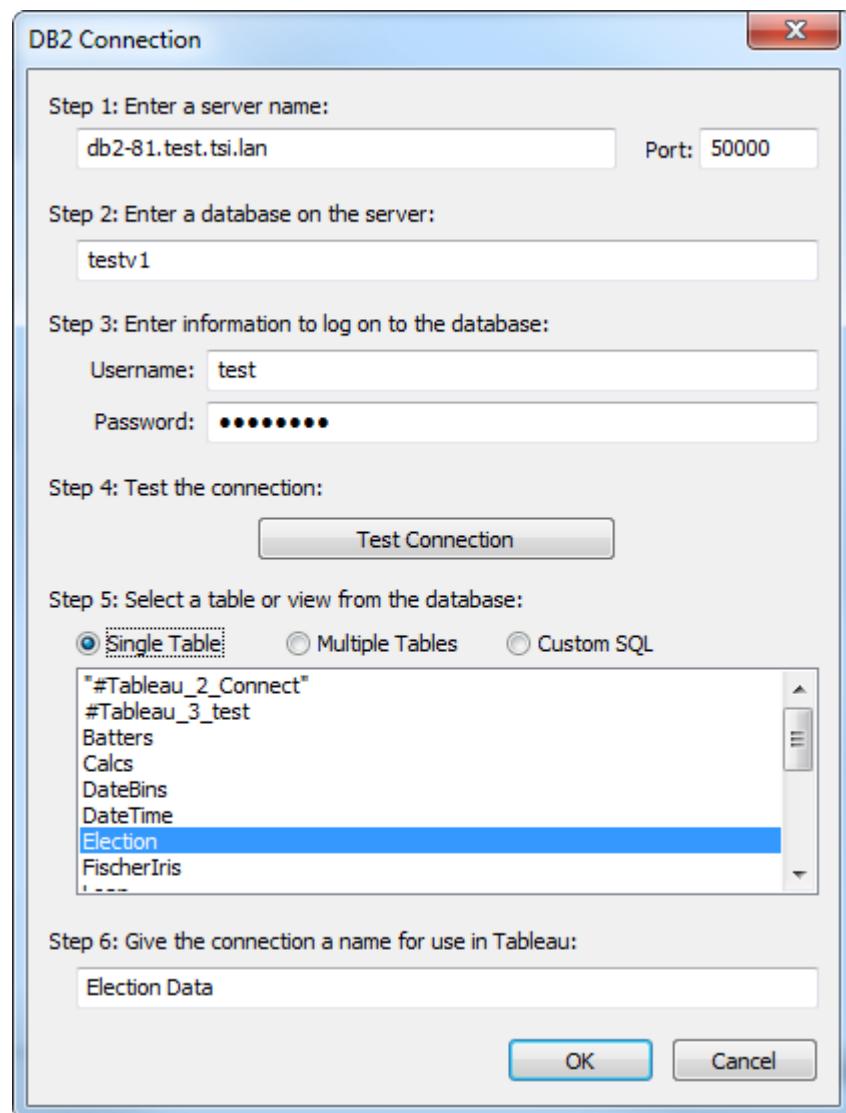
- e. Step 5 – Select a table or view from the database.

*IBM DB2 databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- f. Step 6– Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based.*

A completed Connection dialog box for IBM DB2 is shown below.



## InterSystems Caché Database

This example discusses how to connect Tableau to a InterSystems Caché database. Connecting to this data source requires a special license for Tableau that has Caché enabled. Additionally, you or a database administrator must load a stored procedure into your Caché database before you connect using Tableau.

### *Loading the Stored Procedure*

1. Copy the XML file on the following webpage to the Caché server:  
[www.tableausoftware.com/community/support/cache](http://www.tableausoftware.com/community/support/cache)
2. Start Caché Studio at the server from the Cube in the system tray.
3. Within Studio, select Tools > Import Local.
4. In the subsequent dialog box select the XML file.
5. In the Import dialog box, make sure both the class name TableauFuncs and Compile Imported options are selected.
6. Click OK.

### *Connecting to the Database*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select InterSystems Caché.
3. Follow the steps in the InterSystems Caché Connection dialog box to complete the connection.
  - a. Step 1 – Type the namespace on the server that hosts the database.
  - b. Step 2 – Enter the database name that you want to connect to.

Servers often contain multiple databases. Type the name of the specific database on the server that you want to connect to. Database names are case sensitive.

- c. Step 3 – Enter your username and password to log on to the server.
- d. Step 4 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the

*connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

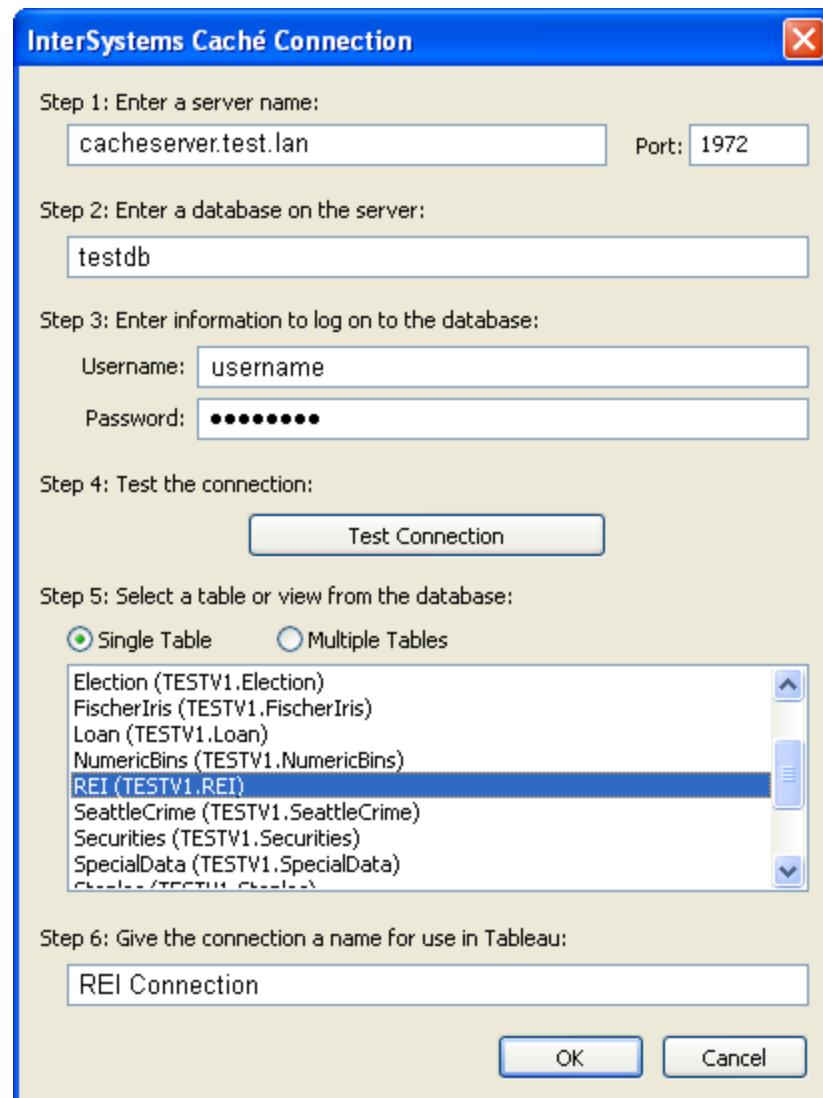
- e. *Step 5 – Select a table or view from the database.*

*InterSystems Caché databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- f. *Step 6– Give the connection a name for use in Tableau.*

*Specify a unique name for the connection. The default name is automatically generated based.*

A completed Connection dialog box for InterSystems Caché is shown below.



## Microsoft Analysis Services Database

This example discusses how to connect Tableau to a Microsoft Analysis Services database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Microsoft Analysis Services.
3. Follow the steps in the Microsoft Analysis Services Connection dialog box to complete the connection.
  - a. Step 1 – Select whether to connect to a cube file on the server or locally and then locate the cube you want to connect to.

To connect to a remote cube, type the name of a specific server into the text box. If you are connecting to the server via HTTP you can enter the URL as the server name. To connect to a local cube file, select Local cube file and click Browse to navigate to the cube file on your computer.

- b. Step 2 – Provide log in information for the server.

Specify whether to use Windows NT Integrated security or a specific username and password. If the cube is password protected, you must type your username and password.

- c. Step 3 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

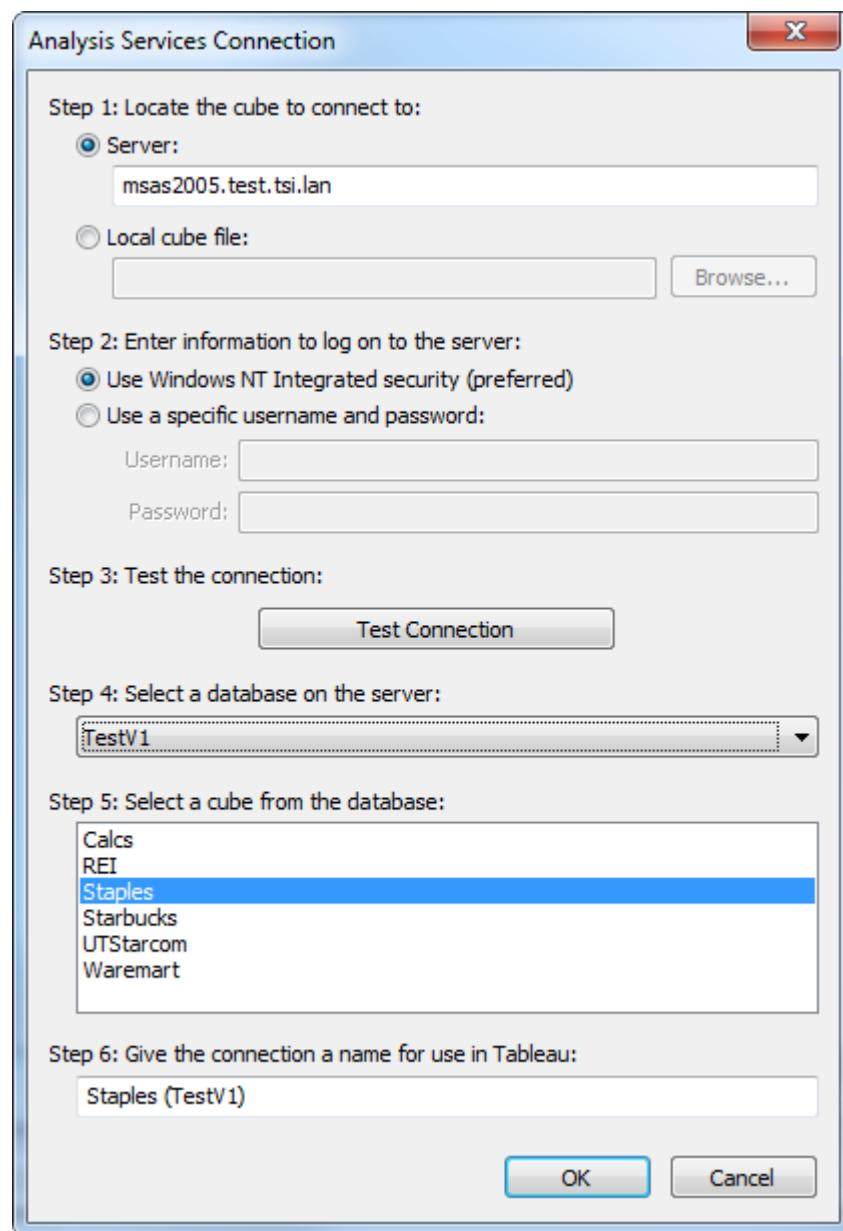
- d. Step 4 – Use the drop-down list to select the database that you want to connect to.
- e. Step 5 – Select a cube from the database.

Microsoft Analysis Services databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- f. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based.

A completed Connection dialog box for Microsoft Analysis Services is shown below.



**Note:**

*If you are connecting to a Microsoft Analysis Services 2000 data source, you are given the option to enable NonEmptyCrossjoin Optimization. When selected this option ensures that virtual dimensions are shown.*

## Microsoft PowerPivot

*This example discusses how to connect Tableau to a Microsoft PowerPivot database.*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Microsoft PowerPivot.
3. Follow the steps in the Microsoft PowerPivot Connection dialog box to complete the connection.
  - a. Step 1 – Select whether to connect to a PowerPivot file on SharePoint or a local Excel file.

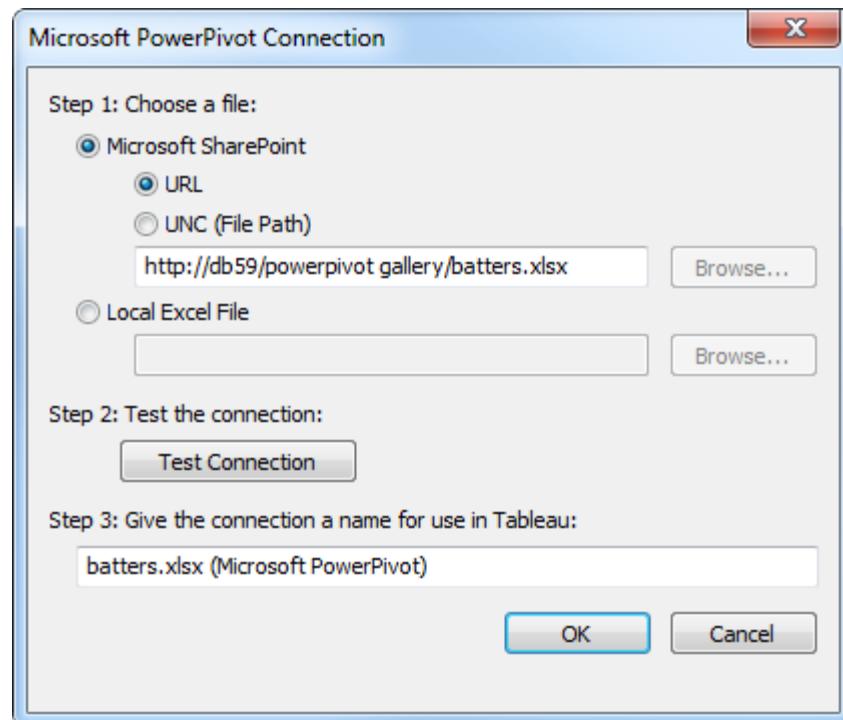
*If you are connecting to SharePoint type the URL or specify a UNC File Path. You can use the Browse button to select the file. If you are connecting to a local Excel file, click the Browse button to navigate to the file you want to connect to.*

*If you plan to publish the workbook to Tableau Server, make sure to connect to a PowerPivot file on SharePoint. Tableau Server does not support connections to local PowerPivot files.*

- b. Step 2 – Test the connection.
- c. Step 3 – Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based.*

*A completed Connection dialog box for Microsoft PowerPivot is shown below.*



## Microsoft SQL Server Database

This example discusses how to connect Tableau to a Microsoft SQL Server database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Microsoft SQL Server.
3. Follow the steps in the Microsoft SQL Server Connection dialog box to complete the connection.
  - a. Step 1 – Enter the server name or select it from the drop-down list.

You can select a server from the drop-down menu. This menu will contain all the SQL Server databases on your computer and on the network to which you have access. Alternatively, you can type in the name of a specific server.

- b. Step 2 – Provide log in information for the server.

Specify whether to use Windows NT Integrated security or a specific username and password.

- c. Step 3 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

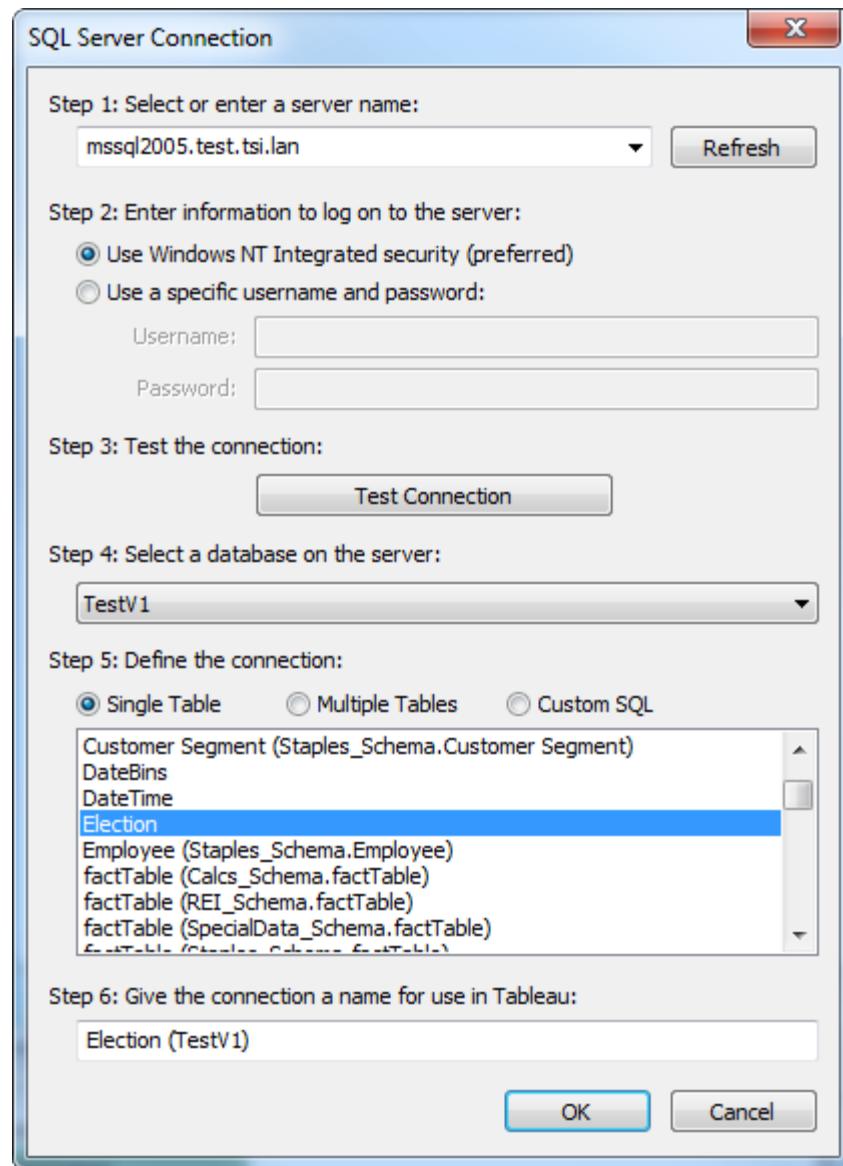
- d. Step 4 – Use the drop-down list to select the database that you want to connect to.
- e. Step 5 – Select a table or view from the database.

Microsoft SQL Server databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- f. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based.

A completed Connection dialog box for Microsoft SQL Server is shown below.



## MySQL Database

This example discusses how to connect Tableau to a MySQL database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select MySQL.
3. Follow the steps in the MySQL Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Enter your username and password to log on to the server.
  - c. Step 3 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

- d. Step 4 – Select the database that you want to connect to.
- e. Step 5 – Select a table or view from the database.

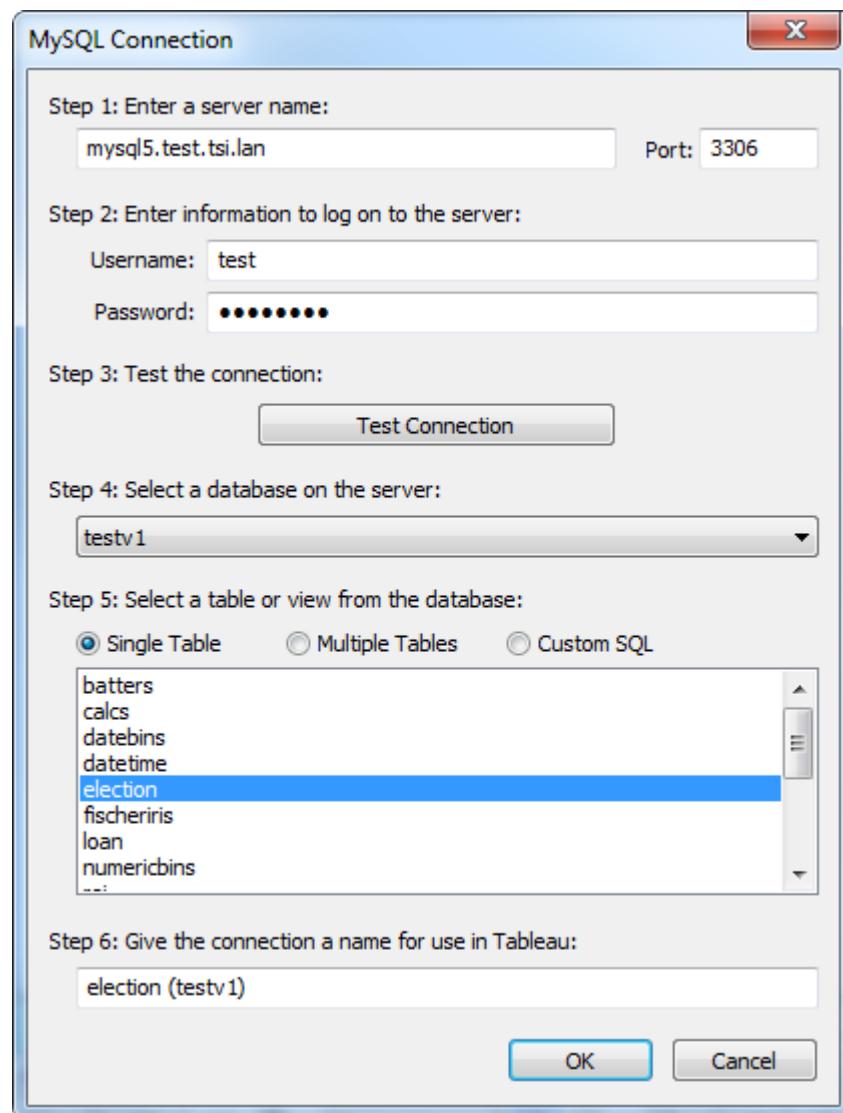
MySQL databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- f. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based.

A completed Connection dialog box for MySQL is shown below.

## Tableau Desktop Help



## Netezza Database

*This example discusses how to connect Tableau to a Netezza database.*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Netezza.
3. Follow the steps in the Netezza Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Enter the database name that you want to connect to.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Test the connection.

*If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

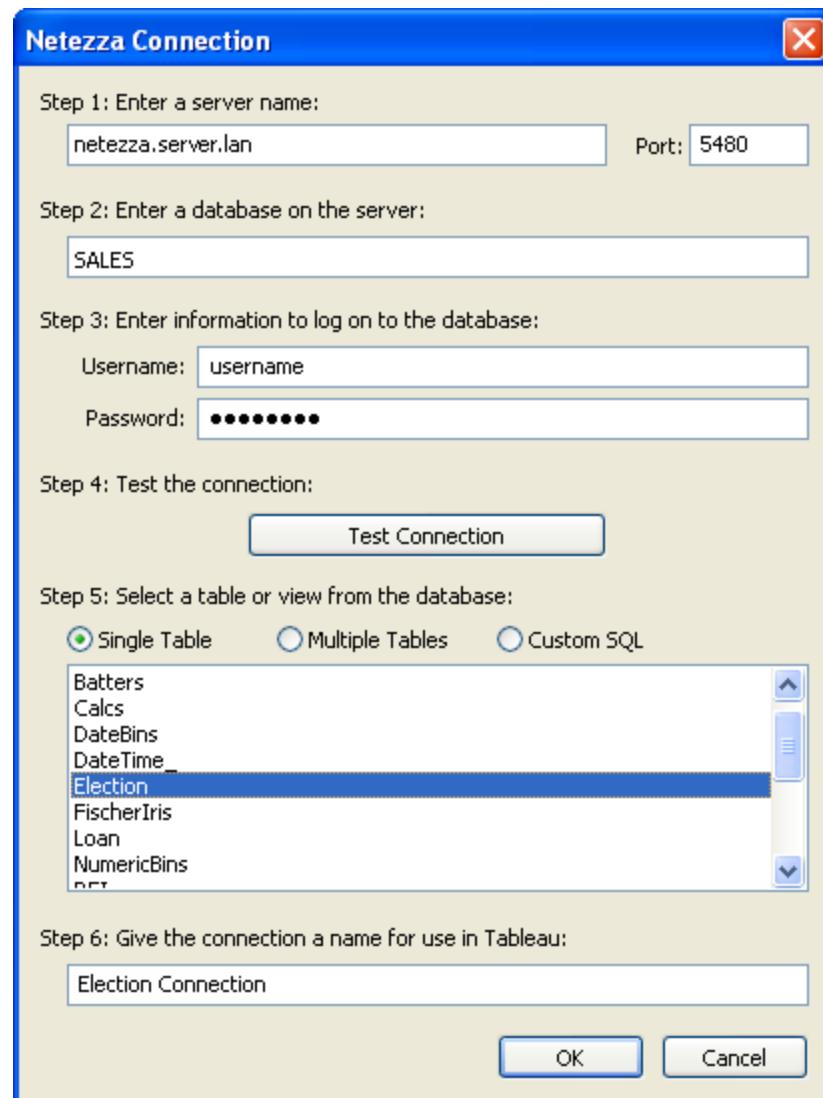
- e. Step 5 – Select a table or view from the database.

*Netezza databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- f. Step 6 – Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based.*

A completed Connection dialog box for Netezza is shown below.



## OData

This example discusses how to connect Tableau to an OData data source.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select OData.
3. Follow the steps in the OData Connection dialog box to complete the connection.
  - a. Step 1 – Select or enter a URL to the data you want to connect to. Click the link to find an OData data source on Windows Azure Marketplace DataMarket.
  - b. Step 2 – Enter authentication information.

If necessary, enter authentication information. You can authenticate using your Windows Azure Marketplace DataMarket account key or a username and password.

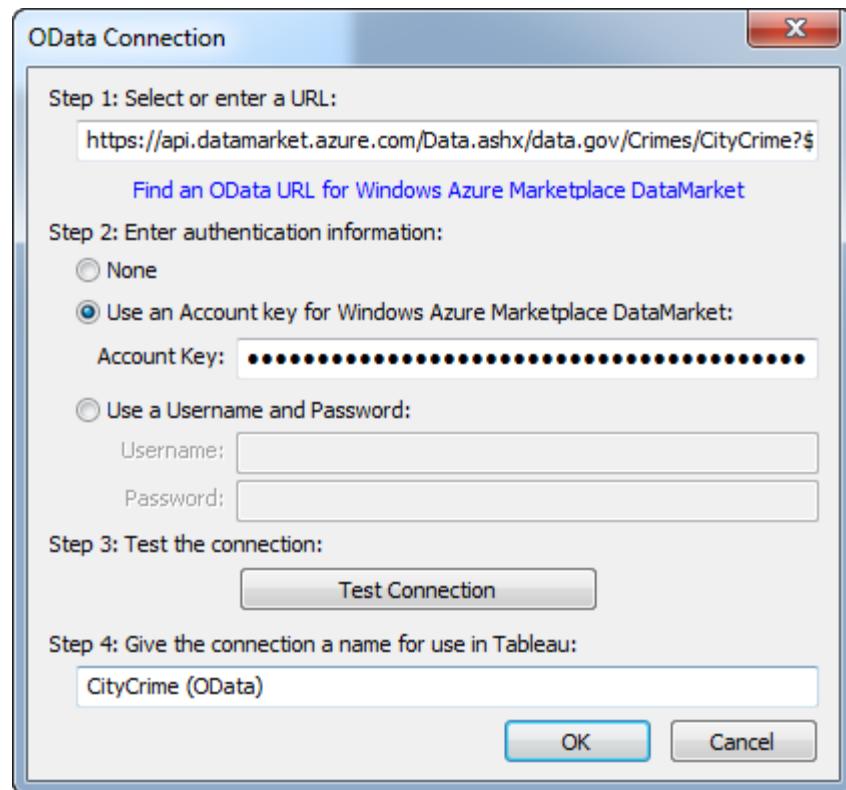
- c. Step 3 – Connect.

If the connection is unsuccessful, verify that the URL and authentication information are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

- d. Step 4– Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated.

A completed Connection dialog box for OData is shown below.



## Oracle Database

This example discusses how to connect Tableau to an Oracle database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Oracle.
3. Follow the steps in the Oracle Connection dialog box to complete the connection.
  - a. Step 1 – Enter the Oracle connection name.

If you do not know the exact connection string to type, click the advanced button. In the Advanced Oracle Connection dialog box, type the server name, service name, and optionally specify the port. Then click OK. The connection name will be created based on these variables.

- b. Step 2 – Provide log in information for the server.

Specify whether to use Windows NT Integrated security or a specific username and password. If the cube is password protected, you must type your username and password.

- c. Step 3 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

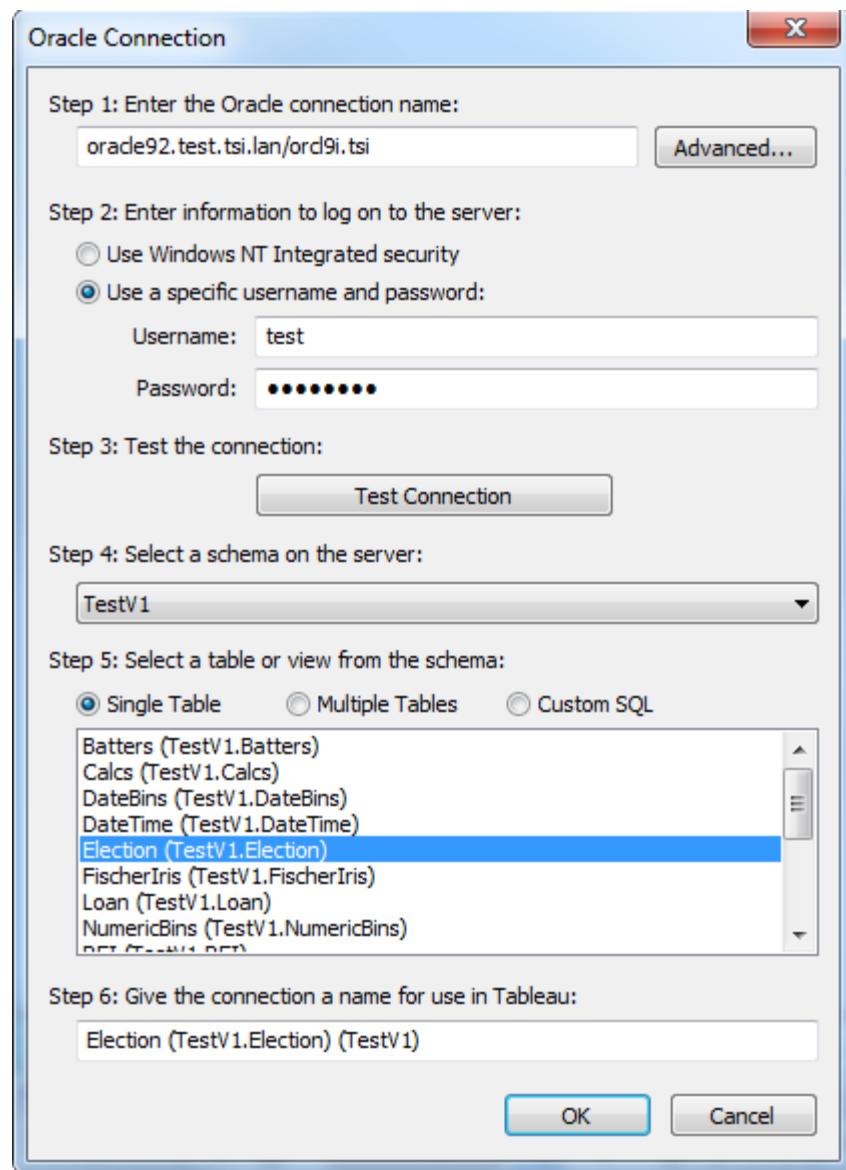
- d. Step 4 – Use the drop-down list to select the schema that you want to connect to.
- e. Step 5 – Select a table or view from the database.

Oracle databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- f. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based.

A completed Connection dialog box for Oracle is shown below.



**Note:**

*In order to use your net services definitions in Tableau, you must set either TNS\_ADMIN or ORACLE\_HOME as an environment variable. To set TNS\_ADMIN as the environment variable use the full path of the directory that contains the tnsnames.ora file. To set ORACLE\_Home as an environment variable use the path to the main Oracle directory.*

## Oracle Essbase Database

This example discusses how to connect Tableau to an Oracle Essbase database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Oracle Essbase.
3. Follow the steps in the Oracle Essbase Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 3 – Enter your username and password to log on to the server.
  - c. Step 4 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

- d. Step 2 – Use the drop-down list to select an application on the server that you want to connect to.
- e. Step 5 – Select a database from the application.

Oracle Essbase databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

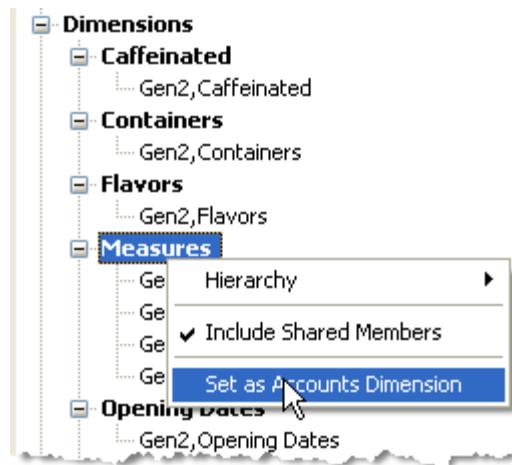
- f. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based.

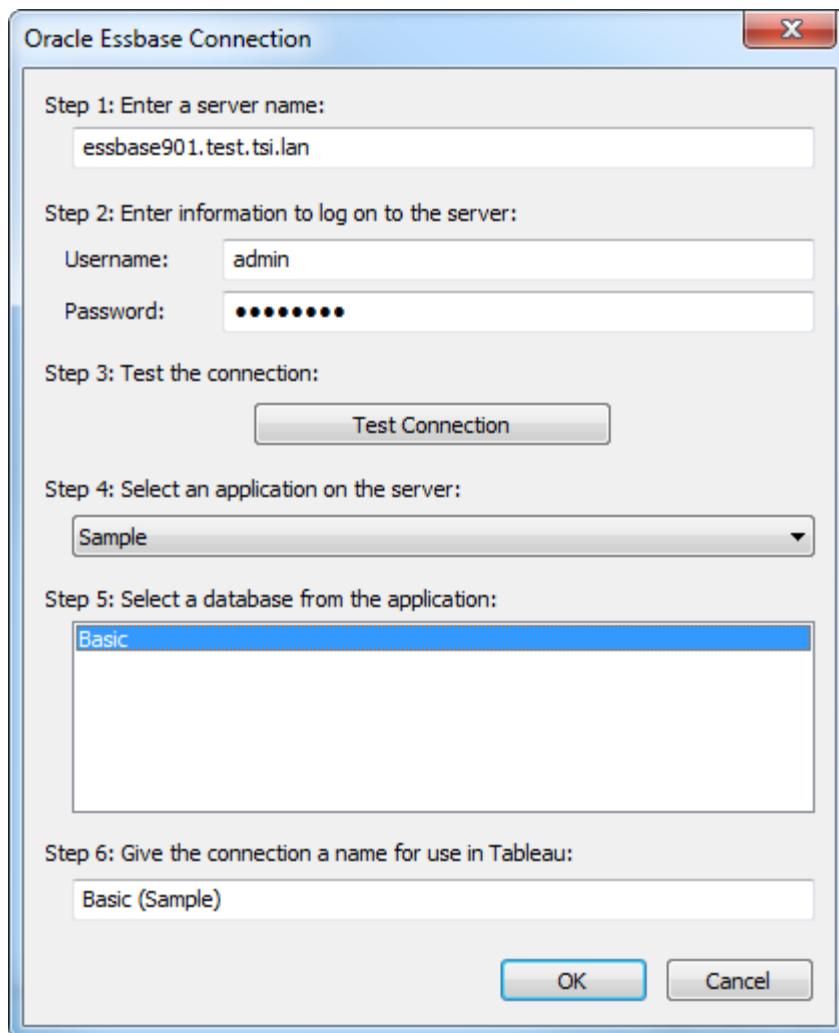
- g. **Optional:** Set an Accounts Dimension.

In some case, the accounts dimension for your data source can appear in the Dimensions area of the Data window. This might occur if there is an error in the cube and another field is identified as the accounts dimension or there is no accounts dimension set at all. The accounts dimension defines the fields that are included as measures.

For example, as shown in the figure below, Measures is the accounts dimension for the data source but appears as a dimension in the Data window. To correct this error, right-click the field and then select Set as Accounts Dimension from the context menu.



A completed Connection dialog box for Oracle Essbase is shown below.





## ParAccel Database

*This example discusses how to connect Tableau to a ParAccel database.*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select ParAccel.
3. Follow the steps in the ParAccel Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Enter the database name that you want to connect to.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Test the connection.

*If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

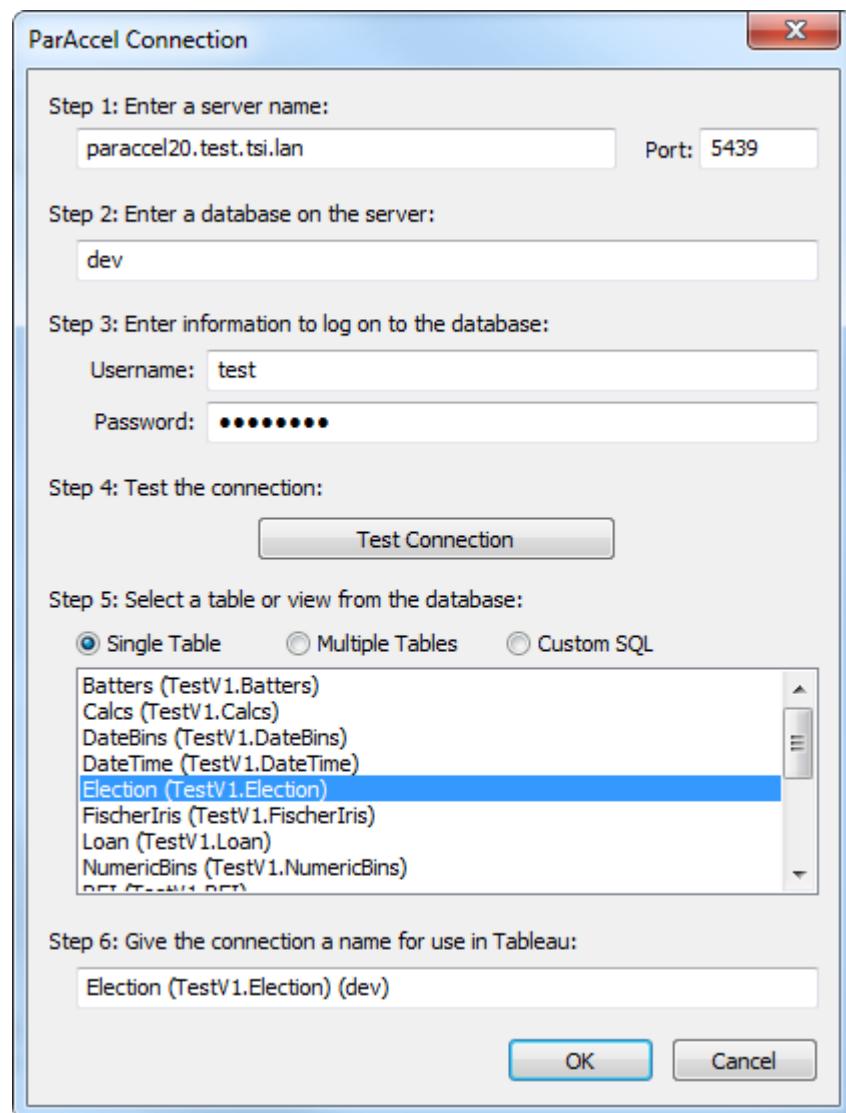
- e. Step 5 – Select a table or view from the database.

*ParAccel databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- f. Step 6 – Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based.*

A completed Connection dialog box for ParAccel is shown below.



## PostgreSQL Database

*This example discusses how to connect Tableau to a PostgreSQL database.*

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select PostgreSQL.
3. Follow the steps in the PostgreSQL Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Enter the database name that you want to connect to.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Test the connection.

*If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

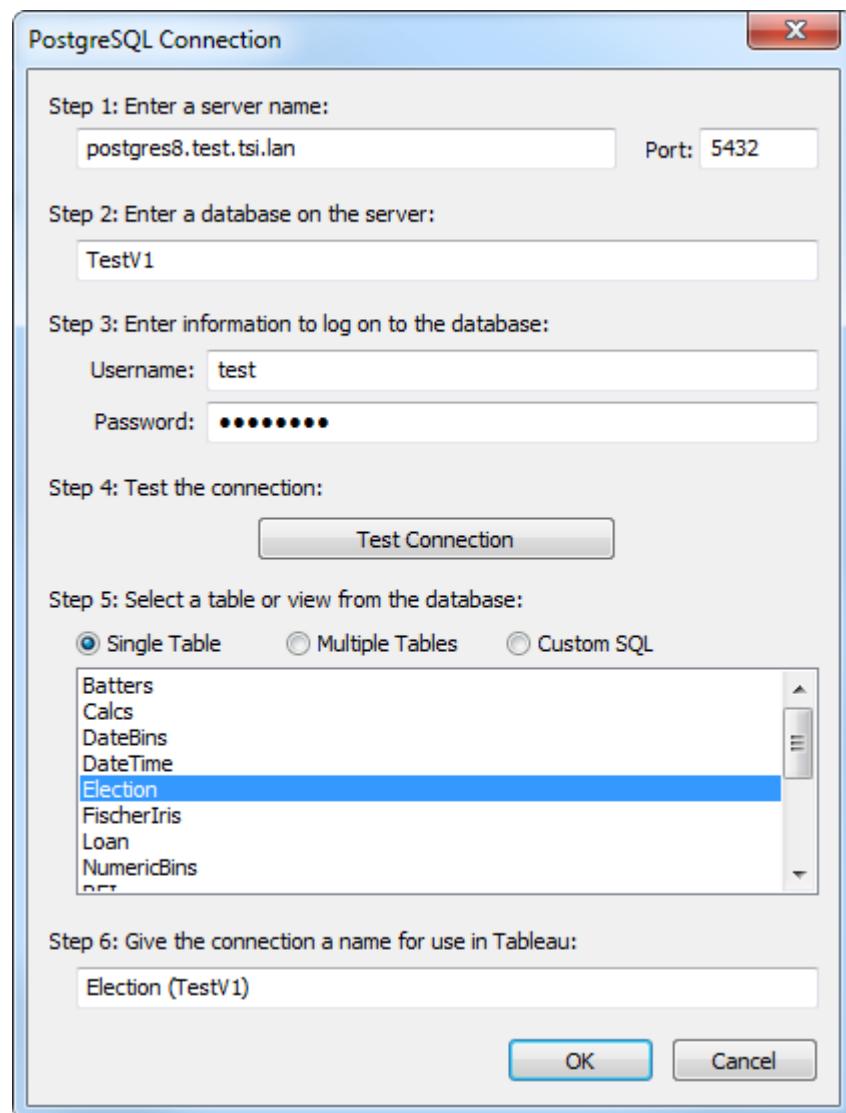
- e. Step 5 – Select a table or view from the database.

*PostgreSQL databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- f. Step 6 – Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based.*

A completed Connection dialog box for PostgreSQL is shown below.



## Progress OpenEdge Database

*This example discusses how to connect Tableau to a Progress OpenEdge database.*

1. *Select Data > Connect to Data to open the Connect to Data page.*
2. *Select Progress OpenEdge.*
3. *Follow the steps in the Progress OpenEdge Connection dialog box to complete the connection.*
  - a. *Step 1 – Type the name of the server that hosts the database.*
  - b. *Step 2 – Enter the database name that you want to connect to.*
  - c. *Step 3 – Enter your username and password to log on to the server.*
  - d. *Step 4 – Establish the connection.*

*If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

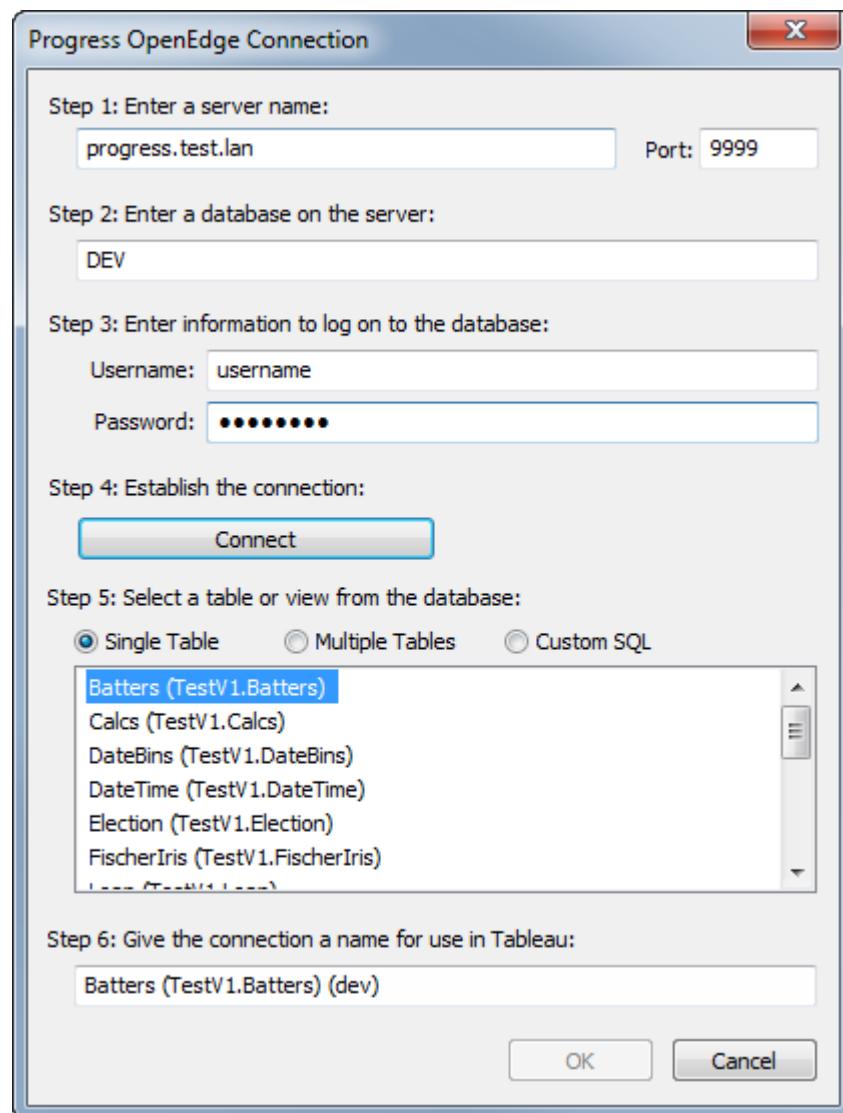
- e. *Step 5 – Select a table or view from the database.*

*Progress OpenEdge databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- f. *Step 6 – Give the connection a name for use in Tableau.*

*Specify a unique name for the connection. The default name is automatically generated.*

A completed Connection dialog box for Progress OpenEdge is shown below.



## Sybase IQ Database

This example discusses how to connect Tableau to a Sybase IQ database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Sybase IQ.
3. Follow the steps in the Sybase IQ Connection dialog box to complete the connection.
  - a. Step 1 – Enter the server name that hosts the database you want to connect to.
  - b. Step 2 – Enter a database name on the server.

*Servers often contain multiple databases. Type the name of a specific database on the server. Database names are case sensitive.*

- c. Step 3 – Provide log in information for the server.

*Specify whether to use Windows NT Integrated security or a specific username and password.*

- d. Step 4 – Test the connection.

*If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

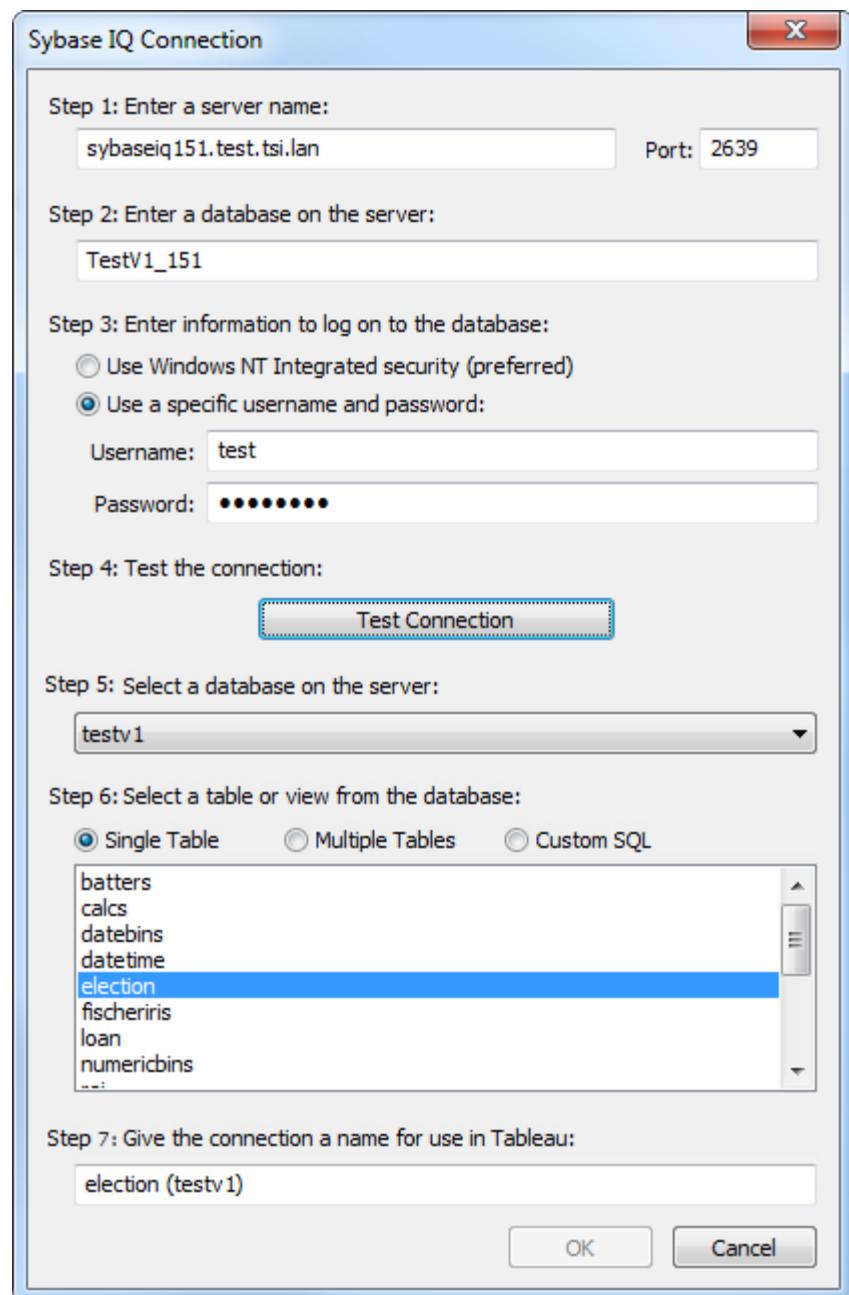
- e. Step 5 – Use the drop-down list to select a schema on the server.
- f. Step 6 – Select a table or view from the database.

*Sybase IQ databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- g. Step 7 – Give the connection a name for use in Tableau.

*Specify a unique name for the connection. The default name is automatically generated based.*

A completed Connection dialog box for Sybase IQ is shown below.



## **Teradata Database**

### **Teradata Database**

*This example discusses how to connect Tableau to a Teradata database.*

1. *Select Data > Connect to Data to open the Connect to Data page.*
2. *Select Teradata.*
3. *Follow the steps in the Teradata Connection dialog box to complete the connection.*
  - a. *Step 1 – Enter the server name that hosts the database you want to connect to.*
  - b. *Step 2 – Select the authentication method. Tableau supports connecting with the built-in Teradata authentication or LDAP.*
  - c. *Step 2 – Enter your username and password to log onto the server.*
  - d. *Step 3 – Test the connection.*

*If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.*

- e. *Step 4 – Search for or enter a database that you want to connect to.*
- f. *Step 5 – Enter a table or view from the database that you want to connect to.*

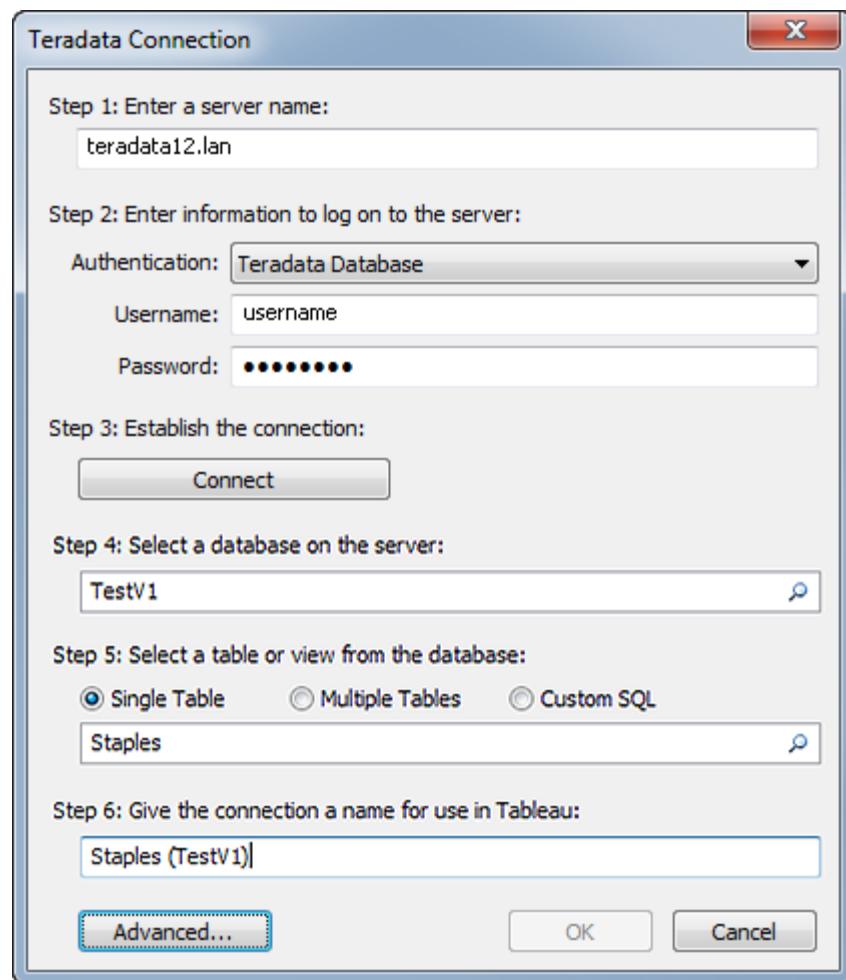
*Teradata databases can contain multiple tables and views. Type the name of the table you want to connect to or click the Search button to browse and select the table. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.*

- g. *Step 7 – Give the connection a name for use in Tableau.*

*Specify a unique name for the connection. The default name is automatically generated based.*

- h. *Optionally set up Query Banding and Initial SQL.*

*A completed Connection dialog box for Teradata is shown below.*



- [Advanced Teradata Options](#)

## Advanced Teradata Options

*When connecting to Teradata databases you can optionally set up query bands and initial sql. These advanced options are used to increase performance and take advantage of the built in security rules of the database.*

### Query Bands

*When connecting to a Teradata database, you can optionally define query band statements that run during connection. Query banding allows you to pass parameters into the Teradata environment. Use these to set up a workbook to filter the data based on security rules that exist in the database. For example, you can pass in the Tableau Server username for the current user so when the view is loaded it only shows the data specific to that user. Query bands can also be used to improve performance. When connecting to Teradata, you can define a map between the name of the attributes passed into the query band and the corresponding values from Tableau.*

#### To set up query banding:

1. In the Teradata Connection dialog box, click the Advanced button at the bottom.
2. In the subsequent dialog box, specify name/value pairs in the top text box labeled Query Banding. You can use the Insert drop-down menu to add Tableau values. The Tableau Values are described in the table below.

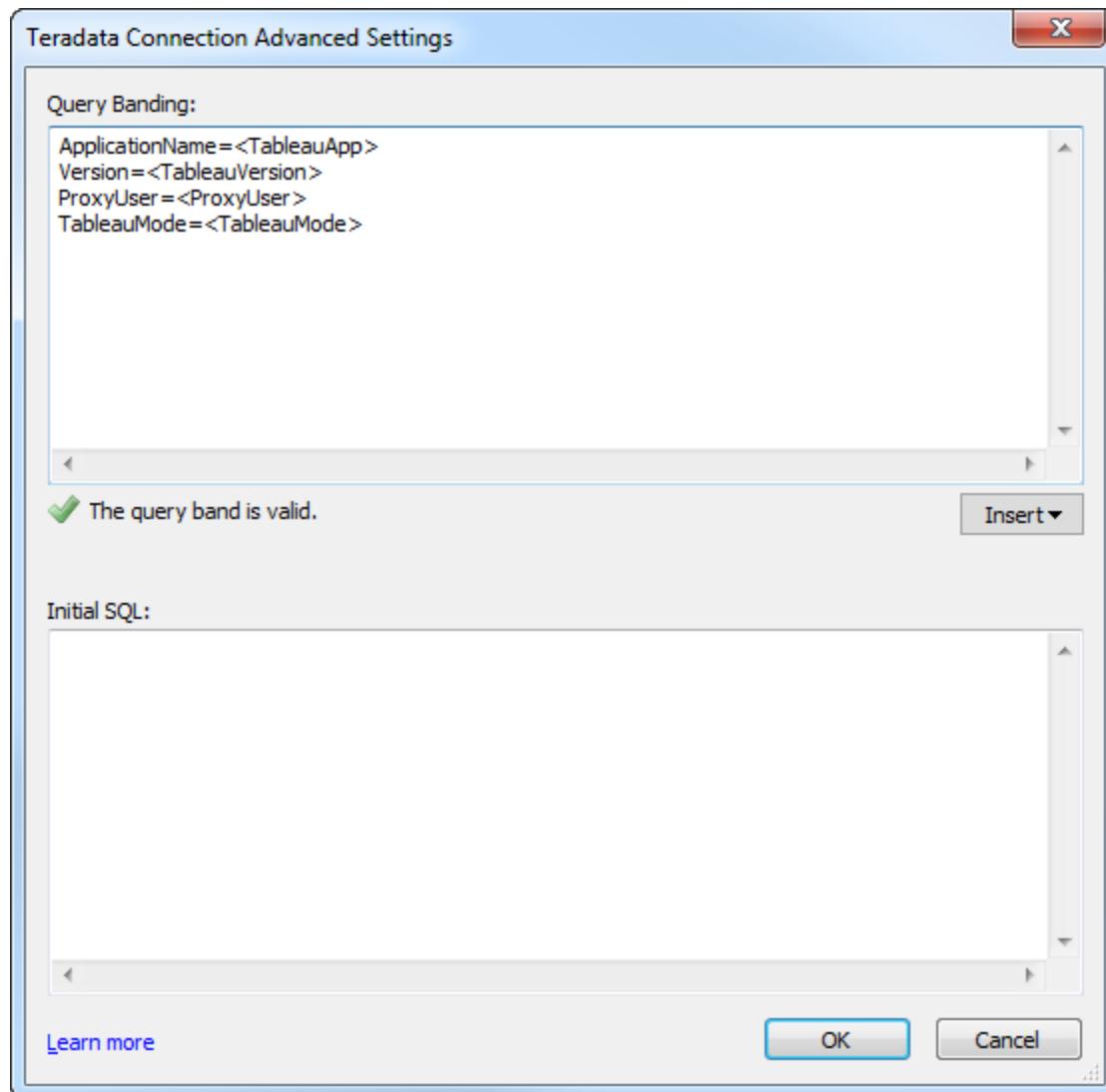
Value	Description	Example
<TableauMode>	The mode Tableau is operating in when generating queries. This value will either be “Connect” when retrieving metadata or “Analytical” when retrieving actual data.	Connect or Analytical
<LoginUser>	The username of the person logged into the database.	jsmith
<ServerUser>	The logged in Server user. Does not include domain name.	jsmith
<ServerUserFull>	The logged in server user including the domain name (if the server is using Active Directory).	domain.lan\jsmith
<ProxyUser>	Used when setting up impersonation on the server. Provides the username of the current server user.	jsmith
<ProxyUserFull>	Used when setting up impersonation on the server. Provides the username and	domain.lan\jsmith

Value	Description	Example
	domain name of the current server user.	
<TableauApp>	The name of the Tableau application.	Tableau Desktop Professional or Tableau Server
<TableauVersion>	The version of the Tableau application	6100.11.0428.0300
<WorkbookName>	The name of the workbook.	Financial-Analysis

An example query band statement is shown below. this example passes the username for the current server user.

ApplicationName=<TableauApp>Version=<TableauVersion>ProxyUser=<ProxyUser>TableauMode=<TableauMode>

Tableau checks the statement for errors as you type. When it is valid a green checkmark displays at the bottom of the text box.



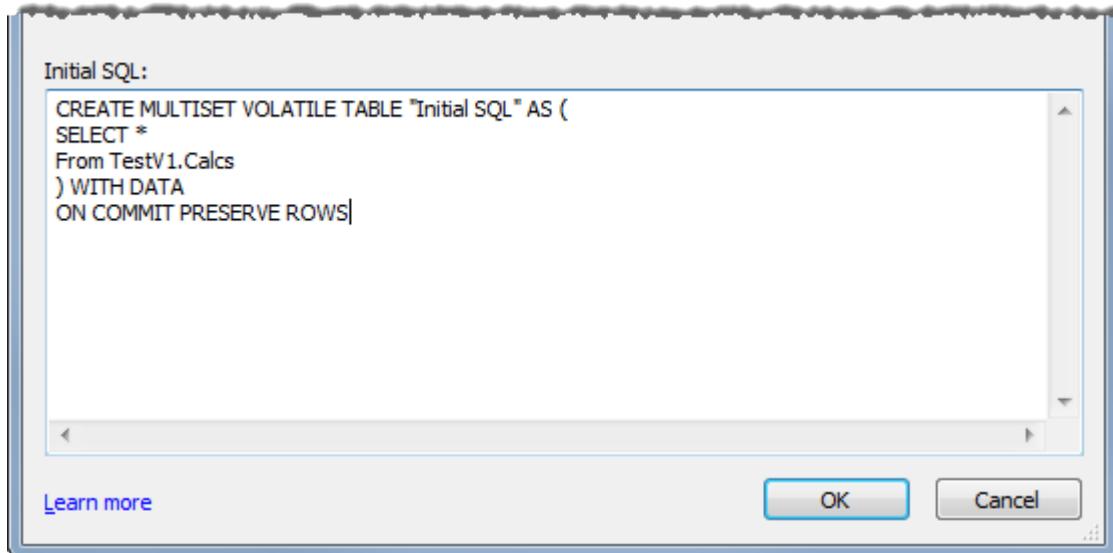
## *Initial SQL*

When connecting to Teradata databases, you can optionally specify a SQL command that will be run once upon connection. This query is useful to set up temporary tables that will be used during the session and can be used to set up a custom data environment. This initial SQL is different than a Custom SQL connection because it is only run when you first open the workbook rather than affecting every query to retrieve rows from the database.

### **To set up initial SQL:**

1. In the Teradata Connection dialog box, click the Advanced button at the bottom.

2. In the subsequent dialog box, type the SQL command into the lower text box labeled Initial SQL.



**Note:** Tableau does not examine the statement for errors. This SQL statement is simply sent to the database upon connection.

Your software license may restrict you from using initial SQL with your Teradata connection. If you are publishing to Tableau Server, the server must be configured to allow initial SQL statements. By default, the server software is configured to allow these statements to run when the workbook is loaded in a web browser. Administrators can disable the functionality on the Data Connections tab of the Tableau Server Configuration utility. If the server does not allow initial SQL statements, the workbook will still open, but the initial SQL commands will not be sent.

## Vectorwise Database

This example discusses how to connect Tableau to a Vectorwise database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Vectorwise.
3. Follow the steps in the Vectorwise Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the virtual node for the database.
  - b. Step 2 – Enter the database name that you want to connect to.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Establish the connection.

If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

- e. Step 5 – Select a schema on the server.
- f. Step 5 – Select a table or view from the database.

Vectorwise databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- g. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based on the database and table.

## Vertica Database

This example discusses how to connect Tableau to a Vertica database.

1. Select Data > Connect to Data to open the Connect to Data page.
2. Select Vertica.
3. Follow the steps in the Vertica Connection dialog box to complete the connection.
  - a. Step 1 – Type the name of the server that hosts the database.
  - b. Step 2 – Enter the database name that you want to connect to.
  - c. Step 3 – Enter your username and password to log on to the server.
  - d. Step 4 – Test the connection.

If the connection is successful, Tableau will alert you. If the connection is unsuccessful, verify that your user name and password are correct. If the connection continues to fail, your computer is having trouble locating the server. Contact your network administrator or database administrator.

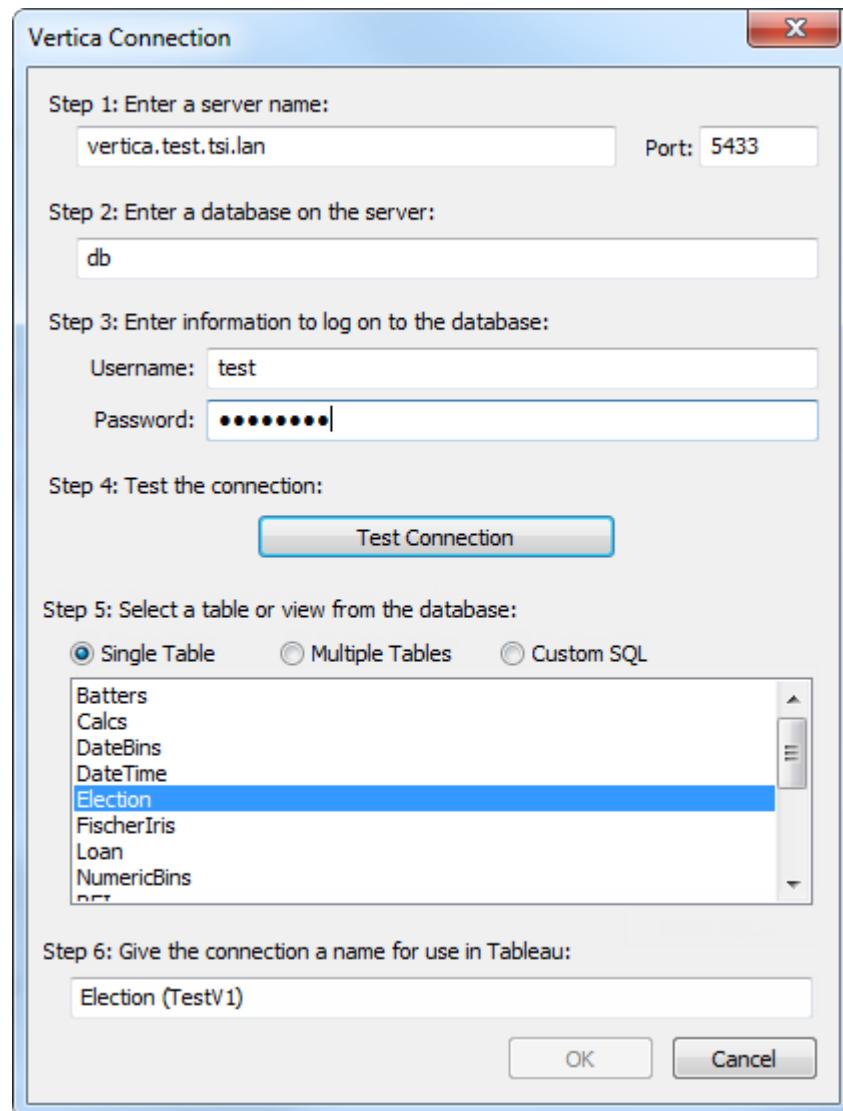
- e. Step 5 – Select a table or view from the database.

Vertica databases can contain multiple tables and views. Specify which table or view within the database you want to connect to. You can also connect to multiple tables or a specific query by selecting the Multiple Tables and Custom SQL options.

- f. Step 6 – Give the connection a name for use in Tableau.

Specify a unique name for the connection. The default name is automatically generated based on the database and tables.

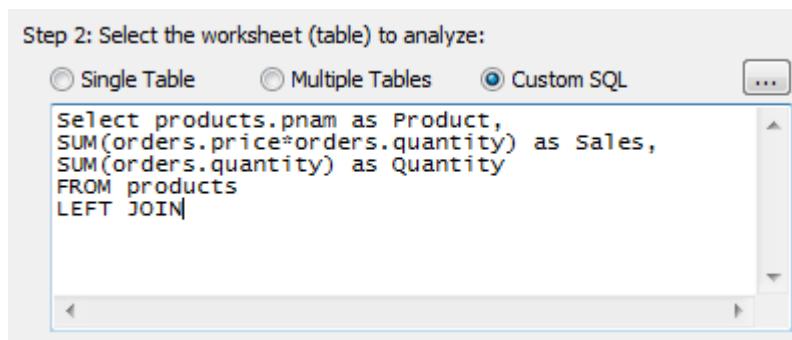
A completed Connection dialog box for Vertica is shown below.



## Connecting to a Custom SQL Query

For most relational data sources you can connect to a specific query rather than the entire data source. Often this can be useful when you know exactly the information you need and you understand how to write SQL queries.

1. Select *Custom SQL* in the connection dialog box.
2. Type or paste the query into the text box. The  button in the upper right corner of the text box opens a larger editing window for more complex queries.



When you finish the connection, only the relevant fields display in the Tableau Data window.

If your SQL query references duplicate columns, you may get errors when trying to use one of the columns in Tableau. This will happen even if the query is valid. For example, consider the following query:

```
SELECT * from authors, titleauthor where authors.au_id =
titleauthor.au_id
```

The query is valid, but the `au_id` field is ambiguous because it exists in both the “authors” table and the “titleauthor” table. Tableau will connect to the query but you will get an error anytime you try to use the `au_id` field. That’s because Tableau doesn’t know which table you are referring to.

## Editing the Connection

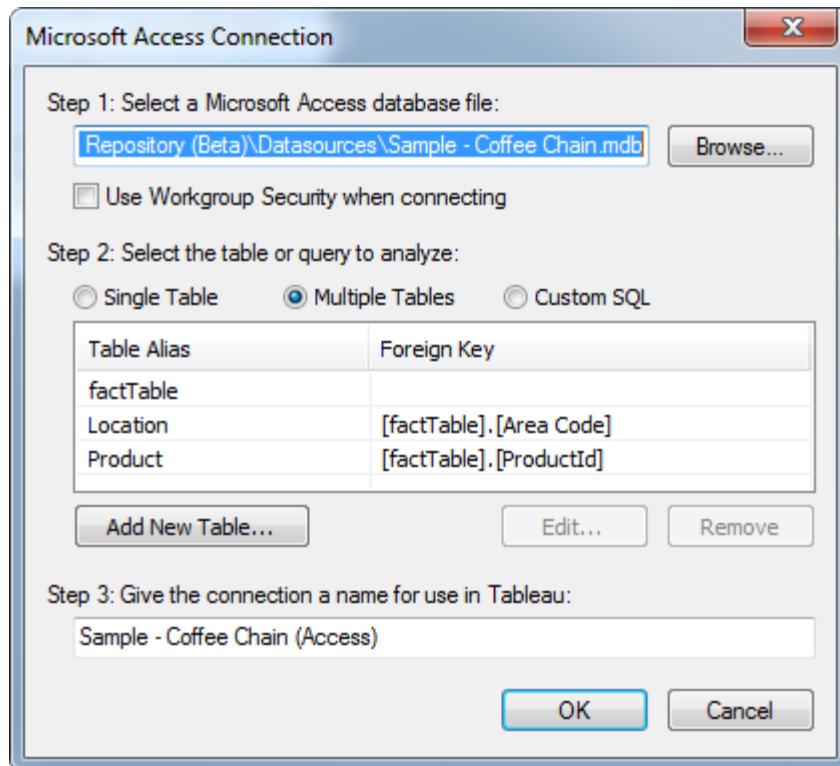
When a Tableau workbook is connected to a data source, you can edit the connection. You might want to edit the data source connection to:

- Specify a new location for the data source. Suppose the name or location of a data source you were using has changed and is no longer available using the previous connection information. In this case, you can direct the workbook to the correct location without losing your work.
- Apply analyses created using one data source to another data source.

Suppose you create a workbook containing several views involving markets, products, sales, and profits and you want to apply the analyses to a new data source. Instead of recreating each view from scratch, you can edit the original data connection and specify a new data source.

### Editing a Connection

1. Select a data source on the Data menu and then select Edit Connection.
2. Complete the data source-specific connection dialog box. For example, the Microsoft Access Connection dialog box is shown below. You can specify a new file, or you can select a different table to analyze.



## Replacing Field References

*When you successfully connect to a new data source, all worksheets that previously referred to the original data source now refer to the new data source. If the new data source does not have the same field names that are used in the original workbook, the fields become invalid and are marked with an exclamation mark . You can quickly resolve the problem by replacing the field's references.*

*For example, say you have a workbook connected to a data source that contains a Product Category field. Then you edit the connection to point to a new data source that has all the same data but instead of Product Category, the field name has been changed to Product Type. The Product Category field remains in the Data window but is marked as invalid. To make the field valid, you can replace the references, which means you can map the invalid field to a valid field in new data source (e.g., Product Category corresponds to Product Type).*

1. Right-click the invalid field in the Data window and select Replace References.
2. In the Replace References dialog box, select a field from the new data source that corresponds to the invalid field.

## **Renaming the Connection**

*When you connect to a data source you are given the option to give it a name for use in Tableau. You can change the name you specified by selecting a data source on the Data menu and then selecting Rename. Naming a connection is useful when you have a single workbook connected to many data sources. The name you assign can help you keep track of the specifics of the connection. You can also review the connection properties by selecting a data source on the Data menu and then selecting Properties.*

## Duplicating the Connection

*Sometimes you'll want to make changes to a data connection such as add more tables, hide and show fields, set field defaults, and so on. When you make these changes it affects all sheets that use the data connection. You can duplicate a connection so that you can make the changes without affecting the existing sheets. To duplicate a connection select a data source on the Data menu and then select Duplicate. When you duplicate a connection the name has "(copy)" appended to the end.*

### Related tasks

[Renaming the Connection](#)

## Replace Data Source

There are times when you may want to update a workbook or sheet to use a different data source. For example, you may have a workbook that was built against a local text file. However, the data source has since been published to Tableau Server and you want to connect to the published version. Rather than rebuild your workbook using the new connection, you can replace the data source.

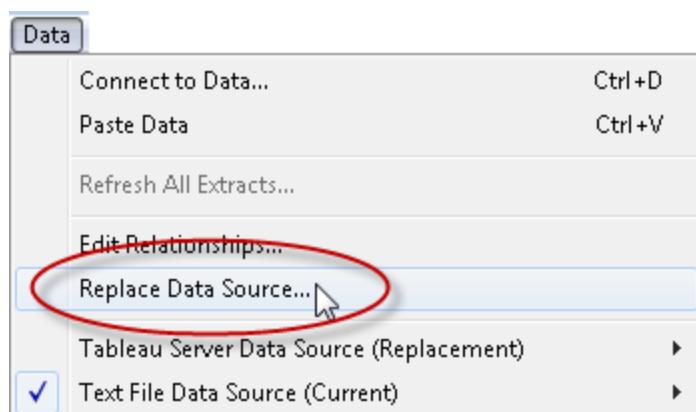
Replacing the data source is available between:

- Two relational data sources (on a server, local files, or extracts).
- Two multidimensional data sources of the same type.

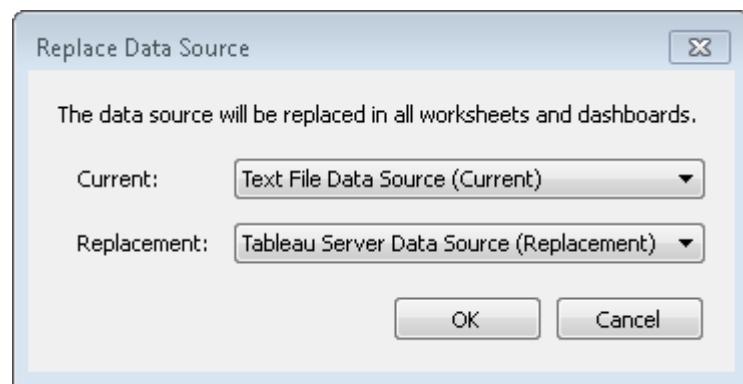
The two data sources do not have to be identical, however, any differences will affect the sheets in the workbook. Any fields that don't exist in the new data source (or have a different name) will remain in the Data window but will be marked invalid. Additionally, you may see changes to custom sets, groups, and calculated fields that depend on the missing fields. Refer to [Editing the Connection](#) to learn replace field references to correct invalid fields.

Follow the steps below to replace a data source:

1. Open a workbook that connects to the old data source.
2. Select Data > Connect to Data and then connect to the new data source.
3. Select Data > Replace Data Source.



4. In the Replace Data Source dialog box, select the Current data source and the Replacement data source.



5. When finished, click OK.

*All worksheets and dashboards that used the original connection are updated to use the new data source. Click Undo on the toolbar to revert the change and return to your original connection.*

## Exporting the Connection

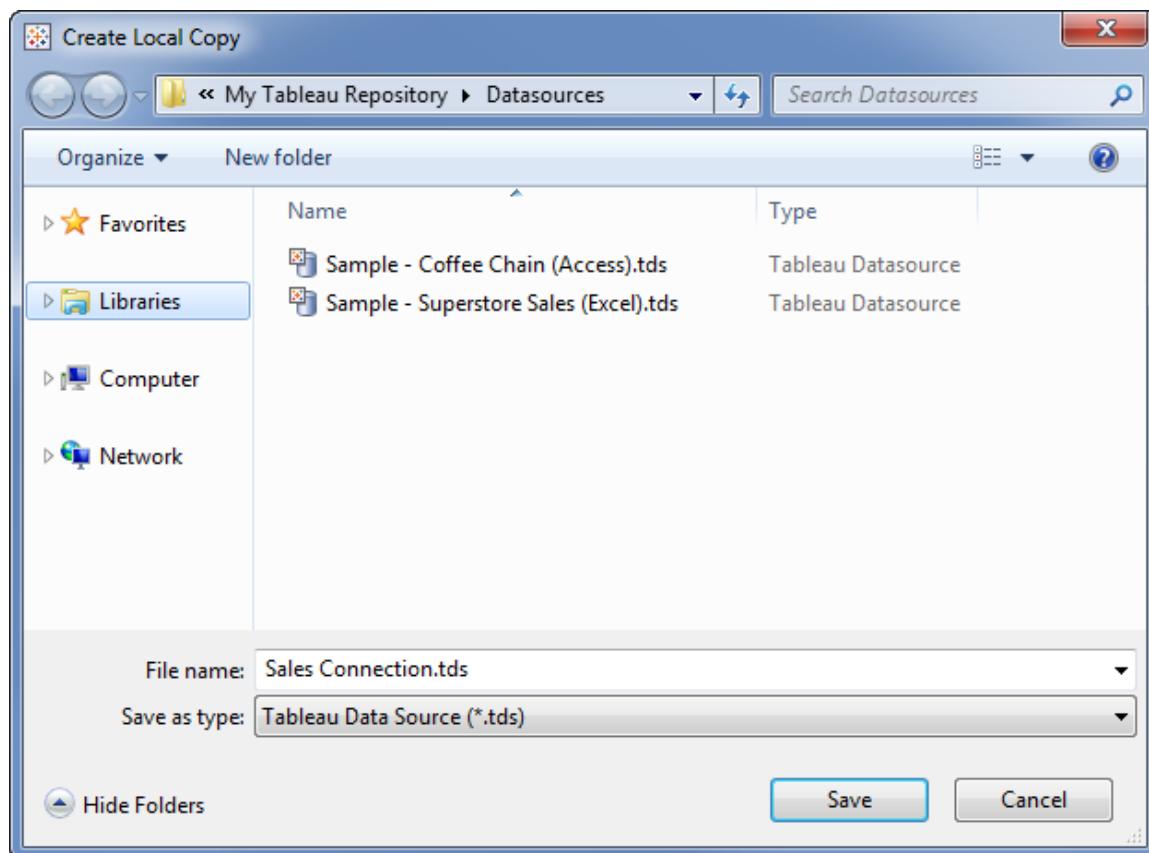
*At any time while connected to a data source, you can export the connection information as a shortcut that allows you quickly connect without opening the connection dialog box. You might want to do this if you often connect to the same data source multiple times or if you've added custom fields to the Data window such as groups, sets, calculated fields, and binned fields or added joined tables. For subsequent connections to that source, use the shortcut so that you don't have to recreate the custom fields. Note that you can also save custom fields by saving the workbook or by creating a bookmark file.*

*The connection is saved as a TDS (Tableau data source) file and is available on the Connect to Data page. Each TDS file references one data source, and stores information about the data source type and location, and any custom fields you have created. TDS files do not store data, workbooks, or worksheets.*

*TDS files are stored in the Data sources folder of the Tableau Repository. They have the .tds extension and can be identified by the data source icon . If you move the TDS file to another location, you cannot access the file with the Connect to Data dialog box. However, you can access the file by selecting File > Open and navigating to the file. You can also connect by dragging the TDS file onto Tableau's desktop icon or onto the running application.*

*If you move the data source referenced by the TDS file, you will not be able to complete the connection. In this case, Tableau will ask you to replace the original data source with another one. Note that the replacement data source must be of the same type (Excel, MySQL, and so on) as the original.*

1. Select a data source on the Data menu and then select Add to Saved Data Sources.
2. Complete the Export Data Source dialog box by specifying a file name.



As shown below, the new TDS file is displayed on the Connect to Data page.

## Connect to Data

### In a file

- Tableau Data Extract
- Microsoft Access
- Microsoft Excel
- Text File
- Import from Workbook

### On a server

- Tableau Server
- Aster Data nCluster
- Cloudera Hadoop Hive
- Firebird

### Saved data sources

- Sales Connection
- Sample - Coffee Chain (Access)
- Sample - Superstore Sales (Excel)

## Refreshing the Data

*If you make modifications to a data source such as adding new fields or rows, changing data values or field names, or deleting data, Tableau will reflect those changes the next time you connect to the data source. However, because Tableau queries a data source and does not import the data, you can immediately update Tableau to reflect the data source modifications without disconnecting.*

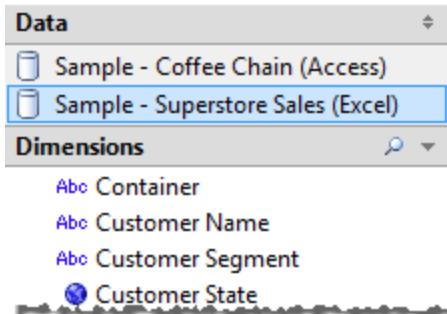
*If you are connected to a data source that has been modified, you can immediately update Tableau with the changes by selecting a data source on the Data menu and then selecting Refresh.*

*If you remove a field from a data source that is used in a Tableau worksheet, and then refresh the data source, a warning message displays indicating that the field will be removed from the view and the worksheet will not display correctly because of the missing field.*

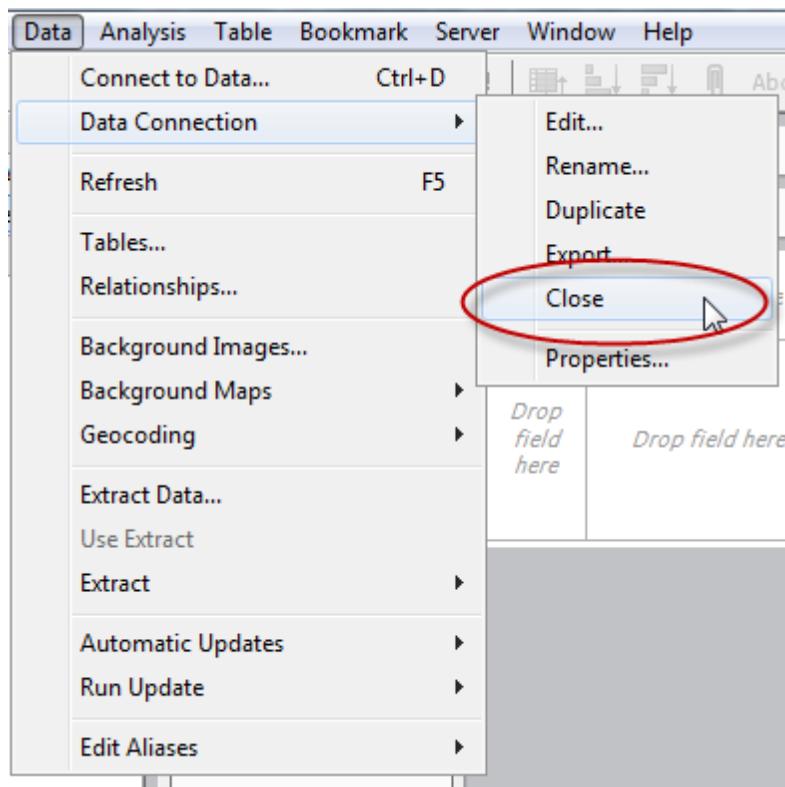
## Closing the Connection

You can close a data connection at any time. Doing so does not modify the data source. Instead, it disconnects Tableau from the data so that you can no longer query it. Additionally, the connection is cleared from the Data window and all open worksheets associated with the data are cleared. If you accidentally close a connection, use the Undo button to reconnect.

1. Select the data source at the top of the Data window.



2. Select a data source on the Data menu and then select Close.



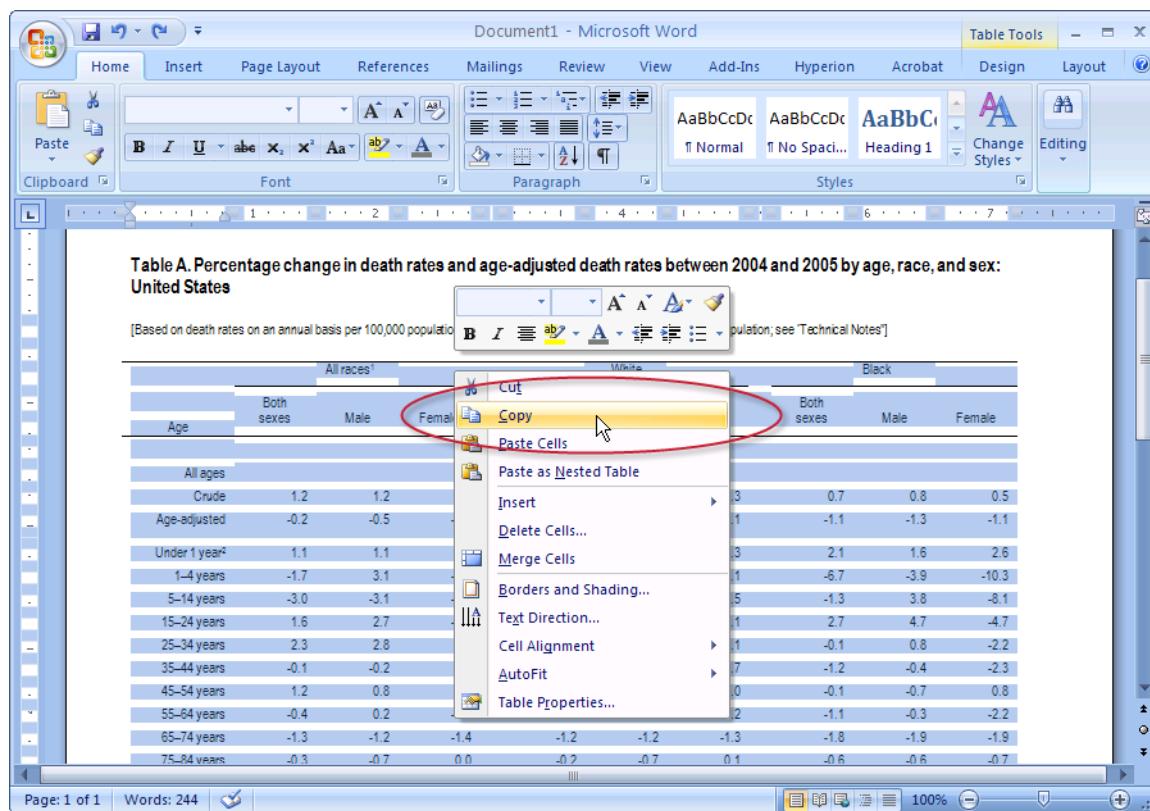


## Clipboard Data Sources

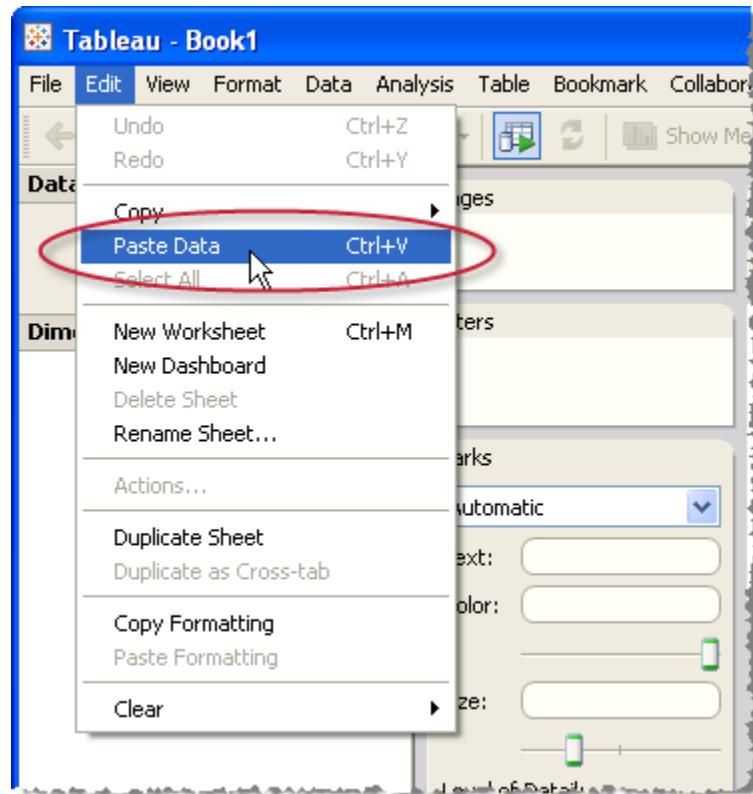
Sometimes you want to pull in data from an outside source for some quick analysis. Rather than create a whole data source and then connect in Tableau, you can copy and paste the data directly into the application. Tableau automatically creates a data source that you can begin analyzing. When you save the workbook, the data source is saved as a tab delimited text file into your Tableau Repository.

You can copy and paste data from a variety of office applications including Microsoft Excel and Word. You can also copy and paste html tables from webpages. Tables that are copied as comma separated values or tab delimited can be pasted into Tableau. Please be aware that not all applications use these formats when copying.

1. Select the data you want and copy it to the clipboard.



2. Open Tableau Desktop and select Data > Paste Data.



3. Select *File > Save to save the data source. When you save the workbook the data source is automatically put into your repository. If you save as a packaged workbook the data sources is saved with the workbook instead.*

NoName	Sum of All races1	Sum of Black	Sum of White
Null			
1-4 years	3.100	-3.900	5.100
5-14 years	-3.100	3.800	-4.600
15-24 years	2.700	4.700	1.900
25-34 years	2.800	0.800	3.000
35-44 years	-0.200	-0.400	-0.300
45-54 years	0.800	-0.700	1.100
55-64 years	0.200	-0.300	0.200
65-74 years	-1.200	-1.900	-1.200
75-84 years	-0.700	-0.600	-0.700
85 years and over	-0.900	-4.400	-0.600
Age			
Age-adjusted	-0.600	-1.300	-0.400
All ages			
Crude	1.200	0.800	1.200
Under 1 year2	1.100	1.600	1.300

# Working with Multiple Connections

## Working with Multiple Connections

A workbook can contain multiple connections to multiple data sources. Each connection is listed at the top of the Data window. Each worksheet has a primary connection and can optionally have several secondary connections using data blending. The primary connection and the secondary connections are linked by specified relationships. Adding a secondary connection to a sheet can be useful when you have data in multiple data sources that you want to integrate into a single analysis.

- [Understanding Data Blending](#)
- [Navigating Connections in the Data Window](#)
- [Adding a Secondary Connection](#)
- [Defining Relationships](#)
- [Example - Data Blending on a Worksheet](#)
- [Troubleshooting Data Blending](#)

## Understanding Data Blending

*Data blending is when you blend data from multiple data sources on a single worksheet. The data is joined on common dimensions. Data Blending does not create row level joins and is not a way to add new dimensions or rows to your data. Refer to [Joining Tables](#) to learn how to create those types of joins. Instead, data blending should be used when you have related data in multiple data sources that you want to analyze together in a single view. For example, you may have Sales data collected in an Oracle database and Sales Goal data in an Excel spreadsheet. To compare actual sales to target sales, you can blend the data based on common dimensions to get access to the Sales Goal measure.*

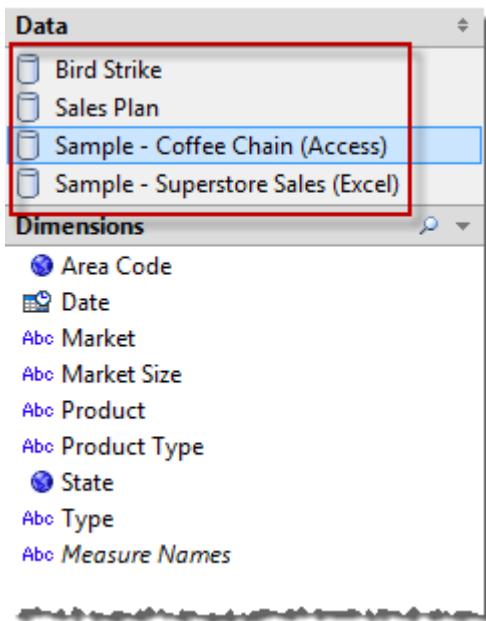
*To integrate data, you must first add one of the common dimensions from the primary data source to the view. For example, when blending Actual and Target sales data, the two data sources may have a Date field in common. The Date field must be used on the sheet. Then when you switch to the secondary data source in the Data window, Tableau automatically links fields that have the same name. If they don't have the same name, you can define a custom relationship that creates the correct mapping between fields.*

*For each data source that is used on the sheet, a query is sent to the database and the results are processed. Then all the results are left joined on the common dimensions. The join is done on the member aliases of the common dimensions so if the underlying values aren't an exact match, you can fix it up in Tableau.*

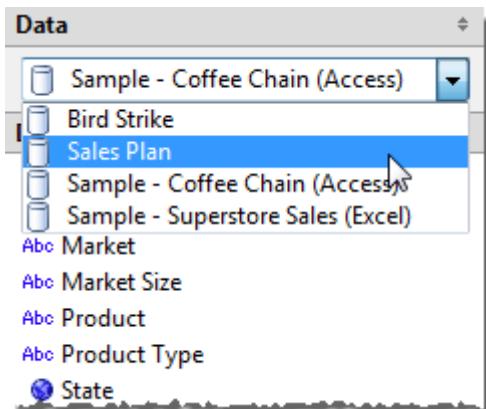
*In general, a good test to see whether data can be integrated smoothly is to drag the dimensions from the primary data source into a text table on one sheet. Then on another sheet, drag the same fields from the secondary data source into a text table. If the two tables match up then the data is most likely going to blend correctly.*

## Navigating Connections in the Data Window

The top of the Data window lists all of the connections in a given workbook. Simply select the data source you want to use and the Data window updates to show the corresponding fields.

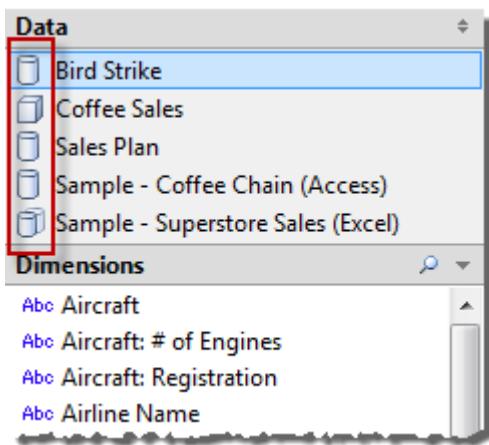


You can resize the connection list area in the Data window to save space. When you resize to a limited vertical height, the list is converted to a drop-down list.

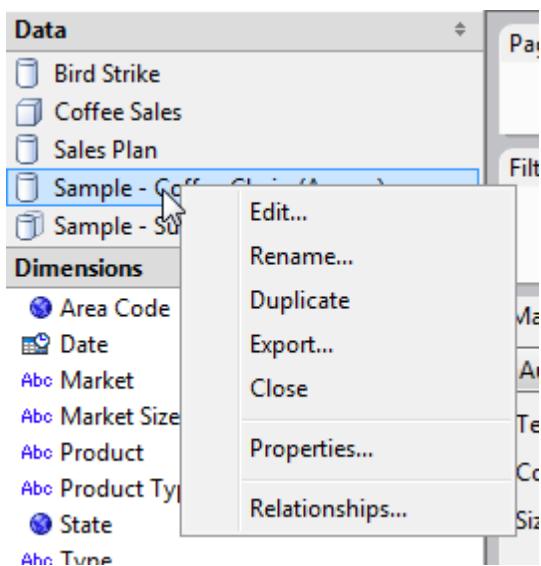


## Tableau Desktop Help

*Each connection has an icon to indicate the type of connection. For example, the icon can indicate whether the data source is relational, a cube, or a data extract.*



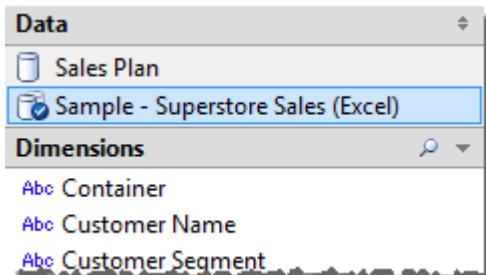
*You can right-click the connections to access the commands that are on the Data menu. For example, you can right-click a connection and rename, export, or close it.*



## Adding a Secondary Connection

Sometimes you may have data in two separate data sources that you want to analyze together on a single worksheet. While you can analyze several data sources together on the same worksheet, each worksheet must have a primary data source.

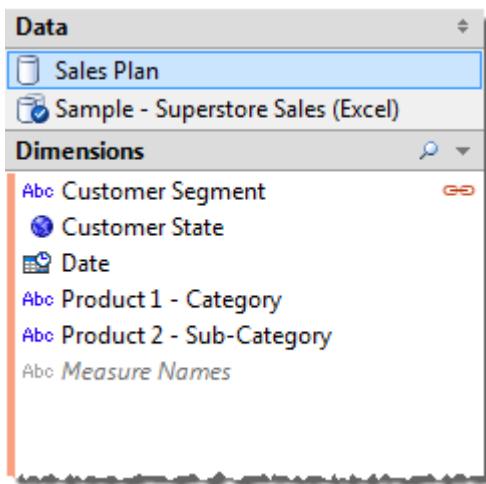
The primary data source is the connection that you first use in the view. After you drag fields to the view, the primary connection is marked with a blue check mark.



If you switch to another connection, you'll notice that the Data window is marked with an orange color to indicate that if you use fields from this connection, it will become the secondary connection.

**Note:**

Multidimensional data sources (cubes) cannot be used as the secondary data source. They can only be used as the primary data source.



**To add a secondary connection:**

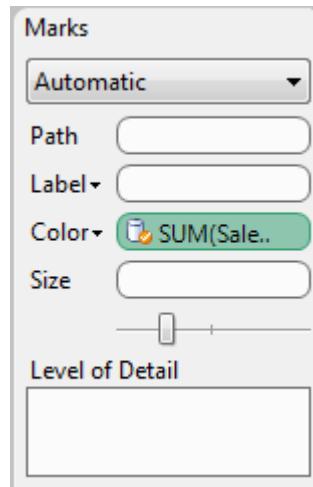
1. Connect to the primary data source and build a view.
2. When you need additional data from a separate data source, select Data > Connect to Data.
3. Follow the steps in [How to Connect to a Data Source](#) to connect to the secondary data source.
4. On the worksheet where you need the secondary data, select the new connection. Notice that the Data window is colored orange to indicate that it is a secondary data source.

If your view uses any fields that exist in the secondary data source, you'll see that Tableau automatically defined a relationship to link those two columns.

Linked fields are marked with a link icon  in the Data window. You can also define your own custom relationships to handle columns that don't have matching names. You must have a linked field in the view to use data from the secondary connection.

5. Drag the fields from the secondary data source into the view.

The fields in the view that are from the secondary data source are marked with an orange check mark to indicate that they are from the secondary data source.



**To remove a secondary connection:**

- *Right-click the secondary connection at the top of the Data window and select Close.*

## Defining Relationships

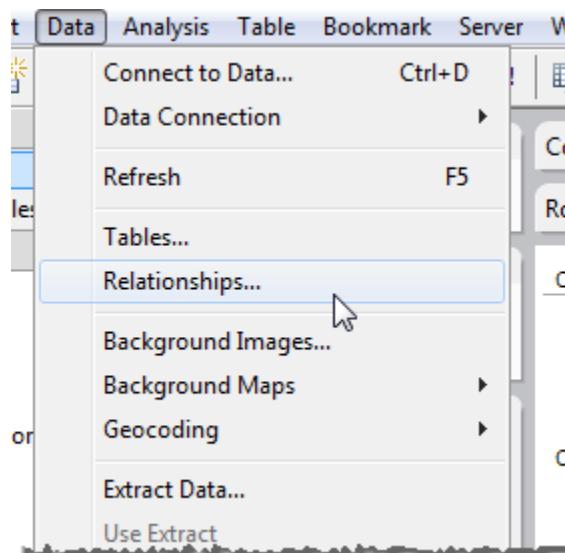
Tableau automatically recognizes when a field you are using in the view exists in a secondary data source. These fields are marked with a link icon in the Data window and an automatic relationship is created between the two data sources. The relationship allows you to blend data from both data sources on a single sheet. You must have a linked field in the view in order to use data from the secondary data source. For example, a workbook may have two connections: Superstore Sales and Sales Plan. These two connections have related information including the columns for Customer Segment and Customer State. The data from Sales Plan (the secondary data source) cannot be used (blended) until one of those common fields has been added to the view.

You can modify the automatic relationships or create new custom relationships by selecting Data > Edit Relationships.

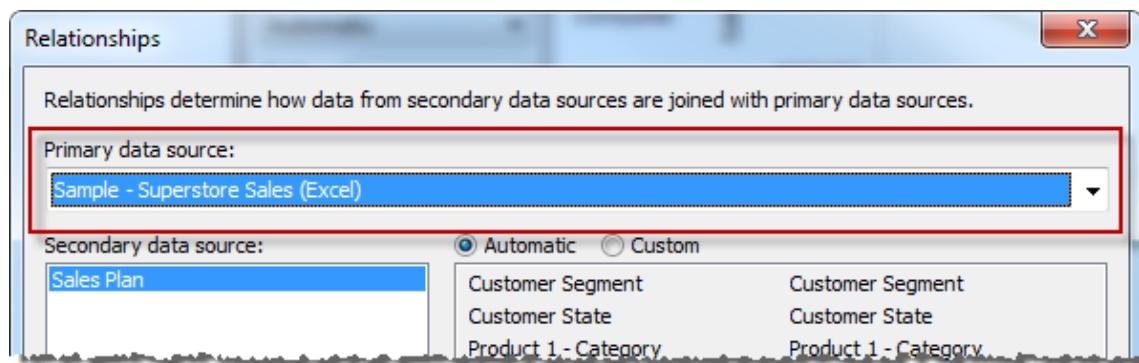
The Relationships dialog box lets you select a primary data source using the drop-down list at the top. Then you can select a secondary data source in a list on the left side of the dialog box. The right side of the dialog box lists any relationships that have been added.

**To add and edit relationships:**

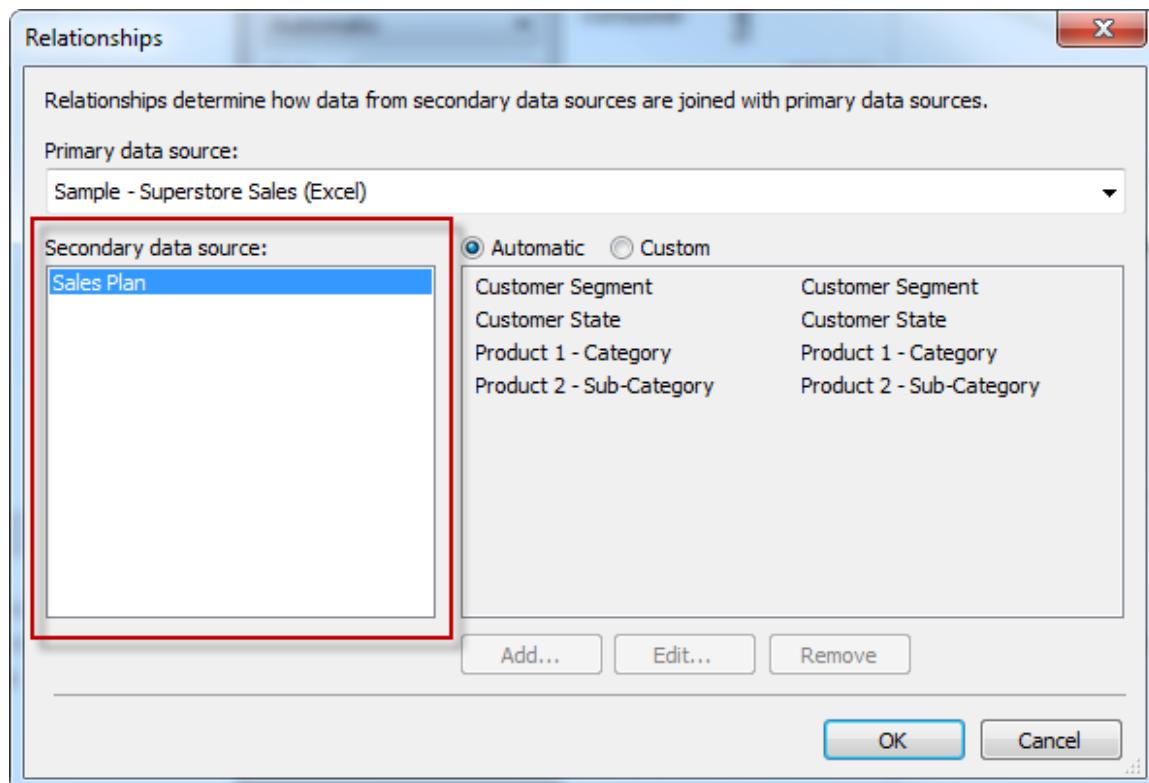
1. Select Data > Edit Relationships to open the Relationships dialog box.



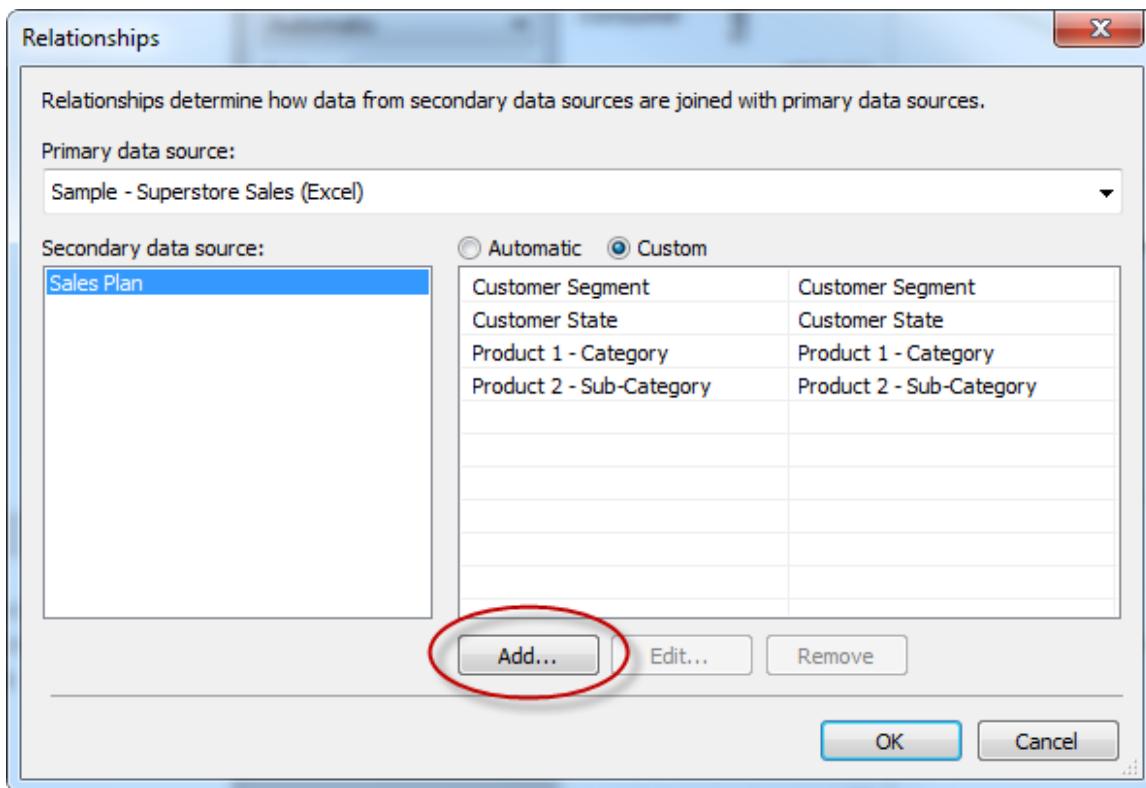
2. Make sure that the primary data source is selected from the down list.



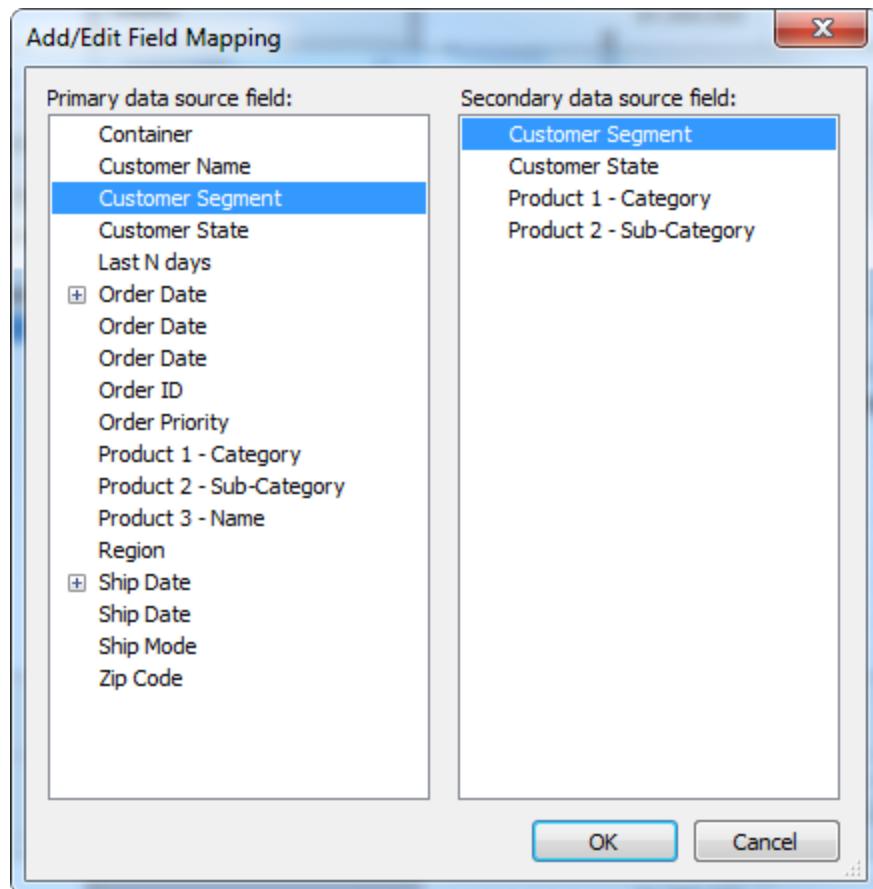
3. Select a secondary data source from the list on the left.



4. Select Custom at the top of the relationships list.
5. Click the Add button or select an existing relationship and click the Edit button.



6. Select a field in the primary data source and map it to matching field in the secondary data source.



7. When finished, click OK.
8. Add and Remove as many relationships as necessary, and when finished, click OK again.

*When the related field from the primary data source is used in the view, the linked fields in the secondary data source are marked with a link icon  in the Data window to show that they are related to a field in the primary data source.*

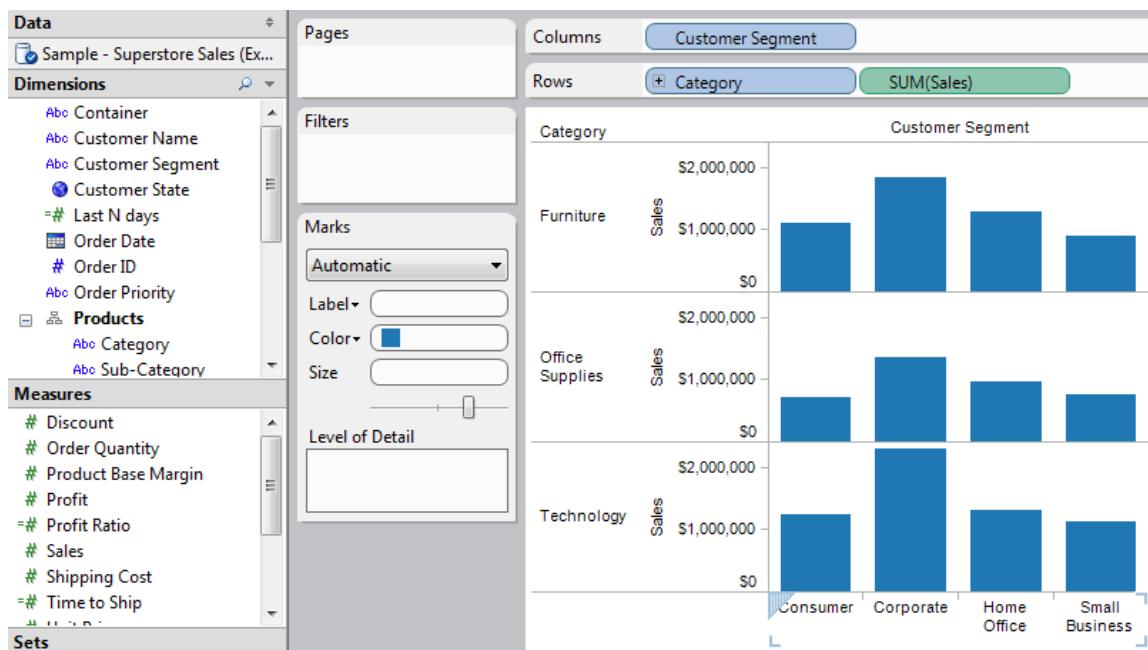
*The relationship matches values based on the member aliases. You can fix up fields that don't match by editing the aliases. For example, when mapping a State Name field in the primary data source to a State Abbreviation field in the secondary data source, "AK" will not map correctly to "Alaska". You'll have to modify the aliases in one of the data sources.*

## Example - Data Blending on a Worksheet

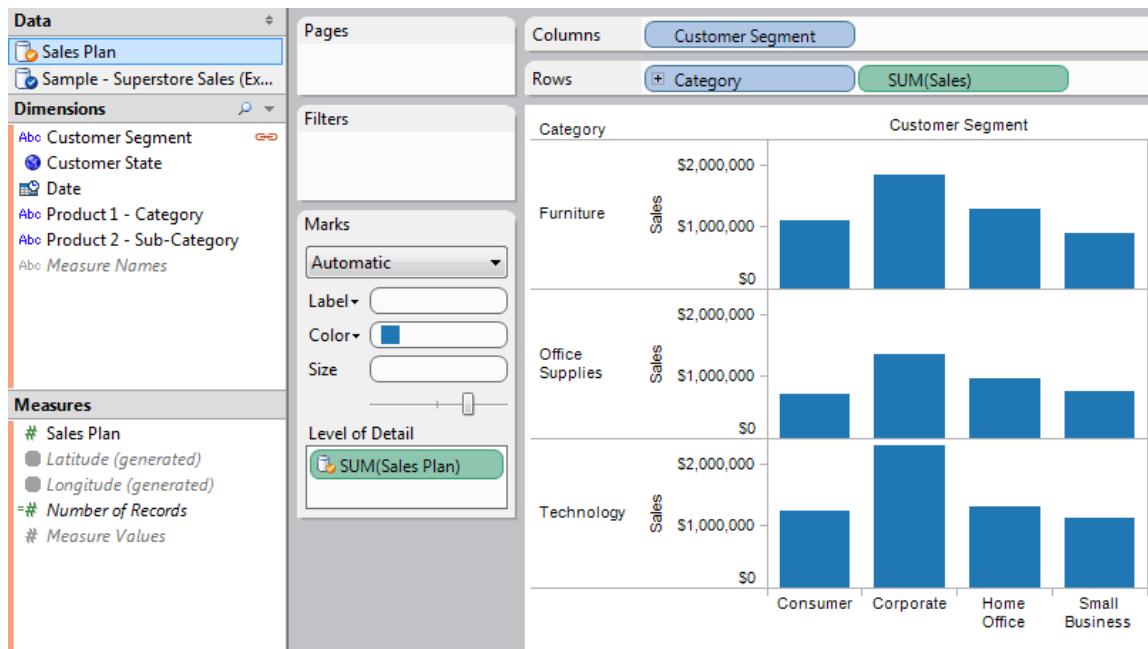
This example uses two data sources: Sample - Superstore Sales (Excel) that comes with the application and an auxiliary Excel file that contains forecasted sales information. An example of each of their columns are shown below:

Follow the steps below to use data from both data sources on a single worksheet.

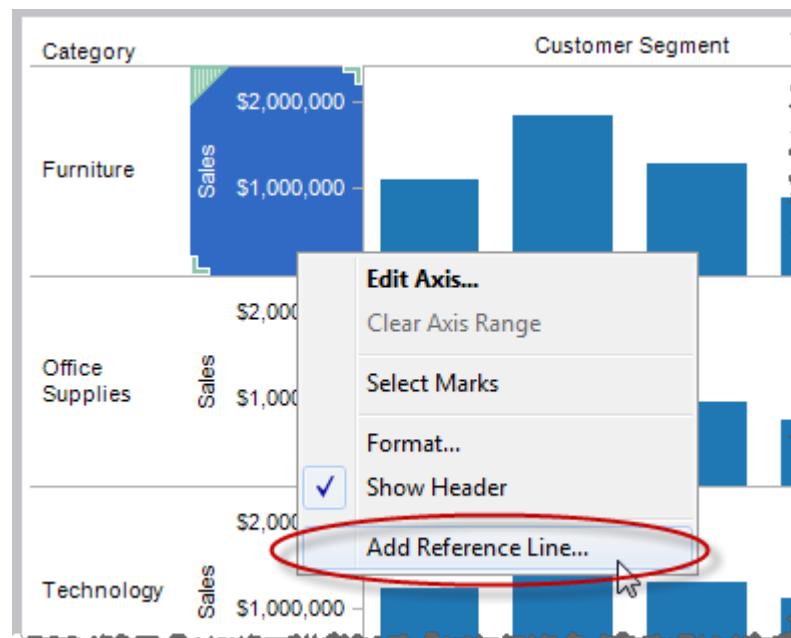
1. Connect to Sample - Superstore Sales (Excel) and build a view that shows Sales by Customer Segment and Product Category.



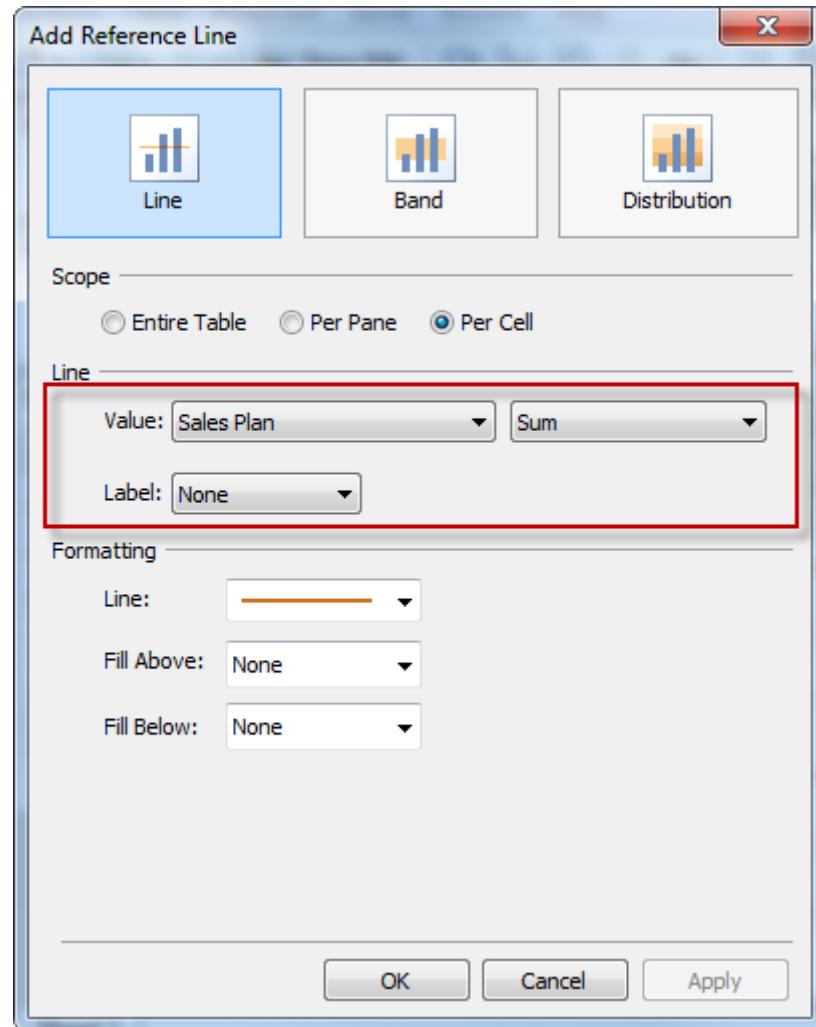
2. Select Data > Connect to Data and connect to the Sales Plan spreadsheet.
3. Drag the Sales Plan measure to the Level of Detail shelf.



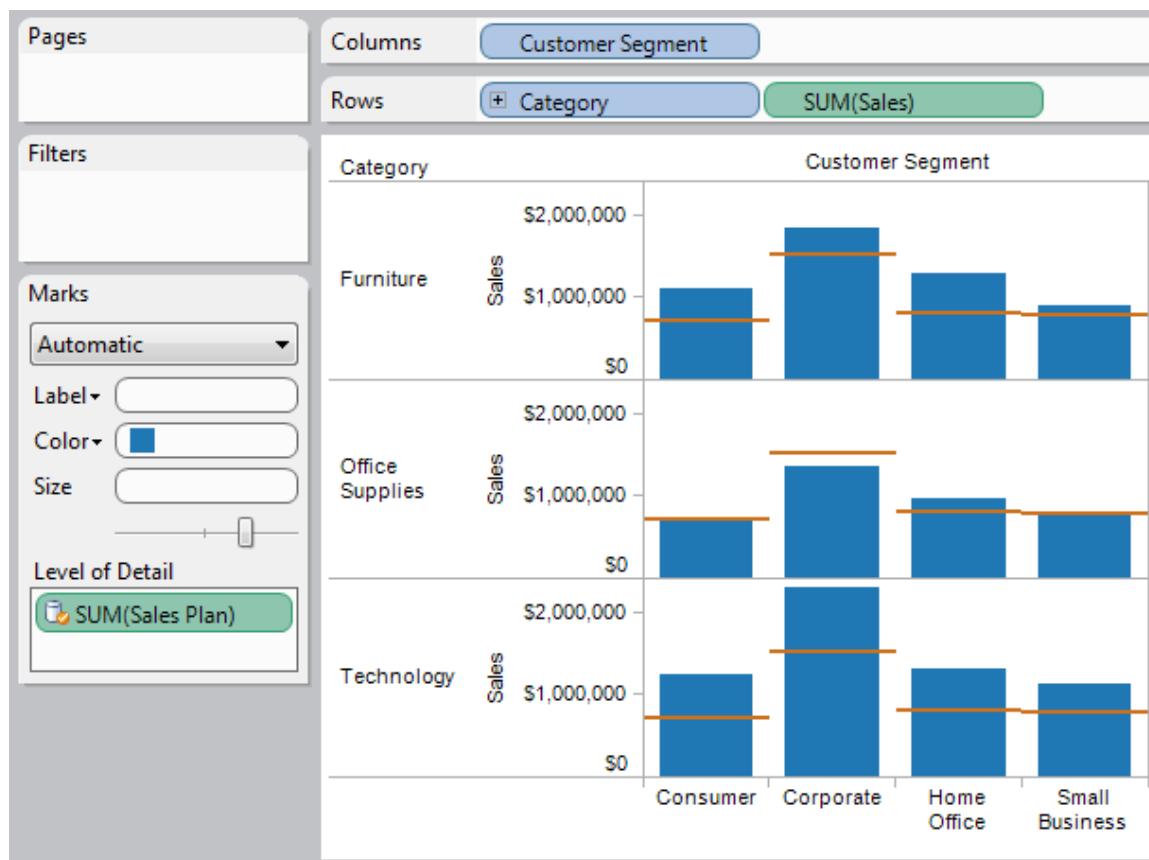
- Right-click the Sales axis and select Add Reference Line.



5. In the Reference Line dialog box, add a reference line that shows Sales Plan per cell. When finished, click OK.



6. The Worksheet is now pulling data from the secondary data source (Sales Plan) to show how actual sales compared to the forecasted sales.



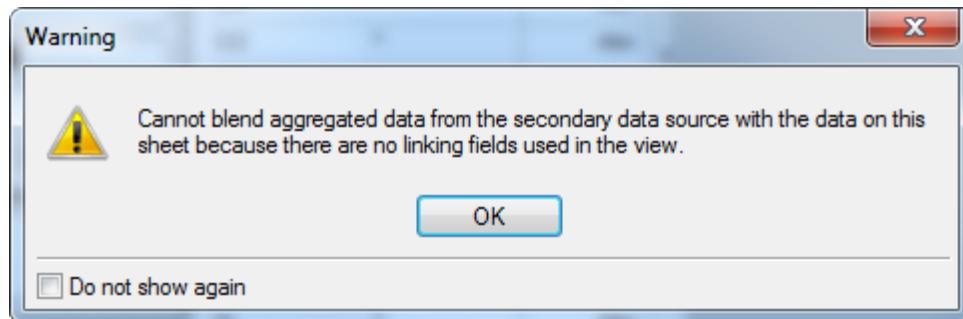
## Troubleshooting Data Blending

When you integrate data from multiple data sources, you may run into some of these common issues:

### *Warning: Cannot Blend Because No Linking Fields*

When you drag a field from a secondary data source to the view, you may see a warning that says:

*Cannot blend aggregated data from the secondary data source with the data on this sheet because there are no linking fields used in the view.*

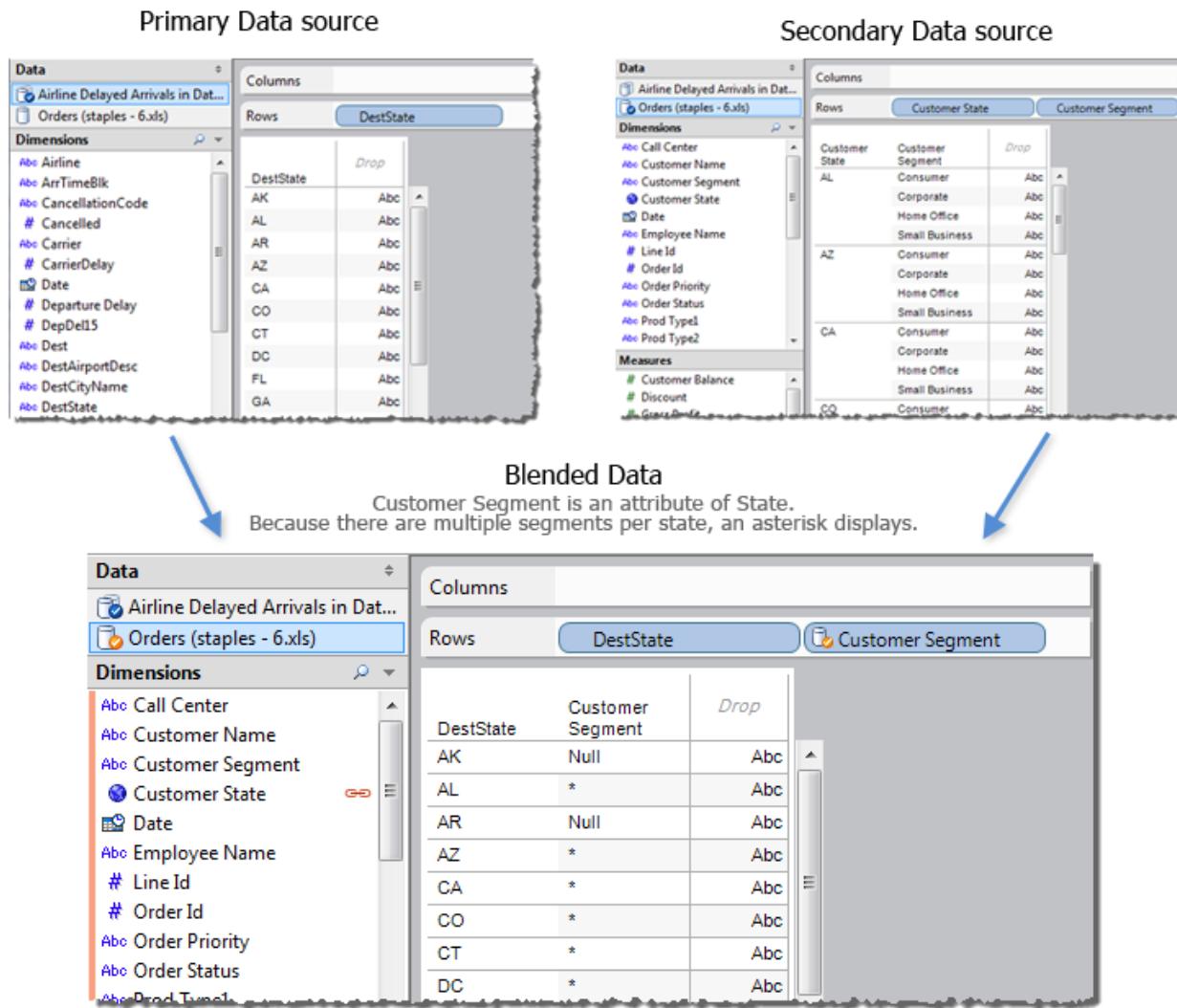


This warning occurs when you have not used a linking field in the view. For example, if you have two data sources with the related dimensions State and Date, you must be using one of those primary dimensions in the view before you can blend data from the secondary data source.

The secondary data source may not have any relationships to the primary data source. Look in the Data window for the link icon. Tableau automatically links fields that have the same name. If your fields do not have the same name you'll have to create a custom relationship.

### *Asterisks Show in the View*

When you relate secondary data, make sure that there is only one matching member in the secondary dimension for each mark. If there are multiple matching members you will see an asterisk in the view. For example, say you have two data sources. The primary data source has a state field that contains state abbreviations. The secondary data source also contains a state field along with a customer segment field. Each state may have multiple customer segments (e.g., CA has Consumer and Corporate). When you relate the two data sources on state, you've created a relationship where state can have multiple customer segment values. When that happens you will see an asterisk in the view.



All secondary fields are aggregated. Dimensions are aggregated as Attributes (ATTR), which means that if there's only one member it will show the member value but if there are multiple members it will show an asterisk.

### Using a Multidimensional (Cube) Data Source

When blending data in Tableau, multidimensional data sources cannot be used as secondary data sources. These types of databases can only be used as the primary data source.

## Joining Tables

### Joining Tables

*Many relational data sources are made up of a collection of tables that are related by specific fields. For example, a data source for a publisher may have a table for authors that contains the first name, last name, phone number, etc. of clients. In addition, there may be another table for titles that contains the price, royalty, and title of published books. In order to analyze these two tables together, to answer questions like, how much was paid in royalties last year for a particular author, you would join the two tables using a common field such as Author ID. That way you can view and use the fields from both tables in your analysis.*

- [Adding Tables](#)
- [Editing Tables](#)

## Adding Tables

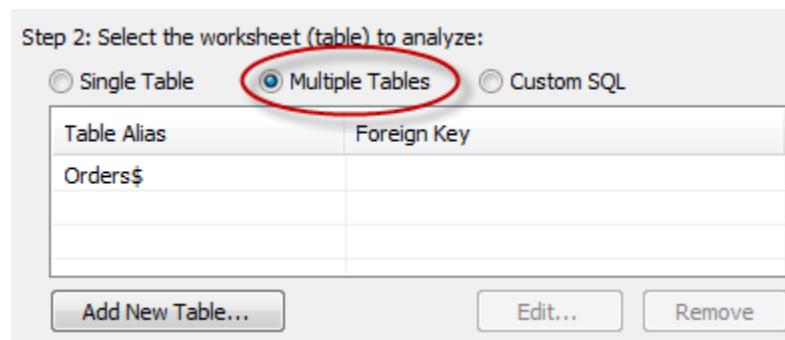
### Adding Tables

You can connect to multiple tables when you first connect to a data source using the connection dialog box. There you can add tables, specify joins, and modify the field aliases in the case you have similarly named fields in each of the tables. You can also add tables after you have already connected to the data source. This section describes how to connect to multiple tables as well as adding tables to the Data window.

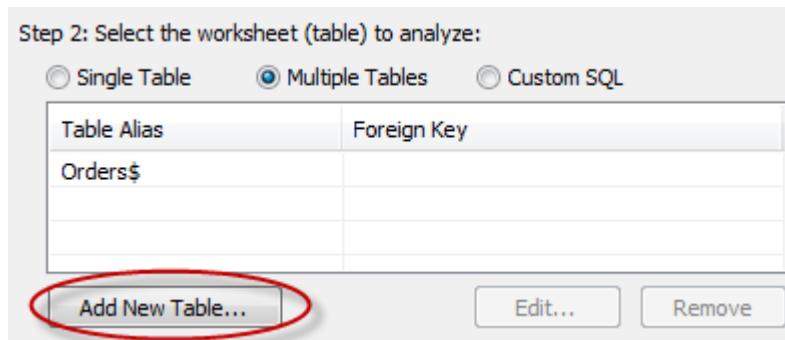
- [Connecting to Multiple Tables](#)
- [Adding Tables to the Data window](#)

## Connecting to Multiple Tables

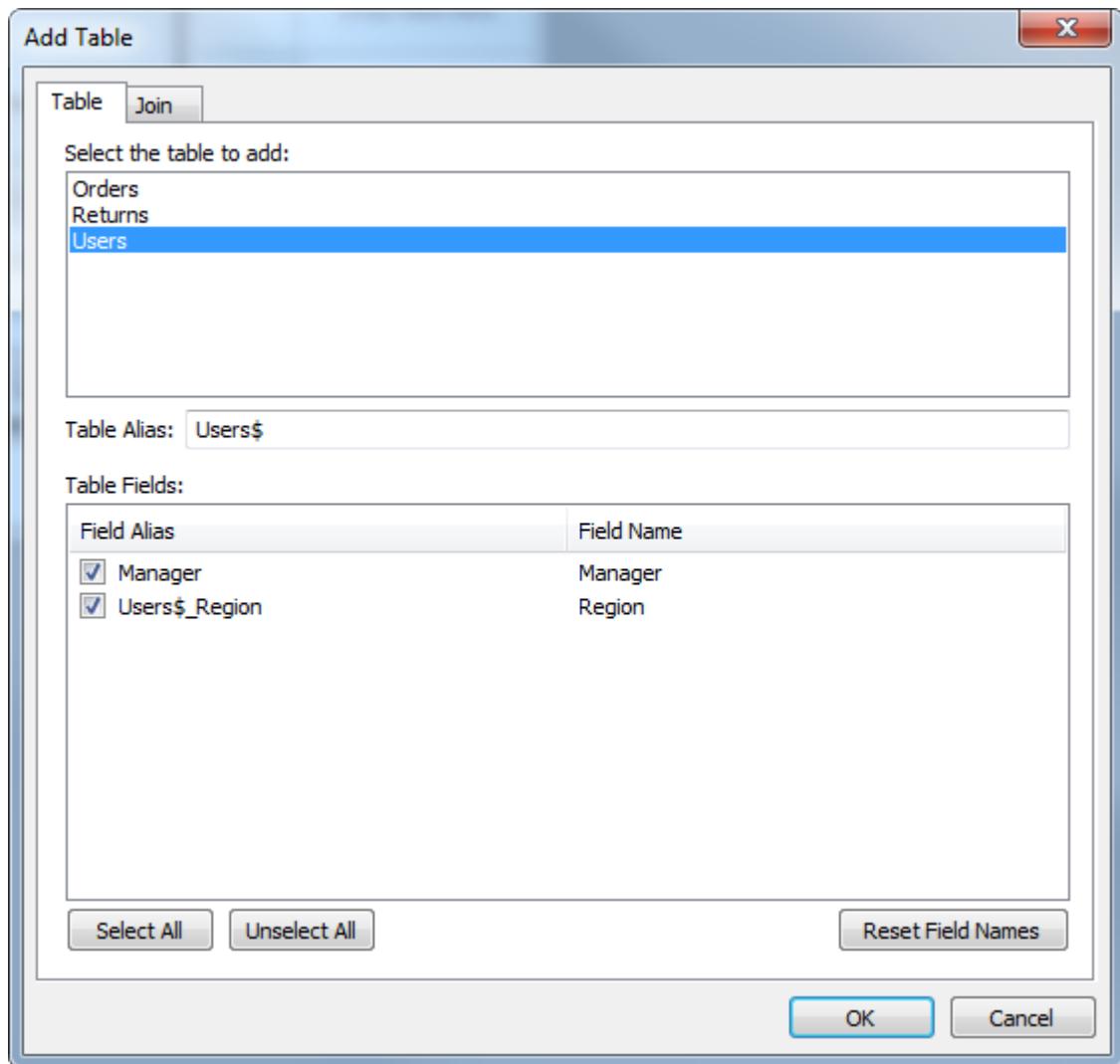
1. In the Connection dialog box, complete the connection information according to the examples described in [Examples - Connecting to Data Sources](#).
2. Select the table or view you want to start with (typically the fact table) and then select the Multiple Tables option.



3. Click the Add New Table button at the bottom of the dialog box.



4. In the Add Table dialog box select a table to add to the Data window.



5. Optionally change *Field aliases*.

*In the bottom half of the Add Table dialog box, there is a list of fields with their aliases. Double-click the field alias to change how the field will be displayed in the Data window. This is often useful when you have duplicate field names across tables or your field names are not very understandable.*

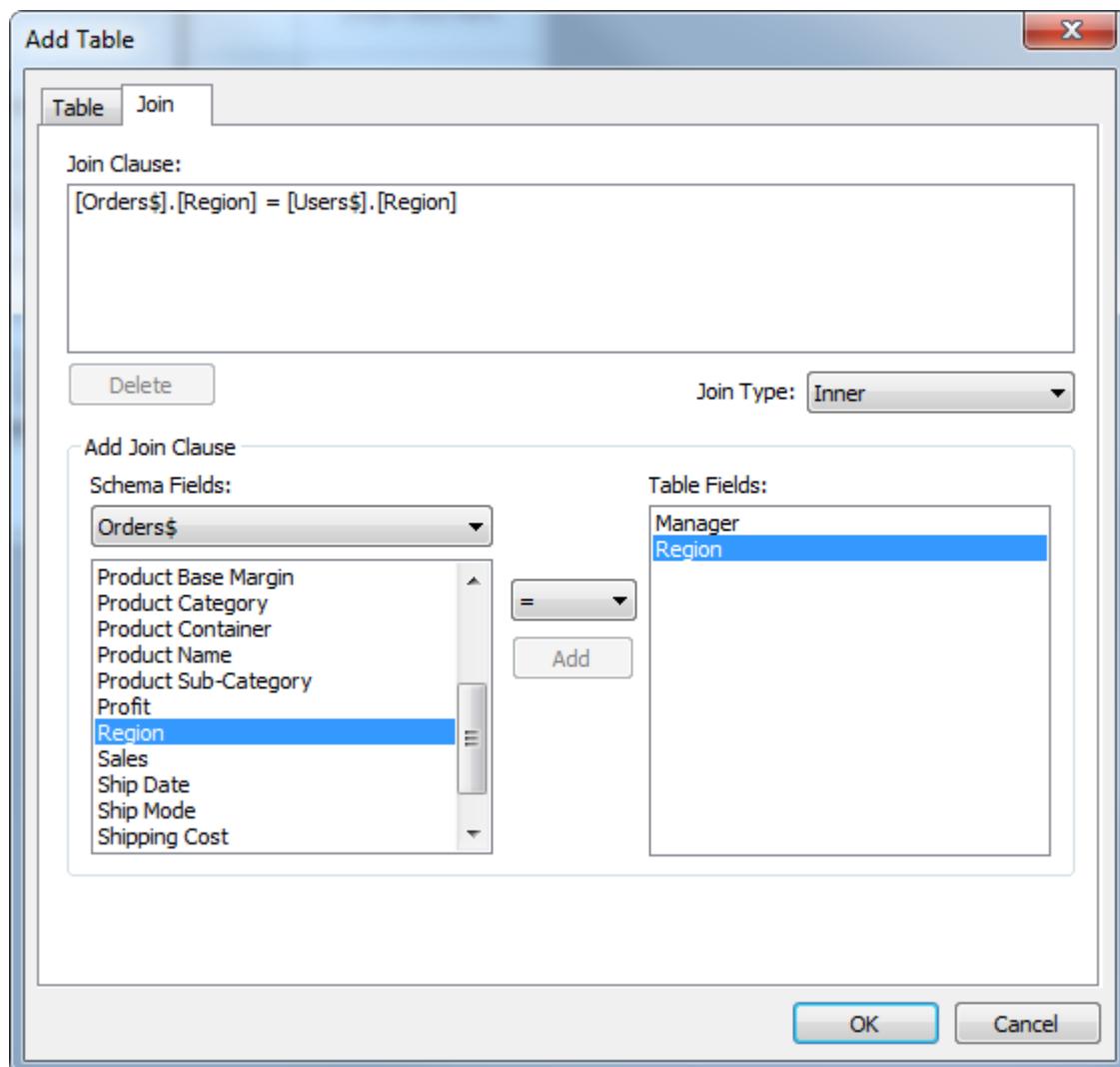
6. Add a join by selecting the *Join* tab.

*Tableau will automatically create a join for you based on the structure of your data. Select the Joins tab to inspect the join clause to make sure it is how you want to connect the tables.*

You can delete unwanted join clauses by selecting it in the list of join clauses and clicking Delete.

7. In the Join pane, add one or more join clauses by selecting a field from the original table, a field from the added table, and an operator. Then click Add to add it to the list of Join Clauses.

For example, in a data source that has a table of order information and another for users information, you could join the two tables based on the Region field that exists in both tables. Select Region in both the lists of fields, select the equal sign as the operator, and click Add.



8. Select the type of join from the Join Type drop-down list. You can select Inner, Left, or Right.

*Please note, you cannot nest Inner joins within Left or Right joins. These joins will cause a join expression not supported error.*

9. When finished, click OK.

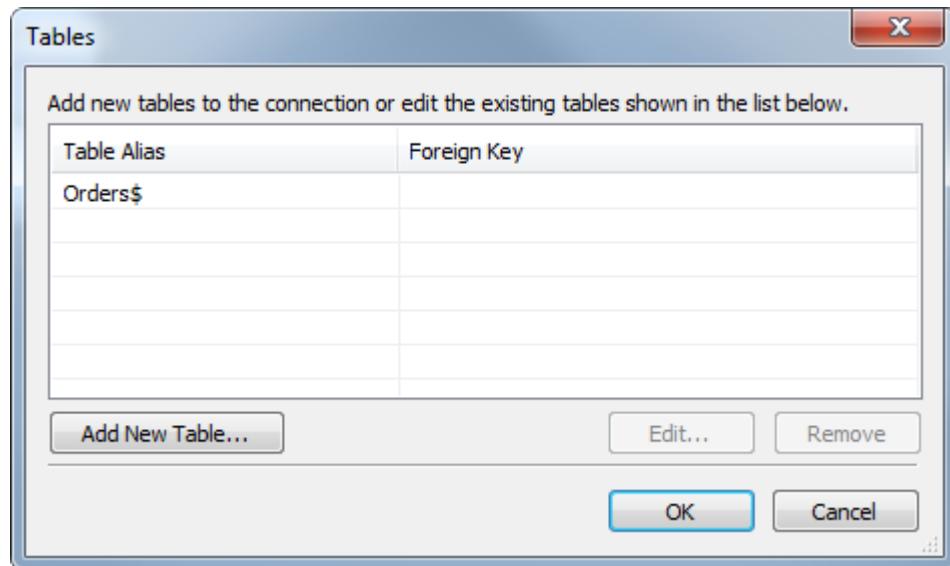
*The tables are listed in the Connection dialog box along with the foreign keys.*

10. Complete the connection by giving it a name and clicking OK.

*When you add joined tables, the Data window is automatically organized to use the Group by Table command. You can turn this feature off or change how the Data window is sorted using the Data window menu.*

## Adding Tables to the Data window

1. Select a data source on the Data menu and then select Edit Tables.



2. In the Tables dialog box, click Add New Table.
3. In the Add Tables dialog box, select a table to add. Complete the dialog box by defining at least one join clause and optionally changing field aliases.
4. When finished, click OK and then OK again to close the dialog boxes.

When you connect to multiple tables you are essentially connecting to a denormalized view of the data source. This means that all queries are run against all tables and it is possible for some measures to be over counted. For example, suppose you have an employees table and an orders table. However you keep the employee salary measure in the orders table. The salary will be counted for each order the employee made. Use the MIN aggregation to remove the double counting.

## Editing Tables

You can modify the joined tables using the *Tables* command. You may want to edit a table to add or remove fields from the *Data* window, modify the *join clause*, or add more *join clauses* to further define how the table is connected to the original table.

1. Select a data source on the *Data* menu and then select *Edit Tables*.
2. In the *Tables* dialog box, select the joined table you want to modify and click *Edit*.
3. In the subsequent dialog box, you can change the table and field aliases as well as add and remove fields from the *Data* window. Select the *Join* tab to edit the *join clauses*.
4. When finished click *OK* twice to close the *Tables* dialog boxes.

# Extracting Data

## Extracting Data

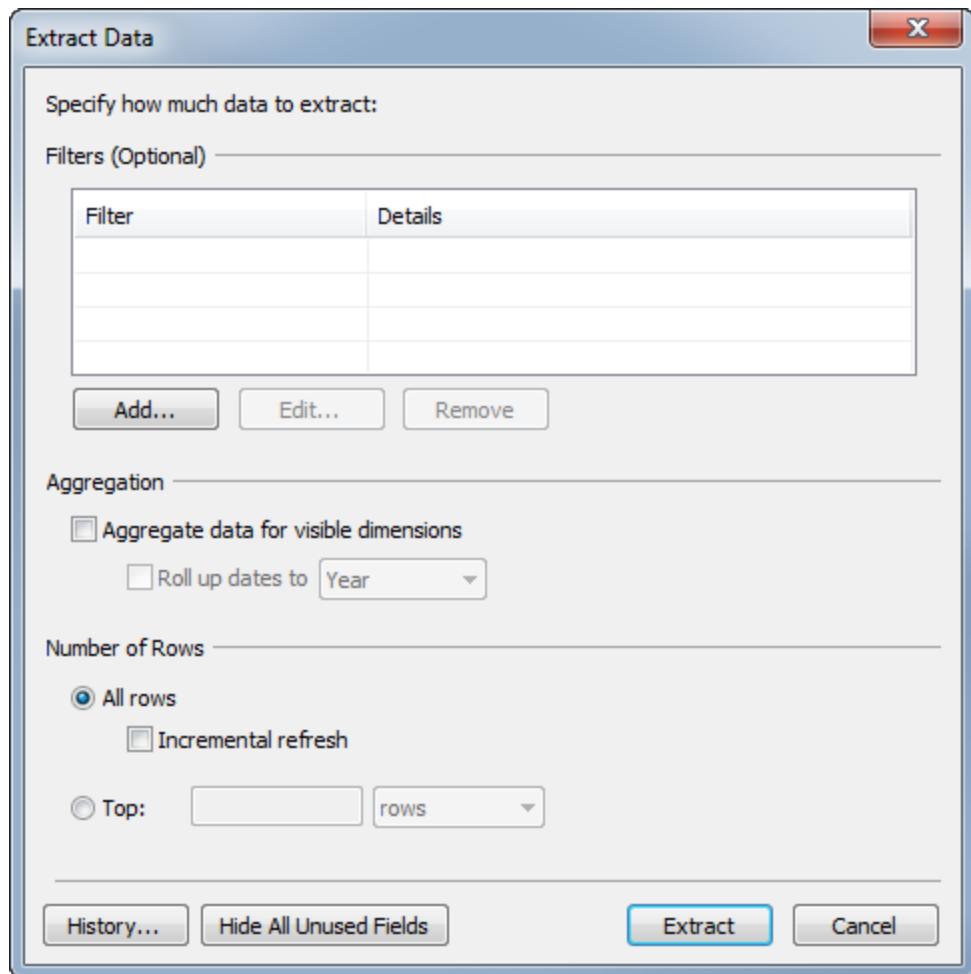
*Extracts are saved subsets of a data source that you can use to improve performance, upgrade your data to allow for more advanced capabilities, and analyze offline. You can create an extract by defining filters and limits that include the data you want in the extract. After you create an extract you can refresh it with data from the original data source. You can either fully refresh the data, replacing all of the extract contents; or you can increment the extract; which only adds rows that are new since the last refresh.*

*Extracts can:*

- *Improve performance. For file based data sources such as Excel or Access, a full extract takes advantage of the Tableau data engine. For large data sources, a filtered extract can limit the load on the server when you only need a subset of data.*
- *Add functionality to file based data sources, such as the ability to compute Count Distinct.*
- *Provide offline access to your data. If you are traveling and need to access your data offline, you can extract the relevant data to a local data source.*
- [Creating an Extract](#)
- [Using Extracts](#)
- [Refreshing Extracts](#)
- [Adding Rows from a File](#)
- [Upgrading Legacy Extracts](#)
- [Optimizing Extracts](#)

## Creating an Extract

1. Select a data source on the Data menu and then select Extract Data to open the Extract Data dialog box.

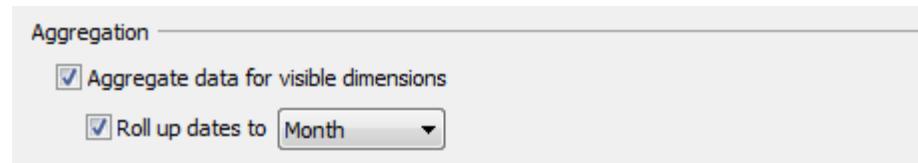


2. Optionally define filters to limit the data that will be extracted. Any fields that are hidden in the Data window will be automatically excluded from the extract. Click the Hide All Unused Fields button to quickly remove them from the extract.

To add filters, click the Add button under the Filters list.

3. Specify whether to Aggregate data for visible dimensions. When you select this option the measures are aggregated using their default aggregation. Aggregating the data can minimize the size of the extract file and increase performance.

*When you choose to aggregate the data you can also choose to Roll up dates to a specified date level such as Year, Month, etc.*



*The examples below show how the data will be extracted for each aggregation option.*

Original Data	<table border="1"> <thead> <tr> <th></th><th>A</th><th>B</th><th>C</th></tr> <tr> <th>1</th><th>Date</th><th>Region</th><th>Sales</th></tr> </thead> <tbody> <tr> <td>2</td><td>1/1/2009</td><td>South</td><td>\$500</td></tr> <tr> <td>3</td><td>1/1/2009</td><td>West</td><td>\$200</td></tr> <tr> <td>4</td><td>1/1/2009</td><td>West</td><td>\$100</td></tr> <tr> <td>5</td><td>1/1/2009</td><td>East</td><td>\$300</td></tr> <tr> <td>6</td><td>1/2/2009</td><td>South</td><td>\$600</td></tr> <tr> <td>7</td><td>1/2/2009</td><td>South</td><td>\$400</td></tr> <tr> <td>8</td><td>1/2/2009</td><td>East</td><td>\$100</td></tr> <tr> <td>9</td><td></td><td></td><td></td></tr> </tbody> </table>		A	B	C	1	Date	Region	Sales	2	1/1/2009	South	\$500	3	1/1/2009	West	\$200	4	1/1/2009	West	\$100	5	1/1/2009	East	\$300	6	1/2/2009	South	\$600	7	1/2/2009	South	\$400	8	1/2/2009	East	\$100	9				Each record is shown as a separate row. There are 7 rows in the data source.
	A	B	C																																							
1	Date	Region	Sales																																							
2	1/1/2009	South	\$500																																							
3	1/1/2009	West	\$200																																							
4	1/1/2009	West	\$100																																							
5	1/1/2009	East	\$300																																							
6	1/2/2009	South	\$600																																							
7	1/2/2009	South	\$400																																							
8	1/2/2009	East	\$100																																							
9																																										
Aggregate Data (no roll up)	<table border="1"> <thead> <tr> <th></th> <th>A</th> <th>B</th> <th>C</th> </tr> <tr> <th>1</th> <th>Date</th> <th>Region</th> <th>Sales</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>1/1/2009</td> <td>East</td> <td>\$300</td> </tr> <tr> <td>3</td> <td>1/1/2009</td> <td>South</td> <td>\$500</td> </tr> <tr> <td>4</td> <td>1/1/2009</td> <td>West</td> <td>\$300</td> </tr> <tr> <td>5</td> <td>1/2/2009</td> <td>East</td> <td>\$100</td> </tr> <tr> <td>6</td> <td>1/2/2009</td> <td>South</td> <td>\$1,000</td> </tr> <tr> <td>7</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		A	B	C	1	Date	Region	Sales	2	1/1/2009	East	\$300	3	1/1/2009	South	\$500	4	1/1/2009	West	\$300	5	1/2/2009	East	\$100	6	1/2/2009	South	\$1,000	7				Records with the same date and region have been aggregated into a single row. There are 5 rows in the data source.								
	A	B	C																																							
1	Date	Region	Sales																																							
2	1/1/2009	East	\$300																																							
3	1/1/2009	South	\$500																																							
4	1/1/2009	West	\$300																																							
5	1/2/2009	East	\$100																																							
6	1/2/2009	South	\$1,000																																							
7																																										
Aggregate Data (roll up dates to Month)		Dates have been rolled up to the Month level and records with the same region have been aggregated into a single row. There are 3 rows in																																								

	A	B	C	D
1	Date	Region	Sales	
2	1/1/2009	East	\$400	
3	1/1/2009	South	\$1,500	
4	1/1/2009	West	\$300	
5				

the data source.

4. Select the number of rows you want to extract. You can extract All, the Top N rows, or a Sample from the data source. Tableau first applies any filters and aggregation and then extracts the number of rows from the filtered and aggregated results.

*The number of rows options depend on the type of data source you are extracting from. For example, not all data sources support sampling so that option is not always available.*

5. When finished, click Extract.
6. In the subsequent dialog box, select a location to save the extract into and give the file a name. Then click Save.

*Depending on the size of your data source, extracting data can take a long time. However, after you have extracted the data and saved it to your hard drive, performance will improve.*

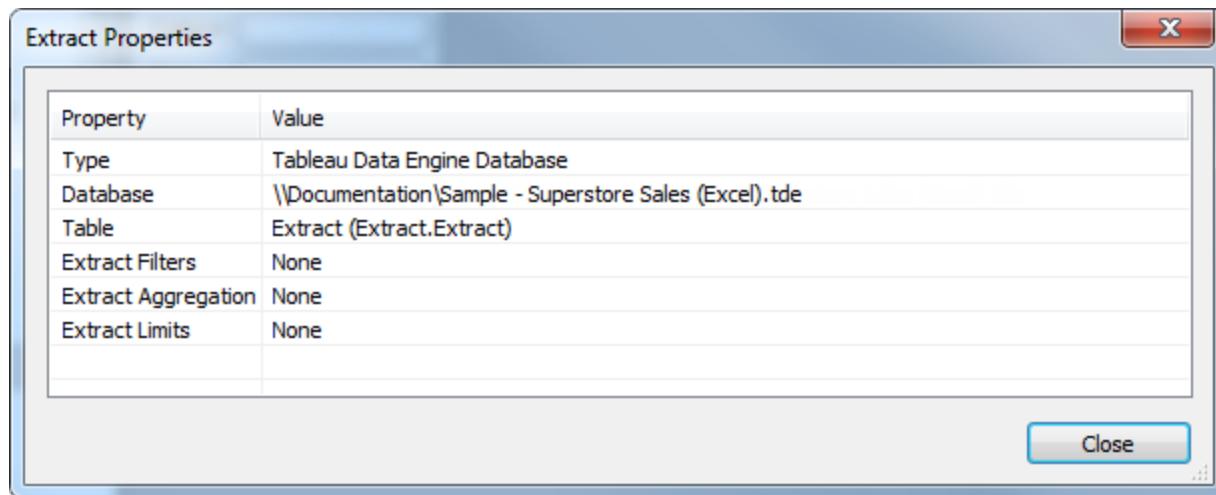
## Using Extracts

After you create an extract, the current workbook begins using the extract. However, the extract connection is not saved with the workbook until the next time you save. That means, if you close the workbook without saving first, the workbook will connect to the original data source the next time you open it.

You may want to create an extract with a sample of the data so you can set up the view and then switch to the whole data source, thus avoiding long queries every time you place a field on the shelf. You can toggle between using the extract and using the entire data source by selecting a data source on the Data menu and then selecting Use Extract.

You can remove an extract at anytime by selecting a data source on the Data menu and then selecting Extract > Remove. When you remove an extract you can choose to Remove the extract from the workbook only or Remove and delete the extract file, which will delete the extract from your hard drive.

You can see when the extract was last updated and other details by selecting a data source on the Data menu and then selecting Extract > History.



## Refreshing Extracts

*When the underlying data changes, you can refresh the extract by selecting a data source on the Data menu and then selecting Extract > Refresh. Extracts can be configured to be fully refreshed, replacing all of the data with what's in the underlying data source, or incrementally refreshed, adding just the new rows since the last refresh.*

### *Full Extracts*

*By default, extracts are fully refreshed. That means that every time you refresh the extract, all of the rows are replaced with the data in the underlying data source. While this kind of refresh ensures you have an exact copy of what is in the underlying data source, it can sometimes take a long time and be expensive on the database depending on how big the extract is.*

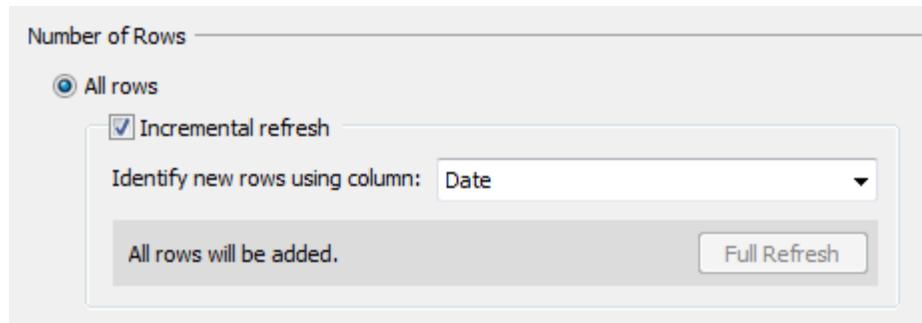
*If the extract is not set up for incremental extract, selecting refreshing the extract will fully refresh the extract. If you're publishing the data source to Tableau Server, you can specify the type of refresh in the Scheduling & Passwords dialog box.*

### *Incremental Extracts*

*Rather than refreshing the entire extract, you can set it up to only add the rows that are new since the last time you extracted data. For example, you may have a data source that is updated daily with new sales transactions. Rather than rebuild the entire extract each day, you can just add the new transactions that occurred that day. Then once a week you may want to do a full refresh just to be sure you have the most up to date data.*

*Follow the steps below to set up an extract to be incrementally refreshed.*

1. Select a data source on the Data menu and then select Extract.
2. In the Extract Data dialog box, select All rows as the number of Rows to extract. Incremental refresh can only be defined when you are extracting all rows in the database. You cannot increment a sample extract.
3. Select Incremental refresh and then specify a column in the database that will be used to identify new rows. For example, if you select a Date field, refreshing will add all rows whose date is after that last time you refreshed. Alternatively, you can use an ID column that increases as rows are added to the database.



4. When finished, click *Extract*.

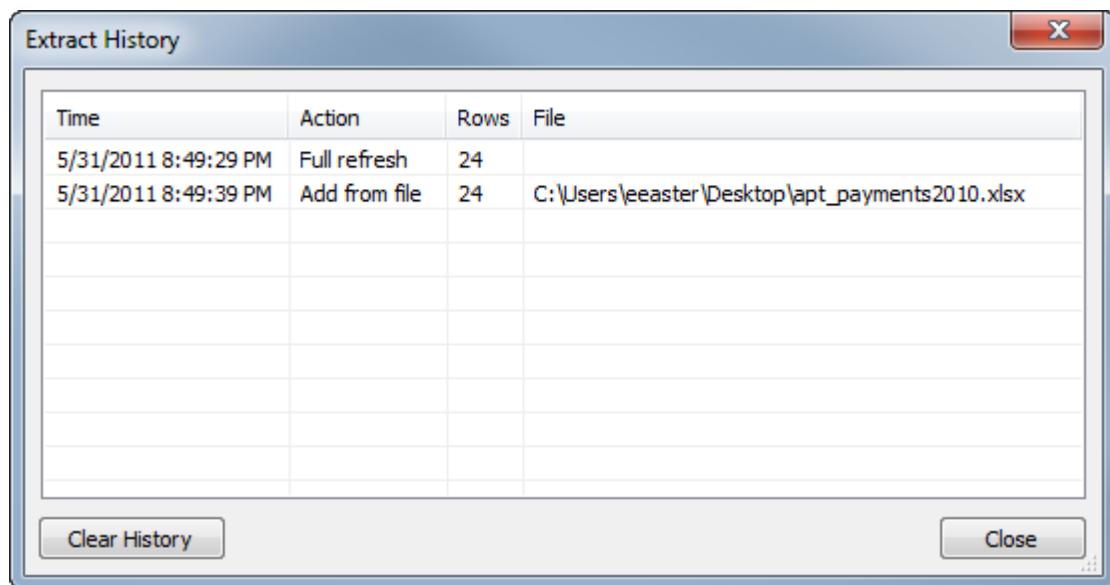
The steps above can be used to define a new extract or configure an existing extract for incremental refresh. If you are editing an existing extract, the last refresh is shown so you can be sure you are updating the extract with the correct data.

If you publish the data source to Tableau Server you can specify a schedule for incremental refresh as well as full refresh in the *Schedules & Passwords* dialog box.

#### *Extract History*

You can see a history of when the extract was refreshed by selecting a data source on the Data menu and then select *Extract > History*.

The *Extract History* dialog box shows the date and time for each refresh, whether it was full or incremental, and the number of rows that were added. If the refresh was from a file, it also shows the source file name.



## Adding Rows from a File

You can add new data to an extract from a file. For example, you may take an extract from a data warehouse that has the past ten years worth of data. However, new data has been kept in an Excel workbook. You can add the new data to the extract so that you can analyze the most recent information against the historical data.

Follow the steps below to add data from a file.

1. Select a data source on the Data menu and then select Extract > Add Data From File.
2. Browse to and select the file that has the new data.
3. Specify any Joins or Custom SQL necessary. The columns in the file must match the columns in the extract.
4. When finished, click OK.

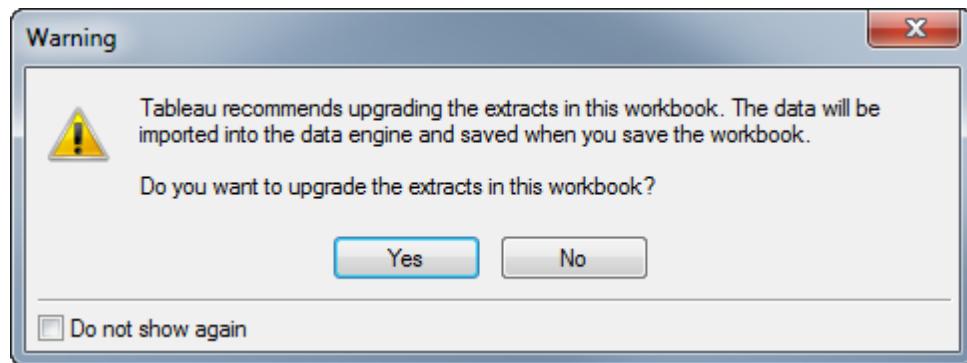
The new rows are added to the extract. You can see a summary of the number of rows that were added by selecting a data source on the Data menu and then selecting Extract > History.

**Note:**

When you refresh this extract, the data will be replaced with the data from the original data source.

## Upgrading Legacy Extracts

If you have data extracts that were created before version 6.0, you should upgrade the extracts to use the data engine. When you open the workbook, you are given the option to upgrade the extracts.



You can also upgrade the extracts by selecting a data source on the Data menu and then selecting Upgrade Extract.

## Optimizing Extracts

*To improve performance when working with extracts you can optimize the extract. Optimizing moves the calculated fields you've created into the extract so that they don't have to be computed locally every time you use them.*

*Optimize the extract by selecting a data source on the Data menu and then selecting Extract > Optimize.*

*When you modify the calculated field, the modified version will be used until you optimize the extract again.*

*Each time you optimize the extract, any deleted calculations will be removed from the extract, new ones will be added, and modified ones will be updated.*

# Managing Queries

## Managing Queries

*Queries are automatically generated every time you add a field to a shelf and interact with the view. Tableau offers several ways you can manage these queries once they are sent to the underlying data source.*

- [Automatic Updates](#)
- [Cancel Query](#)
- [Abandoned Queries](#)
- [Precision Warnings](#)

## Automatic Updates

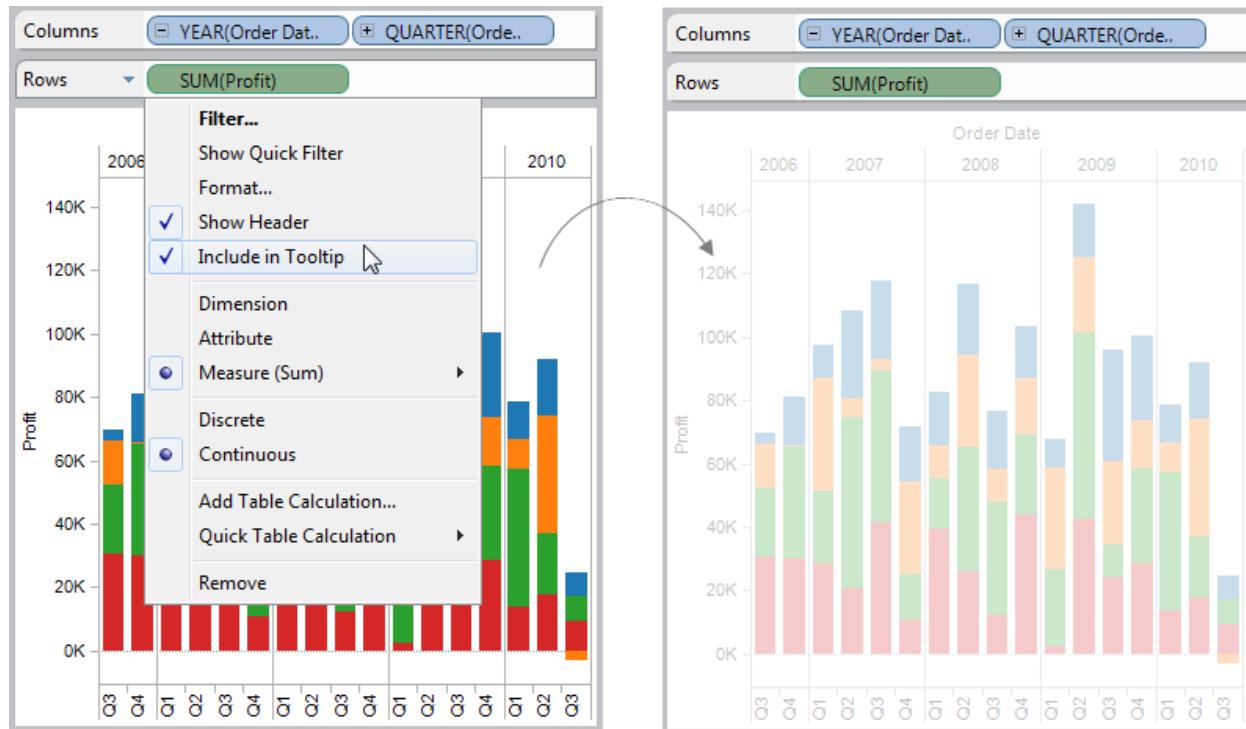
When you place a field on a shelf, Tableau generates the view by querying the data source. If you are creating a dense data view that involves many fields, the queries might be time consuming and significantly degrade system performance. In this case, you can instruct Tableau to turn off automatic updates.

By default, automatic updates are turned on and the toolbar button is highlighted . However, it is sometimes more efficient for Tableau to execute the queries you need for your final view, rather than for every intermediate step required to compose that view.

You can turn off updates by pressing F10 or the Automatic Updates toolbar button .

While automatic updates are turned off, you can still update the view at any time by clicking F9 or the Run Update  on the toolbar. This way, you can update your data view at an intermediate step. It is possible to enter an invalid state when automatic updates are turned off. When this happens, the view is desaturated and invalid commands are disabled. The view and commands become available again when you click Run Update on the toolbar.

For example, the view below has automatic updates turned off. When the aggregation for Profit is changed from a summation to an average, the view is desaturated to let you know that you have made a change to the view that has made the current view invalid.



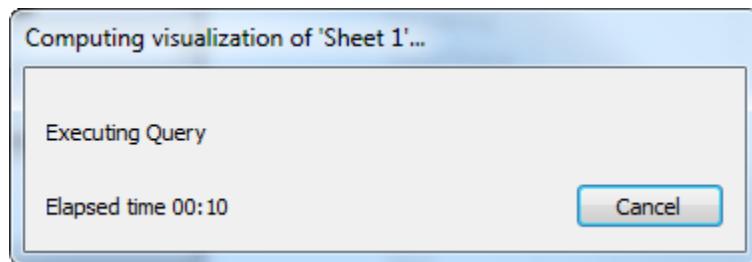


## Cancel Query

*This command is used any time you want to stop a query that is in process. You may want to cancel a query that is taking a long time to complete due to the size of the data source. When a query is taking a long time to complete, a progress dialog box opens. You can cancel a requested query by clicking the Cancel button on the Processing Request dialog box.*

**To cancel a query:**

1. Click Cancel in the Processing Request dialog box.



2. After canceling a query the view becomes invalid because it is in an in-between state. The result is a blank view although all your fields are still on the shelves. To resume working with Tableau, alter the view in anyway and allow the query to complete.

**Note:**

*Cancelling a large number of queries can result in performance degradation in the underlying database. Although the query has been abandoned by Tableau, it is still executing on the database.*

## Abandoned Queries

*When you cancel a query in Tableau, the database is told to stop processing the query. However, some databases do not support cancel (MS Excel, MS Access, Essbase, Microsoft Analysis Services 2000). If you cancel a query using one of these types of data sources, the query is abandoned by Tableau but is still running in the background and using resources. When you have abandoned queries, an indicator appears in the bottom right corner of the workbook showing the number of queries still running  . As queries in the background complete, the number will go down. It is important to monitor the number of queries running and not let the number get too high, otherwise you will see performance degradation of both Tableau and the underlying database.*

### Note:

*Text, Microsoft Excel, and Microsoft Access data sources may be temporarily unavailable after canceling a query because of a lock performed internally. You may have to wait until the abandoned query has completed before re-connecting.*

## Precision Warnings

*When you add a field to a view that contains values with more precision than Tableau can model, a warning icon  is displayed in the bottom right corner of the status bar. For example, a value in the database may have 22 decimal places but Tableau only supports up to 15. When you add that field to the view, you get a precision warning. If you click on the warning, you can read more details including the number of decimal places that have been truncated in the view.*

*Remember that the precision of the data displayed in Tableau will always first be dependent on the data in your database. If the values in your database exceed 15 decimal places, when you add them to the view, the value is truncated and a precision warning appears.*

# Understanding Data Fields

## Understanding Data Fields

The data in all data sources are categorized into fields such as Customer, Sales, Profit, Temperature, etc. These fields are made from the columns in your data source. When you connect to a data source with Tableau, the fields are displayed along the left side of the workbook in the Data window. The fields are what you will use to build views of your data. Each field is automatically assigned a data type (such as integer, string, and date) and a pair of data roles.

- [Understanding the Data Window](#)
- [Data Window Features and Functions](#)
- [Editing Field Properties](#)
- [Data Types and Roles](#)
- [Special Values](#)

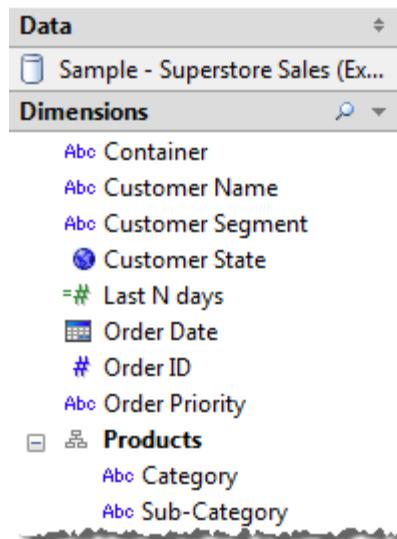
## Understanding the Data Window

### Understanding the Data Window

All data sources contain fields. In Tableau, these fields appear in the Data window. For multidimensional data sources, the fields are determined by the dimensions and measures of a cube. For relational data sources, the fields are determined by the columns of a table or view. Each field contains a unique attribute of the data such as customer name, sales total, product type, and so on. For example, some of the fields of an Excel worksheet are shown below.

A	B	C	Q
Record No	Order Priority	Sales Total	Order Date
1	1 5-LOW	2302.42	1/1/2001
2	2 5-LOW	996.66	1/1/2001
3	3 5-LOW	2564.85	1/1/2001
4	4 5-LOW	226.52	1/2/2001
5	5 3-MEDIUM	159.98	1/2/2001
6	6 3-MEDIUM	2679.68	1/2/2001
7	7 3-MEDIUM	898.31	1/2/2001
8	8 3-MEDIUM	56.95	1/2/2001
9	9 3-MEDIUM	10.42	1/2/2001
10	10 3-MEDIUM	4129.53	1/2/2001
11			

After you connect to a data source with Tableau, the data source fields appear on the left side of the workbook in the Data window.



The Data window organizes fields into three areas:

- **Dimensions** – Fields that typically hold discrete qualitative data. Examples of dimensions include dates, customer names, and customer segments.
- **Measures** – Fields that typically hold numerical data that can be aggregated. Examples of measures include sales, profit, number of employees, temperature, frequency, and pressure.
- **Sets** – An additional area that stores custom fields based on existing dimensions and criteria that you specify. Named sets from an MS Analysis Services server also appear in Tableau in this area of the Data window. You can interact with these named sets in the same way you interact with other custom sets in Tableau
- **Parameters** – An additional area that stores parameters that you have created. Parameters are dynamic variables that can be used as placeholders in formulas.

For multidimensional data sources, fields are explicitly defined as dimensions or measures when the database is created. For relational data sources, Tableau automatically organizes the fields. By default, fields containing text, date or boolean values are dimensions, while fields containing numerical values are measures.

The Data window for an Excel worksheet (a relational database) is shown below. The **Discount** and **Order Quantity** fields contain numbers and appear as measures in the Data window. The **Order Priority** field contains text and the **Order Date** field contains dates. These fields appear as dimensions in the Data window.

The screenshot shows the Tableau Data window with the following sections:

- Dimensions:**
  - Abc Container
  - Abc Customer Name
  - Abc Customer Segment
  - Customer State
  - =# Last N days
  - Order Date
  - # Order ID
  - Abc Order Priority
- Products:**
  - Abc Category
  - Abc Sub-Category
  - Abc Product Name
  - Profit (bin)
  - Abc Region
  - Ship Date
  - Abc Ship Mode
  - Supplier
  - Zip Code
- Measures:**
  - # Discount
  - # Order Quantity
  - # Product Base Margin
  - # Profit
  - =# Profit Ratio
  - # Sales
  - # Shipping Cost
  - =# Time to Ship
  - # Unit Price
  - Latitude (generated)
  - Longitude (generated)
  - =# Number of Records
  - # Measure Values
- Sets:**
  - Top 25 Customers by Profit

**Note:**

By default the field names defined in the data source are displayed in the Data window. You can rename fields as well as member names.

- [Relational and Multidimensional Data](#)
- [Hierarchies \(For Relational Databases\)](#)
- [Measure Values and Measure Names](#)
- [Number of Records](#)
- [Latitude and Longitude \(generated\)](#)

## Relational and Multidimensional Data

The Data window for a relational and multidimensional data source are shown below. Note that the windows look essentially the same for both data sources in that the fields are organized into dimensions and measures. However, the multidimensional data source contains hierarchies for dimensions. For example, notice that the Product dimension in the multidimensional Data window contains hierarchical members such as Product Family, Product Department, and so on.

Relational Data Window

**Data**

- Sample - Superstore Sales (Ex...)

**Dimensions**

- Abc Container
- Abc Customer Name
- Abc Customer Segment
- Customer State
- Last N days
- Order Date
- # Order ID
- Abc Order Priority
- Products**
  - Abc Category
  - Abc Sub-Category
  - Abc Product Name
  - Profit (bin)
  - Abc Region
  - Ship Date
  - Abc Ship Mode
  - Supplier
  - Zip Code
  - Abc Measure Names

**Measures**

- # Discount
- # Order Quantity
- # Product Base Margin
- # Profit
- =# Profit Ratio
- # Sales
- # Shipping Cost
- =# Time to Ship
- # Unit Price
- Latitude (generated)
- Longitude (generated)
- =# Number of Records
- # Measure Values

**Sets**

- Top 25 Customers by Profit

Multidimensional Data Window

**Data**

- Basic (Sample)

**Dimensions**

- Scenario**
  - Gen2,Scenario
- Market**
  - Region
  - State
  - Major Market
  - New Market
  - Small Market
  - Population
- Product**
  - Gen2,Product
  - Gen3,Product
  - Caffeinated
  - Ounces
  - Pkg Type
  - Intro Date
- Year**
  - Quarter
  - Gen3,Year

Abc Measure Names

**Measures**

- # Profit
- # Margin
- # Total Expenses
- # Inventory
- # Opening Inventory
- # Additions
- # Ending Inventory
- Ratios**
  - Margin %
  - Profit %
  - Profit per Ounce
  - Latitude (generated)
  - Longitude (generated)
  - # Measure Values

*You can expand or collapse the various areas or hierarchies in a multidimensional Data window by clicking the plus button. You can hide the Data window all together by selecting Window > Show Data Window.*

## Hierarchies (For Relational Databases)

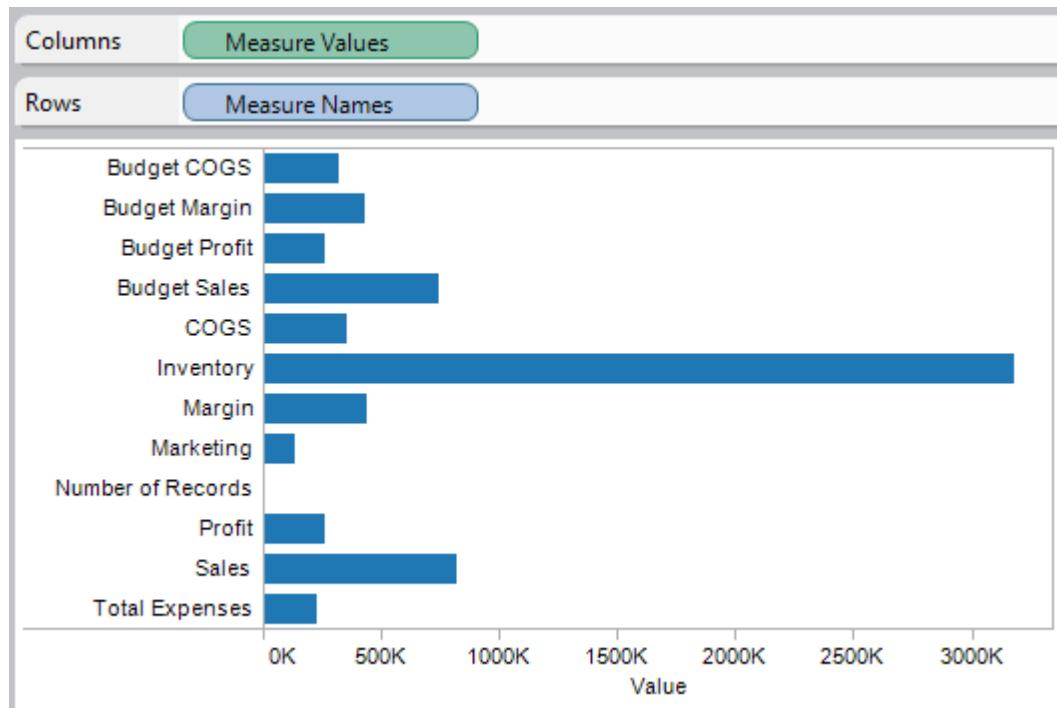
*Unlike multidimensional data sources, relational data sources don't have built in hierarchies. However, often relational data sources have related dimensions that have an inherent hierarchy. For example, a data source may have fields for Country, State, and City. These fields could be grouped into a hierarchy called Location.*

*You can assemble into these hierarchies in the Data window. Hierarchies support single click navigation up and down the levels. When you use the fields in the view, a plus button displays on the field so you can drill down and up in the hierarchy.*

## Measure Values and Measure Names

The Data window contains a few fields that are not part of your data source, two of which are Measure Names and Measure Values. The Measure Values field always appears at the bottom of the Measures area of the Data window and contains all the measures of your data source collected into one field. The Measure Names field always appears at the bottom of the Dimensions area of the Data window and contains all the names of the measures collected into a single dimension.

Tableau automatically creates these fields so that you can build certain types of data views that involved multiple measures. In particular, use these fields if you want to display multiple measures in the same pane simultaneously. As shown below, creating a view with Measure Names and Measure Values is one way to display all the data in your data source.



## Number of Records

*In addition to the Measure Names and Measure Values fields, the Data window contains a Number of Records field that is also not part of the underlying data source. This field represents the number of rows in the data source. It is useful when you are working with a data source that is primarily categorical resulting in very few measures.*

## **Latitude and Longitude (generated)**

*If you have defined any fields to be geographic fields, that is they can be used with maps, Tableau automatically geocodes your data and includes Latitude (generated) and Longitude (generated) fields. You can use these fields to overlay your data on live maps.*

## Data Window Features and Functions

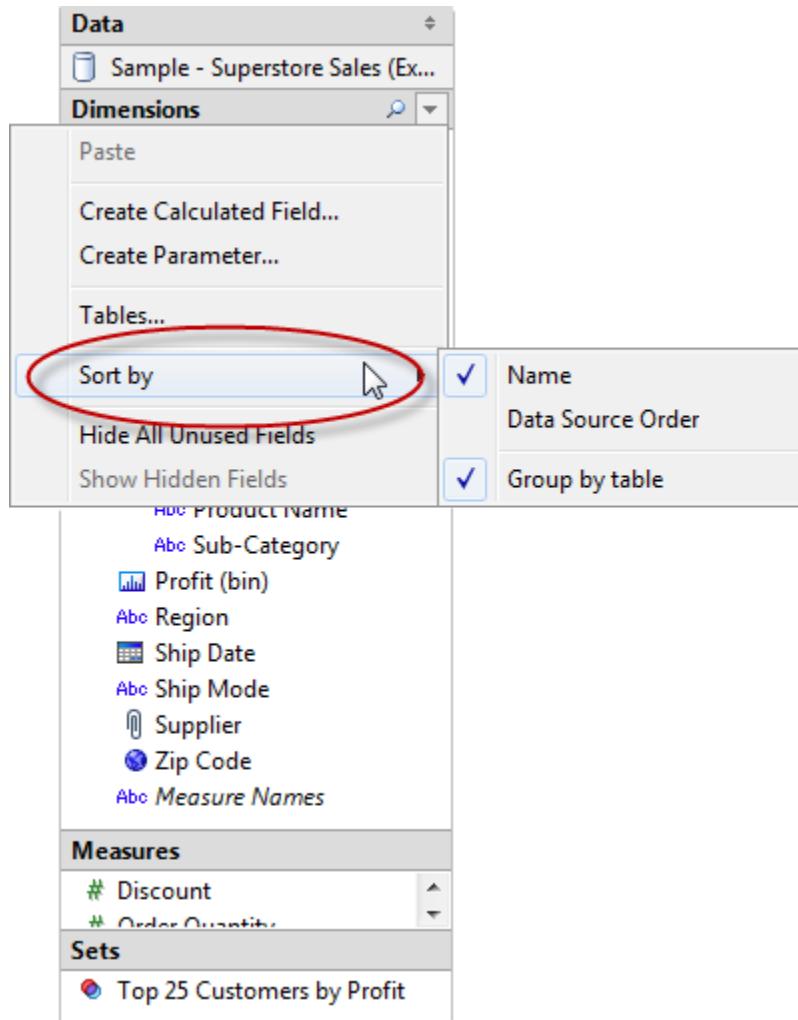
### Data Window Features and Functions

*The Data window has many features and functions to help you organize your data fields, find specific fields, and hide others.*

- [Organize the Data Window](#)
- [Find Fields](#)
- [Rename Fields](#)
- [Hide or Unhide Fields](#)
- [Add Fields to the Data Window](#)

## Organize the Data Window

You can reorganize the Data window from its default layout by selecting from a variety of sorting options. These Sort by options are located in the Data window menu.



You can sort by one of the following options:

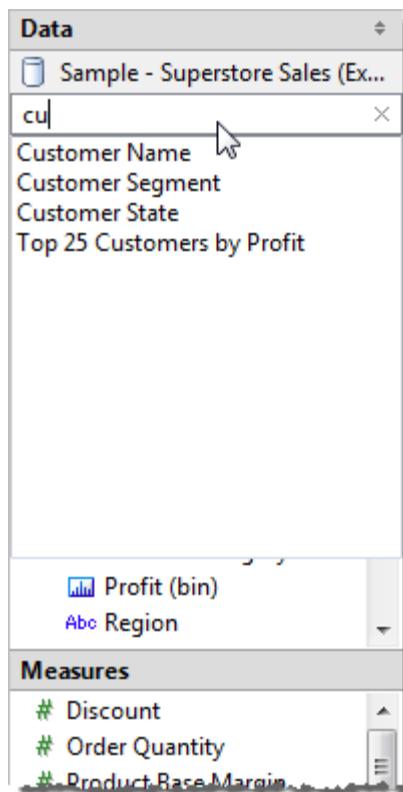
- *Name* – lists the dimensions and measures in alphabetical order according to their field aliases.
- *Data source order* – lists the dimensions and measures in the order they are listed in the underlying data source.

You can also select to *Group by Table*, which is a command that toggles on and off. When you select this option, the dimensions and measures are grouped according to

*the database table they belong to. This is especially useful when you have several joined tables.*

## Find Fields

You can search for fields in the Data window. If there are many fields in your data source it can be difficult to find a specific one like “Date” or “Customer” or “Profit.” To search for a field, click the Find Field icon  at the top of the Data window (Ctrl + F) and type the name of the field you want to search for. Valid field names that fit the description appear in a drop-down list. Select the field you want and press enter on your keyboard to highlight the field in the Data window.



## Rename Fields

You can assign an alternate name for a field that displays in the Data window as well as in the view. For instance, a field called Customer Segment in the data source could be aliased to appear as Business Segment in Tableau. You can rename both dimensions and measures. Renaming a field does not change the name of the field in the underlying data source, rather it is given a special name that only appears Tableau workbooks. The changed field name is saved with the workbook as well as when you export the connection.

### Renaming a Field

1. Right-click the field name in the Data window you want to rename and select Rename.
2. Type the new name in the subsequent dialog box and click OK.

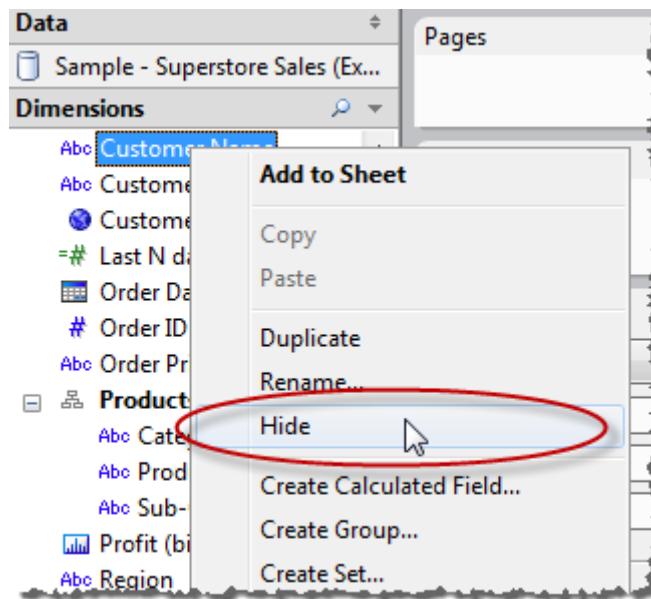
The field displays with the new name in the Data window.

### Reverting to the Default Field Name

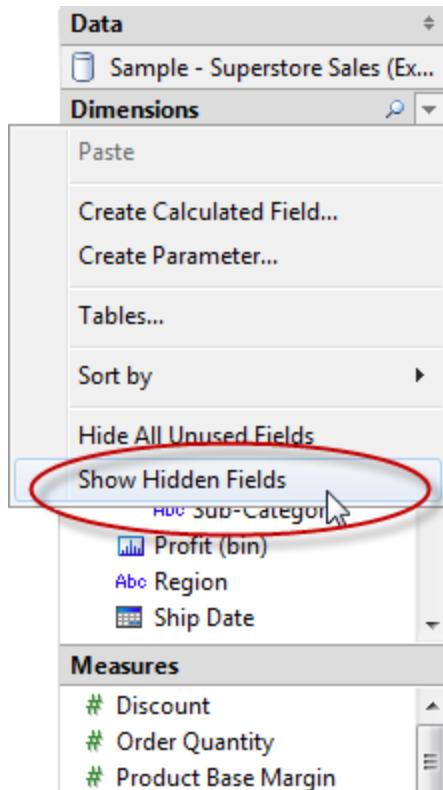
1. Right-click the field and select Rename.
2. In the Rename dialog box, click Reset and then click OK.

## Hide or Unhide Fields

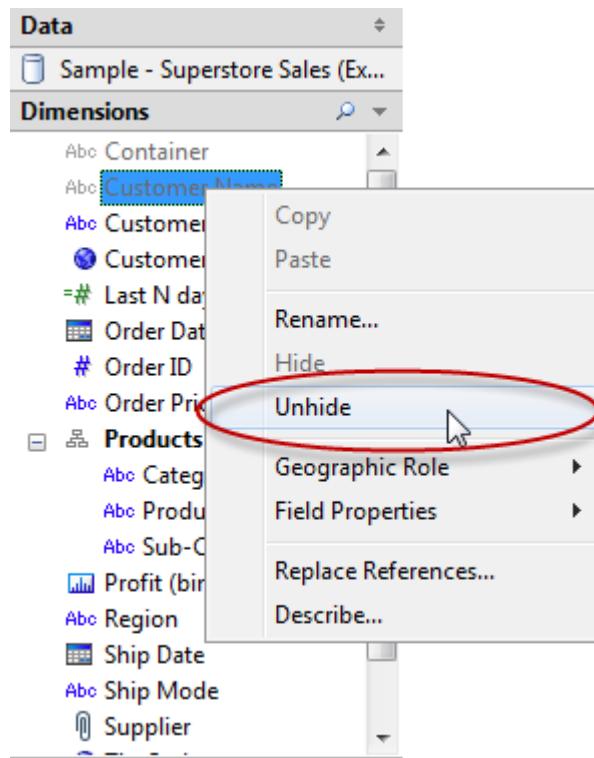
You can selectively hide or show fields in the Data window. To hide a field, right-click the field you want to hide and select Hide.



When you want to change your fields from hidden to visible, select Show Hidden Fields on the Data window menu.



*The hidden fields are shown in gray in the Data window. You can then select one or more hidden fields, right-click and select Unhide.*



Select *Hide All Unused Fields* on the Data window menu to quickly hide all of the fields that are not being used in the workbook.

**Note:**

Hiding fields can be a good way to decrease the size of a data extract file because hidden fields are automatically excluded from the extract.

## Add Fields to the Data Window

*You can create calculated fields that appear in the Data window. These new computed fields can be used like any other field. Select Create Calculated Field on the Data window menu. Alternatively, select Analysis > Create Calculated Field.*

## Editing Field Properties

### Editing Field Properties

*When you drag fields to shelves, the data is represented as marks in the view. You can specify settings for how the marks from each field will be displayed by setting mark properties. For example, when you place a dimension on the color shelf the marks will be colored by the values within that dimension. You can set the Color property so that anytime you use that dimension on the color shelf your chosen colors are used. Using field properties you can set the aliases, colors, and shapes, default aggregation, and so on.*

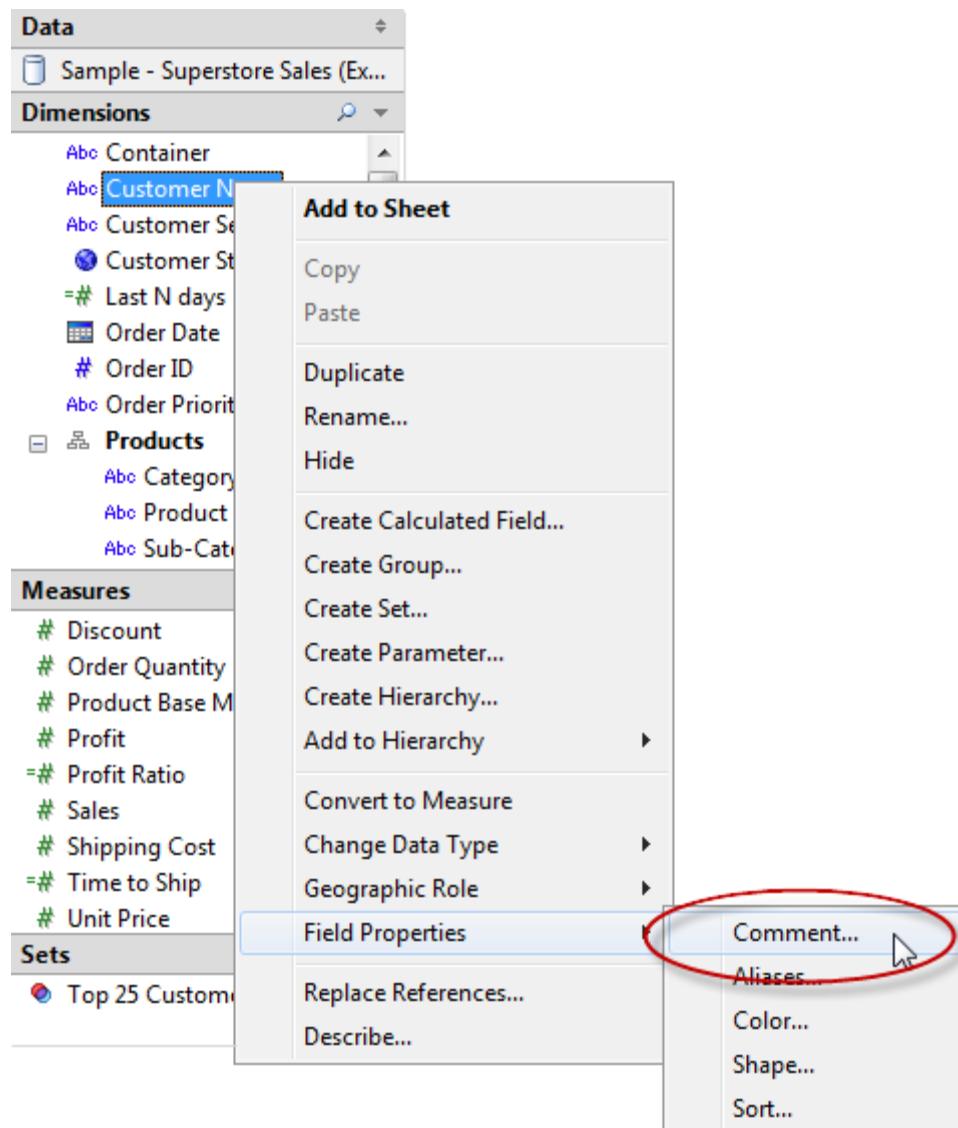
- [Comments](#)
- [Aliases](#)
- [Colors](#)
- [Shapes](#)
- [Formats](#)
- [Sort](#)
- [Aggregation](#)
- [Measure Names](#)

## Comments

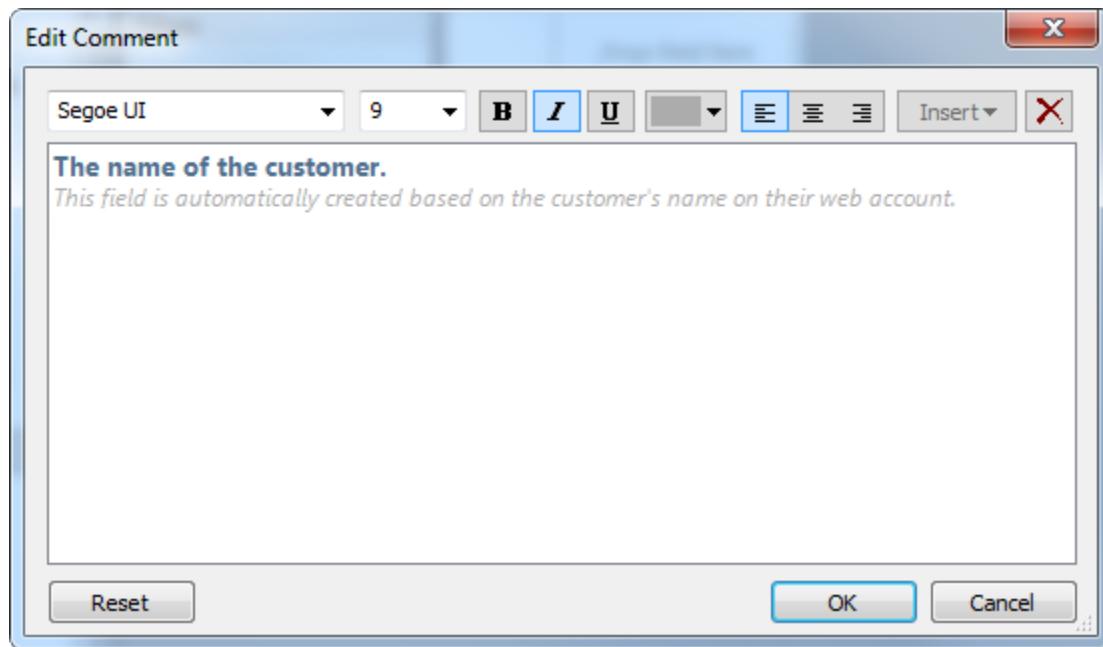
Fields can have comments that describe them. The comments display in a tooltip in the Data window and in the Calculated fields dialog box. Field comments are a good way to give more context to the data in your data source. Comments are especially useful when you are building a workbook for others to use.

### Adding a Comment to a Field

1. Right-click a field in the Data window and select *Field Properties > Comment*.



2. Write a comment in the subsequent dialog box. Comments support rich text formatting that will be represented in the tooltip.



3. When finished, click OK.

The screenshot shows the Tableau Data pane. On the left, under 'Dimensions', there is a list of fields: 'Abc Container', 'Abc Customer Name', 'Abc Customer Segm', 'Customer State', '=# Last N days', 'Order Date', '# Order ID', 'Abc Order Priority', and a collapsed category 'Products'. A tooltip is displayed over the 'Customer Name' field, containing the text: 'The name of the customer.' and 'This field is automatically created based on the customer's name on their web account.' To the right of the Data pane are the 'Pages' and 'Marks' sections of the ribbon.

## Aliases

### Aliases

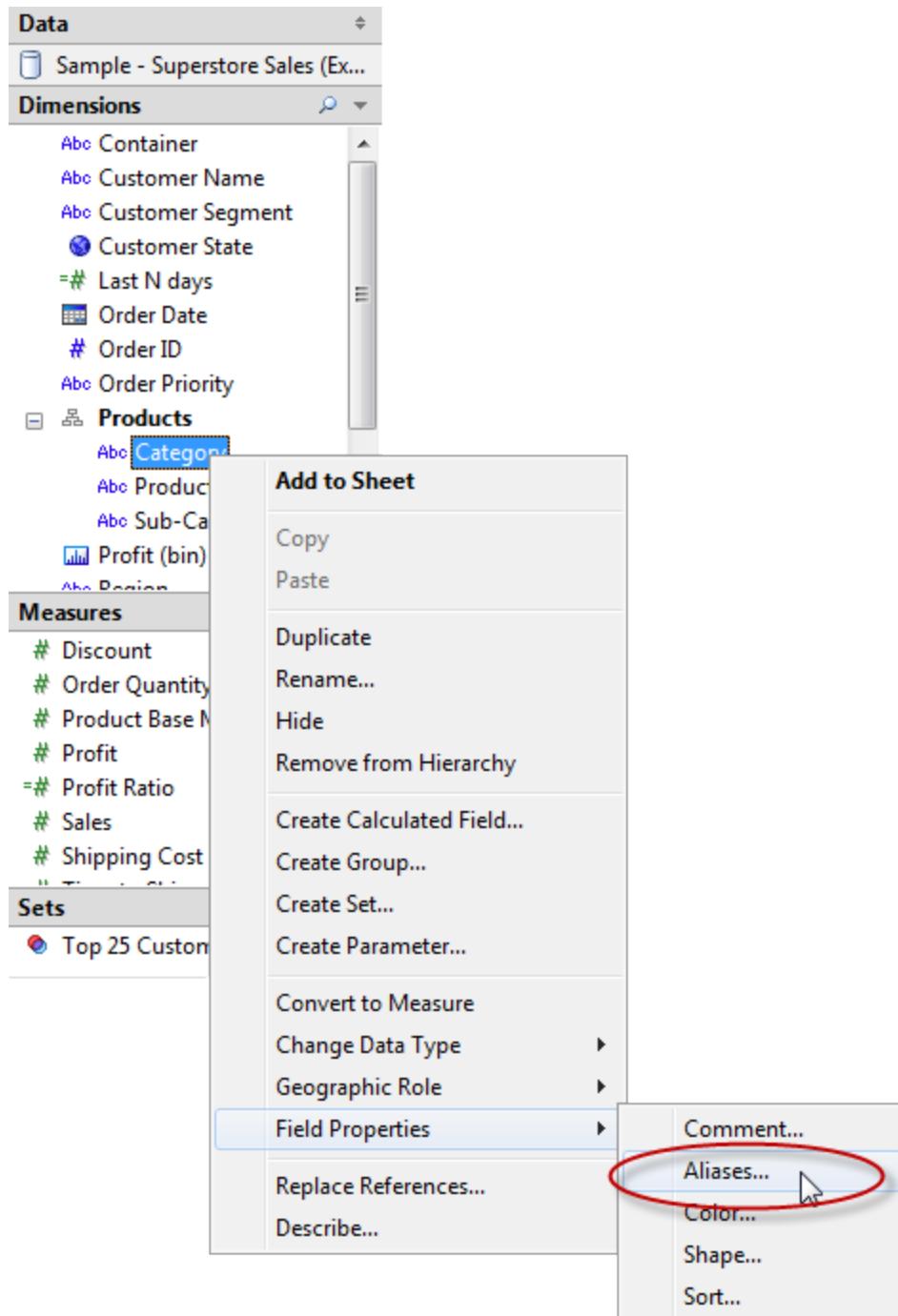
*Aliases are alternate names for specific values within a dimension. For example, you may want to assign aliases for the values of the “Customer Segment” dimension. Perhaps you want the “Consumer” members of this field to display as “Home Consumer” in all views.*

*Aliases can be created for the members of most dimensions in the Data window. You cannot, however, define aliases for continuous dimensions and dates and they do not apply to measures. The method for creating aliases depends on the type of data source you are using.*

- [Aliases with a Relational Data Source](#)
- [Aliases with a Multidimensional Data Source](#)
- [Example – Editing Aliases](#)

## Aliases with a Relational Data Source

To create an alias for a relational data source, right-click a field name and select Field Properties > Aliases

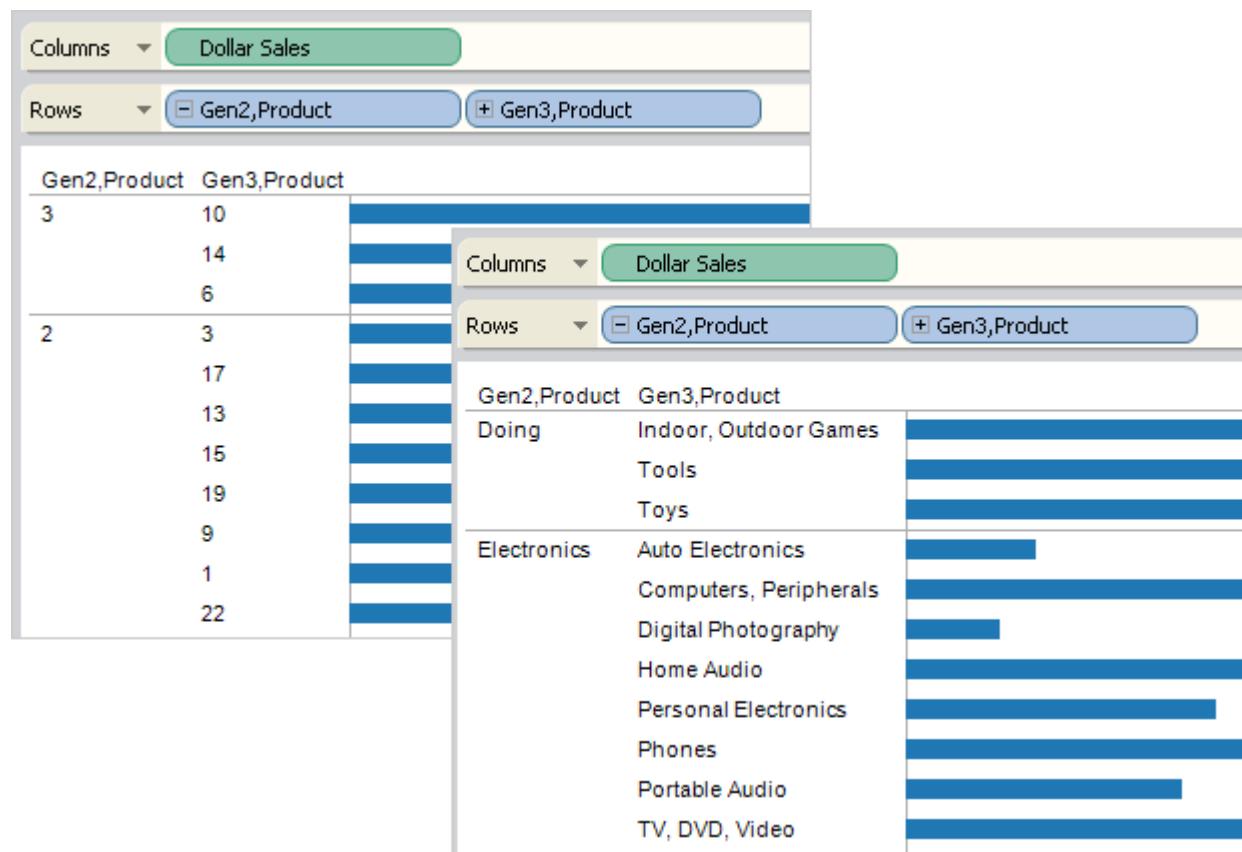


A dialog box opens allowing you to define aliases for each value within the selected dimension. You can reset the member names back to their original names by clicking the Clear Aliases button in the bottom right corner of the Edit Aliases dialog box.

## Aliases with a Multidimensional Data Source

*Aliases for multidimensional databases are created on the server by the server administrator and can be activated in Tableau using the Alias File option on the Data menu. Please talk to your database administrator to find out whether your database has aliases available. Aliases are not supported by Microsoft Analysis Services databases.*

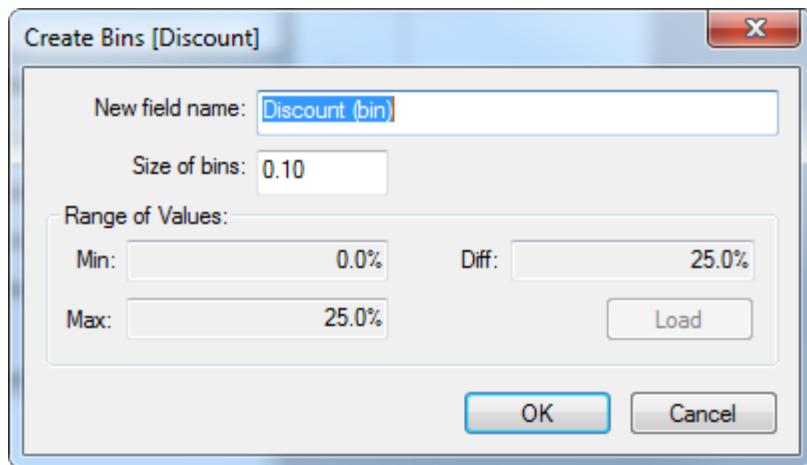
*By default the alias for every member of every dimension is initially defined to be the original member name. For example, the figure below shows a bar chart built from an Essbase database. By default, the original member names are displayed (example on the left). As you can see, these names are not very intuitive. By selecting Data > Aliases File and selecting an appropriate alias file set up by the database administrator, meaningful names are displayed in the headers.*



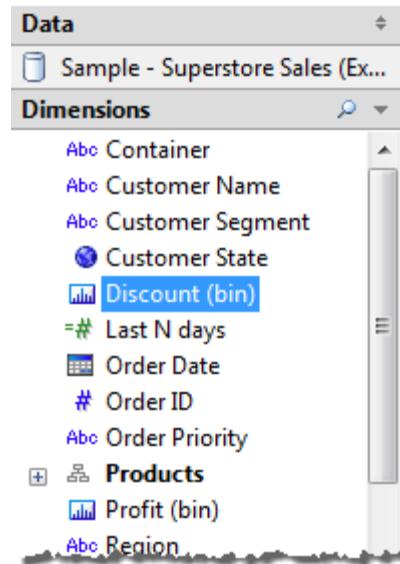
## Example – Editing Aliases

The Superstore Sales Excel sample data source contains a measure called *Discount*, which contains discount values from 0 to 0.25 or 25%. Suppose you want to analyze these data by categories: low discount, medium discount, and high discount.

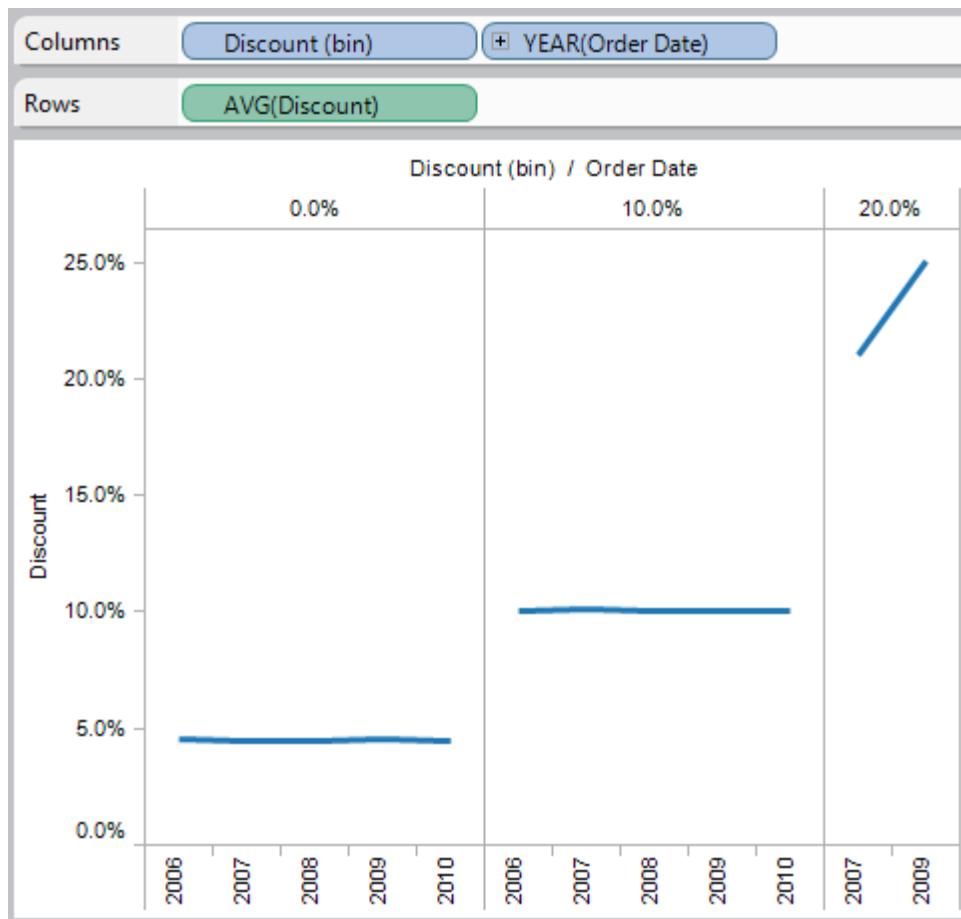
To create the categories, you could first bin the measure so that when added to the view it creates discrete headers instead of a continuous axis. In this example, define a bin size equal to 0.10, which produces three bins. The first bin contains the values 0 to 9%, the second bin contains the values 10% to 19%, and the third bin contains the values 20% and greater. The Create Bins dialog box for this field is shown below.



The new binned field is named *Discount (bin)* and appears in the Dimensions area of the Data window.



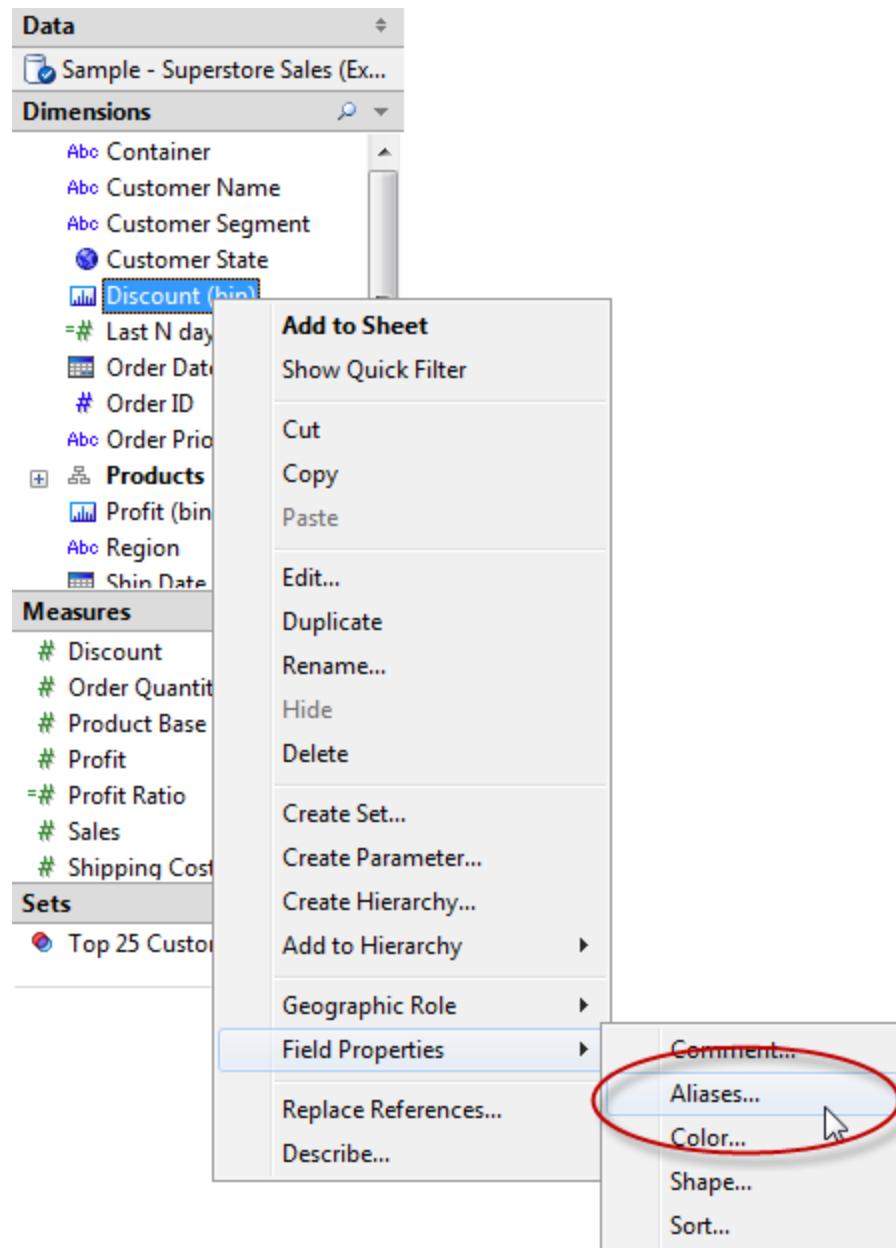
*When you place Discount (bin) on the Rows or Columns shelf, the default aliases for the bins are given by the lower limit of the bin's numerical range*



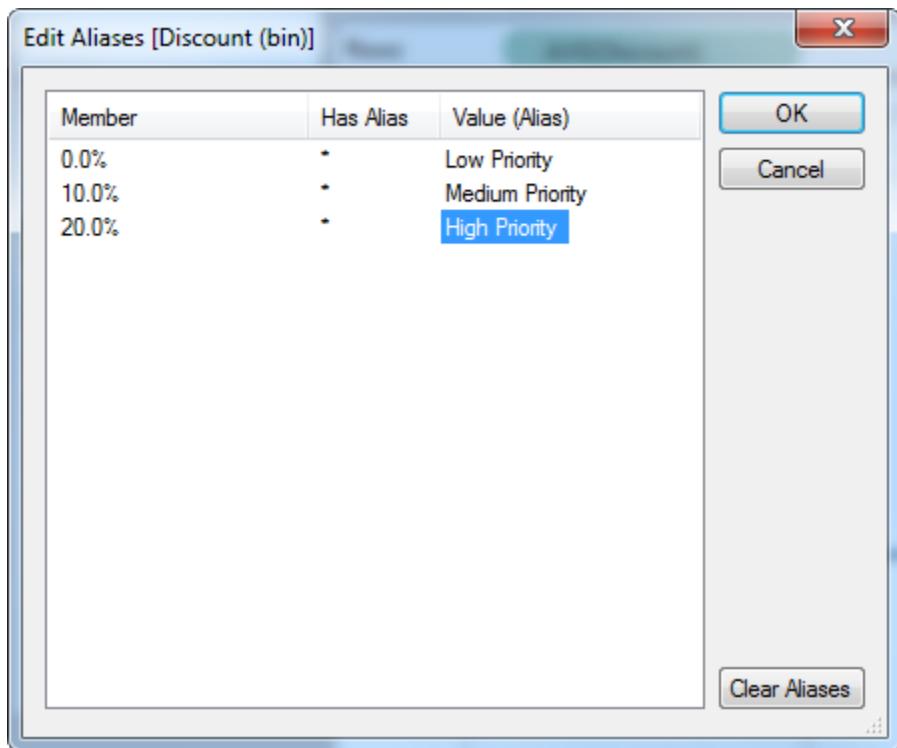
To improve the readability of the bins when they are displayed in Tableau, you can define aliases such as “Low discount”, “Medium discount”, and “High discount.”

#### To edit the aliases:

1. Right-click the name of the dimension in the Data window and select Field Properties > Aliases.



2. Assigning an alias to every member of the *Discount (bin)* fields. For example, the member originally labeled as 0.0% is now labeled as “Low Discount.”



You can change aliases at any time using the *Edit Aliases* dialog box. To do so, click on the alias you want to change and specify the new name. Use the Tab key to advance from one value to the next. To restore the original aliases, click the *Clear Aliases* button in the bottom right corner of the dialog box. You can also sort the members or their aliases by clicking the appropriate column header. After completing the *Edit Aliases* dialog box, Tableau automatically displays the aliases in the view.

## Colors

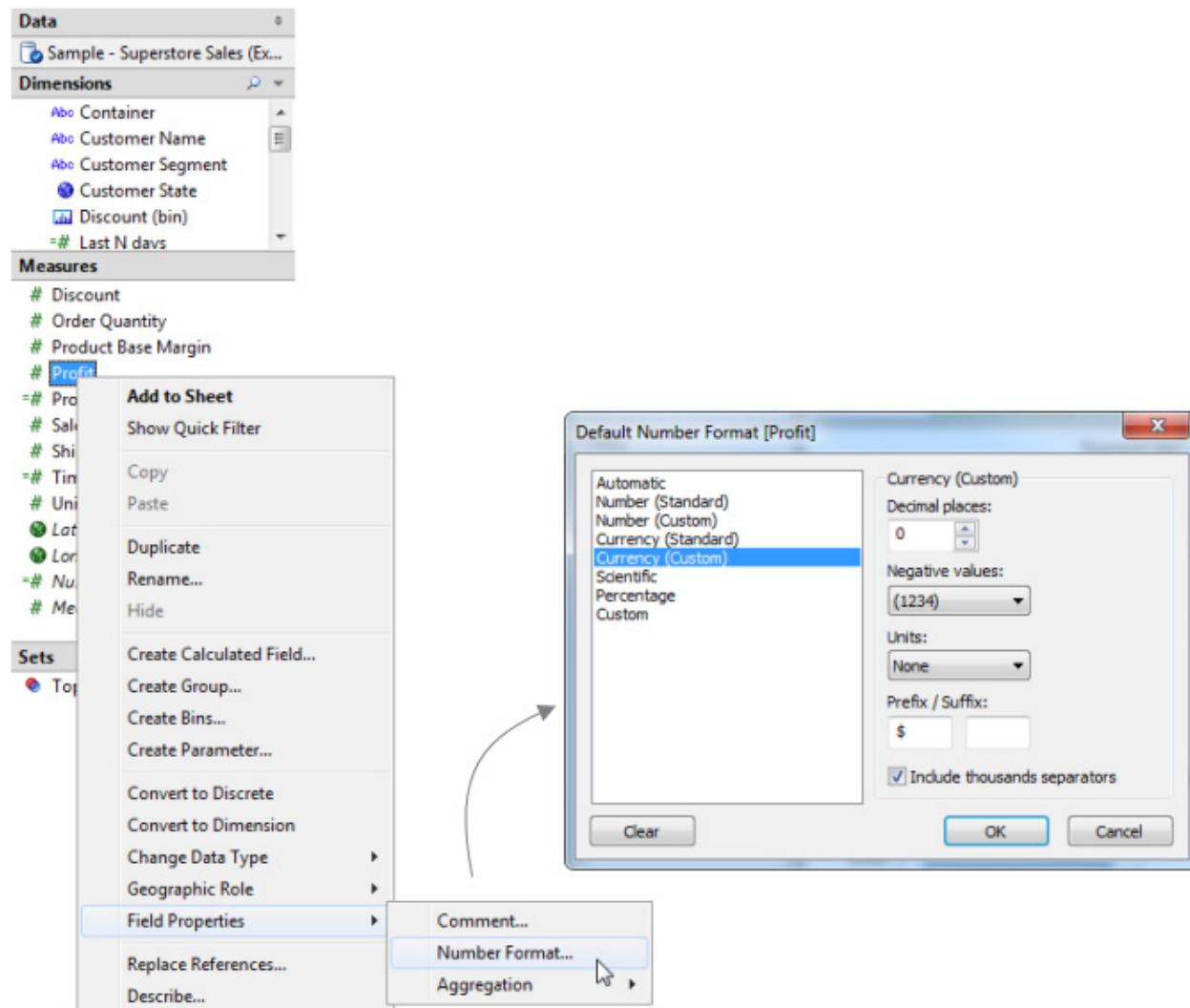
*When you use a dimension to color encode the view, default colors are assigned to the field's values. Color encodings are shared across multiple worksheets that use the same data source to help you create consistent displays of your data. For example, if you define the Western region to be green, it will automatically be green in all other views in the workbook. You can set the default color encodings for a field by right-clicking the field in the Data window and selecting Field Properties > Color.*

## Shapes

*When you use a dimension to shape encode the view, default shapes are assigned to the field's values. Shape encodings are shared across multiple worksheets that use the same data source to help you create consistent displays of your data. For example, if you define the Furniture products are represented with a square mark, it will automatically be changed to a square mark in all other views in the workbook. You can set the default shape encodings for a field by right-clicking the field in the Data window and selecting Field Properties > Shape.*

## Formats

You can set the default text format for date and number fields. For example, you may want to always show the Sales values as currency using the U.S. dollar sign and two decimal points. On the other hand, you may want to always show Discount as a percentage. You can set the default formats by right-clicking a date or numeric field and selecting an option on the Field Properties menu. A dialog box opens where you can specify a default format.



## Sort

You can set a default sort order for the values within a categorical field so that every time you use the field in the view, they values will be sorted correctly. For example, let's say you have an Order Priority field that contains the values High, Medium, and Low. When you place these in the view, by default they will be listed as High, Low, Medium because they are shown in alphabetical order. You can set a default sort so that these values are always listed correctly. To set the default sort order right-click a dimension and select Field Properties > Sort. Then use the sort dialog box to specify a sort order.

**Note:**

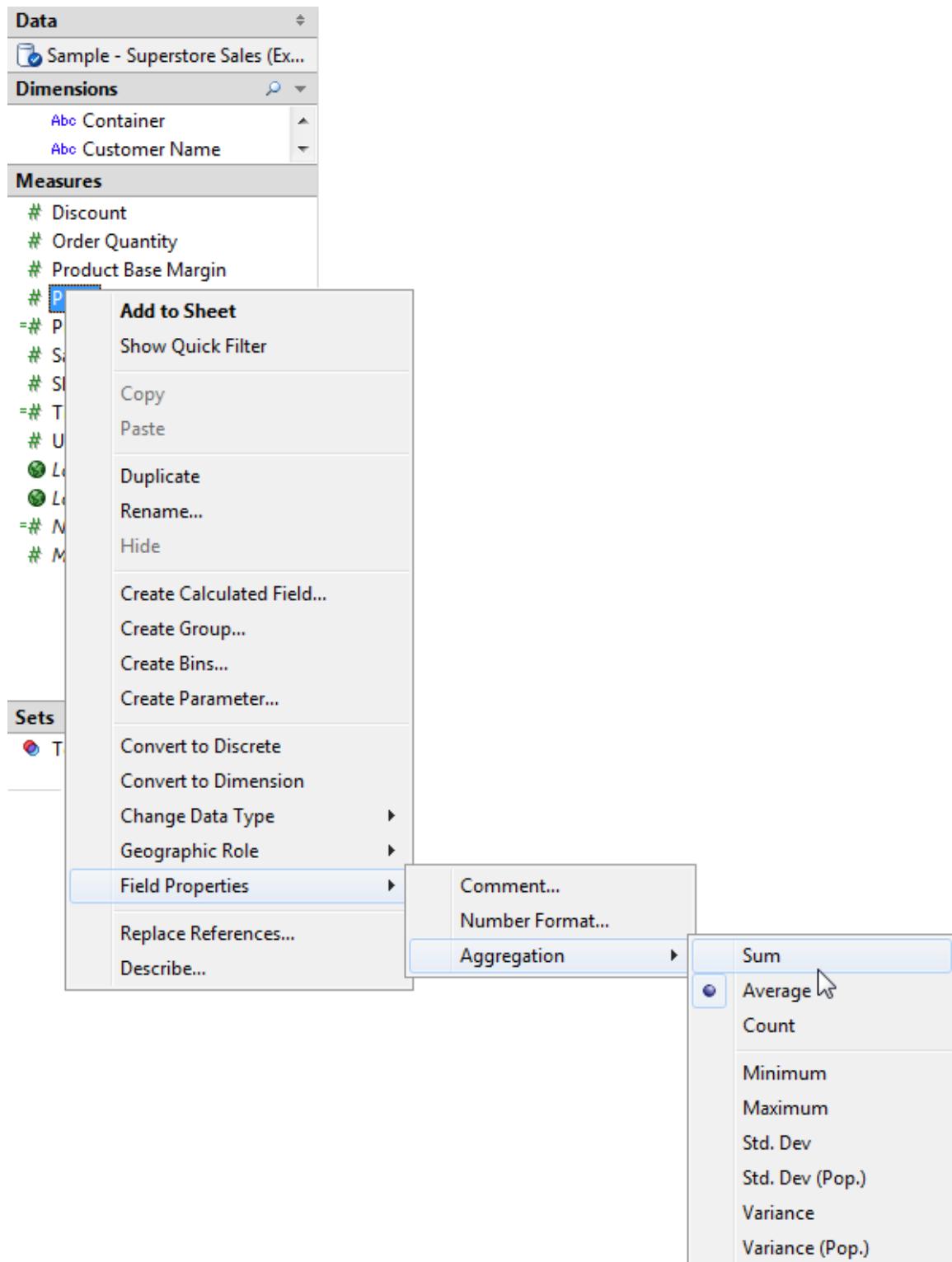
The default sort order also controls how the field values are listed in a quick filter.

## Aggregation

*You can also specify a default aggregation for any measure. The default aggregation will be used automatically when the measure is first totaled in the view.*

### To specify a default aggregation:

1. *Right-click any measure in the Data window and select Field Properties > Aggregation.*
2. *On the Aggregation list, select an aggregation.*

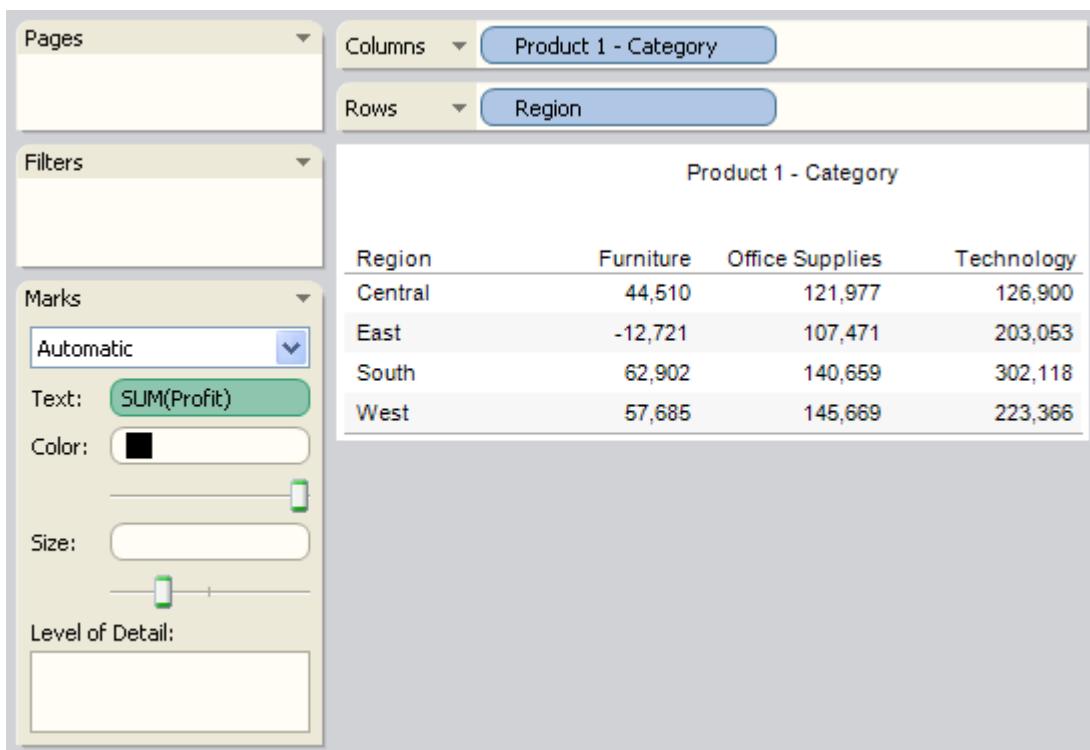


Whether you are specifying the aggregation for a field on a shelf or the default aggregation in the Data window, you can select from the following options:

Option	Description
<b>Default</b>	For Microsoft Analysis Services data sources, this option computes the aggregation on the server.  For Essbase data sources, this option computes the total using the default aggregation determined by the data type (typically SUM).
<b>SUM</b>	Displays the sum of all shown values.
<b>Average</b>	Displays the average of all shown values.
<b>Minimum</b>	Displays the smallest shown value.
<b>Maximum</b>	Displays the largest shown value.
<b>Server</b>	Computes the aggregation on the server.

## Measure Names

There are times that you will want to show multiple measures in a view and so you will use the Measure Values and the Measure Names fields. When you use Measure Names all of the measure names appear as row or column headers in the view. However, the headers include both the measure name and the aggregation label. So if you are showing the summation of profit the header displays as SUM(Profit). You can change the names so that they do not include the aggregation label by editing the member aliases of the Measure Names field. This feature becomes particularly useful when you are working with a text table that shows multiple measures. For example, suppose you have a text table containing the aggregated profit of each product category by region.



Now suppose you want to show both the Profit and the Sales for each product category and region. When you add the Sales measure to the text table, the measures are combined and the Measure Values field is placed on the Text shelf. Additionally, the Measure Names field is added to the Rows shelf.

Product 1 - Category

Region		Furniture	Office Supplies	Technology
Central	Sum of Profit	44,510	121,977	126,900
	Sum of Sales	1,321,948	935,971	1,394,018
East	Sum of Profit	-12,721	107,471	203,053
	Sum of Sales	1,130,830	776,050	1,276,109
South	Sum of Profit	62,902	140,659	302,118
	Sum of Sales	1,354,835	990,105	1,787,040
West	Sum of Profit	57,685	145,669	223,366
	Sum of Sales	1,311,641	1,098,101	1,530,404

Measure Names/Values

- SUM(Profit)
- SUM(Sales)

*Notice how the header names include the aggregation label. Those headers can be annoying if you are putting this view into a presentation. To change the measure names, right-click the Measure Names field on the Rows shelf and select Edit Aliases. Make the changes and click OK.*

Product 1 - Category

Region		Furniture	Office Supplies	Technology
Central	Sum of Profit	44,510	121,977	126,900
	Sum of Sales	1,321,948	935,971	1,394,018
East	Sum of Profit	-12,721	107,471	203,053
	Sum of Sales	1,130,830	776,050	1,276,109
South	Sum of Profit	62,902	140,659	302,118
	Sum of Sales	1,354,835	990,105	1,787,040
West	Sum of Profit	57,685	145,669	223,366
	Sum of Sales	1,311,641	1,098,101	1,530,404

## Data Types and Roles

### Data Types and Roles

*In Tableau, there are several data types that are supported. For example, you may have text values, date values, numerical values, and more. Each of the data types can take on different roles that dictate their behavior in the view.*

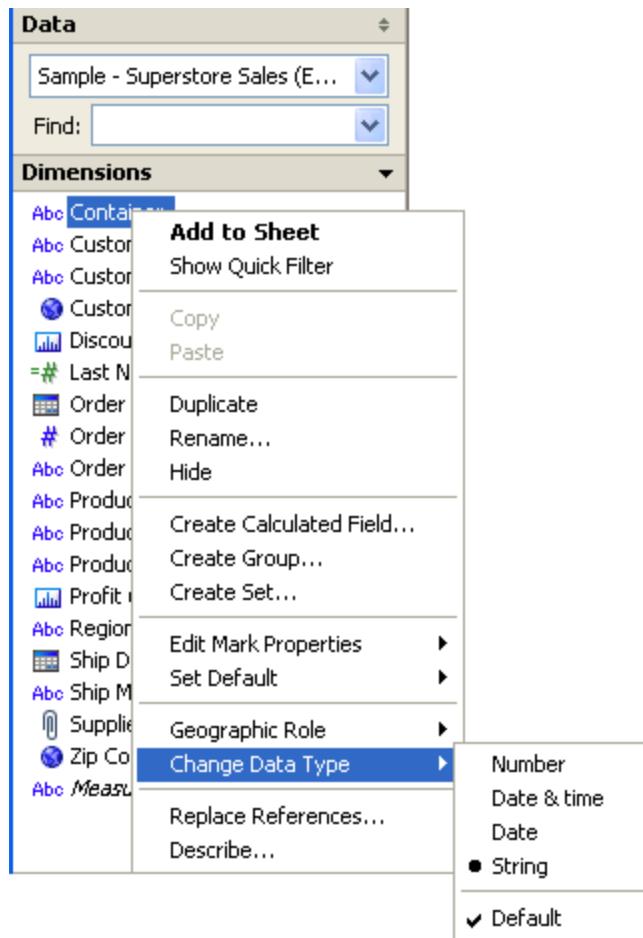
- [Data Types](#)
- [Data Roles](#)

## Data Types

*All fields in a data source have a data type. The data type reflects the kind of information stored in that field, for example integers (410), dates (1/23/2005) and strings (“Wisconsin”). The data type of a field is identified in the Data window by one of the icons shown below.*

Icon	Description
	Text values
	Date values
	Date & Time values
	Numerical values
	Boolean values (relational only)
	Geographic values (used with maps)

*Sometimes Tableau may identify a field with a data type that is incorrect. For example, a field that contains dates may be identified as an integer rather than a date. You can change the data type in Tableau by right-clicking the field in the Data window, selecting Change Data Type, and then selecting the appropriate data type.*



### Note:

Sometimes the data in your database is more precise than Tableau can model. When you add these values to the view a precision warning will appear in the right corner of the status bar.

### Mixed Data Types for Excel and CSV Files

Most columns in an Excel or CSV (comma separated value) file contain values of the same data type (dates, numbers, text). When you connect to the file, Tableau creates a field in the appropriate area of the Data window for each column. Dates and text values are dimensions, and numbers are measures.

However, a column might have a mixture of data types such as numbers and text, or numbers and dates. When you connect to the file, the mixed-value column is mapped to a field with a single data type in Tableau. Therefore, a column that contains numbers and dates might be mapped as a measure or it might be mapped as a date dimension. The mapping is determined by the data types of the first 16 rows in the data source. For

*example, if most of the first 16 rows are text values, then the entire column is mapped as text.*

**Note:**

*Empty cells also create mixed-value columns because their formatting is different from text, dates, or numbers.*

*Depending on the data type Tableau determines for each field, the field might contain Null values for the other (non matching) records as described in the table below.*

Mapped Data Type	Treatment of Other Data Types in the Field
Text	Dates and numbers are treated as text. Nulls are not created.
Dates	Text is treated as Null. A number is treated as the day in numeric order from 1/1/1900. You can identify these values by creating a row or column header with the field.
Numbers	Text is treated as Null. A date is treated as the number of days since 1/1/1900. You can identify these values by converting the measure to a dimension, and then creating row or column headers with the field.

*If using fields that are based on mixed-value columns introduces difficulties when analyzing your data, you can:*

- *Format empty cells in your underlying data source so they match the data type of the column.*
- *Create a new column in Excel that does not contain mixed values.*

## Data Roles

### Data Roles

*In addition to a data type, every field in Tableau is characterized by two important additional settings that determine the role and behavior of the field when it is placed on a shelf.*

*To expose the full functionality of Tableau it is useful to control whether a field is a dimension or measure, and continuous or discrete.*

**Note:**

*On a multidimensional data source, changing data roles is limited. You can change some measures from continuous to discrete, but in general data roles on this type of data source cannot be changed.*

- [Data Roles: Dimension vs. Measure](#)
- [Data Roles: Continuous vs. Discrete](#)

## Data Roles: Dimension vs. Measure

### *Dimensions*

*Dimensions typically produce headers when added to the rows or columns shelves in the view. By default, Tableau treats any field containing qualitative, categorical information as a dimension. This includes, for instance, any field with text or dates values. However, in relational data sources, the actual definition of a dimension is slightly more complex. A dimension is a field that can be considered an independent variable.*

*This means that a measure can be aggregated for each value of the dimension. For instance, you might calculate the Sum of “Sales” for every “State”. In this case the State field is acting as a dimension because you want to aggregate sales for each state. The values of Sales are dependent on the State, so State is an independent field and Sales is a dependent field.*

*Such aggregation could also be computed for numeric fields that are treated as dimensions. For instance, you might want to calculate the SUM of Sales for each “Discount Rate” offered to customers. In this case the Discount Rate field acts as an independent field and the Sales field is dependent even though both fields are numeric. You can use a numeric field as the independent field by first converting the Discount Rate measure to a dimension.*

### *Measures*

*Measures typically produce axes when added to the rows or columns shelves. By default, Tableau treats any field containing numeric (quantitative) information as a measure. However, in relational data sources, the actual definition of a measure is slightly more complex. A measure is a field that is a dependent variable; that is, its value is a function of one or more dimensions.*

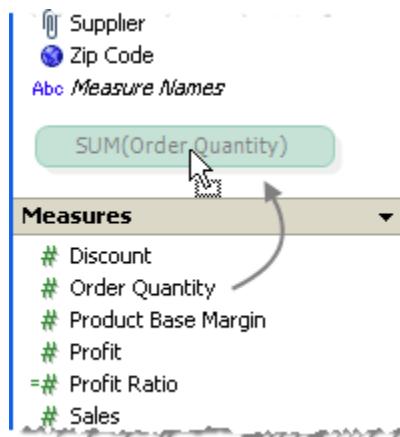
*This means that a measure is a function of other dimensions placed on the worksheet. For instance, you might calculate the Sum of “Sales” for every “State”. In this case, the Sales field is acting as a measure because you want to aggregate the field for each state. But measures could also result in a non-numeric result. For instance, you might create a calculated measure called “Sales Rating” that results in the word “Good” if sales are good and “Bad” otherwise. In this case the “Sales Rating” field acts as a measure even though it produces a non-numeric result. It is considered a measure because it is a function of the dimensions in the view.*

## Converting Measures to Dimensions

*By default, Tableau treats all relational fields containing numbers as measures. However, you might decide that some of these fields should be treated as dimensions. For example, a field containing ages may be categorized as a measure by default in*

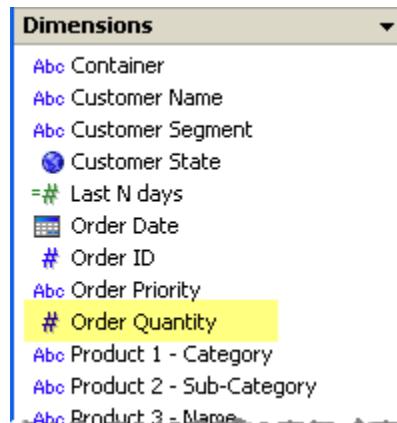
*Tableau because it contains numeric data. However, if you want to look at each individual age rather than an axis you can convert the Age field to a dimension.*

- Click and drag the field from the measures area of the Data window and drop it into the dimensions area.



- Right-click the measure in the Data window and select Convert to Dimension.

*The Order Quantity field is now displayed in the Dimensions area of the Data window and is a discrete quantity as indicated by the blue number icon.*



*If you place the converted field on a shelf, it products headers instead of an axis.*

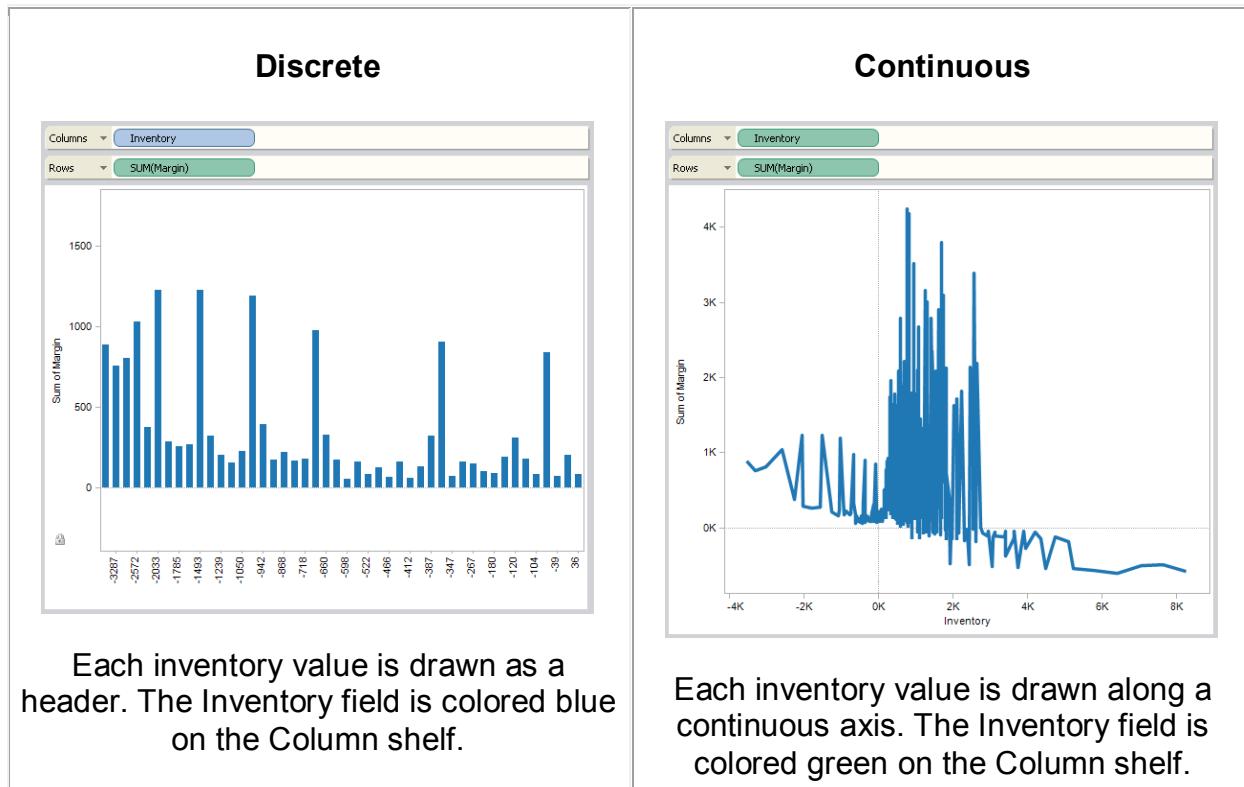
## Tableau Desktop Help

The screenshot shows a Tableau desktop interface with a data view. At the top, there are two dropdown menus: 'Columns' set to 'Product 1 - Category' and 'Rows' set to 'Order Quantity'. The main area displays a table titled 'Product 1 - Category' with the following structure:

Order Quantity	Furniture	Office Supplies	Technology
1	Abc	Abc	Abc
2	Abc	Abc	Abc
3	Abc	Abc	Abc
4	Abc	Abc	Abc
5	Abc	Abc	Abc
6	Abc	Abc	Abc
7	Abc	Abc	Abc
8	Abc	Abc	Abc
9	Abc	Abc	Abc
10	Abc	Abc	Abc
11	Abc	Abc	Abc
12	Abc	Abc	Abc
13	Abc	Abc	Abc
14	Abc	Abc	Abc

## Data Roles: Continuous vs. Discrete

In addition to dimensions and measures, each field is categorized as either discrete or continuous. Below are example graphs illustrating the difference between these two data roles. Both examples show the Sum of Margin as a function of Inventory level. It is the same information presented in two different ways.



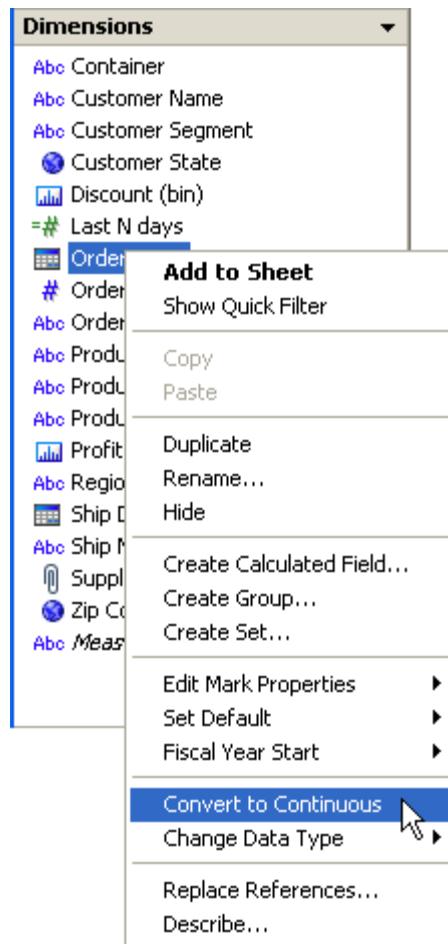
Whether a field is continuous or discrete is reflected in the color of the field's data type icon. In the Data window, blue icons indicate discrete and green icons indicate continuous fields.

Discrete fields always result in headers being drawn whenever they are placed on the row or columns shelves. Continuous fields always result in axes when you add them to the view. These roles are important because you may want to display your data continuously or discretely depending on what you are trying see and the data itself. You can switch between continuous and discrete data roles.

### Converting Discrete to Continuous Quantities

When you are using a relational data source you can convert any numeric or date field into a continuous field.

Select Convert to Continuous on the field's right-click context menu.



*The Order Date field is still displayed in the Dimensions area of the Data window, but now uses a green icon, which indicates it is a continuous quantity.*

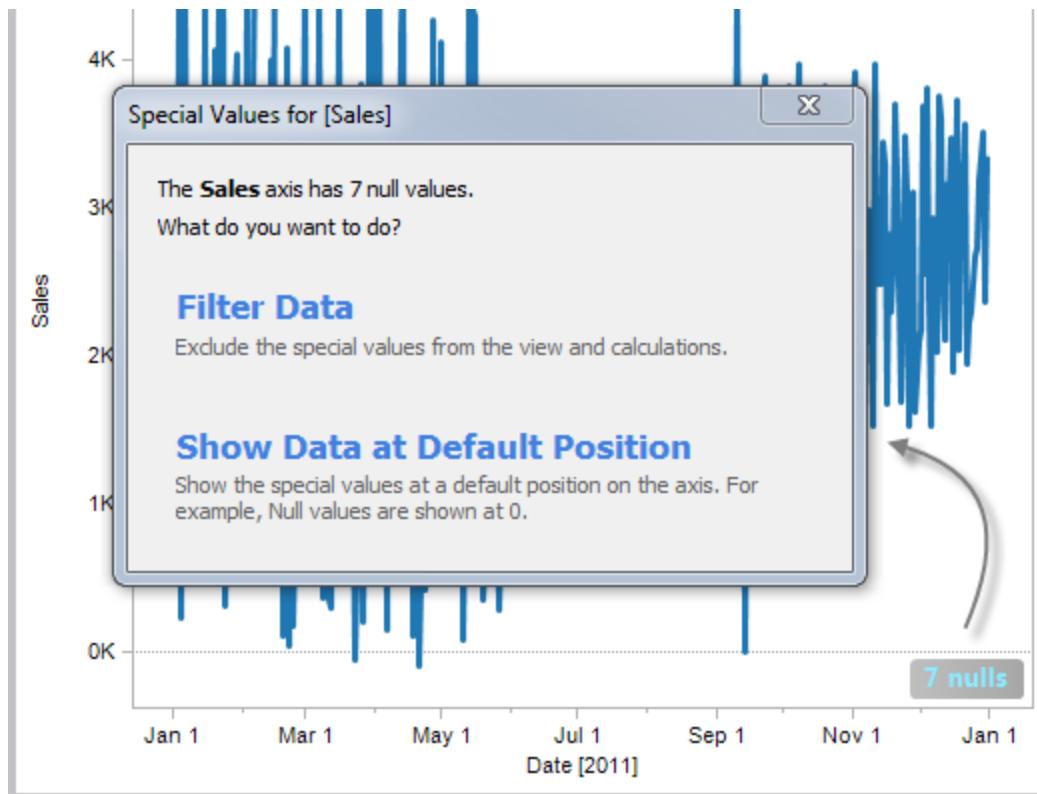


*Placing the field on a shelf produces an axis. However, the field is not a measure because you cannot aggregate it using the usual set of aggregation functions such as SUM and AVERAGE.*

*You can also convert fields to continuous or discrete directly when they are on a shelf using the field's menu. This converts the field while it is on the shelf but does not change its role in the Data window. That way you can use the field as continuous for a specific analysis and discrete elsewhere in the view.*

## Special Values

Some data requires special handling in Tableau. Specifically null values, unrecognized or ambiguous geographic locations, and negative values when working with a logarithmic scale. When your data contains these special values, Tableau cannot plot them in the view. Instead, a indicator displays in the lower right corner of the view. Click the indicator to see more options for how to handle these values.



## Null Numbers and Dates

When you drag a measure or continuous date to the view, the values are shown along a continuous axis. If the field contains null values, Tableau cannot plot them along that axis. Instead, they are shown using an indicator in the lower right corner of the view. Click the indicator and choose from the following options:

- **Filter Data** - exclude the null values from the view using a filter. When you filter data, the null values are also excluded from any calculations used in the view.
- **Show Data at Default Position** - show the data at a default location on the axis. The null values will still be included in calculations. The default position depends on the data type. The table below defines the defaults.

Type of Data	Default Position
Numbers	0
Dates	12/31/1899
Negative Values on a Log Axis	1
Unknown Geographic Location	(0,0)

### *Unknown Geographic Locations*

*When working with maps and geographic fields, any unknown or ambiguous locations display in the indicator in the lower right corner of the view. Click the indicator and choose from the following options:*

- *Edit Locations - correct the locations by mapping your data to known locations.*
- *Filter Data - exclude the unknown locations from the view using a filter. The locations will not be included in calculations.*
- *Show Data at Default Position - show the values at the default position of (0, 0) on the map.*

*If you don't know how to handle the values, you can choose to leave the special values indicator. Generally, you should continue to show the indicator so that you know there is data that is not being shown in the view. However, you can optionally hide the indicator by right-clicking it and selecting Hide Indicator.*



# Building Data Views

## Building Data Views

*This section discusses the basics of using Tableau to build views of your data. You will learn how to build views both manually and automatically using the built in tools. Additionally, you will learn how to sort, filter, group, create sets. Finally, this section includes information about working with dates and times, adding reference lines and bands, and viewing your data.*

- [Parts of the View](#)
- [Building Views Manually](#)
- [Building Views Automatically](#)
- [Using Multiple Measures](#)
- [Filtering](#)
- [Sorting, Grouping, and Sets](#)
- [Dates and Times](#)
- [Missing Values](#)
- [Reference Lines and Bands](#)
- [Inspecting Data](#)

# Parts of the View

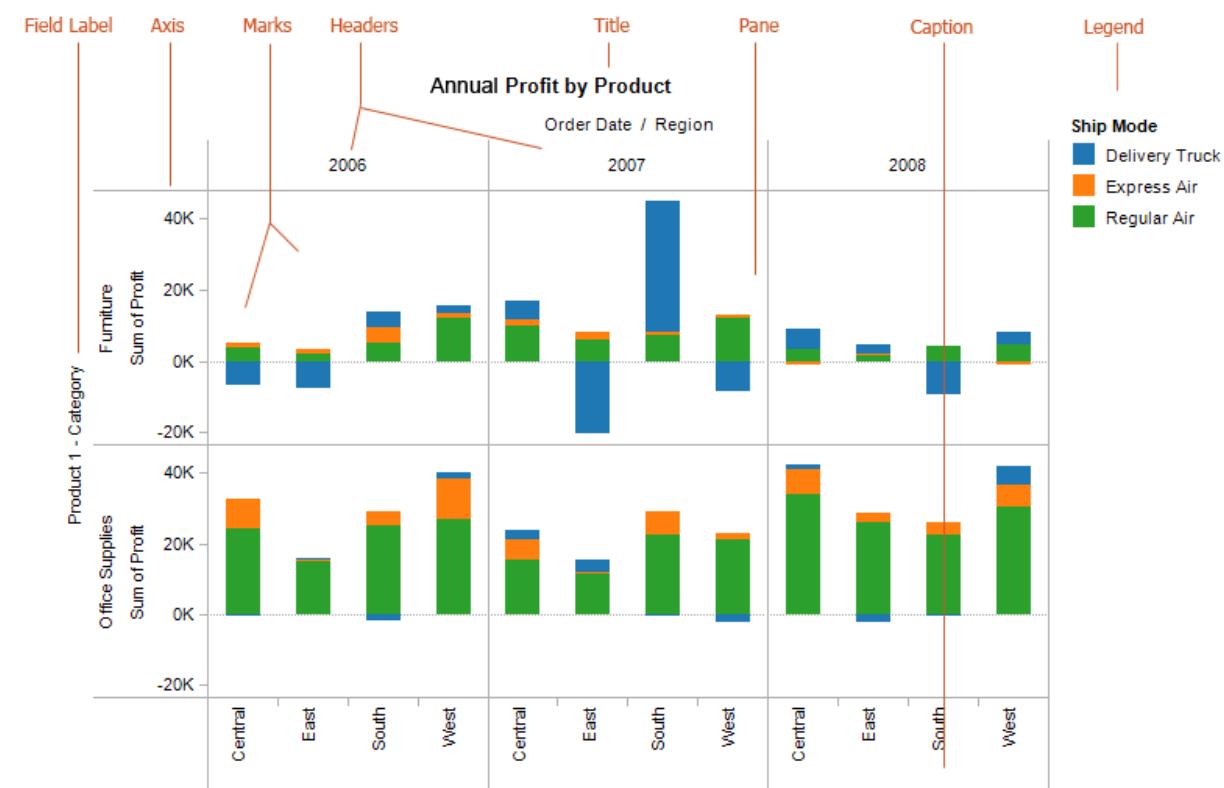
## Parts of the View

This section describes the basic components of the views you can create in Tableau. The parts of a view can be categorized as either table components, which are part of every view, or optional components, which can be turned on or off.

### Table Components

Data views are displayed in a table on every worksheet. A table is a collection of rows and columns, and consists of the following components: Headers, Axes, Panes, Cells, and Marks.

In addition to these, you can optionally show Titles, Captions, Field Labels, and Legends.



Sum of Profit for each Region broken down by Order Date Year vs. Product 1 - Category. Color shows details about Ship Mode. The view is filtered on Order Date Year and Product 1 - Category. The Order Date Year filter keeps 2006, 2007 and 2008. The Product 1 - Category filter keeps Furniture and Office Supplies.

- [Headers](#)
- [Axes](#)
- [Panes](#)
- [Cells](#)
- [Marks](#)
- [Titles](#)
- [Captions](#)
- [Field Labels](#)
- [Legends](#)

## Headers

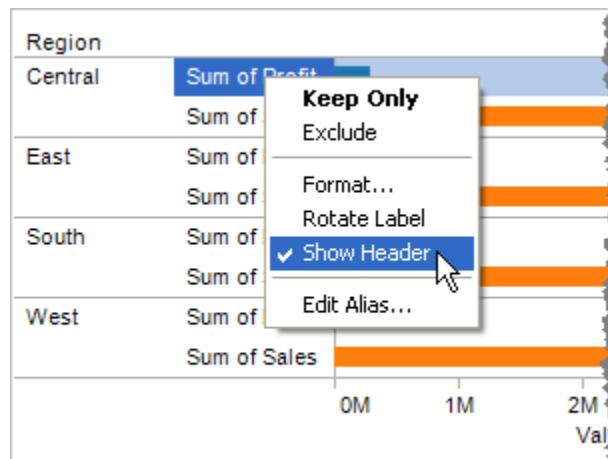
Headers are created when you place a dimension on the Rows shelf or the Columns shelf. The headers show the member names of each field on the shelves. For example, in the view below the column headers show the members of an Order Date field and the row headers show the members of a Product Category field.

	Order Date			
	2006	2007	2008	2009
Appliances	19,849	33,085	21,887	23,202
Bookcases	-3,738	-542	-4,944	-23,947
Chairs & Chairmats	55,817	19,310	40,187	34,625
Computer Peripherals	21,280	15,686	29,252	28,317
Copiers and Fax	33,389	50,521	58,896	24,555
Envelopes	7,451	13,914	12,697	14,649
Labels	2,623	2,361	5,704	3,001
Office Furnishings	24,035	28,456	26,216	18,171

You can show and hide row and column headers at anytime.

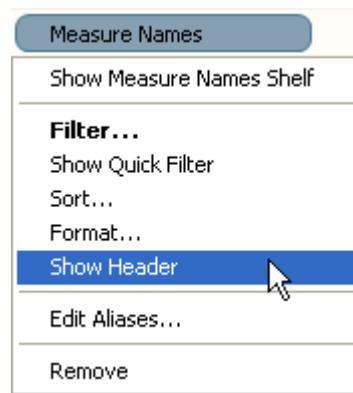
### To hide headers:

- Right-click the headers in the view and select Show Header.

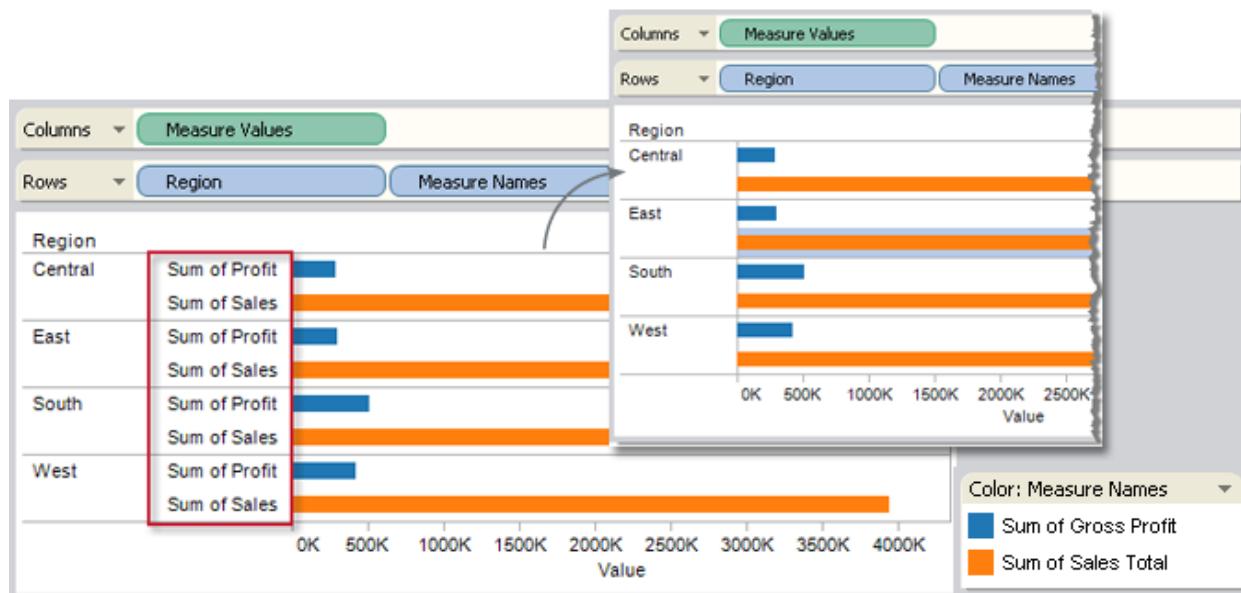


**To show headers:**

- Select the field in the view whose headers you want to show and select Show Header on the field menu.



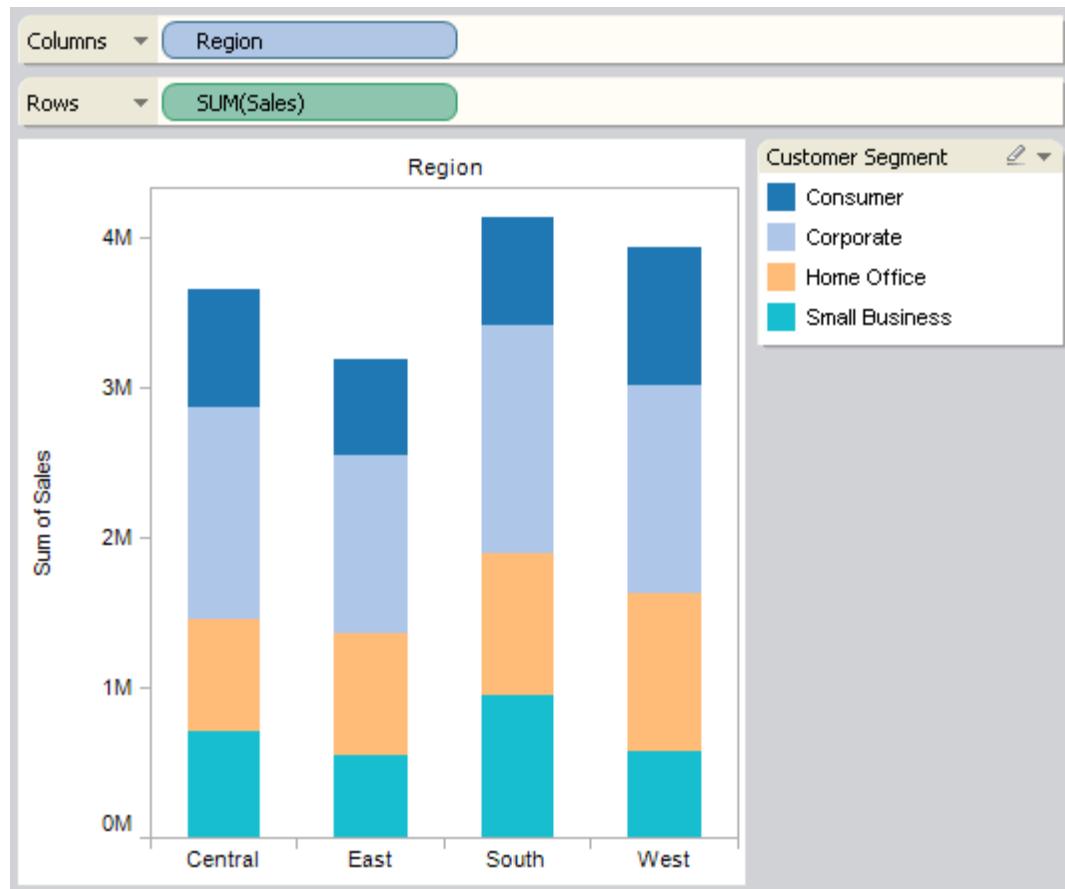
Hiding headers can be really useful when you are working with multiple measures. For example, the view below shows both the sales and profit for each region along a single axis. You can see the view looks cluttered with the Measure Names headers showing. Because Measure Names is also indicated by the mark color, you can hide the excess headers to clean up the view.





## Axes

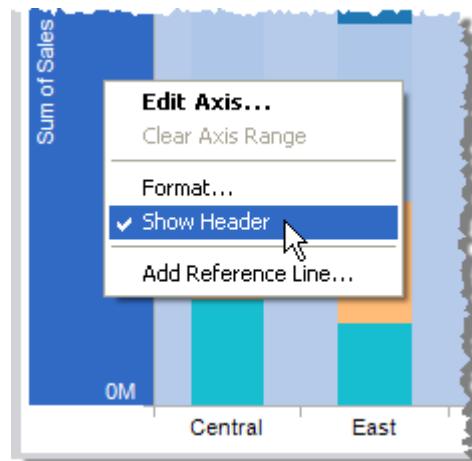
Axes are created when you place a measure on the Rows or Columns shelf. By default, the values of the measure field are displayed along a continuous axis.



You can show and hide axes at anytime.

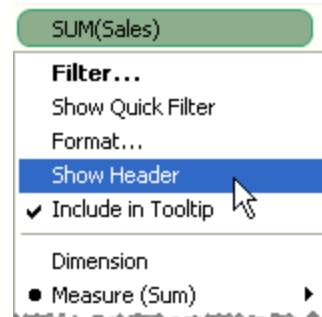
**To hide axes:**

- Right-click the axis in the view and select Show Header.



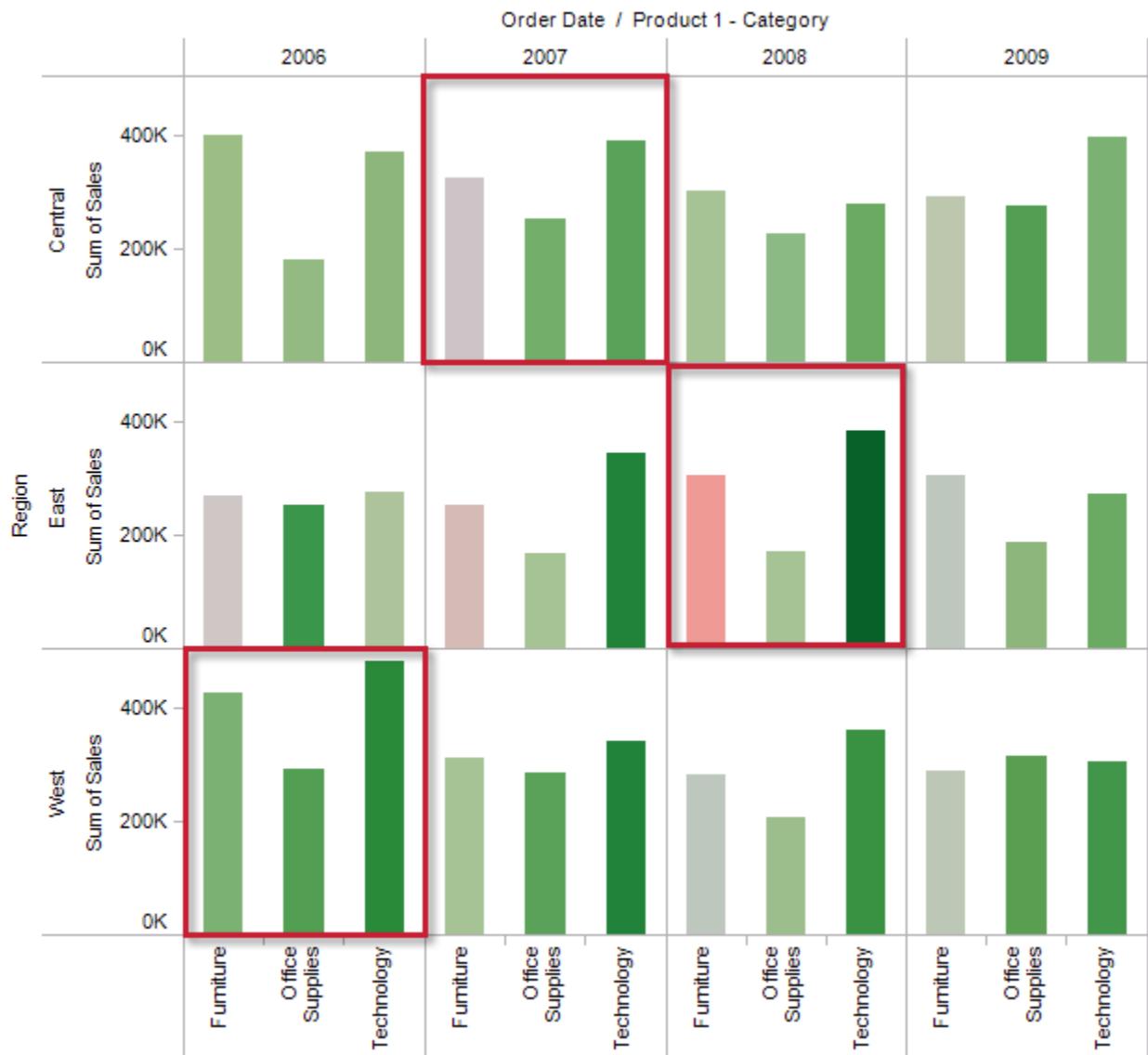
**To show axes:**

- Select the measure in the view whose axis you want to show and select Show Header on the field menu.



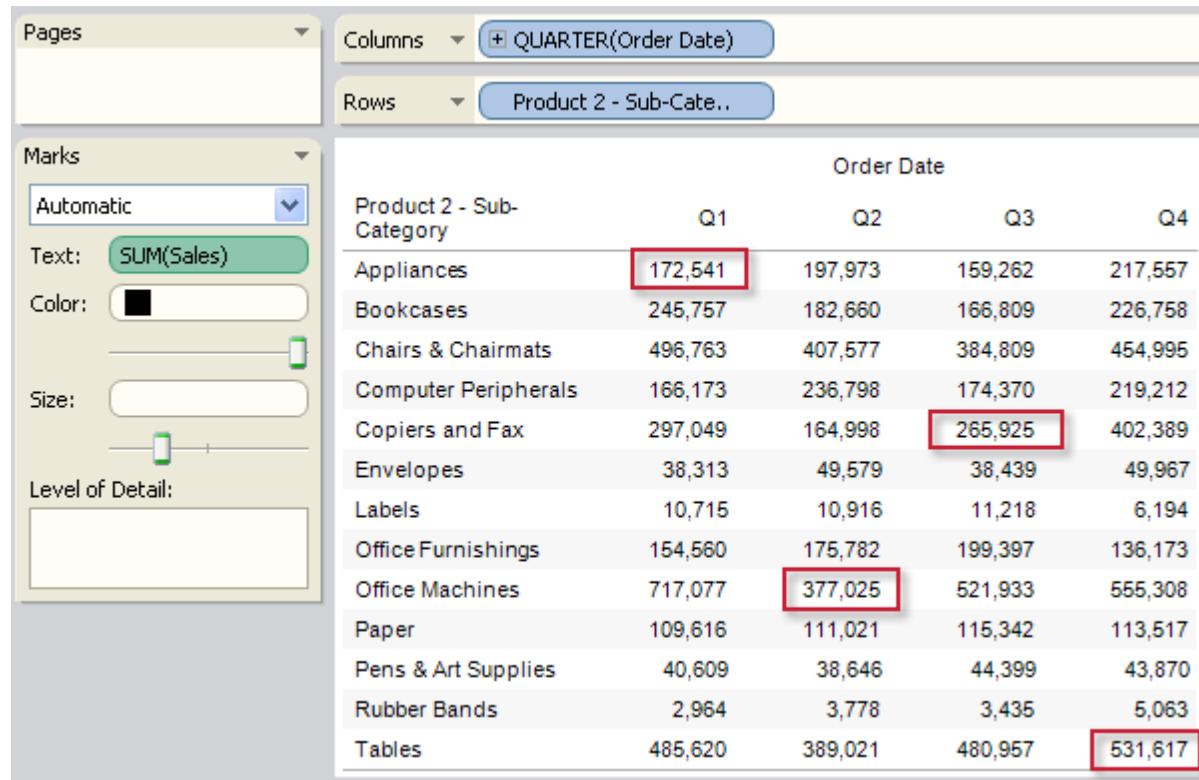
## Panes

Panes are created by the intersection of the rows and columns in a table. Depending on the table type, panes might be created by the intersection of an axis with headers, an axis with an axis, or headers with headers. Panes are identified by lines within the table.



## Cells

Cells are the basic components of any table you can create in Tableau. For a text table, the cell is the intersection of a row and a column, and is where the text is displayed. For other view types such as bar charts and scatter plots, identifying the cell is not always possible or useful.



## Marks

### Marks

*Tableau does not use chart types to build data views. Instead, data are displayed with marks, where every mark corresponds to a row (or a group of rows) in your data source.*

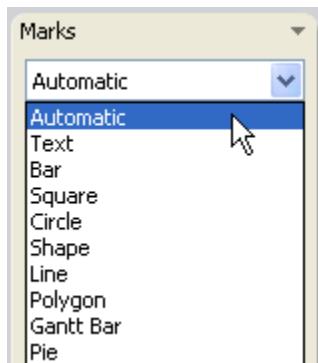
*You can build views of your data by placing fields on shelves and by selecting the appropriate mark type (or by accepting the default mark type).*

- [Mark Types](#)
- [Stacking Marks](#)
- [Changing Mark Size and Color](#)

## Mark Types

### Mark Types

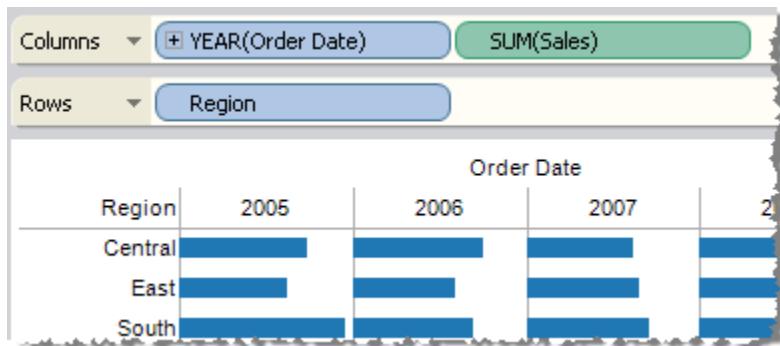
Mark types are available from the Mark menu. All mark types can be modified by color-encoding and by size-encoding (except polygon) the data



- [Automatic Mark](#)
- [Bar Mark](#)
- [Line Mark](#)
- [Area Mark](#)
- [Square Mark](#)
- [Circle Mark](#)
- [Shape Mark](#)
- [Text Mark](#)
- [Filled Map Mark](#)
- [Pie Mark](#)
- [Gantt Bar Mark](#)
- [Polygon Mark](#)

## Automatic Mark

When the Mark menu is set to Automatic, Tableau automatically selects the best mark type for your data view. This mark type is determined by the inner fields on the Rows and Columns shelves.



For example, if you create a view with a dimension as the inner field on both the Rows shelf and the Columns shelf, the text mark is automatically selected. If you create a view that has measures on both the Rows shelf and the Columns shelf, the shape mark is automatically selected. If you create a view with a dimension as the inner field on the Rows shelf and a measure on the Columns shelf (or vice versa), the bar mark is automatically selected. Note that Tableau automatically places measures inside dimensions when they share a shelf.

You can override the default selection and use any mark type that provides insight into your data. However, you should exercise some caution when manually selecting a mark type because the resulting view might hide important information about your data.

## Bar Mark

The bar mark type is useful when you want to compare measures across categories, or when you want to break data down into stacked bars. Tableau displays your data using bars when:

- The Mark menu is set to Automatic, and you place a dimension and a measure as the inner fields on the Rows and Columns shelves (or vice versa). If the dimension is a date dimension, the Line mark is chosen instead.
- You select Bar from the Mark menu.

Note that the marks are automatically stacked.

The data view shown below displays a dimension and a measure and is color-encoded by a dimension. Because the Mark menu is set to Automatic, the data are displayed using bars.



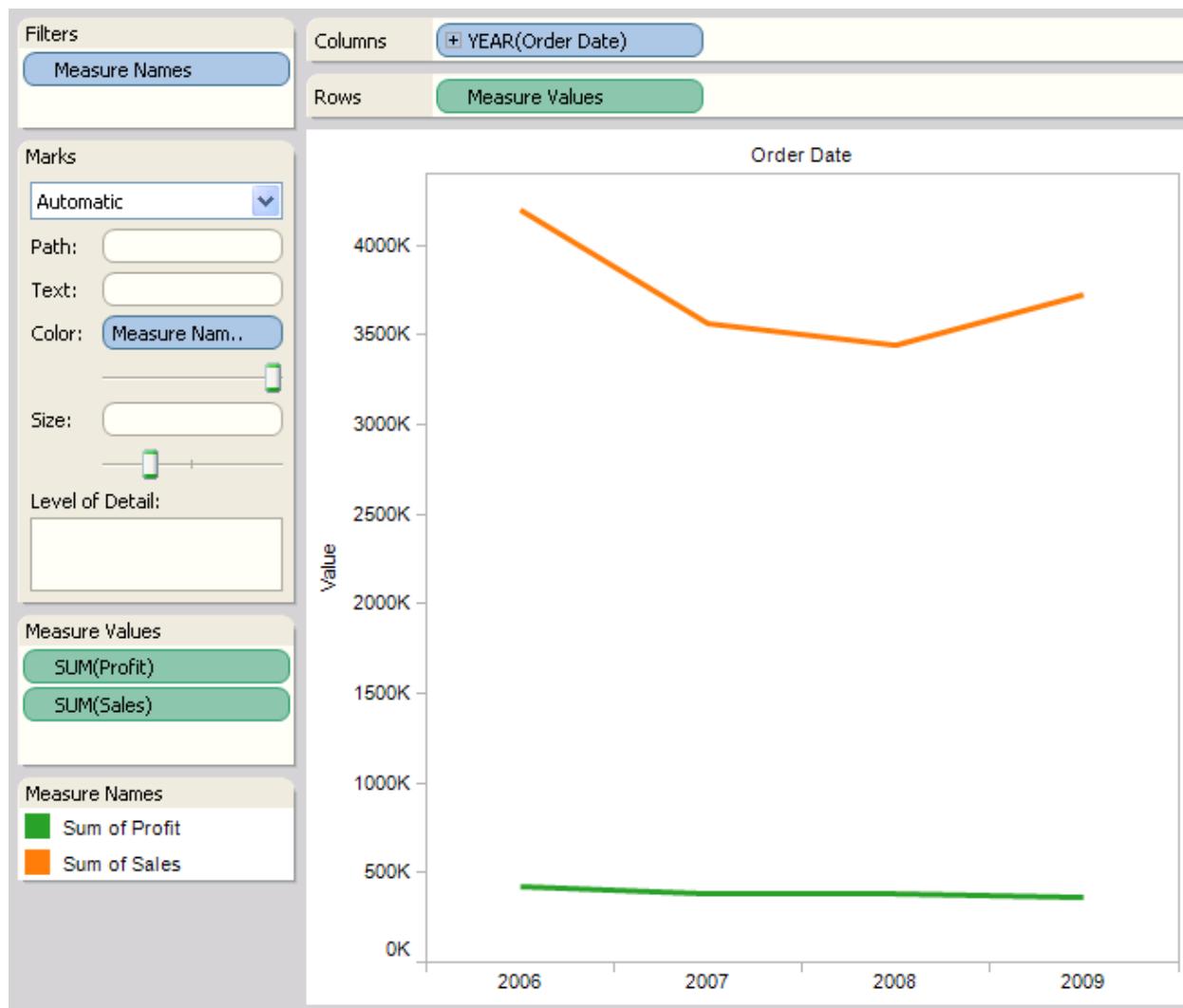


## Line Mark

The line mark type is useful when you want to see trends in data over time, your data are ordered, or interpolation makes sense. Tableau displays data using lines when:

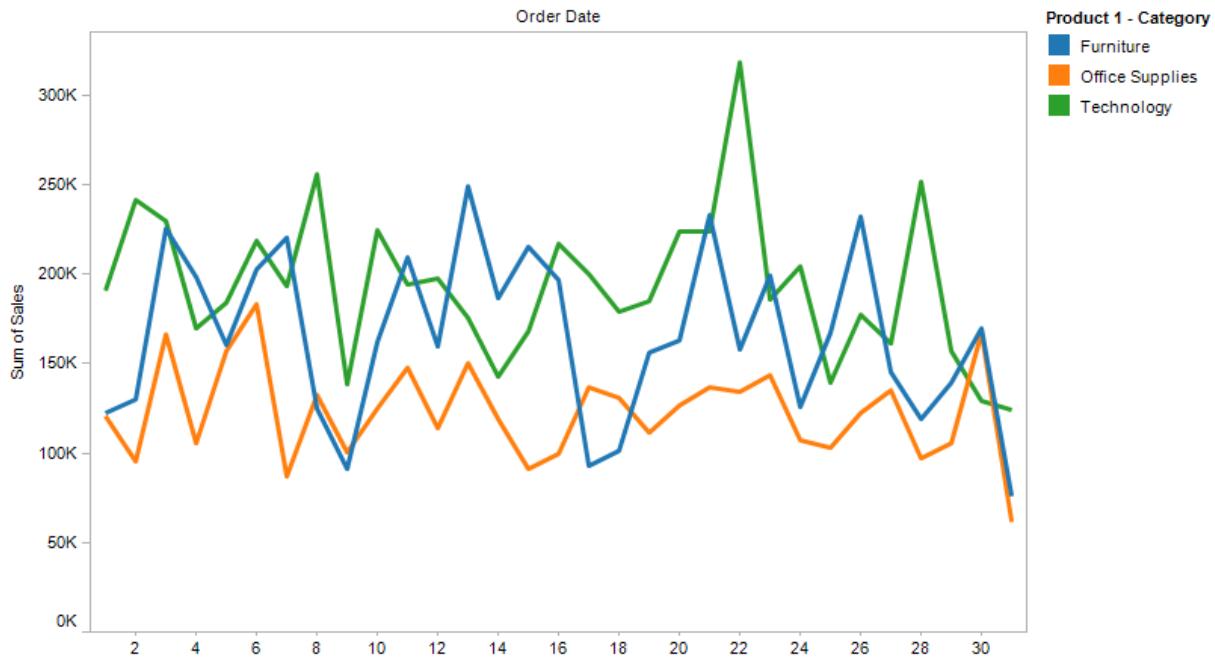
- The Mark menu is set to Automatic, and you place one or more measures on either the Columns shelf or the Rows shelf, and then plot the measures against a date dimension or a continuous dimension.
- You select Line from the Mark menu.

The data view shown below displays a dimension in the column of a table and several measures as the rows of the table.



*With the line mark type, you can specify the drawing order of the line by placing a field on the Path shelf.*

*As the density of data increases, trends are often easier to see when using lines. This view shows 90 data points.*

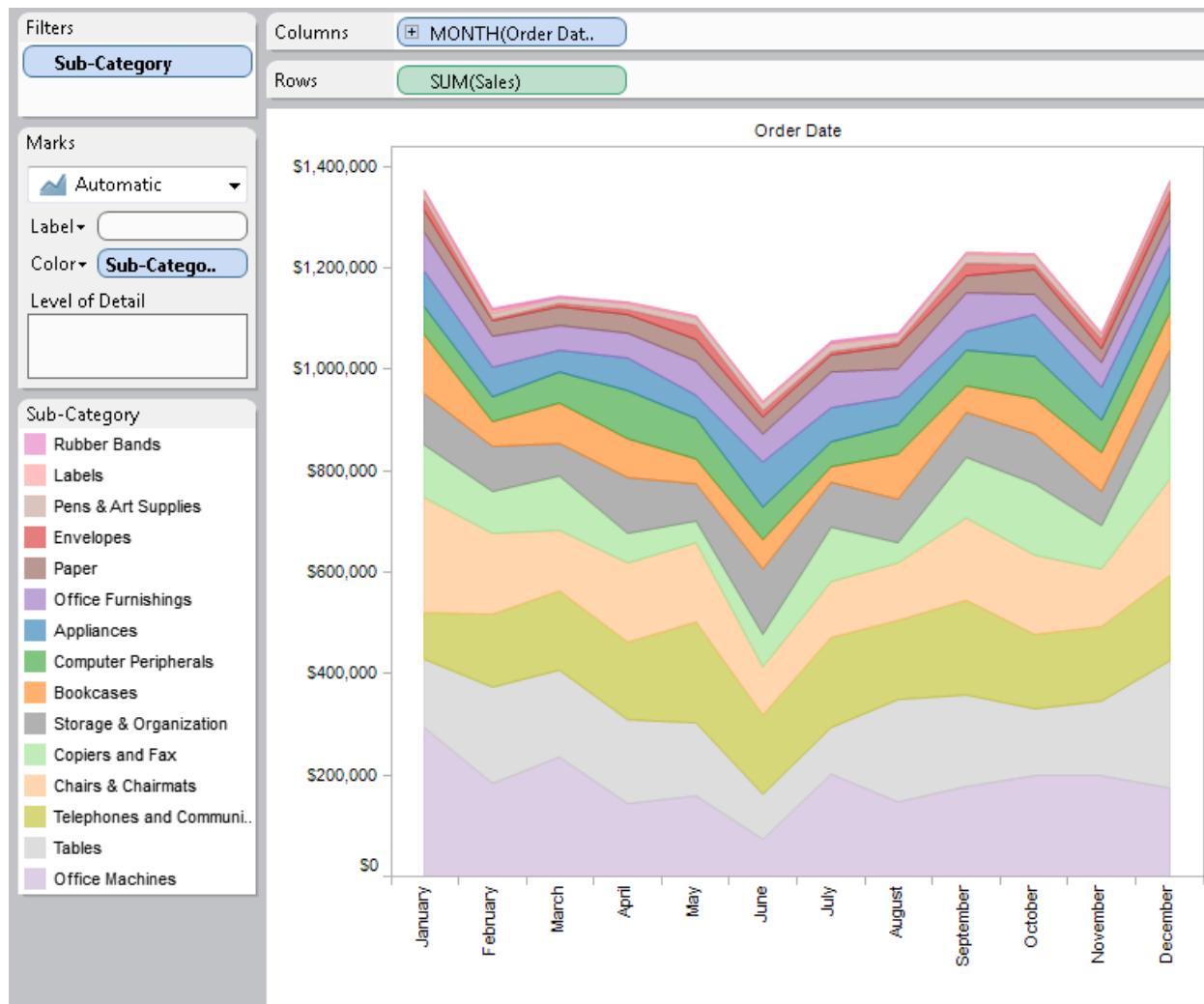


## Area Mark

The Area mark type is useful when you have a view the marks are Stacked and do not overlap. In an area chart, the space between each line and the next line is filled with a color. This type of chart is not the best way to show specific values along the line but it can clearly show the total values so you can get an idea of how a dimension is contributing to an overall trend. Tableau displays your data using areas when:

- The Mark menu is set to Automatic with one or more measures plotted against a date dimension or continuous dimension. The Analysis > Stack Marks option must also be set to On.

The view below shows a date dimension on the Columns shelf and a measure on the Rows shelf. Each line represents the sales for a product category. The lines have been stacked so that they do not overlap.

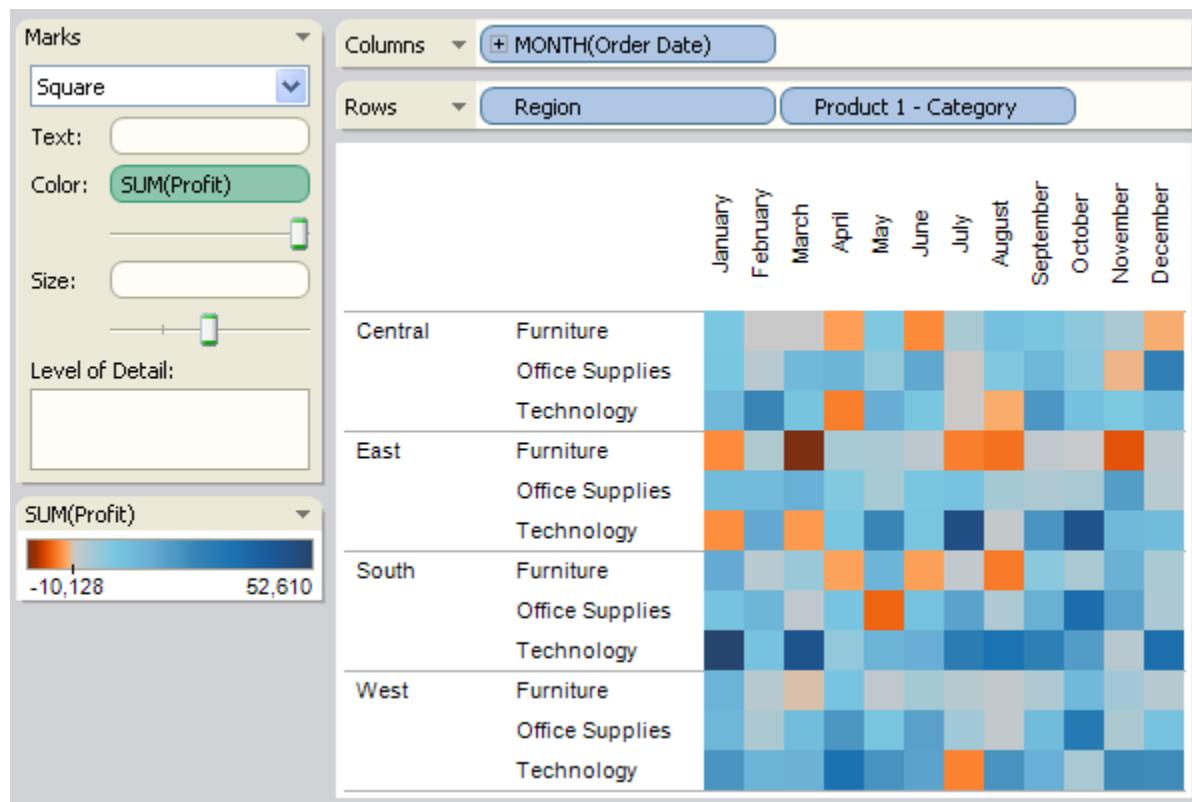


You can add labels, edit the color legend, and highlight areas similar to [Line](#) charts. In addition, you can turn on [Effects](#) such as mark borders.

## Square Mark

The square mark type is useful when you want to clearly see individual data points. When you select Square from the Mark menu, Tableau displays your data using squares.

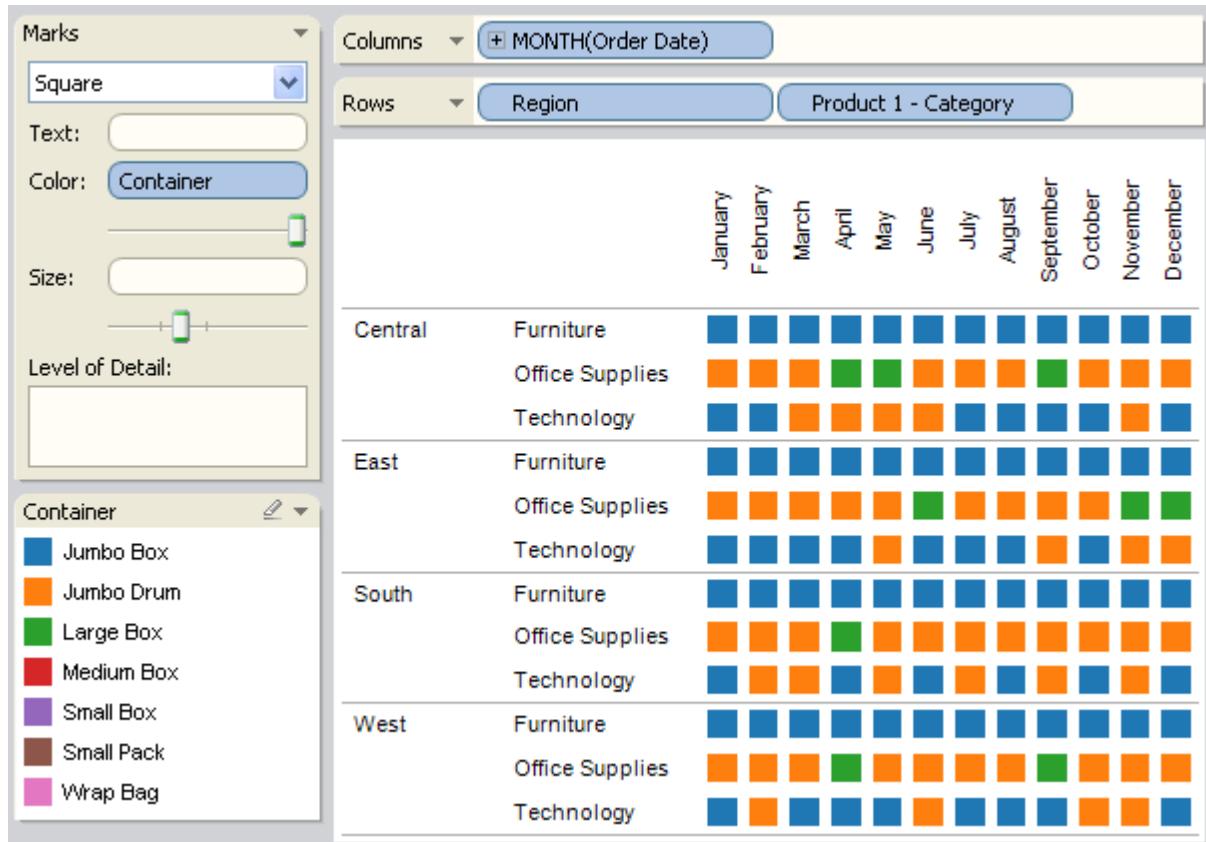
The data view shown below displays several dimensions in both the rows and columns of a table. If the Mark menu was set to Automatic, the data would be displayed using text. By manually selecting Square, a completely different view is created. In particular, by placing a measure on the Color shelf, square marks can be used to create a heat map.



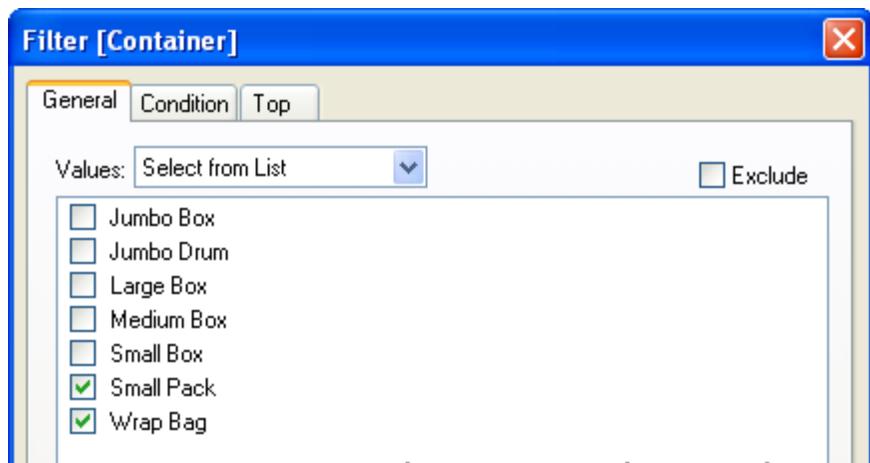
To reproduce this view, select the Format > Cell Size > Square Cell menu item and then adjust the size of the squares using the Size slider.

Because of the flexibility of Tableau, you might create a view that contains overlapping data and is difficult to interpret. One way to do this is to place a dimension on the Color shelf. A view with overlapping data can be deceptive because only one of the marks for each cell is visible.

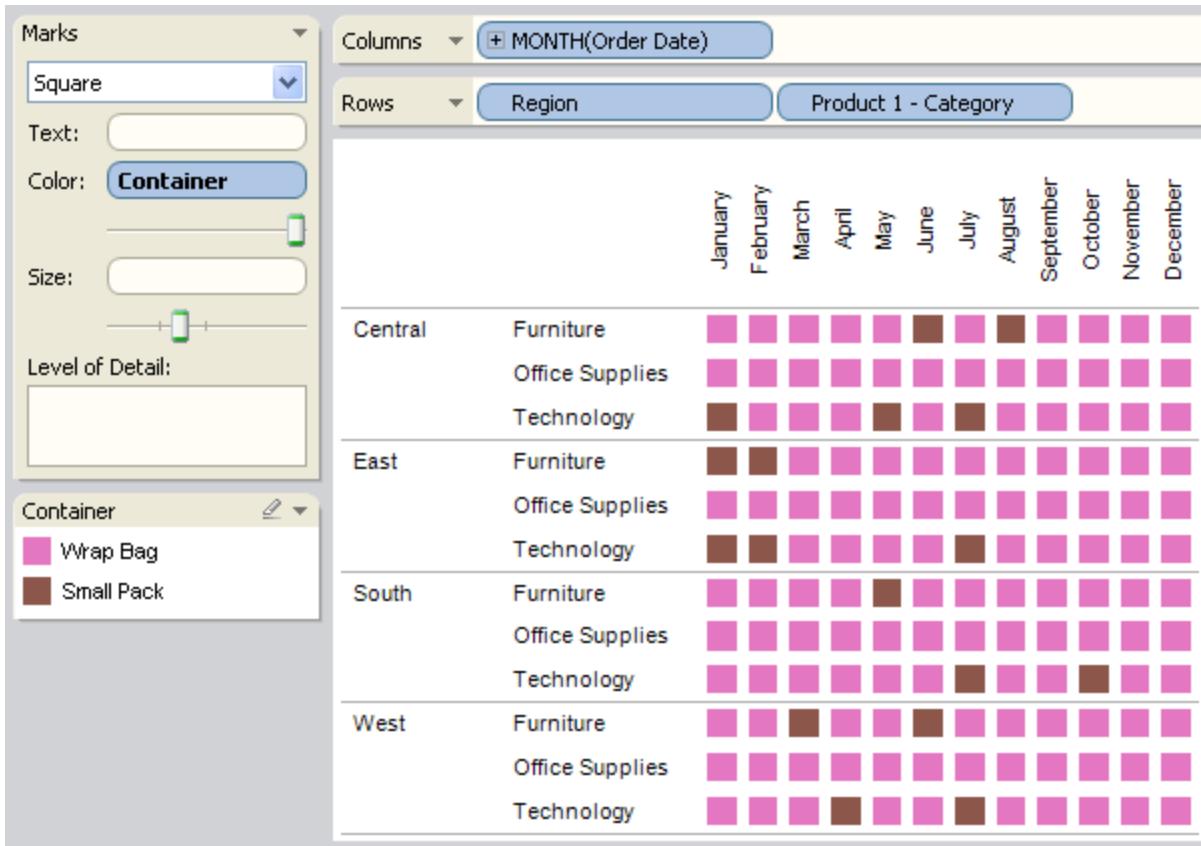
For example, suppose you replace the Profit measure in the example above with the Container dimension. As shown below, the squares indicate that there aren't any products shipped by Small Pack (brown) or Wrap Bag (pink).



Filter Container to only include Small Pack and Wrap Bag.



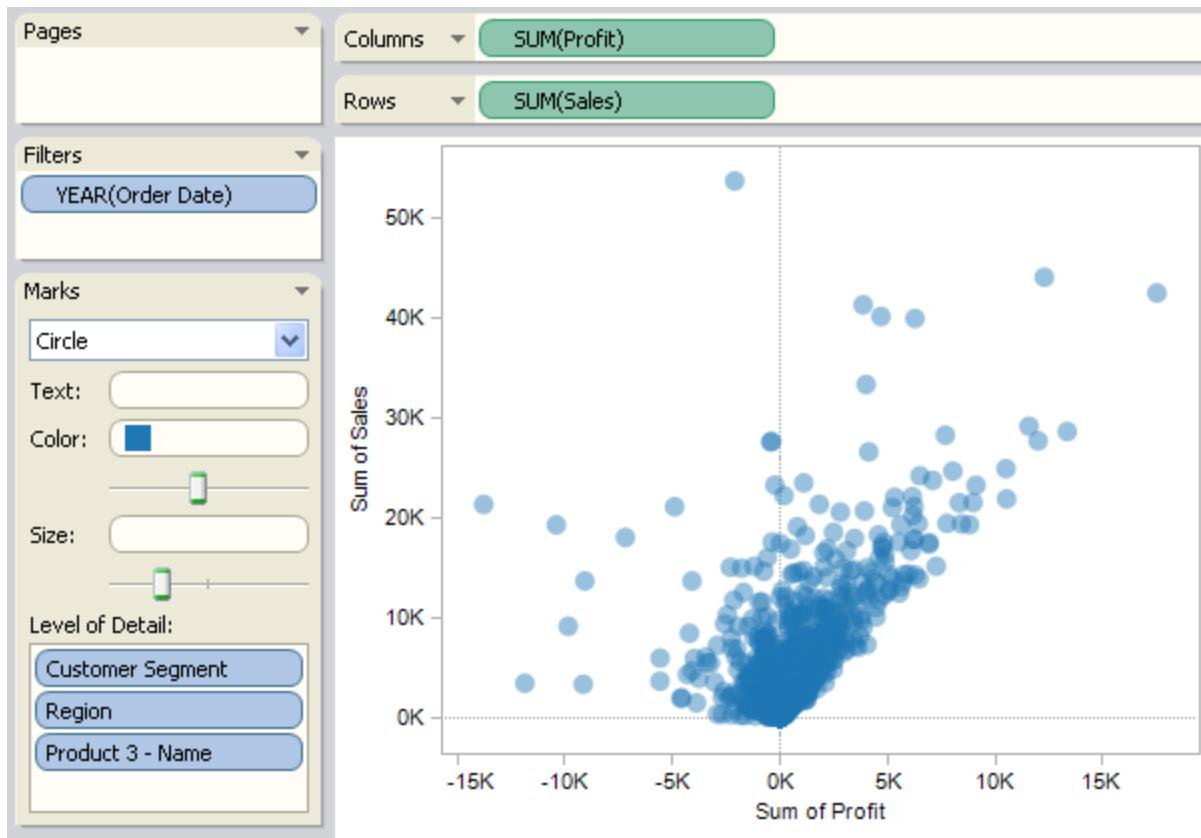
As you can see, all of the squares have changed color showing that the marks overlapped.



## Circle Mark

When you select *Circle* from the *Mark* menu, Tableau displays your data using circles.

As shown below, the data are displayed using circles. If the mark type was set to *Automatic*, Tableau would display the data using a shape (an open circle).

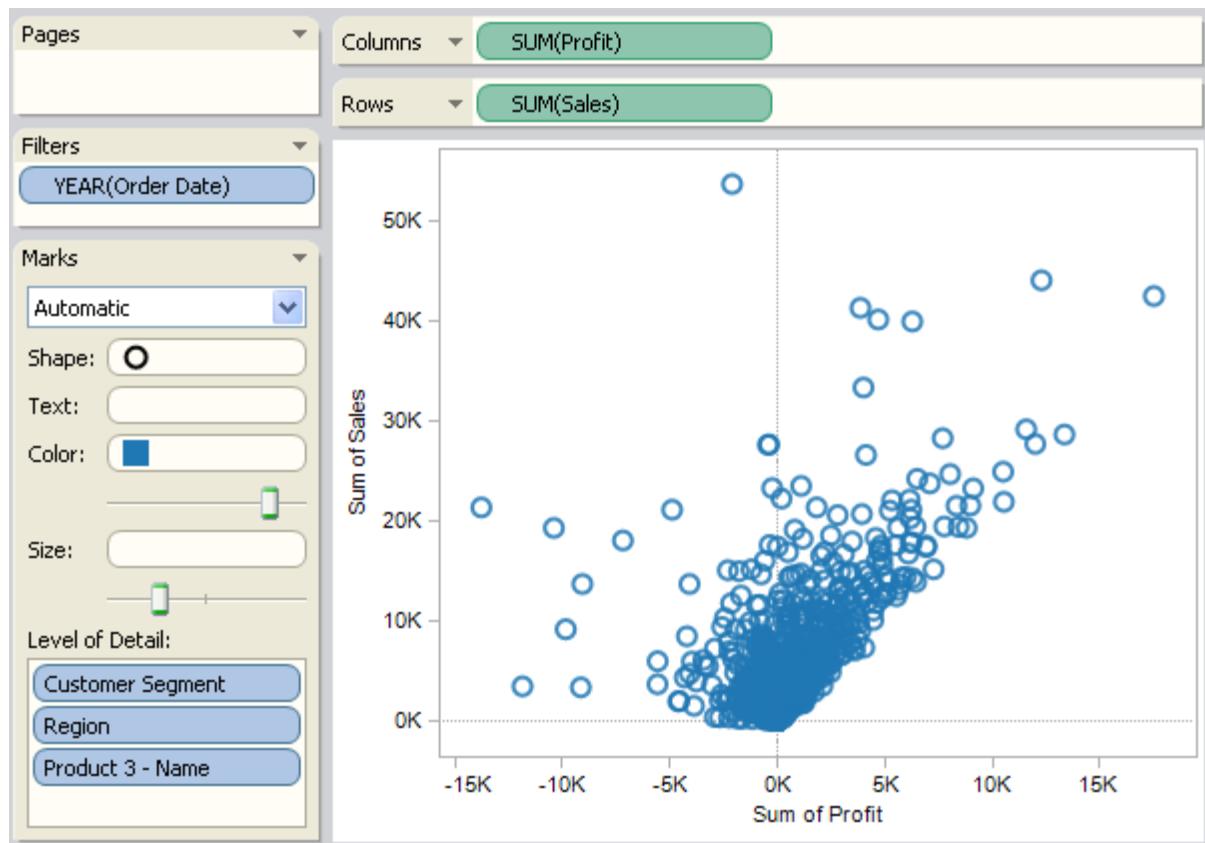


## Shape Mark

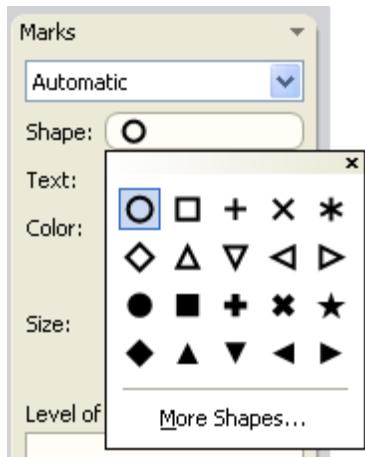
The shape mark type is useful when you want to clearly see individual data points while also viewing categories associated with those points. Tableau displays your data using a shape when:

- The Mark menu is set to Automatic, and you place one or more measures on both the Rows and the Columns shelves.
- You select Shape from the Mark menu.

The view shown below displays the data from two measures. Because the Mark menu is set to Automatic, the data are displayed using a shape.



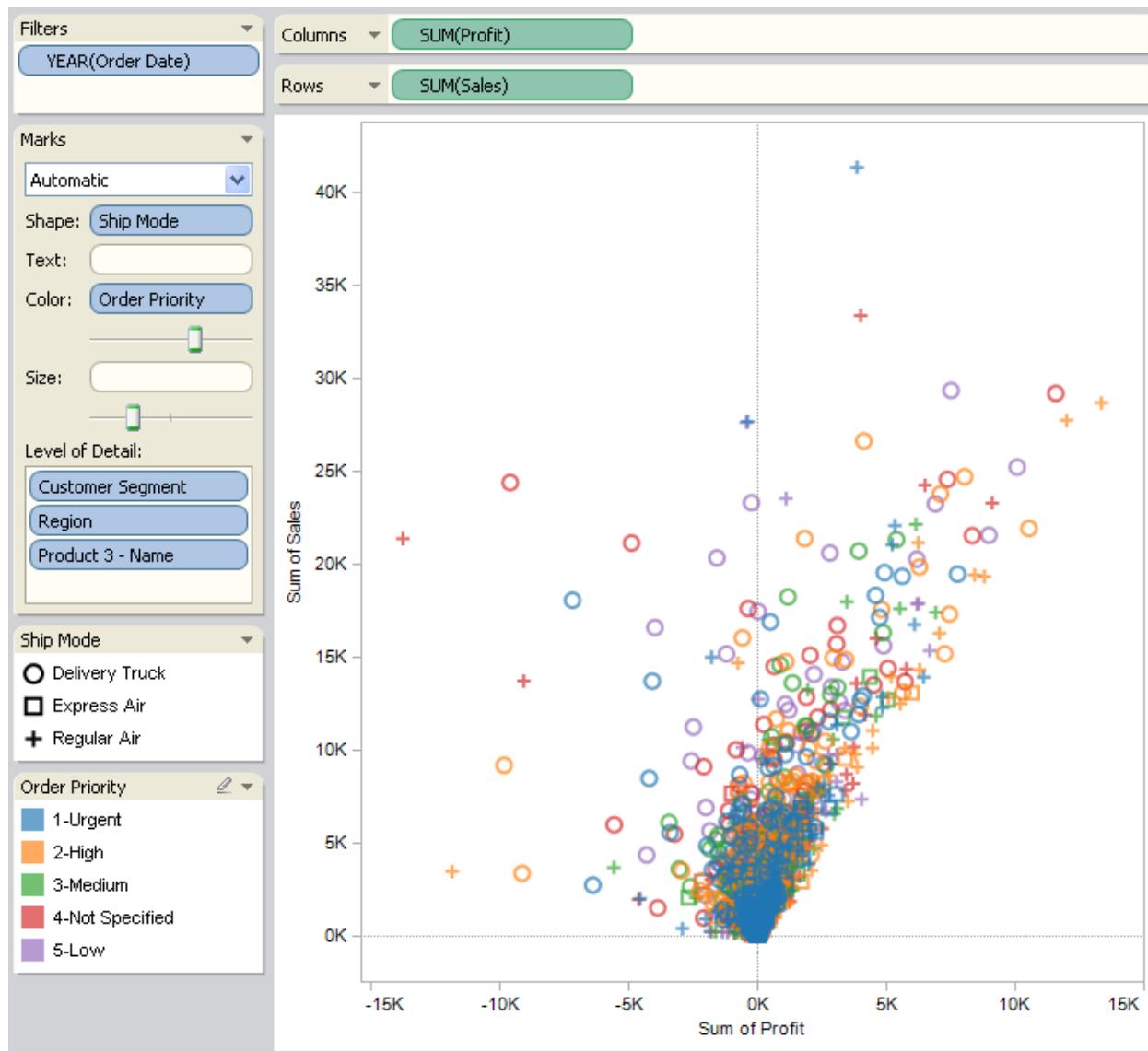
By default, the shape used is an open circle. You can select a different shape by clicking on the shape legend. As shown below, twenty unique shapes are available.



To enhance the data view, you can place a dimension on the Shape shelf. Tableau separates the marks according to the members in the dimension, and assigns a unique shape to each member. The shape legend displays each member name and its associated shape.

As shown below, the Ship Mode dimension is used to shape-encode the view.

## Tableau Desktop Help



## Text Mark

The text mark type is useful when you want to display the numbers associated with one or more dimension members. This type of view is often called a text table, a cross-tab, or a Pivot Table. Tableau displays your data using text when:

- The Mark menu is set to *Automatic*, and you place one or more dimensions as the inner fields on both the Rows and the Columns shelves.
- You select *Text* from the Mark menu.

Initially, the data are displayed using the

Abc

icon.

The screenshot shows the Tableau Data View interface. At the top, there are two shelves: 'Columns' containing 'YEAR(Order Date)' and 'Rows' containing 'Product 2 - Sub-Cate..'. Below these shelves is a data table. The table has a header row labeled 'Order Date' with three columns: 2005, 2006, and 2007. The rows represent sub-categories under 'Product 2 - Sub-Categories': Appliances, Binders and Binder Accesso.., Bookcases, Chairs & Chairmats, and Computer Peripherals. Each row contains three entries corresponding to the years 2005, 2006, and 2007, all of which are labeled 'Abc'.

	Order Date		
Product 2 - Sub-Category	2005	2006	2007
Appliances	Abc	Abc	Abc
Binders and Binder Accesso..	Abc	Abc	Abc
Bookcases	Abc	Abc	Abc
Chairs & Chairmats	Abc	Abc	Abc
Computer Peripherals	Abc	Abc	Abc

To complete the view, you must place a field (typically a measure) on the Text shelf. As shown below, the Sales measure, which is aggregated as a summation, is used to complete the table.

## Tableau Desktop Help

The screenshot shows the Tableau desktop interface with a cross-tab view. The columns are labeled 'Product 2 - Sub-Cate..', 'Order Date', '2006', '2007', '2008', and '2009'. The rows are labeled 'Product 2 - Sub-Category' and include categories like Appliances, Binders and Binder Accesso.., Bookcases, Chairs & Chairmats, Computer Peripherals, Copiers and Fax, Envelopes, Labels, Office Furnishings, Office Machines, Paper, Pens & Art Supplies, Rubber Bands, Scissors, Rulers and Trimme.., Storage & Organization, Tables, and Telephones and Communica..'. The data values range from 3,142 to 732,505. The 'Marks' shelf on the left shows 'Text: SUM(Sales)' and 'Color: Black'.

Product 2 - Sub-Category	Order Date	2006	2007	2008	2009
Appliances		170,657	216,660	168,657	191,359
Binders and Binder Accesso..		360,210	178,639	185,123	300,550
Bookcases		253,942	263,566	140,664	163,810
Chairs & Chairmats		518,011	380,704	451,249	394,181
Computer Peripherals		215,565	175,327	191,042	214,620
Copiers and Fax		273,287	339,713	280,821	236,541
Envelopes		31,376	51,093	39,308	54,521
Labels		10,364	7,393	12,937	8,350
Office Furnishings		194,770	162,197	164,979	143,966
Office Machines		732,505	446,780	428,749	563,308
Paper		118,093	119,516	100,490	111,397
Pens & Art Supplies		42,340	46,728	42,671	35,786
Rubber Bands		3,142	3,754	4,375	3,969
Scissors, Rulers and Trimme..		16,653	6,877	10,645	46,821
Storage & Organization		297,775	289,979	243,495	268,525
Tables		478,981	429,657	500,322	478,255
Telephones and Communica..		472,252	442,048	471,010	504,005

### Note:

You can create a cross-tab of any data view by selecting the Worksheet > Duplicate as Cross-tab menu item.

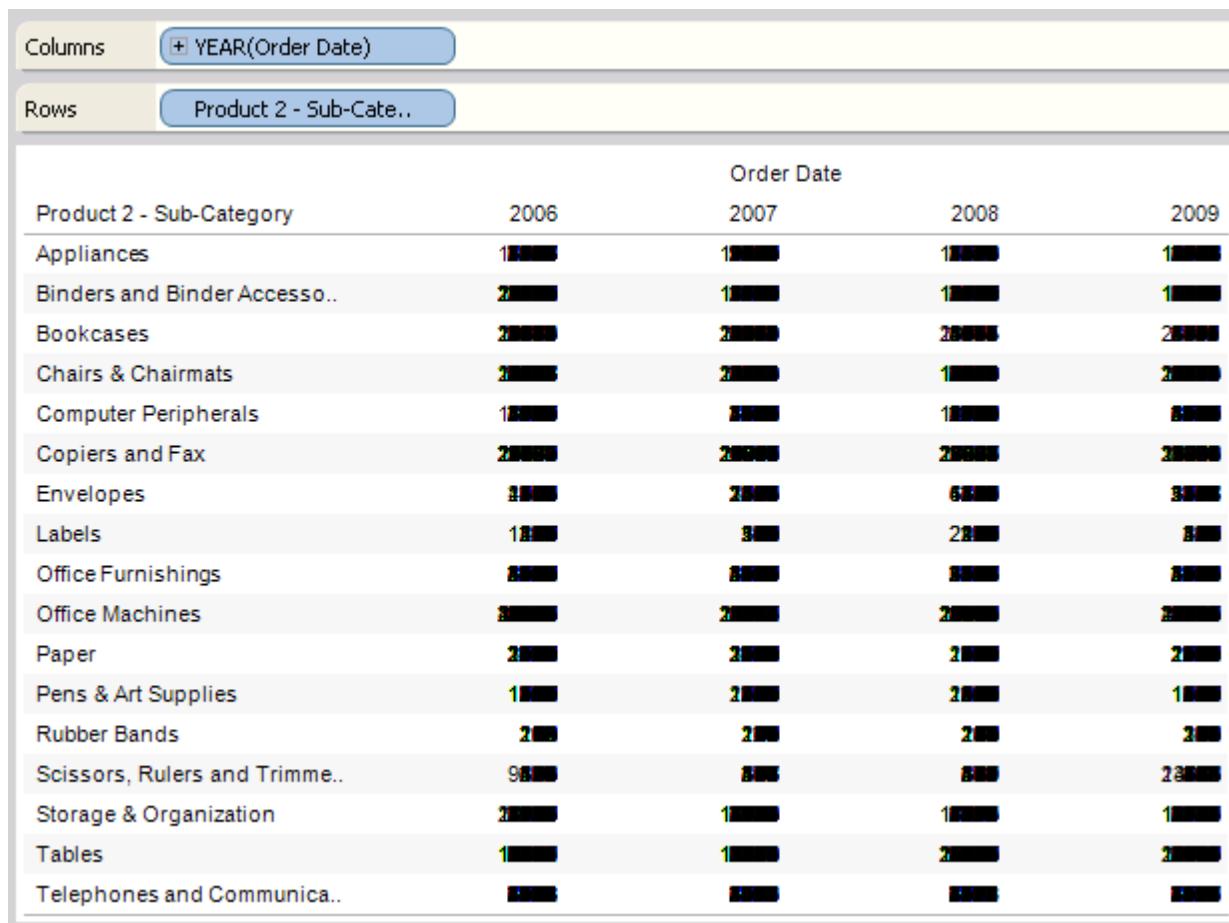
Because of the flexibility of Tableau, you might create a view that contains overlapping text. In this case, the following warning dialog box appears. If you do not want to display this dialog box in the future, select the check box in the lower left. To display the dialog box again, select the Help > Show Messages Again menu item.



Overlapping text occurs when multiple data source values contribute to a single text table cell. There are three common cases to consider.

- **Level of detail** – If you place a dimension on the Level of Detail, Color, Shape, Size, or Text shelf, overlapping text occurs if multiple dimension members (levels of detail) contribute to a text table cell. To avoid overlapping text in this case, you might consider placing the dimension on the Rows or the Columns shelf.
- **Disaggregated data** – If you disaggregate a measure placed on the Text shelf, overlapping text occurs if multiple data source rows contribute to a text table cell. If you want to display disaggregated data, a text table is probably not the best choice. Instead, consider displaying the data in a scatter plot.
- **Non-unique names** – When connected to a multidimensional data source, a dimension can include non unique names.

In the example below, overlapping text occurs when you disaggregate the Sales measure. As shown below, the cells contain overlapping sales data. This is because more than one data source row has a sale record for a given year and product. Note that Office Machines in 2004 indicates that there is only one sales record. However, this cell can still contain overlapping text if there are multiple data source rows with the same value. In this case, the overlapping text warning dialog box would still appear.



The screenshot shows a Tableau data view with the following structure:

- Columns:** YEAR(Order Date)
- Rows:** Product 2 - Sub-Cate..
- Table Headers:** Order Date, 2006, 2007, 2008, 2009
- Table Data:** A grid of sales data for various products across four years. The data shows overlapping text in several cells, particularly in the 2007 column where multiple data source rows have the same value.

	Order Date	2006	2007	2008	2009
Product 2 - Sub-Category		2006	2007	2008	2009
Appliances	1	1	1	1	1
Binders and Binder Accesso..	2	1	1	1	1
Bookcases	2	2	2	2	2
Chairs & Chairmats	2	2	1	2	2
Computer Peripherals	1	1	1	1	1
Copiers and Fax	2	2	2	2	2
Envelopes	2	2	6	3	3
Labels	1	3	2	1	1
Office Furnishings	2	2	2	2	2
Office Machines	2	2	2	2	2
Paper	2	2	2	2	2
Pens & Art Supplies	1	2	2	1	1
Rubber Bands	2	2	2	2	2
Scissors, Rulers and Trimme..	9	8	8	28	28
Storage & Organization	2	1	1	1	1
Tables	1	1	2	2	2
Telephones and Communica..	2	2	2	2	2

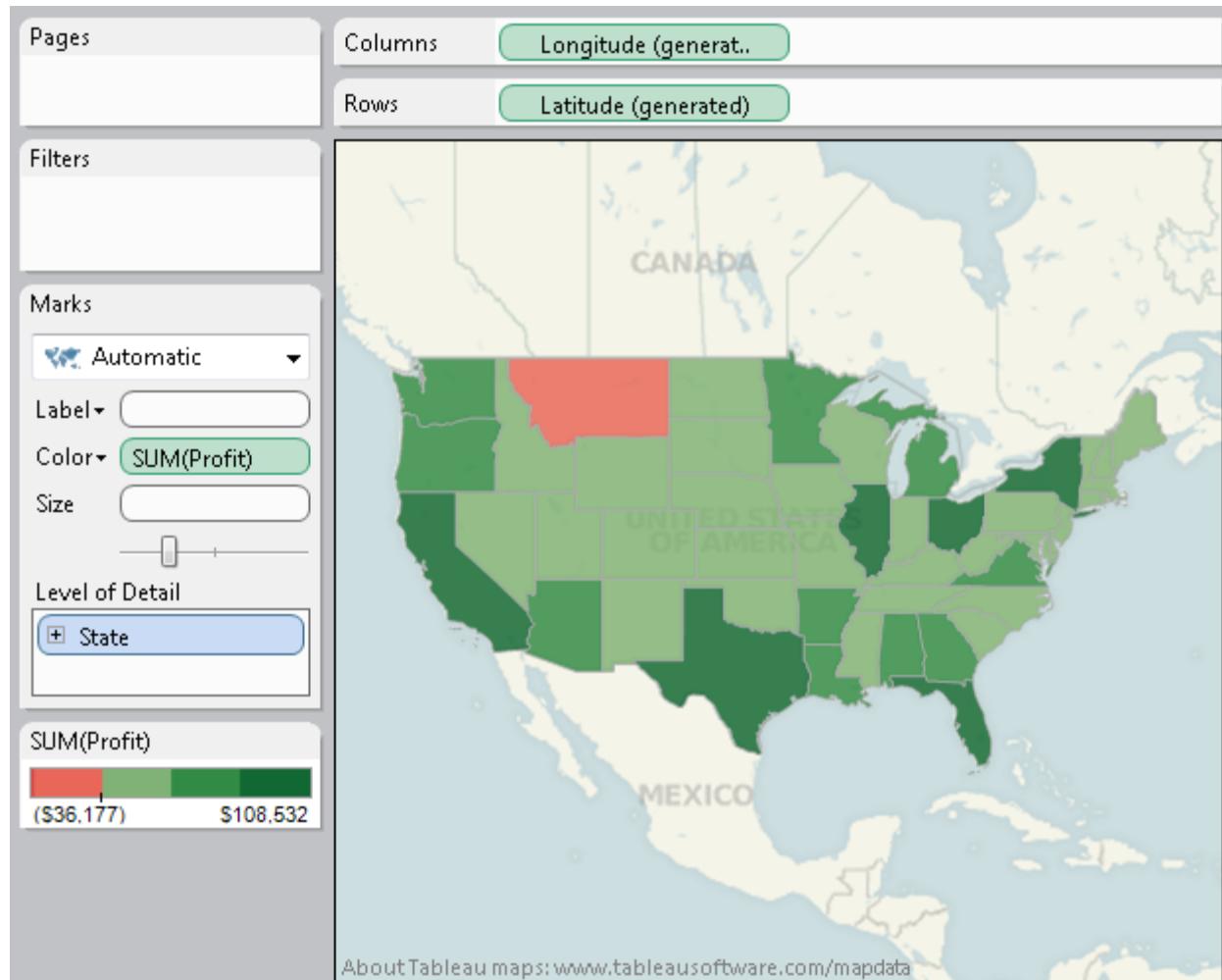


## Filled Map Mark

The *filled map mark* type uses geocoding to fill a polygon with a color based on data. The primary use of the filled map mark type is for creating choropleth maps (also known as thematic maps or data maps). The area to be filled is defined by the geographic fields used in the view. Tableau displays data using a filled map when:

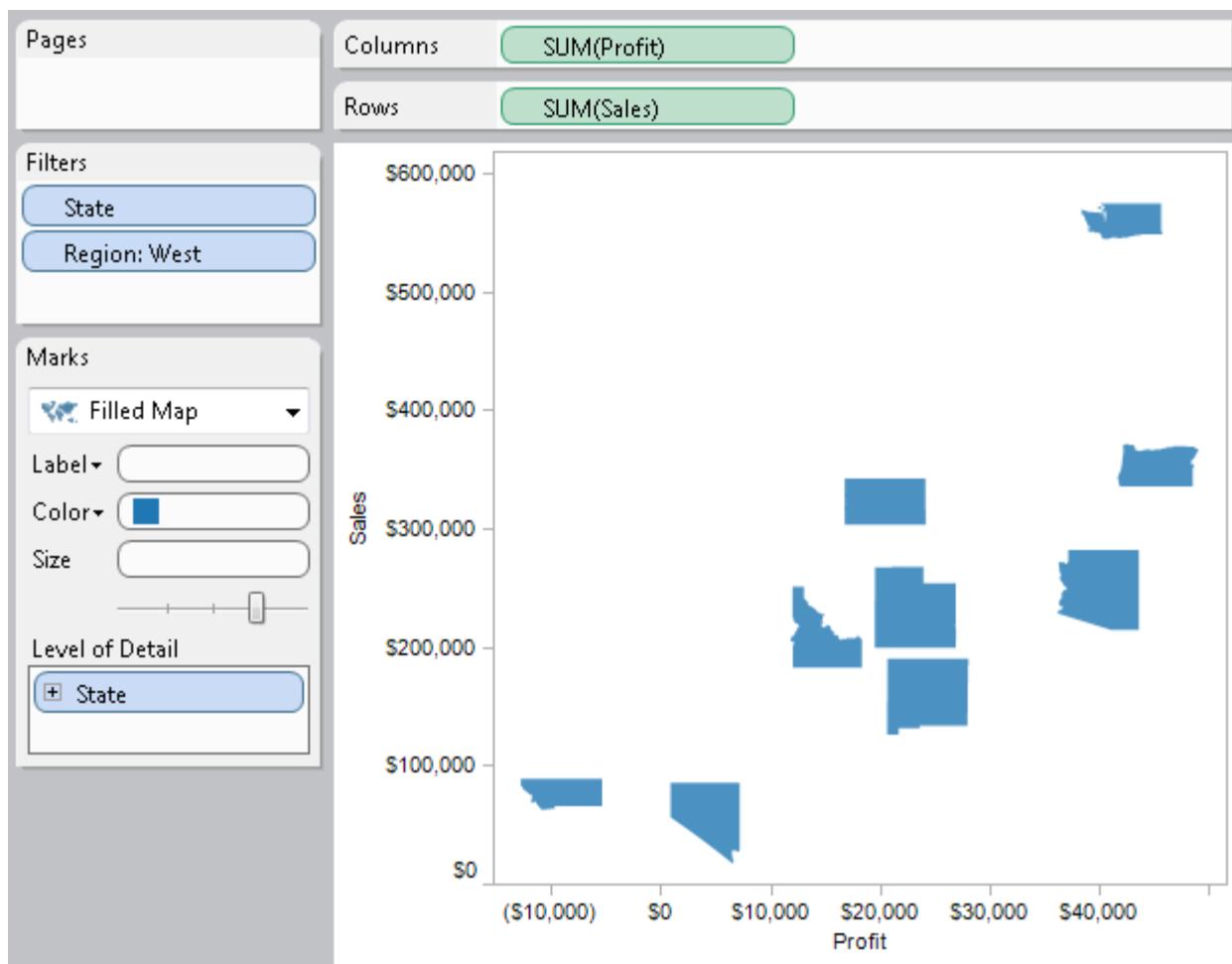
- A geographic dimension is on the *Level of Detail* shelf along with *Latitude* and *Longitude* on the *Rows* and *Columns* shelf. A measure or continuous dimension is added to the *Color* shelf.
- You select *Filled Map* from the *Mark* menu.

The data view below shows a map with the State geographic dimension on the *Level of Detail* shelf. The *Profit* measure is on the *Color* shelf.



The polygon for each state is filled with a color based on the profit for that state. The profit in Montana is low while the profit in Texas is high.

Another way to use the Filled Map mark type is when you are plotting two measures against each other. By default, placing two measures on the Rows and Columns shelves creates a scatter plot. However, adding a geographic dimension allows you to change the mark type to Filled Map. Each mark becomes the area defined by the geographic field. For example, the view below shows Sales versus Profit for a selection of states. Rather than showing a round mark with a label for each state, the view uses the Filled Map mark type to draw the outline of each state. While this works well for recognizable areas, it is not the best choice for areas that are similar shapes.



## Pie Mark

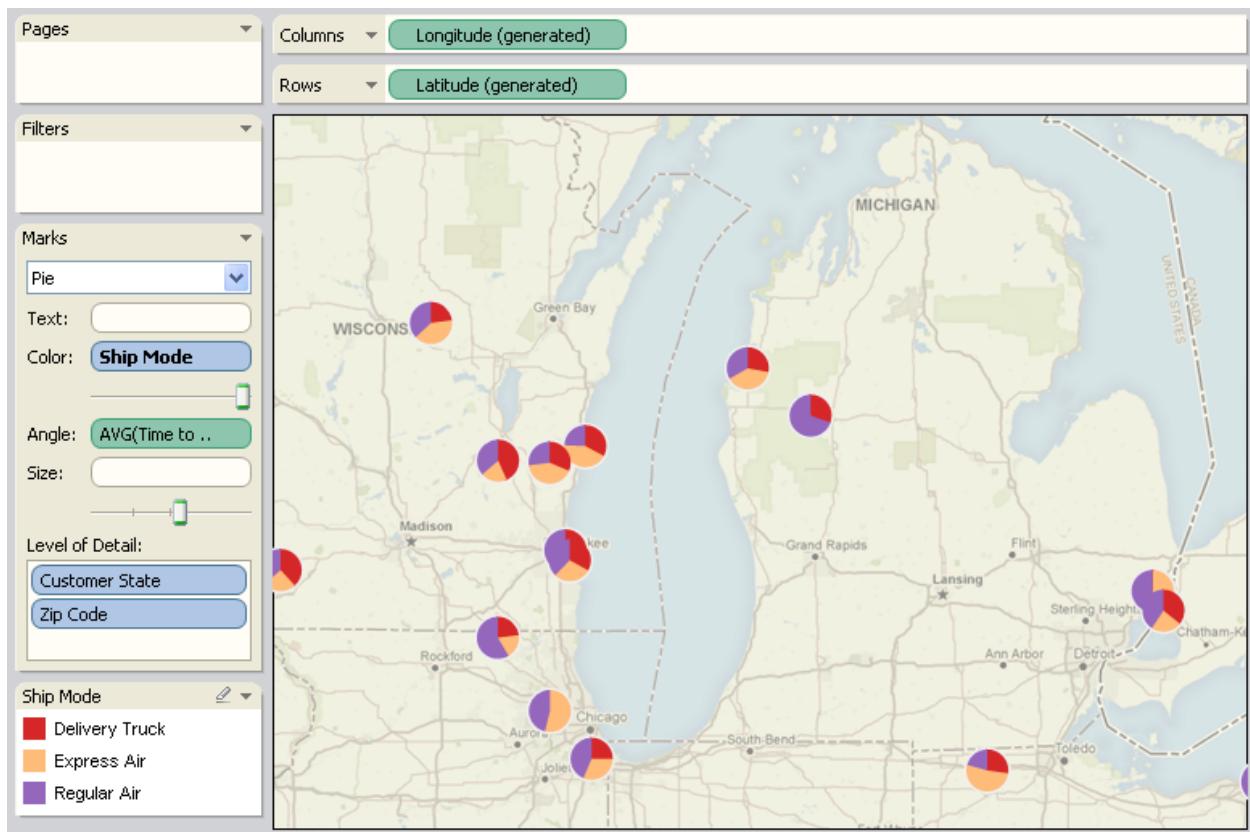
*The pie mark can be used to show proportions. Although generally this type of information can be better shown using stacked bar charts, there are cases where using pie marks can be very effective. For example, pie marks are very useful when trying to convey the percentage allocation of marketing expenses by state where the spending of geographically close states are very relevant.*

*Tableau will never use the pie mark as an automatic mark type, but you can select Pie on the Mark menu.*

*When you select the Pie mark type, an additional shelf is available for angle. The Angle shelf determines the angular measure of the pie wedges. For example if you place a measure such as Sales on the angle shelf, the total 360 degrees of the pie corresponds to the total sum of sales and each wedge is divided for the values of the field on the Color shelf.*

*The view below shows the time it took to ship products by various ship modes. The data overlays a map and shows the information by zip code. We can quickly see that Regular Air takes the longest to ship in this particular region except in the south part of Michigan where they seem to have optimized for that ship mode.*

## Tableau Desktop Help



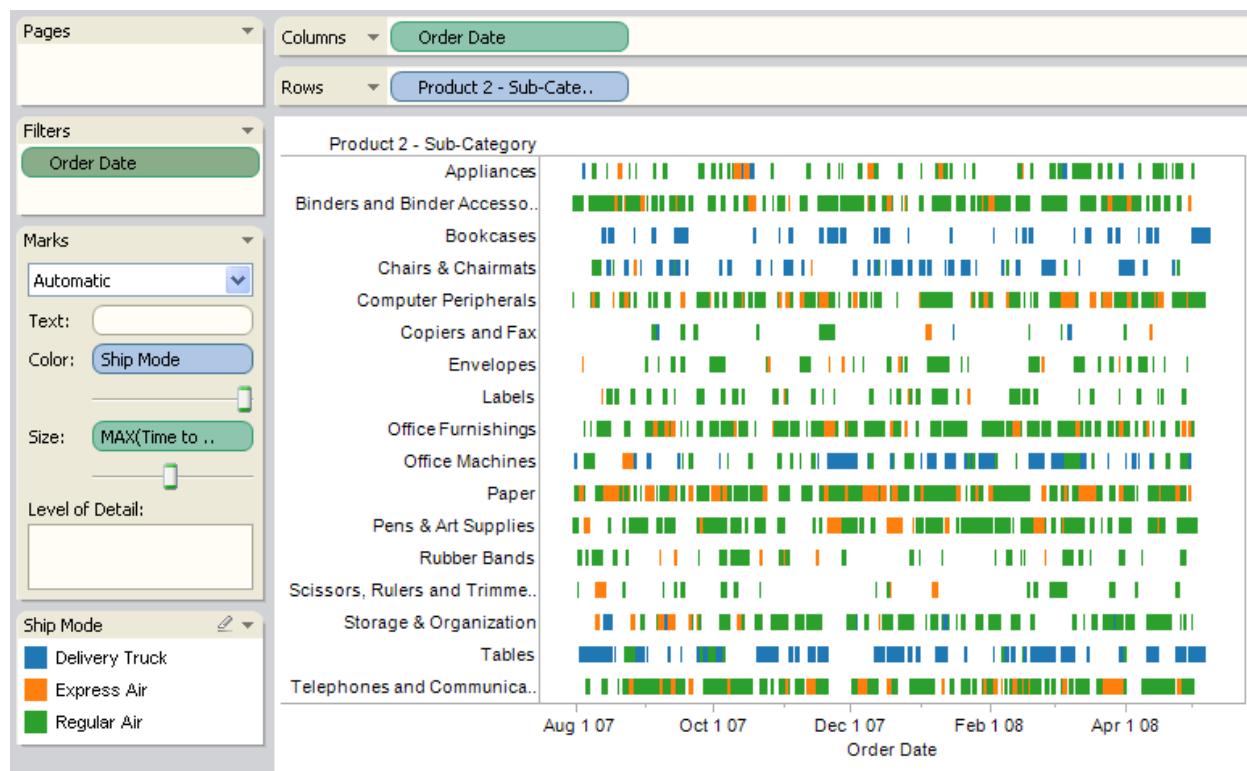
## Gantt Bar Mark

The Gantt bar mark type is useful when you are viewing dates, project plans, or the relationships between different quantitative variables. Tableau displays your data using Gantt bars when:

- The Mark menu is set to *Automatic* and you place one or more dimensions on either the Columns shelf or the Rows shelf, and then plot the dimensions against a continuous quantity.
- You select *Gantt Bar* from the Mark menu.

The distinguishing characteristic of Gantt bars is that the length of every mark is proportional to the measure placed on the Size shelf.

The data view shown below displays a dimension as a function of a continuous date. If the Mark menu is set to *Automatic*, the data would be displayed using bars. By manually selecting *Gantt Bar* and adding additional fields to the view, a different view is created.



*In particular, by placing the Time to Ship measure on the Size shelf, every bar in the view has been drawn with a length that indicates the delivery time of an order. Additionally, by placing the Ship Mode dimension on the Color shelf, each bar is color-encoded by the ship mode.*

## Polygon Mark

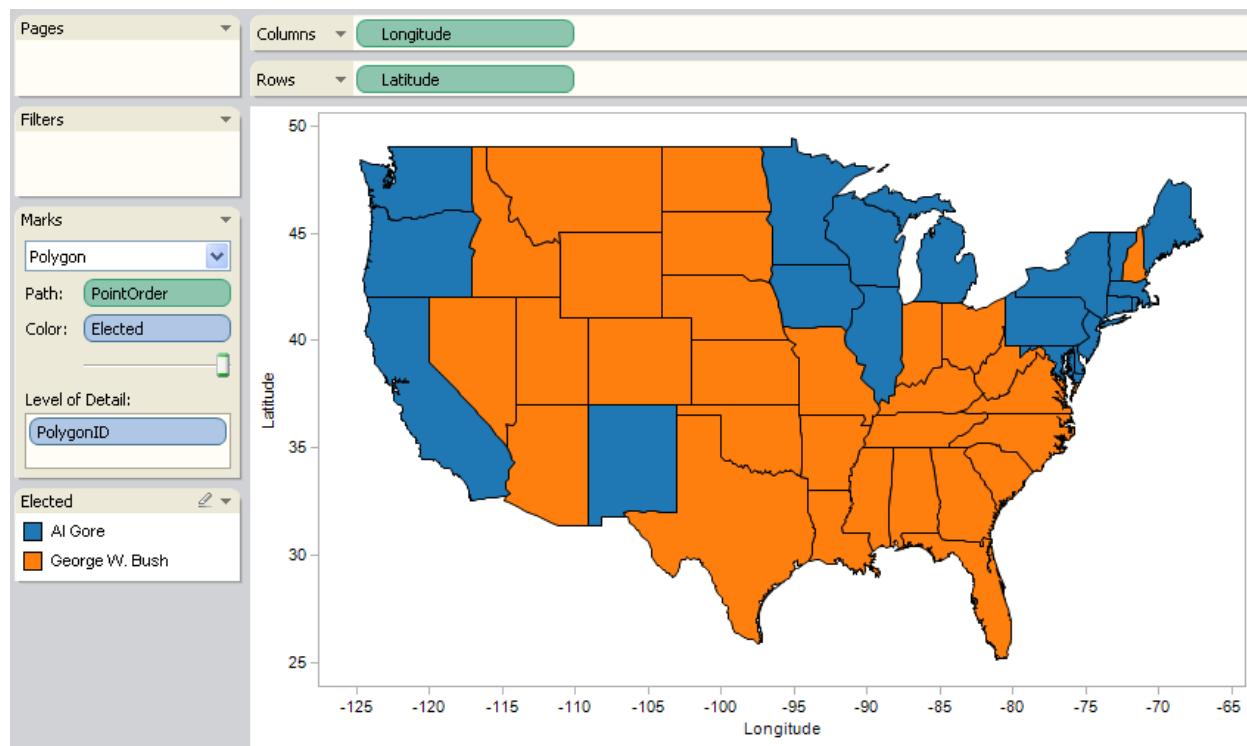
*Polygons are points connected by lines. The polygon mark type is useful when you want to connect points to create data areas. Tableau displays data using polygons when you select Polygon from the Mark menu.*

### Note:

*The polygon mark is not commonly used and often requires a specially constructed data source.*

*The view shown below comes from a specially constructed data source that holds geographic and election data. It displays the 48 contiguous US states as a function of latitude and longitude and color-encodes each state by the 2000 presidential election results.*

*If Mark is set to Automatic, the data will be displayed using a shape. By manually selecting Polygon, and adding additional fields to the view, a different view is created.*



*Every state is considered to be a polygon in the data source. The PolygonID field on the Level of Detail shelf is distinct for each US state. You can remove states from the view by filtering this field.*

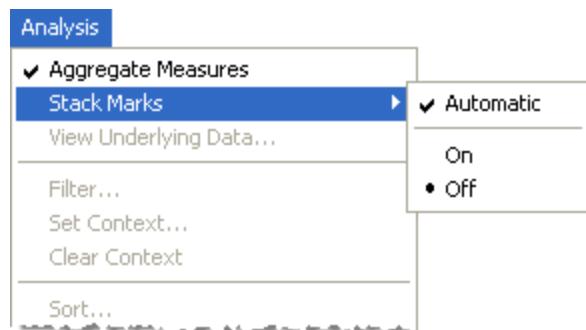
*Additionally, you can specify the drawing order of the lines that constitute each polygon by placing a field on the Path shelf. In this example, the PointOrder measure is used to draw each state.*

## Stacking Marks

### Stacking Marks

*Stacking marks is relevant when your data view includes numeric axes. That is, at least one measure has been placed on the Rows or Columns shelf. When marks are stacked, they are drawn cumulatively along an axis. When marks are not stacked, they are drawn independently along an axis. That is, they are overlapping.*

*Stacking marks is particularly useful for bar charts which is why Tableau automatically stacks bars. You might find that stacking marks is useful for other marks such as lines as well. You can control whether marks are stacked or overlapping in any given view by selecting the Analysis > Stack Marks menu item. You can either allow Tableau to automatically select whether the marks are stacked or you can specify on or off. The default mode is automatic. When you are in automatic mode, the Stack Marks menu indicates whether stacked marks is on or off.*



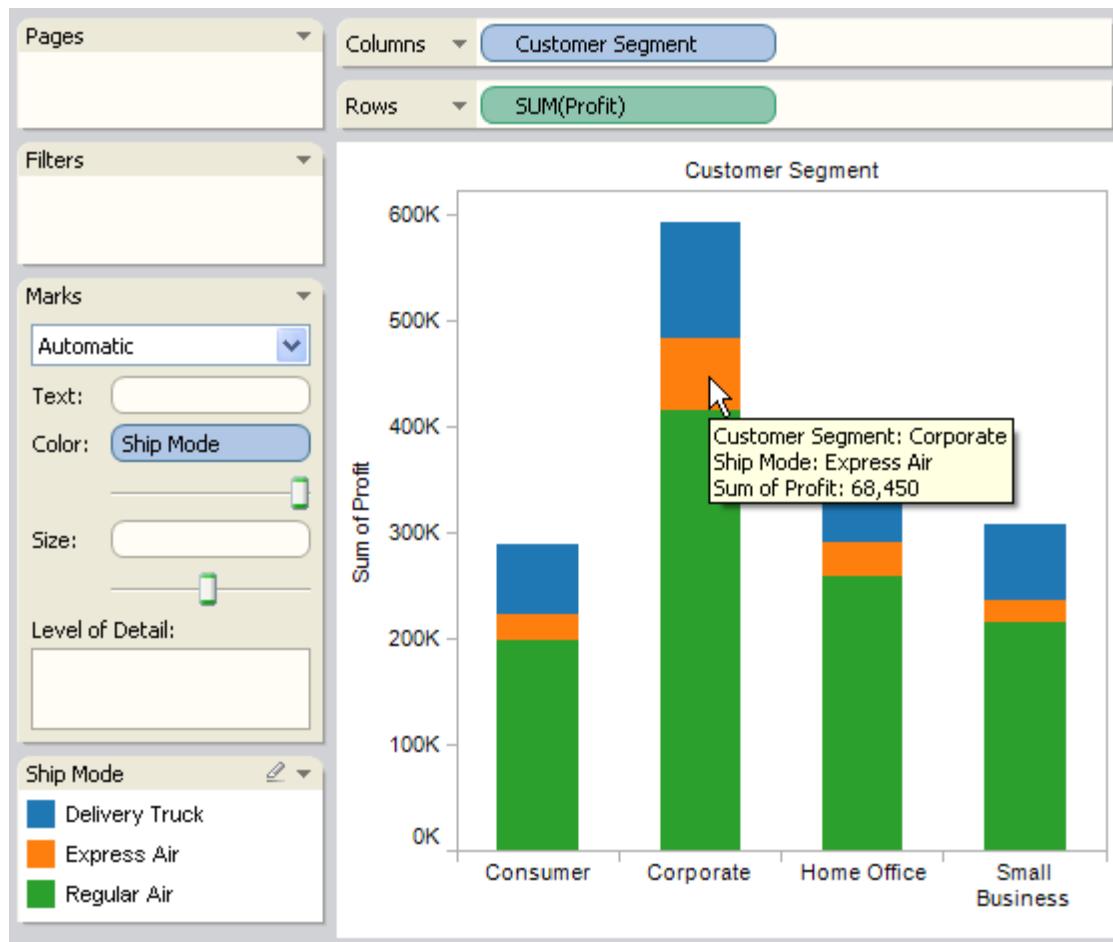
*If you select On or Off on the Stack Marks menu, you are switched to manual mode. Your selection remains throughout any changes you make to the view.*

*The following examples illustrate stacking marks.*

- [Example – Stacking Bars](#)
- [Example – Stacking Lines](#)

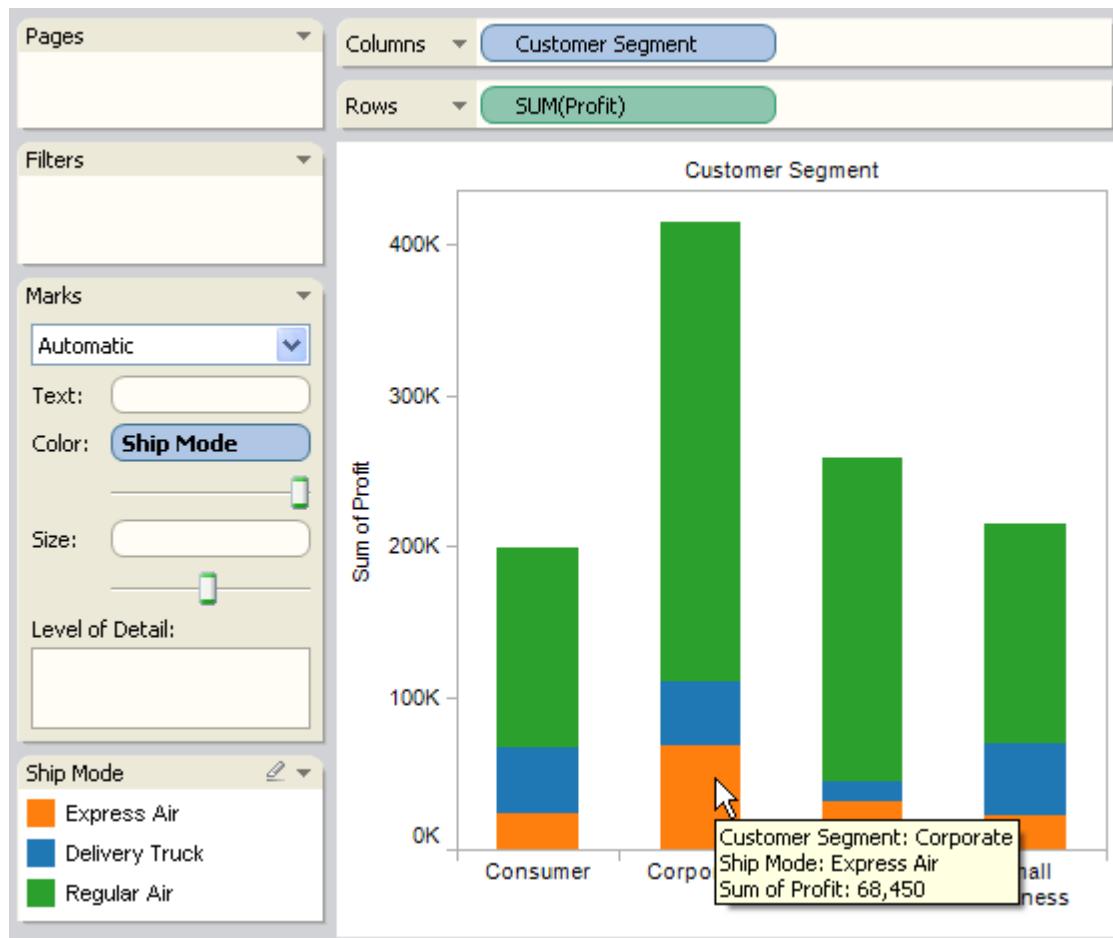
## Example – Stacking Bars

Consider the stacked bars view shown below. It was created by placing a dimension on Columns shelf, placing a measure on the Rows shelf, and color-encoding the data by a dimension.



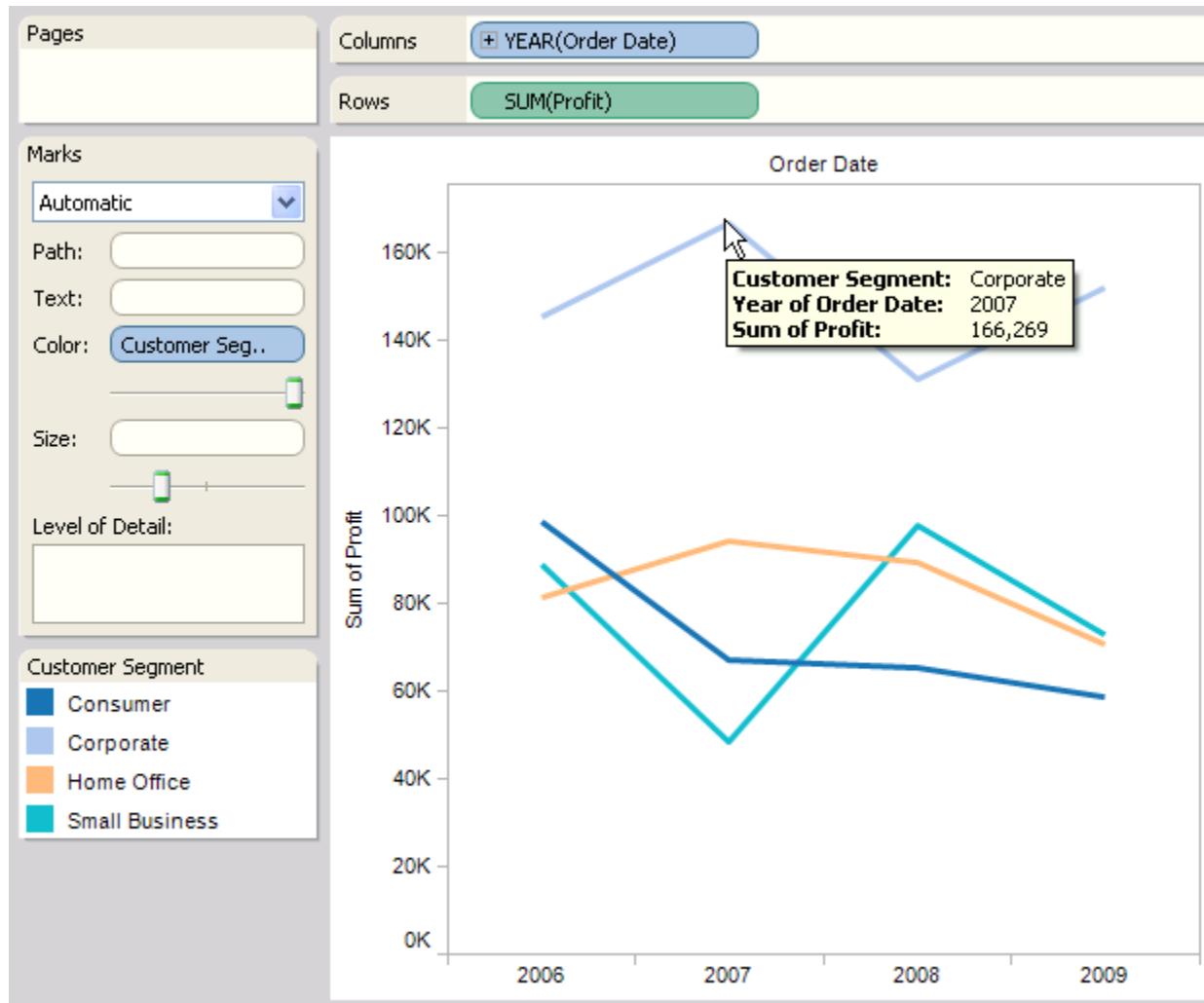
Because the mark type is a bar, Tableau automatically stacks the marks. This means that the marks are drawn cumulatively and the height of each stacked segment within each bar represents the value for that segment. For example, the sum of the profit for products shipped by Express Air (orange bar segment) in the Corporate market is \$68,450.

If you un-stack the marks, they all start from the horizontal axis. As shown below, you can still view the individual bar segments. Be aware, however, because un-stacked marks overlap, it is possible to create a view where bar segments are not visible.



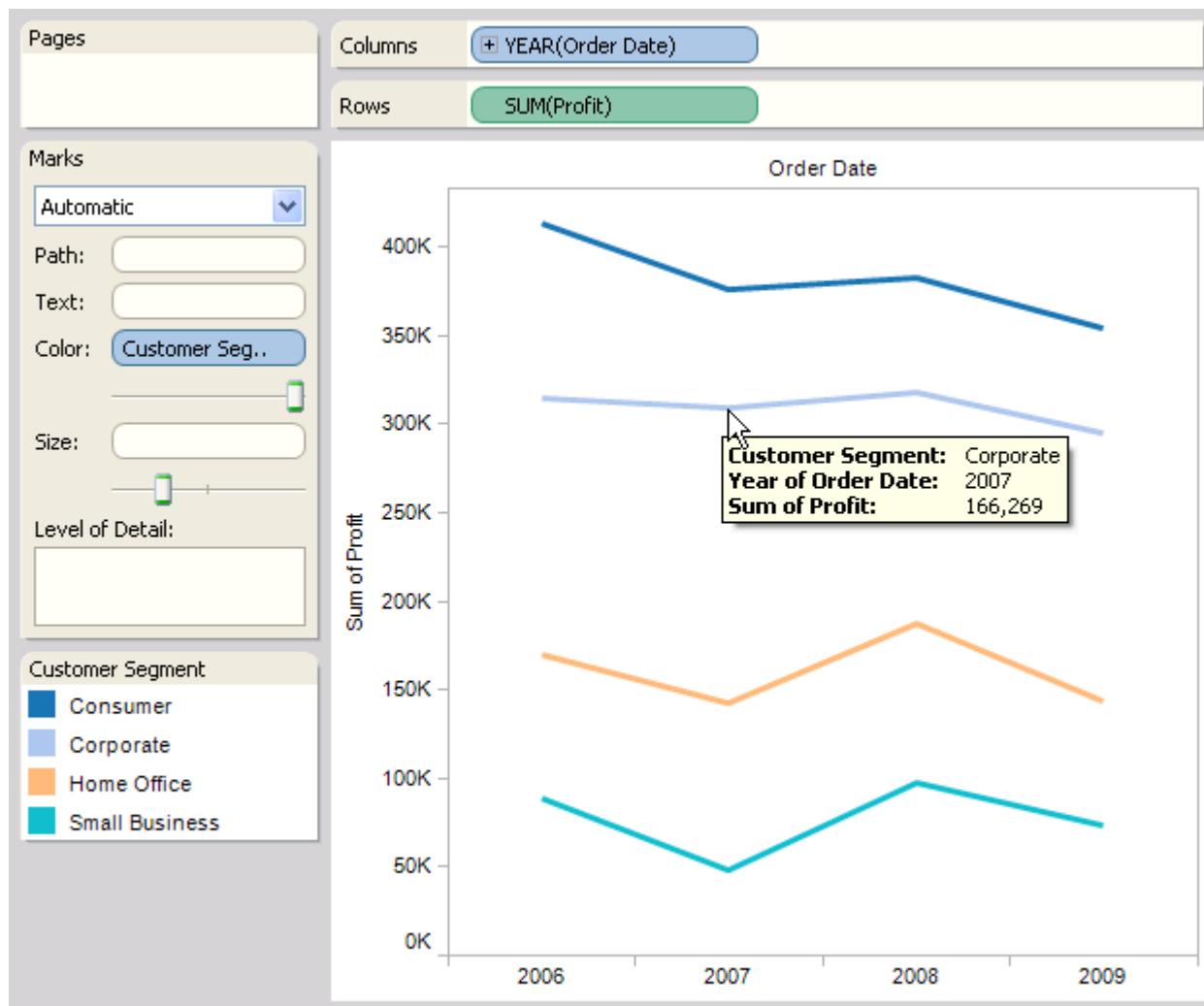
## Example – Stacking Lines

Consider the data view shown below. It was created by placing a date dimension on the Columns shelf, placing a measure on the Rows shelf, and color-encoding the data by a dimension. Because the mark type is a line, the marks are not automatically stacked. Instead, they are drawn independently from the horizontal axis.



Interpret any data point by reading the associated values from the horizontal and vertical axes. For example, in the year 2007, the Corporate (light blue) sales totaled \$166,269. That is, the space between that data point and the horizontal axis is equal to the sum of the sales for the Corporate market.

Now, stack the marks by selecting the Analysis > Stack Marks > On menu item. The stacked lines view is shown below.



In this view, the lines are no longer independent of each other. Instead, they are drawn cumulatively. The stacking order is given by the order of the dimension members in the data source. This order is reflected in the color legend, from bottom to top.

Therefore, the stacked Small Business (teal) line is the same as its un-stacked version because it's at the bottom of the stacking list. The stacked Home Office (peach) line is derived by adding its un-stacked values to the un-stacked Small Business values. The stacked Corporate (light blue) line is derived by adding its un-stacked values to the stacked Home Office data. The stacked Consumer (blue) line is derived by adding its un-stacked values to the stacked Corporate data.

The vertical axis gives the new scale for the stacked marks. Interpret the space between consecutive lines as the sum of the profit. The lines are no longer all compared to the horizontal axis.

*For example, notice that the tooltip for the 2007 Corporate data still shows the profit as \$166,269. The interpretation is that the space between the Corporate data and the Home Office data yields the sum of the profit for the Corporate market.*

## Changing Mark Size and Color

### Changing Mark Size and Color

You can format marks by changing the mark size and color. This allows you to highlight specific data, to distinguish between marks effectively, and to create optimal presentations. You can also display or remove mark borders. This section discusses the following topics:

- [Changing Mark Size](#)
- [Changing Mark Color](#)

## Changing Mark Size

*Each mark is displayed with a default mark size. You can change the size of marks at any time by moving the Size slider.*



*If you move the slider to the right, marks get larger. If you move the slider to the left, marks get smaller. The Size slider affects different marks in different ways, as described in the following table.*

Mark Type	Description
Circle, Square, Shape, Text	Moving the slider makes the mark bigger or smaller.
Bar, Gantt Bar	Moving the slider makes bars wider or narrower.
Line	Moving the slider makes lines thicker or thinner.
Polygon	You cannot change the size of a polygon.
Pie	Moving the slider makes the overall size of the pie bigger and smaller.

*The size of your data view is not modified when you change marks using the Size slider. However, if you change the view size, the mark size might change to accommodate the new formatting. For example, if you make the table bigger, the marks might become bigger as well.*

**Note:**

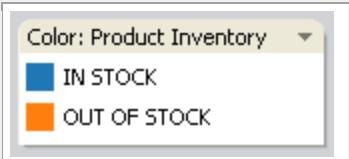
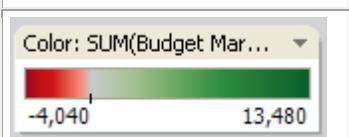
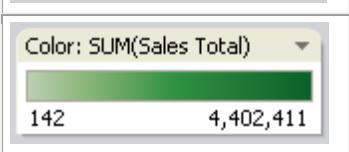
*Changing the mark size is not the same as size-encoding the data using the Size shelf.*

## Changing Mark Color

*Each mark is displayed with a color, which is presented in a color legend on the Tableau interface.*

*By default, all marks use the same color. However, you can display more than one color by placing a dimension or a measure on the Color shelf (Ctrl+Alt+O). Placing a dimension on the Color shelf separates the marks according to the dimension members and assigns a unique color to each member. Placing a measure on the Color shelf creates a continuous range of colors.*

*Depending on your data view, Tableau will use one of the four color legends described in the following table.*

Legend Type	Description
	This is the default color. It is used when the Color shelf is not populated with a field. To edit the default color, select Format > Marks and modify the color in the Format window.
	This legend appears when the Color shelf is populated with a dimension. To edit a color, double-click anywhere in the legend.
	This is a diverging color legend and appears when the Color shelf is populated with a measure that contains both positive and negative numbers. To edit the colors, click any part of the color spectrum.
	This legend appears when the Color shelf is populated with a measure that contains only positive or only negative numbers. To edit the colors, click any part of the color spectrum.

## Titles

You can add a title to any worksheet or dashboard. The title is displayed on the Title card.

### To show and hide titles:

- Select Worksheet > Show Title or click View Cards



- on the toolbar and then select the Title card.



### Worksheet Title

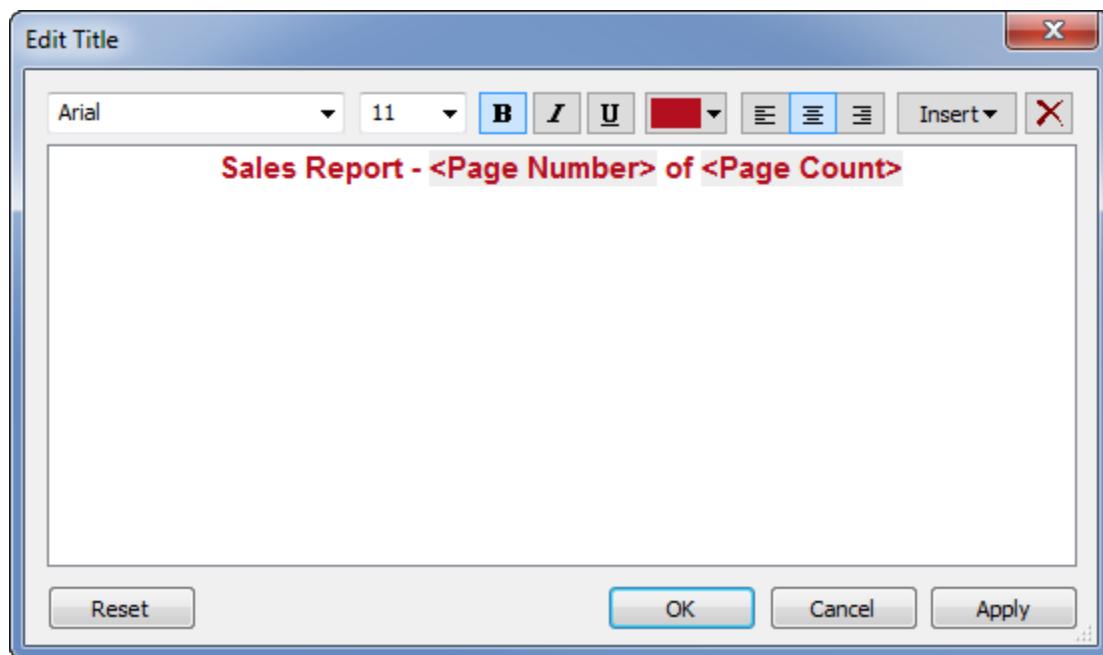


### Dashboard Title

By default, the title is the name of the sheet, but you can use a custom title and even include automatic text such as page number and sheet name.

### To edit titles:

1. Right-click on the title and select Edit Title.
2. In the Page Setup dialog box, type a new title into the Title text box. Use the arrow to the right of the text box to add automatic text such as page number, sheet name, page count, and more.



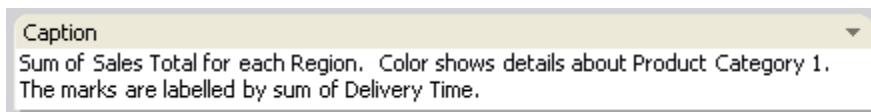
You can format the font, alignment, shading, and border of titles.

## Captions

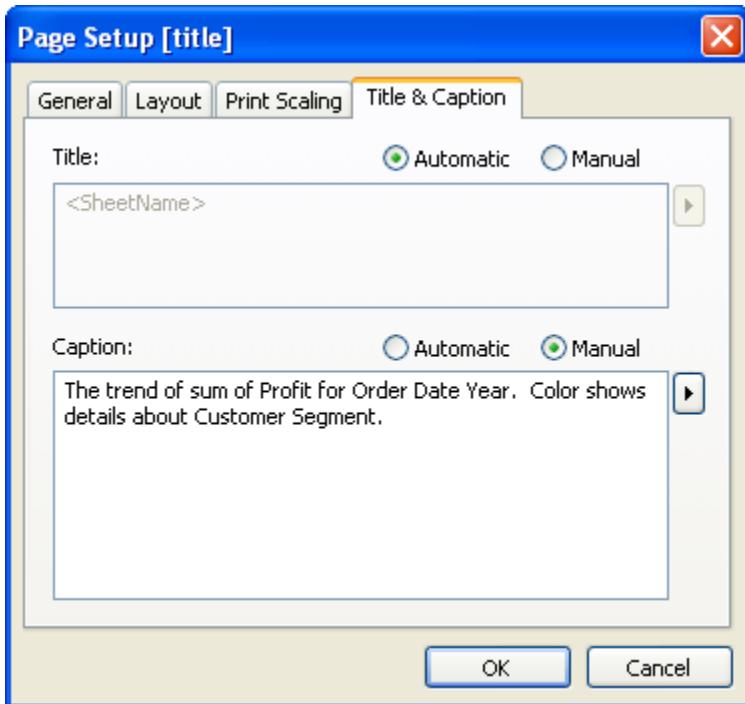
All views can have a caption that is either automatically generated or manually created. The caption is displayed on the Caption card. To show the caption, select it on the View Cards toolbar menu



or select Worksheet > Show Caption.



The caption is automatically generated by default, however, you can edit the caption by double clicking the Caption card and selecting Manual in the subsequent dialog box.



Use the arrow to the right of the text box to add automatic text such as page number, sheet name, page count, and more.

*The caption is part of the Page Setup settings and can optionally be printed and published with the view. Additionally, when you export the view as an image to another application like Microsoft PowerPoint, you can select to include the caption.*

*You can format the font, alignment, shading, and border of captions.*

## Field Labels

*Placing discrete fields on the rows and column shelves creates headers in the view that display the members of the field. For example, if you place a field containing products on the rows shelf, each product name is shown as row headers. In addition to showing these headers, you can show field labels, which are labels for the headers. In this example, the rows are labeled as Product Category, thus indicating that the list of products are members of the Product Category field.*

Columns	Region	+ YEAR(Order Date)						
Rows	Product 1 - Category							
Region / Order Date								
	East				West			
Product 1 - Category	2006	2007	2008	2009	2006	2007	2008	2009
Furniture	-1,025	-4,281	-11,996	4,580	30,134	15,679	4,687	7,184
Office Suppli..	49,760	16,089	15,547	26,075	42,990	40,164	20,710	41,805
Technology	13,707	62,681	91,234	35,431	56,813	63,373	51,240	48,087

*Field labels apply only to discrete fields. When you add continuous fields to the view, an axis is created. The axis is labeled with a header.*

*By default, field labels are shown. You can hide or show field labels at anytime.*

### To show and hide field labels:

- Select *Analysis > Table Layout > Show Field Labels for Rowsor Show Field Labels for Columns.*

The screenshot shows a Tableau data view with a context menu open over a 'Sub-Category' field. The menu is divided into several sections: Analysis, Table Layout, and Advanced. Under 'Analysis', 'Aggregate Measures' is selected. Under 'Table Layout', 'Show Field Labels for Rows' is checked. A callout arrow points from the 'Advanced...' section of the menu to a second data view below.

**Region**

Sub-Category	Central	East	South	West	Grand Total
Appliances	\$317,079	\$136,944	\$149,023	\$133,946	\$736,992
Binders and Binder Accesso..	\$309,262	\$294,907	\$214,942	\$203,847	\$1,022,958
Bookcases	\$258,919	\$145,818	\$171,504	\$246,411	\$822,652
Chairs & Chairmats	\$651,654	\$469,652	\$292,478	\$348,052	\$1,761,837
Computer Peripherals	\$250,718	\$198,649	\$195,535	\$150,974	\$795,876
Copiers and Fax	\$237	\$343,117	\$1,130,361		
Envelopes	\$256	\$49,608	\$174,086		
Labels	\$930	\$7,692	\$38,982		
Office Furnishings	\$434	\$159,443	\$698,094		
Office Machines	\$807	\$673,390	\$2,168,697		
Paper	\$210	\$98,576	\$446,453		
Pens & Art Supplies	\$768	\$42,625	\$167,107		
Rubber Bands	\$687	\$3,416	\$15,007		
Scissors, Rulers and	\$315	\$30,577	\$80,996		
Storage & Organizati	\$166	\$227,534	\$1,070,183		
Tables	\$405	\$454,887	\$1,896,008		
Telephones and Co					

**Analysis**

- Show Mark Labels
- Aggregate Measures
- Stack Marks
- View Data...
- Reveal Hidden Data
- Percentage of
- Totals
- Trend Lines
- Special Values

**Table Layout**

- Show Empty Rows
- Show Empty Columns
- Show Field Labels for Rows
- Show Field Labels for Columns
- Advanced...

**Region**

	Central	East	South
Appliances	\$317,079	\$136,944	\$149,023
Binders and Binder Accesso..	\$309,262	\$294,907	\$214,942
Bookcases	\$258,919	\$145,818	\$171,504
Chairs & Chairmats	\$651,654	\$469,652	\$292,478
Computer Peripherals	\$250,718	\$198,649	\$195,535
Copiers and Fax	\$404,175	\$173,833	\$209,237
Envelopes	\$47,531	\$43,691	\$33,256

You can format the fonts, alignment, shading, and separators for field labels.

## Legends

When you add fields to any of the encoding shelves such as the Color, Shape, and Size shelves, a legend appears to indicate how the view is encoded with relation to your data.



Not only do legends help you understand encodings, you can also use legends to sort, filter, and highlight specific sets of data.

## Building Views Manually

### Building Views Manually

*Building views in Tableau can be really easy if you understand some basic concepts of how it all work.*

- [Dragging Fields](#)
- [Types of Shelves](#)
- [Multidimensional Hierarchies](#)
- [Working with Large Views](#)
- [Example - Building Data Views Manually](#)

## Dragging Fields

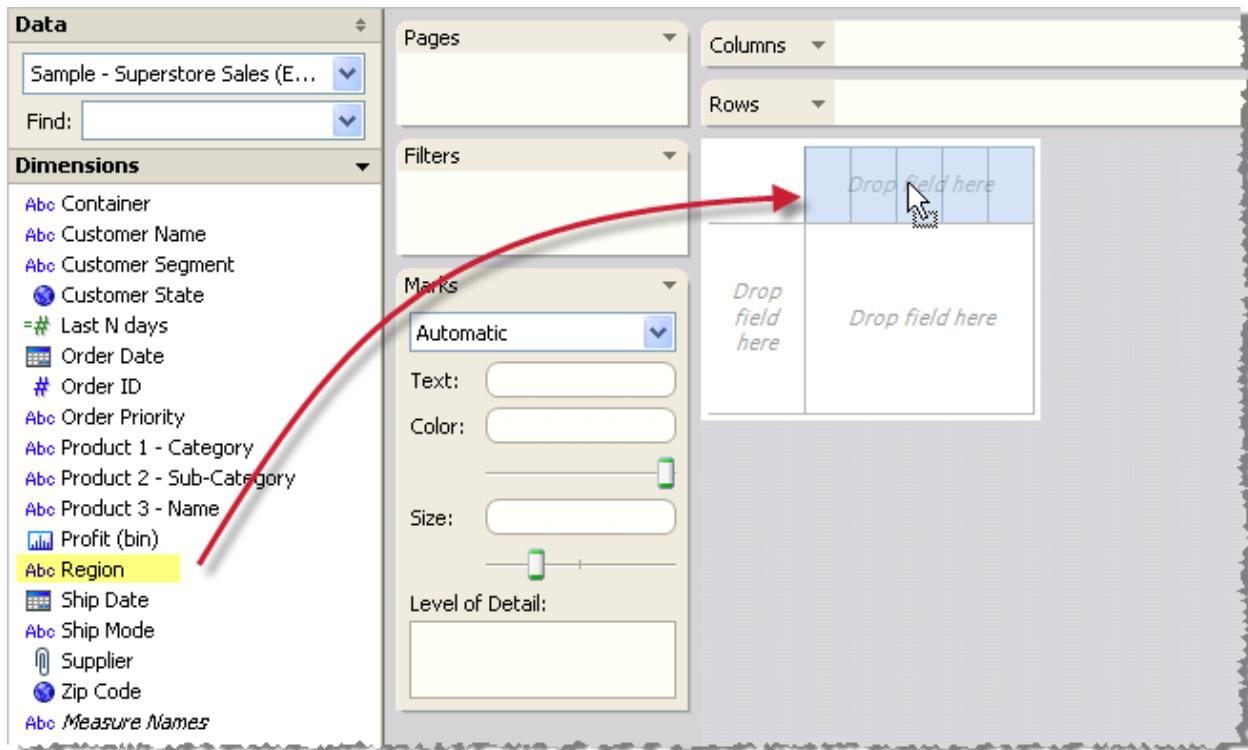
### Dragging Fields

You can build views of your data by dragging fields from the Data window to the view. You can drag fields to a variety of active areas in the view or place them on the shelves that are part of every worksheet.

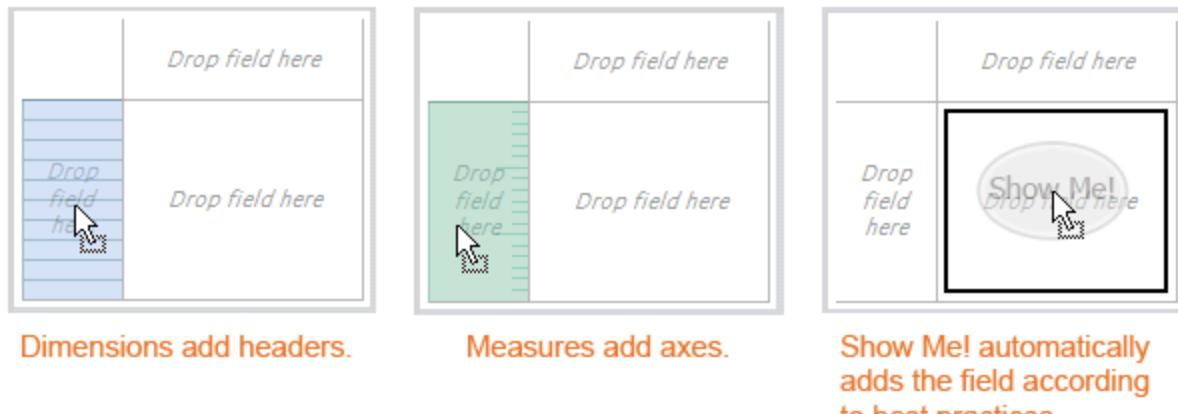
- [The Basics](#)
- [Adding More Fields](#)
- [Rearrange the Rows and Columns](#)

## The Basics

*When you begin creating a new data view on a blank worksheet, drag a field from the Data window to and drop it in the view.*

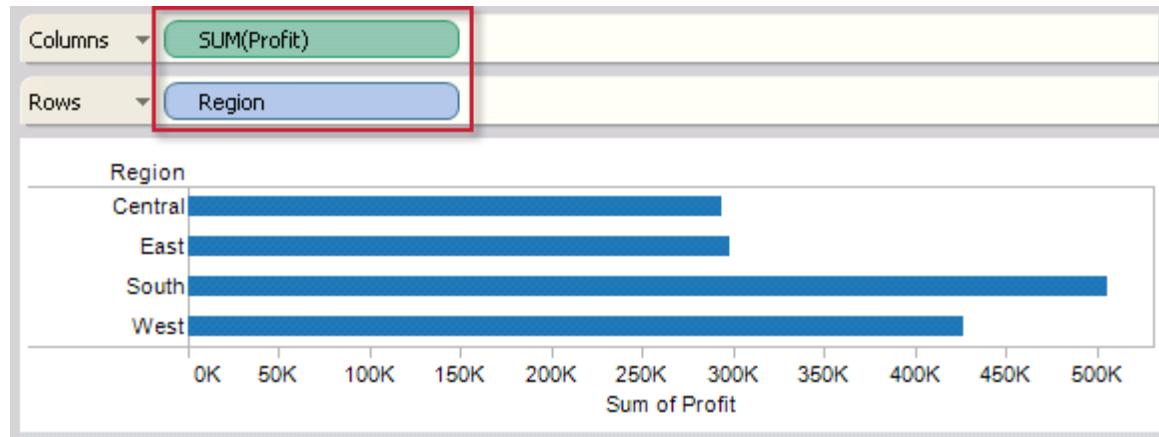


*While dragging fields you can pause on the active areas in the view to see how the field will be added to the view. For example, in general dimensions will add row and column headers to the view while measures add continuous axes. Below are some examples of how fields can be added to the view.*



For a more advanced discussion of dimensions and measures, refer to .

When you drag a field to one of the active areas in the view, the field is added to the view and displays on one of the shelves. For example, in the view below the Regions are shown as Rows and Profit is shown as a Column with a continuous axis.



You can drag fields directly to the shelves instead of the active areas in the view. You can also drag fields from one shelf to another shelf. The number of fields that you can place on the Columns, Rows, Level of Detail, Filters, and Pages shelves is unlimited. However, the Color, Size, Shape, Text, and Path shelves can hold only one field at a time.

To remove a field from a shelf, drag it off the worksheet or select Remove on the field's context menu. To quickly remove multiple fields from a shelf, right-click the shelf and select Clear Shelf on the context menu.

## Adding More Fields

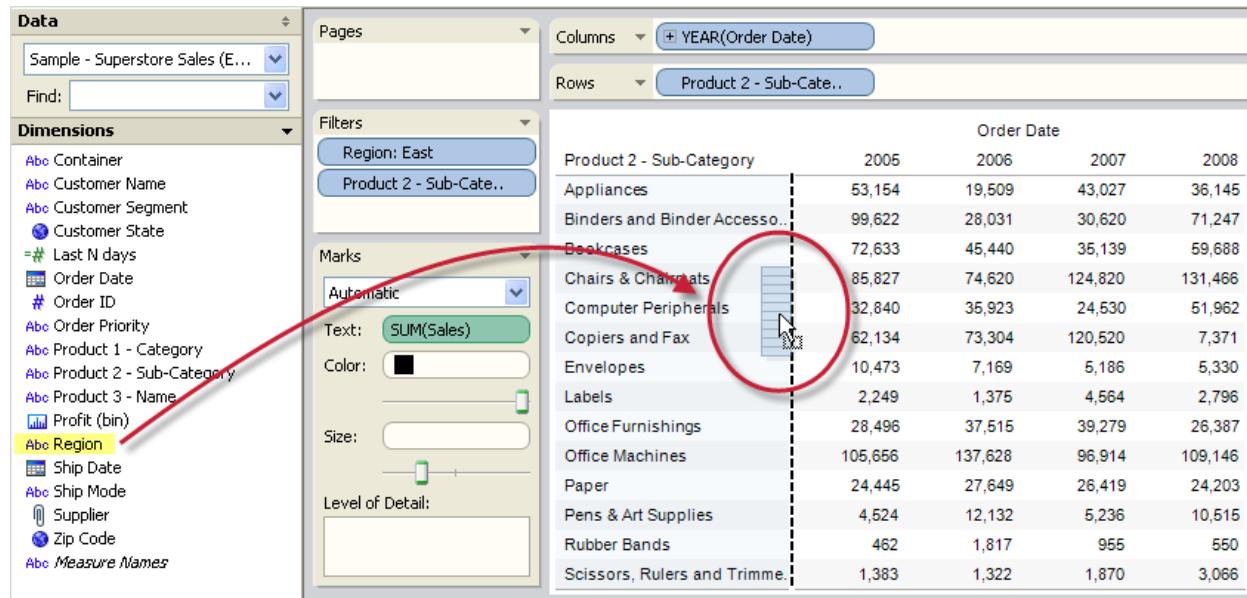
### Adding More Fields

You can add as many fields as necessary by dragging and dropping them on the different areas of the view. Once there are more fields in the view there are some extra active areas. For example you can add replace fields by dropping them on existing headers and axes in the view. Or instead of replacing the field you can blend multiple measures onto a single axis. Finally, you can rearrange the rows and columns in the view.

- [Adding Headers Using Dimensions](#)
- [Adding Axes Using Measures](#)

## Adding Headers Using Dimensions

You can add headers by dragging a dimension and dropping on either side of existing headers, or to the left of an axis. For example, in the view below you can add the Region field by dragging it and dropping it to the right of the product names.



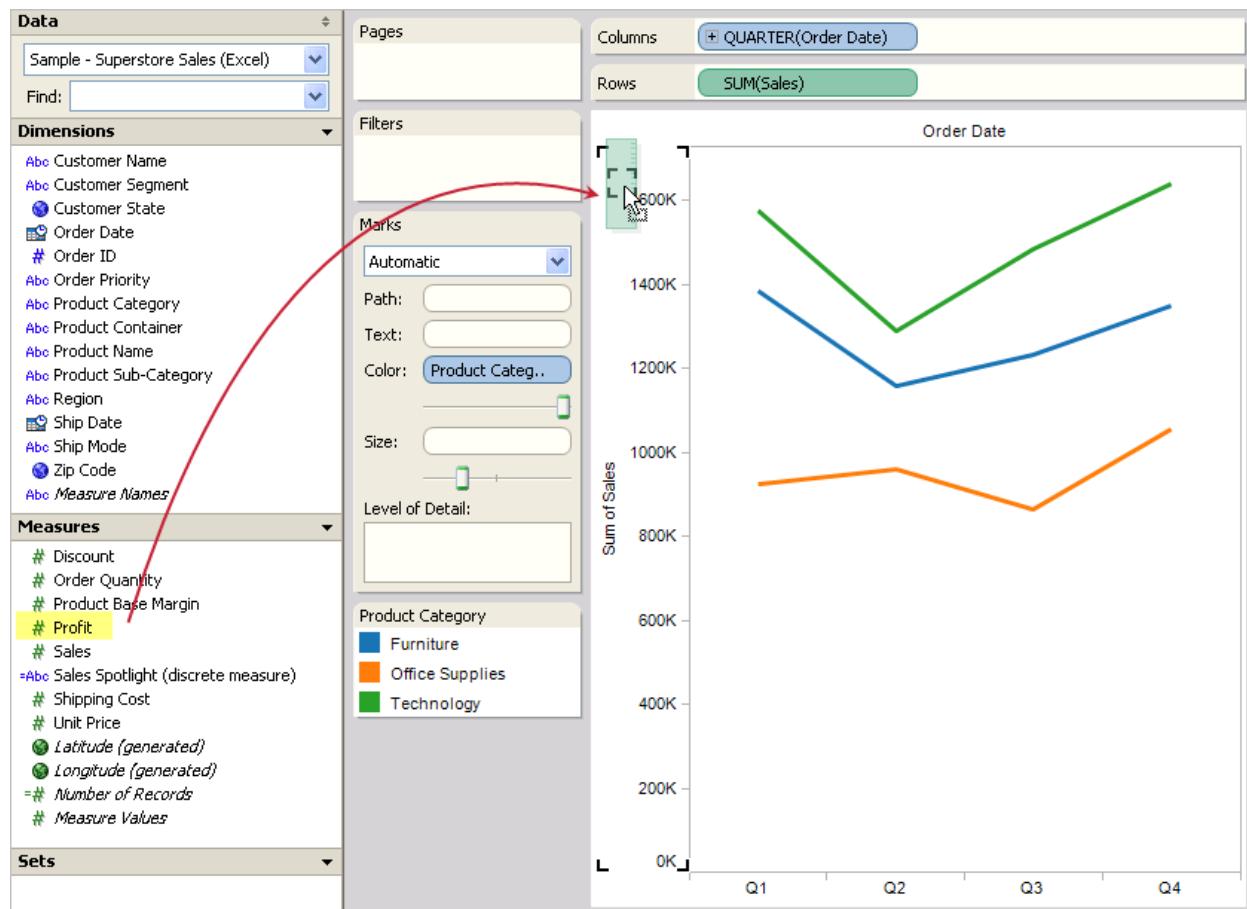
You can see that as you hover over the view, a dotted black line indicates active areas where you can add headers.

## Adding Axes Using Measures

You can add axes by dragging a measure and dropping it on an active area in the view. If an axis already exists in the view you can replace the existing axis, blend the new measure with the existing axis, or add a secondary axis.

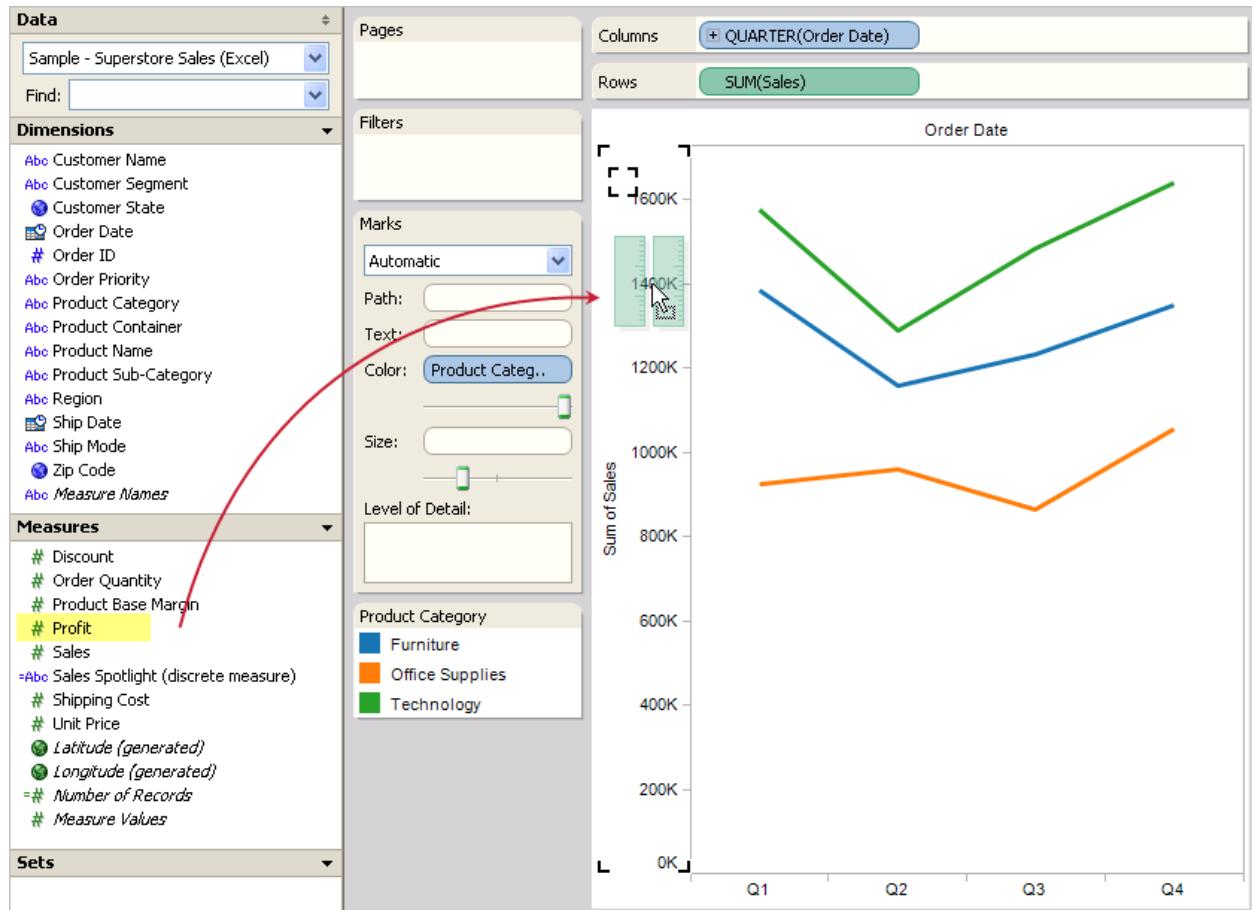
### Replace the Existing Axis

Drag the new measure to the top left portion of the axis in the view. A small square drop zone appears and a single axis icon displays to indicate that a single axis will be left when you drop the measure.



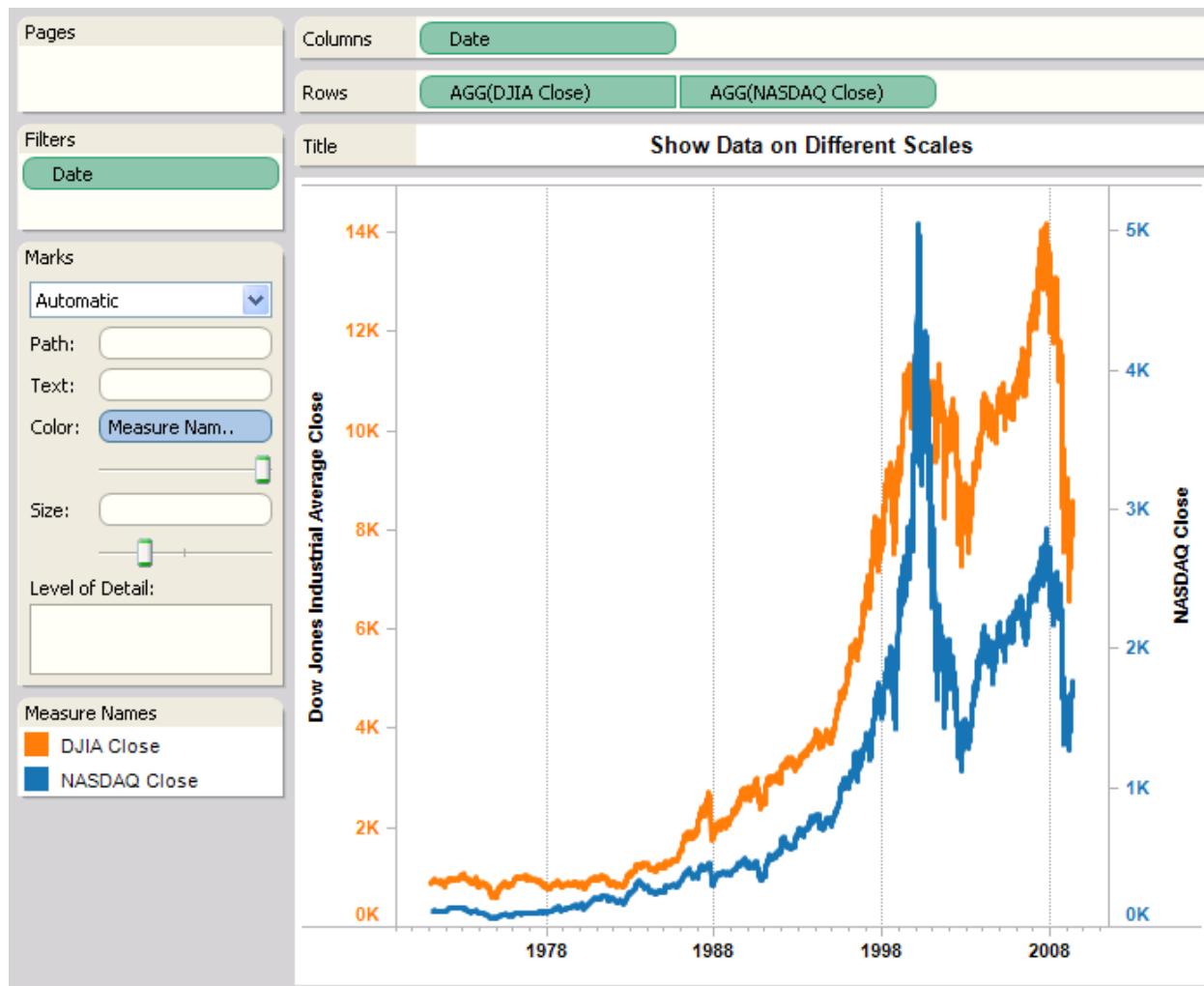
## ***Blend the Measures on Single Axis***

You can show multiple measures on a single axis by dragging the new measure directly on top of the existing axis. Blending measures uses the Measure Names and Measure Values fields.



## ***Add a Secondary Axis***

Drag the field to the right side of the view to add the measure as a secondary axis. Secondary Axes are useful when you want to compare two fields that have different scales. In this case, blending the these axes would distort the view. Instead you can add a secondary axis. You can add up to four axes to the view: two on the Columns shelf and two on the Rows shelf. Below is an example of a secondary axis view showing the Dow Jones Industrial Average and NASDAQ close values over time.



## Rearrange the Rows and Columns

Finally, you can rearrange the rows and columns in the view by dragging the selection border for headers or an axis.

The screenshot shows a Tableau data view with two panes. The top pane displays a table with 'Region' on the rows and 'Product 1 - Category' on the columns. The columns represent years from 2005 to 2008. The bottom pane shows the same data structure, but the 'Region' row header is selected and highlighted in blue, indicating it is being moved. A red circle highlights the selection border around the 'Region' header in the top pane. The data values are as follows:

		Order Date			
	Product 1 - Cate..	2005	2006	2007	2008
Central	Furniture	401,702	325,745	301,788	292,712
	Office Supplies	179,753	251,679	227,352	277,186
	Technology	372,012	388,864	277,817	355,325
East	Furniture	269,097	251,486	304,332	305,916
	Office Supplies	252,122	165,750	168,050	190,128
	Technology	277,221	344,862	371,579	282,447
South	Furniture	347,066	347,062	367,383	293,323
	Office Supplies	326,182	219,318	202,805	241,800
	Technology	563,114	328,583	350,882	544,462
West	Furniture	427,839	311,832	283,711	288,259
	Office Supplies	292,553	283,892	207,766	313,891
	Technology	481,263	341,558	359,687	347,895

## Types of Shelves

### Types of Shelves

*Every worksheet in Tableau contains shelves. By placing fields on shelves, you can create the rows and columns of a data view, exclude data from the view, show additional levels of detail, and encode the data in various ways.*

*Each section contains examples that illustrate how a simple data view is modified by placing a dimension or a measure on the shelf.*

*Some shelves are available only when certain mark types are used. For example, the Shape shelf appears when the shape mark type is used. Additionally, some shelves are not particularly useful with certain mark types.*

*You should experiment with various combinations of shelves, fields, and mark types to find the optimal view for your data. Tableau can also help you determine the best way to display your data using Show Me!*

- [Columns and rows Shelves](#)
- [Pages Shelf](#)
- [Filters Shelf](#)
- [Level of Detail Shelf](#)
- [Color Shelf](#)
- [Size Shelf](#)
- [Shape Shelf](#)
- [Label Shelf](#)
- [Path Shelf](#)

## Columns and rows Shelves

The Columns shelf creates the columns of a table, while the Rows shelf creates the rows of a table. You can place an unlimited number of fields on these shelves.

When you place a dimension on the Rows or Columns shelf, headers for the members of that dimension are created. When you place a measure on the Rows or Columns shelf, quantitative axes for that measure are created. As you build up your data view with more fields, additional headers and axes are included in the table and you get an increasingly detailed picture of your data.

In the view shown below, the members of the Customer Segment dimension are displayed as column headers, while the Profit measure is displayed as a vertical quantitative axis.

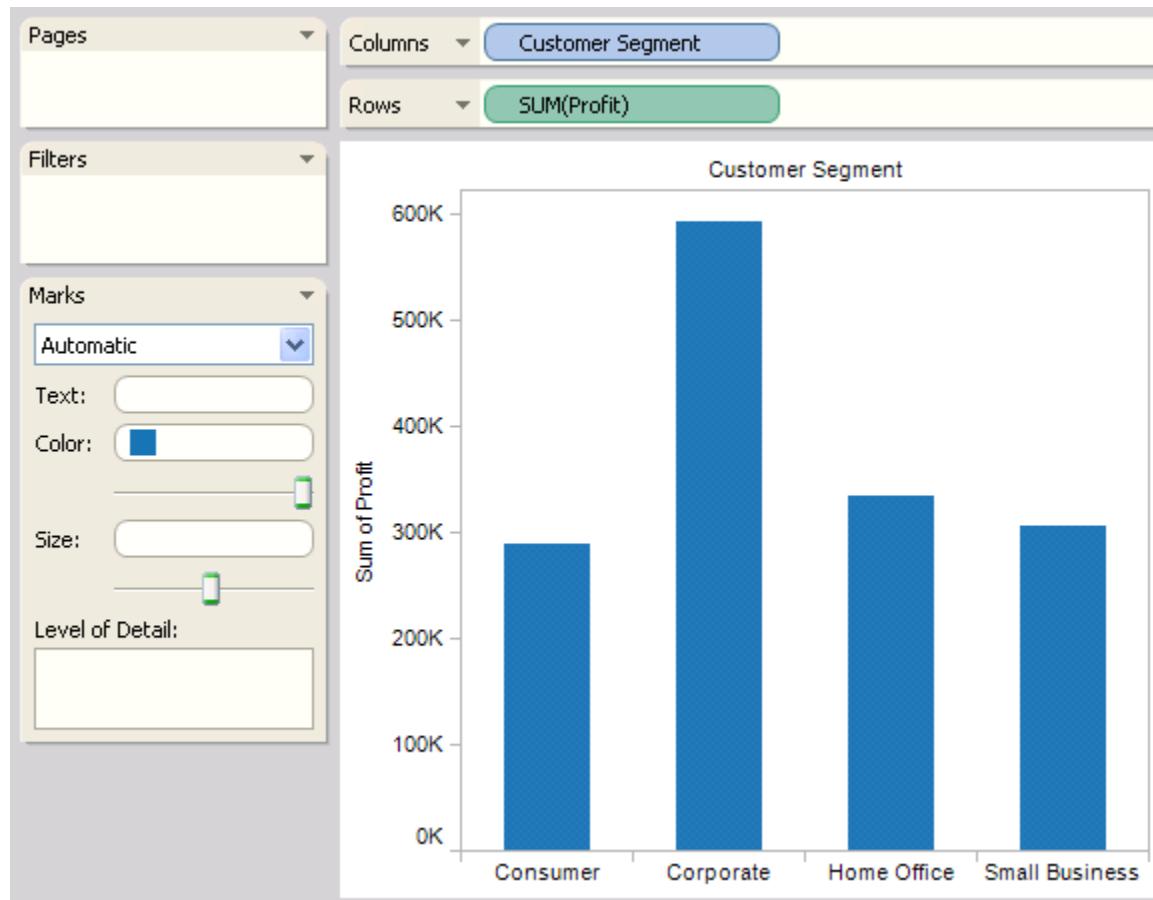
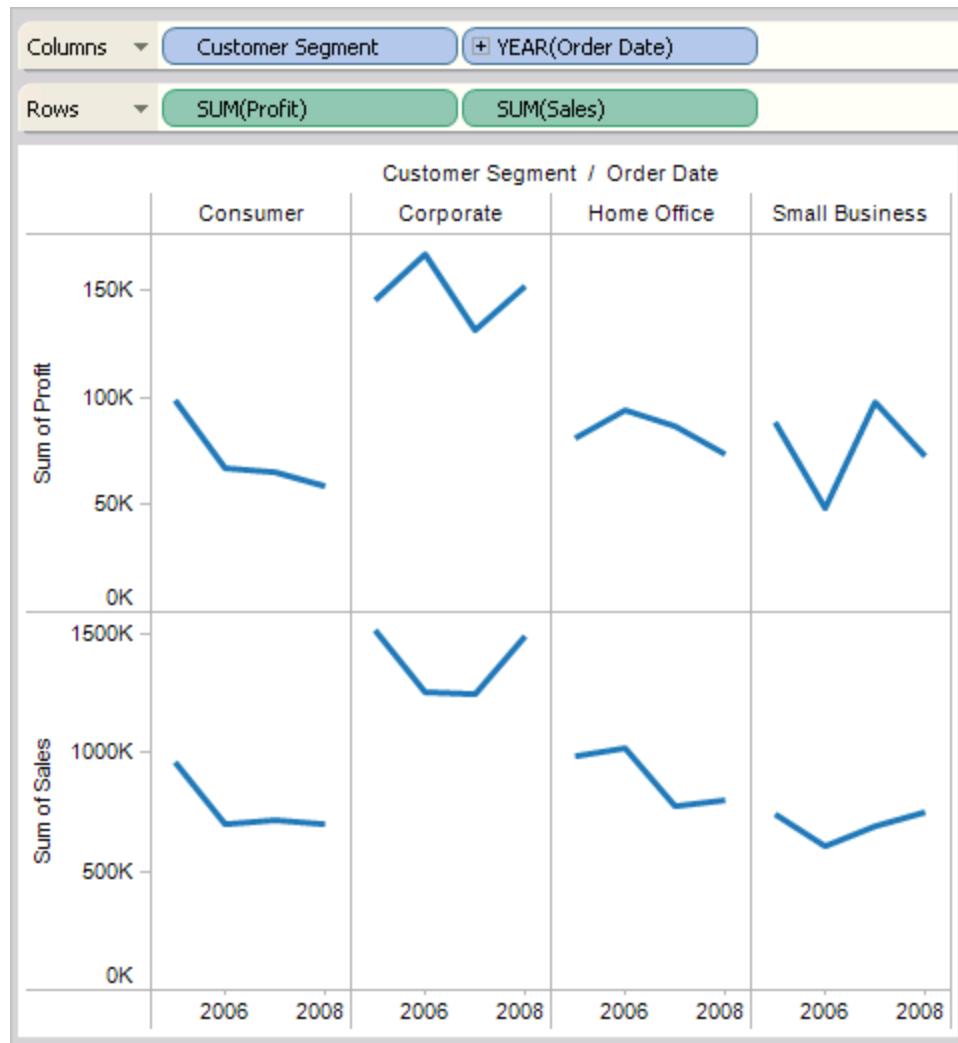


Tableau displays data using marks, where every mark corresponds to a row (or a group of rows) in your data source. The inner fields on the Rows and Columns shelves determine the default mark type. For example, if the inner fields are a measure and a

*dimension, the default mark type is a bar. You can manually select a different mark type using the Mark menu. Refer to [Mark Types](#) for more information.*

*Adding more fields to the Rows and Columns shelves adds more rows, columns, and panes to the table.*



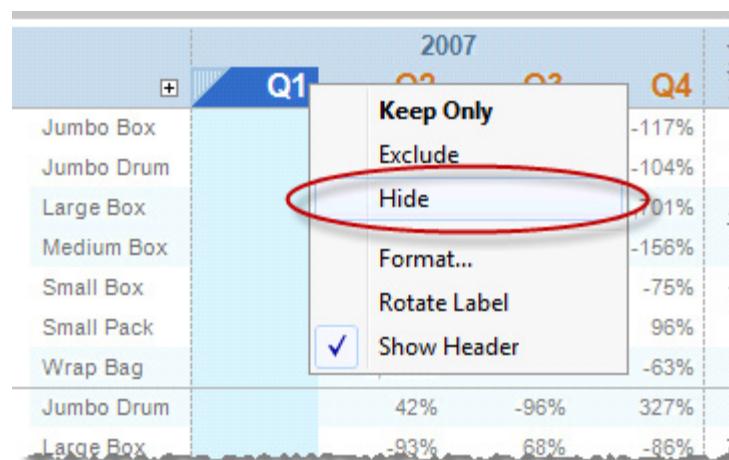
### ***Hide Rows and Columns***

*Generally you will add dimensions and measures to create the rows and columns of the table and you'll either include all data or add filters to only show a subset. However, when you filter data it is also excluded from calculations and other computations performed on the summarized data in the table. For example, depend on the data shown in the view for computations such as year over year growth and running totals. In*

these cases you can hide the rows and columns that you don't want to show without changing the calculation.

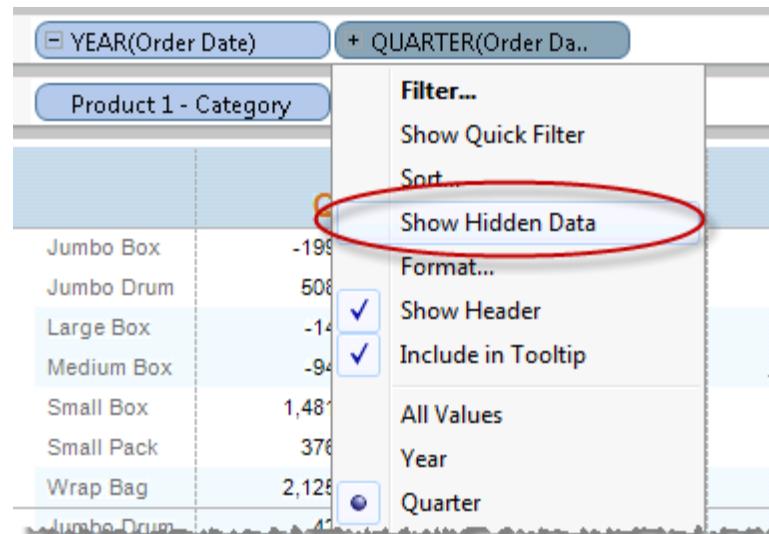
### To hide a row or column:

- Right-click the row or column you want to hide and then select **Hide**.



### To show hidden data:

- Open the field menu for a field that has hidden columns or rows and select **Show Hidden Data**.

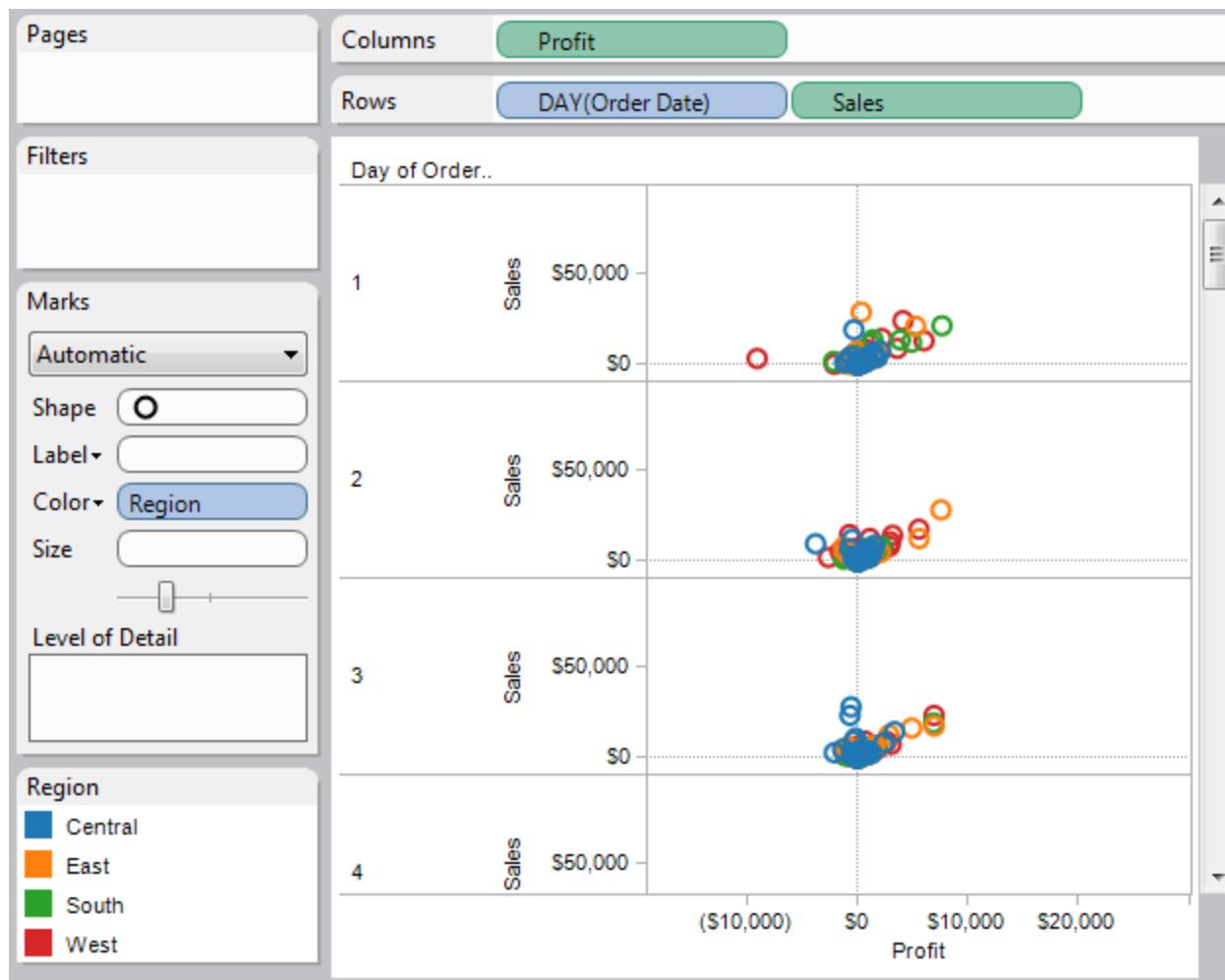


*Hiding columns is especially useful when using table calculations that compare to previous or next. In that case, there is always a row or column that doesn't show data because there is no data to compare to. You can simply hide the empty column without modifying the table calculation.*

## Pages Shelf

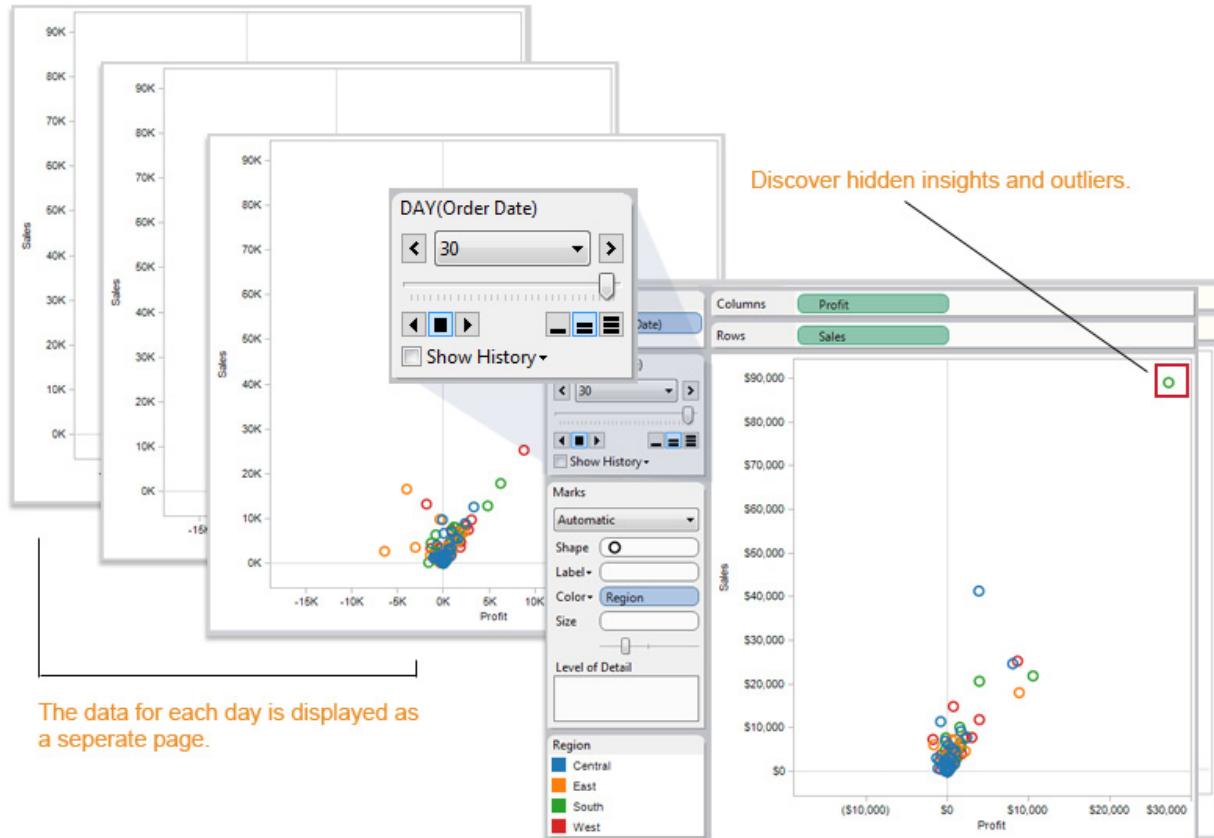
The Pages shelf lets you break a view into a series of pages so you can better analyze how a specific field affects the rest of the data in a view. When you place a dimension on the Page shelf you are basically adding a new row for each member in the dimension. When you place a measure on the Pages shelf, the measure is converted into a discrete measure.

The page shelf creates a view on a different page for each new row so you can easily flip through each view and compare them on a common axis. For example, the view below shows the Profit vs. Sales by Region for each day throughout the month.

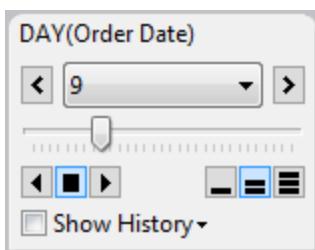


You can see that it is difficult to see how these two measures have interacted from day to day. However, when you move the Day field to the Pages shelf and flip through the pages (one for each day) you can quickly discover hidden insights. In this example, it is

interesting that the 19th is an especially big day in terms of sales and profit in the Western region.



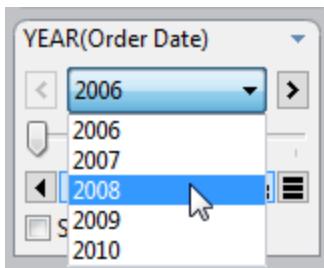
When you add a field to the page shelf the Current Page card displays. Use this card to navigate through the pages.



There are three ways to navigate through the pages in a view.

### ***Jump to a specific page***

Select the member or value you want to view from the drop-down list on the Current Page card to display a specific page rather than scrolling through the entire sequence.



### ***Manually Advance through the pages***

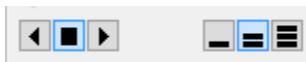
You can manually advance through the sequence of pages by doing one of the following:

- Use the forward and back buttons on either side of the drop-down list to navigate through the pages one at a time.
- Use the Page Slider to quickly scroll forward and backward in the sequence of pages.
- Use the keyboard shortcuts below to scroll forward and backward in the sequence of pages.

F4	Starts and stops forward playback
SHIFT + F4	Starts and stops backward playback
CTRL + .	Skip forward one page
CTRL + ,	Skip backward one page

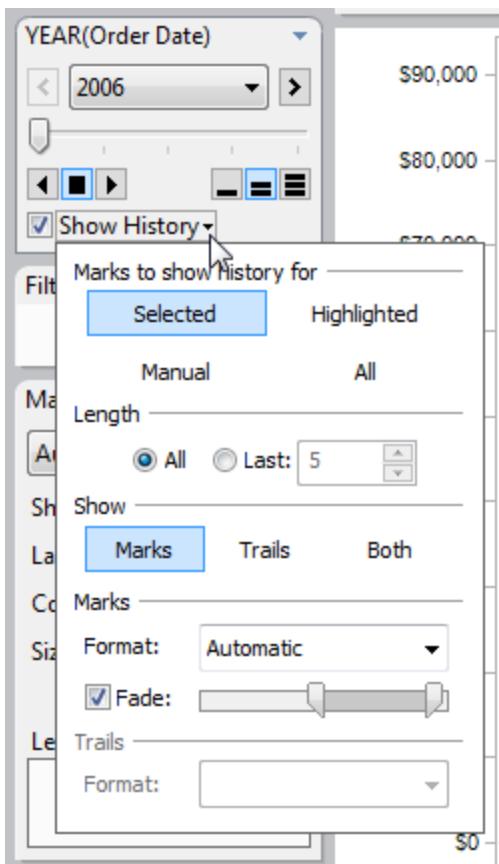
### ***Automatically Advance through the pages***

Use the playback controls to watch a slide show of the pages in the view. You can play forward, play backward, and stop. You can control the speed of playback with the speed controls in the bottom right corner of the card. The smallest bar indicates the slowest playback speed.



## Page History

Optionally show page history using the *Show History* checkbox. When you show history, marks from previous pages are shown in addition to the previous page. Open the drop-down control for history to specify what marks to show and when to show them.



The history drop-down control has the following options:

- Marks to show history for – select whether you want to show history for just selected marks, highlighted marks, marks that you've manually selected to show history for, or all marks. You manually show history for marks by right-clicking the mark in the view and selecting an option on the *Page History* menu.
- Length – select the number of pages to show in the history.

- *Show – specify whether to show the historical marks, a line tracing through the previous values (trails), or both.*
- *Marks – format the historical marks including the color and how much to fade them If the color is set to automatic, the marks will either use the default mark color or the color encoding on the Color shelf.*
- *Trails – format the lines that are drawn through the historical marks. This options is only available if Trails is selected in the Show options.*

**Note:**

*Page trails may not display if there are multiple marks per color on a page. Make sure that the level of detail for the view is less than or equal to the level of detail on the pages and color shelves.*

## Filters Shelf

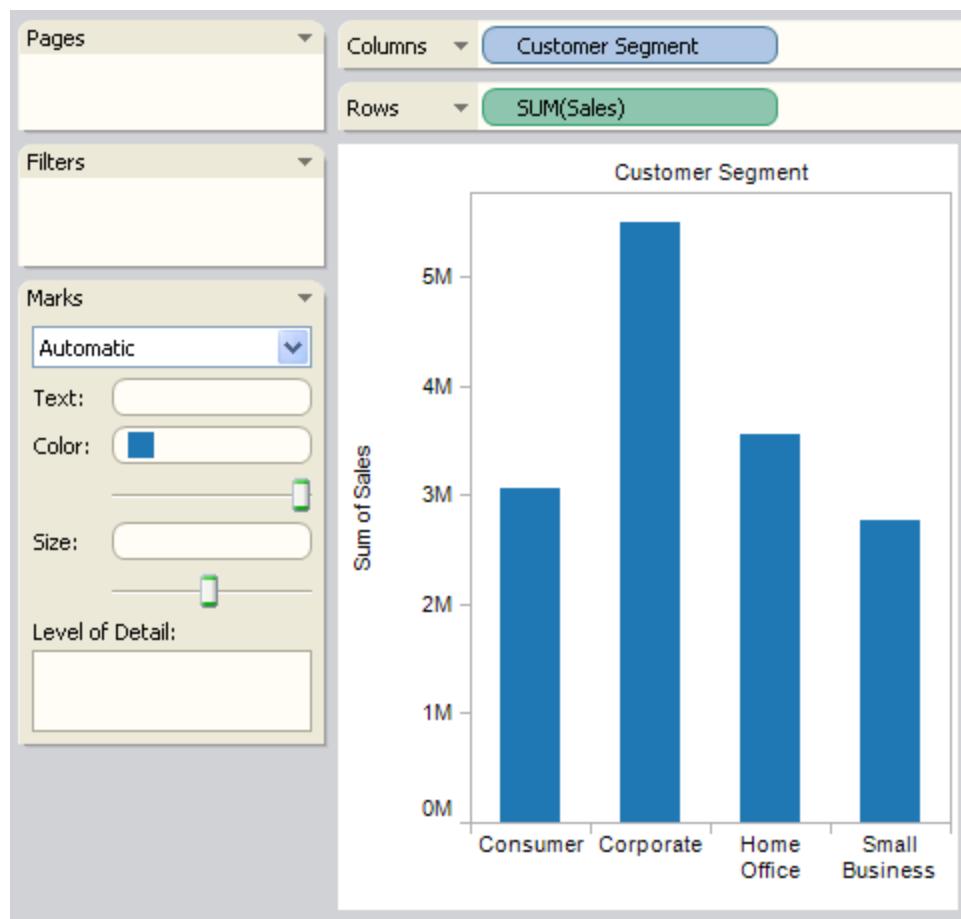
The *Filters shelf* allows you to specify which data to include and exclude. For example, you might want to analyze the profit for each customer segment, but only for certain shipping containers and delivery times. By placing fields on the *Filters shelf*, you can create such a view.

### Note:

This section presents a brief overview of filtering. Refer to for a complete description.

You can filter data using measures, dimensions, or both at the same time. Additionally, you can filter data based on the fields that make up the columns and rows of the table. This is called an *internal filter*. You can also filter data using fields that don't contribute headers or axes to the table. This is called an *external filter*. All filtered fields display on the *Filters shelf*.

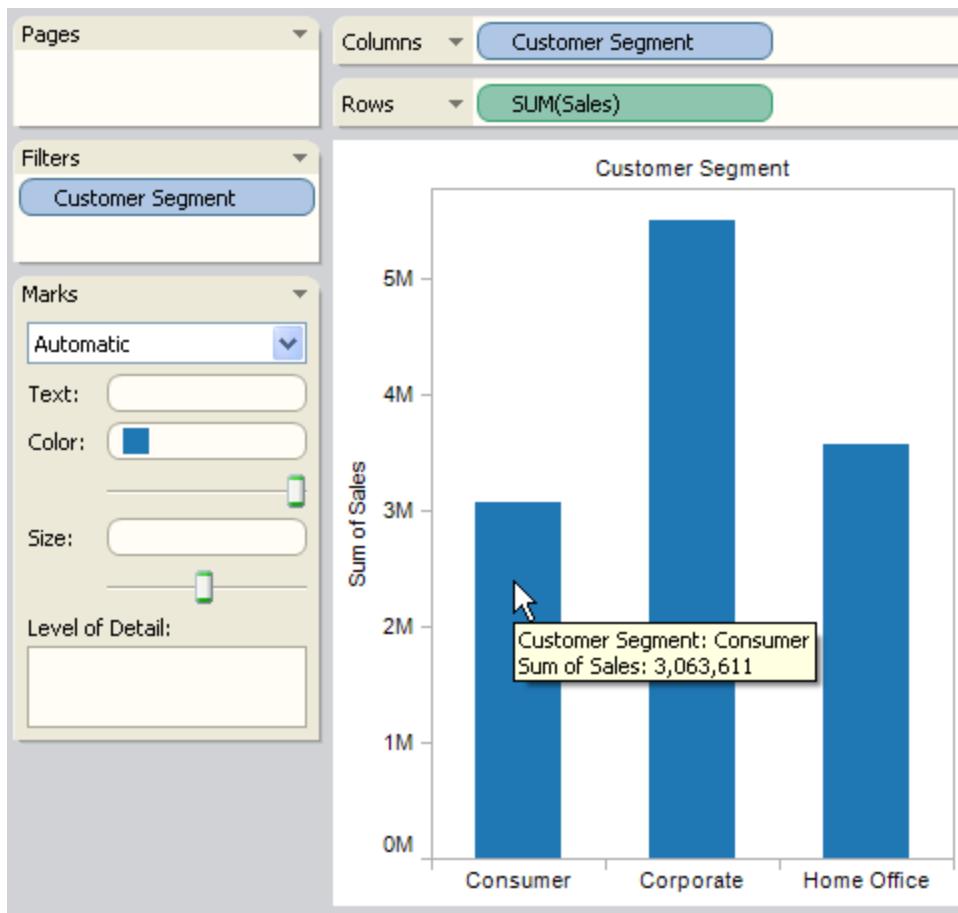
To illustrate the basic concepts of filtering, consider the following view.



Suppose you are not interested in the Small Business data. You can remove this column from the view by filtering the Customer Segment dimension. To do so, select Filter from the field's context menu. The Filter dialog box opens. By default all members are selected. Un-check Small Business to exclude it from the view. All selected members will be included.

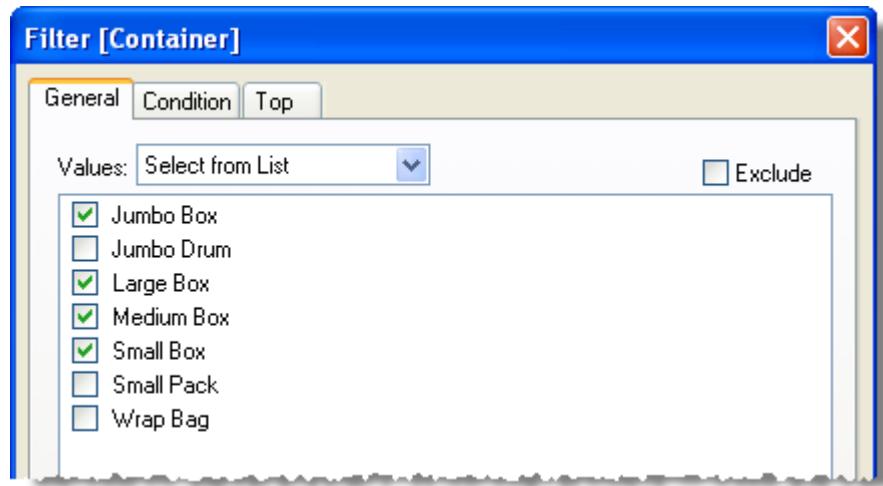


As shown below, Customer Segment is automatically placed on the Filters shelf, and the view now contains three columns instead of the previous four.

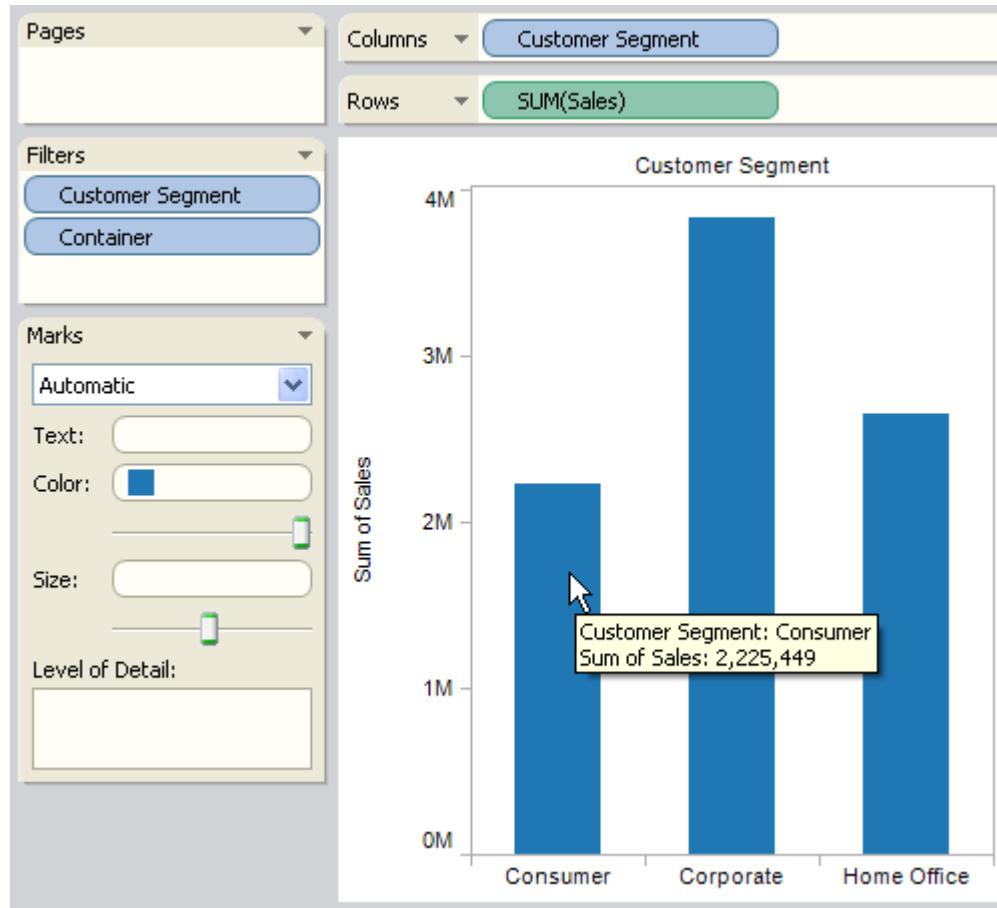


Suppose you want to only view sales for products that were shipped in boxes. To do this, place the Container dimension directly on the Filters shelf. This is an example of an external filter because Container is not part of the view. That is, it does not contribute row or column headers.

The Filter dialog box shown below automatically opens. By default, none of the members are selected. Select the members you want to keep as part of the view. All deselected members are excluded.



The modified data view is shown below. The tooltip shows that the sum of the sales for the Consumer segment has decreased to \$2,225,449. This number is derived by summing all the rows in the data source that are associated with the Corporate market and that use a box as a shipping container.



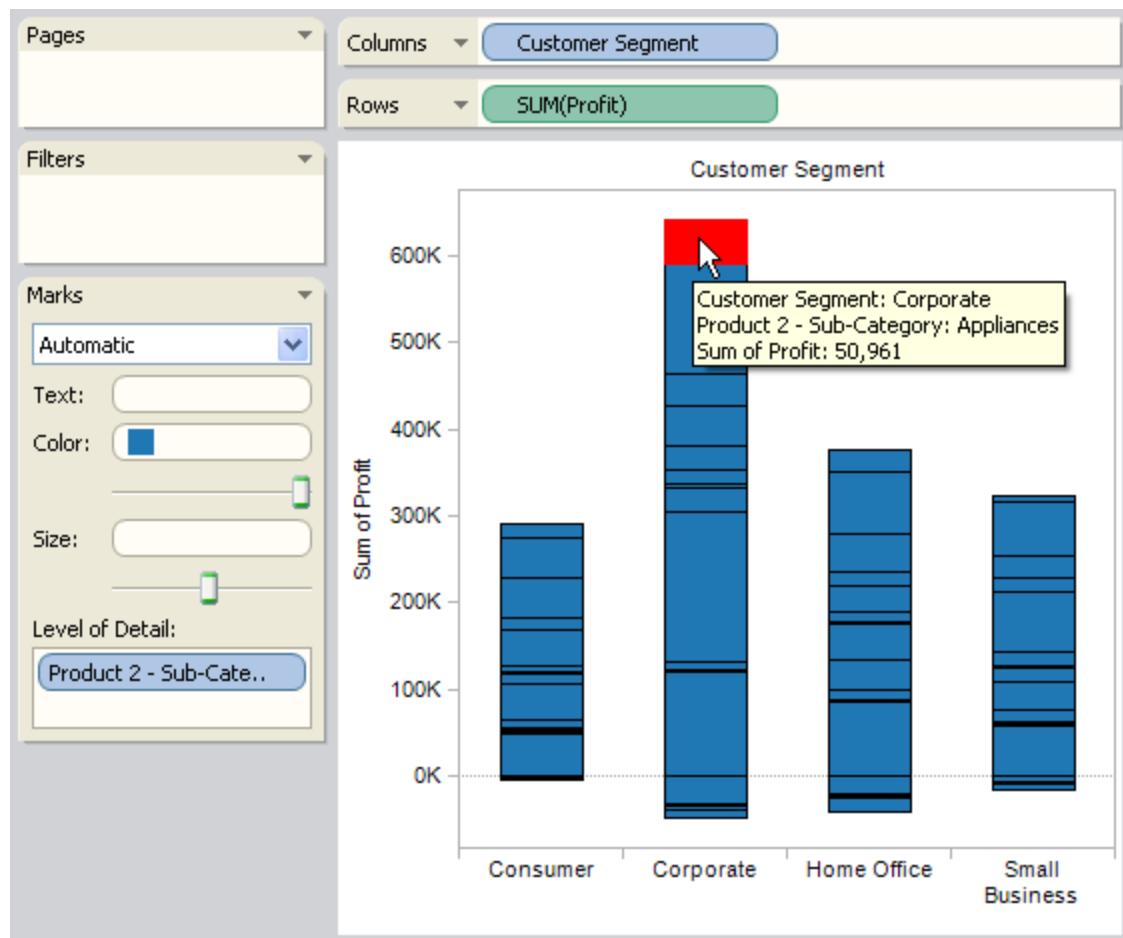
*The order of fields placed on the Filters shelf does not affect the data view because the filters are independent. The result of filtering by customer segment, and then by container is the same as filtering by container and then by customer segment.*

## Level of Detail Shelf

Whenever you place a dimension on the Rows or Columns shelf, the categorical members create table headers. The headers represent levels of detail because they separate the data source rows into specific categories. You can identify each category by the member name. For example, the Customer Segment dimension separates the data source rows into four levels of detail: Consumer, Corporate, Home Office, and Small Business.

The Level of Detail shelf also allows you to separate the marks in a data view according to the members (levels of detail) of a dimension. However, unlike using the Rows and Columns shelf, using this shelf is a way to show more data without changing the table structure.

As shown below, the bars are separated into segments according to the members of the Product 2 - Sub-Category dimension. The size of each segment reflects the contribution to the profit for a particular member. For example, the view below shows that Appliances category in the Corporate market has a profit of \$50,960.



*You can place any number of dimensions on the Level of Detail shelf. In fact, placing all dimensions on this shelf is one way to display all the rows of your data source.*

**Note:**

*The Level of Detail shelf works only if the measures that contribute axes to the table are aggregated. If the measures are disaggregated, then it isn't possible to separate the marks into additional levels of detail because all levels of detail are already shown.*

*Also, placing a measure on the Level of Detail shelf has no effect because measures do not contain members. However, you can place measures on this shelf if you want to export their values to Microsoft Access, copy their values to the Windows Clipboard, or view them in the tooltips.*

## Color Shelf

### Color Shelf

*All marks have a default color that is used when there are no fields on the color shelf. Most marks use a blue color while text marks are shown in black.*

*The Color shelf encodes data by assigning different colors to the marks in a data view based on the values of a field. The effect of color-encoding your data view depends on whether you use categorical or quantitative colors. You can also use the drop-down control to specify other color properties such as transparency, borders, and halos. The color shelf is discussed in the following topics:*

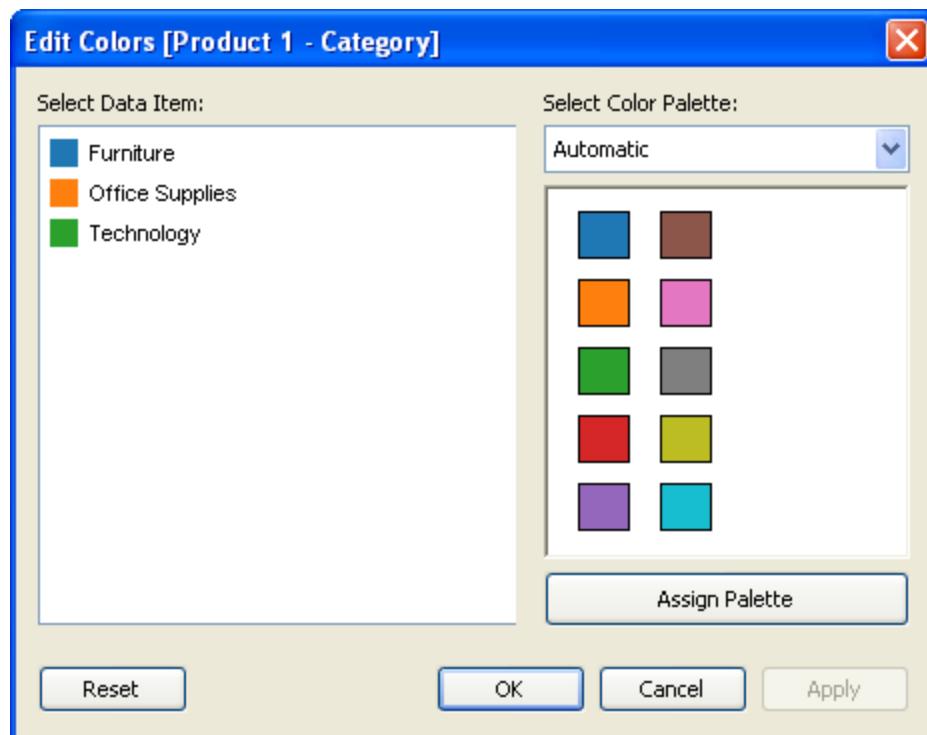
**Note:**

*Color encodings are shared across multiple worksheets that use the same data source to help you create consistent displays of your data. For example, if you define the Western region to be green, it will automatically be green in all other views in the workbook. You can set the default color encodings for a field by right-clicking the field in the Data window and selecting Edit encodings > Color.*

- [Categorical Colors](#)
- [Quantitative Colors](#)
- [Transparency](#)
- [Effects](#)

## Categorical Colors

When you add a dimension to the Color shelf a categorical legend is added based on the members in the dimension field. You can modify the colors used in the legend by right-clicking on the legend and selecting *Edit colors* or by double-clicking on the legend. The *Edit Colors* dialog box for a categorical legend is shown below.



To change the color of a member, select the member on the left and then select the new color in the palette on the right. When finished, click OK to close the format dialog box.

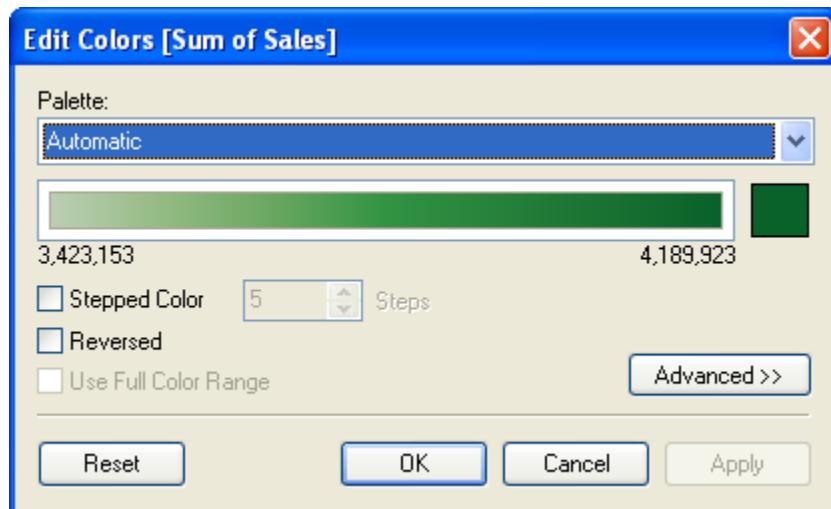
You can select a different color palette from the drop down list in the upper right of the *Edit Color* dialog box. Select from either categorical palettes or ordinal palettes. A categorical palette, such as Tableau 20 contains several distinct colors that can be assigned to dimension members that have no inherent order. Ordinal palettes contain a spectrum of related colors, which can be used for dimension members that have an associated order such as dates and numbers. The views below show a categorical palette versus an ordinal palette.

Once you select a palette, click *Assign Palette* to automatically assign the new palette colors to the members in the field. When finished, click OK to view the changes and close the dialog.

*To return to the automatic color settings that Tableau provides by default click Reset in the Edit Colors dialog box and then click OK.*

## Quantitative Colors

When you add a measure to the Color shelf a quantitative legend is added creating a continuous range of colors. You can modify the colors used in the range, the distribution of color, and other range attributes in the Edit Color dialog box. Right-click the legend and select Edit Colors or double-click on the legend. The Edit Colors dialog box for a quantitative legend is shown below.

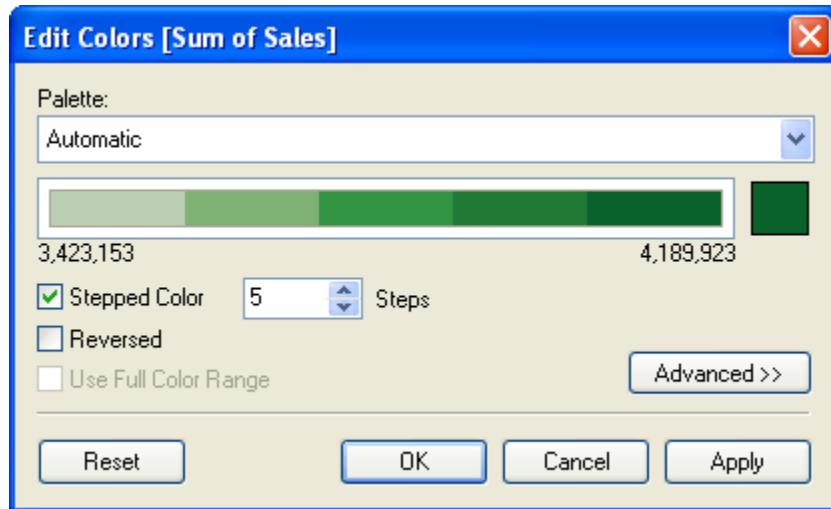


To change the color used in the range, simply click on the color indicator to the right of the range and click on a new color in the spectrum. You can select a new palette from the Palette menu. You can choose between a sequential palette and a diverging palette. A sequential palette shows a simple range of values using color intensity to indicate one end of the range from the other. A diverging palette shows two ranges of values using color intensity to show the magnitude of the number and the actual color to show which range the number is from. Diverging palettes are most commonly used to show the difference between positive and negative numbers. When finished, click Apply.

Each of the options for formatting quantitative colors are described below:

### *Using Stepped Color*

You can modify how the colors are distributed by selecting Stepped Color. The stepped color option groups the values into uniform bins each given a unique color. Use the text box to specify how many bins you want to use. For example, if you had a range of values from 0 to 100 and you select 5 steps, the color range would be broken up every 20 units. That means that all points between 0 and 20 would be colored the same, all points between 21 and 40 would be colored the same and so on. The dialog box below shows the color range broken up into five steps. When finished, click Apply.



If a diverging color palette is selected, the center point is shown on the color ramp with a small black mark. When the number of steps is odd, the center mark is placed in the middle of the center step. When the number of steps is even, the center mark is placed at the boundary of the center-most two steps.

### ***Reversing the Color Palette***

Select Reversed to switch the order of colors in the range. For example, if you want lower values to have a darker intensity in a sequential palette, reverse the palette. Alternatively, if you are using a diverging color palette with red representing -100 to 0 and blue representing 0 to 100, you can switch the colors using the reverse option to make blue represent the negative range and red represent the positive range. When finished, click Apply.

### ***Using the Full Color Range***

When you are using a diverging color palette you can select to Use Full Color Range. When you select this option, Tableau assigns the starting number a full intensity and the ending number a full intensity. If the range is from -10 to 100, the color representing negative numbers changes in shade much more quickly than the color representing positive numbers. If you do not select Use Full Color Range, Tableau assigns the color intensity as if the range was from -100 to 100 so that the change in shade is the same on both sides of zero. The example below shows a diverging color palette for values from -10 to 150. Without using the full color range, -10 is represented by a light red color. When the full color range is used, -10 is represented by a full red. When finished, click Apply.

### ***Limits the Color Range***

*You can limit the range that the colors are distributed across using the Advanced options. When you click Advanced in the Edit Colors dialog box, you can select to specify the start, end, and center values on the range by selecting the check box and typing a new value into the textbox. The Start value is the lower limit in the range, the End value is the upper limit, and the Center value is the where the neutral color is located on a diverging color palette. When finished, click Apply.*

### ***Resetting the Color Range***

*To return to the automatic color settings that Tableau provides by default click Reset in the Edit Colors dialog box and then click OK.*

## **Transparency**

*You can also modify the transparency of the marks drop-down control next to the Color shelf. This is especially useful in dense scatter plots or when you are looking at data overlaying a map or background image. As you slide the slider toward the left the marks become more transparent.*

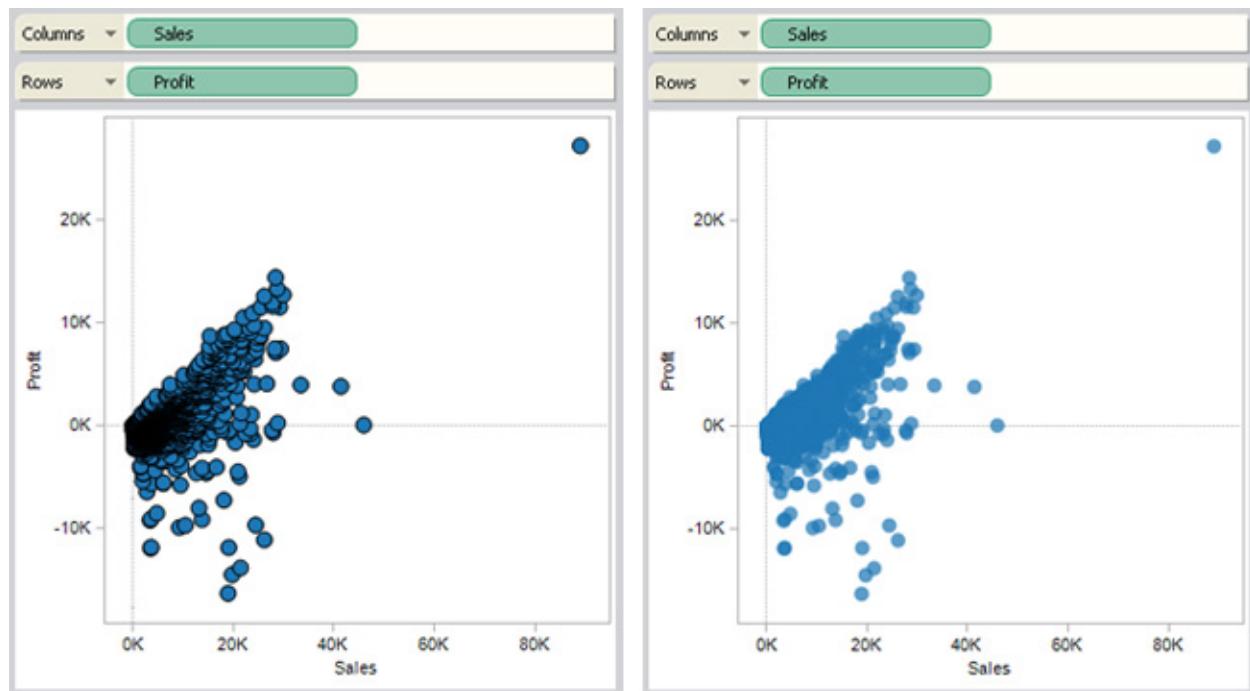
## Effects

*Use the drop-down control next to the color shelf to modify other color properties. You can*

### Mark Borders

*By default, Tableau displays all marks without a border. You can turn on the mark borders for all mark types except text, line, and shape. Turn on mark borders by selecting a color on the color shelf drop-down control.*

*Borders are often useful for distinguishing between closely spaced marks. For example, the view shown below has mark borders turned on (left) and turned off (right). As you can see, when borders are turned off, the marks become indistinguishable in the areas where they are tightly clustered.*

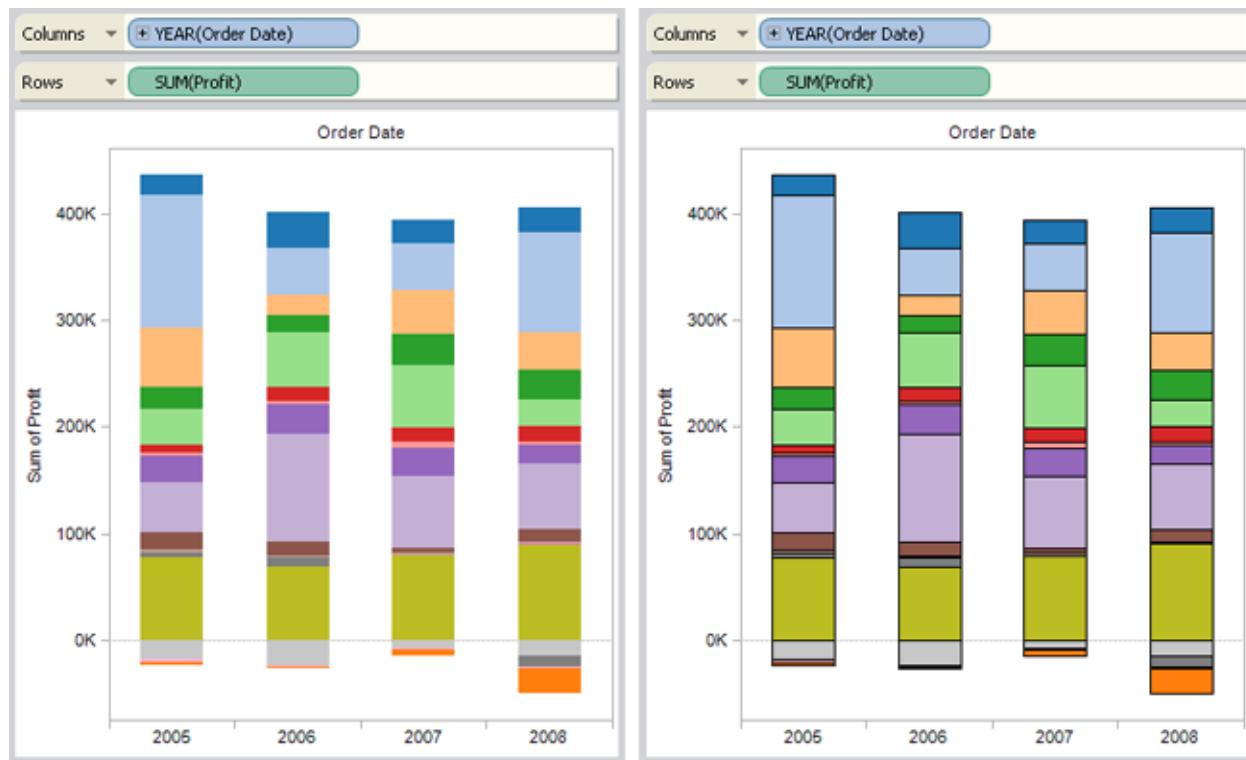


### Note:

*You can also use transparency to show the density of marks.*

*Leaving mark borders off is particularly useful when you are viewing a large number of small marks that are color-encoded. It can be difficult to see the color encoding because the borders dominate the marks.*

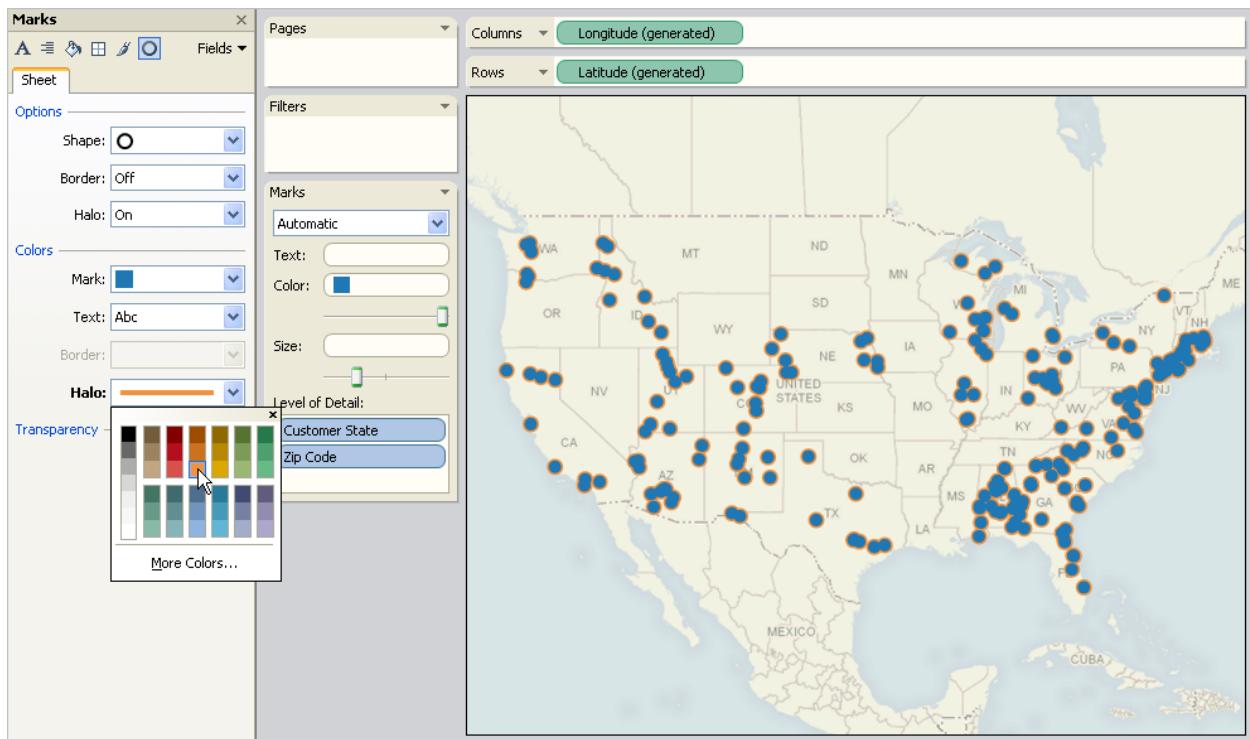
For example, the view shown below displays bars that are segmented by a large number of color-encoded dimension members. As you can see, when mark borders are turned on some marks are difficult to identify by color. When borders are turned off, the marks can easily be distinguished.



### **Mark Halos**

In order to make the marks in a view more visible when placed on top of a background image or map, each mark is surrounded by a solid contrasting color called a halo. Mark halos are available when you have a background image or background map. You can turn mark halos by selecting a color on the color shelf drop-down control.

The view below uses a map so the marks are surrounded by orange halos to make them stand out.



## Markers

When you are using the Line mark type, you can add a marker effect to show and hide the points along the line. You can show selected points, all points, or no points. Select a marker effect on the color shelf drop-down control.

## Size Shelf

### Size Shelf

The Size shelf allows you to encode data by assigning different sizes to the marks in a data view. Depending on whether you use a discrete or continuous field you will add either categorical or quantitative size encodings.

- [Categorical Sizes](#)
- [Quantitative Sizes](#)

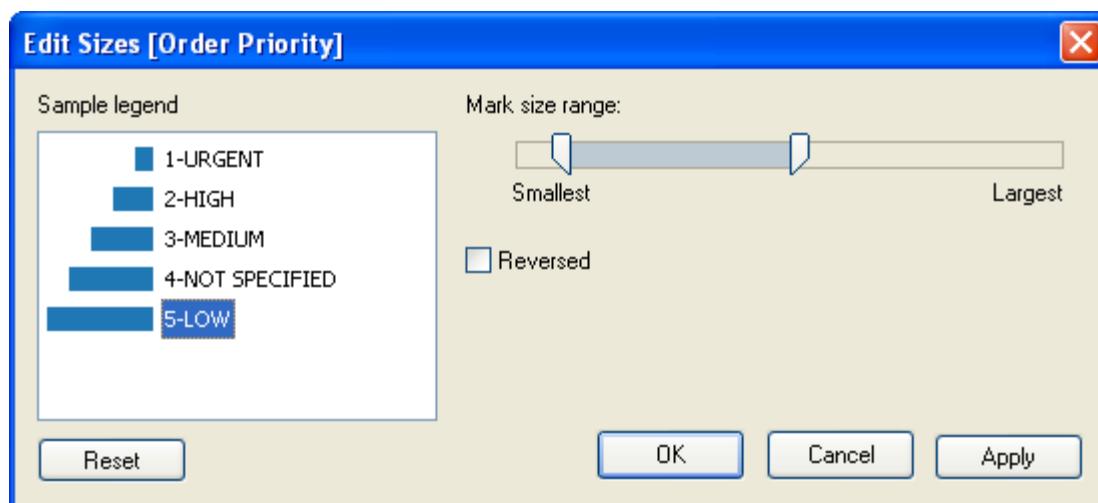
## Categorical Sizes

*When you place a discrete field on the Size shelf, Tableau separates the marks according to the members in the dimension, and assigns a unique size to each member. Because size has an inherent order to it (small to big), categorical sizes work best for ordered data like years or quarters.*

*Note that size-encoding data with a discrete field separates the marks in the same way as the Level of Detail shelf does, and then provides additional information (a shape) for each mark. When you add categorical size encoding to the view, a legend displays showing the sizes assigned to each member in the field placed on the size shelf. You can modify how these sizes are distributed in the Edit Sizes dialog box.*

### To edit categorical size encodings in a view:

1. Double-click on the legend or select *Edit Size* from the legend's menu to open the *Edit Sizes* dialog box.



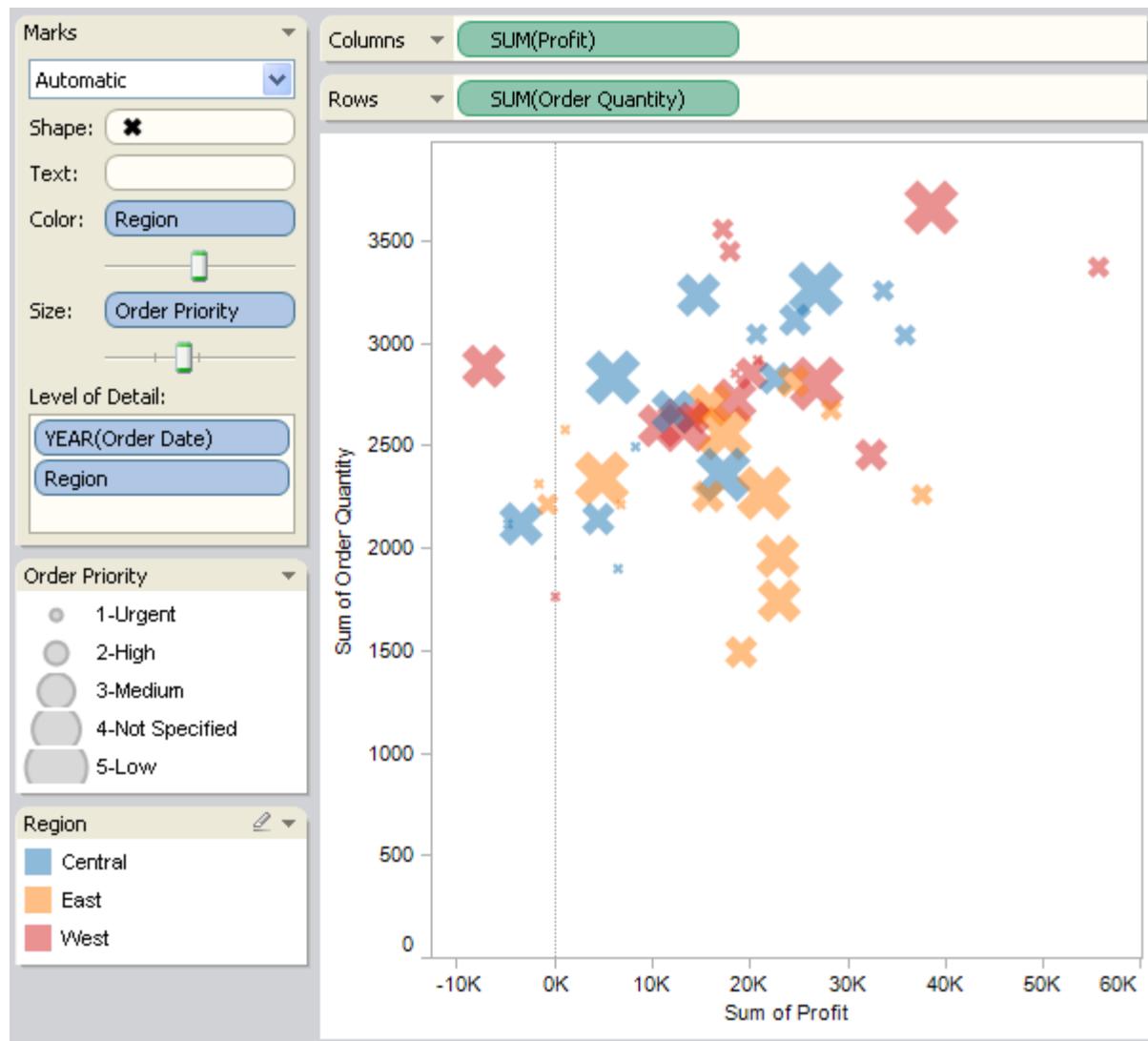
2. In the *Edit Sizes* dialog box, the sizes are displayed on the left and a size range slider is shown on the right. The sizes assigned to each member are distributed across the specified range. Use the slider to adjust the sizes assigned to each member.

You can also select *Reversed* to assign the largest mark to the smallest value and the smallest mark to the largest value.

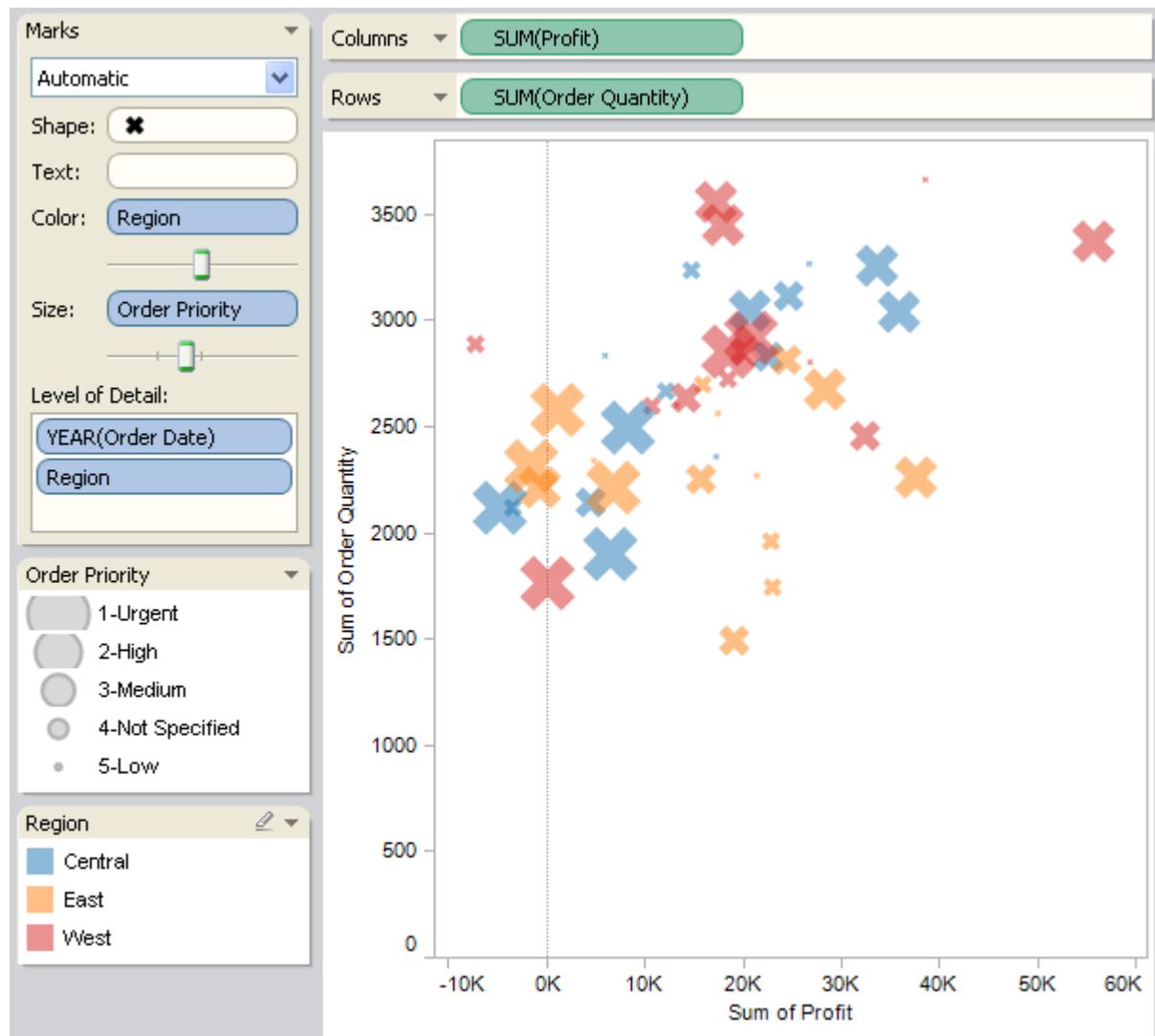
3. When finished click *OK*.

### Example – Categorical Sizes

The view below shows the sales and profit of a superstore broken down by region and order date. The order priority is indicated by the size of the mark.



In this case, the highest priority orders are shown with the smallest mark, which doesn't make sense. Use the Edit Sizes dialog box to Reverse the range so that the highest priority orders have the largest mark.



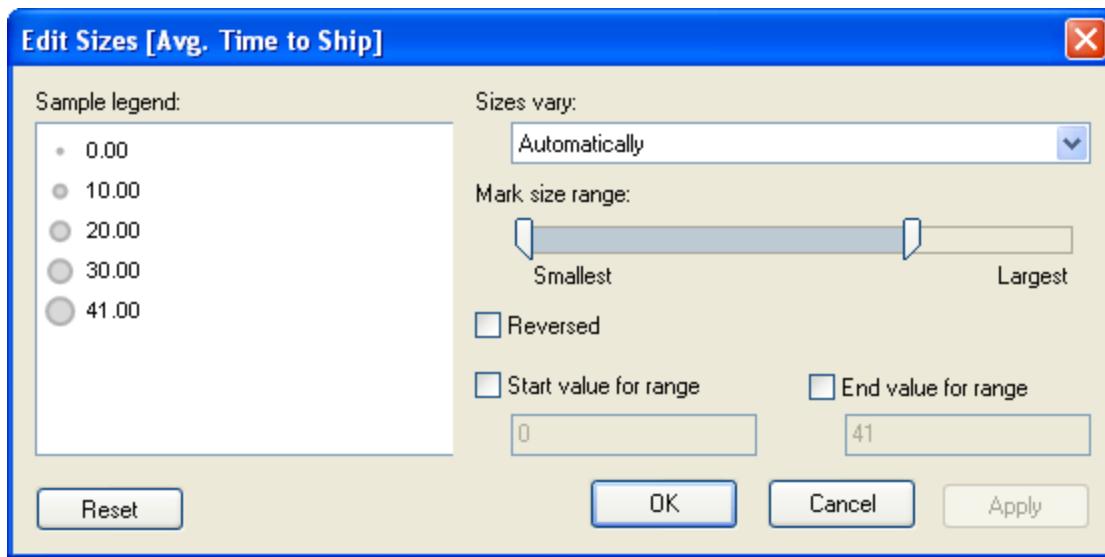
## Quantitative Sizes

*When you place a continuous field on the Size shelf, Tableau draws each mark with a different size using a continuous range. The smallest value is assigned the smallest sized mark and similarly the largest value is represented by the largest mark.*

*When you add quantitative size encoding to the view, a legend displays showing the range of values over which sizes are assigned. You can modify how these sizes are distributed in the Edit Sizes dialog box.*

### To edit quantitative size encodings:

1. Double-click on the size legend or select *Edit Size* from the legend's menu to open the *Edit Sizes* dialog box.

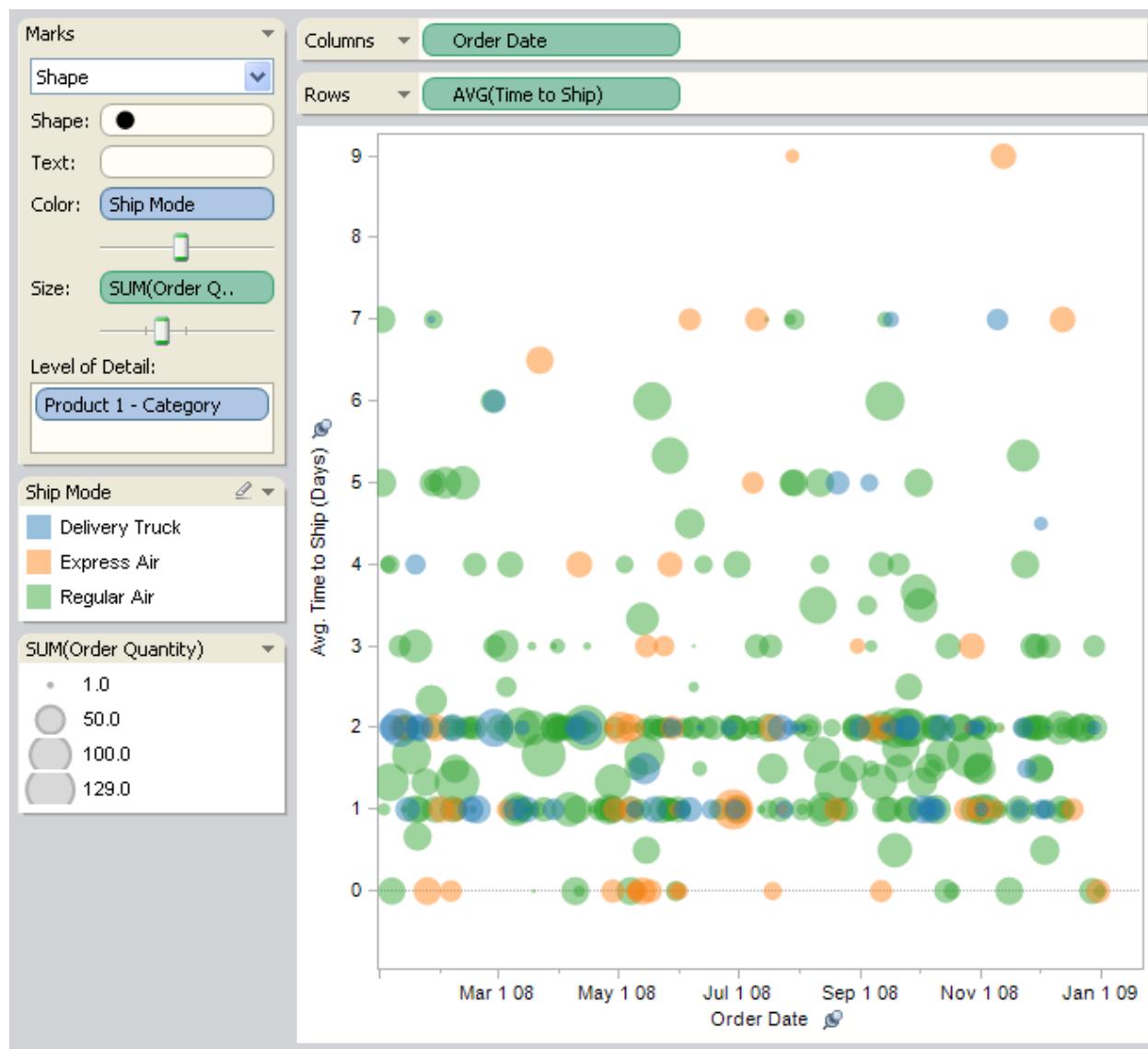


2. In the *Edit Sizes* dialog box, select one of the following ways to map the sizes:
  - *Automatically* - selects the mapping that best fits your data. If the data is numeric and does not cross zero (e.g. all positive or all negative), the 'From zero' mapping is used. Otherwise, the 'By range' mapping is used.
  - *By range* - Uses the minimum and maximum values in the data to determine the distribution of sizes. For example, if a field has values from 14 to 25, the sizes will be distributed across this range.

- From zero - Sizes are interpolated from zero making the maximum mark size assigned to the absolute value of the data value that is farthest from zero.
3. Use the range slider to adjust the distribution of sizes. When the From zero mapping is selected, the lower slider is disabled because it is always set to zero.
  4. You can optionally select Reversed to assign the largest mark to the smallest value and the smallest mark to the largest value. This option is not available if you have selected to map the sizes from zero because the smallest mark is always assigned to zero.
  5. Finally, you can select the Start and End checkboxes and manually type in a beginning and end value for the range of values to modify the distribution of sizes.
  6. When finished, click OK.

### ***Example – Quantitative Sizes***

The view below analyzes the time it takes to ship products based on their ship mode, order date, and the size of the order. The size of each mark represents the order quantity while the color represents the Ship Mode. Looking at the view you can quickly see that most products ship within 1 and 2 days. However, larger orders shipped via Regular Air tend to take longer, especially during the second quarter. Curiously, there are a couple of smaller orders that were shipped via Express Air that took a long time to ship.



You can also change the size of the marks using the Size slider.



For the line and bar mark types, the size slider controls the width of the mark. For the Gantt bar mark type, the size slider controls the length of the bar. For the other supported mark types, the size slider controls the area of the mark.

## Shape Shelf

### Shape Shelf

The Shape shelf allows you to encode data by assigning different shapes to the marks in a data view. This section discusses the following topics:

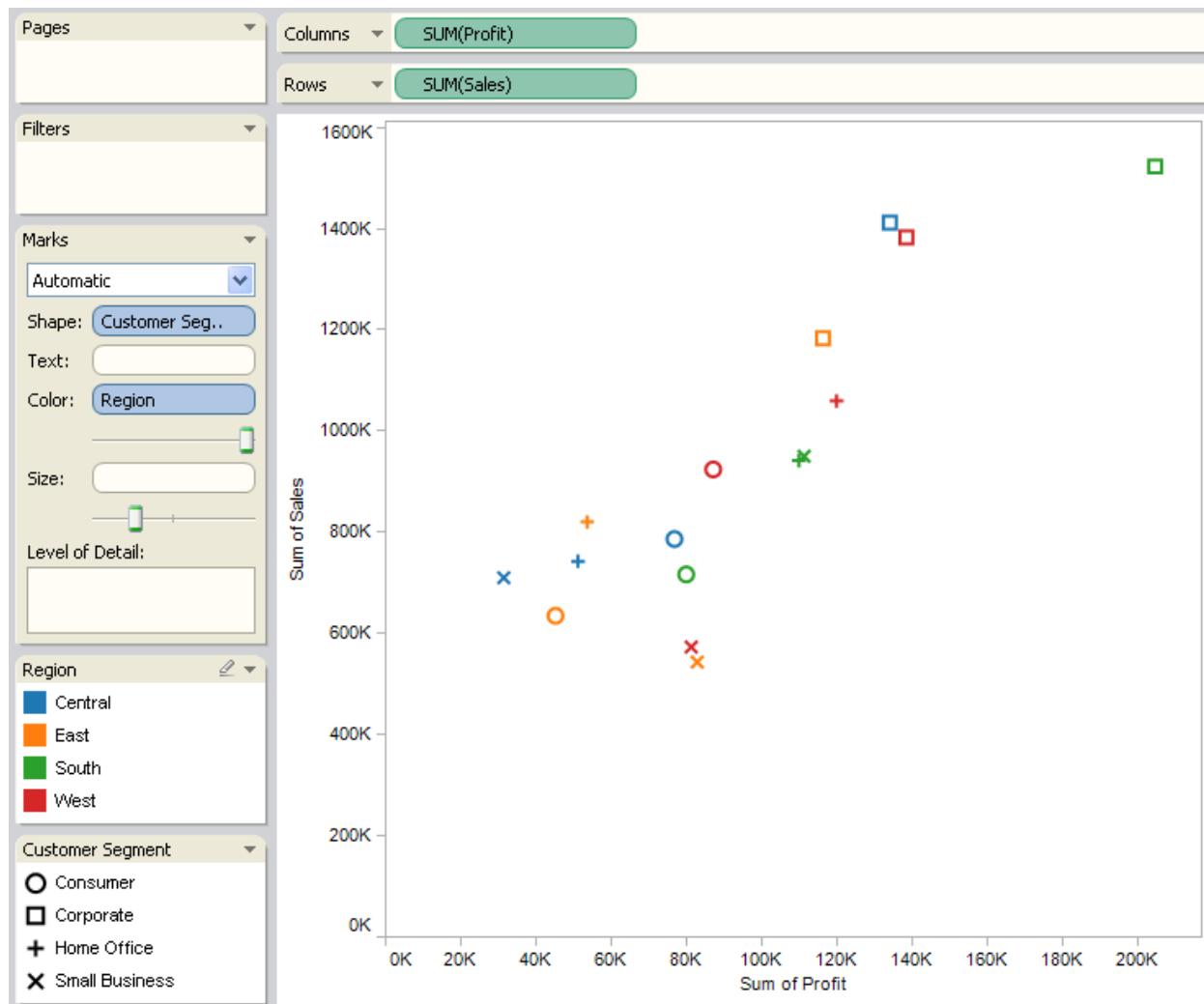
- [About Shapes](#)
- [Editing Shapes](#)
- [Custom Shapes](#)

## About Shapes

*When you place a dimension on the Shape shelf, Tableau separates the marks according to the members in the dimension, and assigns a unique shape to each member. The shape legend displays each member name and its associated shape. When you place a measure on the Shape shelf the measure is converted to a discrete measure.*

*Note that shape-encoding data separates the marks in the same way as the Level of Detail shelf does, and then provides additional information (a shape) for each mark. The Shape shelf is available when you select the shape mark type from the Mark menu. It is the default mark type when measures are the inner fields for both the Rows shelf and the Columns shelf.*

*As shown below, the marks are separated into different shapes according to the members of the Customer Segment dimension. Each shape reflects the customer segment's contribution to the profit and sales.*

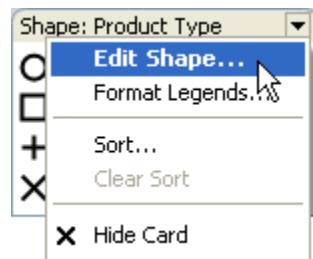


## Editing Shapes

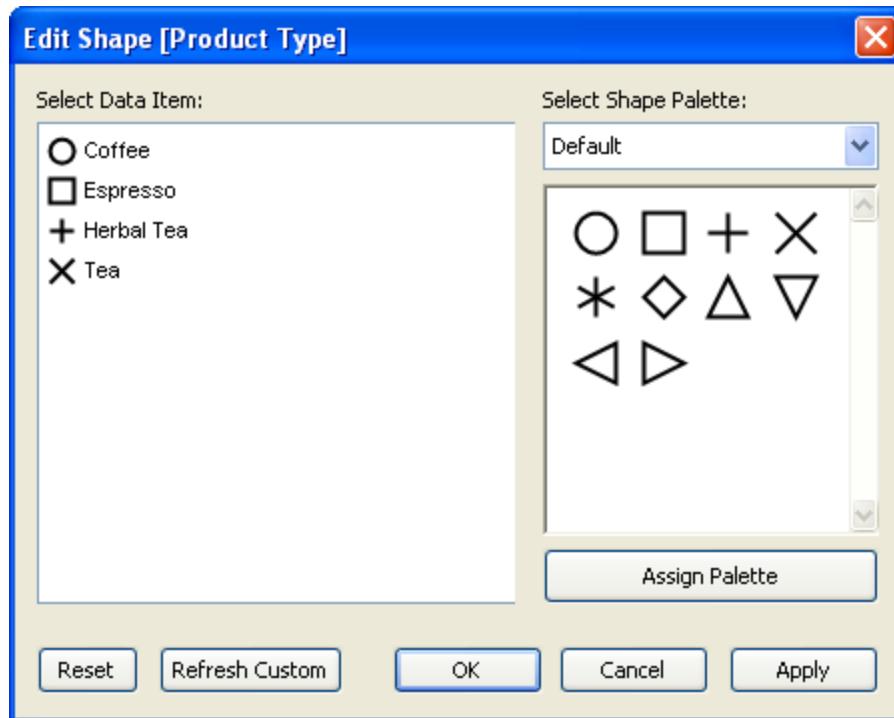
By default, ten unique shapes are used to encode dimensions. If you have more than 10 members, the shapes repeat. In addition to the default palette, you can choose from a variety of shape palettes such as filled shapes, arrows, and even weather symbols.

### To edit shapes:

1. Double-click the Shape Legend or select Edit Shapes on the legend's card menu. If there is no shape encoding, you can open the Edit Shapes dialog box by clicking the shape shelf itself and then selecting More Shapes.



2. In the Edit Shape dialog box, select a member on the left and then select the new shape in the palette on the right. You can also click the Assign Palette button to quickly assign the shapes to the members of the field.



Select a different shape palette using the drop-down list in the upper right of the Edit Shape dialog box.

**Note:**

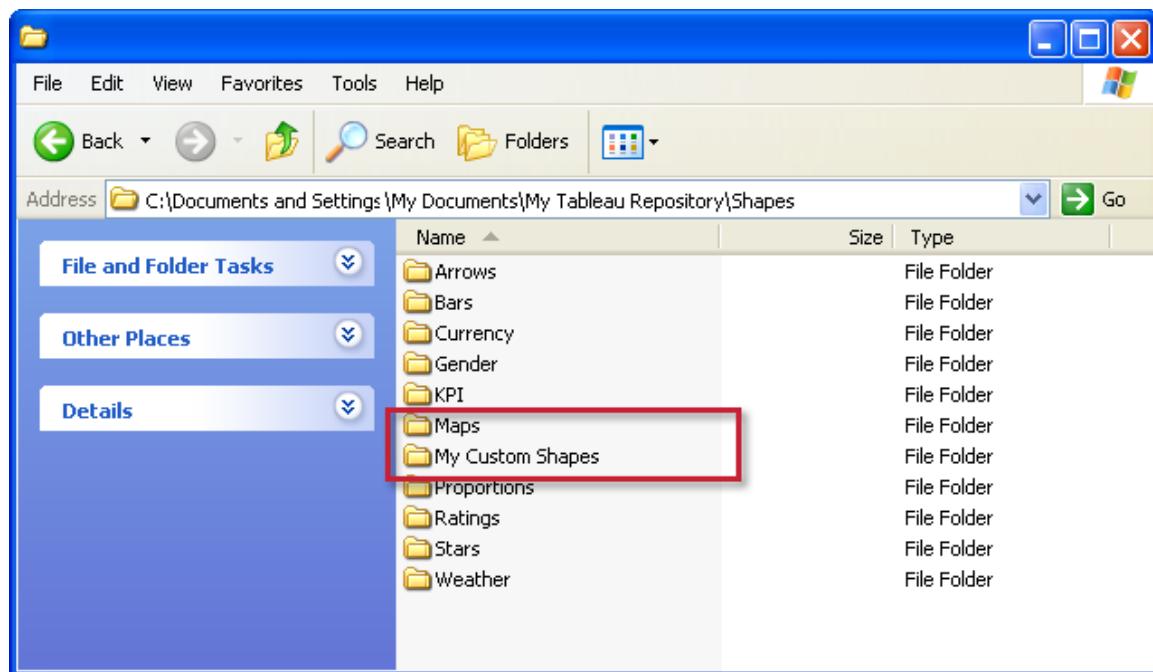
Shape encodings are shared across multiple worksheets that use the same data source to help you create consistent displays of your data. For example, if you define Furniture products to be represented by a square, they will automatically be squares in all other views in the workbook. You can set the default shape encodings for a field by right-clicking the field in the Data window and selecting *Edit encodings > Shape*.

## Custom Shapes

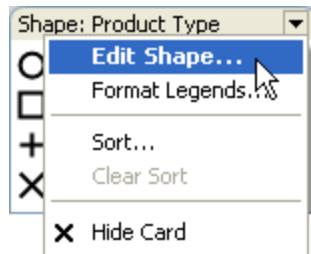
You can add custom shapes by adding the shape image files to the *Shapes* folder in your Tableau Repository located in your *Documents* folder. When you use custom shapes, they are saved with the workbook. That way the workbook can be shared with others.

**To create custom shapes:**

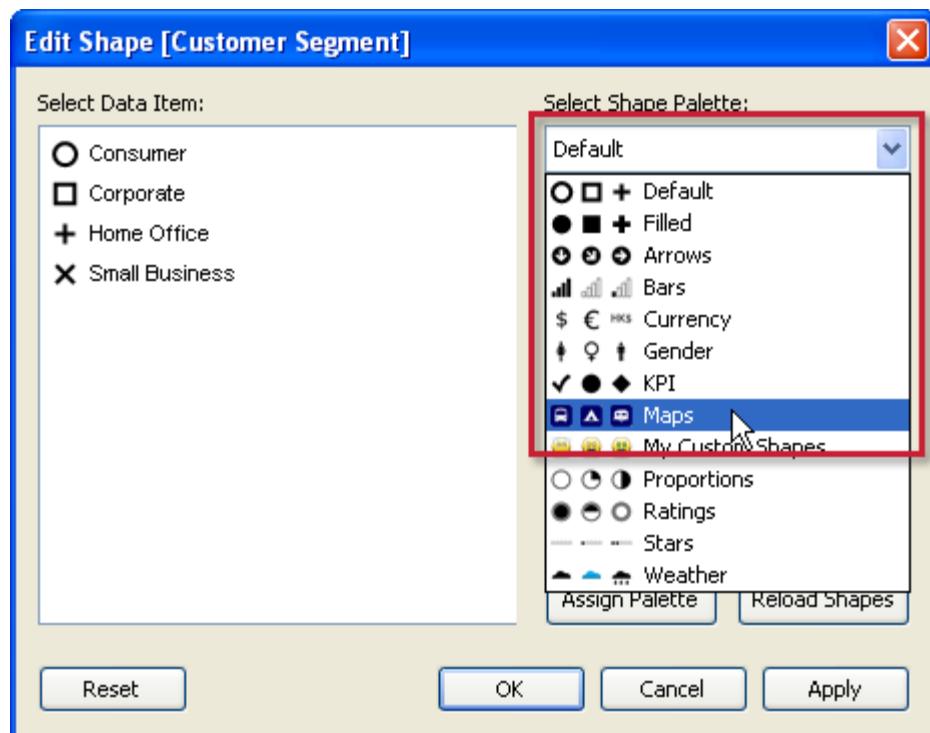
1. Create your shape image files. Each shape should be saved as its own file and can be in many image formats including bitmap (.bmp), portable network graphic (.png), JPEG, graphics interchange format (.gif), and so on. Refer to the tips below to learn more about making useful shapes.
2. Place the shapes into the *My Tableau Repository* folder located in your *Documents* folder. The shapes should be put into a new folder inside the *Shapes* folder. The name of the folder will be used as the name of the palette in Tableau. In the example below, two new palettes are created: *Maps* and *My Custom Shapes*.



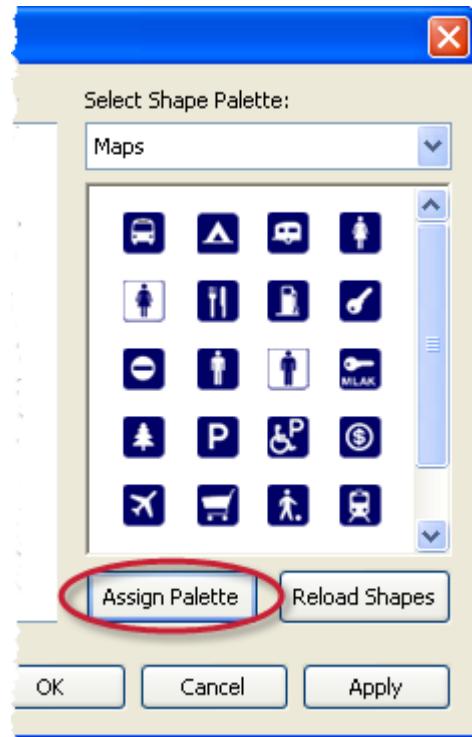
3. In Tableau, open the *Edit Shape* dialog box.



4. Choose the new custom palette in the drop-down list in the upper right of the dialog box. If you modified the shapes while Tableau was running, you may need to click the **Reload Shapes** button so the new shapes are available in the dialog box.

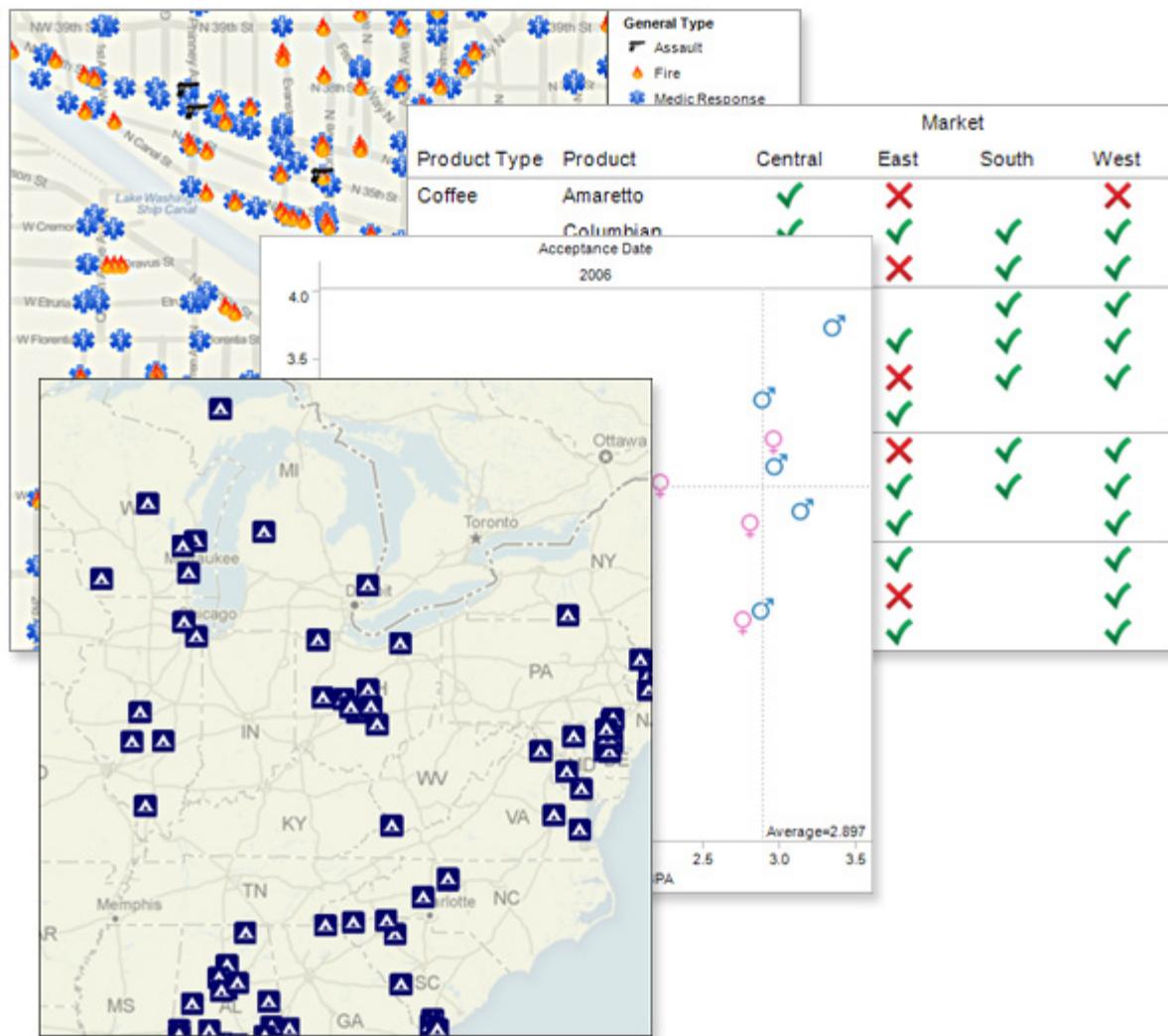


5. You can either assign members shapes one at a time, or click the Assign Palette button to automatically assign the shapes to the members.



You can return to the default palette at any time by clicking the *Reset* button. If you open a workbook that uses custom shapes that you don't have, the workbook will show the custom shapes because the shapes are saved as part of the workbook. However, you can click the *Reload Shapes* button in the *Edit Shapes* dialog box to use the ones in your repository instead.

Below are some examples of views that use both the default and custom shape palettes.



### Tips for Creating Custom Shapes

When you create custom shapes there are a few things that you can do to improve how your shapes look and function in the view. Below are some tips to help you make good custom shapes. If you are creating your own shapes, we recommend following general guidelines for making icons or clip art.

- **Suggested Size** - unless you plan on using the Size shelf to make the shapes really large, you should try to make your original shape size close to 32 pixels by 32 pixels. However, the original size is dependent on the range of sizes you want available in Tableau. You can resize the shapes in Tableau using the Size shelf as well as the cell size options on the Format menu.
- **Adding Color Encoding** - if you plan to also use the Color shelf to encode the shapes with color, you should use a transparent background. Otherwise, the

*entire square of the image will be colored rather than just the symbol. GIF and PNG file formats both support transparency. GIF files support transparency for a single color that is 100% transparent, while .png supports alpha channels with a range of transparency levels available on every pixel in the image. When Tableau color encodes the symbol, the amount of transparency for each pixel will not be modified, so you can maintain smooth edges.*

- **File Formats** - Tableau does not support symbols that are in the Enhanced Meta File format (.emf). The shape image files can be in one of the following formats: .png, .gif, .jpg, .bmp, and .tiff.

## Label Shelf

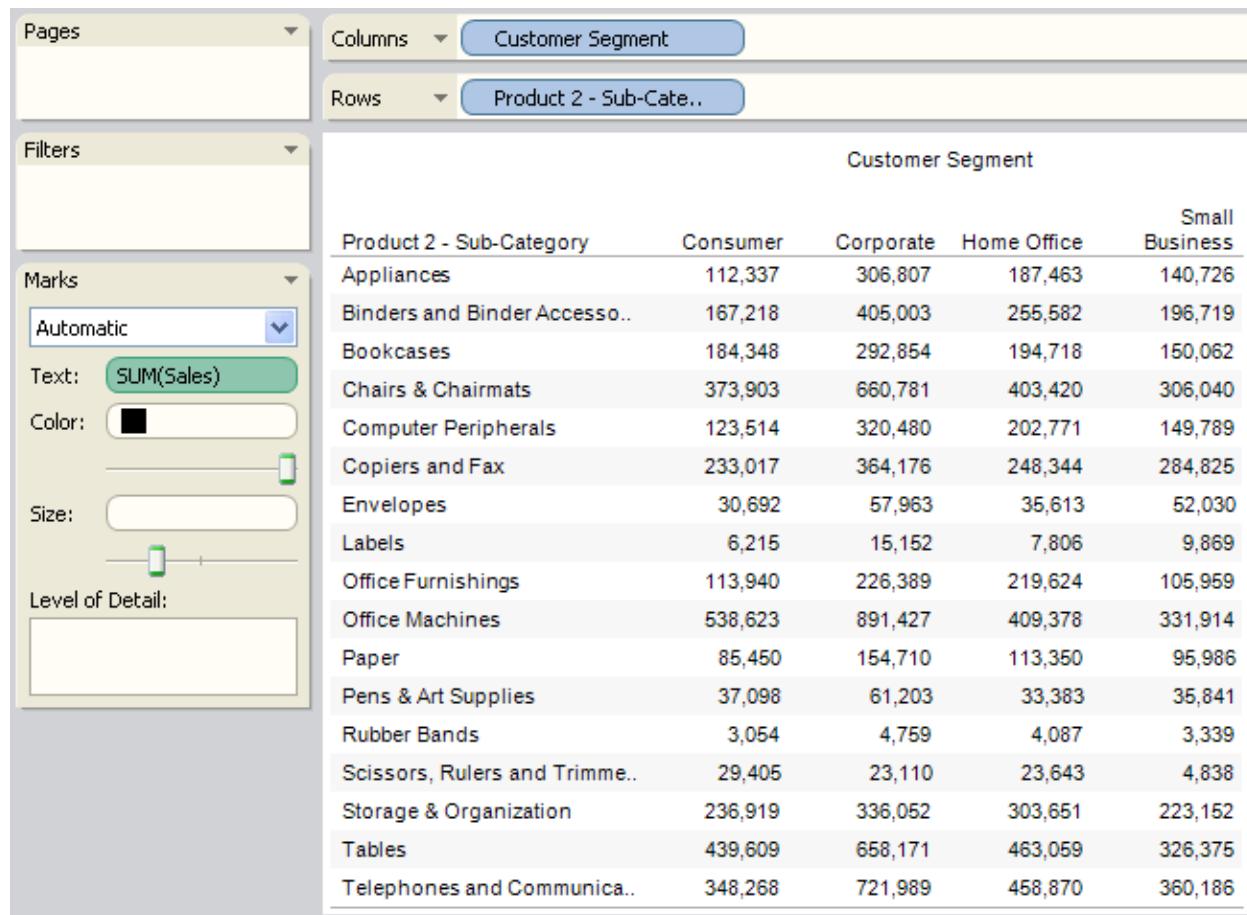
The Label shelf allows you to view the numbers associated with a data view, and to encode data by assigning text labels to the marks. The effect of text-encoding your data view depends on whether you use a dimension or a measure.

- Dimension – When you place a dimension on the Text shelf, Tableau separates the marks according to the members in the dimension. The text labels are given by the dimension member names.
- Measure – When you place a measure on the Text shelf, the text labels are given by the measure values. The measure can be either aggregated or disaggregated. However, disaggregating the measure is generally not useful because it often results in overlapping text.

Text is the default mark type when dimensions are the inner fields for both the Rows shelf and the Columns shelf.

The most common view using the Text shelf is a text table, which is also referred to as cross-tab or a PivotTable.

## Tableau Desktop Help

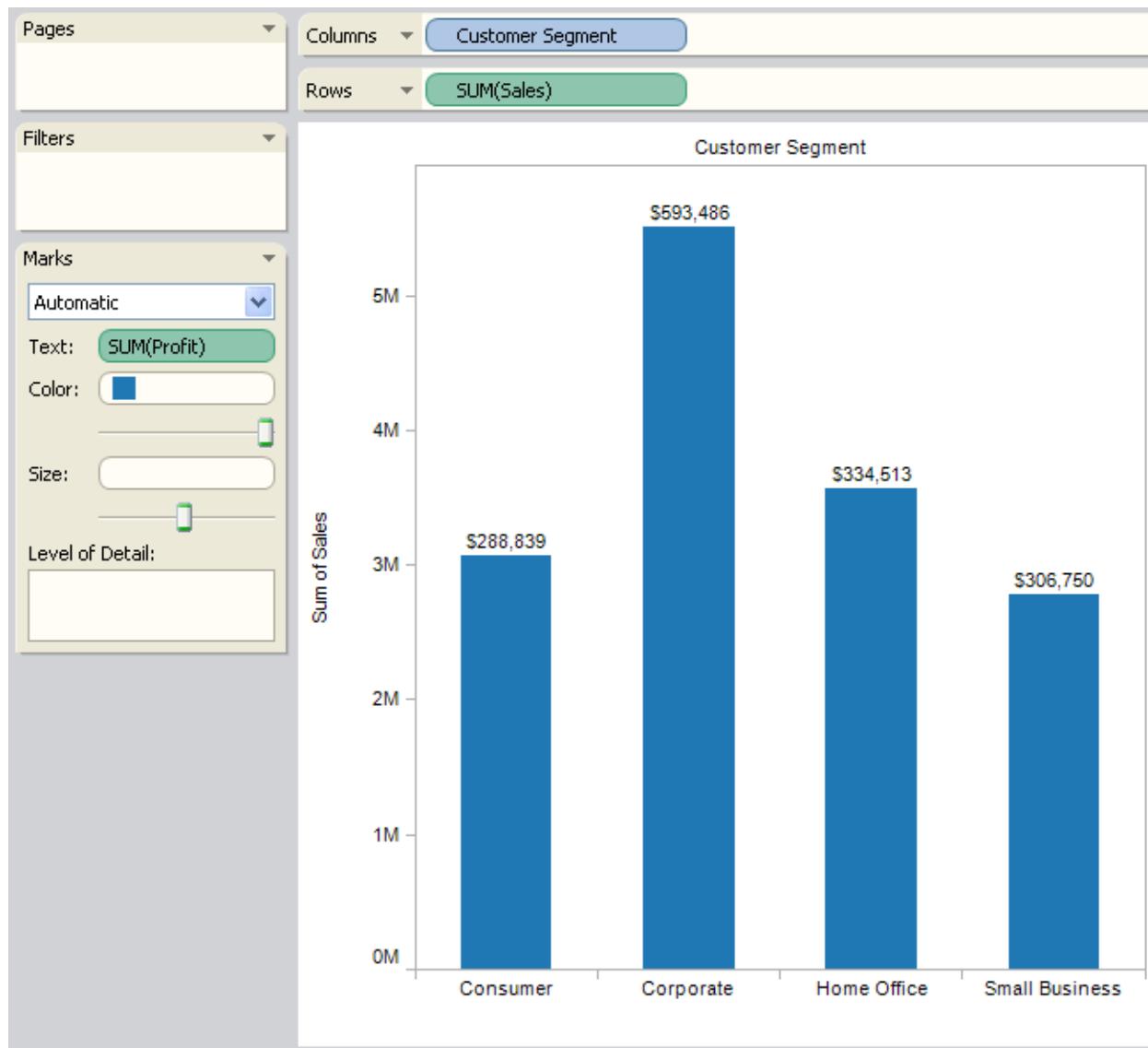


### Note:

You can display text labels with other mark types by selecting clicking Show Mark Labels on the toolbar. Refer [Mark Labels](#) to learn more about showing and hiding mark labels.

If you place a dimension on the Text shelf, the marks are separated and labeled according to the dimension member names. If you place a measure on the Text shelf, the marks are labeled by the values contained by the measure.

As shown below, the heights of the bars are given by the Sales measure and the labels are given by the sum of the Profit measure.



## Path Shelf

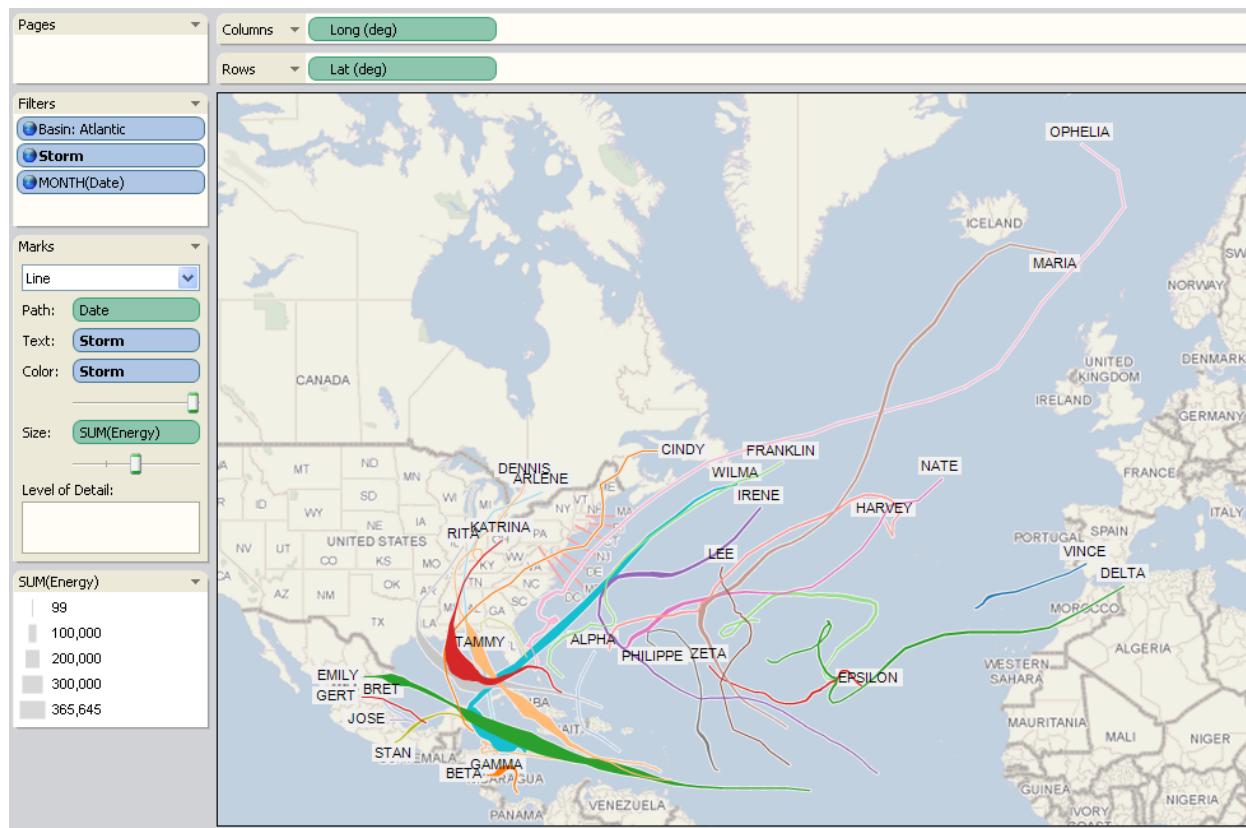
The Path shelf allows you to encode data by connecting marks using a particular drawing order. You can path-encode your data using either a dimension or a measure.

- Dimension – When you place a dimension on the Path shelf, Tableau connects the marks according to the members in the dimension. If the dimension is a date, the drawing order is given by the date order. If the dimension holds words such as customer names or product types, the drawing order is given by the order of the members in the data source. You can change the order by which data points are connected by changing the sort order of the members. Refer to [Sorting](#).
- Measure – When you place a measure on the Path shelf, Tableau connects the marks according to the values of the measure. The measure can be aggregated or disaggregated.

The Path shelf is available only when you select the line or polygon mark type from the Mark menu. Refer to [Mark Types](#) for more information.

To create a useful path-encoded view, your data table should contain at least one measure. This is because you cannot create a path that connects only categorical data (dimensions).

The view below was created using storm data from the Atlantic basin in 2005. The view uses line marks with the path determined by the date of the storm. In this example, it lets you see the path of the storm.

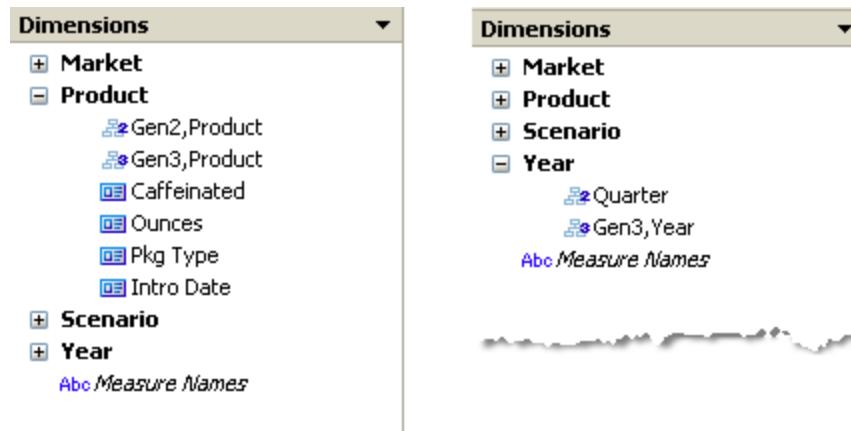


*By placing the continuous date on the Path shelf, the lines are drawn in chronological order.*

## Multidimensional Hierarchies

### Multidimensional Hierarchies

*Multidimensional data sources contain hierarchies. For example, your database might contain a Product dimension that includes members such as product family, product department, and so on organized into a hierarchy, or you might have a Time dimension that includes years, quarters, and months.*



- [Drilling Down and Up in a Hierarchy](#)
- [Building Views with Oracle Essbase](#)
- [Building Views with Microsoft Analysis Services](#)
- [Perfect Pivoting](#)
- [Defining Unique Values](#)
- [Utility Dimensions](#)

### Multidimensional Hierarchies

#### Drilling Down and Up in a Hierarchy

*One of the most useful ways to navigate hierarchies is to drill down or drill up. For example, if you are examining the sales totals for various years, you can then drill down and view sales for all of the months within each year. Alternatively, if you are examining sales totals for all months, you can then drill up and view the sales for each year.*

*You can drill down and drill up in Tableau by clicking on fields placed on shelves, or by selecting a hierarchy header in the table. These two methods are described below.*

## Using Fields on Shelves

You can drill down or drill up by clicking on a dimension that is placed on any shelf. If the dimension is on the Rows or Columns shelf, drilling down shows more data (more headers) in the table, while drilling up shows less data in the table.

You can click on the plus/minus control that appears on any hierarchical dimension on any shelf. If a dimension member shows the plus sign , then its children are not already showing and you can drill down at least one level. If a dimension member shows the minus sign , then its children are already showing and you can drill up.

The following figure demonstrates drilling down one level in the hierarchy for the Region dimension to expose the States.

The diagram illustrates the process of drilling down in Tableau. On the left, a smaller view shows the initial state of the data with the 'Region' dimension on the Rows shelf and the 'Gen2,Population' dimension on the Columns shelf. The data is summarized by Region (East, West, South, Central) across three population categories: Small, Medium, and Large. An arrow points from this initial view to a larger, detailed view on the right. In the larger view, the 'Region' dimension is still on the Rows shelf, but it has been expanded to show individual states under each region. The 'State' dimension is now on the Columns shelf, showing the breakdown of each region into its constituent states. The data is presented in a more granular form, with specific state names like New York, Massachusetts, Florida, Connecticut, New Hampshire, California, Oregon, Washington, Utah, Nevada, Texas, and Oklahoma, along with their corresponding population counts.

Gen2,Population			
Region	Small	Medium	Large
East	4,218	11,741	8,202
West	16,897		12,964
South	6,813		6,425
Central	21,301	16,961	

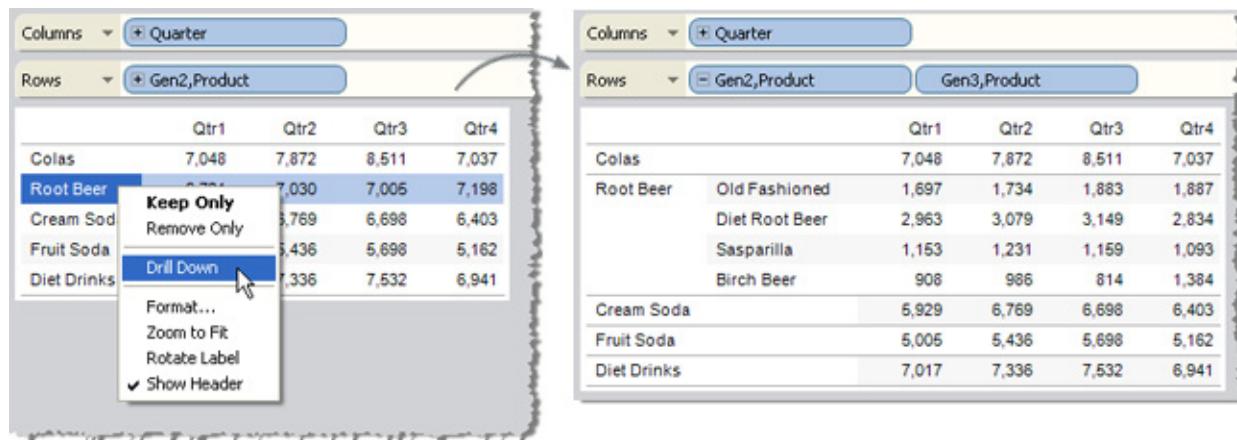
  

Gen2,Population			
Region	State		
	Small	Medium	Large
East	New York		8,202
	Massachusetts		6,712
	Florida		5,029
	Connecticut		3,093
	New Hampshire		1,125
West	California		12,964
	Oregon		5,062
	Washington		4,641
	Utah		3,155
	Nevada		4,039
South	Texas		6,425
	Oklahoma		3,491

## Using Headers

You can drill down and drill up for individual dimension members in a hierarchy by right-clicking a table header and selecting Drill Down or Drill Up from the context menu. This is often referred to as nonuniform drill down because you expose only the members of interest instead of exposing all the members of a given level.

For example, the following figure illustrates drilling down into the Root Beer member of the Gen2,Product dimension. Note that new row headers are displayed in the table and that Gen3,Product, which is the next generation in the hierarchy, is automatically displayed.



*One reason to use nonuniform drill down is if your data source has a ragged hierarchy (asymmetric layout). You also might want to view the children for just the member of interest.*

#### **Note:**

*Drilling down and drilling up results in filtering the data.*

### **Building Views with Oracle Essbase**

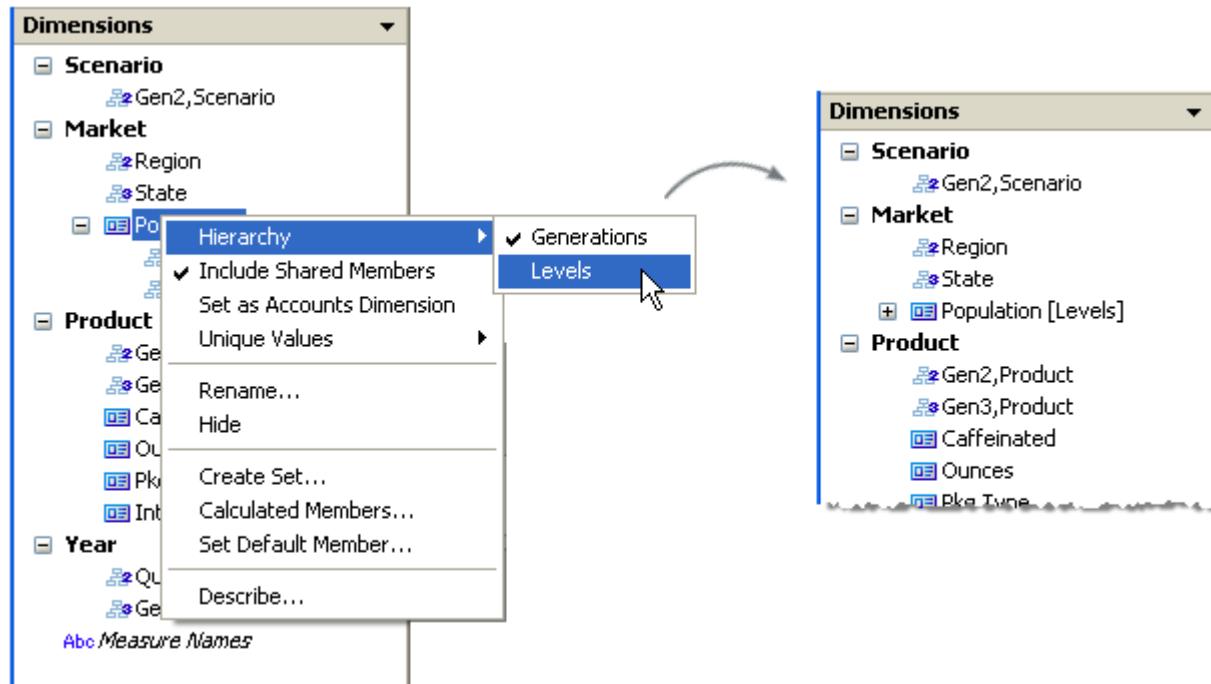
*When Tableau is connected to an Oracle Essbase data source, there are three important features that you should know about:*

#### **Generations and Levels**

*In Tableau, you can work with either the generations or the levels of a dimension. The generations of a dimension are all members that are an equal distance from the root of the dimension. The levels are all members that are an equal distance from the leaves of the dimension. For balanced dimensions, you'll typically want to work with generations. However, if your dimension is ragged, then it may make more sense to navigate using levels.*

*By default, the generations of each dimension are listed in the Data window. When you drag a dimension to a shelf, all generations that are ancestors of the selected generation (all generations that are above it in the hierarchy) are automatically included in the placement.*

*If you would rather navigate using the levels of a dimension, right-click the name of the dimension and then select Hierarchy > Levels.*



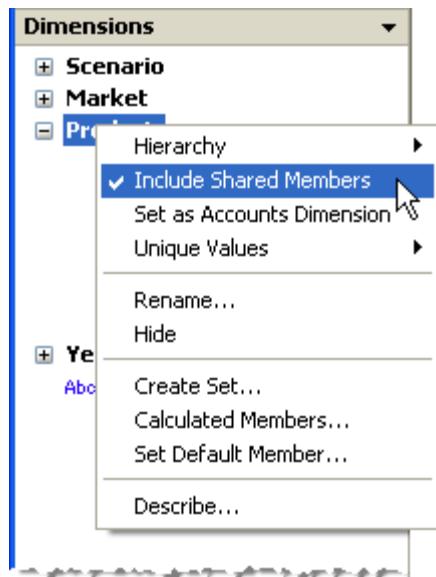
### Note:

If you are using the same dimension in multiple worksheets, you can use levels in one worksheet and generations in another worksheet simultaneously. Furthermore, you can mix generations and levels from different dimensions in the same worksheet.

### Shared Members

Shared members are dimension members that appear in more than one place in a hierarchy. For example, Diet Coke might be part of the product generation. But it might be shared by both the diet colas branch and the colas branch of the product hierarchy above it. In the database, however, the data about Diet Coke is stored just once.

By default, Tableau includes shared members in all generations (or levels) of a dimension. This means that a shared member might appear multiple times in a table. If you choose to exclude shared members, they will appear only once in a table. By default, shared members are included for all dimensions. Exclude shared members for a given dimension hierarchy by right-clicking the dimension name in the Data window and selecting *Include Shared Members* from the menu.

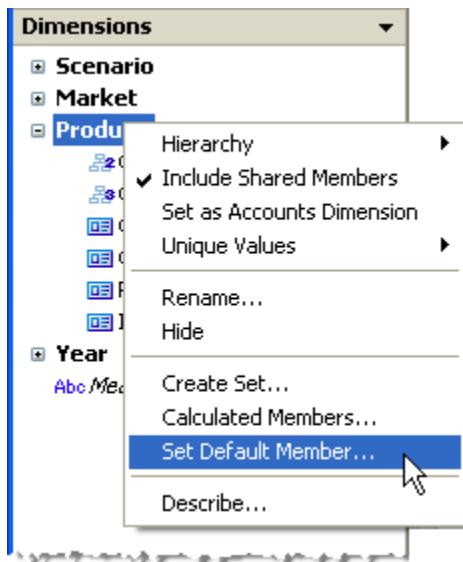


The figure below shows part of a data view where shared members are included (left) and excluded (right). Notice that diet drinks are shared members.

### Setting the Default Member

All multidimensional data sources have default members that are set when the data source is first built. If you find that you are creating filters all the time to look at the same specific data, you may find it useful to change the default member. For example, if you are the regional manager for the Western region in a company and you only want to look at your region's numbers, you can set the default member to the Western region.

You can change the default member in Tableau by right-clicking a dimension hierarchy and selecting Set Default Member.



In the subsequent dialog box, select from the following options:

- *Default member defined on cube – uses the default member that was defined when the cube was built. This is the default setting in Tableau.*
- *(All) member for the hierarchy – uses the ALL member for the selected hierarchy as the default member.*
- *Selected member – uses the member that you select in the bottom half of the dialog box as the default member.*

*The default member determines how you view the cube and so is much more powerful than applying filters. All fields will be calculated based on the default member you select. In addition, these default member settings are saved with the connection.*

## Building Views with Microsoft Analysis Services Cubes

*When you build views in Tableau using a Microsoft Analysis Services Cube it is possible to have measures and dimensions that don't make a lot of sense when placed in the view together. For example, you may have a measure for Sales Quota. It won't make sense to place that measure against a dimension containing products if products don't have sales quotas. Tableau helps you figure out the dimensions and measure that can be used together in meaningful ways by highlighting unrelated dimensions and measures in gray. So in the last example, when we place Sales Quota onto a shelf, the products dimensions are highlighted in gray. Highlighted dimensions are not disabled and can still be added to the view. When you add an incompatible measure to the view, the measure is marked with a caution symbol.*

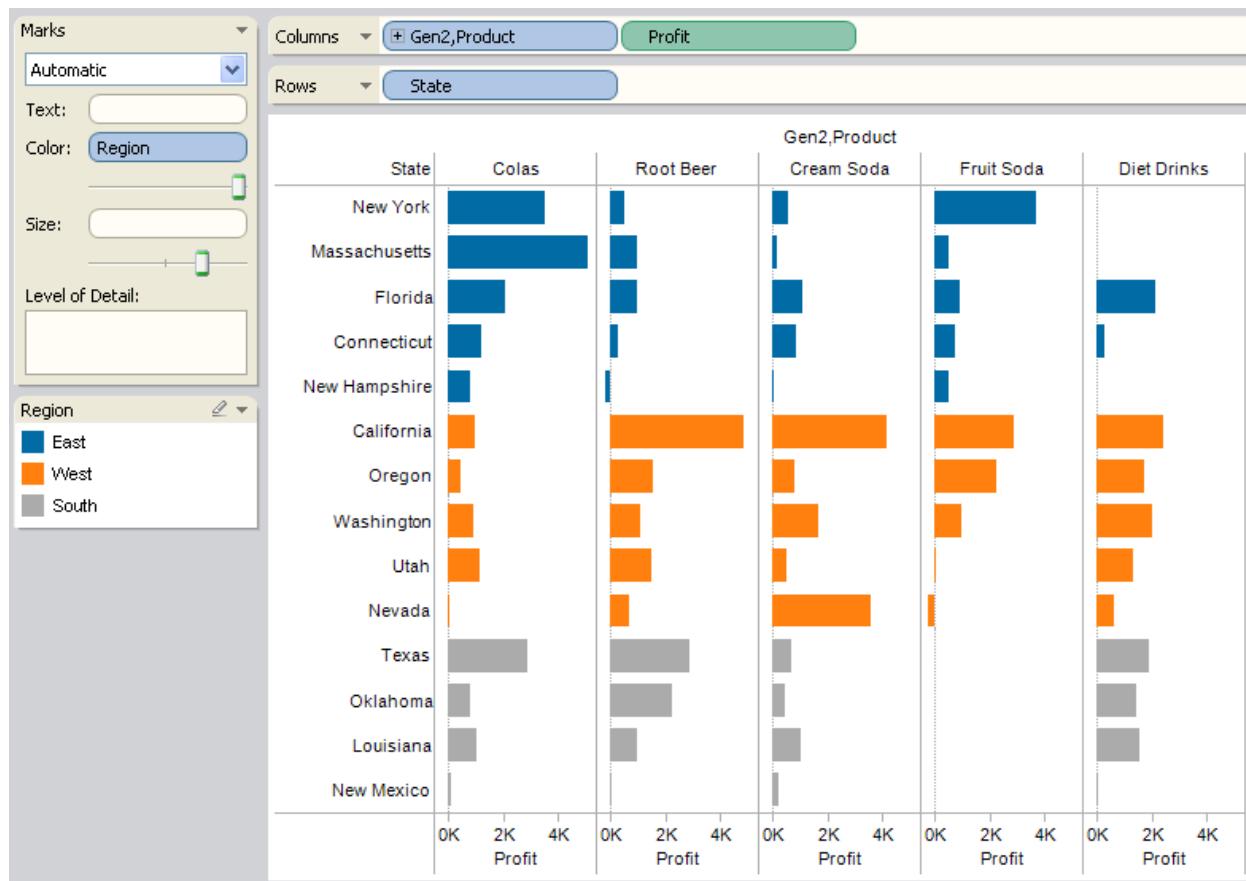


## Perfect Pivoting

*In Tableau, perfect pivoting refers to working with hierarchies in these ways:*

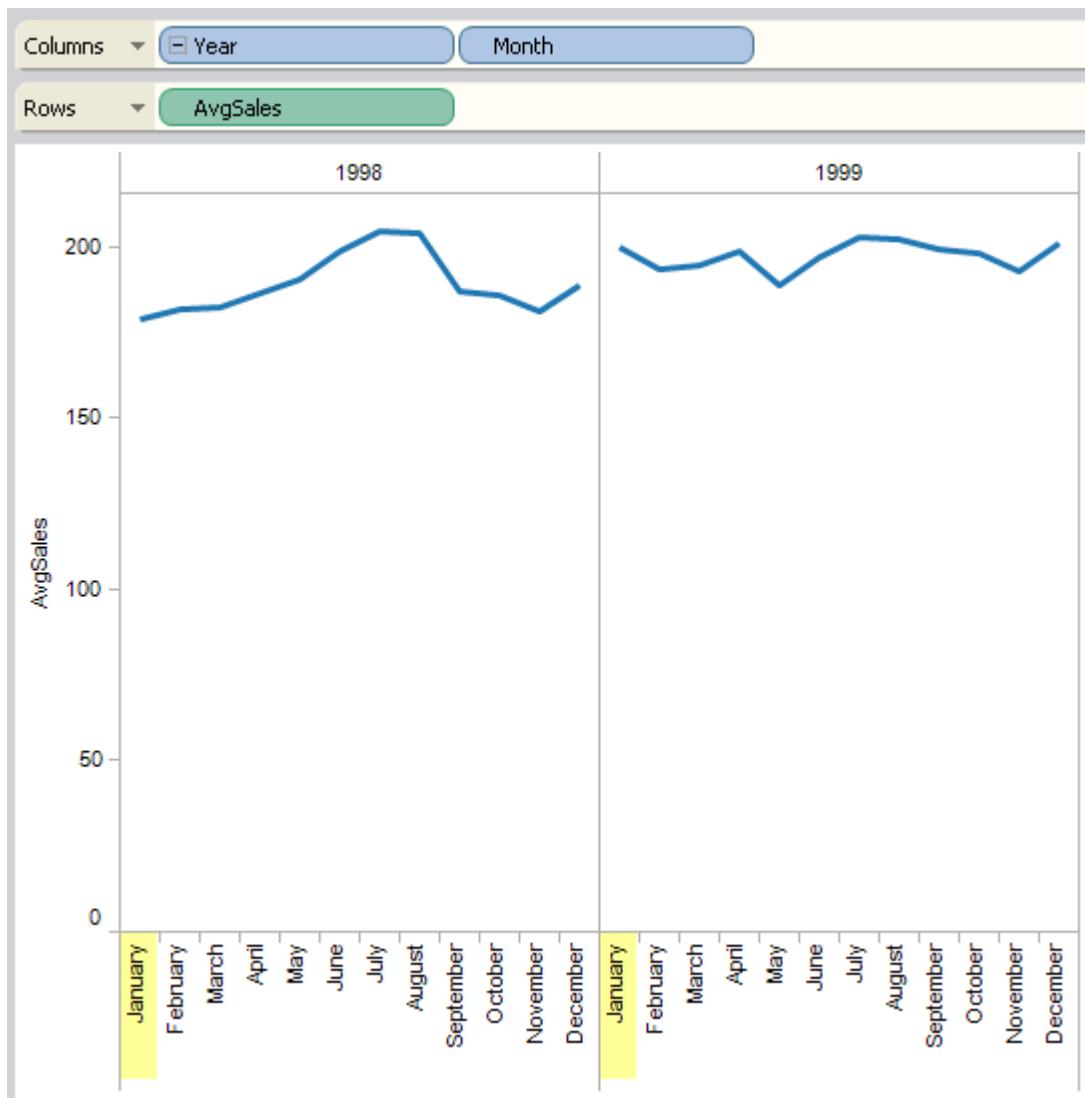
- *Using varying levels of detail including skipping levels (for example, Country and City, but not State).*
- *Using varying levels of detail on different worksheet shelves simultaneously (for example, Product Family on the Columns shelf and Product Department on the Color shelf).*
- *Using varying levels of detail out of order (for example, Quarter before Year).*

*For example, in the following view the Market hierarchy is broken up to show the State level as Rows and the Region level as Color.*

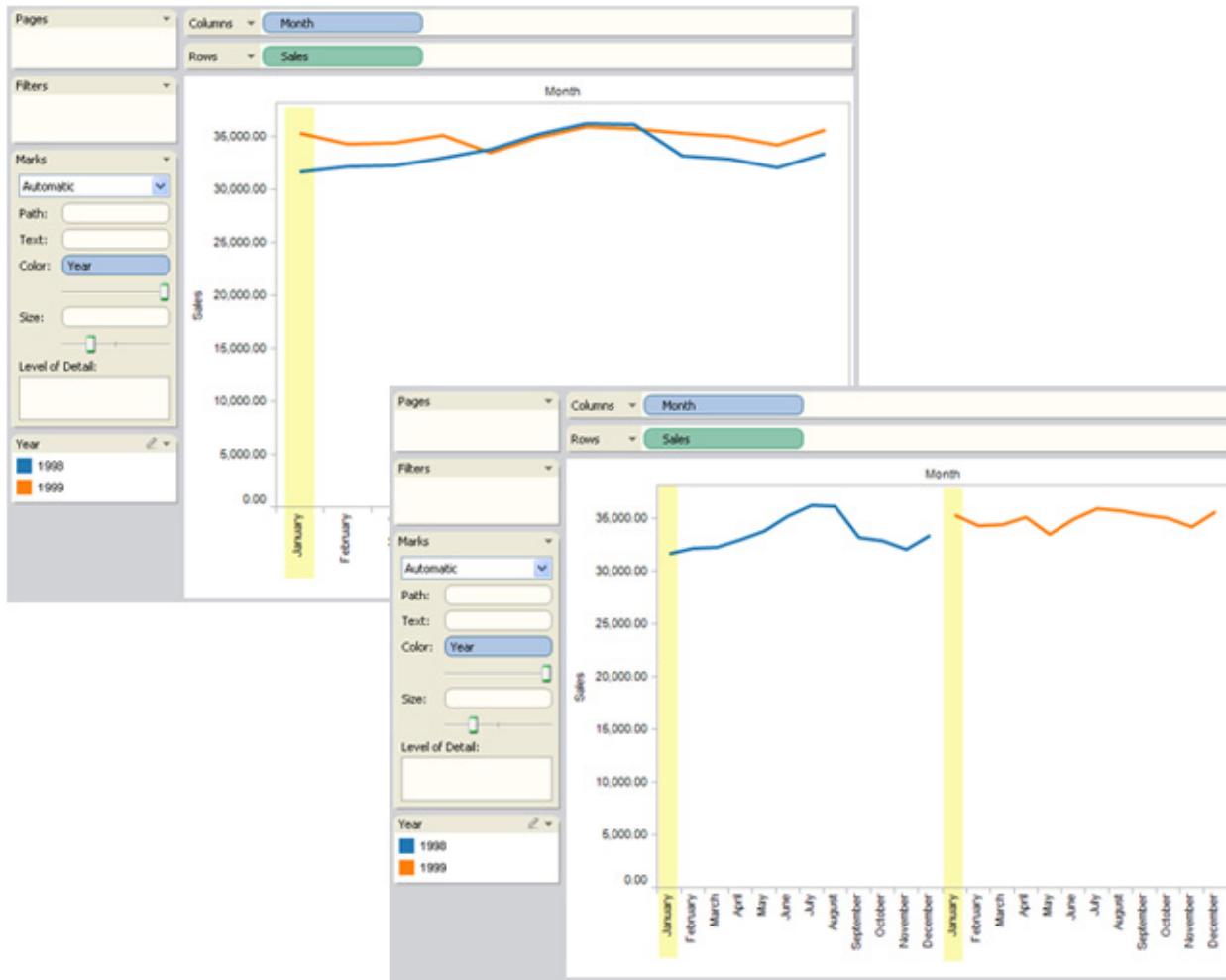


## Defining Unique Values

Sometimes, when you are building views in Tableau, a field will have multiple members with the same name. For example, you may have a view showing the average profit by month over several years. The month January appears multiple times (once for each year).



*While the name, January, is repeated, each instance of January can either be considered similar or unique. If you consider them similar, they will appear in the same column if you decided to move the Year field to the color shelf. However, if you consider them unique, they will be treated as two different values.*



*It is generally okay to consider repeated names within date and time fields (like in the previous example) similar but if there are repeated names in the Customer Name field, you won't want to consider the two customers as the same person.*

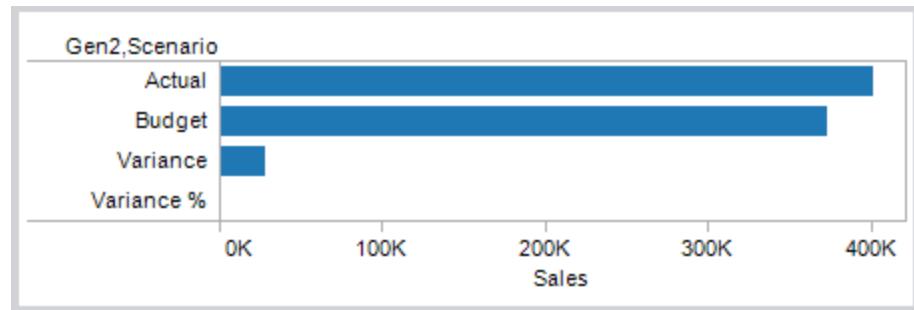
*You can define how you want Tableau to determine whether repeated values are unique by right-clicking on the dimension and selecting one of the following on the Unique Values context menu:*

- *By Key: each member is considered unique based on the key given it by the system administrator when the database is set up. Members with the same name but different keys are treated as unique values.*
- *By Name: each member is considered unique based on the member name. Members with the same name (regardless of their keys) are treated as if they are the same.*

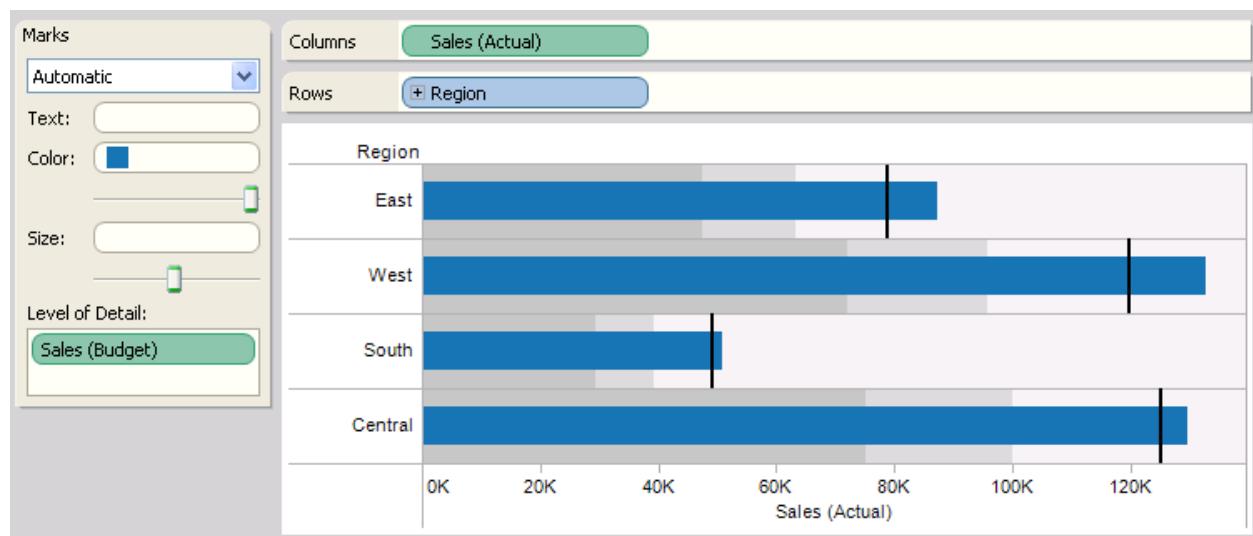
*By default, unique date and time values are determined by name and all other values are determined by key.*

## Utility Dimensions

*Oracle Essbase databases sometimes have special dimensions used to model comparative values such as Actual vs. Budgeted or Current Year vs. Previous Years. These dimensions are the utility dimensions and are often set up as Scenario or Years. For example, the members of a Scenario dimension are shown below.*



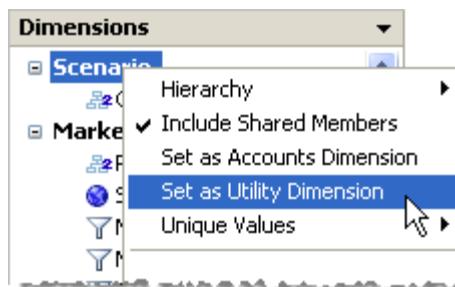
*In the above view, you can see Actual Sales, Budgeted Sales, and so on. However, what if you wanted compare Actual Sales to Budgeted Sales in a bullet graph? In that case you need to set the Scenario dimension to be used as the utility dimension. When you set a dimension as the utility dimension you can then specify which member of the utility dimension to use for each measure in the view. For example, below is a bullet graph showing actual sales to budgeted sales by region.*



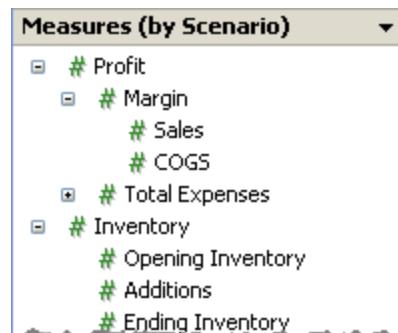
You can see that the Sales measure is used twice in the view: once to show actual and once to show budgeted.

**To use a dimension as the utility dimension:**

1. Right-click the dimension in the Data window and select **Set as Utility Dimension**.

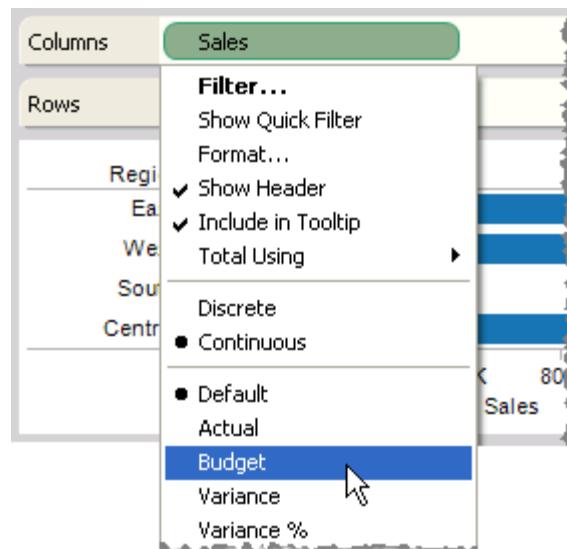


The dimension is hidden in the Data window and can no longer be used as a dimension field in the view. The Measures area of the Data window indicates that there is a utility dimension.



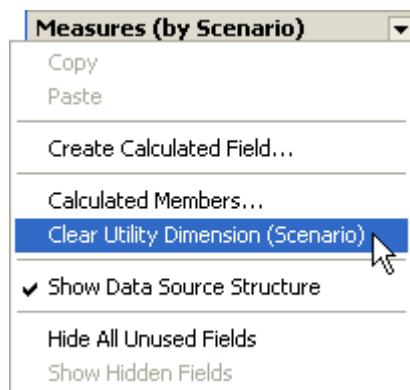
2. Drag a measure to the view.

- o Open the field menu for the measure in the view and select the member of the utility dimension you want to anchor the measure to.



**To remove a utility dimension:**

- Open the drop-down menu next to the *Measures title* in the Data window and select **Clear Utility Dimension**.



When you remove the utility dimension, measures that reference it in the view are no longer valid.

## Drilling Down and Up in a Hierarchy

*One of the most useful ways to navigate hierarchies is to drill down or drill up. For example, if you are examining the sales totals for various years, you can then drill down and view sales for all of the months within each year. Alternatively, if you are examining sales totals for all months, you can then drill up and view the sales for each year.*

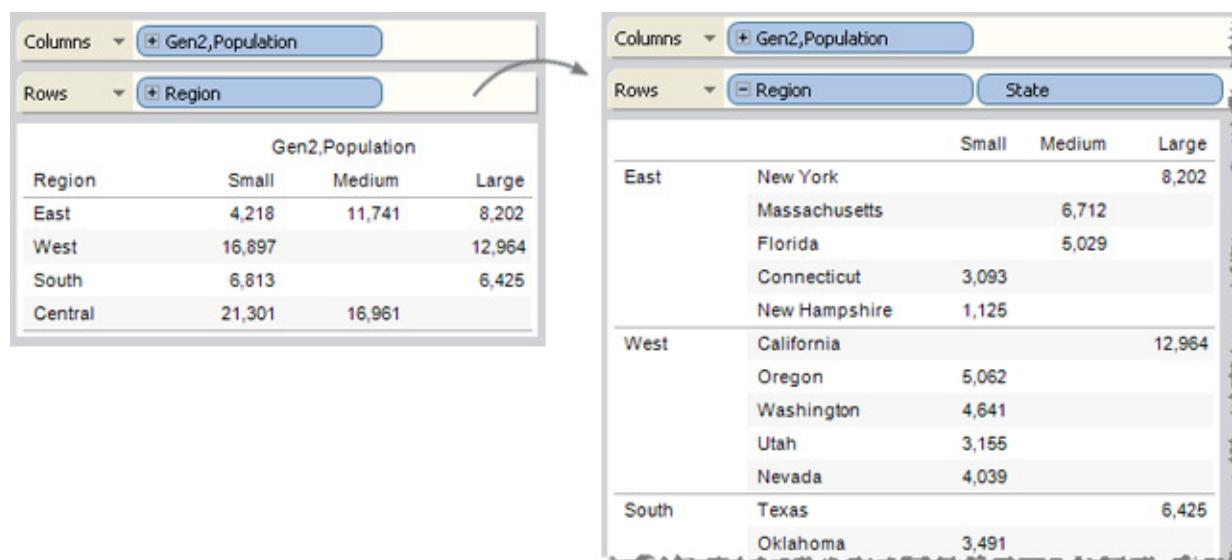
*You can drill down and drill up in Tableau by clicking on fields placed on shelves, or by selecting a hierarchy header in the table. These two methods are described below.*

### Using Fields on Shelves

*You can drill down or drill up by clicking on a dimension that is placed on any shelf. If the dimension is on the Rows or Columns shelf, drilling down shows more data (more headers) in the table, while drilling up shows less data in the table.*

*You can click on the plus/minus control that appears on any hierarchical dimension on any shelf. If a dimension member shows the plus sign +, then its children are not already showing and you can drill down at least one level. If a dimension member shows the minus sign -, then its children are already showing and you can drill up.*

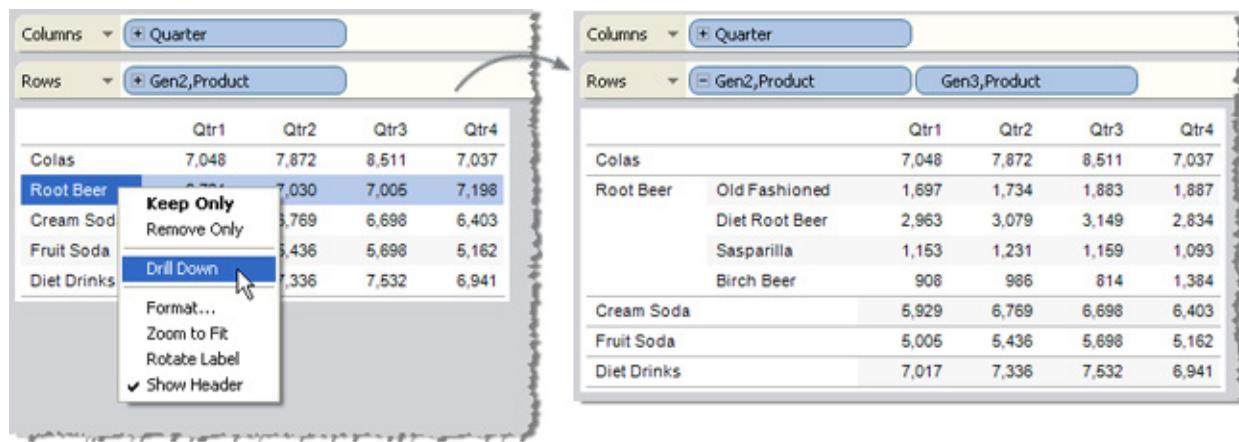
*The following figure demonstrates drilling down one level in the hierarchy for the Region dimension to expose the States.*



## Using Headers

You can drill down and drill up for individual dimension members in a hierarchy by right-clicking a table header and selecting Drill Down or Drill Up from the context menu. This is often referred to as nonuniform drill down because you expose only the members of interest instead of exposing all the members of a given level.

For example, the following figure illustrates drilling down into the Root Beer member of the Gen2,Product dimension. Note that new row headers are displayed in the table and that Gen3,Product, which is the next generation in the hierarchy, is automatically displayed.



One reason to use nonuniform drill down is if your data source has a ragged hierarchy (asymmetric layout). You also might want to view the children for just the member of interest.

### Note:

Drilling down and drilling up results in filtering the data.

## Building Views with Oracle Essbase

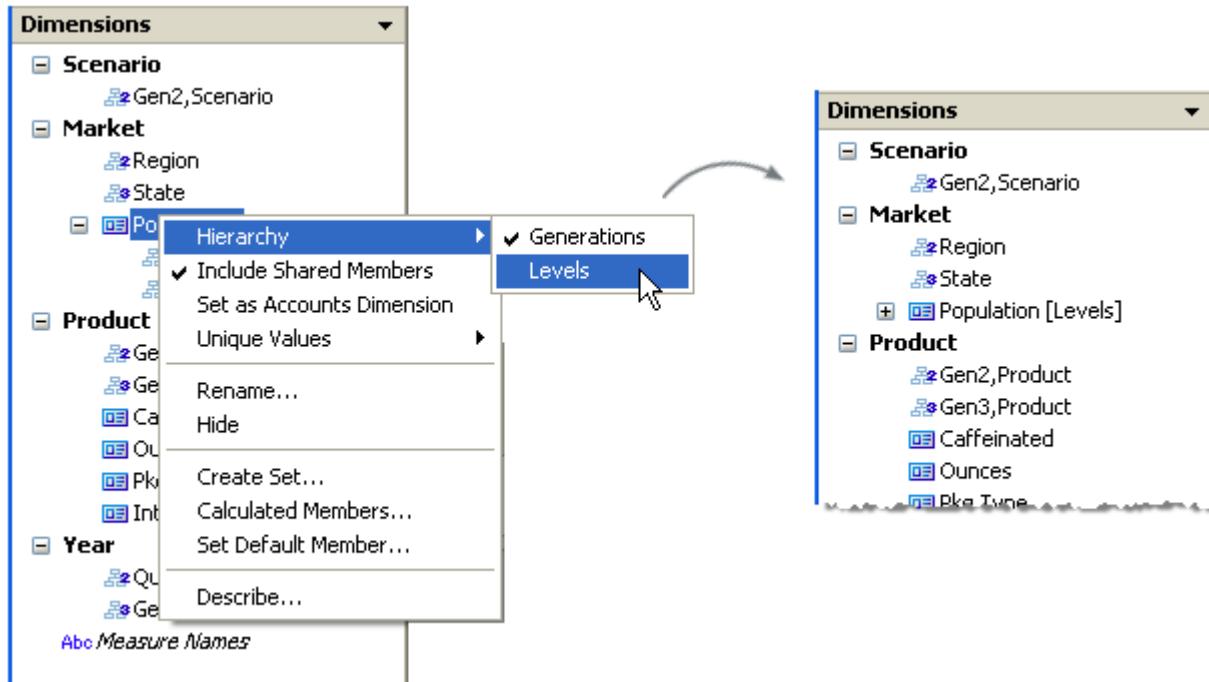
When Tableau is connected to an Oracle Essbase data source, there are three important features that you should know about:

### *Generations and Levels*

In Tableau, you can work with either the generations or the levels of a dimension. The generations of a dimension are all members that are an equal distance from the root of the dimension. The levels are all members that are an equal distance from the leaves of the dimension. For balanced dimensions, you'll typically want to work with generations. However, if your dimension is ragged, then it may make more sense to navigate using levels.

By default, the generations of each dimension are listed in the Data window. When you drag a dimension to a shelf, all generations that are ancestors of the selected generation (all generations that are above it in the hierarchy) are automatically included in the placement.

If you would rather navigate using the levels of a dimension, right-click the name of the dimension and then select Hierarchy > Levels.



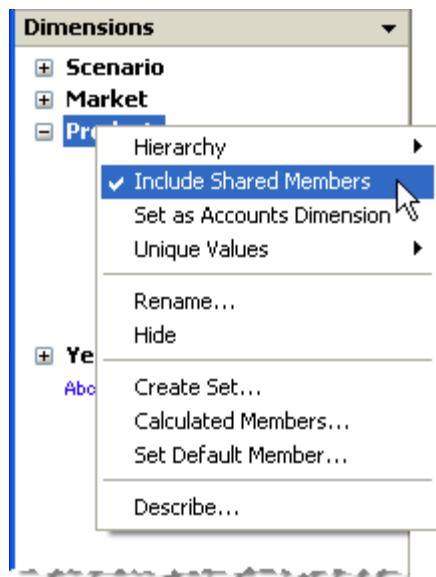
**Note:**

If you are using the same dimension in multiple worksheets, you can use levels in one worksheet and generations in another worksheet simultaneously. Furthermore, you can mix generations and levels from different dimensions in the same worksheet.

### Shared Members

Shared members are dimension members that appear in more than one place in a hierarchy. For example, Diet Coke might be part of the product generation. But it might be shared by both the diet colas branch and the colas branch of the product hierarchy above it. In the database, however, the data about Diet Coke is stored just once.

By default, Tableau includes shared members in all generations (or levels) of a dimension. This means that a shared member might appear multiple times in a table. If you choose to exclude shared members, they will appear only once in a table. By default, shared members are included for all dimensions. Exclude shared members for a given dimension hierarchy by right-clicking the dimension name in the Data window and selecting *Include Shared Members* from the menu.



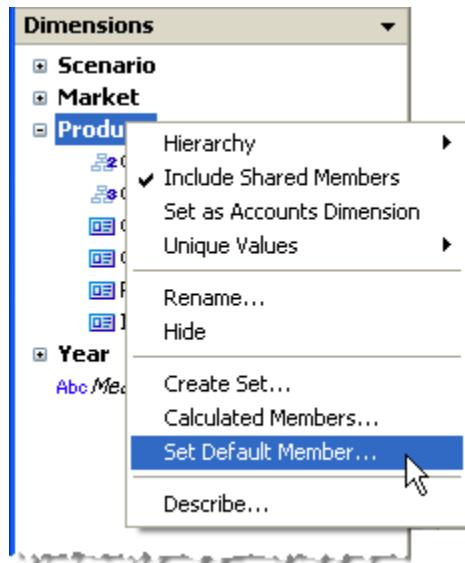
The figure below shows part of a data view where shared members are included (left) and excluded (right). Notice that diet drinks are shared members.

### Setting the Default Member

All multidimensional data sources have default members that are set when the data source is first built. If you find that you are creating filters all the time to look at the same specific data, you may find it useful to change the default member. For example, if you

*are the regional manager for the Western region in a company and you only want to look at your region's numbers, you can set the default member to the Western region.*

*You can change the default member in Tableau by right-clicking a dimension hierarchy and selecting Set Default Member.*



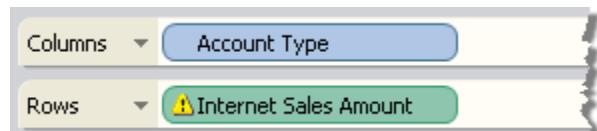
*In the subsequent dialog box, select from the following options:*

- *Default member defined on cube – uses the default member that was defined when the cube was built. This is the default setting in Tableau.*
- *(All) member for the hierarchy – uses the ALL member for the selected hierarchy as the default member.*
- *Selected member – uses the member that you select in the bottom half of the dialog box as the default member.*

*The default member determines how you view the cube and so is much more powerful than applying filters. All fields will be calculated based on the default member you select. In addition, these default member settings are saved with the connection.*

## Building Views with Microsoft Analysis Services

When you build views in Tableau using a Microsoft Analysis Services Cube it is possible to have measures and dimensions that don't make a lot of sense when placed in the view together. For example, you may have a measure for Sales Quota. It won't make sense to place that measure against a dimension containing products if products don't have sales quotas. Tableau helps you figure out the dimensions and measure that can be used together in meaningful ways by highlighting unrelated dimensions and measures in gray. So in the last example, when we place Sales Quota onto a shelf, the products dimensions are highlighted in gray. Highlighted dimensions are not disabled and can still be added to the view. When you add an incompatible measure to the view, the measure is marked with a caution symbol.

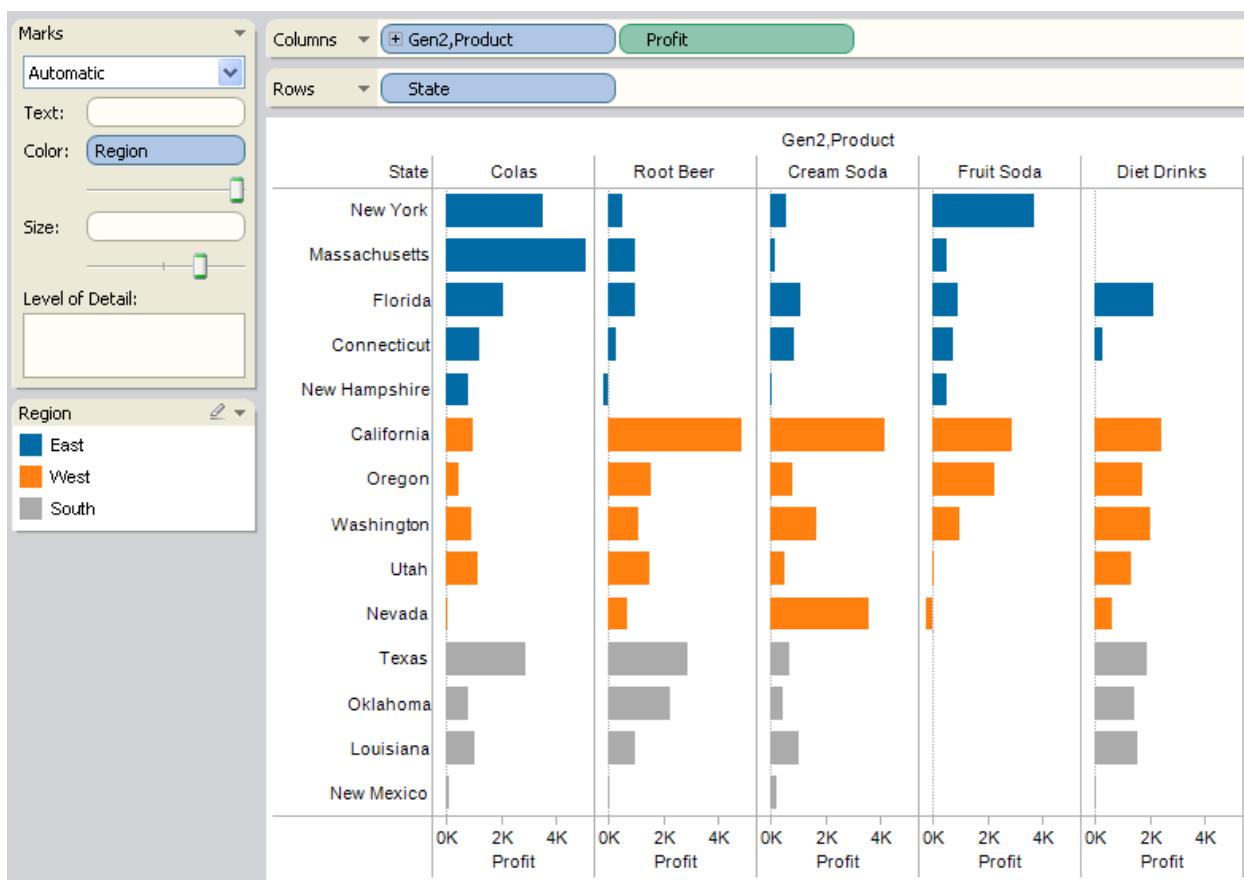


## Perfect Pivoting

In Tableau, perfect pivoting refers to working with hierarchies in these ways:

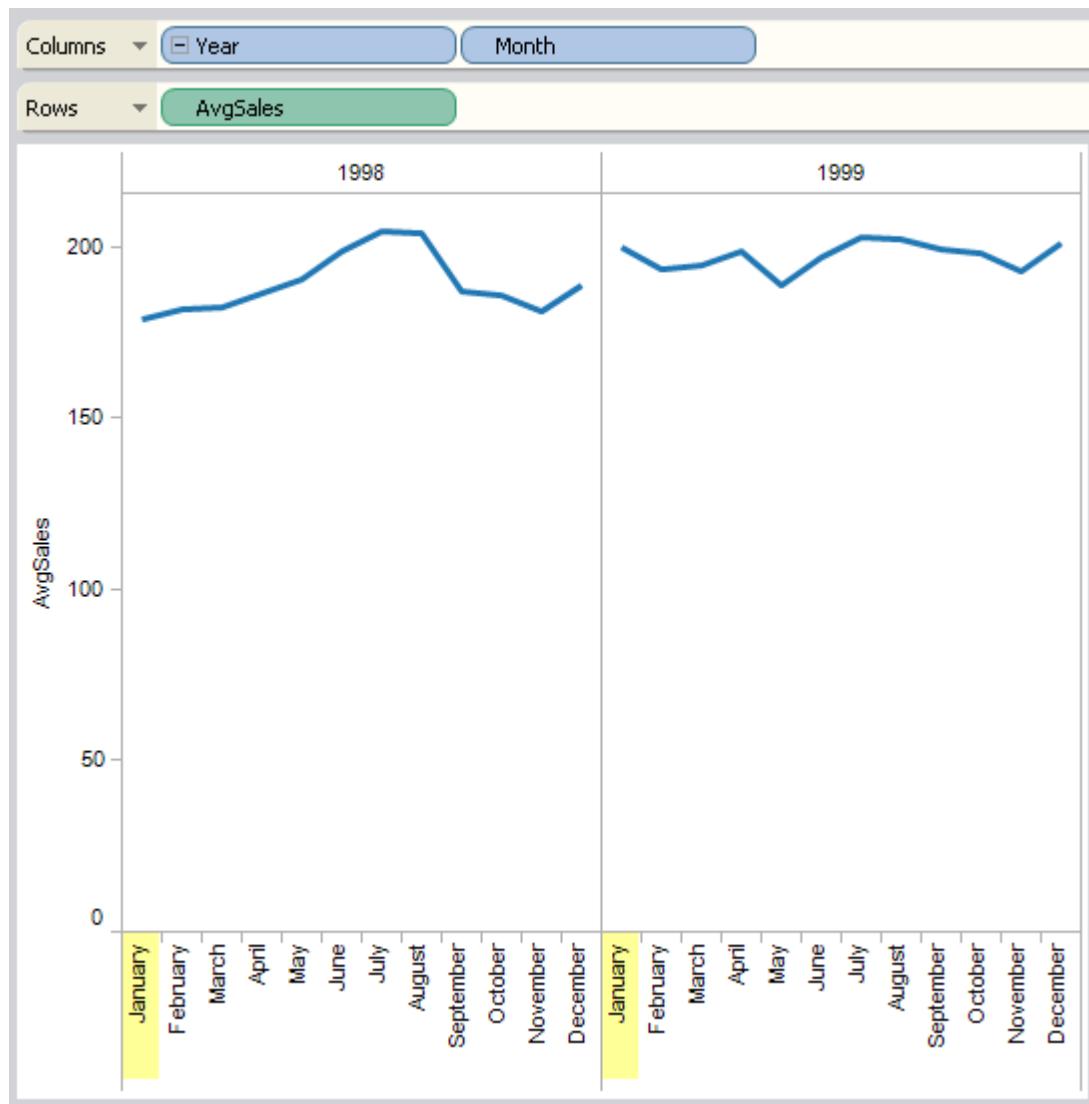
- Using varying levels of detail including skipping levels (for example, Country and City, but not State).
- Using varying levels of detail on different worksheet shelves simultaneously (for example, Product Family on the Columns shelf and Product Department on the Color shelf).
- Using varying levels of detail out of order (for example, Quarter before Year).

For example, in the following view the Market hierarchy is broken up to show the State level as Rows and the Region level as Color.

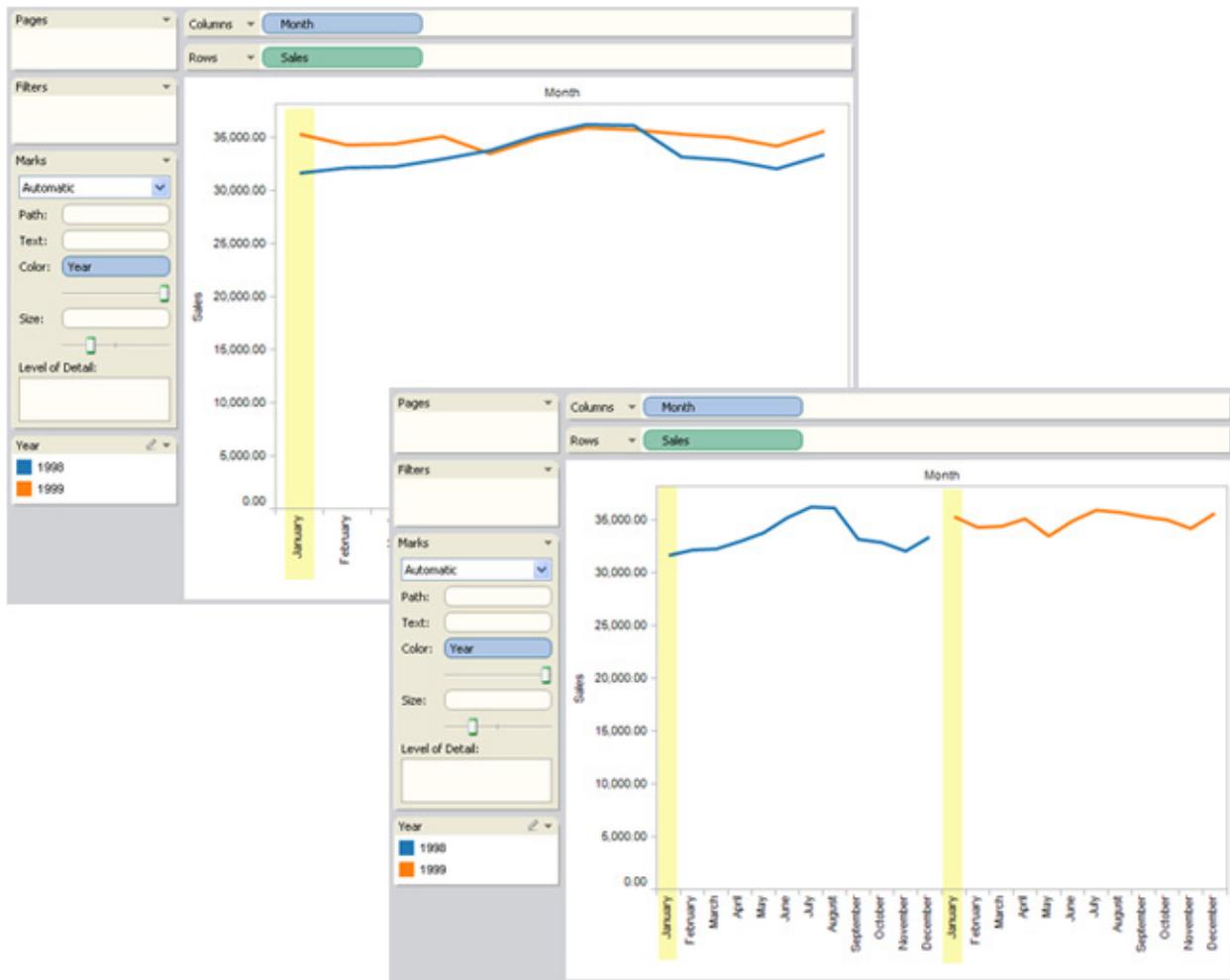


## Defining Unique Values

Sometimes, when you are building views in Tableau, a field will have multiple members with the same name. For example, you may have a view showing the average profit by month over several years. The month January appears multiple times (once for each year).



While the name, January, is repeated, each instance of January can either be considered similar or unique. If you consider them similar, they will appear in the same column if you decided to move the Year field to the color shelf. However, if you consider them unique, they will be treated as two different values.



*It is generally okay to consider repeated names within date and time fields (like in the previous example) similar but if there are repeated names in the Customer Name field, you won't want to consider the two customers as the same person.*

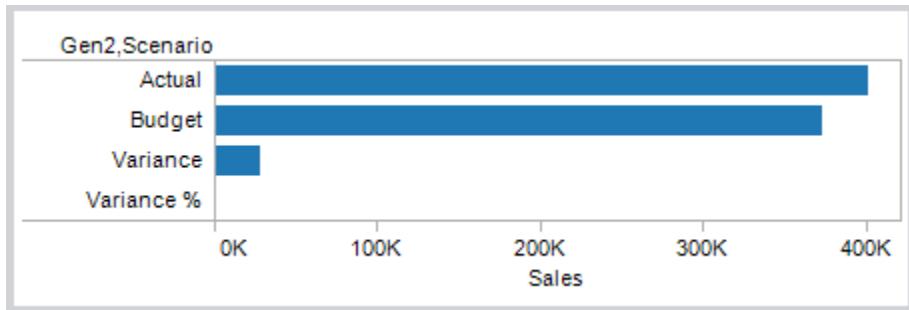
*You can define how you want Tableau to determine whether repeated values are unique by right-clicking on the dimension and selecting one of the following on the Unique Values context menu:*

- *By Key: each member is considered unique based on the key given it by the system administrator when the database is set up. Members with the same name but different keys are treated as unique values.*
- *By Name: each member is considered unique based on the member name. Members with the same name (regardless of their keys) are treated as if they are the same.*

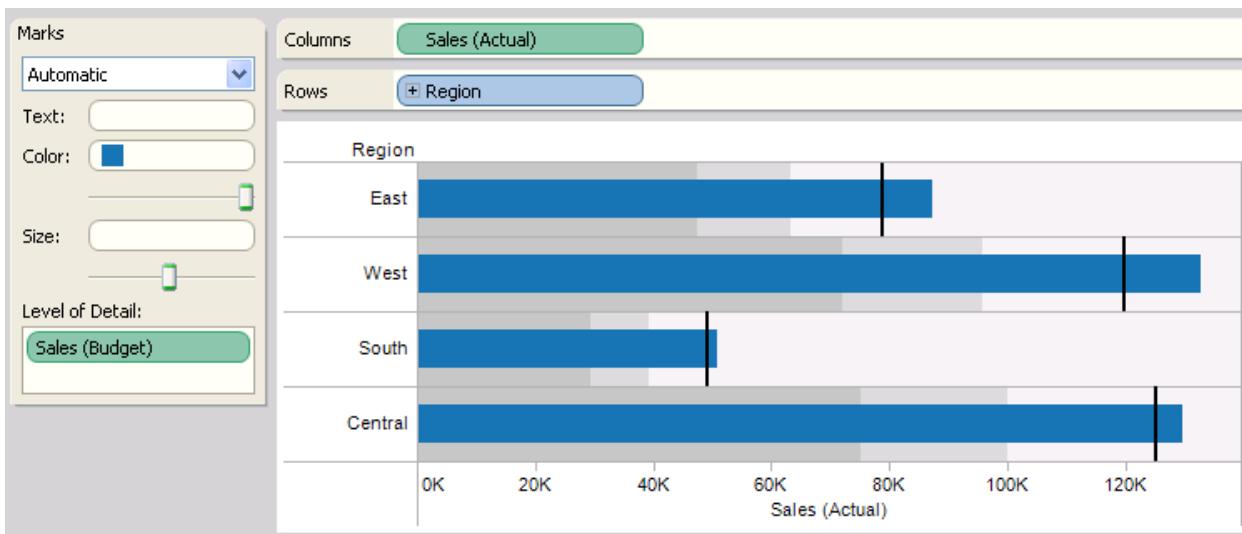
*By default, unique date and time values are determined by name and all other values are determined by key.*

## Utility Dimensions

Oracle Essbase databases sometimes have special dimensions used to model comparative values such as Actual vs. Budgeted or Current Year vs. Previous Years. These dimensions are the utility dimensions and are often set up as Scenario or Years. For example, the members of a Scenario dimension are shown below.



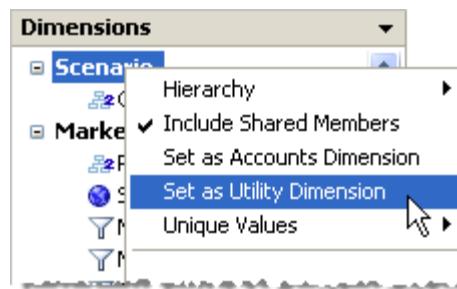
In the above view, you can see Actual Sales, Budgeted Sales, and so on. However, what if you wanted compare Actual Sales to Budgeted Sales in a bullet graph? In that case you need to set the Scenario dimension to be used as the utility dimension. When you set a dimension as the utility dimension you can then specify which member of the utility dimension to use for each measure in the view. For example, below is a bullet graph showing actual sales to budgeted sales by region.



You can see that the Sales measure is used twice in the view: once to show actual and once to show budgeted.

**To use a dimension as the utility dimension:**

1. Right-click the dimension in the Data window and select **Set as Utility Dimension**.

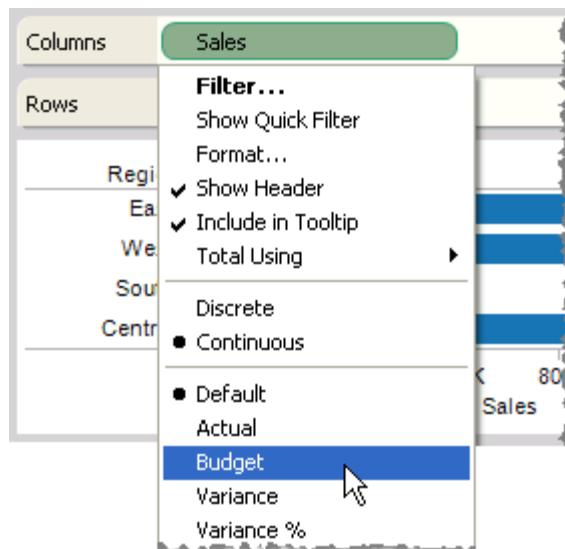


The dimension is hidden in the Data window and can no longer be used as a dimension field in the view. The Measures area of the Data window indicates that there is a utility dimension.



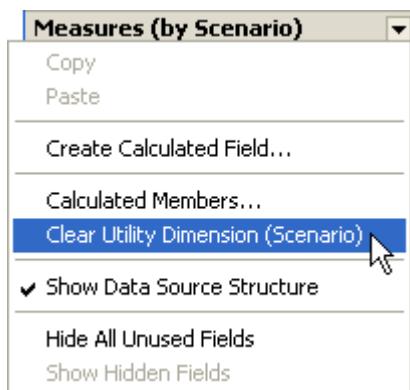
2. Drag a measure to the view.

- o Open the field menu for the measure in the view and select the member of the utility dimension you want to anchor the measure to.



**To remove a utility dimension:**

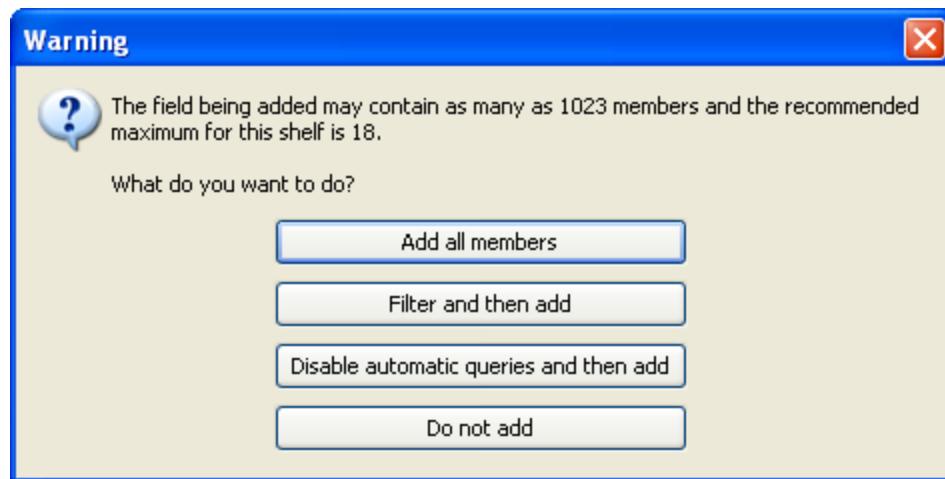
- Open the drop-down menu next to the *Measures title* in the Data window and select **Clear Utility Dimension**.



When you remove the utility dimension, measures that reference it in the view are no longer valid.

## Working with Large Views

*Placing dimensions with a large number of dimensions on a shelf may take a long time and generally won't be very useful when they are added. Tableau will present you with the following dialog box with the options to make it more manageable.*



*If you are building a data view that involves a large amount of data, it is generally more efficient to follow this procedure:*

1. Turn off automatic updates by clicking the Pause Automatic Updates button 
2. Place all desired fields on shelves.
3. Specify filters to restrict the data to the members of interest.
4. Turn on automatic updates by clicking the Resume Automatic Updates button on the toolbar.

*At any time a query is taking too long, you can cancel the query by clicking Cancel in the progress dialog box.*

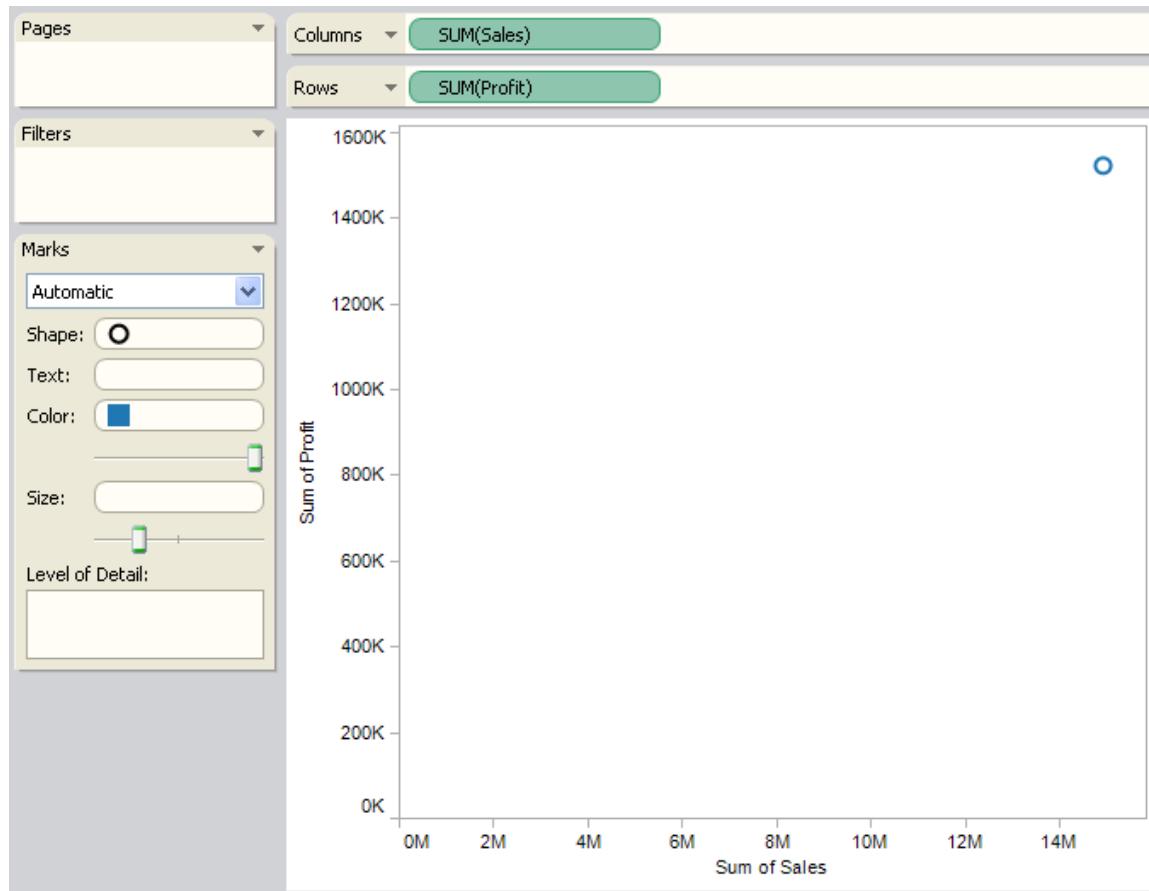
## Example - Building Data Views Manually

In this example, you will use the Sample - Superstore Sales (Excel) data source to create a view that contains two aggregated measures displayed as a scatter plot. The data are color-encoded and shape-encoded, and an additional level of detail is included. The data are also filtered.

To create the view, do the following:

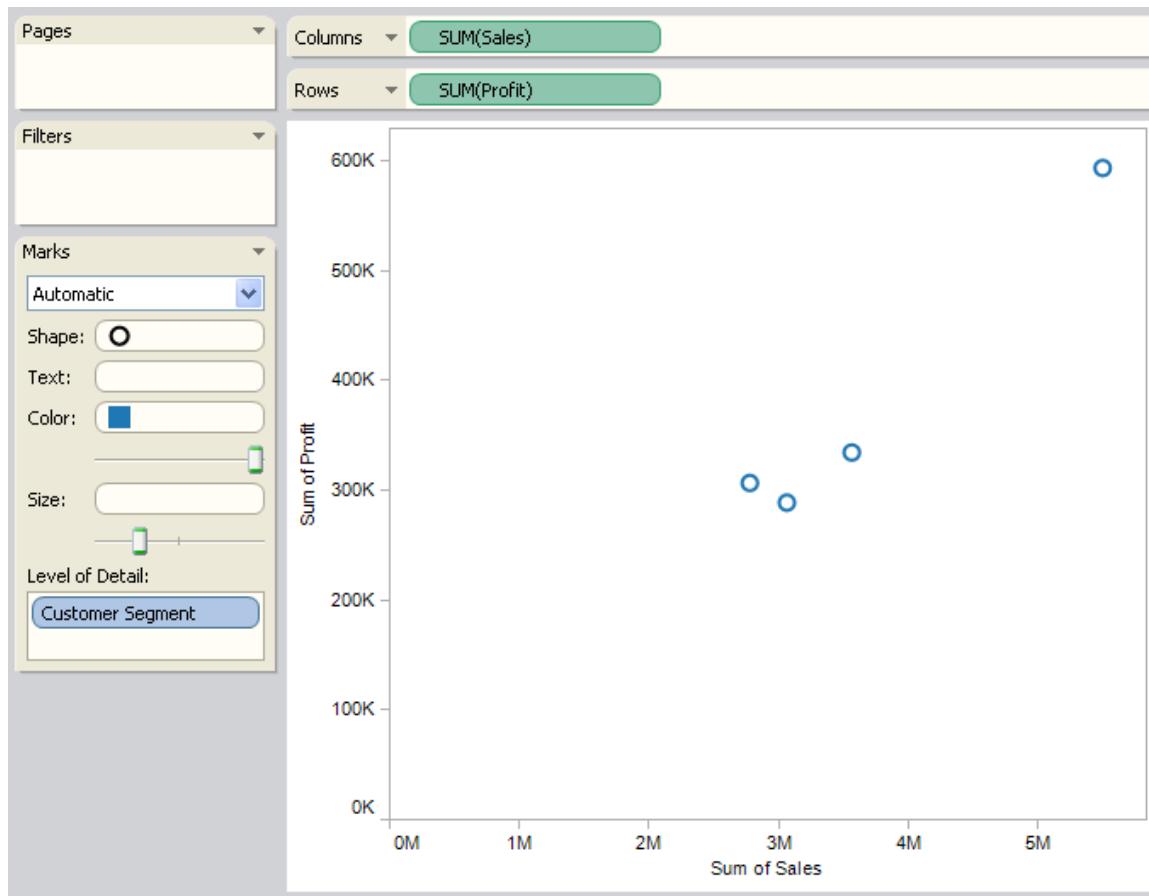
1. Place the Sales measure on the Columns shelf and the Profit measure on the Rows shelf.

The measures are automatically aggregated and result in one data point. The data point is displayed using the shape mark type. Note that you are not displaying any levels of detail because dimension members are not included in the view.



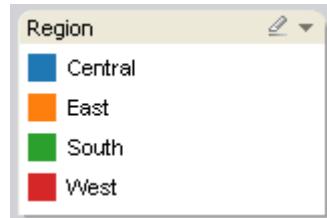
2. Place the Customer Segment dimension on the Level of Detail shelf.

The original mark is now separated into four marks, where each new mark is associated with a member (level of detail) of the Customer Segment dimension.



3. Place the Region dimension on the Color shelf.

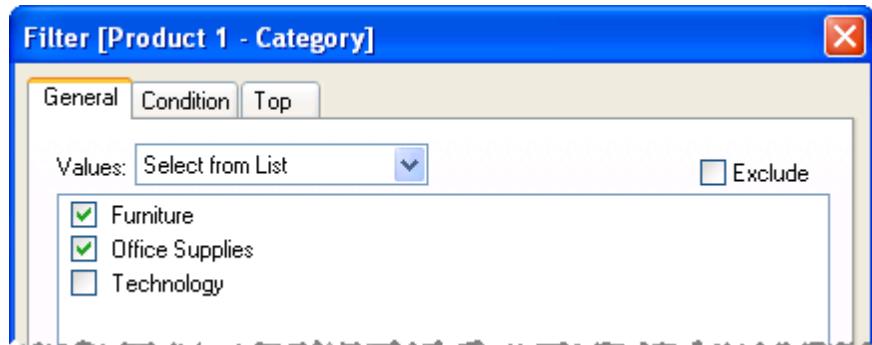
Each of the four marks are now separated into four new marks for a total of sixteen. Each new mark is associated with a member of the Region dimension, and is encoded with a unique color. The color legend displays each member name and its associated color.



4. Place the Product 1 -Category dimension on the Shape shelf and filter the dimension to exclude Technology products.

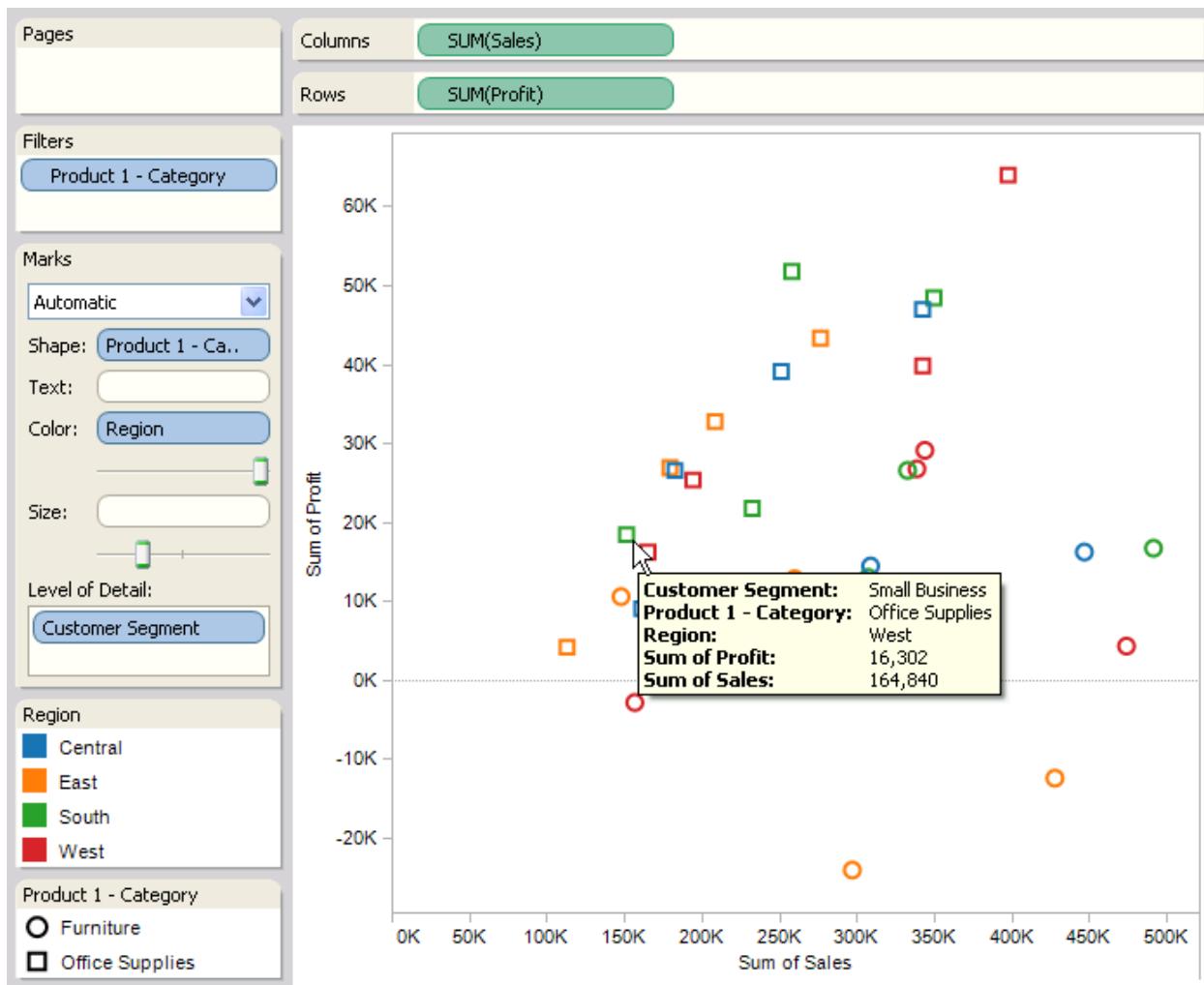
*Each of the twelve marks are now separated into three new marks for a total of 48. Each new mark is associated with a member of the Product 1 - Category dimension, and is encoded with a unique shape. The shape legend displays each member name and its associated shape.*

*To filter the data, select Filter on the Product 1 - Category context menu. The Filter dialog box opens. Deselect Technology to exclude it from the view.*



*The final view is shown below.*

## Tableau Desktop Help



## Building Views Automatically

### Building Views Automatically

*Tableau contains a suite of tools designed to help you quickly create useful views. Two situations in which you would want to create views automatically are when you want:*

- *Better Insight – People often have difficulty mapping data to views that address their analytical or presentation needs. Tableau contains built-in rules that are used to examine data and suggest ways of looking at it. In this way the software acts as a tour guide for producing useful views of data.*
- *Time Savings – Building data views manually can sometimes be time consuming. Using Tableau’s automatic features can help you work faster by giving you a starting view that you can further refine manually.*

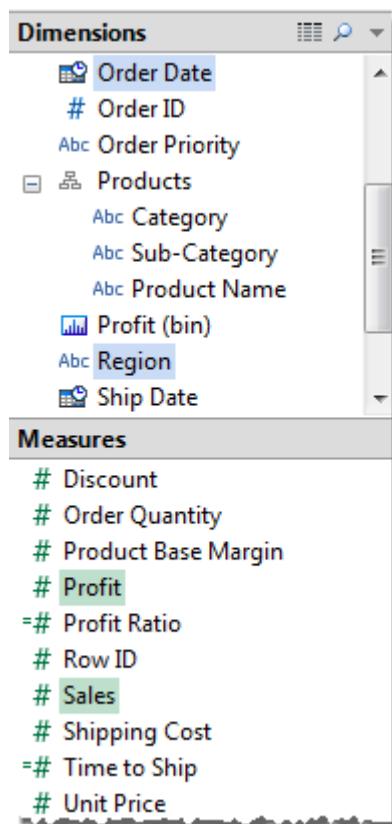
*Automatically generate views using ShowMe! or Double-Click.*

- [Show Me!](#)
- [Add to Sheet: Double-Click](#)

## Show Me!

*Show Me! creates a view based on the fields already used in the view and any fields you've selected in the Data window. Open Show Me! by clicking Show Me! on the toolbar  . When you use Show Me! simply select fields you want to analyze in the Data window and then select the type of view you want to create. Tableau automatically evaluates the selected fields and gives you the option of several types of views that would be appropriate for those fields.*

1. *Select fields in the Data window that you want to analyze. Use the Ctrl key to make multiple selections.*



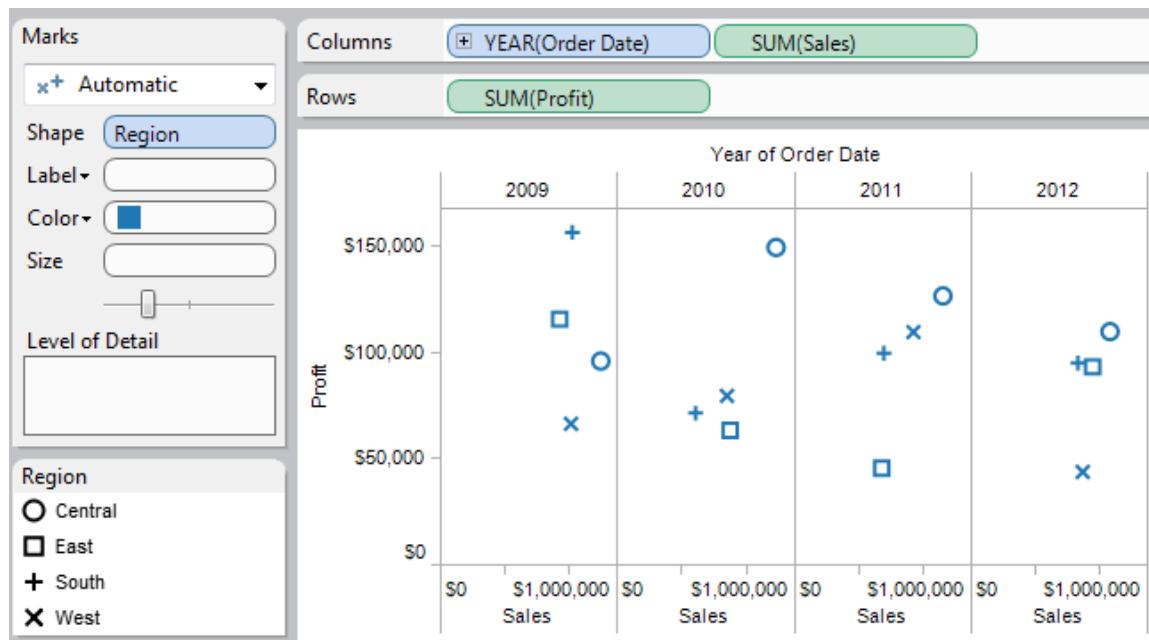
2. *Select the type of view you want to create in Show Me! panel.*



*Any view type that is not grey will generate a view of your data. As you hover over each view type, the description at the bottom shows the minimum requirements.*

3. View the Result. Tableau automatically creates a view of the data.

## Tableau Desktop Help

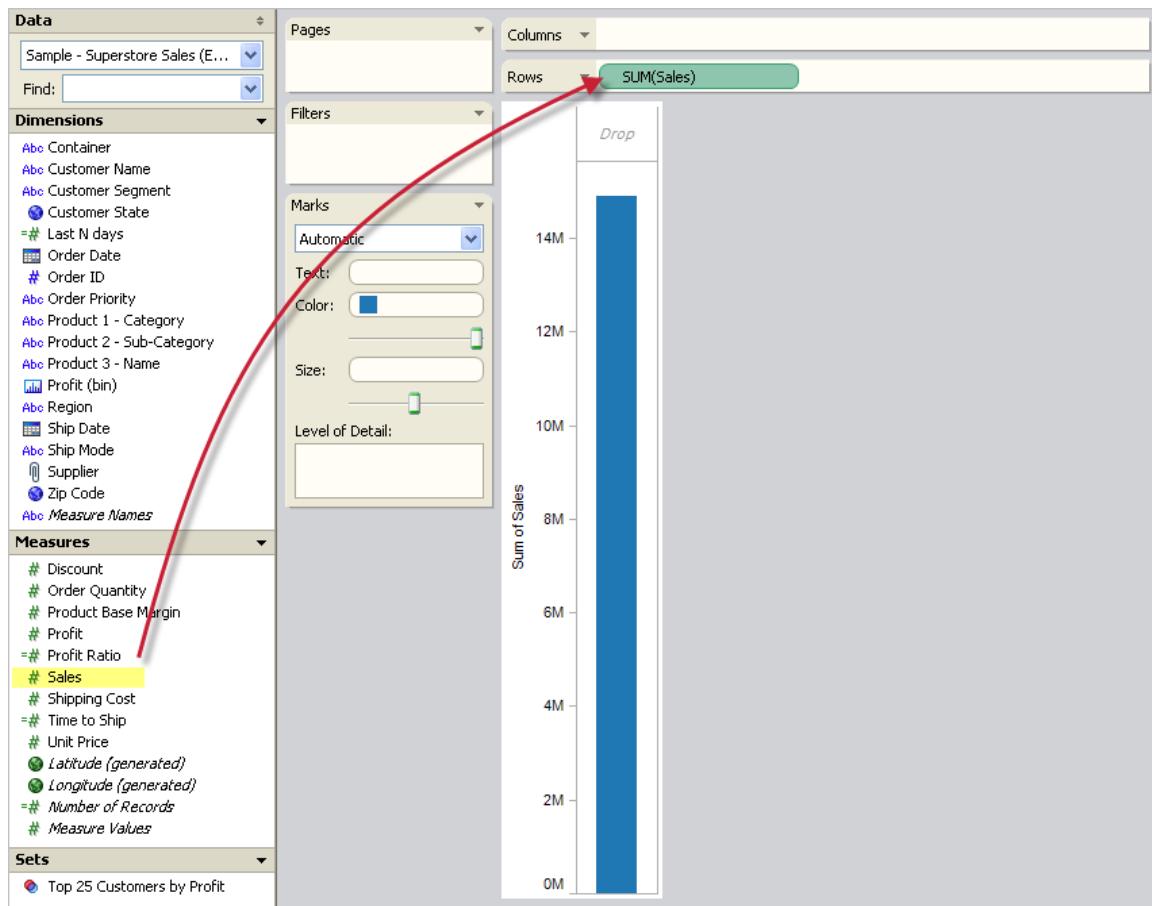


## Add to Sheet: Double-Click

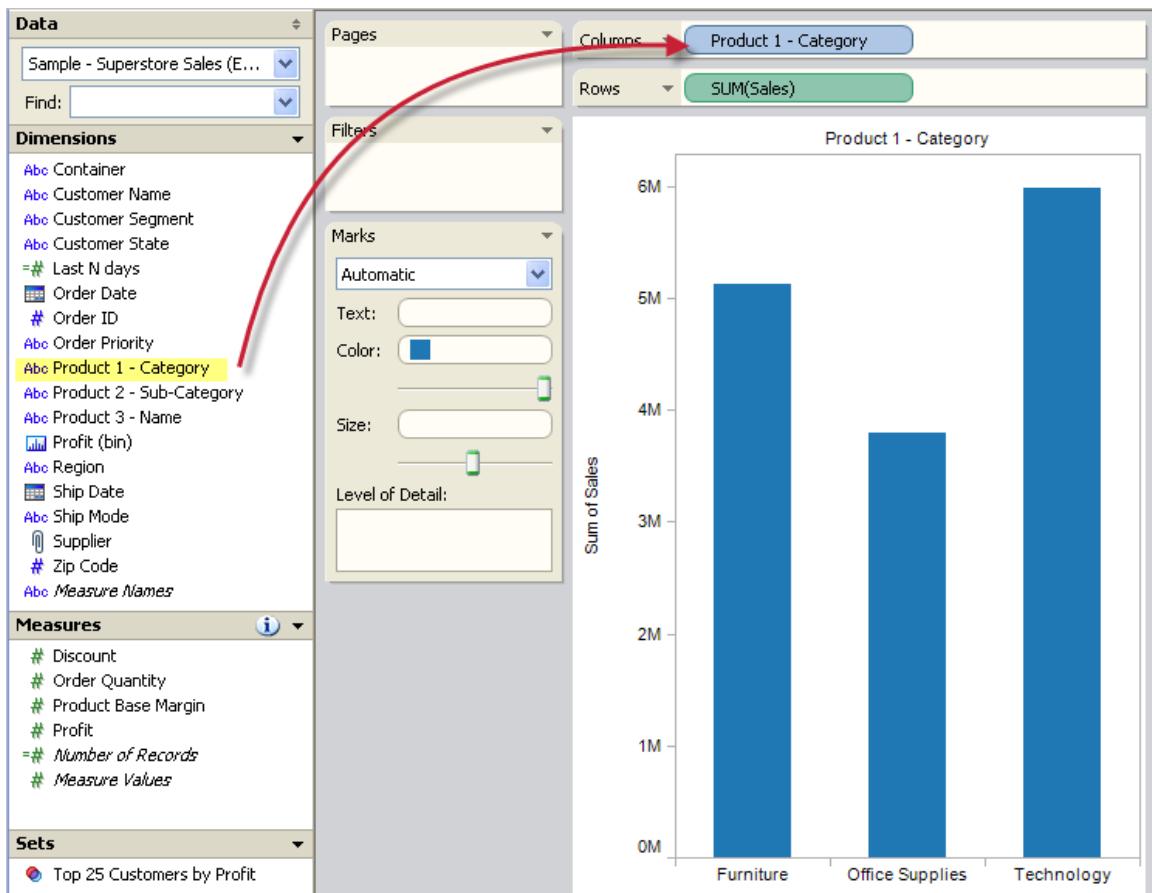
Tableau supports an additional method for automatically generating views of data called Automatic Double-Click. To use this method, double-click fields in the Data window you are interested in. Tableau automatically adds each field to the view. That is, each double-click results in an additional field added to a shelf in an intelligent way. Like Show Me!, this function leverages Tableau's ability to make an intelligent "best guess" of how the data should be displayed.

**Here's how it works:**

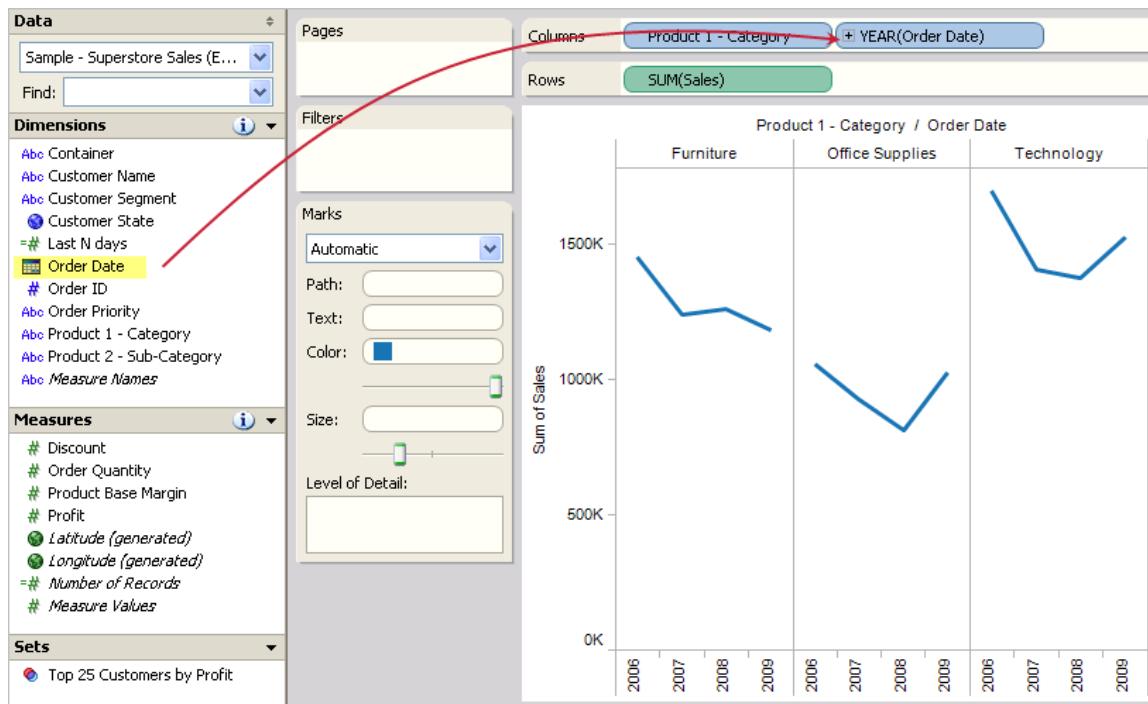
1. Double-clicking the Sales measure in the Data window automatically adds that field to the view in an intelligent way.



2. Double-clicking the Product 1 - Category dimension in the Data window automatically adds that field to the view in an intelligent fashion.



- Double-clicking the Order Date dimension in the Data window automatically adds that field to the view in an intelligent way. As you double-click fields they are successively added to the view. The order in which you click fields determines the type of view created.



*The following table describes some of the rules used in creating automatic views via the Double Click method.*

Text Table	Adding a dimension first produces a text table (or cross-tab). All subsequent clicks on fields result in refinement of the text table.
Bars	Adding a measure first and then a dimension produces a bar view. All subsequent clicks result in refinement of the bar view, unless a date dimension is added, at which time the view is changed to a line.
Line	Adding a measure and then a date dimension produces a line view. All subsequent clicks result in refinement of the line view.
Continuous Line	Adding a continuous dimension and then a measure produces a continuous line view. Subsequent dimensions result in refinement of the continuous line view. Subsequent measures add quantitative axes to the view.
Scatter	Adding a measure and then another measure produces a scatter view. Subsequent dimensions result in refinement to the scatter view. Subsequent measures will create a scatter matrix.
Maps	Adding a geographic field produces a map view with latitude and longitude as axes and the geographic field on the Level of Detail shelf. Subsequent dimensions add rows to the view while subsequent measures further refine the map by adding size and color encoding.

## Using Multiple Measures

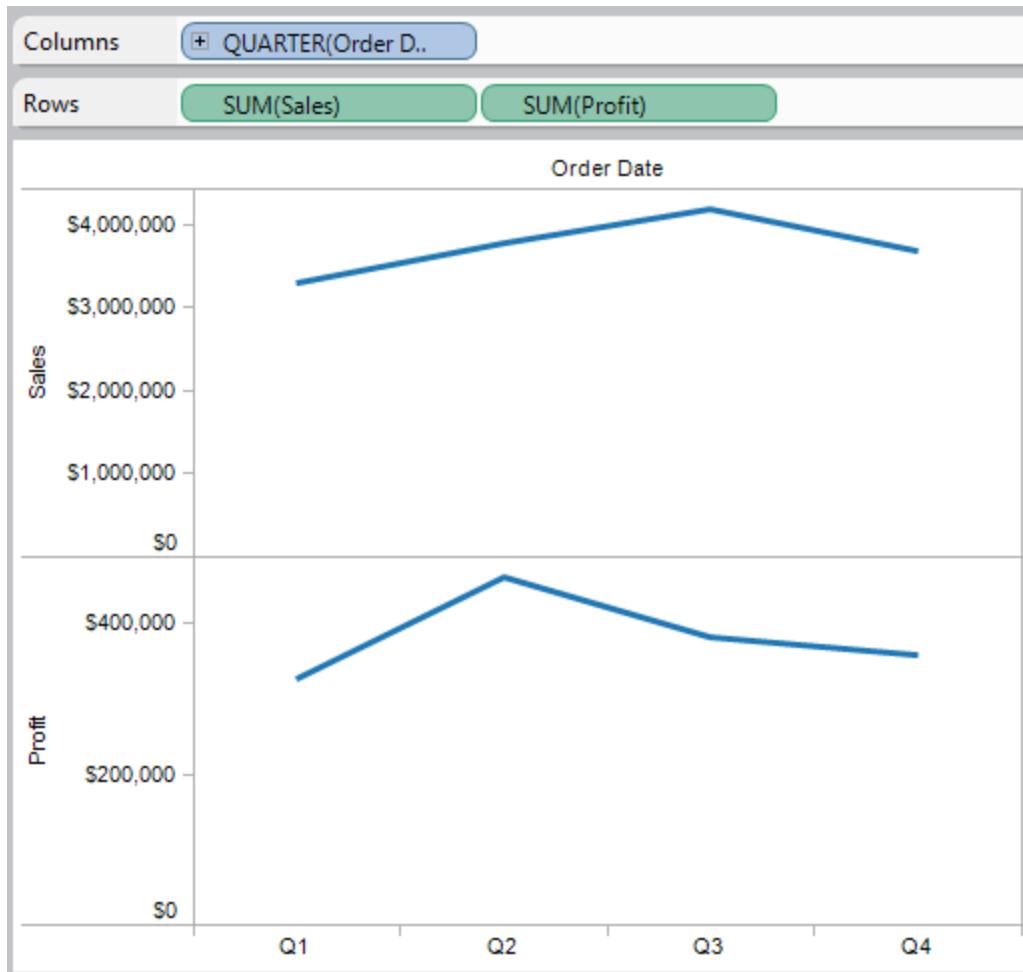
### Using Multiple Measures

*There are lots of different ways to compare multiple measures in a single view. For example, you can create individual axes for each measure or you can blend the two measures to share an axis and finally, you can add dual axes where there are two independent axes layered in the same pane. In any of these cases you can customize the marks for each axis to use multiple mark types and add different levels of detail. Views that have customized marks are called combination charts.*

- [Individual Axes](#)
- [Blended Axes](#)
- [Dual Axes](#)
- [Combination Charts](#)

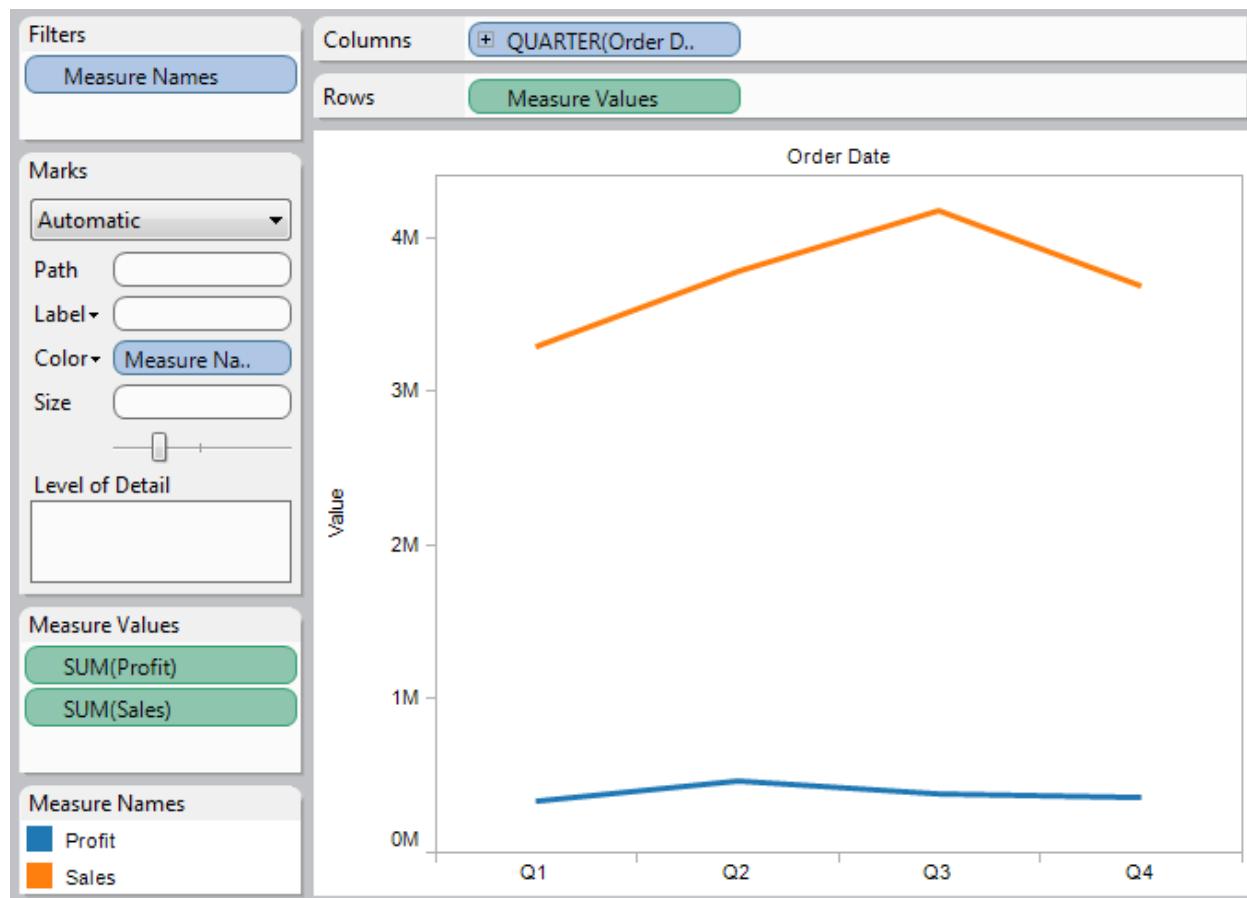
## Individual Axes

Add individual axes for each measure by dragging measures to the Rows and Columns shelves. Each measure on the Rows shelf adds an additional axis to the rows of the table. Each measure on the Columns shelf adds an additional axis to the columns of the table. For example, the view below shows quarterly sales and profit. The Sales and Profit axes are individual rows in the table and have independent scales.

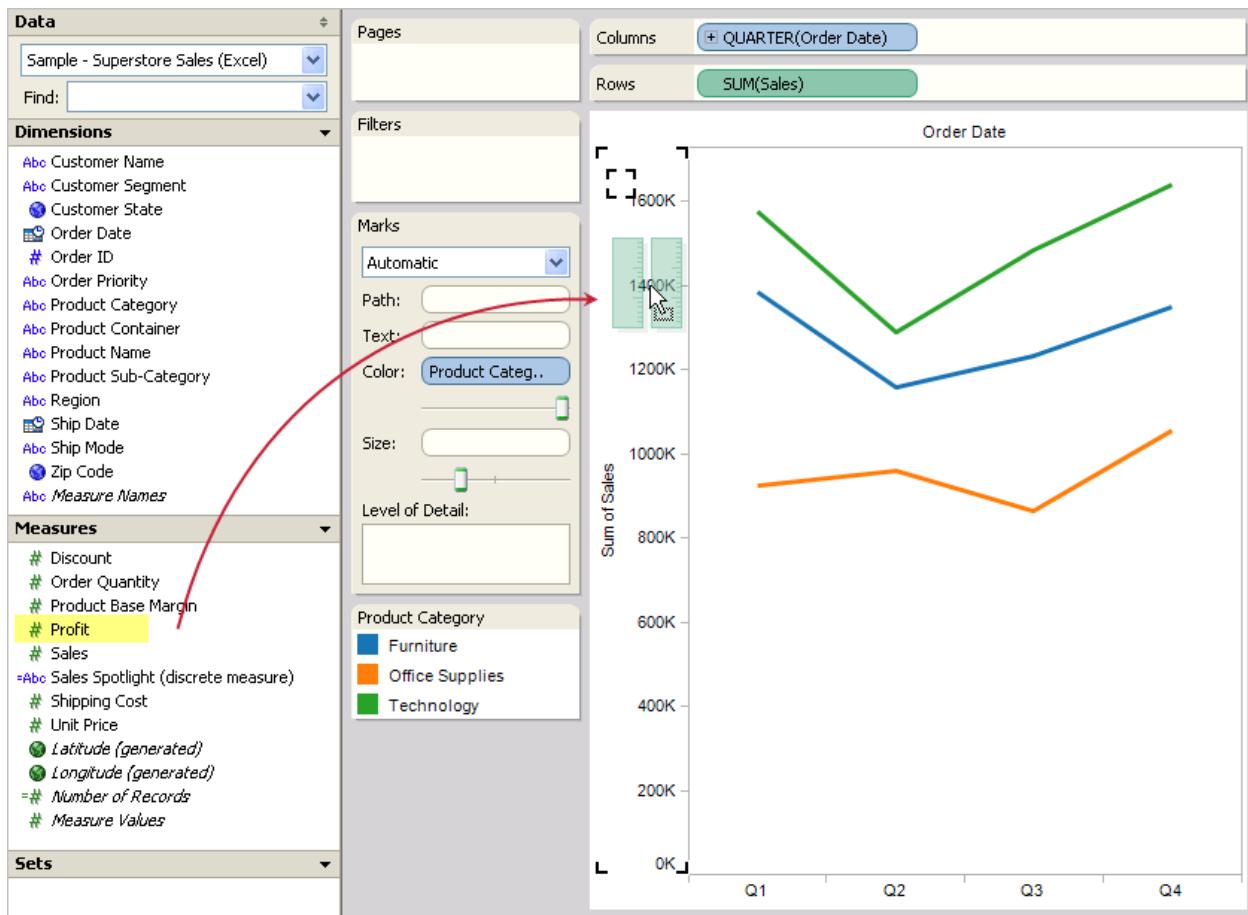


## Blended Axes

Measures can share a single axis so that all the marks are shown in a single pane. Instead of adding rows and columns to the view, when you blend measures there is a single row or column and all of the values for each measure is shown along one continuous axis. For example, the view below shows quarterly sales and profit on a shared axis.



To blend multiple measures, simply drag one measure or axis and drop it onto an existing axis.



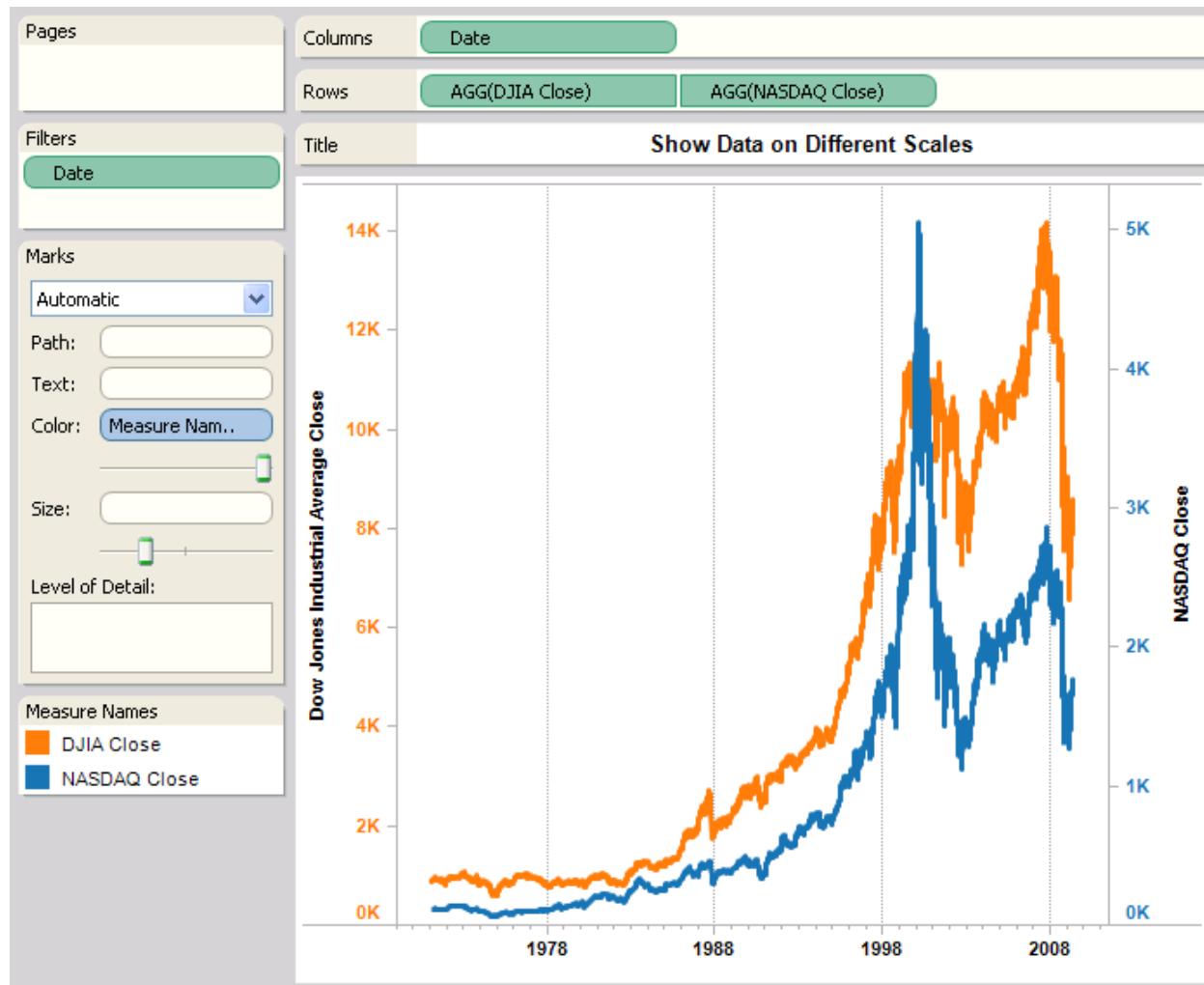
Blending measures uses the Measure Names and Measure Values fields, which are generated fields that contain all of the measure names in your data source and all of the measure values. The shared axis is created using the Measure Values field. The Measure Names field is added to the Color shelf so that a line is drawn for each measure. Finally, the Measure Names field is filtered to only include the measures you want to blend.

#### Note:

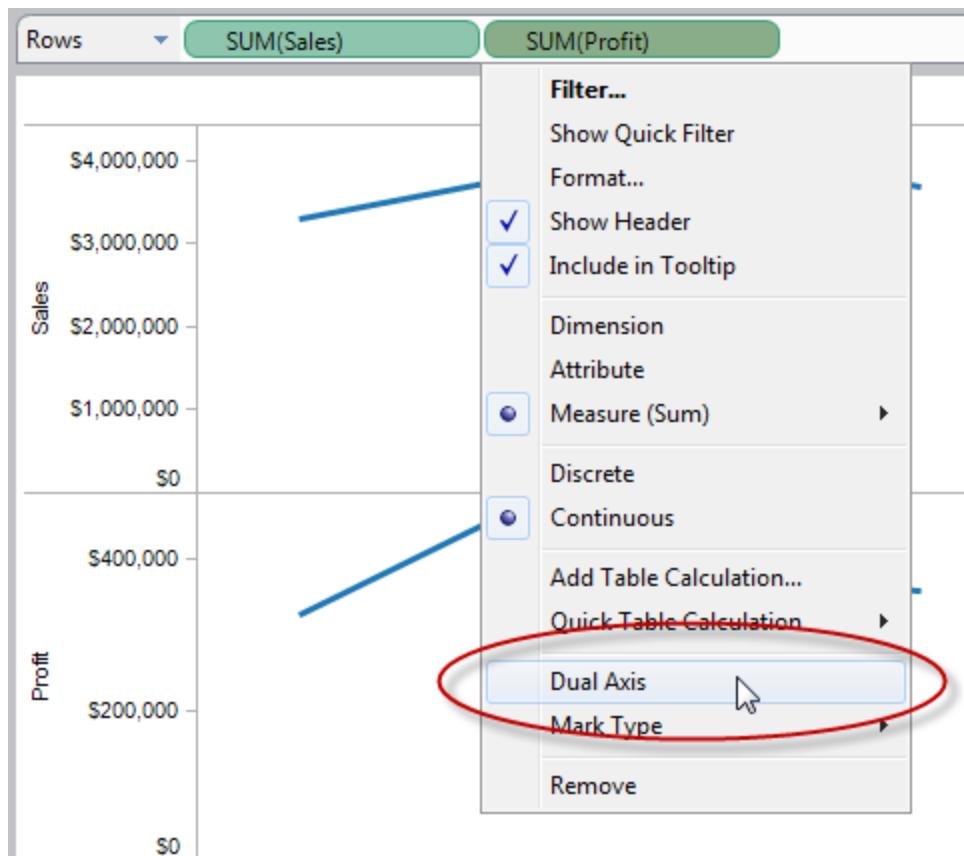
Blending axes is most appropriate when comparing measures that have a similar scale and units. If the scales of the two measures are drastically different, the trends may be distorted.

## Dual Axes

You can compare multiple measures using dual axes, which are two independent axes that are layered on top of each other. Dual axes are useful when you have two measures that have different scales. For example, the view below shows Dow Jones and NASDAQ close values over time. The two axes are independent scales but the marks are layered in the same pane.



To add the measure as dual axis drag the field to the right side of the view and drop it when you see a black dashed line. You can also select Dual Axis on the field menu for the measure.



You can add up to four layered axes: two on the Columns shelf and two on the Rows shelf.

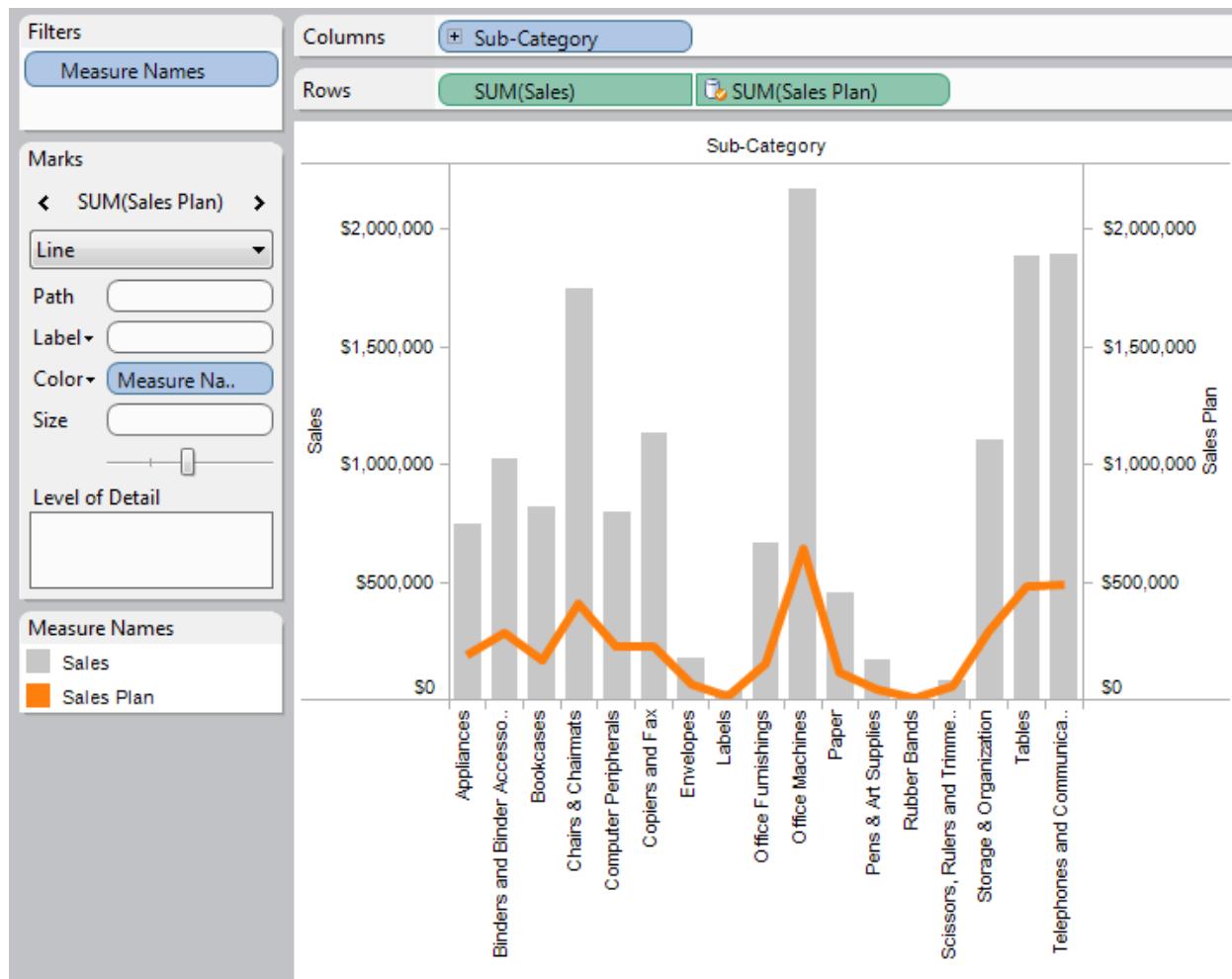
**Note:**

When you are using dual axes you should make sure that the two axes scales align with each other so you can make a correct comparison. You can easily line the two axes up by right-clicking the secondary axis and selecting Synchronize Axis.

## Combination Charts

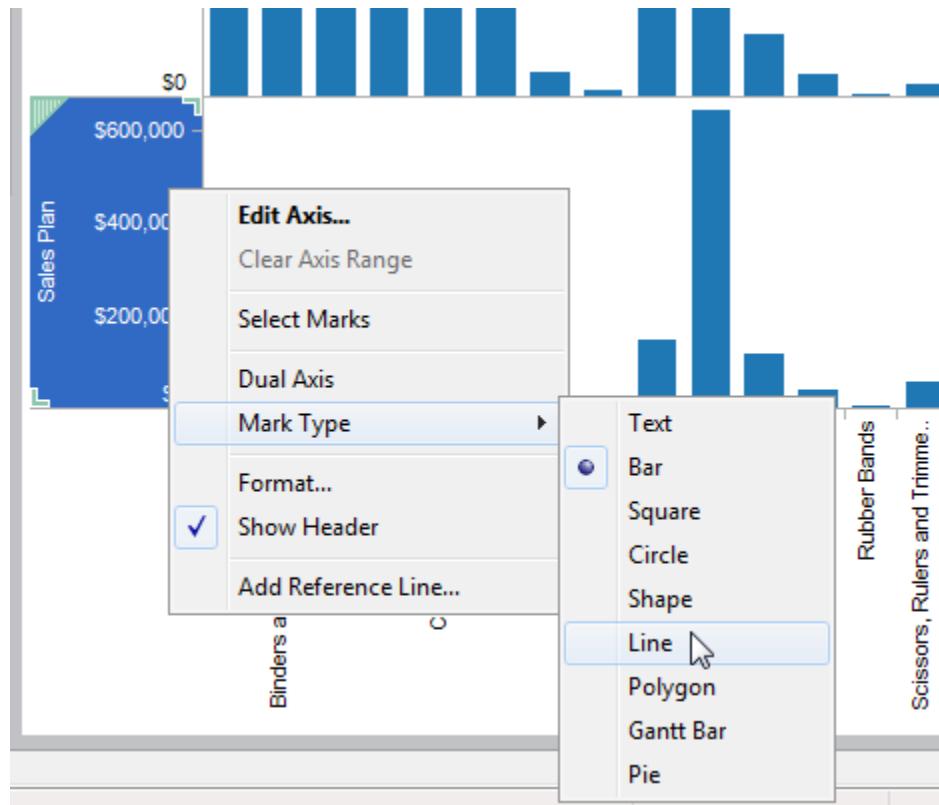
When working with multiple measures in a view, you can customize the mark type for each distinct measure. For example, you can create a view with a line showing a target amount across several months and a bar chart showing the actual attainment for the months. These measures can be displayed as individual axes, blended axes, or dual axes.

Because each measure can have customized marks, you can customize the level of detail, size, shape, and color encoding for each measure too.



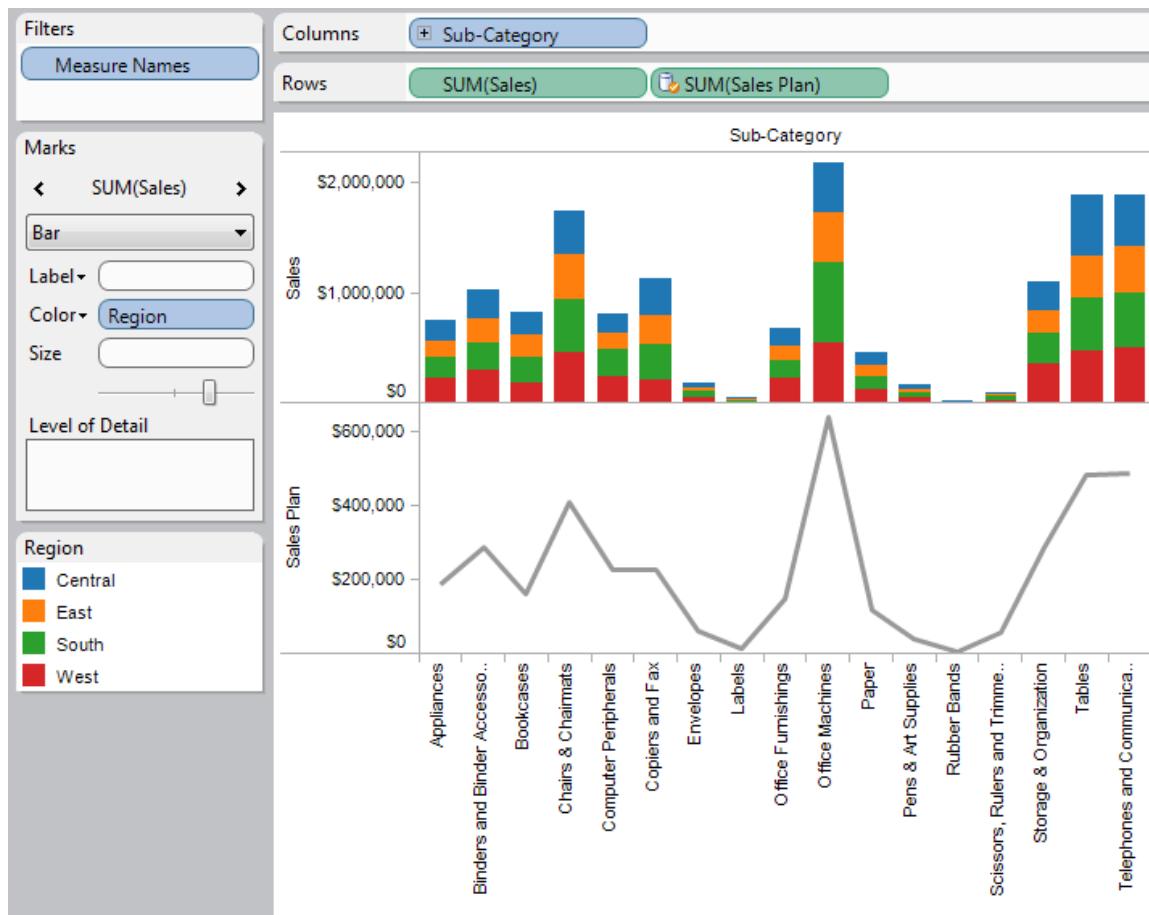
To customize the marks for a measure:

1. Right-click the axis for the measure you want to customize and select *Mark Type* and then select a custom mark type.

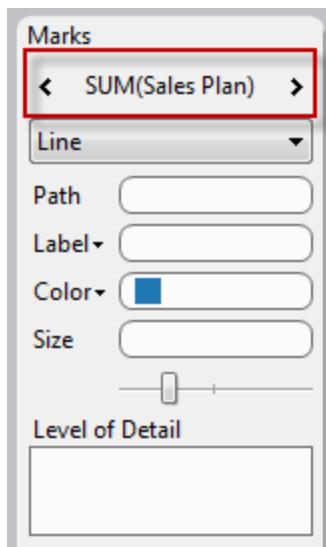


2. The Marks card switches into an advanced mode that shows the mark properties for the measure you customized. Any changes to the mark type, shape, size, color, and level of detail will be applied to the selected measure. For example, in the view below the marks card is showing the properties for the SUM(Sales) measure. When Region is placed on the Color shelf, the encoding and level of detail is only applied to the SUM(Sales) layer. The SUM(Sales Plan) is now broken down by Region.

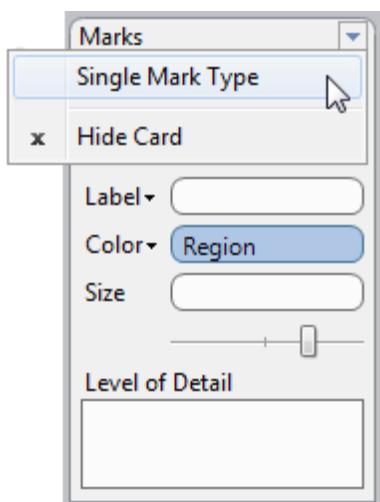
## Tableau Desktop Help



*When the Marks card is in the Advanced mode you can switch between each of the measures in the view using control at the top of the Marks card. Select ALL to modify properties for all measures at once.*



Select Single Mark Type on the Marks card menu to make all measures use the properties that are currently showing in the marks card.



## Filtering

### Filtering

Narrow the data shown in a view using Filter. Filters are defined by selecting specific dimension members or a range of measure values. For example a view showing product sales in four different regions may be filtered to only show three regions. In this case, the filter is created by selecting the specific regions to show. Another example may be to filter the same view to only show sales between \$5000 and \$20,000. For this filter a range of values is defined. In addition to these basic filters you can create complex computed filters to show the top 10 products based on sales, all products sold in the last 30 days, and so on.

All fields that are filtered display on the Filters shelf so you can quickly determine the data that has been removed from the view. Filters are applied to the view in the order they appear on the Filters shelf. However, by default filters are evaluated independently from each other, which means each filter is evaluated against the entire underlying data source and other filters are not taken into account. When working with independent filters, the order on the filters shelf does not change the results.

- [Adding Filters](#)
- [Global Filters](#)
- [Context Filters](#)
- [Calculation Filters](#)

## Adding Filters

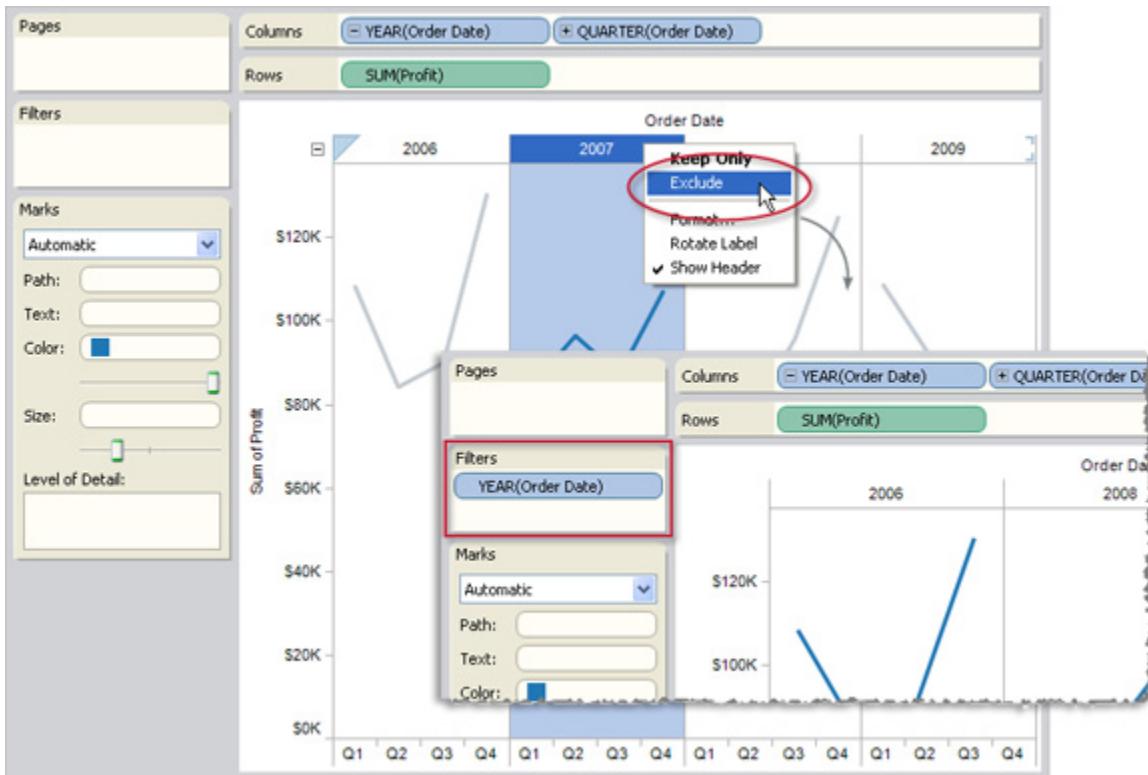
### Adding Filters

*All fields that are filtered show on the Filters shelf. You can add a filter either by selecting data in the view, dragging a field to the Filters shelf, or turning on quick filters.*

- [Selecting Data to Filter](#)
- [Dragging Fields to the Filters Shelf](#)
- [Using Quick Filters](#)

## Selecting Data to Filter

You can filter data by selecting headers or marks in the view and then selecting **Keep Only** or **Exclude** on the right-click context menu. The dimension members are removed from the view and the filtered fields are added to the Filters shelf.



## Selecting Headers

When you select a table header that is part of a hierarchy, all of the next level headers are also selected automatically. For example, the view shown below consists of two unrelated dimensions placed on the Columns shelf, and two levels of the same hierarchy placed on the Rows shelf.

The selected row headers include the East member of the Region dimension, and the Texas and Louisiana members of the State dimension. Note that when East is selected, all members from the next (inner) level in the hierarchy are automatically selected.

The selected column headers include the Colas and Root Beer members of the Gen2, Product dimension. Note that when these outer dimensions are selected, the inner dimension members from Pkg Type are not automatically selected. This is because the Gen2, Product and PkgType dimensions are unrelated.

Columns		+ Gen2,Product		Pkg Type							
Rows		- Region		State							
Region	State	Colas		Root Beer		Cream Soda		Fruit Soda		Diet Drinks	
		Bottle	Can	Bottle	Can	Bottle	Can	Bottle	Can	Bottle	Can
East	New York		\$8,940	\$7,939	\$9,305		\$8,514				
	Massachusetts		\$6,518	\$5,180	\$1,418		\$1,541				
	Florida		\$5,867	\$5,283	\$3,630	\$1,074	\$2,487	\$2,393	\$4,142		
	Connecticut		\$3,378	\$3,090	\$3,849		\$2,094	\$1,384			
	New Hampshire	\$1,467	\$1,570	\$2,180	\$965		\$1,109				
West	California	\$1,324	\$10,772	\$16,794	\$8,073	\$3,055	\$7,424	\$7,151	\$4,887		
	Oregon	\$1,433	\$2,817	\$6,743	\$1,581	\$875	\$6,543	\$3,810	\$2,166		
	Washington		\$4,937	\$4,704	\$1,243	\$3,378	\$4,774	\$2,068	\$6,268		
	Utah	\$1,764	\$3,469	\$4,237	\$3,101	\$1,467	\$3,267	\$1,315	\$3,552		
	Nevada		\$1,790	\$1,722	\$8,850	\$3,768	\$13,026	\$613	\$4,593		
South	Texas	\$8,073	\$7,424	\$1,291	\$1,515			\$2,276	\$3,378		
	Oklahoma	\$2,446	\$6,543	\$2,890	\$1,562			\$2,799	\$2,427		
	Louisiana	\$2,660	\$4,774	\$2,085	\$1,797			\$1,371	\$3,214		
Central	New Mexico	\$3,101	\$3,267	\$825	\$593			\$1,087	\$2,124		
	Illinois	\$8,850	\$13,026	\$4,918	\$3,183	\$4,241		\$5,875	\$6,834		
	Ohio	\$1,515	\$2,724	\$5,228	\$865	\$676	\$5,867	\$1,418	\$2,109		
	Wisconsin	\$1,562	\$5,283	\$3,142	\$1,417	\$1,697	\$3,077	\$1,074	\$4,090		
	Missouri		\$3,849	\$2,440	\$1,531	\$1,368	\$2,864	\$1,125	\$3,132		
West	Iowa	\$593	\$1,331	\$1,129	\$3,651	\$7,151	\$12,943	\$516	\$7,657		
	Colorado	\$3,183	\$4,918	\$4,241	\$2,948	\$3,810	\$4,459	\$1,965	\$6,865		
Grand Total		\$12,841	\$93,293	\$109,086	\$64,436	\$36,969	\$84,230	\$38,240	\$67,438		

Selecting **Keep Only** keeps all selected headers as shown below. The Product field is filtered to show Colas and Root Beer and the Market field is filtered to show the Eastern region as well as Texas and Louisiana in the Southern region.

## Tableau Desktop Help

Columns	+ Gen2,Product	Pkg Type
Rows	- Region	State
Region	State	Colas
		Bottle
		Can
		Root Beer
		Bottle
East	New York	\$8,940
	Massachusetts	\$6,518
	Florida	\$5,867
	Connecticut	\$3,378
	New Hampshire	\$1,467 \$1,570 \$2,180
South	Texas	\$8,073
	Louisiana	\$2,660
Grand Total		\$1,467 \$37,006 \$35,870

Selecting **Exclude** excludes all selected headers as shown below. The Product field is filtered to show Cream Soda, Fruit Soda, and Diet Drinks. The Market field is filtered to show the Western and Central regions along with the remaining states in the Southern region.

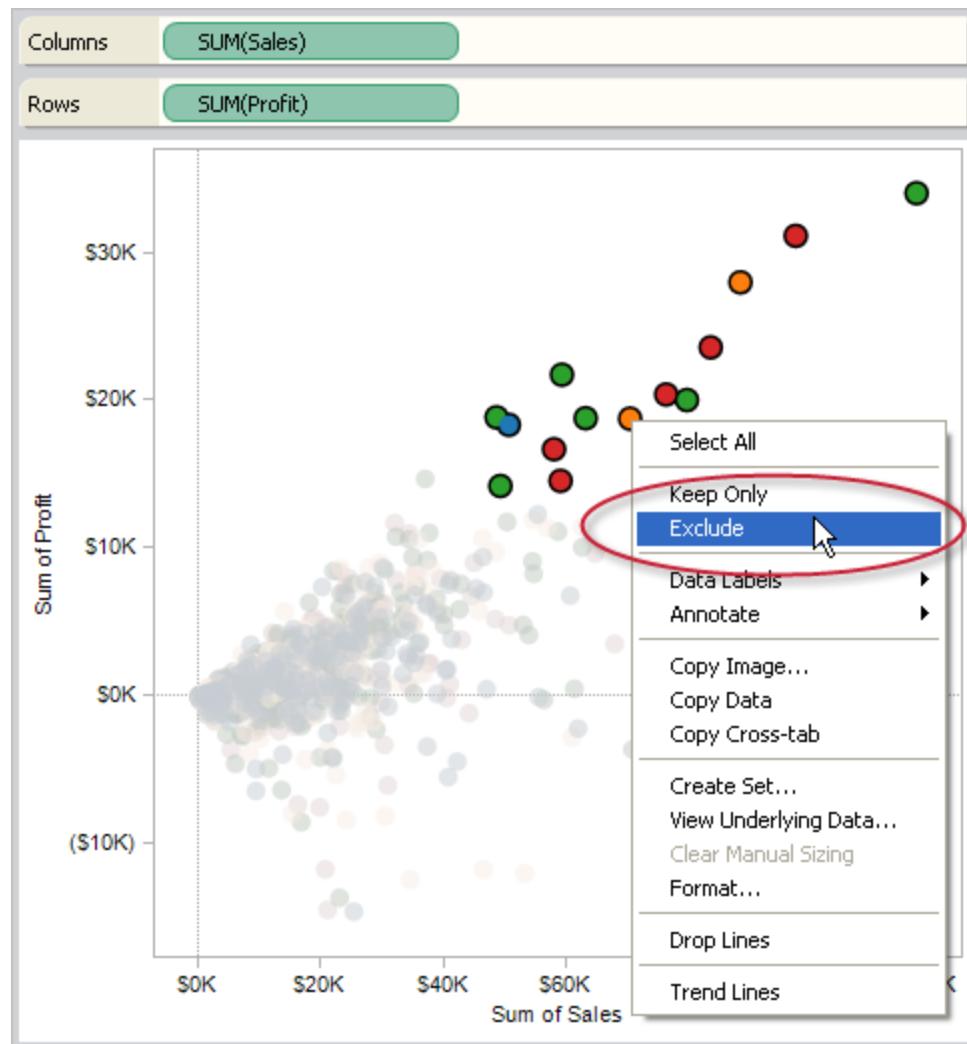
Columns	+ Gen2,Product	Pkg Type
Rows	- Region	State
Region	State	Cream Soda
		Bottle
		Can
		Fruit Soda
		Bottle
West	California	\$8,073 \$3,055
	Oregon	\$1,581 \$875
	Washington	\$1,243 \$3,378
	Utah	\$3,101 \$1,467
	Nevada	\$8,850 \$3,768
South	Oklahoma	\$2,890 \$1,562
	New Mexico	\$825 \$593
Central	Illinois	\$4,918 \$3,183
	Ohio	\$865 \$676
	Wisconsin	\$1,417 \$1,697
	Missouri	\$1,531 \$1,368
	Iowa	\$3,651 \$7,151
	Colorado	\$2,948 \$3,810
Grand Total		\$41,893 \$32,583 \$68,485 \$30,816 \$56,704

## Selecting Marks

Instead of selecting headers to filter, you can filter individual marks in a view. This method is useful when you are looking at a scatter plot and you want to focus on a set of outliers or remove them so you can better focus on the rest of the data. Select individual marks or click and drag to select several marks. Then right-click and select Keep Only or Exclude.

### Note:

These options are not available if a Wildcard Match filter is already specified for the field. Refer to [Filtering Dimensions](#) to learn more about Wildcard Match filters.



## Dragging Fields to the Filters Shelf

### Dragging Fields to the Filters Shelf

*Another way to create a filter is to drag a field directly to the filters shelf. When you add a field to the filters shelf, the Filter dialog box opens so you can define the filter. The Filter dialog box differs depending on whether you are filtering a dimension, measure, or date field.*

- [Filtering Dimensions](#)
- [Filtering Measures](#)
- [Filtering Dates](#)

## Filtering Dimensions

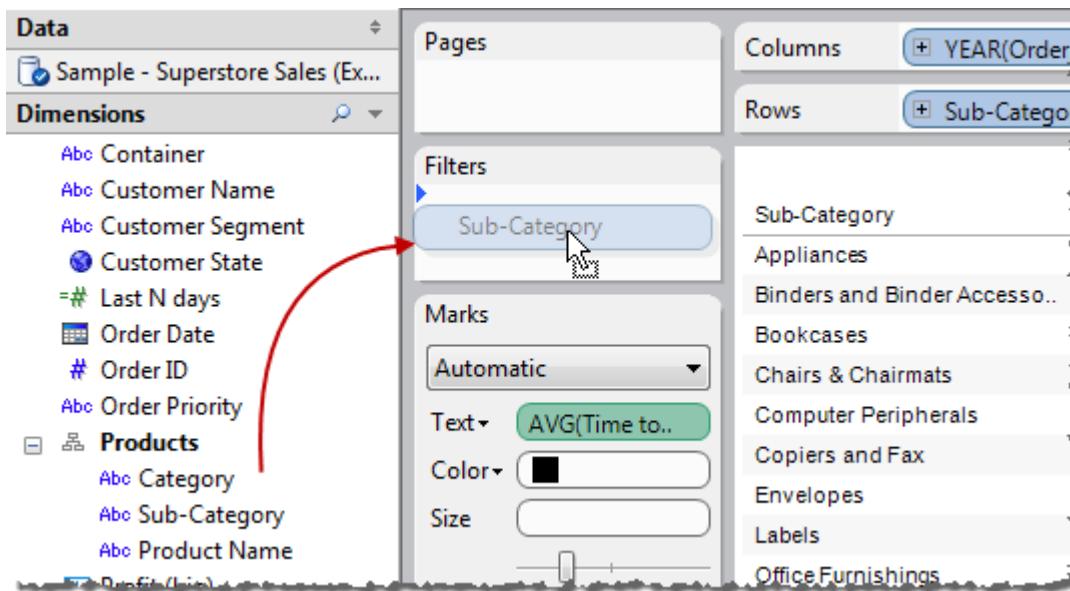
### Filtering Dimensions

*Dimensions contain discrete categorical data so filtering this type of field generally involves selecting the values to include or exclude. You can create a basic categorical filter or you can define conditions and limits to create a more complex filter definition.*

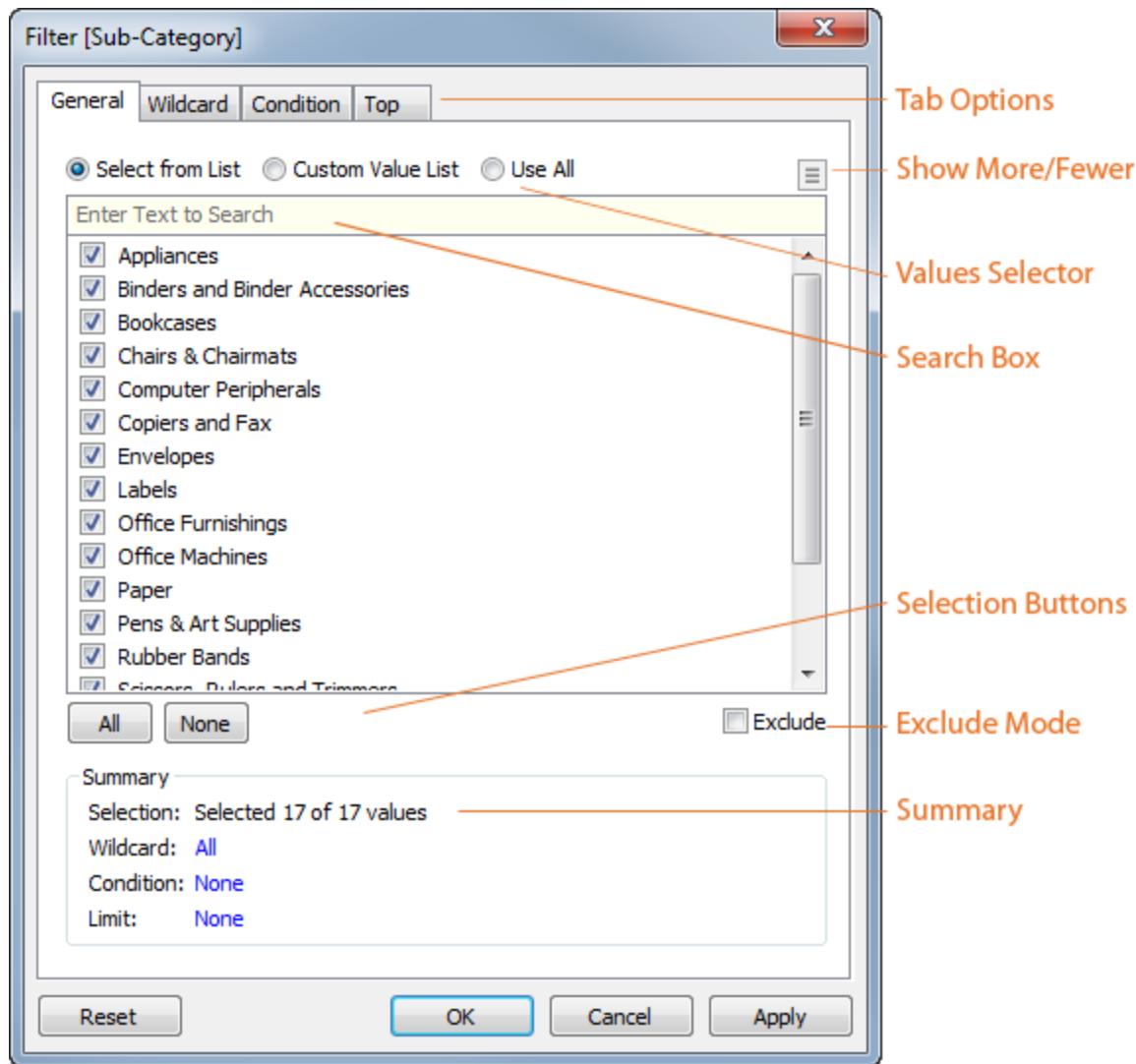
- [Basic Categorical Filters](#)
- [Adding Conditions to Filters](#)
- [Adding Limits to Filters](#)
- [Example - Filtering Dimensions](#)

## Basic Categorical Filters

1. Drag a field from the Data window to the Filters shelf. You can also right-click a field on any shelf and select Filter.



2. Use the General Tab of the Filter dialog box to select the values you want to include or exclude.



Each option on the General tab is described below:

- **Show More/Fewer** - The contents of the Filter dialog box is affected by the filters that are already set in the view. For example, if you create a filter on the Market category that only includes the western region, when you open the States filter dialog box, you typically only want to see the relevant values (the western states). If you do want to see all the values in the data source including the ones that don't pass the current filters, you can click the Show More toggle. The Show More/Fewer option includes and excludes data from displaying in the Filter dialog box so you can find what you are looking for quicker.
- **Values Selector** - Use the Values drop-down list to choose a method of selecting values. Depending on the data source you are using and the type of dimension you are filtering, you can select from the following options:

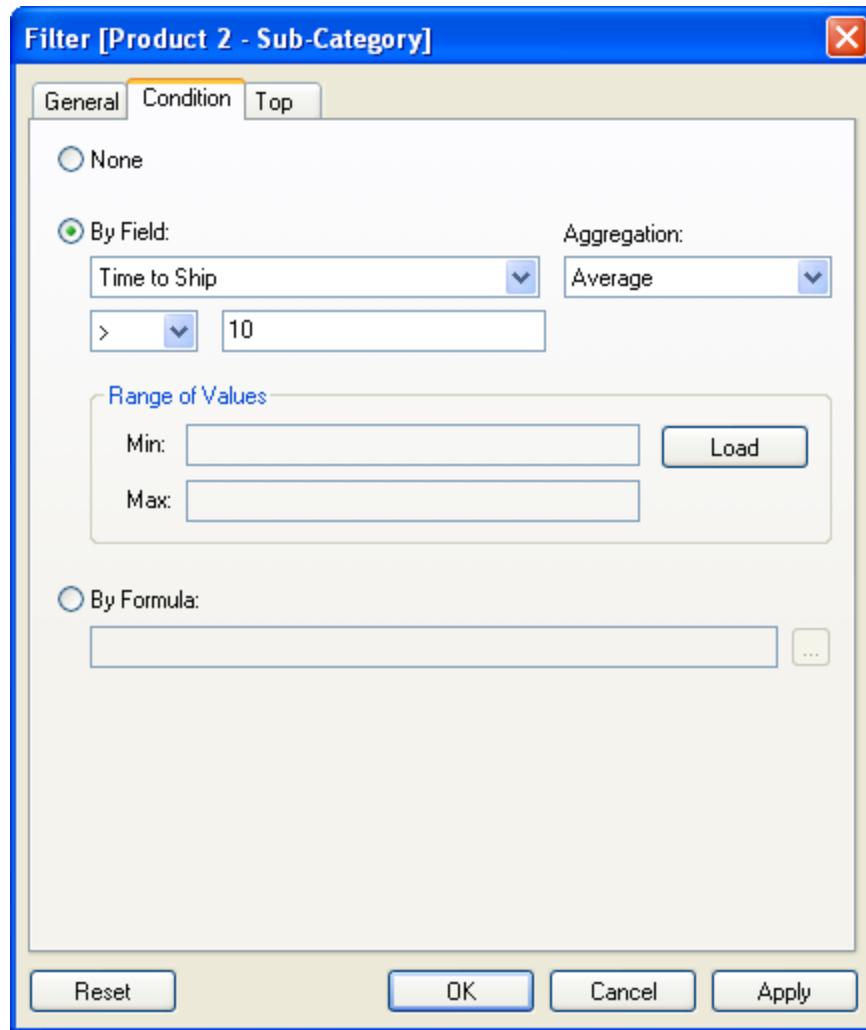
- *Select from List - select from a list of the values (requires a database query to get the values)*
- *Wildcard Match - type several characters to select all values that match the given pattern. You can use the asterisk character as a wildcard character. For example, type ca\* to select all values that start with the letters "ca."*
- *Type In - type explicit dimension member names into a text box to define a filter without querying the database. Use this option when you are using a large data source and queries are slow. If you know the dimension members you are interested in, you can type them into the text box or copy and paste them from another application. Make sure that each member is on its own line in the text box.*
- *Use All - select all of the members in the data source. Sometimes you will want to define a condition or limit filter that is based on all the data, even if that data changes over time. Rather than selecting specific members to include or exclude from the filter, the Use All option always includes every member in the database as the input to the condition or limit.*
- *Search Box - When you are working with a field that has a lot of members you may want to search the values and quickly select the ones you are looking for. Type into the search box. Matching values show below the search box. Select the values you want. Each search adds to the selection.*
- *Selection Controls - These selection controls are available for multidimensional data sources and help you quickly select entire levels. Located at the top of the dialog box, the numbers indicate each level. The color shows what values are selected. The default color means no values are selected for that level, blue means all members on that level are selected, and gray means some members are selected.*



- *Exclude Mode - By default, selected members when defining a filter will be included and deselected members will be excluded. However, sometimes it is easier to define what you don't want instead of all of the values you do want show. Select the Exclude option in the upper right corner of the dialog box to make your selections excluded from the filter instead of included.*

## Adding Conditions to Filters

Use the Condition Tab in the Filter dialog box to define rules to filter by. For example, in a view showing the average Time to Ship for a collection of products, you may want to only show the Products that have a Time to Ship that is greater than 10 days. You can use the built-in controls to write a condition or you can write a custom formula.



Each option on the Condition tab is described below:

- *None:* select this option if you do not want to add a condition to the filter. This is the default setting.
- *By Field:* select this option to specify a condition based on existing fields in the data source. Use the first two drop-down lists to select the field and aggregation you want to base the condition on. Then select a condition operator such as

*greater than, equal to, etc. Finally, type a criteria value into the text box. For example, to create the condition described above, select Time to Ship and AVG from the first two drop-down lists. Then select Greater (>) from the operator list and type 10 into the text box.*

**Note:**

*You can use the Range of Values box to load the entire range of values for the selected field in the data source. The example above would not make sense if all the records in the data source for Time to Ship were greater than 10 days to begin with. Using the Range of Values box helps you decide a value that makes sense to the records in your data source. Click Load to view the range of values for the selected field.*

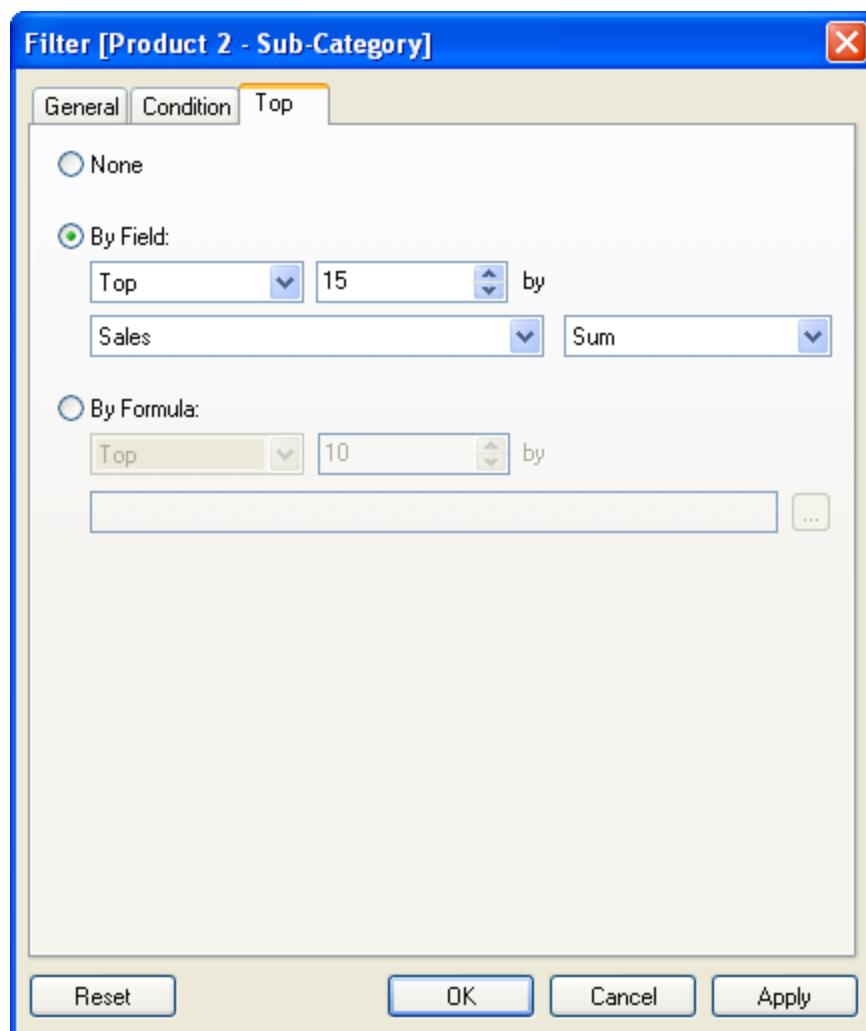
- *By Formula: select this option for more advanced filter conditions. You can type a custom formula into the text box or open the formula editing dialog box by clicking the*



*button to the right of the text box.*

## Adding Limits to Filters

Use the Top tab in the Filter dialog box to define a formula that computes the data that will be included in the view. For example, in the same view discussed above that shows the average Time to Ship for a collection of products, you can decide to only show the Top 15 Products in terms of Sales. Rather than have to define a specific range for Sales (e.g., greater than \$100,000) you can define a limit that is relative to the other members in the field. The formula defined on the Top tab is evaluated on the results of the formula on the Condition tab.



Each option on the Top tab is described below:

- *None:* select this option if you do not want to add a limit to the filter. This is the default setting.

- *By Field:* select this option to add a simple limit based on an existing field in the data source. First select the limit range using the first two drop-down lists. For example you can select Top 10 or Bottom 20. Finally select the field and aggregation to base the limit on. So if you wanted to filter based on the Top 10 Sales, select Top and 10 from the first two drop-down lists and then select Sales and SUM from remaining lists.
- *By Formula:* select this option for more advanced filter limits. Select the limit range using the first two drop-down lists (e.g. Top 10 or Bottom 20). Then you can type a custom formula into the text box or open the formula editing dialog box by clicking the

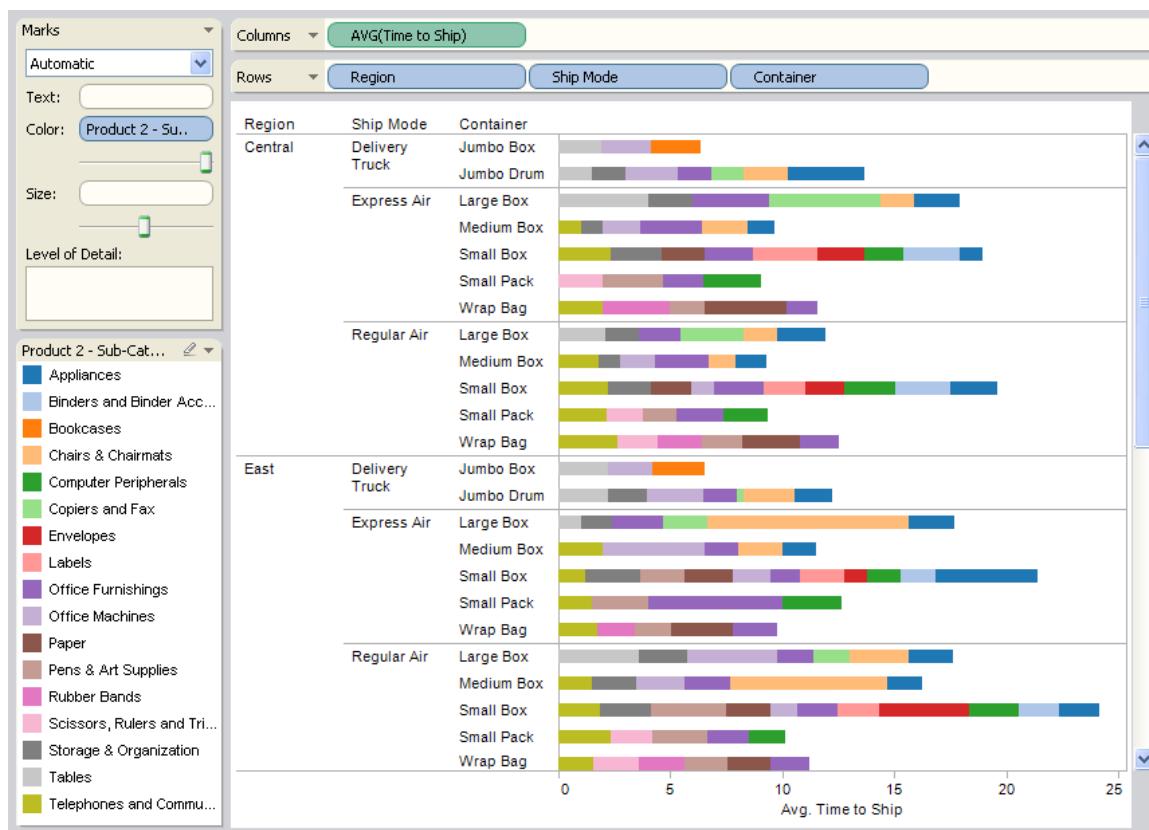


- *button to the right of the text box.*

## Example - Filtering Dimensions

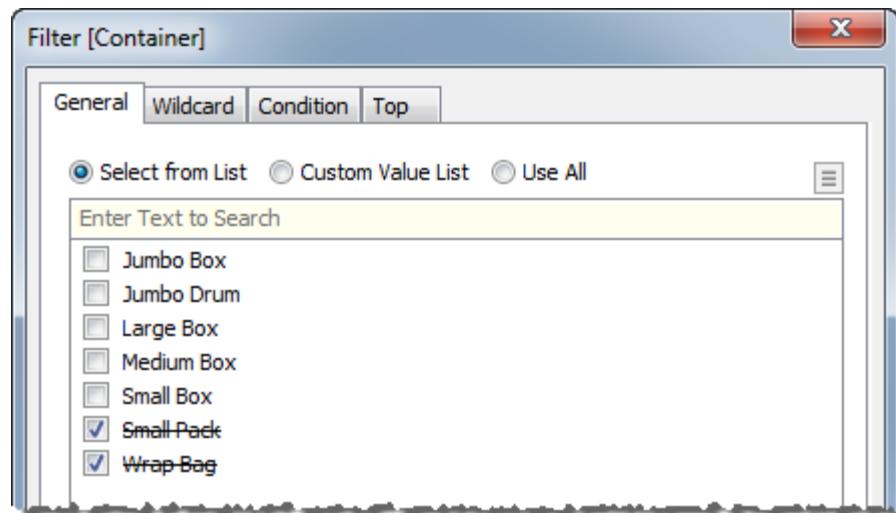
This example filters headers and color encodings in a bar chart using the Filter dialog box. To filter the data, follow the steps below.

1. Create the initial data view shown below. It was created using the Superstore Sales Excel data source. The view shows the average regional time to ship for each product based on the container and ship mode.

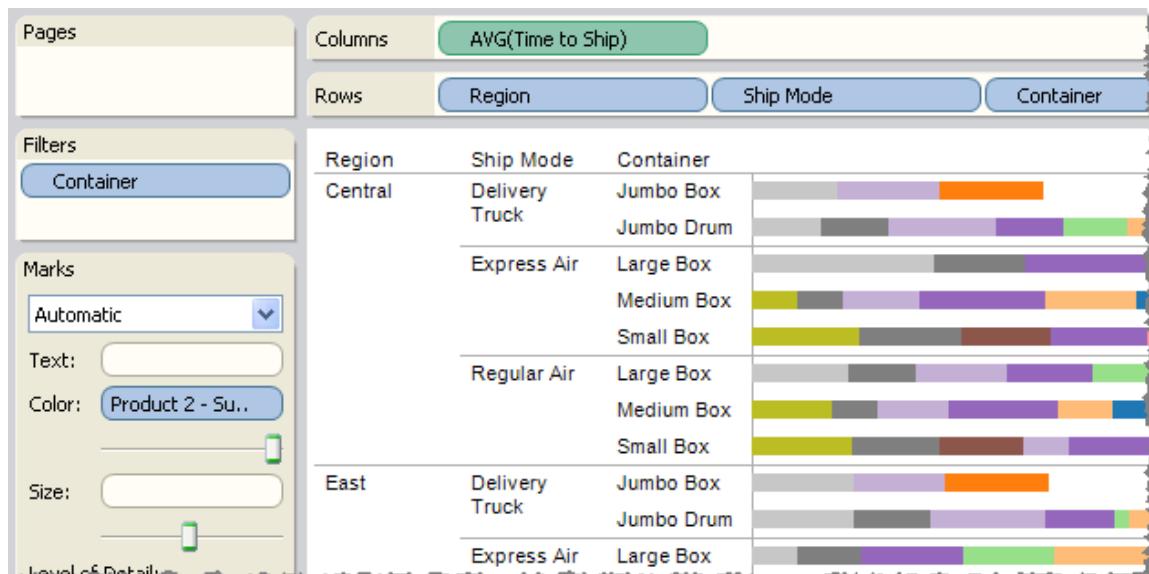


2. Create a basic filter on the Container dimension that excludes the Small Pack and Wrap Bag shipping containers.

Drag the Container dimension to the Filters shelf to open the Filter dialog box. Click the None button at the bottom of the list to deselect all of the shipping containers. Then select the Exclude option in the upper right corner of the dialog box. Finally, select Small Pack and Wrap Bag. When finished click OK.

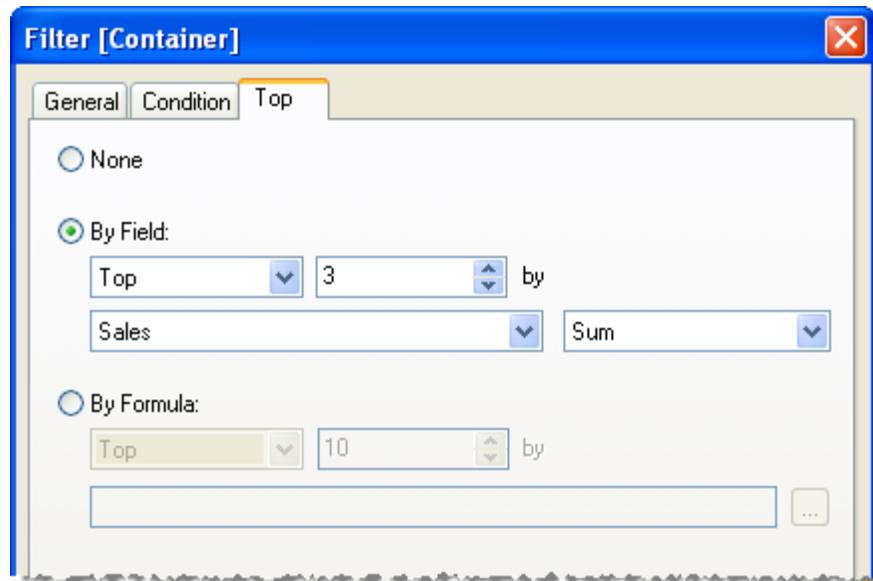


3. The view updates to only show orders that were not shipped in a Small Pack or Wrap Bag.



4. Now let's refine the filter on Container by adding a limit. Right-click the Container field on the Filters shelf and select Filter. The Filter dialog box opens. Leave the selections as they are.

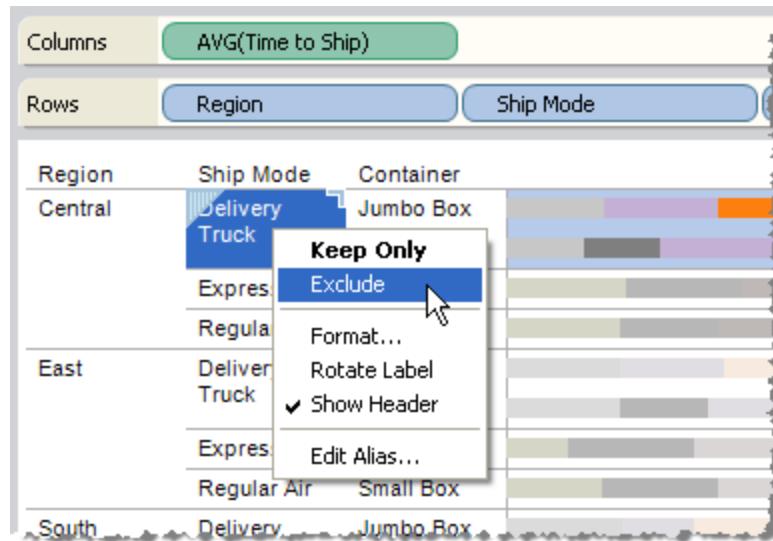
5. Switch to the Top tab and select By Field. Select Top 3 from first two drop-down lists. Then select Sales and SUM from the remaining drop-down lists. When finished click OK.



The Top formula is computed after the selections on the General tab. So first Tableau computes all orders that were not shipped in Small Pack or Wrap Bag containers. Then the view shows just the top 3 of those orders in terms of sales.

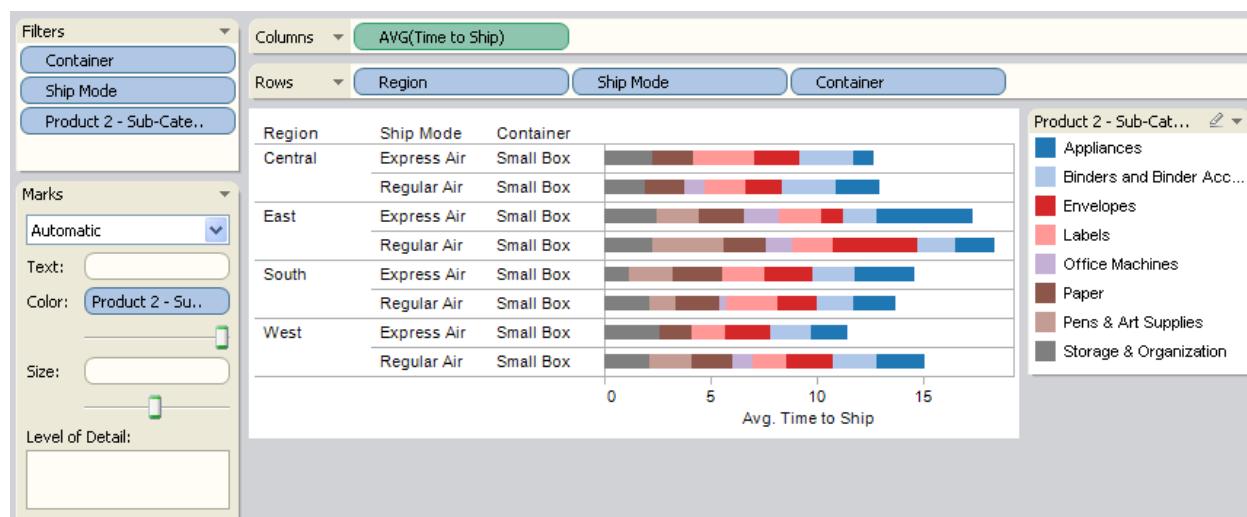
6. Now let's add a new filter on Ship Mode to exclude orders that were shipped via Delivery Truck.

Right-click the Delivery Truck row header and select Exclude. The Delivery Truck ship mode is removed from each region in the view.



7. Finally, let's filter the Product 2 - Sub-Category dimension to minimize the number of colors being used in the view. Drag the Product 2 - Sub-Category dimension to the Filters shelf.
8. In the Filter dialog box, deselect the Computer Peripherals, Office Machines, and Telephones and Communication values.

The final view is shown below. Take a look at the Filters shelf. You can easily see that the view is filtered on three separate fields. To determine which values have been excluded, open the Filter dialog box for each of these fields.



## Filtering Measures

### Filtering Measures

Measures contain quantitative data so filtering this type of field generally involves selecting a range of values that you want to include. There are four types of quantitative filters: Range of Values, At Least, At Most, and Special.

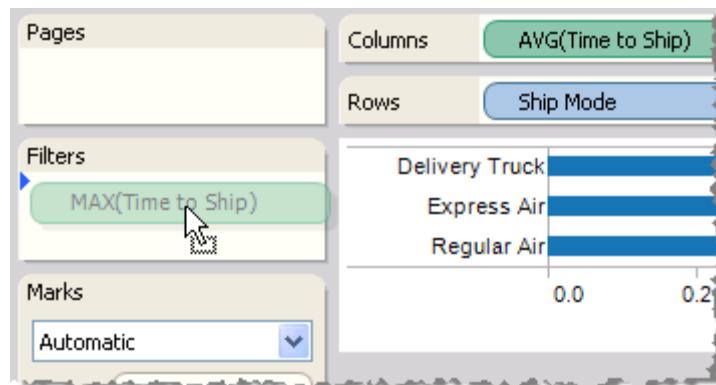
#### Note:

If you have a large data source, filtering measures can lead to a significant degradation in performance. It is sometimes much more efficient to filter by creating a set containing the measure and then applying a filter to the set.

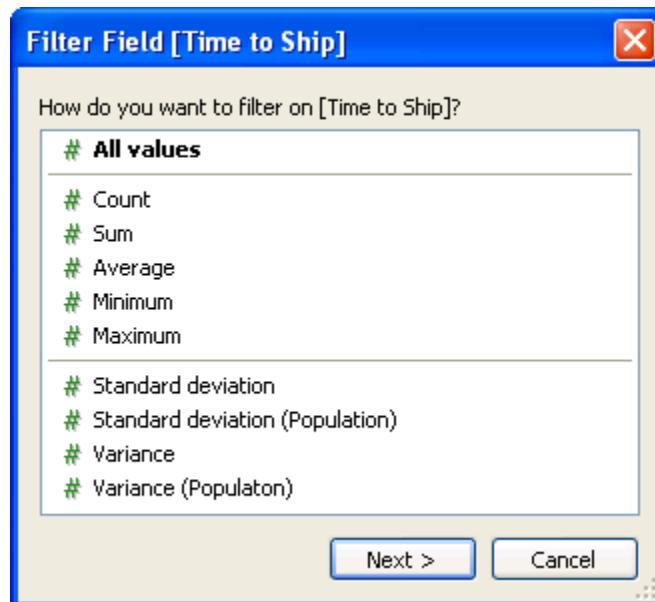
- [Basic Quantitative Filters](#)
- [Showing and Hiding Values in the Filter Dialog Box](#)
- [Example – Filtering Measures](#)

## Basic Quantitative Filters

1. Open the Filter dialog box dragging a measure on any shelf.

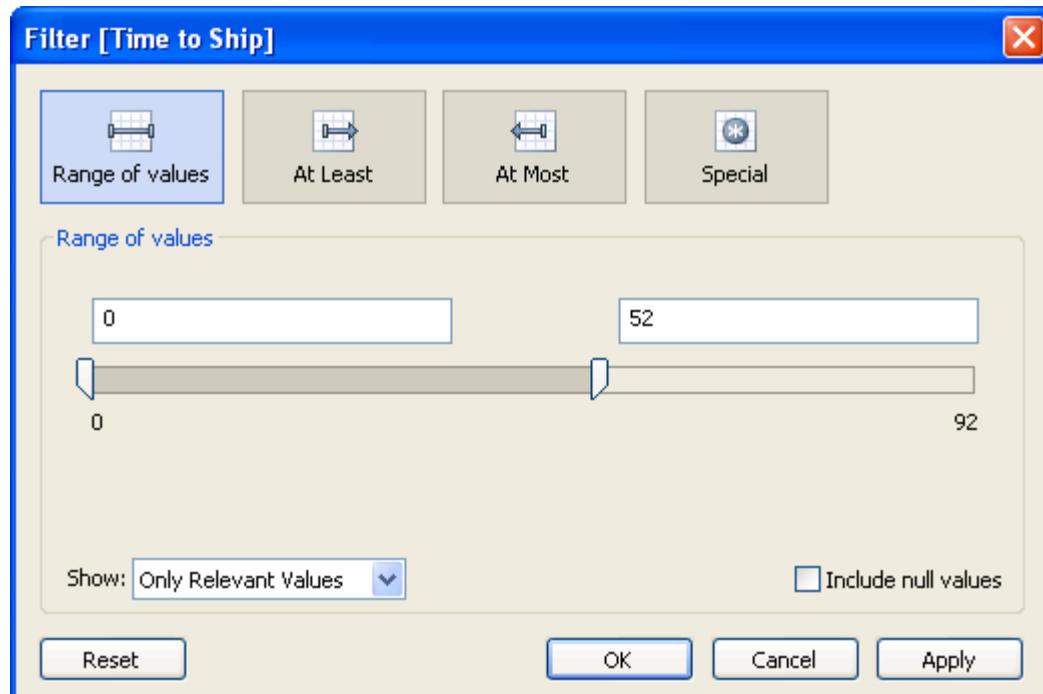


2. The Filter Field dialog box opens where you need to specify an aggregation. When finished, click Next.

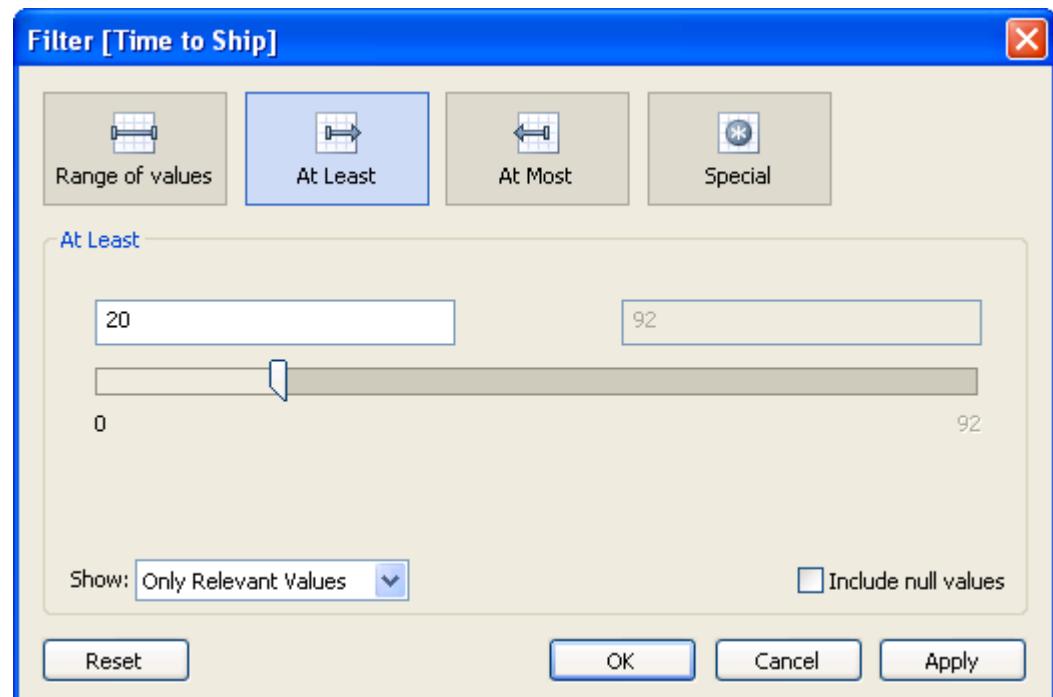


3. The Filter dialog box opens. There are four types of quantitative filters: Range of Values, At Least, At Most, and Special. Each of these types of filters are described below:

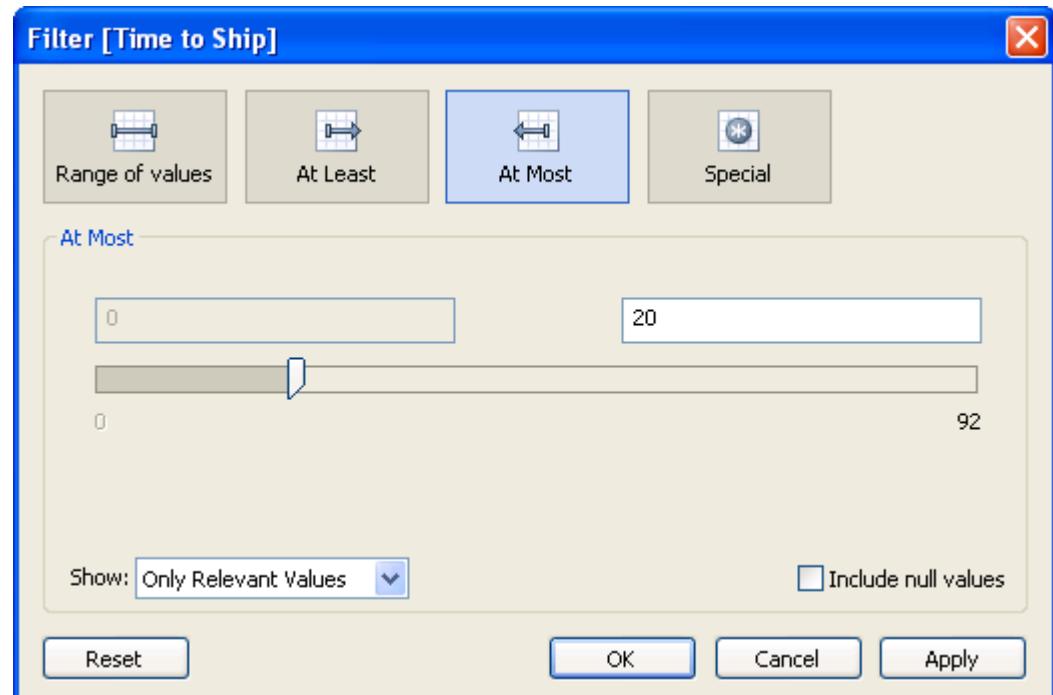
- Range of Values - Specify the minimum and maximum values of the range to include in the view. The values you specify are included in the range.



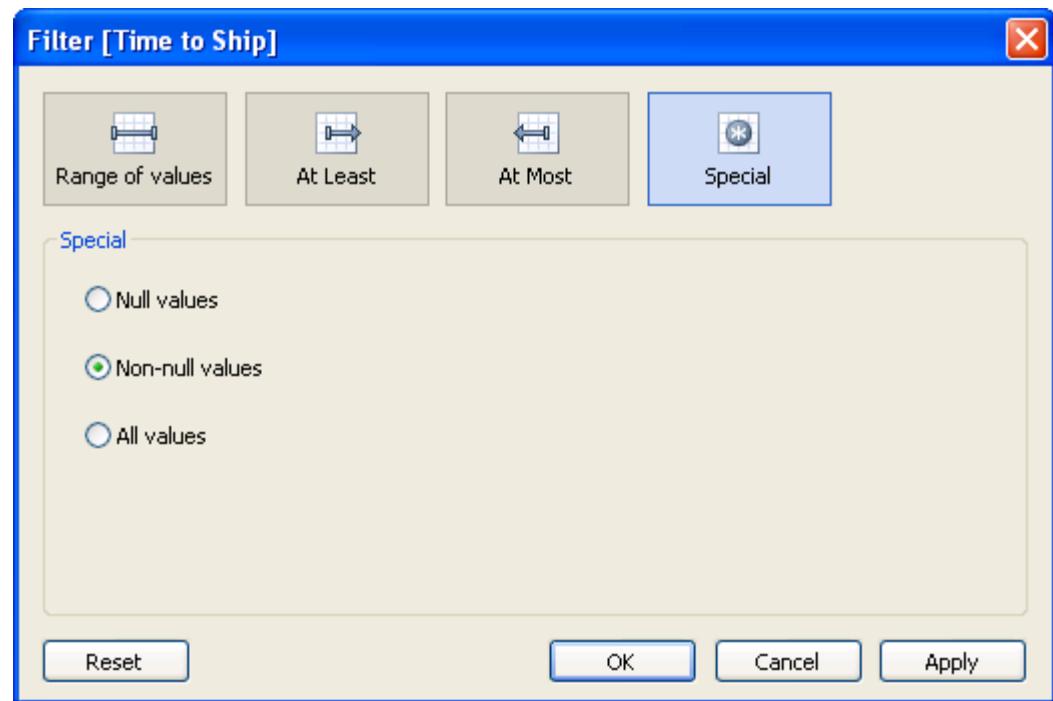
- At Least - Include all values that are greater than or equal to a specified minimum value. This type of filter is useful when the data changes often so specifying an upper limit may not be possible.



- *At Most - Include all values that are less than or equal to a specified maximum value. This type of filter is useful when the data changes often so specifying a lower limit may be not be possible.*



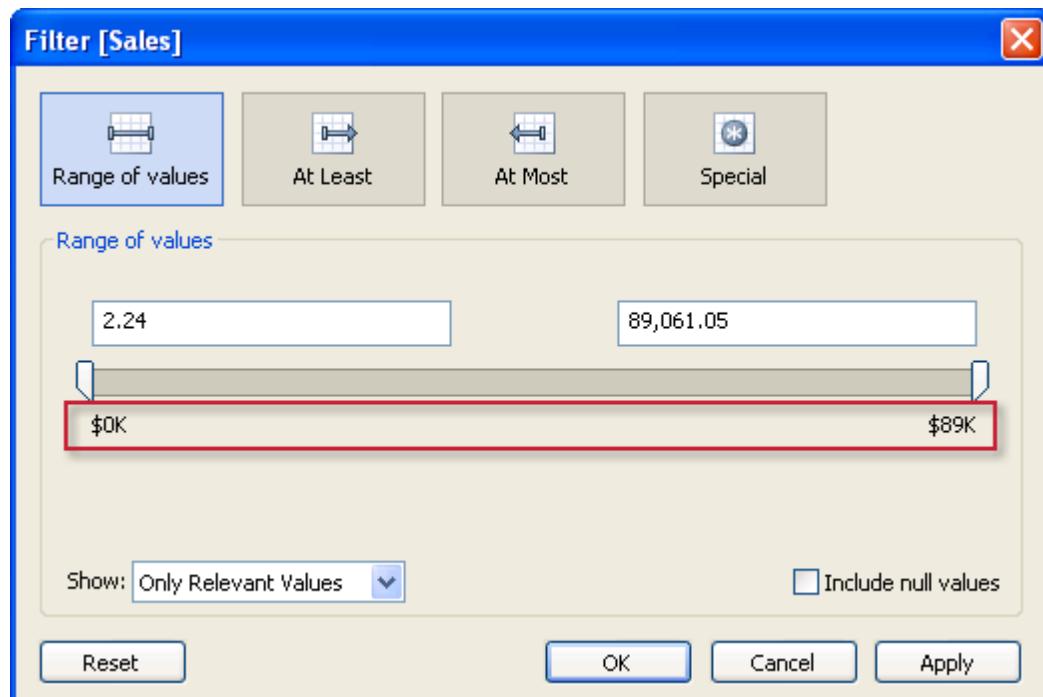
- **Special** - This special type of filter helps you filter on Null values. Include only Null values, Non-null values, or All Values.



4. *When finished defining the filter click OK.*

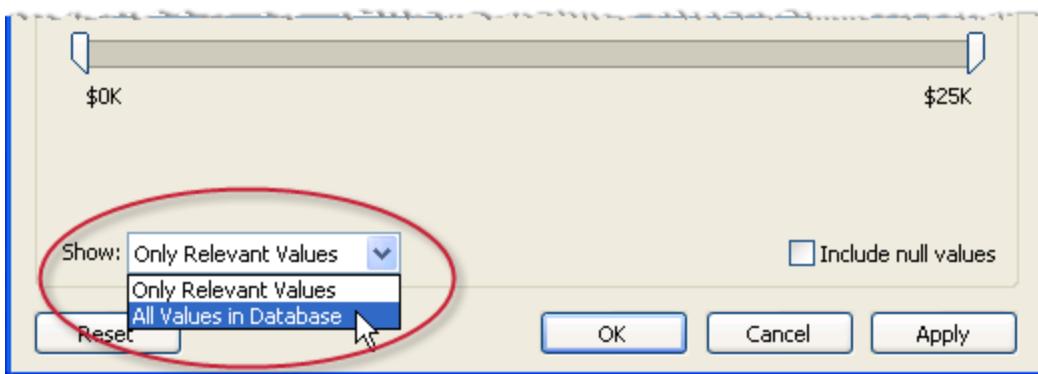
## Showing and Hiding Values in the Filter Dialog Box

The filter dialog box shows the minimum and maximum values for the field below the range slider. These numbers give you context when you are deciding the range of values to include in the filter.



These minimum and maximum values are affected by the other filters set on the view. For example, a database may include records with sales ranging from \$0 to \$89K. If you created a filter on the Sales field the minimum and maximum values shown in the filter dialog box would indicate this range. However, let's say you then filter the view to only show Office Supply products, which sell for between \$0 and \$25K. By default the filter dialog box will consider that filter and only show the office supplies range. You can use the Show menu in the bottom left corner of the dialog box to switch between Only Relevant Values and All Values in the Database. These options only affect the range that is shown in the filter dialog box and doesn't change how the filter will be applied to the view.

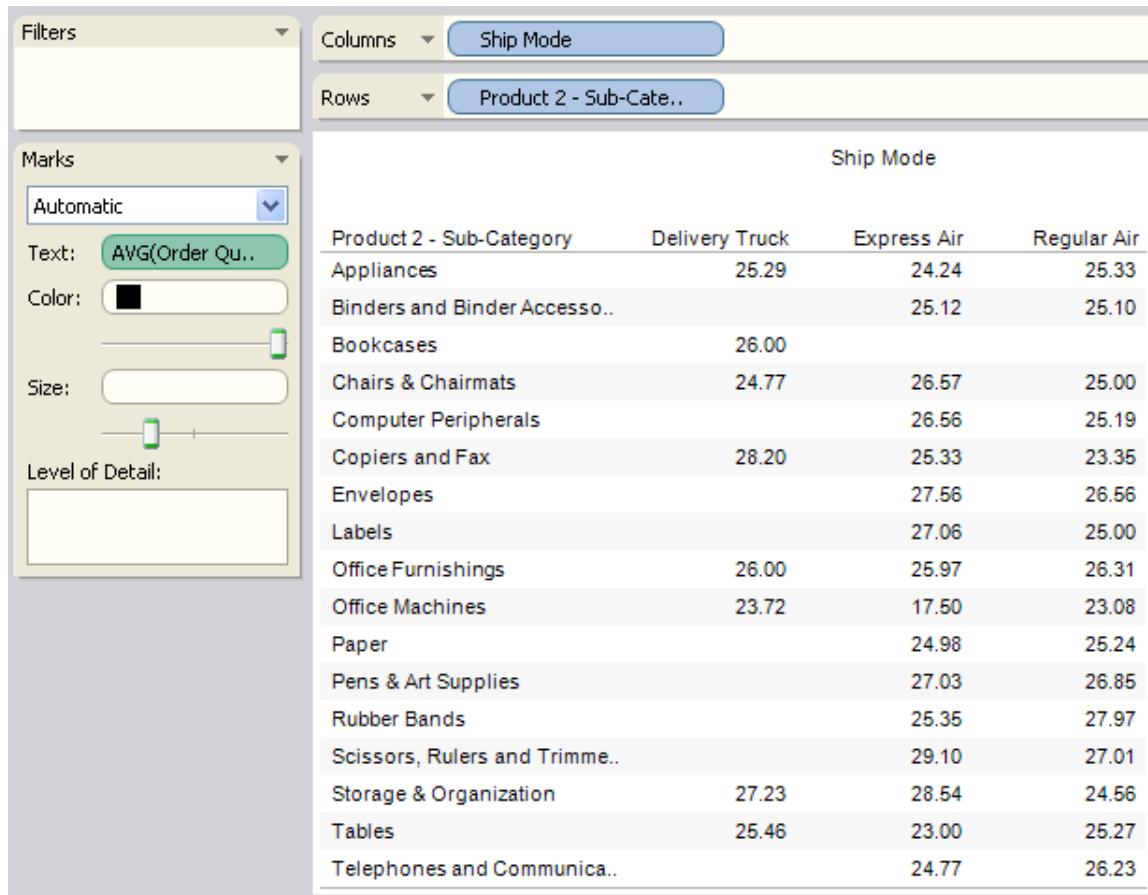
## Tableau Desktop Help



## Example – Filtering Measures

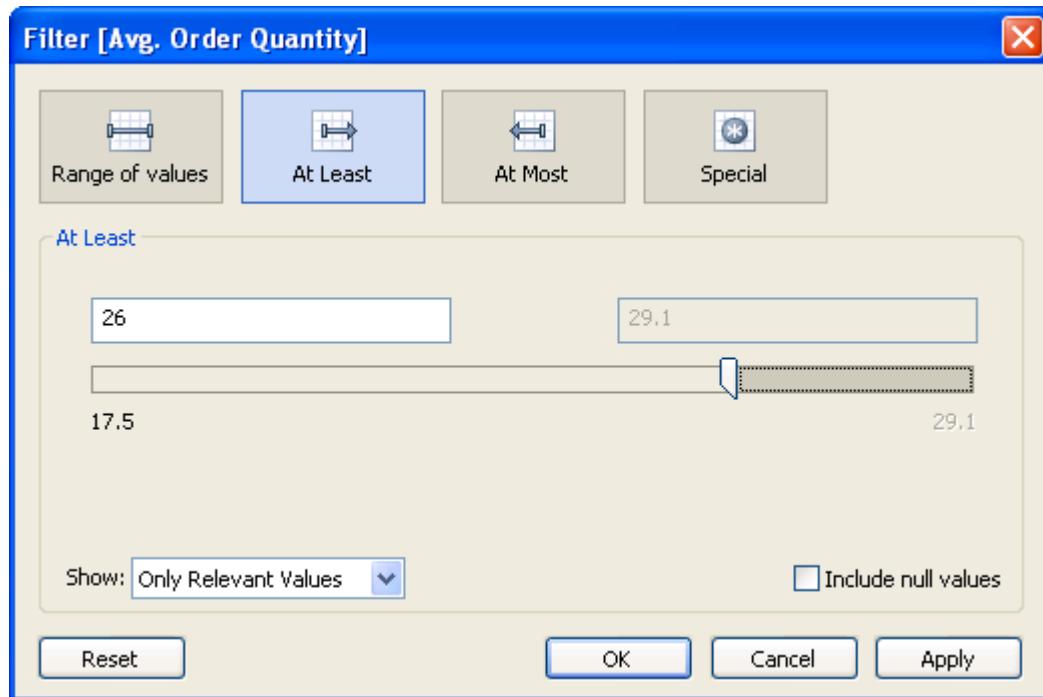
This example filters a text table using an aggregated measure, and then filters the table using the same measure in an disaggregated state.

1. Create the initial view using the Sample - Superstore Sales (Excel) data source. The text table is shown below.



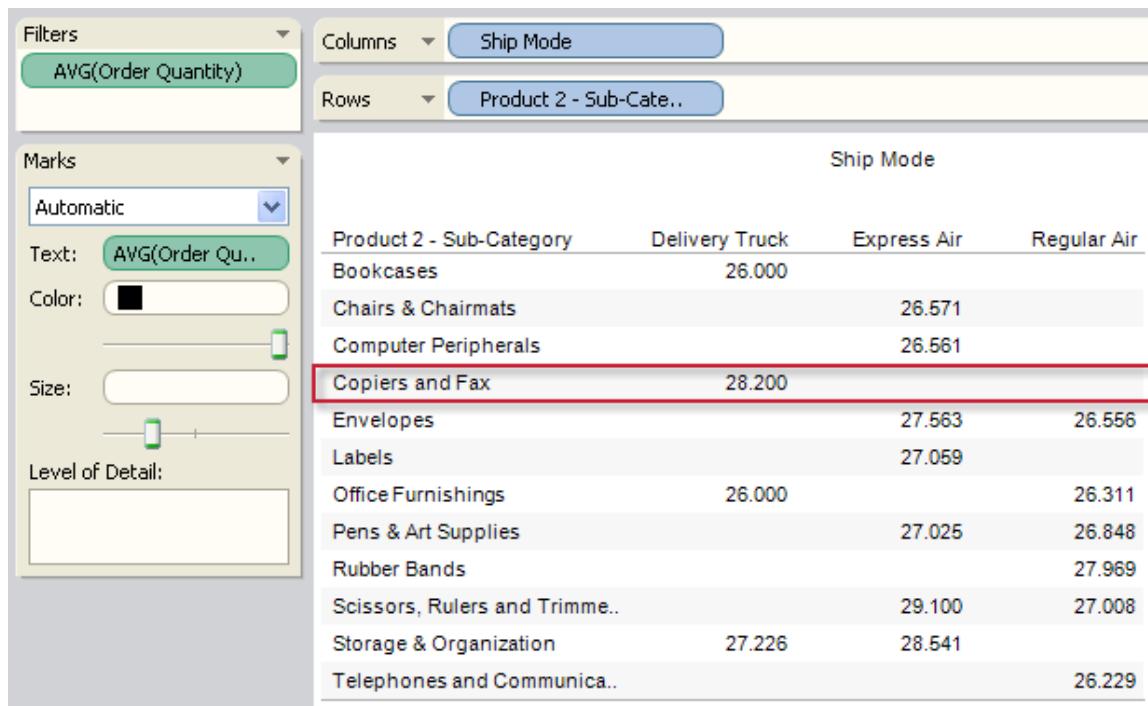
2. Filter the data to only show orders with an average quantity of 26 or more. You can create this type of filter by dragging the Order Quantity measure to the Filters shelf and select Average as the aggregation.

The Filter dialog box is shown below. This type of filter is an At Least filter with the minimum value set to 26.

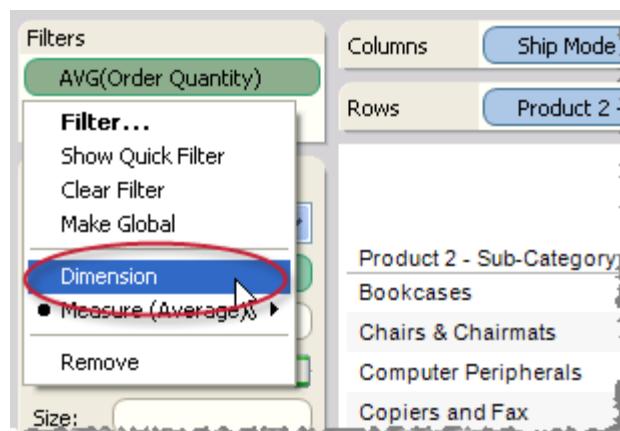


3. When finished, click OK.

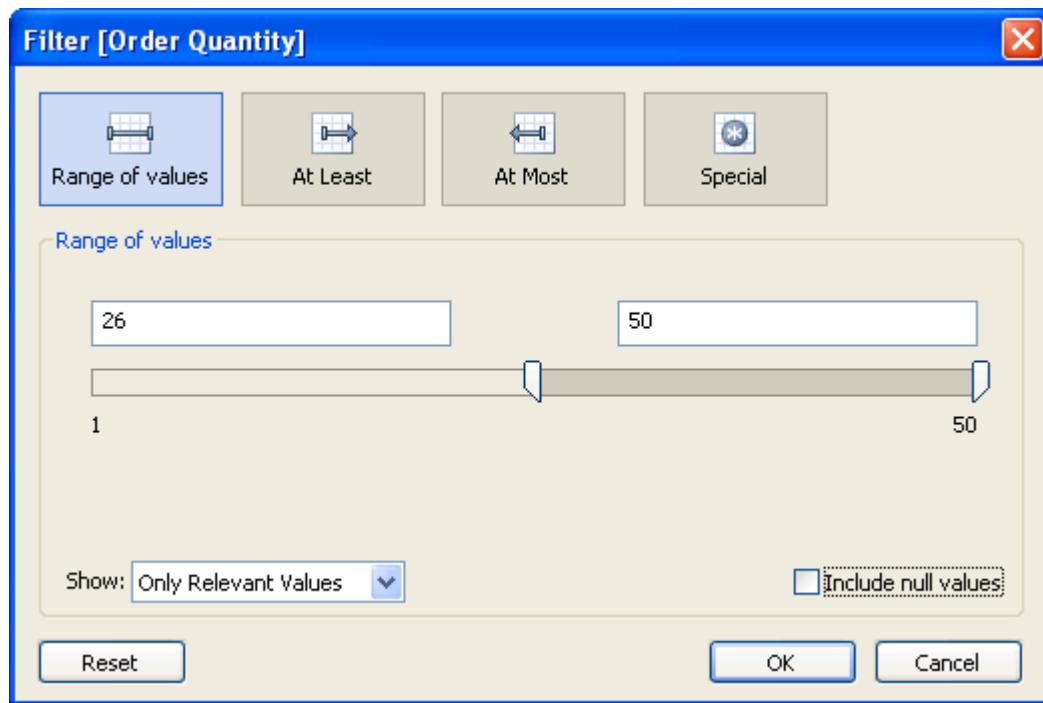
The modified view is shown below. Comparing this view with the original, unfiltered view is straightforward because the measure and the filter use the same aggregation. For example, Copiers & Faxes shipped by Express Air and Regular Air are removed from the view because the average order quantity is less than 26, while Copiers & Faxes shipped by Delivery Truck remains in the view because the average order quantity is greater than 26.



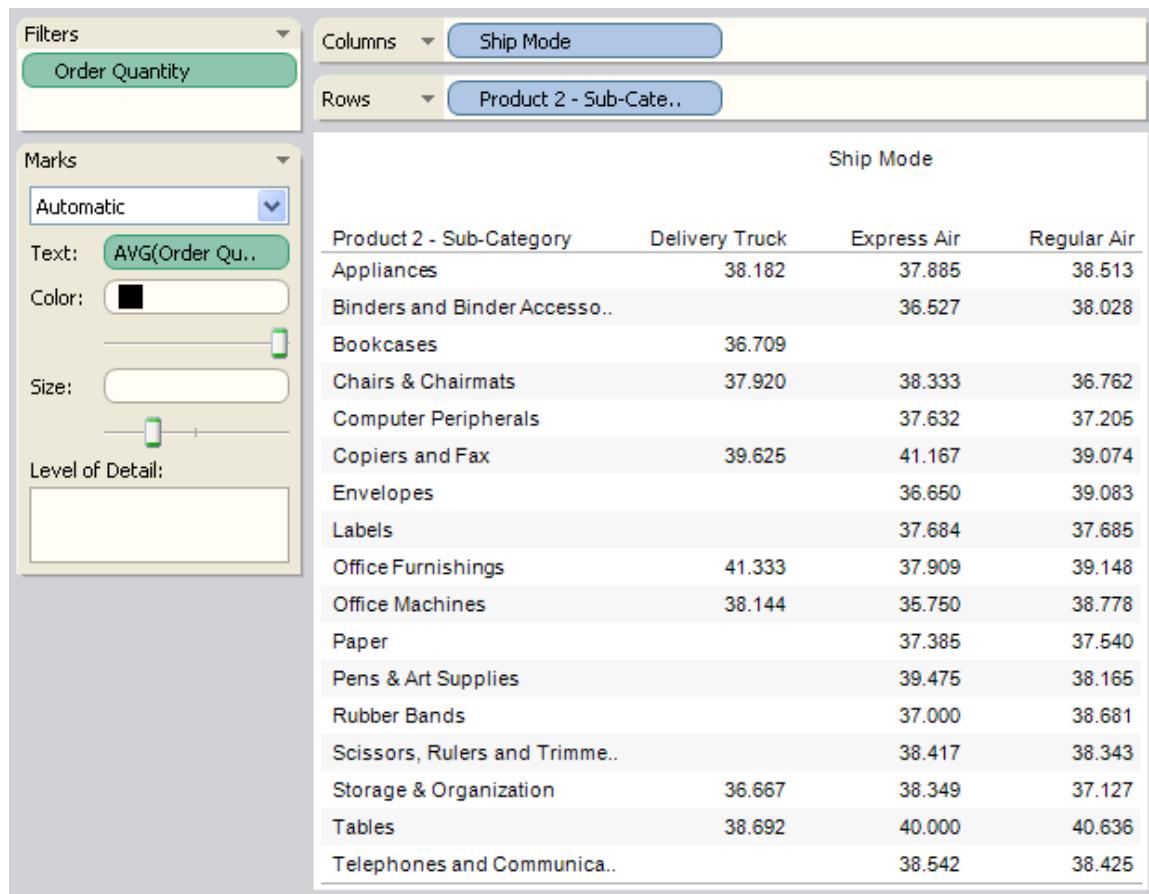
- Now let's filter the same view using a disaggregated measure. Suppose you want to filter the view using the disaggregated Order Quantity measure. To do this, select Dimension on the context menu of the AVG(Order Quantity) field on the Filters shelf.



The Filter dialog box is shown below. It displays the limits of the individual rows for the Order Quantity measure. Specify a new lower limit of 26.



The filtered data view is shown below. Notice that the numbers are very different from the original, unfiltered view. This is because Tableau excludes each row in the data source that has an order quantity that is less than 26, and then aggregates the remaining rows as an average.



## Filtering Dates

### Filtering Dates

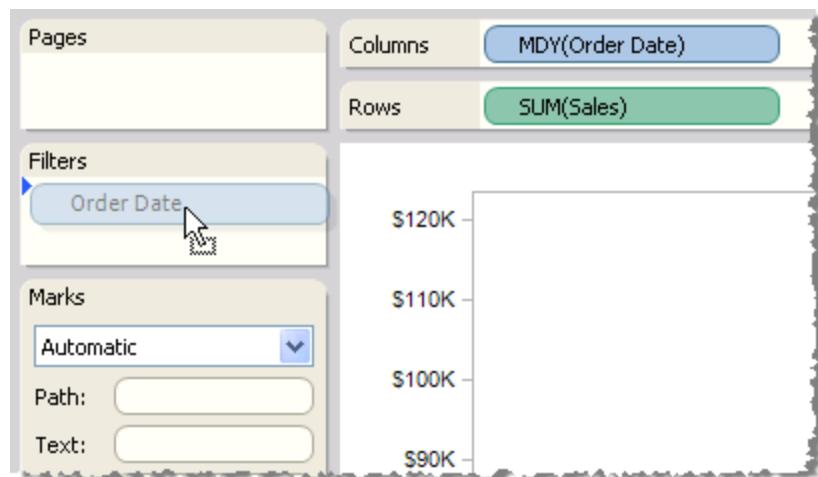
*Date fields are a special kind of dimension that Tableau often handles differently than standard categorical data. This is especially true when you are creating date filters. Date filters are extremely common and fall into three categories: Relative Date Filters, which show a date range that is relative to a specific day; Range of Date Filters, which show a defined range of discrete dates; and Discrete Date Filters, which show individual dates that you've selected from a list.*

- [Relative Date Filters](#)
- [Range of Dates](#)
- [Other Types of Date Filters](#)
- [Discrete Date Filters](#)
- [Example - Filtering Dates](#)

## Relative Date Filters

A relative date filter lets you define a range of dates that updates based on the date and time you open the view. For example, you may want to see Year to Date sales, all records from the past 30 days, or bugs closed last week. Relative date filters can also be relative to a specific anchor date rather than today. Follow the steps below to create a relative date filter.

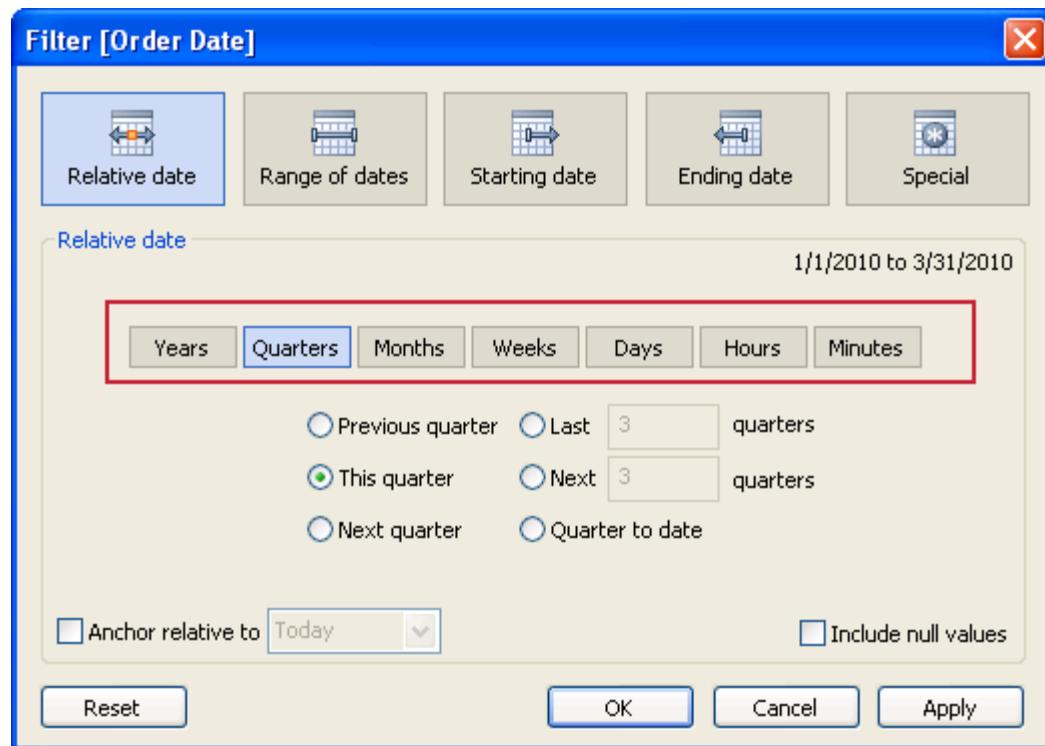
1. Drag a date field from the Data window and drop it on the Filters shelf.



2. In the Filter Field dialog box, select Relative to Now and then click Next.

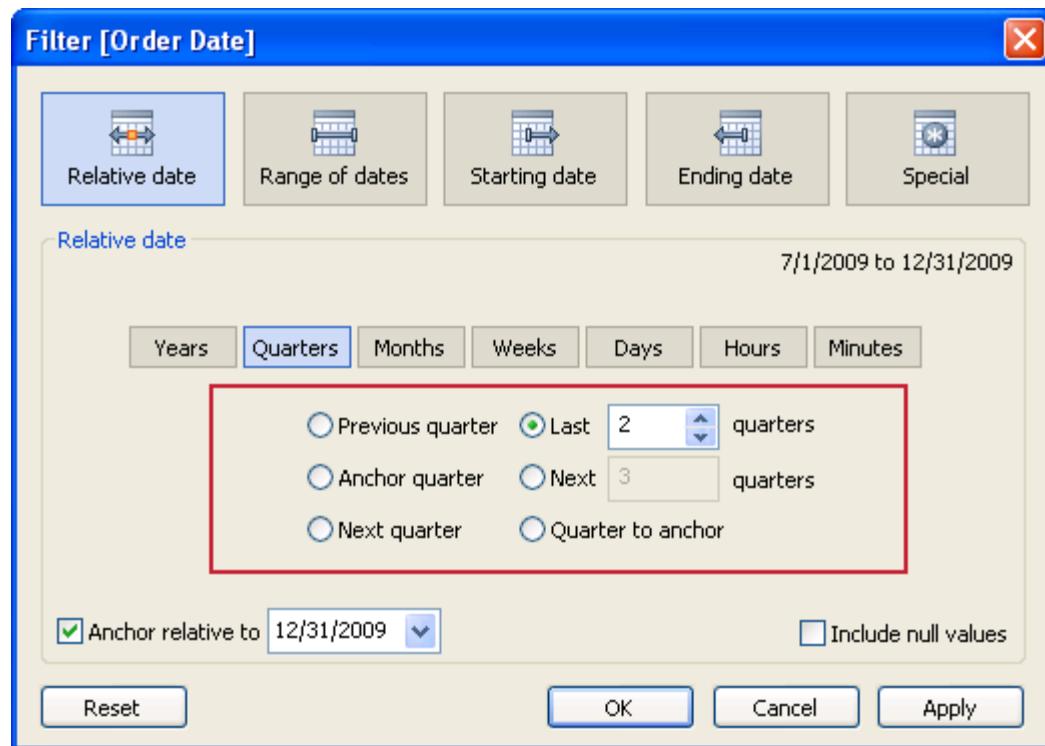


3. *The Filter dialog box opens showing the Relative to Now options. Select a unit of time to filter by. For example, to filter to show the last 2 quarters, select Quarters as the time unit.*



4. Use the rest of the controls to define the date filter. You can select from a variety of common options including current, previous, and next. By default, the filter is relative to today. To make the filter relative to an alternate date select the **Anchor relative to** option in the bottom left corner and select the date to anchor to.

*The date period includes the current unit of time. For example, selecting Last 2 Quarters will include the current quarter and the previous quarter. Use the preview in the upper right corner to check your filter settings.*

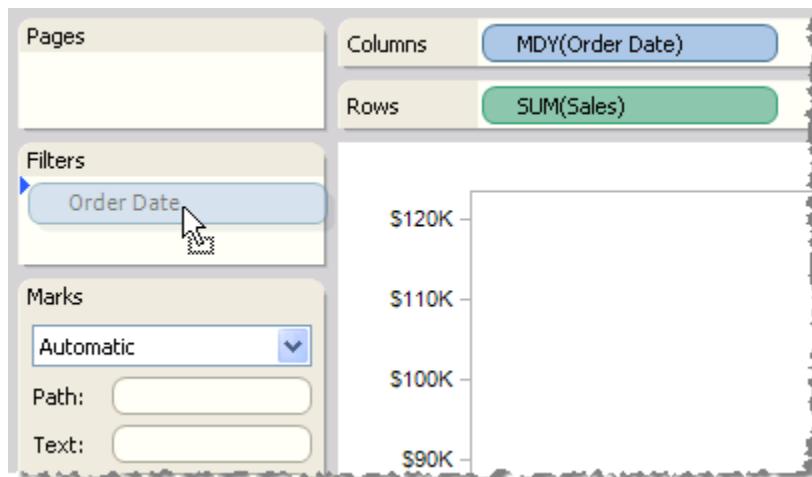


5. When finished, click OK.

## Range of Dates

Use this type of filter to define a fixed range of dates. For example, you may want to see all orders placed between March 1, 2009 and June 12, 2009. Follow the steps below to create a Range of Dates filter.

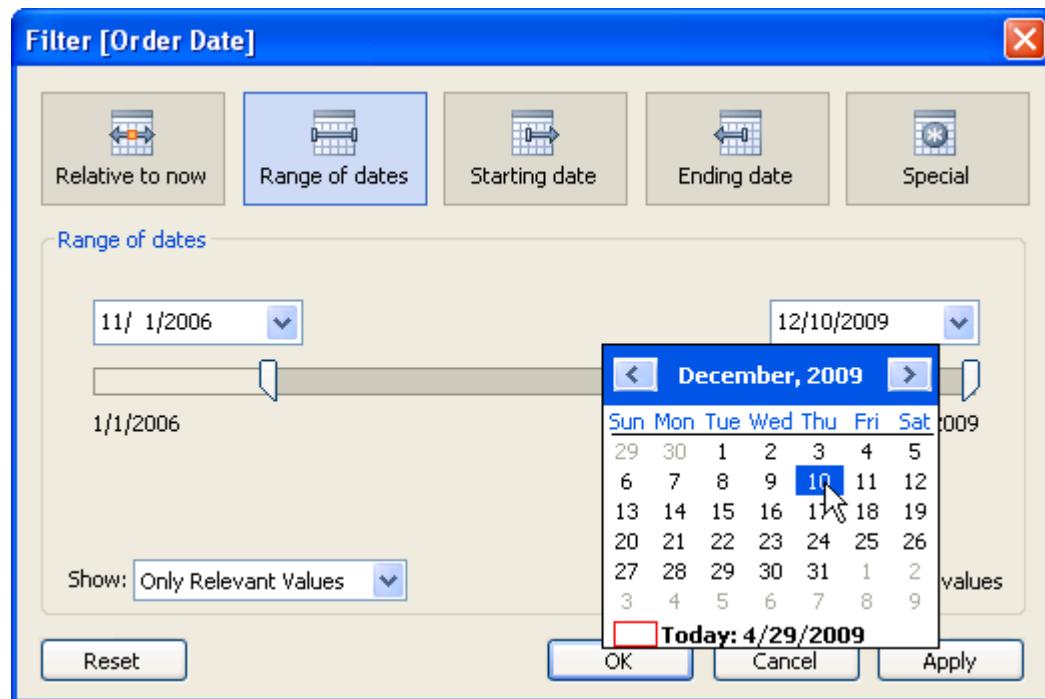
1. Drag a date field from the Data window and drop it on the Filters shelf.



2. In the Filter Field dialog box, select Range of Dates and then click Next.



3. *The Filter dialog box opens showing the Range of Dates options. Use the slider or the drop-down date controls to select minimum and maximum dates for the range you want to include. The range is inclusive, which means that the minimum and maximum dates are included in the filter.*



4. When finished, click OK.

**Note:**

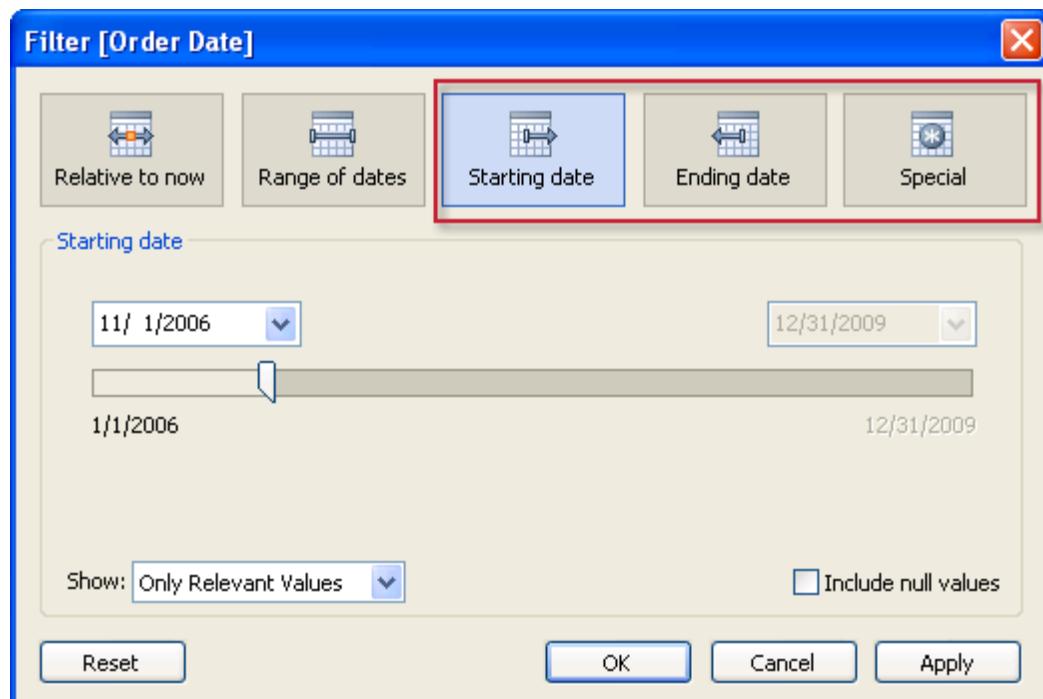
If the field also includes Time you can select the Show Times option to further refine your filter range.

## Other Types of Date Filters

You can also filter dates by defining just a Starting Date or and Ending Date. These filters are useful when you want to define an open ended range.

In addition, you can create Special filters that include only Null dates, Non-null dates, or All dates.

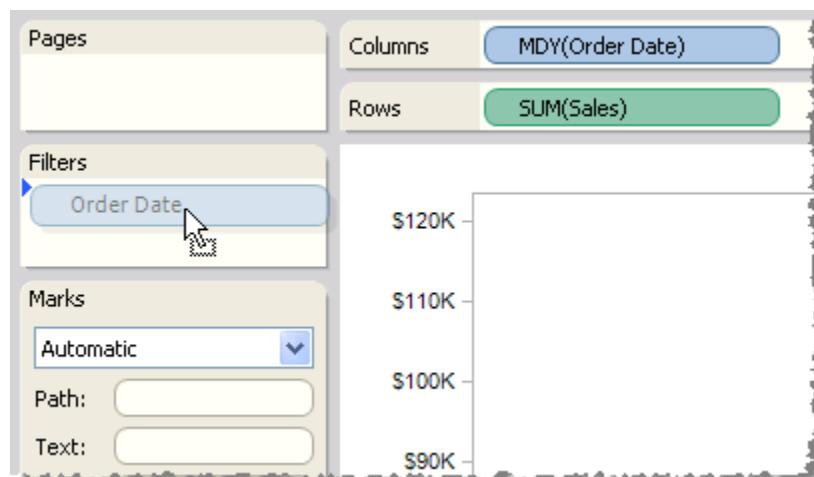
Use the options at the top of the Filter dialog box to define these types of filters.



## Discrete Date Filters

Sometimes you may want to filter to include specific individual dates or entire date levels. This type of filter is called a *Discrete Date Filter* because you are defining discrete values instead of a range. Follow the steps below to create a discrete date filter.

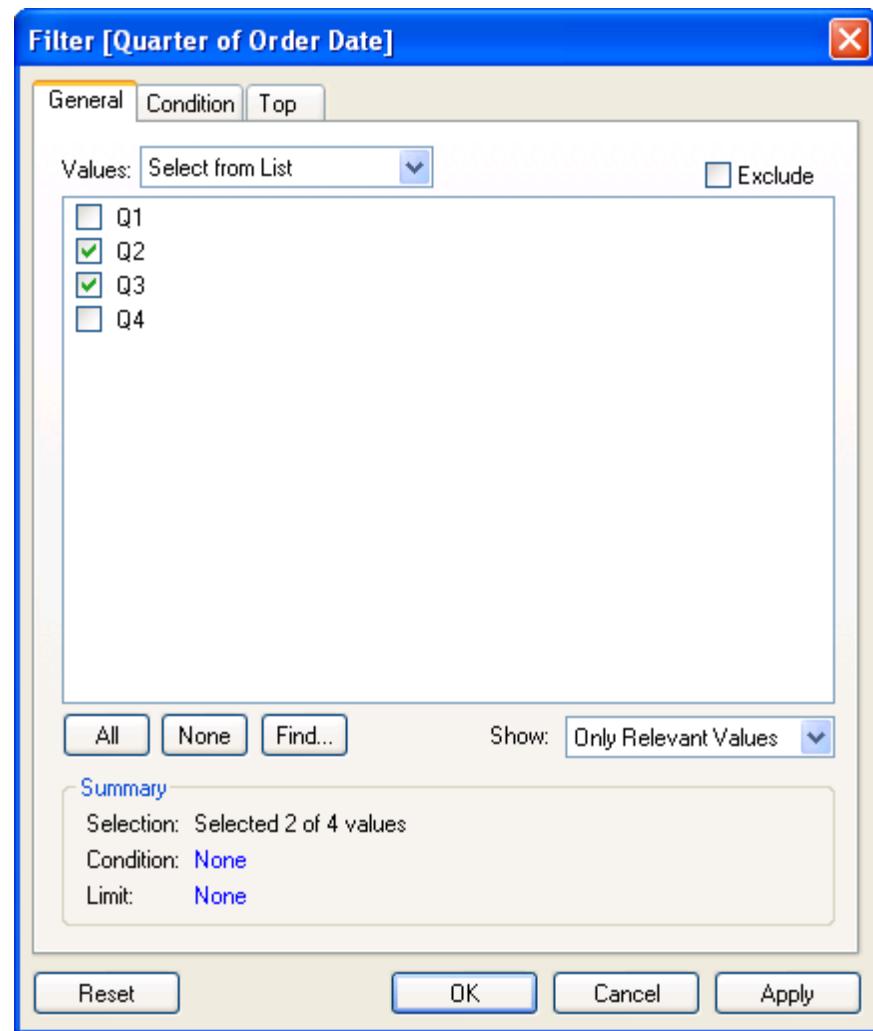
1. Drag a date field from the Data window and drop it on the Filters shelf.



2. In the Filter Field dialog box, select a date level or select Individual dates and then click Next.



3. In the Filter dialog box, select the dates you want to include.

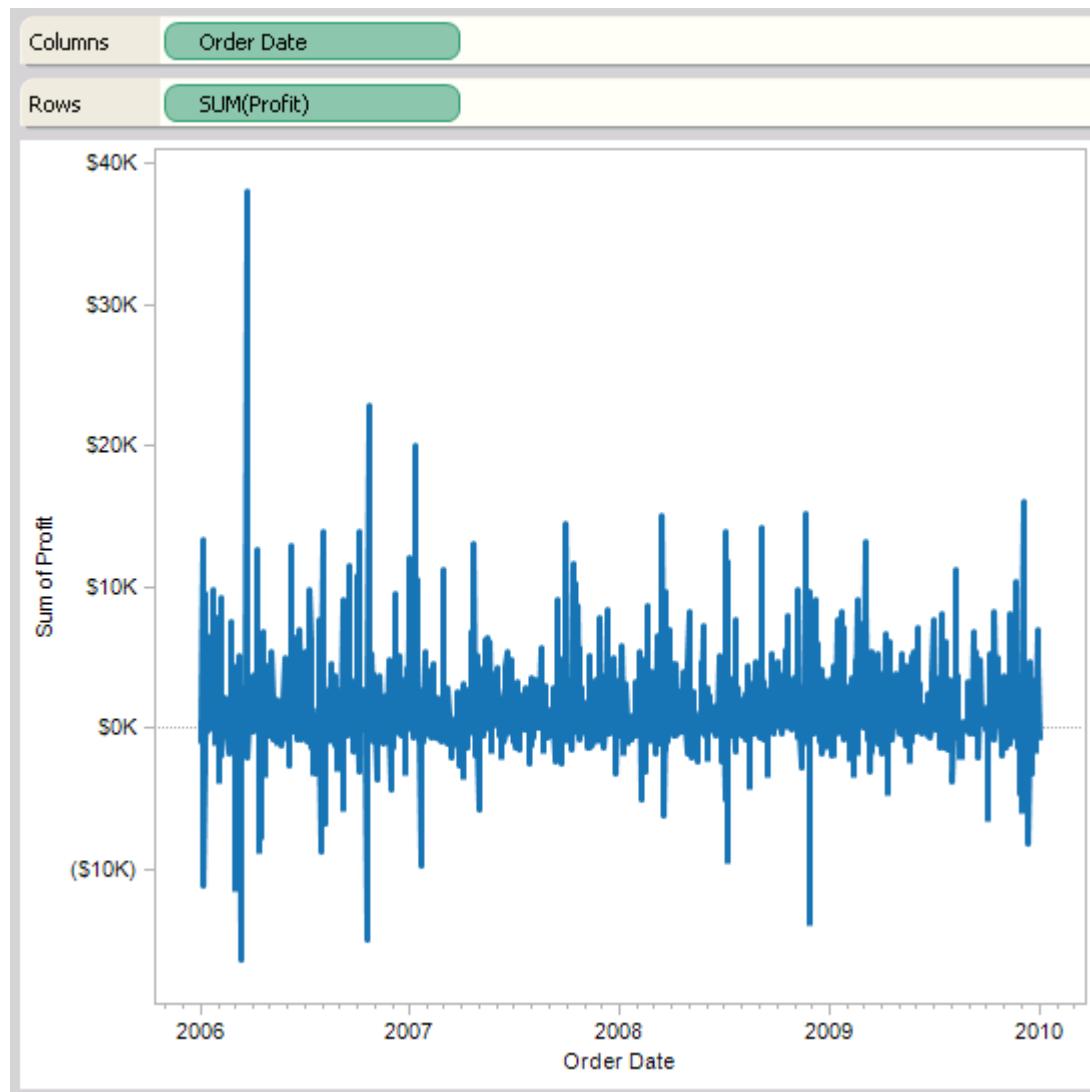


4. When finished, click OK.

## Example - Filtering Dates

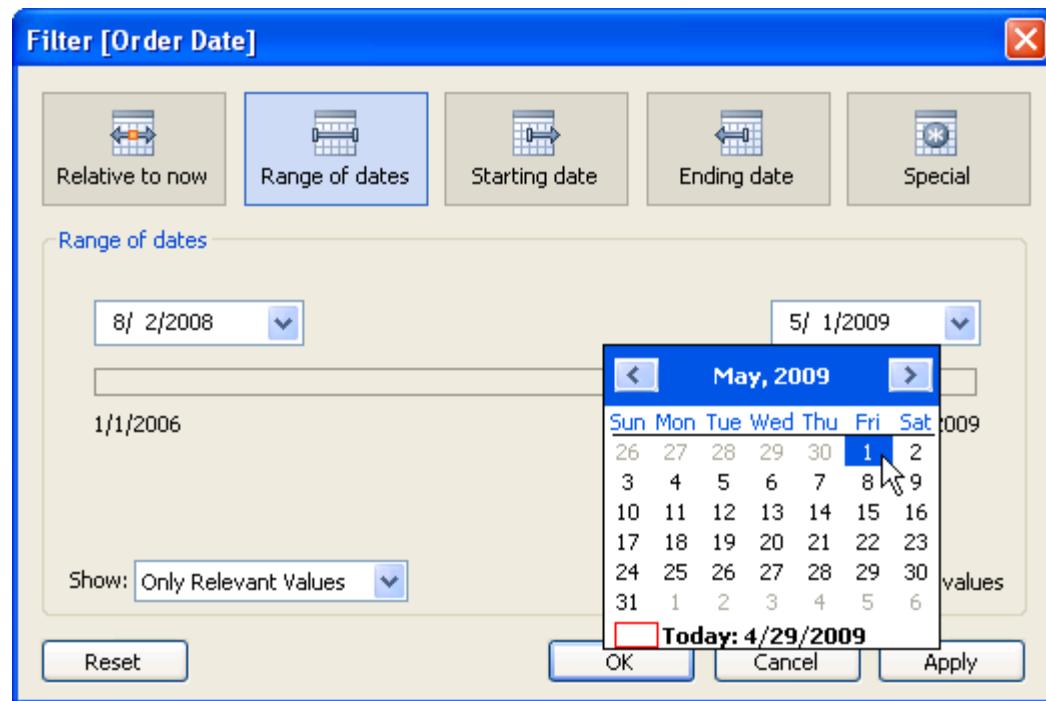
This example filters a line graph, to show the profit over a specific range of time. The steps are as follows:

1. Create the initial view shown below. It was created using the Superstore Sales Excel data source. Place Order Date on to the Columns shelf and select All Values as the aggregation. Then place Profit onto the Rows shelf.



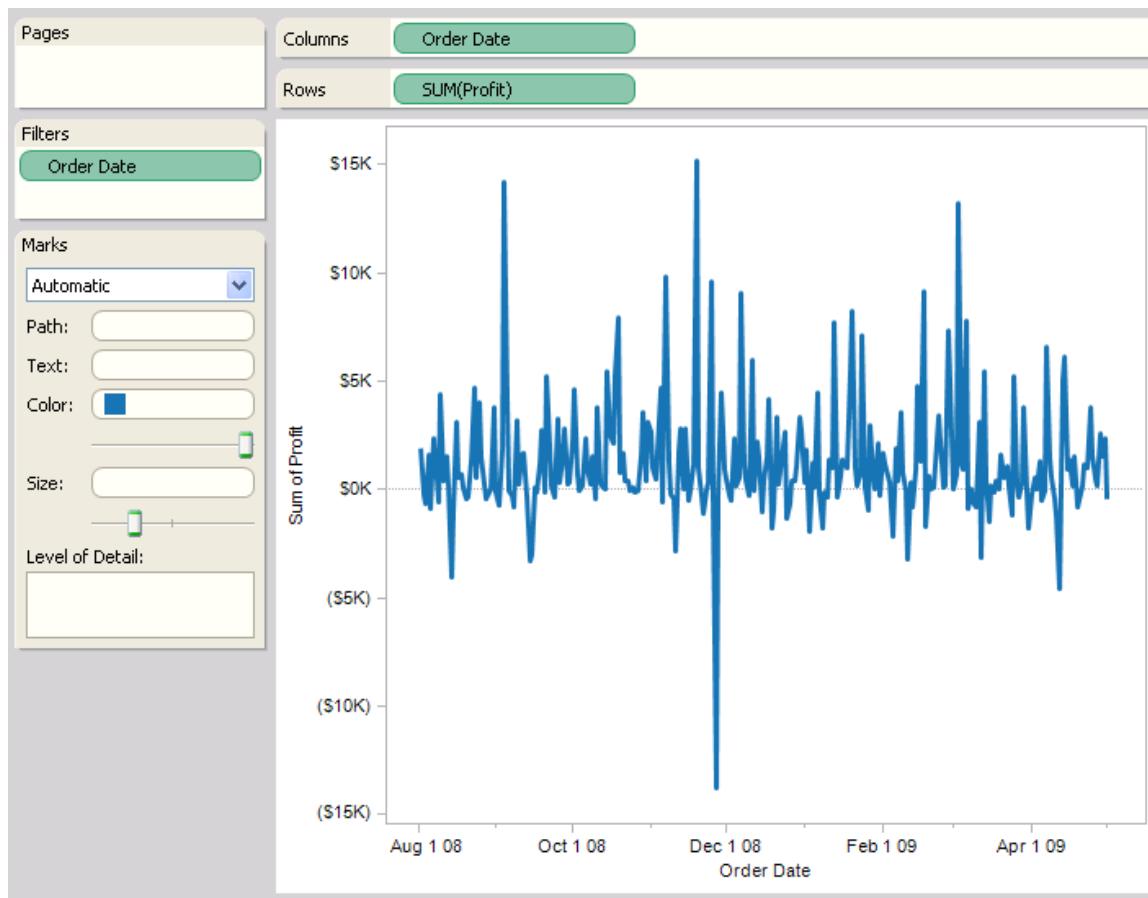
2. Now let's filter the view to include only orders that were placed between August 2, 2008 and May 1, 2009. To create this filter drag the Order Date field to the Filters shelf and select Range of Dates in the Filter Field dialog box. Then click Next.

The Filter dialog box is shown below. It displays the Order Date limits. Use the drop-down date controls to specify a new lower limit of August 2, 2008 and an upper limit of May 1, 2009.



The filtered view is shown below.

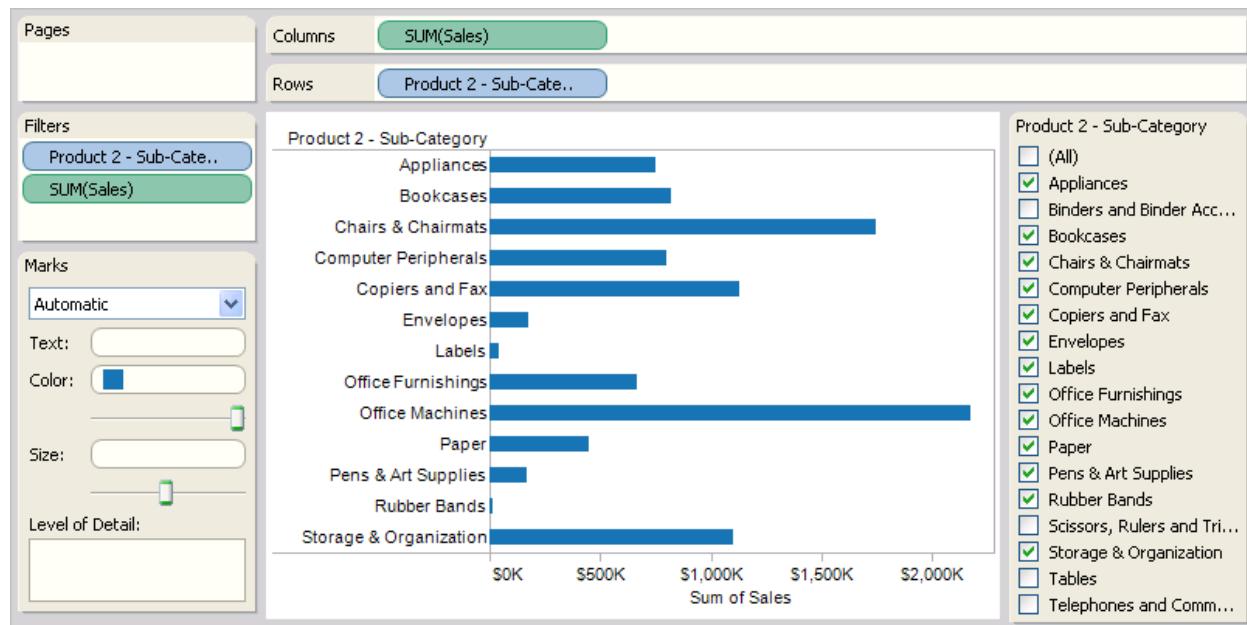
## Tableau Desktop Help



## Using Quick Filters

### Using Quick Filters

Tableau lets you quickly add and modify filters using Quick Filters. When you turn on a Quick Filter, a smaller representation of the Filter dialog box opens as a new card. From there you can quickly decide what to include in the view.



- [Turning on Quick Filters](#)
- [Quick Filter Options](#)
- [Searching Quick Filters](#)

## Turning on Quick Filters

A Quick Filter can be turned on for existing filters or for non-filtered fields. To show or hide a quick filter, select Show Quick Filter from the field's context menu.



## Quick Filter Options

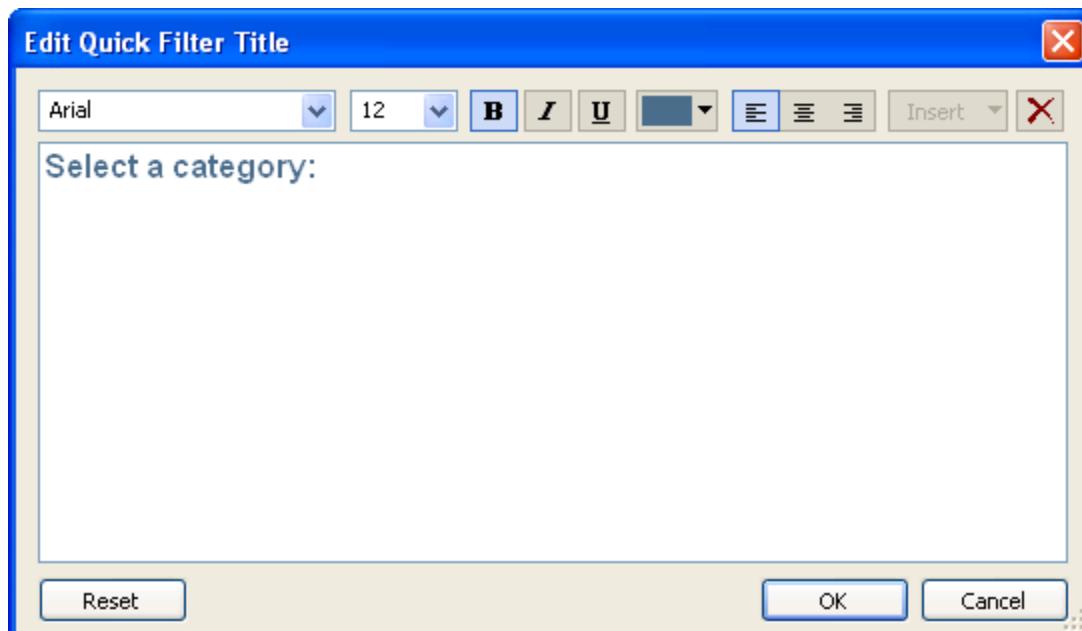
### Quick Filter Options

After you've turned on a quick filter there are many different options that let control how the filter works and its appearance. You can access these options using the card menu in the upper right corner of the quick filter card. Some options are available for all types of filters and others depend on whether you're filtering a Categorical field (dimensions) or a Quantitative field (measures). Finally, you can customize how quick filters display on the sheet, in dashboards, or when published to Tableau Server.

- [General Quick Filter Options](#)
- [Categorical Quick Filter Options](#)
- [Quantitative Quick Filter Options](#)
- [Customizing Quick Filters](#)

## General Quick Filter Options

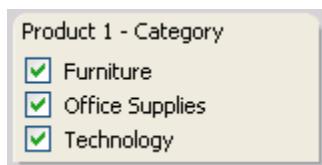
- *Edit* - This option opens the main Filter dialog box so you can further refine the filter by adding conditions and limits.
- *Clear Filter* - Removes the filter from the Filters shelf and removes the quick filter.
- *Make Global* - Make the filter global, which means it applies to all sheets that use the same data source.
- *Only Relevant Values* - Specifies which values to show in the quick filter. When you select this option other filters are considered and only values that pass these filters are shown. For example, a quick filter on State will only show the Eastern states when a filter on Region is set. You can use the toggle at the top of the quick filter card to switch between this option and the All Values in Database option.
- *All Values in Database* - Specified which values to show in the quick filter. When you select this option all values in the database are shown regardless of the other filters on the view.
- *Edit Title* - By default the title of the quick filter is the name of the field being filtered. Use this option to modify the title. Click Reset to return to the default title.



- *Hide Card - Hides the quick filter card but does not remove the filter from the Filters shelf.*

## Categorical Quick Filter Options

- *Include Values* - The items selected in the quick filter will be included in the view.
- *Exclude Values* - The items selected in the quick filter will be excluded from the view.
- *Multiple Values List* - Displays the values in the quick filter as a list of checkboxes where multiple values can be selected.



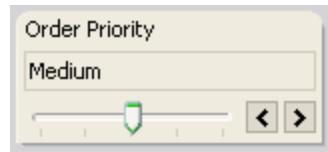
- *Single Value List* - Displays the values of the quick filter as a list of radio buttons where only a single value can be selected at a time. An "All" option can be added to the list to let you quickly select all values without switching to a multiple values list.



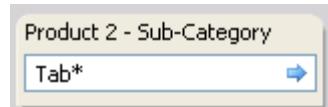
- *Compact List* - Displays the values of the quick filter in a drop-down list where only a single value can be selected at a time.



- *Slider - Displays the values of the quick filter along the range of a slider. Only a single value can be selected at a time. This option is useful for dimensions that have an implicit order such as dates.*



- *Wildcard Match - Displays a text box where you can type a few characters. All values that match those characters are automatically selected. You can use the asterisk character as a wildcard character. For example, you can type "tab\*" to select all values that begin with the letters "tab". Pattern Match is not case sensitive. If you are using a multidimensional data source, this option is only available when filtering single level hierarchies and attributes.*



## Quantitative Quick Filter Options

- *Range of Values/Dates - shows the filtered values as a pair of sliders that you can adjust to include or exclude more values. Click on the upper and lower limit readouts to enter the values manually.*

*The darker area inside the slider range is called the data bar. It indicates the range in which data points actually lie in the view. Use this indicator to determine a filter that makes sense for the data in your data source. For example, you may filter the Sales field to only include values between \$200,000 and \$500,000 but your view only contains values between \$250,000 and \$320,000. The range of data you can see in the view is indicated by the data bar while the sliders show you the range of the filter.*



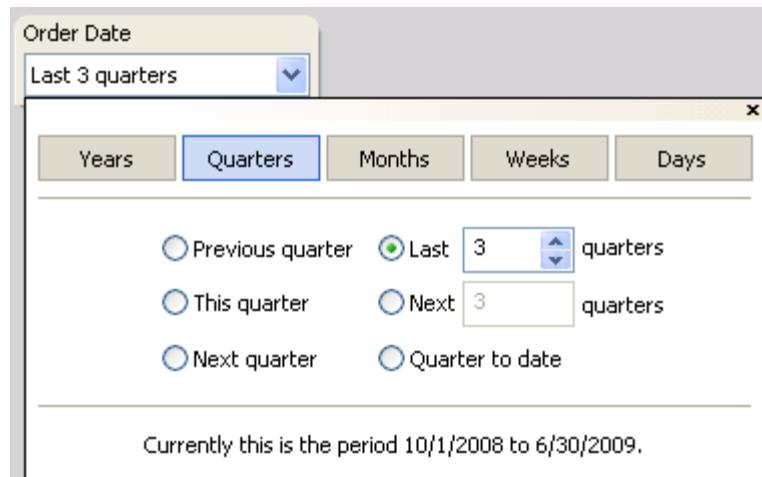
- *At Least/Starting Date- shows a single slider with a fixed minimum value. Use this option to create a filter using an open ended range.*



- *At Most/Ending Date - shows a slider with a fixed maximum value. Use this option to create a filter using an open ended range.*



- *Relative to Now - shows a control where you can define a dynamic date range that updates based on when you open the view. The option is only available for filters on continuous date fields.*

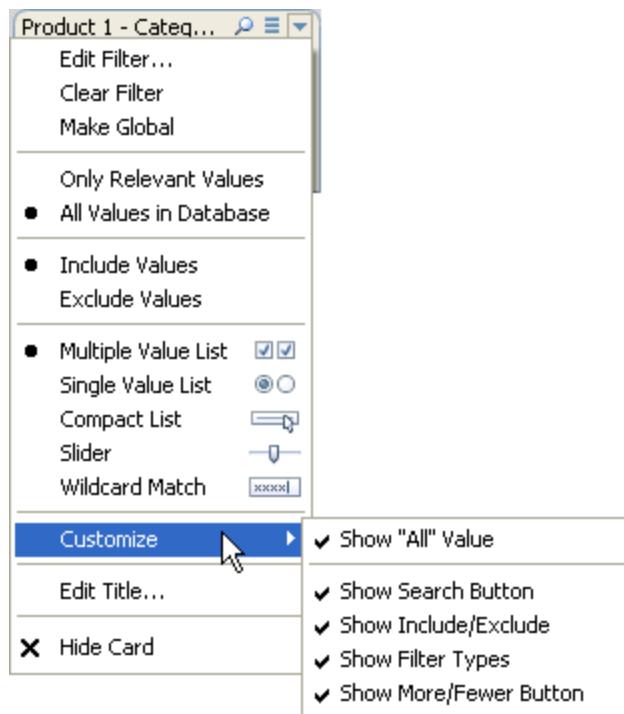


- *Browse Periods - shows common date ranges such as past day, week, month, three months, one year, and five years. This option is only available for filters on continuous date fields.*



## Customizing Quick Filters

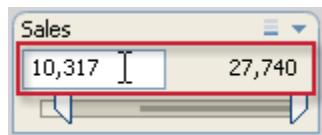
You can control how a quick filter control appears on the sheet, in dashboards, or when published to Tableau Server. Customize quick filters by selecting *Customize* on the quick filter card menu.



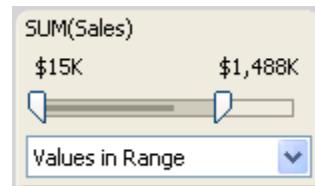
Then select from the following options:

- Show “All” Value** - toggles whether to show the “All” option that displays by default in multiple values and single value lists.
- Show Search Button** - toggles whether to show the search button at the top of the quick filter.
- Show Include/Exclude** - toggles whether to show the Include Values and Exclude Values commands on the quick filter card menu. When shown, users can switch the quick filter between include and exclude modes.
- Show Filter Types** - toggles whether to let users change the type of quick filter is shown. For example, when shown, a user can change a multiple values list to a compact list.
- Show More/Fewer Button** - toggles whether to show the More/Fewer button at the top of the quick filter.

- *Show Readouts - controls whether the minimum and maximum values are displayed as text above a range of values. The readouts can be used to manually type a new value instead of using the sliders.*



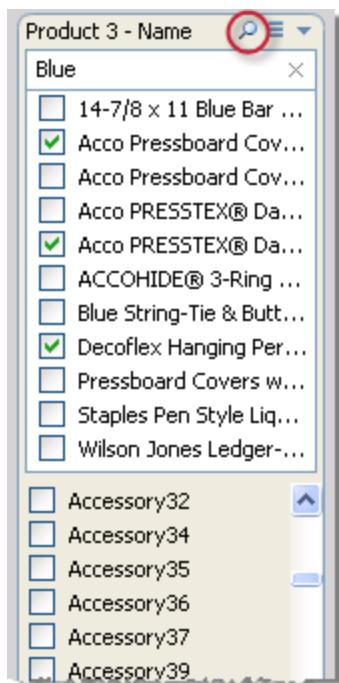
- *Show Null Controls - shows a drop-down list that lets you control how the filter handles null values. You can select from the following options:*
  - *Values in Range - the filter only includes values within the specified range.*
  - *Values in Range and Null Values - the filter includes values within the specified range as well as null values.*
  - *Null Values Only - the filter includes only null values.*
  - *Non-Null Values Only - the filter includes only values that are not null.*
  - *All Values - the filter includes all values. Use this option to quickly reset the selected range to include all values.*



## Searching Quick Filters

Sometimes a categorical quick filter may contain a lot of values. You can use the Search option to quickly find and select the values you want. To open the search field, click the Search icon in the upper right corner of the quick filter card. Then start typing the value you want to select. Matching values that contain the specified characters will show directly below the search field where you can select or deselect them as needed.

By default, search will return all values that contain the search term. You can use the asterisk character as a wildcard to restrict the results to values that begin with or end with the specified characters. For example, searching for “Bl\*” will find all values that start with the characters b and l. Search is not case sensitive.

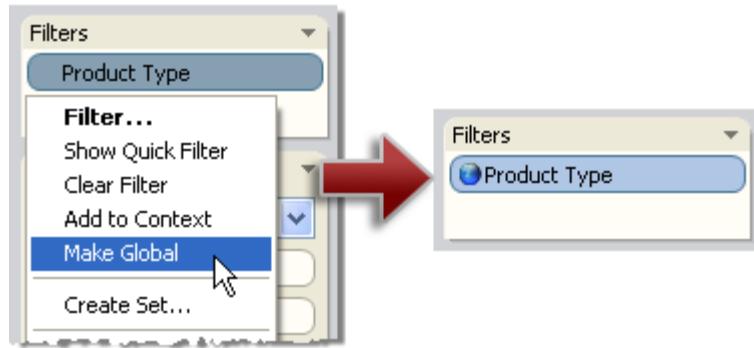


## Global Filters

A global filter is a filter that applies to all worksheets in the workbook that are connected to the same data source. For example, you may have a filter that only includes a specific region or product of interest. Rather than adding this filter every time you create a new sheet, you can simply create the filter once and then make it global.

### To make a global filter:

- Right-click an existing filter on the filter shelf and select Make Global.



The field is marked with a globe icon and the filter is applied to all worksheets in the workbook. Additionally, the filter is automatically added to any new worksheet you create. Any changes you make to the filter affects all of the worksheets.

At anytime you can make a global filter local again. When you make a filter local, the filter remains on all the worksheets, however, they are no longer tied together and can be deleted or modified on an individual basis.

### To make a global filter local:

- Right-click on the global filter on the filter shelf and select Make Local.



*The globe icon is removed and the filter can once again be modified individually per worksheet.*

## Context Filters

### Context Filters

By default, all filters that you set in Tableau are computed independently. That is, each filter accesses all rows in your data source without regard to other filters. However, you can set one or more categorical filters as context filters for the view. You can think of a context filter as being an independent filter. Any other filters that you set are defined as dependent filters because they process only the data that passes through the context filter.

You may create a context filter to:

- Improve performance – If you set a lot of filters or have a large data source, the queries can be slow. You can set one or more context filters to improve performance.
- Create a dependent numerical or top N filter – You can set a context filter to include only the data of interest, and then set a numerical or a top N filter.

For example, suppose you're in charge of breakfast products for a large grocery chain. Your task is to find the top 10 breakfast products by profitability for all stores. If the data source is very large, you can set a context filter to include only breakfast products. Then you can create a top 10 filter by profit as a dependent filter, which would process only the data that passes through the context filter.

Context filters are particularly useful for relational data sources because a temporary table is created. This table is automatically generated by Tableau when you set the context, and acts as a separate (smaller) data source that results in increased performance when you build data views.

#### Note:

For Excel, Access, and text data sources, the temporary table is created as an Access table. For SQL Server, MySQL, and Oracle data sources, you must have permission to create a temporary table on the server.

For multidimensional data sources, temporary tables are not created and context filters only define which filters are independent and dependent.

- [Creating Context Filters](#)
- [Example – Context Filters](#)

## Creating Context Filters

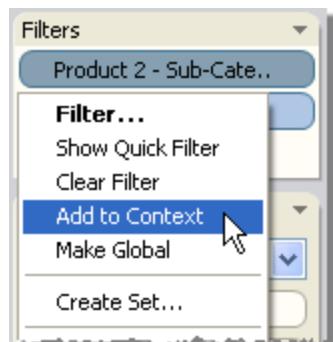
To create a context filter, select *Add to Context* from the context menu of an existing categorical filter. The context is computed once to generate the view. All other filters are then computed relative to the context. Context filters:

- Appear at the top of the Filters shelf.
- Are identified by a grey color and the pushpin icon



- Cannot be rearranged on the shelf.

As shown below, the Product dimension is set to be the context for a data view. The Customers filter is computed using only the data that passes through Product.



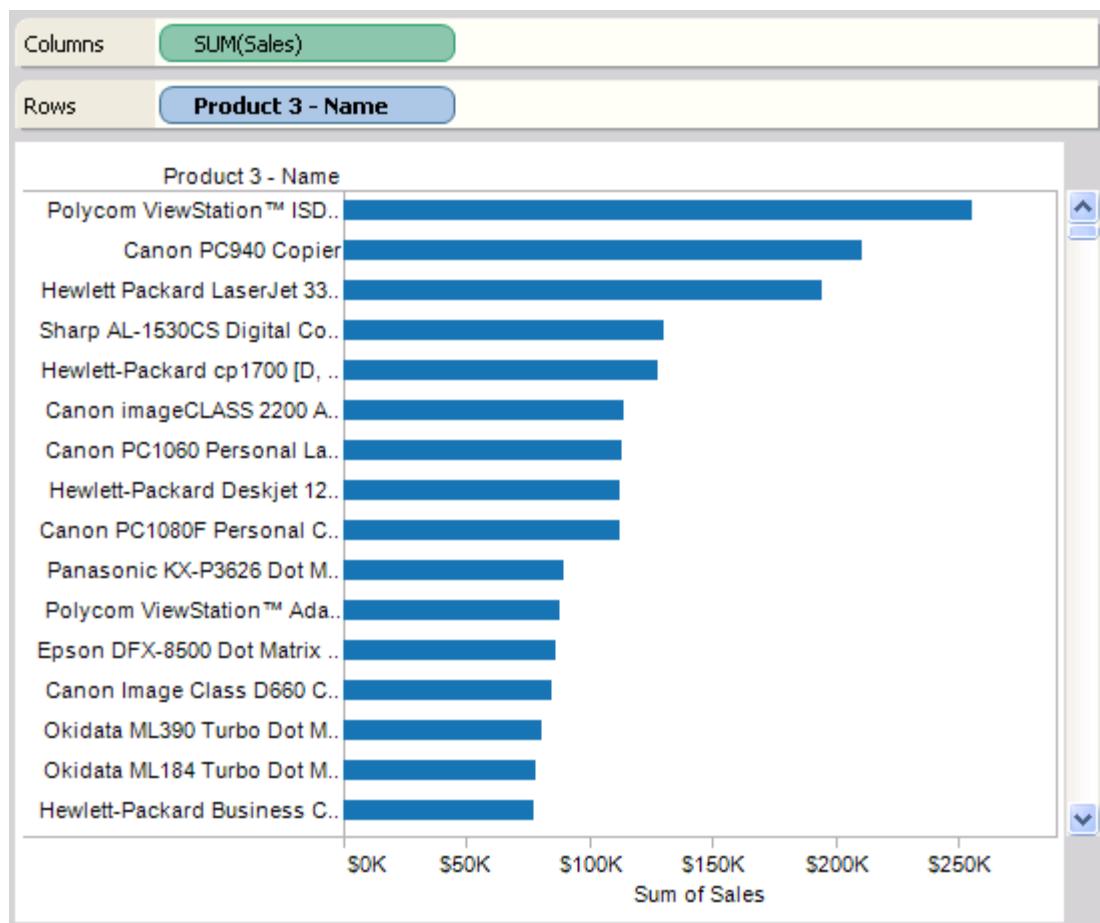
You can modify a context filter by:

- Removing the field from the Filters shelf – If other context filters remain on the shelf, a new context is computed.
- Editing the filter – A new context is computed each time you edit a context filter.
- Selecting Remove from Context – The filter remains on the shelf as a standard categorical filter. If other context filters remain on the shelf, a new context is computed.

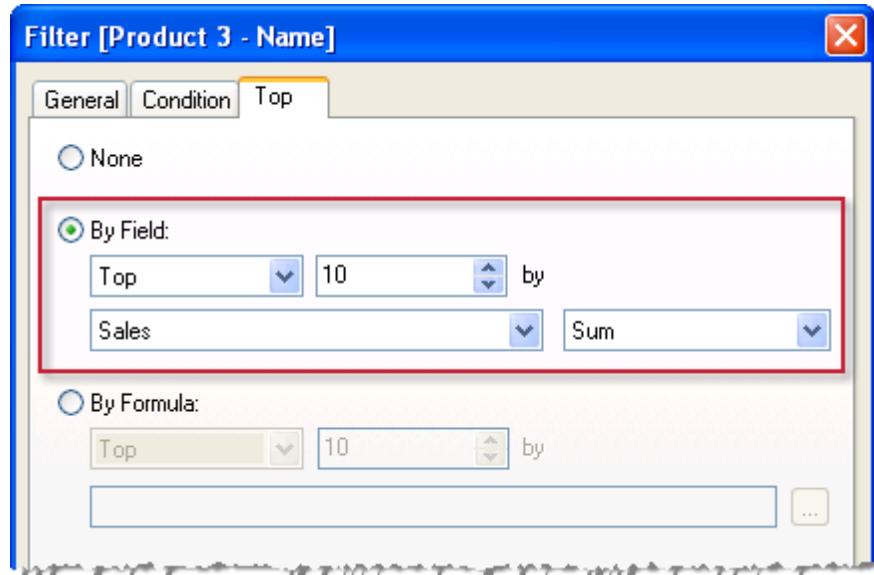
## Example – Context Filters

This example walks you through how to create a context filter. First you'll filter a view to show the top 10 products by sales. Then you'll create a context filter on product category so you can see the top 10 furniture products.

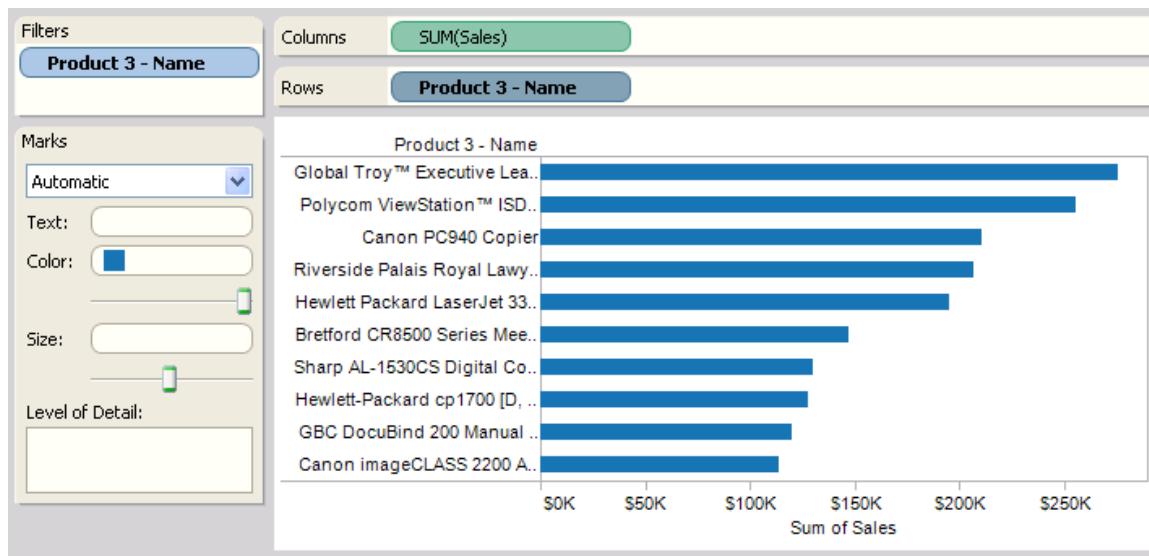
1. Use the Sample - Superstore Sales data source to create the initial view shown below. The view shows the sales for all products sorted with the highest sale at the top.



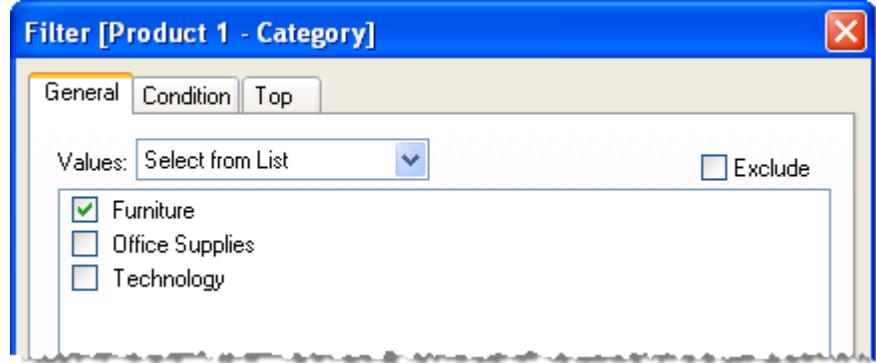
2. Now create a Top 10 filter to just show the top selling products. You can create this filter by dragging the Product 3- Name field to the Filters shelf. In the filter dialog box, switch to the Top tab and define a filter that is Top 10 by Sum of Sales. Refer to [Adding Limits to Filters](#) to learn more about defining a Top N filter.



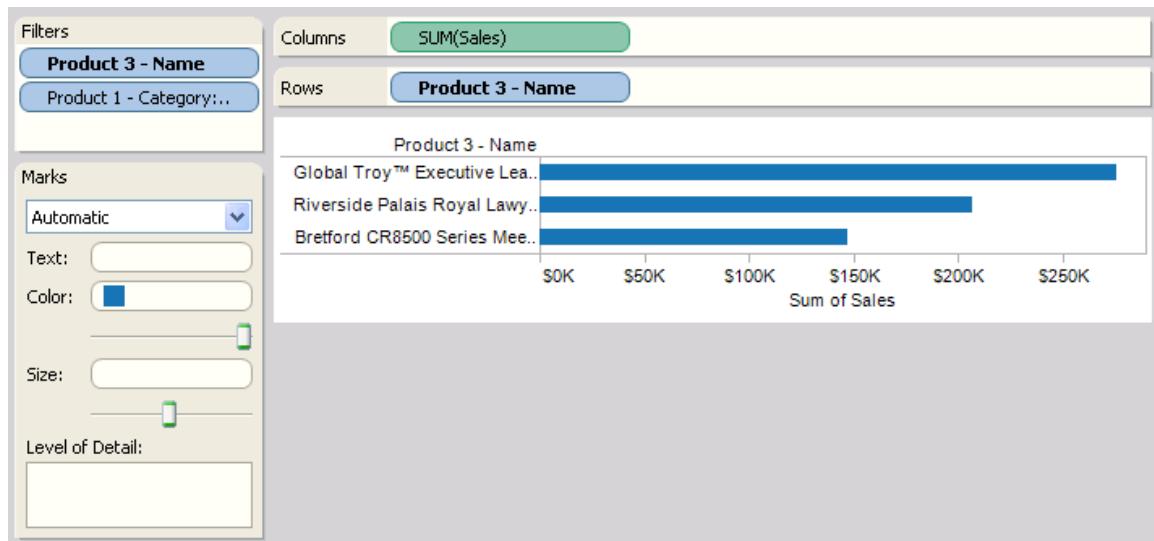
- When you click OK, you'll see that the view is filtered to show the top 10 products in terms of sales.



- Now, let's add another filter to only show only furniture products. Drag the Product 1 - Category field to the Filters shelf and select Furniture. When finished, click OK.



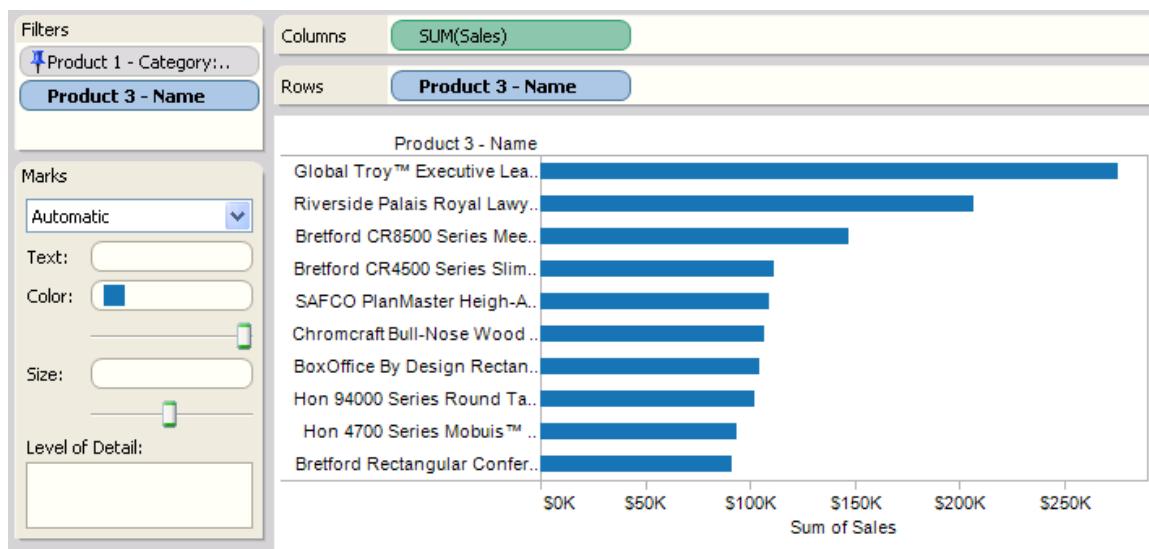
5. The view is filtered but instead of 10 products, it now only shows 3. The reason is because by default all filters are evaluated separately and the view shows the union of the results. So this view shows that three of the top 10 overall products are furniture products.



6. To find out what the top 10 furniture products are we need to make the Product 1 - Category filter a context filter. Right-click the field on the Filters shelf and select Add to Context.



- The filter is marked as a context filter and the view updates to show the top 10 furniture products. Tableau has first evaluated the data source and identified all of the furniture products. Then the Top 10 filter is evaluated on the results of that context.



## Calculation Filters

### Calculation Filters

*Filters on dimensions that are not used elsewhere in the view are called calculation filters. For these types of filters, Tableau performs a calculation on the selected dimension members. This occurs when:*

- *The dimension is only on the Filters shelf (not used on other shelves).*
- *You define the filter to include multiple values.*

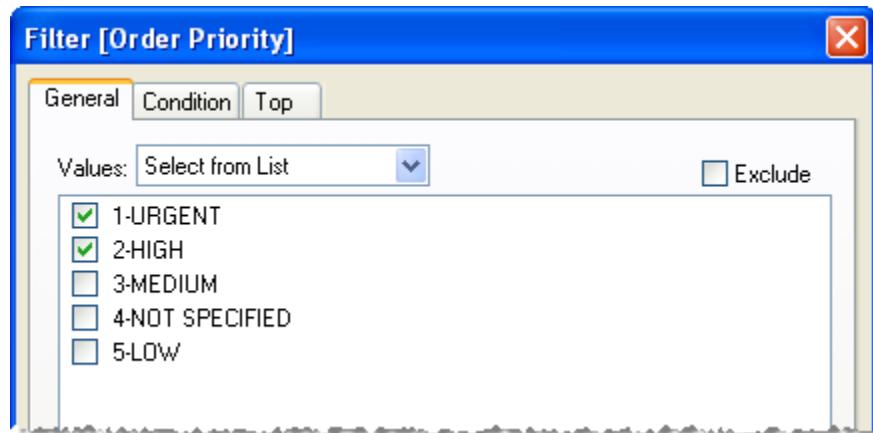
*The calculation icon  displays next to the field's name to indicate this operation.*

*The calculation that is performed depends on the data source. For relational data sources, the calculation matches the aggregation for each measure used in the view. For multidimensional data sources, the calculation is always a summation and the  icon is used to indicate this operation.*

- [Calculation Filters: Relational Data Source](#)
- [Calculation Filters: Multidimensional Data Source](#)

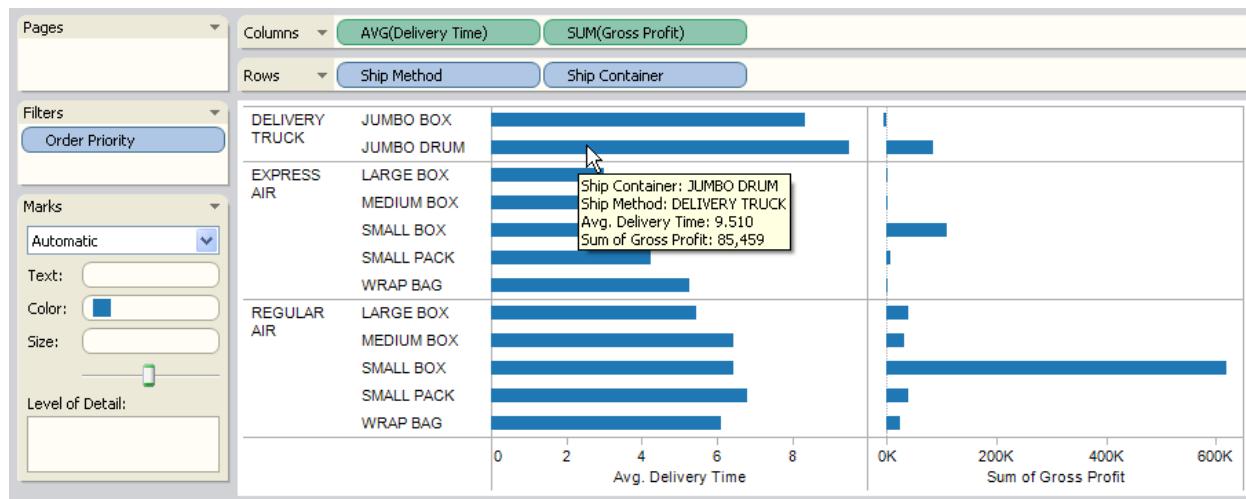
## Calculation Filters: Relational Data Source

Consider the view shown below. It consists of the Profit measure aggregated as a summation and the Order Quantity measure aggregated as an average. These measures are displayed with the Ship Mode and Container dimensions. An external filter that consists of two members of the Order Priority dimension is applied to the data.



Because the data source is relational, Tableau automatically applies the appropriate calculation to the members of the external filter based on the aggregation of each measure. Therefore, a summation is performed for Profit and an average is performed for Order Quantity.

For example, the tooltip shows the data for Jumbo Drums delivered by truck. The average order quantity is 24.3. This number was calculated by averaging the order quantities for all the rows that have an Urgent or High order priority. Similarly, the sum of profit is \$114,363. This number was calculated by summing the profit for all the rows that have an Urgent or High order priority.

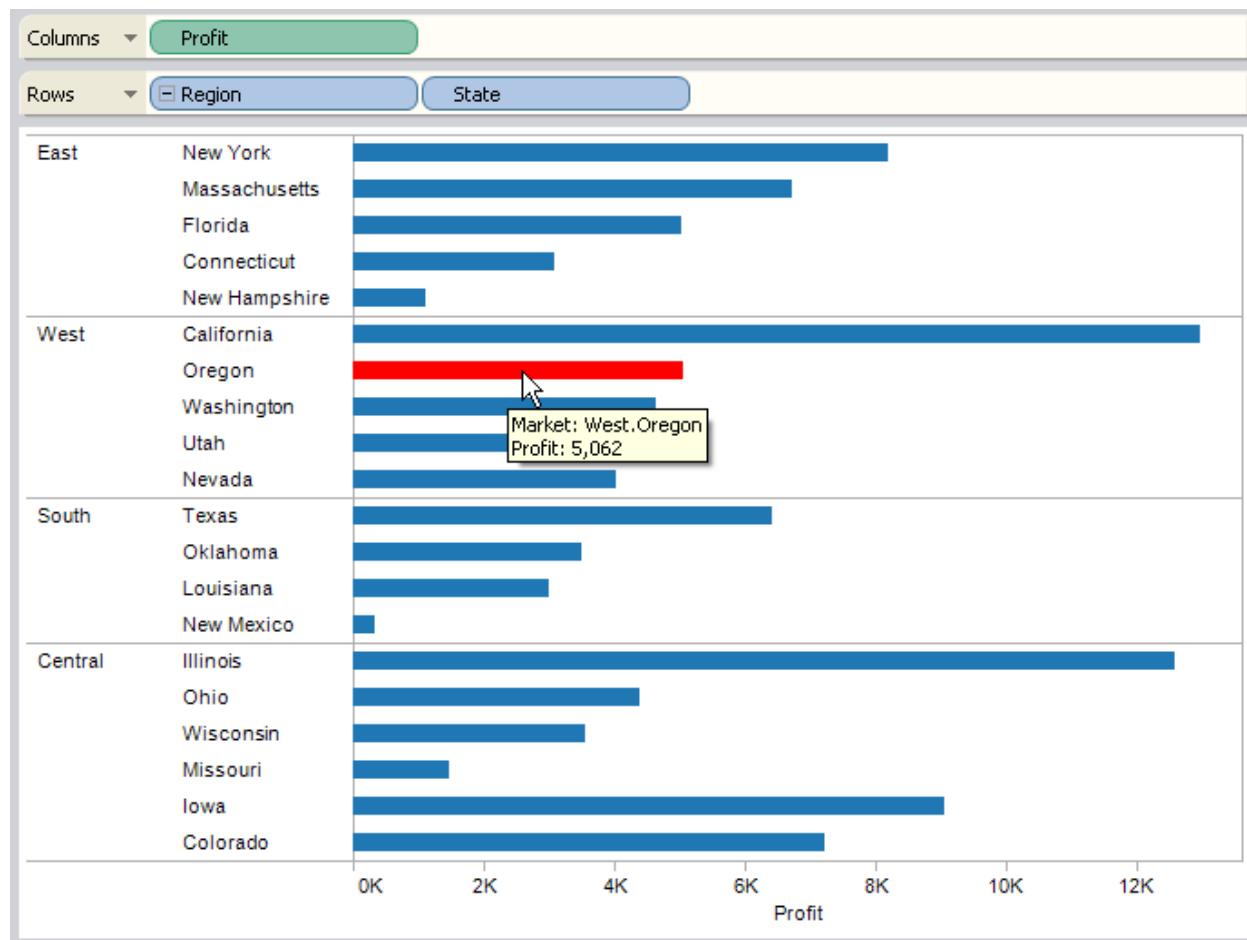


## Calculation Filters: Multidimensional Data Source

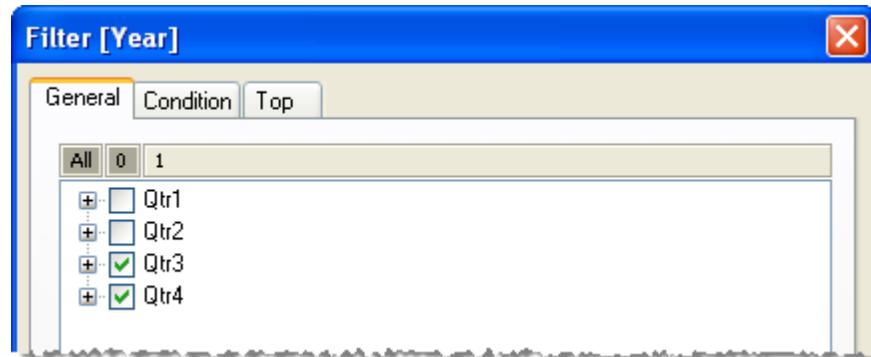
You can think of a calculation filter as “slicing” the cube’s data through the specified dimensions. Therefore, a calculation filter for a multidimensional data source is sometimes referred to as a slicer.

Because the aggregation for this arbitrary slice was not defined when the cube was created, Tableau automatically performs a summation. Fortunately, measures are usually aggregated as a summation. Therefore, applying a calculation filter produces a sum of a group of sums, which is a calculation that is useful and easy to interpret.

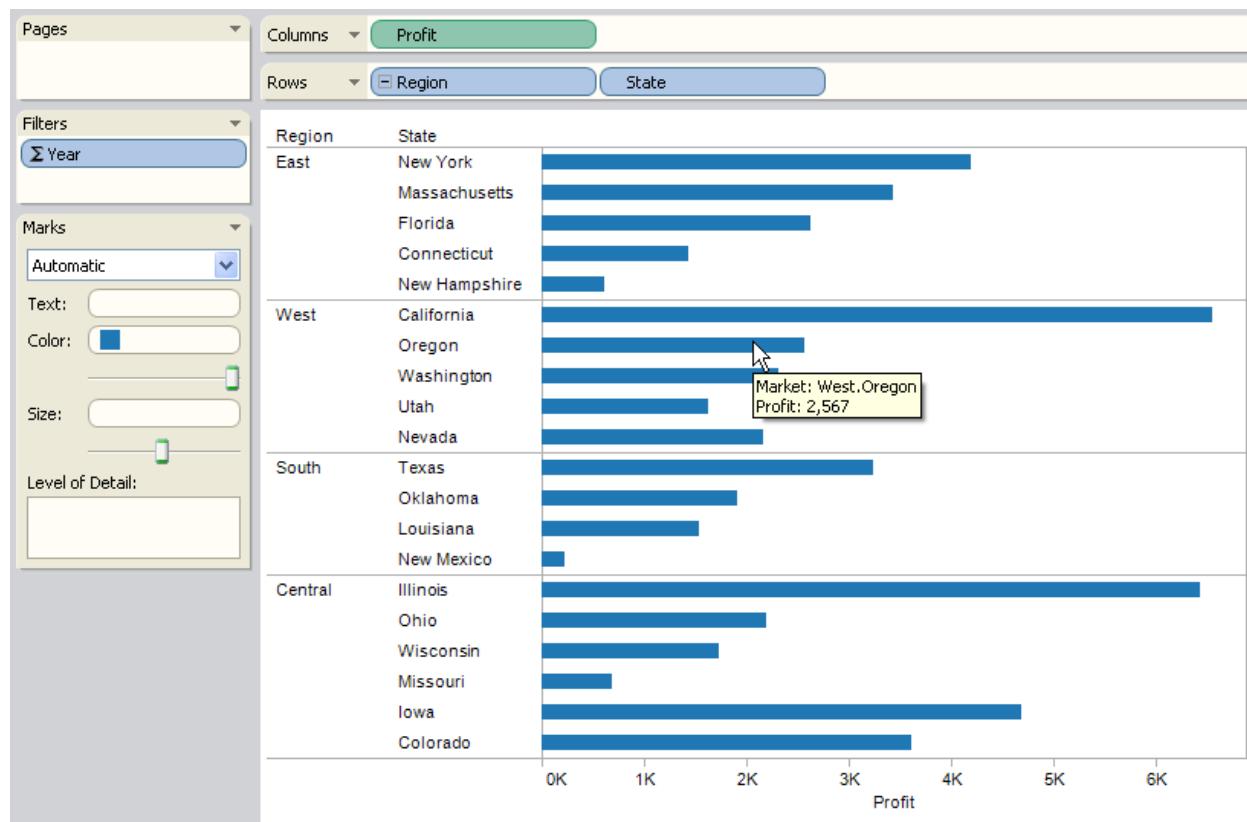
For example, consider the view shown below. The tool tip shows that the profit for Oregon is 5,062.



An external filter that consists of the Q3 and Q4 members of the Quarter dimension is applied to the data.



For example, in the view below the profit for Oregon is now \$2,567. This number was calculated by summing the data for Qtr3 and Qtr4.



## Sorting, Grouping, and Sets

### Sorting, Grouping, and Sets

*After you understand the basics of building data views, use sorting, groups, and sets to further refine your views and extract exactly the information you are looking for. This section discusses how to re-order and sort the data in a view, filter out unnecessary rows and columns, group dimension members into higher level categories, and create a set using multiple dimensions to create richer encodings.*

- [Sorting](#)
- [Groups](#)
- [Sets](#)

## Sorting

### Sorting

*In Tableau, sorting a data view means arranging dimension members in a specified order. Tableau supports computed sorting and manual sorting.*

- [Computed Sorting](#)
- [Manual Sorting](#)

## Computed Sorting

### Computed Sorting

You might want to sort customers by alphabetical order, or sort a product line from lowest sales to highest sales. Both of these sorts are “computed sorts” because they use programmatic rules that you define to sort the field.

- [About Computed Sorting](#)
- [How to Sort Data \(Computed Sorts\)](#)
- [Example – Sorting a Text Table](#)
- [Example – Sorting a Hierarchy](#)

## About Computed Sorting

*Sorting dimensions in a computed manner follows these rules:*

- *You can sort any discrete field after it has been placed on a shelf (except the Filters shelf).*
- *Each dimension that appears on a worksheet can be sorted independently of any other dimension.*
- *The shelf location of the dimension determines the component of the data view that's sorted. For example, if the dimension resides on the Columns shelf, the columns of the data view are sorted for that field. If the dimension resides on the Color shelf, the color encodings are sorted.*
- *Sorts are computed based on the values of the filters and sets in the view. Refer to [Groups](#) for more information.*
- *Sorted fields are identified with bold names.*

*Continuous fields are automatically sorted from lowest number to highest number (as indicated by the axes) and you cannot manually change the sort. However, you can reverse the order of an axis using field specific formatting.*

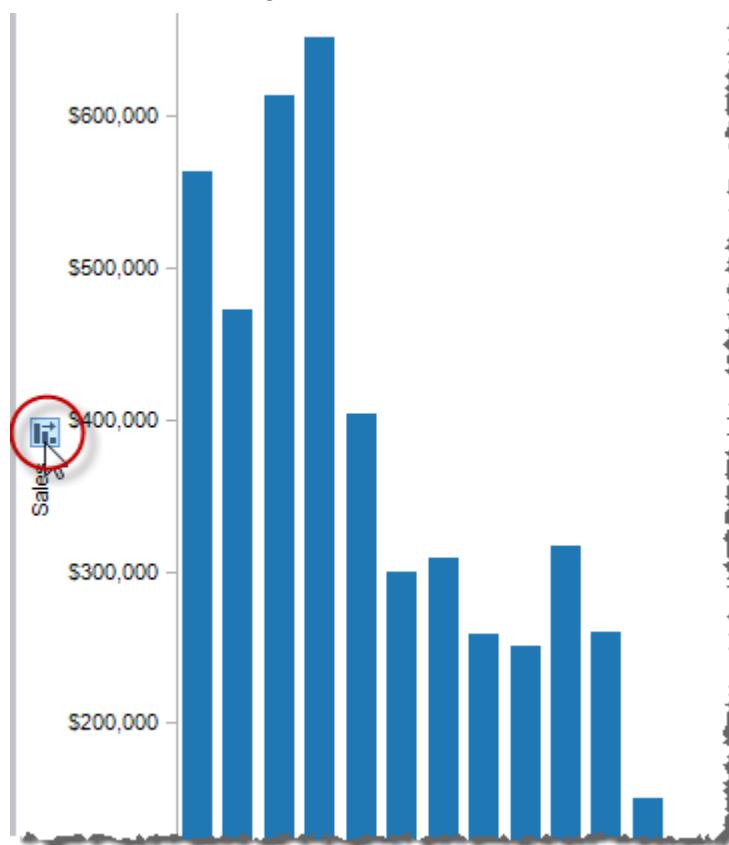
## How to Sort Data (Computed Sorts)

*Computed sorts can be applied either directly on an axis in the view or using the sort dialog box to apply computed sorts to specific fields in the view.*

### *Sorting on an Axis*

*A quick way to create a computed sort is to use the sort buttons on an axis. The sort buttons on an axis will automatically create a sort that makes sense for the view you've created. The sort will be computed, which means it will update correctly if the underlying data changes.*

*When you hover over an axis with your cursor, a sort icon displays. Click it once to sort Ascending, again to sort Descending, and a third time to clear the sort.*

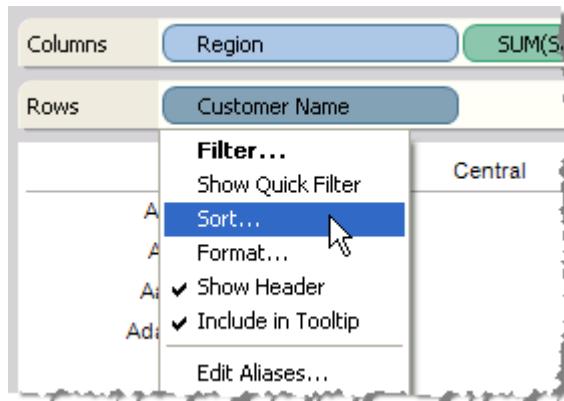


### *Sorting Specific Fields*

*You can sort a specific field using the Sort dialog box.*

1. Open the Sort dialog box.

*Right-click on the field that you want to sort and select Sort from the its context menu.*



## 2. Specify the sorting options.

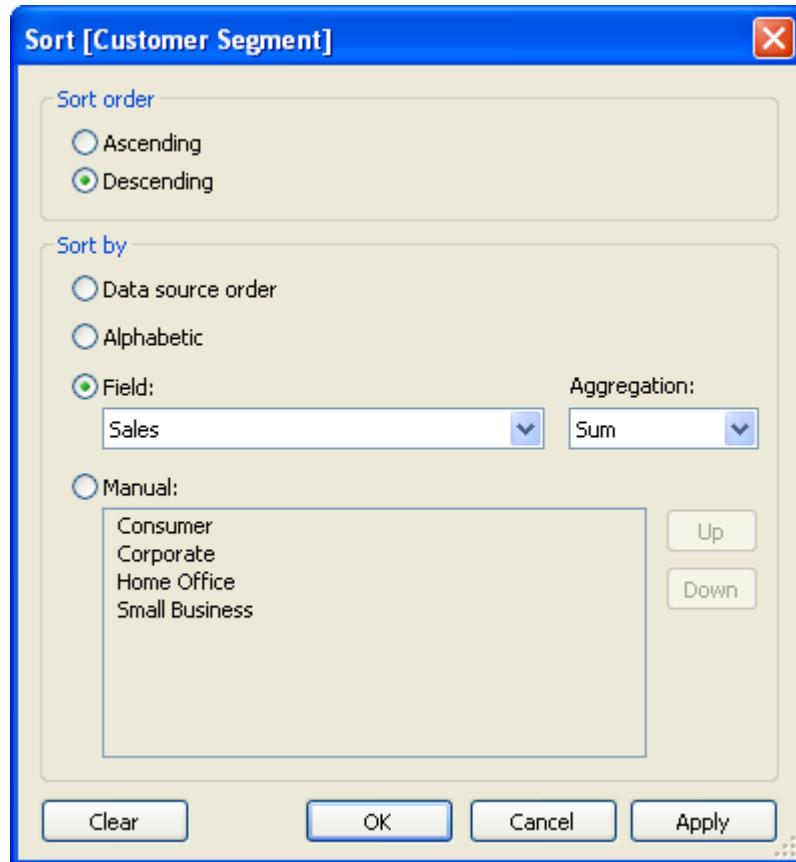
*Complete the Sort dialog box by specifying the following criteria:*

- *Sort order - Displays the sort results in ascending or descending order.*
- *Sort by – Sort by one of these three options:*
  - **Data source order** - *the order that the data source naturally orders the data. Generally for relational data sources, this tends to be in alphabetical order. If you are using a cube, this order is the defined hierachal order of the members within a dimension.*
  - **Alphabetic** - *the order of the letters in the alphabet.*
  - **Field** - *order the data based on the associated values of another field. For example, you could order several products by their total sales values.*

*When working with a relational data source and sorting by another field, you must also specify the aggregation function to use. This option is not available for multidimensional data sources because aggregations are defined when the cube is created and cannot be modified in Tableau.*

*A typical scenario is to sort one or more dimensions by a measure. For example, the Sort dialog box shown below is configured to sort the members of the Customer Segment field in descending order and by the sum of the Sales measure. The results*

will be displayed so that the member with the highest sales is displayed first, the member with the second highest sales is displayed second, and so on.



You should keep the following rules in mind when interpreting the sort results:

- Tableau computes the sort across the entire table using the specified criteria. Refer to [Example – Sorting a Text Table](#) for an example.
- Sorts do not break the dimension hierarchy. Sorted fields are always displayed within the ordered context already set forth by the fields on the Rows and Columns shelves. This means that Tableau will not rearrange any of the headers of the fields that appear before (to the left of) the sorted field.

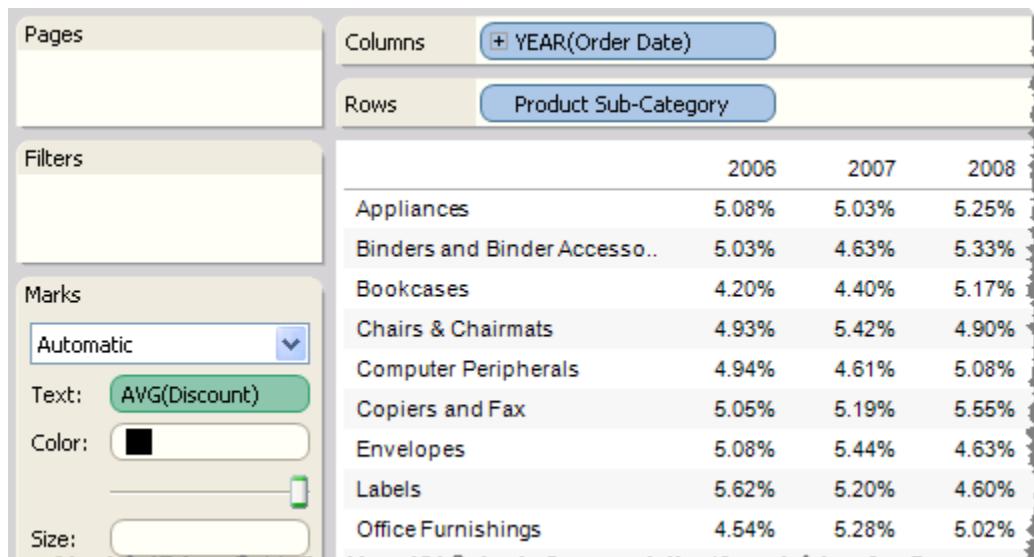
If you want to break the dimension hierarchy when sorting a multidimensional data source, place only the hierarchy level that you want sorted on the Rows or Columns shelf.

## Example – Sorting a Text Table

Using the Sample - Superstore Sales (Excel) data source, this example sorts the rows and columns of a text table to determine which products and years have the highest average discounts. To create the view, follow the steps below:

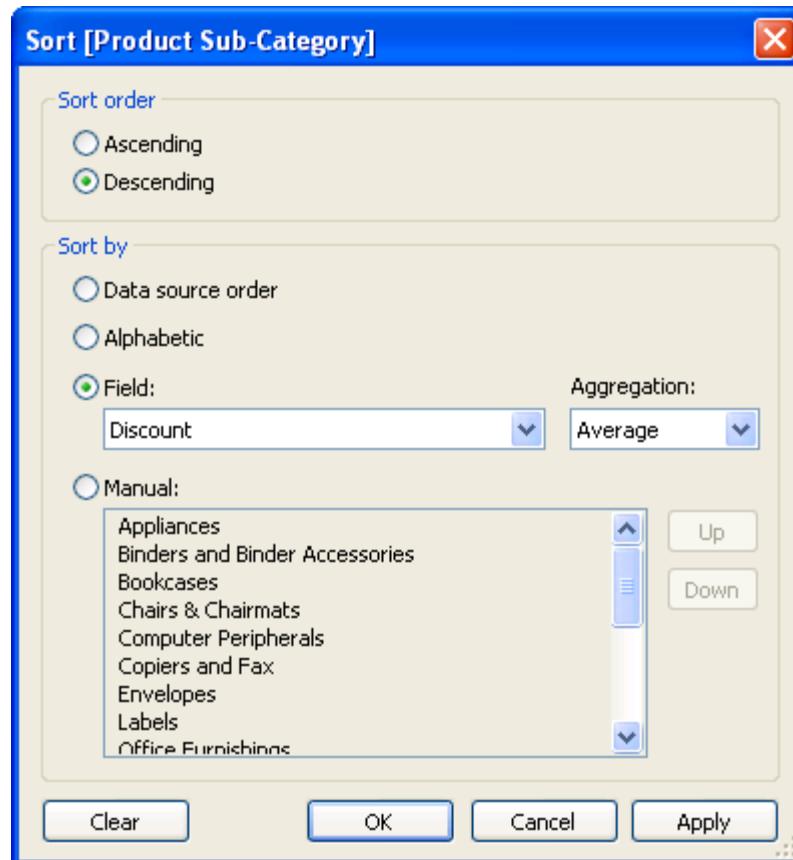
1. Place the Order Date dimension on the Columns shelf and the Product Sub-Category dimension on the Rows shelf.

Complete the text table by placing Discount on the Text shelf and aggregating the measure as an average (select Measure > Average from the field's context menu). By default, the table is sorted in alphabetical order.

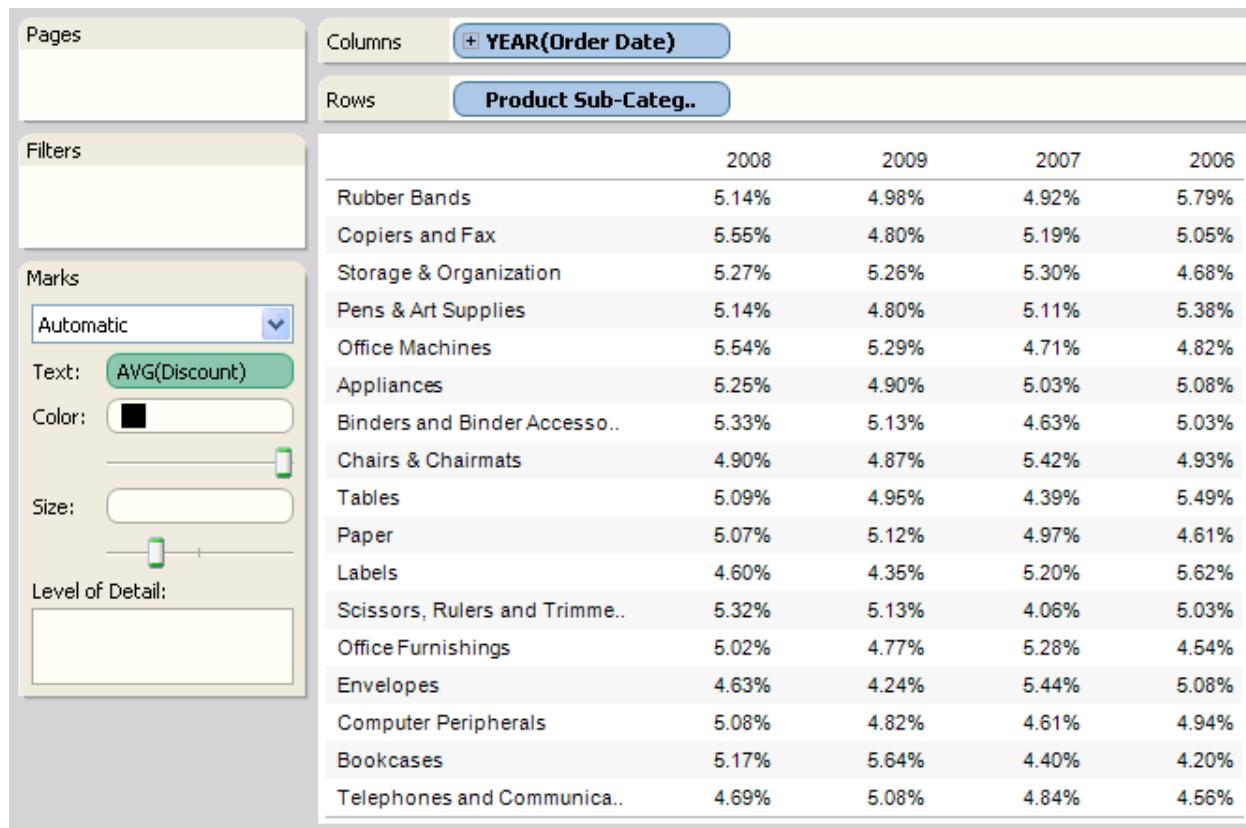


2. Sort the fields.

Right-click on Order Date field and select Sort. In the Sort dialog box select Descending as the Sort Order and sort by Discount aggregated as an Average. When finished click OK. Then apply the same sort to Product Sub-Category.

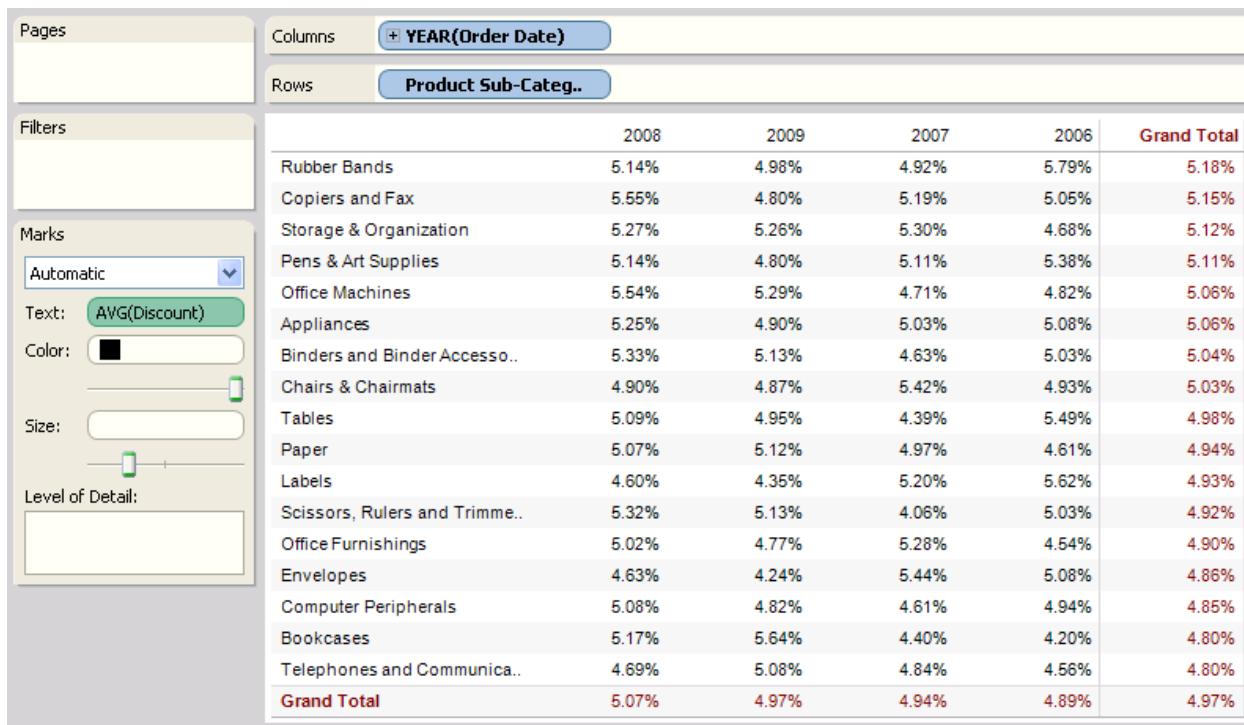


The view is shown below. Rubber Bands is the top row in the table because it has the largest average discount across all years, while Telephones and Communications are at the bottom in the table because that category has the smallest average discount across all years. Similarly, 2008 is the left most column because it has the largest average discount for all products, while 2006 is the right most column because it has the smallest average discount for all products.



*At first glance, it's not clear if the data has been correctly sorted. That's because Tableau computes the sort across the entire table using the specified criteria. By turning grand totals on for both columns and rows, using the Table menu, you can see that the sort was performed correctly.*

## Tableau Desktop Help

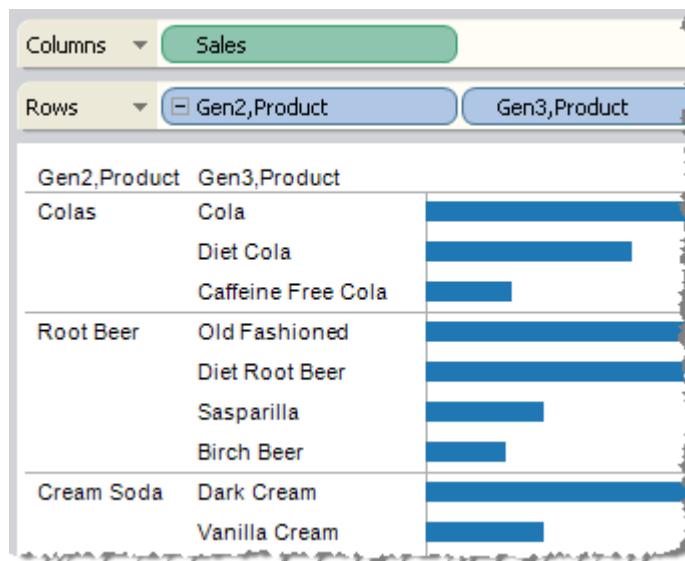


## Example – Sorting a Hierarchy

This example uses a multidimensional data source to sort the rows of a bar chart in order to determine which beverages have the highest sales. To create the view, follow the steps below.

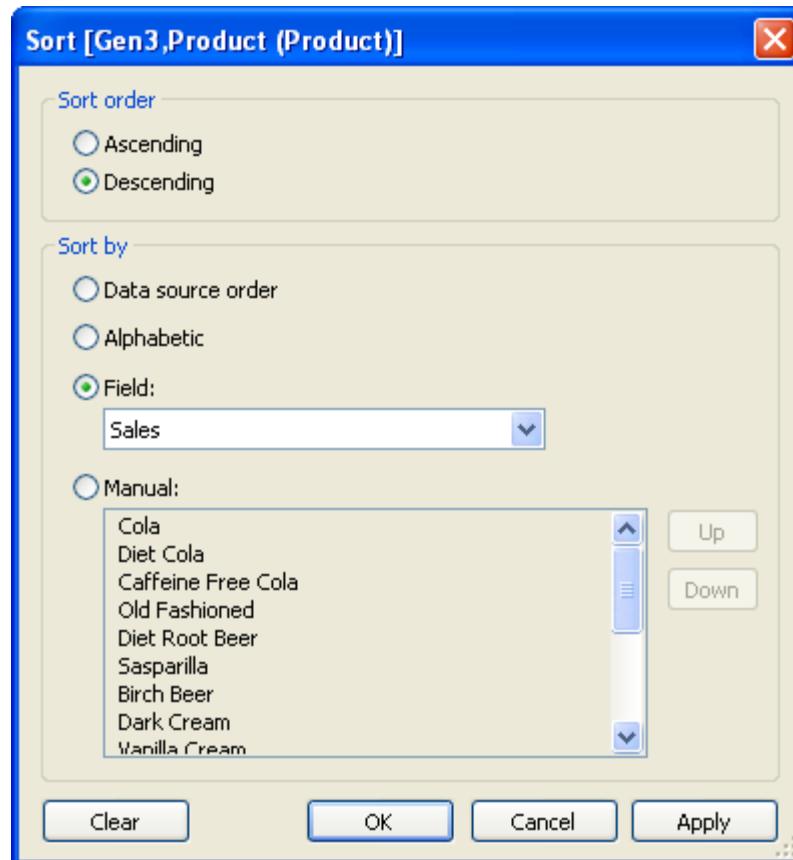
1. Place the Sales measure on the Columns shelf and the Gen2,Product dimension on the Rows shelf.

Drill down one level in the hierarchy to display Gen3,Product.

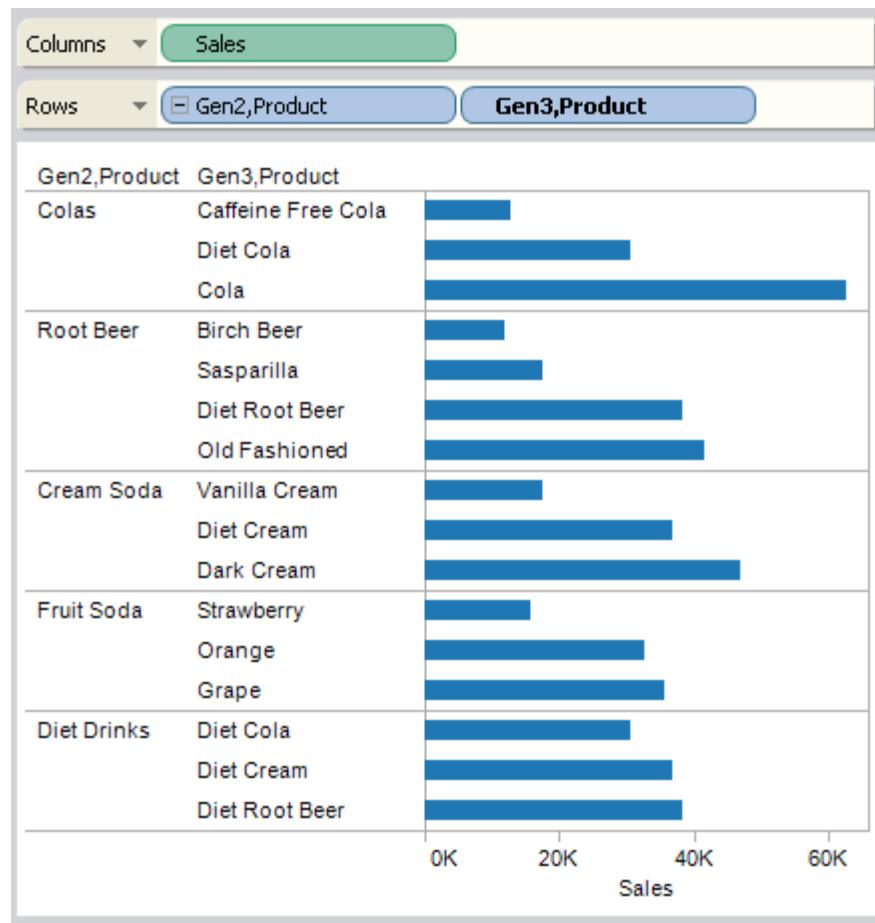


2. Sort Gen3,Product in ascending order by the Sales measure.

Right-click on Gen3,Product and select Sort from the field's context menu. In the Sort dialog box select Ascending as the Sort order and sort by the Sales field.

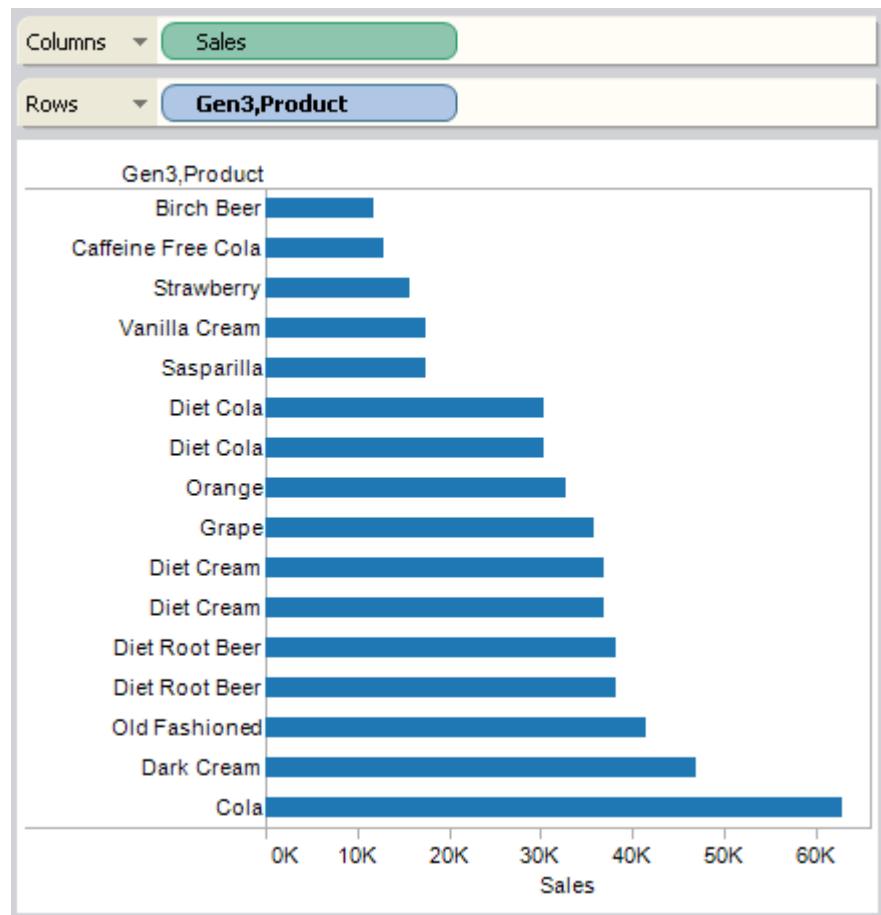


The view is shown below. Notice that the Gen3,Product members are sorted within each parent member. For example, Cola, Diet Cola, and Caffeine Free Cola are sorted only within the Colas level. Tableau does not rearrange headers that appear before the sorted field.



3. If you want to order dimension members without regard to its parent, you should remove Gen2,Product from the Rows shelf. The sorted data are shown below.

## Tableau Desktop Help



## Manual Sorting

### Manual Sorting

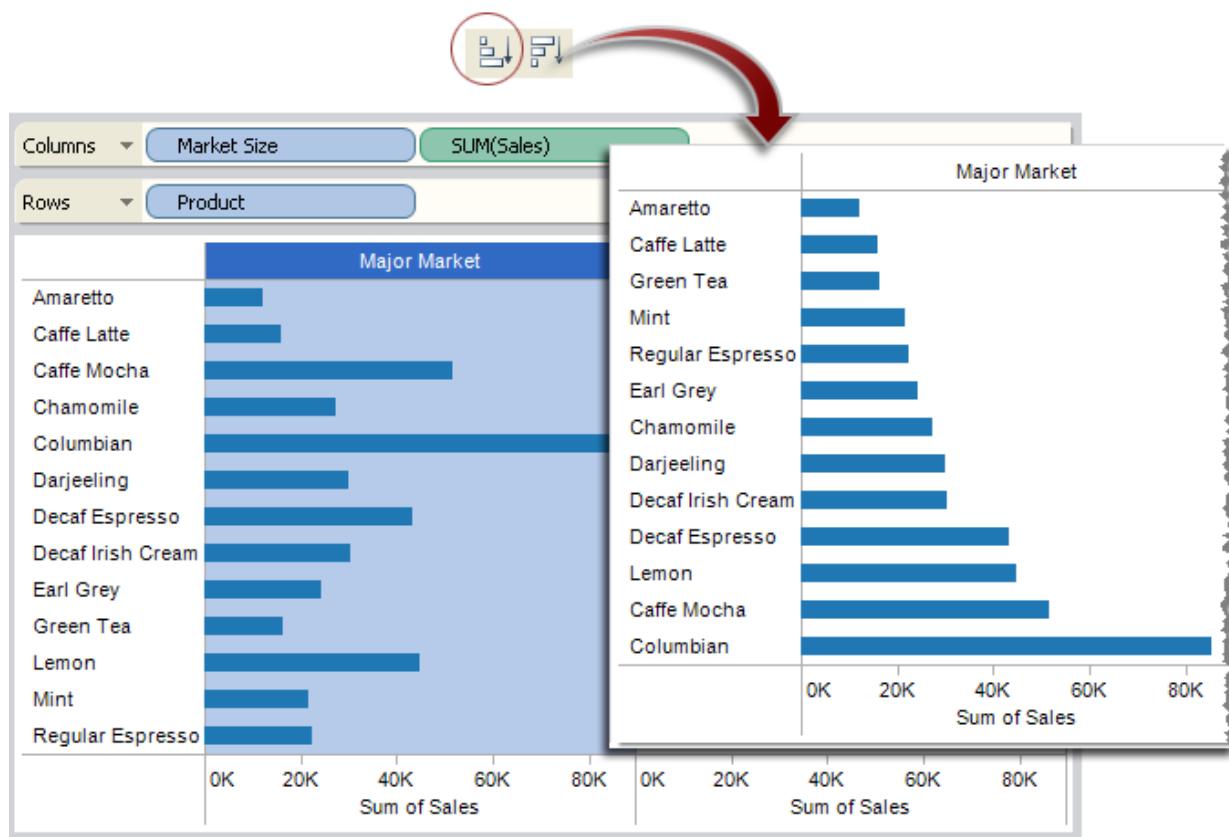
*Manual sorting allows you to rearrange the order of dimension members in the table by dragging them in an ad-hoc fashion, giving precise control over how items appear next to one another in tables and in legends. It also gives you control over the order in which data is drawn on the screen. This control is useful when comparing specific pieces of data or interpreting overlapping data. Manual sorts can only be applied to discrete fields including a discrete measure.*

*There are two ways to manually sort the data in a view. You can either select items in the view and use the Sort toolbar buttons or you can drag and drop headers in the view.*

- [Sorting Using the Toolbar and Tooltips](#)
- [Sort by Drag and Drop](#)
- [Example- Manually Sorting Drawing Order](#)

## Sorting Using the Toolbar and Tooltips

The two sort buttons on the toolbar and in tooltips manually sort a selection either in ascending or descending order based on the other fields in the view. For example, the view below shows sales by product and market size. When you select the Major Market column, thus selecting all of the products, the quick sort buttons sorts the product field by SUM(Sales), which is the measure in the view.

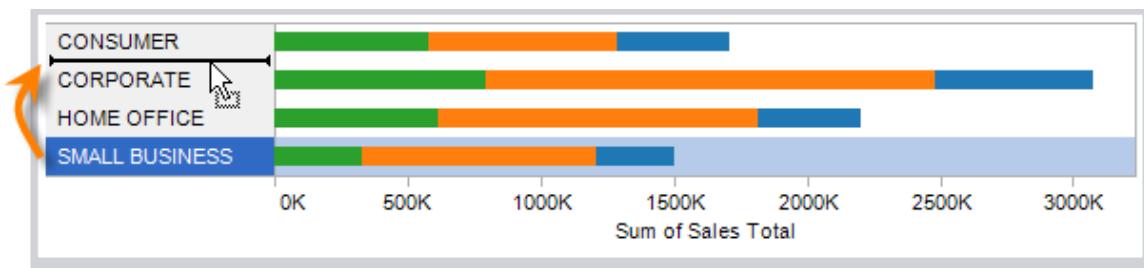


An easy way to anticipate how a selection will be sorted is to make a selection in the view and hover over the ascending or descending sort buttons on the toolbar. The tooltip for each button describes how the selection will be sorted.

Using the quick sort buttons on the toolbar or in the tooltip creates a manual sort which you can always modify using the sort dialog box. Right-click a sorted field (indicated with bold text) and select Sort to open the Sort dialog box.

## Sort by Drag and Drop

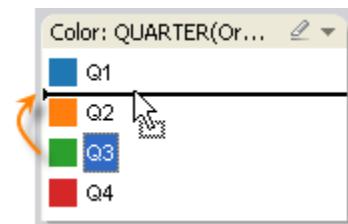
1. Select the dimension member you want to move. This can be any dimension member that appears in a row or column header of a table, or in a legend like the color legend.
2. Drag the member to the desired location within that row, column or legend.



## Example- Manually Sorting Drawing Order

Changing the drawing order of a field allows you to see obscured data in your views in cases where data of one color or shape obscure data of another color or shape. For instance, if you can't see red marks in a scatter plot because they are obscured by green marks, you can change the drawing order so that the red points are drawn on top of the green points (and vice versa).

Change the drawing order of a field by re-arranging the order of dimension members in a legend. For instance, if you want to place red items in front of green items in a view, select the red legend entry and move it higher on the list of items shown in the legend. The marks are drawn in the view according to the order in the legend, from bottom to top. Also you can toggle back and forth between layered field items by dragging any one of the fields from top to bottom or from bottom to top.



Sorting the drawing order is not restricted to color legends. You can reorder shape legends as well. If you have multiple valid legends, the drawing order is defined first by shape, then by color. For example, suppose you have both a shape legend and a color legend. If you have a red circle on top of a green square, moving the green above the red in the color legend will not necessarily move the green square on top of the red circle. It depends on the order in the shape legend first. If circles are above squares in the shape legend, no amount of reordering the color legend will get that square on top of the circle. Instead, move the square shape above the circle shape first and then reorder the color legend.

## Groups

### Groups

A group is a group of dimension members that have been combined into higher level categories. For example, if you are working with a view that shows average test scores by major, you may want to group certain majors together to create major categories. English and History may be combined into a group called Liberal Arts Majors while Biology and Physics may be grouped as Science Majors.

- [Creating Groups](#)
- [Editing an Existing Group](#)
- [Finding Members in Groups Dialog Box](#)

### Groups

#### Creating Groups

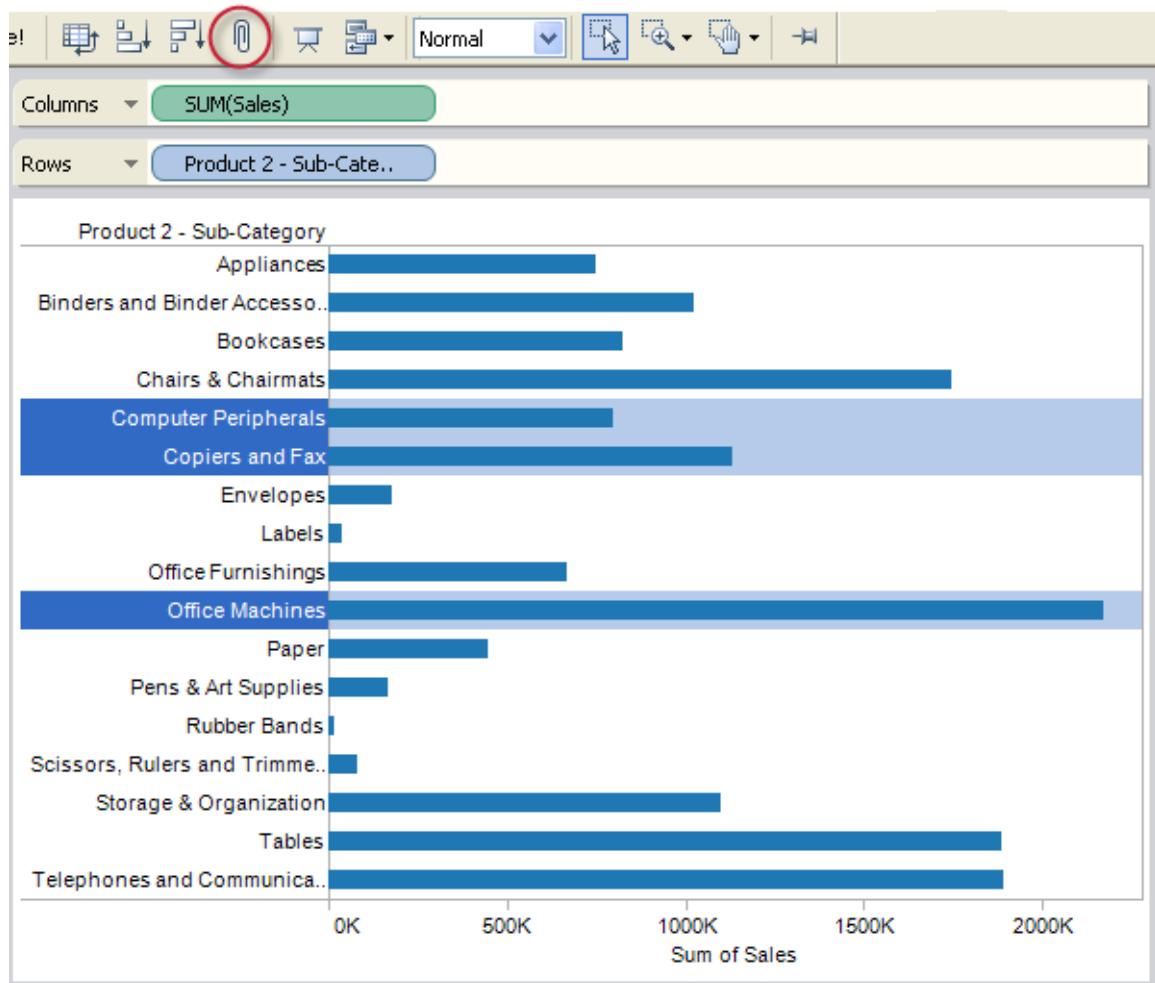
The most common way to create a group is through the group button on the toolbar. However, you can also create groups by right-clicking a dimension in the Data window and selecting Create Group.

##### To create a group using the toolbar:

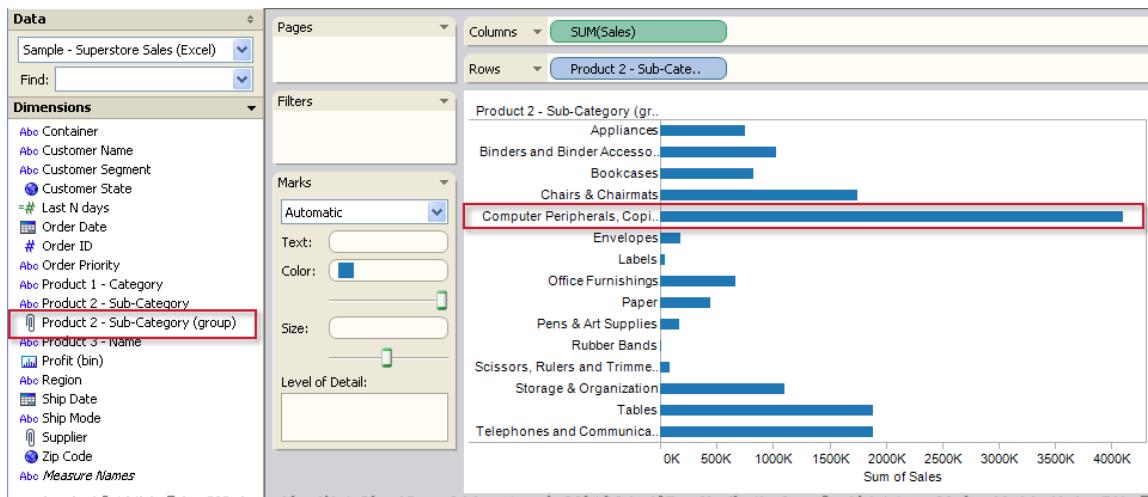
1. Hold the CTRL or Shift key on the keyboard to multi-select dimension members in the view.
2. Click the Group button



on the toolbar.



*The selected members are combined into a single member and a new grouped field is added to the Data window. A default member name is automatically constructed using the combined member names.*



You can use the grouped field just like any other field in the view, except the grouped field is cannot be used to create calculated fields.

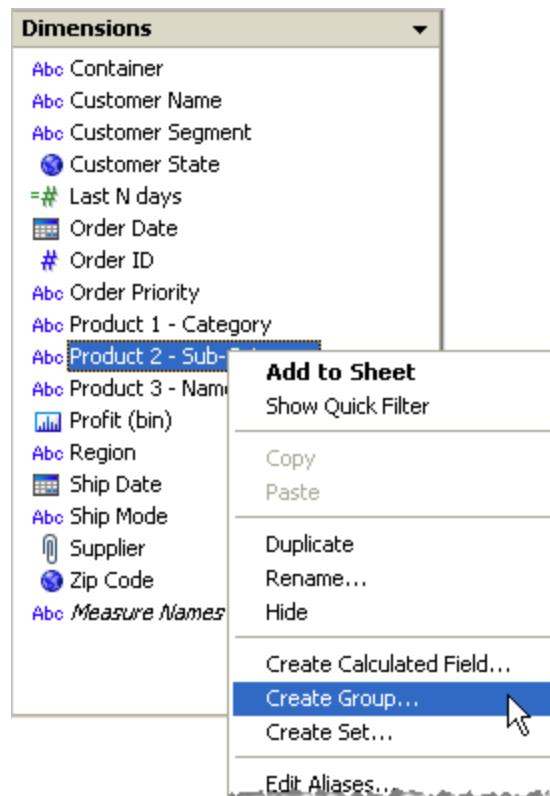
You can add to or remove members from a group by right-clicking the grouped field in the Data window and selecting Edit. In the Edit Group dialog box you can also change the default name of the group and combine fields into new groups. Refer to [Editing an Existing Group](#) to learn more.

#### Note:

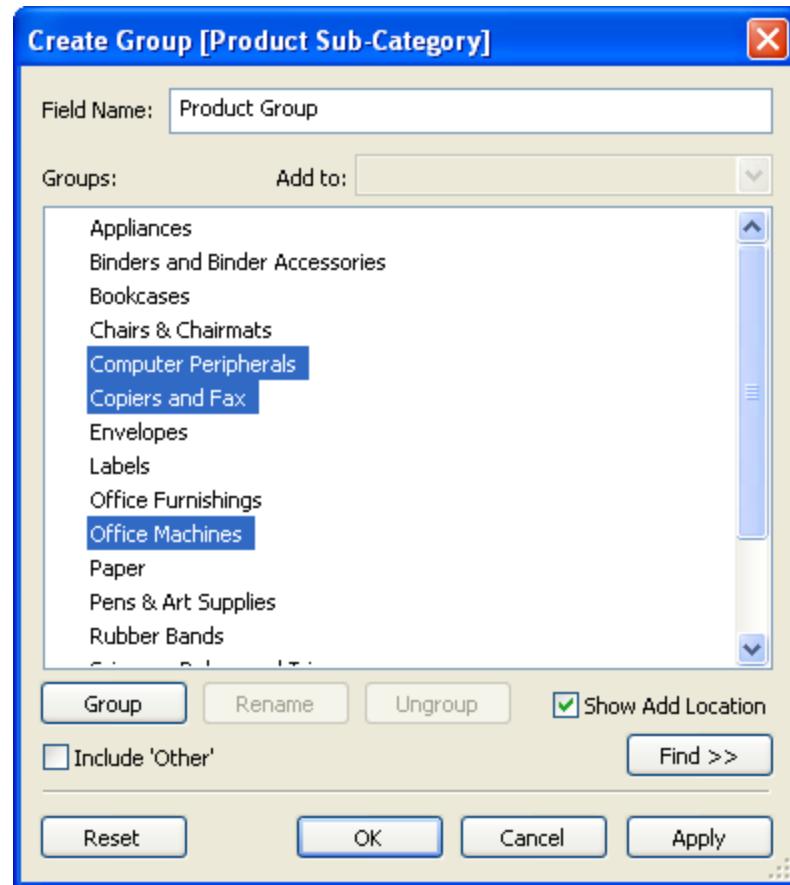
You can quickly un-group the dimension members by selecting the group in the view and clicking the Group button on the toolbar.

#### To create groups from the Data window:

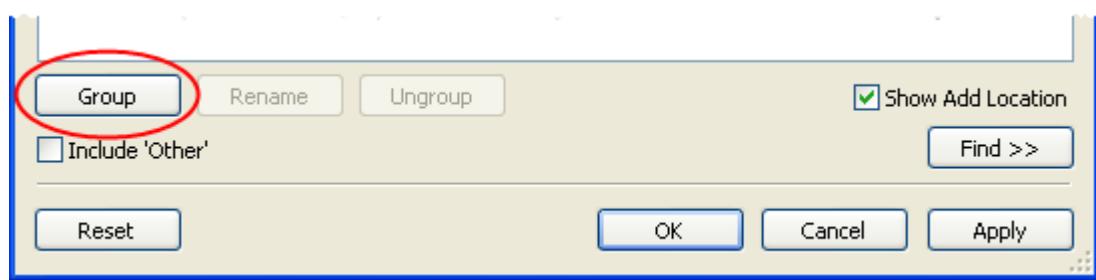
1. Right-click a dimension in the Data window and select Create Group.



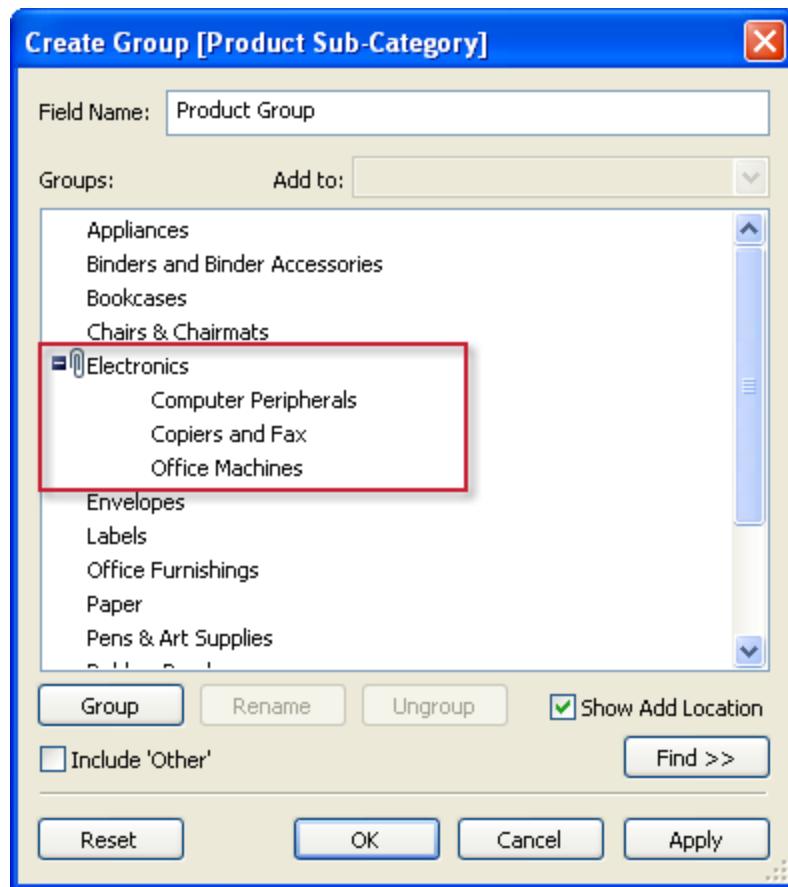
2. In the *Create Group* dialog box, select several members that you want to group. Hold the **CTRL** key on your keyboard to select multiple members.



3. Click the **Group** button at the bottom of the dialog box.



*The selected members are combined into a single member. A default title is automatically constructed using the combined member names. Rename the group by selecting it in the list and clicking the Rename button at the bottom of the dialog box.*

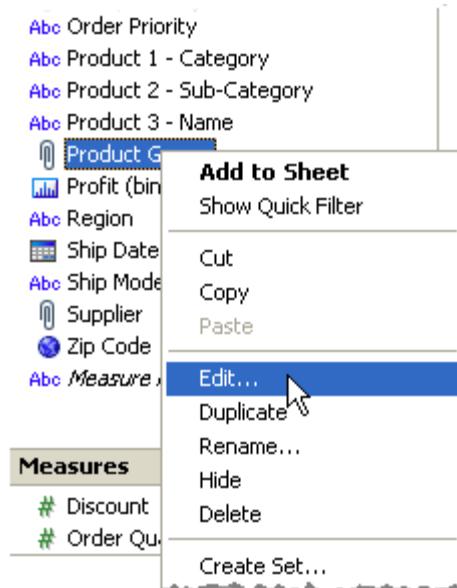


## Editing an Existing Group

After you have created a group either using the toolbar or from the Data window, you can add members to the group, change the default member names, as well as change the name of the grouped field using the Edit Group dialog box.

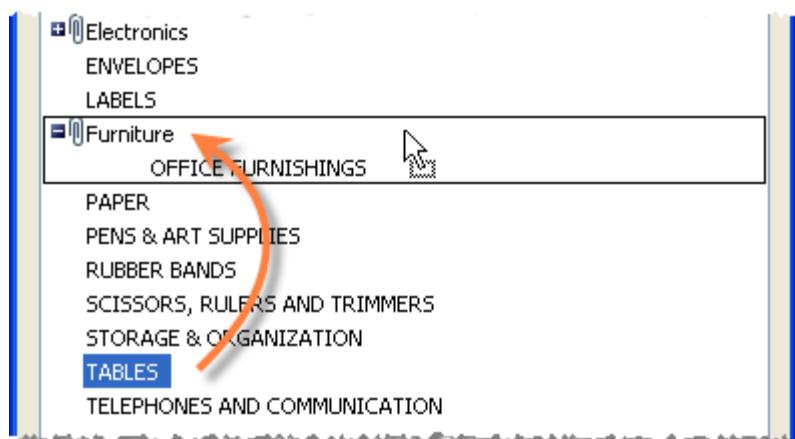
### To add members to an existing group:

1. Right-click the grouped field in the Data window and select Edit.



2. In the *Edit group dialog box*, do one of the following:

- Select one or more members and drag and drop them into the existing group. This method works best if you are working with a dimension that has few members.



- Select one or more members, right-click and select Add To. In the subsequent dialog box, select the group you want to add the selected members to and click OK.



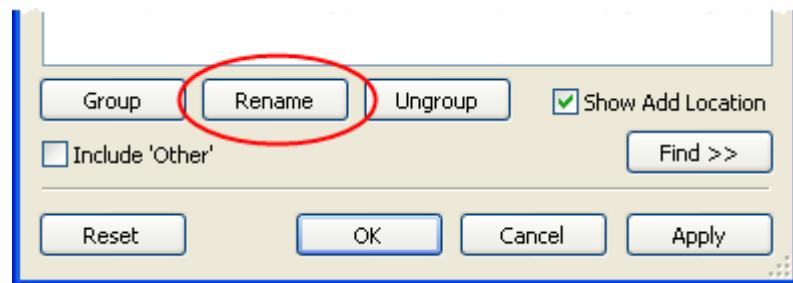
- Select one ore more members and select the group in the Add to drop down list at the top of the dialog box.



3. When finished, click OK.

**To rename a group:**

1. Right-click the grouped field in the Data window and select Edit.
2. In the Edit Group dialog box, select the grouped members and click the Rename button at the bottom of the dialog box.



3. Type a new name and press Enter on your keyboard.

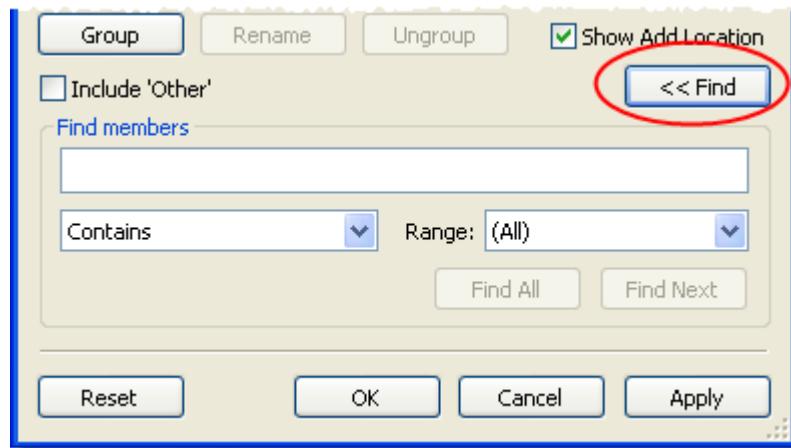
4. When finished, click OK.

### Finding Members in the Groups Dialog Box

When you create groups from a large dimension with many members, use the Find option to quickly select the members you are looking for and add them to an existing group.

#### To use the find options:

1. Show the find options by clicking the Find button at the bottom of the dialog box.



2. Type all or part of the member name into the text box and select an appropriate result criteria from the drop down list. You can select whether to find members that start with, contain, or are an exact match to the search term.
3. Select a Range to search in. You can select to search all members, or within specific groups.
4. Click Find All to select all the matching members or select Find Next to manually navigate through each of the search results.
5. When you have found and selected the members of interest, you can quickly add them to an existing group by selecting the group from the Add to drop-down list at the top of the dialog box.

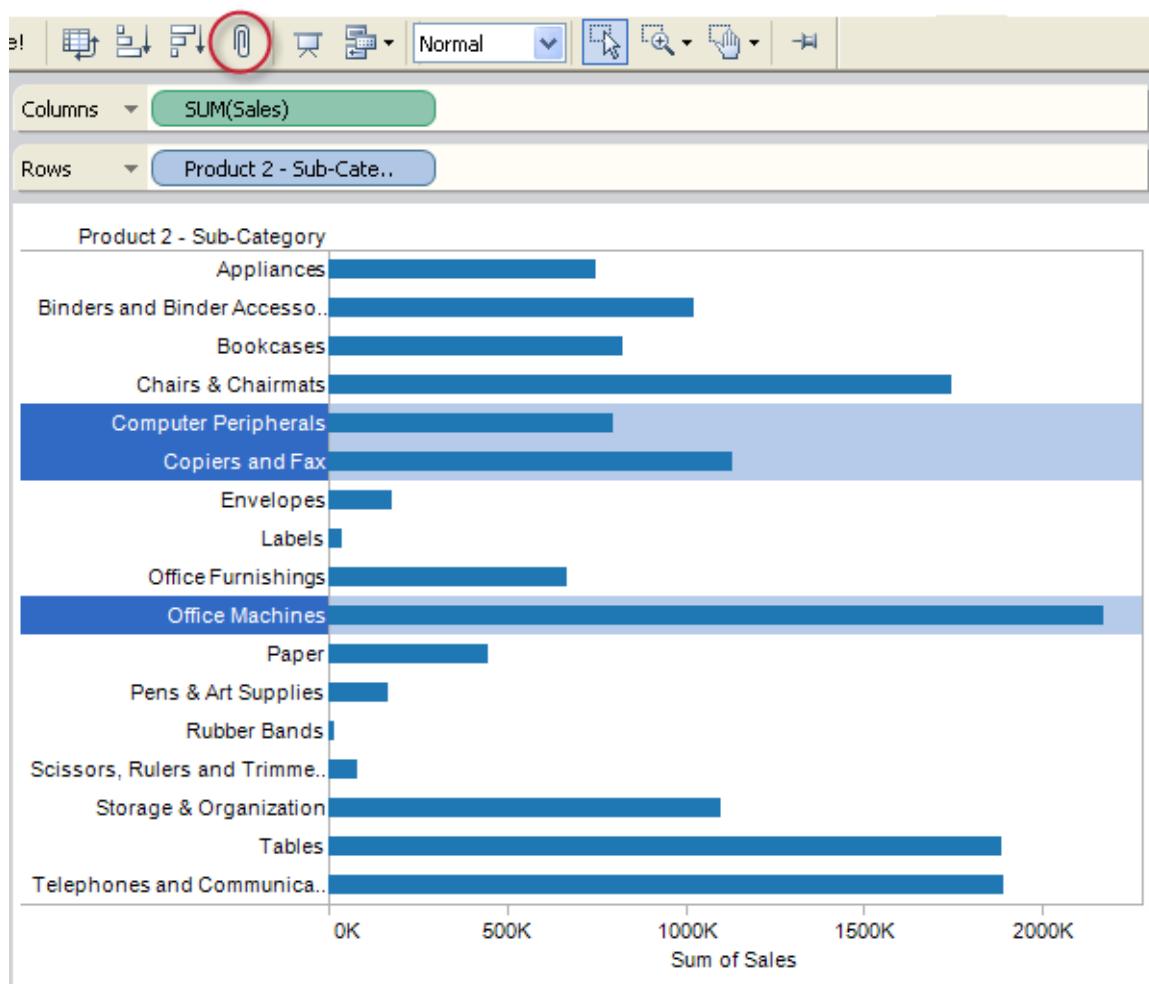
## Creating Groups

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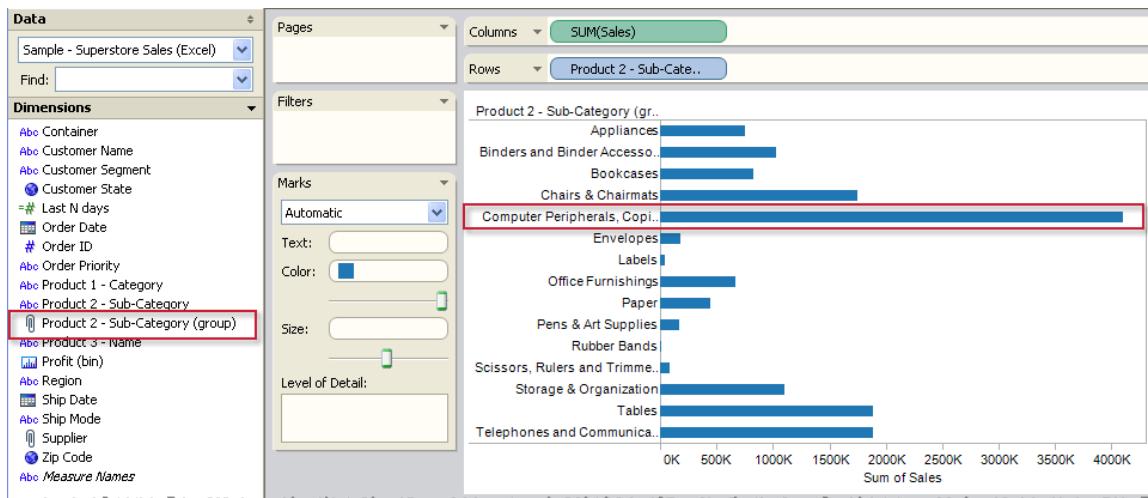
### To create a group using the toolbar:

1. Hold the CTRL or Shift key on the keyboard to multi-select dimension members in the view.
2. Click the Group button

 on the toolbar.



The selected members are combined into a single member and a new grouped field is added to the Data window. A default member name is automatically constructed using the combined member names.



You can use the grouped field just like any other field in the view, except the grouped field is cannot be used to create calculated fields.

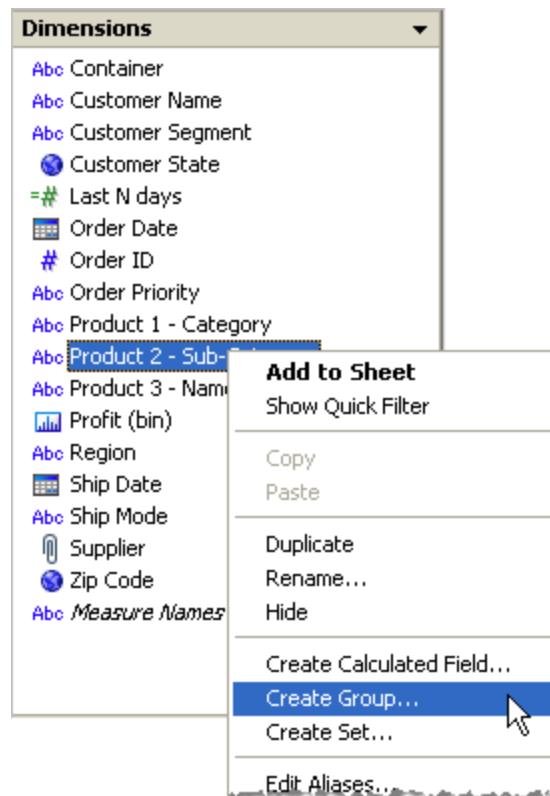
You can add to or remove members from a group by right-clicking the grouped field in the Data window and selecting Edit. In the Edit Group dialog box you can also change the default name of the group and combine fields into new groups. Refer to [Editing an Existing Group](#) to learn more.

#### Note:

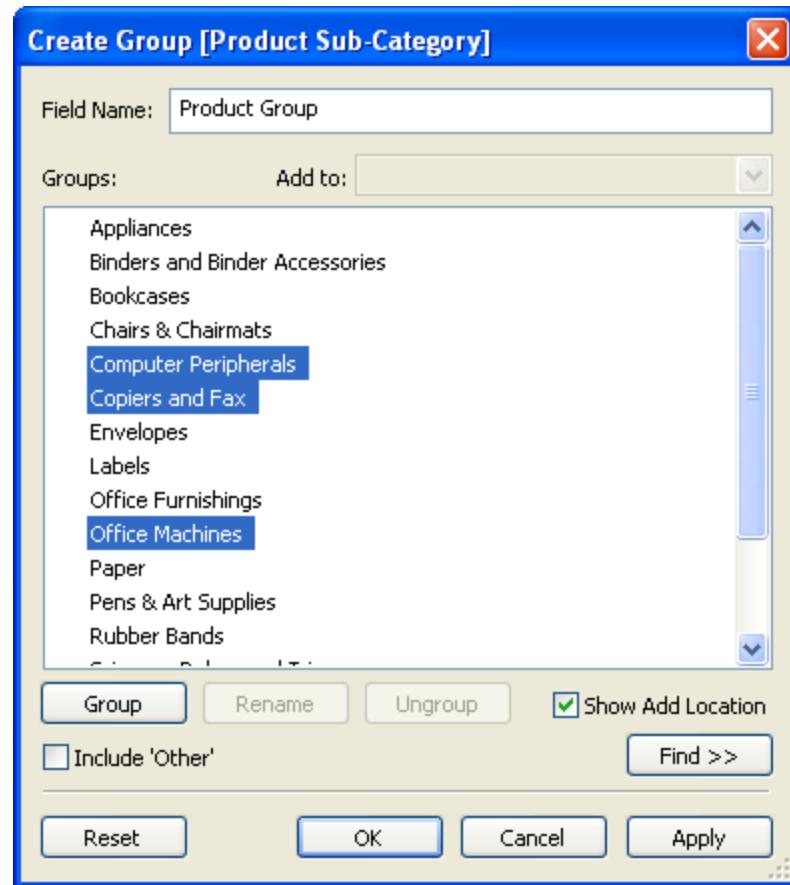
You can quickly un-group the dimension members by selecting the group in the view and clicking the Group button on the toolbar.

#### To create groups from the Data window:

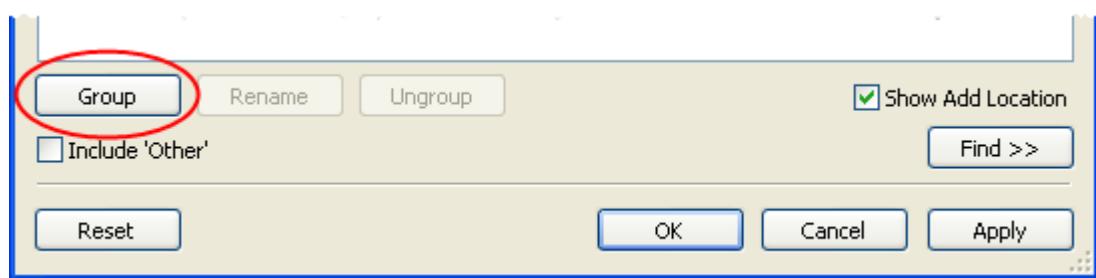
1. Right-click a dimension in the Data window and select Create Group.



2. In the *Create Group* dialog box, select several members that you want to group. Hold the **CTRL** key on your keyboard to select multiple members.

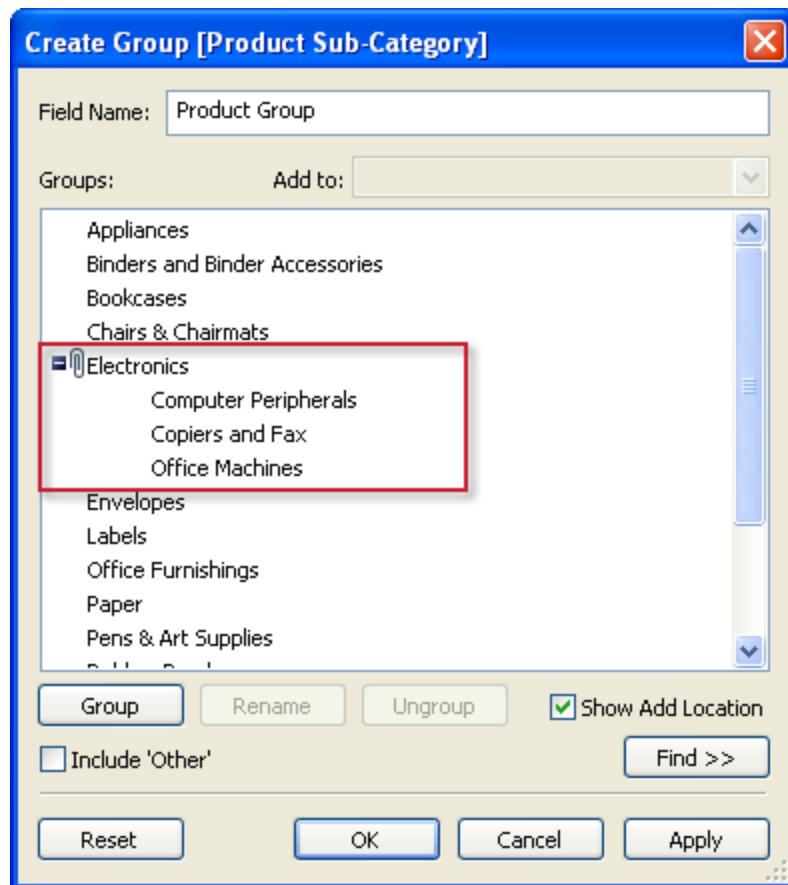


3. Click the *Group* button at the bottom of the dialog box.



*The selected members are combined into a single member. A default title is automatically constructed using the combined member names. Rename the group by selecting it in the list and clicking the Rename button at the bottom of the dialog box.*

## Tableau Desktop Help

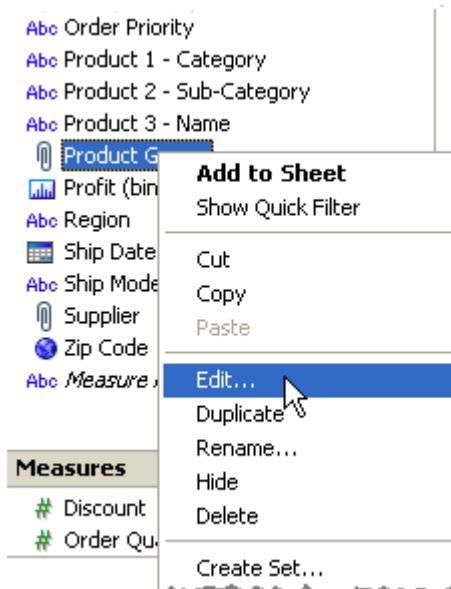


## Editing an Existing Group

After you have created a group either using the toolbar or from the Data window, you can add members to the group, change the default member names, as well as change the name of the grouped field using the Edit Group dialog box.

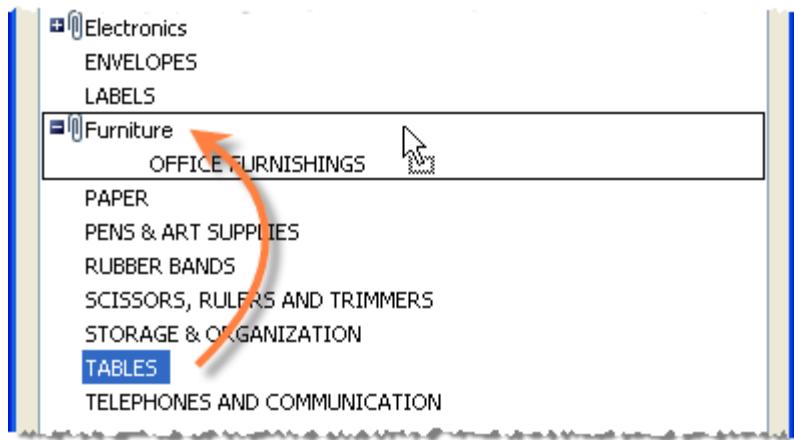
### To add members to an existing group:

1. Right-click the grouped field in the Data window and select *Edit*.



2. In the *Edit group dialog box*, do one of the following:

- Select one or more members and drag and drop them into the existing group. This method works best if you are working with a dimension that has few members.



- Select one or more members, right-click and select Add To. In the subsequent dialog box, select the group you want to add the selected members to and click OK.



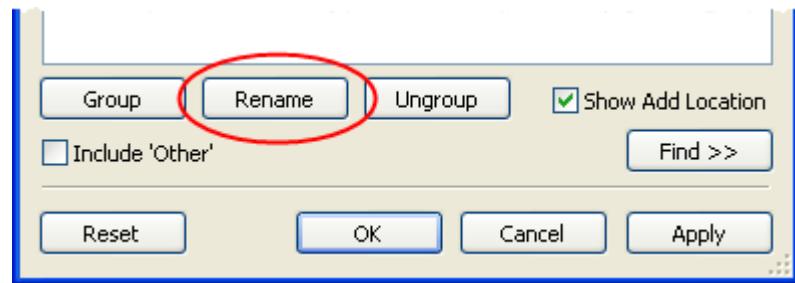
- Select one ore more members and select the group in the Add to drop down list at the top of the dialog box.



3. When finished, click OK.

**To rename a group:**

1. Right-click the grouped field in the Data window and select Edit.
2. In the Edit Group dialog box, select the grouped members and click the Rename button at the bottom of the dialog box.



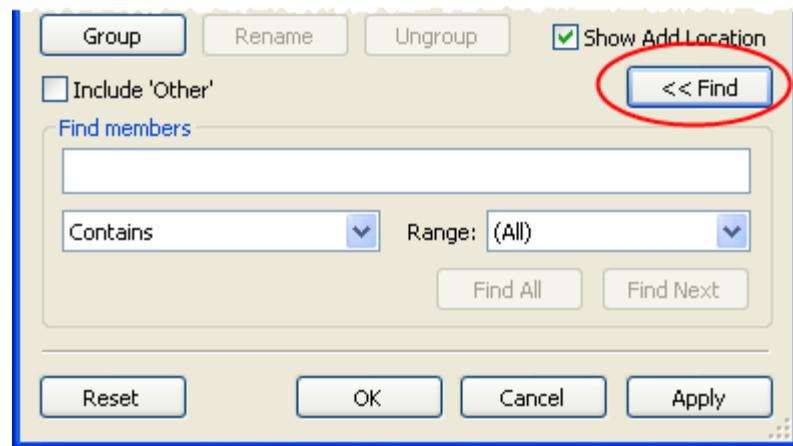
3. Type a new name and press Enter on your keyboard.
4. When finished, click OK.

## Finding Members in Groups Dialog Box

When you create groups from a large dimension with many members, use the Find option to quickly select the members you are looking for and add them to an existing group.

### To use the find options:

1. Show the find options by clicking the Find button at the bottom of the dialog box.



2. Type all or part of the member name into the text box and select an appropriate result criteria from the drop down list. You can select whether to find members that start with, contain, or are an exact match to the search term.
3. Select a Range to search in. You can select to search all members, or within specific groups.
4. Click Find All to select all the matching members or select Find Next to manually navigate through each of the search results.
5. When you have found and selected the members of interest, you can quickly add them to an existing group by selecting the group from the Add to drop-down list at the top of the dialog box.

## Sets

### Sets

*Sets are custom fields you create that are based on existing dimensions, and that filter data using one or more criteria. You can create a set from any existing dimension. When you create a set for continuous dates associated with a relational data source , the set will be based on discrete values rather than a continuous range of values.*

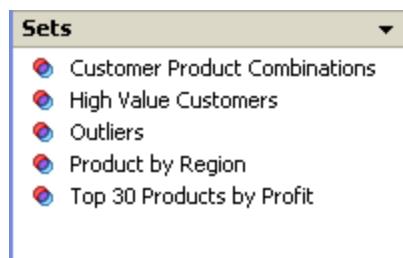
- [About Sets](#)
- [How to Create a Set](#)
- [Creating Sets Examples](#)

## About Sets

The three main uses of a set are:

- Create a subset of the data – Select one or more dimension members that are of interest to you. For example, sort a field and select only cities on the west coast with populations greater than 500,000, or manually select outliers that appear in a scatter plot. Refer to [Example – A Set Containing a Subset](#) for more information.
- Create unique encodings – Combine dimension members to create unique encodings. For example, create a set that combines market and product, and then color-encode a data view using the combined members. Refer to [Example – A Set Containing Unique Encodings](#) for more information.
- Save filters for later use – once you have created a filter, you can save the filter as a set and use it in all of the worksheets in a workbook. This saves you from having to recreate the filter every time you want to use it.

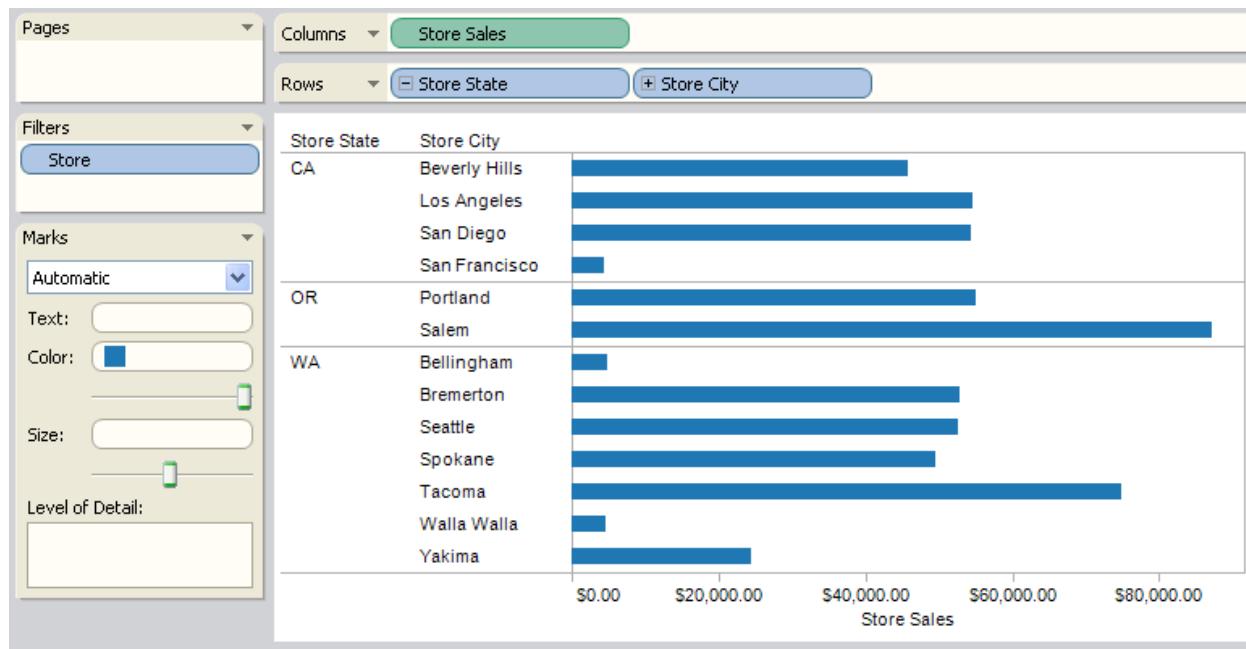
Tableau displays sets in the Sets area of the Data window and labels them with the  icon.



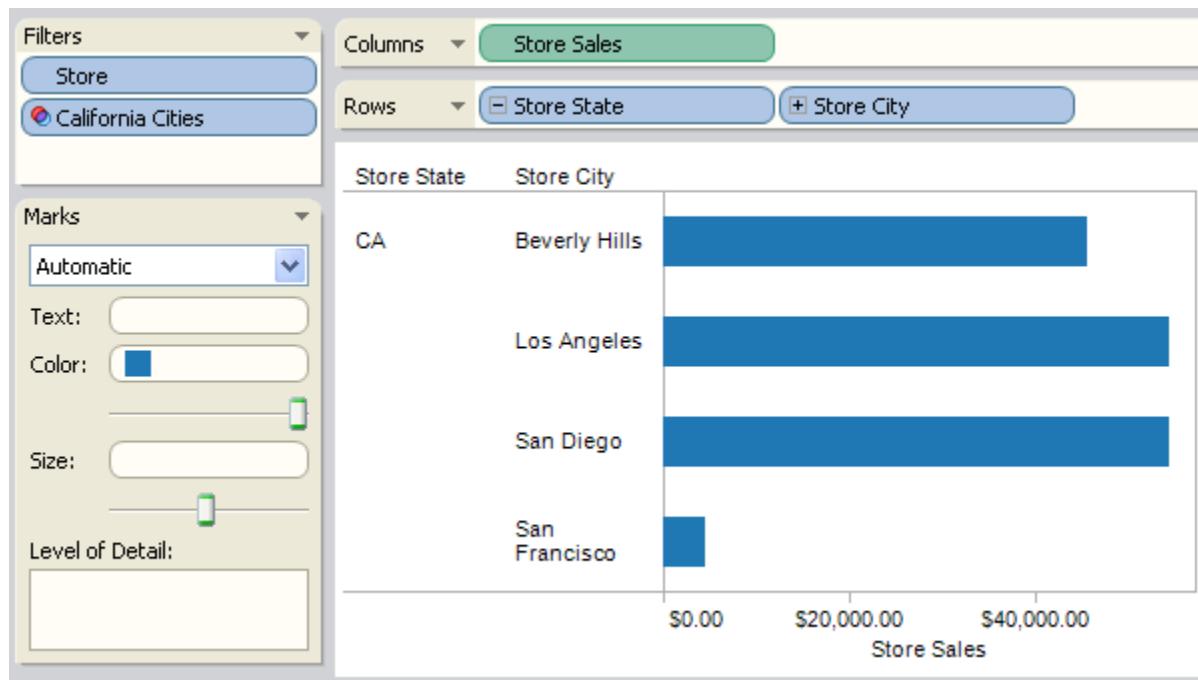
You can work with a set just as you would with any other dimension. For example, after placing a set on a shelf, you can filter the members, sort the members, and so on.

Additionally, sets are always treated as a filter. Therefore, when you place a set on a shelf, it is automatically placed on the Filters shelf as well.

Note that if you use a filter and a set that are based on the same dimension, the result is the intersection of the filter and the set or its descendants. For example, the following view filters the Store hierarchy to include only the states and the cities shown below.



If you create a set that includes only California, and then place the set on the Filters shelf, the resulting view will contain only the cities in California. That is, the view results from the intersection of the set and the Store filter.



### ***Named Sets in Microsoft Analysis Services***

*Named sets from your Microsoft Analysis Services Server appear in Tableau in the form of Sets in the Data window. You can interact with these named sets in the same fashion you can interact with any custom sets in Tableau.*



## How to Create a Set

### How to Create a Set

You can create a set in one of the following ways:

The best method for you depends on your data characteristics, analysis needs, and so on. If you want to save the sets you create, you should save your work as a workbook or a bookmark. If you do not save any of your work and exit Tableau, your sets will be lost.

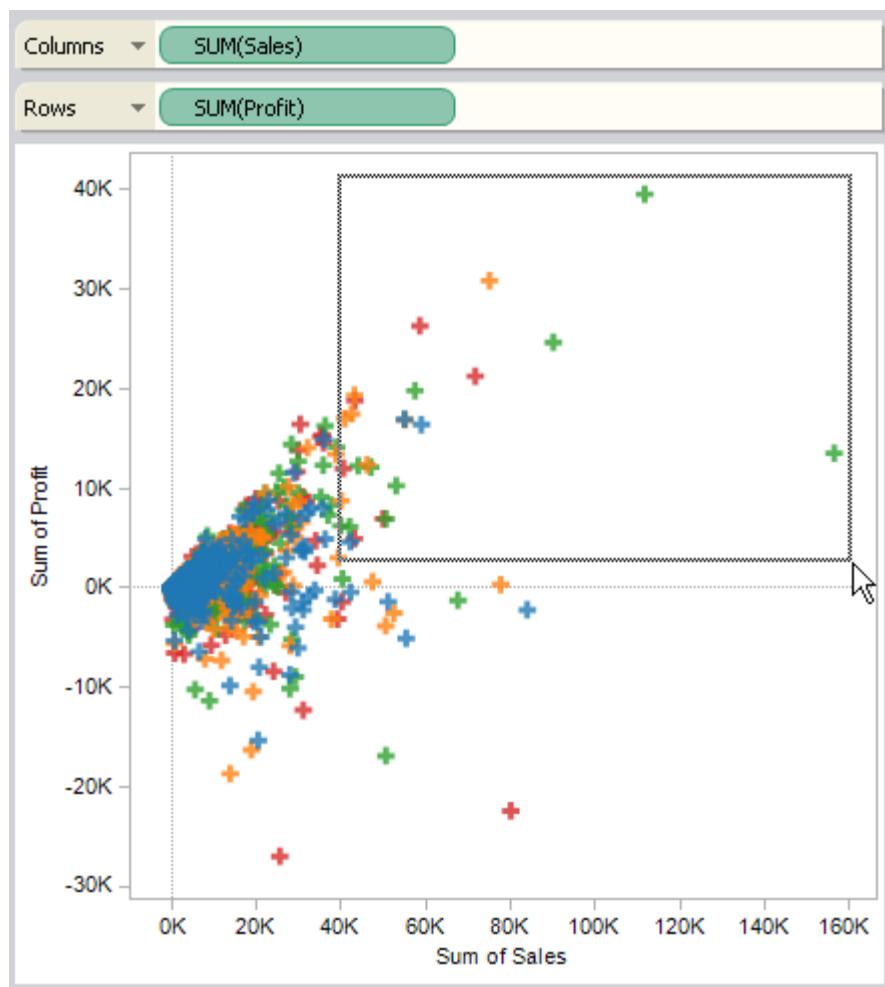
- [Create a Set by Selecting Marks](#)
- [Create a Set from a Field](#)
- [Create a Nest Set](#)

## Create a Set by Selecting Marks

*Create a set by selecting marks if you want to create a subset of your data, and the data of interest can best be identified via the data view. For example, you might select outliers or the top few values from a field that's been sorted.*

*Create the set by manually selecting the desired marks in a data view, and then selecting Create Set from the view's right-click context menu.*

*For example, consider the scatter plot shown below. The view consists of two measures that are color-encoded by a dimension. A collection of data points deemed to be outliers are manually selected for a new set.*



*Selecting Create Set from the right-click context menu opens the Create Set From Selection dialog box. You can specify the set name, select one or more set members and copy them to the Windows Clipboard, click on a column header to sort the*

members, or right-click on a column header to remove the column or to restore the original sort order. Changing the sort order in the dialog box does not change the set definition. You should remove columns that aren't important to your analysis. This will make header labels easier to read and will improve performance.

Optionally select the *Exclude* checkbox in the upper right corner if you want the set to contain all members except the ones you selected.

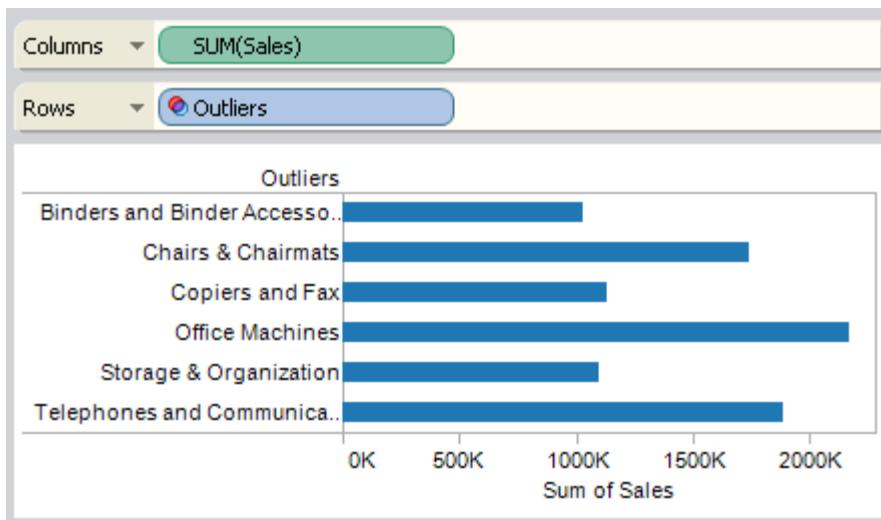
**Note:**

You can optionally select to add the set to the filters shelf after you create it using the check box in the lower right corner of the dialog box.

Tableau displays the new set in the Sets area of the Data window.



When you use the set in a data view, a header is created for each set member. As shown below, the header labels are given by the member names. For cubes, you can choose to display the fully qualified name by selecting the set in the Data window, and then selecting Qualify Member Names from the field's right-click context menu.

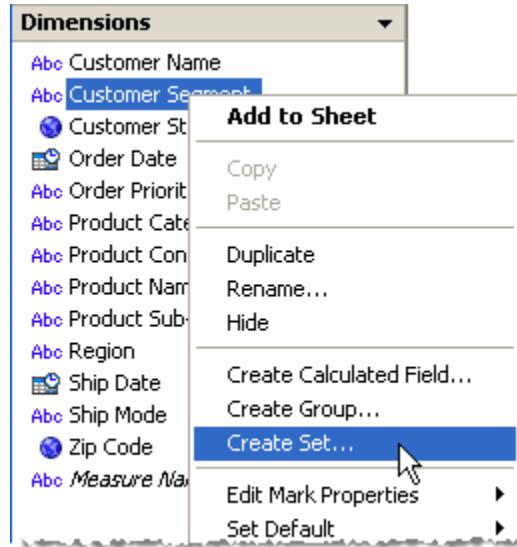




## Create a Set from a Field

*Create a set from a field if you want to create a subset of a specific field.*

*Create the set by selecting right-clicking the field in the Data window and selecting Create Set.*



*The Create Set dialog box opens. Complete the dialog box by specifying the set name and selecting one or more dimension members. In addition, you can optionally define conditions and Top limits to further define the set.*

*The dialog box shown below is associated with a multidimensional data source. Notice that members are selected from different hierarchy levels.*

## Tableau Desktop Help

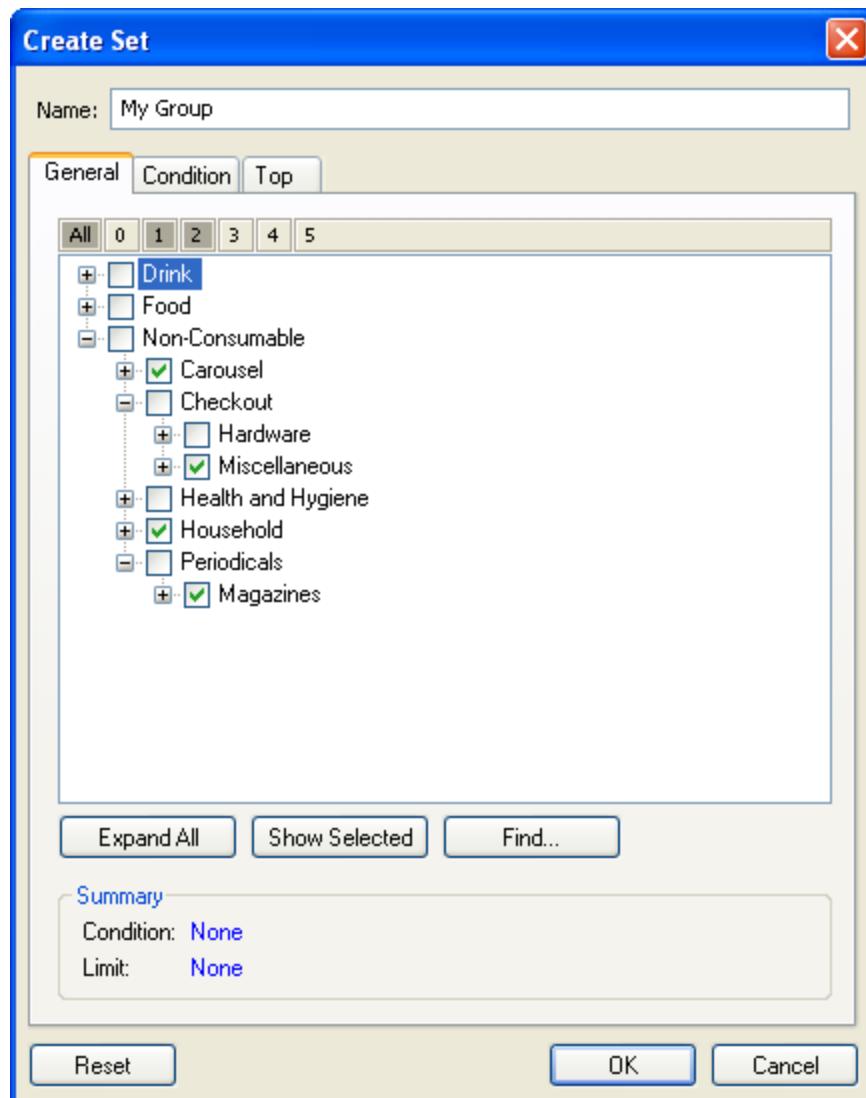


Tableau displays the new set in the Sets area of the Data window.



## Create a Nest Set

A nest set is a cross product of members from different dimensions. You would create a nest set if you want to encode a data view using multiple dimensions. Refer to [Example – A Set Containing Unique Encodings](#) to learn more about this method.

Create the nest set by selecting multiple dimensions in the Data window and then selecting Create Set from the right-click context menu of a selected field.

**Note:**

For multidimensional data sources, you must select levels from different hierarchies.

For example, the selections shown below will produce a new set that consists of the City and Education Level dimensions.



The Create Set From Selection dialog box opens. You can specify the set name, select one or more set members and copy them to the Windows Clipboard, click on a column header to sort the members, or right-click on a column header to remove the column or to restore the original sort order.

## Tableau Desktop Help

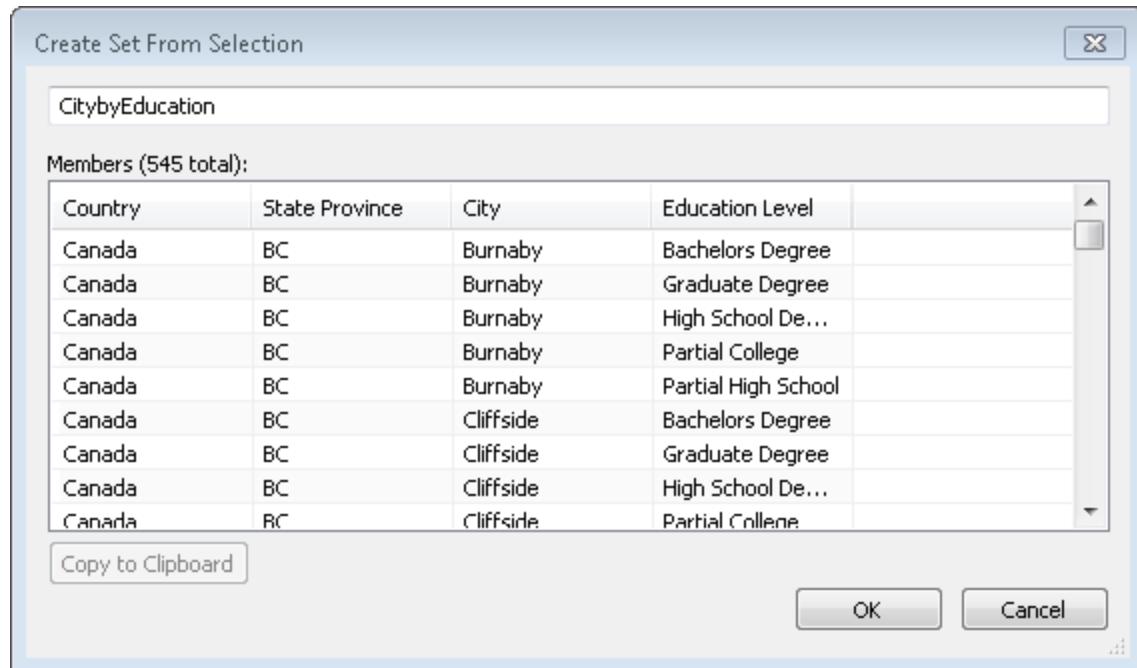


Tableau displays the new set in the Sets area of the Data window.



When you use the set in a data view, a header is created for each member. The header label is given by combining the original dimension names as shown below. For cubes, you can choose to display the fully qualified name.

Columns  Product Family  Product Department

Rows  CitybyEducation

	Drink			
	Alcoholic Beverages	Beverages	Dairy	Baked Goods
Altadena, Bachelors Degree	14.12	14.96	2.22	17.90
Altadena, Graduate Degree				8.84
Altadena, High School Degree	25.53	38.14	3.07	28.35
Altadena, Partial College	7.06	17.43	7.33	12.92
Altadena, Partial High School	17.07	67.62	14.70	44.35
Arcadia, Bachelors Degree	12.83	41.73	3.68	25.42
Arcadia, Graduate Degree	6.71	5.85		2.54
Arcadia, High School Degree	25.55	28.21	13.31	29.05
Arcadia, Partial College	1.95	14.18		
Arcadia, Partial High School	8.67	54.95	3.03	43.90
Bellflower, Bachelors Degree	12.51	57.24	16.60	39.04

## Creating Sets Examples

### Creating Sets Examples

*This section contains examples to help you understand how to create and use sets.*

- [Example – A Set Containing a Subset](#)
- [Example – A Set Containing Unique Encodings](#)
- [Example – Hierarchical Sets and their Descendents](#)

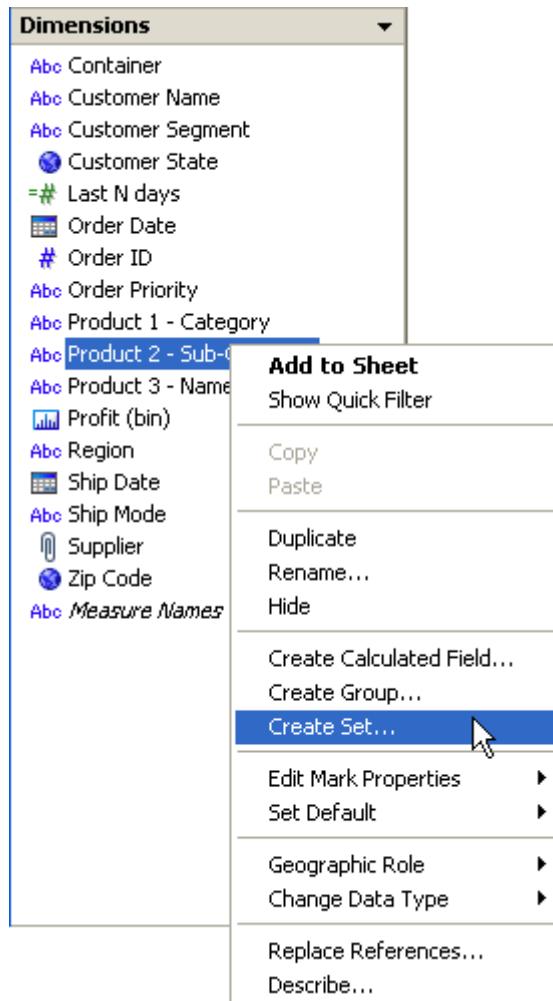
## Example – A Set Containing a Subset

One reason to create a set is so you can easily work with just the dimension members that are of interest to you. For example, you might want to work with specific geographic regions, high-value customers, or one product line in your organization. To create such a set, select the relevant dimension members using any of the methods described in [How to Create a Set](#).

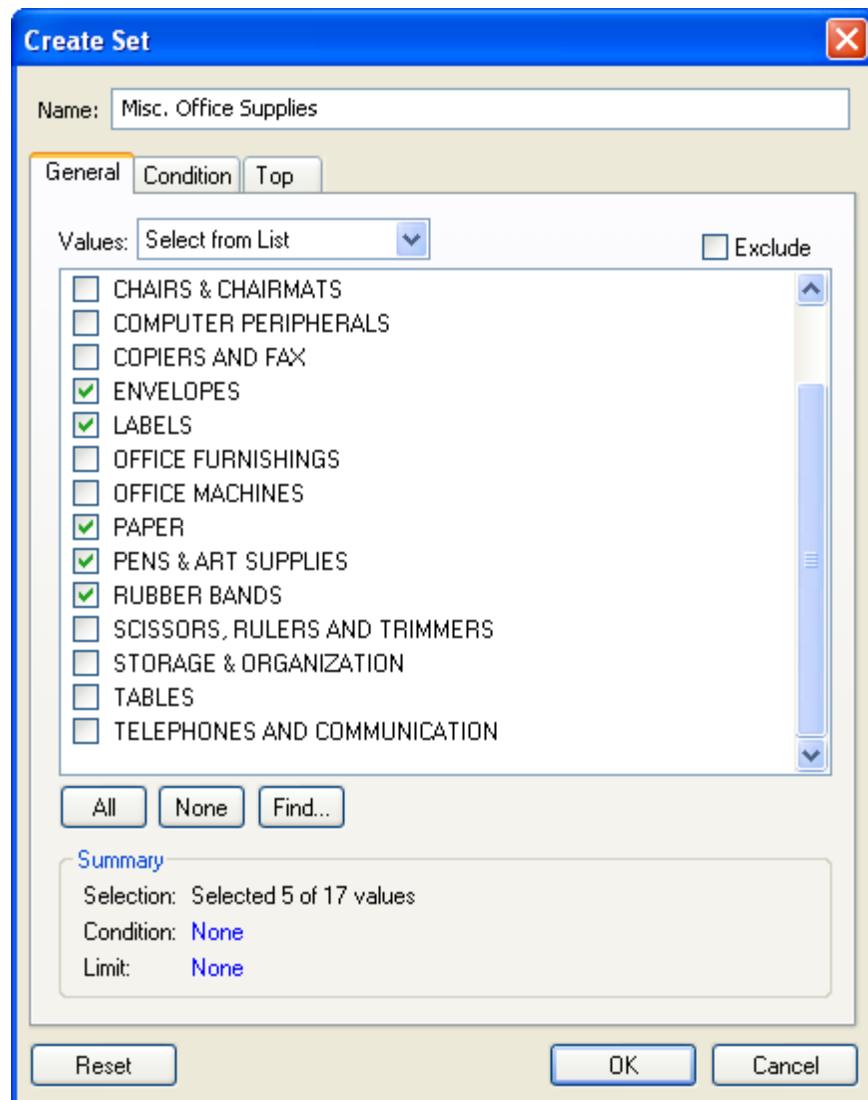
In this example, you will create a subset of the Sample Superstore data source using the Create Set dialog box. Follow the steps below:

1. Select the dimension that will form the set.

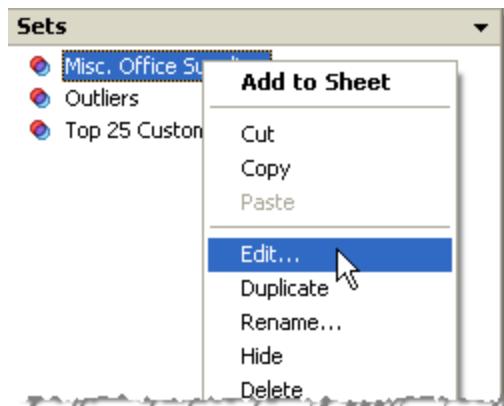
Right-click Product 2 - Sub-Category in the Data window, and select Create Set.



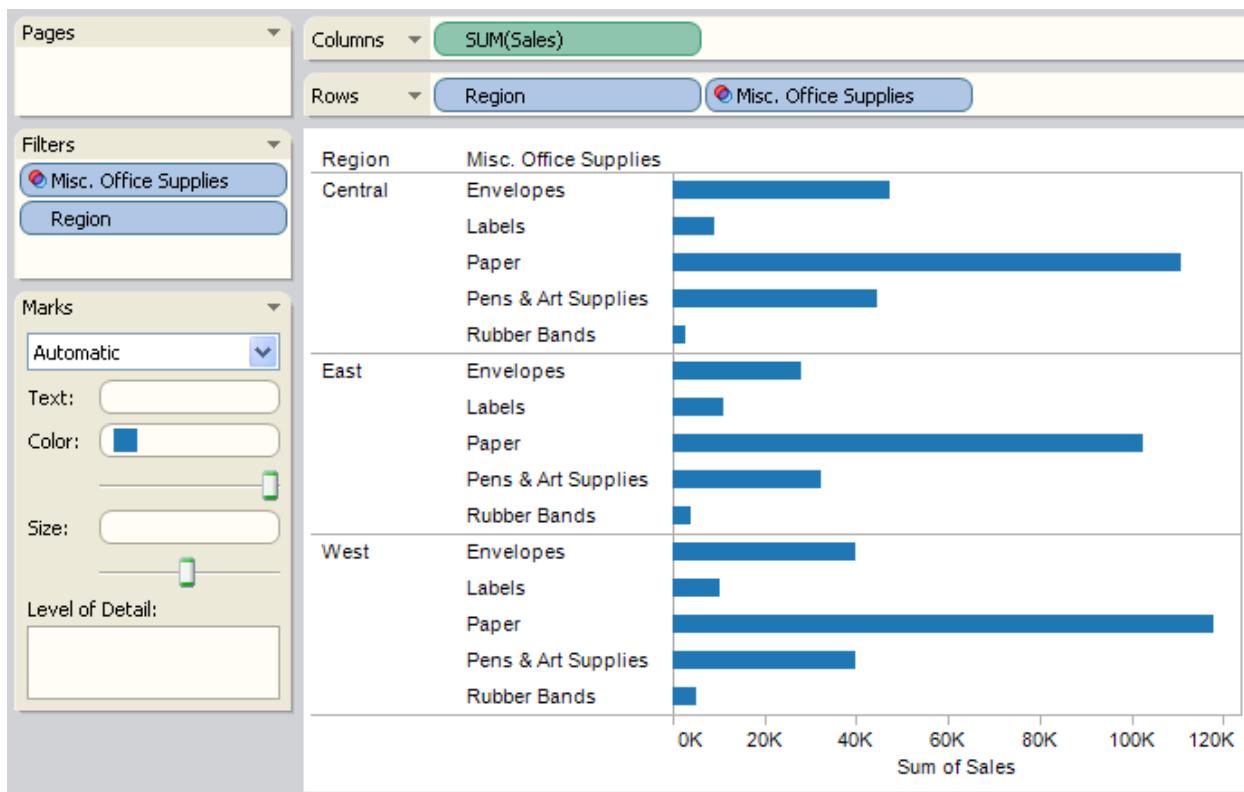
2. In the Create Set dialog box, specify the name of the set and select the dimension members that you want to include in the set. In this example, you are only interested in Envelopes, Labels, Paper, Pens and Art Supplies, and Rubber Bands.



The new set displays in the Sets area of the Data window. You can edit the set, show set members, and so on using the right-click context menu.



You can use the set to create data views just like any other field. Note that for cubes, the members are displayed using qualified names. A qualified name has the form Food.Dairy or Drink.Beverages.Hot Beverages.Coffee, which provides information about a member's ancestors. You can turn off qualified names via the set's right-click context menu.



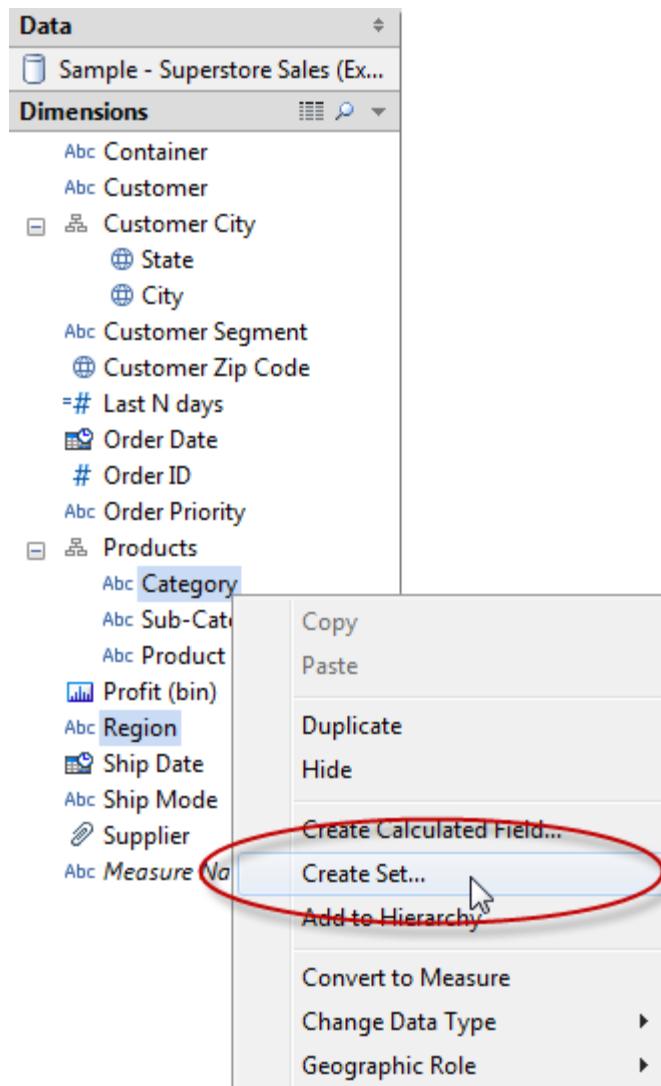
## **Example – A Set Containing Unique Encodings**

*Encoding shelves such as Color, Size, and so on accept only one field at a time. Using the original data source fields, you are limited to encoding your data view with the members of only one dimension. By creating a set, you can encode the view with members from different dimensions.*

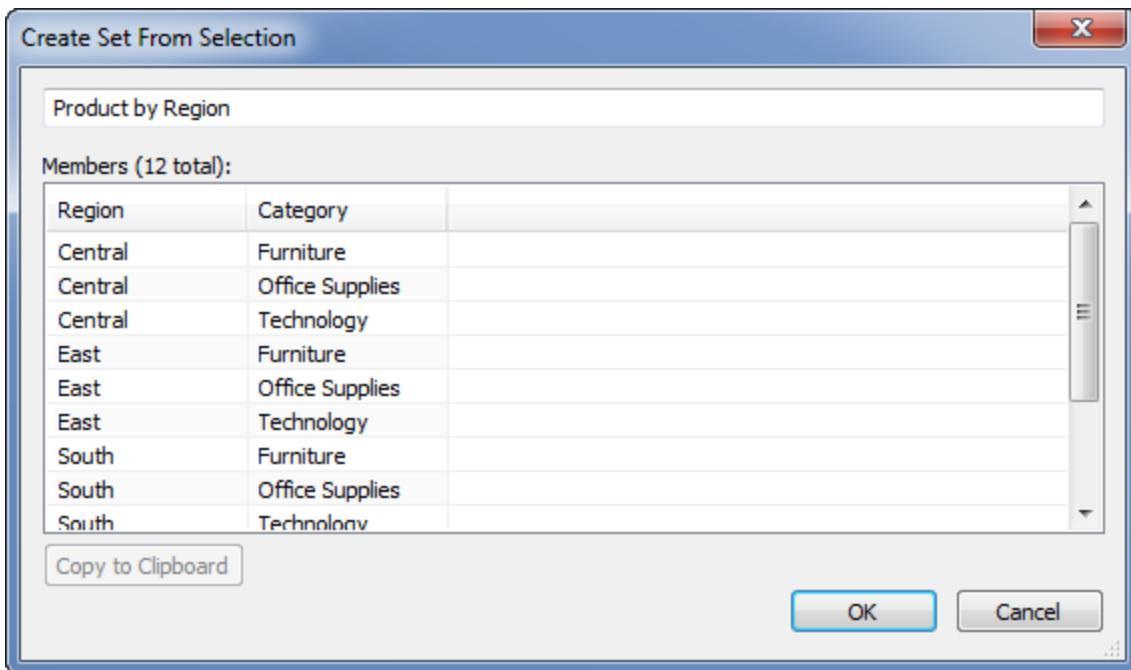
*This example uses the Superstore Sales Excel data source to create a set that contains all the members from two different dimensions. The set is used to encode a data view by color, and is then filtered to include only the members of interest. The steps are as follows:*

1. Create the set.

*Create the set by selecting the Region and Category dimensions in the Data window, and then selecting Create Set from the context menu.*



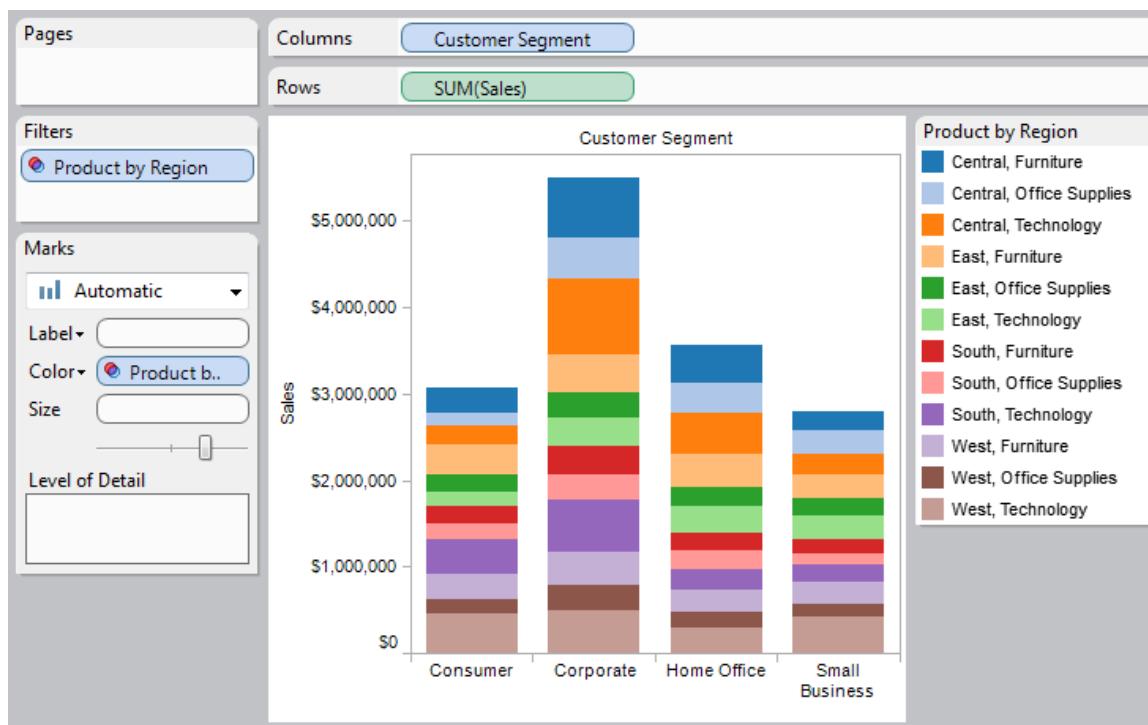
*The Create Set From Selection dialog box opens. Call the new set Product by Region.*



2. *Encode the data view with the new set.*

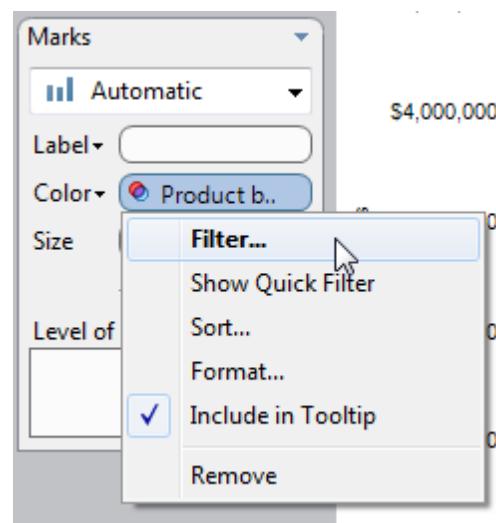
*The data view shown below was created by placing the Customer Segment dimension on Columns shelf, placing the Sales measure on the Rows shelf, and color-encoding the data using the new set.*

*When you place the set on the Color shelf, Tableau separates the marks according to the members in the set, and assigns a unique color to each member. The color legend displays each member name and its color.*

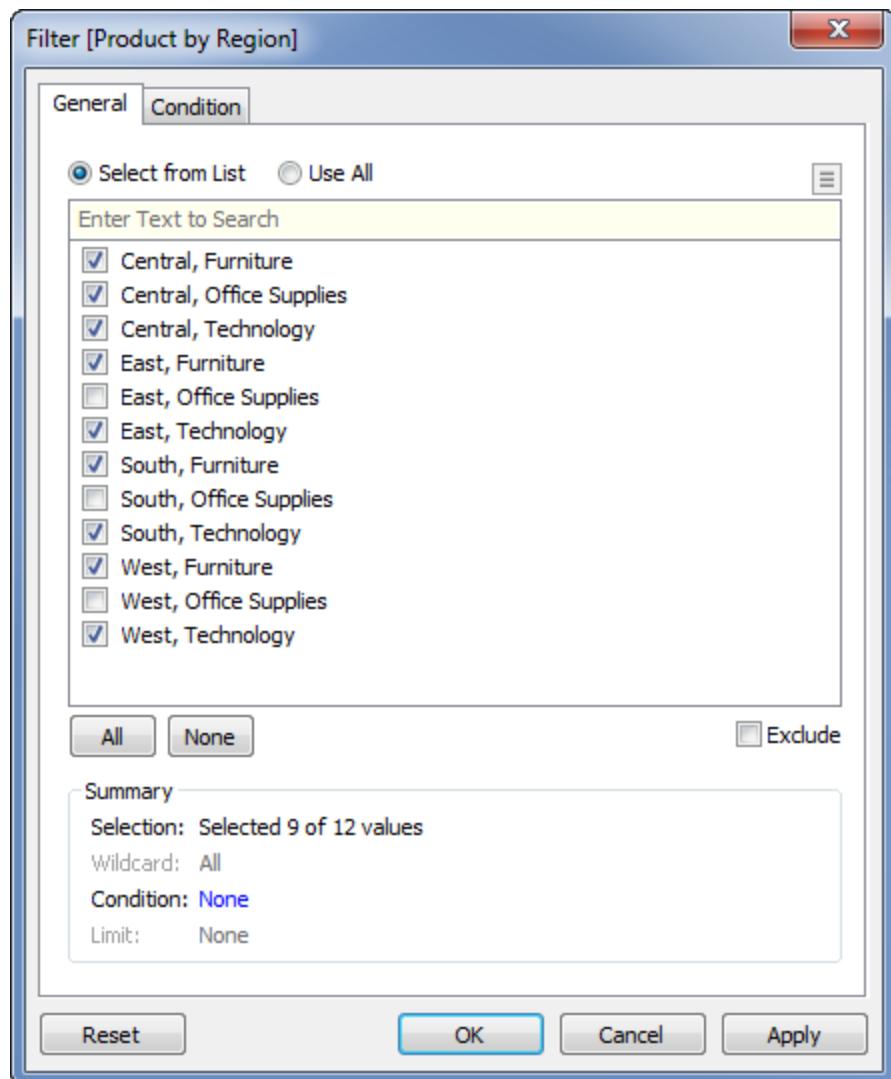


### 3. Filter the set.

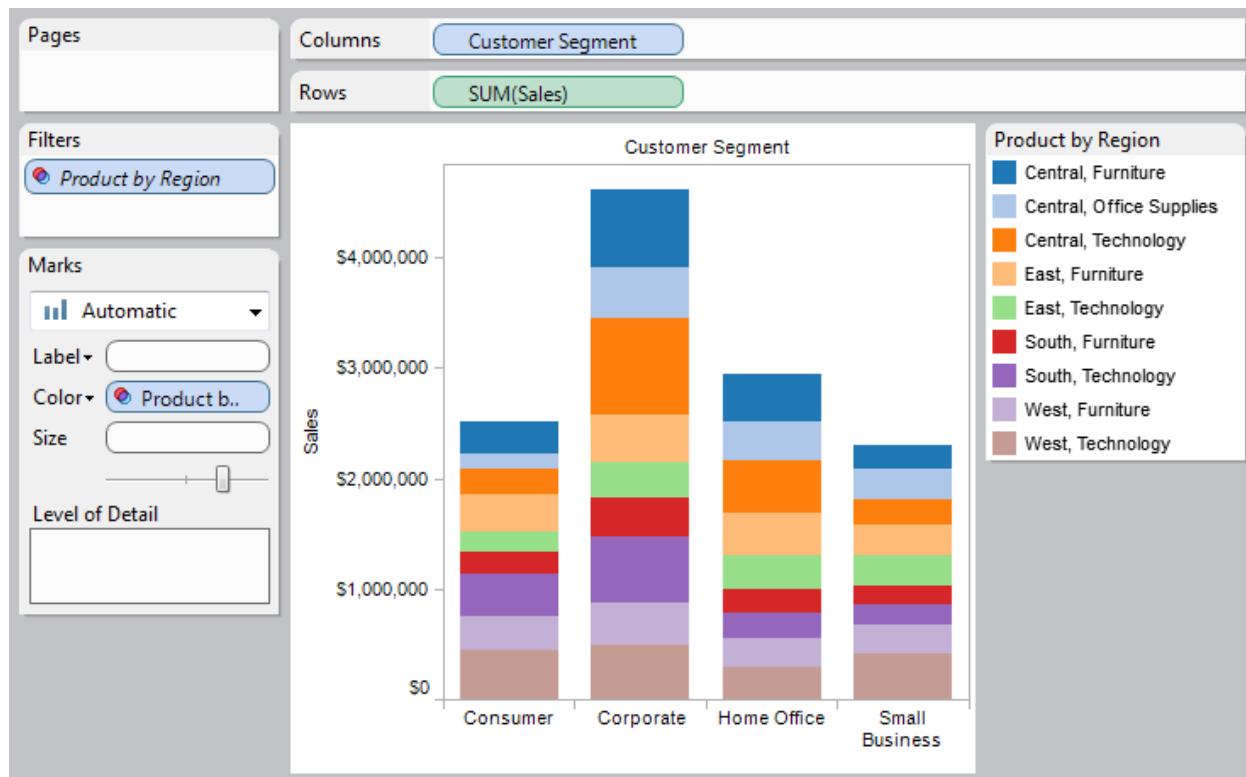
*Filter the set to include only the dimension members of interest. You can open the Filter dialog box by selecting Filter on the set's field menu.*



*For this example, include only the Furniture and Technology products.*

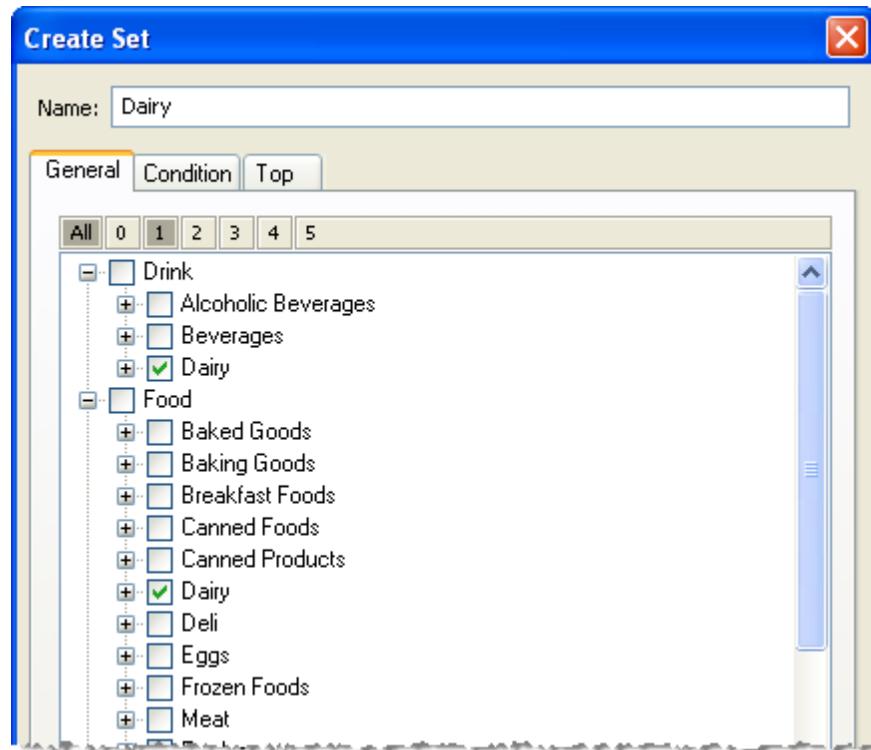


*The final view is shown below. Note the name of the filtered set is italicized.*

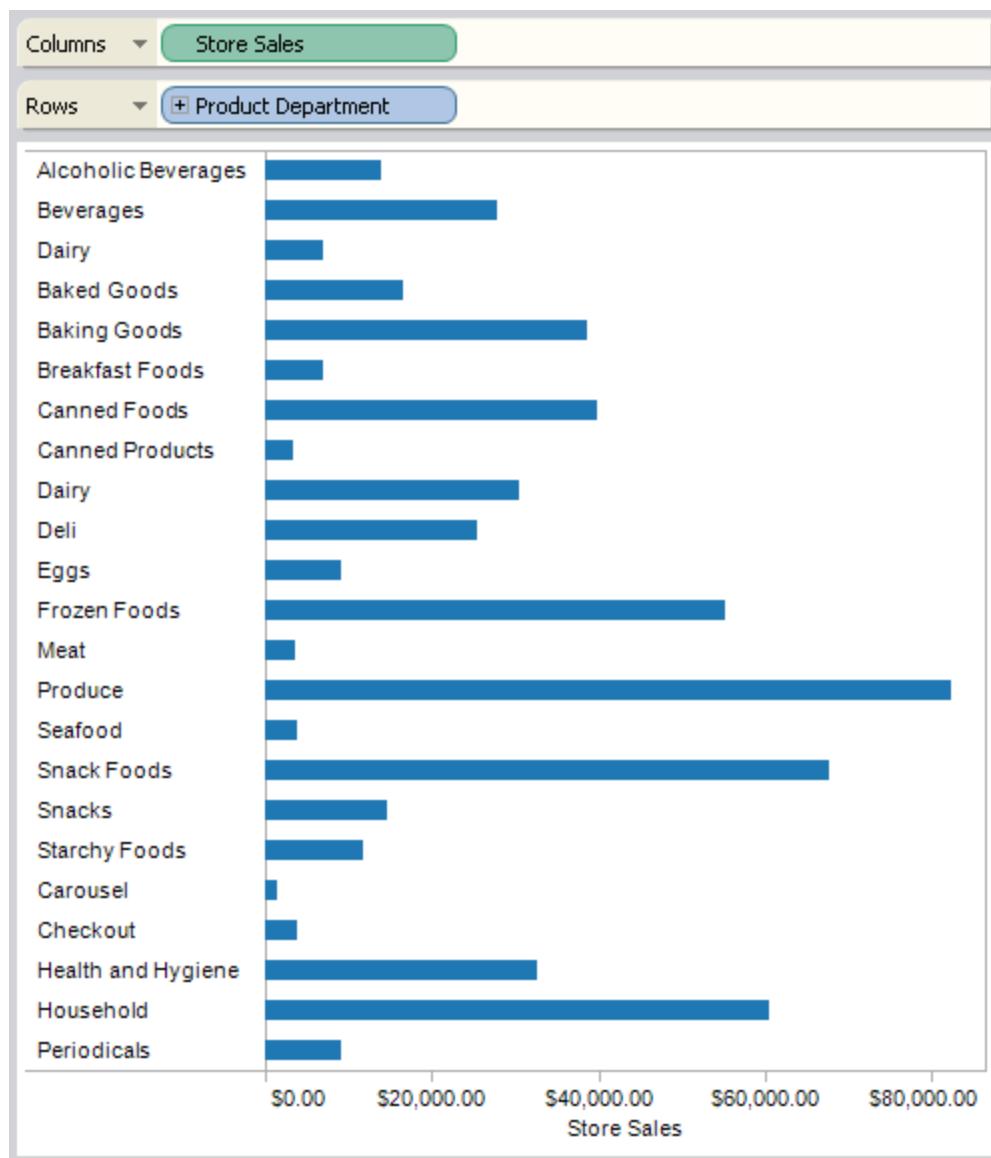


## Example – Hierarchical Sets and their Descendents

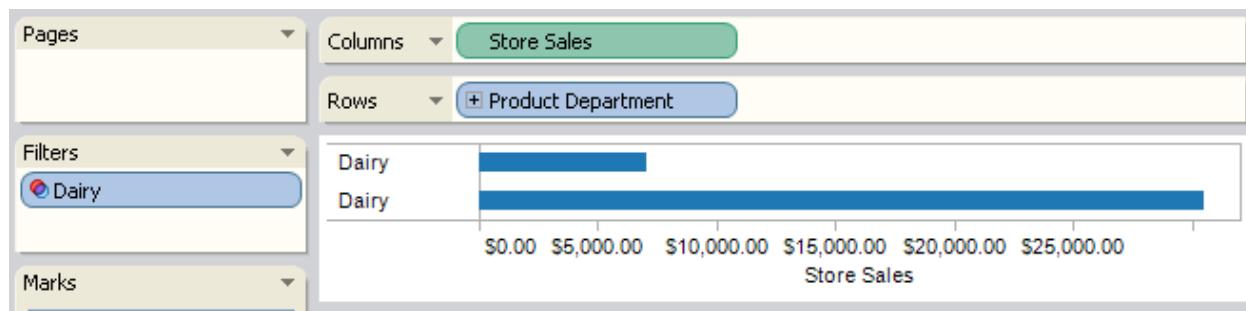
A hierarchical set filters data to the selected members and all of their descendants. For example, a set named *Dairy* is created from the Product hierarchy. As shown below, it includes only the *Dairy* product department.



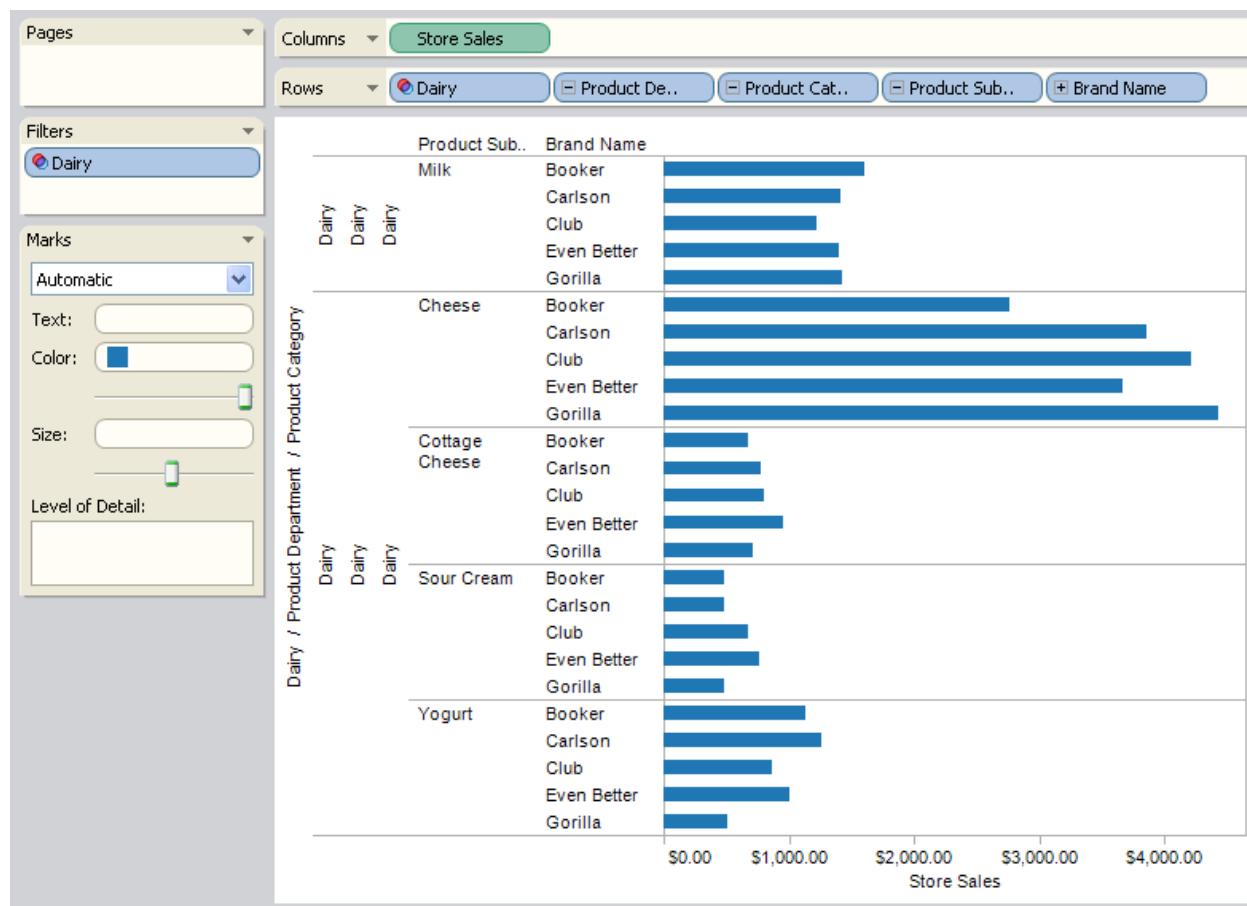
Consider the following view. The Product Category dimension is placed on the Rows shelf and the Store Sales measure is placed on the Columns shelf.



If you place the Dairy set on the Filters shelf, you can see that the view is filtered to include only the Dairy product categories.



As shown below, you can drill down into Product Department to reveal the Product Category, Product Subcategory, and Brand Name levels. As these descendants are revealed, row headers are added to the view. This is because a set filter allows you to view the levels of detail contained within the filtered members.



# Dates and Times

## Dates and Times

*Working with dates in Tableau differs depending on whether you are using a Relational or Multidimensional Data Source. This section below discusses these differences.*

### Dates in Multidimensional Data Sources

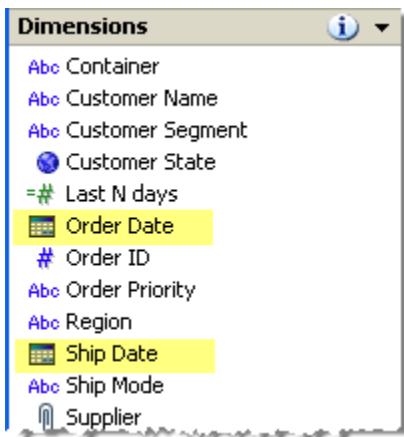
*For multidimensional data sources, dates dimensions are usually organized into hierarchies that contain levels such as year, quarter, and month. In addition, some multidimensional data sources have time intelligence enabled, which enables different ways to look at these data levels such as Months by Year, Months by Quarter, Weekends, etc. These are represented as attributes of the hierarchy. These hierarchies and attributes are defined when the cube is created and you cannot modify them in Tableau. For example, the Time dimension from a Microsoft Analysis Services data source is shown below.*



*When you place a multidimensional date on a shelf, the field is treated like any other dimension. For example, you can drill down, drill up, and so on.*

### Dates in Relational Data Sources

*For relational data sources, dates and times are automatically placed in the Dimensions area of the Data window and are identified by the icon. For example, the Order Date and Ship Date dimensions from an Excel data source are shown below.*



When you place a relational date on a shelf, the field name is automatically modified to reflect the default date level. Tableau defines the default date level to be the level at which there are multiple instances. For example, if the date field includes multiple years, the default level is year. However, if the date field contains data for just one year but includes multiple months, then the default level is month.

If you don't want Tableau to automatically select a date level and would rather have a date dimension be a continuous field, you can right-click the field in the Data window and select Convert to Continuous. The dimension turns green in the Data window and anytime you use the field it will be continuous. You can easily revert back by selecting Convert to Discrete from the field's context menu in the Data window. You can also convert a single field to continuous while it is on a shelf by selecting Continuous on its field menu. The field on the shelf turns green but the field in the Data window is still discrete.

- [Changing Date Levels](#)
- [Custom Dates](#)
- [Fiscal Dates](#)
- [Perfect Pivoting with Dates](#)
- [Continuous Dates](#)

## Changing Date Levels

For both relational and multidimensional data sources, you can change the date level using the field's context menu after dragging it to a shelf. For multidimensional dates, the levels available in the context menu are given by the levels defined in the date hierarchy. For relational dates, you can select between the discrete date levels at the top of the menu or the continuous date at the bottom. A preview of each date level is shown. Below is the field menu for a relational date with the discrete Quarter level selected.

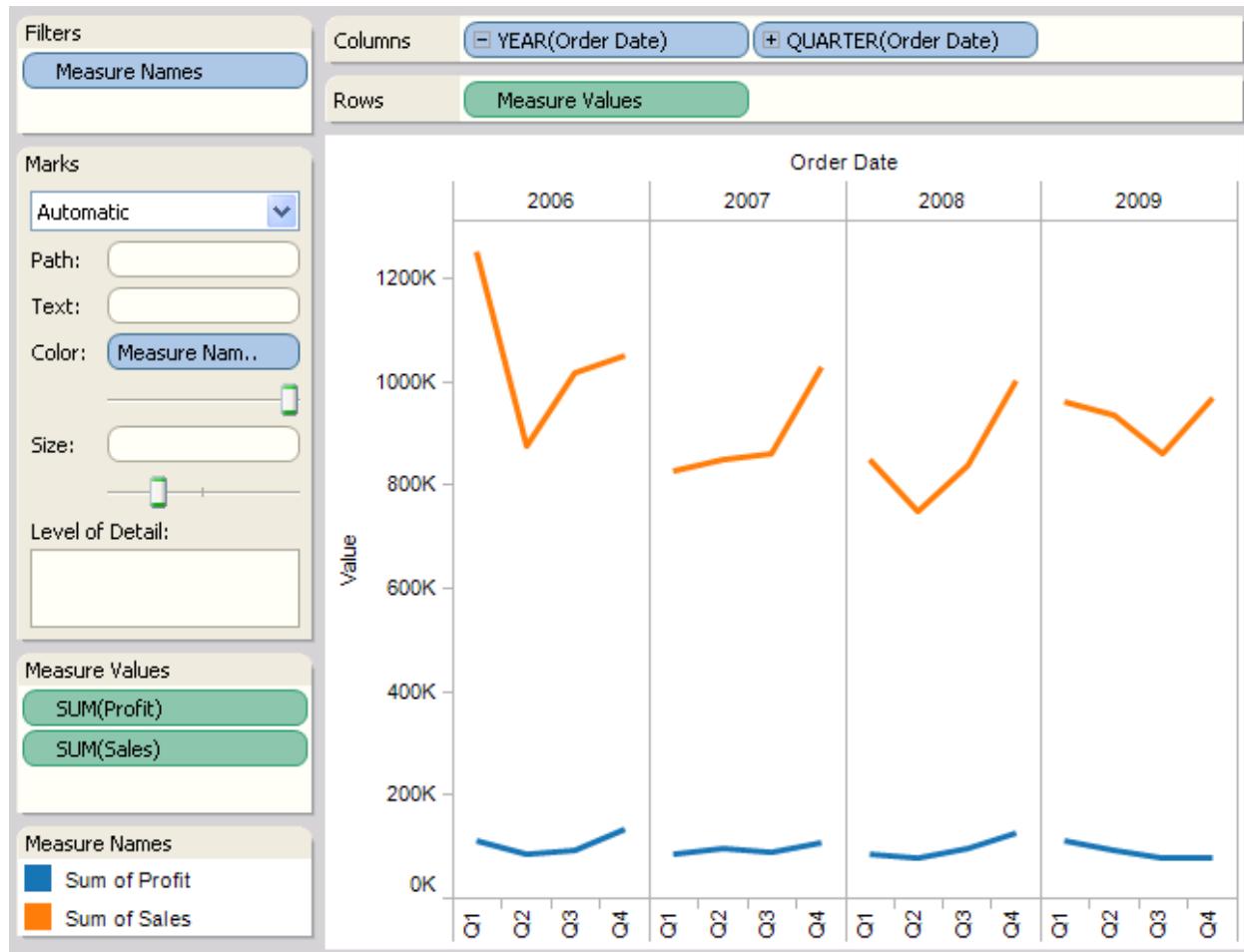


For relational dates, there are many different date levels available, as shown above. When you select a particular level, Tableau asks the data source to perform a computation on the date field. For example, suppose a particular row in your data source has a date entry of 01/23/07. The year is 2007, the quarter is 1 because January falls in the first quarter, and the week number is 4 because January 23rd falls in the fourth week. How the date level is computed depends on your data source because the computation is actually being done by the data source. Therefore, if your data source is configured to use a specific standard to compute week number, Tableau will use the same standard.

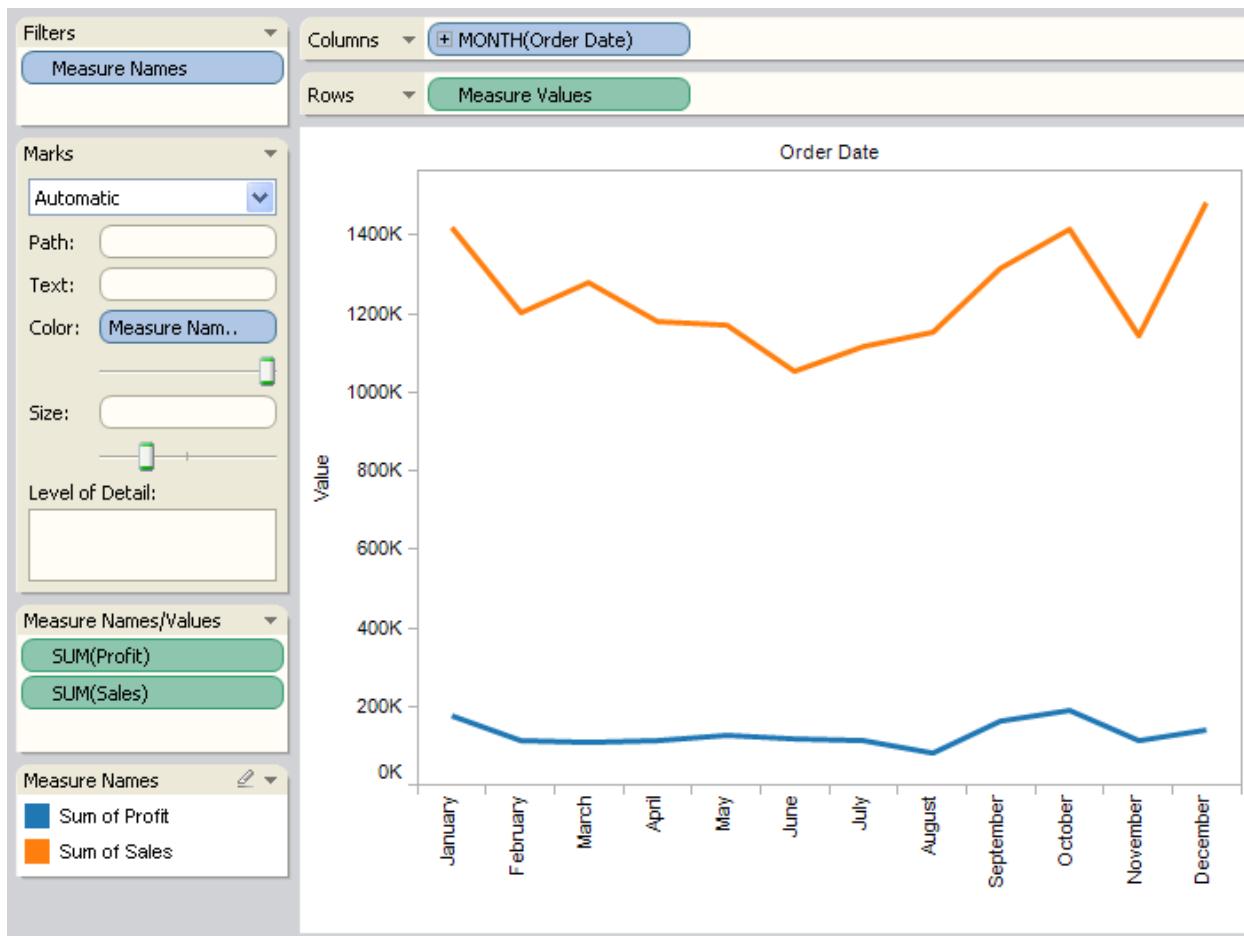
Note that some date levels might not make sense for your relational data source. For example, if the date format does not include time information such as hour, minute, or second, then selecting one of these options will not add any data to your view.

You can work with dates at varying levels of detail simultaneously. To do so, you can drill into dates by clicking the **+** control. You can also drag date fields to the Rows or Columns shelf multiple times in order to nest them and to drill down into them at varying levels of detail.

For example, the view shown below drills down into the year level to display the quarter level as well.

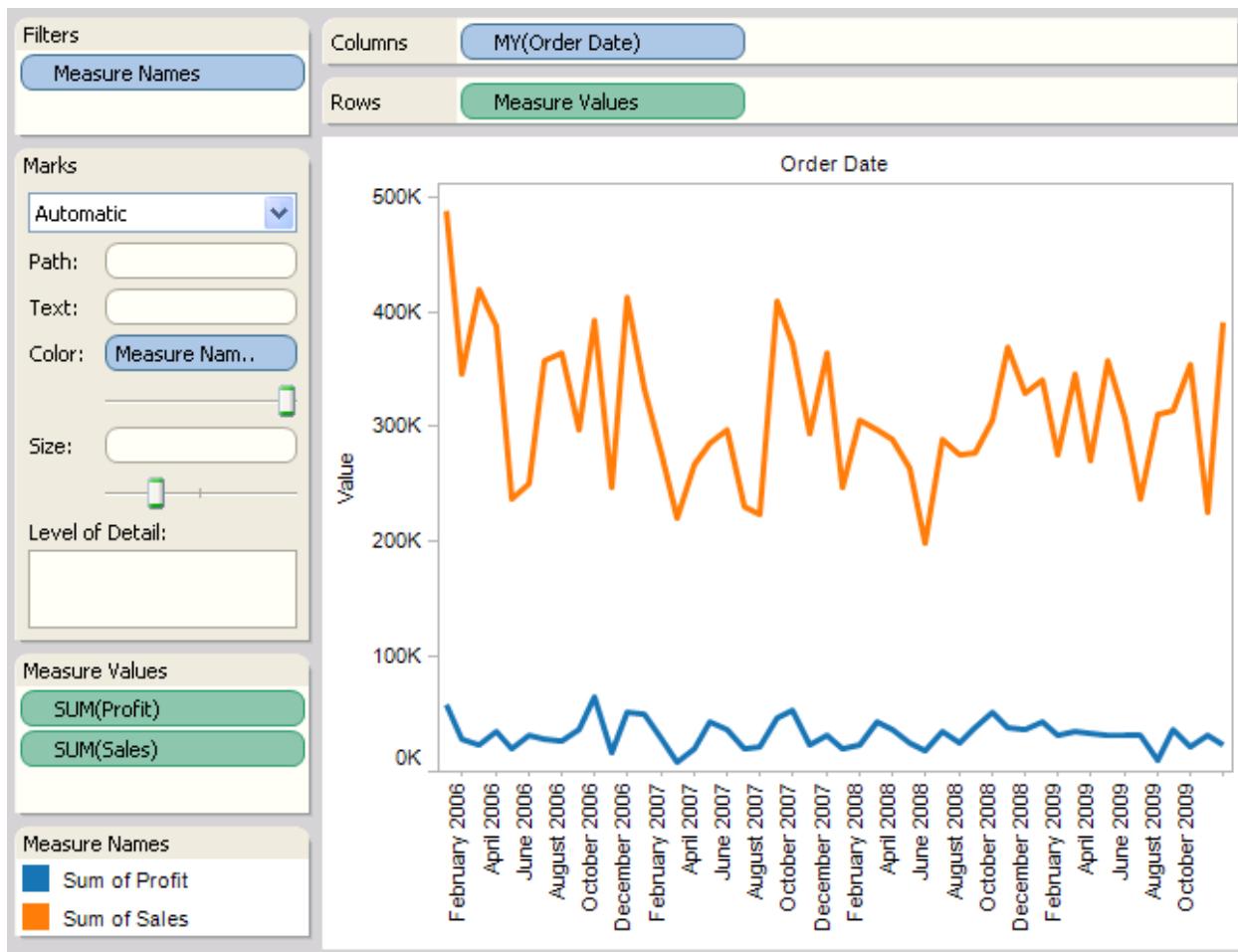


You can display the data by month by selecting Month from the date field's context menu. This displays the data for each month across all years.



To display finer granularity, you can select the MMMM YYYY level from the field menu. Tableau displays the dates using the month and the year.

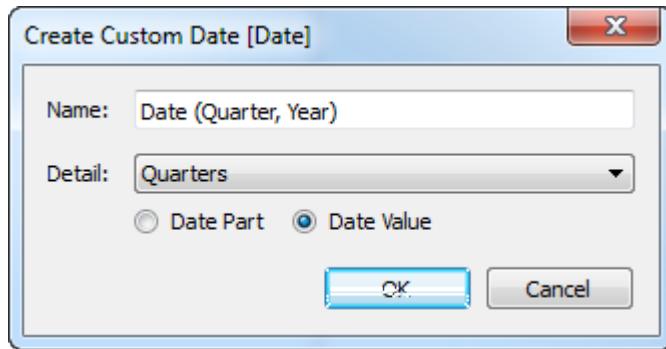
## Tableau Desktop Help



## Custom Dates

You can create a custom date that is binned or truncated to a specific level. The custom date becomes a new field in the Data window. Custom dates are useful if you always use a date at a specific level or you want to create calculations that rely on a binned or truncated date. Custom dates can also be created using the `DATEPART` and `DATETRUNC` functions in a calculated field. Follow the steps below to create a custom date:

1. Right-click a date field in the Data window and select Create Custom Date.
2. In the Create Custom Date dialog box, type a name for the custom date. For example, Date (Quarter, Year).
3. Select the level that you want to show the date at.
4. select whether you want to display discrete Date Parts or show continuous Date Values.



5. When finished, click OK.

## Fiscal Dates

*Occasionally a date field needs to be expressed in terms of its fiscal date equivalent. For instance, calendar years always run from January 1st until December 31st. But an organization's fiscal year might start on a month other than January. For instance, a company's fiscal year might run from June 1st in one year through May 31st of the following year. In these cases, it's helpful to express the Fiscal Year and the Fiscal Quarter and the Fiscal Week Number rather than their calendar equivalents, when using the date field in a view.*

*To express date fields in fiscal terms, follow these steps:*

1. *Right-click the date dimension in the Data window and select Fiscal Year Start. This option is only available on fields that are classified as date dimensions.*
2. *Designate the start of the fiscal year by selecting a month from the subsequent context menu.*

*Whether a given level of a date dimension is affected by the conversion to a fiscal equivalent depends on the specific case. Consult the following table:*

Date Level	When Converted to Fiscal
YEAR	The YEAR reflects the fiscal year. For instance, the year for the date June 1, 2004 would be shown as FY 2005.
QUARTER	The QUARTER reflects the fiscal quarter. For instance, the quarter for the date June 1, 2004 would be shown as Q1.
MONTH	No change in behavior. The calendar month is the same as the fiscal month.
DAY	No change in behavior. The calendar day is the same as the fiscal day.
HOUR	No change in behavior. The calendar hour is the same as the fiscal hour.
MINUTE	No change in behavior. The calendar minute is the same as the fiscal minute.
SECOND	No change in behavior. The calendar second is the same as the fiscal second.
WEEKNUMBER	The WEEKNUMBER reflects the fiscal week number. For instance, the week number for the date June 1, 2004 would be shown as 1.

Date Level	When Converted to Fiscal
WEEKDAY	No change in behavior. The calendar weekday is the same as the fiscal weekday.
MM/YYYY	No change in behavior. This date format always displays calendar dates, even when a fiscal year has been assigned.
M/D/Y	This date format always displays Calendar dates, even when a fiscal year has been assigned.

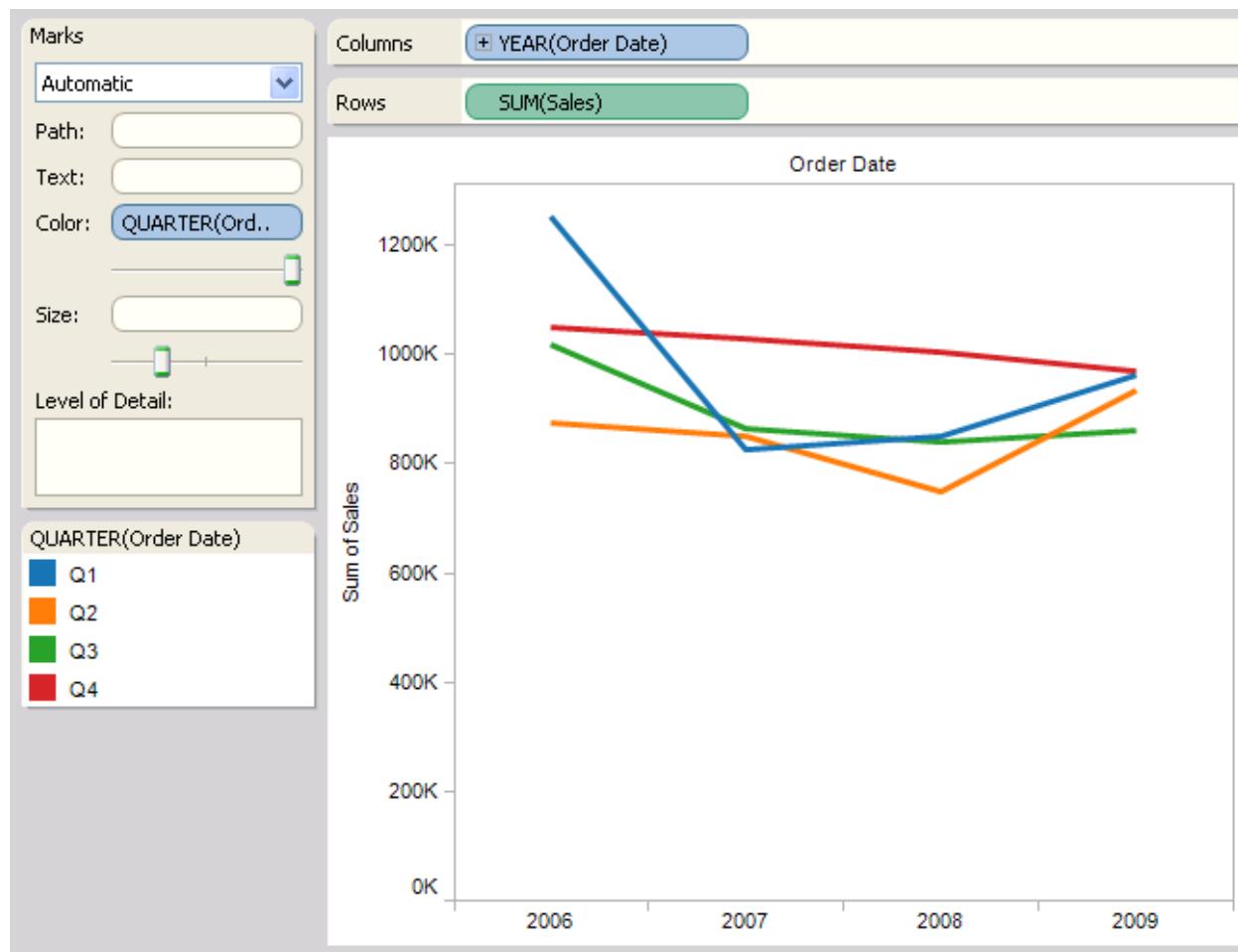
*Notice that the only date level that expressly displays the conversion to a fiscal calendar is the YEAR level. Specifically, fiscal years are shown with the FY prefix. This is not true of fiscal quarters or week numbers, however, which are not shown with any special fiscal markings.*

*Fiscal year designations for any given date dimension are applied to all instances of the field in the Tableau workbook. Fiscal dates can only be applied to dimensions in a relational data source.*

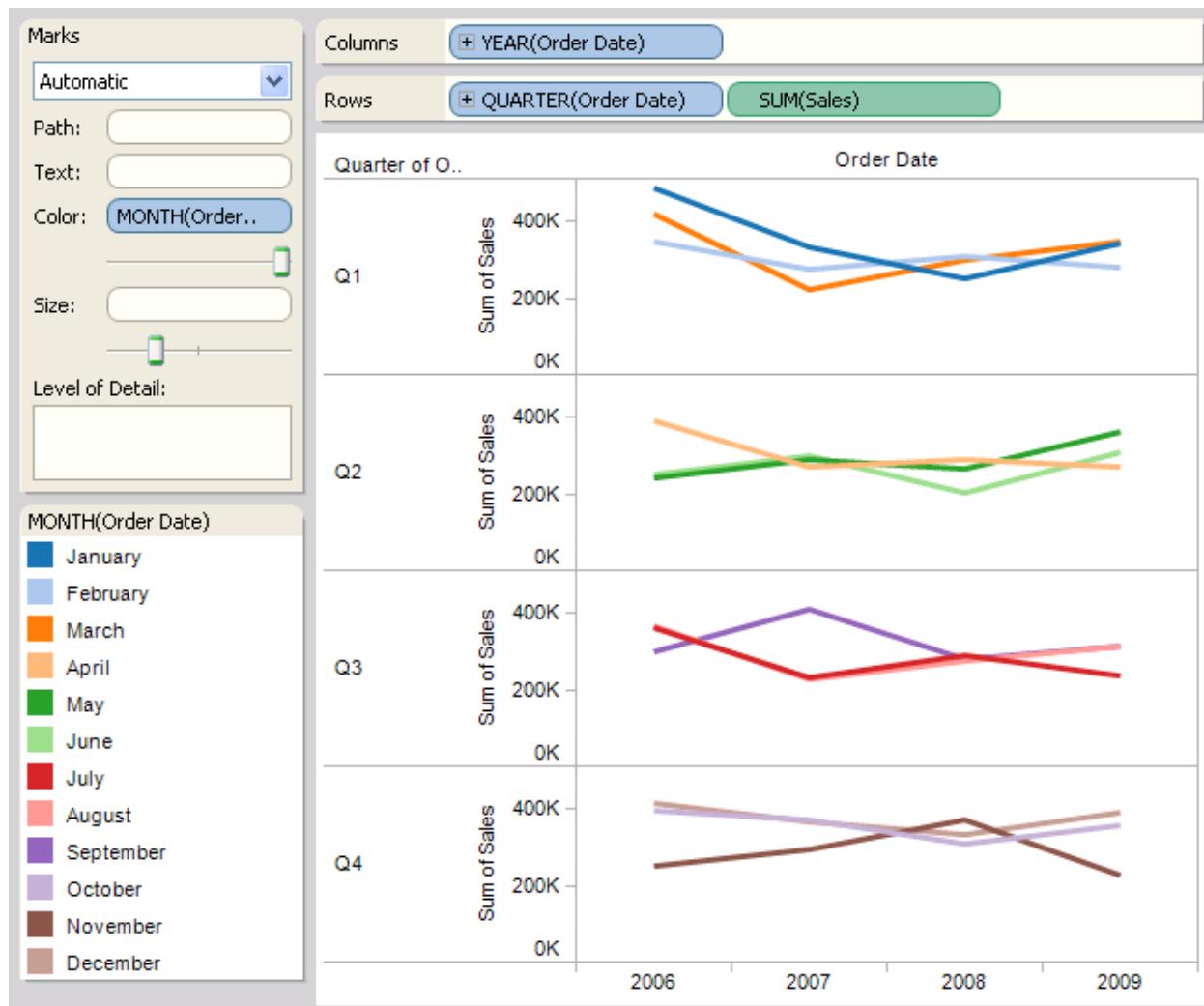
## Perfect Pivoting with Dates

You can perfect pivot dates by placing different date levels on different worksheet shelves simultaneously. Place the date field on a variety of shelves and then select the desired date level from the fields' context menus.

For example, the following line chart displays years as column headers and then color-encodes the marks by quarter.



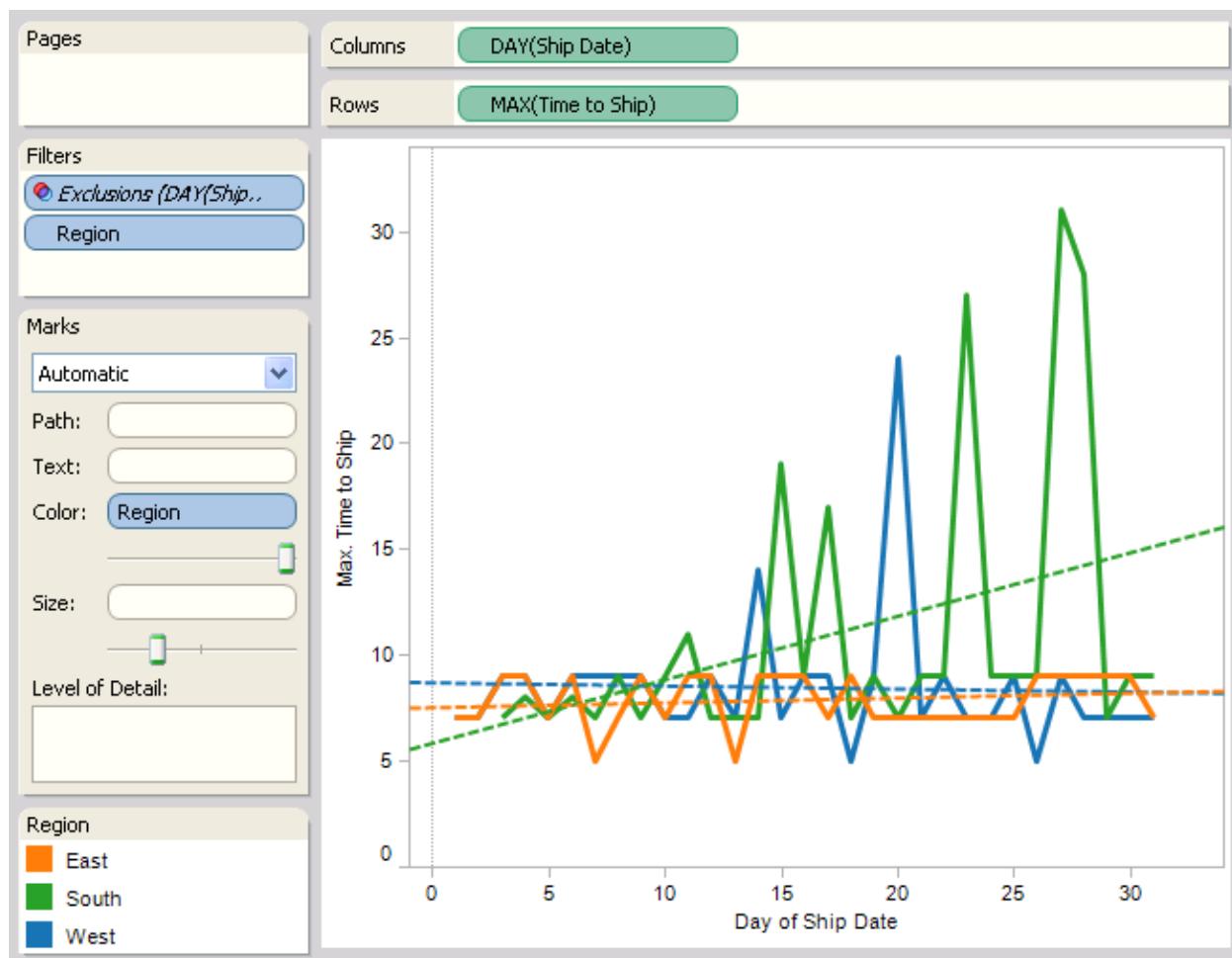
You can separate the marks by month and by quarter as shown below.



## Continuous Dates

You can treat a date as a continuous quantity after placing the field on a shelf. You do this by selecting Continuous from the field's context menu. This draws a quantitative axis for the date values. You can then change the displayed date range by double-clicking on the axis and specifying the desired range.

For example, the view below displays the time to ship as a function of a continuous ship date and color-encoded by region. As you can see, the color of the Ship Date field changes from blue to green after it is converted to a continuous quantity.



Treating dates as a continuous quantity is particularly useful when you use Gantt bars or want to see trends using line charts as shown above.

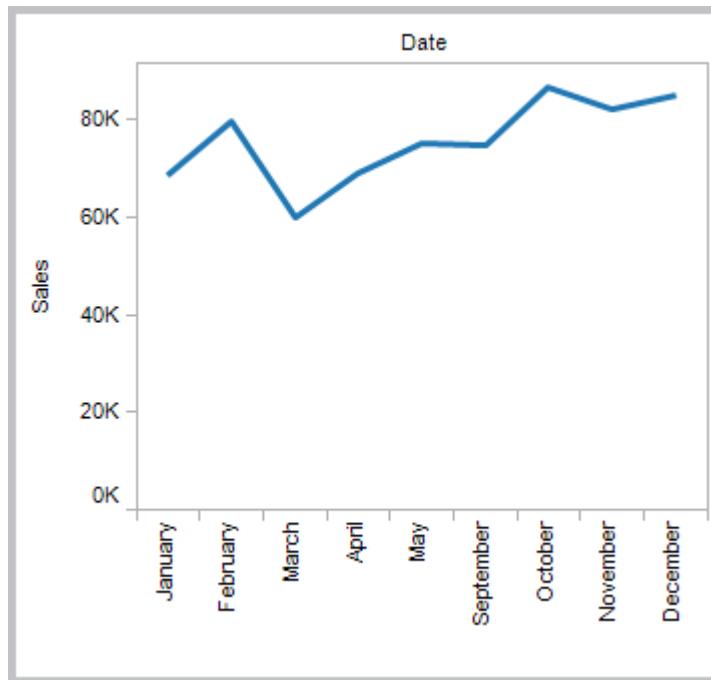
*By default, date dimensions are discrete fields for which Tableau automatically selects a date level when it is placed on a shelf. You can make a date dimension continuous by default by right-clicking the field in the Data window and selecting Convert to Continuous. The field turns green and is automatically converted to a continuous field when you drag it to a shelf. To revert to discrete again, right-click the field in the Data window and select Convert to Discrete.*

## Missing Values

When you're working with dates or a numeric bins, Tableau only shows the values that are represented in your data. If your data does not contain the complete range of values, the missing values will not be shown. For example, your data may contain data for January through May and September through December. However, there was no data recorded for June, July, and August. If you create a line chart in Tableau, the missing months will not be shown. You can optionally show the missing months to make it clear that there was no data recorded during that time.

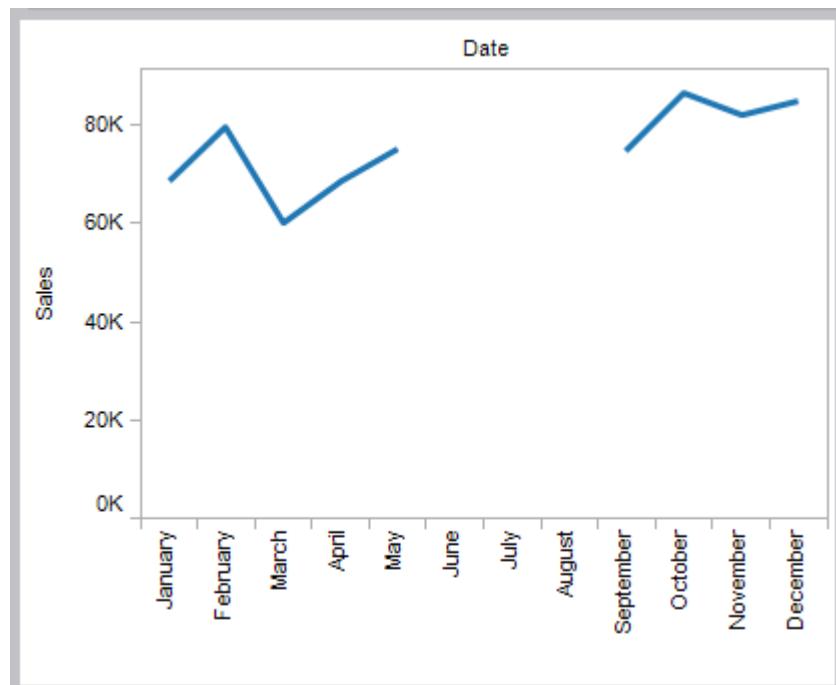
### ***Missing Values Hidden (Default)***

By default, missing values in a date range or numeric bins are not shown.

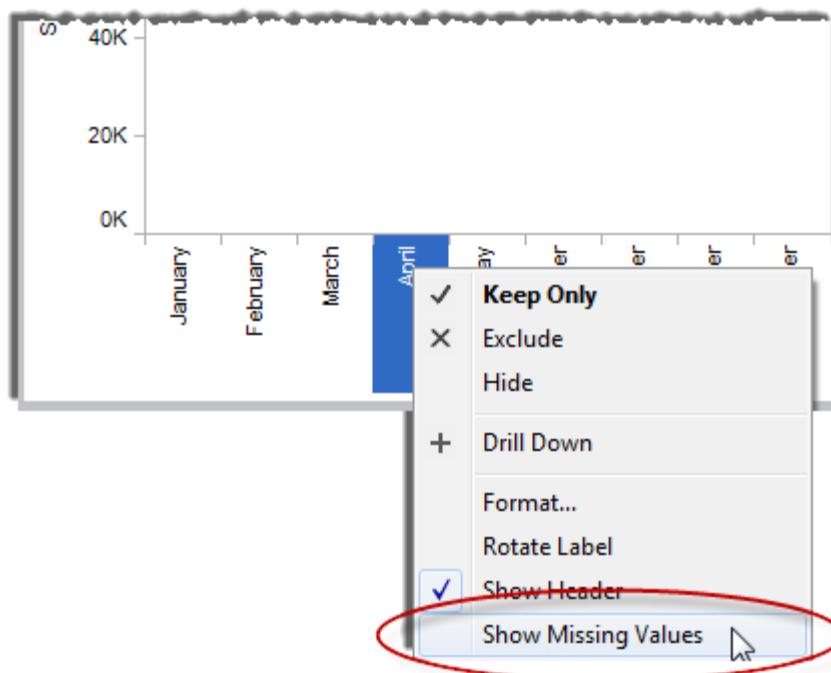


### ***Missing Values Shown***

You can show the missing values to indicate incomplete data.



To show missing values in a range, right-click the date or bin headers and select Show Missing Values.

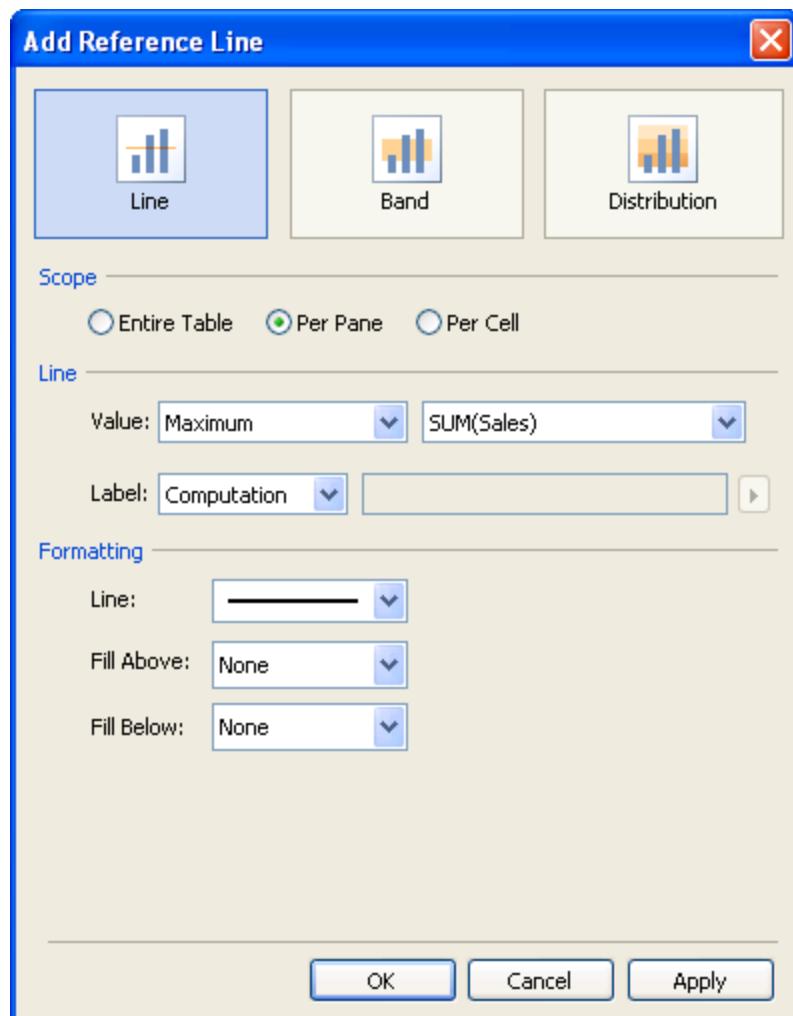


## Reference Lines and Bands

### Reference Lines and Bands

A reference line is typically used to mark a specific value or region on an axis. For example, if you are analyzing the monthly sales for several products, you may want to include a reference line at the average sales mark so you can see how each product performed against the average. Alternatively you may want to shade a particular area along the axis. Finally, you may want to use reference lines to specify a distribution. There are three types of reference lines: lines, bands, and distribution.

Tableau lets you add an unlimited number of reference lines. Add reference lines using the Add Reference Line dialog box.

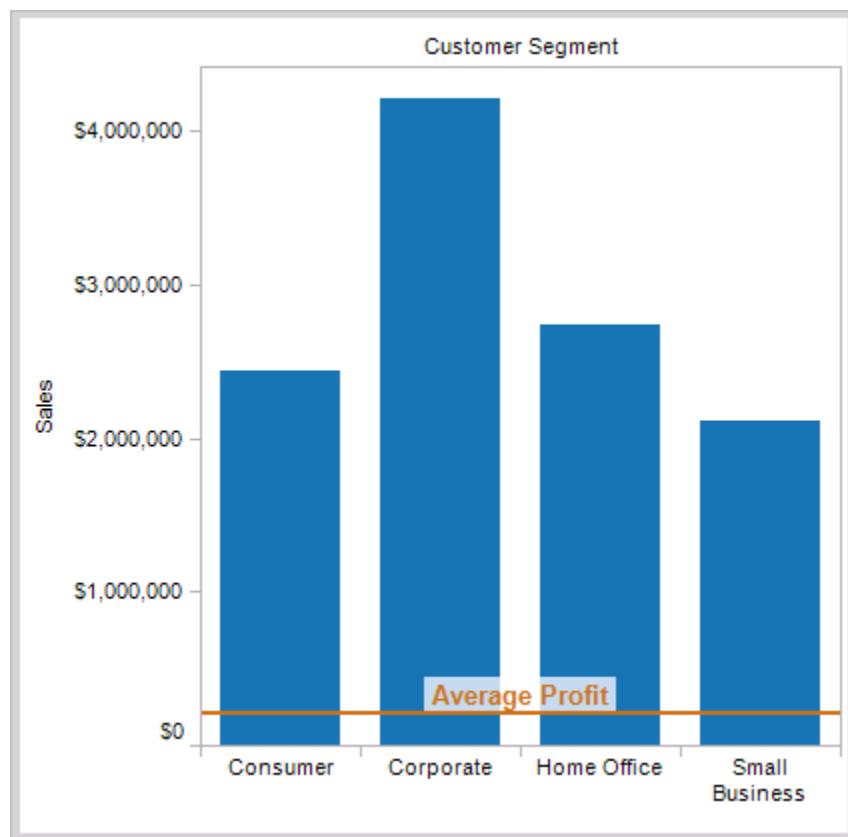


- [Types of Reference Lines and Bands](#)
- [Adding Reference Lines](#)
- [Adding Reference Bands](#)
- [Adding Reference Distributions \(Bullet Graphs\)](#)
- [Editing Reference Lines and Bands](#)
- [Removing Reference Lines and Bands](#)

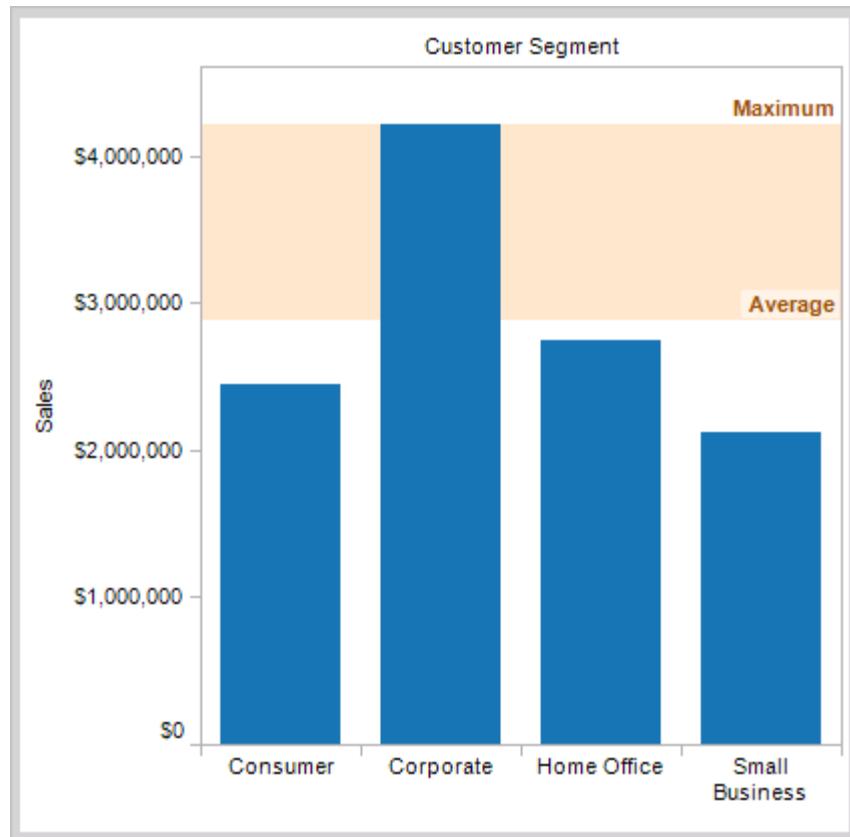
## Types of Reference Lines and Bands

*There are three types of reference lines and bands*

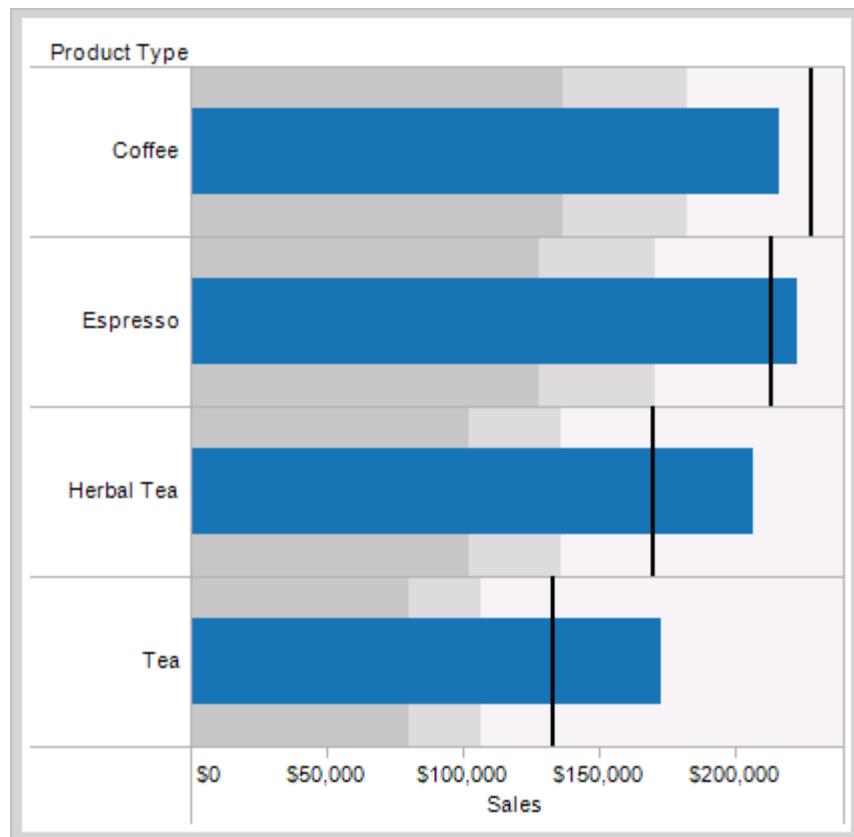
- **Line** - adds a line at a constant or computed value on the axis. Computed values can be based on a specified field.



- **Band** - shades an area behind the marks in the view between two constant or computed values on the axis.



- **Distribution** - adds a gradient of shading to indicate the distribution of values along the axis. Distribution can be defined by confidence interval, percentages, percentiles, quantiles, or standard deviation. In addition to the shading, you can add a line to mark a constant or computed value along the axis. This type of reference line is used to create bullet charts.



**Note:**

Reference lines are not available when the view is a map using online or offline maps.

## Adding Reference Lines

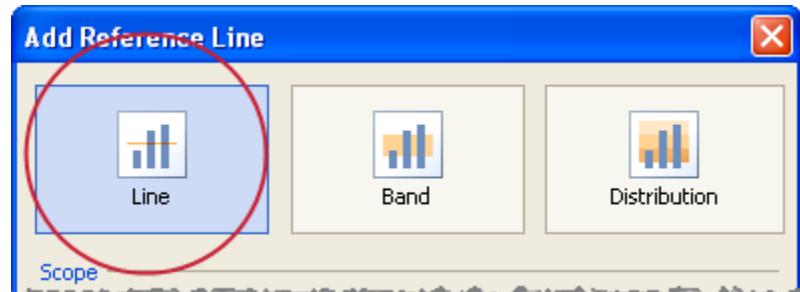
You can add a reference line to any continuous axis.

To add a reference line:

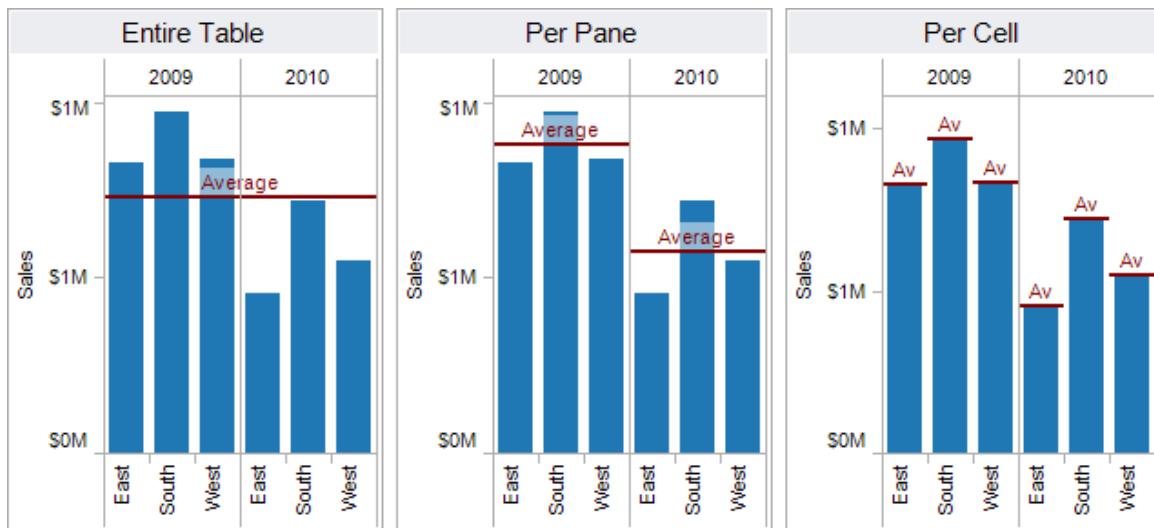
1. Right-click on a quantitative axis and select Add Reference Line.



2. In the Add Reference Line dialog box, select **Line**.



3. In the Add Reference Line dialog box, select one of the following scopes:



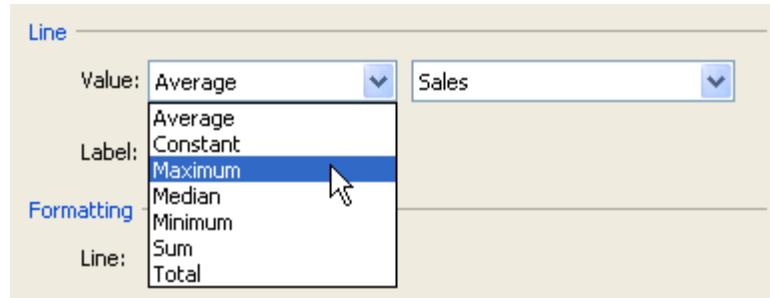
Adds a reference line to the entire table across all panes.

Adds a reference line on a per pane basis. Computed reference lines are recalculated for each pane in the view.

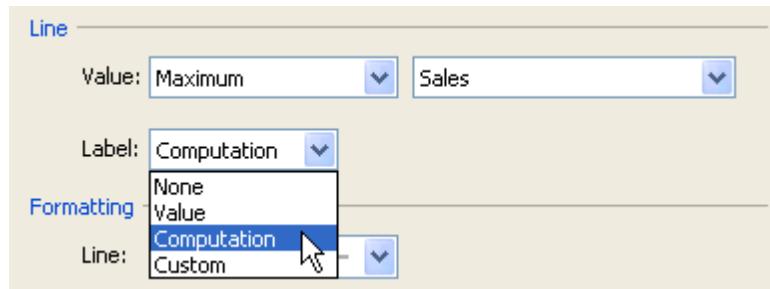
Adds a reference line within each cell. Computed reference lines are recalculated for each cell in the view.

4. Select the Value to mark on the axis. You can select from the following options:

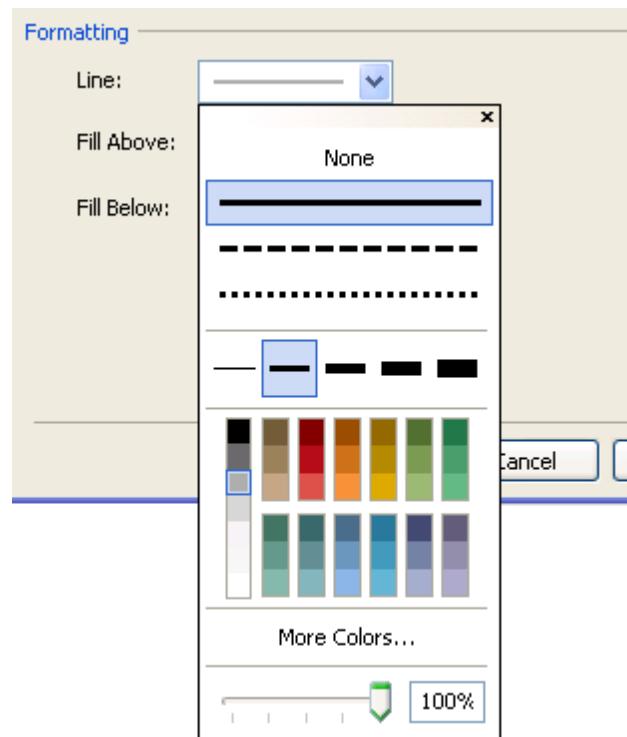
- **Average** - places a line at the average value along the axis.
- **Constant** - places a line at the specified value on the axis.
- **Maximum** - places a line at the maximum value.
- **Median** - places a line at the median value.
- **Minimum** - places a line at the minimum value.
- **Sum** - places a line at the SUM of all the values in either the cell, pane, or entire view.
- **Total** - places a line at the aggregate of all the values in either the cell, pane, or the entire view. This option is particularly useful when computing a weighted average rather than an average of averages. It is also useful when working with a calculation with a custom aggregation. The total is computed using the underlying data and behaves the same as selecting one of the totals option the Analysis menu.



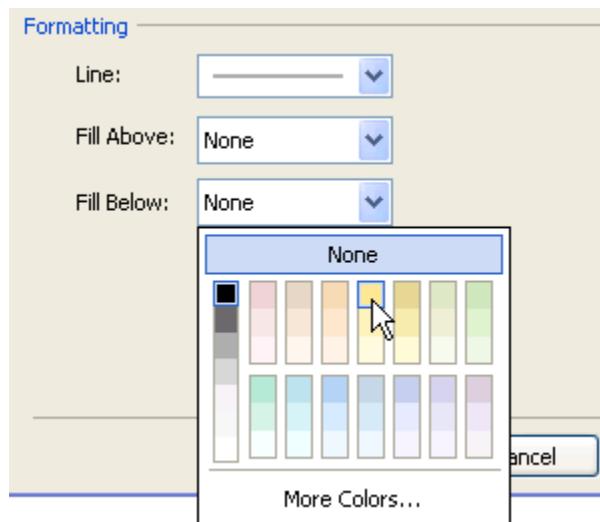
5. These values can be applied to any of the measures used in the view. For example, in a view showing sales over time, you can add a reference line that marks the average profit. If there are multiple measures in the view, select the measure to use to compute the reference line.
6. Select how you want to label the line. You can select from the following options:
  - **None** –select this option to not include a label for the reference line.
  - **Value** – select this option to include a label that is the corresponding value on the axis.
  - **Computation** – select this option to display an automatic label. The label is based on the computation and the measure that is selected.
  - **Custom** – select this option to type a custom label into the text box. You can use the menu to the right of the text box to insert values such as the computation or the value.



7. Specify Formatting options for the line. You can change the style, thickness, and color.



8. Optionally, add a **Fill color Above and Below the line**.



## Adding Reference Bands

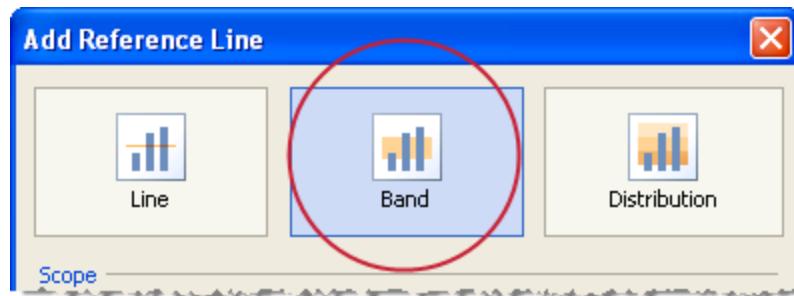
Reference bands are shaded areas behind the marks in the view between two constant or computed values on the axis. You can add reference bands to any continuous axis.

**To add a reference band:**

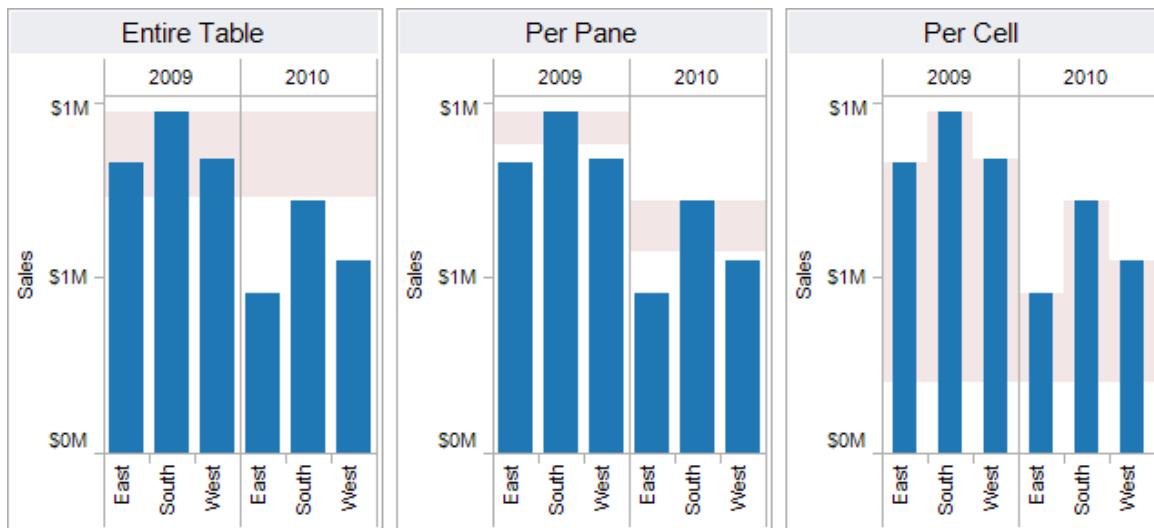
1. Right-click on a quantitative axis and select Add Reference Line.



2. In the Add Reference Line dialog box, select **Band**.



3. Select one of the following scopes:

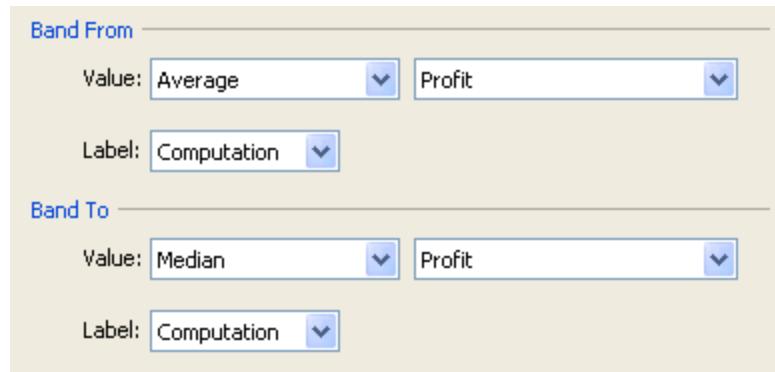


Adds a reference band to the entire table across all panes.

Adds a reference band on a per pane basis. Computed reference bands are recalculated for each pane in the view.

Adds a reference band within each cell. Computed reference bands are recalculated for each cell in the view.

4. Specify two values to shade between. For each value you can specify the one of the following values and how you want to label it:
  - **Average** - places a line at the average value along the axis.
  - **Constant** - places a line at the specified value on the axis.
  - **Maximum** - places a line at the maximum value.
  - **Median** - places a line at the median value.
  - **Minimum** - places a line at the minimum value.
  - **Sum** - places a line at the SUM of all the values in either the cell, pane, or entire view.
  - **Total** - places a line at the aggregate of all the values in either the cell, pane, or the entire view. This option is particularly useful when computing weighted average rather than an average of averages. It is also useful when working with a calculation with a custom aggregation. The total is computed using the underlying data and behaves the same as selecting one of the totals options in the Analysis menu.



5. *Each value can be based on any of the measures used in the view. For example, in a view showing sales over time, you can add a reference band that shades between the average profit and maximum profit. If there are multiple measures in the view, select the measure to use to compute the reference line.*
6. *Format the reference band. You can mark the two values with a line and select the color to shade between them with.*



7. *When finished, click OK.*

## Adding Reference Distributions (Bullet Graphs)

### Adding Reference Distributions (Bullet Graphs)

*Reference distributions are a variation of reference bands. A reference distribution adds a gradient of shading to indicate the distribution of values along the axis. Distributions can be defined by confidence interval, percentages, percentiles, quantiles, or standard deviation. In addition to the shading, you can add a line to mark a constant or computed value along the axis.*

- [Basic Reference Distributions](#)
- [Bullet Graphs](#)

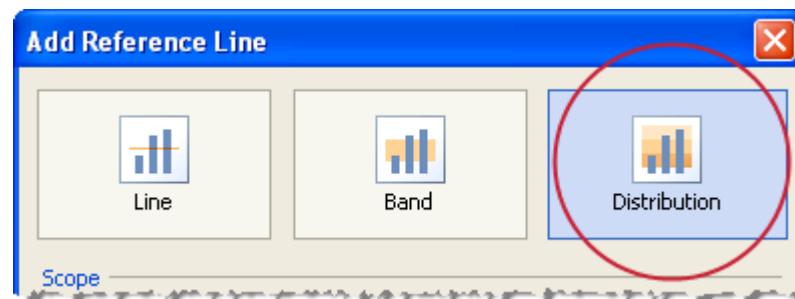
## Basic Reference Distributions

**To add a reference distribution:**

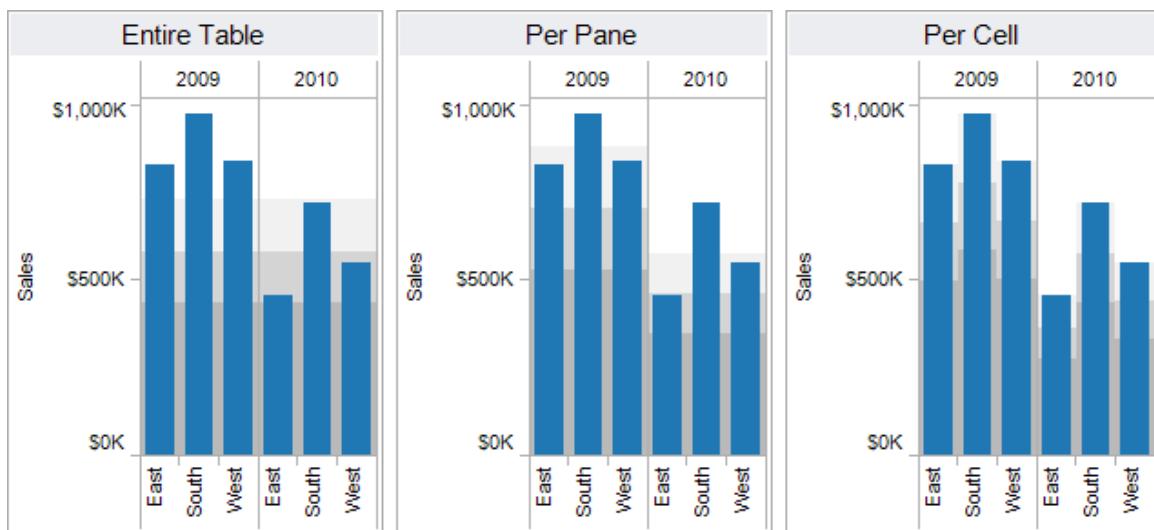
1. Right-click on a quantitative axis and select Add Reference Line.



2. In the Add Reference Line dialog box, select **Distribution**.



3. Select one of the following scopes:



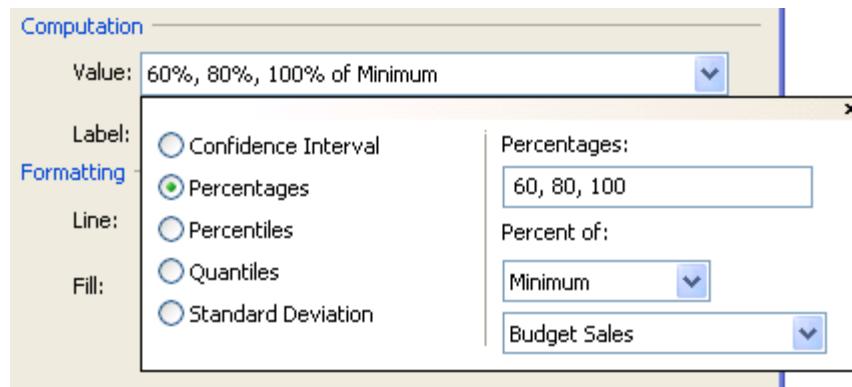
Adds a reference distribution to the entire table across all panes.

Adds a reference distribution on a per pane basis. Computed distributions are recalculated for each pane in the view.

Adds a reference distributions within each cell. Computed distributions are recalculated for each cell in the view.

#### 4. Select the distribution values. You can select from the following options:

- **Confidence Interval** - shades the interval between which lie the specified percentage of values.
- **Percentages** - shades the interval between which lie specified percentages of values. Separate multiple percentage values with a comma (e.g., 60%, 80%, 1000%).
- **Percentiles** - places a line indicating a specified percentile. When you select this option, you must also select the percentage.
- **Quantiles** - breaks the view into a specified number of tiles using shading and lines. When you select this computation, you must also select the number of tiles.
- **Standard Deviation** - places lines and shading to indicated the specified number of standard deviations above and below the mean. When you select this option you must specify the factor, which is the number of standard deviations and whether the computation is on a sample or the population.



5. Specify formatting options. You can format the lines (e.g., style, thickness, and color) as well as the fill gradient. Select from a list of predefined gradients. Select Reverse to change the order of shading in the gradient and Symmetric to use a single color instead of a gradient. You can also specify whether to add additional shading above and below the defined distribution.

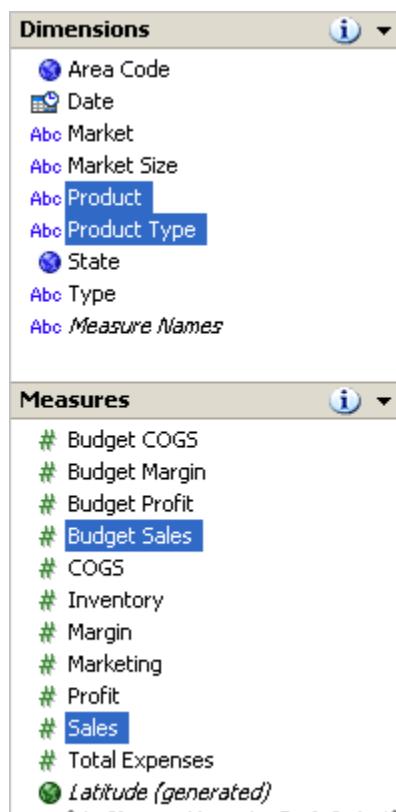


## Bullet Graphs

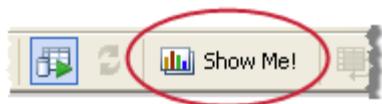
Reference distributions can also be used to create bullet graphs. A bullet graph is a variation of a bar graph developed to replace dashboard gauges and meters. The bullet graph is generally used to compare a primary measure to one or more other measures in the context of qualitative ranges of performance such as poor, satisfactory, and good. You can create a bullet graph by adding two reference lines: a distribution to indicate the qualitative ranges of performance and a line to indicate the target.

### To create a bullet graph:

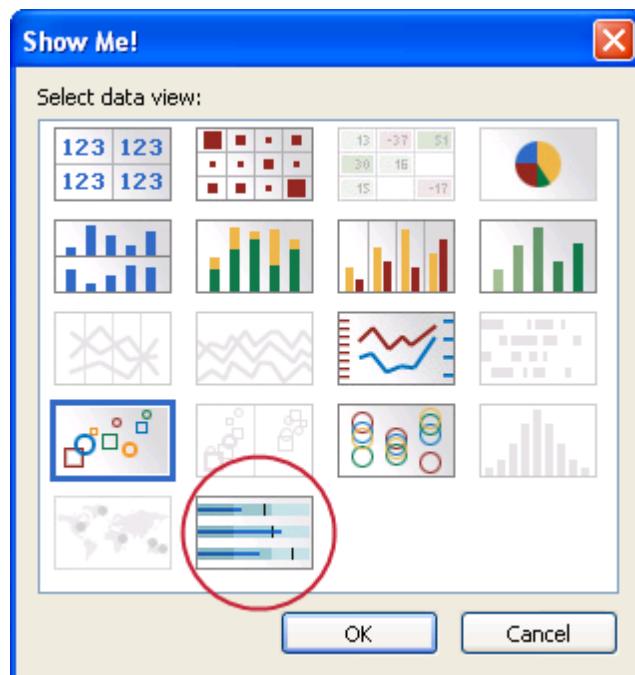
1. Select two measures in the Data window. These measures will be compared in the bullet graph. For example, budget vs. actual; actual vs. target; etc.



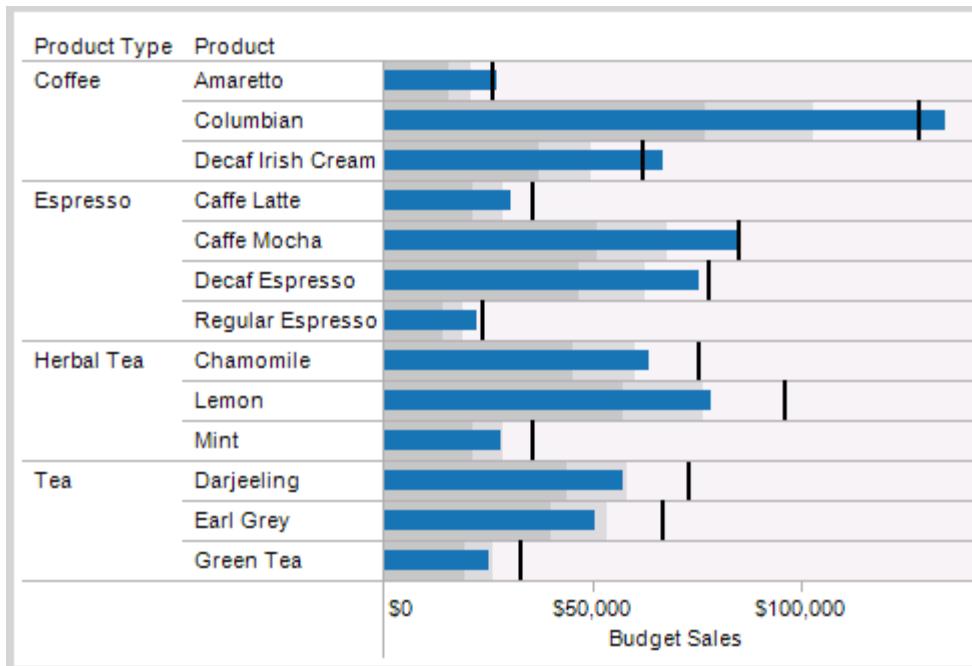
2. Click the **Show Me!** button in the toolbar.



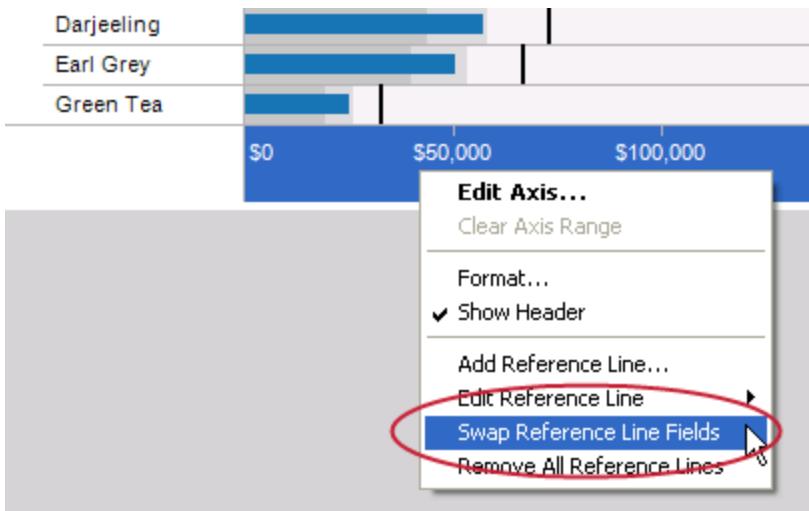
3. Select **Bullet Graph** in the Show Me! dialog box.



Two reference lines are added. By default, Tableau adds a reference distribution that is defined as 60% and 80% of the Average of the measure on the Level of Detail shelf. It also adds a reference line that marks the Average of that same measure. The other measure is placed on the Rows shelf.



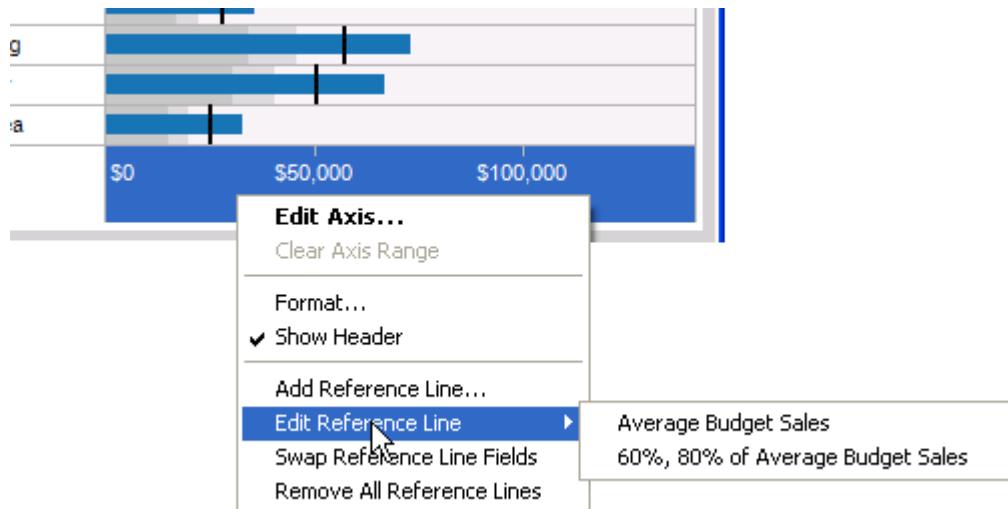
You can quickly swap the two measures by right-clicking on the continuous axis and selecting Swap Reference Line Fields.



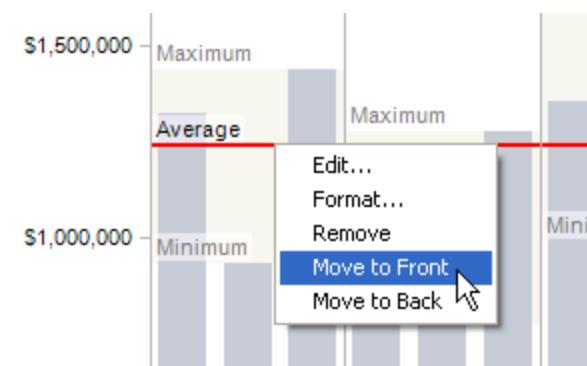
Edit each of the reference lines to change its definition. For example, you may want to add 100%, or draw a line at a constant value.

## Editing Reference Lines and Bands

After you've added a reference line or band, you can edit the definition by right-clicking the continuous axis and selecting **Edit Reference Line**. If there are multiple reference lines or bands in the view, use the additional menu to select the one you want to edit.



When you have multiple reference lines, you may want to change the order they are drawn in the view. You can reorder a reference line by right-clicking the line and selecting **Move to Front** or **Move to Back**.

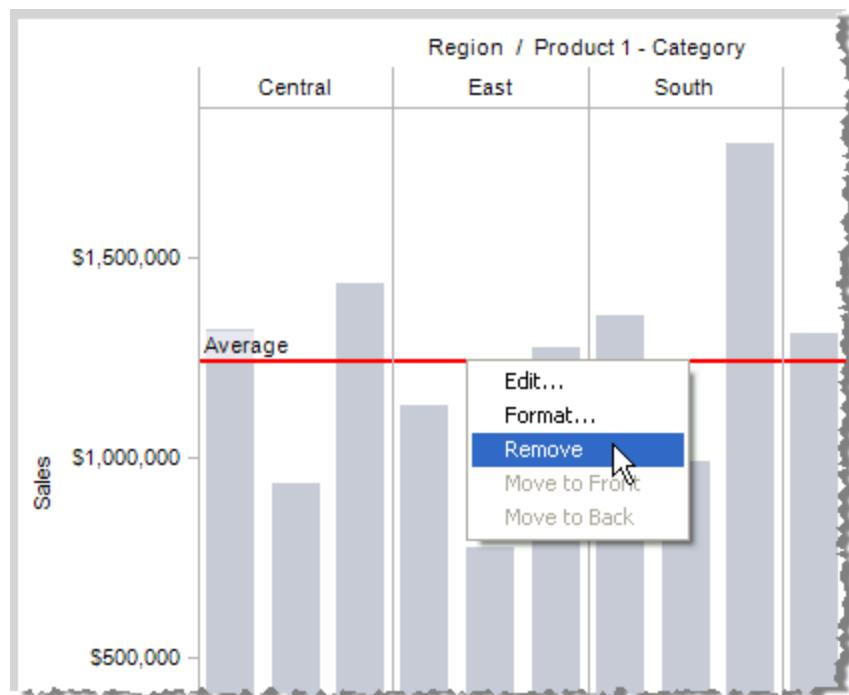


## Removing Reference Lines and Bands

You can remove a individual reference line or band or remove them all at once.

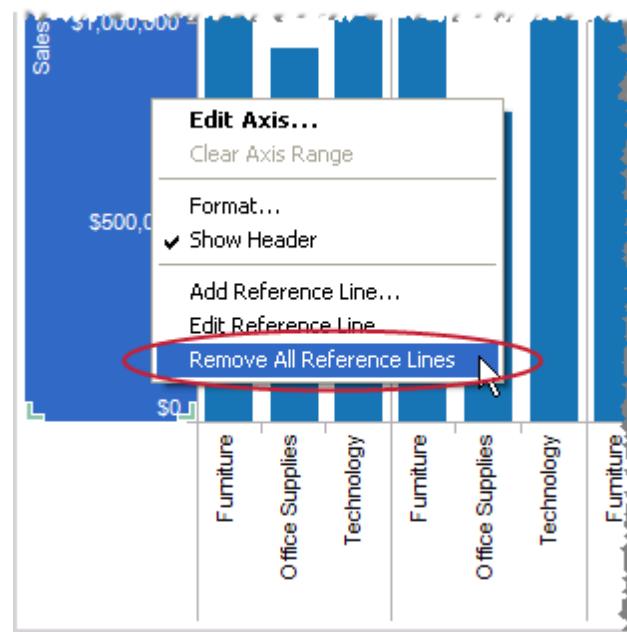
**To remove an individual reference line:**

- Right-click the reference line in the view and select **Remove**. If you are removing a reference band or distribution that doesn't include a line, right-click where at the beginning or end of the shaded area. In distributions, you can also right-click where between the different shades in the gradient.



**To remove all reference lines:**

- Right-click the continuous axis and select **Remove All Reference Lines**.



# Inspecting Data

## Inspecting Data

Once you have created a view, Tableau offers a selection of dynamic data inspection tools that help you isolate the data of interest and then continue to explore and analyze. For example, if you have a dense data view, you can focus on a particular region, select a group of outliers, view the underlying data source rows for each mark, and then view a summary of the selected marks include the average, minimum, and maximum values.

- [Select](#)
- [Zoom Controls](#)
- [Pan](#)
- [Undo and Redo](#)
- [Drop Lines](#)
- [Summary Card](#)
- [View Data](#)
- [Describing the View](#)

## Select

*Selecting marks is useful when you want to visually identify a subset of the data view or you want to run an action.*

*You can select any individual mark by clicking on it. You can select multiple marks by holding down the Ctrl key. You can also drag the cursor to draw a box around the marks you want to select. Finally, you can combine these methods to quickly select all the marks of interest.*

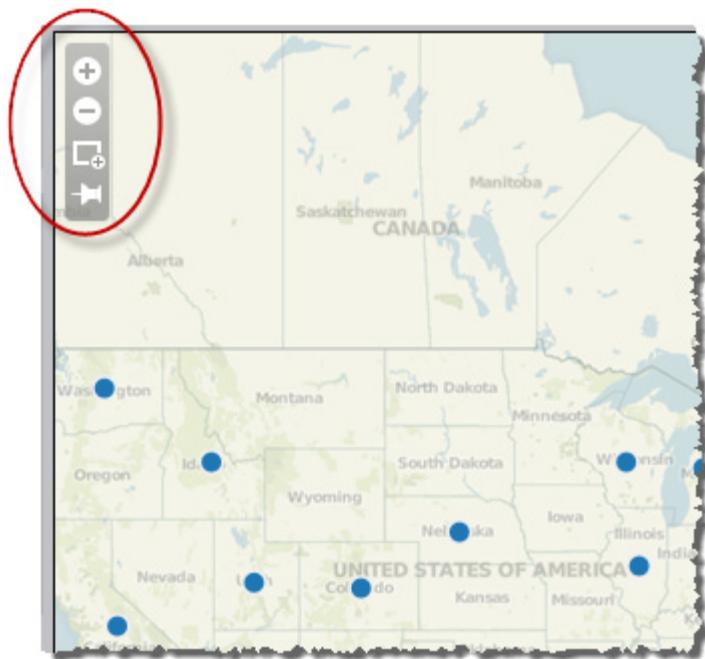
## Zoom Controls

Tableau has a set of zoom controls that display in the upper left corner of the view. By default, these controls only display when you hover over a map view. You can control when the zoom controls display by selecting *Worksheet > Show Zoom Controls* and then select one of the following options:

- *Automatic* – displays when you hover the mouse over map views.
- *Show on hover* – displays when you hover the pointer over all views.
- *Hide* – never displays.

These settings also apply to the view when it is opened in Tableau Reader or Tableau Server. You must specify a setting for each worksheet.

The zoom controls allow you to zoom in and out, zoom to a specific area, and fix or reset the axes. Each control is described below.



### Zoom In and Out

Zooming is useful when you have a lot of data in a view and you want to focus on a specific part of the view without excluding the rest. Click the plus button  to zoom in

on the view and the minus button  to zoom out. If the zoom controls are hidden, double click the view to zoom in and hold down SHIFT and double-click to zoom out.

### *Area Zoom*

Rather than zooming in and out on the entire view, you can select a specific area to zoom to. When you zoom in on an area, the view is enlarged so that the selected area fills the window. Select the Area Zoom button  and then click and drag in the view to select the area to zoom. If the zoom controls are hidden, hold down CTRL + SHIFT and then drag the pointer to select the area you want to zoom to.

### *Reset Axes*

When you zoom in or out the axes in the view are locked to a specific range. You can quickly reset the view back to the automatic axis range by clicking the Reset Axes  button in the zoom controls. This button is also available on the toolbar.

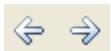
## Pan

*You can move your view of a table up and down as well as left and right with the pan tool. There are two uses of panning. The first is when you have zoomed in on a view, particularly a map, and want to move the map around to see other marks of interest. The second is when your data view contains many panes, and you want to move quickly from pane to pane.*

*Use the Pan tool by holding SHIFT and then dragging the cursor across the view.*

## Undo and Redo

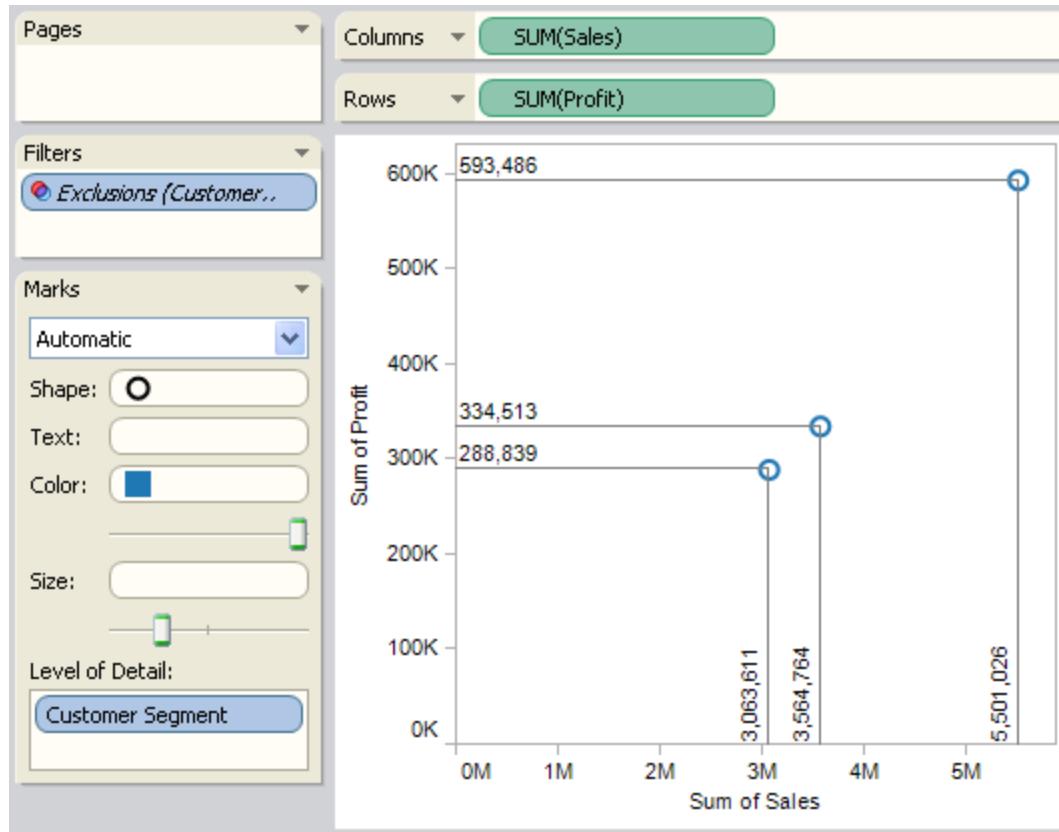
You can perform unlimited undo and redo of your actions. You can undo almost all actions in Tableau by pressing the Undo button on the toolbar. Likewise, you can redo almost all actions by pressing the Redo button on the toolbar.



In this regard, every workbook behaves like a web browser. You can quickly return to a previous view. Or you can browse all the views of a data source that you have created. Tableau saves the undo/redo history across all worksheets until you exit. The history is not saved between sessions.

## Drop Lines

*Drop lines are most useful for distinguishing marks and calling out their position in the view. For example, in a view that is dense with scatter marks, you can turn on drop lines to show the position of a particular data point. When you add drop lines a line is extended from the marks to one of the axes. You can choose to show drop lines all the time or only when a mark is selected.*



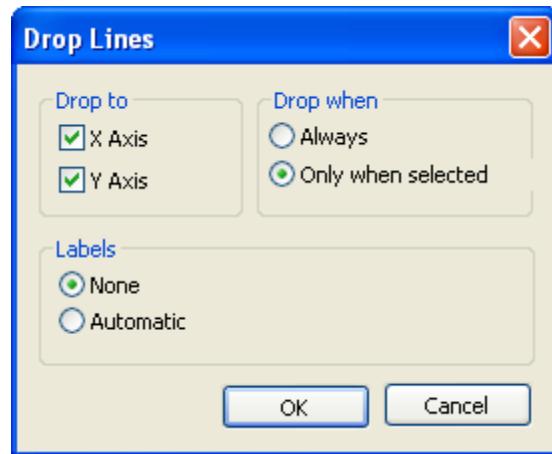
To add drop lines to the view:

- Right-click on the pane and select Drop Lines.

By default, drop lines are set to only show when the mark is selected. You can change this setting and specify other options in the Drop Lines dialog box.

To edit drop lines:

- Right-click on the pane and select Edit Drop Lines to open the Drop Lines dialog box.

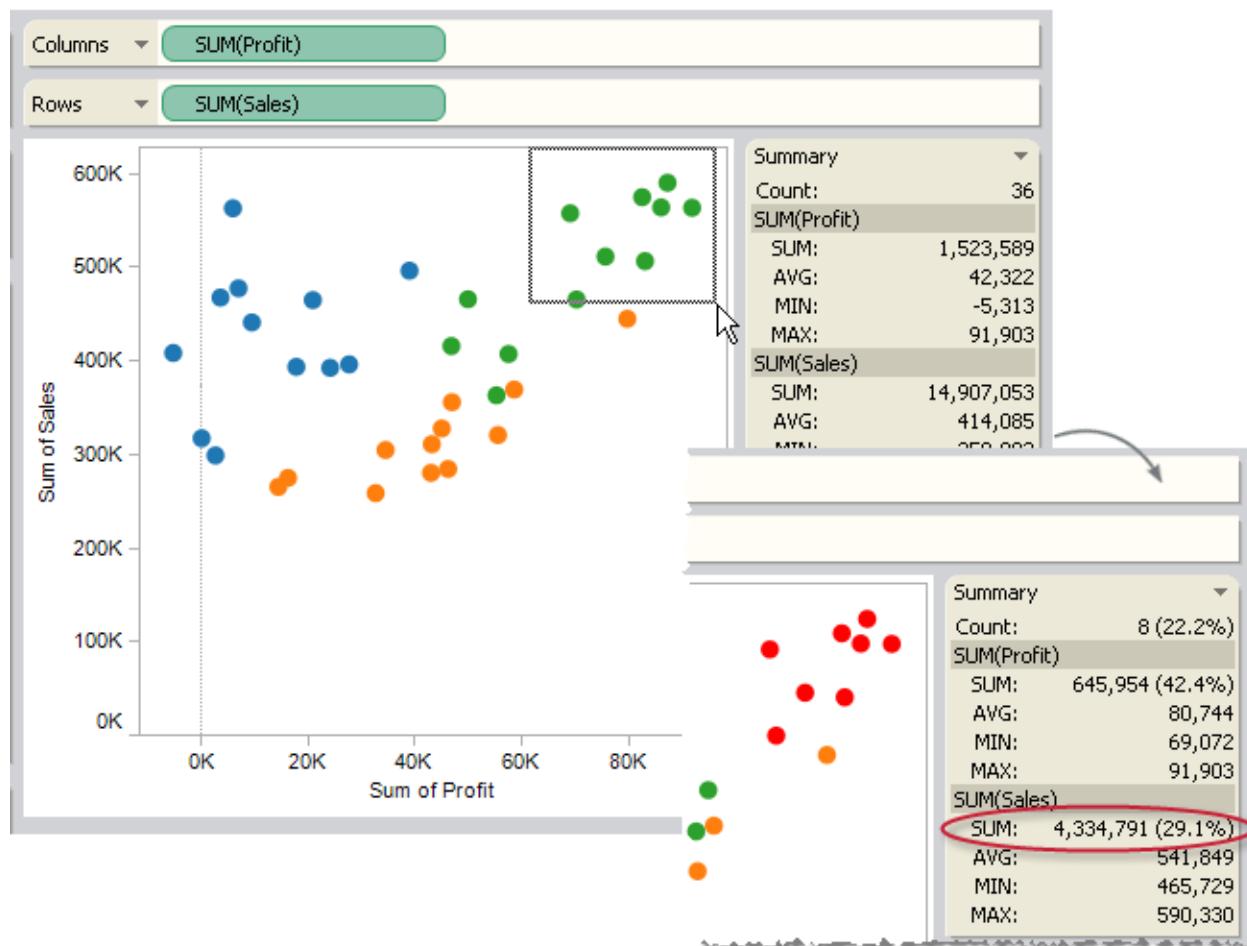


2. In the *Drop Lines* dialog box select an axis to draw the line to, whether to always show the drop lines, and whether to show labels.
3. When finished click *OK*.

## Summary Card

The summary card is a really quick way to view information about a selection or the entire data source. The card shows the SUM, MIN, MAX, and Average for each measure in the view. You can hide or show the Summary Card by selecting it on the View Cards toolbar menu  . You can also select Worksheet > Show Summary.

Consider this example, the view below is a scatter plot of profit vs. sales for three different product categories. You can see that the technology category contains high profit and high sales products (the green marks). When you select these marks, the summary card quickly shows you that these products account for \$4,334,791 in sales with a minimum sale of \$465,729.



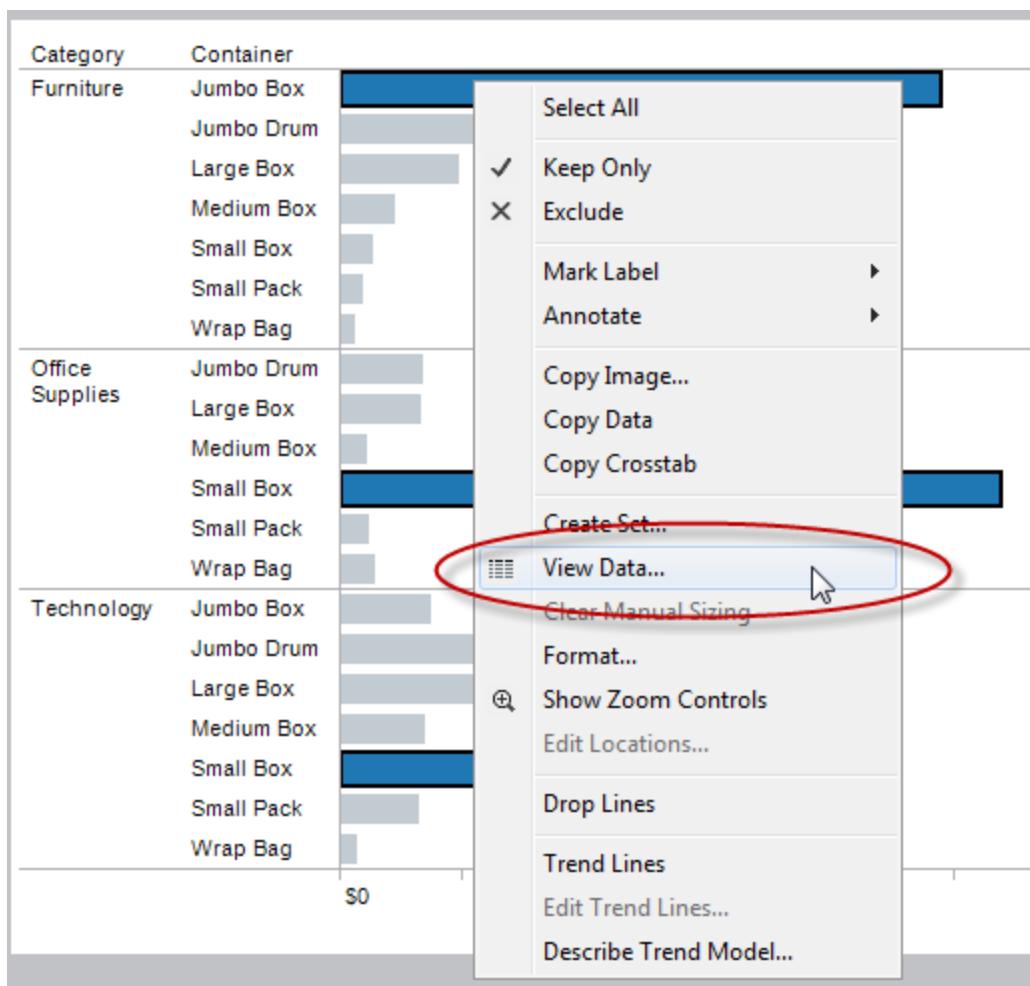
## View Data

The View Data command lets you display the values for each row in the data source that compose the marks. It also shows you the summary data based on the aggregations in the view. You might want to do view data to verify the aggregated value associated with a mark, or to isolate and export the individual rows associated with data of interest such as outliers.

You can view data for a selection of marks, the fields in the Data window, and when you're connecting to data.

The View Data command works with all relational and multi-dimensional databases except Oracle Essbase databases. While you can view data with Microsoft Analysis Services multi-dimensional databases, the database must be drill-through enabled and there are some restrictions to the data you can see.

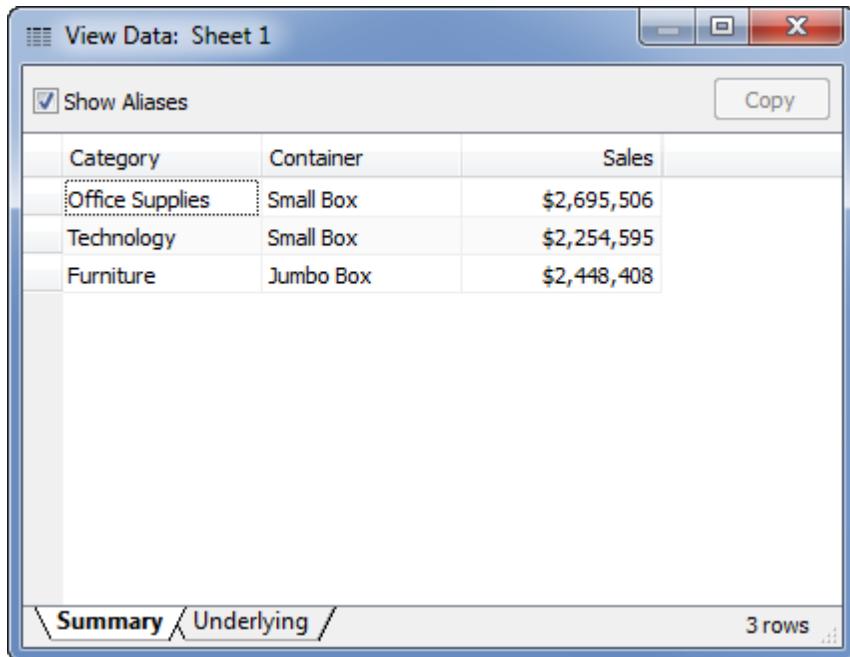
The view shown below shows the sales for two product dimensions as a bar chart. Suppose you want to view the data for the largest marks in each pane. To do this, select the marks of interest, right-click in the table, and select View Data on the context menu. Alternatively, you can select the Analysis > View Data menu item.

**Note:**

*Viewing data may not return any records if you are using a field that contains floating point values as a dimension. This is due to the precision of the data source and mainly occurs when you are connected to Microsoft Excel, Microsoft Access, or text files.*

**Summary Data**

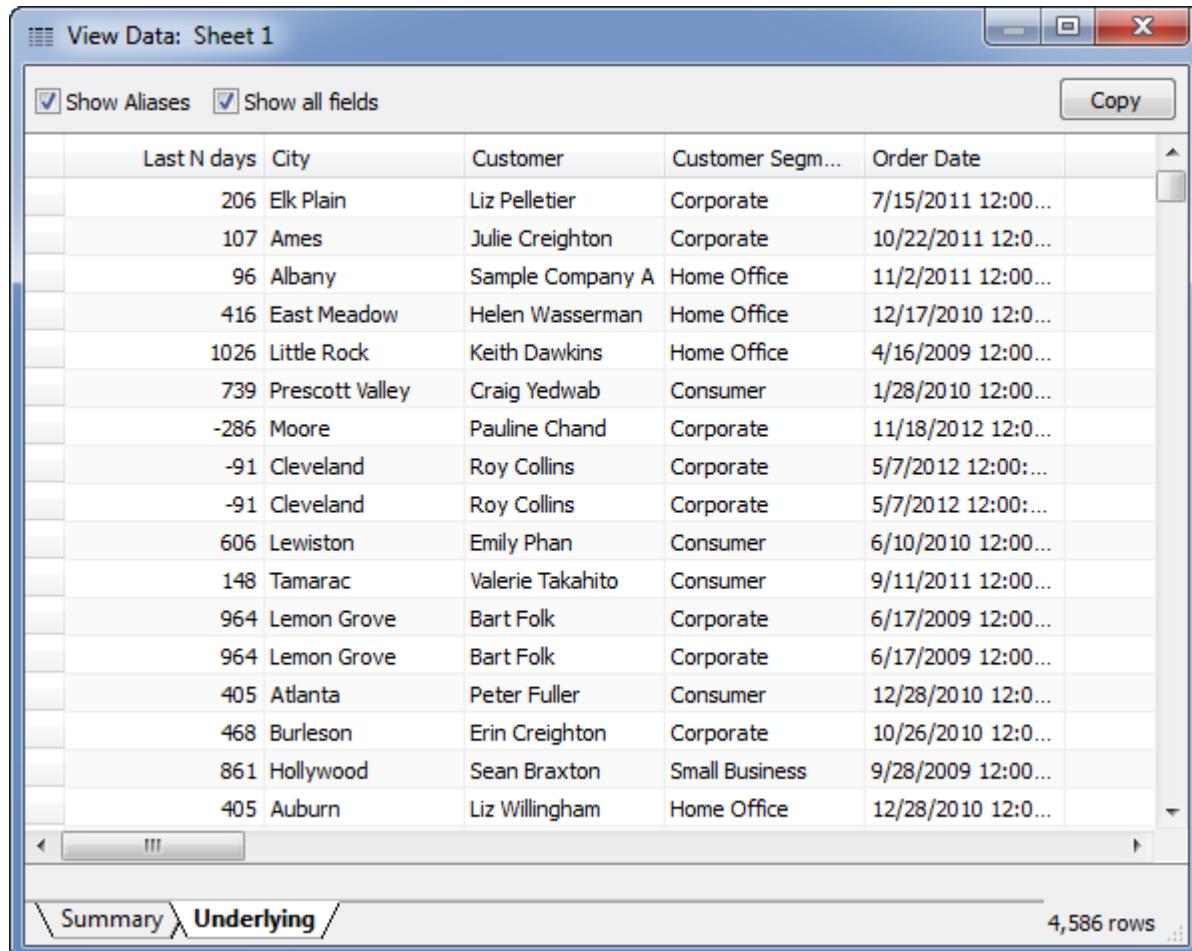
*The summarized data is shown on the Summary tab. The summarized data is a text table of the aggregated data for only the fields shown in the view.*



### *Underlying Data*

*The underlying data for the selected marks are displayed on the Underlying tab in the View Data dialog box. Notice that the number of rows that compose the underlying data is shown in the lower right of the dialog box.*

## Tableau Desktop Help



You can sort the data by clicking one or more column headers. To restore the original sort order, click the header repeatedly until it is no longer highlighted with a sort arrow.

By default, the Show all fields check box is selected. Clear this option to only show the columns used on shelves (or fields referenced by a calculation used on a shelf) in the current worksheet.

If you want to export one or more data source rows, select the data points of interest by selecting the row and then clicking Copy to copy the selected data to the Windows Clipboard and paste it into another file.

### View Data (Microsoft Analysis Services)

View Data with a Microsoft Analysis Services database works almost the same way it does with relational data sources. The difference is that a Microsoft Analysis Services cube is generally set up and configured by an administrator who decides whether it is enabled for drill-through and the fields that a user is allowed to see. That means that

*when you try to view data using a database that is not enabled, you may get an error message alerting you that the cube is not enabled for drill-through.*



*In addition, Microsoft Analysis Services databases limit viewing data to a single mark at a time.*

*When you are viewing underlying data for a field, the Show all fields option is checked and disabled by default. With a Microsoft Analysis Services database, only the fields specified by the administrator are shown so you cannot choose to include all data source fields in the dialog box.*

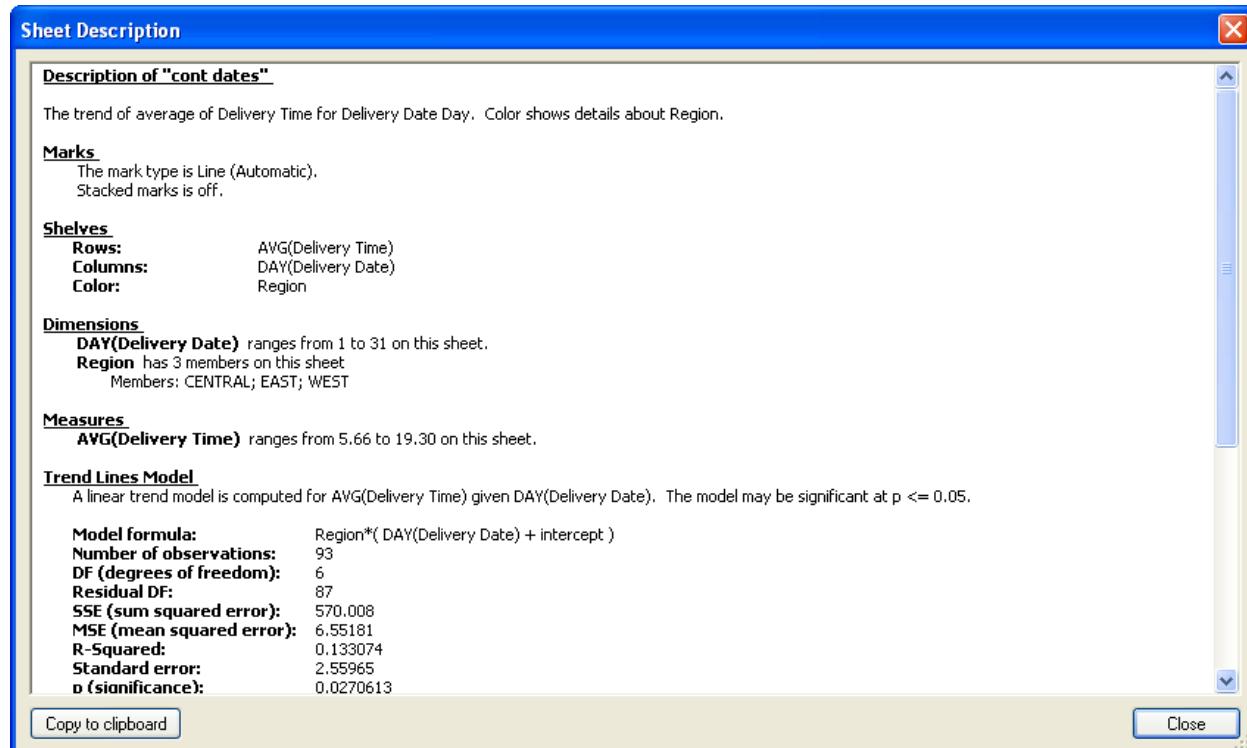
## Describing the View

Occasionally you may want to succinctly summarize an analysis you have completed on a worksheet. You might then want to remind yourself of what it shows (the filters that are applied, etc.), and finally, you may want to share a summary of the analysis with someone else.

When you choose Worksheet > Describe Sheet, you can view a description of the workbook, data source, fields and layout of the current worksheet. This summary includes the Caption in the first line, but expounds on other important summary information. This information can be copied and exported to other applications using the clipboard.

**Note:**

If you have Trend Lines turned on, the Describe Sheet dialog box includes information about the trend line model, including an anova table.



# Advanced Analysis

## Advanced Analysis

*Now that you understand the basics of building views in Tableau, become an advanced user by learning how to create custom calculations, use the built in statistics tools, leverage dynamic parameters, map data, and more.*

- [Actions](#)
- [Calculations](#)
- [Parameters](#)
- [Background Images](#)
- [Background Maps](#)
- [Trend Lines and Statistics](#)
- [Log Axes](#)

## Actions

### Actions

Tableau allows you to add context and interactivity to your data using actions. Link to web pages, files, and other Tableau worksheets directly from your analytical results. Use the data in one view to filter data in another as you create guided analytical stories. Finally, call attention to specific results using highlighting.

For example, in a dashboard showing home sales by neighborhood you could use actions to help you quickly see relevant information for a selected neighborhood. Select a neighborhood in one view which then highlights the related houses in a map view, filters a list of the houses sold, and opens a webpage showing census data for the neighborhood.

There are three kinds of actions in Tableau: Filter, Highlight, and URL actions.

- [Filter Actions](#)
- [Highlight Actions](#)
- [URL Actions](#)
- [Running Actions](#)
- [Actions and Dashboards](#)
- [Using Field and Filter Values in Actions](#)

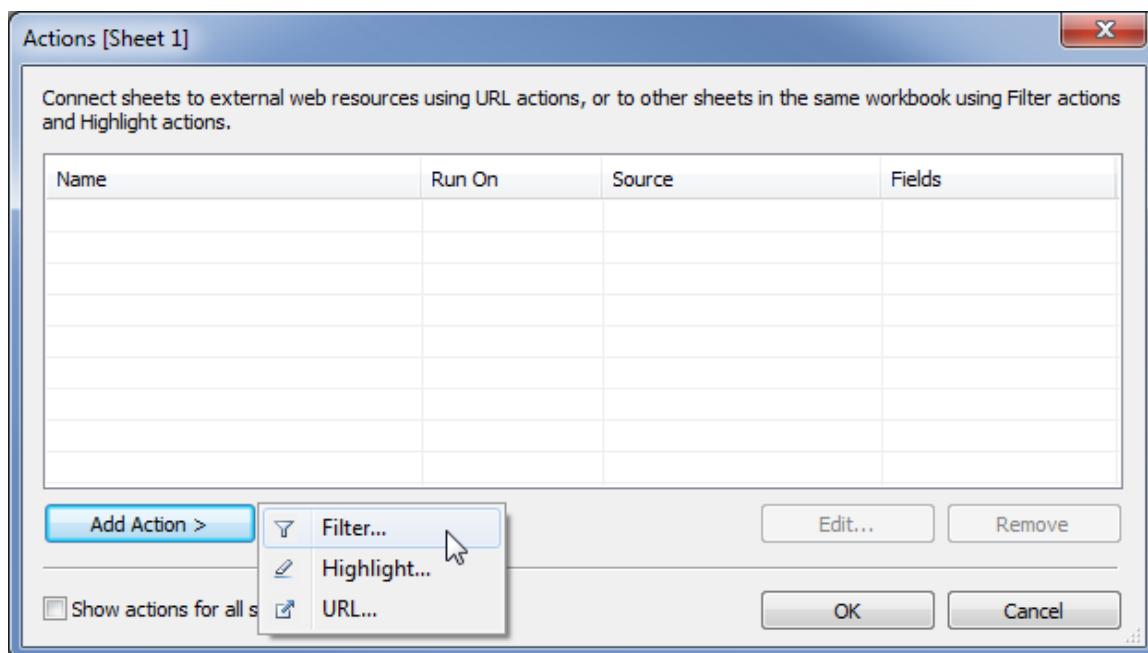
## Filter Actions

*Filter actions are a way to send information between worksheets. Typically a filter action is used to send information from a selected mark to another sheet showing related information. For example, when looking at a view showing the sales price of houses, you may want to be able to select a particular house and show all comparable houses in a different view. You could define a filter action to accomplish this task. First you need to decide what comparable means. In this case, say that comparable houses are houses with a similar sale price and square footage. A filter action to show comparable houses can be defined by selecting a destination worksheet and defining filters on sales price and square footage.*

*Filter actions work by sending the data values of the relevant source fields as filters to the destination sheet. If you launch the filter action described in this example from a house that sold for \$450,000, the destination sheet will have a filter to only show houses that sold for the same amount.*

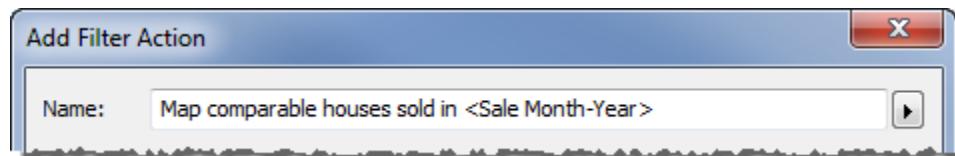
*To create a filter action:*

1. Select Worksheet > Actions.
2. In the Actions dialog box, click Add Action and then select Filter.

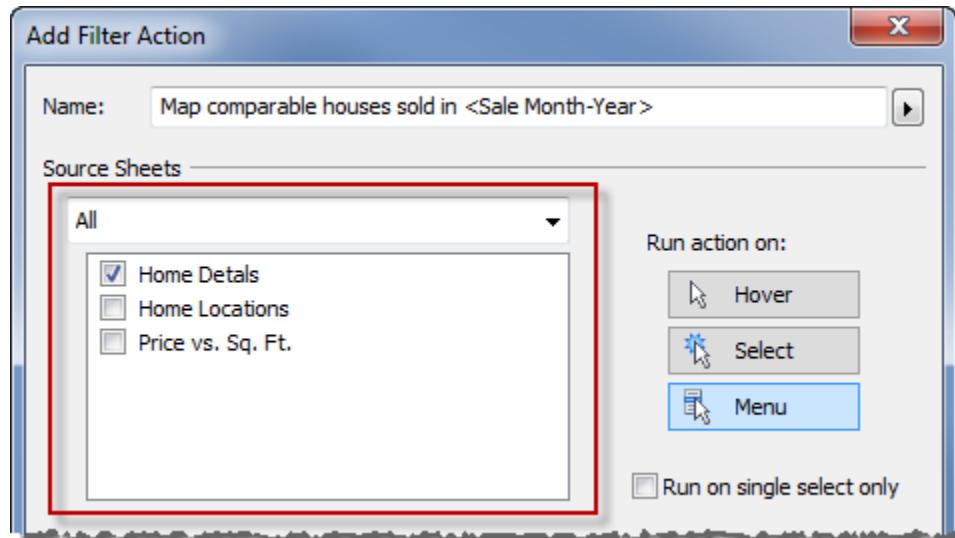


3. In the subsequent dialog box specify a name for the Action.

*Use a name that defines the action. If you choose to run the action using the menu the name is the option that shows on the menu. For example, when sending housing information from one sheet to a map, the name could be "Map all comparable houses sold in February" You can use variables in the name that will be filled in based on the values of the selected field.*



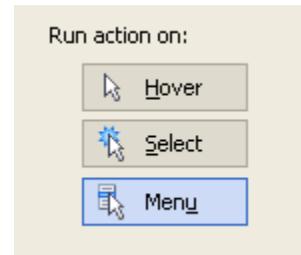
4. Use the drop-down list to select a source sheet or data source. When you select a data source or dashboard sheet you can further refine by selecting the individual sheets you want to launch the action from.



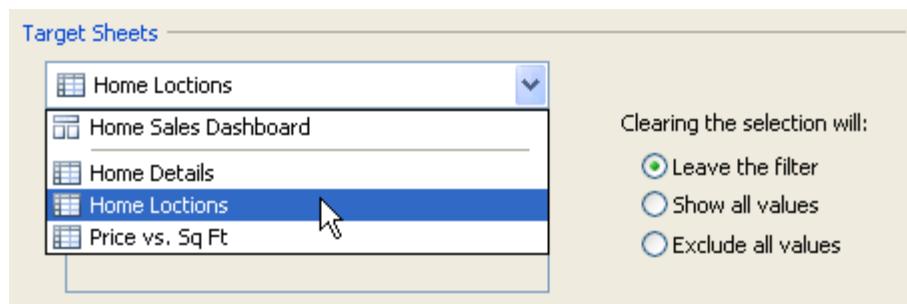
5. Then select how you want to launch the action. Select one of the following options:

- Hover - rest the pointer over a mark in the view to run the action. This option works well for highlight and filter actions within a dashboard.

- *Select - click on a mark in the view to run the action. This option works well for all types of actions.*
- *Menu - right-click a selected mark in the view and then select an option on a the context menu. This option works well for filter and URL actions.*



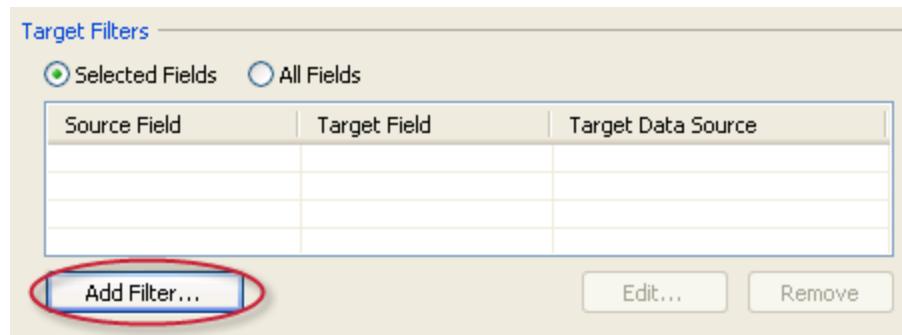
6. Use the second drop-down list to select a target sheet. When you select a dashboard sheet you can further refine the target by selecting one or more sheets within the dashboard.



7. Specify what to do when the select is cleared in the view. You can select from the following options:

- **Leave the filter** - leaves the filter on the target sheets. The target views in the dashboard will show the filtered results.
- **Show all values** - changes the filter to include all values.
- **Exclude all values** - changes the filter to exclude all values. This option is useful when you are building dashboards that only show some sheets if a value in another sheet is selected.

8. Setup one or more filters to specify the data that you want to show on the target sheets. You can filter on All Fields or define filters on Selected Fields.
9. If you are defining filters for specific fields click Add Filter.



10. In the Add Filter dialog box select a source and target data sources and fields. When you run the action from a specific mark on the source sheet, a filter is added to the target sheet that only includes values for the target field that match the values of the source field. In the comparable houses sheet link example, the Source Field is Beds and the Target Field is Beds. That means when you launch the sheet link for a house that has 3 bedrooms, the destination worksheet will only show houses that also have 3 bedrooms.



11. When finished, click OK three times to close the dialog boxes and return to the view.

If you are connected to a relational data source, you can add sheet links across data sources even if the field names are not exactly the same. One data source may have a field titled *Latitude* while another has a *Lat* field. Using the drop down lists in this dialog box, you can associate the *Latitude* field to the *Lat* field. When using a multidimensional data source, the destination sheet must use the same data source as the source sheet. Moreover, the source field names must match the destination field names.

**Note:**

The fields available in the Target Field drop-down list are dependent on what you selected as the Source Field. Only fields with the same data type as the source field can be selected as a destination field.

## Highlight Actions

### Highlight Actions

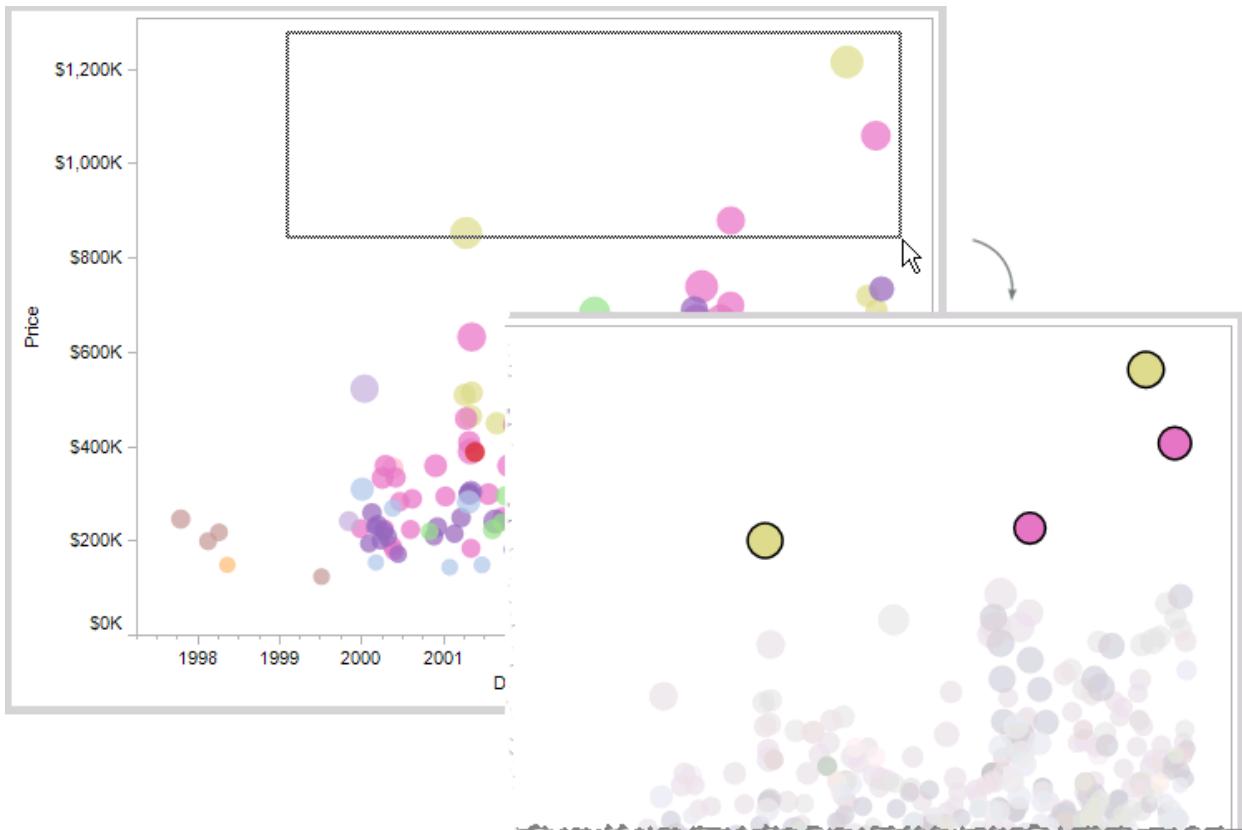
*Highlight actions allow you to call attention to marks of interest by coloring select marks and dimming all others. You can highlight marks in the view by selecting the marks you want to highlight, use the color legend to select related marks, or create an advanced highlight action.*

- [Selecting Marks to Highlight](#)
- [Color Legend Highlighting](#)
- [Highlight Toolbar Button](#)
- [Creating Advanced Highlight Actions](#)

## Selecting Marks to Highlight

When you select a mark in the view all other marks are dimmed to draw attention to the selection. Selection is saved with the workbook and can be included when publishing. The simplest way to add highlighting to a view is to select the marks you want to highlight.

You can select multiple marks by holding down the *Ctrl* key on your keyboard while you select each mark. You can also click and drag the pointer to select all marks in a specific area of the view.



## Color Legend Highlighting

*Color legend highlighting is a powerful analytical mode for the color legend that allows you to focus on select members in the view. When you turn on color legend highlighting the marks associated with the selected items in the color legend are colored while all other marks are gray.*

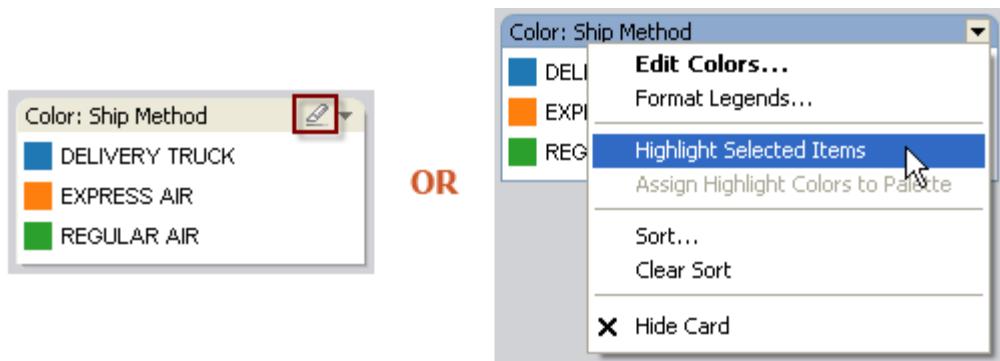
*For example, the views below show the relationship between order quantity and profit for several products. The view on the left uses the normal color legend, all marks are colored based on their shipping mode. The view on the right uses legend highlighting to call out the products that were delivered via Delivery Truck.*



*You can easily switch between legend highlighting and normal modes using the color legend card menu. Then, if you like how a view is highlighted, you can assign the highlight colors to the color palette. The old colors are replaced with the highlight colors.*

**To turn on color legend highlighting:**

1. Click the **Highlight** button  at the top of the color legend or select **Highlight Selected Items** on the color legend card menu.

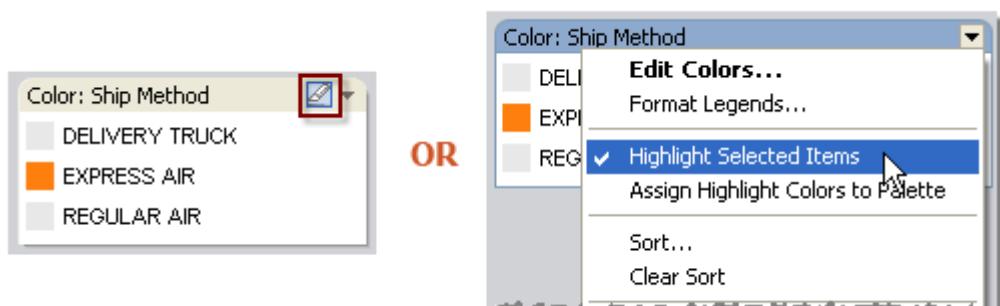


2. Select an item in the color legend.

*Once legend highlighting is turned on, you can quickly focus on specific data in the view by selecting different items in the color legend. When color legend highlighting is turned on a Highlight Action is created and can be modified in the Actions dialog box.*

**To turn off color legend highlighting:**

- Click the Highlight button  at the top of the color legend or select **Highlight Selected Items** on the color legend card menu.



*When you turn color legend highlighting off the action is removed from the Actions dialog box.*

*If you like how the view is highlighted and want to keep a specific member highlighted even when you turn off legend highlight mode, you can assign the highlight colors to the existing color palette. The original color legend is discarded and the highlight colors become the new color palette for the legend.*

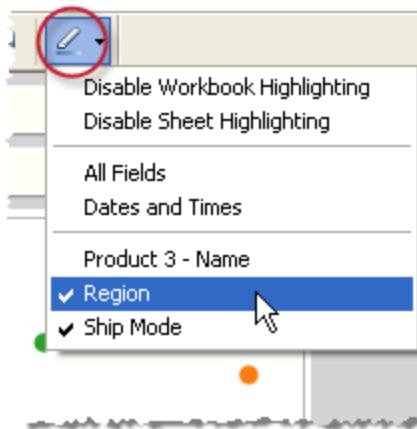
**To assign the highlight colors to the color palette:**

- Select *Assign Highlight Colors to Palette* on the color legend card menu.

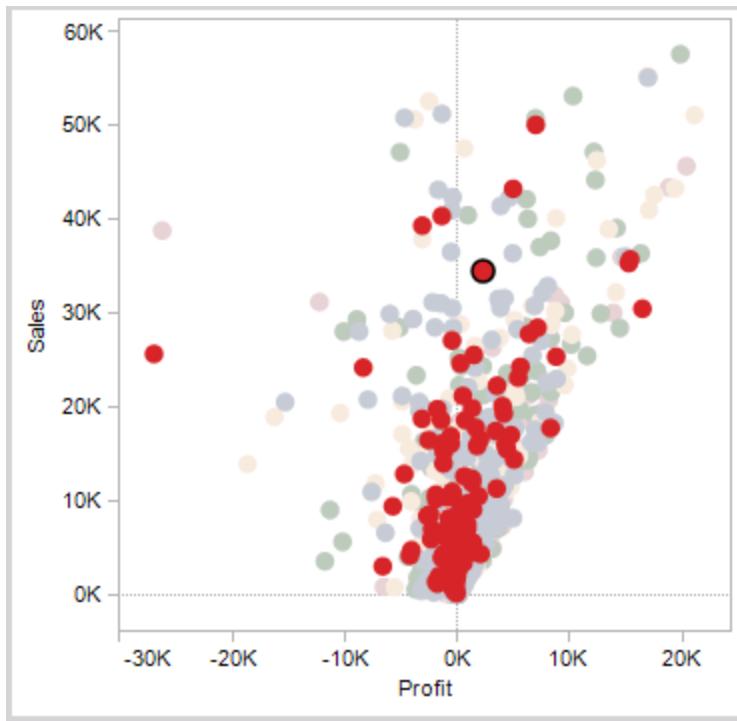


## Highlight Toolbar Button

Another way to add a highlight action is using the highlight button in the toolbar. Similar to the color legend highlighting, the toolbar button lets you highlight a collection of related marks in the view. To turn on highlighting, select the fields you want to use for highlighting on the toolbar menu. Then select a mark in the view to see the related data.



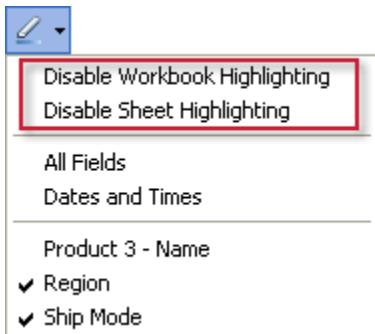
For example, the view below shows sales vs. profit by region. When a mark is selected, all other marks from that region that were shipped using the selected ship mode are highlighted. In this case you can quickly see all products from the Wester region that were shipped via Delivery truck.



The toolbar menu also lets you highlight on All fields or Dates & Times. All fields will consider all fields when determining matching records. Dates & Times considers all date and time fields.

When you use the Highlight toolbar button an action is created in the Actions dialog box. You can modify the action to create more advanced highlighting behavior.

Finally, you can use the toolbar button to disable highlighting across the entire workbook or for just the active sheet.

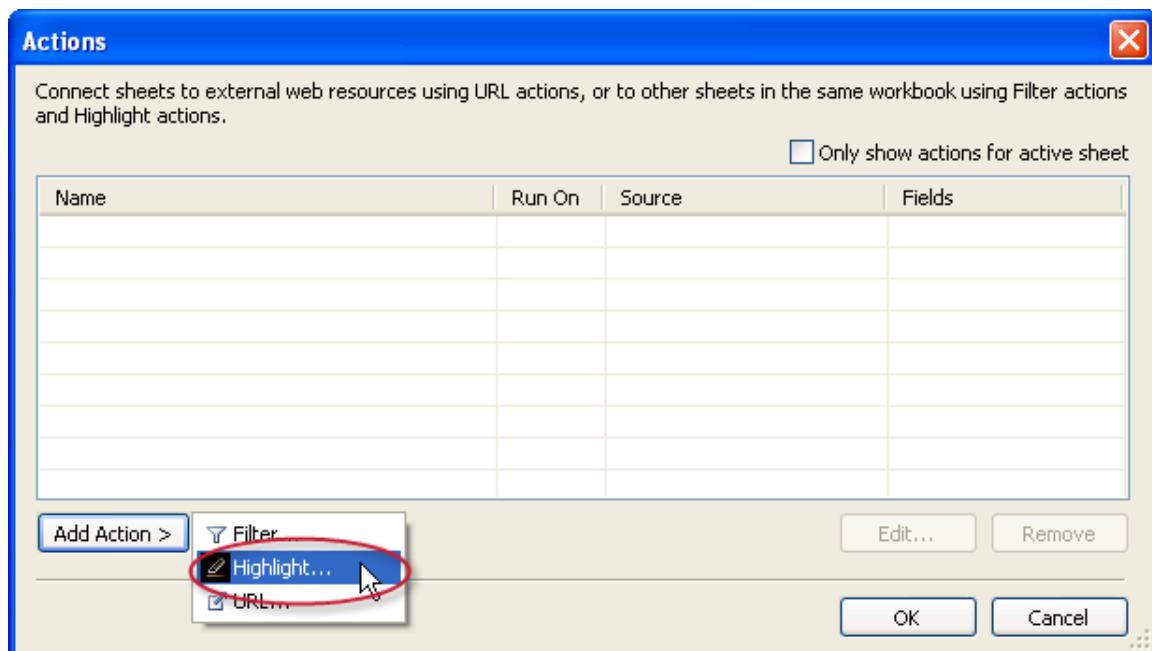


## Creating Advanced Highlight Actions

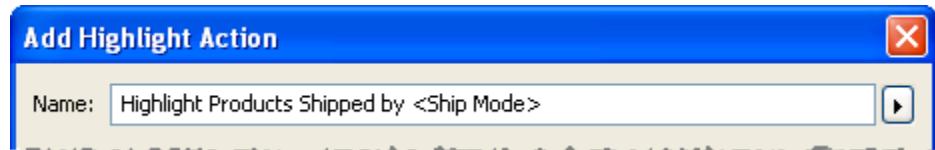
You can define more advanced highlight actions using the Actions dialog. There you can specify source and target sheets along and the fields you want to use for highlighting. Follow the steps below to create a Highlight Action.

To create a highlight action:

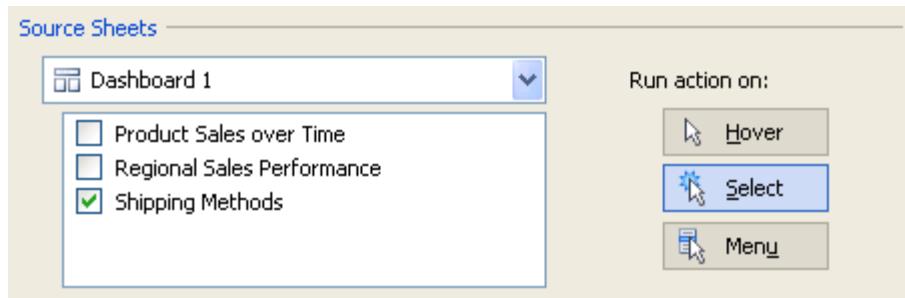
1. Select Worksheet > Actions.
2. In the Actions dialog box click the Add Action button and then select Highlight.



3. Give the action a name that will identify it in the Actions dialog. Try to make it descriptive. For example, *Highlight Products Shipped by Delivery Truck*. You can use variables in the name that will be filled in based on the values of the selected field.



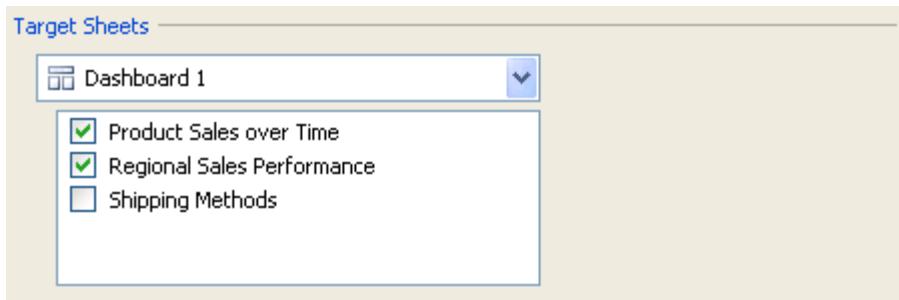
4. Use the drop-down list to select the Source sheet or data source. If you select a data source or a dashboard sheet you can further select individual sheets within them.



5. Select how you want to launch the action. You can select from the following options:
  - Hover - rest the pointer over a mark in the view to run the action. This option works well for highlight and filter actions within a dashboard.
  - Select - click on a mark in the view to run the action. This option works well for all types of actions.
  - Menu - right-click a selected mark in the view and then select an option on the context menu. This option works well for filter and URL actions.

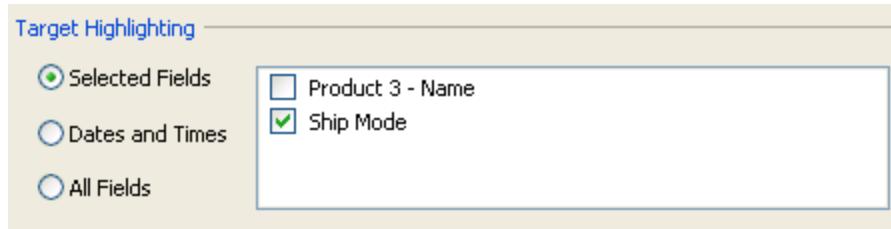


6. Select a Target sheet. If you select a dashboard you can further select individual sheets within the dashboard.



7. Select the fields you want to use for highlighting. Select from the following options:

- Selected Fields - marks in the target sheet are highlighted based on select fields. For example, highlighting using the Ship Mode field will result in an action that highlights all marks in the target sheet that have the same ship mode as the selected mark in the source sheet.
- Dates and Times - marks in the target sheet are highlighted when their date and time match those of the marks selected in the source sheet. All dates and time fields are considered when determining a match.
- All Fields - marks in the target sheet are highlighted when they match the marks selected in the source sheet. All fields are considered when determining a match.



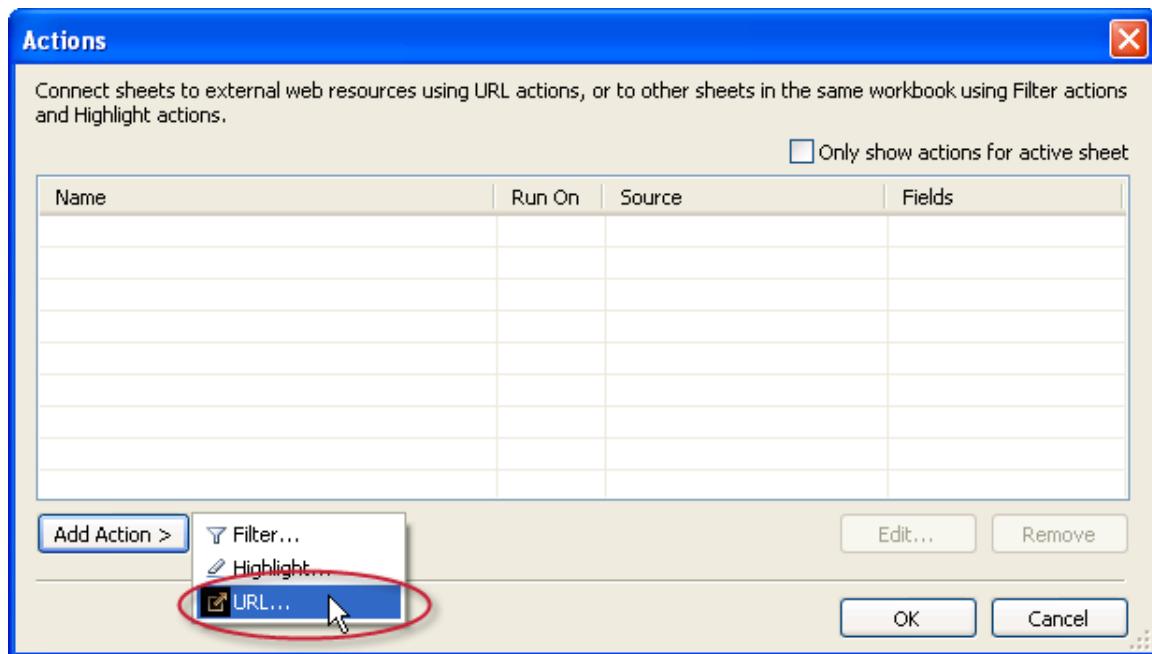
8. When finished, click OK twice to close the dialog boxes and return to the view.

## URL Actions

A URL action is a hyperlink that points to a Web page, file, or other web-based resource outside of Tableau. You can use URL actions to link to more information about your data that may be hosted outside of your data source. To make the link relevant to your data, you can substitute field values of a selection into the URL as parameters.

To add a Hyperlink:

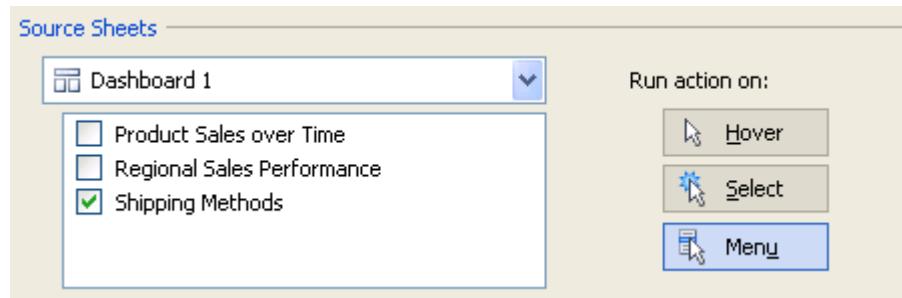
1. Select Worksheet > Actions.
2. In the Actions dialog box, click Add Action and then select URL.



3. In the subsequent dialog box, specify a name for the link. Make the name descriptive of the action. If you choose to run the action using the menu the name is the option that shows on the menu. For example, when linking to more product details, the name could be "Show More Details for Binder Clips." You can use variables in the name that will be filled in based on the values of the selected field.



4. Use the drop-down list to select a source sheet or data source. If you select a data source or dashboard you can select individual sheets within it.



5. Select the fields you want to use for highlighting. Select from the following options:
- Hover - rest the pointer over a mark in the view to run the action. This option works well for highlight and filter actions within a dashboard.
  - Select - click on a mark in the view to run the action. This option works well for all types of actions.
  - Menu - right-click a selected mark in the view and then select an option on a the context menu. This option works well for filter and URL actions.



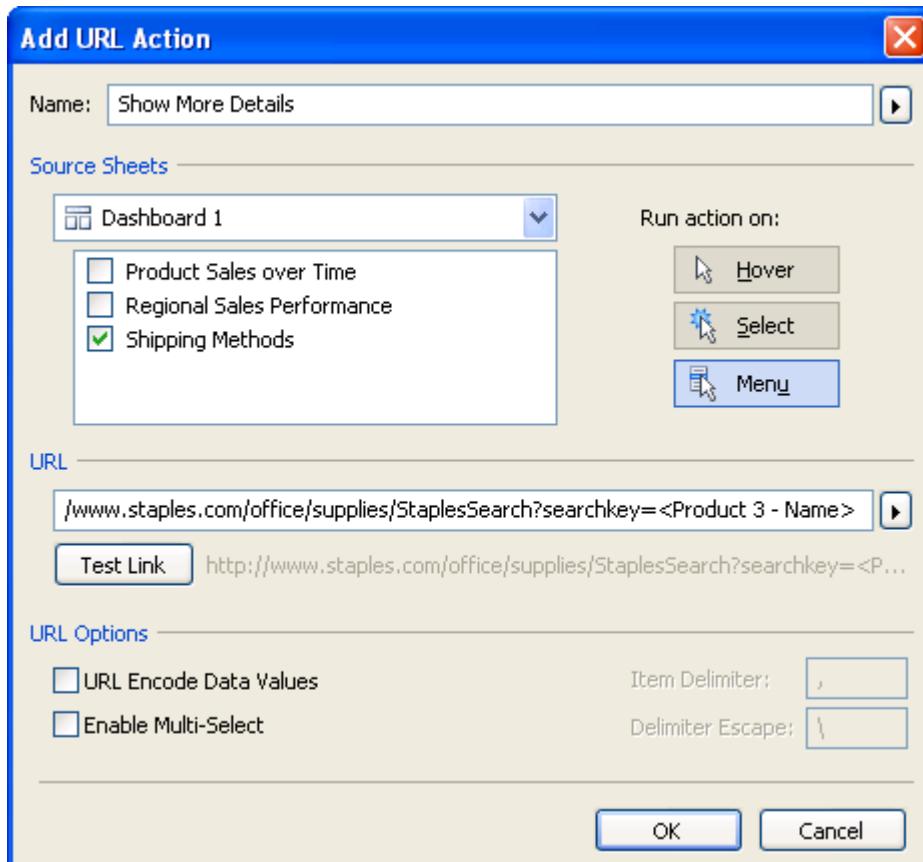
6. *Specify the URL. You can use any URL that your browser can recognize including web pages, ftp resources, and files.*

*Just as you can use variables in the name of the URL, you can also use field values and filter values as parameters in the URL. That means that you can send information about each selected mark or filter setting to a given website.*

7. *Optionally select one or more of the following options:*

- **URL Encode Data Values** - *select this option if your data contains values that use characters that are not allowable in a URL. For example if one of your data values contains an ampersand, such as “Sales & Finance,” the ampersand must be translated into characters that your browser understands (URL encoded) if you want to include that value in the URL.*
- **Enable Multi-Select** - *select this option if you are linking to a webpage that can take lists of values as parameters in the link. For example, say you select several products in a view and you want to see each product’s details hosted on a webpage. If the server can load multiple product details based on a list of identifiers (product ID or product name), you could use multi-select to send the list of identifiers as parameters.*

*When you enable multi-select you must also define the item delimiter, which is the character that separates each item in the list (often a comma). You must also define the Delimiter Escape, which is used if the delimiter character is used in a data value.*



8. When finished, click OK twice to close the dialog boxes and return to the view.

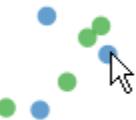
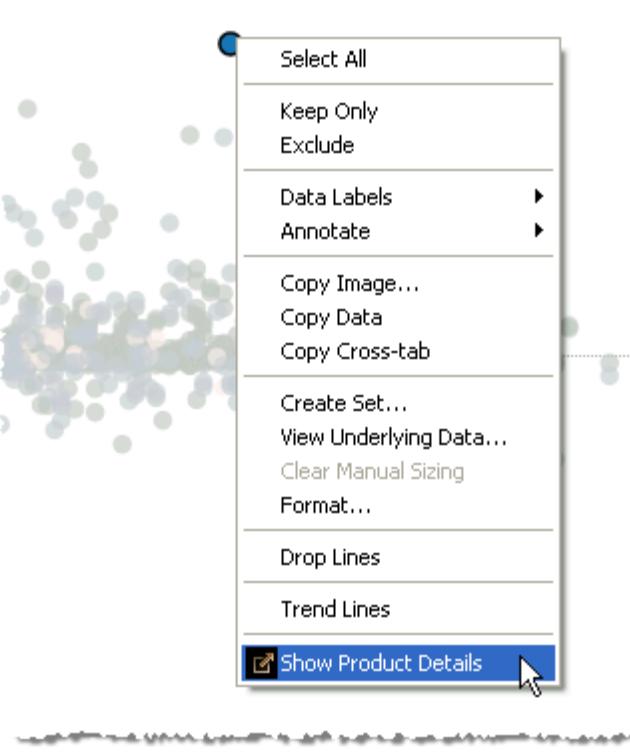
**Note:**

URL actions can also point to a web page object in a dashboard. Refer to [Actions and Dashboards](#) to learn more about how actions work with dashboards.

## Running Actions

*Depending on how the action is created you can run an action using one of the following three methods:*

- *Hover - rest the pointer over a mark in the view to run the action. This option works well for highlight and filter actions within a dashboard.*
- *Select - click on a mark in the view to run the action. This option works well for all types of actions.*
- *Menu - right-click a selected mark in the view and then select an option on a the context menu. This option works well for filter and URL actions.*

Hover	Select	Menu
		

*Links are not always visible for every worksheet and mark. Because links are mapped to specific fields in the data source, links will only be available for the worksheets that use the mapped fields. For example, if you add a hyperlink that uses both Latitude and Longitude as parameters in the link, the link will only be available to worksheets that use*

*Latitude and Longitude in the view. Additionally, the link is only available on marks and headers that contain relevant values.*

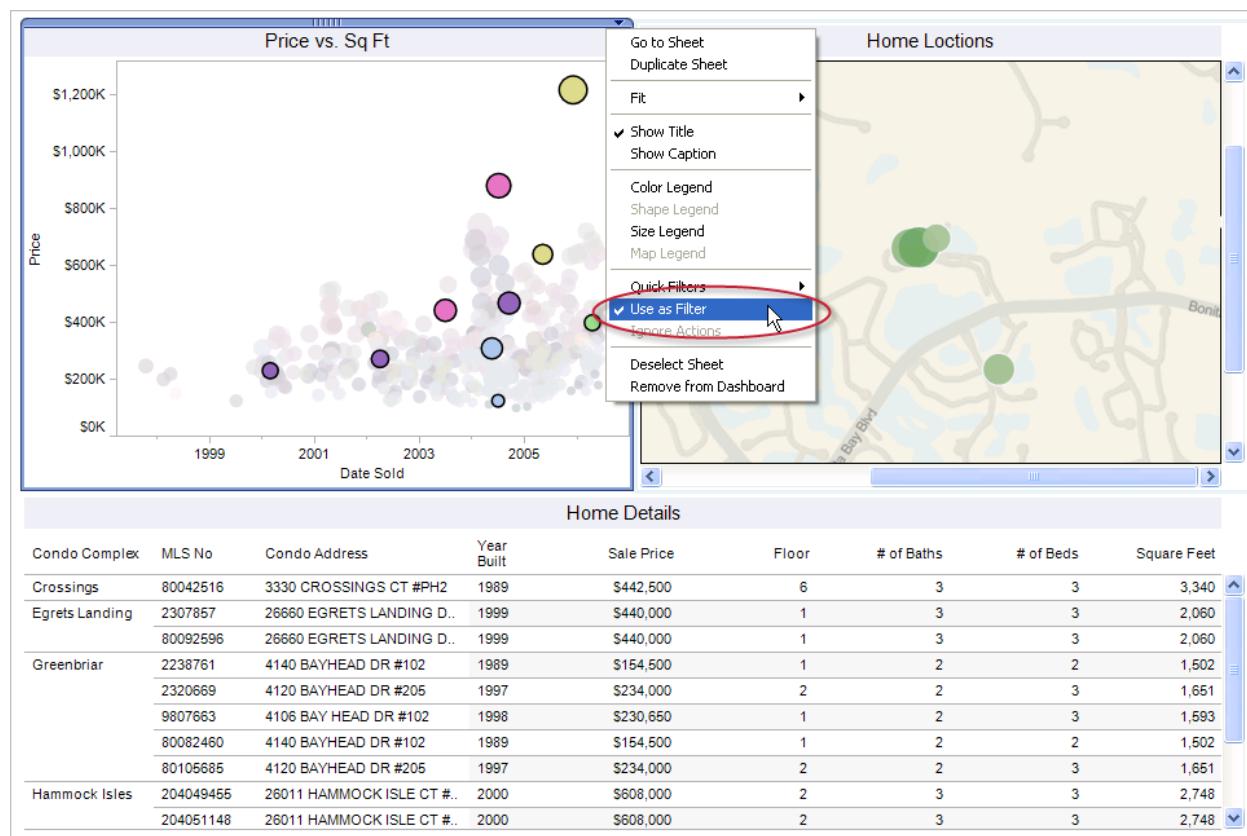
## Actions and Dashboards

### Actions and Dashboards

*Actions often have special behavior when the source or destination is a dashboard. Filter and Highlight actions can affect other views in the dashboard and URL actions can update a webpage object so you don't have to open your web browser. Finally, you can create simple Filter and Highlight actions using special menu options so you don't have to open the Actions dialog box.*

#### *Example: Filter Actions in a Dashboard*

*This example shows how to create a filter action in a dashboard. The example shows a Real Estate dashboard with three views. Using the Use as Filter option you can set one of the views to act as a filter on all the other views in the dashboard. In this case the scatter plot in the upper right is filtering the map view and the text table to show more details about the selected houses.*

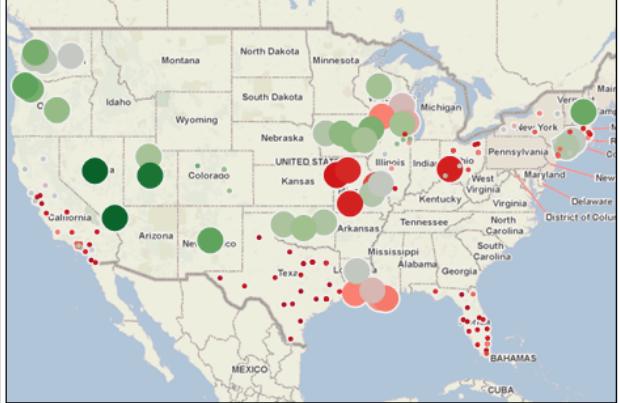


*The Use as Filter command can only apply to one view at a time. A filter action is created that you can modify in the Actions dialog box.*

### Example: URL Actions in a Dashboard

This example shows how a URL action works with a web page object in a dashboard. Below is a dashboard showing sales information by product for several stores in a coffee franchise. Included in the dashboard is a web page object that shows product details. The text table has a URL action that points at that web page. When you launch the action the web page automatically updates within the dashboard rather than opening a web browser.

Product Type	Product	Market								Grand Total	
		Central		East		South		West			
	Sum of Sal..	Sum of Profit	Sum of Sal..	Sum of Profit	Sum of Sales	Sum of Profit	Sum of Sal..	Sum of Profit	Sum of Sal..	Sum of Profit	
Coffee	Amaretto	14,012	5,104	2,994	1,010			9,263	-1,224	26,269	4,890
	Columbian	28,911	8,525	47,385	27,256	21,663	8,767	30,352	11,256	128,311	55,804
	Decaf Irish Cream	26,157	9,635	6,262	2,726	11,596	2,935	18,233	-1,307	62,248	13,989
Espresso	Caffe Latte					15,443	3,873	20,456	7,502	35,899	11,375
	Caffe Mocha					6,646	-6,232	14,166	5,202	18,874	4,066
	Decaf Espresso					720	2,411	15,381	5,930	30,578	12,302
	Regular Espresso					1,031	10,065				24,031
Herbal Tea	Chamomile					193	764	11,183	3,178	25,631	8,854
	Lemon					177	7,902	14,494	2,593	32,273	13,121
	Mint					991	-2,243			14,384	4,328
Tea	Darjeeling					984	6,500			28,773	11,784
	Earl Grey					507	3,404			27,382	10,426
	Green Tea					5,209	1,227	11,576	5,684	16,065	-7,112
<b>Grand Total</b>		<b>265,045</b>	<b>93,852</b>	<b>178,576</b>	<b>59,217</b>	<b>103,926</b>	<b>32,478</b>	<b>272,264</b>	<b>73,996</b>	<b>819,811</b>	<b>259,543</b>



**Caffè Latte**

Rich, full-bodied Starbucks® espresso in steamed milk lightly topped with foam.



**may we suggest?**

**Try something new**

[Cappuccino](#)

[nutrition facts table](#)

[\(customize\)](#)

## Using Field and Filter Values in Actions

### Using Field and Filter Values in Actions

*When you add an action in Tableau you often want to use values from your data as parameters in the name of the action as well as the action itself. Using fields as variables in the action name makes the menu item that launches the action specific to the selected mark. More commonly, using field and filter values as parameters in the URL of a URL action allows you to send information about a specific data point or filter setting to the destination webpage.*

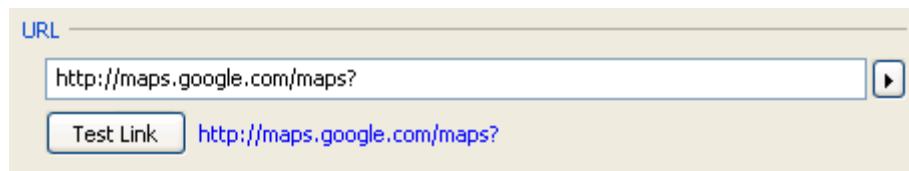
- [Using Field and Filter Values in URLs](#)
- [Using Field and Filter Values in Action Names](#)

## Using Field and Filter Values in URLs

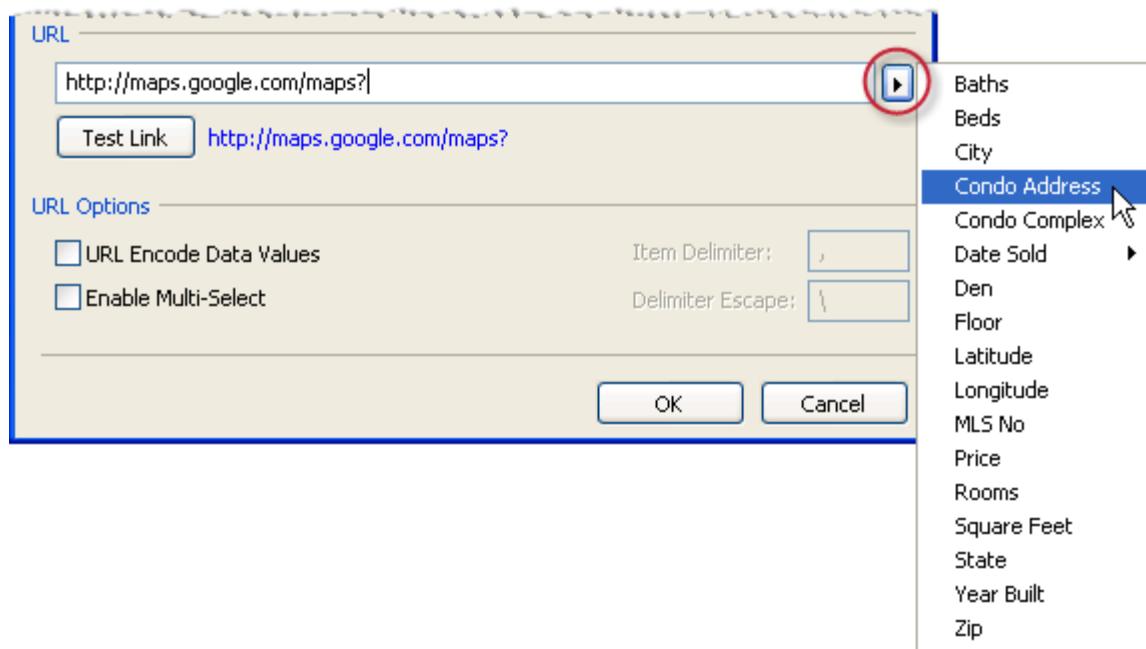
Tableau lets you add field and filter information as variables into URL actions so when you follow the link the values of those fields and filters are included. For example, when linking to an online mapping service, you can use an address field as a parameter so launching the link from a specific data point shows the address associated with that record on a map.

### To add a field or filter value as a parameter to a URL action:

1. In the Add URL Action dialog box, begin typing the URL for the link.



2. Place the cursor where you want to insert a field or filter value.
3. Click the arrow to the right of the text box and select the field or filter you want to add as a parameter. The field or filter name is added to the URL between angle brackets.



You can continue adding field and filter parameters as many times as you need to create the URL.

**Note:**

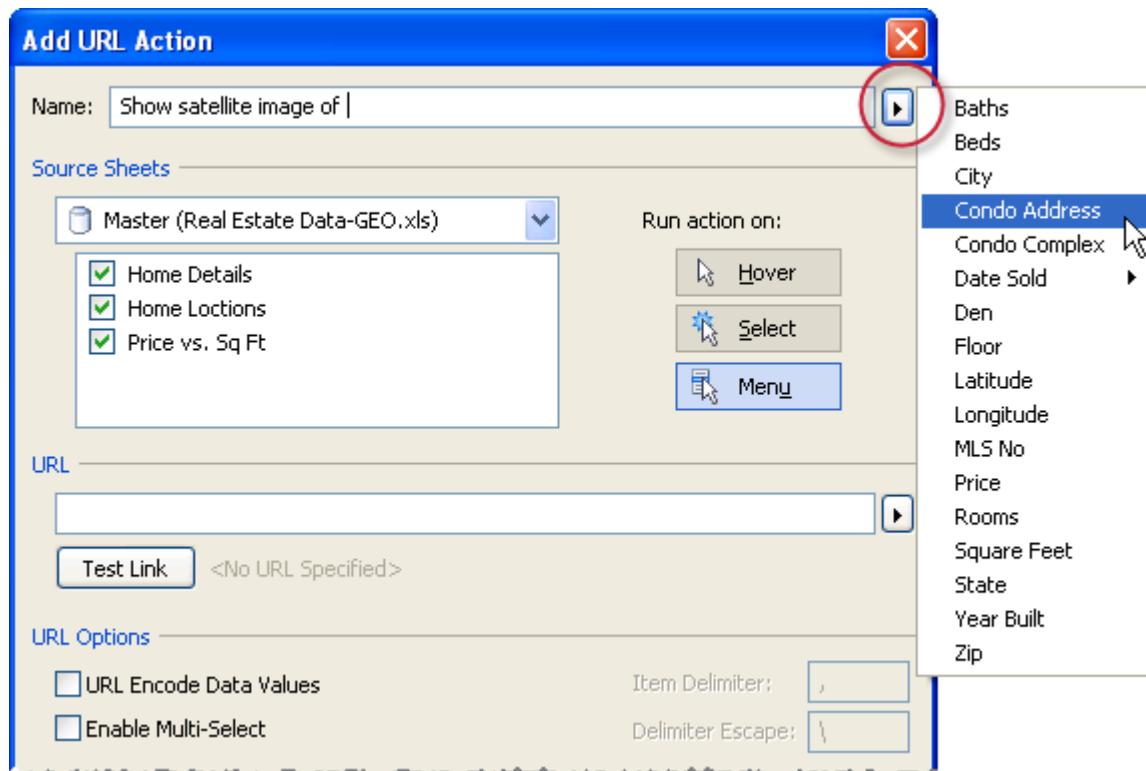
The list of available fields only includes non-aggregated fields. To use aggregated field values as a parameter in a link, you must first create a calculated field and then use the name of that field in the link. The calculated field must also be used in the view in order for the link to be available. A good way to use these fields is by placing them on the Level of Detail shelf.

## Using Field and Filter Values in Action Names

In addition to using field and filter values in URLs, you can use field and filter information as variables in the action names. The name of the action displays on the context menu when an action is launched using the menu. Using field and filter variables in the name is useful in making the action specific to the selected mark. In a view showing real estate information, you could name a URL action that points at satellite images from an online mapping service, “Show satellite image of <Address>.” When you right-click on a specific mark, the <Address> tag is replaced with the location value associated with that mark.

### To add a field or filter as a variable in a Name:

1. In the Add Action dialog box, begin typing the name for the action.
2. Place the cursor where you want to insert the field or filter value.
3. Click the arrow to the right of the text box and select the field or filter you want to add as a variable. The field or filter name is added between angle brackets.



# Calculations

## Calculations

To extract meaningful results from your data, you might want to perform one or more calculations. Some calculations are predefined in Tableau, while you can customize others to suit your specific needs.

You can use all of the different types of calculations simultaneously. For example, you can create a new calculated field called Profit that is the difference between the Sales and Cost fields. You could then apply an aggregation (like a summation) to this new field in order to view total profit over time. You could then display the numbers as percentages and turn on grand totals to see how these percentages vary from category to category. Finally, you could bin the new field and display the data as a histogram.

### Note:

You can use all of the following calculations if you are using a relational data source, however, multidimensional data sources do not support aggregations and binned data.

- [Aggregations](#)
- [Calculated Fields](#)
- [Table Calculations](#)
- [Binned Data](#)
- [Totals](#)
- [Percentages](#)

## Aggregations

### Aggregations

*Sometimes it is useful to look at numerical data in an aggregated form such as a summation or an average. The mathematical functions that produce aggregated data are called aggregation functions. Aggregation functions perform a calculation on a set of values and result in a single value. For example, a measure that contains the values 1, 2, 3, 3, 4 aggregated as a sum results in a single value: 13.*

*For example, if you have 3,000 sales transactions from 50 products in your data source, you might want to view the sum of sales for each product, so that you can decide which products have the highest revenue.*

**Note:**

*You can aggregate measures using Tableau only for relational data sources. Multidimensional data sources contain aggregated data only.*

*Tableau provides a set of predefined aggregations that are shown in the table below.*

Aggregation	Description	Result for measure that contains 1, 2, 2, 3
ATTR	Returns the value of the given expression if it only has a single value for all rows in the group, otherwise it displays an asterisk (*) character. Null values are ignored. This aggregation is particularly useful when aggregating a dimension.	N/A
Dimension	Returns all unique values in a measure or dimension.	3 values (1, 2, 3)
Sum	Computes the sum of the numbers in a measure. Null values are ignored.	1 value (8)
Average	Computes the arithmetic mean of the numbers in a measure. Null values are ignored.	1 value (2)
Minimum	Computes the smallest number in a measure or continuous dimension. Null values are ignored.	1 value (1)
Maximum	Computes the largest number in a measure or a continuous dimension. Null values are ignored.	1 value (3)
Standard Deviation	Computes the standard deviation of all values in the given expression based on a sample population. Null values are ignored. Returns a Null if there are fewer than 2 members in the	1 value (0.8165)

Aggregation	Description	Result for measure that contains 1, 2, 2, 3
	sample that are not Null. Use this function if your data represents a sample of the population.	
Standard Deviation Population	Computes the standard deviation of all values in the given expression based on a biased population. Assumes that its arguments consist of the entire population. Use this function for large sample sizes.	1 value (0.7071)
Variance	Computes the variance of all values in the given expression based on a sample. Null values are ignored. Returns a Null if there are fewer than 2 members in the sample that are not Null. Use this function if your data represents a sample of the population.	1 value (0.6667)
Variance Population	Computes the variance of all values in the given expression based on a biased population. Assumes that its arguments consist of the entire population. Use this function for large sample sizes.	1 value (0.5000)
Count	Counts the number of rows in a measure or a dimension. When applied to a dimension, Tableau creates a new temporary column that is a measure because the result of a COUNT is a number. You can count numbers, dates, booleans, and strings. Null values are ignored in all cases.	1 value (4)
Count Distinct	Counts the number of unique values in a measure or dimension. When applied to a dimension, Tableau creates a new temporary column that is a measure because the result of a COUNT is a number. You can count numbers, dates, booleans and strings. Null values are ignored in all cases. This function is not supported for Microsoft Access, Microsoft Excel, and Text file data sources.	1 value (3)
Disaggregate	Returns all records in the underlying data source.	4 values (1, 2, 2, 3)

You can also define custom aggregations as described in [Aggregate Calculations](#). Note that depending on the type of data view you create, Tableau will apply these aggregations at the appropriate level of detail. For example, Tableau will apply the

*aggregation to individual dimension members (the average delivery time in the East region), all members in a given dimension (the average delivery time in the East, West, and Central regions), or groups of dimensions (the sum of sales for all regions and for all markets).*

*You may specify a default aggregation for any measure that is not a user-defined aggregation. A default aggregation is a preferred calculation for summarizing a continuous or discrete field. The default aggregation is automatically used when a measure is first placed on a shelf. Change the default aggregation by right-clicking a measure in the Data window and selecting Field Properties > Aggregation. Below the default aggregation for the Budget Margin measure is set to Average.*

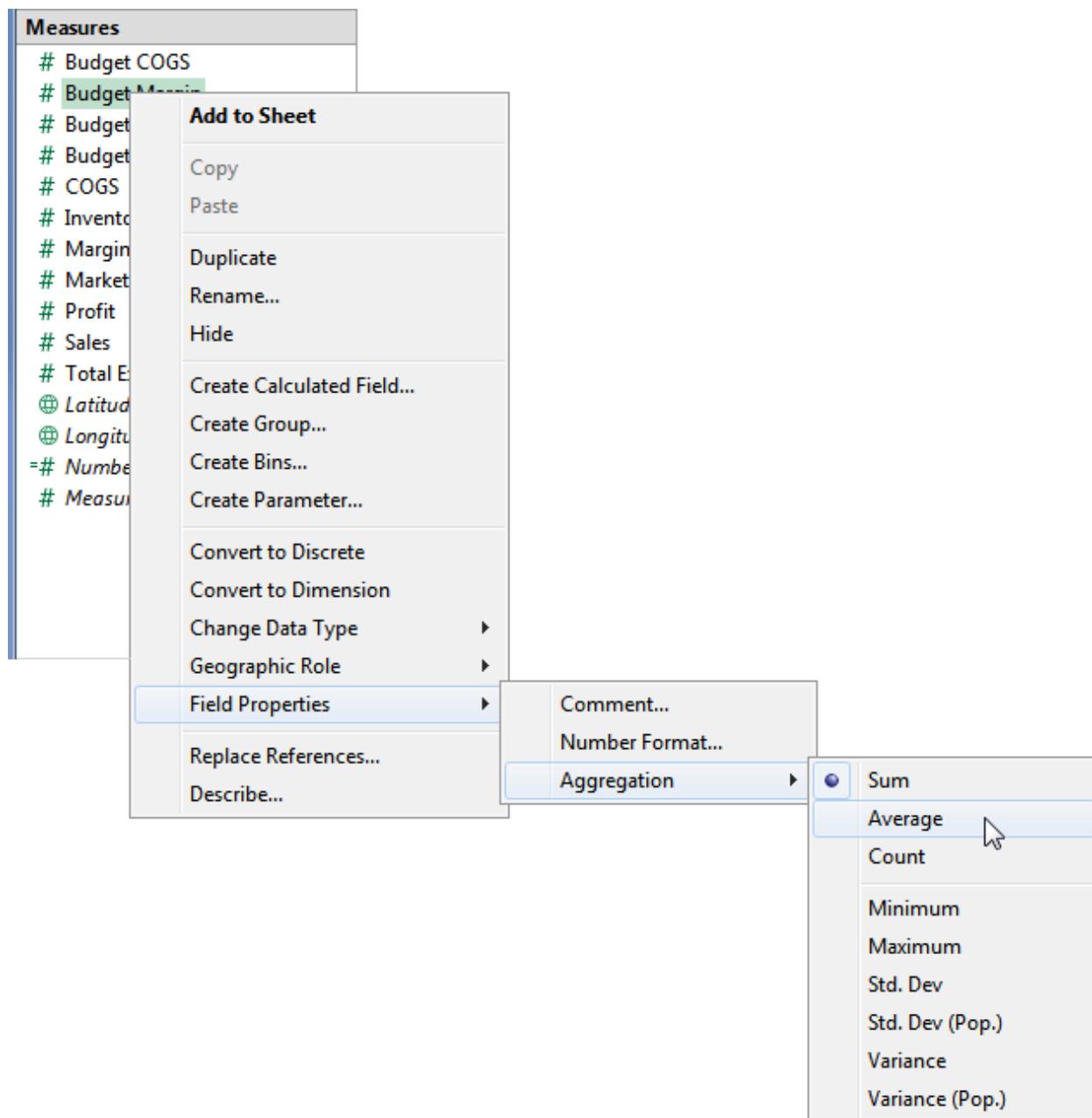


Tableau also allows you to view data in disaggregated form (relational databases only). This is an extremely powerful feature. When data are disaggregated, you can view all of the individual rows of your data source. For example, after discovering that the sum of sales for rubber bands is \$14,600, you might want to see the distribution of individual sales transactions. To answer this question, you need to create a view that shows individual rows of data. That is, you need to disaggregate the data (refer to [Disaggregating Data](#)). Also, one way to look at disaggregated data is to view the underlying data that's displayed in a table.

- [Aggregating Data](#)

- [\*\*Disaggregating Data\*\*](#)
- [\*\*Example – Aggregating and Disaggregating Data\*\*](#)

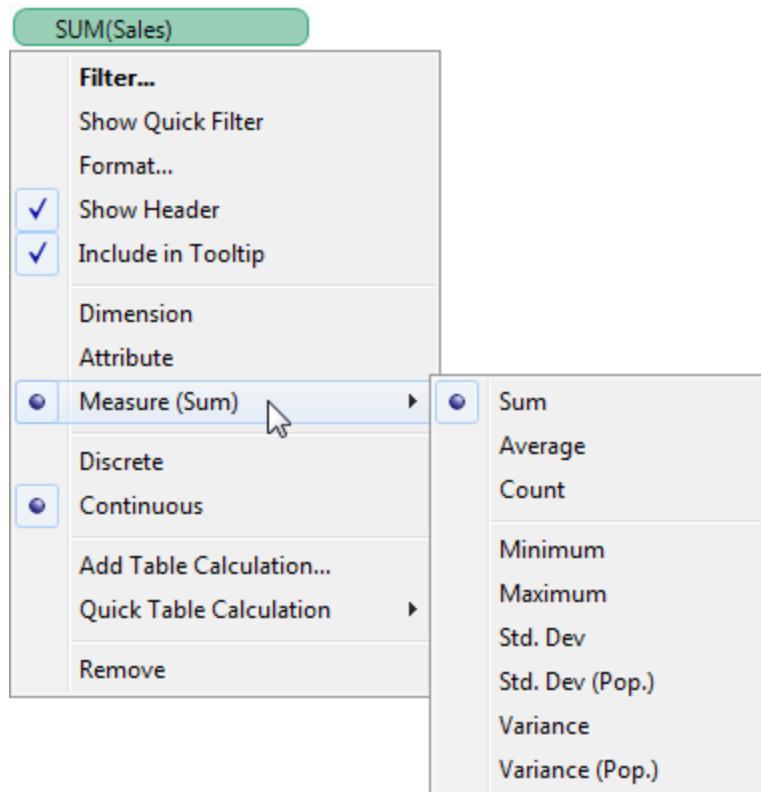
## Aggregating Data

When you place a measure on a shelf, Tableau automatically aggregates the data, usually by summing it. You can easily determine the aggregation applied to a field because the function always appears in front of the field's name when it is placed on a shelf. For example, Sales becomes SUM(Sales).

### Note:

You can aggregate measures using Tableau only for relational data sources. Multidimensional data sources contain aggregated data only.

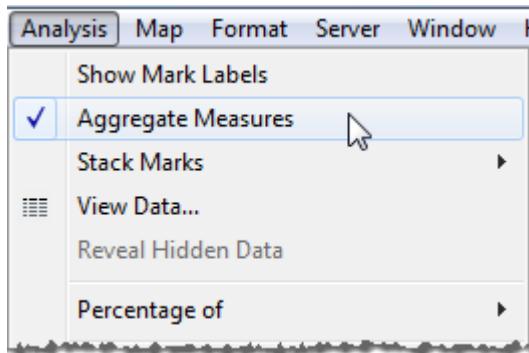
You can change the aggregation of a field by selecting a different function from the field's context menu. As shown below, all of the predefined aggregations are available from this menu.



## Aggregating Measures

You can assign a different aggregation to every measure you place on a shelf. For example, you can aggregate Sales as a summation, Profit as a maximum, and Discount as an average.

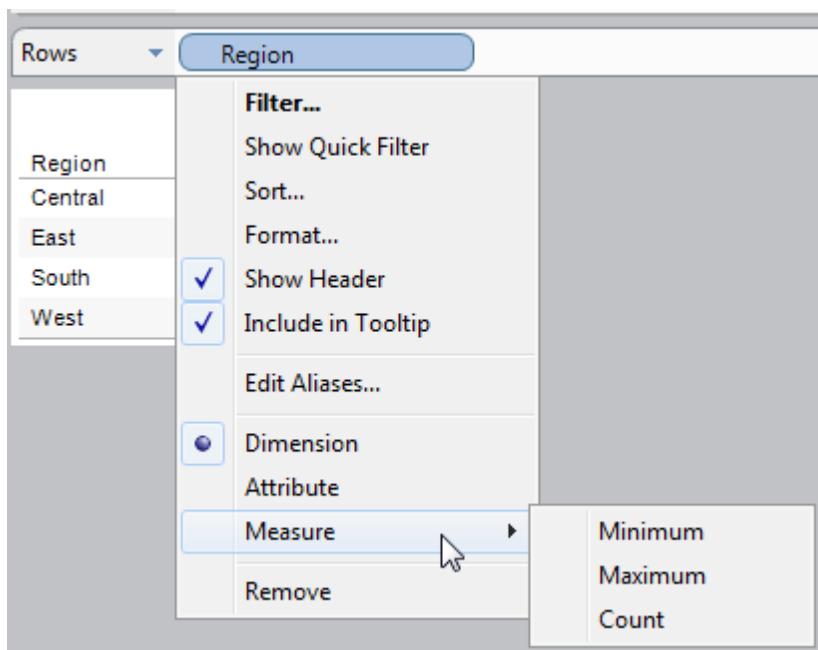
You can change the aggregation state for all the measures on a worksheet by selecting the Analysis > Aggregate Measures menu item.



When all measures are disaggregated you see a mark for each row in the view. You cannot select specific marks to Keep Only, Exclude, or create a Set when all measures are disaggregated.

### *Aggregating Dimensions*

Dimensions can be aggregated as a measure using Minimum, Maximum, and Count. When you aggregate dimensions, you create a new temporary measure column, so the dimension is now viewed as a measure.



Another way to view a dimension is to treat it as an Attribute. When you aggregate a dimension as an attribute, it is treated like a label instead of partitioning the data. The Attribute aggregation has several uses such as ensuring a consistent level of detail when blending multiple data sources, providing a way to aggregate dimensions when computing table calculations, which require an aggregate expression, and finally it can increase query performance because it is computed locally.

Tableau computes Attribute with a the following formula:

```
IF MIN([dimension]) = MAX([dimension]) THEN MIN([dimension])
ELSE "*" END
```

The above formula is computed in Tableau after the data is retrieved from the initial query. The asterisk (\*) is actually a visual indicator of a special type of Null value that occurs when there are multiple values. Refer to [Troubleshooting Data Blending](#) to learn more about the asterisk.

Below is an example of using Attribute in a table calculation. The table shows sales by market, market size, and state. Now suppose you wanted to compute the percent of total sales each state contributed to the market. When you add a Percent of Total [Quick Table Calculations](#) that computes along State, the calculation computes within the red area shown below. This is because the Market Size dimension is partitioning the data.

Columns	Measure Names			
Rows	Market		Market Size	State
Market	Market Size	State	Sales	% of Total Sales along State
Central	Major Market	Colorado	\$48,179	31.58%
		Illinois	\$69,883	45.80%
		Ohio	\$34,517	22.62%
	Small Market	Iowa	\$54,750	48.68%
		Missouri	\$24,647	21.92%
		Wisconsin	\$33,069	29.40%
East	Major Market	Florida	\$37,443	27.08%
		Massachusetts	\$29,965	21.67%
		New York	\$70,852	51.25%
	Small Market	Connecticut	\$25,429	63.07%
		New Hampshire	\$14,887	36.93%
		Tennessee	\$27,459	44.28%
South	Major Market	Texas	\$37,410	100.00%
	Small Market	Louisiana	\$23,161	34.82%
		New Mexico	\$15,892	23.89%

When you aggregate Market Size as an Attribute, the calculation is computed within the Market and the Market Size information is used purely as a label in the display.

Columns		Measure Names		
Rows		Market	ATTR(Market Size)	State
Market	Market Size	State	Sales	% of Total Sales along State
Central	Major Market	Colorado	\$48,179	18.18%
		Illinois	\$69,883	26.37%
		Ohio	\$34,517	13.02%
	Small Market	Iowa	\$54,750	20.66%
		Missouri	\$24,647	9.30%
		Wisconsin	\$33,069	12.48%
East	Major Market	Florida	\$37,443	20.97%
		Massachusetts	\$29,965	16.78%
		New York	\$70,852	39.68%
	Small Market	Connecticut	\$25,429	14.24%
		New Hampshire	\$14,887	8.34%
South	Major Market	Texas	\$37,410	36.00%
	Small Market	Louisiana	\$23,161	22.29%
		New Mexico	\$15,892	15.29%

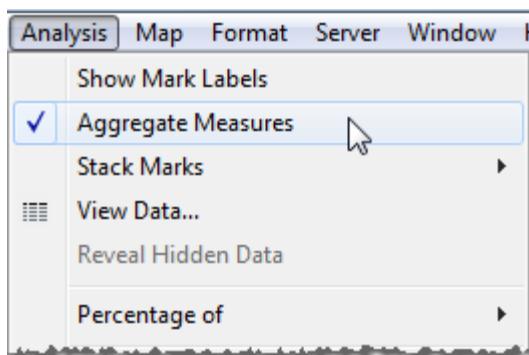
## Disaggregating Data

*Disaggregating your data allows you to view every row of the data source which can be useful when you are analyzing measures that you may want to use both independently and dependently in the view. For example, you may be analyzing the results from a product satisfaction survey with the Age of participants along one axis. You can aggregate the Age field to determine the average age of participants or disaggregate the data to determine at what age participants were most satisfied with the product.*

### Note:

*If your data source is very large, disaggregating the data can result in a significant performance degradation.*

*You can disaggregate all measures in the view by selecting Analysis > Aggregate Measures.*

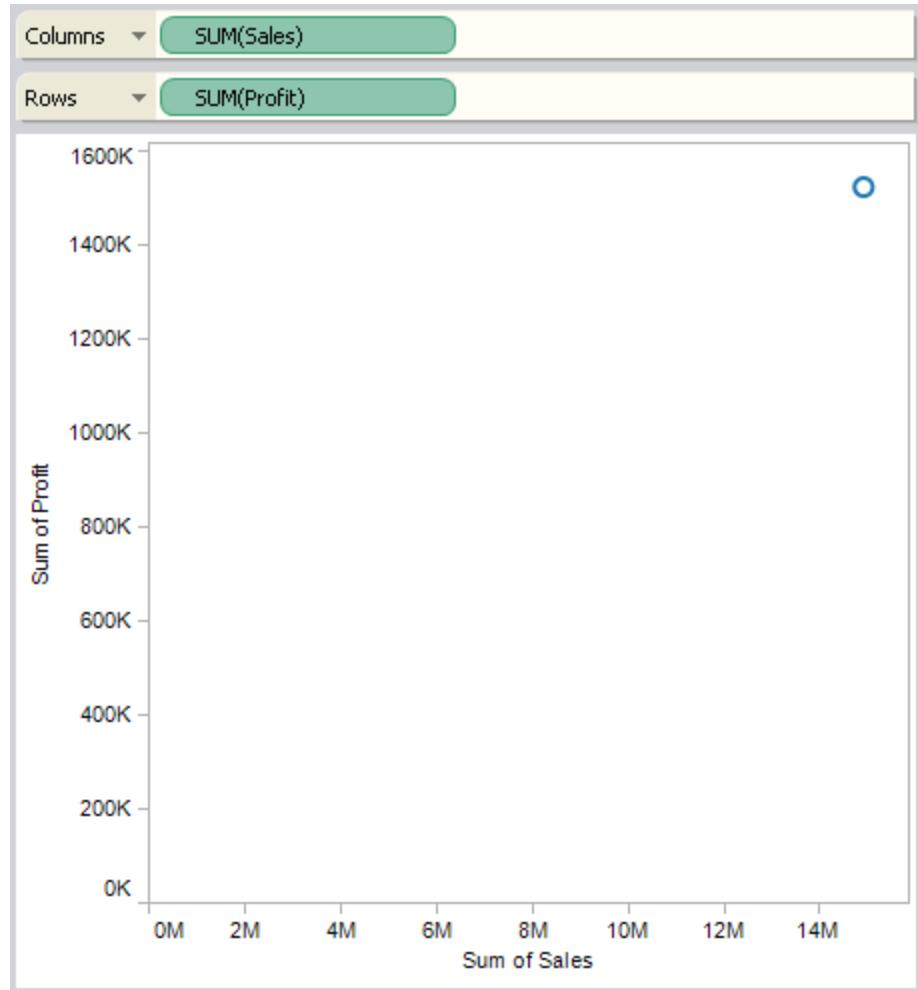


## Example – Aggregating and Disaggregating Data

This example includes several views of aggregated and disaggregated data created using the Sample – Superstore Sales data source. To create the views, follow these five steps:

1. Place the Sales measure on the Columns shelf and the Profit measure on the Rows shelf.

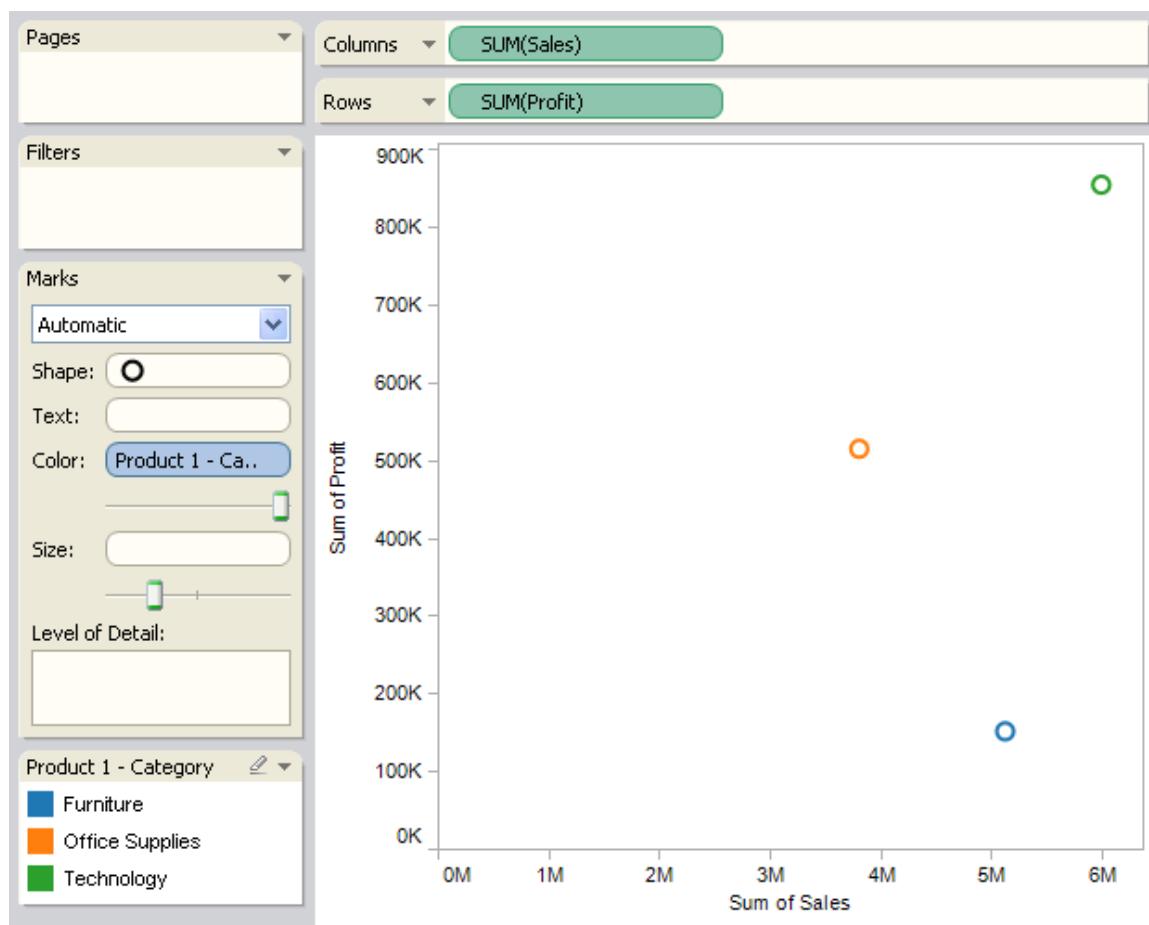
The measures are automatically aggregated as sums. The aggregation is indicated by the field names and by the tooltip. The values shown in the tooltip are the sales and the profit for the entire data source. That is, the summations are performed using every row in the data source.



2. Place the Product 1 - Category dimension on the Color shelf.

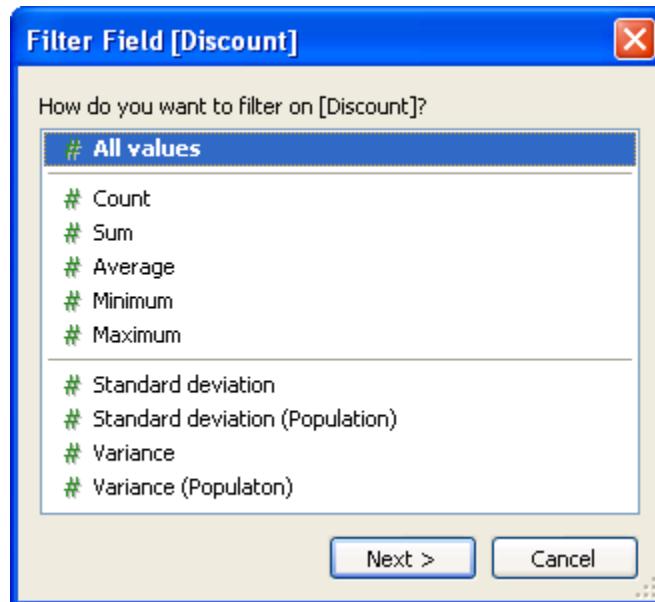
One way to show more data in your view is to disaggregate the measures. Another way is to show additional levels of detail. For example, placing the Product 1- Category dimension on the Color shelf separates the data into three marks—one for each dimension member—and then encodes the marks using color.

Although more marks are displayed, the measures are still aggregated. The single mark in the view indicates the sum of the sales and the sum of the profit for Office Supplies. If you were to sum the sales and profit values for the three marks, you would produce the values for the entire data set as given in the previous step of this example.

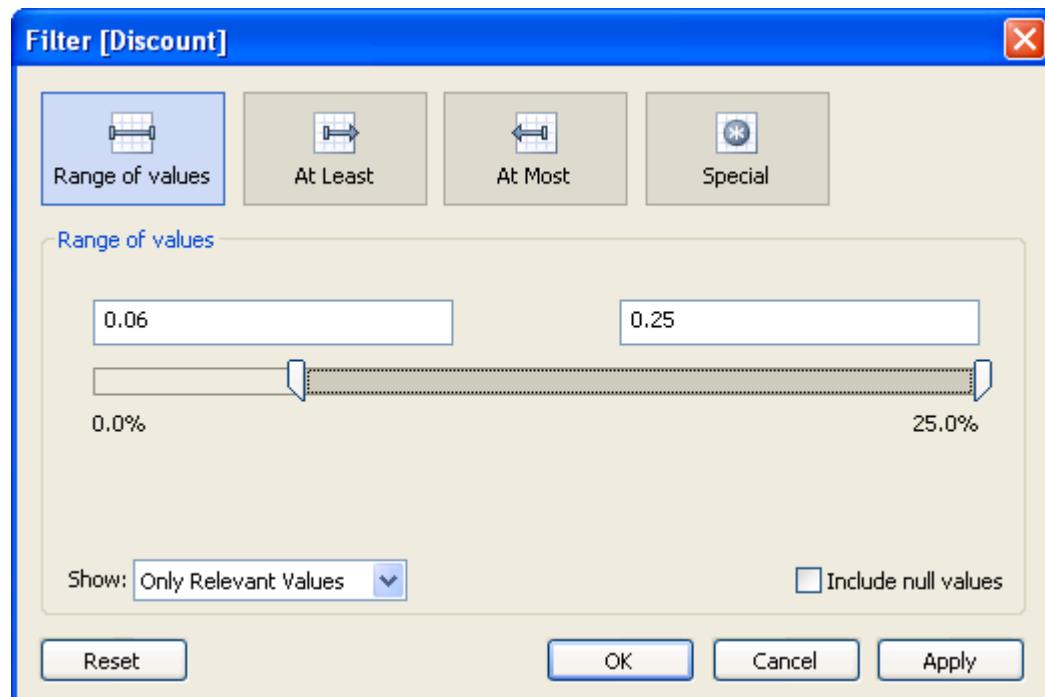


3. Place the Discount measure on the Filters shelf.

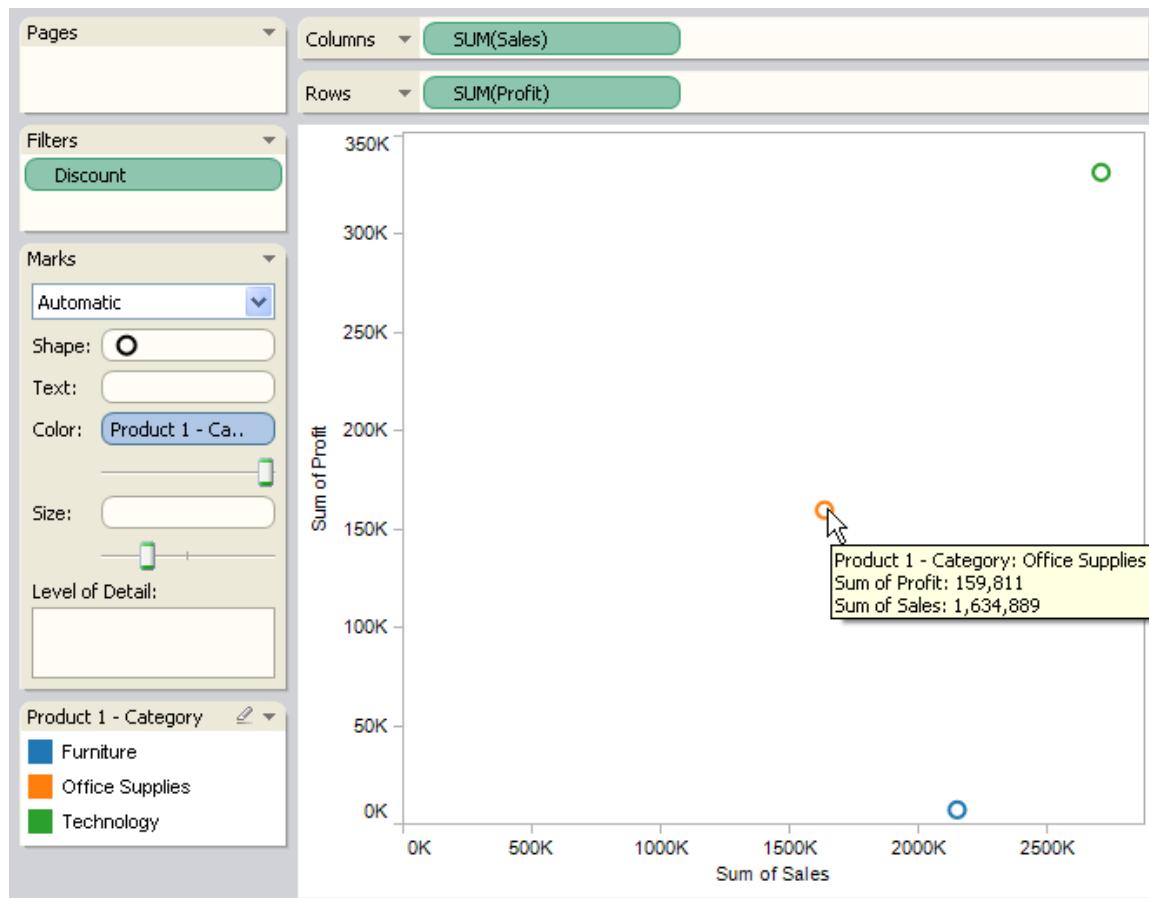
*In the Filter Field dialog box select All Values to filter on the disaggregated measure.*



*Filter the data to only include discounts greater than 6% (0.06). Because Discount is disaggregated, Tableau applies the filter to each row in the data source before performing the aggregations for the Sales and Profit measures.*

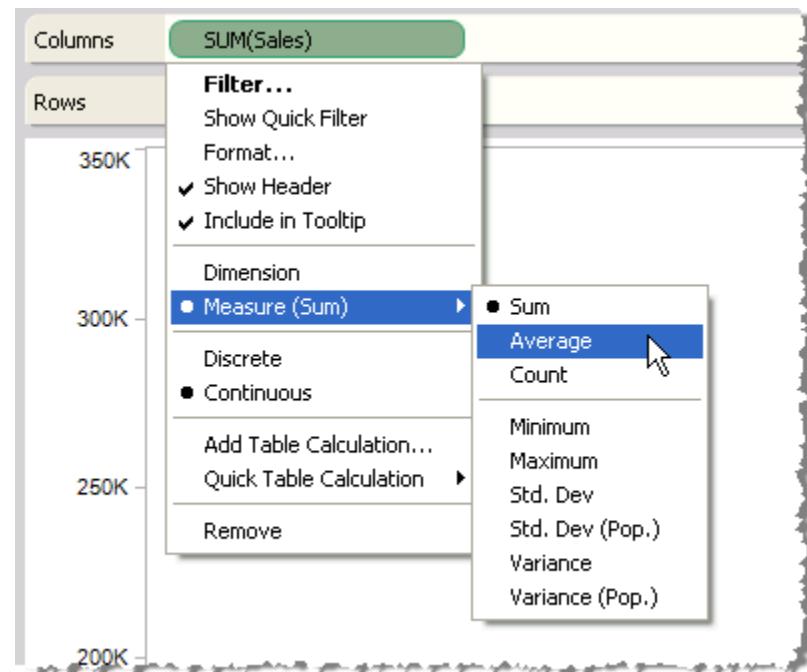


The view is shown below. The tooltip indicates that both the sales and the profit numbers are smaller than in the previous view. This is because data have been filtered out of the aggregation operation.

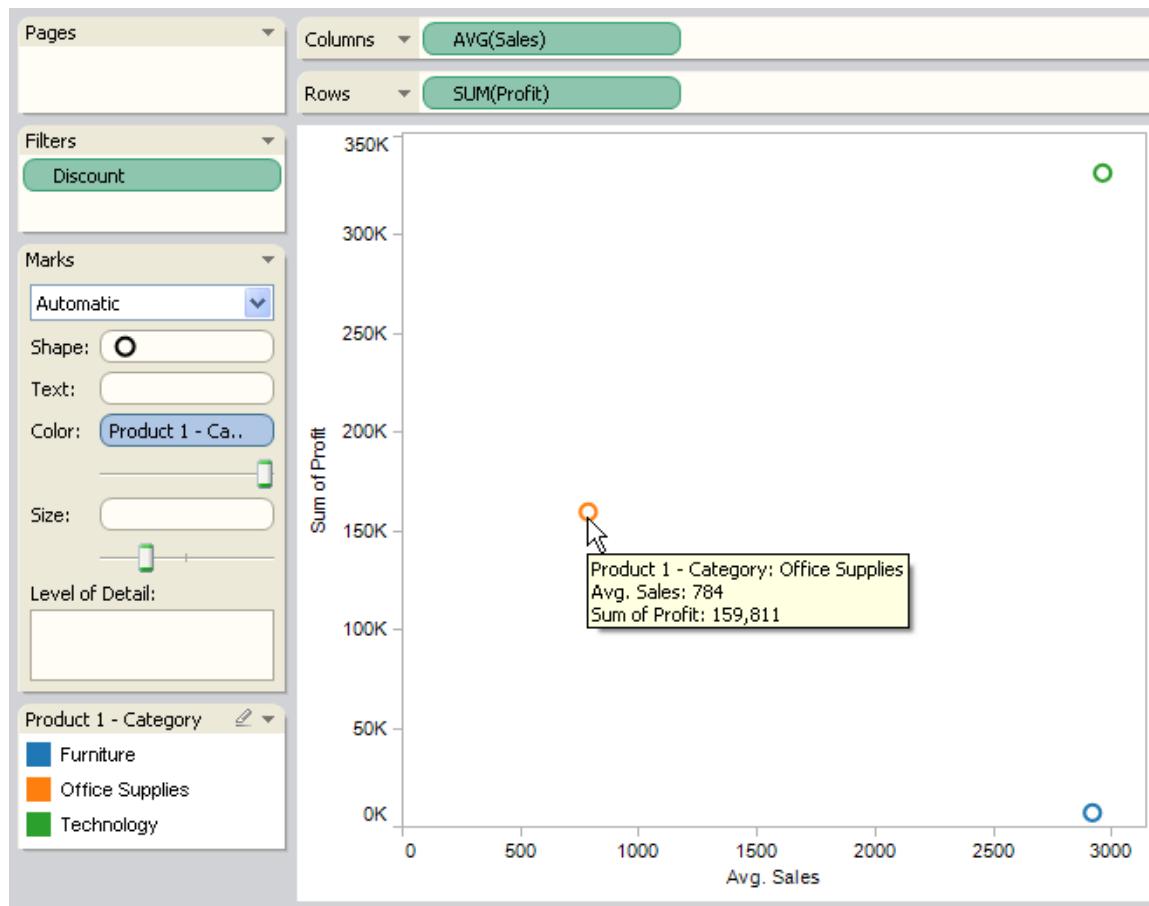


4. Change the aggregation of Sales to an average.

*The measures are not required to have the same aggregation. Change the aggregation by selecting Average from the field's context menu.*



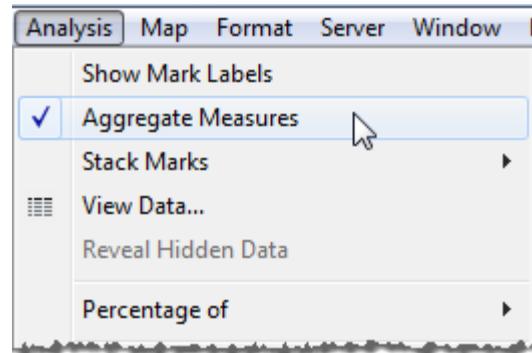
The view is shown below. The field name and tooltips indicate the new aggregation.



## 5. Disaggregate the data.

All measures—except those placed on the *Filters* shelf—must have the same aggregation state. That is, they must all be either aggregated or disaggregated.

You change the aggregation state by selecting the *Analysis > Aggregate Measures* menu item.



The view is shown below. Disaggregating the data displays every row in the data source that passes through the filter. The tooltip shows the profit and sales for one particular row.



## Calculated Fields

### Calculated Fields

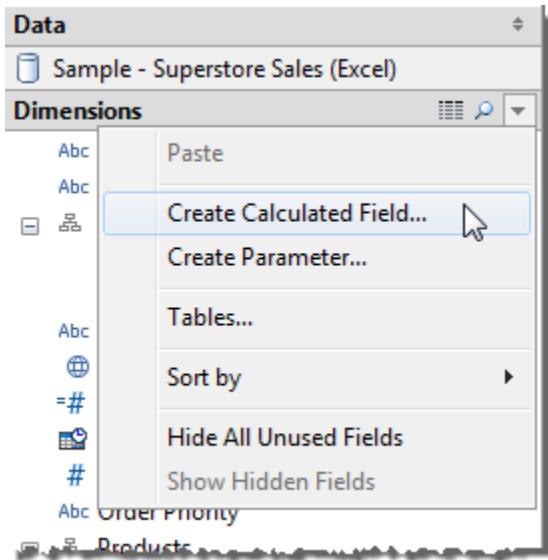
You might find that your data source doesn't include all of the fields needed to answer your questions. For example, you might want to create a new calculated field called Profit that is the difference between the Sales and the Cost fields, or you might want to create a conditional statement that divides the Sales Budget field into values that are under budget and values that are over budget.

Tableau allows you to create a new calculated field by defining a formula that is based on data source fields and other calculated fields, and that uses standard functions and operators.

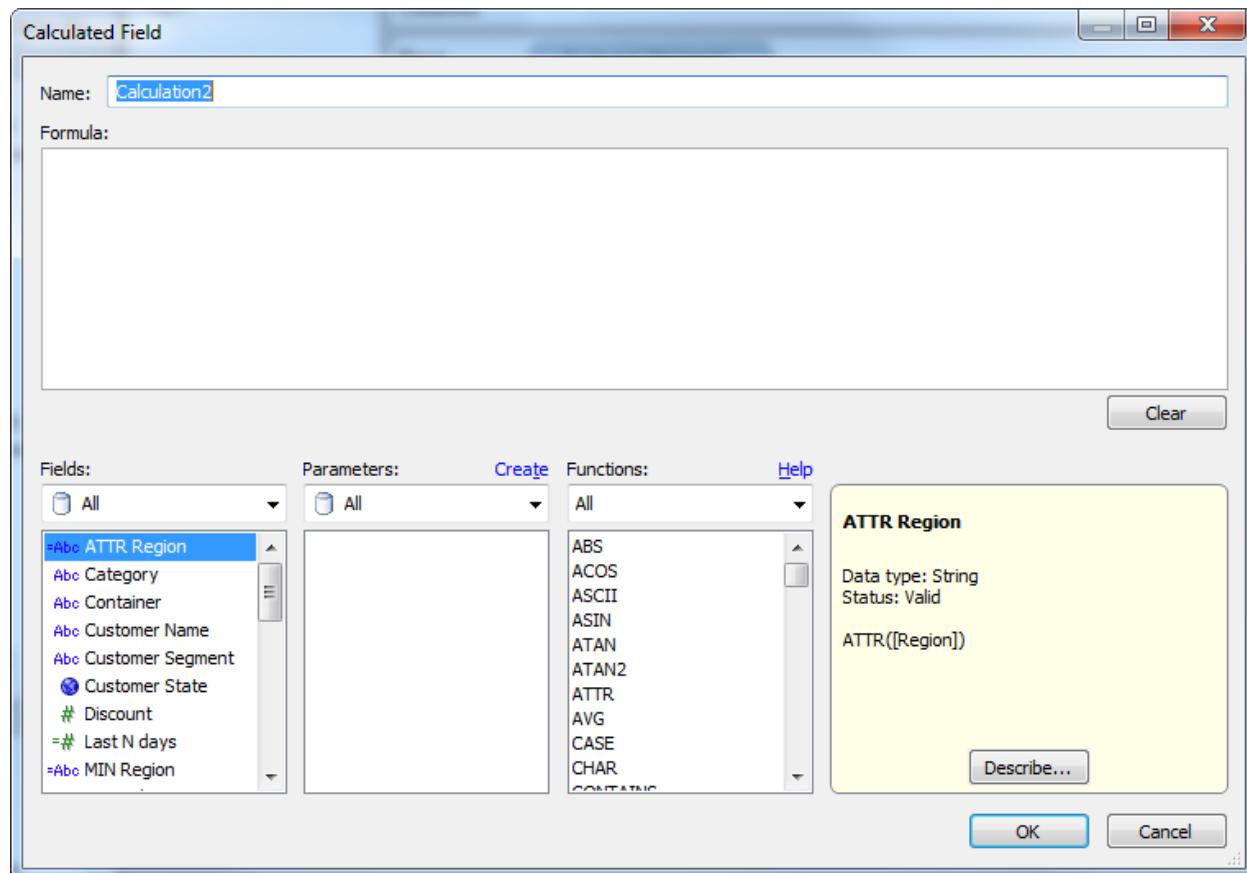
- [How to Create a Calculated Field](#)
- [How to Create a Calculated Member](#)
- [Copying and Pasting Calculated Fields](#)
- [Writing formulas in Tableau](#)
- [Example – Creating a Calculated Field](#)
- [Aggregate Calculations](#)
- [Example - Spotlighting Using Calculations](#)

## How to Create a Calculated Field

To create a new calculated field, select *Analysis > Create Calculated Field*, or select *Create Calculated Field* on one of the Data window title menu.



The Calculated Field dialog box opens.



To define the calculation do the following:

1. Specify a name for the new field.
2. Create a formula that defines the new field. Refer to [Writing formulas in Tableau](#) for more information about how to define a formula.
3. When finished, click OK.

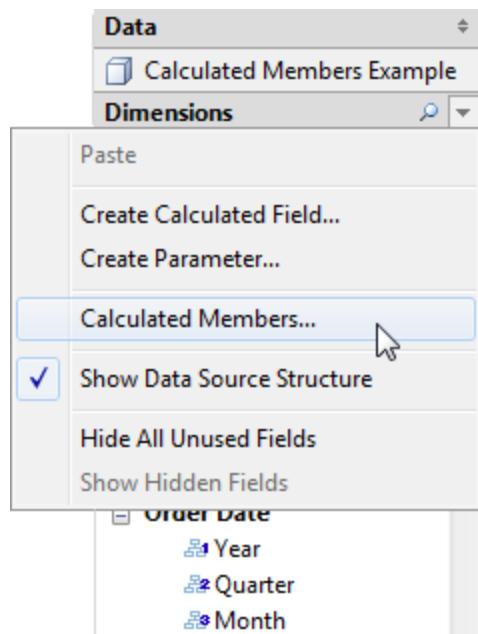
The new calculated field displays in either the Dimensions area or the Measures area of the Data window depending on the data type returned by the calculation. Calculations that return a string or date are dimensions, while calculations that return a number are measures. In the latter case, you can convert the measure to a dimension if you want to treat the calculated values as discrete rather than continuous.

## How to Create a Calculated Member

If you are using a multidimensional data source, you have the option to create calculated members using MDX formulas instead of Tableau formulas. A calculated member can either be a calculated measure, which is a new field in the data source just like calculated fields, or a calculated dimension member, which is simply a new member within an existing hierarchy. For example, a Product dimension may have three members: Soda, Coffee, and Crackers. You can define a new calculated member called "Beverages" that sums the Soda and Coffee members. Now when you place the Products dimension on the Rows shelf it displays four rows: Soda, Coffee, Crackers, and Beverages.

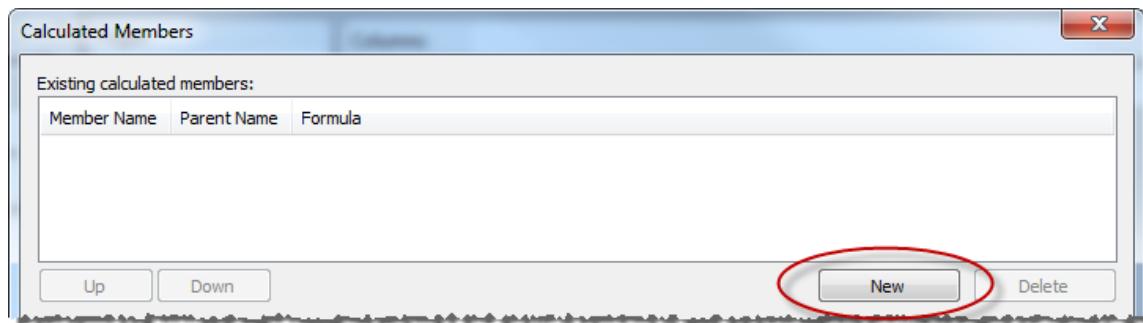
### Defining Calculated Members

You can define a calculated dimension member by selecting Calculated Members on the Data window menu. The Calculated Members dialog box opens where you can create, delete, and edit any calculated members.

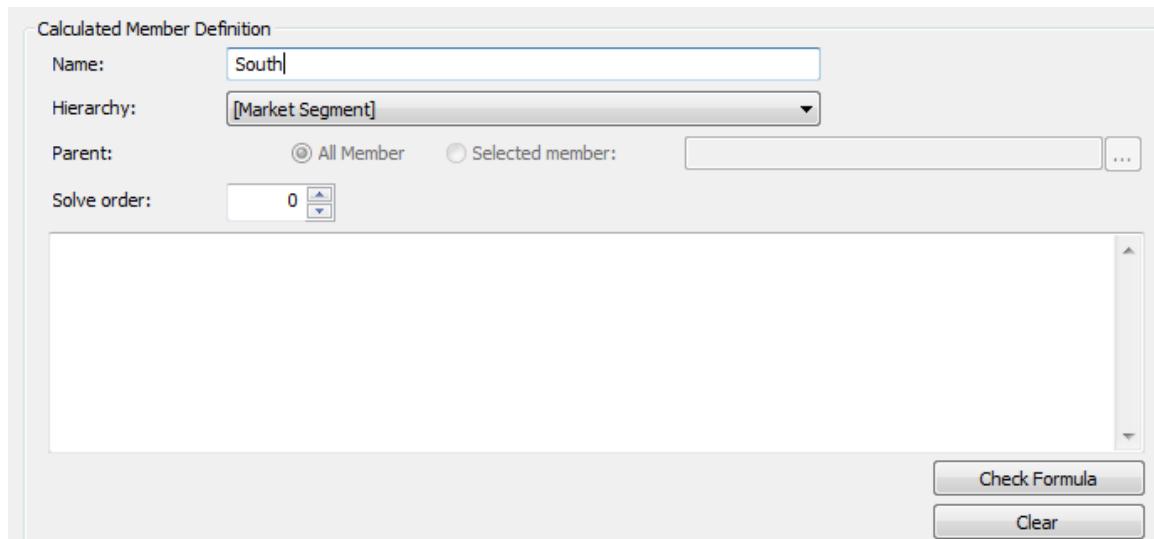


To create a new calculated member do the following:

1. Click New to add a new row to the list of calculated members at the top of the dialog box.



2. Type a Name for the new calculated member in the Member Definition area of the dialog box.



3. Select a hierarchy from the Hierarchy drop-down list. If you are creating a calculated measure, select [Measures] and define a result type using the Result Type drop-down list. Then skip to step five.
4. Specify the Parent member for the new calculated member. The All Member is selected by default, however, you can choose the Selected Member option to browse the hierarchy and select a specific parent member.
5. Give the new member a solve order.

Sometimes a single cell in your data source can be defined by two different formulas. The solve order defines the precedence given to each formula.

*Formulas with a lower solve order are solved first. The default solve order is zero.*

6. Type or paste an MDX expression into the *Formula* text box.
7. Click *Check Formula* to verify that the formula is valid.
8. When finished, click *OK*.

*The new member displays in the Data window either as part of the Measures area, if you chose [Measures] as the parent member, or in the Dimensions area under the specified parent member. You can use the new member just like any other field in the view.*

## **Copying and Pasting Calculated Fields**

*Calculated fields are available to all sheets that use the same data source in a single workbook. In addition, you can copy and paste these custom fields between workbooks simply by right-clicking the field in the Data window and selecting Copy. Then in the new workbook, right-click the Data window and select Paste. You can copy and paste all custom defined fields such as calculated fields, ad hoc groups, user filters, sets, and so on.*

## Writing formulas in Tableau

The formula editor has built-in coloring and validation to help you avoid syntax errors. As you write the formula, syntax errors are underlined with a red squiggly line. Hover over the error to see directions for fixing it. Also any errors with the calculation are shown in a drop-down list. When the calculation is valid, a green check mark is displayed.

When you are writing formulas, any part that displays in bold indicates that it will be computed locally within Tableau on the aggregated results. Any normal weight text will be computed at the database level.

Formulas are made up of the following parts:

### 1. Functions

The Functions area of the dialog box contains all the functions you can use to create a formula. The functions are organized into categories, which are available from the drop-down menu. By default all functions are displayed.

You can display a brief description for each function by clicking its name in the list box. Double-click a function to include it in a formula. Functions are colored black in the formula.

### 2. Fields

All data source fields and calculated fields are listed in the Fields area of the dialog box. Binned fields and sets are not listed because they cannot be used in calculations.

The field's data type and the name display in the list. Use the drop-down menu to select a secondary data source and see its fields.

Double-click a field name to include it in a formula. You can also just type the bare field name. However, if the field name includes special characters such as spaces, it must be delimited with square brackets as in `SUM([Store Profit])`. A right bracket `)` can be doubled to include it in the field name itself. For example, the field name "Store Profit" would be written as `[Store Profit]]`.

Fields are colored orange in the formula.

### 3. Operators

Operators are not available on the dialog box like functions and fields. Instead, you must manually type the operators into your formula. All standard operators

*such as addition (+), subtraction (-), multiplication (\*), and division (/) are supported. Operators are colored black in the formula.*

#### **4. Parameters (optional)**

*Parameters are placeholders variables that can be inserted into calculations to replace constant values. When a parameter is used in a calculation, you can then use a parameter control to dynamically change the value. Parameters are colored purple in the formula.*

#### **5. Comments (optional)**

*You can insert custom comments for your calculations as a means of annotation for later review. To add a comment to a calculation type two forward slash characters into the formula pane.*

*For example:*

*Sales \* Profit //John's calculation*

*In this example //John's calculation is a comment.*

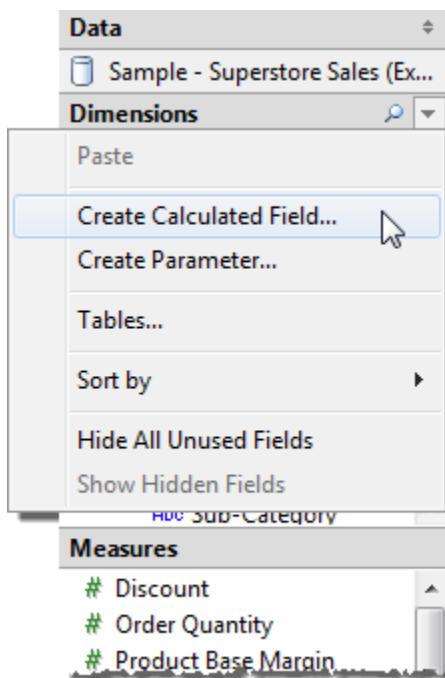
*A comment starts at the two forward slashes (//) and goes to the end of the line. A multiline comment can be written by starting each line with two forward slashes (//). Comments are colored green in the formula.*

## Example – Creating a Calculated Field

In this example we will create a calculated field using Tableau formulas and use the new field in a data view. Then we'll edit the field's formula to create a new view, and finally delete the field from the Data window. This example uses the Sample - Superstore Sales (Excel) data source.

1. Create the view.

Select New Calculated Field on the Data window menu.

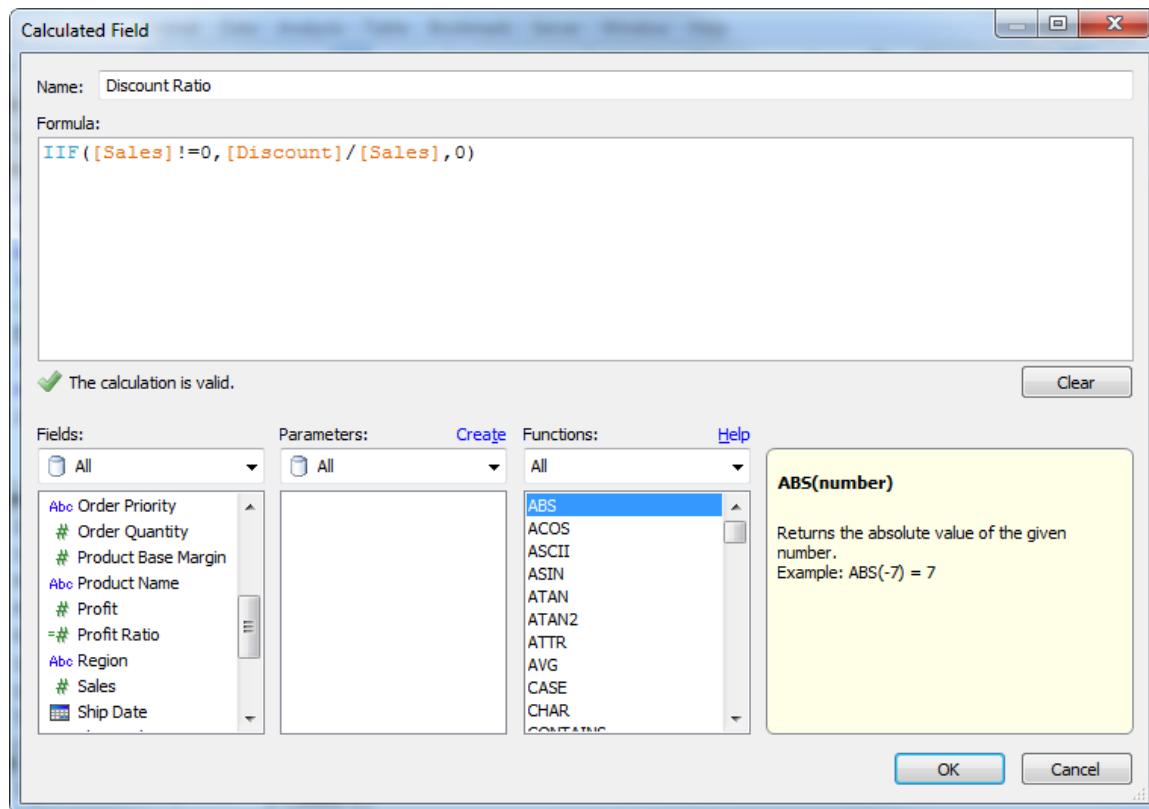


2. Complete the Calculation dialog box.

Name the new field *Discount Ratio* and enter the formula shown below.

$IIF([Sales] !=0, [Discount]/[Sales],0)$

You can type the formula by double clicking the field names in the Fields list and functions in the Functions list. You must type the operators ( $!=$  and  $/$ ) manually. Note that the *IIF* statement is used to avoid dividing by zero.

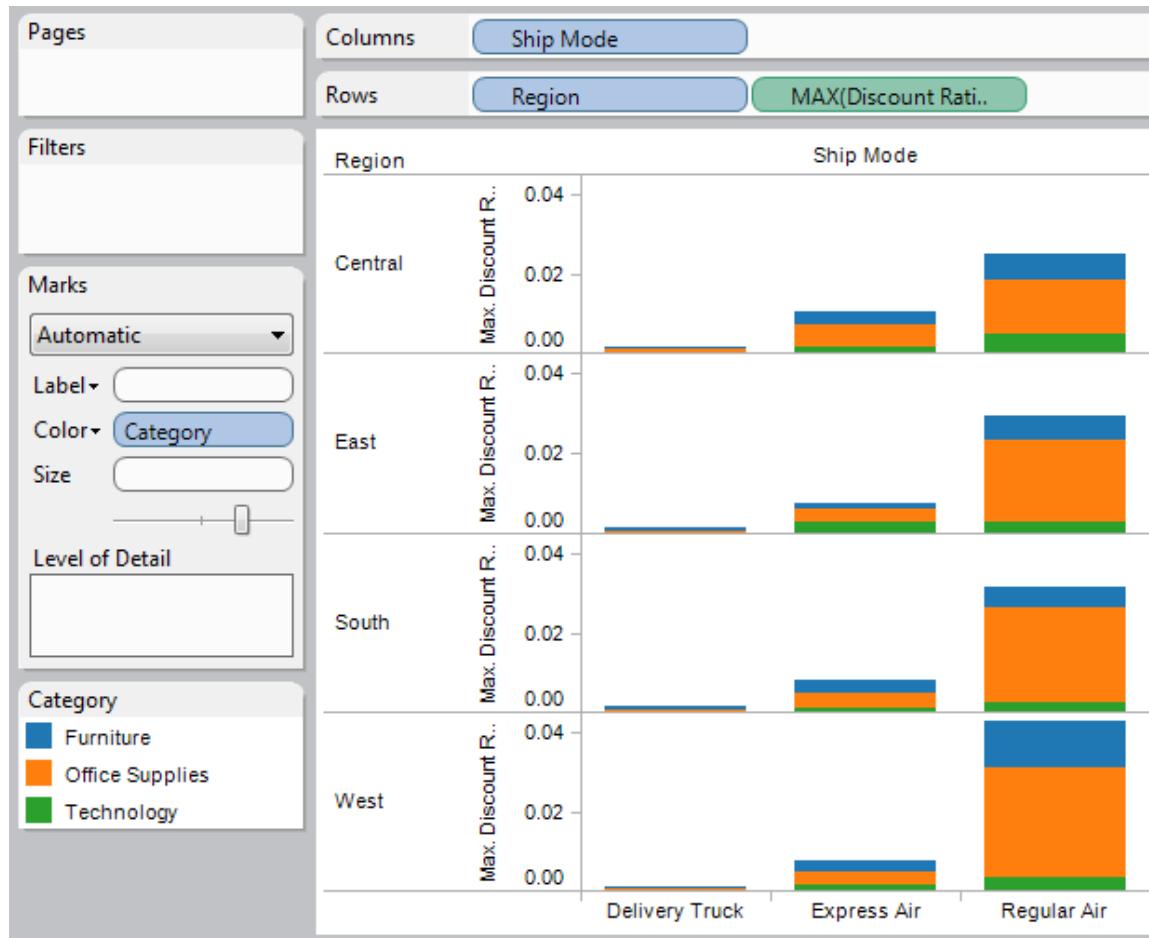


*The new field displays in the Measures area of the Data window because the calculation returns a number. You can use this new field just like any other field.*

The screenshot shows the 'Measures' pane in the Tableau Data window. It lists several calculated fields and measures, including `# Discount`, `=# Discount Ratio`, `# Order Quantity`, `# Product Base Margin`, `# Profit`, `=# Profit Ratio`, `# Sales`, and `# Shipping Cost`.

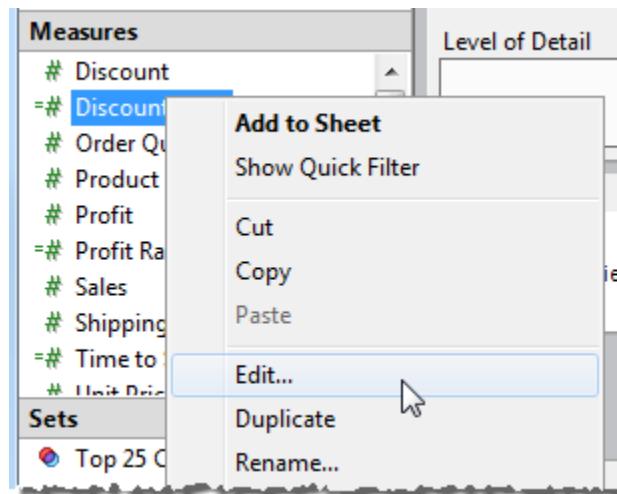
3. Add the calculation to the view.

Place Ship Mode on the columns shelf, Region on the Rows shelf, and Product 1- Category on the Color shelf. Then place the new calculation, Discount Ratio onto the Rows shelf. Note that you can treat the new calculation just like any other measure. For example, you can apply an aggregation to it. Below, Discount Ratio is aggregated as a maximum.

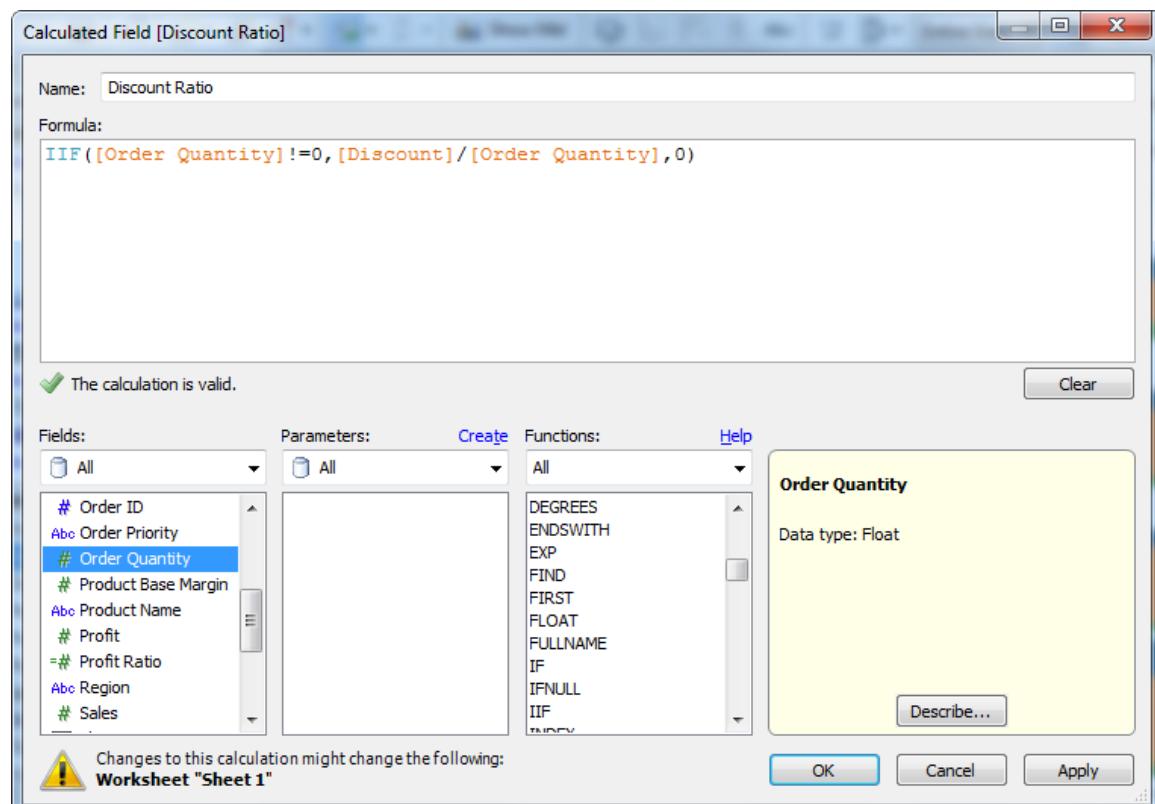


#### 4. Edit the calculation.

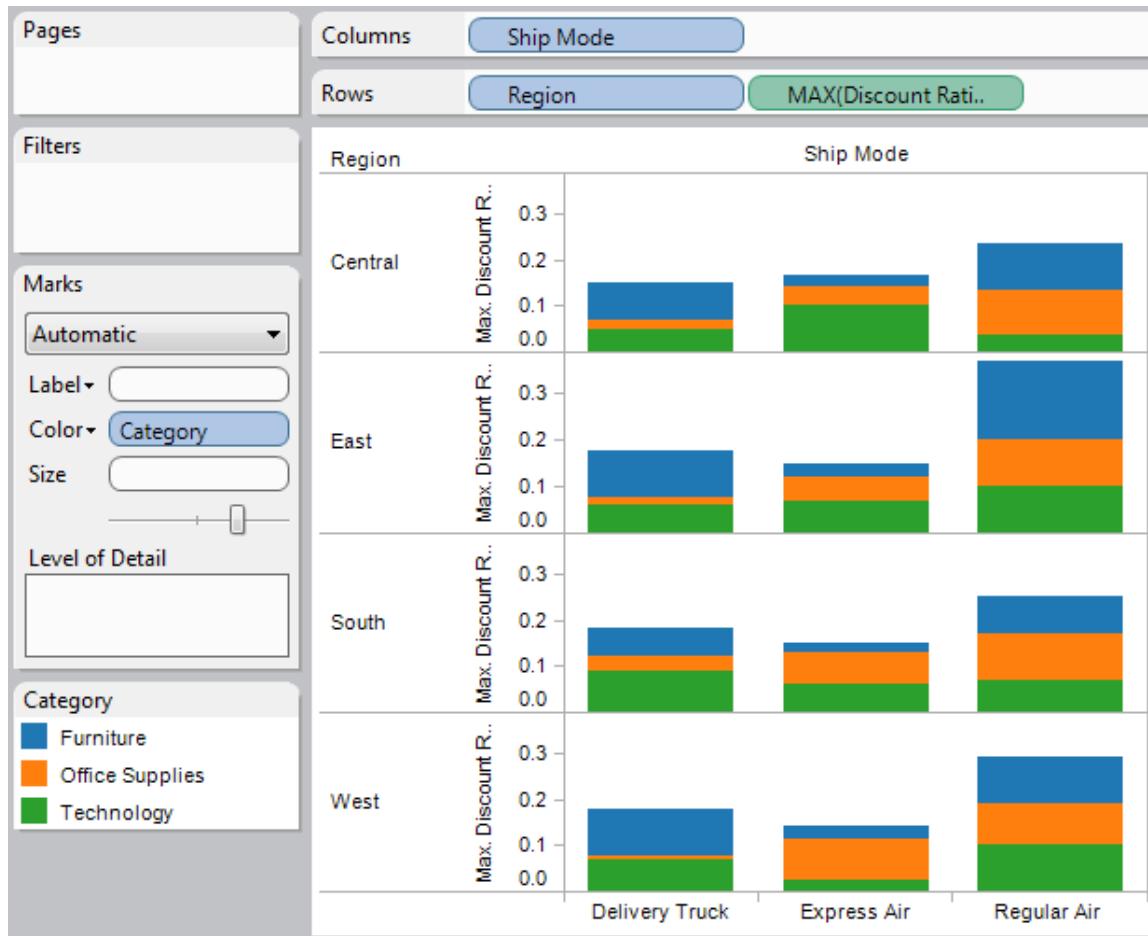
You can change the field's formula by right-clicking the field name in the Data window and selecting Edit or by selecting Analysis > Edit Calculation.



In the Calculated Field dialog box, change Sales to Order Quantity.

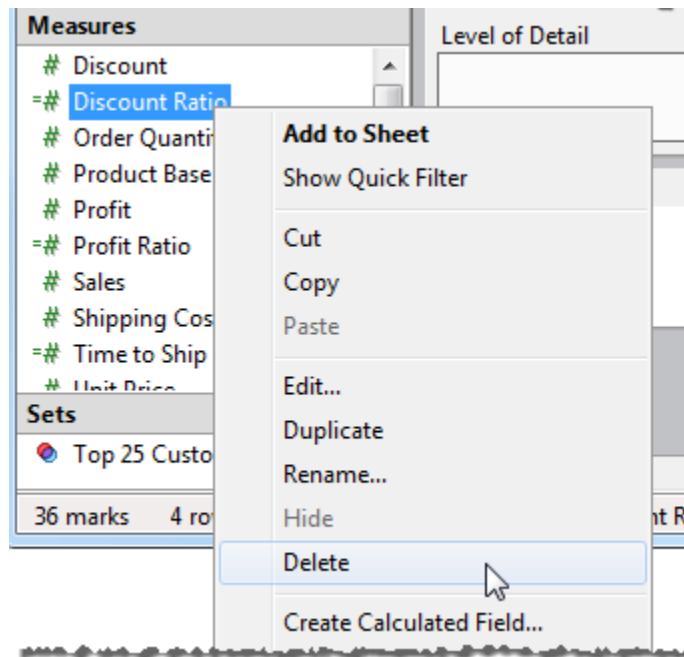


The view automatically updates after you click OK in the Calculated Field dialog box.



##### 5. Delete the calculated field.

You can delete a calculated field by right-clicking the field name in the Data window and selecting Delete from the right-click context menu. Before deleting the field, you might want to save your workbook. If you do not save your work, the calculated fields will be lost.



## Aggregate Calculations

### Aggregate Calculations

Aggregate functions allow you to summarize data. As described in [Aggregations](#), Tableau includes a variety of predefined aggregations such as summation and variance. An aggregate calculation allows you to define aggregations other than these predefined choices.

- [About Aggregate Calculations](#)
- [How to Create an Aggregate Calculation](#)
- [Aggregate Calculations in a Disaggregated State](#)
- [Example – Aggregate Calculation](#)

## About Aggregate Calculations

Suppose you want to analyze the overall gross margin for every product in your data source. One way to do this is to create a new calculated field called Margin that is equal to the profit divided by the sales. Then you could place this measure on a shelf and use the predefined summation aggregation. In this scenario, Margin is defined as follows:

$$\text{Margin} = \text{SUM}([\text{Profit}]) / \text{SUM}([\text{Sales}])$$

This formula calculates the ratio of profit and sales for every row in the data source, and then sums the numbers. That is, the division is performed before the aggregation. However, this is almost certainly not what you would have intended because summing ratios is generally not useful.

Instead, you probably want to know the sum of all profits divided by the sum of all sales. That formula is shown below.

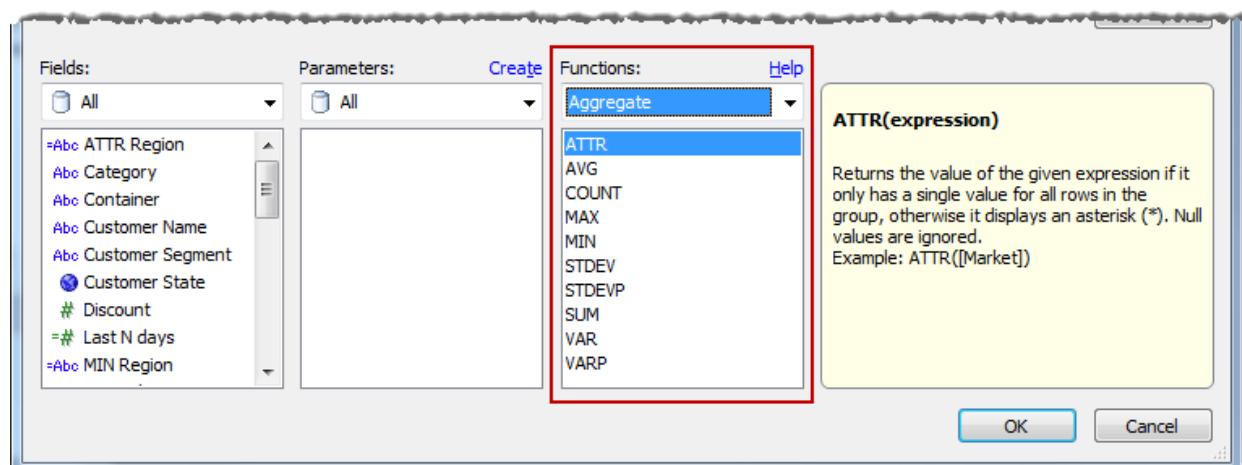
$\text{Margin} = \text{SUM}([\text{Profit}]) / \text{SUM}([\text{Sales}])$

In this case, the division is performed after each measure is aggregated. An aggregate calculation allows you to create formulas like this.

## How to Create an Aggregate Calculation

When a calculation uses an aggregate function, it's called an aggregate calculation. You create an aggregate calculation by defining a new calculated field as described in [How to Create a Calculated Field](#). The formula will contain one or more aggregate functions. You can easily pick an aggregate function from the Calculation dialog box by selecting **Aggregate** from the Functions menu as shown below.

These functions are identical to the predefined aggregate functions listed in [Aggregations](#).



The aggregate calculation appears with the letters AGG in front of it when it is placed on a shelf.

The screenshot shows a dashboard shelf with two items: 'Customer Segment' and 'Region'. The 'Region' item is highlighted with a green background, indicating it is selected. Below the shelf, the text 'AGG(Margin)' is displayed, representing the aggregate calculation.

When you create an aggregate calculation, no further aggregation of the calculation is possible. Therefore, the field's context menu does not offer any aggregation choices. However, you can disaggregate the field.

The rules that apply to aggregate calculations are:

- For any aggregate calculation, you cannot combine an aggregated value and a disaggregated value. For example,  $SUM(Price) * [Items]$  is not a valid

*expression because  $\text{SUM}(\text{Price})$  is aggregated and  $\text{Items}$  is not. However,  $\text{SUM}(\text{Price} * \text{Items})$  and  $\text{SUM}(\text{Price}) * \text{SUM}(\text{Items})$  are both valid.*

- *Constant terms in an expression act as aggregated or disaggregated values as appropriate. For example:  $\text{SUM}(\text{Price} * 7)$  and  $\text{SUM}(\text{Price}) * 7$  are both valid expressions.*
- *All of the functions can be evaluated on aggregated values. However, the arguments to any given function must either all be aggregated or all disaggregated. For example:  $\text{MAX}(\text{SUM}(\text{Sales}), \text{Profit})$  is not a valid expression because  $\text{Sales}$  is aggregated and  $\text{Profit}$  is not. However,  $\text{MAX}(\text{SUM}(\text{Sales}), \text{SUM}(\text{Profit}))$  is a valid expression.*
- *An aggregate calculation is always a measure.*
- *Like predefined aggregations, aggregate calculations are computed correctly for grand totals. Refer to [Grand Totals](#) for more information.*

## Aggregate Calculations in a Disaggregated State

If an aggregate calculation is disaggregated, the calculation is modified in a way that depends on the functions used. Every function has a disaggregated substitute, as shown below.

Aggregation Function	Disaggregated Substitute
AVG (data)	data
COUNT (data)	IIF (ISNULL (data) , 0 , 1)
COUNTD (data)	IIF (ISNULL (data) , 0 , 1)
MAX (data)	data
MIN (data)	data
STDEV (data)	Null
STDEVP (data)	IIF (ISNULL (data) , Null , 0)
SUM (data)	data
VAR (data)	Null
VARP (data)	IIF (ISNULL (data) , Null , 0)

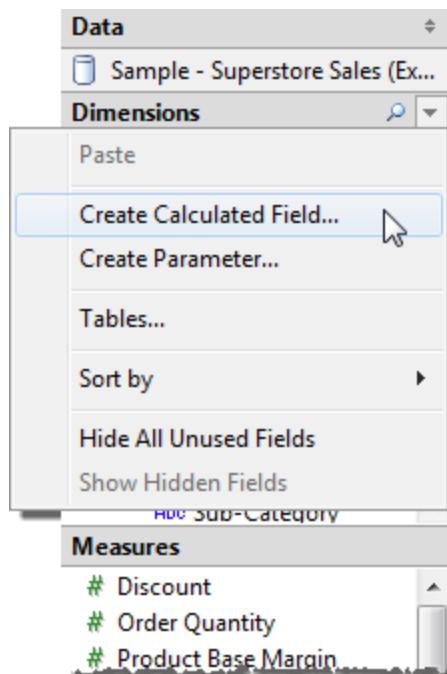
Note that STDEV and VAR are Null because those functions return Null if there are fewer than two elements in a group that are not Null, and each group has size 1 when it is disaggregated. Refer to [Aggregations](#) for descriptions of the aggregation functions.

Therefore, if you define an aggregate calculation called Margin that is equal to  $SUM(Profit)/SUM(Sales)$  and then disaggregate the data, it is interpreted as Profit/Sales.

## Example – Aggregate Calculation

In this example you will use the Sample - Superstore Sales data source to create an aggregate calculation called Margin, and use the new field in a data view.

1. Select New Calculated Field on the Data window menu.

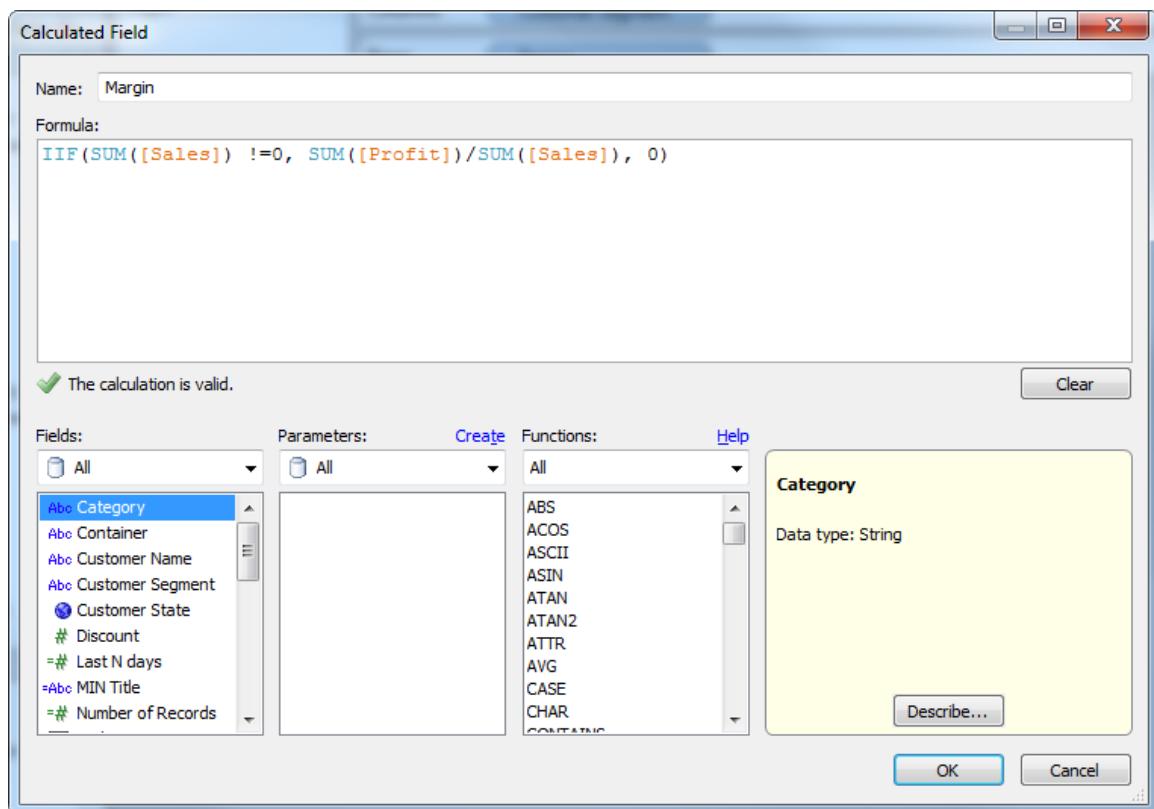


2. Define the calculation.

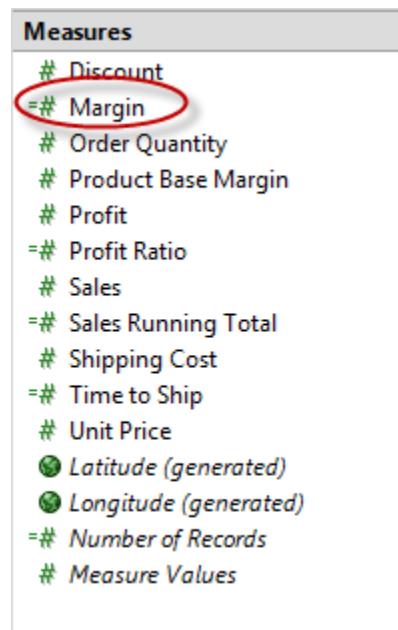
Name the new field Margin and enter the formula shown below.

```
IIF(SUM([Sales]) != 0, SUM([Profit])/SUM([Sales]), 0)
```

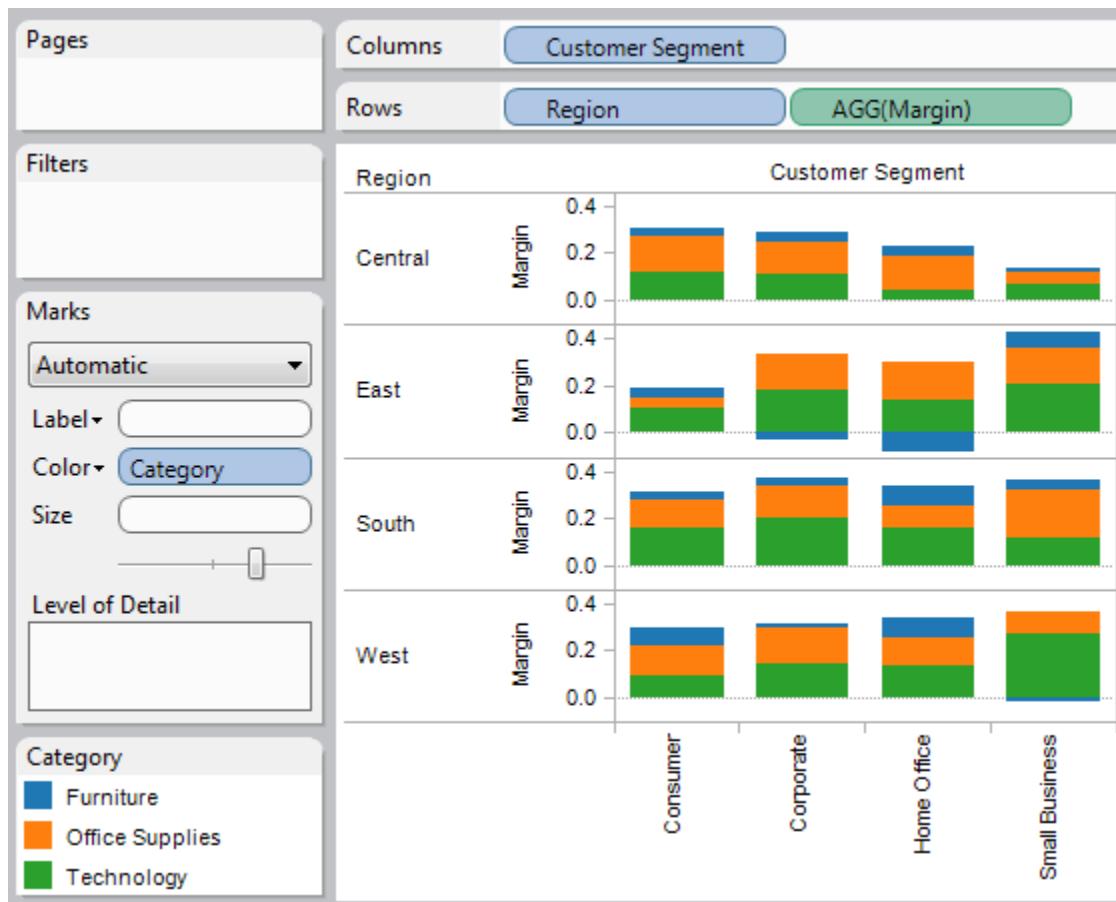
You enter the formula by selecting functions from the Functions area of the dialog box, and field names from the Fields area of the dialog box. You must type the operators ( $\neq$  and  $/$ ) manually. Note that the `IIF` statement is used to avoid dividing by zero.



The new calculated field displays in the Measures area of the Data window where you can use it like any other measure.



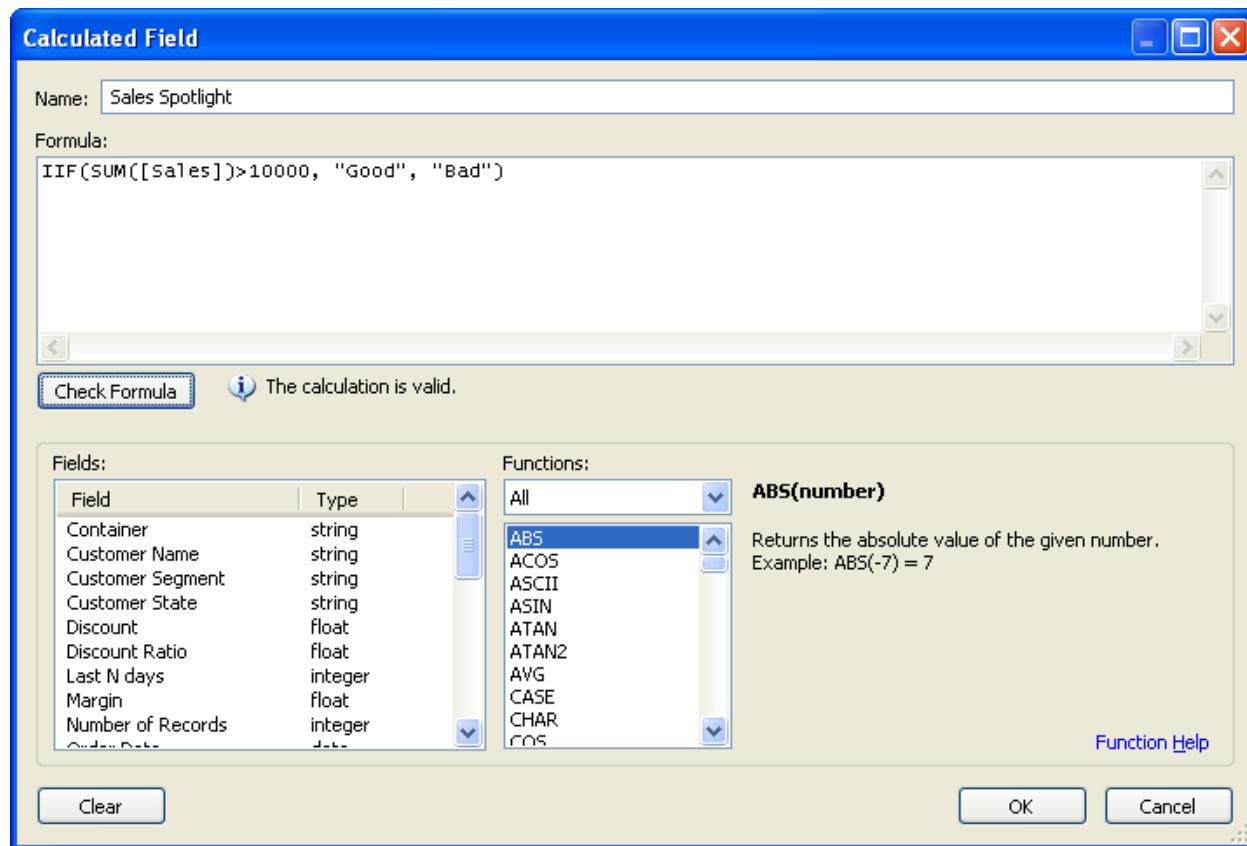
A view using the new aggregate measure is shown below.



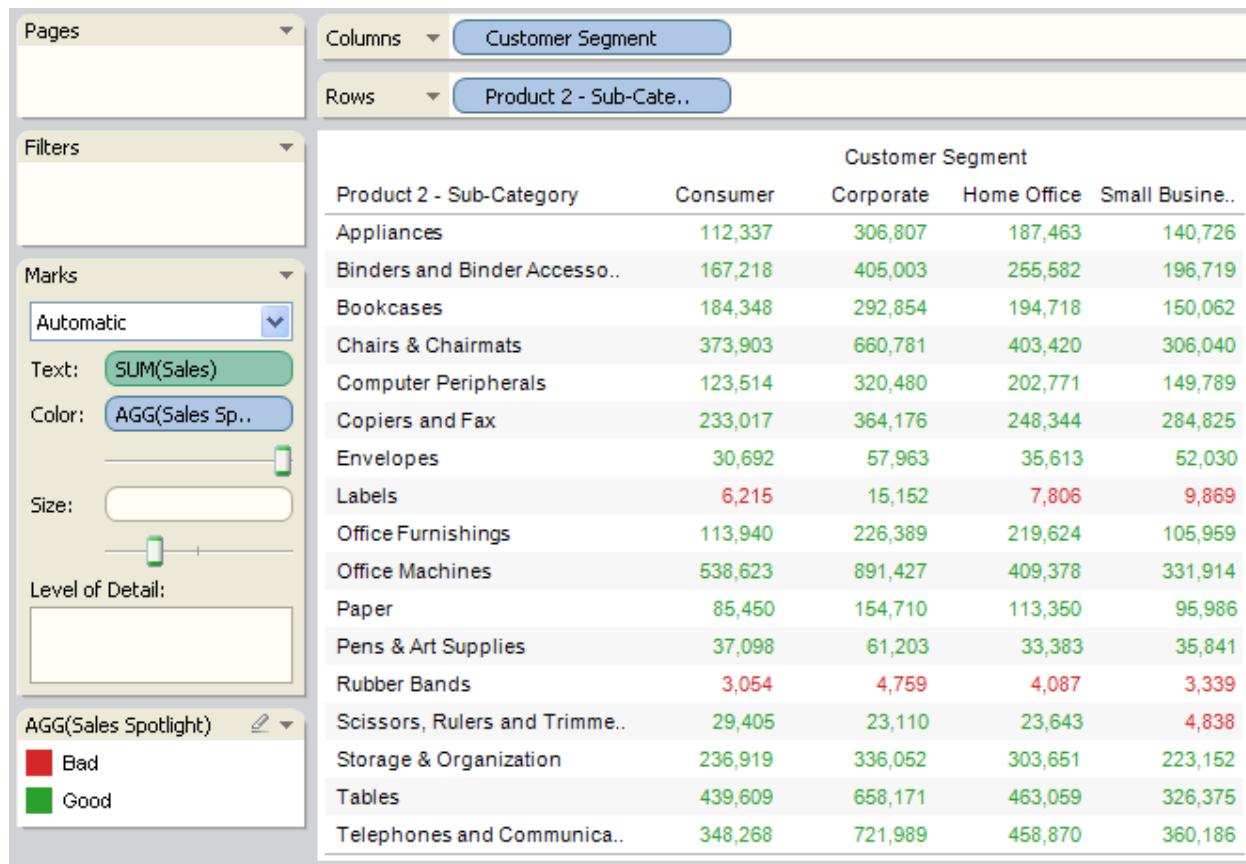
*When Margin is placed on a shelf, its name is automatically changed to AGG(Margin), which indicates it's an aggregate calculation. Additionally, the field's context menu does not include any aggregation choices because aggregating a field that's already aggregated is not possible.*

## Example - Spotlighting Using Calculations

*Spotlighting is a term that applies a calculation that shows discrete thresholds based on the values of a measure. For instance, you might want to color-code sales so that those over 10,000 appear green and those below 10,000 appear red. A spotlighting calculation is just a special case of a calculation that results in a discrete measure. A discrete measure is a calculation that is a dependent variable (and therefore a measure), but which results in a discrete result (as opposed to a continuous result). Thus the name discrete measure. Here is an example:*



*The formula in this example defines a discrete measure called “Sales Spotlight.” Discrete measures always appear with a blue “abc” icon in the Data window. The example above is a measure because it is a function of another measure. It’s discrete because it produces discrete values (“Good” and “Bad”) as a result rather than continuous values like numbers. Here is an example of this categorical measure in use:*



Here the “sales spotlight” field is on the Color Shelf. It appears with the “AGG” prefix because it is an aggregate calculation. Values above 10,000 and below 10,000 are assigned different colors. This type of discrete highlighting is often called spotlighting.

## Table Calculations

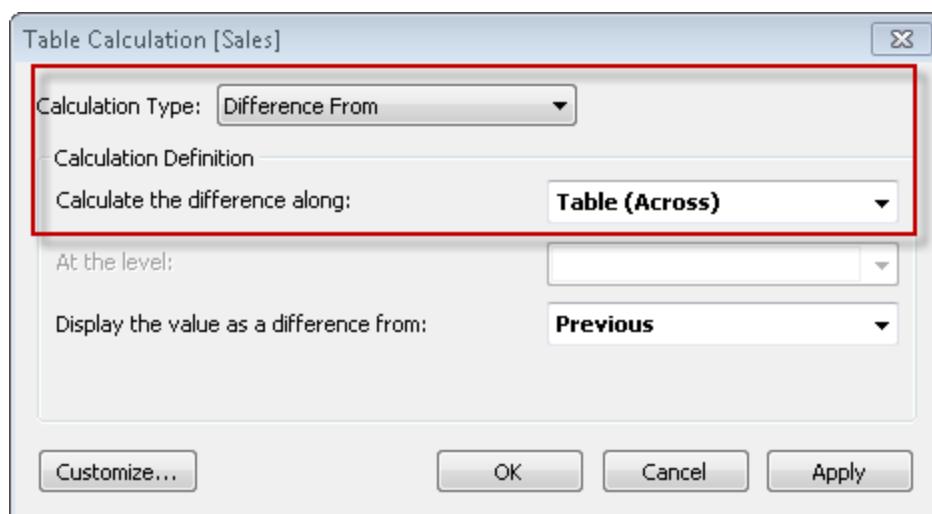
### Table Calculations

- [Understanding Table Calculations](#)
- [Quick Table Calculations](#)
- [Defining Basic Table Calculations](#)
- [Secondary Table Calculations](#)
- [Customizing Table Calculations](#)

## Understanding Table Calculations

### Understanding Table Calculations

*Table calculations are computations that are applied to the values in the table. These computations are unique in that they use data from multiple rows in the database to calculate a value. To create a table calculation, you need to define both what you want to compute and what to compute along. For example, when defining a running sum calculation for several years you are computing a running sum along the Date field. These are defined in the calculated field dialog box using the Calculation Type and Calculate Along drop-down menus.*



*The definition of what to compute along has two parts: addressing fields and partitioning fields.*

- [Addressing and Partitioning](#)

## Addressing and Partitioning

The addressing fields define what part of the table you are computing along. The partitioning fields define how to group the calculation. In the example of a running sum of product sales across several years, the addressing field is the Date field while the partitioning field is the product field. When you'd define the addressing for a table calculation, all the other fields are used for partitioning.

You can specify the addressing in the Table Calculation dialog box. The addressing can be relative to the table structure or a specific field. Each addressing option is described below.

### Table (Across)

This option sets the addressing to compute along the entire table moving horizontally through each partition. For example, the view below shows quarterly sales by region and product category. When a calculation addressing is set to Table Across, the fields that span horizontally across the table are the addressing fields (Category and Region). All the other fields (Year, Quarter) are partitioning. The addressing fields are shown in orange while partitioning fields are shown in blue.

		Category / Region							
Year of Order Date	Quarter of Order Date	Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

That means that each partition will be the combination of Year and Quarter.

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
Central	East	South	West	Central	East	South	West		
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

Partition  
1  
2  
...  
...

### Table (Down)

This option sets the addressing to compute along the entire table moving vertically through each partition. For example, the same view from above is shown below with the addressing set to compute along Table Down. The fields that span vertically (Year, Quarter) are now the addressing fields and the rest of the fields are partitioning (Category and Region). The addressing fields are shown in orange while partitioning fields are shown in blue.

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

That means that each partition is the combination of Category and Region.

Year of Order Date	Quarter of Order Date	Category / Region					Office Supplies		
		Central	East	Furniture	South	West	Central	East	South
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

Partition    1    2    ...

### Table (Across then Down)

This option sets the addressing to compute across the entire table horizontally and then down the table vertically. This means that both the fields that span across the table and down the table are addressing fields.

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

That means that the entire table is the partition. The computation will compute across, move to the next row and continue to compute across, and so on.

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,039	\$41,043	\$54,162	\$98,604	\$69,730	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

### Partition 1

#### *Pane (Across)*

*This option sets to compute across the pane horizontally. The fields that span across the pane horizontally are the addressing fields. However, the fields that separate the panes are now partitioning fields. In the example below Category becomes a partitioning field along with Year and Quarter. Region is the addressing field.*

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

*That means that the combination of Year, Quarter, and Category is the partition.*

		Category / Region							
Year of Order Date	Quarter of Order Date	Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	1 \$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	2 \$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

### Pane (Down)

This option sets the addressing to compute down the table within the pane. The fields that separate the pane (Category and Year) are partitioning fields. In addition, the Region field becomes a partitioning field while the Quarter field is the addressing field.

		Category / Region							
Year of Order Date	Quarter of Order Date	Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

That means that the combination of Year, Category, and Region is the partition.

Year of Order Date	Quarter of Order Date	Category / Region				Office Supplies			
		Central	Furniture	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

### *Pane (Across then Down)*

*This option sets the addressing to compute across within the pane, then move to the next row and continue to compute across. The addressing fields are both the fields that run across the table horizontally and down the table vertically (Region and Quarter). The partitioning fields are the fields that define the pane (Category and Year).*

Year of Order Date	Quarter of Order Date	Category / Region				Office Supplies			
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

*That means that the combination of Category and Year make up the partition.*

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,039	\$41,043	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,630	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

### Cell

This option sets the addressing to the individual cells in the table. All fields become partitioning fields. This option is generally most useful when computing a percent of total calculation.

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

That means that the partition is the combination of Category, Region, Year, and Quarter.

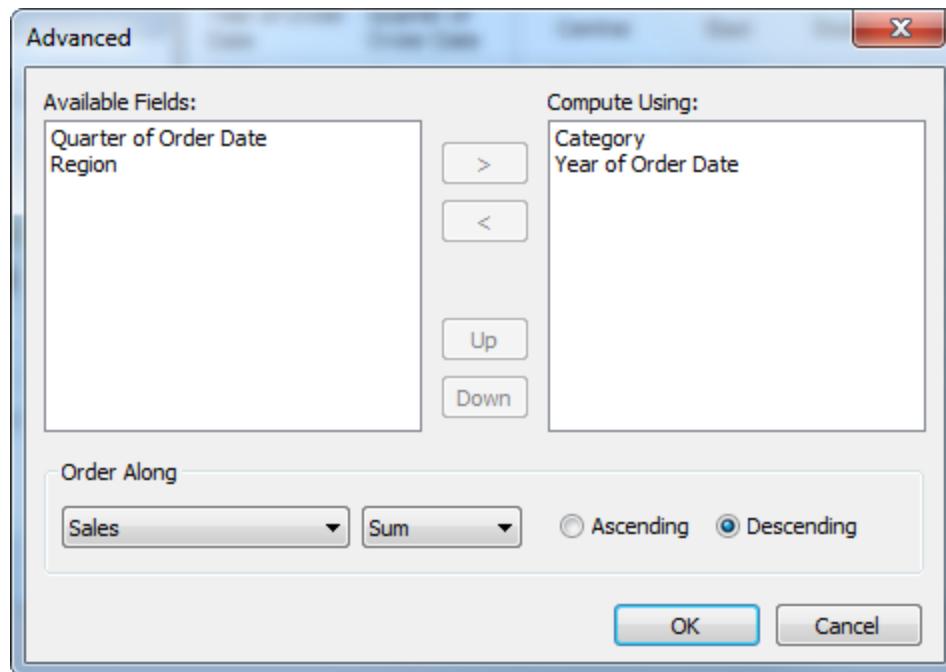
Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$51,839	\$41,343	\$53,162	\$43,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

## Individual Fields

This option sets the addressing to compute across the field you specify. The benefit of this option is that you get absolute control over how the calculation will be computed. Be careful though, because, addressing on an individual field means that when you rearrange the table, the calculation may no longer match the table structure.

## Advanced

The advanced option lets you specify multiple fields to act as the addressing fields. When you select Advanced another dialog box opens where you can specify one or more fields to act as addressing fields. Then you can specify how to order those fields.



For example, in the view below the addressing fields are set to Category and Year. These are ordered by SUM(Sales) Descending. That means that the combination of Quarter and Region create the partition. Q1 Central exists four times in the table, and that is the partition.

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,402	\$104,157	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$43,478	\$107,494	\$69,127	\$66,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

Because the order is set to SUM(Sales), the calculation is computed based on their SUM(Sales) values from highest to lowest.

Year of Order Date	Quarter of Order Date	Category / Region							
		Furniture				Office Supplies			
		Central	East	South	West	Central	East	South	West
2008	Q1	\$54,839	\$41,843	\$54,162	\$98,604	\$69,738	\$20,531	\$38,466	\$85,317
	Q2	\$71,341	\$56,705	\$103,741	\$103,660	\$43,070	\$38,547	\$65,251	\$108,219
	Q3	\$104,219	\$78,408	\$91,407	\$56,204	\$70,649	\$29,540	\$80,171	\$68,221
	Q4	\$41,478	\$107,494	\$89,127	\$85,453	\$64,378	\$44,255	\$23,944	\$52,238
2009	Q1	\$41,344	\$77,462	\$29,104	\$66,449	\$62,809	\$58,498	\$28,940	\$47,086
	Q2	\$78,894	\$64,045	\$163,505	\$69,963	\$46,951	\$21,775	\$66,439	\$50,694
	Q3	\$157,720	\$39,988	\$75,475	\$82,548	\$65,696	\$53,205	\$72,427	\$43,299
	Q4	\$74,210	\$77,246	\$49,308	\$44,382	\$87,564	\$65,831	\$34,448	\$87,042

## Quick Table Calculations

You can add common table calculations to your view using the Quick Table Calculations menu item on the field context menus. These quick calculations are predefined table calculations based on the most common scenarios.

**To add a quick table calculation:**

1. Right-click the measure you want to use in the table calculation and select Quick Table Calculation.
2. On the sub-menu select one of the following options:
  - *Running Total*
  - *Difference*
  - *Percent Difference*
  - *Percent of Total*
  - *Moving Average*
  - *Year to Date (YTD) Total*
  - *Compound Growth Rate (CAGR)*
  - *Year over Year Growth*
  - *Year to Date (YTD) Growth*

After adding the quick table calculation to the view, you can edit the definition by selecting Edit Table Calculation on the field's context menu.

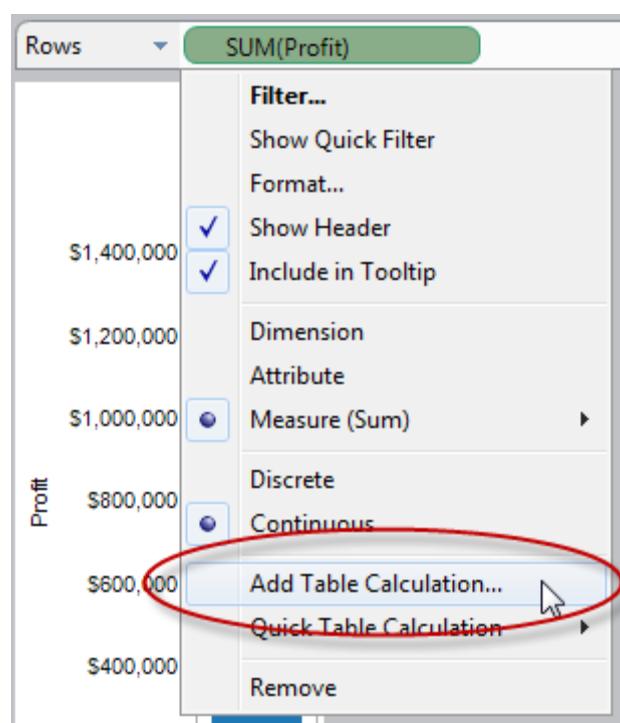
## Defining Basic Table Calculations

### Defining Basic Table Calculations

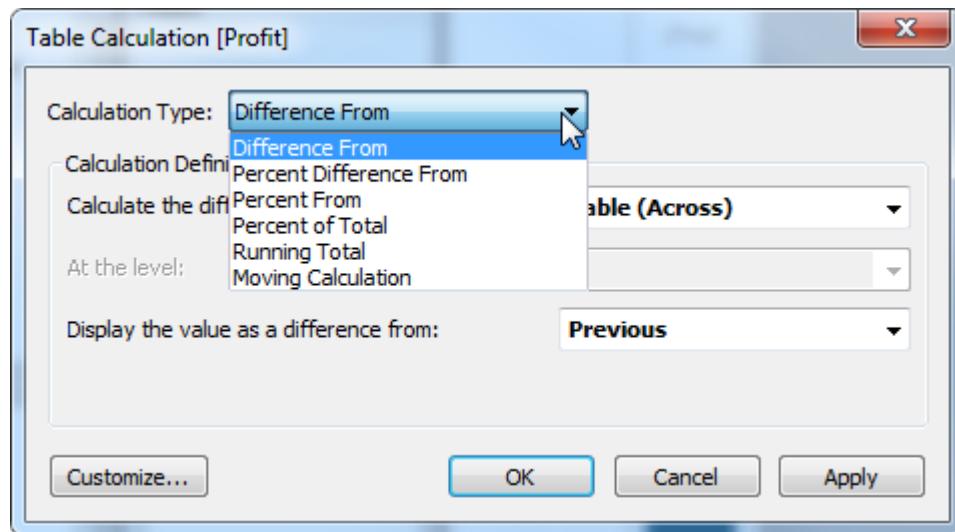
When you add a *Table Calculation* to the view, you need to specify the parameters that define the formula used in the computation. All of these parameters are set in the *Table Calculation* dialog box.

**To manually define a table calculation:**

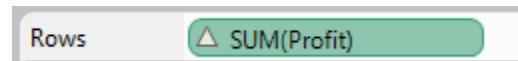
1. Right-click the measure you want to use in the computation and select *Add Table Calculation*.



2. In the *Table Calculation* dialog box, select one of the types of calculations from the drop-down menu at the top.



3. Define the formula using the drop-down lists in the bottom half of the dialog box. Learn more about how to define each type of calculation by selecting it in the list above.
4. When finished click OK. The measure is now marked as a table calculation and all the relevant values in the view are computed using the table calculation.



- [Difference From Calculation](#)
- [Percent Difference From Calculation](#)
- [Percent From Calculation](#)
- [Running Total Calculation](#)
- [Moving Calculation](#)

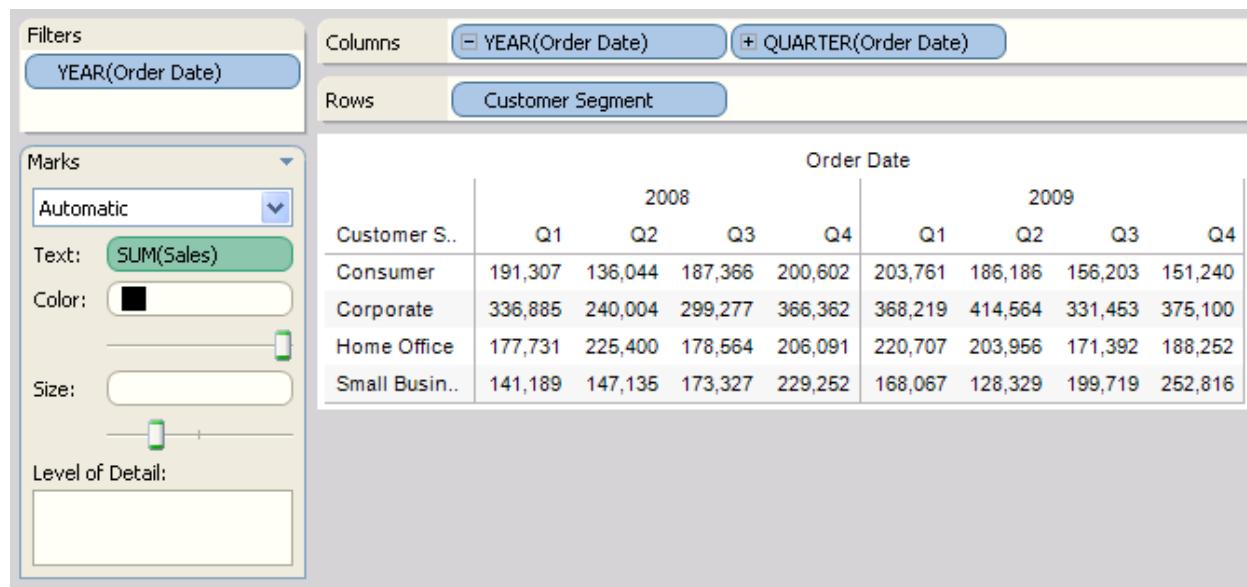
## Difference From Calculation

*Use this type of calculation to compute the difference between two specified values in the table along a certain dimension. For example, compute the difference between 2006 and 2007 quarterly sales for four different customer segments.*

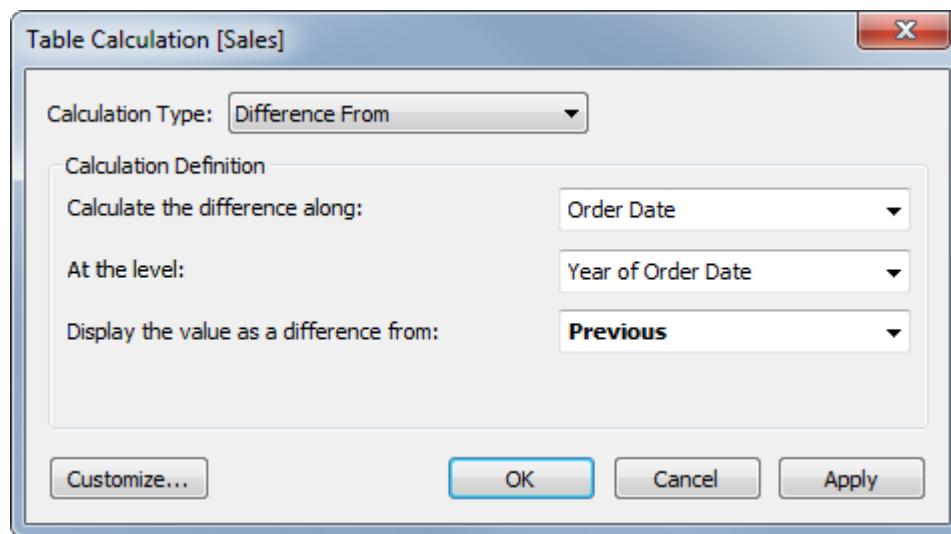
*When defining a Difference From calculation, you need to specify a dimension or table structure to compute across, the dimension level to use in the computation (this is only required if you are computing across a dimension), and a value to compare the current value to. The following is an example of a Difference From calculation.*

### Example: Difference From Calculation

*The table below shows the 2006 and 2007 quarterly sales numbers for several different customer segments of a superstore.*



*To compute the difference between 2008 and 2009 sales, you can define a table calculation using the definition shown below.*



The difference is calculated along the Order Date dimension at the level of year because we are comparing 2008 sales to 2009 sales. The table now displays the difference between each quarter in 2009 and the corresponding quarter in the previous year. Notice that there are no values for 2008. That's because there are no previous years to compute the difference from. You can hide that column without affecting the calculation.

Customer S..	2008				2009			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Consumer					12,454	50,141	-31,163	-49,362
Corporate					31,334	174,560	32,176	8,738
Home Office					42,976	-21,444	-7,172	-17,839
Small Busin..					26,878	-18,807	26,392	23,564

The view below may be more clear. It shows both the Difference From calculation and the Total Sales (before the computation). You can see that in the first quarter of 2009

the total sales was \$203,761 while in the same quarter in 2008 the total sales was \$191,307. The difference between these two values is \$12,454.

Columns		+ QUARTER(Order Date)		Measure Names							
Rows		Customer Segment		+ YEAR(Order Date)							
		Order Date									
		Q1		Q2		Q3		Q4			
Customer Segment	Year of Order Date	Sum of Sales	Difference in Sum of Sales	Sum of Sales	Difference in Sum of Sales	Sum of Sales	Difference in Sum of Sales	Sum of Sales	Difference in Sum of Sales	Sum of Sales	Difference in Sum of Sales
Consumer	2008	191,307		136,044		187,366		200,602			
	2009	203,761	12,454	186,186	50,141	156,203	-31,163	151,240	-49,362		
Corporate	2008	336,885		240,004		299,277		366,362			
	2009	368,219	31,334	414,564	174,560	331,453	32,176	375,100	8,738		
Home Office	2008	177,731		225,400		178,564		206,091			
	2009	220,707	42,976	203,956	-21,444	171,392	-7,172	188,252	-17,839		
Small Business	2008	141,189		147,135		173,327		229,252			
	2009	168,067	26,878	128,329	-18,807	199,719	26,392	252,816	23,564		

### Note:

You can add a Difference From calculation to your view quickly by right-clicking the measure you want to use in the computation and selecting Quick Table Calculations > Difference. This quick calculation computes the difference between values across rows where each difference is calculated against the previous value. Refer to [Quick Table Calculations](#).

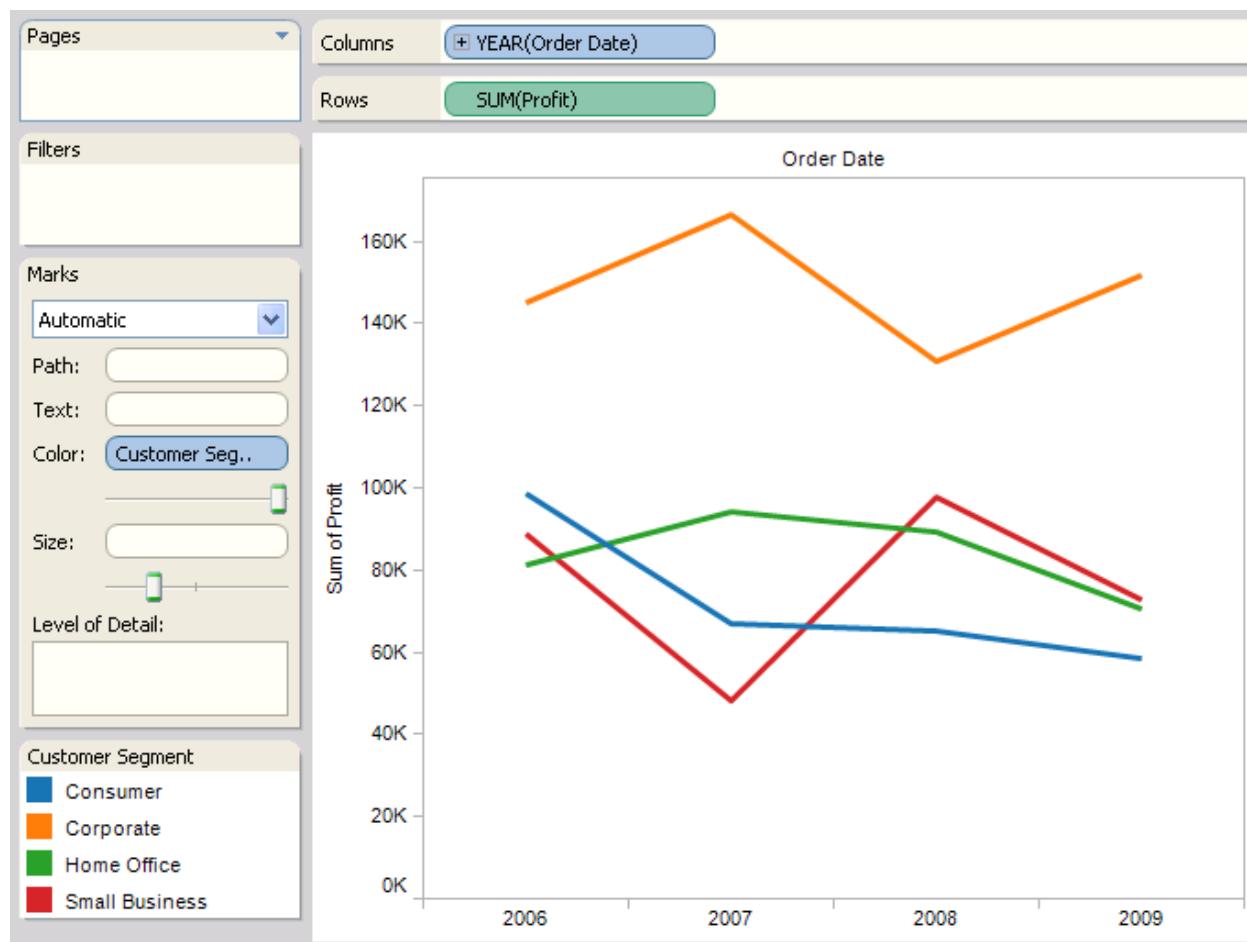
## Percent Difference From Calculation

Use this type of calculation to display the rate of change between two specified values in the table by computing the difference as a percentage. A common use of this type of calculation is to compute the percent gain year after year (CAGR).

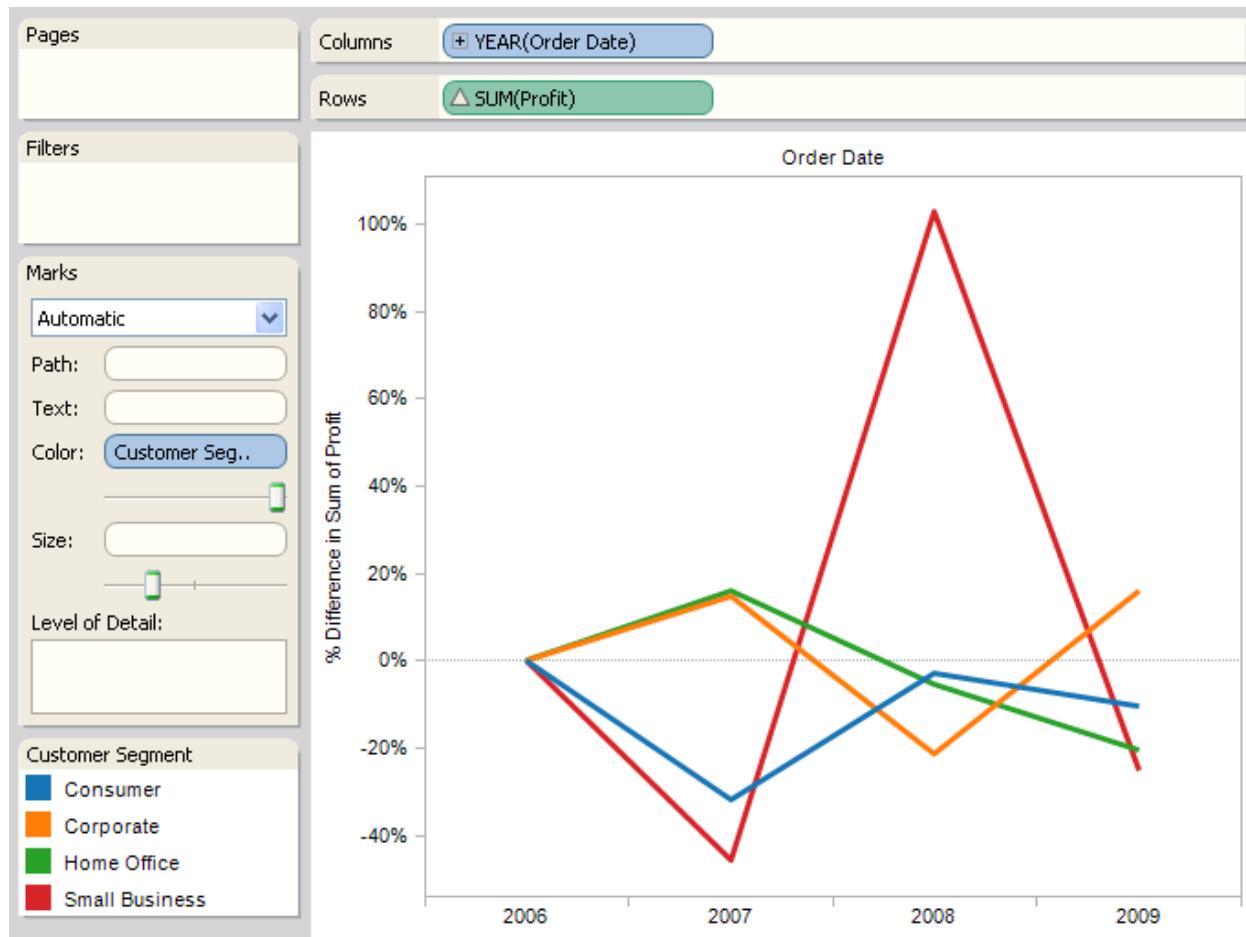
Similar to the Difference From calculation, to define a Percent Difference From calculation you need to specify a dimension or table structure to compute across, the dimension level to use in the computation (this is only required if you are computing across a dimension), and a value to compare the current value to. The following is an example of a Percent Difference calculation.

### Example: Percent Difference From Calculation

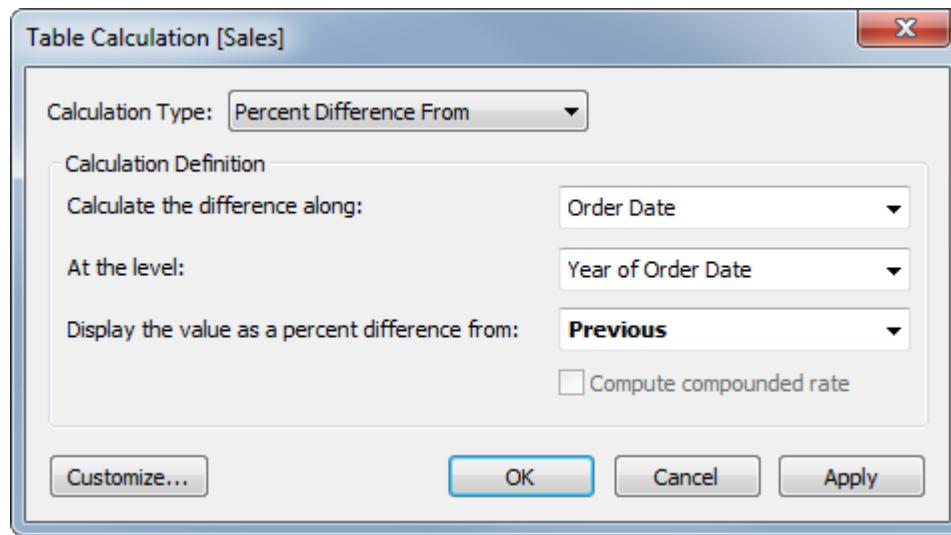
The table below shows the profit for several customer segments over four years. Looking at the view, we can see that there was a drop in profit in the Small Business and Consumer segments in 2007.



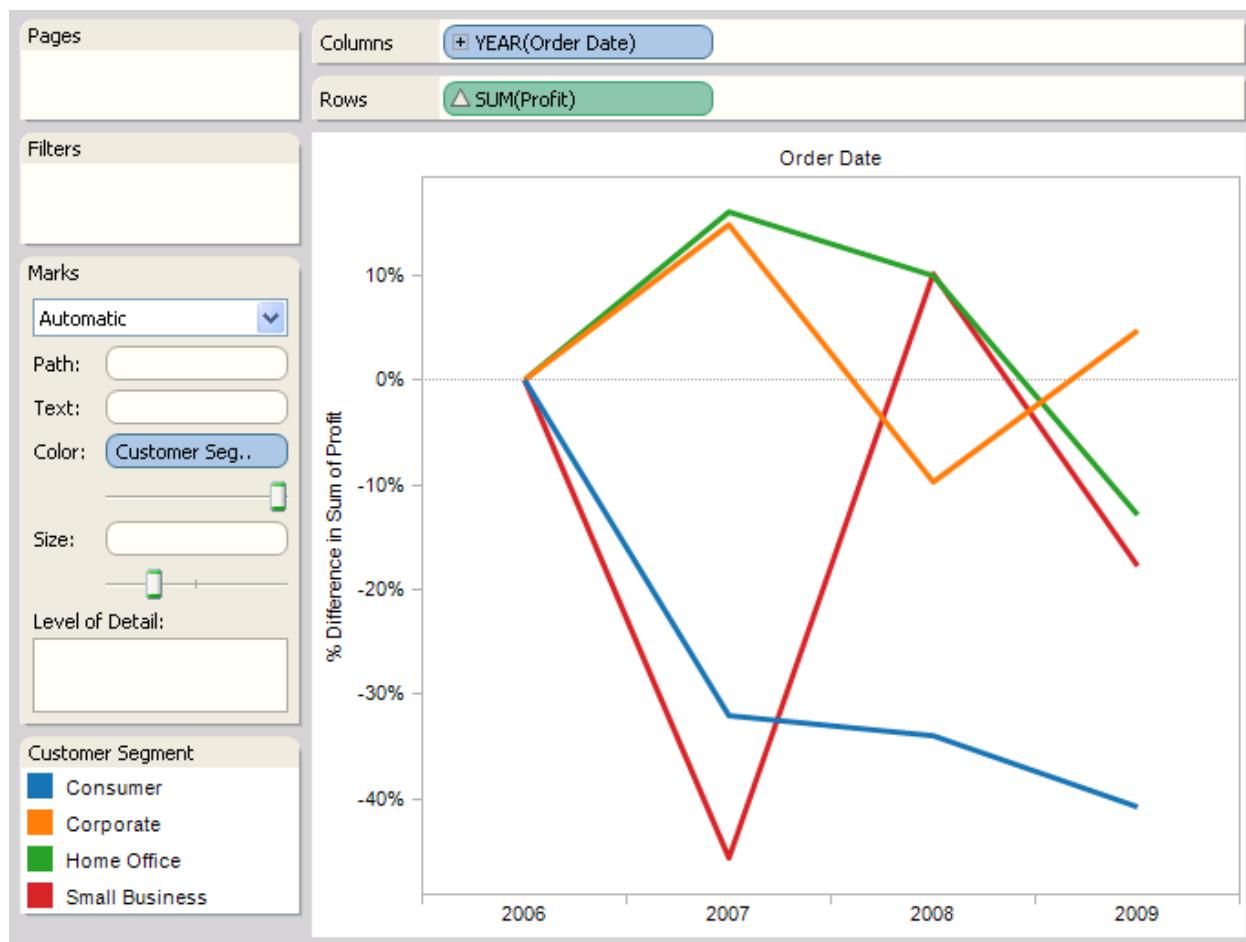
When we view this same view using a Percent Difference From calculation, it becomes clear that Small Business segment rebounded quite dramatically in 2008.



You can define a Percent Difference From calculation like this using the table calculation definition shown below.



*The difference is calculated along the Order Date dimension at the Year level because we are comparing year after year profit. Each value in the view is a difference of the previous year. The view below shows each year as a difference of 2006 Profit. You can see that the Corporate segment is the only one to be above the 2006 profits in 2009.*

**Note:**

*Percent Difference From calculations are commonly used to calculate compound growth rates and year over year growth. You can quickly add these calculations by right-clicking the measure you want to use in the calculation and selecting the calculation on the Quick Table Calculation sub-menu. Refer to [Quick Table Calculations](#).*

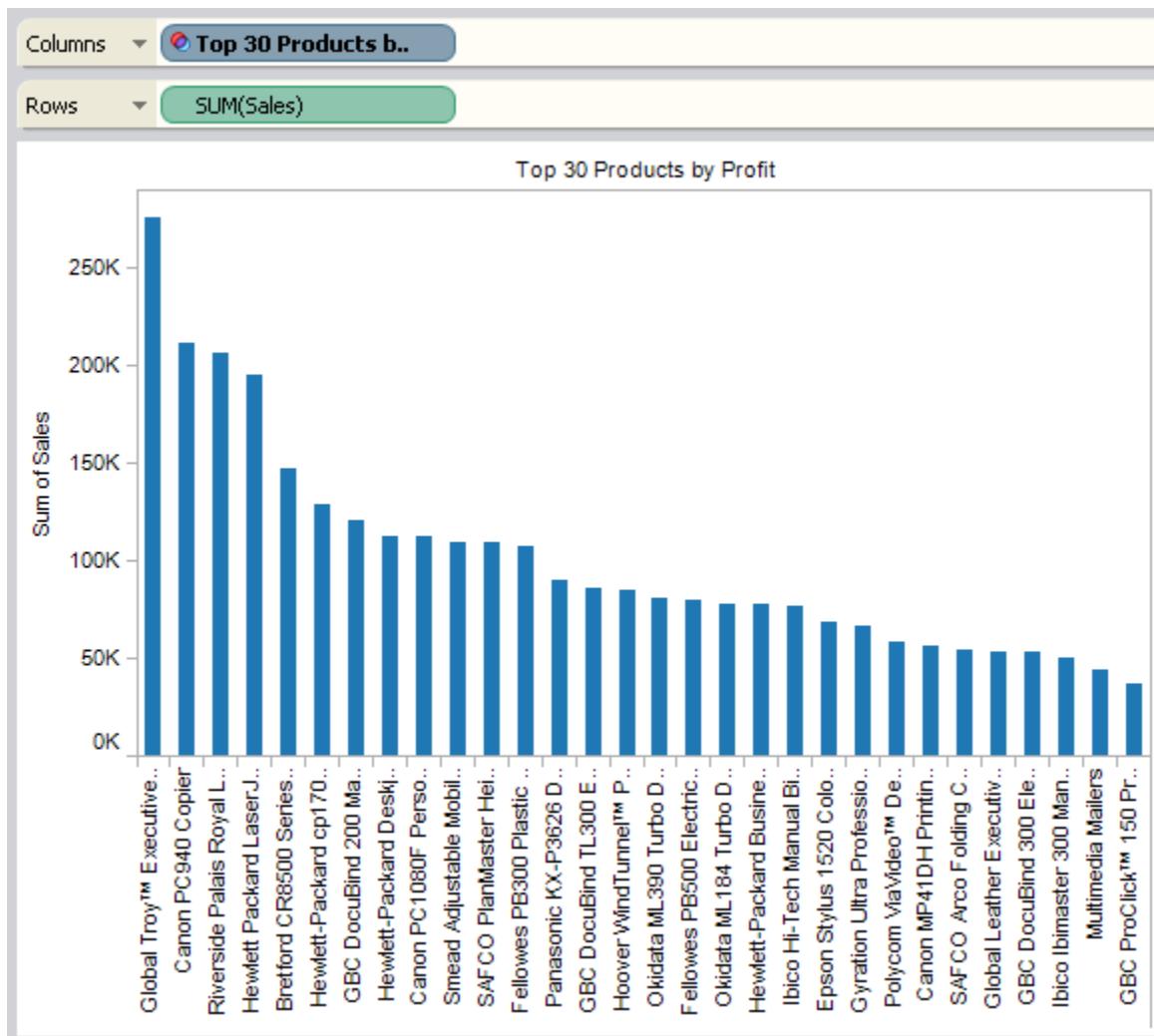
## **Percent From Calculation**

*A Percent From calculation is similar to the Percent Difference From calculation in that you can use it to compute the change between two values as a percentage. However, this type of calculation computes an absolute change. For example, use the Percent From calculation to compare the sales performance of several products.*

*When you define a Percent From calculation you need to specify a table structure or dimension to calculate the percentage from. If you select a dimension, you also need to select a level. Finally, you need to select a value that each value in the table will be displayed as a percentage of. The following is an example of a Percent From calculation.*

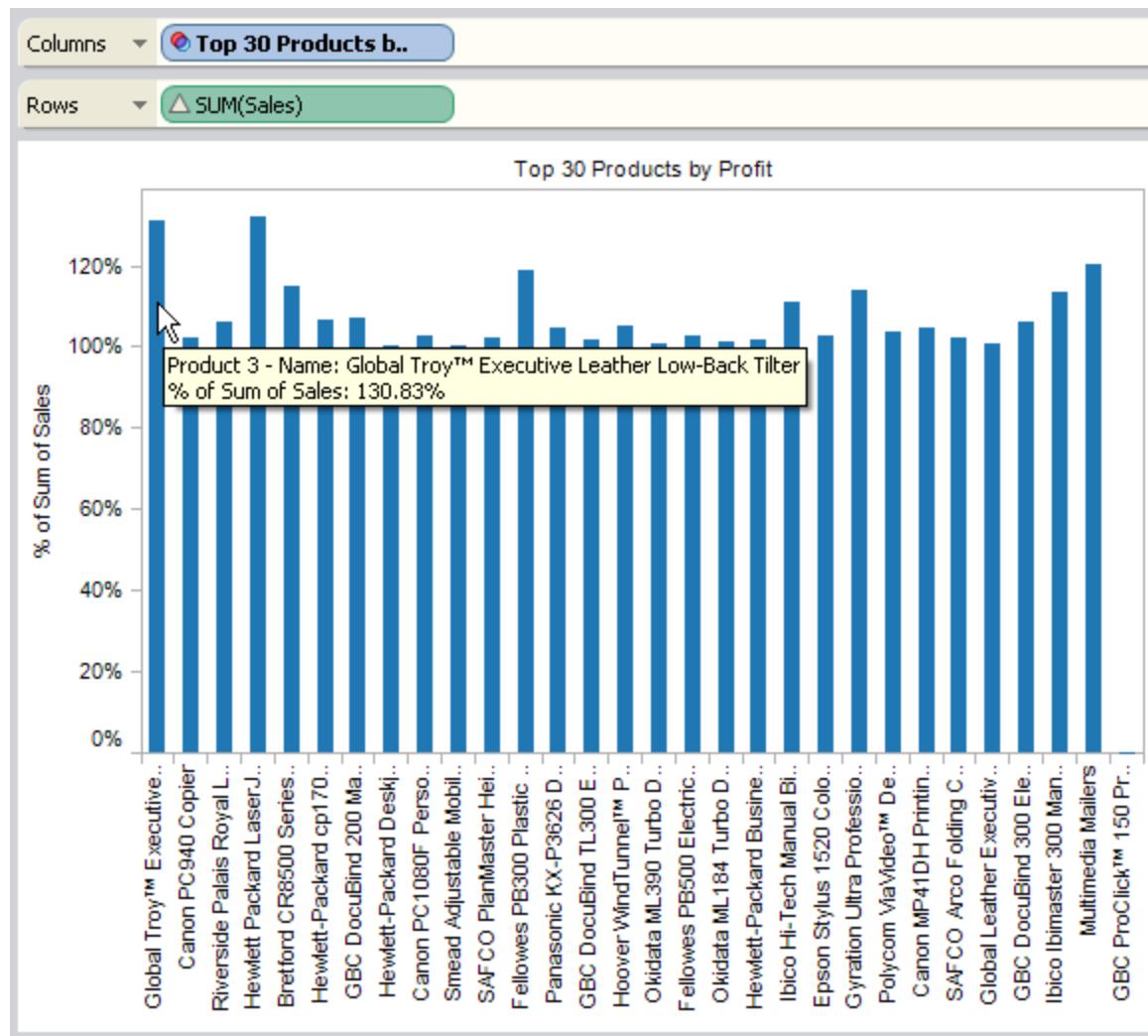
### **Example: Percent From Calculation**

*The view below shows the sales of the top thirty products by profit at a superstore. You can see that the top selling product is the Global Troy Executive Leather chair.*

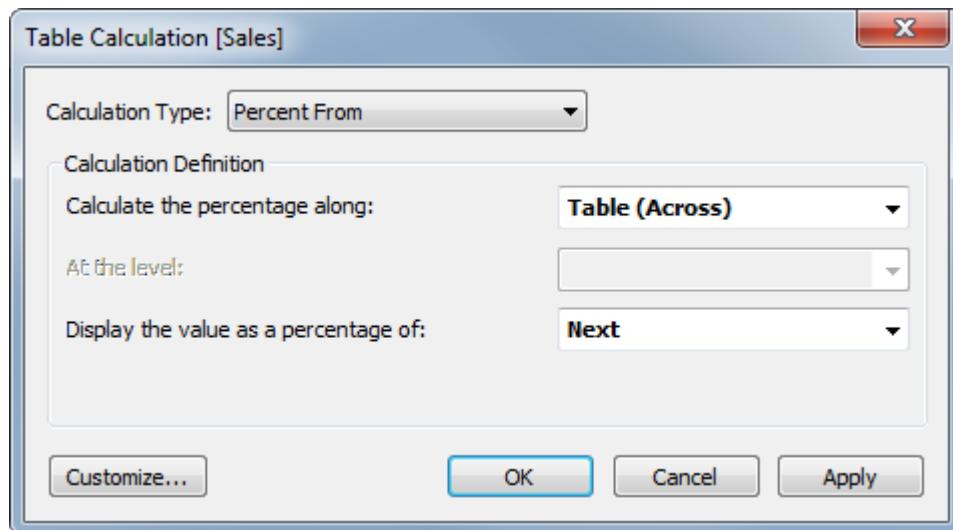


While it is generally clear how each product is performing when compared to the next in terms of sales, you can use a Percent From calculation to compute just how much better each product is from the next. The view below has this type of calculation placed on the text shelf. Each mark is labeled with the percentage it is of the next product in the list. You can now see that the Leather Chair is 130% better in terms of sales than the Canon Copier.

## Tableau Desktop Help



*This table calculation was computed using the definition shown in the dialog box below. The percentage is calculated across the rows and each product is displayed as a percentage of the next product.*



## Running Total Calculation

Use the *Running Total* calculation to compute a cumulative total across a dimension or table structure. For example, you can use this type of calculation to calculate the cumulative sales for each quarter for several years.

When you define a running total calculation, you need to specify an aggregation to use when summarizing the values. For example, the most common aggregation will be sum so you can see the summation of values, but sometimes you may want to use average or another aggregation. You also need to specify the dimension to compute a running total across. This can either be an actual dimension in the data source or a table structure like rows or columns. Finally, you need to specify when to restart the at zero and begin totaling again. The following is an example of a *Running Total* calculation.

### Example - Running Total Calculation

The view below shows the total quarterly sales from 2006 to 2009.

The screenshot shows a Tableau data view with the following structure:

- Columns:** QUARTER(Order Date)
- Rows:** YEAR(Order Date)
- Table Headers:** Order Date, Year of Order.., Q1, Q2, Q3, Q4
- Data:**

Year of Order..	Q1	Q2	Q3	Q4
2006	1,249,502	874,001	1,017,316	1,049,104
2007	825,652	848,340	860,896	1,025,743
2008	847,112	748,583	838,533	1,002,307
2009	960,755	933,034	858,767	967,408

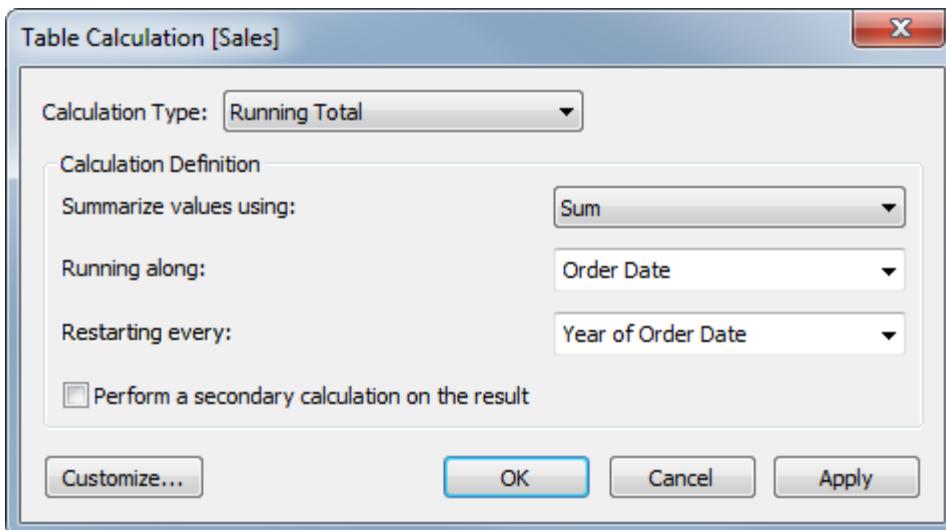
While it is useful to see each quarter's sales, you may also want to see the cumulative totals for each quarter in the year. To create this kind of view we can add a *Running Total* calculation. The view below shows the running totals for each quarter restarting at zero for each year. That means that the Quarter 4 shows the total sales for that year.

Columns **+ QUARTER(Order Date)**

Rows **+ YEAR(Order Date)** **Measure Names**

		Order Date			
Year of Order..		Q1	Q2	Q3	Q4
2006	Sales Total	1,249,502	874,001	1,017,316	1,049,104
	Running Total	1,249,502	2,123,503	3,140,819	4,189,923
2007	Sales Total	825,652	848,340	860,896	1,025,743
	Running Total	825,652	1,673,992	2,534,888	3,560,631
2008	Sales Total	847,112	748,583	838,533	1,002,307
	Running Total	847,112	1,595,695	2,434,228	3,436,536
2009	Sales Total	960,755	933,034	858,767	967,408
	Running Total	960,755	1,893,788	2,752,555	3,719,964

This calculation was defined by the formula shown below. We are summarizing values as a sum along the Order Date dimension restarting at zero every Year.



### Note:

You can add a Running Total calculation to your view easily using the Quick Table Calculations menu. Right-click the measure you want to use in the calculation and select Quick Table Calculations > Running Total. Refer to [Quick Table Calculations](#).

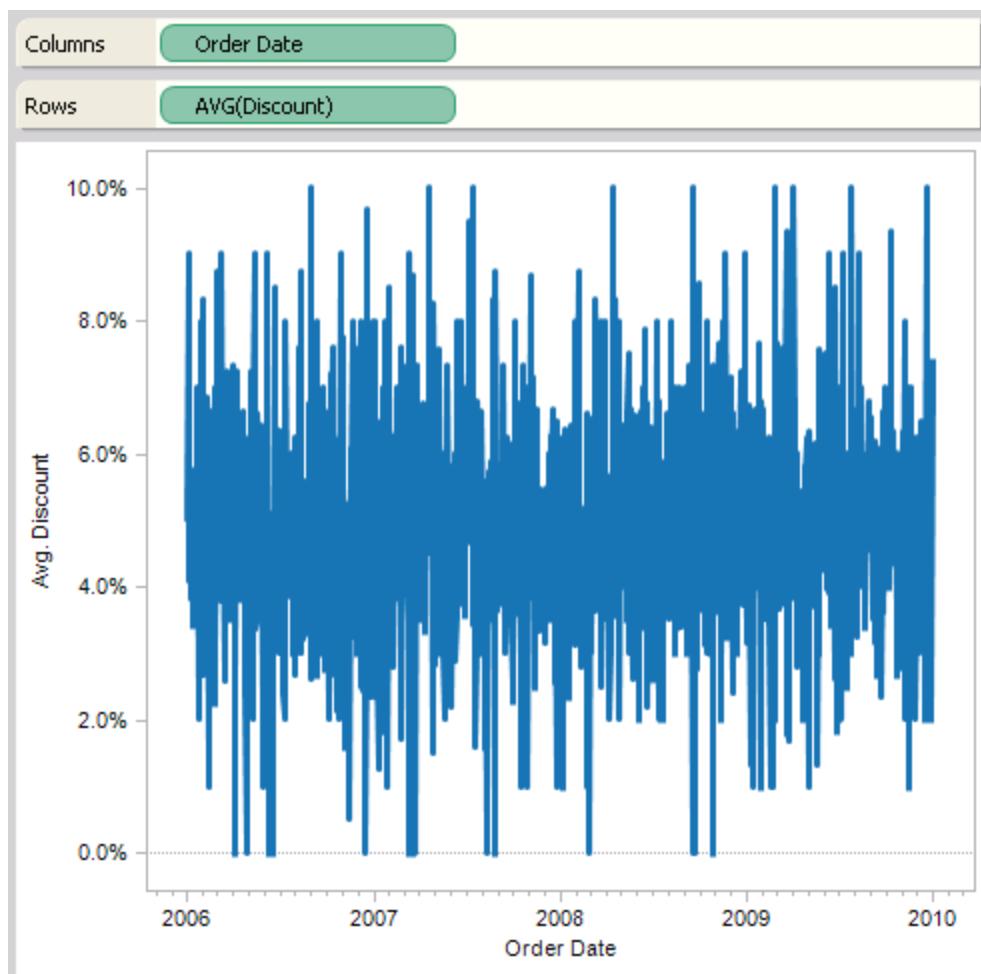
## Moving Calculation

A moving calculation is typically used to smooth short term fluctuations in your data so that you can see long term trends. A good example is when you are looking at securities data. There are so many fluctuations every day that it is hard to see the big picture through the daily ups and downs. You can use a moving calculation to define a range of values to summarize using an aggregation of your choice.

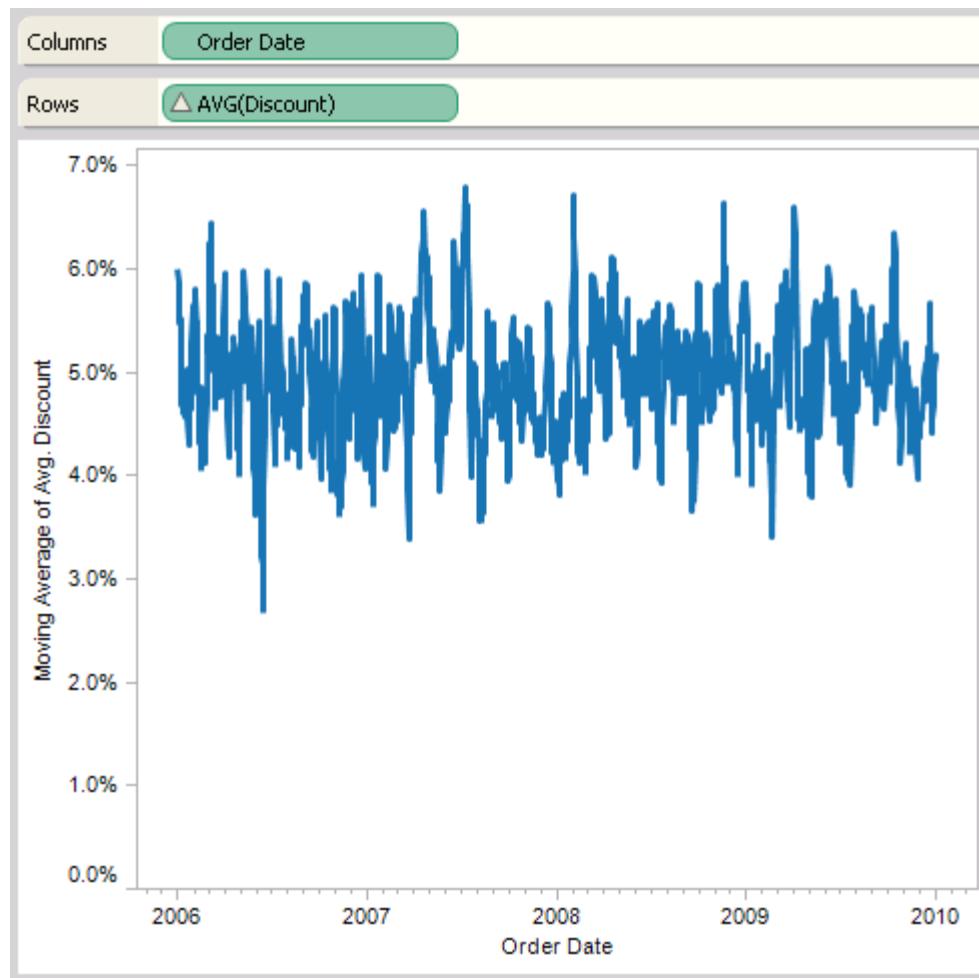
When you define a moving calculation you must first specify the aggregation you want to use when summarizing that data. The most common aggregation for this type of calculation is an average. Next you need to specify the dimension to summarize across. You can select a table structure such as Rows or Columns or an actual field in your data source. Once you have selected a dimension, define the number of values before the current value and the number of values after the current value to include in the summary. You can also decide whether to include the current value using the checkbox on the right. The following is an example of a Moving Calculation.

### *Example - Moving Calculation*

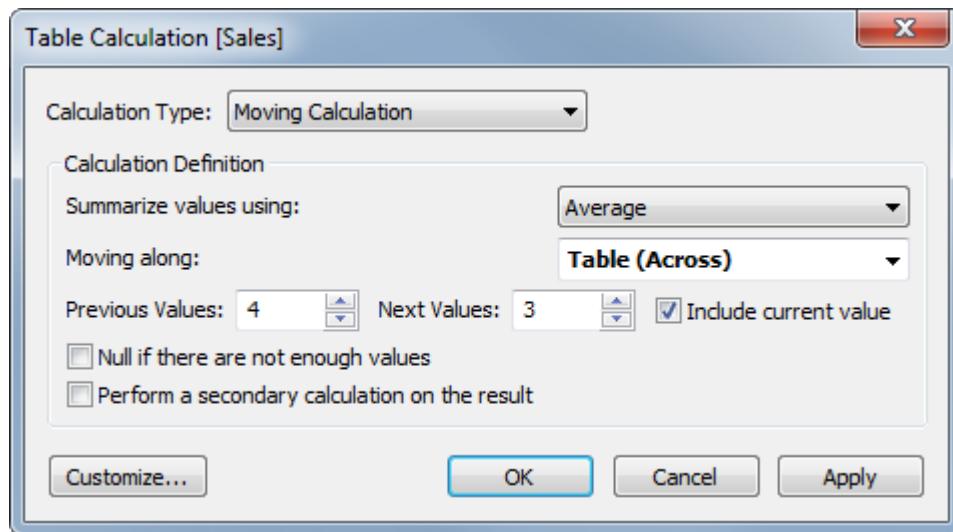
The view below shows the discounts given at a superstore along a continuous date axis. As you can see, it is very difficult to see any kind of trend in this view.



However, if you add a Moving Average, the view becomes much more manageable.



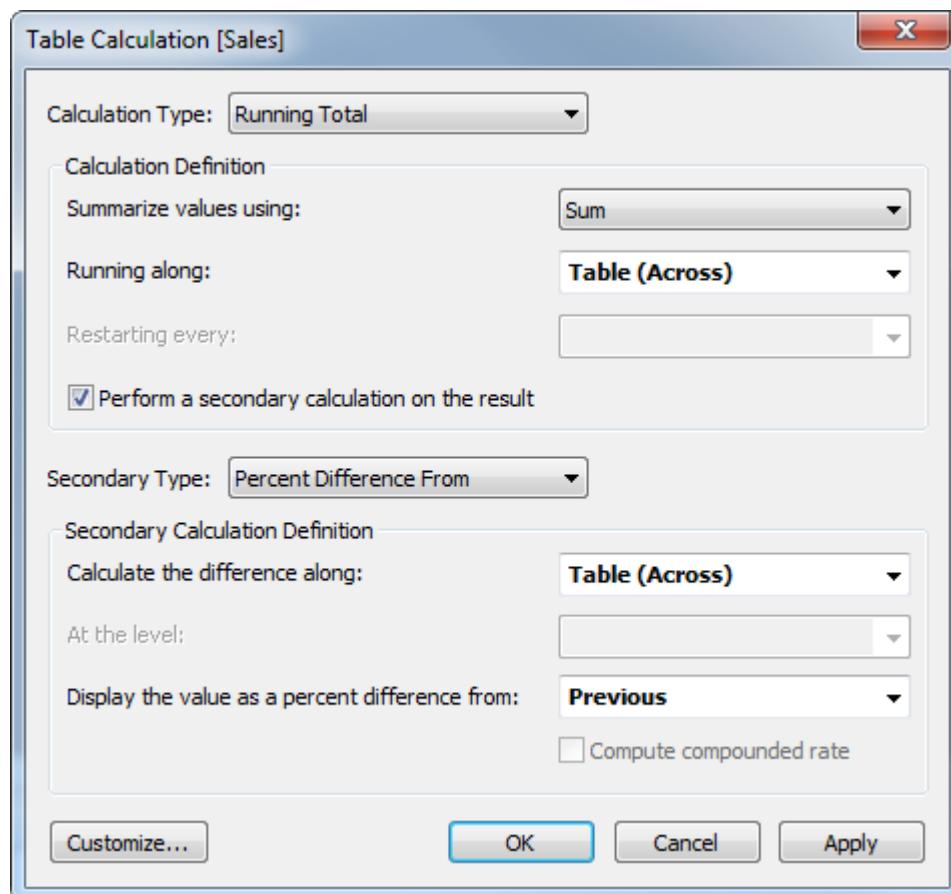
*This calculation was defined by the formula shown below. The values are summarized as an average along the rows in the view. Each value is an average of the seven days surrounding the current value (four days before and three days after). Note that we have opted to include the current value.*

**Note:**

You can add a Moving Average to your view quickly using the Quick Table Calculations menu. Right-click the measure you want to use in the calculation and select Quick Table Calculations > Moving Average. By default this quick calculation will add a moving average across the rows in the view, summarizing the previous two values including the current value. Refer to [Quick Table Calculations](#).

## Secondary Table Calculations

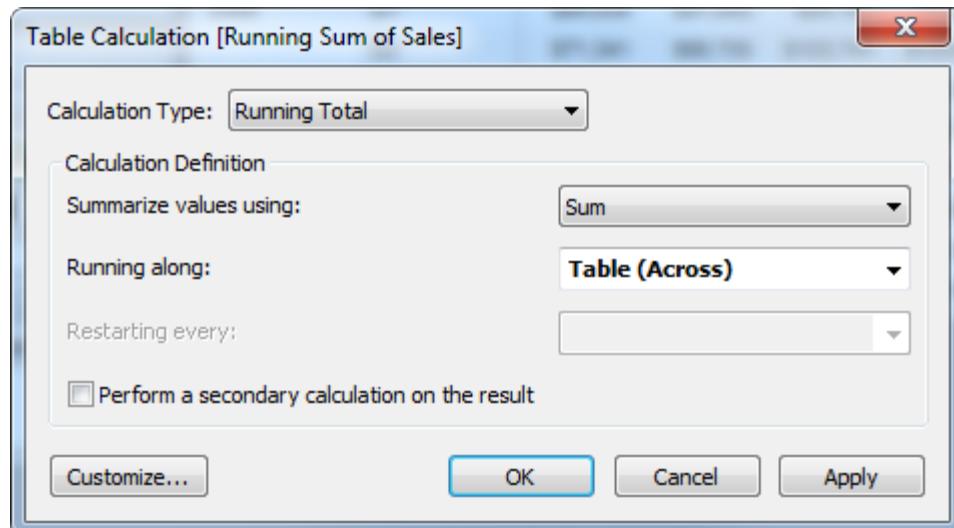
Table calculations can be very useful when you want to perform a calculation that applies to all of the data in the table. Most of the time you will only need to add a single calculation such as Difference From or Running Total. However, you may sometimes want to combine two calculations so that you perform one and then perform the next on the results. For example, when calculating the Year to Date Growth, you first need to calculate the cumulative totals and then calculate the percent difference each total is from the previous year. You can add a secondary calculation to Running Totals and Moving Calculations by selecting Perform secondary calculation on the result in the Table Calculation dialog box.



## Customizing Table Calculations

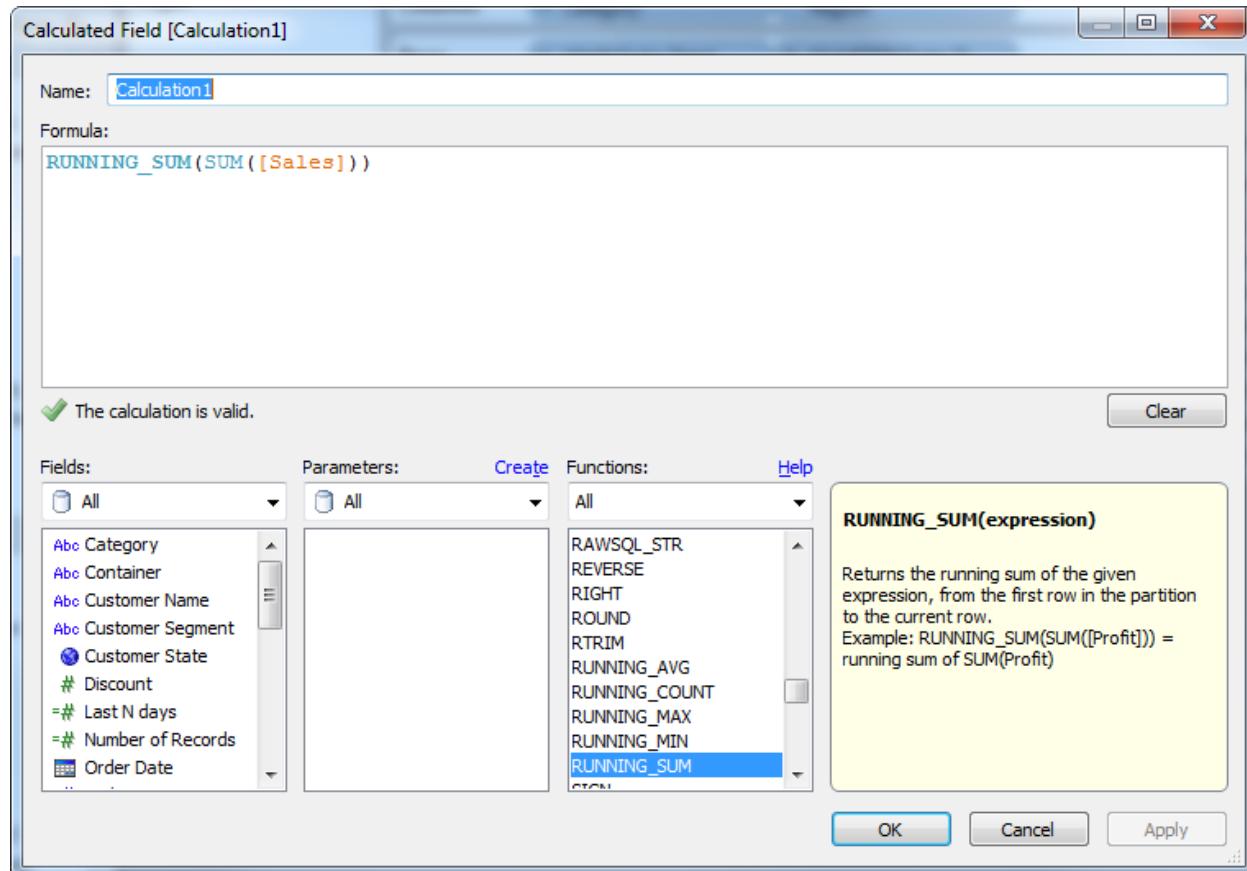
*Table calculations are a special type of calculated field that computes on the local data in Tableau. While you can use the built-in table calculations such as Percent of Total, Difference From, Running Total, and so on; the functions required to define these calculations are also available for use in your own custom calculated fields. Customizing table calculations allows you to compute values such as the difference in number of orders this quarter versus an average quarter, total sales for regions that have above average margin, time since first click on a website, average temperature based on the last three days weighted at 10%, 40%, and 50%, and so much more.*

*An easy way to become familiar with the Table Calculation functions is to add a basic table calculation and then click the Customize button in the lower left corner of the Table Calculation dialog box.*



*When you click Customize, the Calculated Field dialog box opens showing the formula for the calculation. You can see that it uses special functions.*

## Tableau Desktop Help



After you customize the calculated field, the changes are not saved until you click OK in the Calculated Field dialog box and in the Table Calculation dialog box. The new table calculation field is added to the Data window.

The screenshot shows the Tableau Data window with the 'Measures' shelf selected. The shelf lists various measures: Discount, Order Quantity, Product Base Margin, Profit, Profit Ratio, Sales, Sales Running Total, Shipping Cost, Time to Ship, Unit Price, Latitude (generated), and Longitude (generated). The 'Sales Running Total' measure is highlighted with a red oval.

When you use that field in other views, it uses the default addressing and partitioning specified when the table calculation was created. You can change the addressing by right-clicking the field and select an option on the Compare To context menu.

The screenshot shows a Tableau interface with a data view and a context menu open over a table calculation. The context menu is titled "Compute using" and includes options like "Edit Table Calculation..." and "Remove". A secondary menu is open to the right, titled "Compare To", listing various addressing options: Table (Across), Table (Down), Table (Across then Down), Table (Down then Across), Pane (Across), Pane (Down), Pane (Across then Down), Pane (Down then Across), Cell, Category, Order Date, and Region. The "Region" option is highlighted with a blue selection bar.

	Q2	71,341	128,045	231,1
Q3	104,219	182,627	274,1	
Q4	43,478	150,971	240,1	
2009	41,344	118,807	147,9	
	78,894	142,939	306,4	
	157,720	197,708	273,1	
	74,210	151,456	200,1	
Q1				

Sheet 1 /  
SUM of AGG(Sales Running Total): 20,184,233

Table calculation formulas must use aggregated data throughout the entire formula. When you are referring to a dimension in the formula you can use the `MIN([Dimension])` or `MAX([Dimension])` aggregations. However, this trick only works if the view is grouped by that dimension. That is, when there is a single dimension value for the row in question. For example, the view below shows several customer segments. Each segment corresponds to 4 regions. The `MIN([Region])` returns "Central" even though there are three other regions.

Customer Segment	Drop
Consumer	Central
Corporate	Central
Home Office	Central
Small Business	Central

You can instead use the ATTR([Dimension]) aggregation. When you use ATTR the dimension value is used when you are grouping by the dimension. If there are multiple values it shows an asterisk. Nulls are ignored. The same view is shown below using ATTR([Region]).

Customer Segment	Drop
Consumer	*
Corporate	*
Home Office	*
Small Business	*

The ATTR aggregation is especially useful when you are working with multiple data sources on a single sheet.

## Binned Data

Sometimes it's useful to organize the values of a measure into bins. For example, suppose you have a measure that holds the ages of customers ranging from 18 to 90. If you wanted to analyze how customer value breaks down by different age groups, you would bin the data. Also, to create a histogram you must first bin data.

In Tableau, bin data by highlighting a numeric dimension or measure in the Data window and selecting Create Bins from the context menu.

**Note:**

You can bin data only for relational data sources. This feature is not supported for multidimensional data sources.

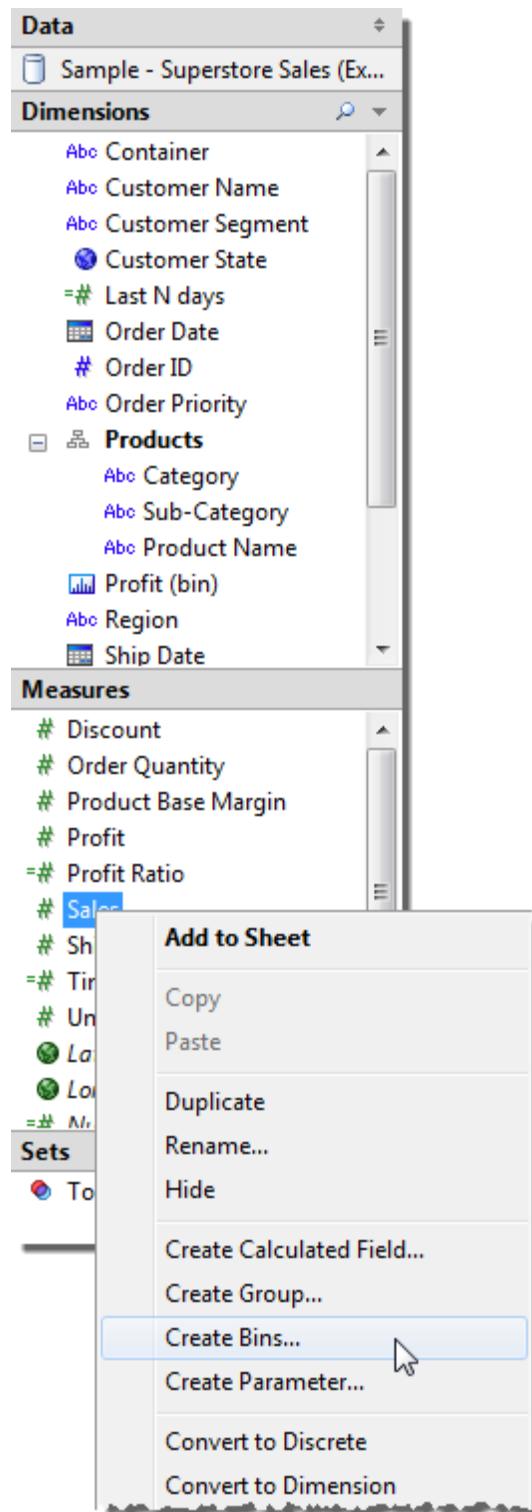
When you bin a measure you create a new dimension. That's because you are creating discrete categories out of a continuous range of values. The following example walks you through creating a histogram using binned data.

### *Example – Creating a Histogram with Binned Data*

Histograms are one way to display the distribution of values in a field. In Tableau, you can create a histogram by binning the values of a measure and then creating a view based on the measure and its binned values. This example uses the Sample - Superstore Sales data source.

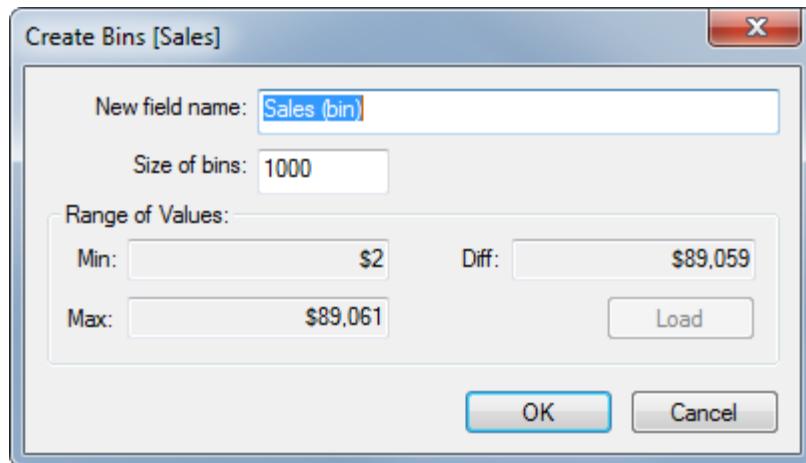
**To create a histogram based on binned data:**

1. Select the Sales measure in the Data window and select Create Bins on the right-click context menu.



2. Complete the Create Bins dialog box.

When you bin a measure, you create a new field. The new field is a binned version of the original field. Specify the name of the new field and the size of each bin. To help you determine the best bin size, press the Load button to display the range of values of the measure.



The binned field appears in the Dimensions area of the Data window because the bins are treated as discrete categories.

A screenshot of the Tableau Data window. On the left, there's a tree view under the heading "Products". The tree includes "Abc Category", "Abc Sub-Category", "Abc Product Name", "Profit (bin)" (with a small bar chart icon), "Abc Region", "Sales (bin)" (with a small bar chart icon and circled with a red oval), "Ship Date", "Abc Ship Mode", "Supplier", "Zip Code", and "Abc Measure Names". The "Sales (bin)" node is highlighted with a red oval.

3. Place the Sales measure on the Rows shelf.

*The measure is automatically aggregated as a summation, and an axis is created with a label given by the field name.*

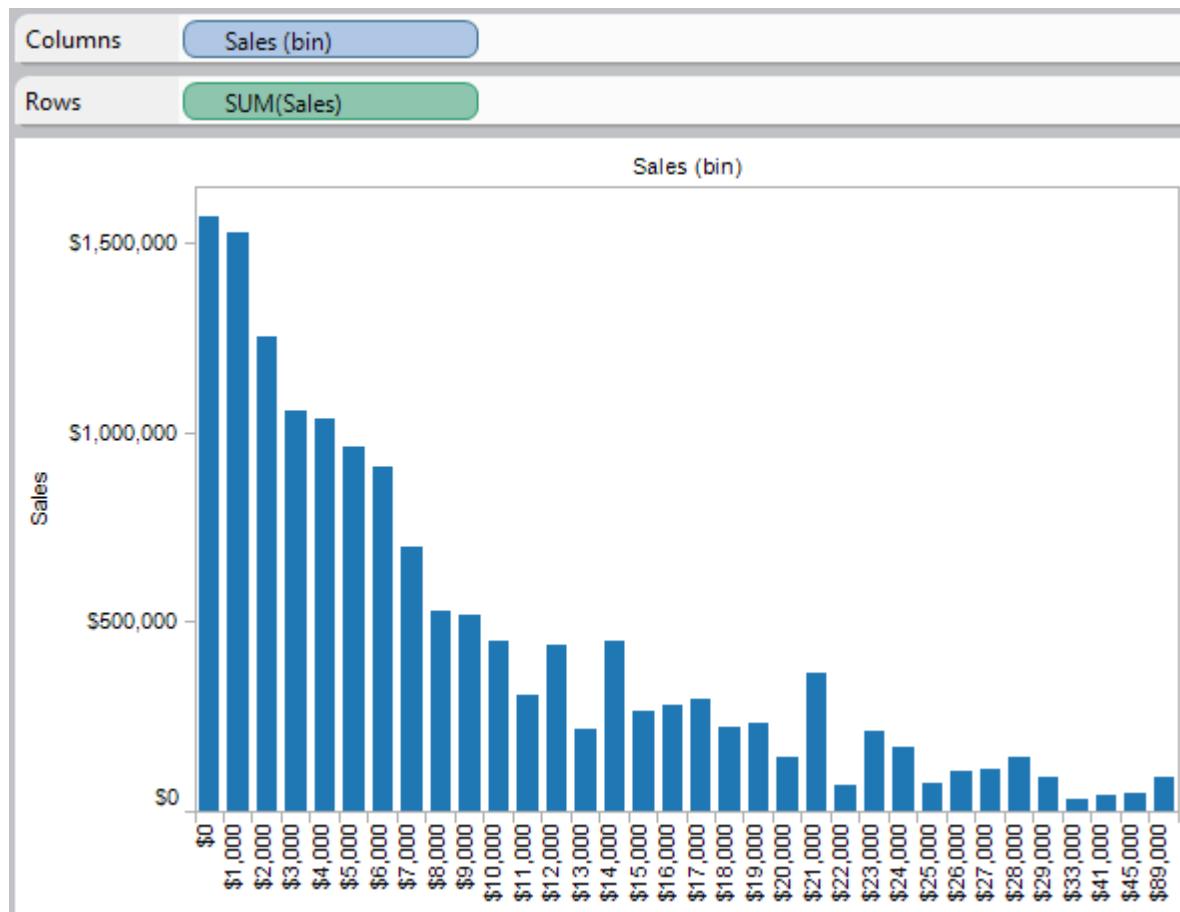
4. Place the Sales (bin) dimension on the Columns shelf.

*Row headers are created with labels given by the dimension member names.*

**Note:**

*Notice that all bins are of equal size. If you want to create variable sized bins, you can create a calculation using the CASE function.*

*The view is shown below.*



*Each bin acts as an equal-sized container that summarizes data for a specific range of values. Each bin label designates the lower limit of the range of numbers that is assigned to the bin. Note that the lower limit is inclusive. For example, the bin labeled 1K contains numbers greater than or equal to 1,000, but less than 2,000.*

**Note:**

*This example shows how to build a histogram manually. You can also create a histogram automatically. Do this by (1) selecting a measure in the Data window; (2) clicking the Show Me! button on the toolbar; (3) selecting the histogram option.*

## Totals

### Totals

You can automatically compute grand totals and subtotals for the data in a view. By default Tableau uses the underlying data to compute totals. However, if you are using a multidimensional data source you can specify whether to do compute the total on the server using the underlying data or in locally using the data that you see in the table.

- [Local vs. Server Computation](#)
- [Grand Totals](#)
- [Subtotals](#)

## Local vs. Server Computation

If you are using a multidimensional data source, you can specify whether to do the subtotal or total computation on the server using the underlying data in the data source or locally in Tableau using the data that you see in the table.

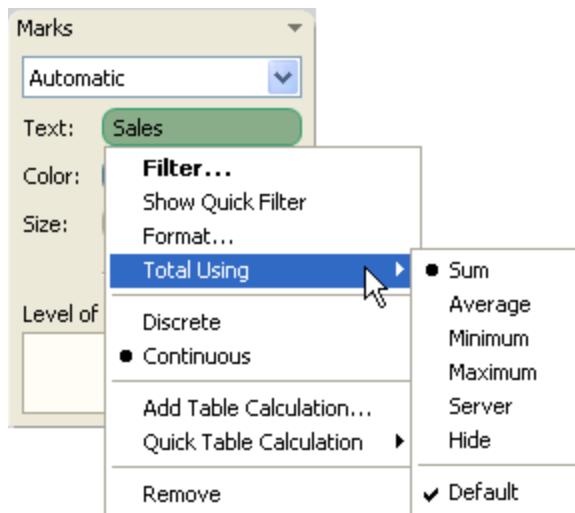
The default setting is to compute all totals on the server if you are connected to a Microsoft Analysis Services data source and locally if you are connected to an Essbase data source using the aggregation specified in the cube. However, there are cases when it is not possible for the server to compute the expected subtotals due to filtering or perfect pivoting.

For example, let's say you have a view showing the sales of Amaretto, Columbian, and Decaf Irish Cream coffees. Then you filter the view to only show Amaretto and Columbian coffee sales. When you turn on subtotals for the Product Type field so you can see the total sales for all Coffees, one of the following will happen:

- If the total can be computed using the filter, the correct total will display. In this case Tableau would compute the total sales for all Coffees.
- If the total cannot be computed using the filter, the Totals cells in the view will be empty. In this case you would want to specify a local computation that only includes the values you see in Tableau.

### To specify a local computation:

1. Select Total Using on the context menu of the measure you are using to calculate the subtotals.
2. Then select an aggregation to use.



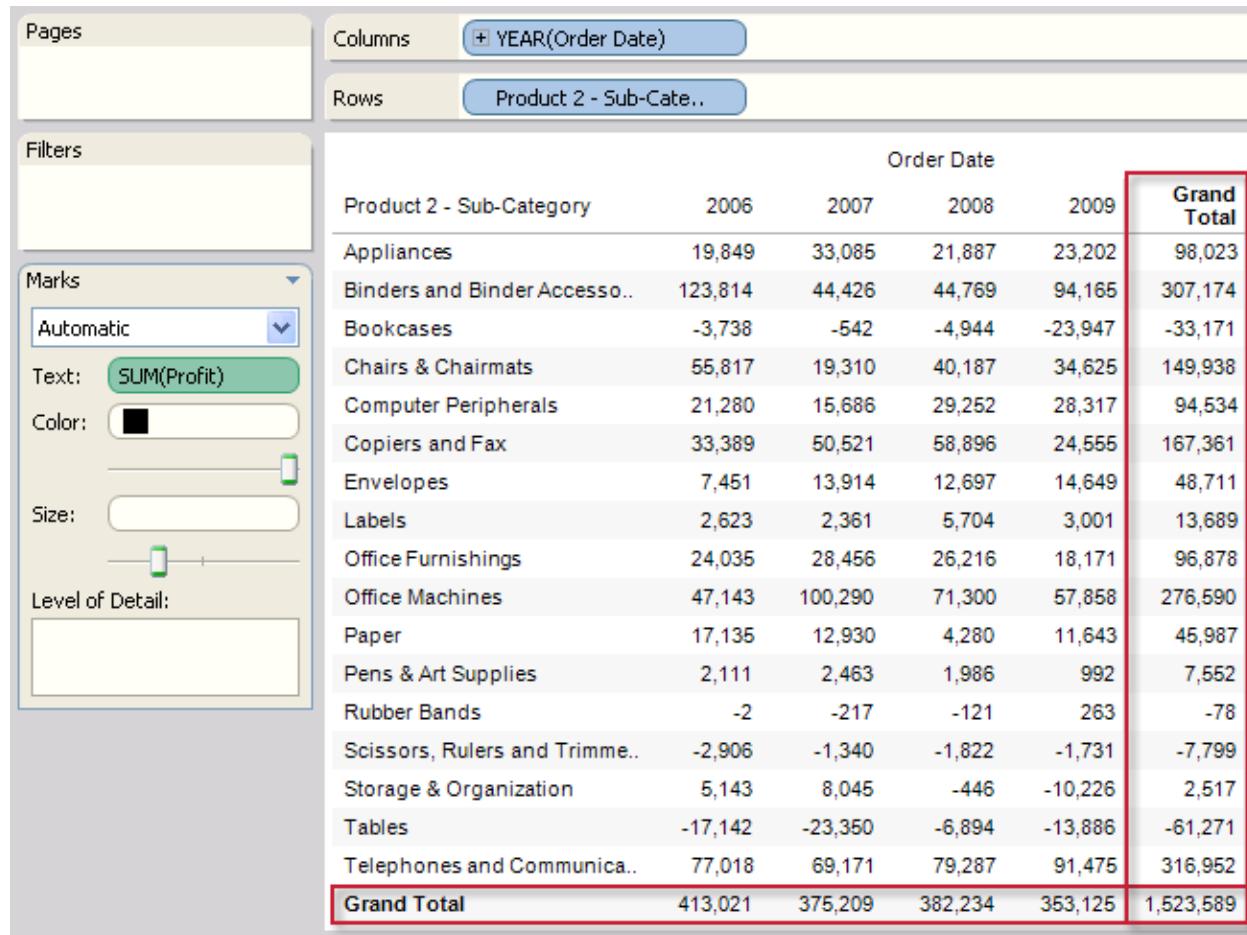
*Server computation is not always available and sometimes the totals will be blank for specific members in the view. When using server computation keep in mind the following information.*

- *Server computation is only available for ASO cubes.*
- *Server computation is not available for dynamic hierarchies. That means if the members in the view are part of a dimension or hierarchy that is tagged as dynamic, they cannot be included in the set of values you are using to compute the totals and will show up as blank in the view.*
- *If you are computing totals for a calculated field whose formula makes assumptions about other calculated members at different levels in the hierarchy, the totals will display as blank in the view.*

## Grand Totals

### Grand Totals

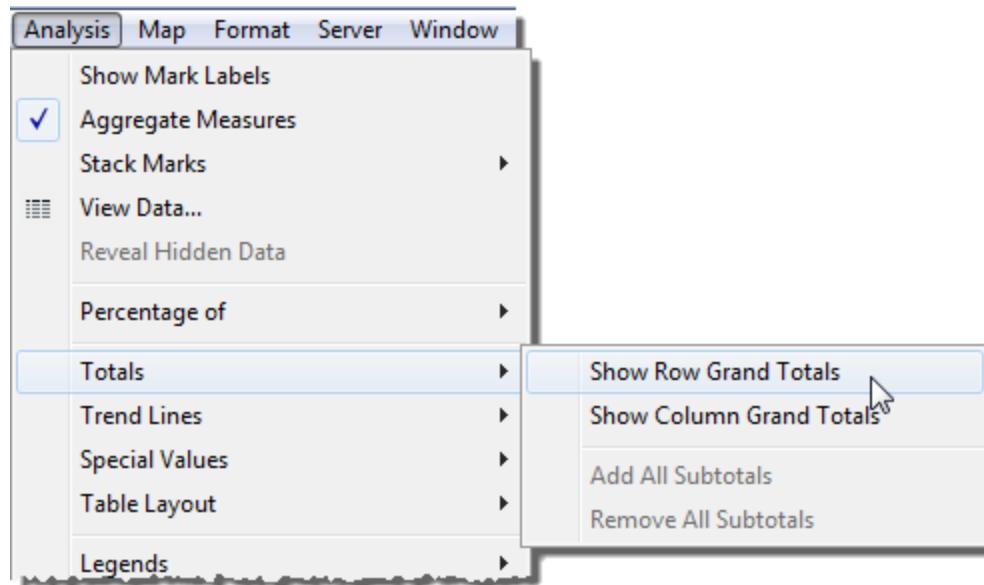
Any view in Tableau can include grand totals. For example, in a view showing the average profit for each product and year, you can turn on grand totals to also see the average profit for all products and all years.



- [How to Turn on Grand Totals](#)
- [Grand Totals and Aggregations](#)
- [Example – Grand Totals and Aggregations](#)

## How to Turn on Grand Totals

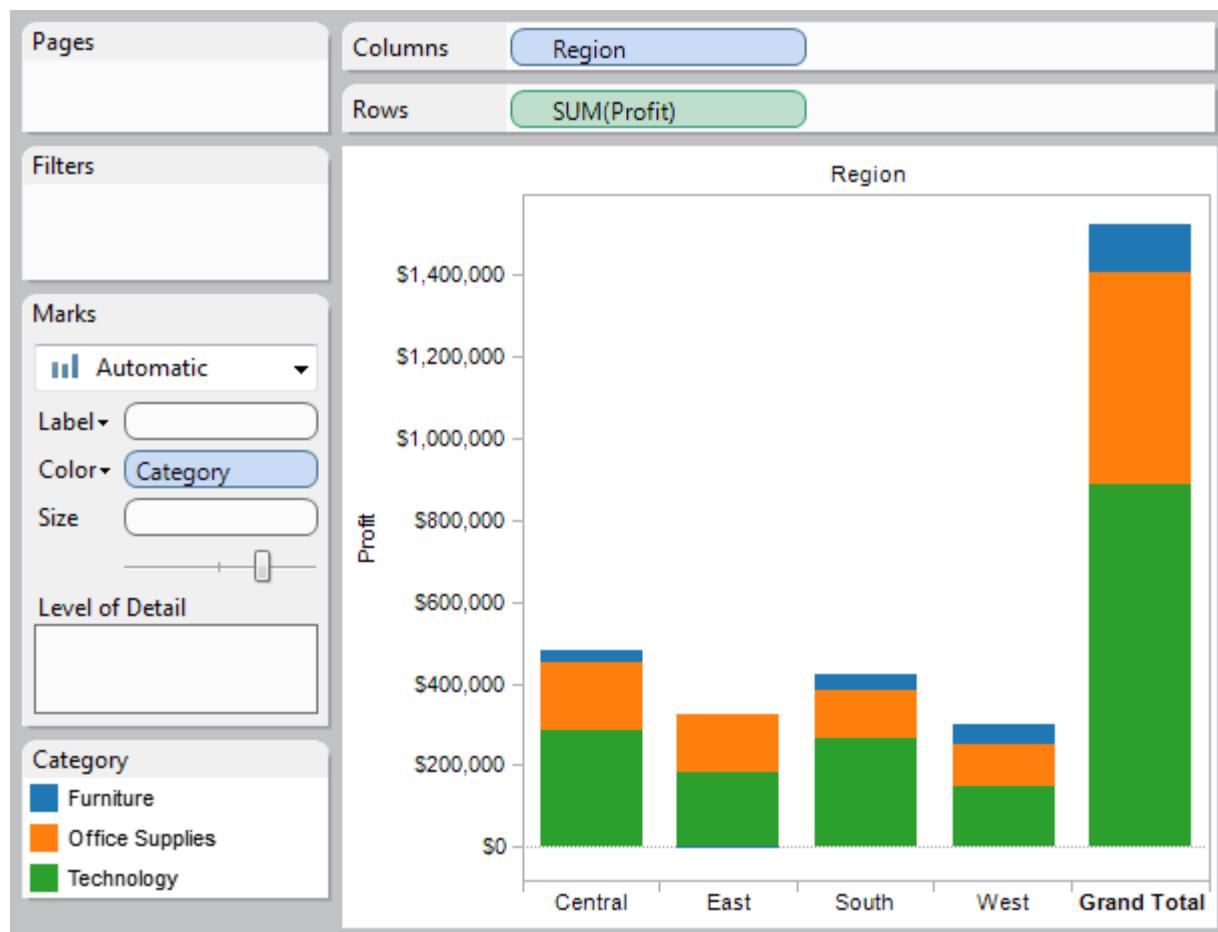
You can calculate grand totals by selecting one of the Grand Totals options on the Analysis > Totals menu. The grand totals are added as an additional row or column to your table.



The following rules dictate whether you can turn on grand totals:

- The view must have at least one header – Headers are displayed whenever you place a dimension on the Columns shelf or the Rows shelf. If column headers are displayed, you can calculate grand totals for columns. If row headers are displayed, you can calculate grand totals for rows.
- Measures must be aggregated – The aggregation determines the values displayed for the totals. Refer to [Grand Totals and Aggregations](#) for more information.
- Grand Totals cannot be applied to continuous dimensions.

You can also display totals for graphical views of data. In the figure below, only column totals are calculated because the table contains only column headers.

**Note:**

*By default totals are computed on the server if you are connected to a Microsoft Analysis Services data source and locally if you are connected to an Essbase data source using the aggregation specified in the cube. Refer to [Local vs. Server Computation](#) to learn more.*

## Grand Totals and Aggregations

*Grand totals are computed using the aggregation of each measure. For example, if you are totaling the SUM(Profit) for several products, the grand total will be the sum of the sums of profit. For aggregations such as SUM, you can easily verify the grand total because a summation of a group of sums is still a summation. However, be aware that your results may be unexpected when using other aggregations, especially custom aggregations. For example, when looking at the average sales for several products, the grand total will be the average of the averages rather than the average of all sales. You can verify any calculation such as an aggregation or a grand total by viewing the underlying disaggregated data.*

*The following table summarizes the standard aggregations and the grand totals that are calculated.*

Aggregation	Calculation Description
Sum	The grand total using sum is the sum of the values shown in the row or column.
Average	The grand total using average is the averages shown in the row or column.
Minimum	The grand total using minimum is the minimum value shown in the row or column.
Maximum	The grand total using maximum is the maximum value shown in the row or column.
Standard Deviation	The grand total using standard deviation is the standard deviation values shown in the row or column.
Variance	The grand total variances are not the variances of the rows and columns in which they reside. Instead, the calculations are based on the underlying data behind the row or column.
Count & Count Distinct	The grand total counts are the counts of the rows and columns in which they reside.

## Example – Grand Totals and Aggregations

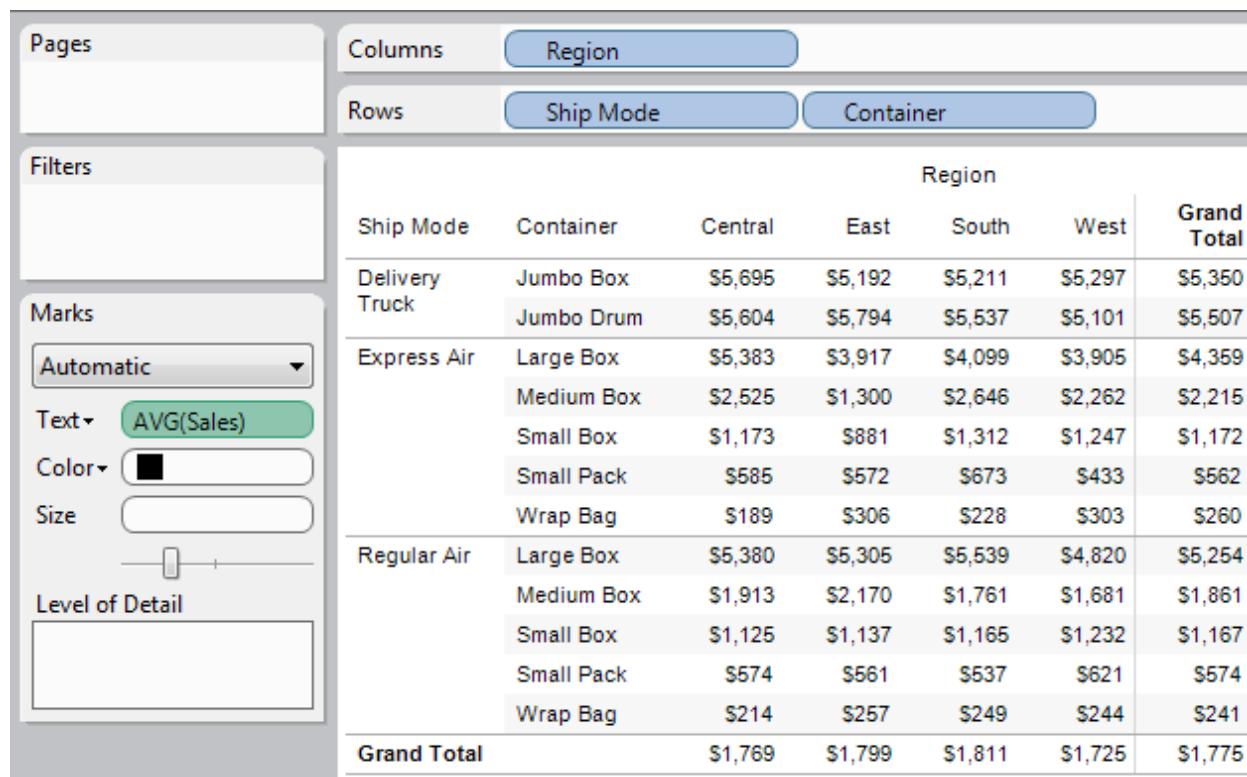
The figure shown below is a text table that displays the sales aggregated as a sum. The grand total for the Jumbo Box shipped by Delivery Truck is \$2,814,305. Tableau calculates this number by summing all the rows in the data source that are associated with the Jumbo Box and Delivery Truck fields. You can easily verify the number by summing the values for the Central, East, South, and West regions.

The screenshot shows a Tableau interface with a sidebar on the left containing 'Pages' (selected), 'Columns' (Region), 'Rows' (Ship Mode, Container), 'Filters', 'Marks' (Text: SUM(Sales), Color: black, Size: 10px), and 'Level of Detail'. The main area displays a data grid titled 'Region' with columns: Ship Mode, Container, Central, East, South, West, and Grand Total. The data is categorized by Ship Mode (Delivery Truck, Express Air, Regular Air) and Container type (Jumbo Box, Jumbo Drum, Large Box, Medium Box, Small Box, Small Pack, Wrap Bag). The 'Grand Total' row at the bottom right is highlighted with a red border.

Region						
Ship Mode	Container	Central	East	South	West	Grand Total
Delivery Truck	Jumbo Box	746,008	555,527	771,204	741,567	2,814,305
	Jumbo Drum	795,699	863,327	980,069	775,398	3,414,494
Express Air	Large Box	86,128	50,922	53,292	62,476	252,818
	Medium Box	35,354	15,596	37,047	29,401	117,398
	Small Box	180,677	106,604	213,880	205,835	706,996
	Small Pack	23,391	12,588	18,847	14,305	69,131
	Wrap Bag	5,103	9,800	10,051	12,726	37,680
Regular Air	Large Box	389,082	371,342	542,789	504,046	1,807,258
	Medium Box	149,191	136,713	151,470	139,519	576,893
	Small Box	1,070,918	905,200	1,163,709	1,244,812	4,384,638
	Small Pack	116,547	104,429	115,943	140,939	477,858
	Wrap Bag	53,838	50,942	73,681	69,123	247,585
Grand Total		3,651,938	3,182,989	4,131,981	3,940,146	14,907,053

The intersection of the grand total for columns and rows represents the grand total for the entire table. Tableau calculates this number by summing the sales for every row in the data source. Because the aggregation is a summation, you can verify this number by summing the grand totals for rows or for columns.

The figure shown below is a text table that displays the sales aggregated as an average. The grand total for the Jumbo Box is \$5,350. Tableau calculates this number by averaging all the rows in the data source that are associated with the Jumbo Box and Delivery Truck fields. You cannot verify this number by averaging the values for the Central, East, and West regions.



*The intersection of the grand total for columns and rows represents the grand total for the entire table. Tableau calculates this number by averaging the sales for every row in the data source. Because the aggregation is an average, you cannot verify this number by averaging the grand totals for rows or for columns. To verify the grand total you need to average the rows in the data source, which are not visible in the table. You can display the rows by right-clicking in the table and selecting View Data on the context menu.*

View Data

Summary Underlying

0 of 32 selected:

Show all fields

Container	Region	Ship Mode	Sales
Wrap Bag	East	Express Air	\$143
Wrap Bag	East	Express Air	\$146
Wrap Bag	East	Express Air	\$129
Wrap Bag	East	Express Air	\$814
Wrap Bag	East	Express Air	\$767
Wrap Bag	East	Express Air	\$151
Wrap Bag	East	Express Air	\$309
Wrap Bag	East	Express Air	\$21
Wrap Bag	East	Express Air	\$2,330
Wrap Bag	East	Express Air	\$410
Wrap Bag	East	Express Air	\$1,341
Wrap Bag	East	Express Air	\$76
Wrap Bag	East	Express Air	\$1,032
Wrap Bag	East	Express Air	\$435
Wrap Bag	East	Express Air	\$42
Wrap Bag	East	Express Air	\$103

Select All Copy to Clipboard Close

## **Subtotals**

## Percentages

### Percentages

*Any analysis in Tableau can be expressed in terms of percentages. For example, rather than viewing sales for every product, you might want to view each product's sales as a percentage of the total sales for all products.*

*You calculate percentages by selecting the Analysis > Percentages Of menu item. When you do this, all measures on the worksheet are displayed as a percentage based on all the table data.*

**Note:**

*The percentage options on the Analysis menu correspond to the percentage table calculations. When you select a percentage option, you are actually adding a Percent of Total table calculation. Refer to [Table Calculations](#) to learn more.*

- [About Percentages](#)
- [Percentages and Aggregations](#)
- [Percentage Options](#)

## About Percentages

*There are two factors that contribute to the percentage calculation:*

- *The aggregation – Percentages are calculated on the basis of the current aggregation for each measure. Refer to [Percentages and Aggregations](#) for more information.*
- *The data to which you compare all percentage calculations – Percentages are a ratio of numbers. The numerator is the value of a given mark. The denominator depends on the type of percentage you want, and is the number to which you compare all your calculations. The comparison can be based on the entire table, a row, a pane, and so on. By default, Tableau uses the entire table. Other percentage calculations are available via the Percentage of menu item. Refer to [Percentage Options](#) for more information.*

*The figure below is an example of a text table with percentages. The percentages are calculated with the Sales measure aggregated as a summation, and are based on the entire table.*

Columns	+ YEAR(Order Date)				
Rows	Product 1 - Category		Region		
Order Date					
Product 1 - Category	Region	2006	2007	2008	2009
Furniture	Central	2.695%	2.185%	2.024%	1.964%
	East	1.805%	1.687%	2.042%	2.052%
	South	2.328%	2.328%	2.464%	1.968%
	West	2.870%	2.092%	1.903%	1.934%
Office Supplies	Central	1.206%	1.688%	1.525%	1.859%
	East	1.691%	1.112%	1.137%	1.265%
	South	2.188%	1.471%	1.360%	1.622%
	West	1.963%	1.904%	1.395%	2.104%
Technology	Central	2.496%	2.609%	1.864%	2.661%
	East	1.860%	2.313%	2.570%	1.817%
	South	3.777%	2.204%	2.354%	3.652%
	West	3.228%	2.291%	2.413%	2.056%

## Percentages and Aggregations

Percentages are computed on the basis of the aggregation for each measure. Standard aggregations include summation, average, and so on. Refer to [Aggregations](#) for more information.

For example, if the aggregation applied to the Sales field is a summation, then the default percentage calculation (percent of table) means that each number displayed is the  $\text{SUM}(\text{Sales})$  for that mark divided by the  $\text{SUM}(\text{Sales})$  for the entire table.

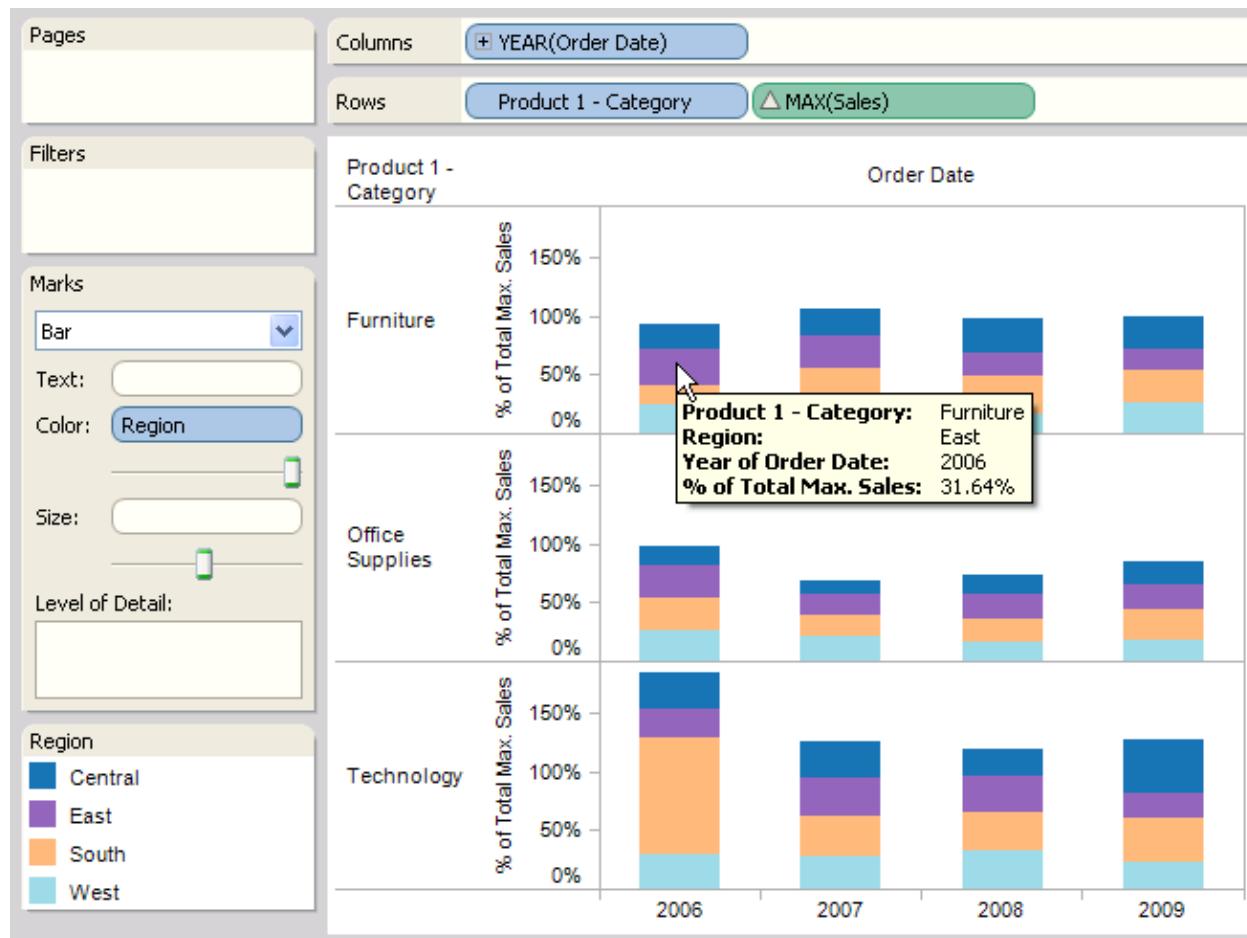
In addition to using predefined aggregations, you can use custom aggregations when calculating percentages. You can define your own aggregations by creating a calculated field. Once the new field is created, you can use percentages on the field as you would any other field. Refer to [Aggregate Calculations](#) for more information.

Percent calculations can also be applied to data that are disaggregated. In this case, all values are expressed as the percentage of a summation. You cannot choose an alternative aggregation.

### Example – Percentages and Aggregations

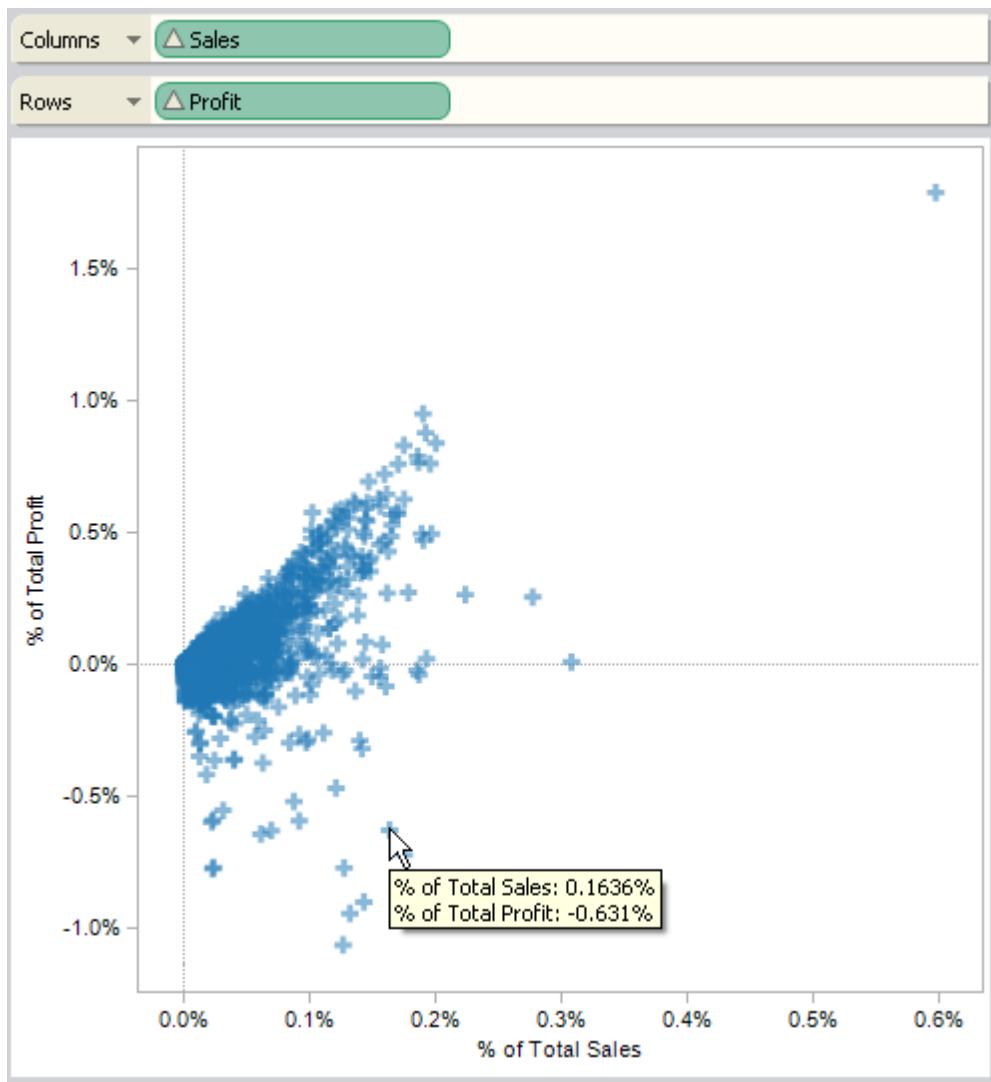
The view shown below is a nested bar chart created using two dimensions and a measure that is aggregated as a maximum. Additionally, the data are color-encoded by a dimension and the default percentage calculation has been applied. Notice that the axis labels are modified to reflect the percent calculation.

The tooltip reveals that the maximum sales for furniture in the east in 2005 is 31.6% of the maximum for the entire table. What is the maximum for the table? You can see by inspection that the maximum occurs in the South in the year 2005. The tooltip for this bar segment would reveal a maximum sales of 100%.



*The next view displays two disaggregated measures as a scatter plot. Again, the default percentage calculation has been applied as reflected by the modified axis labels.*

*The tooltip shows that the selected data point has a profit of -0631% and a sales of 0.1636%. Note that the percentage calculations are based on the entire data source.*



## Percentage Options

### Percentage Options

Computing a percentage involves specifying a total on which the percentage is based. In Tableau, the default percentage calculation is based on the entire table. However, you can change the default by selecting a different percentage option from the Analysis > Percentage of menu.

The option you choose is applied uniformly to all measures that appear on a worksheet. For instance, you cannot choose Percent of Column for one measure and Percent of Row for another.

If you are unsure what the current percentage calculation means, display the grand totals. This provides more information about each row and column. For example, if you select Percent of Row while displaying grand totals, you will see that the total for each row is exactly 100%. Refer to [Grand Totals](#) for more information on grand totals.

The percent calculation options are described in the following sections. In each case, the grand totals are displayed as well.

- [Percent of Table](#)
- [Percent of Column](#)
- [Percent of Row](#)
- [Percent of Pane](#)
- [Percent of Row in Pane](#)
- [Percent of Column in Pane](#)

## Percent of Table

When you select *Percentage of Table*, each measure on the worksheet is expressed as a percentage of the total for the entire worksheet (table). For example, Technology in the East region accounts for 2.50% of total sales in 2006. The grand totals for rows show that 2009 accounts for 24.95% of the total sales. Summing the grand totals for rows or for columns yields 100% of the total.

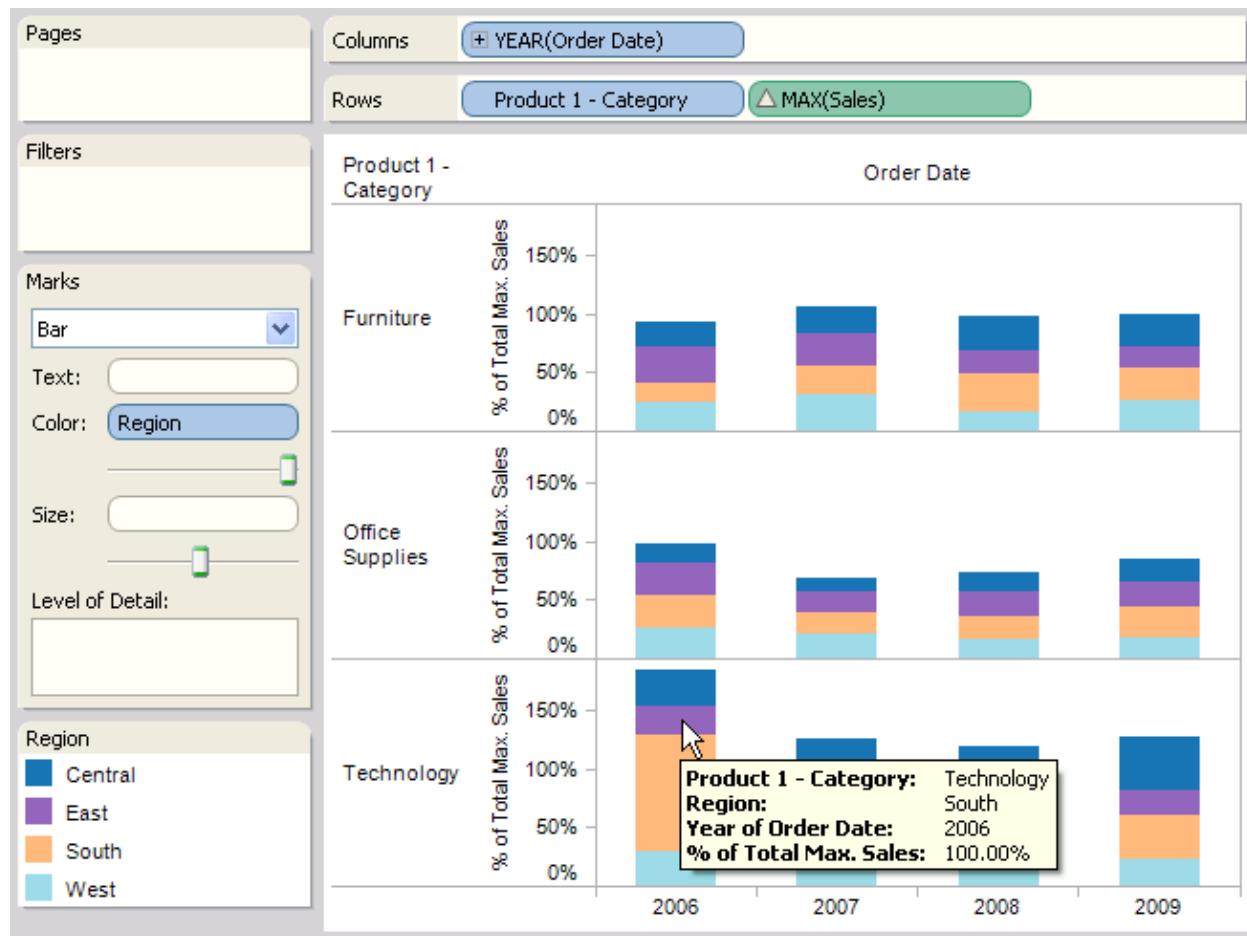
The screenshot shows a Tableau interface with the following components:

- Pages:** Shows 'Columns' and '+ YEAR(Order Date)'.
- Rows:** Shows 'Product 1 - Category' and 'Region'.
- Filters:** Shows 'Marks' settings: Text (SUM(Sales)), Color (Automatic, black), and Size.
- Data Grid:** Displays sales data by Product Category, Region, and Year. The data is summarized by year (2006, 2007, 2008, 2009) and then broken down by Product Category (Furniture, Office Supplies, Technology) and Region (Central, East, South, West). The 'Grand Total' row shows the cumulative percentages for each year.

Order Date						
Product 1 - Category	Region	2006	2007	2008	2009	Grand Total
Furniture	Central	2.69%	2.19%	2.02%	1.96%	8.87%
	East	1.81%	1.69%	2.04%	2.05%	7.59%
	South	2.33%	2.33%	2.46%	1.97%	9.09%
	West	2.87%	2.09%	1.90%	1.93%	8.80%
Office Supplies	Central	1.21%	1.69%	1.53%	1.86%	6.28%
	East	1.69%	1.11%	1.14%	1.27%	5.21%
	South	2.19%	1.47%	1.36%	1.62%	6.64%
	West	1.96%	1.90%	1.40%	2.10%	7.37%
Technology	Central	2.50%	2.61%	1.86%	2.66%	9.63%
	East	1.86%	2.31%	2.57%	1.82%	8.56%
	South	3.78%	2.20%	2.35%	3.65%	11.99%
	West	3.23%	2.29%	2.41%	2.06%	9.99%
<b>Grand Total</b>		28.11%	23.89%	23.05%	24.95%	100.00%

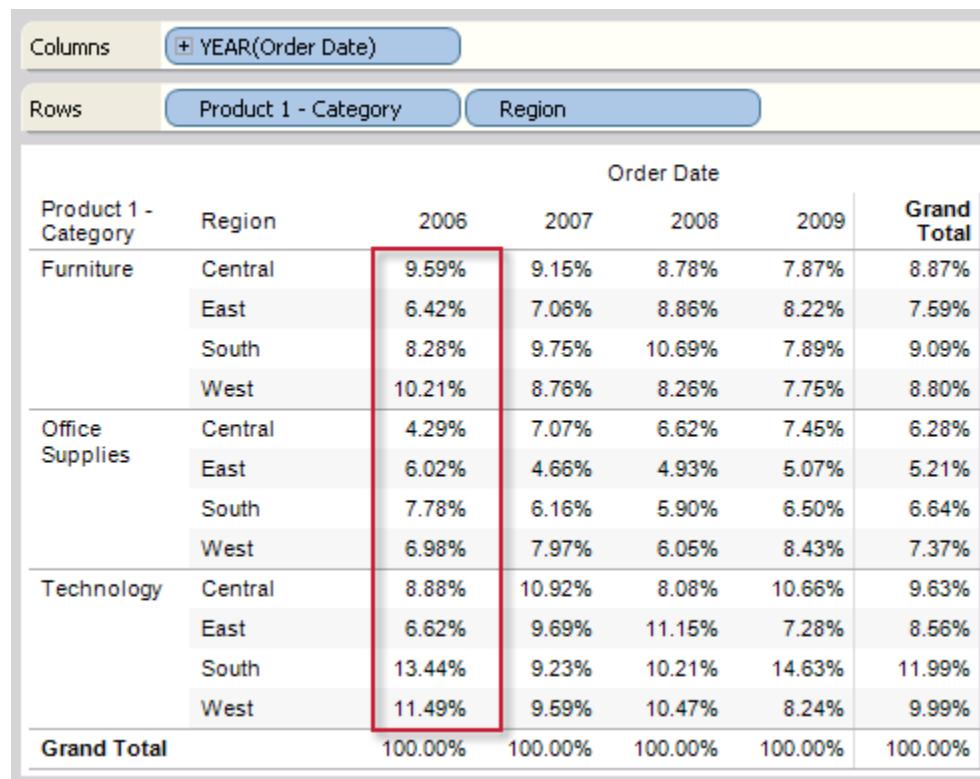
An equivalent graphical table is shown below.

## Tableau Desktop Help



## Percent of Column

When you select Percentage of Column, each measure on the worksheet is expressed as a percentage of the total for the column. For example, Technology in the East region accounts for 6.62% of total sales in the 2006. 2006 is the column in this case.



The screenshot shows a Power BI report interface with the following structure:

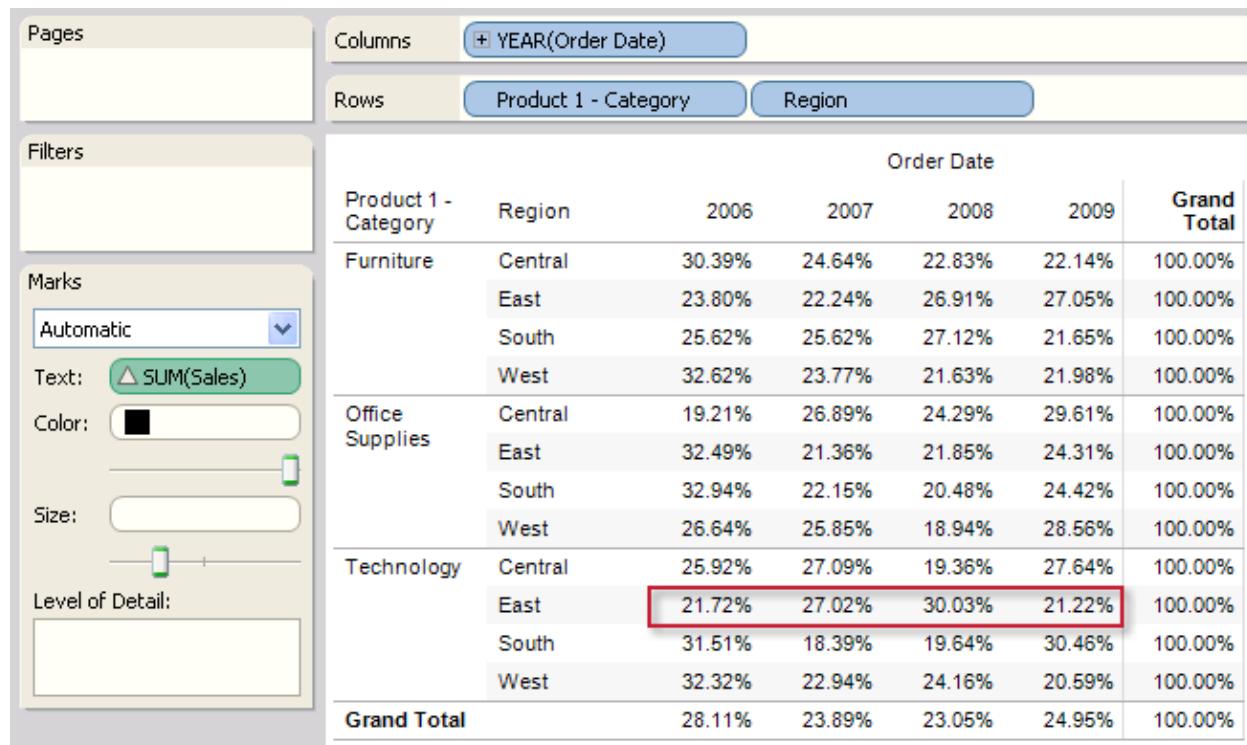
- Columns:** YEAR(Order Date)
- Rows:** Product 1 - Category, Region
- Table Headers:** Order Date, Product 1 - Category, Region, 2006, 2007, 2008, 2009, Grand Total
- Data Rows:**
  - Furniture:** Central (9.59%), East (6.42%), South (8.28%), West (10.21%)
  - Office Supplies:** Central (4.29%), East (6.02%), South (7.78%), West (6.98%)
  - Technology:** Central (8.88%), East (6.62%), South (13.44%), West (11.49%)
- Grand Total:** 100.00% for all years.

The '2006' column is highlighted with a red border.

			Order Date	2006	2007	2008	2009	Grand Total
Product 1 - Category	Region							
Furniture	Central		9.59%	9.15%	8.78%	7.87%	8.87%	
	East		6.42%	7.06%	8.86%	8.22%	7.59%	
	South		8.28%	9.75%	10.69%	7.89%	9.09%	
	West		10.21%	8.76%	8.26%	7.75%	8.80%	
Office Supplies	Central		4.29%	7.07%	6.62%	7.45%	6.28%	
	East		6.02%	4.66%	4.93%	5.07%	5.21%	
	South		7.78%	6.16%	5.90%	6.50%	6.64%	
	West		6.98%	7.97%	6.05%	8.43%	7.37%	
Technology	Central		8.88%	10.92%	8.08%	10.66%	9.63%	
	East		6.62%	9.69%	11.15%	7.28%	8.56%	
	South		13.44%	9.23%	10.21%	14.63%	11.99%	
	West		11.49%	9.59%	10.47%	8.24%	9.99%	
<b>Grand Total</b>			100.00%	100.00%	100.00%	100.00%	100.00%	

## Percent of Row

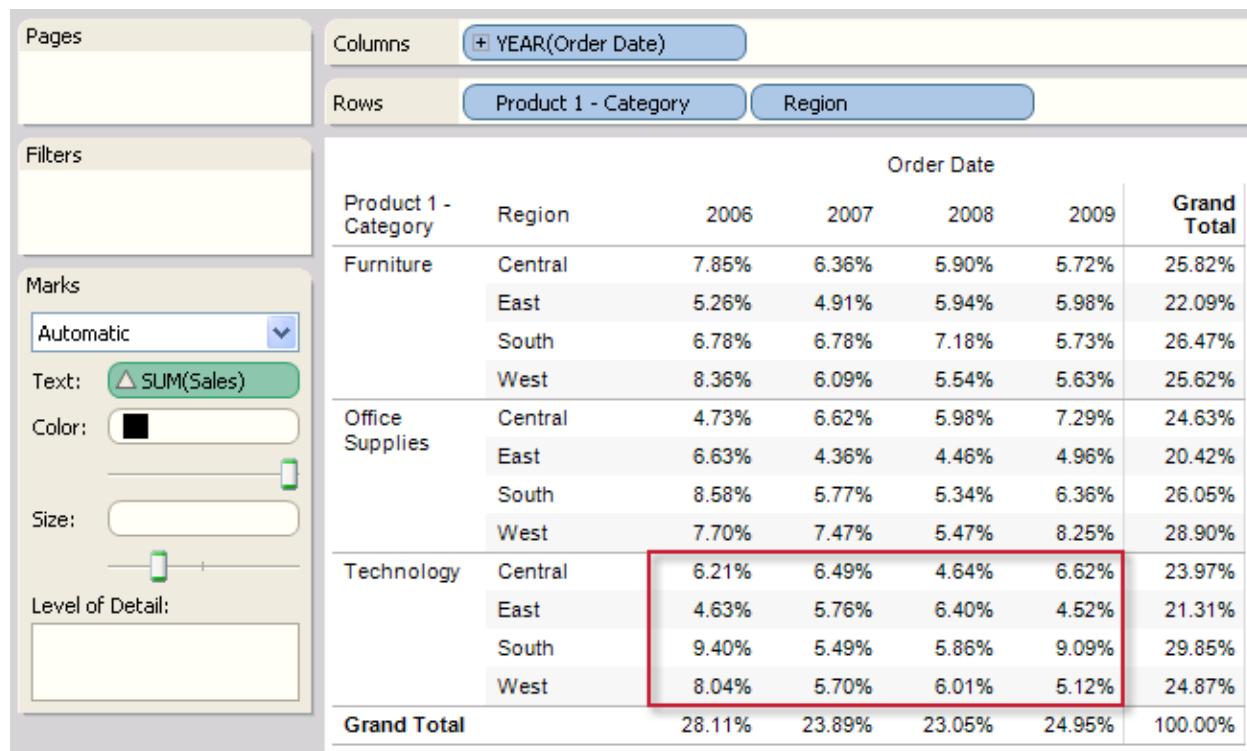
When you select Percentage of Row, each measure on the worksheet is expressed as a percentage of the total for the row. For example, Technology in the East region accounts for 21.72% of technology sales in the east across all years. East is the row in this case.



## Percent of Pane

When you select Percentage of Pane, each measure on the worksheet is expressed as a percentage of the total for the pane. This option is the same as Percent of Table when the table consists of only a single pane.

This table consists of several panes. Each pane encompasses one product category and all four years. Therefore, the table is one pane wide and three panes high.



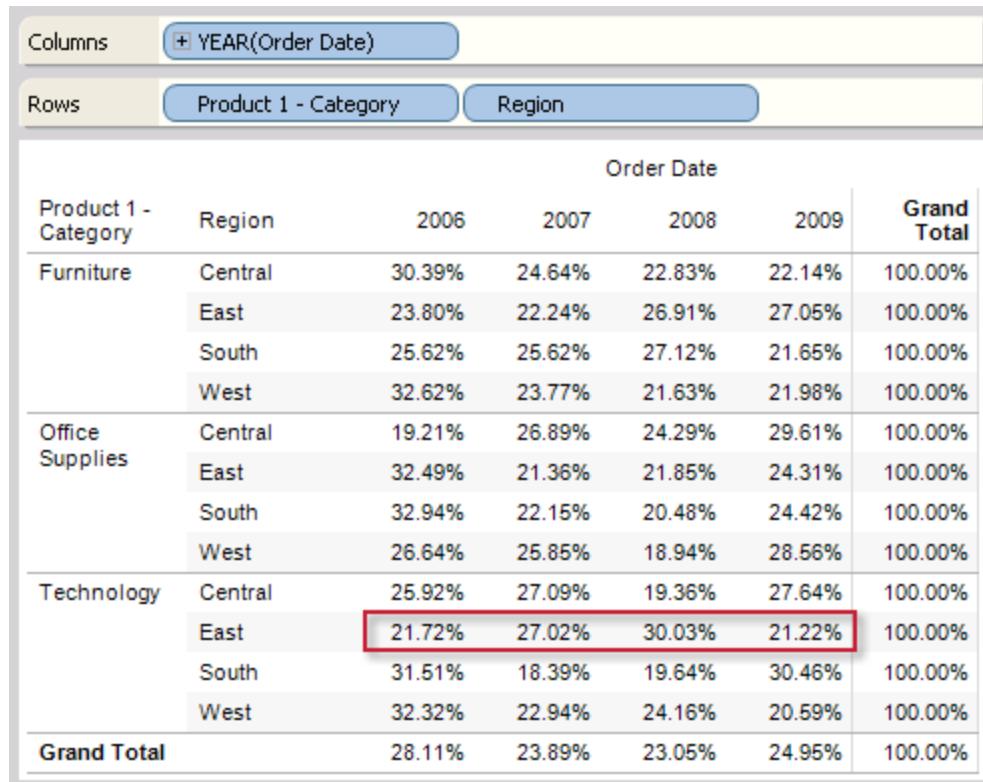
## Percent of Row in Pane

*When you select Percentage of Row in Pane, each measure on the worksheet is expressed as a percentage of the total for a given row within a pane. This option is the same as Percent of Row when the table is only a single pane wide.*

**Note:**

*If you place Measure Names as the inner dimension on the Columns shelf, Tableau will return 100% for each mark because you cannot total up the values for multiple measure names. For example, you can't total up the values for SUM(Sales) and SUM(Profit).*

*The grand total for columns is always 100%. This represents the sum of a given row within a pane.*



The screenshot shows a Tableau desktop interface with the following components:

- Columns Shelf:** Contains the measure "YEAR(Order Date)".
- Rows Shelf:** Contains the dimensions "Product 1 - Category" and "Region".
- Data Grid:** Displays a 3x5 grid of data points. The columns represent "Order Date" (2006, 2007, 2008, 2009, Grand Total) and the rows represent "Product 1 - Category" (Furniture, Office Supplies, Technology) and "Region" (Central, East, South, West). Each cell contains a percentage value.

The data grid values are summarized below:

Category	Region	Order Date				Grand Total
		2006	2007	2008	2009	
Furniture	Central	30.39%	24.64%	22.83%	22.14%	100.00%
	East	23.80%	22.24%	26.91%	27.05%	100.00%
	South	25.62%	25.62%	27.12%	21.65%	100.00%
	West	32.62%	23.77%	21.63%	21.98%	100.00%
Office Supplies	Central	19.21%	26.89%	24.29%	29.61%	100.00%
	East	32.49%	21.36%	21.85%	24.31%	100.00%
	South	32.94%	22.15%	20.48%	24.42%	100.00%
	West	26.64%	25.85%	18.94%	28.56%	100.00%
Technology	Central	25.92%	27.09%	19.36%	27.64%	100.00%
	East	21.72%	27.02%	30.03%	21.22%	100.00%
	South	31.51%	18.39%	19.64%	30.46%	100.00%
	West	32.32%	22.94%	24.16%	20.59%	100.00%
<b>Grand Total</b>		28.11%	23.89%	23.05%	24.95%	100.00%

## Percent of Column in Pane

*When you select Percentage of Column in Pane, each measure on the worksheet is expressed as a percentage of the total for a given column within a pane. This option is the same as Percent of Column when the table is only a single pane high.*

**Note:**

*If you place Measure Names as the inner dimension on the Rows shelf, Tableau will return 100% for each mark because you cannot total up the values for multiple measure names. For example, you can't total up the values for SUM(Sales) and SUM(Profit).*

*The grand total for rows is always 100%. This represents the sum of a given column within a pane.*

Order Date						
Product 1 - Category	Region	2006	2007	2008	2009	Grand Total
Furniture	Central	27.79%	26.35%	24.00%	24.80%	25.82%
	East	18.61%	20.34%	24.21%	25.92%	22.09%
	South	24.01%	28.08%	29.22%	24.85%	26.47%
	West	29.59%	25.23%	22.57%	24.42%	25.62%
Office Supplies	Central	17.11%	27.34%	28.15%	27.14%	24.63%
	East	24.00%	18.00%	20.99%	18.47%	20.42%
	South	31.05%	23.82%	25.11%	23.68%	26.05%
	West	27.85%	30.84%	25.75%	30.71%	28.90%
Technology	Central	21.97%	27.70%	20.25%	26.12%	23.97%
	East	16.37%	24.57%	27.94%	17.84%	21.31%
	South	33.25%	23.41%	25.59%	35.85%	29.85%
	West	28.42%	24.33%	26.22%	20.19%	24.87%
<b>Grand Total</b>		100.00%	100.00%	100.00%	100.00%	100.00%

# Parameters

## Parameters

Parameters are dynamic values that can replace constant values in calculations, filters, and reference lines. For example, you may create a calculated field that returns true if Sales is greater than \$500,000 and otherwise return false. You can replace the constant value of “500000” in the formula with a parameter. Then using the parameter control you can dynamically change the threshold in your calculation. Alternatively, you may have a filter to show the top 10 products by profit. You can replace the fixed value “10” in the filter to by a dynamic parameter so you can quickly look at the top 15, 20, and 30 products.

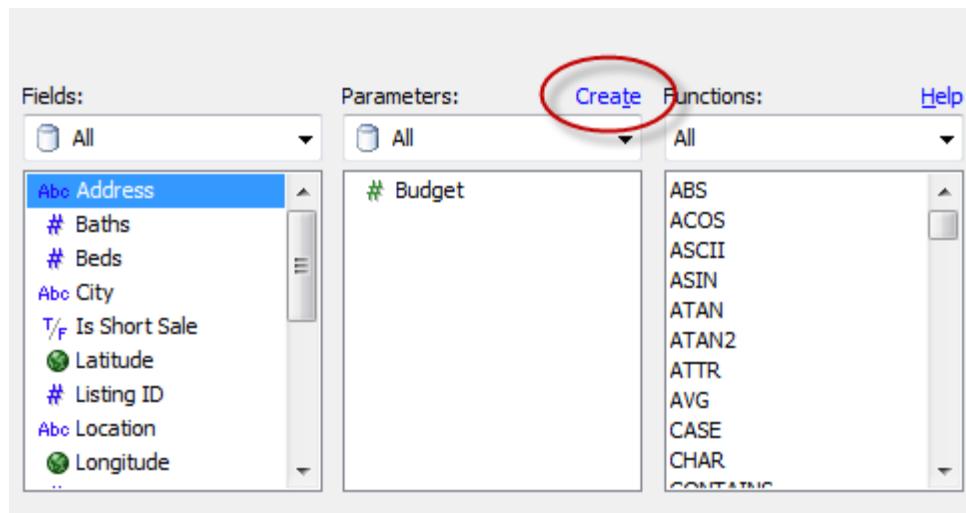
- [Creating Parameters](#)
- [Editing Parameters](#)
- [Using Parameters in Calculations](#)
- [Using Parameters in Filters](#)
- [Using Parameters in Reference Lines](#)
- [Parameter Controls](#)
- [Example - Parameters](#)

## Creating Parameters

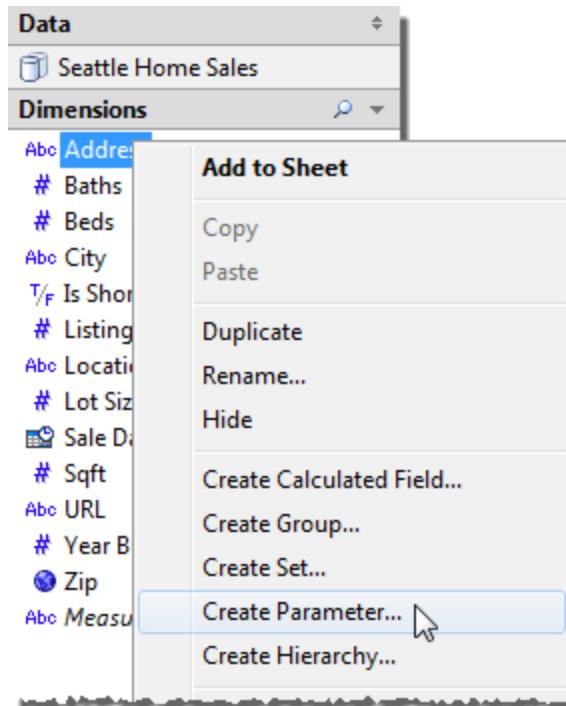
You can create a new parameter based on a selected field, or you can create a new parameter from the Calculated Field dialog box. Follow the instructions below to create a new parameter.

1. Do one of the following:

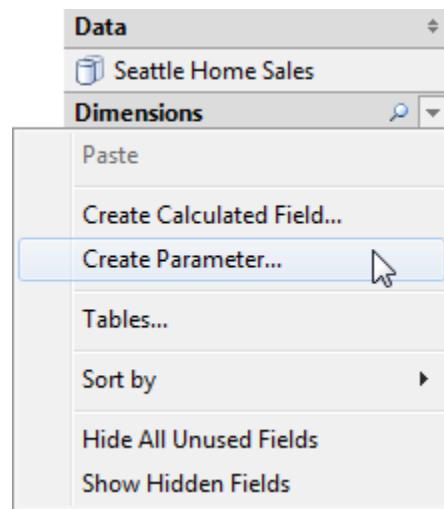
- In the Calculated field dialog box, click the Create link at the top of the list of parameters.



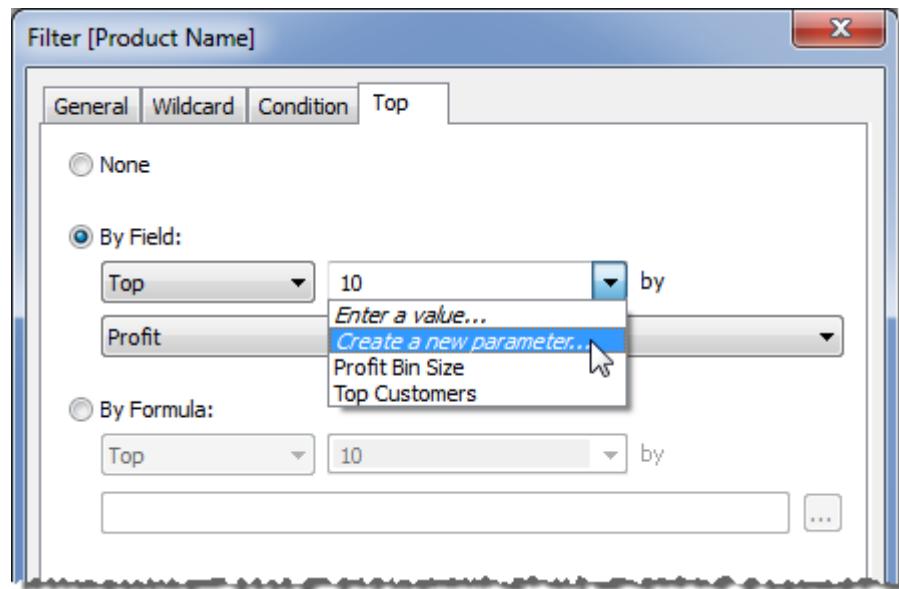
- In the Data window, right-click a field to base the parameter on and select Create Parameter.



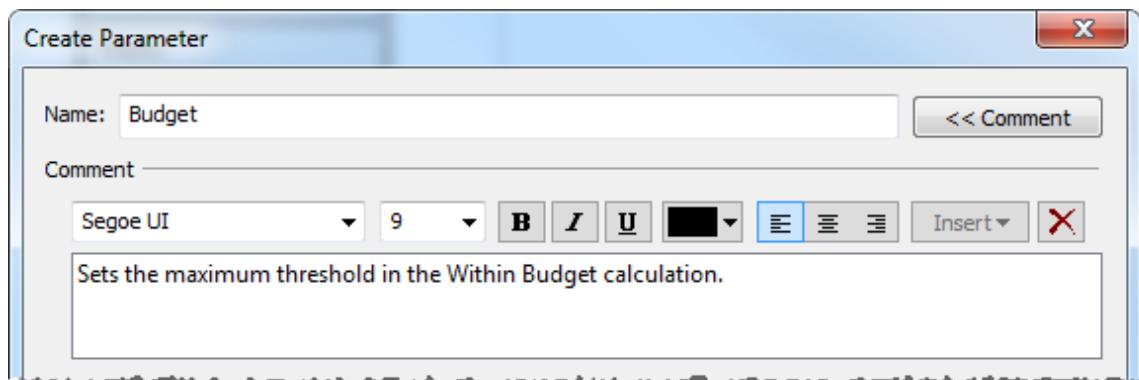
- Open the Data window menu using the drop-down arrow in the upper right corner and select Create Parameter.



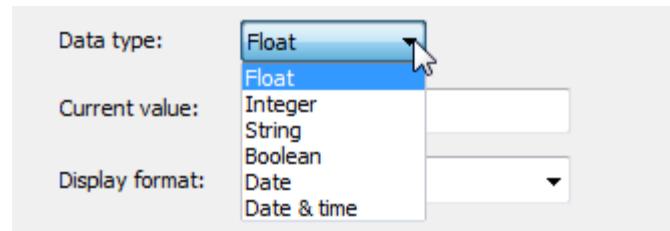
- On the Top tab of the Filter dialog box, select Create New Parameter in the Top drop-down list (by field or by formula).



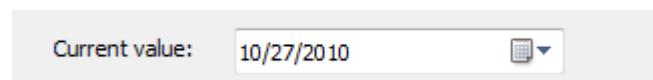
2. In the Create Parameter dialog box, give the field a Name and optionally write a Comment to describe the parameter.



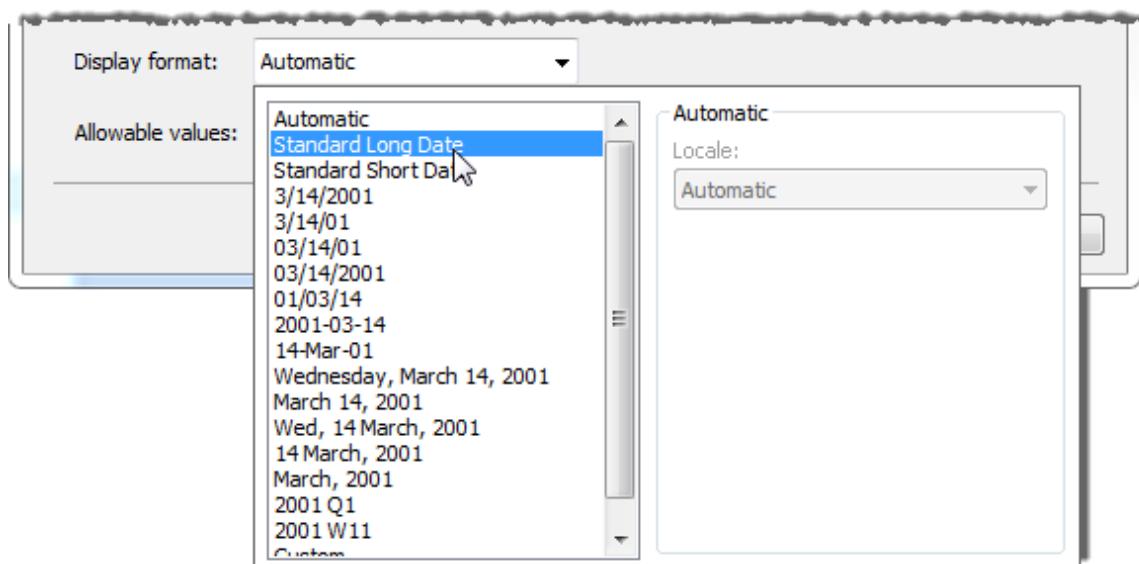
3. Specify the data type for the values it will accept. Parameters can be a float (non integer number), integer, string (text), boolean (true/false), date, or date & time.



4. *Specify a current value. This is the default value for the parameter.*



5. *Specify the display format to use in the parameter control.*



6. *Specify how the parameter will accept values. You can select from the following options:*

- All - the parameter control is a simple type in field.

- *List - the parameter control provides a list of possible values for you to select from.*
- *Range - the parameter control lets you select values within a specified range.*

*The availability of these options is determined by the data type. For example, a string parameter can only accept all values or a list. It does not support a range.*

*If you select List, you must specify the list of values. Click in the left column to type a value. Each value can also have a display alias. You can copy and paste a list of values by clicking Paste from Clipboard. Alternatively you can Add the members of a field as the list of values by selecting Add from Field.*

Value	Display As
1	Apples
2	Bananas
3	Oranges
4	Pears
Add	

Add from Parameter ►

Add from Field ►

Paste from Clipboard

Clear All

*If you select Range you must specify a minimum, maximum and step size. For example, you can define a date range between January 1, 2010 and December 31, 2010, with the step size set to 1 month to create a parameter control that lets you select each month in 2010.*

Range of values

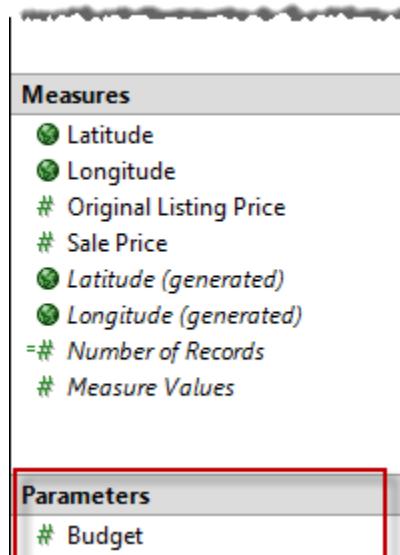
Minimum:  1/ 1/2010

Maximum:  12/31/2010

Step size:  1  Months

7. When finished, click OK.

The parameter is listed in the Parameters section at the bottom of the Data window.



It is also available in the Parameters list in the Calculated Field dialog box, the Top tab of the Filter dialog box, and in the Reference Line dialog box. Parameters are global across the workbook and can be used in any worksheet.

## Editing Parameters

You can edit parameters from the Data window or the parameter control. Follow the instructions below to edit a parameter:

1. *Do one of the following:*
  - Right-click the parameter in the Data window and select Edit.
  - Select Edit Parameter on the parameter control card menu.
2. *In the Edit Parameter dialog box, make the modifications as necessary.*
3. *When finished, click OK. The parameter is updated along with any calculations that use it.*

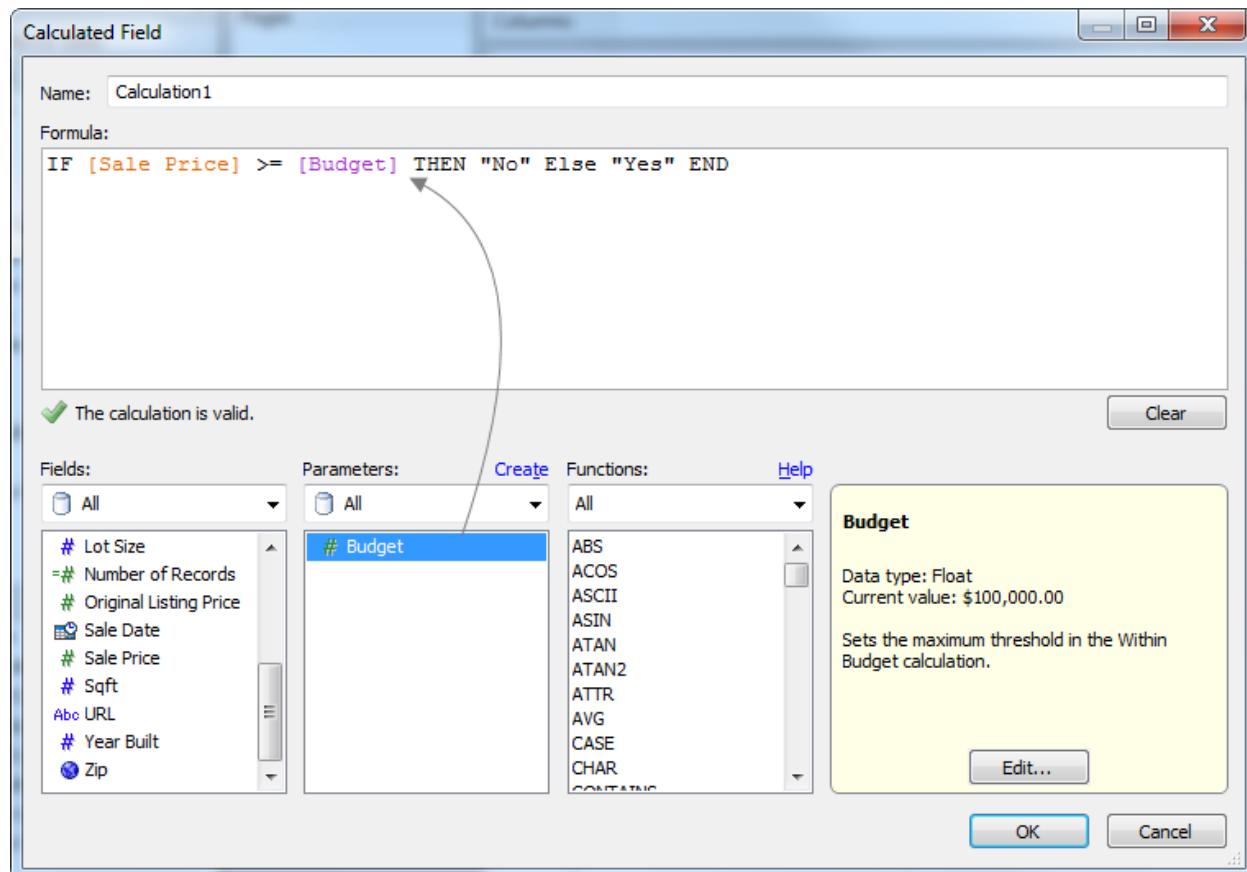
**Note:**

You can delete a parameter by right-clicking it in the Data window and selecting Delete. Any calculated fields that use the deleted parameter will become invalid.

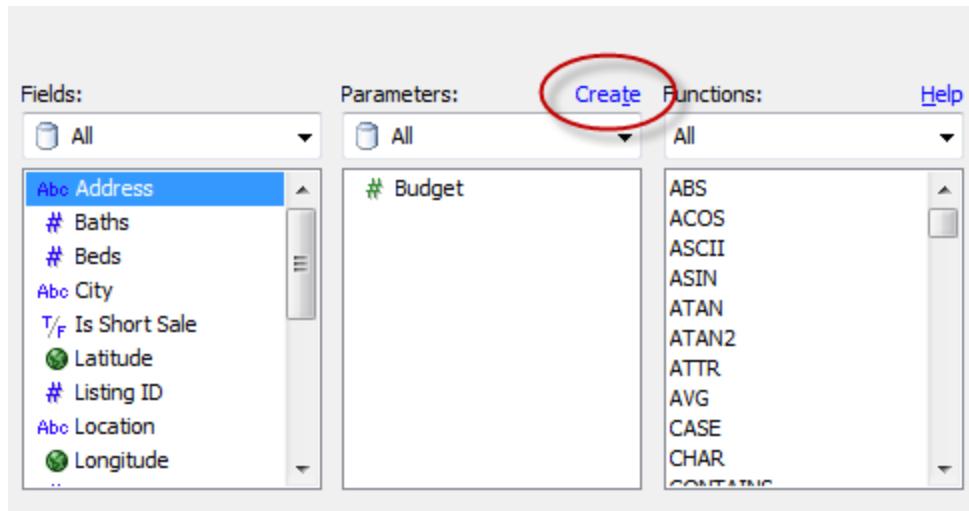
## Using Parameters in Calculations

Parameters give you a way to dynamically modify values in a calculation. Rather than manually editing the calculation (and all dependent calculations), you can use a parameter. Then when you want to change the value, you open the parameter control, change the value, and all of the calculations that use that parameter are updated.

A list of parameters are available in the Calculated Field dialog box. Simply double-click the parameter in the Parameters list to add it to your formula.



Because you often don't realize you need a parameter until you are authoring the calculation, you can create parameters directly from the Calculated Field dialog box. Click the Create link at the top of the Parameters list.

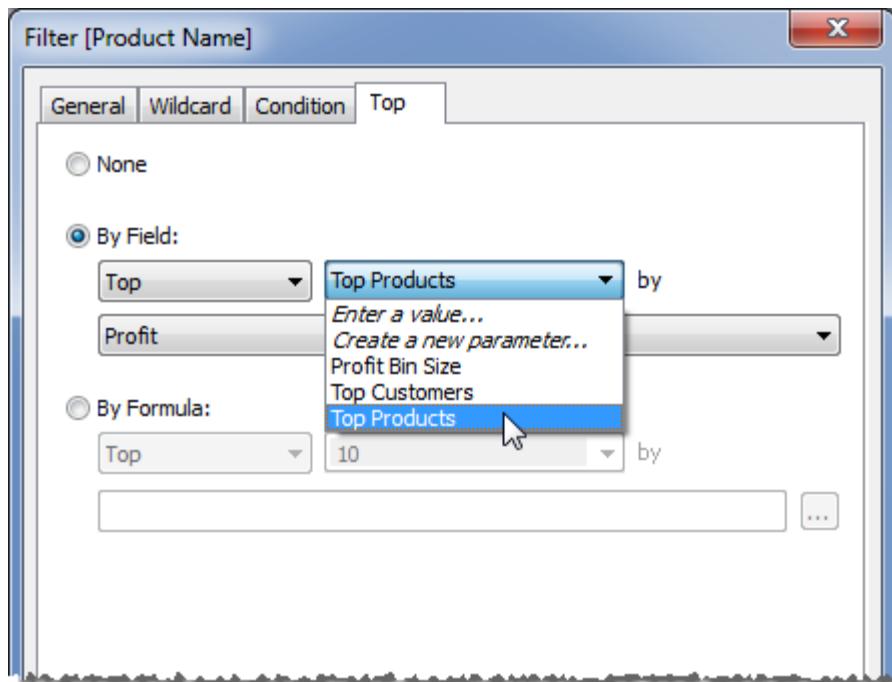


Similar to fields, parameters are written within square brackets in the formula. Parameters are shown as purple in the formula editor.

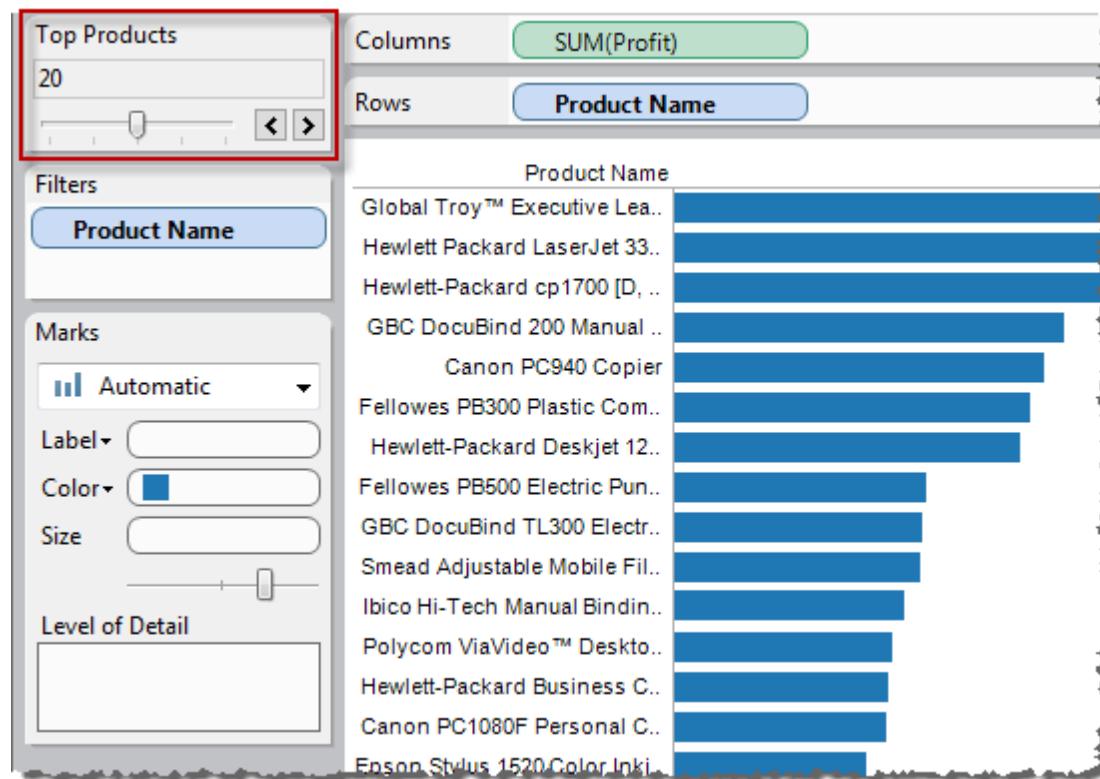
## Using Parameters in Filters

Parameters give you a way to dynamically modify values in a TopN filters. Rather than manually setting the number of values you want to show in the filter, you can use a parameter. Then when you want to change the value, you open the parameter control and the filter updates. For example, when creating a filter to show the Top 10 products based on total profit, you may want to use a parameter instead of the fixed “10” value. That way, you can quickly update the filter to show the top 10, 20, or 30 products.

A list of parameters is available in the drop-down lists on the Top tab of the Filter dialog box. Select the parameter you want to use in the filter.



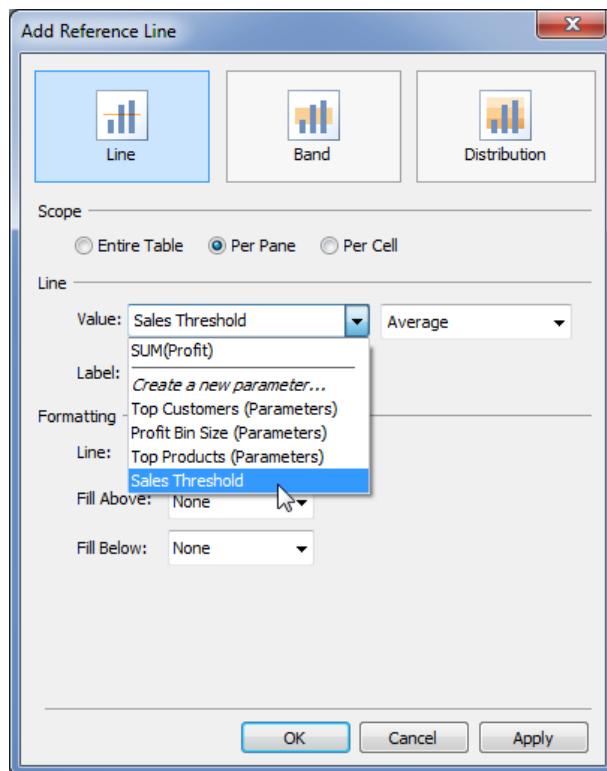
Then show the parameter control by right-clicking the parameter in the Data window and selecting Show Parameter Control. Use the parameter control to modify the filter to show the top 10 products, 15 products, 20 products, and so on.



## Using Parameters in Reference Lines

Parameters give you a way to dynamically modify a reference line. For example instead of showing a reference line at a fixed location on the axis, you can reference a parameter. Then you can use the parameter control to move the reference line.

A list of parameters is available in the Value drop-down list in the Add Reference Line dialog box. Select the parameter you want to use.

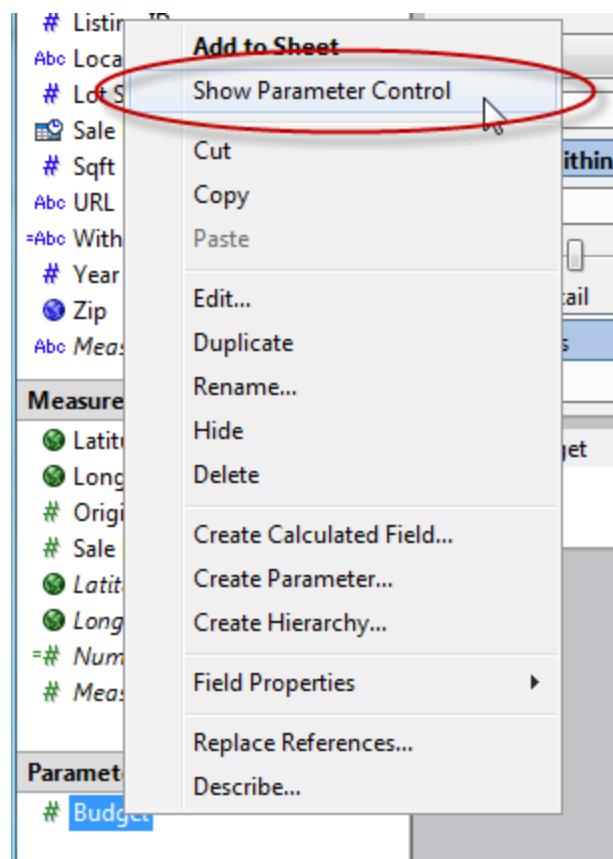


The reference line is drawn at the Current Value specified by the parameter. Open the parameter control by right-clicking the parameter in the Data window and then selecting Show Parameter Control. Use the parameter control to change where the reference line is drawn.

## Parameter Controls

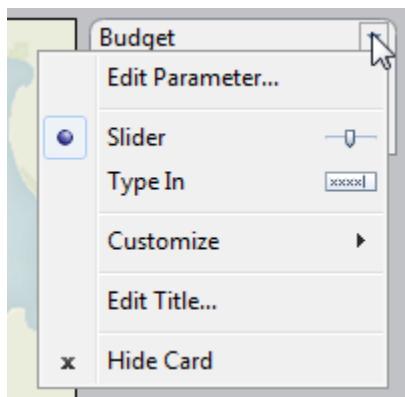
The parameter control is a worksheet card that lets you modify the parameter value. Parameter controls are very similar to quick filter cards in that they contain controls that modify the view. You can open parameter controls on worksheets and dashboards and they are included when you save to the web or publish to Tableau Server.

Open the parameter control by right-clicking the parameter in the Data window and selecting Show Parameter Control.



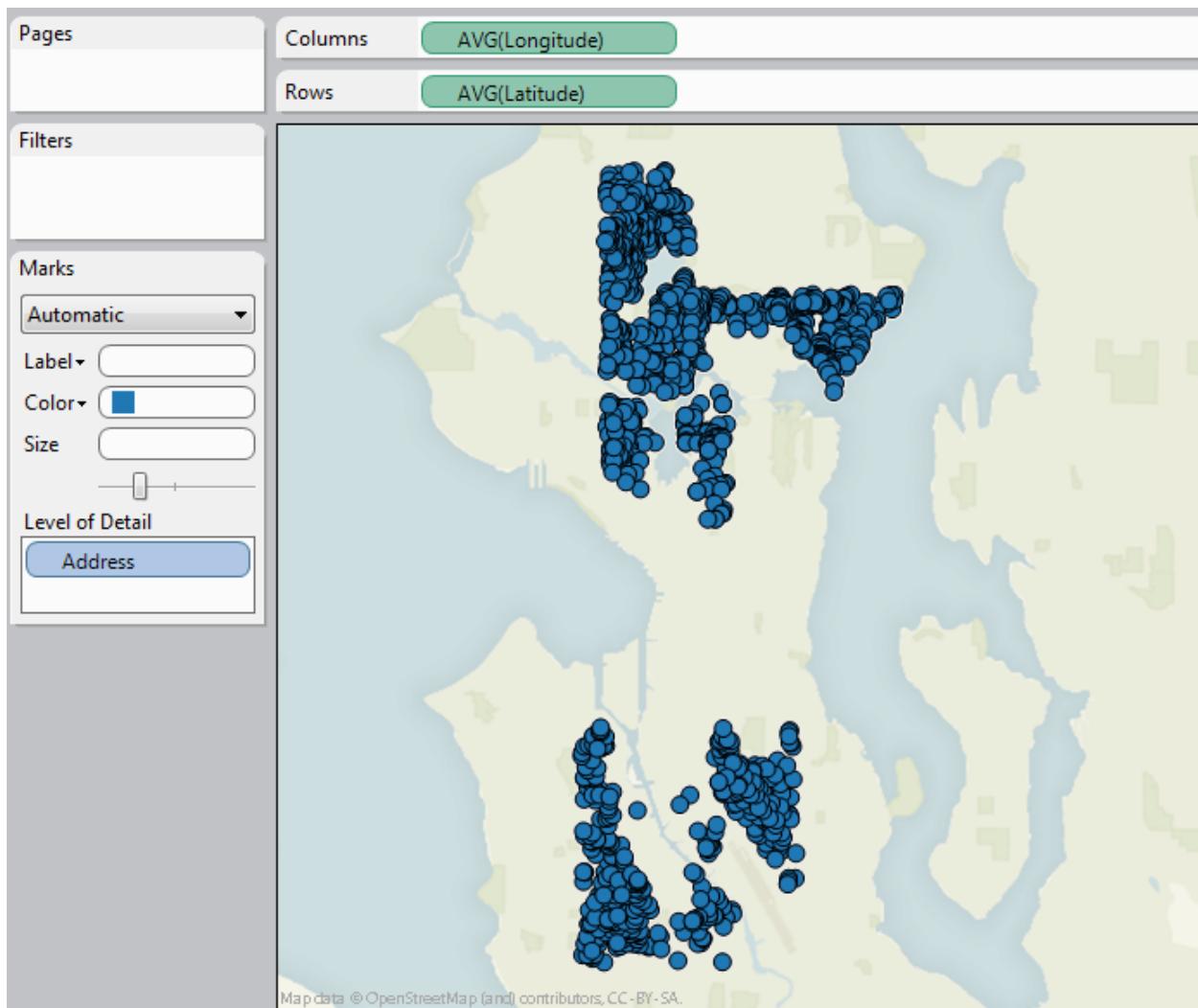
Like other cards, Parameter Controls have a menu that you can open using the drop-down arrow in the upper right corner of the card. Use this menu to customize the display of the control. For example, you can show a list of values as radio buttons, a compact list, a slider, or a type in field. The options available on this menu depend on the data type of the parameter as well as whether it accepts All, a List, or a Range of values.

## Tableau Desktop Help



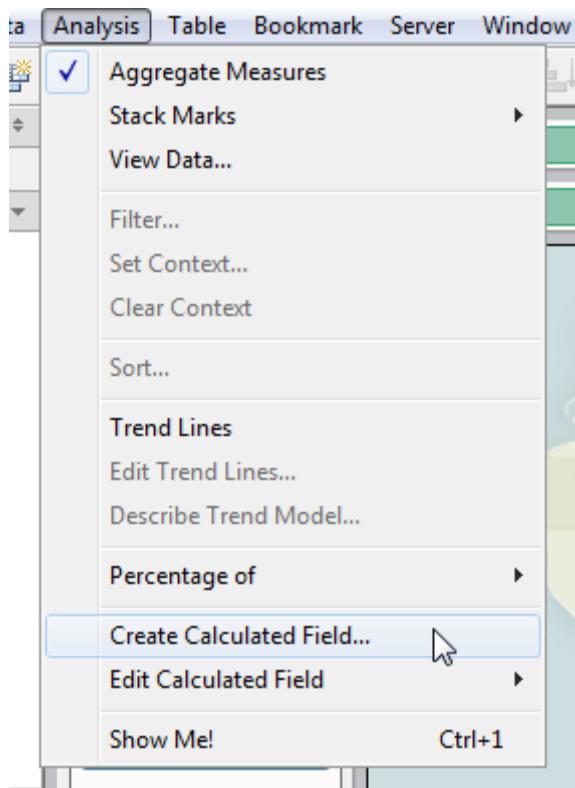
## Example - Parameters

This example uses a data source that contains home sale information. The example below shows a view of recently sold houses in the Seattle area.



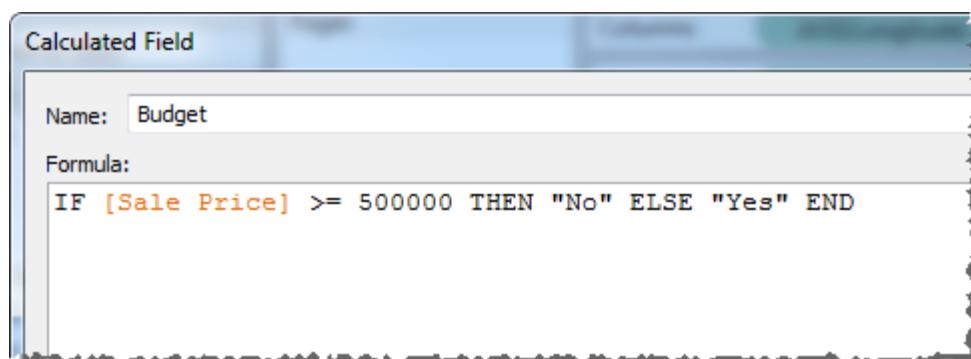
Follow the steps below to create a parameter that is used to color the houses based whether they fit into a specific budget.

1. Open the calculated field dialog box by selecting Analysis > Create Calculated Field.



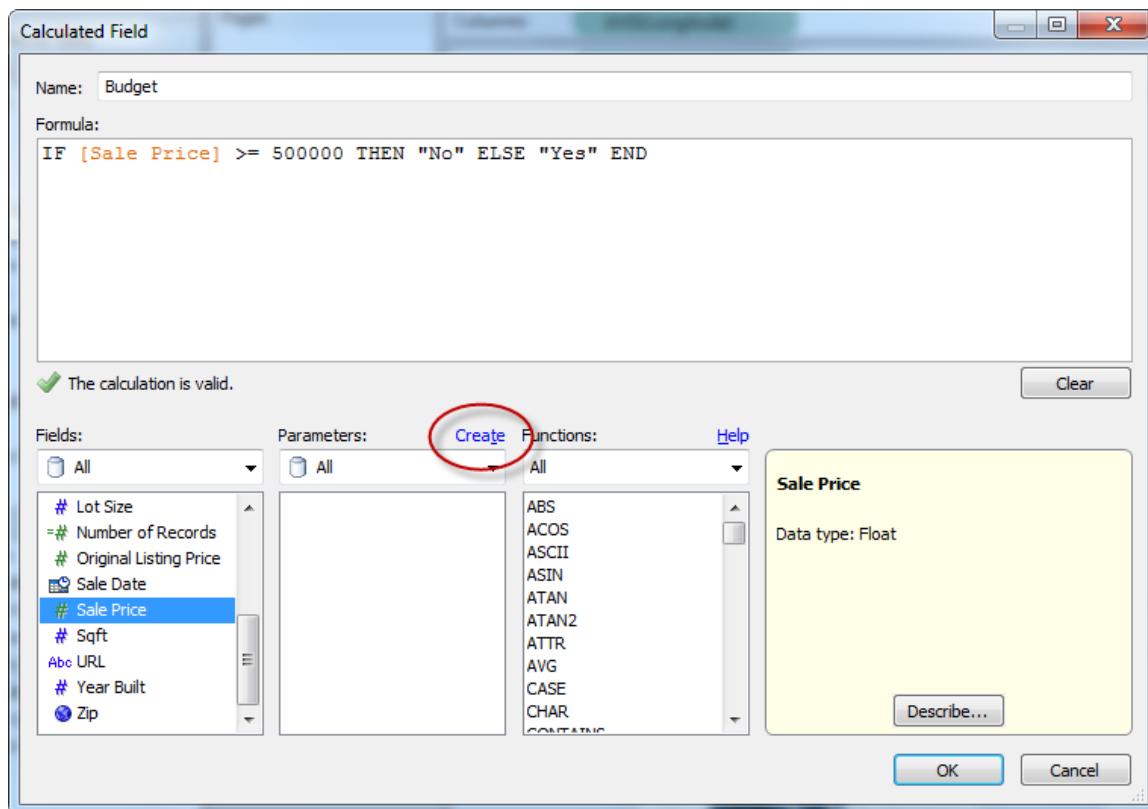
2. Name the field "Within Budget."
3. In the formula type a boolean expression using the IF function. The formula is shown below:

`IF [Sale Price] >= 500000 THEN "No" ELSE "Yes" END`



This formula will create a field that returns No if the sale price is over a budget of 500000. However, this threshold should be dynamic so that you can quickly change the budget without editing the calculation. We need to replace the constant value with a parameter.

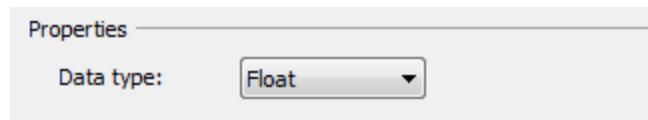
- Click the Create link at the top of the Parameters list in the Calculated Field dialog box.



- Name the parameter "Budget."



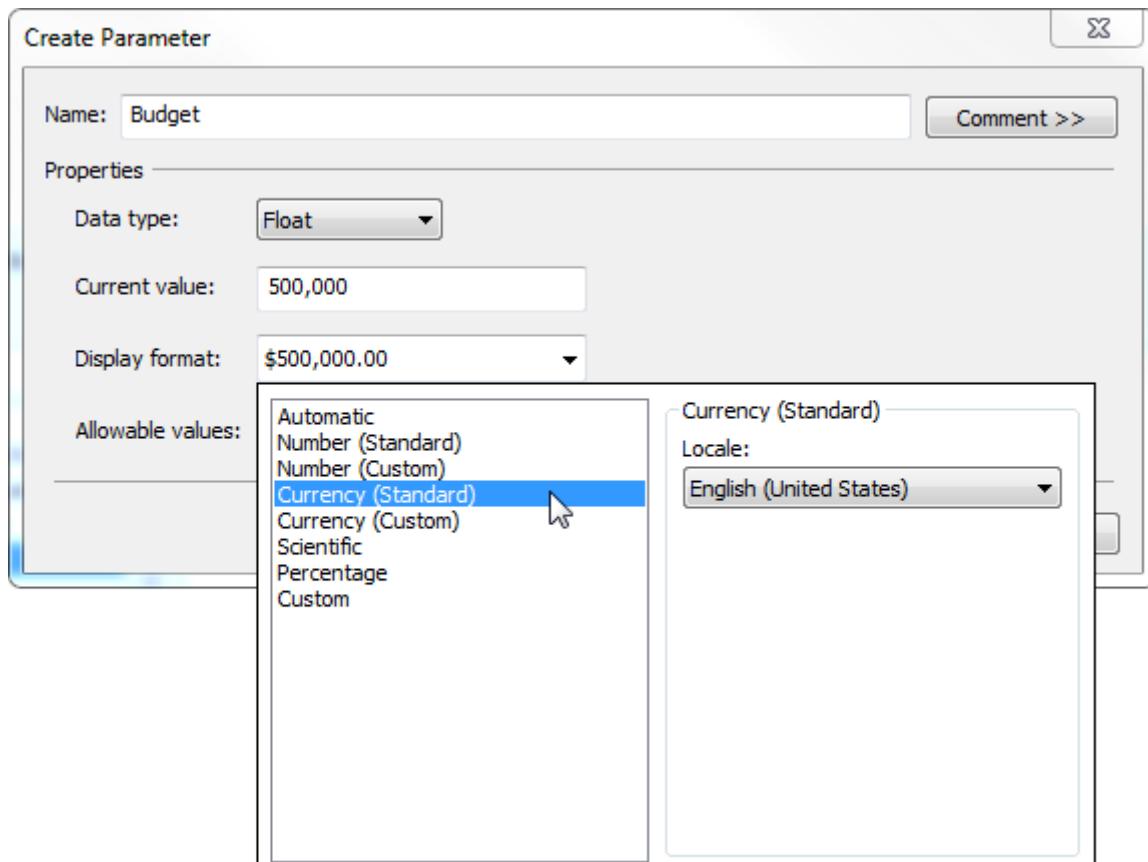
6. Select the *Float* data type because the values will be currency.



7. Set the Current Value to 500000. This is the default value for the parameter and just gives it a starting point.



8. Change the display format to Currency (Standard).

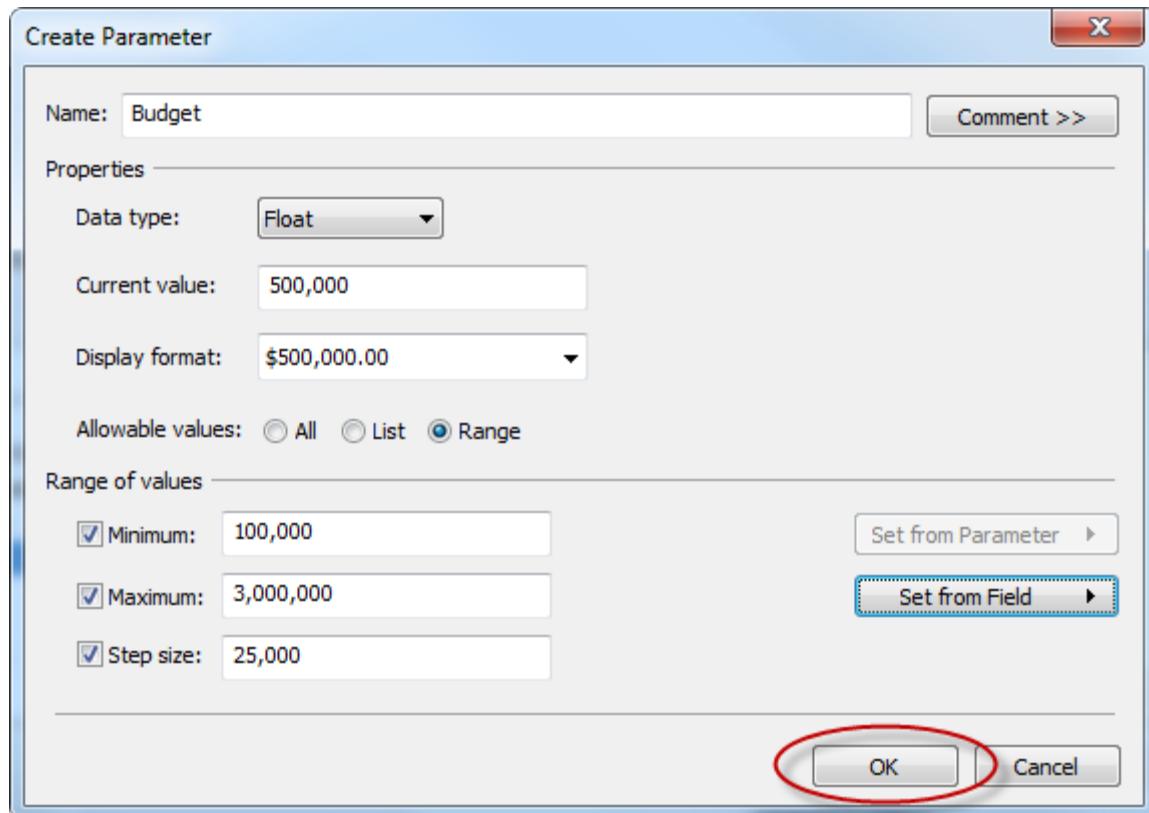


9. Allow a Range of values. Set the Minimum to 100,000 and the Maximum to 3,000,000. Set the Step size to 25,000.

*This definition means that the budget can be between \$100K and \$3M in increments of \$25K.*

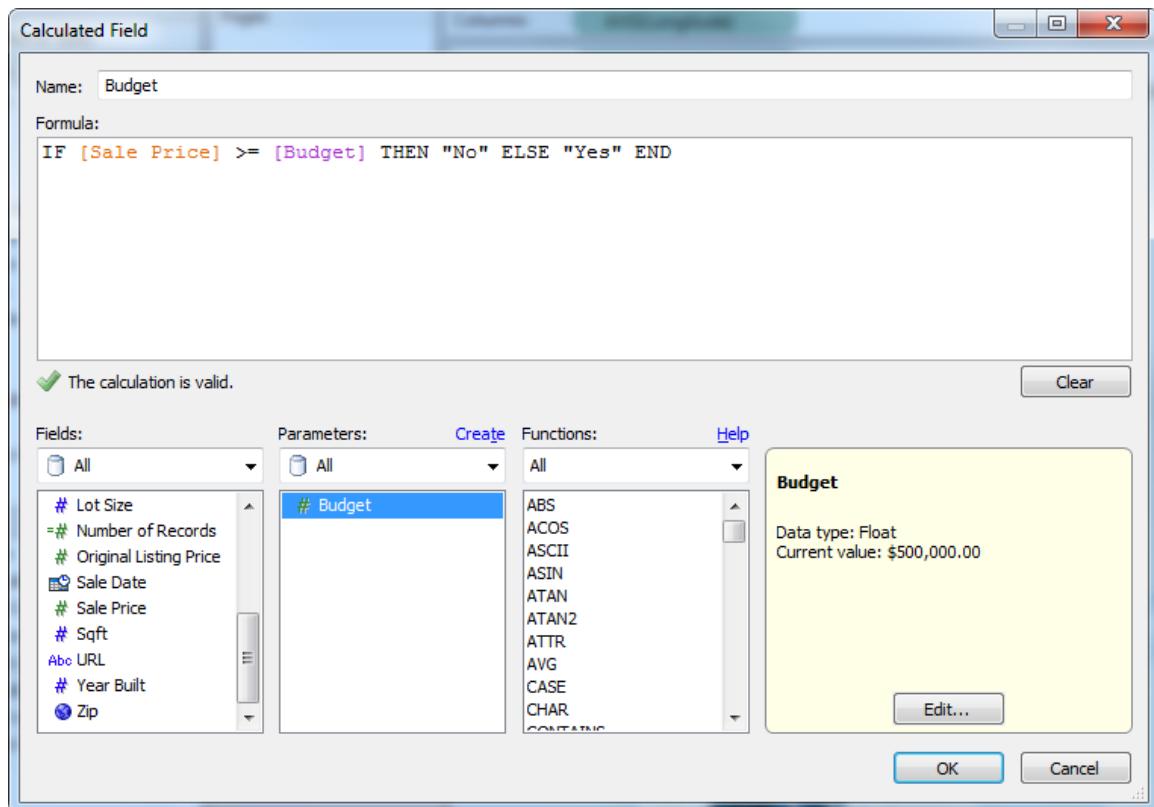
The screenshot shows the 'Range of values' configuration dialog box. It has three radio button options: 'All', 'List', and 'Range'. The 'Range' option is selected. Under 'Range of values', there are three checked checkboxes: 'Minimum' with a value of '100,000', 'Maximum' with a value of '3,000,000', and 'Step size' with a value of '25,000'.

10. When finished, click OK.

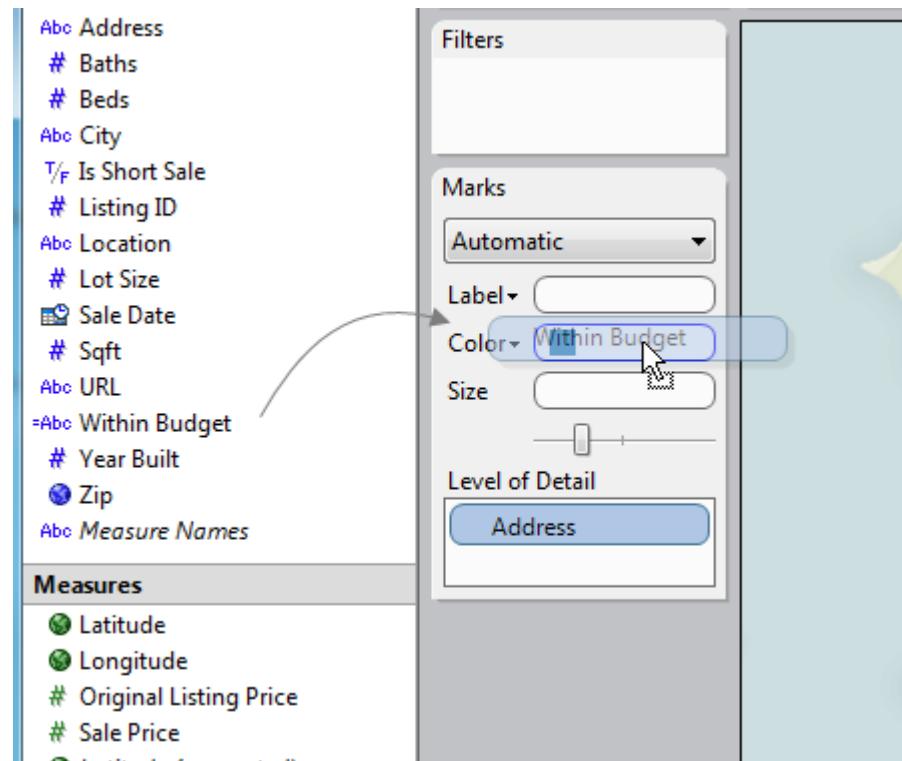


11. Back in Calculated Field dialog box, delete the constant value of "5000000" in the formula. Then double-click the Budget parameter in the Parameters list to add it to the formula. The formula now looks like this:

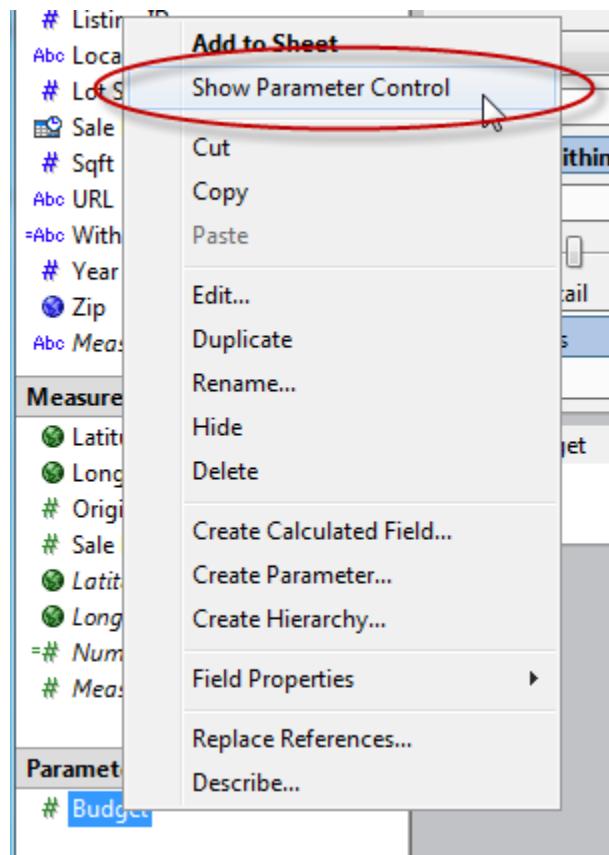
`IF [Sale Price] >= [Budget] THEN "No" ELSE "Yes" END`



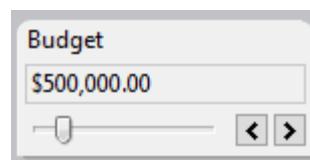
12. Make sure the calculation is valid and then click OK.
13. The new field is added to the Dimensions area of the Data window. Drag the Within Budget field to the Color shelf.



14. Right-click the *Budget* parameter at the bottom of the Data window and select *Show Parameter control*.

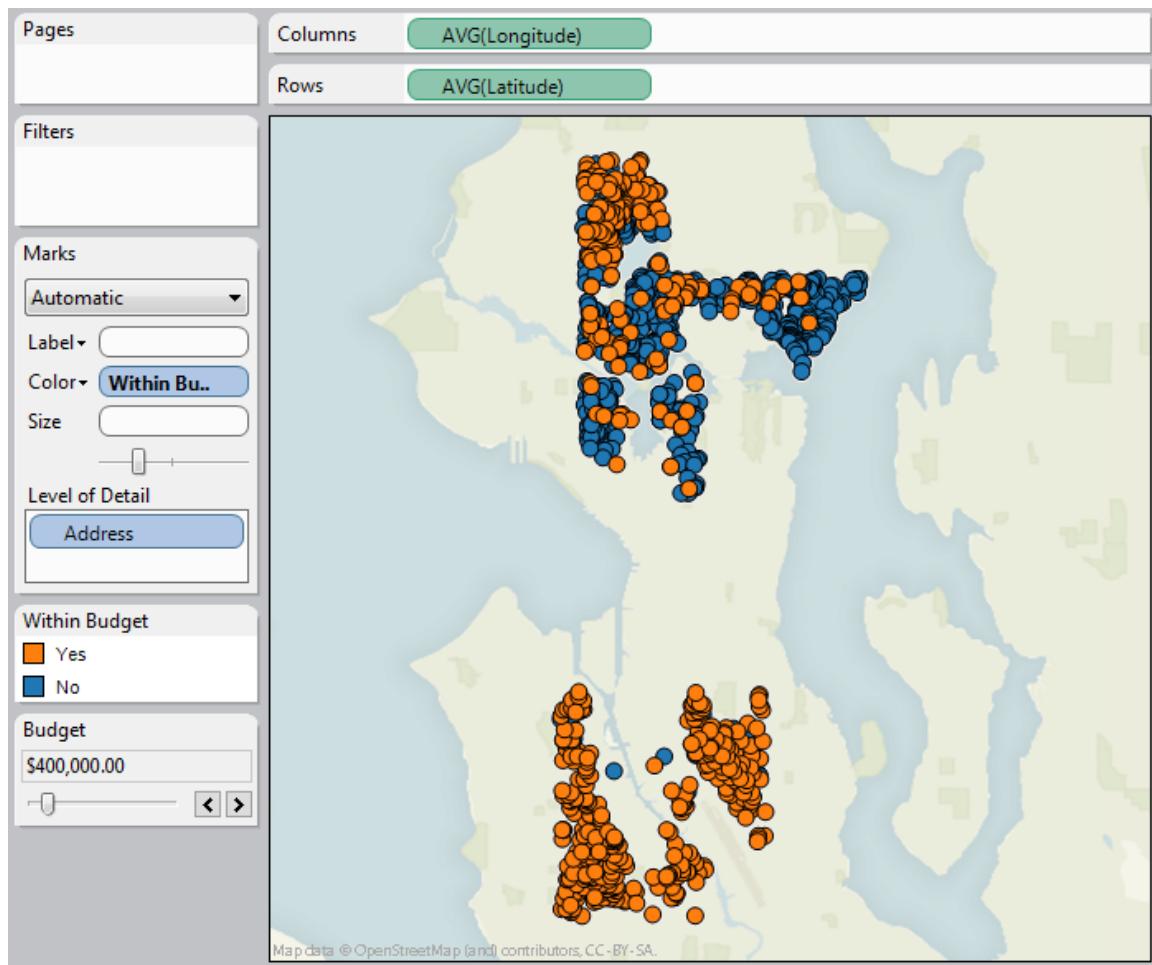


By default the control is shown as a slider. Clicking the right arrow in the control will increase the budget by \$25K.



The view below shows the budget set to \$400,000. Orange houses are within budget and blue are not.

## Tableau Desktop Help



# Background Images

## Background Images

*Background images are images that you display underneath your data in order to add more context to the marks in the view. A common use of background images is adding custom map images that correspond to a coordinate system in your data. For example, you may have data that corresponds to several floors in a building. You can use background images to overlay that data on the actual floor plan of the building to give more context. Other examples of using background images include showing a model of the sea floor, images of web pages for analyzing web logs, and even levels from video games to visualize player statistics.*

*While Tableau allows you to load dynamic maps from the online and offline provider, background images allow you to use your own custom images whether they are special maps or any other image that corresponds to your data.*

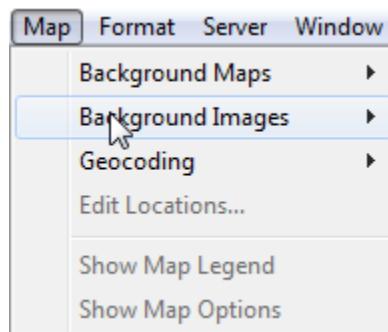
- [Adding Background Images](#)
- [Setting up the View](#)
- [Managing Background Images](#)

## Adding Background Images

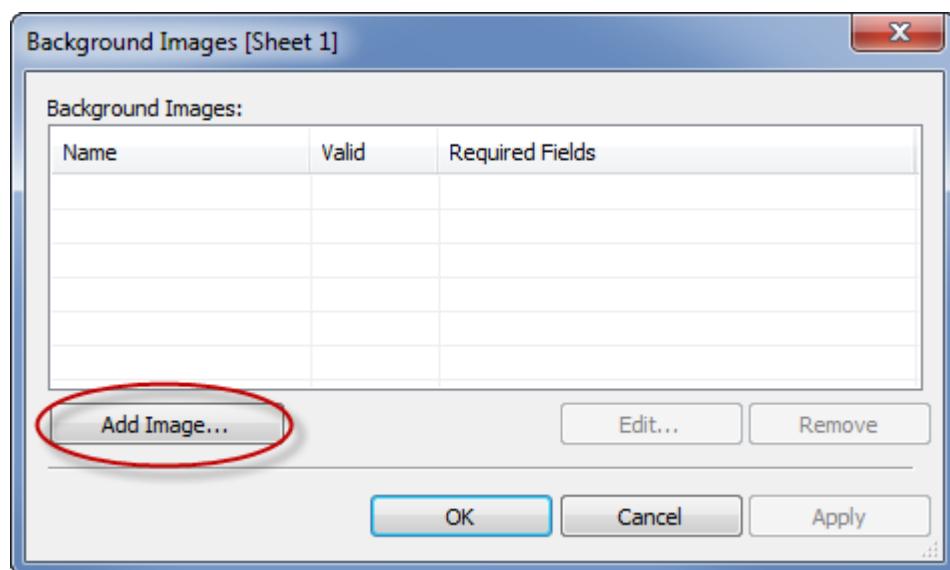
When you add a background image to the view, you need to specify a coordinate system by mapping both the x and y axes to the values of fields in your database. If you are adding a map, the x and y axes should be longitude and latitude expressed as a decimal. However, you can map the axes to any relevant fields based on your own coordinate system.

**To add a background image:**

1. Select Map > Background Images and then select a data source.

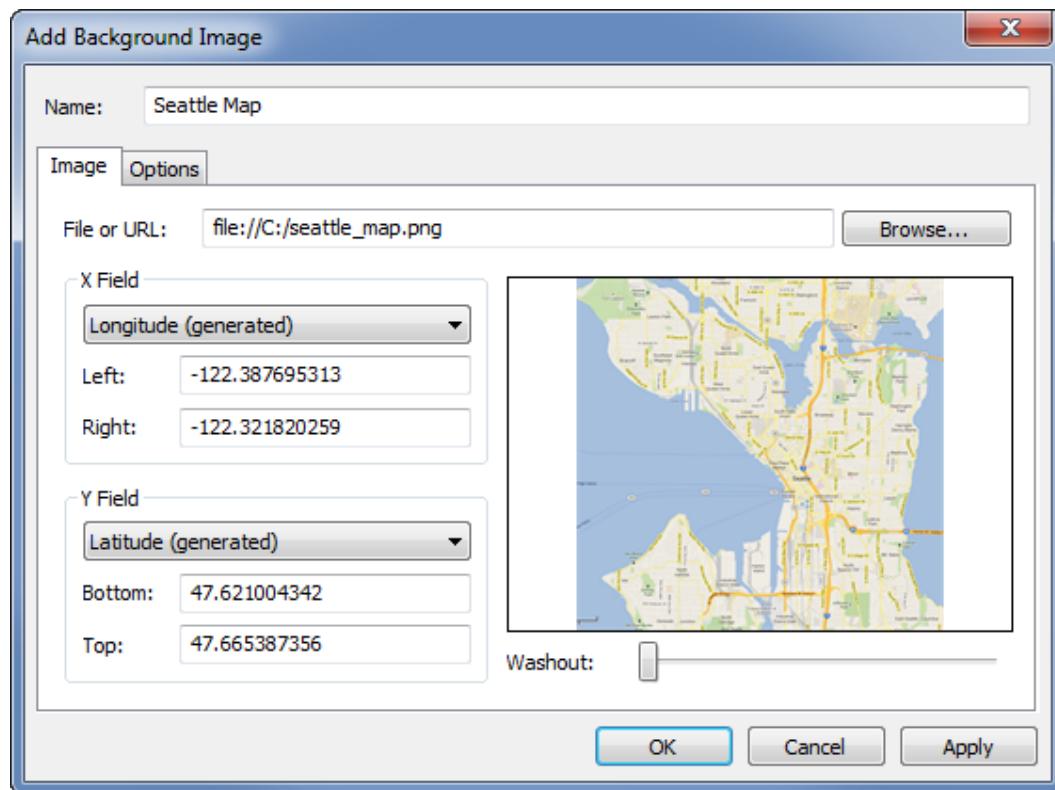


2. In the Background Images dialog box, click Add Image.

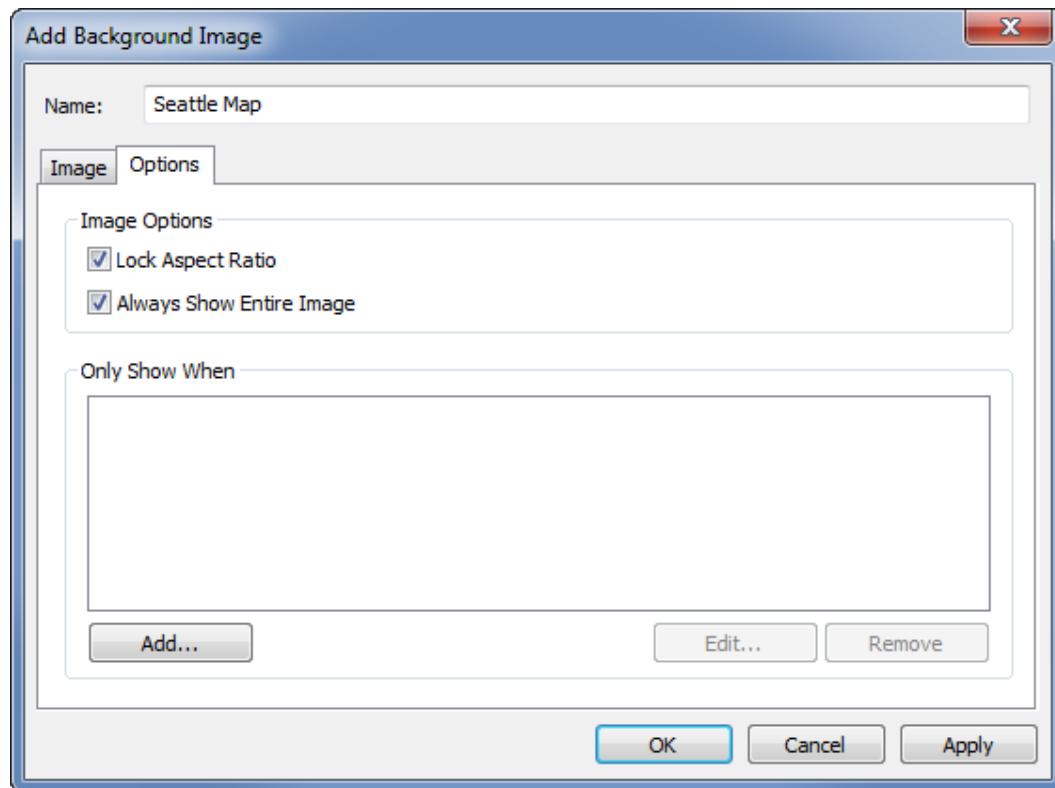


3. In the Add Background Image dialog box do the following:

- Type a name for the image into the Name text box.
- Click Browse to navigate to and select the image you want to add to the background. You can also type a URL to link to an image hosted online.
- Select the field to map to the x-axis of the image and specify the left and right values. When adding a map, the longitude values should be mapped to the x-axis using decimal values (instead of degrees/minutes/seconds or N/S/E/W).
- Select the field to map to the y-axis of the image and specify the top and bottom values. When adding a map, the latitude values should be mapped to the y-axis using decimal values (instead of degrees/minutes/seconds or N/S/E/W).
- You can adjust the intensity of the image using the Washout slider. The farther the slider moves to the right, the more faded the image will appear behind your data.



4. You can specify the following options using the Options tab:
- Lock Aspect Ratio - select this option to maintain the original dimensions of the image for any manipulations of the axes. Deselecting this option allows the image's shape to be distorted.
  - Always Show Entire Image - select this option to avoid cropping the image when the data encompasses only a portion of the image. If you lock both the axis in a view, this option may be negated.
  - Add conditions for when to show the image. Refer to [Adding Conditions to Filters](#) to learn more about defining conditions.



5. Click OK.

When you add the x and y fields to the Rows and Columns shelf in the view, the background image displays behind the data. If the background image does not display, make sure that you are using the disaggregated measures for the x and y fields. You

*can disaggregate all measures by selecting Analysis > Aggregate Measures or change each measure individually by right-clicking the field on the shelf and selecting Dimension. Finally, if you've used the generated Latitude and Longitude fields for the x and y fields, you'll need to disable the built in maps before your background image will display. Select Map > Background Maps > None to disable the built-in maps.*

**Note:**

*In order to make the marks in a view more visible when placed on top of a background image, each mark is surrounded by a solid contrasting color called a halo. You can turn mark halos off by selecting Format > Show Mark Halos.*

## Setting up the View

After you add a background image, you need to build the view in a way that matches the x and y mappings you specified for the image. That is, the fields you specified as x and y must be on the proper shelves. Follow the steps below to set up the view correctly:

1. Place the field mapped to the x-axis on the Columns shelf.

If you are working with maps, the longitude field should be on the columns shelf. It may seem backward at first, however, the fields on the columns shelf determine the values distributed across the x-axis.

2. Place the field mapped to the y-axis on the Rows shelf.

If you are working with maps, the latitude field should be on the rows shelf. It may seem backward at first, however, the fields on the rows shelf determine the values distributed across the y-axis.

## Managing Background Images

### Managing Background Images

You can add several background images to the workbook and then select the image or images to make active on each sheet. The Background Images dialog box lists all of the images, the required fields, and whether they are visible. The visibility is determined based on whether the required fields are used in the current view.

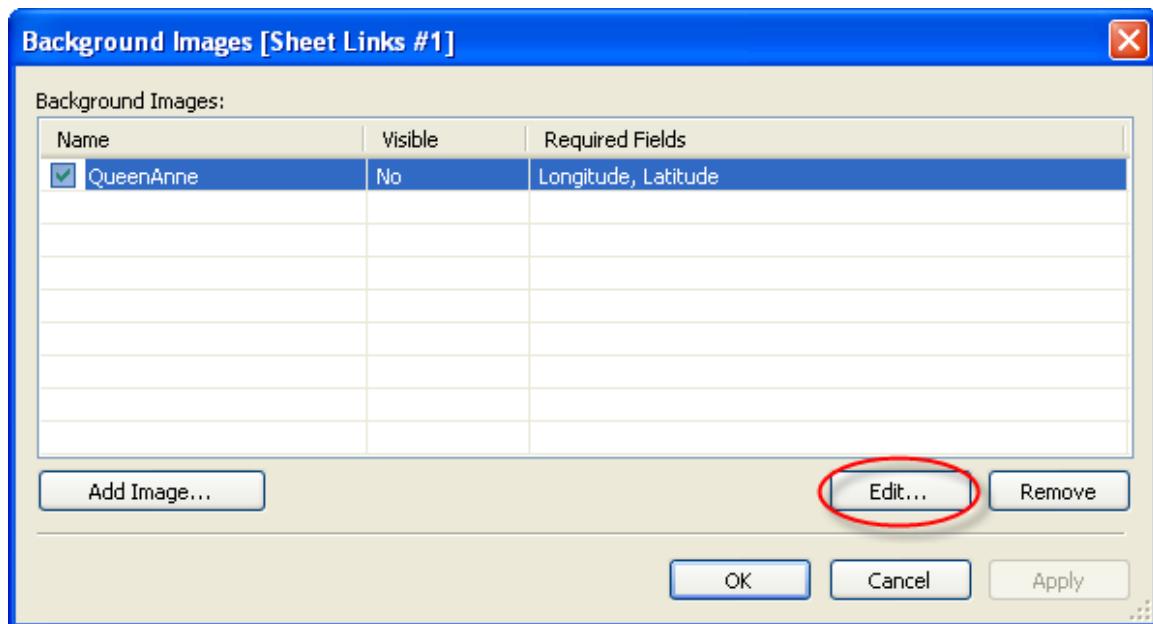
- [Editing an Image](#)
- [Enabling/Disabling Images](#)
- [Adding Show/Hide Conditions](#)
- [Removing an Image](#)

## Editing an Image

*After adding a background image, you can always go back and edit the x and y field mappings as well as any of the options on the Options tab.*

*To edit an image:*

1. Select Map > Background Images.
  2. In the Background Images dialog box, select the image you want to edit and click Edit (you can also just double-click the image name).



3. In the *Edit Background Image* dialog box, make the changes to the image and click OK.

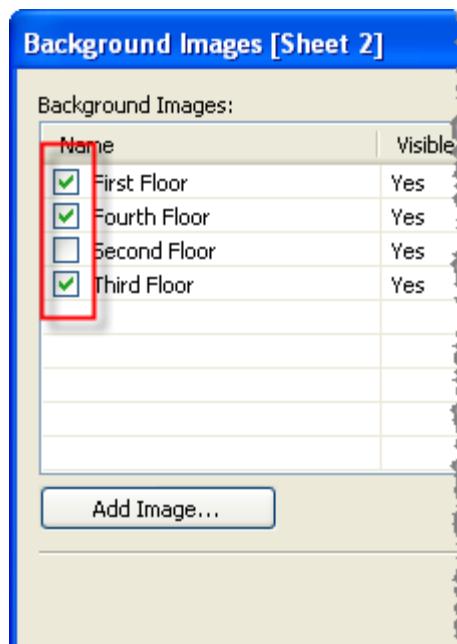
## Enabling/Disabling Images

Although you can add multiple images to a workbook, you may want to only use a subset of the images for a particular set of worksheets. For example, you may want to show a map of the entire United States of America on one view, and maps of individual states in other views.

Use the checkboxes in the Background Images dialog box to enable and disable the images for the current worksheet. You can show several images by enabling multiple images on a single worksheet. For example, you may have several images that you want to tile in the background to make a larger background image.

To enable or disable a background image:

1. Select Map > Background Images.
2. In the Background Images dialog box, select the checkboxes next to the images you want enabled.



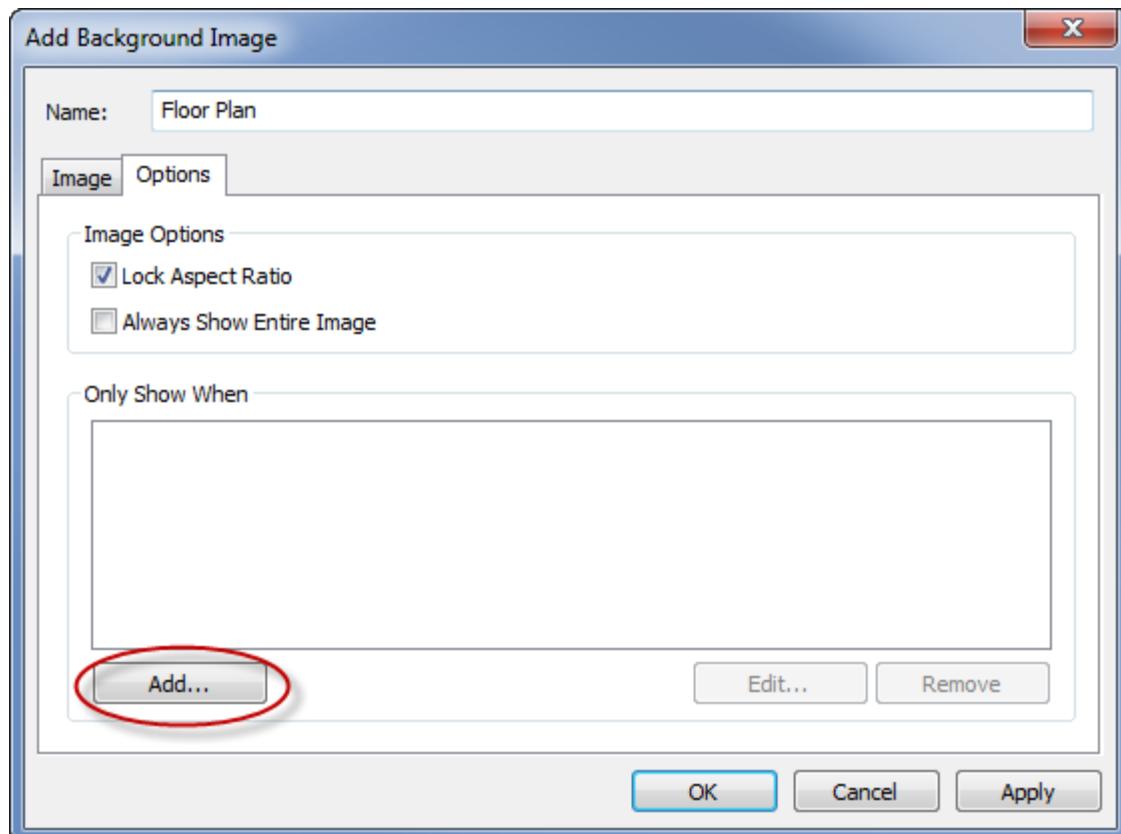
3. Click OK.

## Adding Show/Hide Conditions

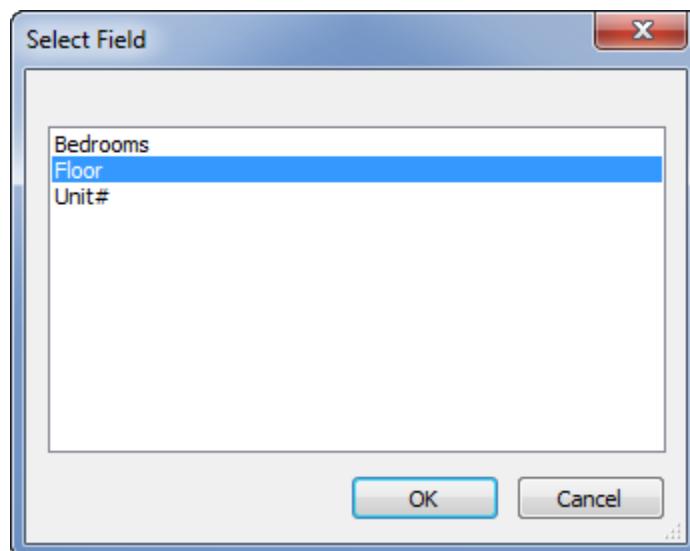
*When you add a background image and enable it, the image will be shown automatically on any worksheet that has the required fields used in the view. To avoid showing an image on all the worksheets, you can specify show/hide conditions. Show/Hide conditions are conditional statements that you define to specify when to show the image. For example, you may have a floor plan image for a multi-story building. While each image is associated with the same coordinates (the corners of the building), you do not want to show the first floor map when looking at the third floor information. In this case, you can specify a condition to only show the first floor image when the Floor field is equal to one.*

### **To specify show/hide conditions:**

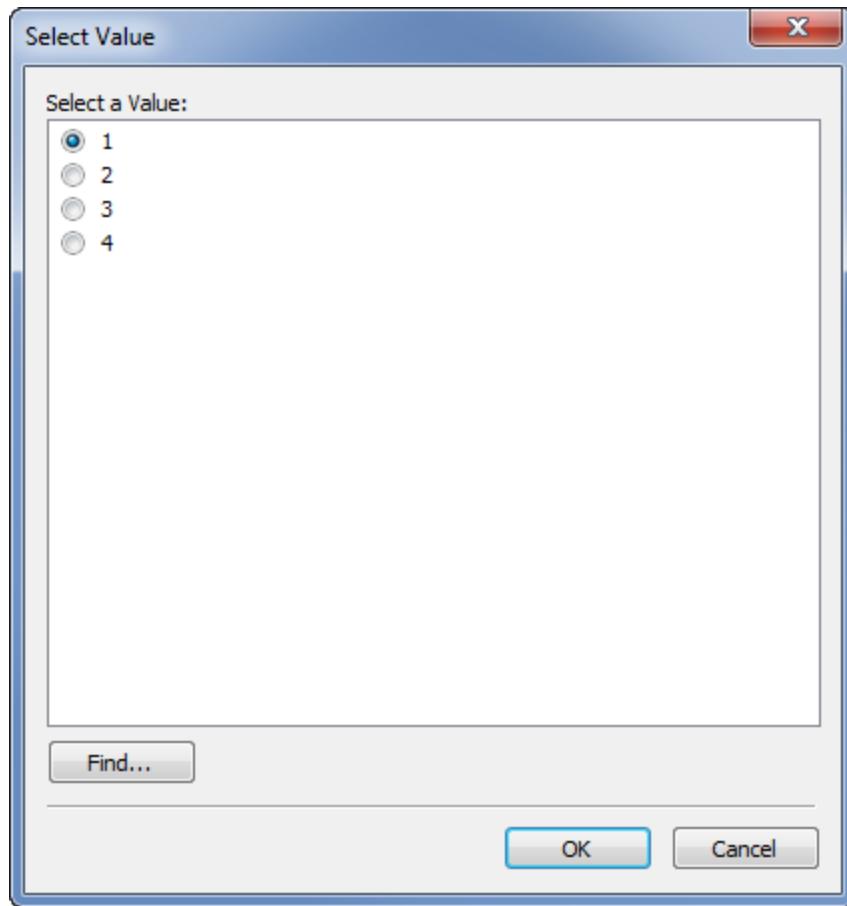
1. *Select Map > Background Images and then select a data source.*
2. *In the Background Images dialog box, select the image you want to add a condition to and click Edit.*
3. *In the subsequent dialog box, select the Options tab.*
4. *Click the Add button at the bottom of the dialog box.*



5. Select a field to base the condition on. In the example described above, the field is Floor.



6. Specify when you want to show the image by selecting a value of the field. For this example, one is selected.



7. Click OK.

A condition statement is added to the image. In the building floor plan example, the condition statement is Only show the image when Floor is equal to One.

8. Click OK twice to close the Background Image dialog boxes and apply the changes.

**Note:**

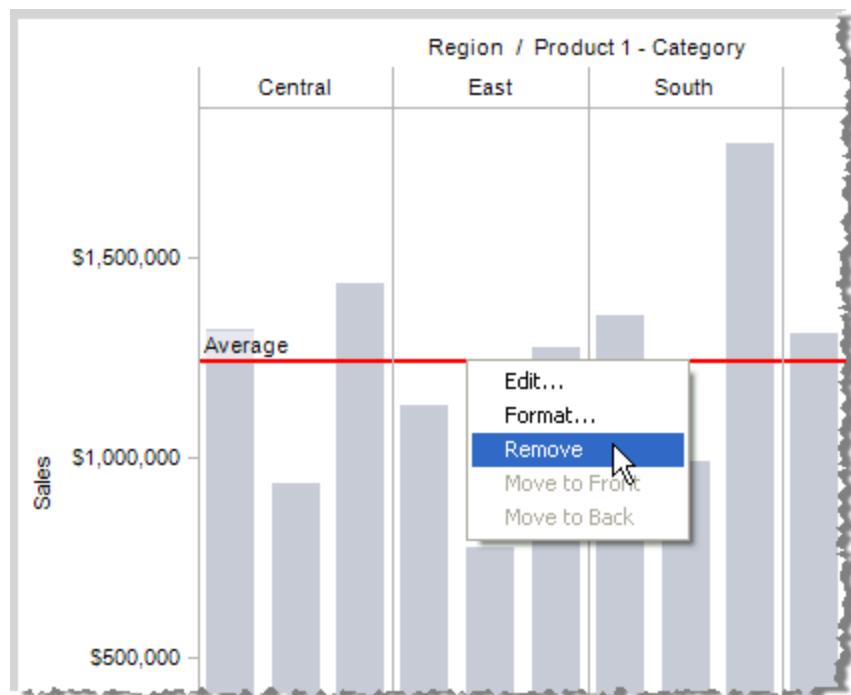
*When you add multiple conditions, the background image will only show when all conditions are met. For example, if a background image has two conditions on Property Name and Floor, it will only show when Property is Greenwood Estates and Floor is 3.*

## Removing an Image

When you no longer want to use a background image you can either disable it or remove it, making it unavailable to all worksheets.

**To remove an image:**

1. Select Map > Background Images.
2. In the Background Images dialog box, select the image you want to remove and click Remove.



3. Click OK.

# Background Maps

## Background Maps

*When you are connected to data that contains location information you can automatically show the data on an online or offline map. Once a map is loaded, you can zoom in and out, pan around the map, or focus on specific regions using the Navigation tools. This section discusses how to build a view using Tableau's background maps feature.*

*If you would like to overlay your data on a static image instead you can use a background image. Refer to [Background Images](#) to learn how.*

- [Geographic Roles](#)
- [Building a Map View](#)
- [Map Options](#)
- [Setting a Default Location](#)
- [Editing Locations](#)
- [Custom Geocoding](#)
- [Background Map Sources](#)
- [Map Storing and Working Offline](#)

## Geographic Roles

*The first step to building a map view is to specify the fields that contain the location data. Tableau will automatically assign geographic roles to fields with common location names such as State, Country, and so on. You can manually assign geographic roles to fields that don't use common names and weren't automatically detected.*

**To assign a geographic role:**

- 1. Right-click the field in the Data window that contains geographic data and select Geographic Role. Then select the type of data the field contains.*

The screenshot shows the Tableau Data window with the 'Data' tab selected. A context menu is open over the 'State' field under the 'Customer City' dimension. The menu options include: Add to Sheet, Copy, Paste, Duplicate, Rename..., Hide, Remove from Hierarchy, Create Calculated Field..., Create Group..., Create Set..., Create Parameter..., Convert to Measure, Change Data Type, Geographic Role, Field Properties, Replace References..., and Describe... . A secondary dropdown menu for 'Geographic Role' is open, listing options: None, Area Code, CBSA/MSA, City, Country, County, State/Province, and ZIP Code/Postcode. The 'State/Province' option is highlighted.

When you assign a field a geographic role it is marked in the Data window with a globe icon . What that means is that Tableau has automatically geocoded the information in that field and associated each value with a latitude and longitude value. Two automatic fields are added to the Measures area of the Data window: Latitude (generated) and Longitude (generated). These fields are available anytime you have use Tableau to geocode your data.

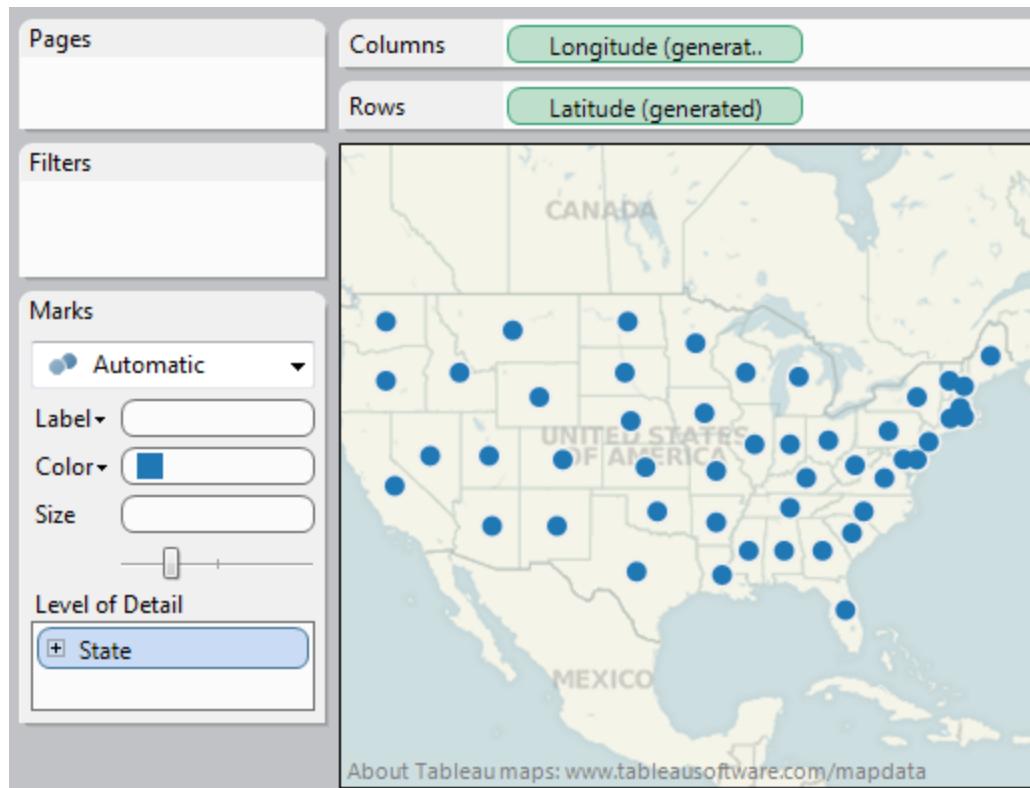
Measures
# Discount
# Order Quantity
# Product Base Margin
# Profit
=# Profit Ratio
# Row ID
# Sales
# Shipping Cost
=# Time to Ship
# Unit Price
🌐 Latitude (generated)
🌐 Longitude (generated)
=# Number of Records
# Measure Values

Below is a table describing the types of information that Tableau can geocode.

Geographic Role	Description
Area Code	U.S. Area Codes; numbers only. Examples: 206, 650, 415
CBSA/MSA	U.S. Core Based Statistical Area. Example: Dallas-Fort Worth-Arlington, TX
City	Worldwide city names. Examples: Seattle, Bordeaux, Stuttgart
Country	Worldwide countries. Includes names, FIPS 10, 2 Character (ISO 3166-1), or 3 Character(ISO 3166-1). Examples: AF, CD, Japan, Australie, Brasilien, BH, AFG, UKR
County	U.S. county names. Examples: King, Clark, Oneida
Latitude	Latitude in decimal degrees. Only available for numeric fields.
Longitude	Longitude in decimal degrees. Only available for numeric fields.
State/Province	Worldwide states and provinces. Includes abbreviations and names. Examples: WA, BC, AB, Auitaine, Hesse, Washington
ZIP Code/Postcode	ZIP Codes and Postcodes for the United States, France, Germany, United Kingdom, Canada, Australia, and New Zealand.

## Building a Map View

You can use the generated latitude and longitude fields to build map views simply by double-clicking a geographic field in the Data window. The Show Me! double-click rules will automatically add the generated Latitude and Longitude fields to the shelves and place the geographic field on the Level of Detail shelf.



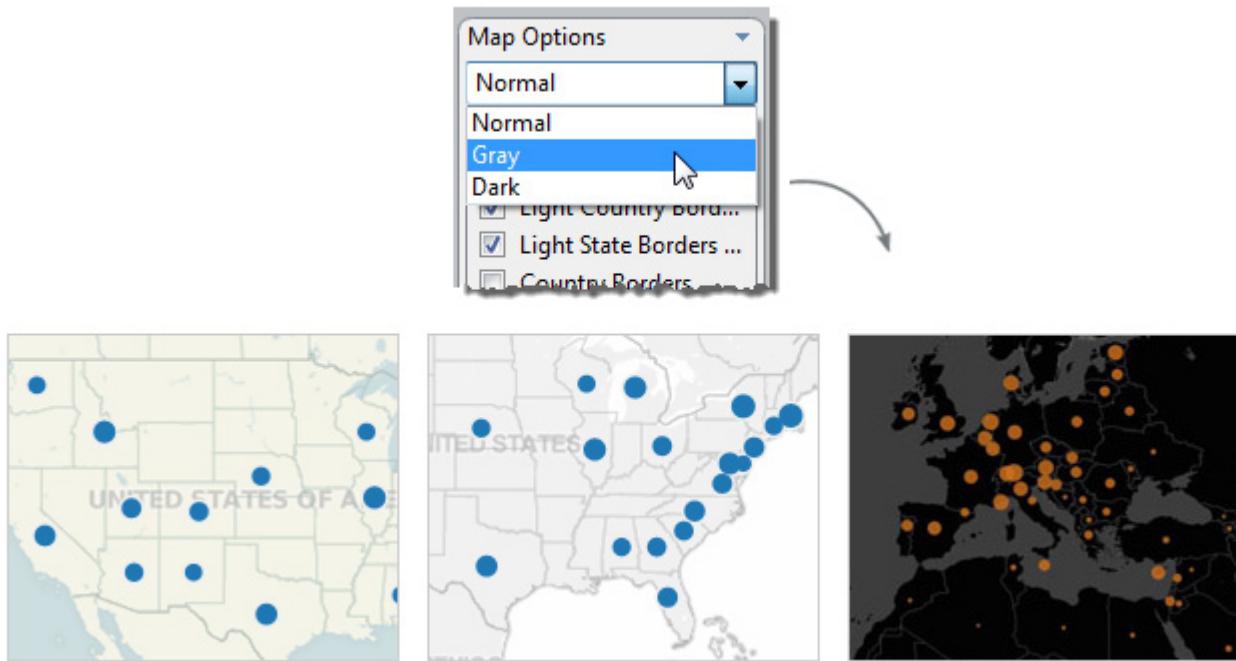
The marks in the view correspond to the field on the Level of Detail shelf. For example, above the State field is used in the view so there is a single mark for each state. As you add more geographic fields to the Level of Detail shelf, the marks in the view will be broken down by the members of those fields. Refer to [build\\_manual.htm#i999891](#) to learn more about how this shelf works.

When you first create a map view you have several options available including a variety of layers such as streets and highways, place names, and so on. Refer to [Map Options](#) to learn more.

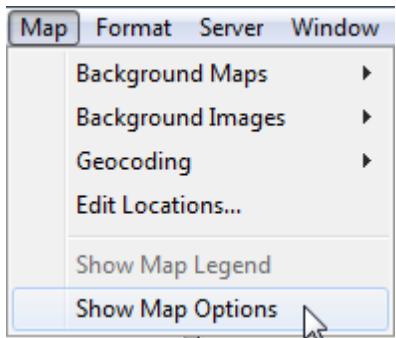
## Map Options

### Map Options

When you load a map there are several options to help you control the display of the map. For example, you can select between the normal, grayscale, or dark map styles using the drop-down menu at the top of the Map Options card.



You can turn on layers such as streets and highways, state and county boundaries, and place names. You can also apply data layers containing census information such as population and average household income. Finally you can adjust the washout to make the map fade into the background more. All of these options are set from the Map Options card, which displays by default when you create a map image. You can also turn it on by selecting Map > Show Map Options.

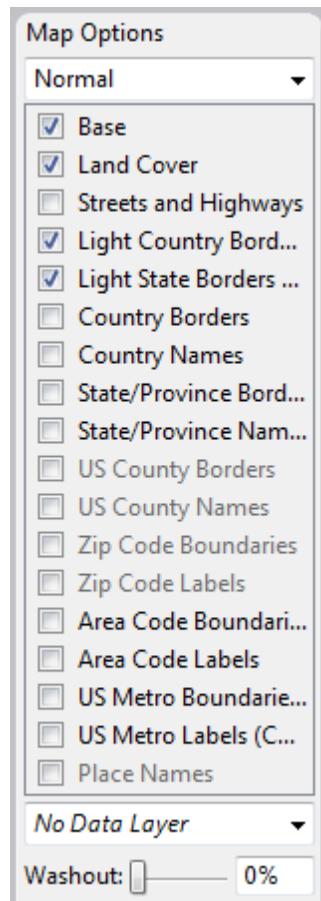


- [\*\*Map Layers\*\*](#)
- [\*\*Data Layers\*\*](#)
- [\*\*Washout\*\*](#)

## Map Layers

Tableau online maps provide several layers that can mark points of interest on the map. For example, overlay streets and highways, county boundaries, and more. These layers are displayed in the Map Options card. Select Map > Show Map Options to show the map options card.

Turn on layers by selecting them in the Map Options card.



Many layers are only visible at specific zoom levels. [data\\_inspection.htm#i1040171](#) to learn more about navigating the view. Each of the map layers are described in the table below.

Layer Name	Description
Base	Shows the base map including water and land areas.
Landcover	Shades wilderness areas and parks to give the map more depth.

<b>Layer Name</b>	<b>Description</b>
Streets and Highways	Marks freeways and highways as well as small city streets. This layer includes the highway and street names as well.
Light Country Borders	Shows a light gray outline of country borders and names.
Light State Borders	Shows a light gray outline of state borders and names.
Country Borders	Highlights country borders in a darker gray.
Country Names	Highlights country names in a darker gray.
State/Province Borders	Highlights state and province borders in a darker gray.
State/Province Names	Highlights state and province names in a darker gray.
US County Borders	Highlights U.S. county borders.
US County Names	Highlights U.S. county names.
Zip Code Boundaries	Marks U.S. zip code boundaries. You must zoom in to see this layer.
Zip Code Labels	Shows labels for U.S. zip codes. You must zoom in to see this layer.
Area Code Boundaries	Marks the U.S. area code boundaries. You must zoom in to see this layer.
Area Code Labels	Shows labels for the U.S. area codes. You must zoom in to see this layer.
US Metro Boundaries (MSA)	Marks U.S. Metropolitan Statistical Areas.
US Metro Labels (MSA)	Shows labels for the U.S. Metropolitan Statistical Areas.
Place Names	Displays the names of places from country names and borders to city names, bodies of water, parks, universities, and more. This layer is very dependent on the zoom level.

*If you find that you have a set of layers that you'd always like to show whenever you create new workbooks or sheets, you can set the current selections as the default.*

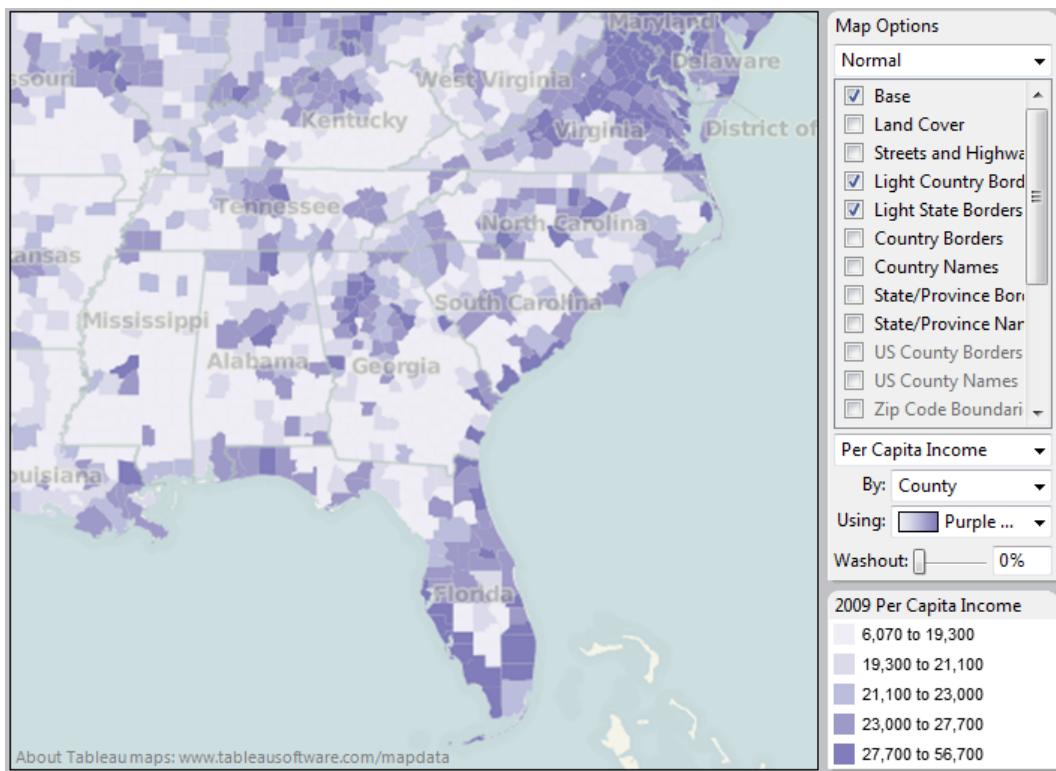
**To set the current map options as the default:**

1. Select the layers you want to show by default.
2. Select Update Defaults on the Map Options card menu.



## Data Layers

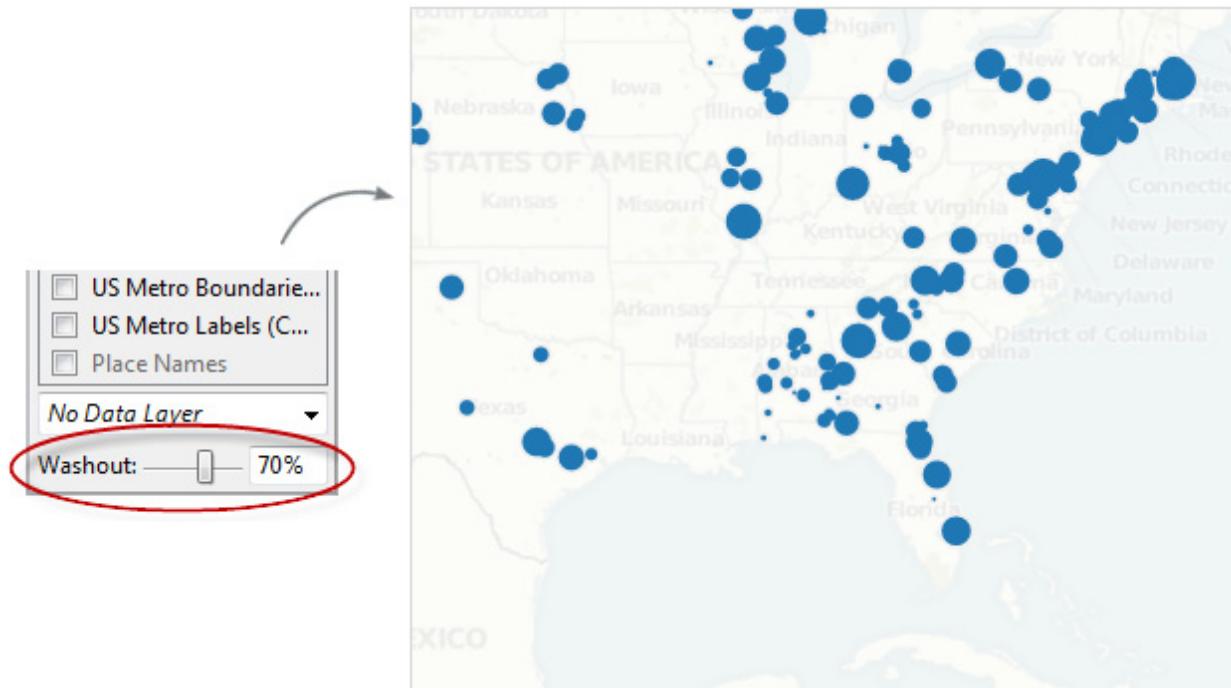
In addition to map layers you can turn on a variety of predefined data layers that show census information. The data layers are added as shading to the map and a legend is shown to explain the colors. You can change the level to show as well as the color legend using the drop-down menus on the map options card.



Hide and show the legend by selecting Map > Show Map Legend.

## Washout

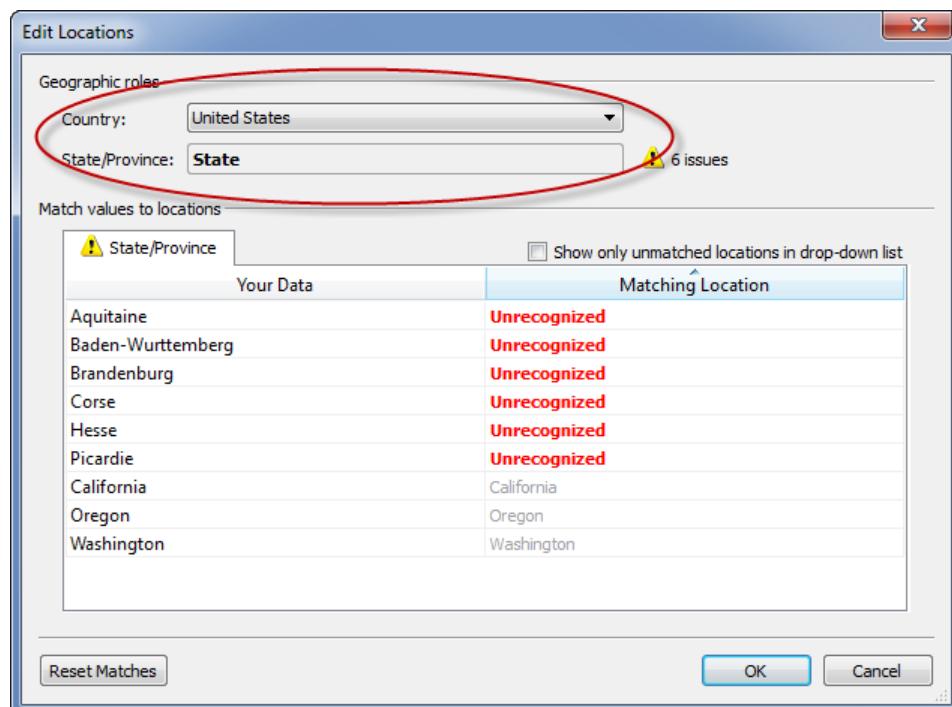
In addition to layers, you can use the Washout slider at the bottom of the Map Options card to control the intensity, or luminance, of the background map. The farther the slider moves to the right, the more faded the map will display behind your data.



## Setting a Default Location

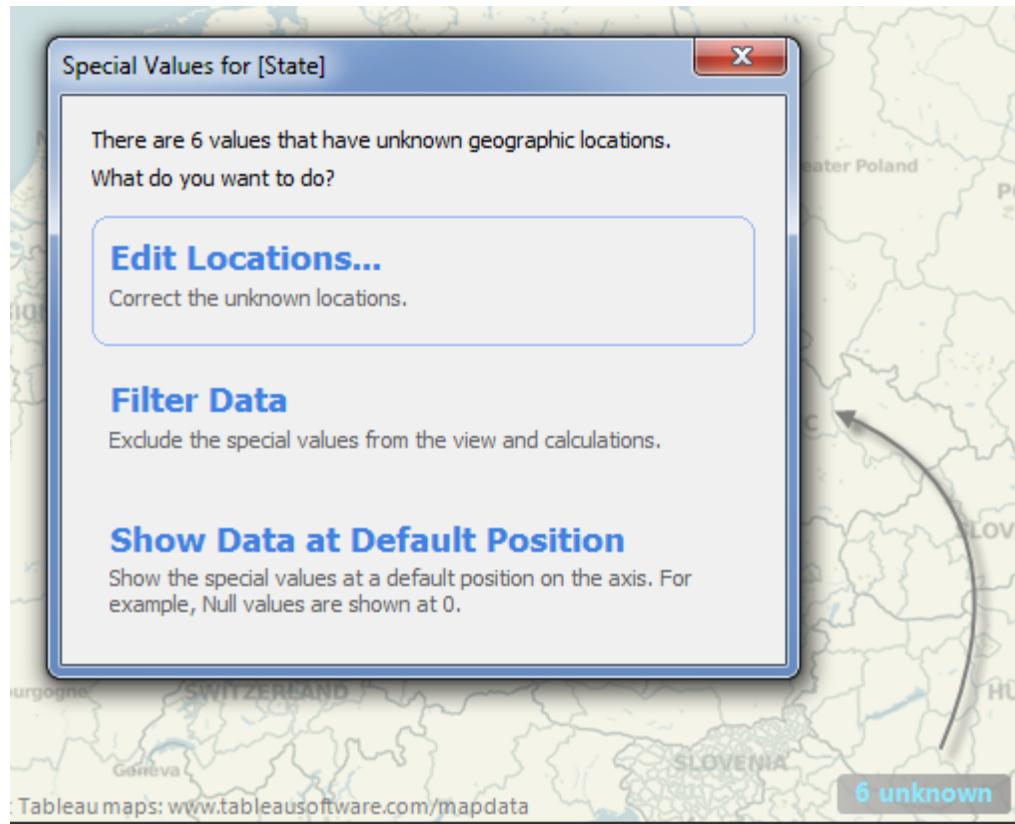
Sometimes your location names may exist in multiple countries and states. For example, Clark county exists in both Washington and Nevada. In those cases, Tableau does not have enough context to geocode the location. You can edit the locations to tell Tableau which country and state your data refers to.

You can edit locations by selecting Map > Edit Locations. Then select the country and/or state that your data refers to.

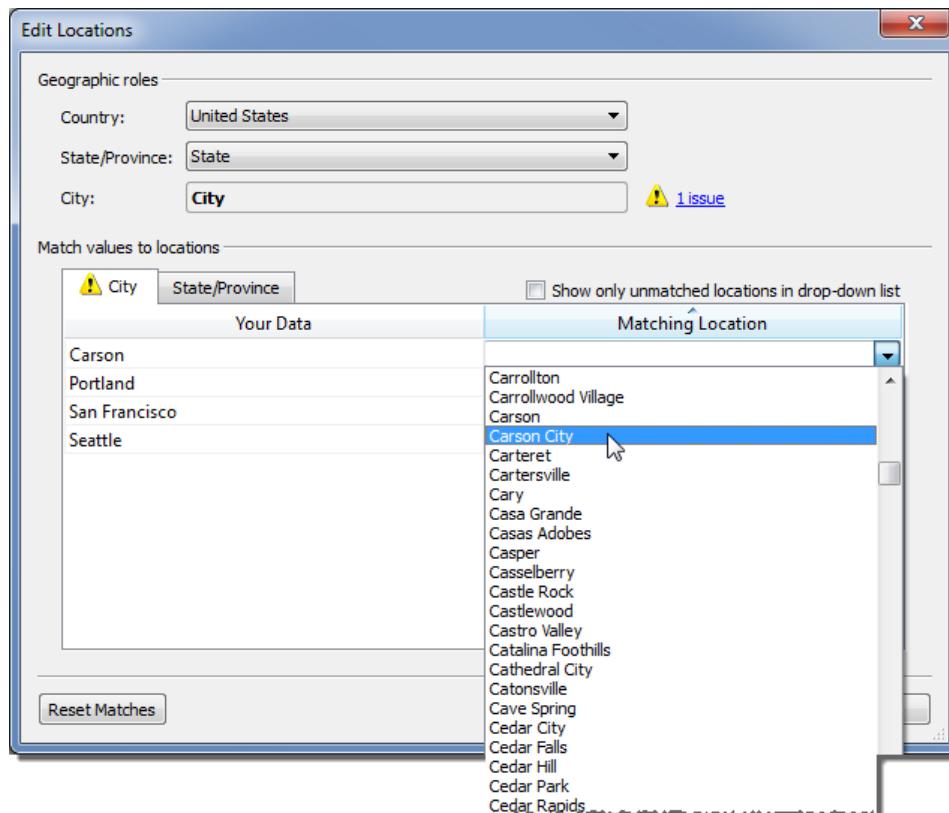


## Editing Locations

Sometimes Tableau will not recognize one or more of the location names in your data. When this happens those values are marked as unrecognized in the lower right corner of the view. Often this happens because your data values may be spelled incorrectly or use an abbreviation that Tableau does not understand. You can edit the unrecognized location names to map to known locations by clicking the special values indicator and the selecting Map > Edit Locations. You can also select Map > Edit Locations.



In the Edit Locations dialog box, both unknown and ambiguous locations are listed. You can usually fix ambiguous locations by specifying the country and/or state your data refers to. For each unrecognized value in your data, select a known location in the right column. For example, below Carson is an unrecognized city name in Nevada. Select Carson City to map it to the correct location.



By default all possible locations are listed in the drop-down list. For example, above all cities in the United States are listed as options. Select the Show only unmatched locations in drop-down list option to restrict the list to locations that have not yet been matched to your data.

## Custom Geocoding

### Custom Geocoding

By default Tableau recognizes a set of geographic roles that can be used to automatically geocode your data and create map views. For example, Tableau recognizes country names, state names, area codes, and so on. Refer to [Geographic Roles](#) for the complete list of built-in geographic roles. If your data contains geographic data that is not supported with the built-in roles you can use custom geocoding to plot the data on a map.

For example, let's say your data contains Country, States, and Cities. The built-in geocoding hierarchy recognizes country and state so your data will be aggregated to that level. However you could import the latitude and longitude information so that Tableau can plot data at the city level too. Another example is to use custom geocoding to extend the existing geographic roles to include more values such as postal codes for the United Kingdom, France, Germany, and so on. Finally, you can use custom geocoding to add new geographic roles for airport codes, custom sales geographies, and more.

To set up custom geocoding you must first create and import a geocoding file that defines the hierarchies and geographical roles.

- [Creating an Import File](#)
- [Importing Custom Geocoding](#)
- [Saving Custom Geocoding](#)

## Creating an Import File

### Creating an Import File

*When adding custom geocoding in Tableau, you need to import a file that contains the new geographic roles and their latitude/longitude definitions. These files should be in Comma Separated Values (CSV) format. Setting up the file differs depending on the type of custom geocoding you are adding. There are three general types of custom geocoding.*

- [Extending an Existing Role](#)
- [Adding New Roles](#)
- [Adding New Hierarchies](#)

## Extending an Existing Role

The built-in geocoding contains hierarchies that you can extend to include locations that are relevant to your data. For example, the existing hierarchy of Country > State may not contain all of the states in your data. You can extend the state level to include missing states. The import file for this type of geocoding should contain all of the columns in every level of the hierarchy above the level you are extending. For example, the existing State hierarchy has a column for State/Province along with Latitude and Longitude. When adding new states make sure to include these columns along with the parent column Country. Below is an example.

	A	B	C	D	E	
1	Country	State	City	Latitude	Longitude	
2	United Kingdom	England	London	52.50	1.50	
3	United Kingdom	Scotland	Galsgow	56.50	4.00	
4	United Kingdom	Wales	Bangor	52.00	3.75	
5	United Kingdom	Northern Ireland	Darkley	54.50	6.75	
6						

In the import file, the names of the columns define the Geographic Roles. That means when you want to extend the existing geocoding, you must make sure your column names match the existing geographic roles in the hierarchy that you are extending. That way the new locations will be added to the Country (Name) and State/Province roles. Below is a list of existing hierarchies and their respective columns.

Existing Hierarchy	Columns to Include in the Import File (in order; left to right)
Country (Name)	Country (Name)* Latitude Longitude
Country (Name), State/Province	Country (Name)* State/Province

<b>Existing Hierarchy</b>	<b>Columns to Include in the Import File (in order; left to right)</b>
	Latitude Longitude
Country (Name), State/Province, City	Country (Name)* State/Province City Latitude Longitude
Country (Name), State/Province, County	Country (Name)* State/Province County Latitude Longitude
Country (Name), Zip Code/Postcode	Country (Name)* ZIP Code Latitude Longitude
Country (Name), Area Code	Country (Name)* Area Code Latitude Longitude

<b>Existing Hierarchy</b>	<b>Columns to Include in the Import File (in order; left to right)</b>
Country (Name), CBSA	Country (Name)* CBSA Latitude Longitude

\* In addition to the Country (Name) column, you can optionally include the following columns: Country 2 char (ISO 3166-1), Country 3 char (ISO 3166-1), and Country (FIPS 10). If you include these columns, they should be just to the right of the Country (Name) column in any order.

Latitude and Longitude values must be real numbers instead of integers. That is, make sure to include at least one decimal place when specifying these values.

**Note:**

The highest level in the hierarchy is Country and cannot be extended to include higher levels such as Continent, etc.

Once you've created your import file, save the file using a descriptive name. Continue on to [Importing Custom Geocoding](#).

## Adding New Roles

Sometimes you may want to add entirely new geographic roles that still fit into the existing hierarchies in the built-in geocoding. For example, you may have data that contains Airport codes or National Park names that you want to plot on a map. These roles fit into the existing hierarchy of Country > State. The import file for this type of geocoding must contain the columns for each level in the existing hierarchy you are adding the role to. For example, airport codes are added to the Country > State hierarchy so the import file must contain all of the columns for the Country and State levels. Below is an example of an import file containing airport codes.

	A	B	C	D	E	F	G
1	Airport (ICAO)	Airport (IATA)	Airport (City)	Country (Name)	Latitude	Longitude	Altitude
2	AYGA	GKA	GOROKA	PAPUA NEW GUINEA	-6.081667	145.391667	5282
3	AYLA	LAE	LAE	PAPUA NEW GUINEA	0	0	0
4	AYMD	MAG	MADANG	PAPUA NEW GUINEA	-5.206944	145.788611	20
5	AYMH	HGU	MOUNT HAGEN	PAPUA NEW GUINEA	-5.826111	144.296111	5388
6	AYNZ	LAE	NADZAB	PAPUA NEW GUINEA	-6.569722	146.726111	239
7	AYPY	POM	PORT MORESBY	PAPUA NEW GUINEA	-9.443333	147.22	146
8	AYRB	RAB	RABAUL	PAPUA NEW GUINEA	0	0	0
9	AYWK	WWK	WEWAK	PAPUA NEW GUINEA	-3.583611	143.669167	19
10	BGAM	N/A	ANGMAGSSALIK	GREENLAND	0	0	0
11	BGAS	N/A	ANGISSOQ	GREENLAND	0	0	0
12	BGAT	N/A	APUTITEQ	GREENLAND	0	0	0
13	BGBW	UAK	NARSSARSSUAQ	GREENLAND	61.161111	-45.4275	112
14	BGCH	JCH	CHRISTIANSHAAB	GREENLAND	0	0	0
15	BGCO	N/A	NERLERIT INAAT	GREENLAND	70.739444	-22.645833	45
16	BGDB	N/A	DANEBOORG	GREENLAND	0	0	0
17	BGDH	N/A	DANMARKSHAVN	GREENLAND	0	0	0
18	BGDU	N/A	DUNDAS	GREENLAND	0	0	0

### Note:

Latitude and Longitude values must be real numbers instead of integers. That is, make sure to include at least one decimal place when specifying these values.

Importing the file above would add the geographic roles Airport (ICAO), Airport (IATA), and Airport (City). Notice that again, the column name for country matches the existing Country (Name) geographic role.

Name the file something descriptive such as Airports.

## Adding New Hierarchies

*When you extend an existing role or add a new role you are working within the already existing hierarchies. However, you may have an entirely new hierarchy that you want to add. For example, you may have custom sales territories that are defined by Theater, Region, District, and Territory instead of Country, State, and Zip Code. This case is similar to creating new roles except there is no column mapping to an existing parent role. Instead you will need to create multiple import files, each representing a level in the new hierarchy.*

*For this example, the top level in the hierarchy is theater so the import file would like the example below.*

	A	B	C	D	
1	Theater	Longitude	Latitude		
2	Domestic	-103.4729087	41.74052214		
3	Americas	-50.88549607	-11.6730767		
4	Europe	10.01001427	51.1682355		
5	Africa	15.46324327	-1.115573283		
6	Asia	66.9236836	48.41704292		
7	Oceania	160.2164916	-9.614065555		
8					

*The next level is Region so its import file should contain columns for both Theater and Region. An example is shown below.*

	A	B	C	D	E
1	Theater	Region	Longitude	Latitude	
2	Domestic	East	-77.01	38.89	
3	Domestic	Central	-84.81	37.39	
4	Domestic	West	-120.58	43.89	
5	Americas	North	-99.66889701	59.68488772	
6	Americas	Central	-85.41245982	12.64791516	
7	Americas	South	-50.88549607	-11.6730767	
8	Europe	West	1.717900132	46.93931477	
9	Europe	Central	8.22751159	46.98008672	
10	Europe	East	24.96676058	45.7526647	
11	Africa	Mediterranean	9.53749919	33.83789177	
12	Africa	Sahara	-3.996166451	19.06482432	
13	Africa	Sub-Saharan	17.90777611	-12.75895424	

*Continue down the hierarchy making sure that each file contains columns for the current level and all of the levels above it. For example, the District file would contain columns for District, Region, and Theater.*

**Note:**

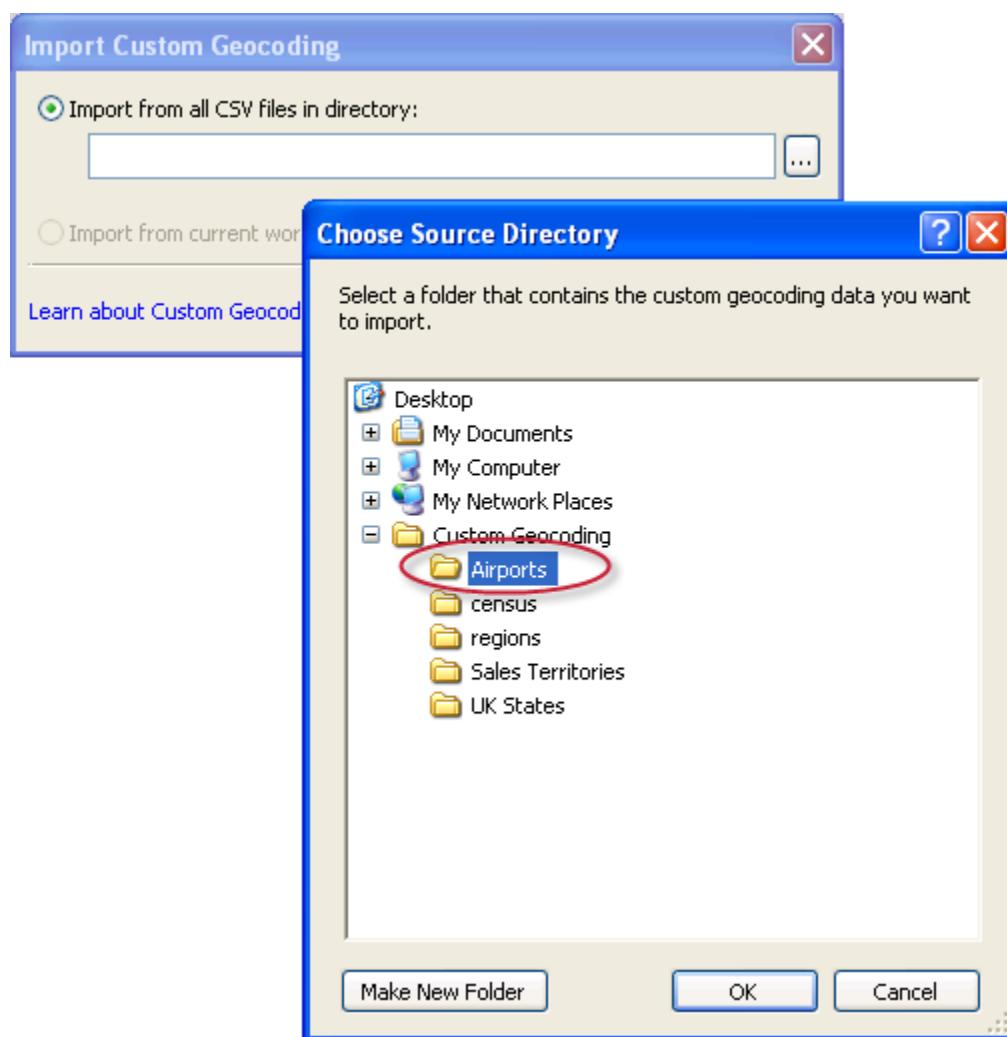
*Latitude and Longitude values must be real numbers instead of integers. That is, make sure to include at least one decimal place when specifying these values.*

*Save each import file into a single folder and name each file with the Level it represents. For this example there are four import files named Theater.csv, Region.csv, District.csv, and Territory.csv.*

## Importing Custom Geocoding

Once you have the import files set up you can import the custom geocoding into Tableau. Follow the steps below to import custom geocoding.

1. Select Map > Geocoding > Import Custom Geocoding.
2. In the Import Custom Geocoding dialog box, specify a directory that contains your import files. Refer to [Creating an Import File](#) to learn how to create an import file. You can use the button to the right of the text field to browse to the directory.



3. When finished, click Import.

*The custom geocoding data is imported into the workbook and the new geographic roles become available. Refer to [Geographic Roles](#) to learn more about assigning roles and building map views.*

## Saving Custom Geocoding

*When you import custom geocoding, the data is stored in a Local Data folder inside your repository. Your repository must be on a local drive in order for custom geocoding to work. Every time you import custom geocoding, all of the CSV files within the chosen directory are scanned and replace the geocoding that already imported. That is why you should store your import files in a single Custom Geocoding directory and always import from there. The custom geocoding becomes available for all workbooks you open from your machine.*

*When you save your workbook as a packaged wordbook, the custom geocoding data is packaged with the workbook.*

### **Note:**

*When you open a packaged workbook you can import the custom into your own repository, but be careful because it will replace any other custom geocoding you may have imported.*

*You can remove the custom geocoding stored in your repository by selecting Map > Geocoding > Remove Custom Geocoding. Keep in mind that this will not remove the geocoding from a packaged workbook, it simply removes it from your repository.*

## Background Map Sources

### Background Map Sources

Tableau comes with a set of online and offline maps that you can access to create map views. In addition, Tableau supports connecting to a Web Map Server (WMS) to support custom maps that are specific to your industry. You can specify the map source, import new maps sources, or export a map source to share with others.

#### To select a new map source:

- Select Map > Background Maps and then select the map source you want to use.

By default Tableau connects to an online map provider, offline map tiles that ship with the product, or you can add a WMS server.

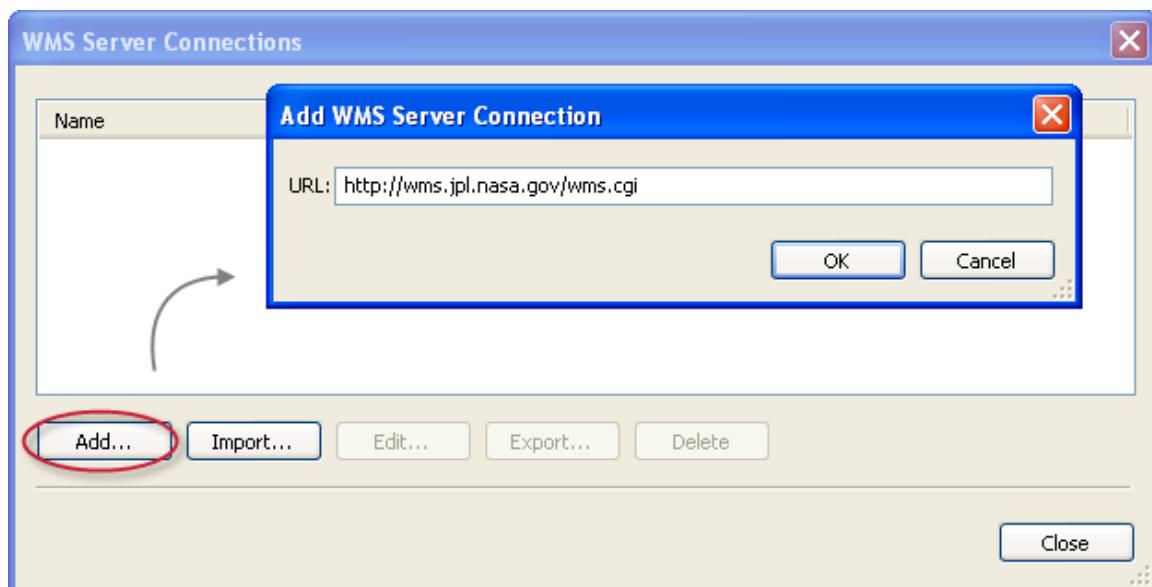
- [Working with WMS Servers](#)
- [Setting a Default Map Source](#)

## Working with WMS Servers

If you have a WMS server that provides custom maps that are specific to your industry you can add the server as a map source. After you added a WMS map server, you can export the map source to share with others or import a map source someone has shared with you.

### To add a WMS server:

1. Select Map > Background Maps > WMS Servers.
2. Click Add.
3. In the subsequent dialog box, type the URL for the server and click OK.

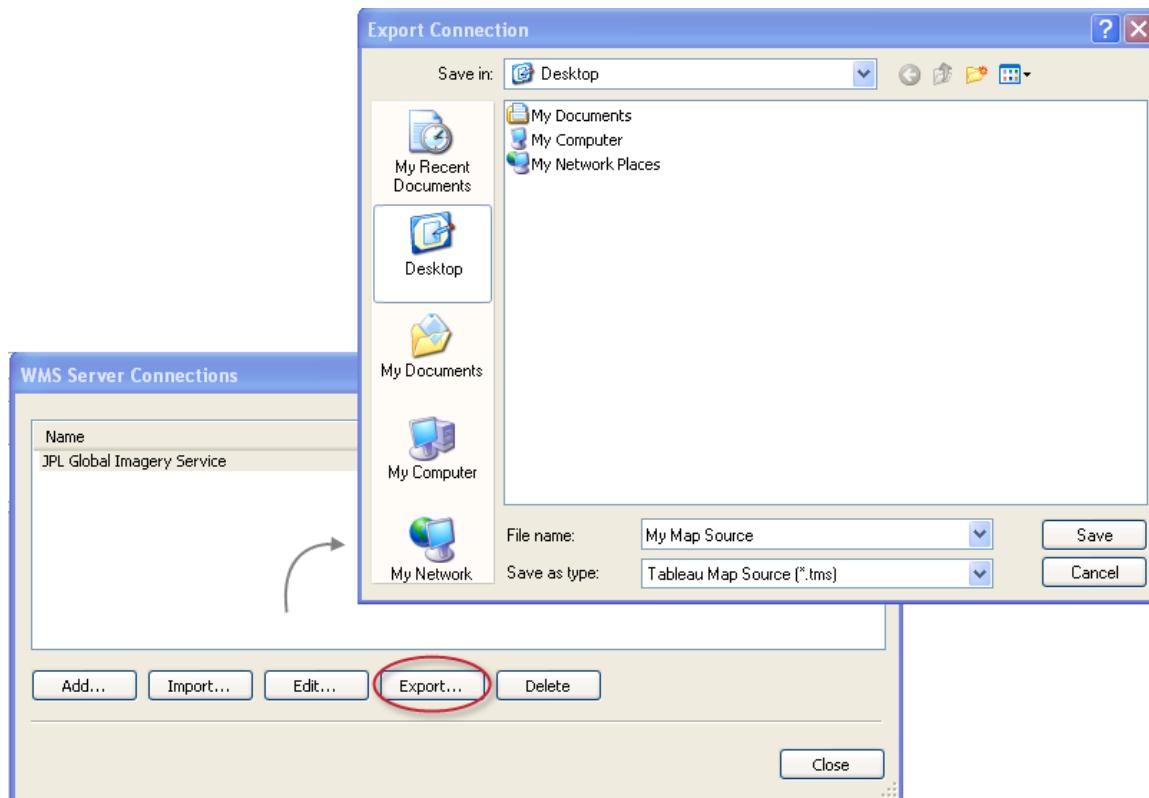


You can add as many map servers as you need. Each map source is displayed in the list of map sources on the Data menu. The map sources will be saved with the workbook and available to anyone you share the workbook with. You can also export the map source to a file that you can share with others so they can quickly connect to it.

### To export a WMS server:

1. Select Map > Background Maps > WMS Servers.
2. Select the server you want to export as a map source and click Export.

3. Type a name for the file and choose a location. The file will be saved as a Tableau Map Source (.tms).
4. Click Save.

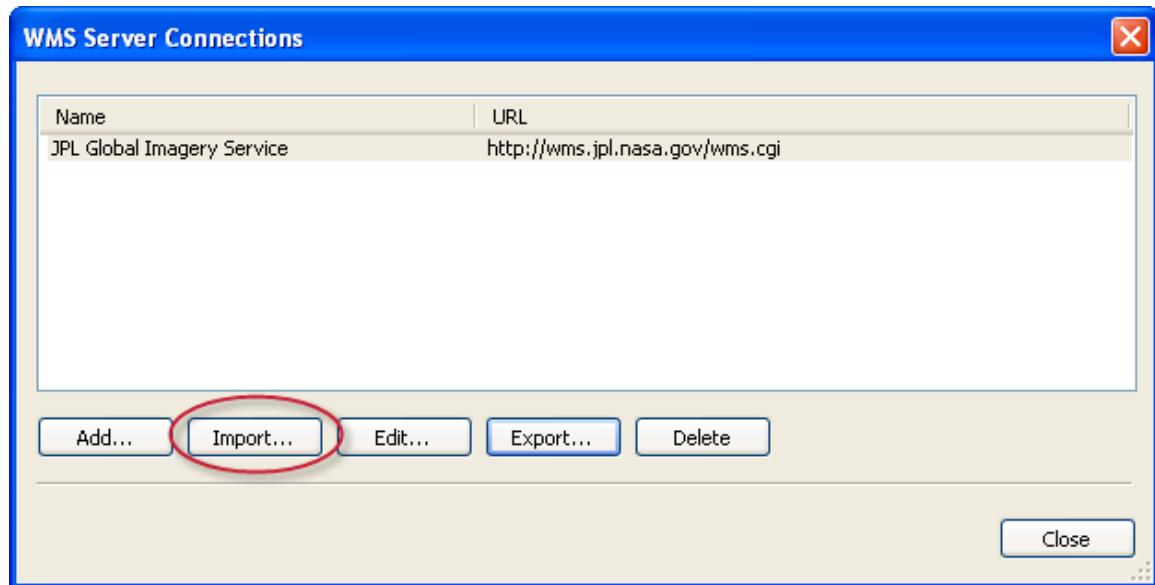


The Tableau Map source includes any default map options settings you have specified. For example, the map source will include any custom set of map layers you have specified to show by default. If you change the map options defaults you should export the map source again to include the new settings in the map source file.

**To import a map source:**

1. Select Map > Background Maps > WMS Servers.
2. Click Import.
3. Navigate to the saved map source file (.tms), select it, and click Open.

## Tableau Desktop Help



## Setting a Default Map Source

*By default all new worksheets connect to Tableau's online map source. You can specify a different map source as the default.*

**To specify a default map source:**

1. Select the map source on the *Map > Background Maps* menu.
2. Select *Map > Background Maps > Set as Default*.

## Map Storing and Working Offline

*When you create map views using the online map provider, Tableau stores the images that make up the map in a cache. That way, as you continue your analysis you don't have to wait for the maps to be retrieved. In addition, by storing the maps you can do a certain amount of work when you are offline.*

*The cache for the maps are stored with your Internet Explorer Temporary Internet Files and can be cleared at any time simply by deleting the temporary files in Internet Explorer.*

*When you are working offline and open a view that uses a map that is stored in the cache, the stored image will be used automatically. However, there are several actions that require Tableau to retrieve a new map. If the new map is not also stored in the cache you won't be able to load the map until you go online. The main actions to be aware of are listed below.*

- *Turning layers on or off - if you decide to turn on a layer that isn't stored in the cache, Tableau will need to connect to retrieve the necessary information.*
- *Zooming - zooming in or out on a map requires different map images. If the images at the specified zoom level don't exist in the cache, Tableau will need to retrieve the updated maps.*
- *Panning - panning sometimes requires new map images. If you are working offline and don't have the necessary map images and legends stored in the cache, the new images and legends will not load.*

*Stored map images and legends remain valid for about thirty days. After that time, Tableau will not use the stored image, instead it will require you to reconnect and fetch an updated map. This is to prevent the map images from becoming outdated.*

# Trend Lines and Statistics

## Trend Lines and Statistics

You can use Tableau's trend line feature to incrementally construct interactive models of behavior that you can use to make predictions about your data. For example, answer questions like whether profit is predicted by time, or whether average delays at an airport are significantly correlated with the month of the year.

- [Adding Trend Lines](#)
- [Remove Trend Lines](#)
- [The Trend Line Model](#)
- [Removing Factors from the Model](#)
- [Testing Significance](#)
- [Trend Lines Example](#)
- [Assumptions](#)
- [Trend Line Model Terms](#)
- [Commonly Asked Questions](#)

## Adding Trend Lines

When you add trend lines to the view, you can specify several options about how you want them to look and behave.

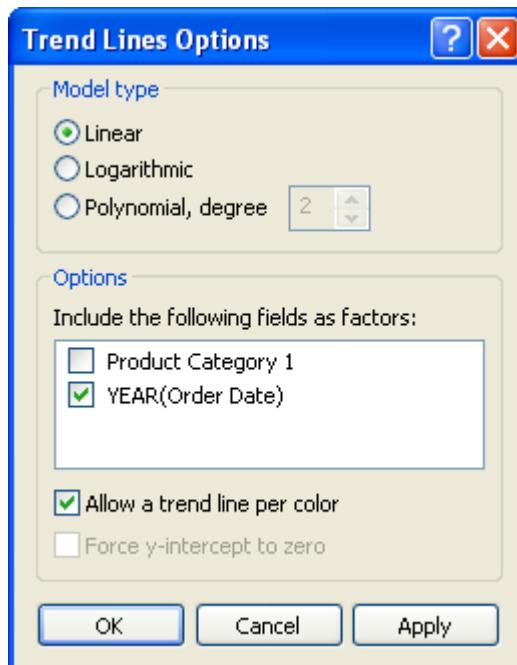
### Add Trend Lines to the View

1. Select Analysis > Trend Lines or right-click on the pane and select Trend Lines.

This command adds a linear trend line and will add a trend line for each color if there is a discrete field on the color shelf. You can optionally continue with the steps below to specify different trend line options.

2. Right-click on the pane and select Edit Trend Lines to open a dialog box where you can specify the following options:

- o Select either a Linear, Logarithmic, or Polynomial model type.
- o Select fields you want to include as factors in the trend line model. For example, on a view of yearly sales for three different products, you may want to see the overall sales trend across all products rather than a different line for each product. In this case, you would exclude the product field as a factor. As shown here:



For more information on excluding factors refer to [Removing Factors from the Model](#).

- Select whether to exclude color. When you have color encodings in your view, you can use this option to add a single trend line that models all of the data ignoring the encoding.
- Select whether to force the intercept to zero. This option is useful when you know that you want your trend line to begin at zero. For example, you may have an analysis of the number of products sold over time. You know that you started out with zero products sold, so you can force the trend line to begin there.

3. When finished click OK.

### Why can't I add Trend Lines?

To add trend lines to a view, both axes must contain a field that can be interpreted as a number. For example, you cannot add a trend line to a view that has the Product Category dimension, which contains strings, on the Columns shelf and the Profit measure on the Rows shelf. However, you can add a trend line to a view of sales over time because both sales and time can be interpreted as numeric values.

On multidimensional data sources, the date hierarchies actually contain strings rather than numbers thus trend lines will not be allowed. Additionally, the 'm/d/yy' and 'mmmm yyyy' date formats on all data sources do not allow trend lines.

If you have trend lines turned on and you modify the view in a way where trend lines are not allowed, the trend lines will not show. When you change the view back to a state that allows trend lines, they will reappear.

#### Note:

Tableau automatically stacks bar marks in many cases. However, trend lines cannot be turned on for stacked bars. You can turn off stacked marks by selecting Off on the Analysis > Stacked Marks menu.

## Remove Trend Lines

*To remove trend lines from the view, simply select Analysis > Trend Lines or right-click the pane and select Trend Lines. The Trend Lines command toggles between on and off. If you have specified any trend line options, they will be used the next time you turn on trend lines. However, if you close the workbook with trend lines turned off, the trend line options will be reset to the default settings.*

## The Trend Line Model

Any time you add a trend line to your view you are building a statistical model. You are answering the question of whether the factors in your view predict a specific value (measure). A simple example is to wonder whether profit is predicted by time in a view that shows the profit of a company over four years.

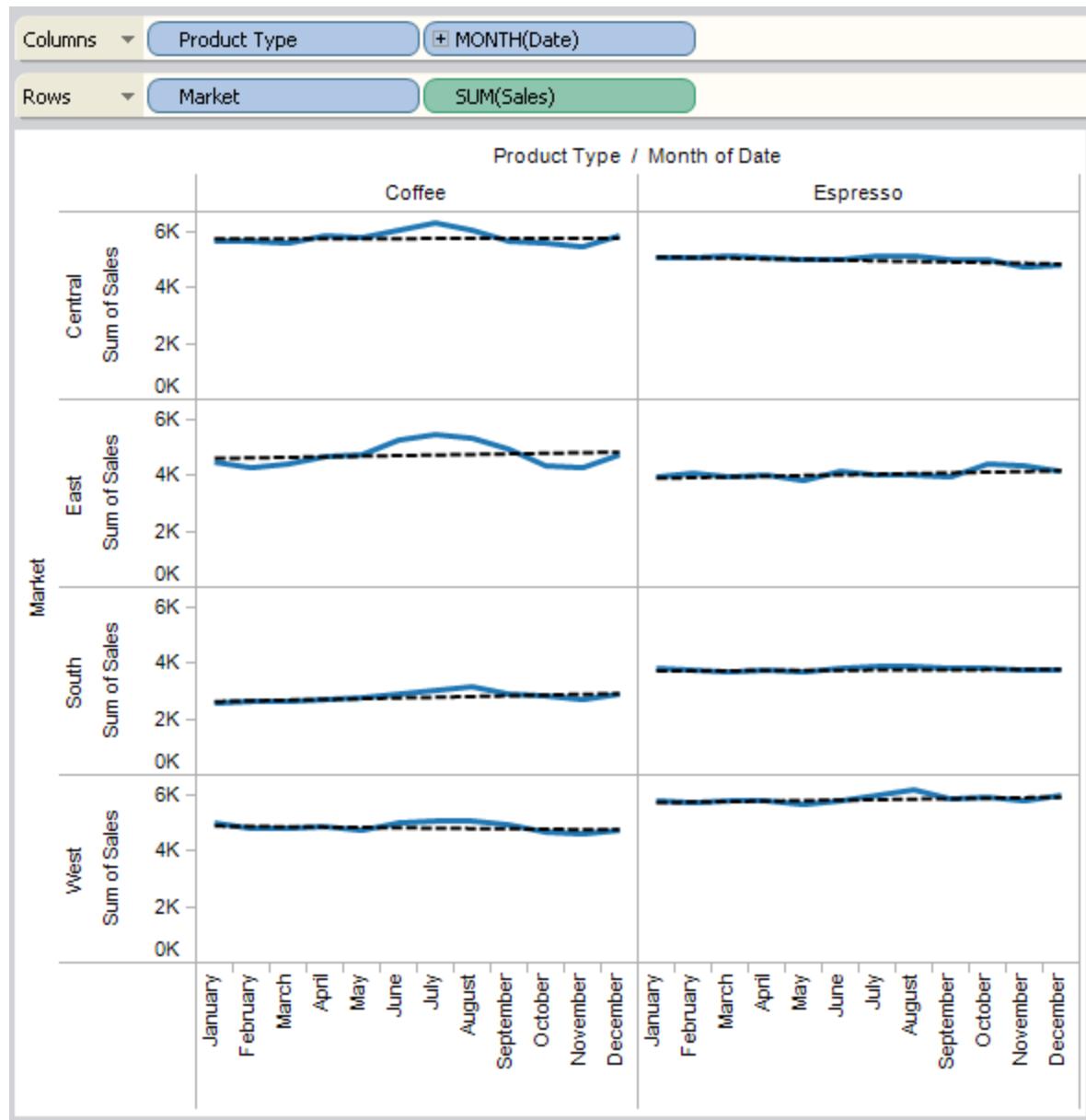
When you add a trend line in Tableau, the line you see is defined by a mathematical formula of the form:  $Y = \text{factor 1} * \text{factor 2} * \dots * \text{factorN} * f(x) + \text{random error}$

The term  $Y$  in the above expression is called the response variable and corresponds to the value you are trying to predict while the term  $X$  is the independent variable. The factors in the expression correspond to the categorical fields in the view (time in the profit example above). In addition, each factor is represented as a matrix. The  $*$  is a particular kind of matrix multiplication operator that takes two matrices with the same number of rows and returns a new matrix with the same number of rows. That means that in the expression  $\text{factor 1} * \text{factor 2}$ , all combinations of the members of factor 1 and factor 2 will be introduced. For example, if factor 1 and factor 2 both had three members, then a total of nine variables will be introduced into the model formula by this operator.

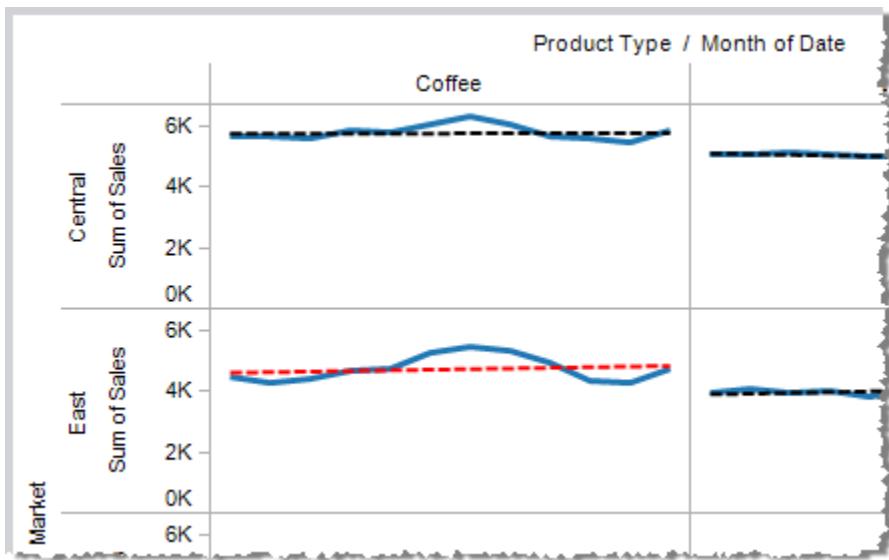
## Removing Factors from the Model

You can remove factors from the model using the Trend Lines Options dialog box. Often you will want to remove factors because you want the trend line model to be based on the entire row in the table rather than broken up by the members or values of a field.

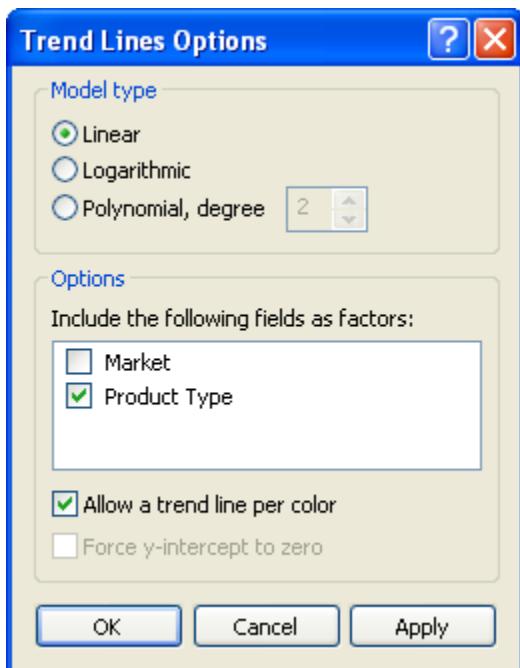
Consider the following example. The view below shows the monthly sales for two different products, broken down by region.



When you select a trend line in the view, you can see that a separate model is created for each customer segment.

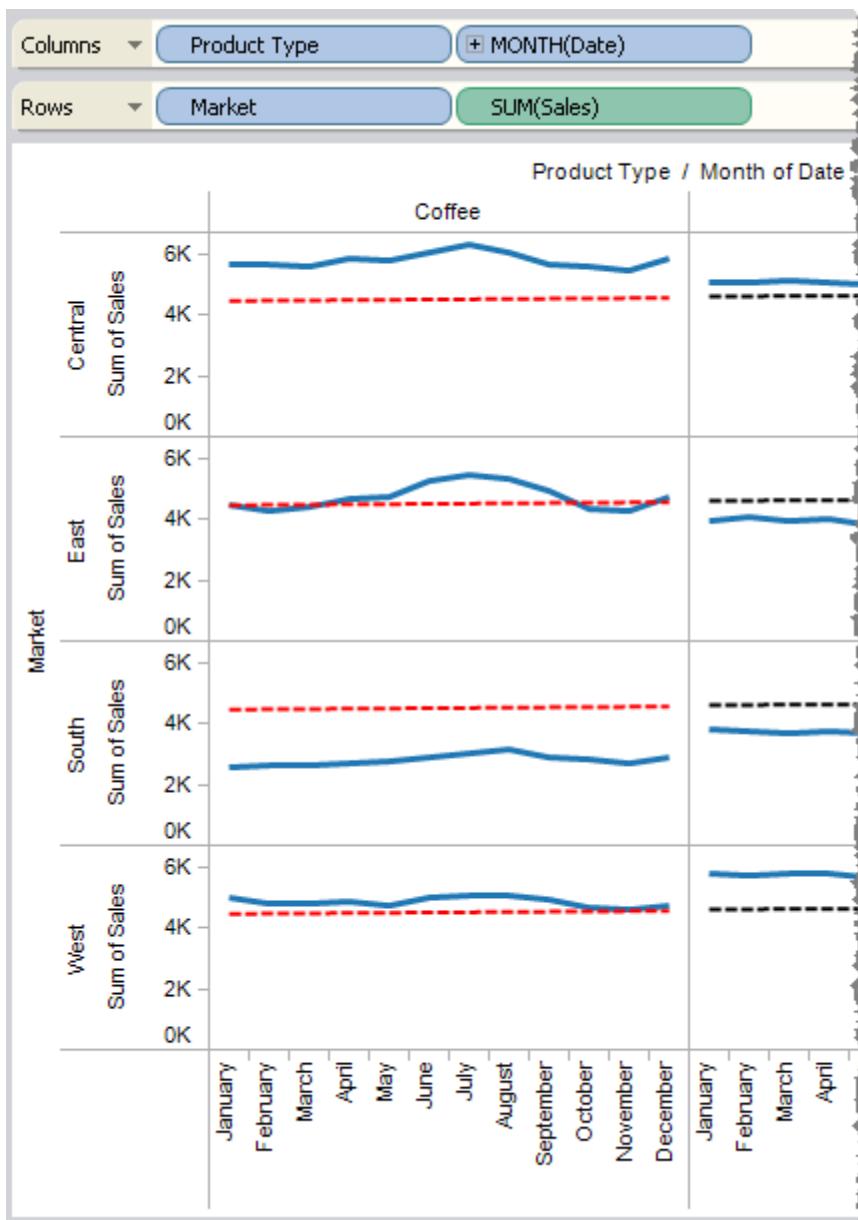


Now remove Market as a factor in the model by deselecting it in the Trend Lines Options dialog box.



You can see that the trend line model is now based on all rows associated with the Product Type field. That is, the trend line depends only on the product type and is the same in each row of a given column.

## Tableau Desktop Help



## Testing Significance

Once you've added a trend line to the view, you typically want to know the goodness of fit of the model, which is a measure of the certainty of the model's predictions. In addition, you may be interested in the significance of each factor. You can view these numbers using the *Describe* command.

In the Sheet Description dialog box, there is a section of statistics about the Trend Line Model. When you are testing the significance, you are most concerned with the p-values. The smaller the p-value, the more significant the model or factor is. It is possible to have a model that has statistical significance but a factor that not really adding much to the model.

### Entire Model Significance

To identify the significance of the entire trend line model, select *Analysis > Describe Trend Line Model*. In the Analysis of Variance table, the p-value is listed. The smaller the p-value, the more significant the model is.

The screenshot shows the 'Describe Trend Model' dialog box. The 'Trend Lines Model' section contains the following information:

- Model formula:** YEAR(Order Date)\*( MONTH(Order Date) + intercept )
- Number of observations:** 48
- DF (degrees of freedom):** 8
- Residual DF:** 40
- SSE (sum squared error):** 0.000520613
- MSE (mean squared error):** < 0.0001
- R-Squared:** 0.75442
- Standard error:** 0.00360767
- p (significance):** < 0.0001 (highlighted in yellow)

The 'Analysis of Variance' table is as follows:

Field	DF	SSE	MSE	F	P
YEAR(Order Date)	6	0.00159559	0.000265932	20.4322	< 0.0001

The 'Individual trend lines' section lists four entries:

Pane(r,c)	P	Equation
(1,1)	0.377	Avg(Discount) = -0.000212099*MONTH(Order Date) + 0.0612408
(1,2)	0.707697	Avg(Discount) = 0.000127367*MONTH(Order Date) + 0.0472482
(1,3)	0.420926	Avg(Discount) = -0.000231552*MONTH(Order Date) + 0.0619409
(1,4)	0.985649	Avg(Discount) = -6.55511e-006*MONTH(Order Date) + 0.0493778

At the bottom left is a 'Copy to clipboard' button, and at the bottom right is a 'Close' button.

This p-value is a comparison of the fit of the entire model to the fit of a model composed solely of the grand mean (the average of data in the data view). That is, this p-value

assesses the explanatory power of the quantitative term  $f(x)$  in the model formula, which can be linear, polynomial or logarithmic with the factors fixed. It is common to test significance by applying the "95% confidence" rule. This equates to a p-value of 0.05 or less.

### *Significance of Specific Fields*

To identify the significance of specific fields in a trend line model, select Analysis > Describe Trend Line Model. In the Analysis of Variance table, which is often referred to as an ANOVA table, each of the fields that are factors in the model are listed. For each field, among other values, you can see the p-value. The p-value indicates how much that field adds to the significance of the entire model. The smaller the p-value the more that field improves the model. The values displayed for each field are derived by comparing the entire model to a model that does not include the field in question.

The following image shows the ANOVA table for a view of quarterly sales for the past two years of three different product categories.

**Analysis of Variance:**

Field	DF	SSE	MSE	F	P
Product Category 1	8	3.22326e+011	4.02908e+010	105.315	< 0.0001
YEAR(Order Date)	6	9.40812e+009	1.56802e+009	4.09862	0.0180582

As you can see, the p-value for Product Category 1 is smaller than the p-value for Order Date. That leads us to believe that the product category is more statistically significant in predicting the total sales than the year. However, both of these factors are statistically significant in this model. (It is common to test significance by applying the "95% confidence" rule. This equates to a p-value of 0.05 or less.)

### *Significance of Individual Trend Lines*

You can view the p-value and formula for individual trend lines in two ways. Either right-click a specific trend line in the view and select Describe Trend Line or select Analysis > Describe Trend Line Model and see the Individual Trend Line table.

The Individual Trend Line table in the Describe Trend Line Model dialog box lists of all the trend lines in your view along with their p-value and the formula. This is an easy way to quickly determine which (if any) trend lines are statistically significant.

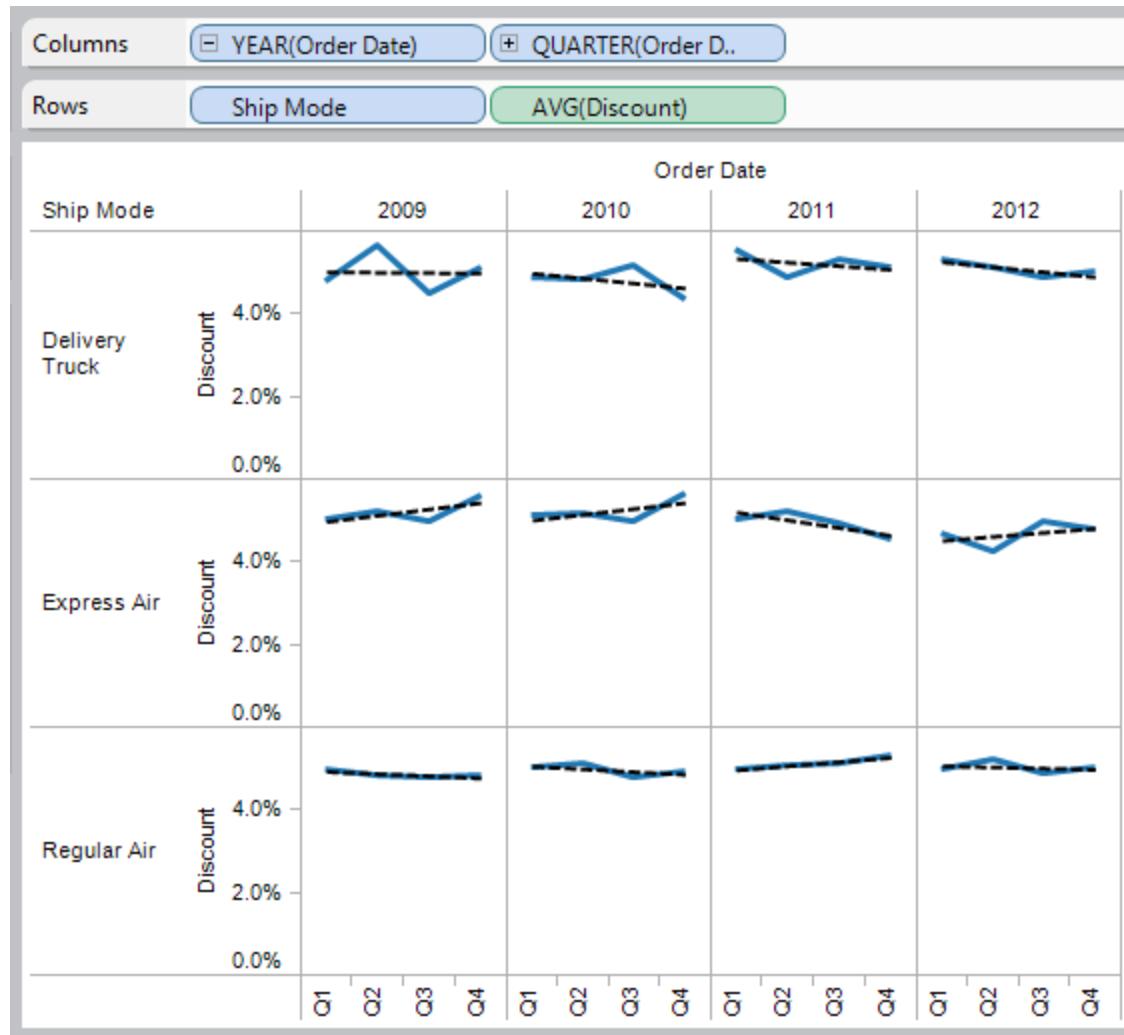
## Trend Lines Example

This example walks through the steps of incrementally testing the significance of various factors to solve a problem.

We start with the question: what is causing high discount rates at a superstore? While statistics cannot answer this question, we can discover the variables that are correlated with high discounts. The view below shows the average monthly discount rates of all stores between 2009 and 2012.



*Our first thought is that the discount rates may be high for specific ship modes. When we put the Ship Mode field on the rows shelf, we see that there was a spike in discount rates for items shipped by Delivery Truck in 2009 and other increases in 2010.*

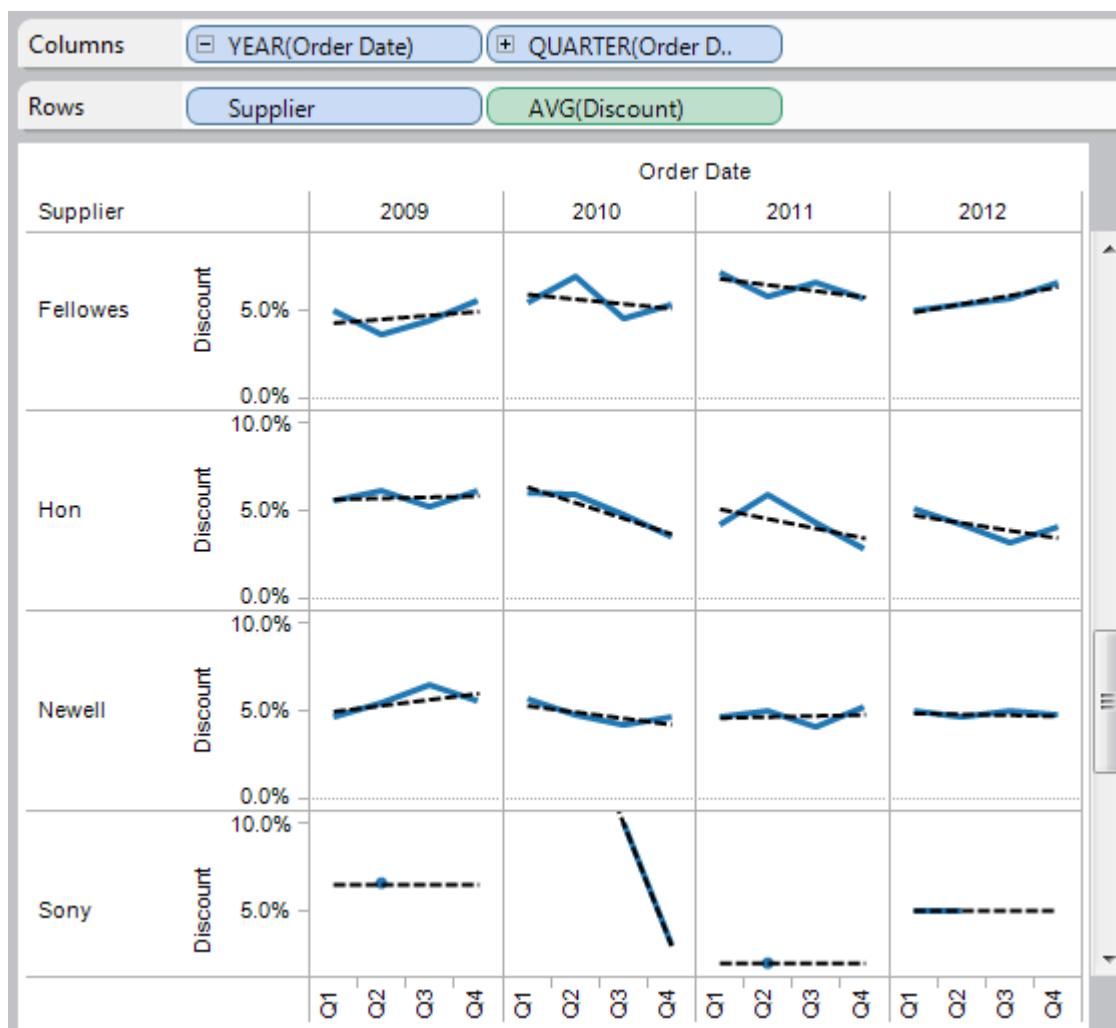


*However, when describing the trend line mode (right-click the trend line and select Describe Trend Line Model, the ANOVA table shows that the p-value for Ship Mode is 0.22. For most, this number is too high to be significant, indicating that we cannot predict discount rates based on ship mode. (It is common to test significance by applying the “95% confidence” rule. This equates to a p-value of 0.05 or less.)*

**Analysis of Variance:**

Field	DF	SSE	MSE	F	p-value
Ship Mode	16	0.000181235	1.133e-005	1.39986	0.222194
Year of Order Date	18	0.00018312	1.017e-005	1.25726	0.295853

Still on the search to find out what is causing the high discount rates, we decide that it could be based on supplier. Certain suppliers may have higher discounts applied. It seems plausible so we put Supplier on the rows shelf.



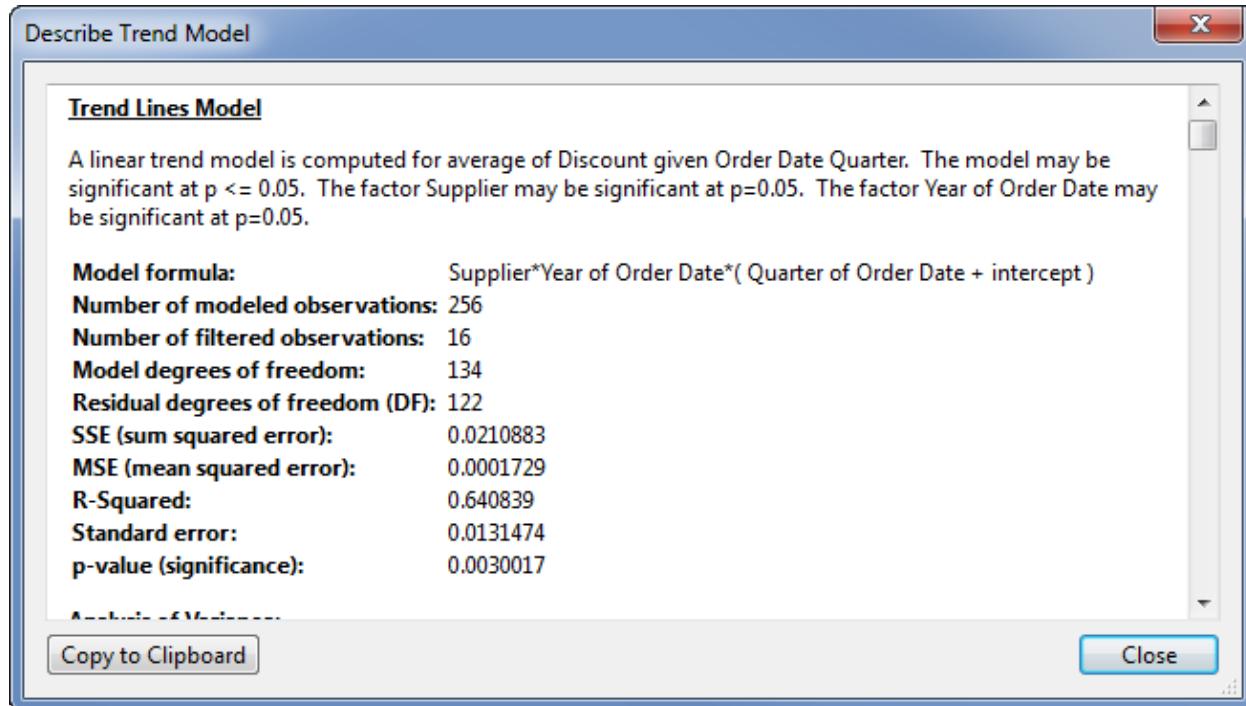
When we open the *Describe Trend Line Model* dialog box, and look at the ANOVA table this time, we see that the p-value for Supplier is 0.0004 and the p-value for the entire model is less than 0.003. With that, we can be confident that the changes in average

*discount rates over time are in fact quite different for different suppliers. In other words we can be statistically confident that the different trend lines slopes for each supplier isn't just due to randomness, but rather there is a real correlation between a supplier and the slope of this line.*

#### Analysis of Variance:

Field	DF	SSE	MSE	F	p-value
Supplier	126	0.0349464	0.0002774	1.60454	0.0045179
Year of Order Date	100	0.0318394	0.0003184	1.84197	0.000667

*In addition to Supplier, we notice that the year field offers a statistically significant improvement to the model. Refer to [Entire Model Significance](#) for more information.*



## Assumptions

The p-values reported in Tableau trend lines depend on some assumptions about the data. The first assumption is that, whenever a test is performed the model for the mean is (at least approximately) correct.

The second assumption is that the "random errors" referred to in the model formula (refer to [The Trend Line Model](#)) are independent across different observations and that they all have the same distribution. This would be violated if the response variable had much more variability around the true trend line in one category vs. another. For instance, in the example shown in this chapter, this would be violated if the discount rate had much more variability around the true trend line in one market vs. another.

## Trend Line Model Terms

When you describe the trend line model, there are several values listed. This section discusses what each of these values means.

### Model Formula

This is the formula for the full trend line model. The formula reflects whether you have specified to exclude factors from the model.

### Number of Observations

This is the number of rows used in the view.

### Residual DF (residual degrees of freedom)

For a fixed model, this value is defined as the number of observations minus the number of parameters estimated in the model.

### DF (degrees of freedom)

In the ANOVA table, this column refers to the degrees of freedom of the smaller model in the given row.

### SSE (sum squared error)

The term SSE generally refers to a “sum of squared errors.” The errors are the difference between the observed value and the value predicted by the model. In the ANOVA table, this column is actually the difference between the SSE of the simpler model in that particular row and the full model, which uses all the factors. This SSE also corresponds to the sum of the differences squared of the predicted values from the smaller model and the full model.

### MSE (mean squared error)

The term MSE refers to "mean squared error" which is the SSE quantity divided by its corresponding degrees of freedom.

### R-Squared

A measure of the percent of the variability explained by the full model as compared to a smaller model.

If  $SSE(F)$  is the sum of squared errors of the full model, and  $SSE(S)$  the sum of squared errors from the smaller model, then

$$R^2 = (SSE(S) - SSE(F)) / SSE(S)$$

*measures the relative drop in variability of the response when using the full model as opposed to the smaller model. In the Describe Trend Line Model dialog box, this model is the model that has a different mean for each pane. This is different than the most common use of R-squared, which compares the model to a model with just a grand mean.*

### *Standard error*

*The square root of the MSE of the full model. It is an estimate of the standard deviation (variability) of the "random errors" in the model formula.*

### *P (significance)*

*The probability that an F random variable with the above degrees of freedom exceeds the observed F in this row of the ANOVA table.*

### *Analysis of Variance*

*This table, also known as the ANOVA table, lists information for each factor in the trend line model. The values are a comparison of the model without the factor in question to the entire model, which includes all factors.*

### *Individual trend lines*

*This table provides information about each trend line in the view. For each trend line, you can see its p-value as well as its equation. This is helpful when you have a lot of panes in the view, each with its own trend line. Looking at the list you can see which, if any, are the most statistically significant.*

## Commonly Asked Questions

*This section describes some commonly asked questions regarding trend lines in Tableau.*

*How do I change the confidence level used in the model?*

*Tableau does not enforce a confidence level. It simply reports the significance of the whole model, or of a specific field, by showing the p-value. A p-value of 0.05, for instance, implies that you can be 95% sure of the model. A p-value of 0.10 means that you can be 90% confident of the model's prediction. So read the reported p-values, and then use whatever rules you wish to determine statistical significance.*

*What does it mean if the p-value for the model is significant but the p-value for the specific field in the ANOVA table is not significant?*

*The p-value in the ANOVA table indicates whether the field adds or detracts from the significance of the entire model. The smaller the p-value the more the field improves the model. The values displayed for each field are derived by comparing the entire model to a model that does not include the field in question. So, this means that the model is statistically significant, but that you cannot be confident that the specific field in question adds anything to it. One thing to inspect in a case like this is whether you are better off removing the factor from the model.*

*What does it mean if the p-value for the model is not significant but the p-value for the specific field in the ANOVA table is significant?*

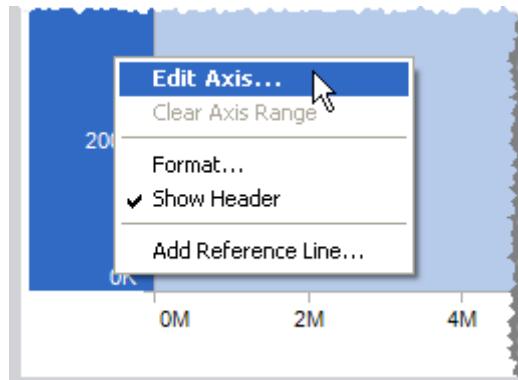
*This could happen in a case when there is no "trend" within each pane. For example, the lines are flat, but the mean varies across a given factor.*

## Log Axes

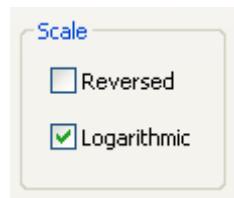
Sometimes you will have a measure that uses a logarithmic scale as opposed to linear. For example, some well known logarithmic scales include the Richter magnitude scale to measure the strength of earthquakes, pH to measure acidity, and the stellar magnitude scale, which measures the brightness of stars. You can Edit the axis scale for any measure to be logarithmic using the Edit Axis dialog box. By default the tick marks are drawn at powers of ten, however, you can specify any base that is greater than 1.

### To change the scale of an axis:

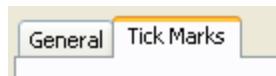
1. Right-click the axis in the view and select *Edit Axis*.



2. In the *Edit Axis* dialog box, select *Logarithmic* for the axis scale.



3. Select the *Tick Marks* tab.



4. Select one of the following Major Tick mark options:

- Automatic - the major tick marks are drawn at powers of 10.
- Fixed - the major tick marks are drawn at a specified exponent. Type a number into the Powers of text box.
- None - major tick marks are not shown.

5. When finished, click OK.

You can also reverse the axis by selecting Reverse in the Scale area on the General tab of the Edit Axis dialog box.

**Note:**

If your data contains negative values Tableau cannot plot them on a logarithmic scale. All values with a negative value will be displayed at 1 on the axis. You can then filter these records to exclude them from the view.

# Publish and Share

## Publish and Share

*Close the loop in your analysis and share your findings with others. Start with rich formatting and finish with publishing the view or creating a dashboard that can be monitored.*

- [Formatting](#)
- [Annotations and Mark Labels](#)
- [Dashboards](#)
- [Publishing to Tableau Server](#)
- [Saving and Exporting](#)
- [Printing](#)

# Formatting

## Formatting

*Formatting is an important part of both your analysis and presentation. You can format almost everything you see on a worksheet including the fonts, shading, alignment, borders, and graph lines. For example, in a text table you may want to add banded shading to help you visually separate consecutive groups of rows or columns. In a scatter view with reference lines you may want to change the line thickness and color. All of these settings can be changed using the Format window.*

*Most often you will want to specify format settings for the entire worksheet, all rows, or all columns. However, Tableau also allows you to format individual parts of the view as well. For example, you can format specific fields, resize the cells and the table, and edit individual axes.*

- [Worksheet Level Formatting](#)
- [Formatting Specific Parts of the View](#)
- [Copying and Pasting Formatting](#)
- [Clearing Formatting](#)
- [Workbook Themes](#)
- [Resizing the Table](#)
- [Miscellaneous Table Options](#)
- [Editing Axes](#)

## Worksheet Level Formatting

### Worksheet Level Formatting

*Most commonly you will want to specify format settings at the worksheet level. For example, you may want to use a specific font for mark labels, remove all the borders in a text table, or add shading to every other column in a view. These format settings can be specified using the Format window.*

*The Format window, when opened, replaces the Data window on the left side of the worksheet. There you can use a series of drop-downs to specify format settings for either the entire sheet, all rows, or all columns.*

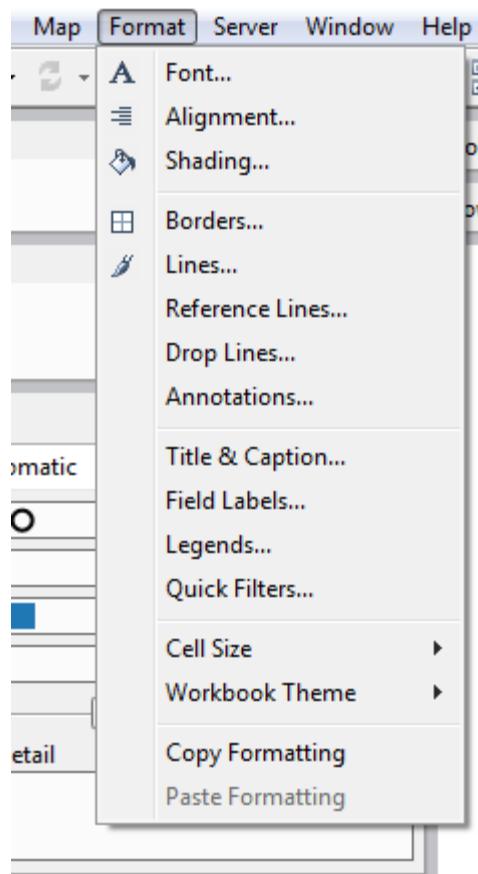
- [Opening the Format Window](#)
- [Fonts](#)
- [Alignment](#)
- [Shading](#)
- [Borders](#)
- [Lines](#)

## Opening the Format Window

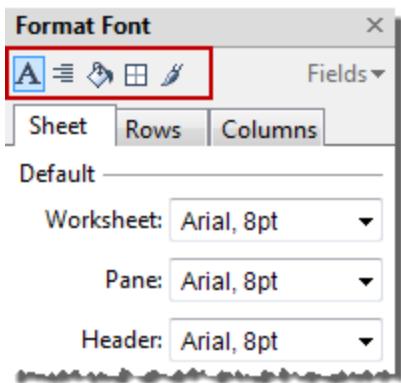
*Use the Format menu to open the Format window.*

**To open the Format window:**

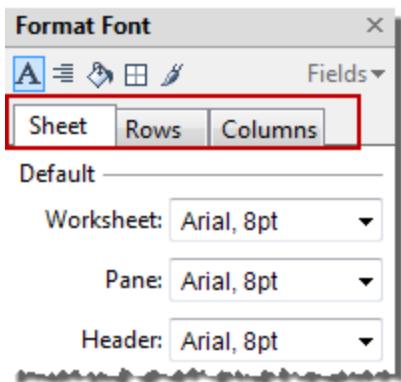
- Select Format and then select the part of the view you want to format.



*The Format window opens on the left side of the workbook, replacing the Data window. At the top of the Format window, there is a toolbar where you can quickly switch between each of the types of format settings available.*



The Format window also contains three tabs: Sheet, Rows, and Columns. Switch between these tabs to apply formatting to the entire sheet, just the rows, or just the columns.

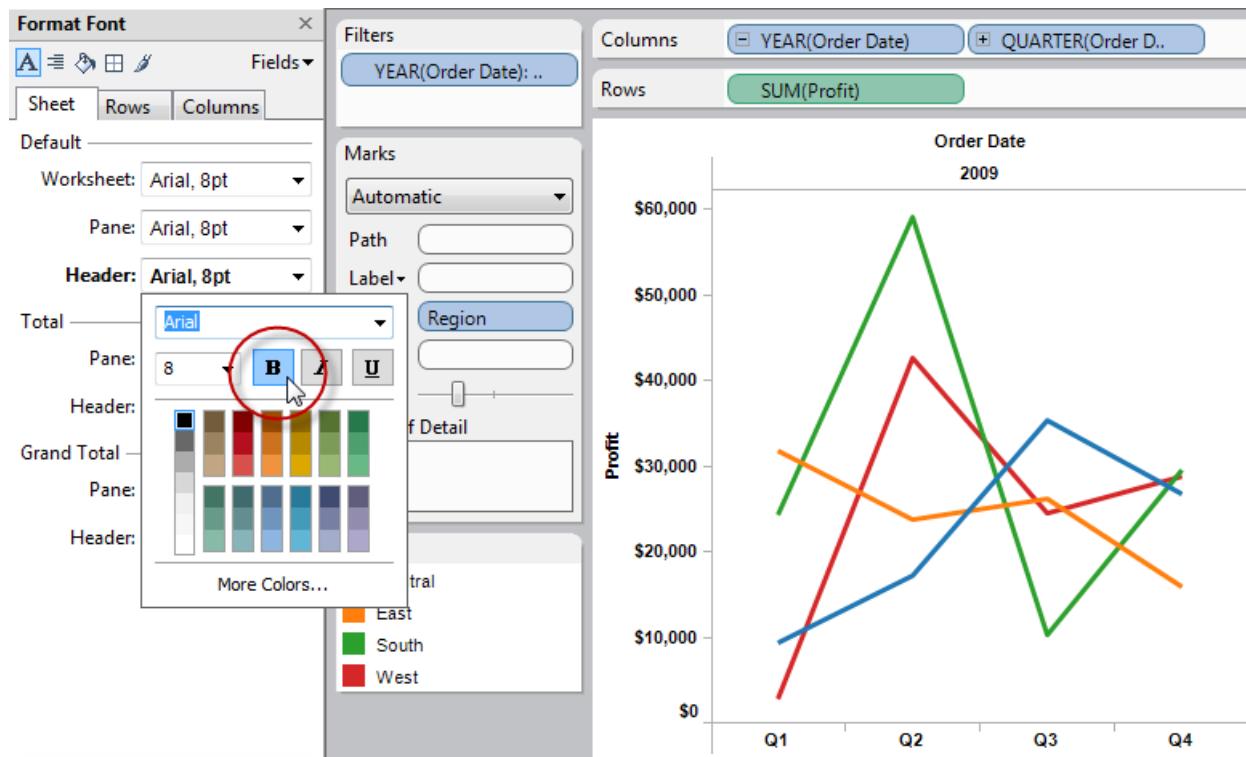


## Fonts

In the Format window, select the Font command  on the toolbar to see the Font format settings. You can specify font properties for the entire worksheet, just the rows, or just the columns.

### *Sheet Font Settings*

For the entire worksheet, you can specify the font, style, size, and color for both the pane text and header text. For example, in the view below, the header text is set to be bold.



If you have totals or grand totals in the view, you can specify special font settings so that these values can stand out from the rest of the data. This is particularly useful when you are working with a text table. The view below shows a text table in which the grand totals are formatted to be bold and dark red.

**Format Font**

Fields ▾

Sheet Rows Columns

Default

Worksheet: Arial, 8pt

Pane: Arial, 8pt

Header: Arial, 8pt

Total

Pane: Arial, 8pt

Header: Arial

Grand Total

Pane:

Header: Arial

More Colors...

Pages

Columns

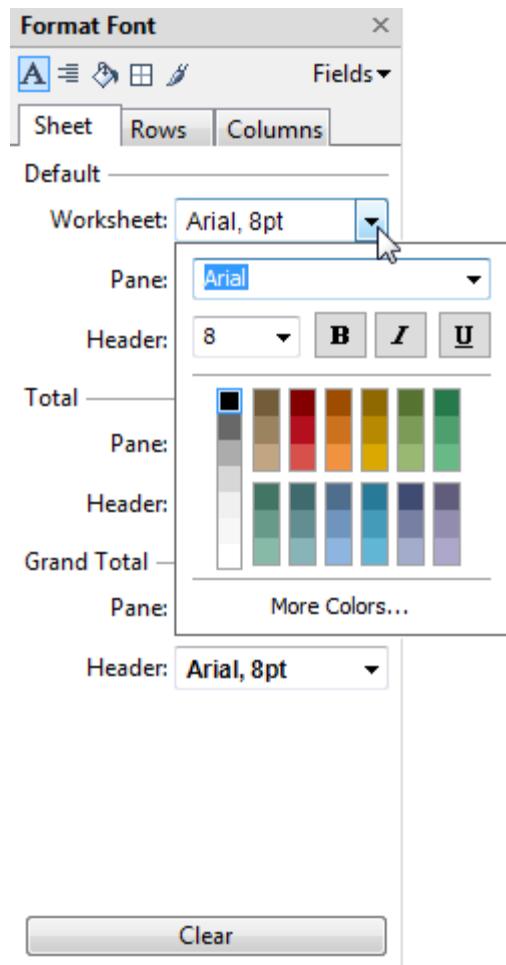
YEAR(Order Date)

Rows

Sub-Category

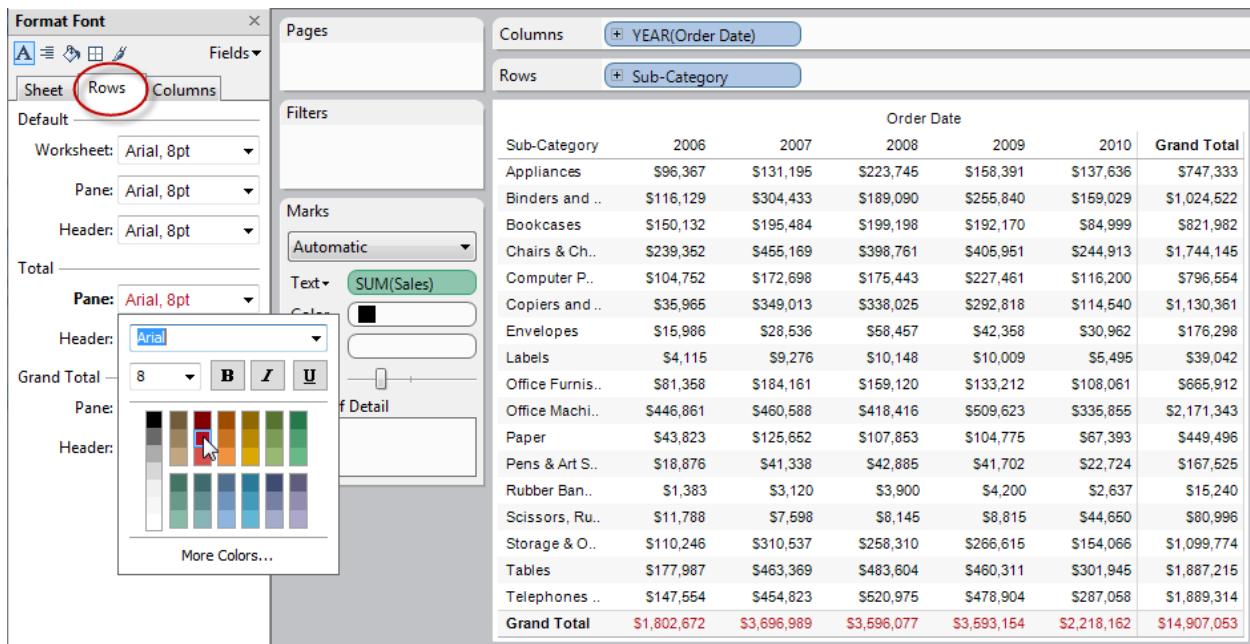
Order Date						
Sub-Category	2006	2007	2008	2009	2010	Grand Total
Appliances	\$96,367	\$131,195	\$223,745	\$158,391	\$137,636	\$747,333
Binders and ..	\$116,129	\$304,433	\$189,090	\$255,840	\$159,029	\$1,024,522
Bookcases	\$150,132	\$195,484	\$199,198	\$192,170	\$84,999	\$821,982
Chairs & Ch..	\$239,352	\$455,169	\$398,761	\$405,951	\$244,913	\$1,744,145
Computer P..	\$104,752	\$172,698	\$175,443	\$227,461	\$116,200	\$796,554
Copiers and ..	\$35,965	\$349,013	\$338,025	\$292,818	\$114,540	\$1,130,361
Envelopes	\$15,986	\$28,536	\$58,457	\$42,358	\$30,962	\$176,298
Labels	\$4,115	\$9,276	\$10,148	\$10,009	\$5,495	\$39,042
Office Furnis..	\$81,358	\$184,161	\$159,120	\$133,212	\$108,061	\$665,912
Office Machi..	\$446,861	\$460,588	\$418,416	\$509,623	\$335,855	\$2,171,343
Paper	\$43,823	\$125,652	\$107,853	\$104,775	\$67,393	\$449,496
Pens & Art S..	\$18,876	\$41,338	\$42,885	\$41,702	\$22,724	\$167,525
Rubber Ban..	\$1,383	\$3,120	\$3,900	\$4,200	\$2,637	\$15,240
Scissors, Ru..	\$11,788	\$7,598	\$8,145	\$8,815	\$44,650	\$80,996
Storage & O..	\$110,246	\$310,537	\$258,310	\$266,615	\$154,086	\$1,099,774
Tables	\$177,987	\$463,369	\$483,604	\$460,311	\$301,945	\$1,887,215
Telephones ..	\$147,554	\$454,823	\$520,975	\$478,904	\$287,058	\$1,889,314

Finally, you can use the Worksheet drop-down to specify the properties of all text in the worksheet.



### Row and Column Font Settings

Switch to the Rows or the Columns tabs to specify font properties for just the rows or just the columns. Here you have the same options as you do for the Sheet in that you can modify the font, style, size, and color for both the pane text and the header text. In the view below the Grand Totals are formatted red for just the Rows. Notice that the Grand Totals for Columns are not affected by this setting.



The screenshot shows the Tableau 'Format Font' dialog box. The 'Rows' tab is highlighted with a red circle. On the right, there's a data visualization of sales data with a color-coded legend for Sub-Categories.

Sub-Category	2006	2007	2008	2009	2010	Grand Total
Appliances	\$96,367	\$131,195	\$223,745	\$158,391	\$137,636	\$747,333
Binders and ..	\$116,129	\$304,433	\$189,090	\$255,840	\$159,029	\$1,024,522
Bookcases	\$150,132	\$195,484	\$199,198	\$192,170	\$84,999	\$821,982
Chairs & Ch..	\$239,352	\$455,169	\$398,761	\$405,951	\$244,913	\$1,744,145
Computer P..	\$104,752	\$172,698	\$175,443	\$227,461	\$116,200	\$796,554
Copiers and ..	\$36,965	\$349,013	\$338,025	\$292,818	\$114,540	\$1,130,361
Envelopes	\$15,986	\$28,536	\$58,457	\$42,358	\$30,962	\$176,298
Labels	\$4,115	\$9,276	\$10,148	\$10,009	\$5,495	\$39,042
Office Furnis..	\$81,358	\$184,161	\$159,120	\$133,212	\$108,061	\$665,912
Office Machi..	\$446,861	\$460,588	\$418,416	\$509,623	\$335,855	\$2,171,343
Paper	\$43,823	\$125,652	\$107,853	\$104,775	\$67,393	\$449,496
Pens & Art S..	\$18,876	\$41,338	\$42,885	\$41,702	\$22,724	\$167,525
Rubber Ban..	\$1,383	\$3,120	\$3,900	\$4,200	\$2,637	\$15,240
Scissors, Ru..	\$11,788	\$7,598	\$8,145	\$8,815	\$44,650	\$80,996
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Tables	\$177,987	\$463,369	\$483,604	\$460,311	\$301,945	\$1,887,215
Telephones ..	\$147,554	\$454,823	\$520,975	\$478,904	\$287,058	\$1,889,314
<b>Grand Total</b>	<b>\$1,802,672</b>	<b>\$3,696,989</b>	<b>\$3,596,077</b>	<b>\$3,593,154</b>	<b>\$2,218,162</b>	<b>\$14,907,053</b>

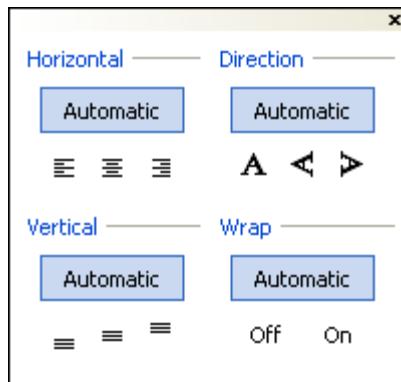
However, sometimes the settings don't make sense for particular views and are greyed out. For example, in the view above, the default pane text is in both rows and columns. Specifying font properties on a row or column level does not make sense, to change the pane text, switch back to the Sheet tab.

## Alignment

In the Format window, select the Alignment command  on the toolbar to see the Alignment format settings. You can specify alignment properties for the entire worksheet, just the rows, or just the columns using the tabs across the top of the Format window.

Using the alignment drop-downs you can specify the text alignment for both the pane and header text. For each of these text areas you can specify the following alignment options:

- *Horizontal* - controls whether the text aligns on the left side, right side, or is centered.
- *Vertical Alignment* - controls whether the text aligns across the top, middle, or bottom.
- *Direction* - rotates the text so that it runs vertically or horizontally.
- *Wrap* - controls whether long headers and pane text wrap to the next line rather than being abbreviated.



## Shading

In the Format window, select the Shading command  on the toolbar to see the Shading format settings. The shading settings control the background color of the pane and headers for normal areas, totals, and grand totals. In addition, you can add row or column banding.

### Row and Column Banding Settings

Sometimes, rather than selecting a single background color for of a pane or header, you may want to alternate the color from row to row or column to column at varying intervals. This kind of shading is called banding. Banding is particularly useful when you are working with a text table. Adding alternating shading can help you distinguish between consecutive rows or columns.

In the Format window, the banding settings allow you to select a color, the size, and level at which you want to apply the banding. Each of these properties are described below.

- Selecting a Color - select the color you want the bands to be using the drop down for either the pane or the header areas.
- Selecting a Band Size - the size refers to the frequency of bands. For example, rather than shade every other row, you may want to shade every three rows. Slide the size selector right and left to specify the band size.
- Selecting a Level - when you have nested tables where you have multiple dimensions on the rows and columns shelves, you may want to add banding at a particular level. For example, in the view below, both Year and Quarter are on the Columns shelf. When you set banding to the first level, the shading alternates between each member of the Quarter dimension. However, if you set banding to the second level, the shading alternates between each member of the Year dimension.

Slide the level selector right and left to specify the banding level.

## Borders

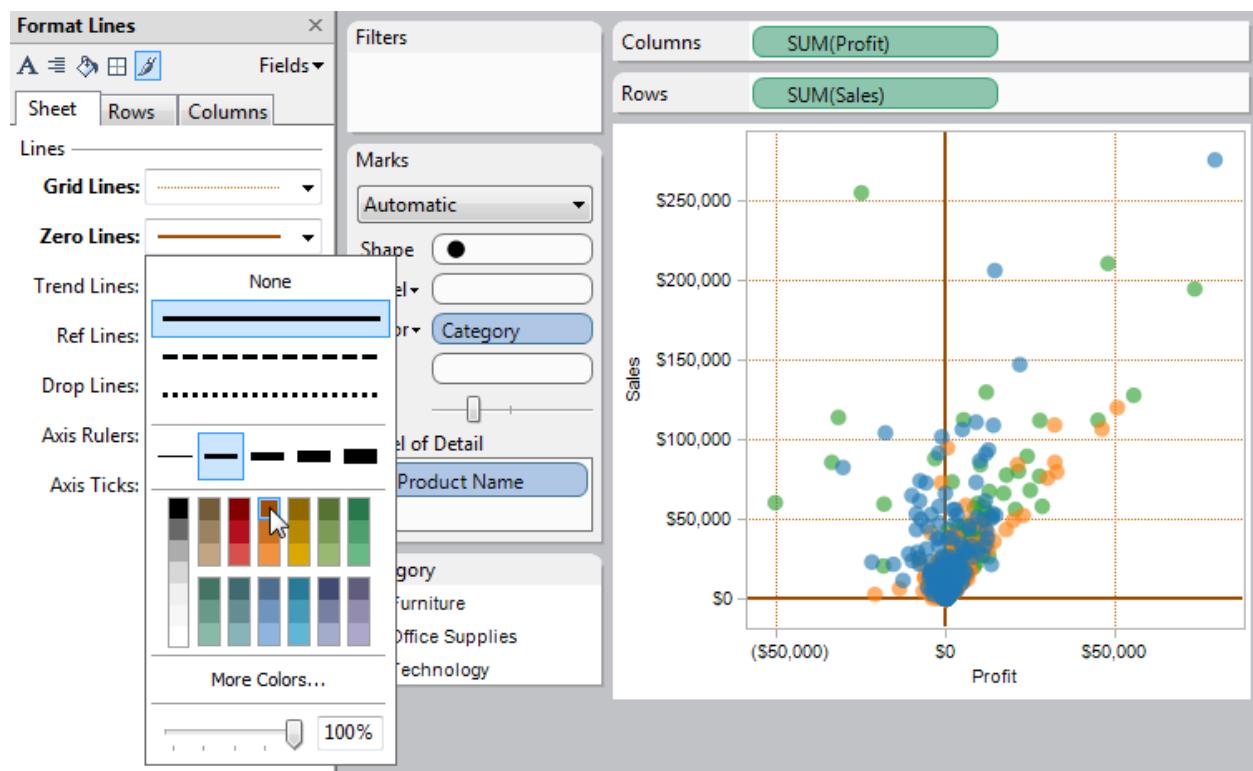
*In the Format window, select the Borders command  on the toolbar to see the Borders format settings. Borders are the lines that surround the table, pane, cells, and headers in a view. You can specify the border style, width, and color for the cell, pane, and header areas. Additionally, you can format the row and column dividers.*

### ***Row and Column Divider Settings***

*Row and column dividers are a good way to visually break up a view and are most commonly used in nested text tables. You can modify the style, width, color, and level of the borders that divide each row or each column using the row and column divider drop-downs. The level refers to the header level you want to divide by. For example, in the view below, there are three dimensions on the rows shelf: Customer Segment, Region, and Product Category 1. When adding a row divider you can switch between dividing every product, every region, or every customer segment by sliding the level selector right and left.*

## Lines

In the Format window, select the Lines command  on the toolbar to see the Lines format settings. The lines settings control the lines that are part of the graph such as grid lines and zero lines as well as lines that help you inspect data such as trend lines, reference lines, and drop lines. You can specify the style, width, and color for each of these lines. Additionally, you can specify font, alignment, and shading settings for reference line and drop line labels. For example, in the view below, the grid lines are turned on and zero lines turned off.



## Formatting Specific Parts of the View

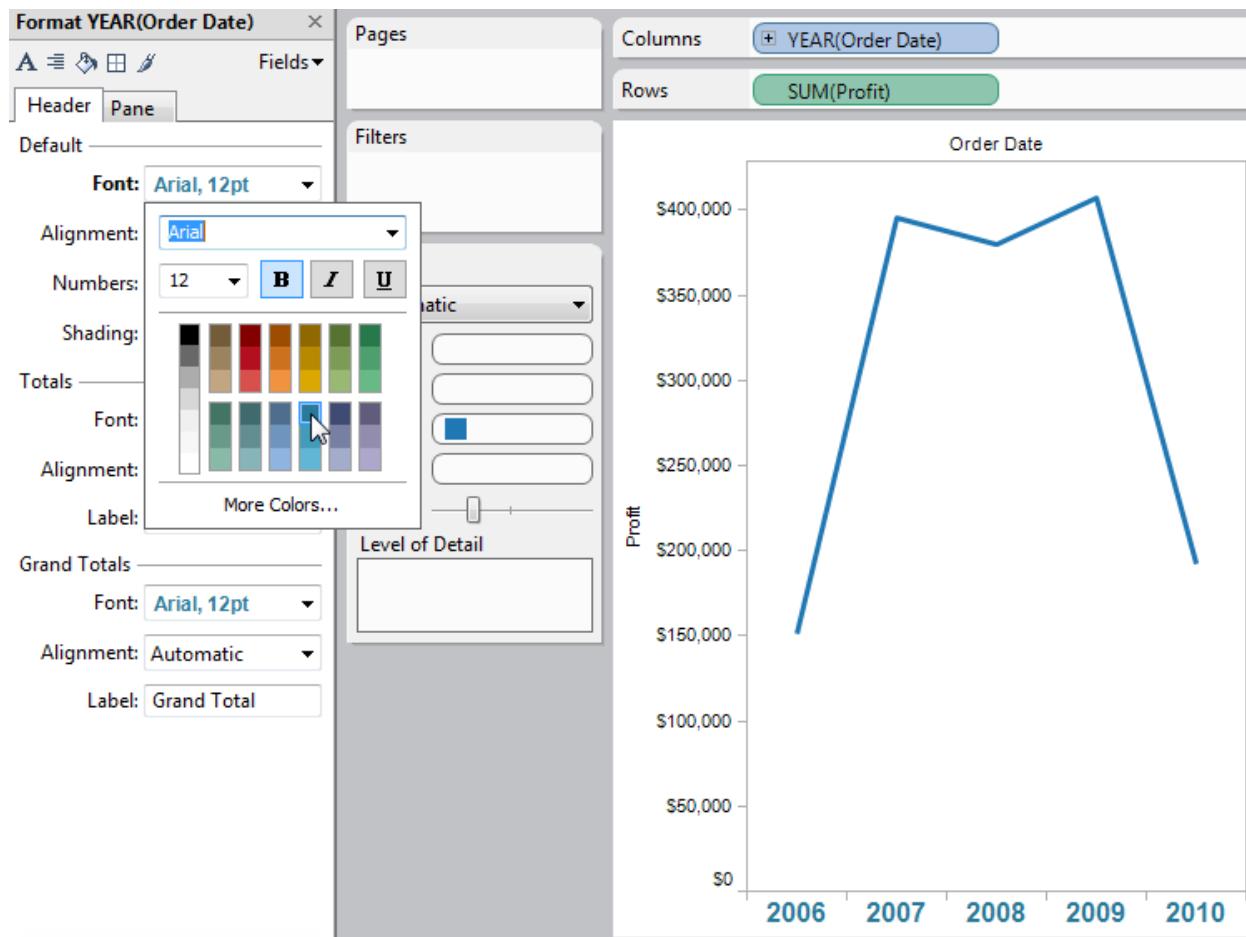
### Formatting Specific Parts of the View

*Although you will more commonly want to apply format settings on a large scale such as the entire worksheet, all rows, or all columns, sometimes you may want to format specific parts of the view. You can specify individual format settings by right-clicking a specific part of the view and selecting Format.*

- [Fields](#)
- [Numbers](#)
- [Field Labels](#)
- [Legends](#)
- [Title and Caption](#)
- [Tooltips](#)
- [Null Values](#)
- [Reference Lines and Bands](#)

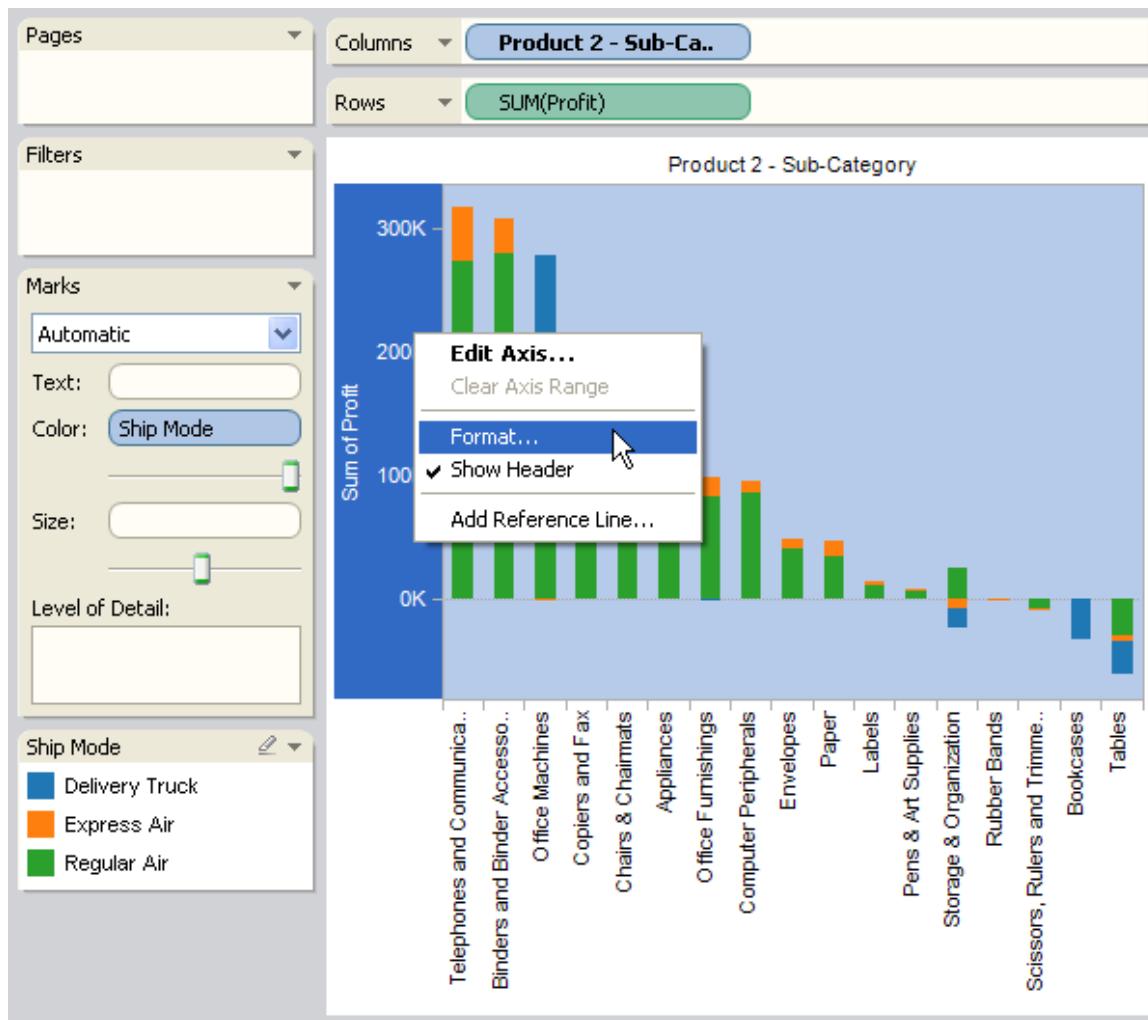
## Fields

Rather than formatting all rows or all columns in a worksheet, you can specify format settings that only apply to a specific field in the view. For example, in the view below, the Year(Order Date) field has been formatted so that the headers are 12pt, bold, and blue. Notice that the header values along the Profit axis are not affected.



### To format a specific field:

1. Right-click the part of the view you want to format and select Format.



*The Format window opens containing settings relevant to the selected field.*

2. *Make changes in the Format window as necessary.*

*For discrete fields such as Region or Customer you can specify font and alignment properties for both header and pane areas. For continuous fields such as Profit or Sales you can format font properties for the pane and axis as well as number format and tick mark colors. Refer to [Editing Axes](#) to learn more about other axis options. The view is updated as you make changes so you can quickly see the colors and formats that work with your view.*

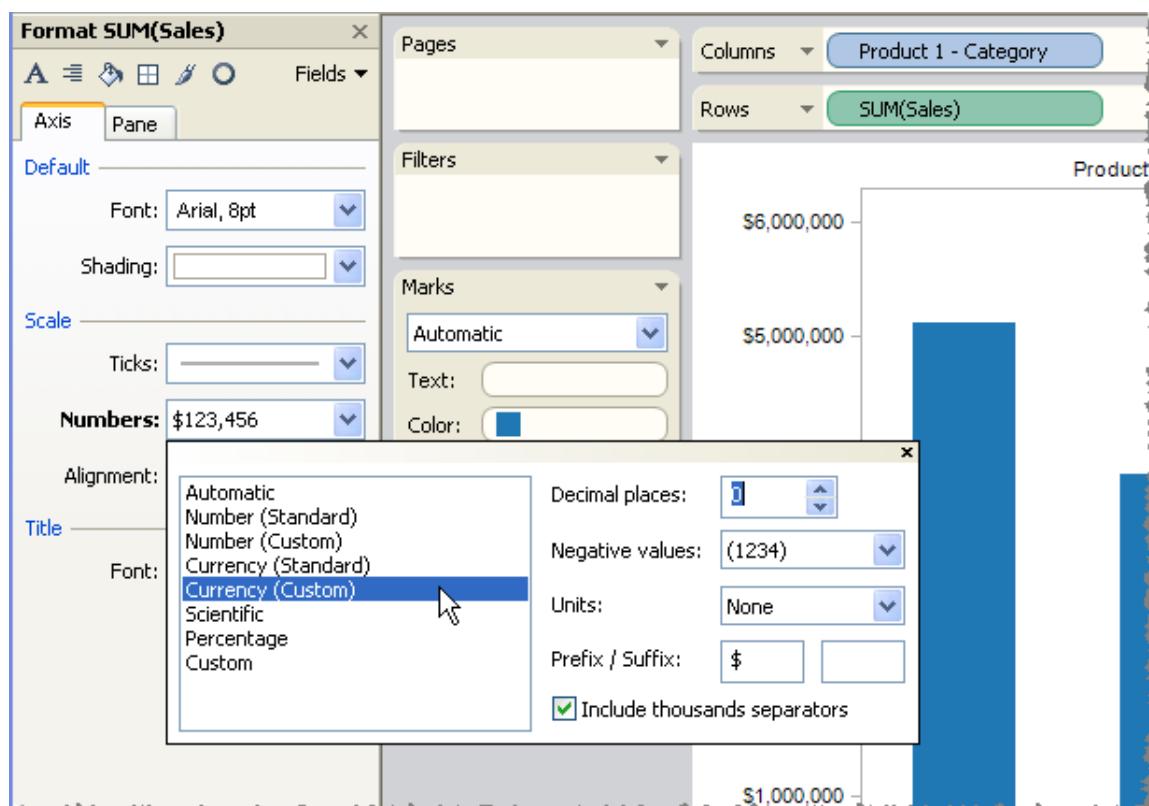
3. *When finished, click the 'x' in the upper right corner of the Format window to return to the Data window.*

## Numbers

When you format a measure, you can specify the number format for both the axis and the pane text. You can select from a set of standard formats, such as number, currency, scientific, and percentage; or you can define a custom number format using Microsoft Excel style format codes.

To specify number format:

1. Right-click a measure or axis in the view and select Format.
2. In the Format window, click the Numbers drop-down.
3. Select a number format. Some formats require additional settings. For example, if you select Currency (Custom), you must also specify the number of decimal places, how to treat negative values, the units, a prefix or suffix, and whether to include thousands separators.



Below is a list of the number formats and associated options available in Tableau

Number Format	Format Options
Automatic: format is automatically selected based on either the format specified by the data source or the data contained in the field.	None
Number (Standard): format is based on locale selected.	Locale: number format changes based on the geographical location selected.
Number (Custom): format is customized to your liking.	Decimal Places: the number of decimal places to display. Negative Values: how negative values will be displayed. Units: the number will be displayed using the specified units. For example, if the number is 20,000 and the units are thousands, the number will be displayed as 20K. Prefix/Suffix: characters that will precede and follow each displayed number. Include thousands separators: whether the number will show separators every thousand (example: 100,000 vs. 100000).
Currency (Standard): format and currency symbol is based on locale selected.	Locale: currency format based on the geographical location selected.
Currency (Custom): format and currency symbol is customized to your liking.	Decimal Places: the number of decimal places to display. Negative Values: how negative values will be displayed. Units: the number will be displayed using the specified units. For example, if the number is 20,000 and the units are thousands, the number will be displayed as 20K. Prefix/Suffix: characters that will precede and follow each displayed number. Include thousands separators: whether the number will show separators every thousand (example: 100,000 vs. 100000).
Scientific: numbers are displayed in scientific notation.	Decimal: the number of decimal places to display.
Percentage: numbers are displayed as a percentage with the percent symbol. The value of 1 is interpreted as 100% and 0 as 0%	Decimal: the number of decimal places to display.
Custom: format is based entirely on what is specified in the format options.	Custom: type in the format you want to use. This format can be specified by an Excel style number code.

*To set the default number format for a specific field, right-click the field in the Data window and select Field Properties > Number Format. In the subsequent dialog box you*

*can specify a number format that will always be used when the field is added to the view. The default number format is saved with the workbook. It is also exported when you export the connection information.*

## Field Labels

*Field labels are row and column headings that indicate the data fields used to create the Table. By default, field labels are shown but you can choose to hide them. When field labels are showing they display in three different parts of the view: rows, columns, and the corner. The view below shows an example of each of these types of field labels.*

	Region / Order Date							
	East				West			
Product 1 - Category	2006	2007	2008	2009	2006	2007	2008	2009
Furniture	-1,025	-4,281	-11,996	4,580	30,134	15,679	4,687	7,184
Office Suppli..	49,760	16,089	15,547	26,075	42,990	40,164	20,710	41,805
Technology	13,707	62,681	91,234	35,431	56,813	63,373	51,240	48,087

*You can format the font, shading, alignment, and separators for each of these types of field labels.*

### To format field labels:

1. Select *Format > Field Labels* or right-click a field label in the view and select *Format*.
2. In the *Format* window, specify setting the font, shading, and alignment of the field labels.

### Note:

*When you have multiple dimensions on the rows or columns shelves the field labels will be displayed adjacent to each other in the table. Each field label is separated from the others with a forward slash symbol. Specify a different separator in the *Format* window.*

## Legends

When you encode the marks using the color and size shelves a legend card displays in the worksheet. You can format the legend font, shading, border, and alignment. You can also edit the titles that display on each legend.

### To format legends:

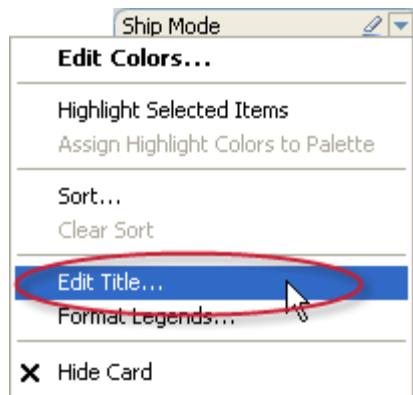
1. Select Format > Legends or right-click the legend and select Format.
2. In the Format window, specify settings for the body and title of the legends.

### Note:

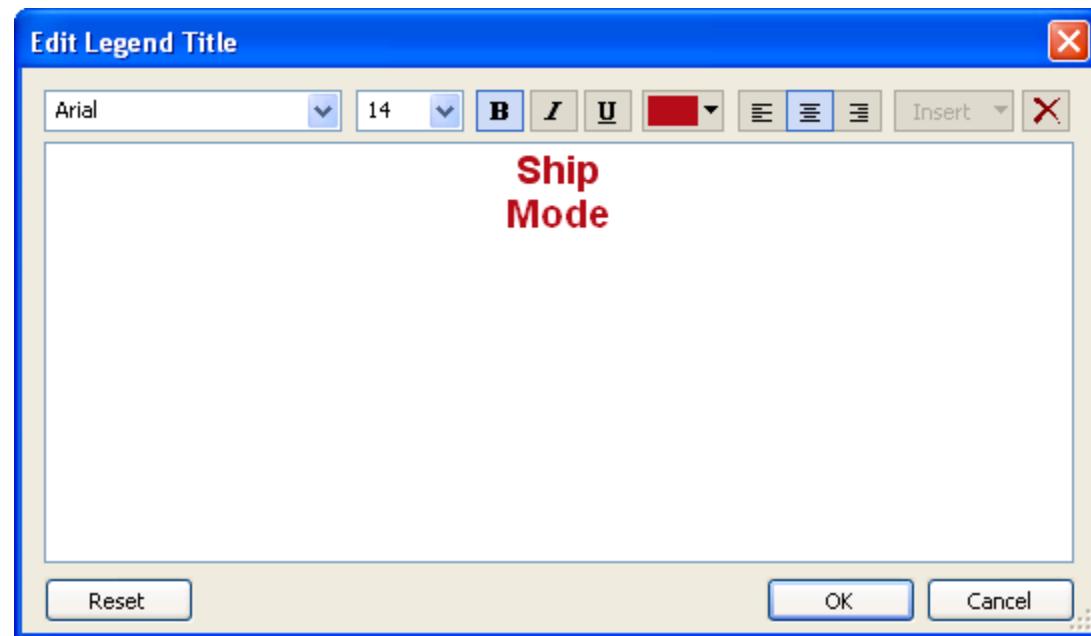
The legend format settings apply to all legends, you cannot format individual legends separately.

### To edit legend titles:

1. On the legend's card menu select Edit Title.



2. In the subsequent dialog box, type a new name for the legend and format it using the formatting options along the top of the dialog box. When finished, click OK.



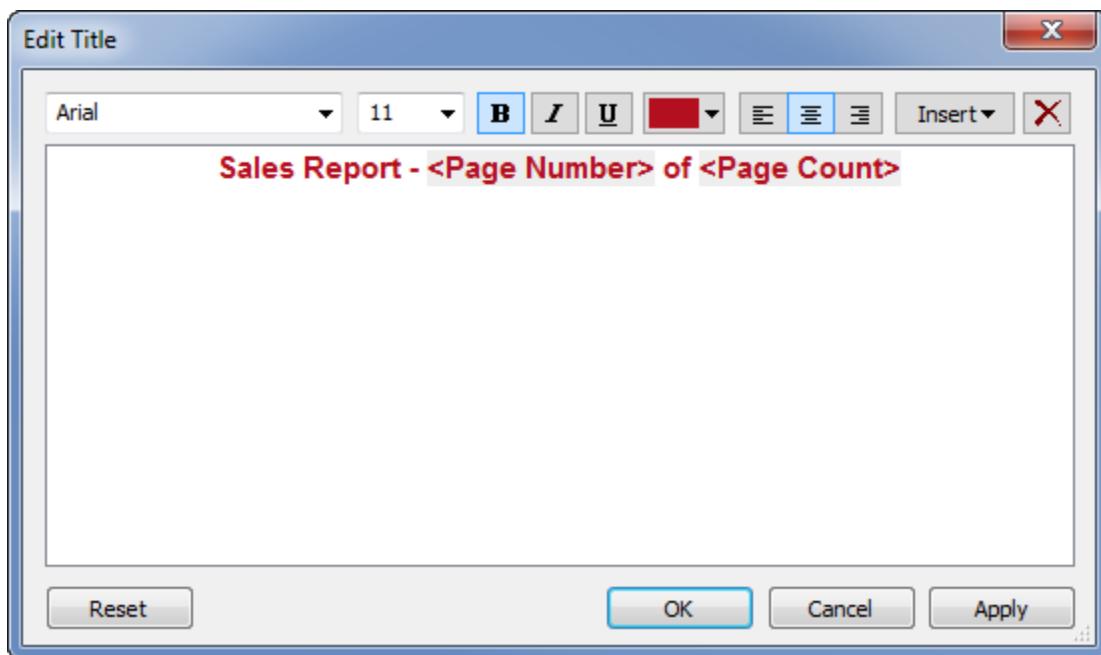
You can click the *Reset* button in the *Edit Title* dialog box to return to the default title.

## Title and Caption

You can add titles and captions to any sheet using the card menu on the toolbar. After you add a title or caption you can edit and format the text as well as the shading and border.

### To edit titles and captions:

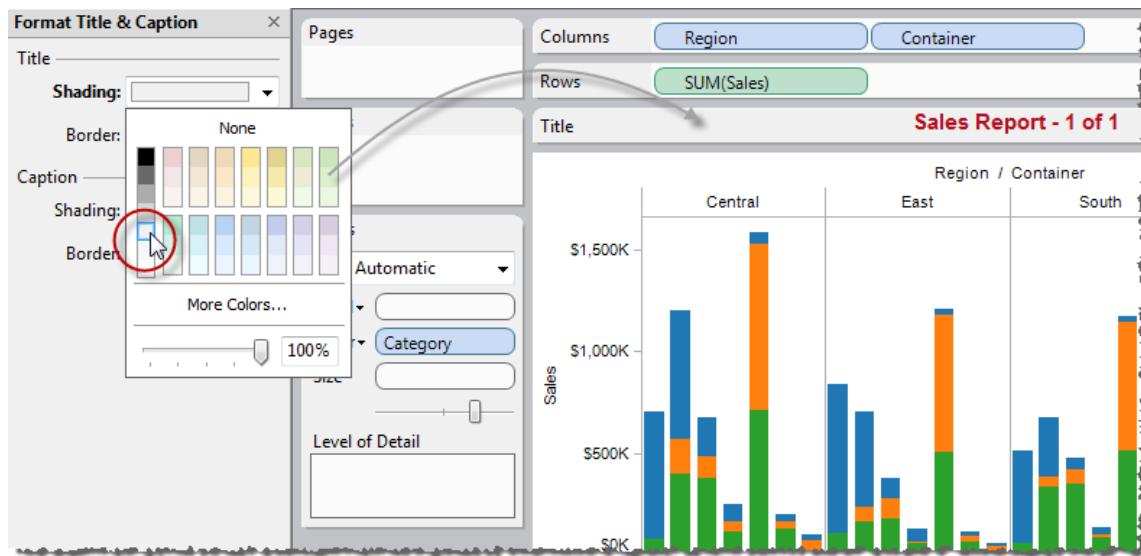
1. Double-click the title on a worksheet or dashboard.
2. In the subsequent dialog box, modify the text and format the font, size, style, color, and alignment. Use the Insert menu to add dynamic text such as sheet properties and field values. When finished, click **OK**.



### To format title and caption borders and shading:

1. Select Format > Title & Caption or right-click the title or caption in the view and select Format.
2. In the format window, use the drop-down controls to add shading and a border.

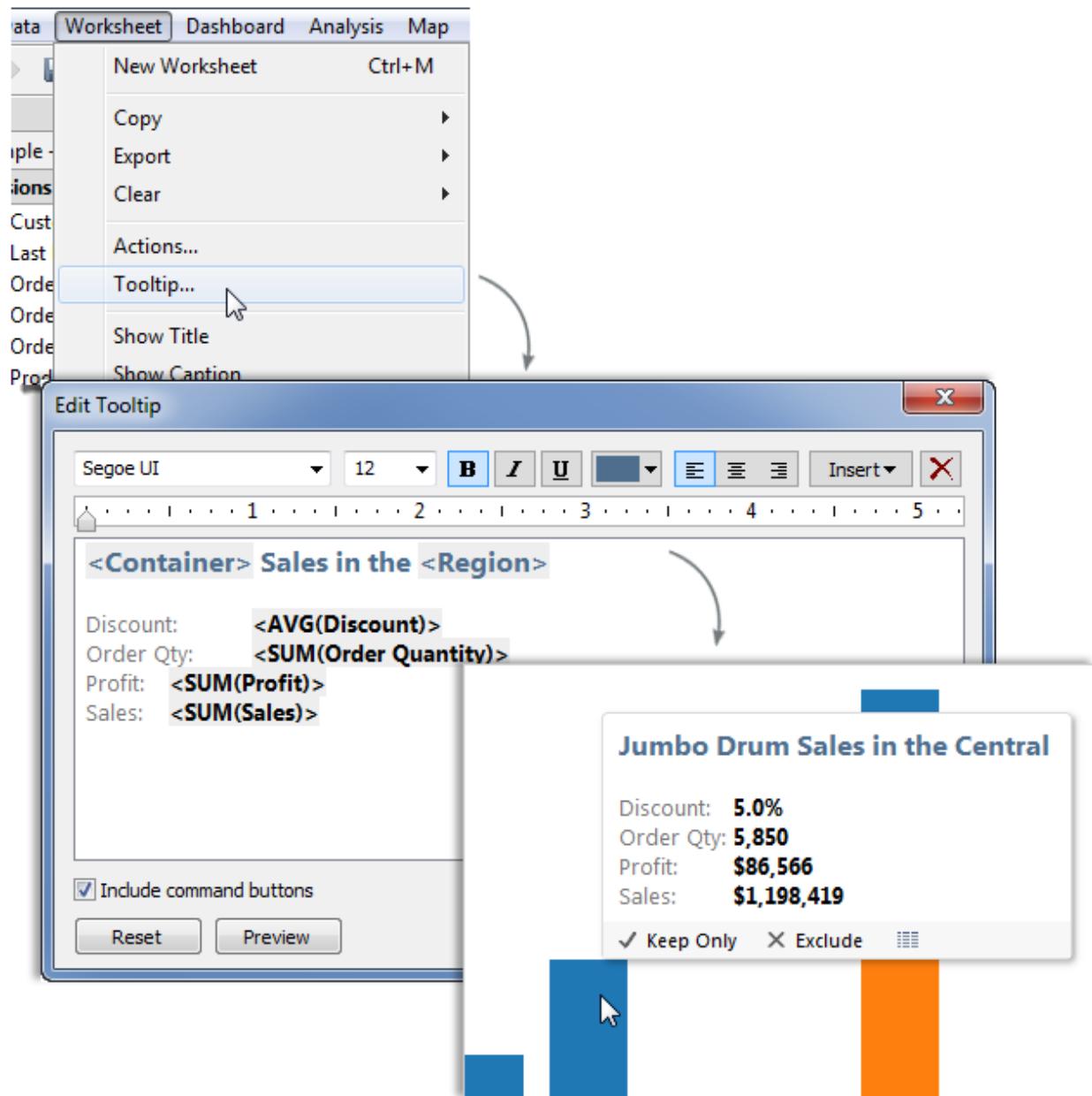
## Tableau Desktop Help



## Toolips

*Toolips are additional data details that display when you rest the pointer over one or more marks in the view. Toolips also offer convenient tools to quickly filter or remove a selection or view underlying data. You can edit the tooltip to include both static and dynamic text. You can also modify which fields are included in the automatic tooltip.*

*You can edit toolips by selecting Worksheet > Tooltip. Toolips are specified for each sheet and can be formatted using the formatting tools along the top of the Edit Tooltip dialog box. use the Insert menu at the top of the dialog box to add dynamic text such as field values, sheet properties, and more.*

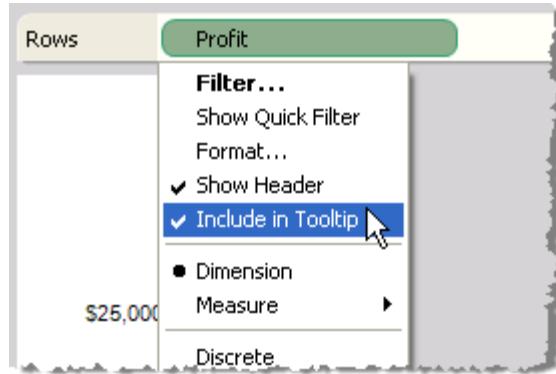


*The All Fields option on the Insert menu adds all field names and values that are used in the view. Inserting the All Fields parameter will automatically update the tooltip as you change the view. You can exclude unnecessary fields from the All Fields option.*

*Select the Include command buttons option to show filtering and view data options in the tooltip. For example, including command buttons will add Keep Only, Exclude, and View Data buttons to the bottom of the tooltip. These command buttons are available both in Tableau Desktop and when the view is published to the web or viewed on a mobile device.*

*To remove a field from the automatic tooltip:*

- *Right-click the field on one of the shelves in the view and select **Include in Tooltip**.*



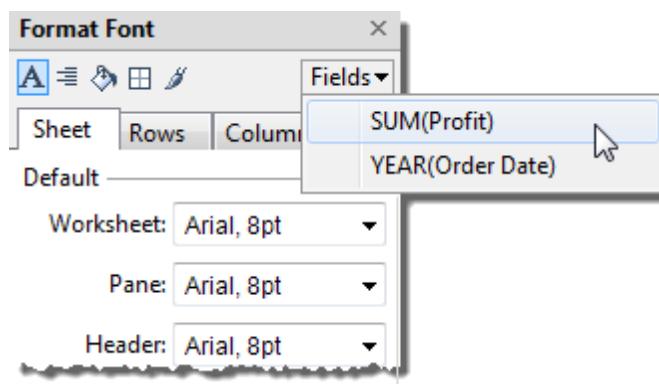
*You can show a field in the tooltip using the same menu option.*

## Null Values

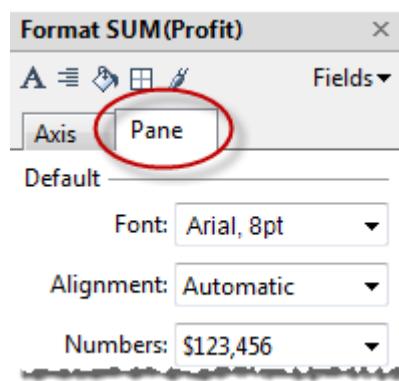
When a measure contains null values, they are usually plotted in a view as zero. However, sometimes that changes the view and you'd rather just suppress null values altogether. You can format each measure to handle null values in a unique way.

### To format a null values for a specific field:

1. Open the Format window and select the field using the drop-down menu in the upper right corner.

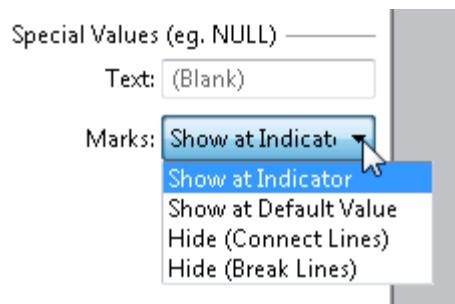


2. Make sure that the **Pane** tab is selected.



3. Optionally specify the text to label null values with when mark labels are turned on.

4. In the Special Values area, optionally specify whether to show the null values using an indicator in the lower right corner of the view, plot them at a default value (e.g., zero for number fields), hide the values but connect lines, or hide and break lines to indicate that null values exist.

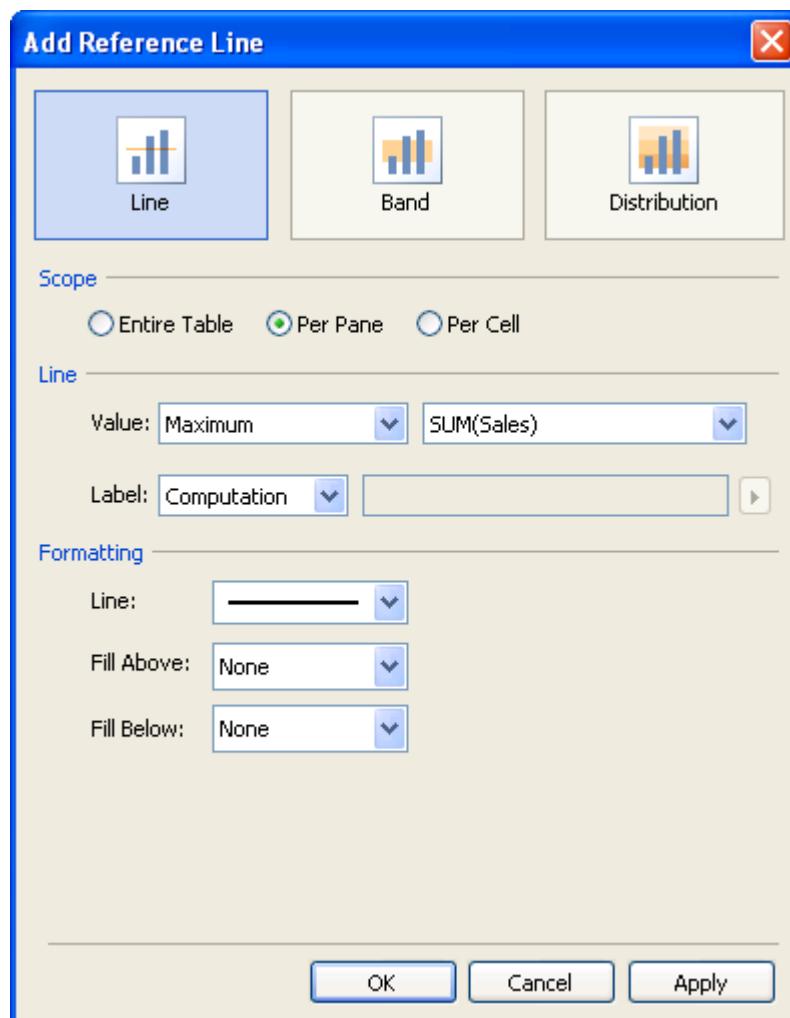


## Reference Lines and Bands

Tableau lets you format the reference lines and bands you add to the view. You can change the style, width, and color of these lines as well as the font properties of the label.

To format a specific reference line:

1. Right-click on the line or bands and select Format.
2. In the Format window you can specify formatting properties associated with reference lines, bands, or distributions. For example, you can change the line style and color as well as the label font properties.



3. When finished click OK.

*Many of the formatting options in the Format window are also available when adding and editing reference lines.*

## Copying and Pasting Formatting

*After you format a worksheet you can copy the format settings to one or more other worksheets. When you copy the formatting from a worksheet, it copies all of the format settings specified by the Format window. However, this command does not copy manual sizing, zoom settings, default label orientation, etc. Also formatting applied to individual reference lines and annotations is not copied with this command.*

**To copy and paste formatting between worksheets:**

1. Select the worksheet from which you want to copy formatting.
2. Right-click the worksheet tab and select Copy Formatting.
3. Select the worksheet you want to paste the formatting into.
4. Right-click the worksheet tab and select Paste Formatting.

**Note:**

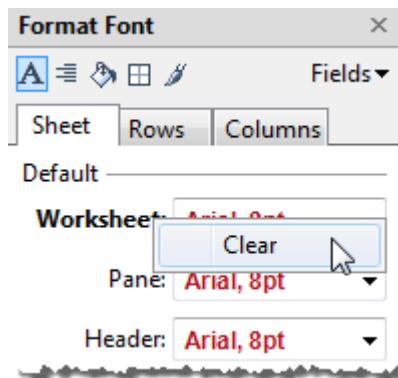
*You can also copy and paste formatting by selecting Copy Formatting on the Format menu.*

## Clearing Formatting

Any time you make changes to a setting in the Format window, the label of the setting is bold to indicate that it is not the default.

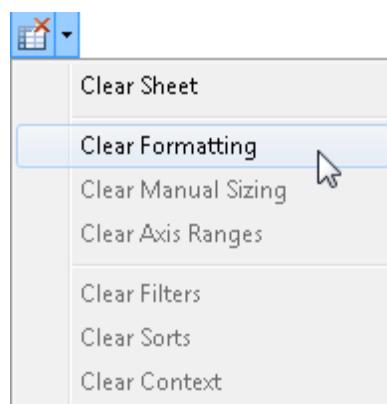
To clear individual settings in the Format window:

- In the Format window, right-click the label of the setting you want to clear and select Clear.



To clear all custom formatting in the worksheet:

- On the toolbar, click the clear menu and select Clear Formatting on the drop-down.



**Note:**

*You can also click the Clear button at the bottom of the Format window to clear all format settings currently showing in the Format window.*

Clear

## Workbook Themes

The default formatting follows best practices for displaying information graphically and improves how the graphics look when exported to the web, PowerPoint, PDF, or Office documents. This default formatting is controlled by the workbook theme. All workbooks created using the latest version of Tableau use the Default workbook theme. However, older Tableau workbooks may use the classic theme. You can upgrade older workbooks to use the default theme.

### To upgrade workbook themes:

1. Open the workbook using Tableau Desktop.
2. Select Format > Workbook Theme > Default.
3. Save the workbook.

## Resizing the Table

### Resizing the Table

Tableau allows you to change the size of the rows, columns, and cells that compose a table. The best way to resize your table depends on the view type and the table components you want to resize.

- [Resizing Rows and Columns](#)
- [Resizing the Entire Table](#)
- [Resizing Cells](#)
- [Reordering Rows and Columns](#)
- [Including and Excluding Rows and Columns](#)
- [Resize Keyboard Shortcuts and Commands](#)
- [Clearing Manual Sizing](#)

## Resizing Rows and Columns

Sometimes the rows and columns are not quite wide or tall enough. You can either resize rows and columns using the cell size commands on the Format menu or by manually dragging the header and axis borders in the view.

### Using the Cell Size Commands

By selecting Format > Cell Size and then the Taller, Shorter, Wider, or Narrower menu items you can resize row and columns.

For example, suppose you want to increase the width of the columns and the height of the rows for the view shown below. You can use the Taller and Wider menu items or the keyboard shortcuts Ctrl + up arrow and Ctrl + right arrow. The views below use both these commands to make the view more readable.

The figure displays two views of a data grid side-by-side, illustrating the effect of using cell size commands to resize rows and columns.

**Left View (Original):**

		Order Date	
		2007	2008
Customer S..	Region	Q1	Q2
Consumer	Central	52,488	53,692
	EAST	24,175	27,161
	South	68,402	27,350
	WEST	46,099	27,849
Corporate	Central	106,046	42,721
	EAST	133,304	50,765
	South	55,454	64,284
	WEST	42,081	75,764
Home Office	Central	47,746	38,696
	EAST	19,410	74,152
	South	30,093	39,625
	WEST	80,482	72,399
Small Business	Central	16,818	27,456
	EAST	20,462	24,629
	South	59,309	21,221
	WEST	44,599	73,829

**Right View (Resized):**

		Order Date			
		2007			
Customer S..	Region	Q1	Q2	Q3	Q4
Consumer	Central	52,488	53,692	43,729	36,676
	EAST	24,175	27,161	60,526	48,296
	South	68,402	27,350	17,303	51,275
	WEST	46,099	27,849	65,259	65,036
Corporate	Central	106,046	42,721	71,616	68,736
	EAST	133,304	50,765	95,779	74,477
	South	55,454	64,284	83,726	150,323
	WEST	42,081	75,764	54,626	72,826
Home Office	Central	47,746	38,696	33,901	66,339

### Note:

For a given field, all members will have the same width and the same height. That is, you cannot resize individual field members.

### Manually Resizing Rows and Columns

To manually resize the widths or heights of row and column headers or axes:

1. Place your cursor over the vertical or horizontal border of a header or axis.
2. When you see the resize cursor



3. , click and drag the border left and right or up and down.



## Resizing the Entire Table

You can increase or decrease the size of the entire table by selecting Bigger or Smaller on the Format > Cell Size menu. For example, to increase the width of the columns and the height of the rows for the view shown below, you can select Format > Cell Size > Bigger until the view is of the desired size. This option increases both the width and height of the panes in an intelligent way. Notice that the size of the row headers increase horizontally when you resize the table.



		Order Date							
		2007				2008			
Customer S.	Region	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Consumer	Central	52,488	53,692	43,729	36,678	61,053	75,505	53,738	52,050
	EAST	24,175	27,161	60,526	48,296	66,396	17,809	42,710	16,348
	South	68,402	27,350	17,303	51,275	33,043	27,262	24,139	66,054
	WEST	46,099	27,849	65,259	66,036	53,270	65,609	35,616	17,791
Corporate	Central	106,046	42,721	71,616					
	EAST	133,304	60,765	95,779					
	South	55,454	64,284	83,726					
	WEST	42,081	75,764	54,626					
Home Office	Central	47,746	38,696	33,901					
	EAST	19,410	74,152	49,270					
	South	30,093	39,625	65,511					
	WEST	80,482	72,399	30,410					
Small Business	Central	16,818	27,456	45,221					
	EAST	20,462	24,629	61,091					
	South	59,309	21,221	54,502					
	WEST	44,599	73,829	10,025					

		Order Date							
		2007				2008			
Customer Segment	Region	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Consumer	Central	52,488	53,692	43,729	36,678	61,053	75,505	53,738	52,050
	EAST	24,175	27,161	60,526	48,296	66,396	17,809	42,710	16,348
	South	68,402	27,350	17,303	51,275	33,043	27,262	24,139	66,054
	WEST	46,099	27,849	65,259	66,036	53,270	65,609	35,616	17,791
Corporate	Central	106,046	42,721	71,616					
	EAST	133,304	60,765	95,779					
	South	55,454	64,284	83,726					
	WEST	42,081	75,764	54,626					
Home Office	Central	47,746	38,696	33,901					
	EAST	19,410	74,152	49,270					
	South	30,093	39,625	65,511					
	WEST	80,482	72,399	30,410					
Small Business	Central	16,818	27,456	45,221					
	EAST	20,462	24,629	61,091					
	South	59,309	21,221	54,502					
	WEST	44,599	73,829	10,025					

For the view shown below, you can select Format > Cell Size > Smaller to decrease the size of the table.

## Tableau Desktop Help



## Resizing Cells

*Any table you can create in Tableau has the cell as its basic component. For a text table, the cell is what you would expect. It is the intersection of a row and a column, and is where the text is displayed.*

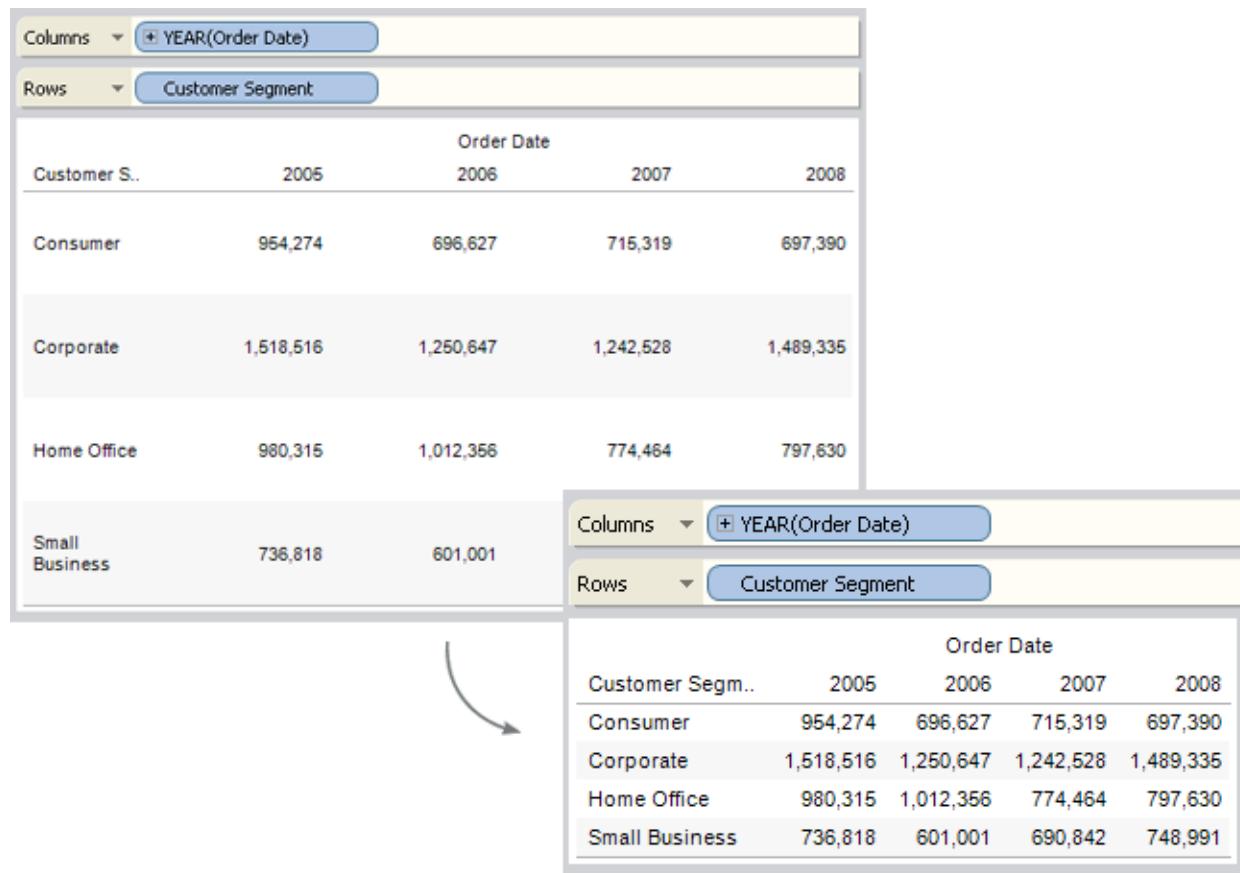
*However, depending on the view you construct, identifying the cell is not always possible or useful like in the case of a scatter plot.*

*Manipulating cells to enhance your data view is useful when dimensions are the inner fields of both the Rows and Columns shelves. In this case, there are two shortcuts you can select on the Format > Cell Size menu:*

- *Square Cell – Adjusts the view so the cell has a 1:1 aspect ratio. This results in a square cell, which is particularly useful for heat maps.*
- *Text Cell – Adjusts the view so the cell has a 3:1 aspect ratio. This is particularly useful for text tables.*

*For example, the text table shown below is modified by selecting Text Cell from the Format menu. This enforces a cell aspect ratio of 3:1 and results in a compact table that is easy to read.*

## Tableau Desktop Help



*The heatmap shown below is modified by selecting Square Cell on the Format > Cell Size menu. This enforces a cell aspect ratio of 1:1 and results in a compact table that is easy to analyze. You can also use the Size slider to adjust the size of each mark.*

**Note:**

After changing the cell size, you can use **Ctrl+B** and **Ctrl+Shift+B** to decrease or increase the table size while maintaining the cell aspect ratio.

## Reordering Rows and Columns

*The members in the view may not always be ordered exactly how you want it. You can reorder the rows and columns by clicking and dragging a header to a new position. Moving columns and rows around is equivalent to manually sorting.*

## Including and Excluding Rows and Columns

*Sometimes you will want to restrict certain members of a field from displaying. You can easily exclude a row or column by right-clicking the header and selecting **Exclude** on the context menu. Excluding a row or column creates a filter.*

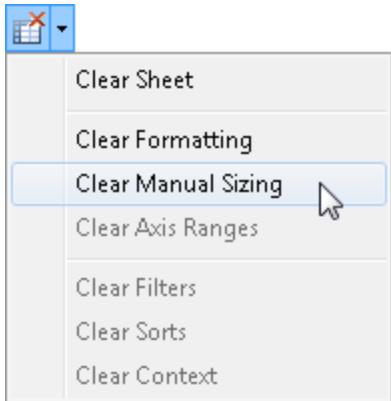
## Resize Keyboard Shortcuts and Commands

*Every view you build in Tableau will be different and require different sizing techniques. Using the keyboard shortcuts to resize rows and columns as well as the entire table makes building views more efficient. The table below defines some keyboard shortcuts and menu commands for common sizing actions.*

Command	Keyboard Shortcut	Menu Command
Taller	CTRL + Up	Format > Cell Size > Taller
Shorter	CTRL + Down	Format > Cell Size > Shorter
Wider	CTRL + Right	Format > Cell Size > Wider
Narrower	CTRL + Left	Format > Cell Size > Narrower
Bigger	CTRL + SHIFT + B	Format > Cell Size > Bigger
Smaller	CTRL + B	Format > Cell Size > Smaller

## Clearing Manual Sizing

You can clear the custom sizing at any time using the Clear command on the toolbar. Select Clear Manual Sizing on the Clear drop-down.



You can also revert to the last saved state by selecting File > Revert to Saved. This option discards all unsaved changes including manual sizing.

## Miscellaneous Table Options

In addition to the standard formatting, there are some other settings that define the table structure. You can modify these settings by selecting Analysis > Table Layout > Advanced to open the Table Options dialog box. There you can specify the aspect ratio, the default number format, row and column attributes, and the default label orientation for labels along the bottom of the view. These settings apply to the whole view, however, some can be overridden by the changes made in the Format window.

### Setting Aspect Ratio

The aspect ratio refers to the ratio of the pane width to the pane height. You can choose to constrain the aspect ratio to a specified amount or not constrain it at all. An unconstrained axis range can be useful because it means that the axes don't have to be the same length. Anytime you manually resize a row or column, you are unconstraining the aspect ratio. The aspect ratio setting only applies to views containing continuous axes on both the row and column shelves. Nominative axes are not affected by the aspect ratio settings.

### Setting Default Number Format

You can define the number of decimal places to display by default for numbers in the view. If you select Automatic, Tableau automatically decides the number of decimal places based on the data in the field. If you select Manual, you can decide to show up to 16 decimal places.

### Setting Row Attributes

Select from the following Row attributes:

- Maximum levels of row labels: determines the number of fields that can be added to the Rows shelf before the headers are combined on the same level.
- Maximum levels of horizontal row labels: determines the number of fields that can be placed on the Rows shelf before headers are automatically oriented vertically rather than horizontally.

### Setting Column Attributes

Select from the following column attributes:

- Maximum levels of column labels: determines the number of fields that can be placed on the Columns shelf before Tableau begins to combine the labels.

- *Show innermost level at bottom of view when there is a vertical axis: displays the innermost level of column headers at the bottom of the view (as opposed to the top) when a vertical axis is added to the view.*
- *Default orientation of labels at bottom of view: determines whether labels at the bottom of the view are oriented horizontally or vertically by default. You can toggle between the horizontal and vertical options by pressing Ctrl + L on your keyboard.*

## Editing Axes

### Editing Axes

*When you add a measure to the Columns or Rows shelf, you add an axis to the view. For each axis you can specify the range, scale, tick mark properties, and more. Edit the axes to create a view that best matches your data and focuses on the relevant information. For example, you may have a view showing the Profit over four years. The automatic axis may range from 0 to \$400,000 but your profits never went below \$300,000. You could adjust the Axis Range so that it starts at \$300,000 thus focusing on where the data points actually lie.*

*Axis formatting options are available in the Edit Axis dialog box.*

- [Changing the Axis Range](#)
- [Changing the Axis Appearance](#)
- [Formatting Tick Marks](#)

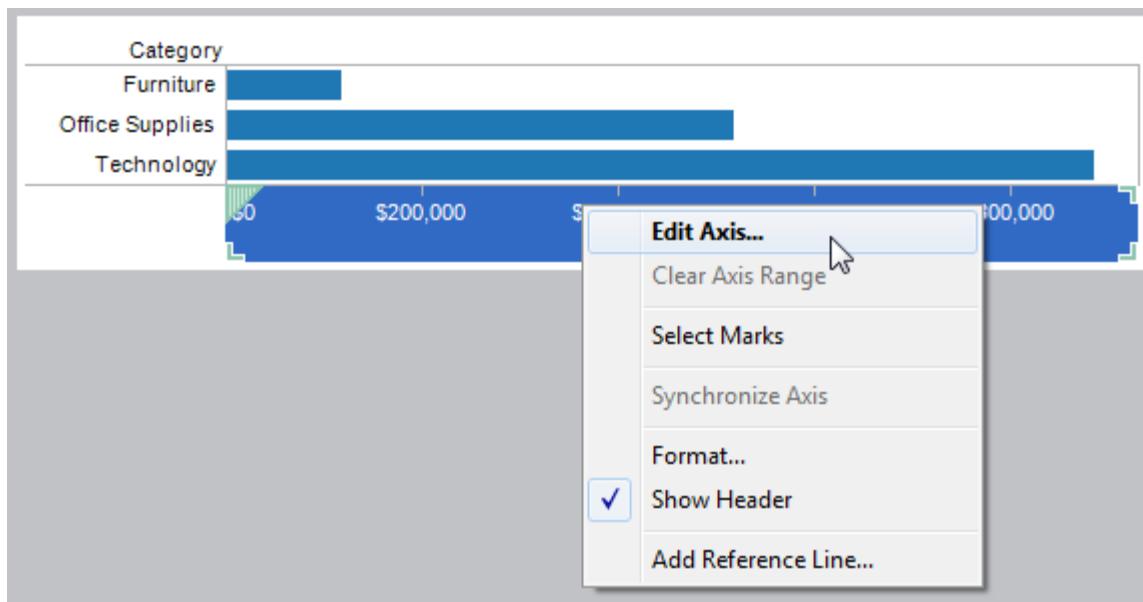
## Changing the Axis Range

### Changing the Axis Range

An axis shows data points that lie within a range of values. You can limit the axis range in order to focus the view to where the data points lie.

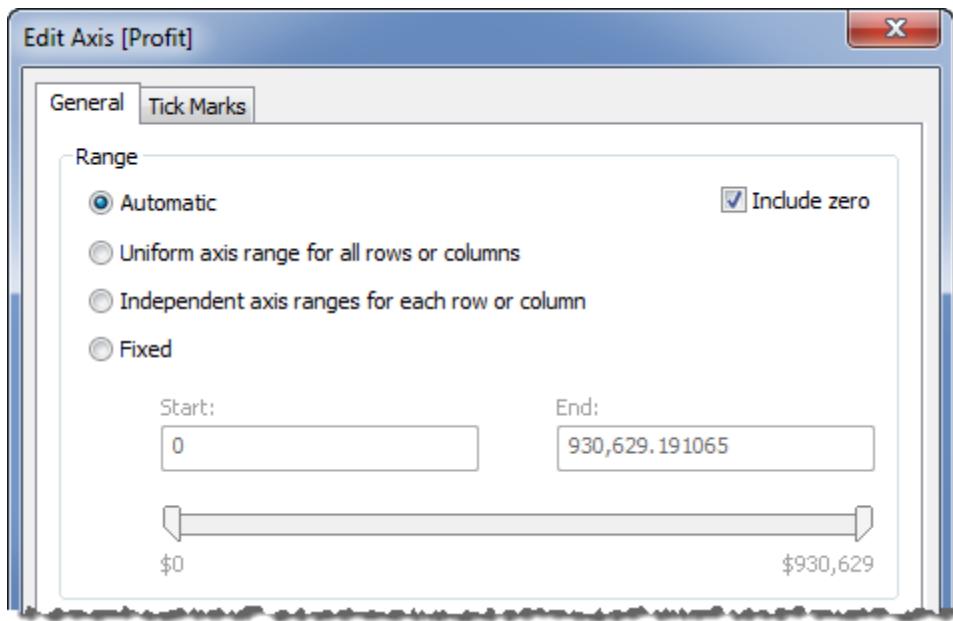
To change the axis range:

1. Right-click on the axis that you want to edit and select Edit Axis.



2. In the Edit Axis dialog box, select one of the following:

- Automatic - The axis range is automatically decided based on the data used in the view.
- Uniform axis range for all rows or columns - the axis range is the same across all panes in the view.
- Independent axis ranges for each row or column - the axis ranges vary across each pane in the view.
- Fixed - specify the start and end values for the axis. Fixed axes are applied across all panes in the view.



3. You can also specify whether to include zero. When the option include zero is cleared, the axis range will adjust to just show the range of values in the data.
  4. When finished, click OK.
- [\*\*Example – Changing the Axis Range\*\*](#)

## Example – Changing the Axis Range

In this example you will build three views using the same data, however, each view will use a different axis range format. These views use the Sample-Superstore Sales spreadsheet to display the aggregated total sales for three product categories over the course of four years. The first view uses a uniform axis range for all rows in the view; the second view uses an independent axis range for each row in the view; and finally, the third view uses a custom defined fixed axis range.

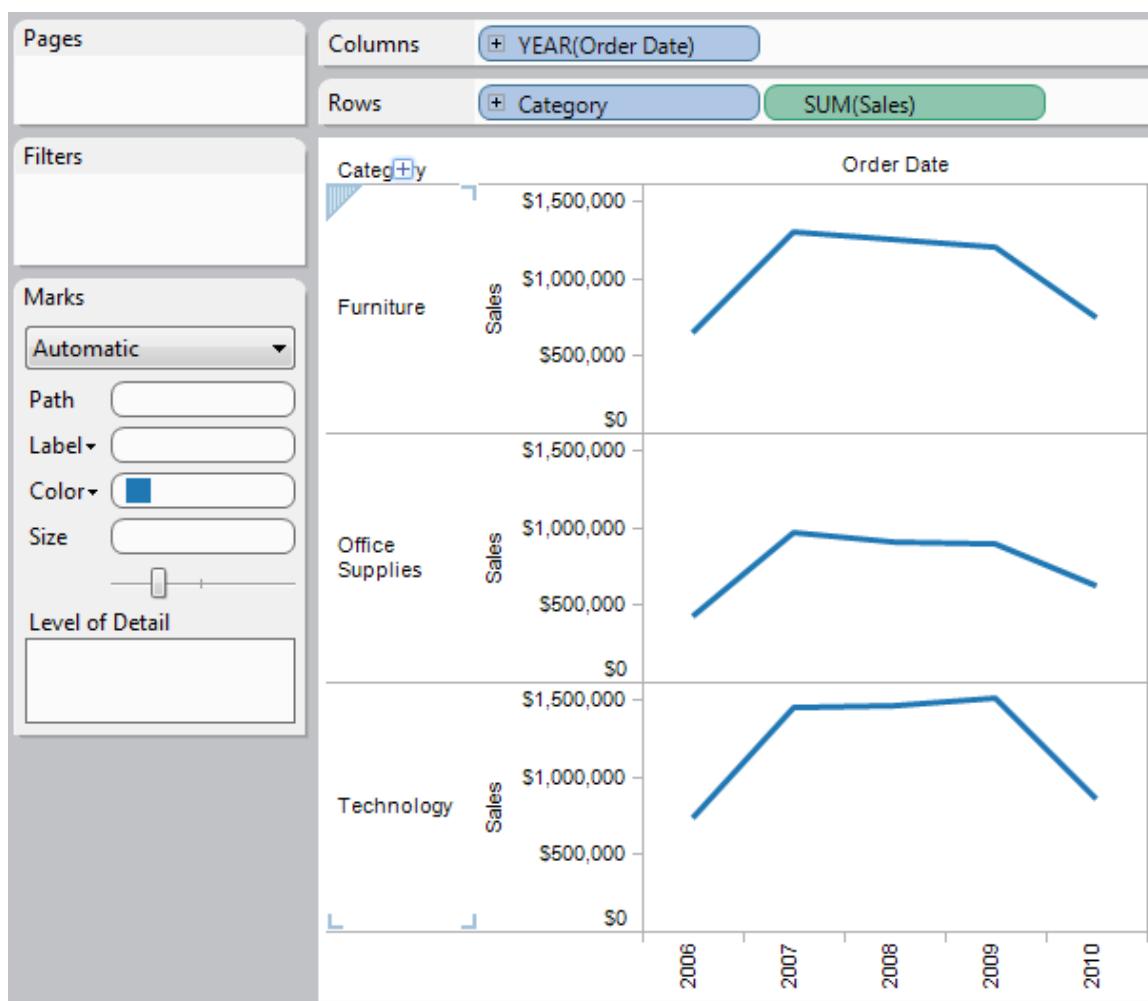
- [View 1- Building a view with a uniform axis range](#)
- [View 2-Building a View using independent axis ranges](#)
- [View 3- Building a view using a fixed axis range](#)

## View 1- Building a view with a uniform axis range

A uniform axis range means that the same range is applied to each row or column in your view. The range is automatically generated based on the underlying data values.

1. Place the Order Date dimension on the Columns shelf and the Product 1 - Category dimension on the Rows shelf.
2. Place the Sales measure on the Rows shelf.

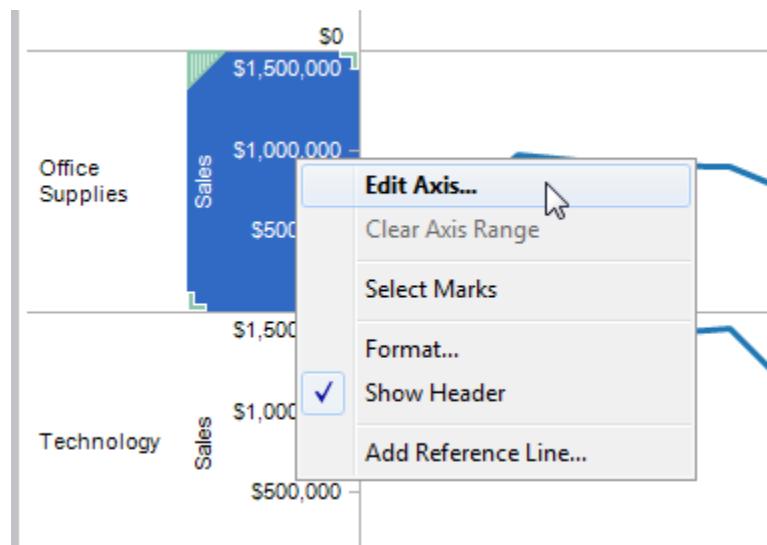
The measure is automatically aggregated as a summation and an axis is added to the view. By default the view uses a uniform axis range. Notice that the axis range is the same, from 0K to 1500K, for each product category.



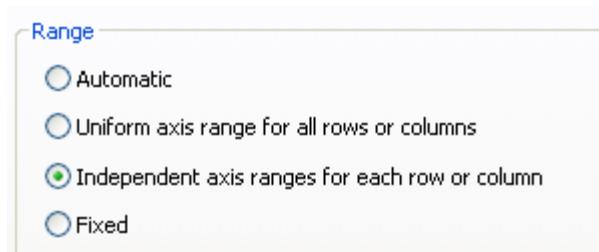
## View 2-Building a View using independent axis ranges

When you use an *independent axis range*, each row or column will have its own axis range based on the underlying data values.

1. Right-click the SUM(Sales) axis in the view and select *Edit Axis*.



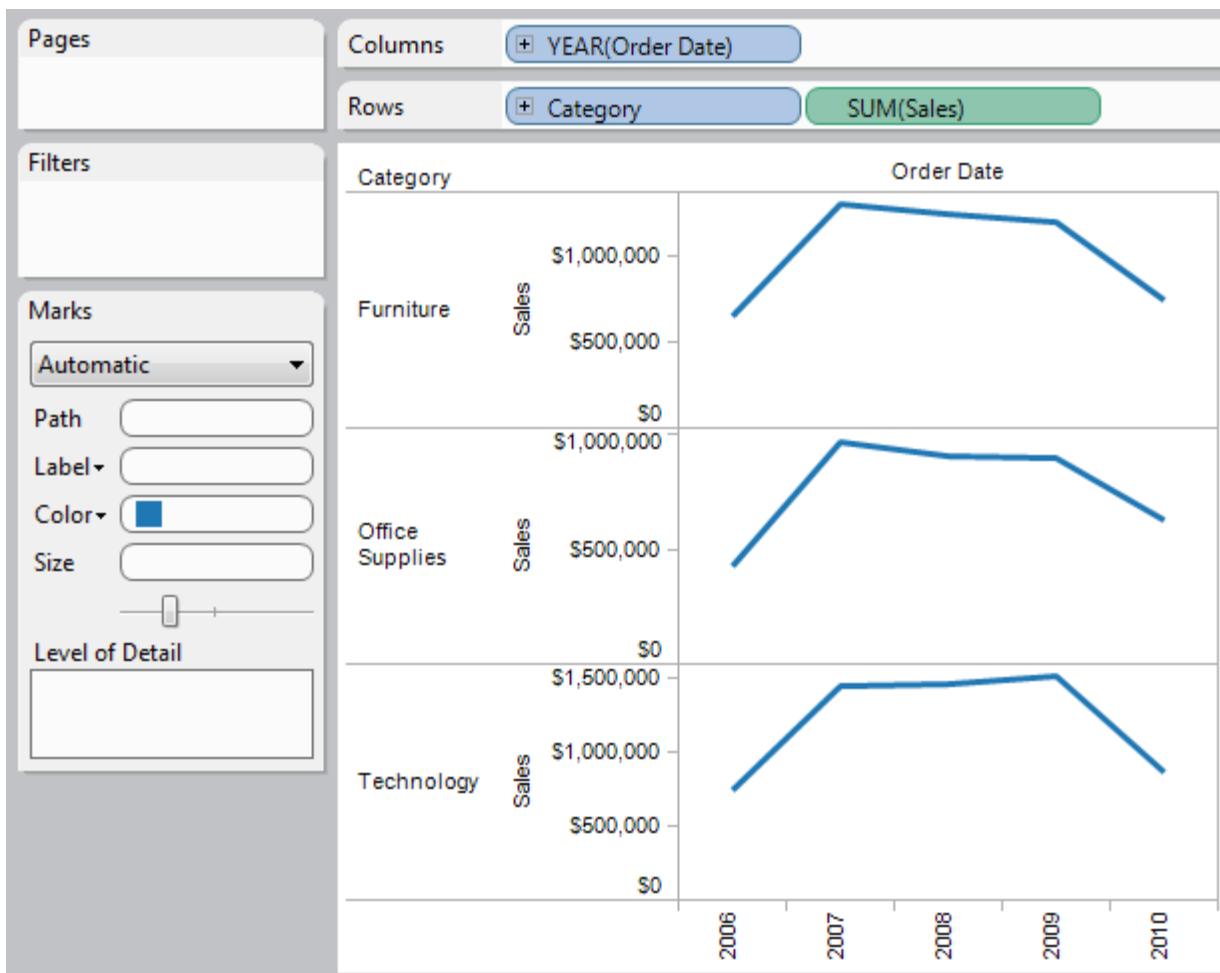
2. In the *Edit Axis* dialog box, select *Independent axis range* for each row or column.



3. When finished, click *OK*.

The axis range for each product category are now *independent* from each other. The Technology and Furniture categories still ranges from 0K to 1500K but the Office Supplies category ranges from 0K to a little over 1000K.

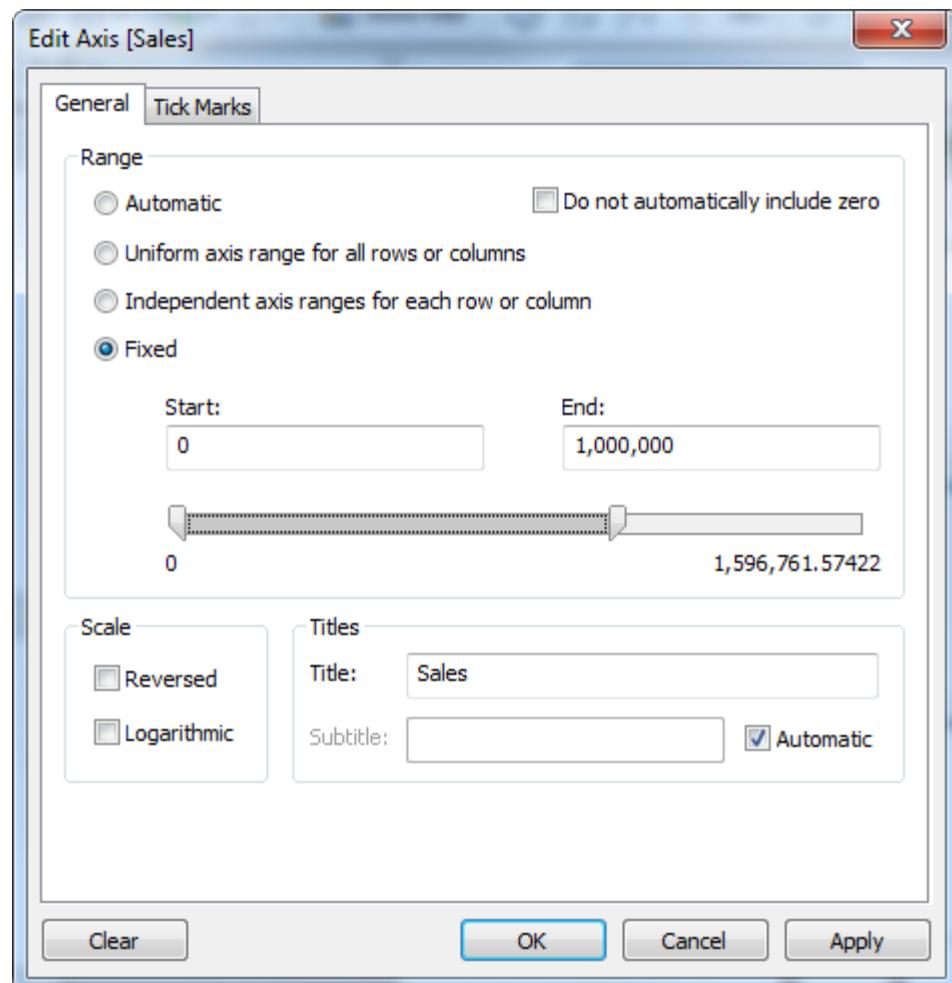
## Tableau Desktop Help



### View 3- Building a view using a fixed axis range

So far, Tableau has automatically generated the axis range based on the underlying data values. You can also define your own range that is applied uniformly across the rows or columns in the view.

1. Right-click on the SUM(Sales) axis in the view and select Edit Axis.
2. In the Edit Axis dialog box, select Fixed. Then define Start and End values either by typing into the text boxes or by dragging the sliders toward each other. For this example, type 0 as the Start and 1000000 as the End.

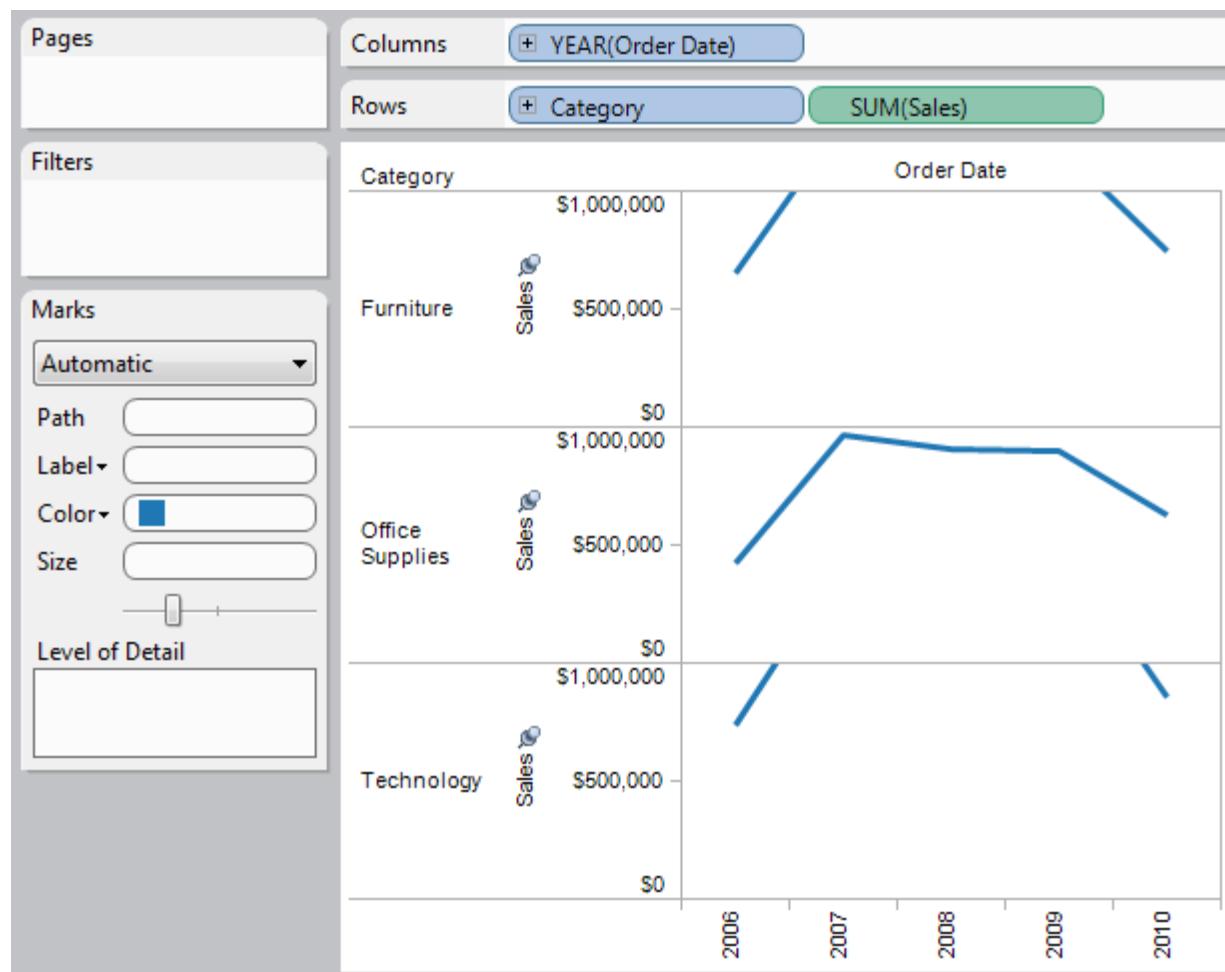


3. When finished, click OK.

Notice that the Technology and Furniture categories don't have any transactions with Sales below 1000K so nothing displays in the panes. The axes are marked with a pin symbol



indicating that you have limited the axis range and that some data may not be showing.



## Changing the Axis Appearance

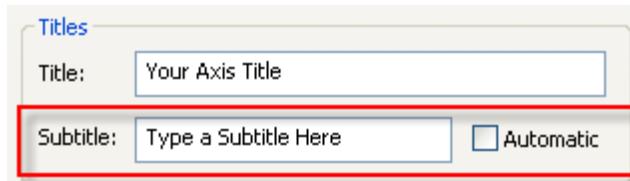
*Every axis has a title that is automatically generated based on the fields in the view. You can specify a custom axis title and add a subtitle using the Edit Axis dialog box. In addition, you can specify the scale of the axis such as whether to use a logarithmic scale and whether to reverse the axis.*

### To change the axis title:

1. Right-click on the axis that you want to edit and select *Edit Axis*.
2. In the *Edit Axis* dialog box, type a new title into the text box.



3. Deselect the *Automatic* check box to add a custom subtitle.



4. When finished, click *OK*.

### To change the axis scale:

1. Right-click the axis that you want to edit and select *Edit Axis*.
2. In the bottom left of the *Edit Axis* dialog box, optionally select one of the following options:
  - o *Reversed*- select this option to reverse the order of values on the axis.

- *Logarithmic - select this option to use a logarithmic scale on the axis.*



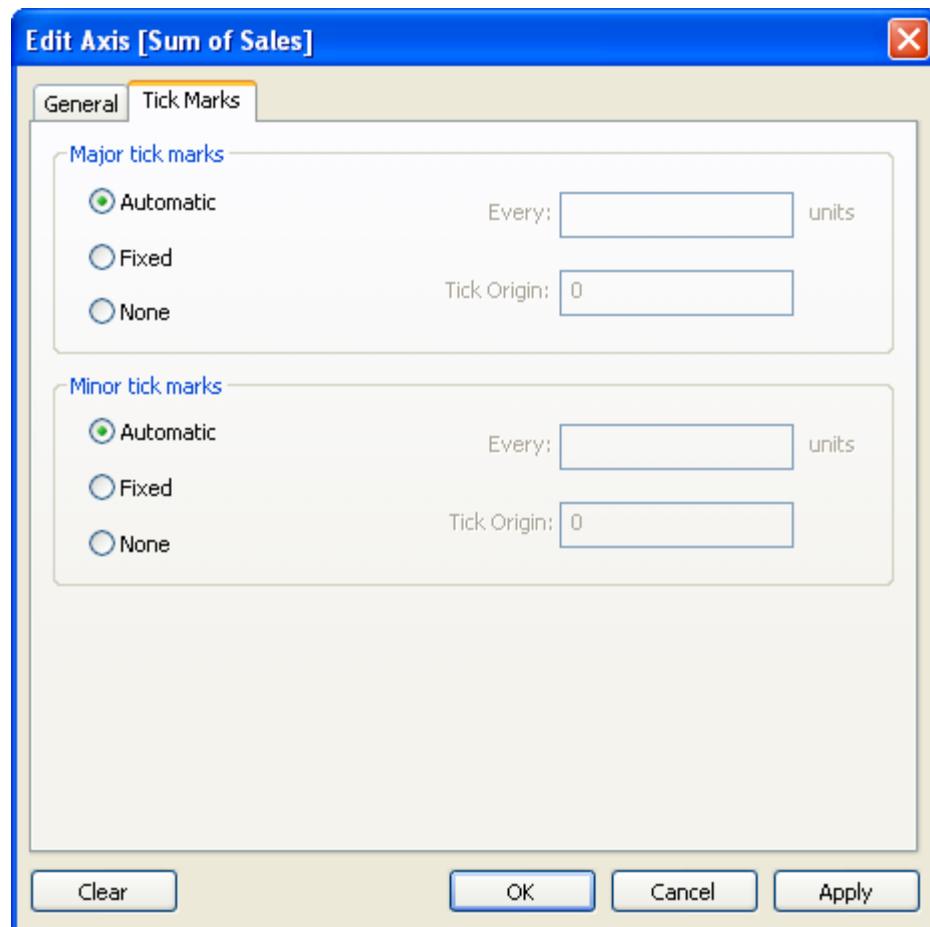
3. *When finished, click OK.*

## Formatting Tick Marks

You can specify how often the tick marks are displayed along the axis. Tableau allows you to modify both the Major and Minor tick marks. Major tick marks are accompanied by unit labels while Minor tick marks simply represent smaller increments between the major marks. You can choose to use automatic or fixed tick marks or have none at all.

### To format tick marks:

1. Right-click the axis you want to edit and select *Edit Axis*.
2. In the *Edit Axis* dialog box, select the *Tick Marks* tab.
3. For both Major and Minor tick marks, select from one of the following options:
  - Automatic - select this option to automatically show tick marks based on the data in the view.
  - Fixed - select this option to specify how often the tick mark should display and the starting value.
  - None - select this option to hide the tick marks completely.



4. When finished, click OK.

# Annotations and Mark Labels

## Annotations and Mark Labels

*Annotations call attention to specific marks, points, or areas in a view. An annotation, sometimes called a call-out, is most commonly displayed as a text box with a line pointing to a specific point or mark. You can also add an area annotation, which calls out several marks or a region of the view. Additionally, you can use mark labels to call out marks of interest or more commonly to label the view to make it more understandable. You can show mark labels for all the marks in the view, or selectively show and hide individual labels.*

- [Annotations](#)
- [Mark Labels](#)

## Annotations

### Annotations

*In Tableau there are three kinds of annotations: mark, point, and area. After you add an annotation, you can edit, re-position, format, and remove it.*

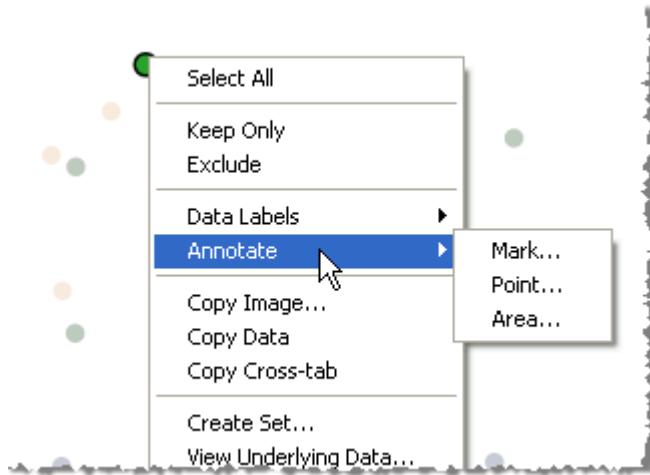
- [Adding Annotations](#)
- [Rearranging Annotations](#)
- [Formatting Annotations](#)
- [Removing Annotations](#)

## Adding Annotations

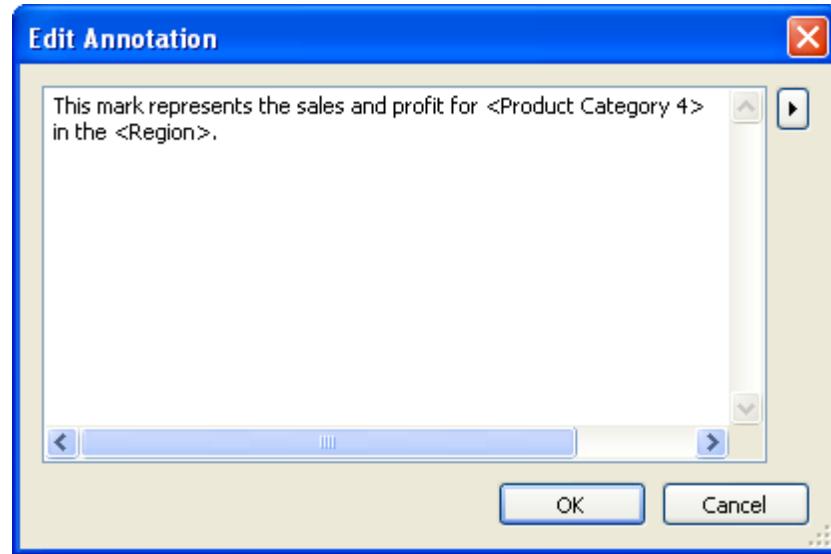
Annotations are an important part of publishing and sharing a view. Use annotations to call out a specific mark, a specific point such as a value on the axis or a reference line, or an area such as a cluster of scatter marks.

### To add an annotation:

1. Right-click the view where you want to add an annotation and select Annotate.

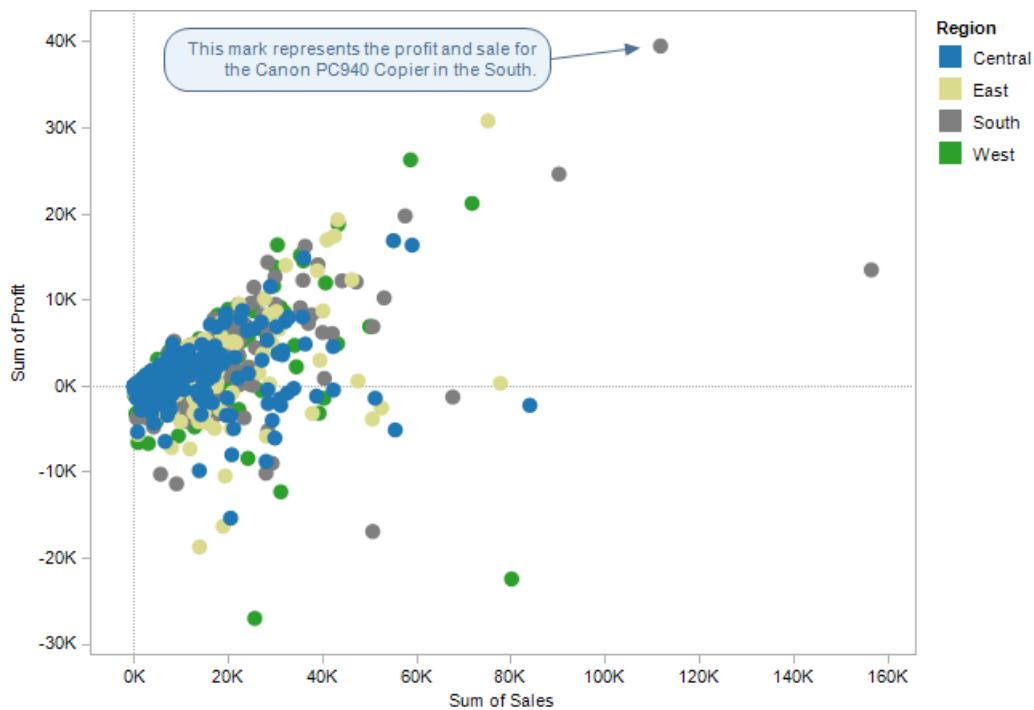


2. On the sub-menu select one of the following types of annotations:
  - *Mark - select this option to add an annotation that is associated with the selected mark. This option is only available if a mark is selected.*
  - *Point - select this option to annotate a specific point in the view.*
  - *Area - select this option to annotate an area in the view such as a cluster of outliers or a targeted region of the view.*
3. In the Edit Annotation dialog box, type the text you want to show in the annotation. Use the arrow button to insert dynamic parameters into the annotation text. For example, the annotation can display data values that update as the underlying data changes.



*Insert the \* parameter using the arrow button to show the data from the tooltip. As you add more detail to the view, this text is updated to show the live tooltip.*

4. When finished, click OK.



## Rearranging Annotations

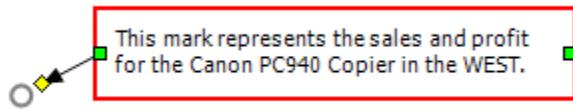
### Rearranging Annotations

*After you add an annotation, you can move it around, resize it, adjust the line, and move the text. Each type of annotation can be rearranged and modified in different ways. This section discusses how to rearrange, resize, and modify each type of annotation.*

- [Mark Annotations](#)
- [Point Annotations](#)
- [Area Annotations](#)

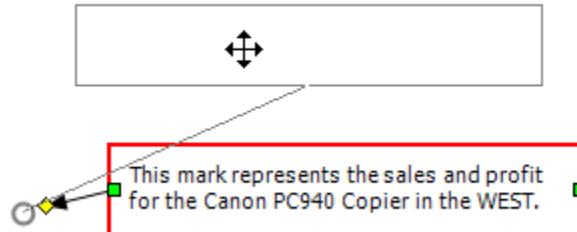
## Mark Annotations

When you select a mark annotation the body and line are selected and several resize handles display. Use these handles to resize the body and line.



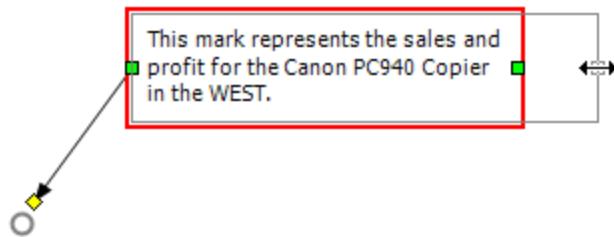
### To reposition the body:

- Click and drag the body of the selected annotation to a new position.



### To resize the body:

- Click and drag the body resize handle
- left and right. The text and height are automatically adjusted to fit the width of the body.



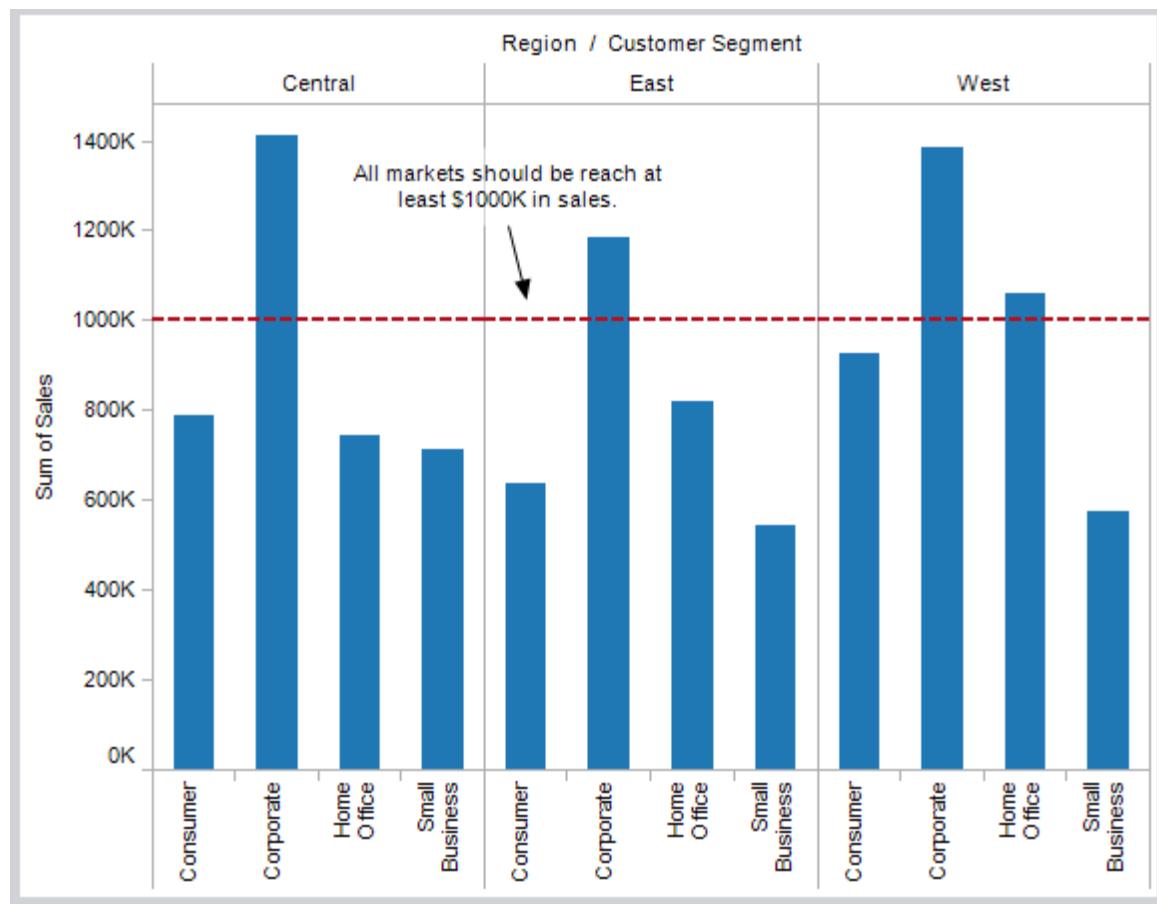
**To resize the line:**

- Click and drag the line resize handle



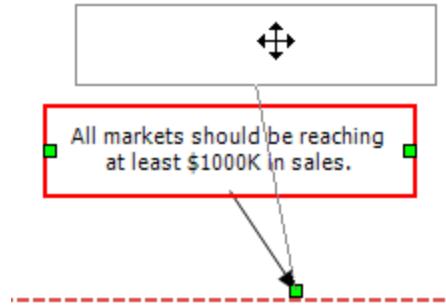
## Point Annotations

A point annotation marks a specific point in the view such as a reference line or a value on an axis. Point annotations display as text with a line. When you select a point annotation, several resize handles display. Use these handles to reposition and resize the body and line.



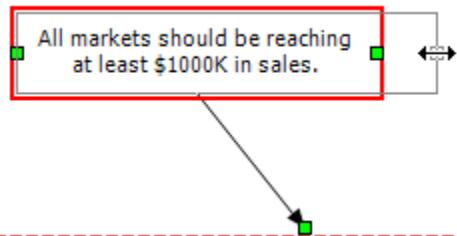
### To reposition the body:

- Click and drag the body of the selected annotation to a new position. As you move the body, the line is automatically resized so that it continues to point at the specific point you selected.



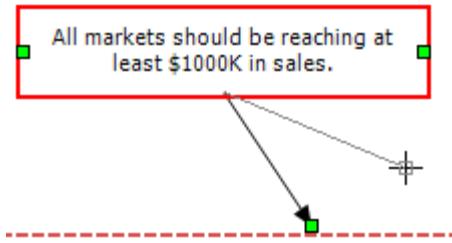
**To resize the body:**

- Click and drag the side resize handles
- 
- left and right. The text and height are automatically adjusted to fit the width of the body.



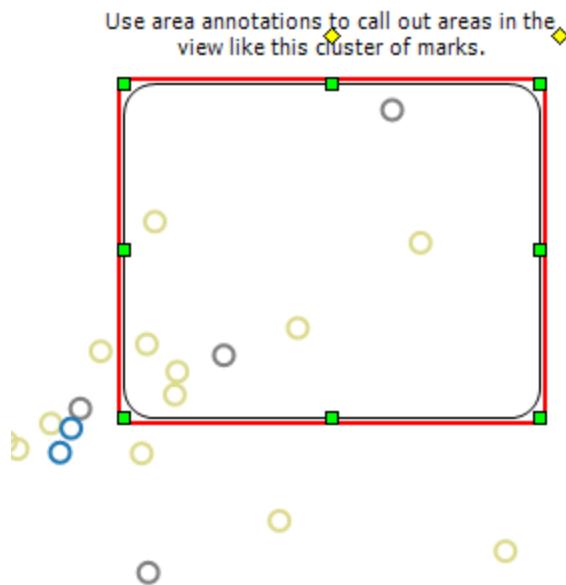
**To move the line end point:**

- Click and drag the end point of the line
- 
- so that it points at a new location.



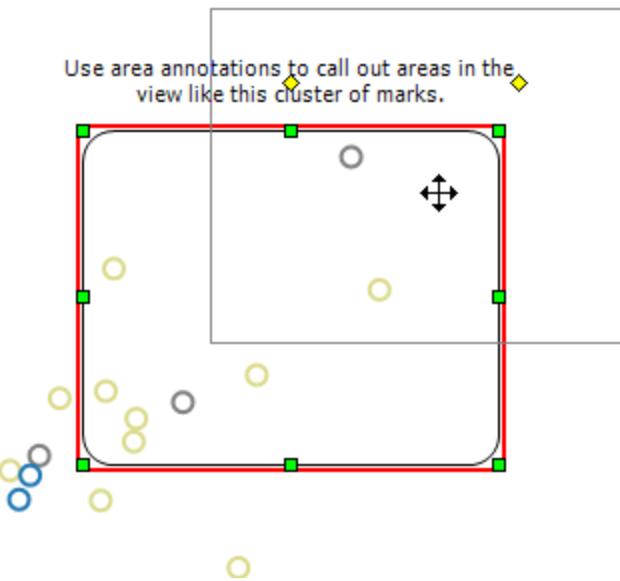
## Area Annotations

An area annotation is a way to highlight or call out an area in the view. Area annotations are not associated with any particular mark, in fact, these annotations are commonly used to call out several marks. When you select an area annotation, several resize handles and two text handles display. Use these handles to reposition and resize the box and text.



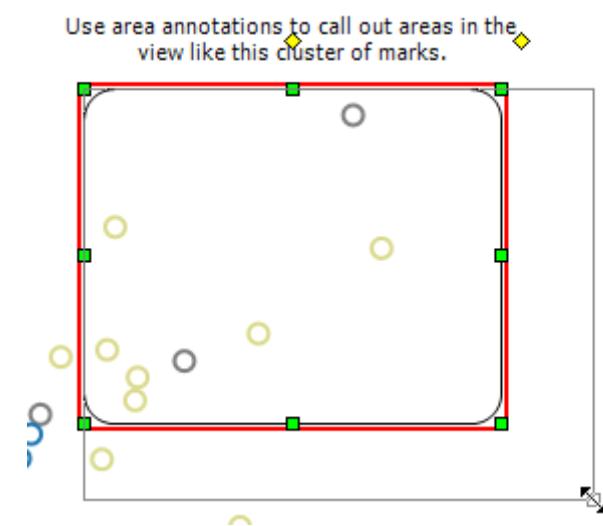
### To reposition the box:

- Click and drag the box of the selected annotation to a new position.



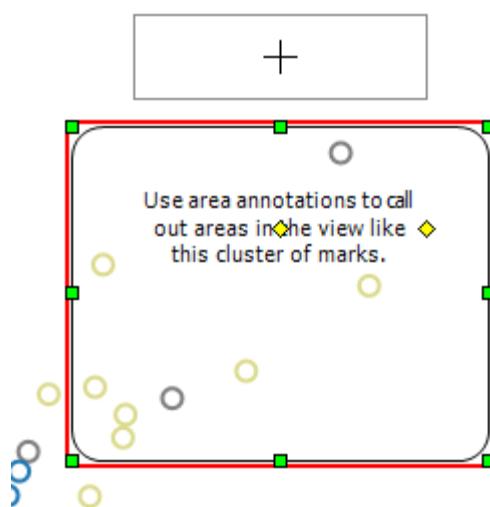
**To resize the box:**

- Click and drag one of the box resize handles

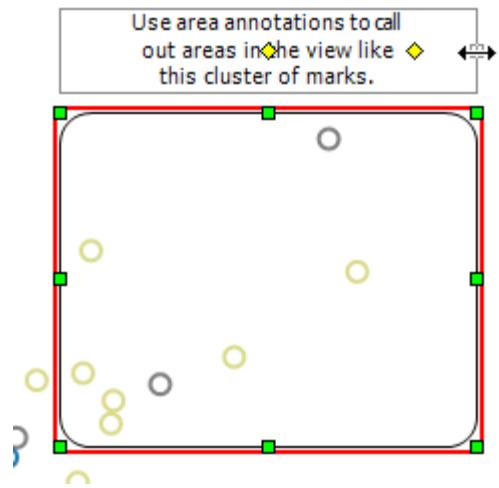


**To reposition the text:**

- Click and drag the center text handle
- to a new position.

**To resize the text width:**

- Click and drag the right text handle
- left and right. The text height is automatically adjusted to fit the width.

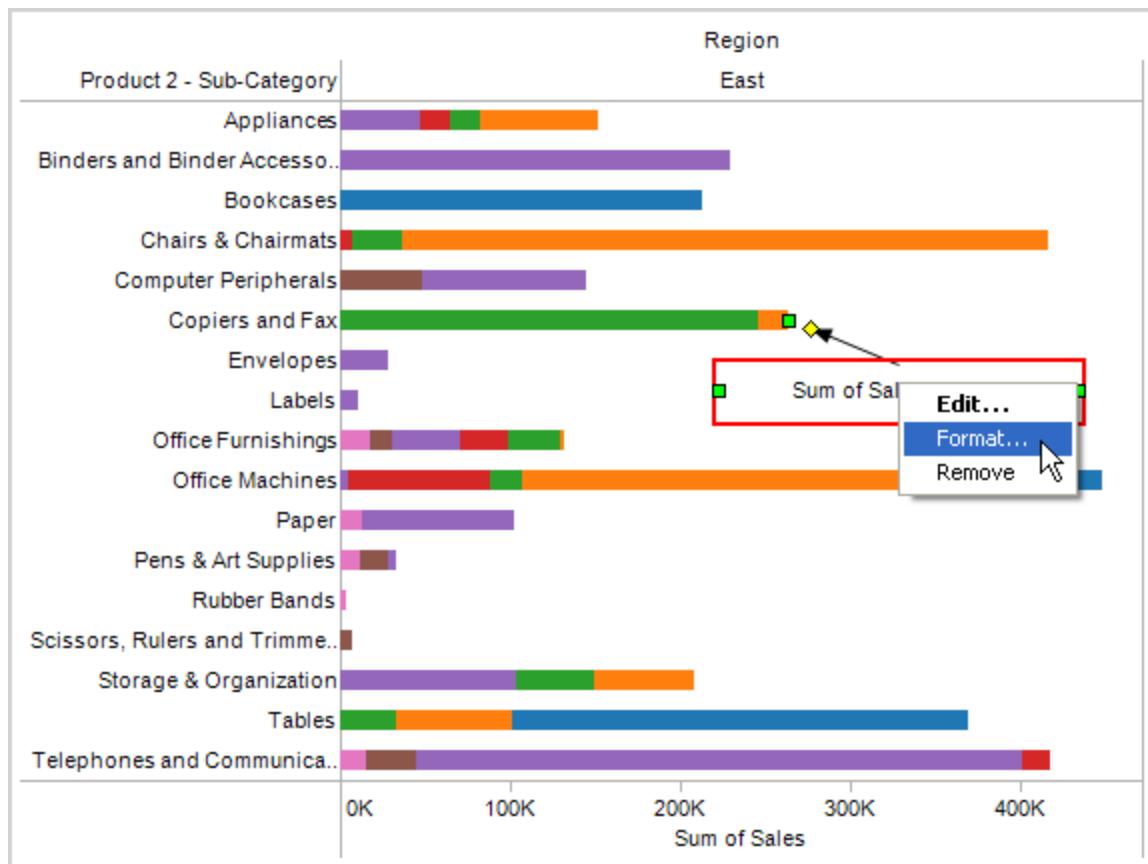


## Formatting Annotations

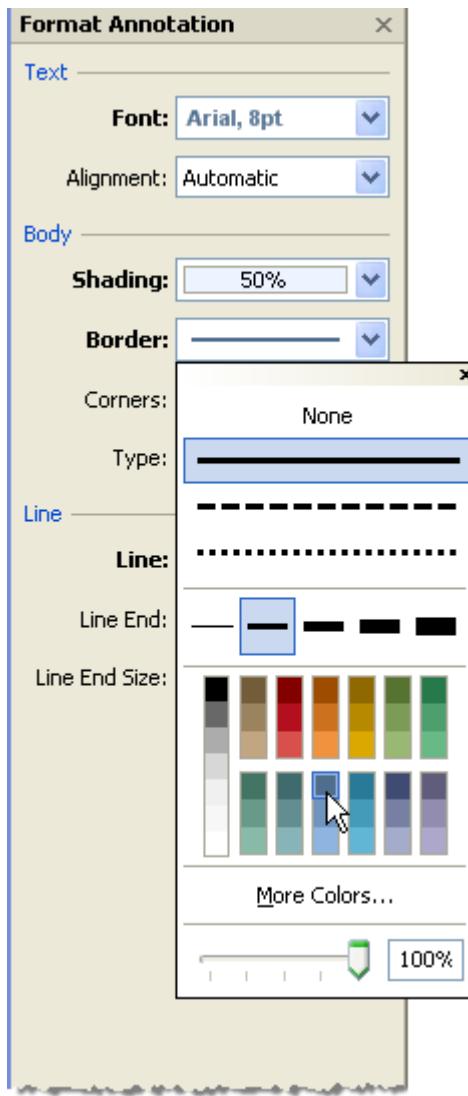
For each annotation you can modify the text, body, and line. For example, you can specify whether the body should be a box, a single edge, or not shown at all. Additionally, you can specify whether the lines on mark and point annotations end with an arrow, dot, or a simple line.

### To format annotations:

1. Select one or more annotations, right-click one of the selected annotations, and select Format. The Format window opens showing the relevant settings.



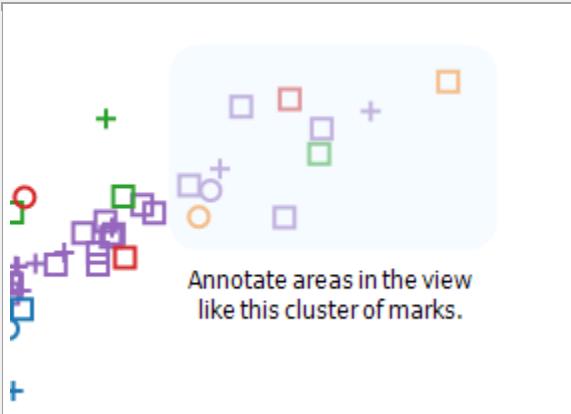
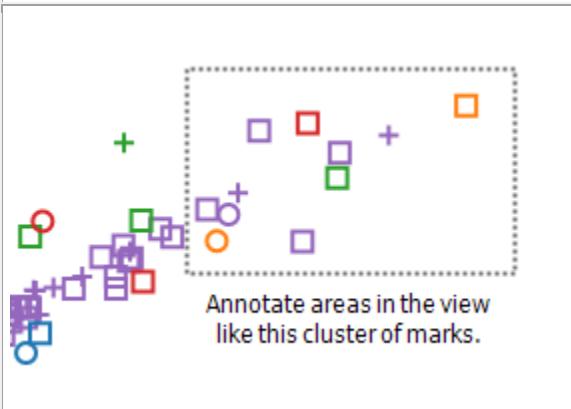
2. In the Format window, use the drop-downs to specify font properties, text alignment, line style, and shading.



### Example Formatting Options

Annotation Style	Format Window Settings
<p>Sum of Gross Profit: 24,524 Sum of Sales Total: 43,178</p> 	<p>Default format settings for point and mark annotations.</p>
<p>Sum of Gross Profit: 24,524 Sum of Sales Total: 43,178</p> 	<p>Body</p> <p>Shading: <input type="text"/> <input type="button" value="▼"/></p> <p>Border: None</p>

Annotation Style	Format Window Settings
	<p><b>Body</b></p> <p>Shading: <input type="text"/> ▾</p> <p>Border: <input type="text"/> ▾</p> <p>Corners: More Rounded ▾</p> <p>Type: Box ▾</p> <p><b>Line</b></p> <p>Line: <input type="text"/> ▾</p> <p>Line End: Dot ▾</p> <p>Line End Size: Medium ▾</p>
	<p><b>Body</b></p> <p>Shading: <input type="text"/> ▾</p> <p>Border: <input type="text"/> ▾</p> <p>Corners: Square ▾</p> <p>Type: Single Edge ▾</p> <p><b>Line</b></p> <p>Line: <input type="text"/> ▾</p> <p>Line End: Dot ▾</p> <p>Line End Si... Small ▾</p>
	<p><b>Body</b></p> <p>Shading: <input type="text"/> ▾</p> <p>Border: <input type="text"/> ▾</p> <p>Corners: Square ▾</p> <p>Type: Box ▾</p> <p><b>Line</b></p> <p>Line: <input type="text"/> ▾</p> <p>Line End: Open Arrow ▾</p> <p>Line End Si... Small ▾</p>

Annotation Style	Format Window Settings
 <p>Annotate areas in the view like this cluster of marks.</p>	<p>Body</p> <p><b>Shading:</b> <input type="color"/> ▾</p> <p><b>Border:</b> None ▾</p> <p><b>Corners:</b> Rounded ▾</p> <p><b>Type:</b> Box ▾</p>
 <p>Annotate areas in the view like this cluster of marks.</p>	<p>Body</p> <p><b>Shading:</b> <input type="color"/> ▾</p> <p><b>Border:</b> Dashed ▾</p> <p><b>Corners:</b> Square ▾</p> <p><b>Type:</b> Box ▾</p>

## Removing Annotations

*At any time you can remove one or more annotations.*

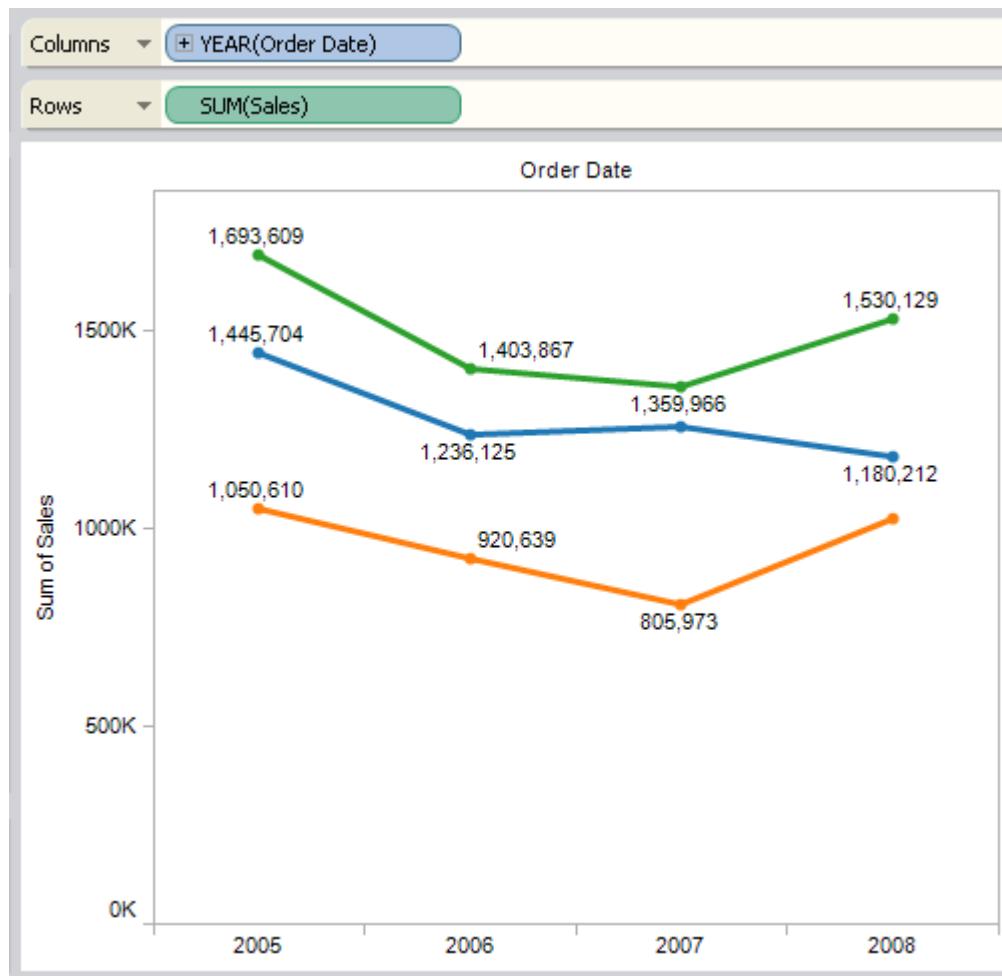
**To remove an annotation:**

1. *Select one or more annotations to remove.*
2. *Right-click one of the selected annotations and select Remove or click the Delete key on your keyboard.*

## Mark Labels

### Mark Labels

Mark labels are values shown next to each data point in a view. For example, in a view that shows product category sales over time as a line, you can turn on mark labels so the sales values display next to each point along the lines. Alternatively, mark labels don't have to be measure values. In the same example, you could turn on mark labels that display the name of each product category next to each line.



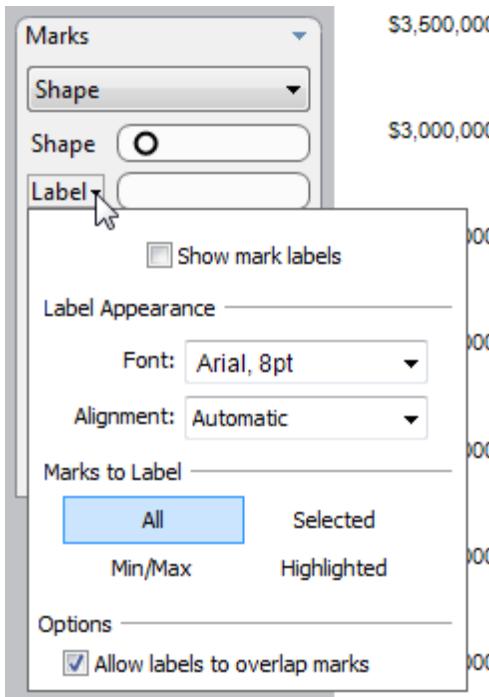
Mark Labels can be turned on for all marks, selected marks, highlighted marks, the minimum and maximum values, or just the line ends in a line chart. Additionally, you can turn on mark labels for an individual marks. This section discusses the following topics:

- [Showing and Hiding Mark Labels for the Worksheet](#)
- [Showing and Hiding Individual Mark Labels](#)

- [\*\*Moving Mark Labels\*\*](#)
- [\*\*Editing Mark Labels with Aliases\*\*](#)

## Showing and Hiding Mark Labels for the Worksheet

You can show and hide mark labels for the whole worksheet by clicking the Show Mark Labels button on the toolbar. Use the Label shelf drop-down control to specify font properties, alignment, when to show the label, and other options.

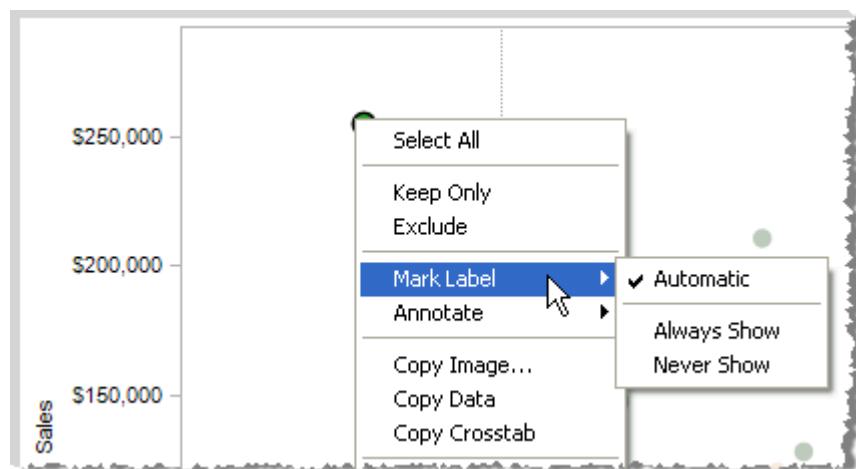


## Showing and Hiding Individual Mark Labels

Rather than showing all mark labels or dynamically showing labels based on the view, you may want to show labels for a selection of individual marks. You can use mark labels to call out the values of specific marks of interest as well as hide overlapping mark labels. You can show and hide individual mark labels using the right-click context menus in the view.

### To show or hide individual mark labels:

1. Right-click the mark you want to show or hide a mark label for.
2. On the context menu select *Mark Labels* and then one of the following:
  - Automatic - select this option to allow Tableau to turn the label on and off depending on the view and the settings in the Format window.
  - Always Show - select this option to show the mark label even when it would otherwise be hidden (based on the settings in the Format window).
  - Never Show - select this option to hide the mark label even when it would otherwise be shown (based on the settings in the Format window).

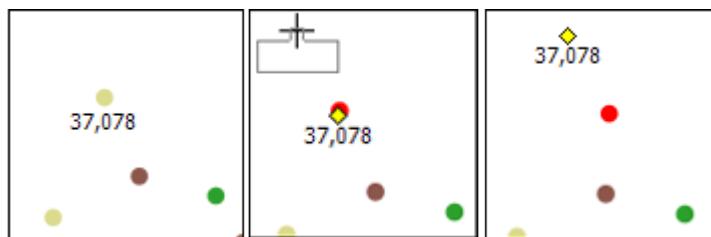


## Moving Mark Labels

After you show a mark label in a view, you can reposition it to best fit your view and presentation. For example, in a stacked bar chart, the mark labels are automatically placed in the center of each bar. However, you may want to stagger the labels so that the longer ones don't overlap.

### To move a mark label:

1. Select the mark whose mark label you want to move.
2. Click and drag the yellow move handle to a new location.



## Editing Mark Labels with Aliases

*Another way to modify mark labels is to edit the aliases of a field. An alias is an alternative name assigned to a dimension member, or to a field name. Tableau gives you the ability to display and edit aliases for data sources that support this feature. When you edit the aliases you can change the names of the members in a field, thus modifying the mark labels displayed in a the view.*

# Dashboards

## Dashboards

A dashboard is a collection of several worksheets and supporting information shown in a single place so you can compare and monitor a variety of data simultaneously. For example, you may have a set of views that you review every day. Rather than flipping through each worksheet, you can create a dashboard that displays all the views at once.

Similar to worksheets, dashboards are shown as tabs at the bottom of the workbook and update with the most recent data from the data source. When you create a dashboard, you can add views from any worksheet in the workbook. You can also add a variety of supporting objects such as text areas, web pages, and images. From the dashboard, you can format, annotate, drill-down, edit axes, and more.

Each view you add to the dashboard is connected to its corresponding worksheet. That means when you modify the worksheet, the dashboard is updated and when you modify the view in the dashboard, the worksheet is updated.

- [Creating Dashboards](#)
- [Organizing Dashboards](#)
- [Understanding Dashboards and Worksheets](#)

## Creating Dashboards

### Creating Dashboards

*Create a dashboard just like any other worksheet, then add and remove views and objects such as images, webpages, and so on.*

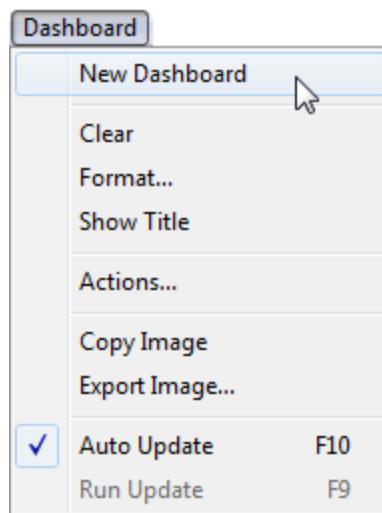
- [How to Create a Dashboard](#)
- [Adding Views to a Dashboard](#)
- [Adding Dashboard Objects](#)
- [Removing Views and Objects from a Dashboard](#)

## How to Create a Dashboard

You can create a dashboard in much the same way you create a new worksheet. After you create a dashboard you can add and remove views and objects.

### To create a dashboard:

- Select Dashboard > New Dashboard.



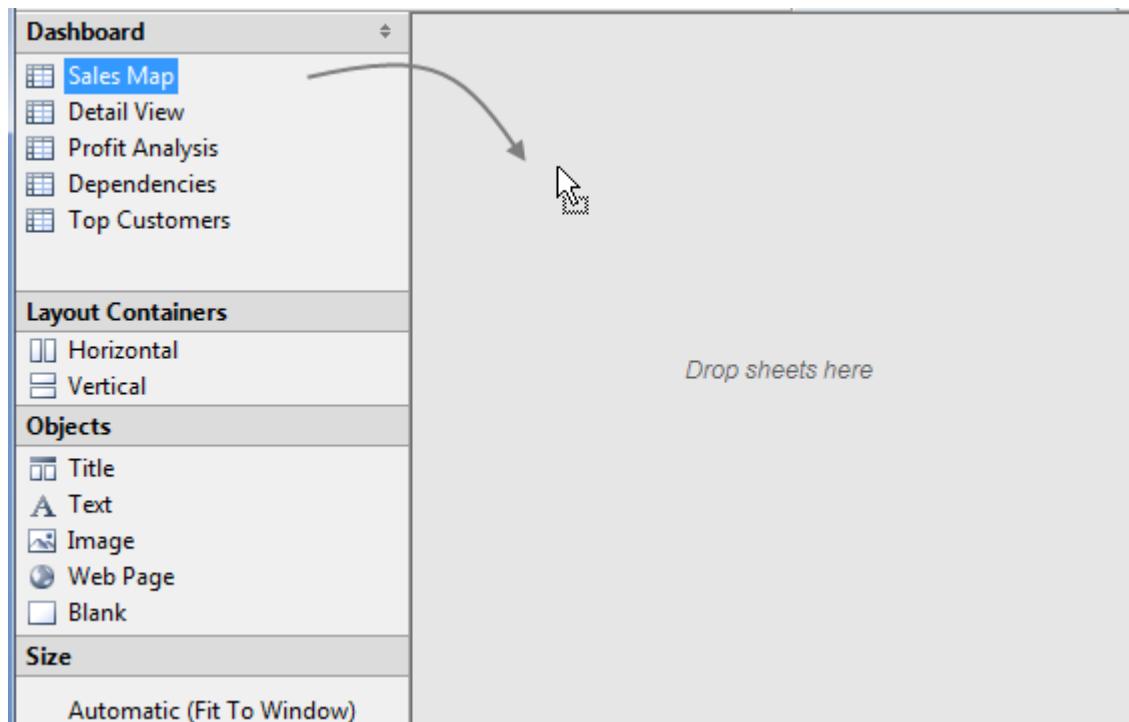
A new tab for the dashboard is added along the bottom of the workbook. Switch to the new dashboard to add views and objects.

## Adding Views to a Dashboard

When you open a dashboard the Dashboard window replaces the Data window on the left side of the workbook. The Dashboard window lists the worksheets that are currently in the workbook. As you create new worksheets, the Dashboard window updates so you always have all worksheets available when adding to a dashboard.

### To add a view to a dashboard:

- Click and drag a worksheet from the Dashboard window to the dashboard on the right.



Continue to drag as many of the worksheets to the dashboard as you like. Notice as you drag worksheets around over the dashboard a gray bar displays, indicating the various places you can drop it.

## Tableau Desktop Help

The screenshot shows the Tableau Desktop interface. On the left, there is a sidebar with several sections: 'Dashboard' (containing 'Sales Map', 'Detail View', 'Profit Analysis', 'Dependencies', and 'Top Customers'), 'Layout Containers' (containing 'Horizontal' and 'Vertical'), 'Objects' (containing 'Title', 'Text', 'Image', 'Web Page', and 'Blank'), and 'Size' (containing 'Automatic (Fit To Window)'). The main area is titled 'Sales Map' and displays a map of North America with various locations marked by blue dots of different sizes, representing data points. A cursor is visible over the map. At the bottom of the map area, there is a link: 'About Tableau maps: www.tableausoftware.com/mapdata'.

After a view is added to the dashboard, the worksheet is marked with a check mark in the Dashboard window. Also, any legends or quick filters that are turned on for the sheet are automatically added to the dashboard.

This screenshot shows the same Tableau Desktop interface as above, but with a red circle highlighting the checkmark icon next to 'Sales Map' in the 'Dashboard' sidebar. This indicates that the 'Sales Map' view has been successfully added to the dashboard.

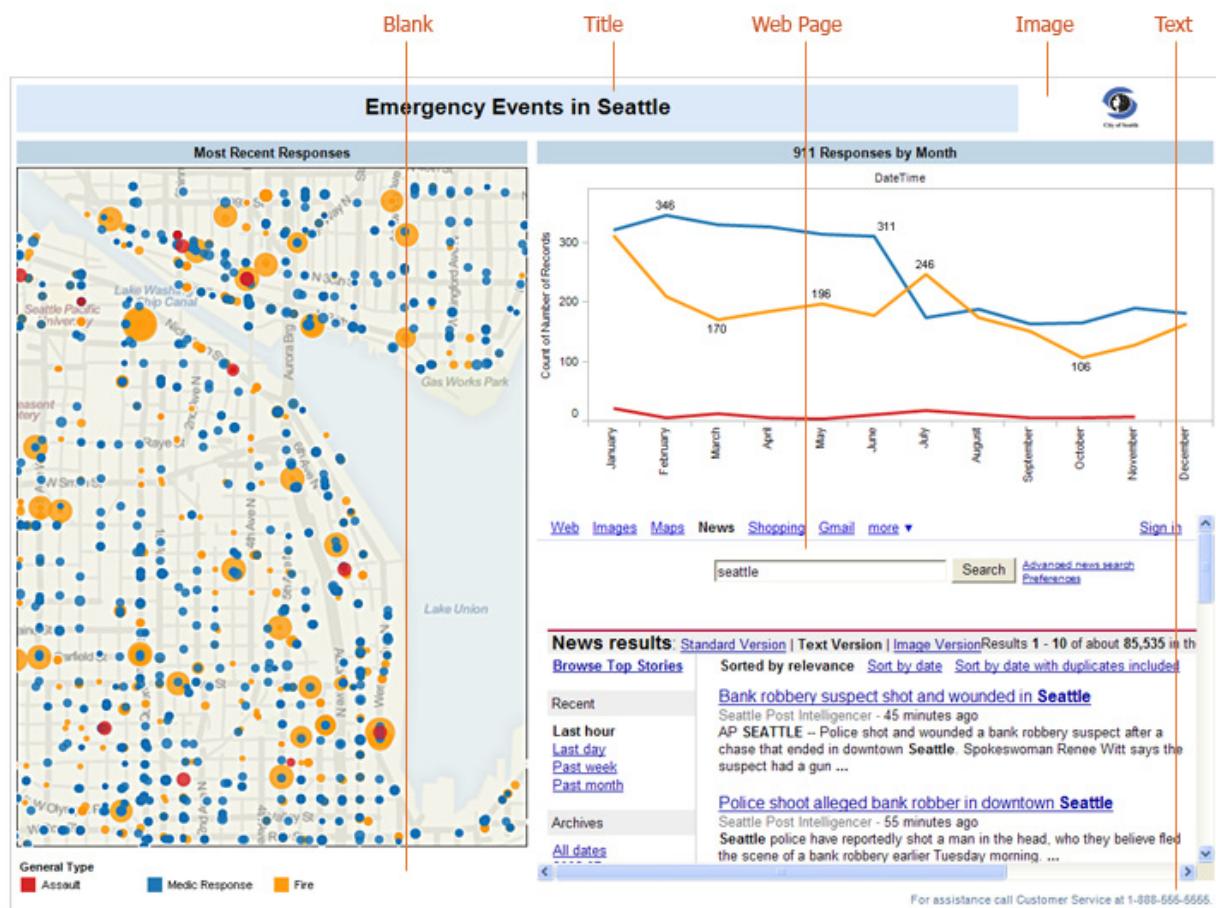
## Adding Dashboard Objects

Dashboards are used to monitor and analyze a collection of related views and information. A dashboard object is an area in the dashboard that can contain supporting information that is not a Tableau view. For example, you can add a text area to include a detailed description. Or you may want to add a web page that is the destination of your hyperlinks. Dashboard objects are listed at the bottom of the dashboard window. You can add titles, text, images, web pages, and blank areas.

### To add a dashboard object:

- Click and drag a dashboard object and drop it on the dashboard. Each of the types of objects are described below:
  - **Title** - The title object allows you to add a title that describes the dashboard. You can place the title object anywhere in the dashboard. The default title text is the name of the dashboard. Edit the title by double-clicking it in the dashboard. You can also format the title by selecting Format > Dashboard.
  - **Text** - The text object allows you add a block of text to the dashboard. This is useful for adding captions, descriptions, and even copyright information. The text object will automatically resize to best fit where you place it in the dashboard. However you can also resize the text area manually by dragging the edges of the text object.
  - **Image** - You can add static image files to the dashboard. For example you may want to add a logo or descriptive diagram. When you add an image object you are prompted to select an image from your computer. You can also type a URL for an image that is hosted online.
  - **Web Page** - The web page object allows you to embed a web page into your dashboard so you can combine your Tableau Visual Explorer content with information from other applications. The web page object is especially useful when you have hyperlinks set up using the Data > Hyperlinks command. If your views include hyperlinks to web pages, you can display those pages in a dashboard by adding a web page object -- the links will automatically open in the dashboard instead of opening a browser window. When you add a web page object you are asked to specify a URL.
  - **Blank** - The blank object lets you add blank areas to your dashboard so you can get the layout just right. Resize the blank object by clicking and dragging the edges of the area.

Below is a dashboard that uses the different types of dashboard objects.

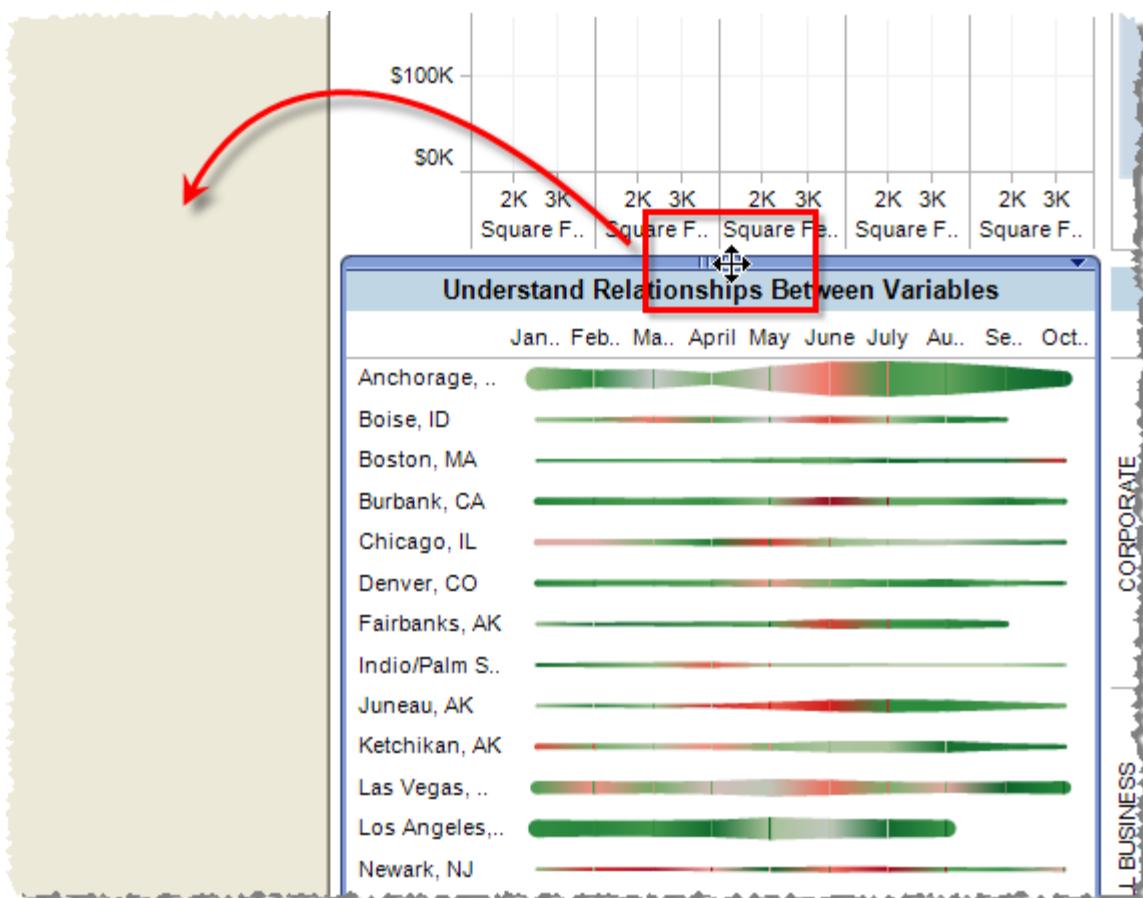


## Removing Views and Objects from a Dashboard

After you add a worksheet or object to a dashboard, you can remove it in a number of different ways including dragging it out of the dashboard, using the context menus in the Dashboard window, or using the dashboard view menu.

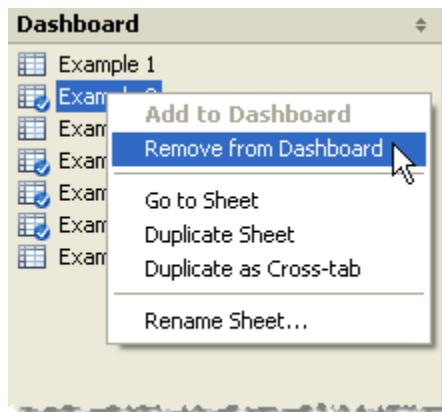
### To remove a view or object by dragging:

1. Select the view you want to remove from the view.
2. Click the move handle at the top of the view and drag it off the dashboard.



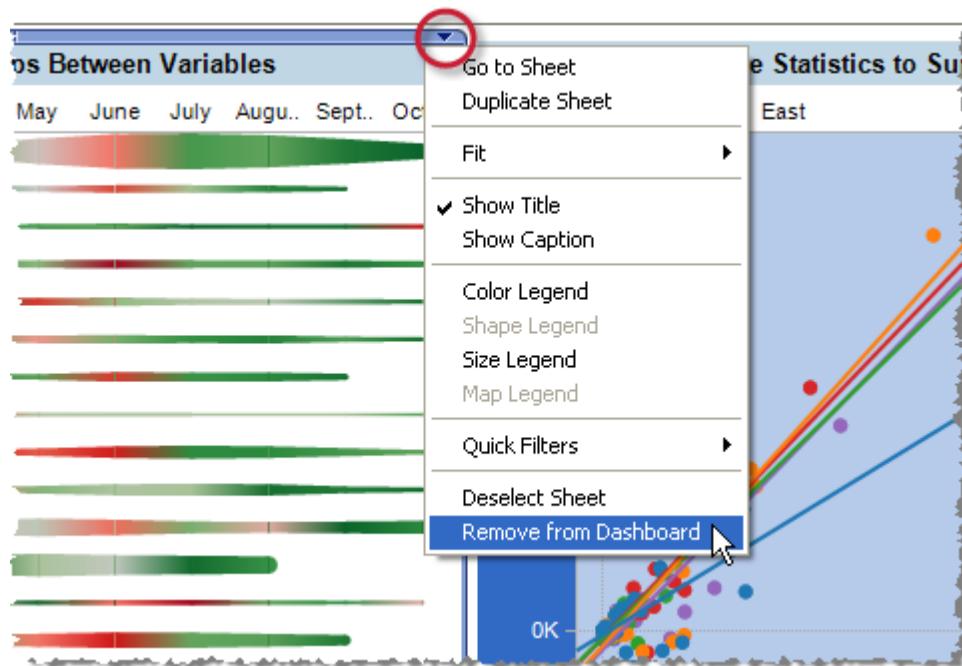
### To remove a worksheet using the Dashboard window:

- Right-click the worksheet in the Dashboard window and select Remove from Dashboard.



**To remove a worksheet or object using the dashboard view menu:**

1. Select the view or object in the dashboard that you want to remove.
2. Select Remove from Dashboard on the dashboard view menu.



## Organizing Dashboards

### Organizing Dashboards

A dashboard can be made up of several views, objects, legends, and quick filters. Each of these can be rearranged and hidden to help you highlight the most important information for your analysis.

- [Layout Containers](#)
- [Showing and Hiding Parts of a Worksheet](#)
- [Rearranging Dashboard Views and Objects](#)
- [Setting the Dashboard Size](#)

## Layout Containers

### Layout Containers

After you create a dashboard you can add sheets and other objects to the dashboard. One type of dashboard object is a layout container. Layout containers help you organize sheets and other objects on a dashboard. These containers create an area in the dashboard where objects automatically adjust their size and position based on the other objects in the container. For example, a dashboard that has a master-detail filter that changes the size of the target view can use a layout container to automatically adjust the other views when the filter is applied.

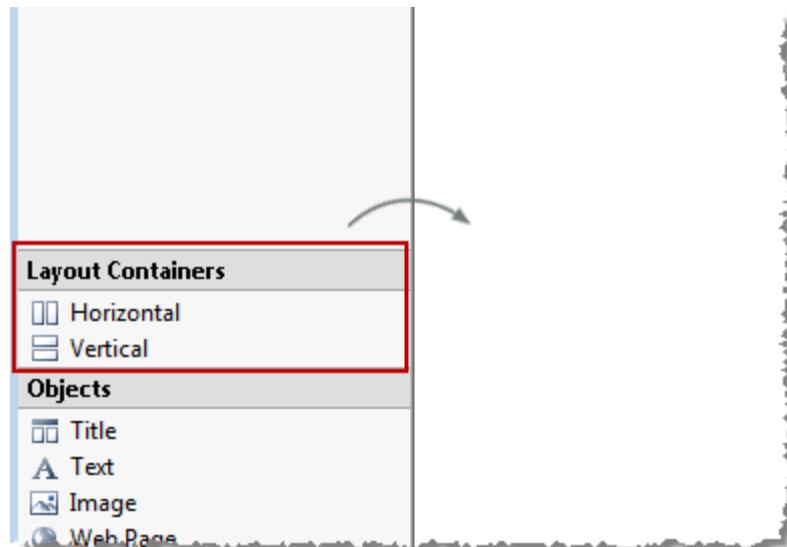
- [Adding Layout Containers](#)
- [Removing Layout Containers](#)
- [Formatting Layout Containers](#)
- [Scaling Layout Containers](#)

## Adding Layout Containers

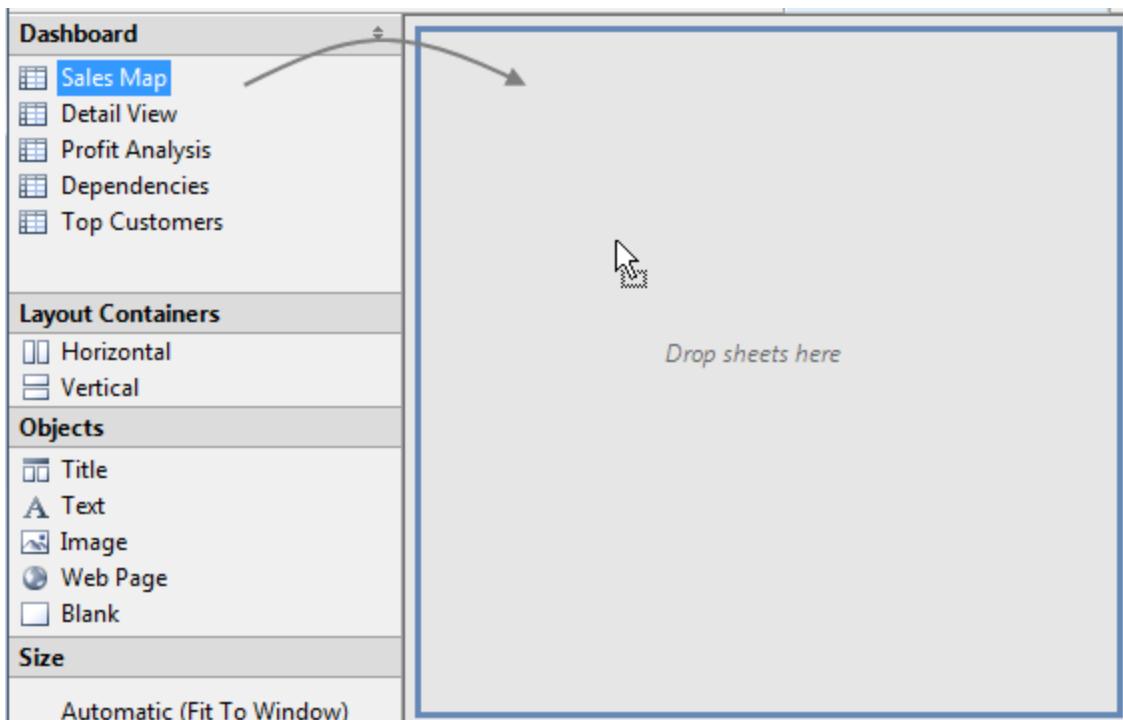
Add a Horizontal Layout Container automatically adjusts the width of dashboard objects.  
Add a Vertical Layout Container to automatically adjust the height of dashboard objects.

**To add a layout container:**

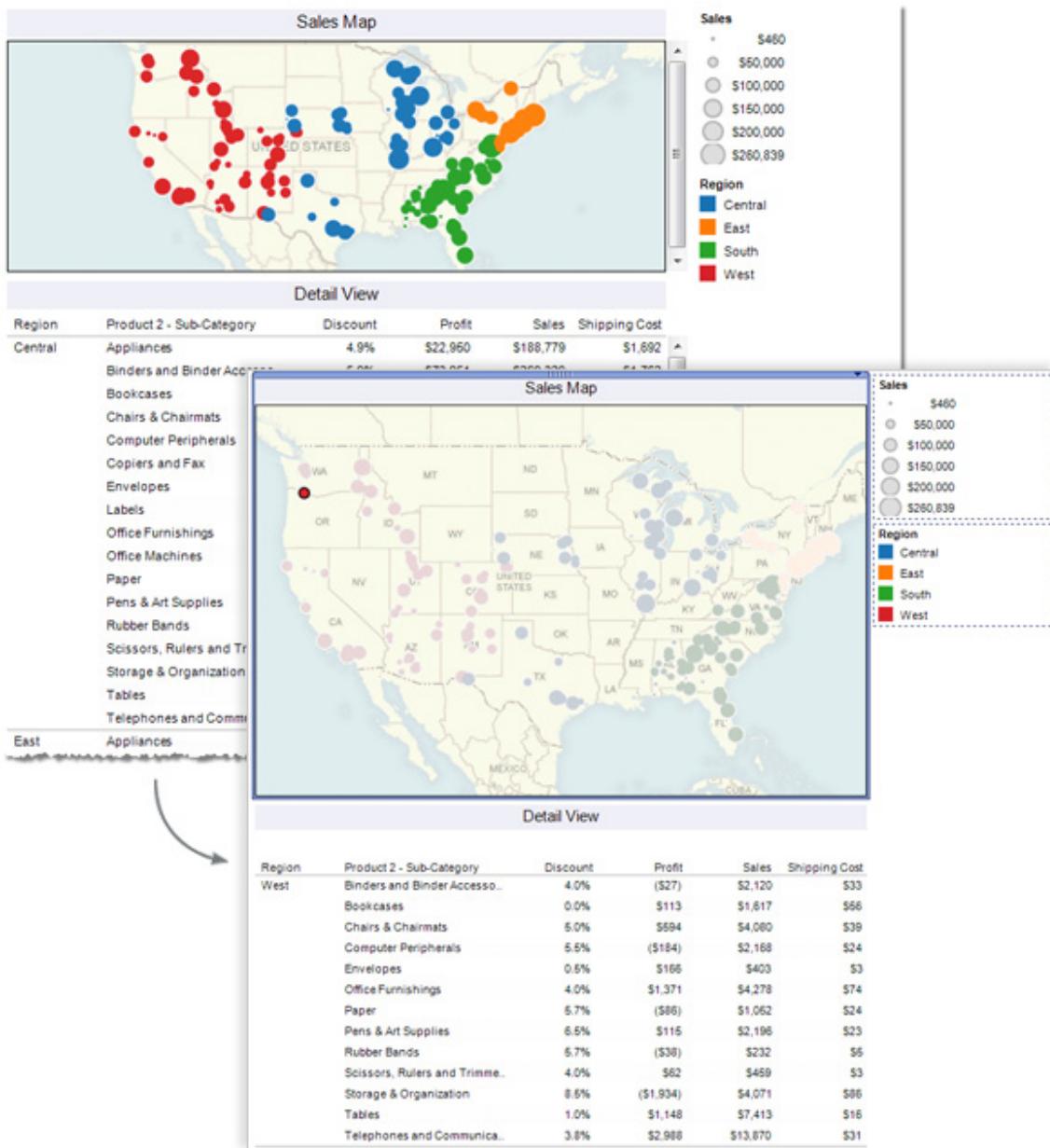
1. Drag a horizontal or vertical layout container to the dashboard.



2. Add sheets and objects to the layout container. As you hover over the layout container, a blue box indicates that the object is being added to the flow of the layout container.



3. Watch as the objects move and resize. For example, in the dashboard below, a filter is applied that causes the text table to get shorter. Because both views are in a vertical layout container, the map automatically resizes into the new space.



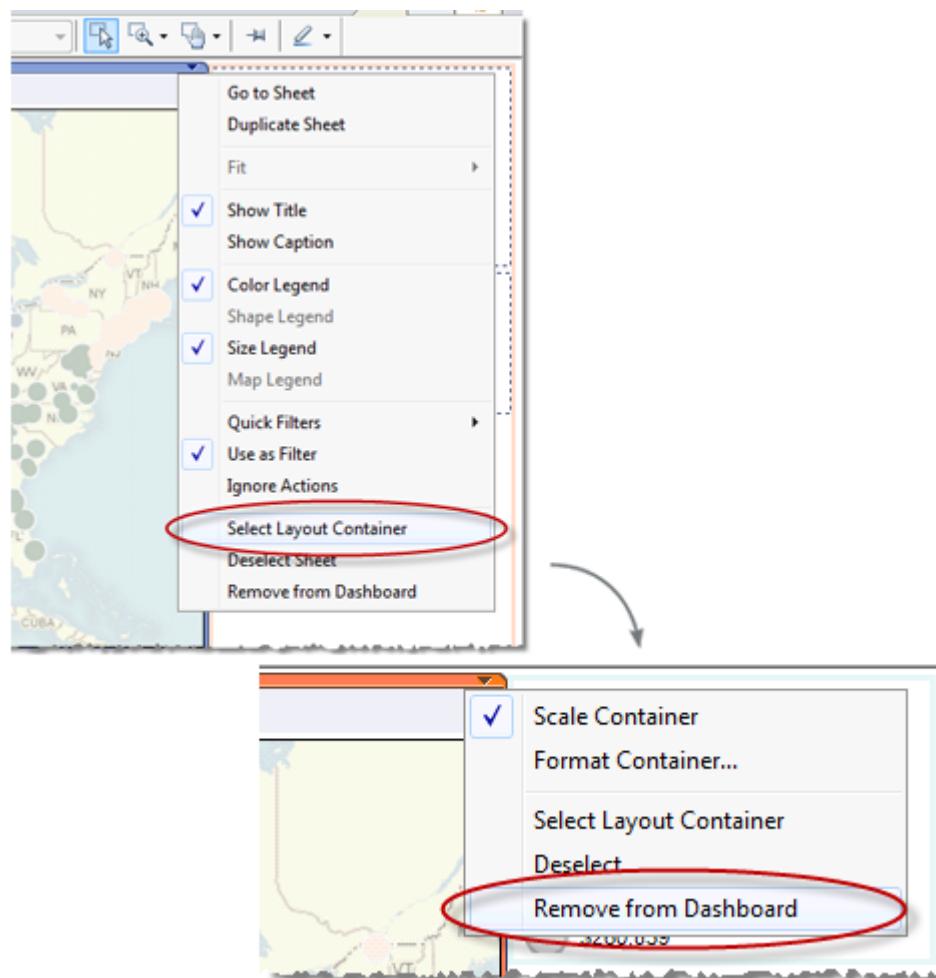
You can add as many layout containers are you want and you can even add layout containers within other containers.

## Removing Layout Containers

When you remove a layout container, it and all of its contents are deleted from the dashboard.

**To remove a layout container:**

1. Select an object in that layout container you want to delete.
2. Open the drop-down menu in the upper right corner of the selected object and select **Select Layout Container**.
3. Open the drop-down menu for the selected layout container and select **Remove from Dashboard**.

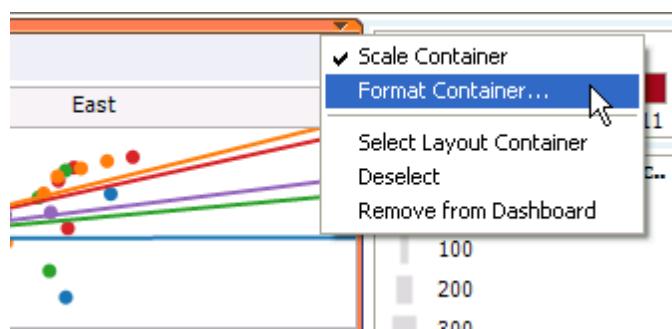


## Formatting Layout Containers

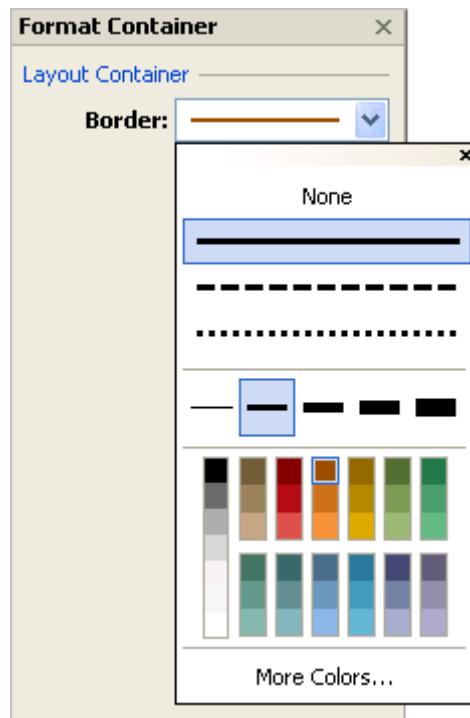
You can specify a border style for layout containers so that you can visually group objects in the dashboard.

**To format layout container borders:**

1. Open the drop-down menu for the layout container you want to format and select **Format Container**.



2. In the Format window, specify a line style, thickness, and color for the border.



## Scaling Layout Containers

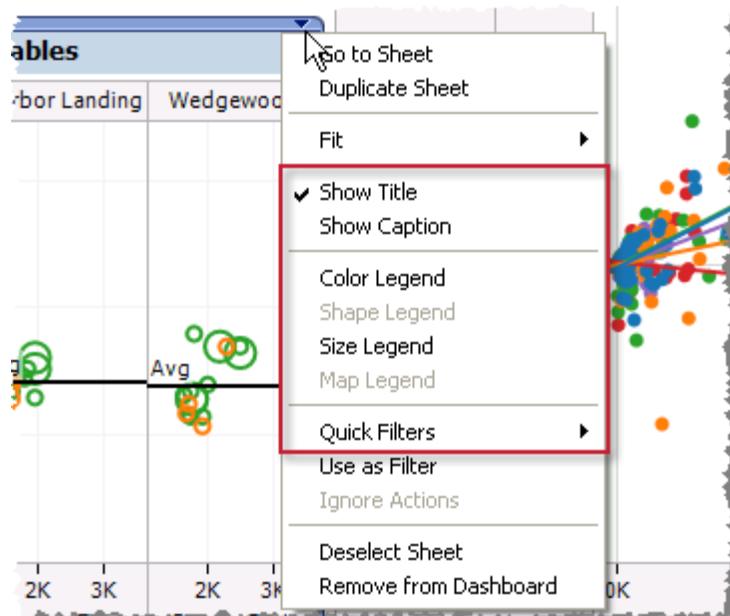
*Layout containers are useful for all kinds of dashboards and give you increased control for how the objects automatically flow in the dashboard as you apply filters. Also, use layout containers when comparing multiple bar charts or bullet graphs. In this case, the bar heights are automatically adjusted so that the bars in both sheets stay aligned.*

## Showing and Hiding Parts of a Worksheet

As you drag worksheets to the dashboard, the view from the worksheet and its legends and quick filters are automatically displayed. However, you may want to hide some parts of the worksheet such as legends, titles, captions, and quick filters. You can show and hide these parts of the worksheet using the drop-down menu in the upper right corner of the views in the dashboard.

### To show and hide parts of the worksheet:

1. Select a view in the dashboard.
2. Open the drop-down menu in the upper right corner of the selected view and select the items you want to show. For example, you can show the title, caption, legends, and a variety of quick filters.



### Note:

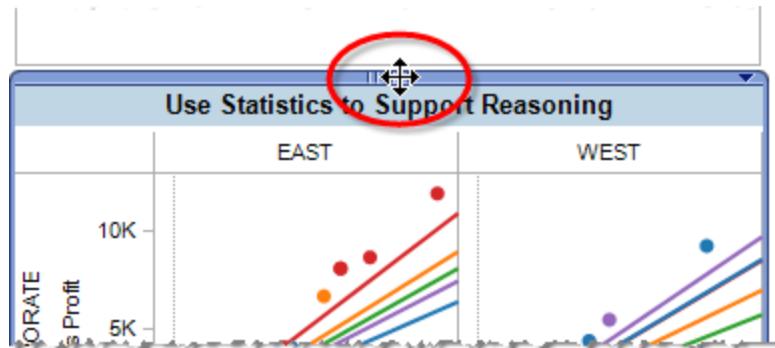
Quick filters are only available for the fields used in the original view.

## Rearranging Dashboard Views and Objects

Rearrange the views, objects, legends, and quick filters in a dashboard in a way that best fits your analysis or presentation. You can rearrange the parts of a dashboard using the move handle at the top of a selected view, legend, or quick filter.

**To move a view, object, legend, or quick filter:**

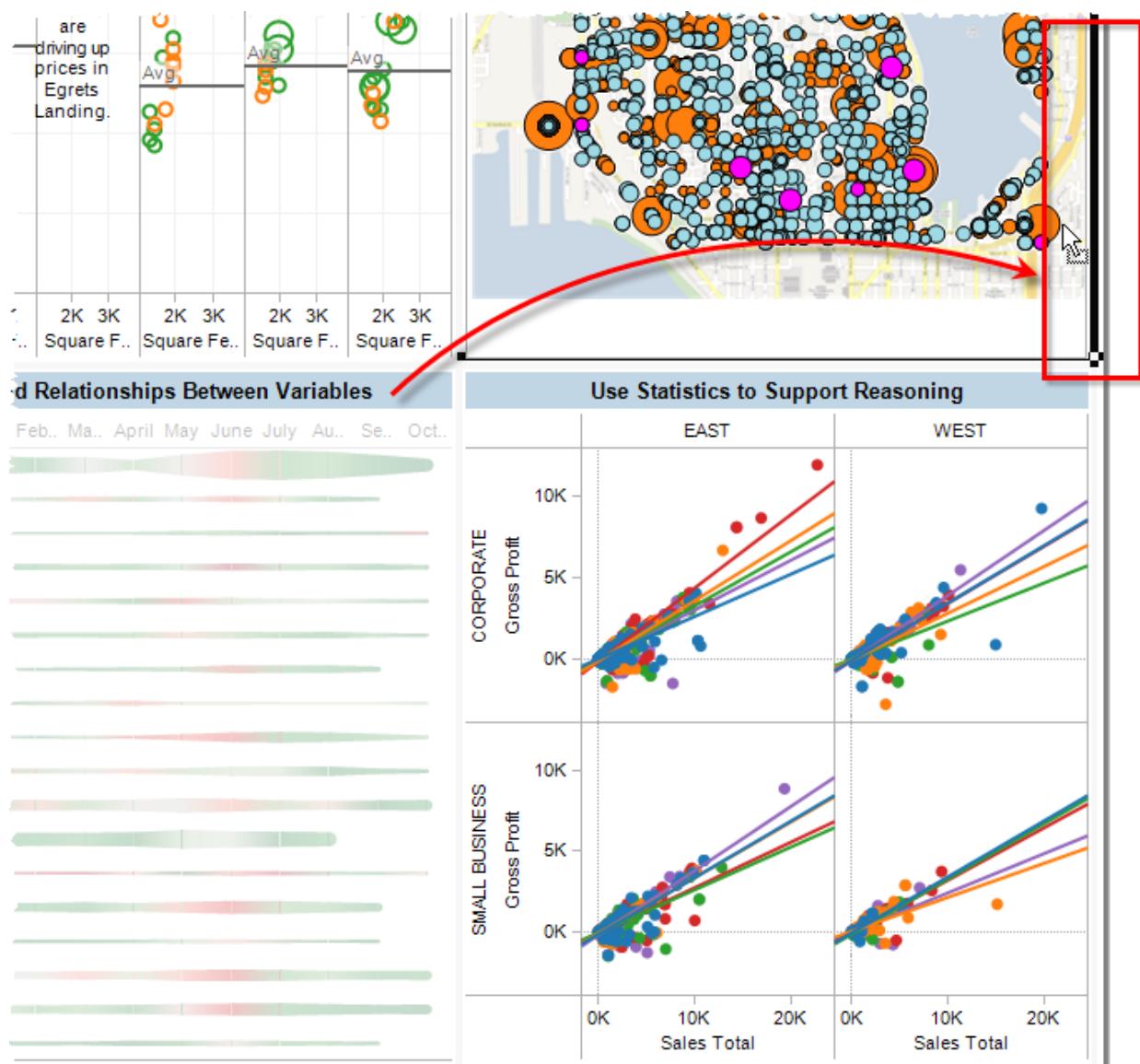
1. Select the view, legend, or quick filter that you want to move.
2. Click and drag the move handle at the top of the selected item to a new location.



3. Drop the dashboard element in a new location.

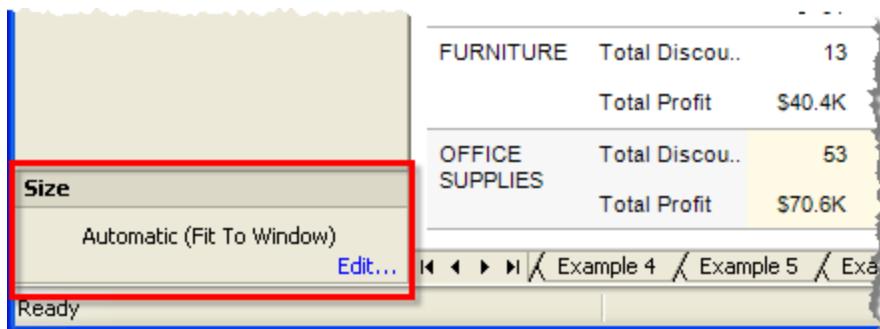
As you drag the element around the dashboard area, a black bar highlights the available places you can drop it.

## Tableau Desktop Help



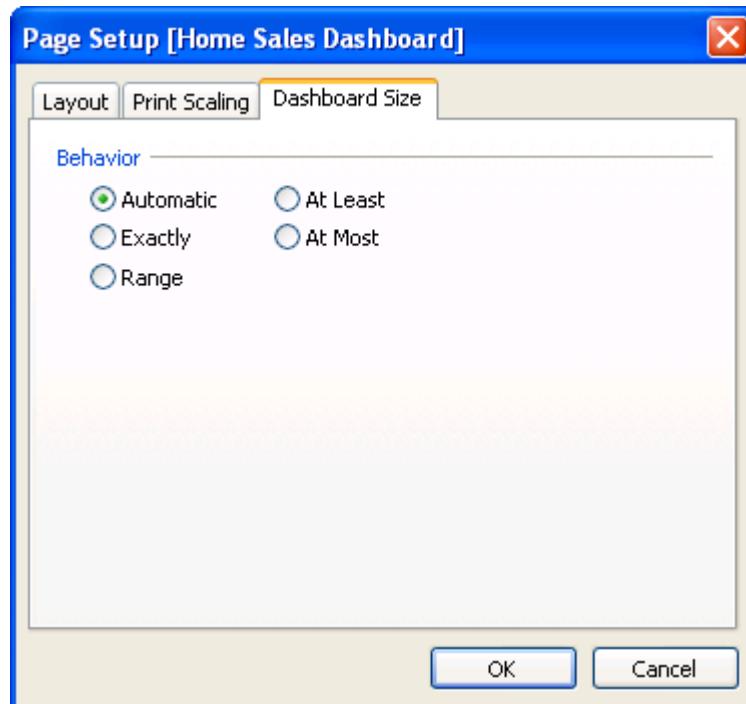
## Setting the Dashboard Size

By default, the views and objects in a dashboard automatically scale to fill the entire window. That means that the size of the dashboard can vary from machine to machine, depending on the screen resolution and the size of the application window. You can specify a specific size for the dashboard which ensures a consistent layout when you share the dashboard with others. The size of the dashboard is displayed at the bottom of the Dashboard window.



### To specify the size of a dashboard:

1. Click *Edit* in the *Size* area of the Dashboard window.
2. In the *Page Setup* dialog box, make sure the *Dashboard Size* tab is selected.



3. Select one of the following behaviors:

- **Automatic** - the dashboard automatically resizes to fill the application window. This is the default behavior.
- **Exactly** - the dashboard always remains a fixed size. If the dashboard is larger than the window the dashboard becomes scrollable.
- **Range** - the dashboard scales between the specified minimum and maximum sizes, after which it scroll bars or white space will display.
- **At Least** - the dashboard automatically resizes to fill the application window, but will not scale smaller than a specified minimum size. When viewed smaller, scroll bars will display.
- **At Most** - the dashboard automatically resizes to fill the application window, but will not scale larger than the specified maximum size. When viewed larger, white space will be added.

4. If you select any option other than Automatic, you must define a size. Select one of the following types of sizes:

- **Standard** - select from a list of common sizes, such as 800 x 600.

- *Custom - type a custom width and height into the text boxes. By default, these text boxes are filled with the dashboard's current width and height.*
5. When finished, click OK.

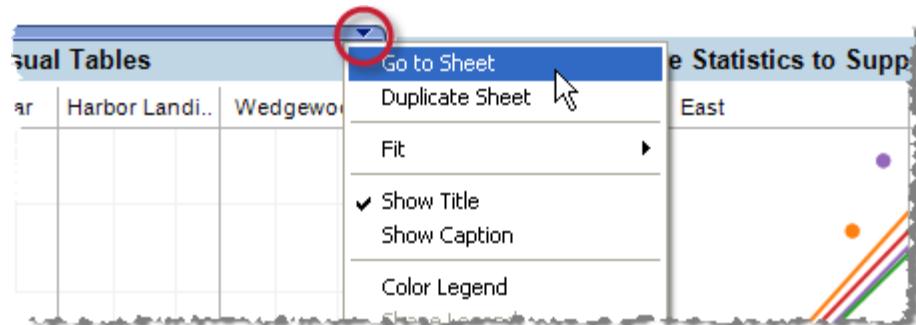
## Understanding Dashboards and Worksheets

The views in a dashboard are connected to the worksheets that they represent. That means when you make changes to the worksheet, the dashboard is updated and subsequently, any changes you make to the dashboard affect the worksheet. This interaction is important to remember when you are annotating, formatting, and resizing the views in your dashboard.

While dashboards are an easy way to summarize and monitor at a glance, you can go back edit the original view by jumping to a selected worksheet. Additionally, you can duplicate worksheets directly from the dashboard to perform in-depth analysis without affecting the dashboard. Finally, you can hide worksheets that are used in dashboards so that they are not shown in the filmstrip, sheet sorter, or in the tabs along the bottom of the workbook.

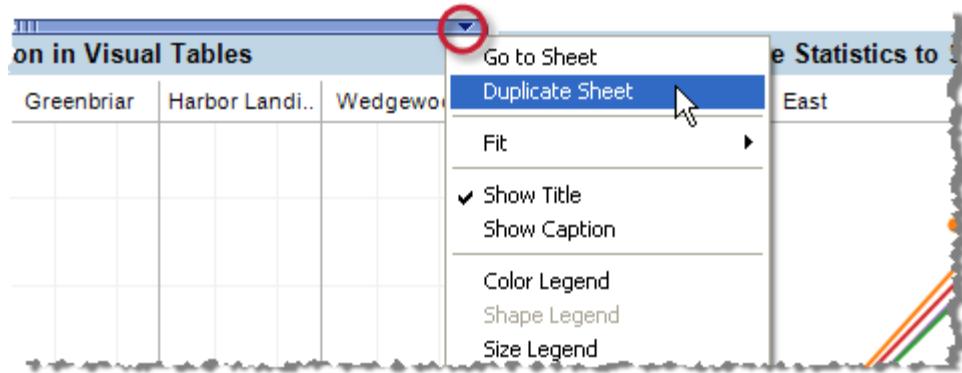
**To jump to a worksheet from a dashboard view:**

1. Select the view you want to see full size.
2. Select Go to Sheet on the dashboard view menu.



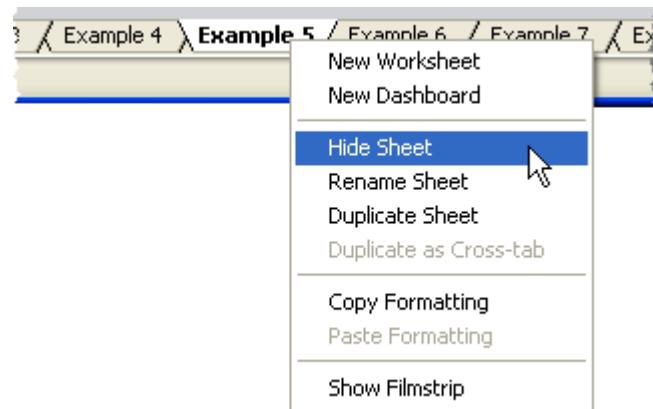
**To duplicate a worksheet from a dashboard view:**

1. Select the view you want to duplicate.
2. Select Duplicate Sheet on the dashboard view menu



**To hide a worksheet:**

- Right-click the worksheet tab or thumbnail and select Hide.



Example 2

Example 4

New Worksheet  
New Dashboard  
Hide Sheet **Hide Sheet**  
Rename Sheet  
Duplicate Sheet  
Copy Formatting  
Paste Formatting  
Refresh Thumbnail  
Refresh All Thumbnails

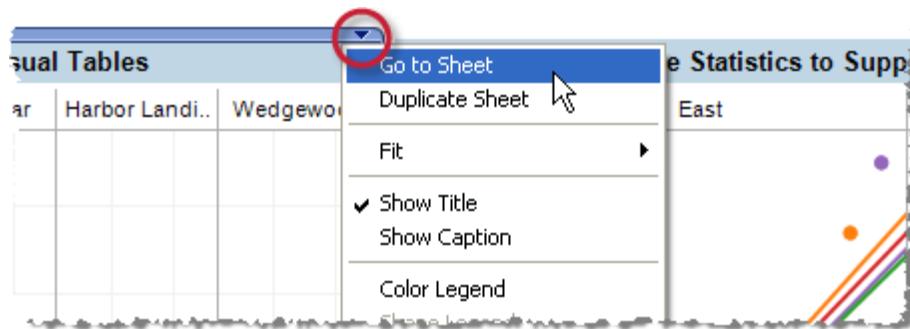
Example 8

Example 9

Dashboard 2

### To Show a Hidden Sheet:

1. Open the dashboard that uses the hidden sheet.
2. Select the hidden sheet in the dashboard and then select Go to Sheet on the dashboard view menu.



Alternatively you can right-click the hidden sheet in the Dashboard window and select Go to Sheet. The sheet opens and its tab appears along the bottom of the workbook once again.

# Publishing to Tableau Server

## Publishing to Tableau Server

*Tableau Server is where you and others can share views of your data within your company. You can publish workbooks and data sources to the server, as well as open workbooks and data sources that others have published to the server.*

*You must be added as a user on Tableau Server and be given publishing permission to publish views and data sources using Tableau Professional. Contact your server administrator to find out whether you have access to Tableau Server. You can also contact a Tableau sales representative to learn more about purchasing Tableau Server.*

**Note:**

Refer to the [Tableau Server Online Help](#) to learn more about browsing the server as well as managing users, groups, and projects.

- [Publishing Workbooks](#)
- [Publishing Data Sources](#)
- [Opening Workbooks from the Server](#)
- [Importing Data Sources from the Server](#)
- [User Filtering](#)

## Publishing Workbooks

### Publishing Workbooks

*Publish views of your data to Tableau Server by publishing the workbook. Workbooks can be organized into projects and assigned tags, which are keywords that are used for search. When you publish a workbook you can add it to existing projects, hide individual sheets, add tags, specify permissions to regulate access to the workbook on the server, and choose to embed database passwords for automatic authentication on the web.*

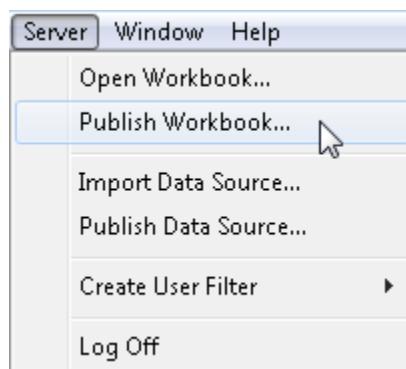
- [How to Publish Workbooks to the Server](#)
- [Saving Workbooks to Tableau Public](#)
- [Specifying Permissions](#)
- [Showing and Hiding Worksheets](#)
- [Embedding Passwords and Authentication](#)
- [Schedules](#)

## How to Publish Workbooks to the Server

After you create a workbook, you can publish to Tableau Server by following the steps below.

### To publish a workbook to the server:

1. Select **Server > Publish Workbook**.



2. Type the following into the Tableau Server Login dialog box:
  - **Server:** the server name or URL (Examples: `sales_server`, `https://sales_server`)
  - **User Name:** your user name. If Tableau Server is configured to use Active Directory, type your Windows user name (the domain is not required), otherwise, type your Tableau Server user name.
  - **Password:** your password



3. In the Publish Workbook to Tableau Server dialog box, select a project to publish the workbook into.

A project is like a folder that can contain workbooks and data sources. Tableau Server comes with one project called Default. Leave the project set to **Default** to add the workbook to this pre-set project. All workbooks must be published into a project.



4. Type a name for the workbook into the Name text box.



**Note:**

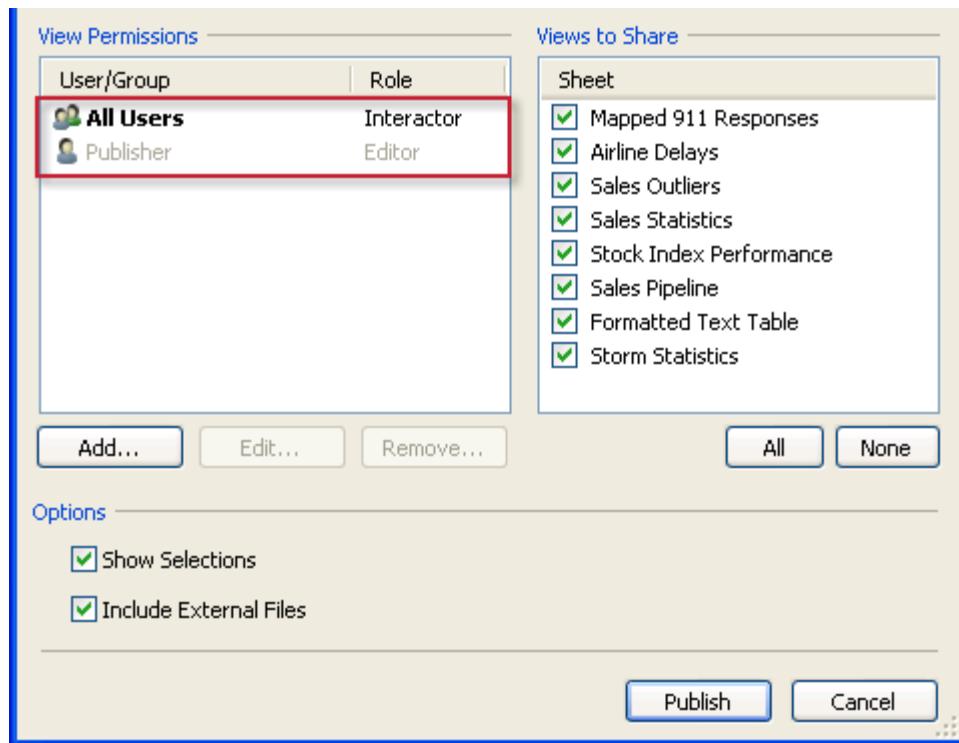
Use the drop-down list to select an existing workbook on the server. When you publish using an existing workbook name, the workbook on the server is overwritten with your workbook. You must be allowed the Write capability to overwrite workbooks on the server.

5. Optionally type one or more keywords that describe the workbook into the Tags text box. Tags help you and others find related workbooks when browsing the server.

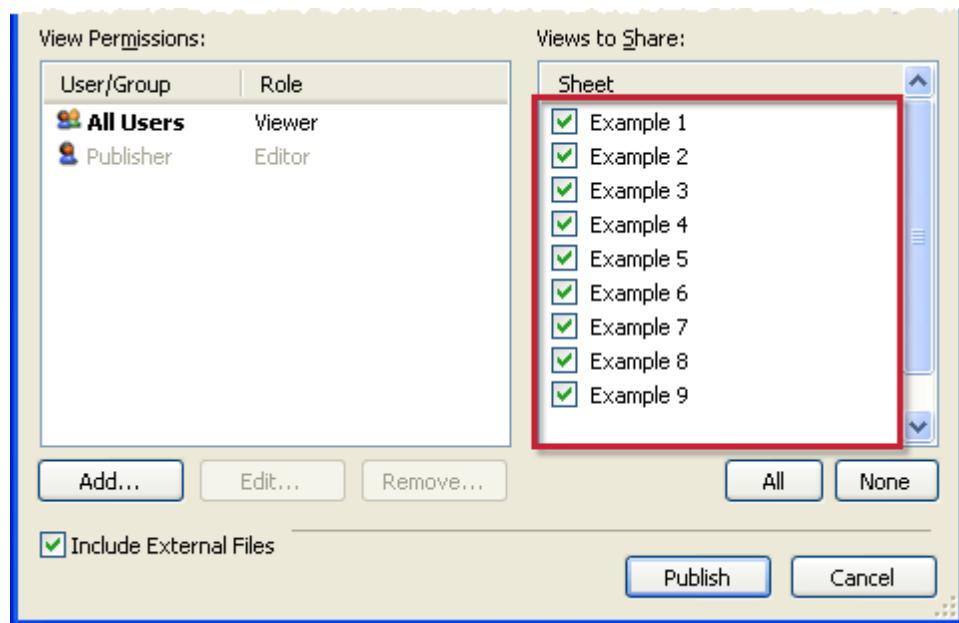
*Each tag should be separated by either a comma or a space. If the tag contains a space, type the tag surrounded by quote marks (e.g., "Sales Quotes").*



6. Optionally specify permissions to allow or deny access to the workbook on the server. By default all users can interact with the workbook and you, as the publisher, are allowed all capabilities. Refer to [Understanding Capabilities](#) to learn more.



7. Select the sheets you want to share on Tableau Server. Any sheets that are not selected are hidden on the server.



8. If the workbook contains one or more user filters you can specify what the thumbnail on the server will look like using the Generate Thumbnails as User drop-down list. Refer to [User Filtering](#) to learn more.
9. Select whether to Show Selections. When this option is selected, any selections you've made in the workbook will be published to the server.
10. Select whether to Include External Files. When you include external files, a copy of any referenced external file data sources or background images are published along with the workbook. External files include Excel, Access, Text, Data Extract, and image files. If you don't include these files, others may not be able to see the worksheets online.
11. Optionally decide whether to embed user names and passwords so server users don't have to have an account on the database to see the views. Refer to [Embedding Passwords and Authentication](#) to learn more.
12. If the workbook uses Extract connections you can optionally add the workbook to a refresh schedule.
13. When finished, click Publish.

**Note:**

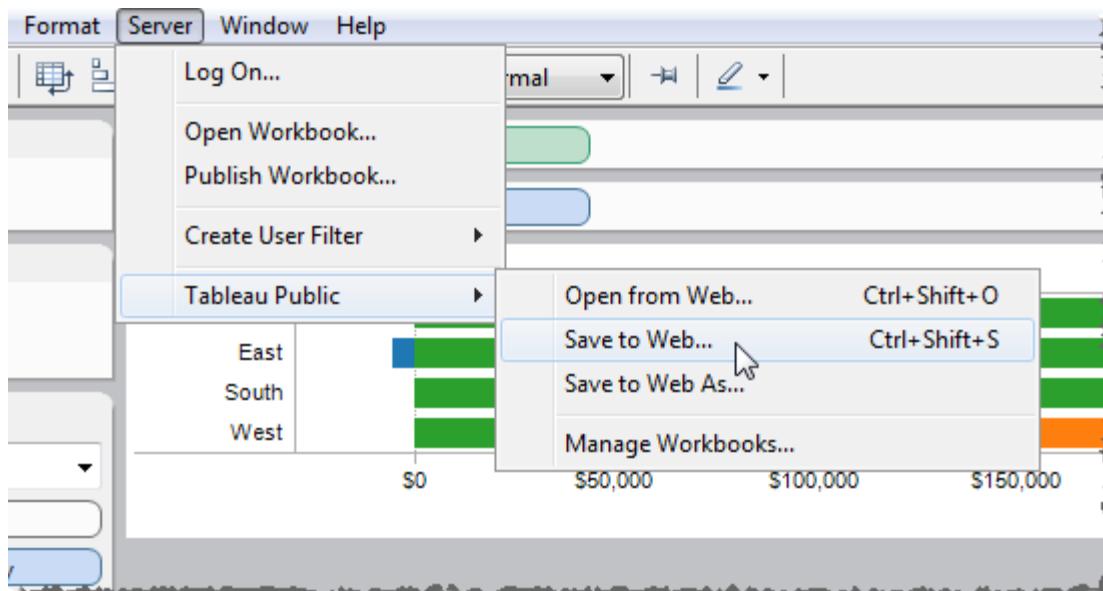
*If you are publishing a workbook that references data sources or images on a mapped drive, you should make sure to check the Include External Files option when publishing. If you do not want to publish the external files to the server, change the connection information so that the workbook references a full UNC path. For example rather than connecting to D:\datasource.xls you would connect to \\filesrv\datasource.xls.*

## Saving Workbooks to Tableau Public

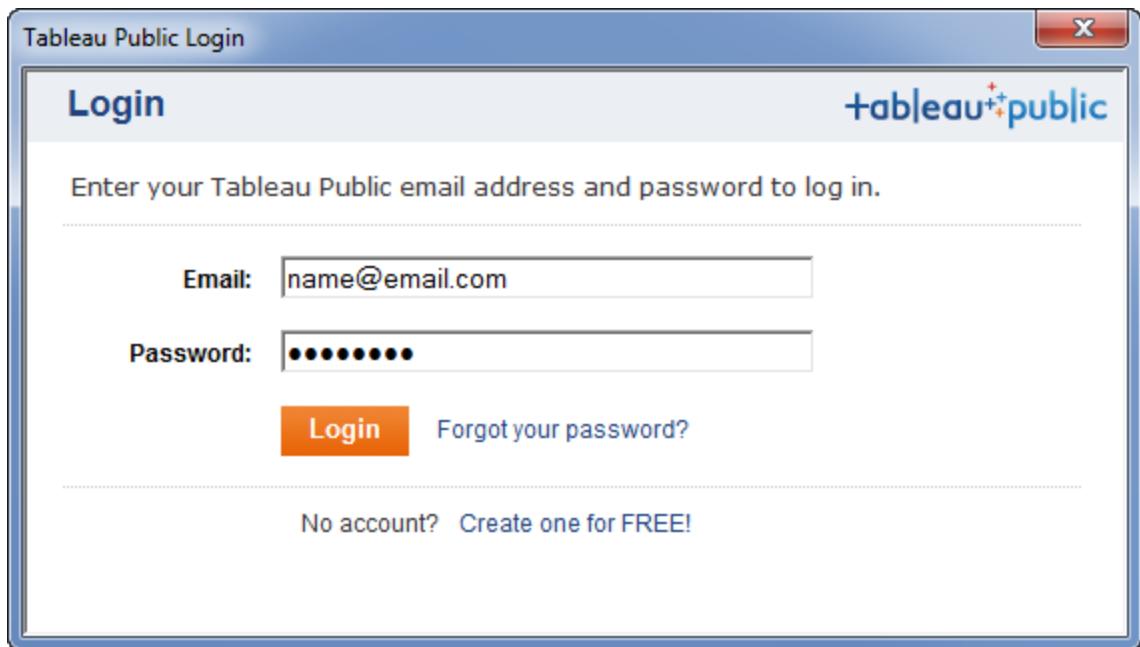
In addition to saving to an internal server, you can also save workbooks to Tableau Public. Tableau Public is a free service that lets anyone publish interactive data to the web. Once on the web, anyone can interact with the data, download it, or create their own visualizations of it. Workbooks saved to Tableau Public must have fewer than 100,000 rows of data. Use Tableau Data Extracts to reduce the size of your data before saving. Refer to [Extracting Data](#) to learn more about creating extracts.

### To save workbooks to Tableau Public:

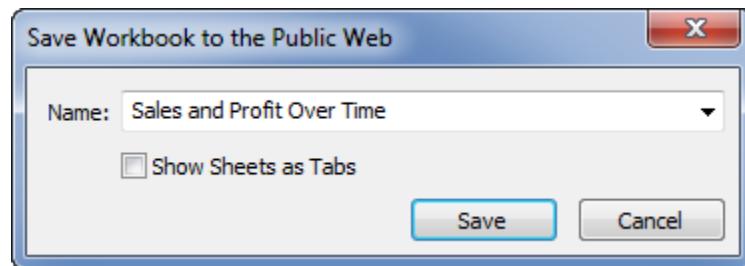
1. Select Server > Tableau Public > Save to Web.



2. When prompted, login using your Tableau Public account. If you don't have one, you can create one for free.

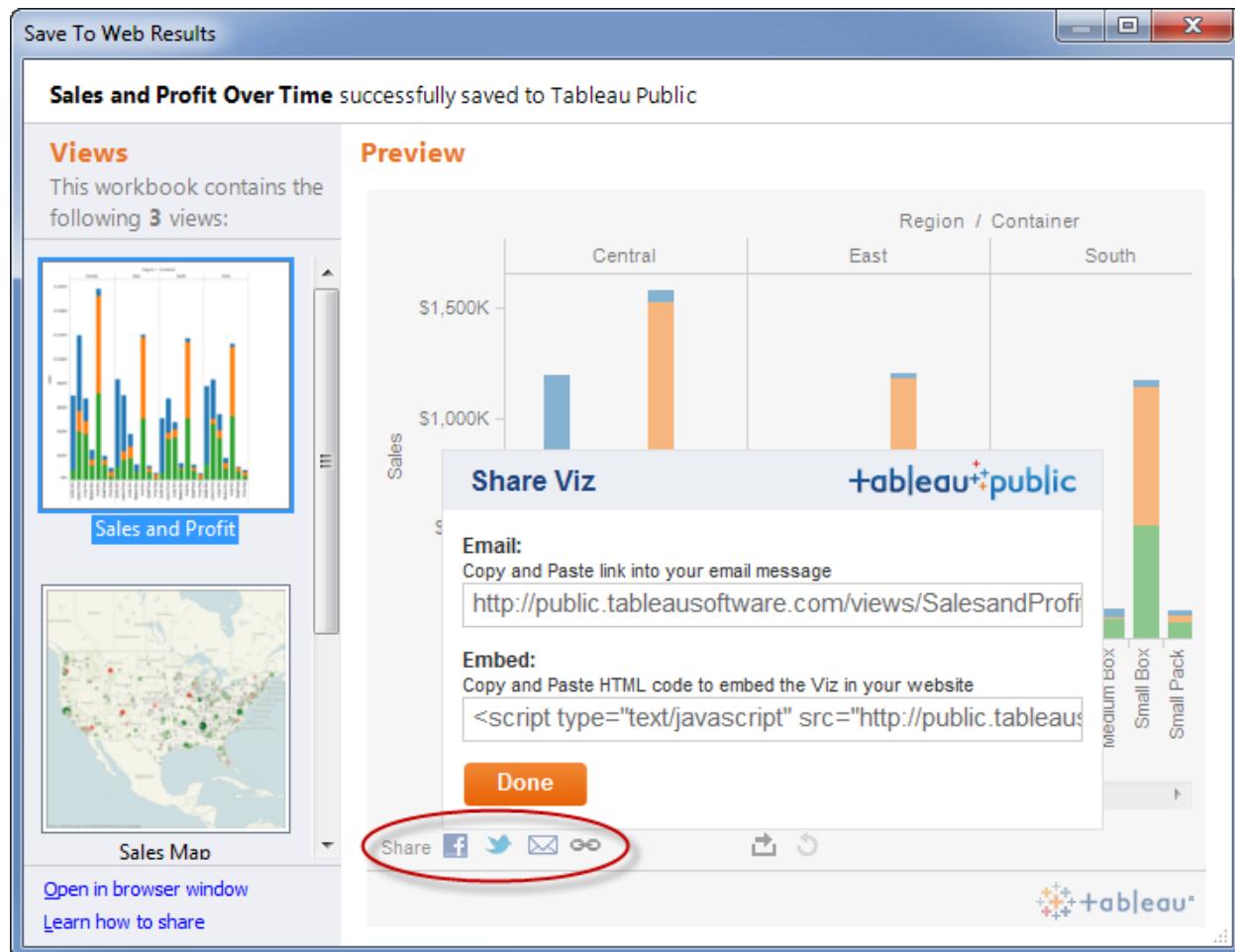


3. Type a name for the workbook and click **Save**.



The published workbook displays so you can preview all of the saved sheets. Select a sheet and click the Share button in the lower left corner of the view to get a link you can email or embed into a webpage.

## Tableau Desktop Help



Workbooks and the underlying data saved to Tableau Public are publicly available. You can manage your content saved to the web online at <http://public.tableausoftware.com>.

Learn more about Tableau Public online at [www.tableausoftware.com/public](http://www.tableausoftware.com/public).

## Specifying Permissions

### Specifying Permissions

*When you publish a workbook, you have the option to specify permissions both for groups and specific users. Permissions allow or deny access to the workbook and its contained views on the server. By default all users are allowed to view the workbook and you, as the publisher, are allowed all capabilities. Tableau Server has three pre-defined sets of permissions called roles. Roles make it easy to assign common sets of permissions.*

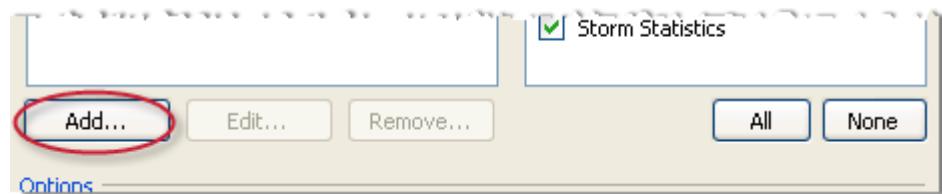
- [Adding Permissions](#)
- [Editing and Removing Permissions](#)
- [Understanding Capabilities](#)

## Adding Permissions

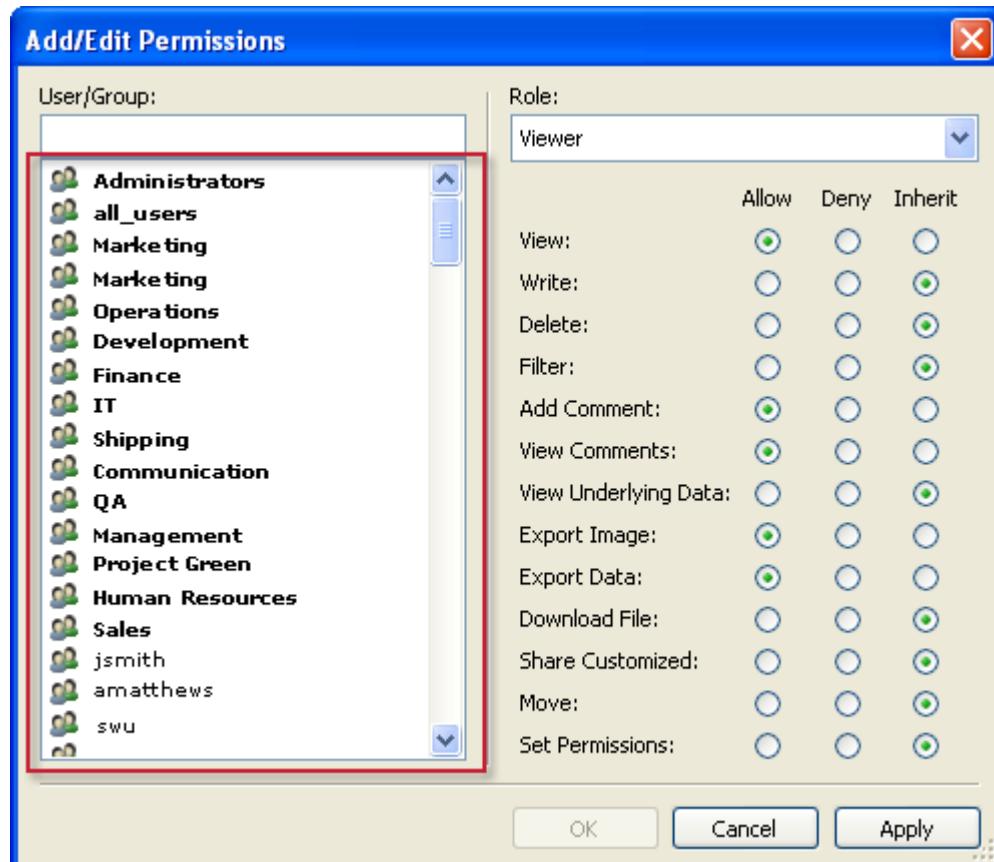
You can add permissions to a workbook in the Publish Workbook dialog box. After a workbook has been published, you can also modify and add permissions directly on Tableau Server.

**To add permissions:**

1. In the Publish Workbook to Tableau Server dialog box, click the Add button in the bottom left corner.

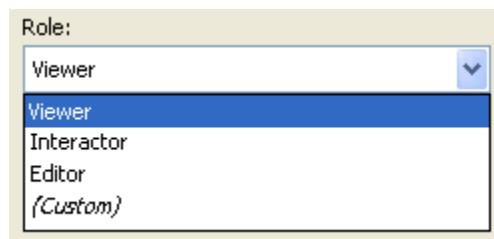


2. Select who you want authorize. You can select a group of users or a specific user in the User/Group list.

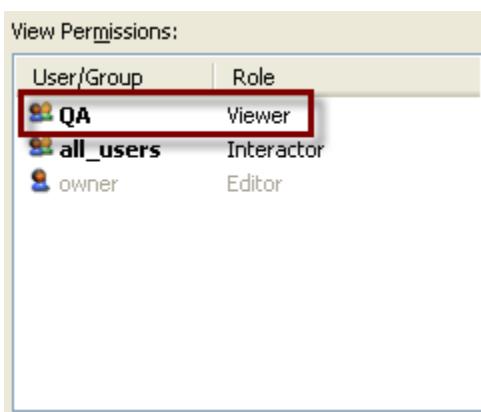


3. Select a role from the drop-down list to assign common sets of capabilities. Tableau Server has the following three pre-set roles:

- **Viewer** - allows users to view the workbook on the server, as well as add and view comments.
- **Interactor** - allows users to view the workbook on the server, apply filters, view the underlying data, export the image, and export the data. All other capabilities are inherited from the user's group and project permissions.
- **Editor** - allows all capabilities.



4. You can also specify custom sets of capabilities. Select whether to Allow or Deny each of the listed capabilities. If you leave the capability set to Inherit, the permission will be inherited from the user's group and project permissions. Refer to [Understanding Capabilities](#) to learn more about each capability.
5. When finished, click OK. The new permission displays in the Publish dialog box.



**Note:**

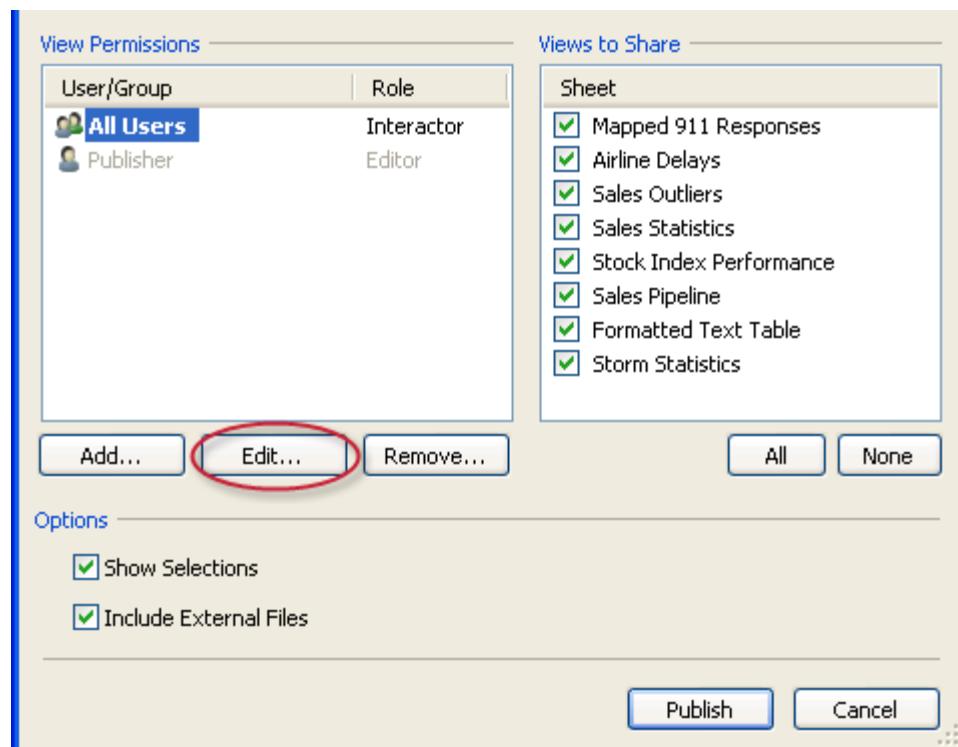
If you are adding permissions for several users and groups, click the Apply button when you are finished specifying permissions. The set of permissions is added and the Add/Edit Permissions dialog box remains open so you can continue to add more.

## Editing and Removing Permissions

In the Publish Workbook to Tableau Server the current permissions assigned to the workbook are shown in the bottom left. You can add, edit, and remove these permissions. Refer to [Adding Permissions](#) to learn more about adding permissions.

### To edit existing permissions:

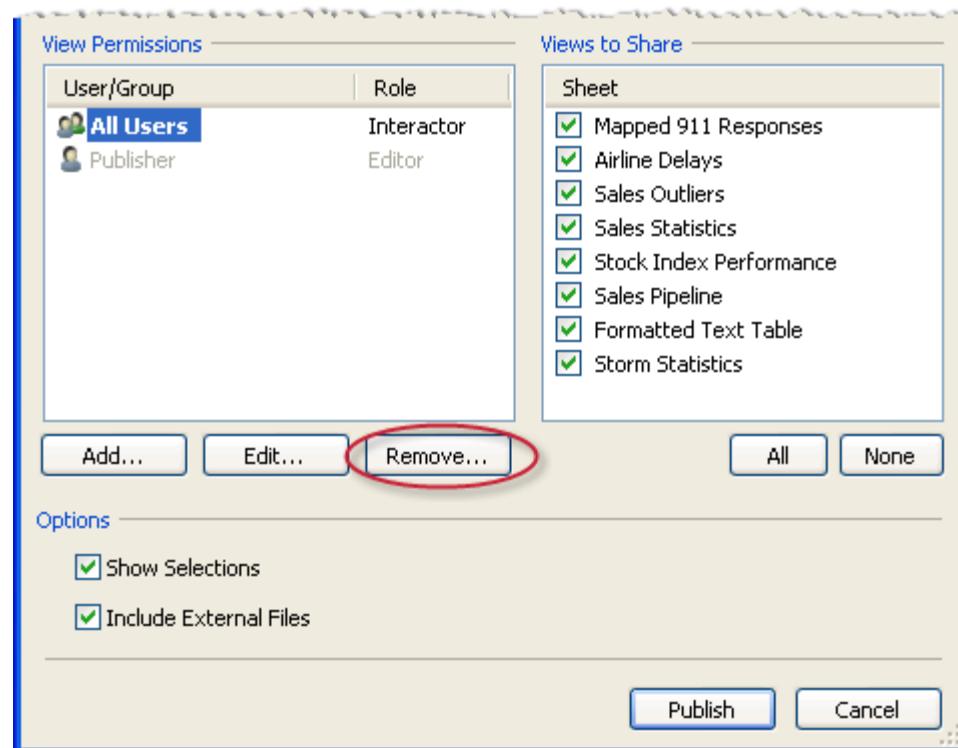
- Select the user or group whose permissions you want to modify and click **Edit**.



### To remove existing permissions:

- Select the user or group whose permissions you want to delete and click **Remove**.

## Tableau Desktop Help



## Understanding Capabilities

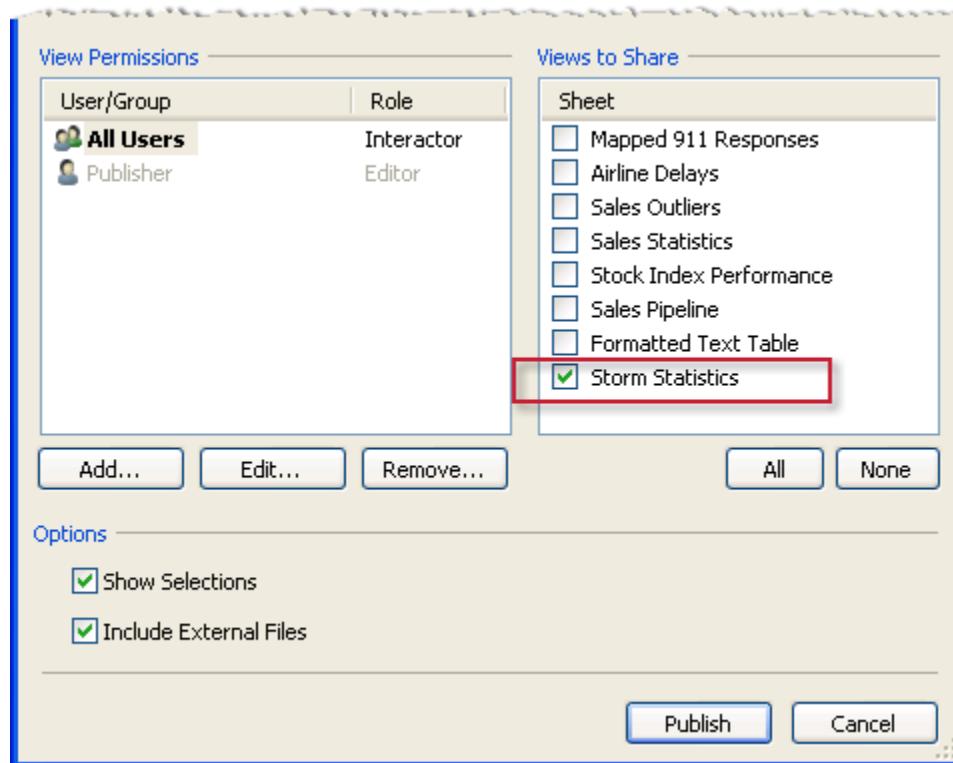
A capability is an action or set of actions that can either be allowed or denied to users and groups when publishing a workbook. The following table describes each of the capabilities:

Capability	When allowed, users can...
View	View the worksheets on Tableau Server.
Write	Overwrite the workbook. If you allow someone this capability and she re-publishes the workbook, she becomes the publisher and is given all capabilities. Your access to the workbook will be controlled by your group permission and any permissions the new publisher sets.
Delete	remove the workbook and all of its contents from the server
Filter	Modify quick filters, keep only filters, and exclude
Add Comment	Add comments to the views in the workbook
View Comments	View the comments associated with the views in the workbook
View Underlying Data	View the underlying data for the worksheets in the workbook.
Export Image	Export each worksheet as an image.
Export Data	Export the data to a text file.
Download file	Open the workbook from the server using Tableau Professional
Share Customized	Share a customized view, making their changes public.
Move	Move workbooks between projects.
Set Permissions	Specify permissions for the workbook and all of the contained views.

## Showing and Hiding Worksheets

By default, all sheets in a workbook are published to Tableau Server and can be viewed by all users. However, when you publish, you have the option to hide specific worksheets so they are not accessible on the server. Hidden sheets can still be accessed when the workbook is opened from the server using Tableau Professional. Users must be allowed the Download File capability to open the workbook from the server. Refer to [Adding Permissions](#) to learn more about how to allow or deny this capability.

Showing and hiding worksheets is useful when you want to publish a complete dashboard without publishing the worksheets that make up the dashboard. For example, when you publish a workbook that has several worksheets and a summary dashboard, you can select to hide the individual worksheets and only show the dashboard. Only the dashboard will show on the server. Remember though, anyone allowed the Download File capability can open the workbook from the server and access the hidden worksheets.

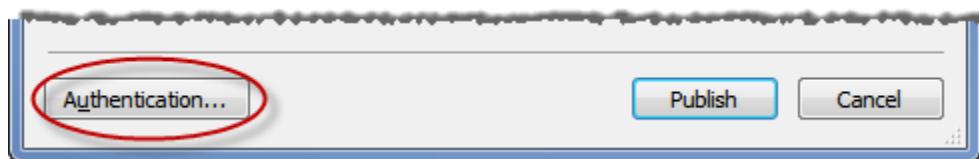


## Embedding Passwords and Authentication

If your workbook connects to a data source that requires a user name and password, by default people viewing it on the server will also be prompted for a user name and password. However, as the author you can choose to specify a database user and password that will always be used when a view is opened on the server. The login information is not made public to the server users rather the server user will just automatically be logged in so they can see the view.

### To embed passwords in a published workbook:

1. In the Publish Workbook dialog box, click the Authentication button in the bottom left corner.

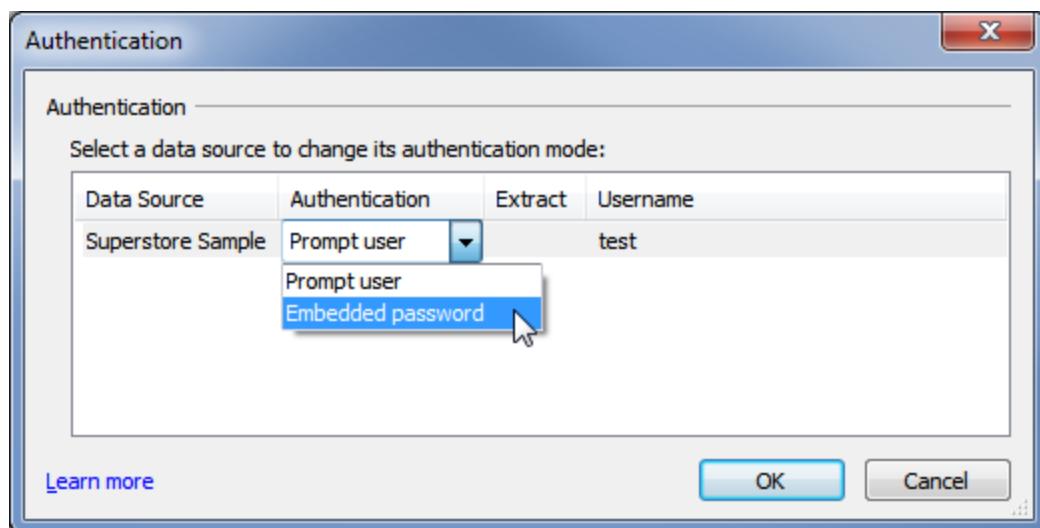


The data source connections that require a user name and password are listed along with the user name you are currently logged in with. Select the connections that you want to embed passwords for and then select an authentication type. Depending on the data source, you can select one of the following options:

- *Prompt user - visitors on Tableau Server will be prompted to enter their own database username and password.*
- *Embedded Password*  
- uses your current user name and password to automatically authenticate Tableau Server users when they load the view.
- *Server Run As account - uses the Server Run As account to automatically authenticate Tableau Server users when they load the view. The Server Run As account is configured by your Tableau Server system administrator.*
- *Impersonate via server Run As account - uses the Tableau Server Run As account to act on behalf of a Tableau Server user visiting the view. This option is only available for Microsoft SQL Server data sources that have*

*been configured for impersonation. Refer to the Reference section of the [Tableau Server Online Help](#).*

- *Impersonate via embedded password - uses your username and password to authenticate Tableau Server users when they load the view. Tableau Server can be running under any type of account, but it will use these credentials, supplied by the publisher, to connect to the database. This option is only available for Microsoft SQL Server data sources that have been configured for impersonation. Refer to the Reference section of the [Tableau Server Online Help](#).*



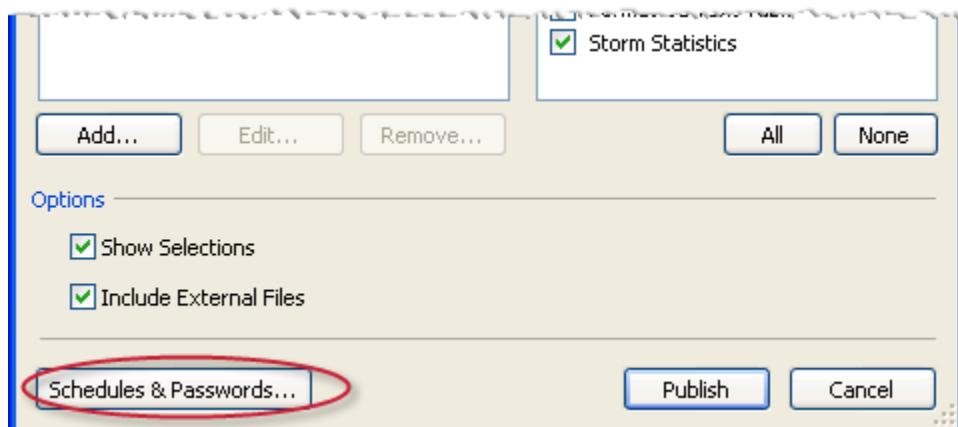
**Note:**

*Whether you are allowed to embed passwords or impersonate is controlled by the Tableau Server administrator. Administrators can allow authors to embed passwords with the Settings on the Maintenance page of the server.*

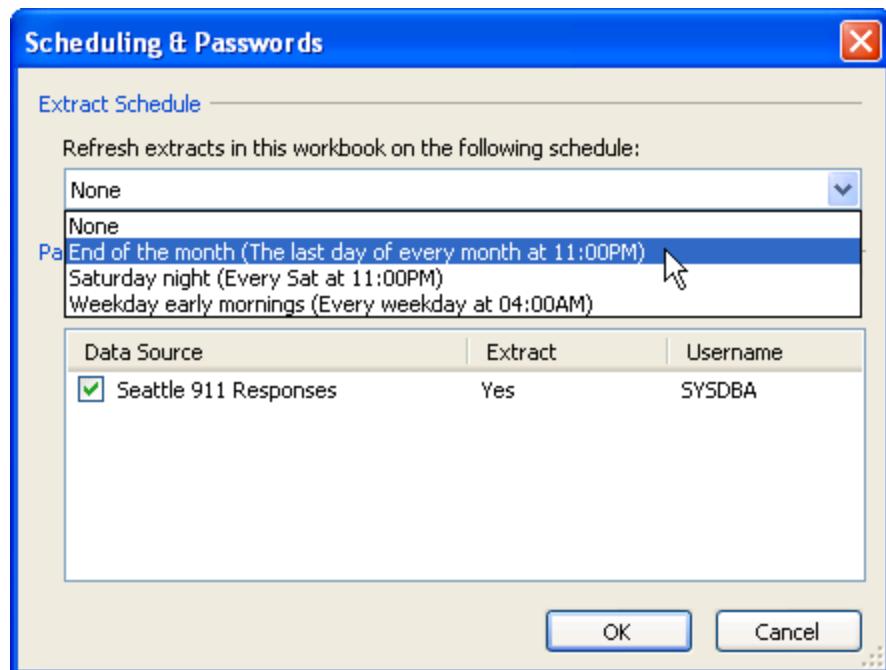
## Schedules

When you publish workbooks that connect to extracts you can schedule the extracts to be refreshed automatically. That way you don't have to republish the workbook every time the underlying data has updated and you can still get the performance of a data extract. For example, let's say you have a workbook that connects to a large data warehouse that is updated weekly. Instead of publishing a workbook that queries the live data, you can create an extract including just the data necessary. This increases performance and limits queries to the live database. Then you can add that workbook to a schedule so that the extract gets refreshed each week with the updated data from the data warehouse.

Schedules are created and managed on the server by an administrator. However, an administrator can allow you to add a workbook to a schedule when you are publishing from Tableau Desktop. If this option has been enabled, a *Schedules & Passwords* button shows in the publish dialog when you are publishing a workbook that connects to a data extract.



In the Scheduling & Passwords dialog box, select a schedule to add the workbook to. All data sources that require authentication must have an embedded password so that the extract can be refreshed. This includes data sources that are not extracts.

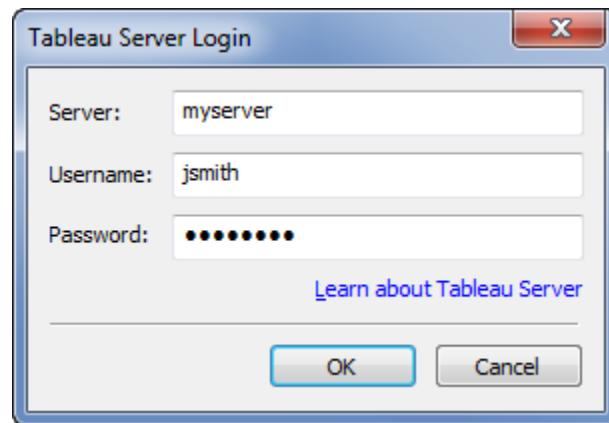


## Publishing Data Sources

In addition to publishing workbooks, you can also publish a data source to Tableau Server. A data source is a reusable connection to data. Publishing the data source to the server allows you to centrally manage and store data sources. The published data can be located in Tableau's data engine (extracts) or in a live, relational database. The published data source also contains field level customizations such as calculations, groups, and sets. This section discusses how to publish a data source to Tableau Server.

### To publish a data source:

1. Select the data source on the Data menu and then select Publish to Server.
2. If you haven't logged into the server, type the following into the Tableau Server Login dialog box:
  - Server: the server name or URL (Examples: sales\_server, https://sales\_server)
  - User Name: your user name. If Tableau Server is configured to use Active Directory, type your Windows user name, otherwise, type your Tableau Server user name.
  - Password: your password



3. In the Publish Data Source to Tableau Server dialog box, select a project to publish the data source into.

*A project is like a folder that can contain workbooks and data sources. Tableau Server comes with one project called Default. Leave the project set to **Default** to add the data source to this pre-set project. All data sources must be published into a project.*



4. Type a name for the data source into the Name text box.



**Note:**

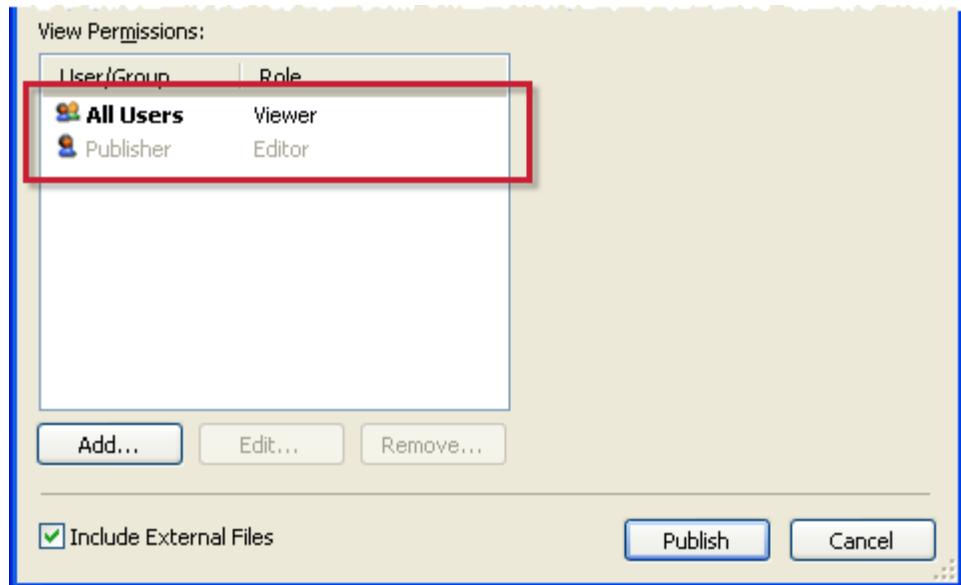
*Use the drop-down list to select an existing data source on the server. When you publish using an existing data source name, the data source on the server is overwritten. You must be allowed the Write permission to overwrite data sources on the server.*

5. Specify the Authentication method. If your data source requires a username and password, you can specify how authentication should be handled when it is published to the server. The options available depend on the type of data source you are publishing.
6. Optionally type one or more keywords that describe the data source into the Tags text box. Tags help you and others find related data sources when browsing the server.

*Each tag should be separated by either a comma or a space. If the tag contains a space, type the tag surrounded by quote marks (e.g., "Sales Quotes").*



7. Optionally specify permissions to allow or deny access to the data source on the server. By default all users can view the data source and you, as the publisher, are allowed all capabilities. Refer to [Specifying Permissions](#) to learn more about assigning more permissions.



8. Finally, if you are publishing an external file data source or a data source that is on a mapped drive select to *Include External Files*. When you include external files, a copy of the data source is published. External file data sources include Excel, Access, Text, Data Extract, and image files. If you don't include these files, others may not be able to see the worksheets online.



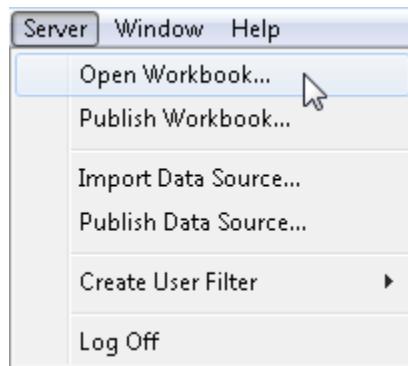
9. When finished, click *Publish*.

## Opening Workbooks from the Server

If you have been allowed the *Download File* capability for a workbook, you can use Tableau Professional to open the workbook from the server. When you open a workbook from the server and make changes, you can either save it to your hard drive or, if you have been allowed the *Write* capability, you can republish the workbook to the server.

**To open a workbook from the server:**

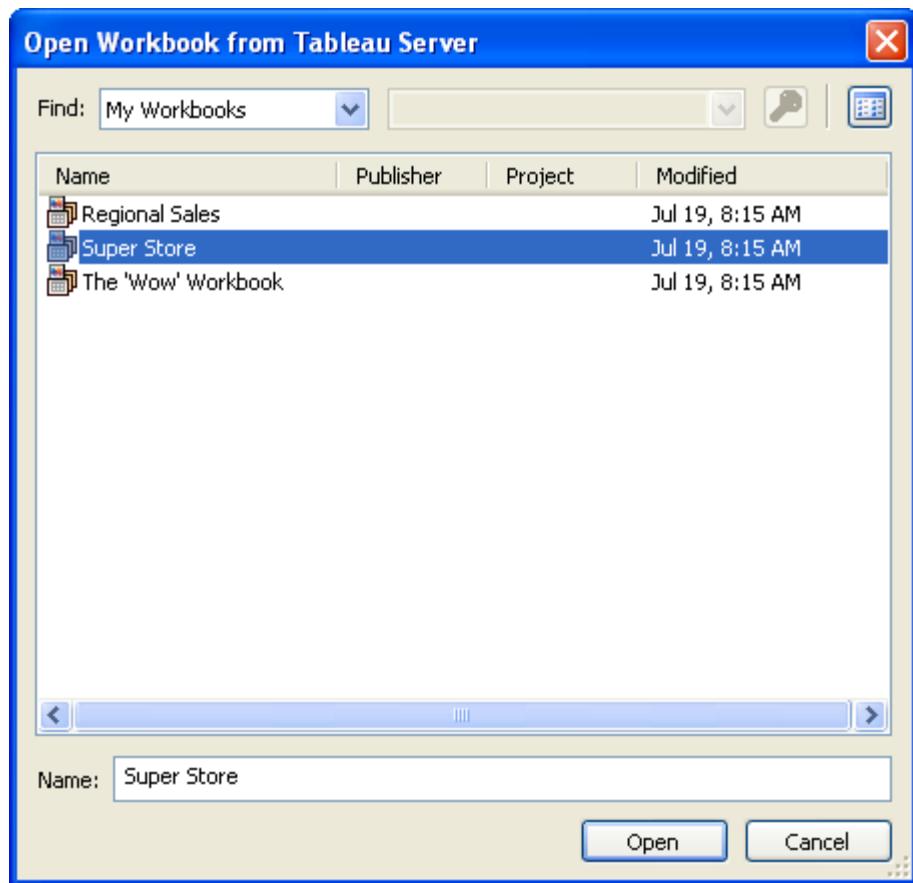
1. Select Server > Open Workbook.



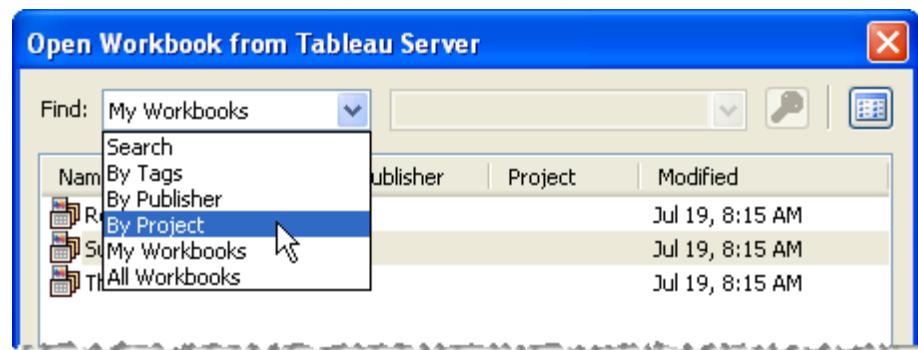
2. Type the following into the Tableau Server Login dialog box:
  - *Server:* the server name or URL (Examples: `sales_server`, `https://sales_server`)
  - *User Name:* your user name. If Tableau Server is configured to use Active Directory, type your Windows user name, otherwise, type your Tableau Server user name.
  - *Password:* your password



3. In the Open Workbook from Tableau Server dialog box, select the workbook you want to open and click Open.



You can find workbooks using the Find drop down lists. You can search all workbooks on the server or find by tags, publisher, project, or workbooks that you published.



## Importing Data Sources from the Server

You can connect to Tableau Server data sources on the Connect to Data page. Refer to the connection example for [Tableau Server](#) to learn how to connect to a published data source.

## User Filtering

### User Filtering

*User filtering is a special kind of filter that allows you to limit the data any given person can see in a published view. For example, in a sales report that gets shared with regional managers, you may want to only allow the Western Regional Manager to see the western sales, the Eastern Regional Manager to see the eastern sales, and so on. Rather than create a separate view for each manager, you can define a user filter that allows each manager to see the data for a particular region.*

*A user filter is defined for an individual field and users or groups are given permission to see a subset of the members in that field. In the sales report example above, the user filter is defined for the Region field and each manager is given permission to see a corresponding region.*

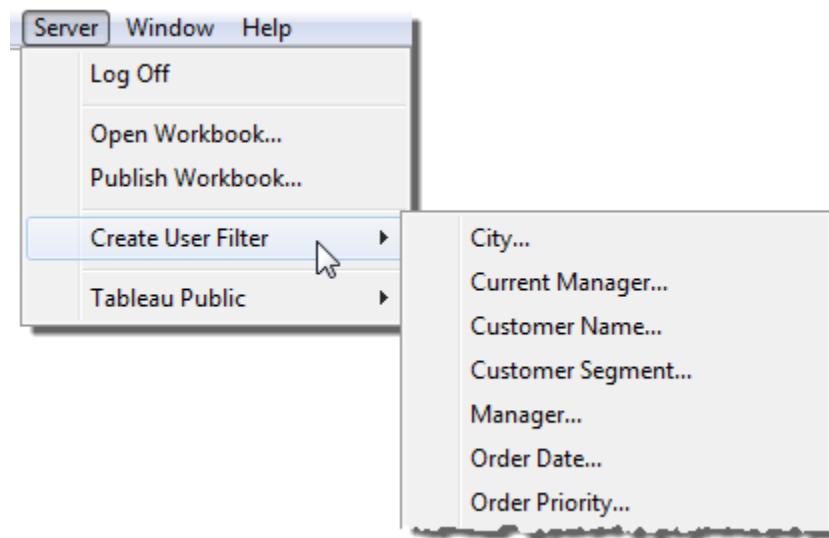
*You can define a user filter for any dimension or multidimensional hierarchy. In addition you can define user filters for sets, binned fields, and groups that you've created. The user list comes from Tableau Server. When you publish to Tableau Server the view is adjusted based on who is logged in and looking at it.*

- [How to Create a User Filter](#)
- [Previewing User Filters](#)
- [Editing User Filters](#)
- [Publishing with User Filters](#)
- [Example - Setting User Filters](#)
- [Filter Using a List of Users in your Data Source](#)

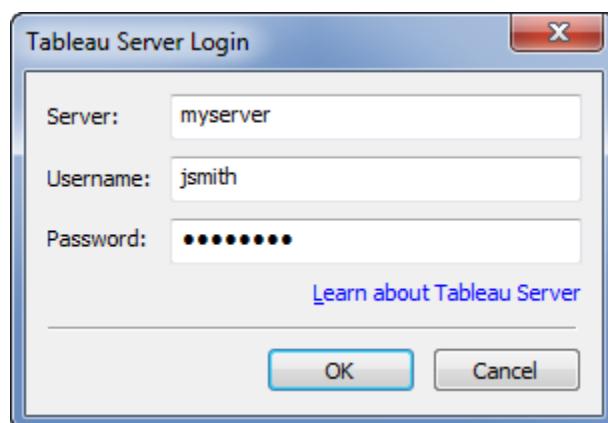
## How to Create a User Filter

You can create as many user filters as you like for a given view.

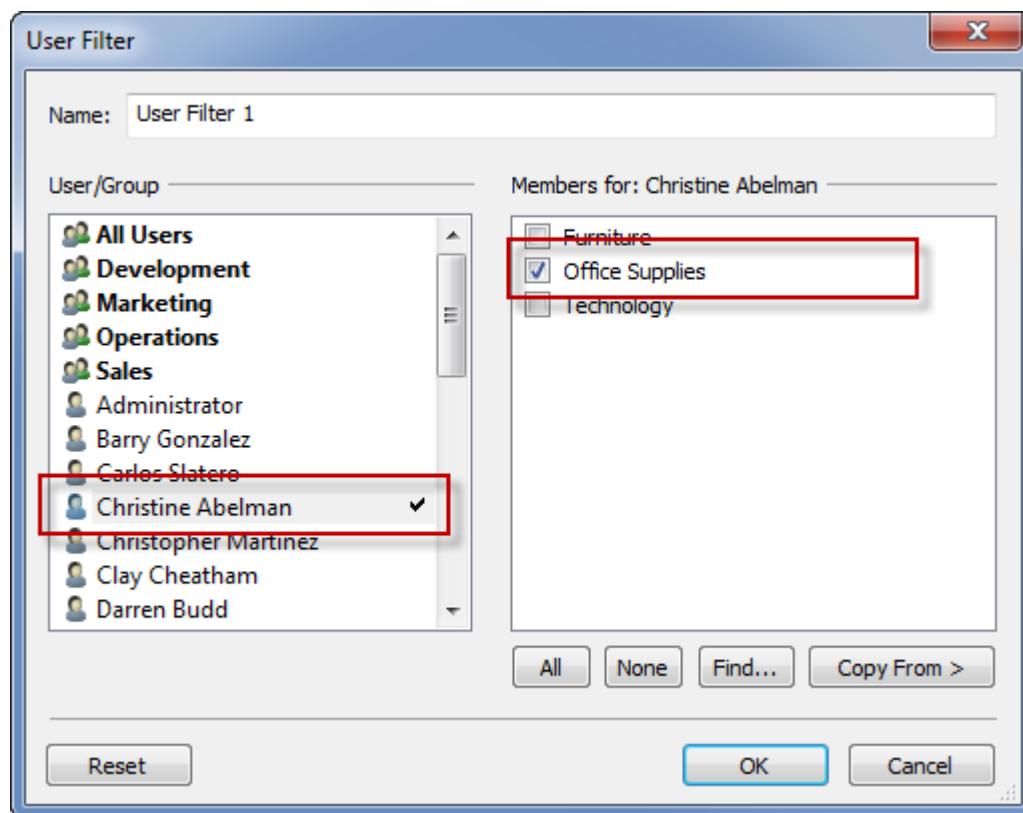
1. Select Server > Create User Filter and then select a field that you want to filter on. For example, if you are limiting product data each person can access select the Product field.



2. If necessary log in to Tableau Server. Refer to [How to Publish Workbooks to the Server](#) to learn more about logging in.



3. In the User Filter dialog box, type a Name for the set of rules you are creating. For example, if you are filtering on product information you could name it Products by User.
4. Select a user or group in the list on the left; then on the right select the members of the field that the selected users are allowed to see. Repeat this process as necessary until everyone is assigned the correct set of members. If there are a large number of users and groups, a search box is available on the left side of the dialog box.

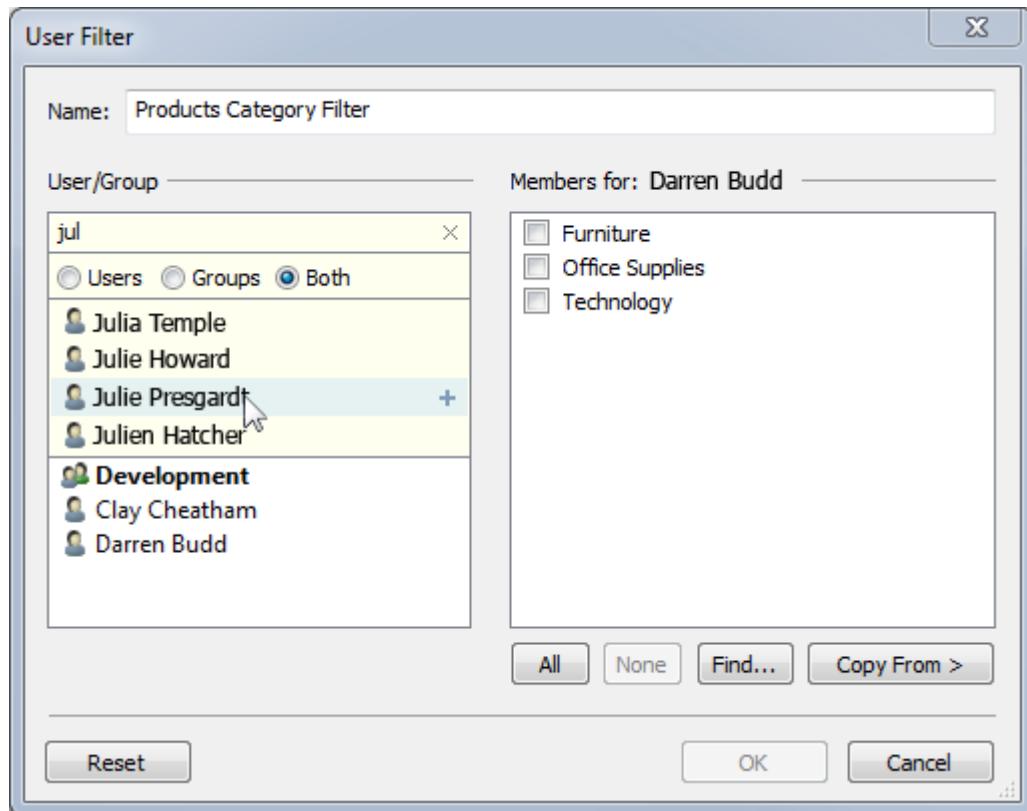


5. When finished click OK.
6. The user filter now shows in the Sets area of the Data window. Drag the new set to the Filters shelf to begin using it in a view. Refer to [Example - Setting User Filters](#) for a step-by-step example of defining user filters.

### Finding Users in the User Filter Dialog Box

When there a large number of users and groups on the server, a search box displays on the left side of the dialog box. Begin typing the name of a user or group into the text box

at the top of the list of users. When ready, press Enter on your keyboard or click the Search icon. Matching names and groups display in a drop-down list. You can filter the results to only show Users, Groups, or Both. Click on a user or group name to add it to the selection. Continue to search and add to the selection until you have the list you need.

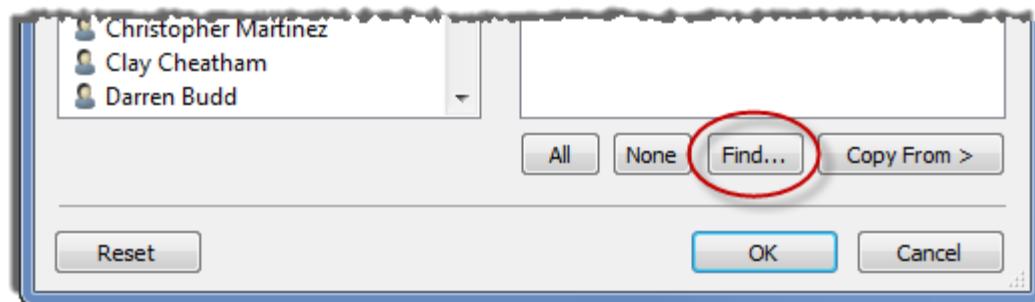


## Finding Field Members in the User Filter Dialog Box

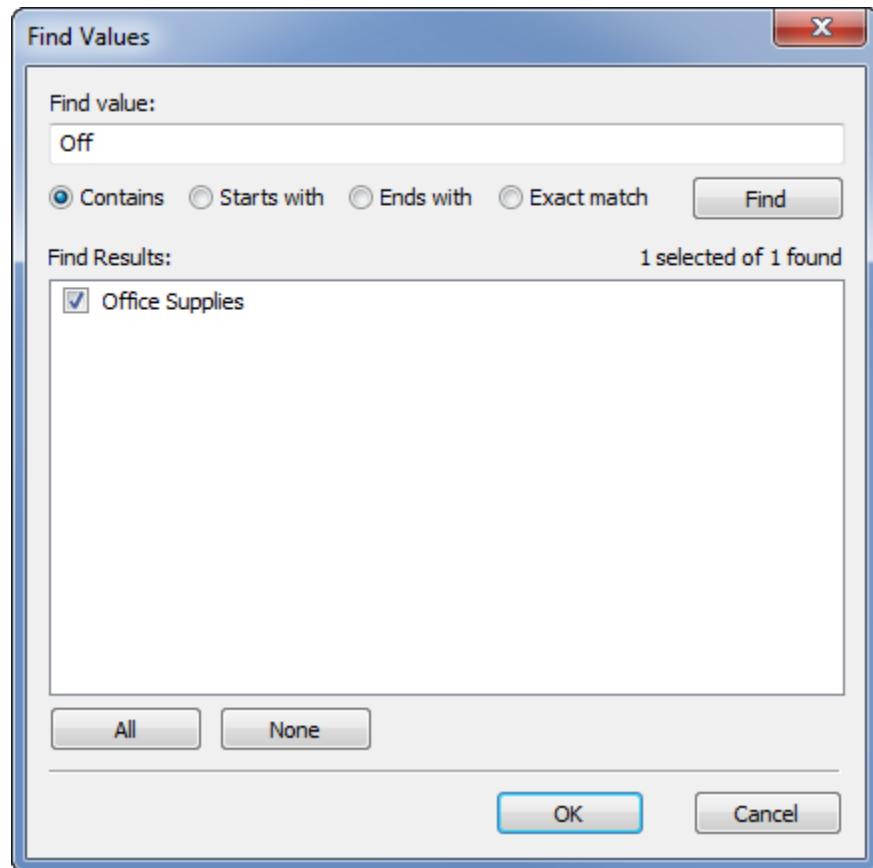
Some fields have a large number of members that are difficult to select one by one. You can find and select members easily using the Find dialog.

**To find members in the User Filter dialog box:**

1. Click the Find button at the bottom of the list of members.



2. Type all or part of the member name into the Find value text box at the top of the Find Values dialog box and then click Find. You can change the search criteria by selecting whether to return members that Contain, Starts with, or is an Exact match to the text you typed.
3. Select one or more members from the results shown in the bottom half of the dialog box. After you select the members of interest you can continue to search for other members until you have all necessary members selected.



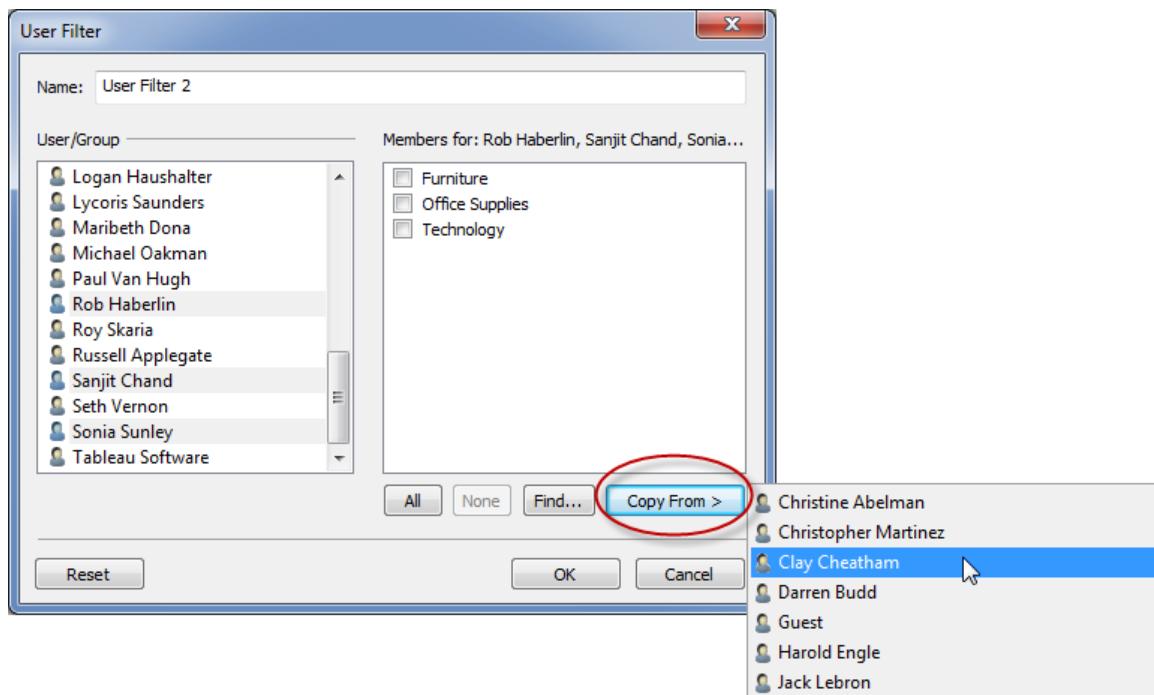
4. When finished, click OK to return to the User Filter dialog box.

### Copying member selections from other users

As you specify the members each user or group can see you may want to just duplicate the member selections you already set for another user or group. For example, if you specify that the Product Manager can see a list of 50 products and then decide that you want to share the same products with everyone else on the her team; you can simply duplicate the member selection instead of having to select the 50 products for every member of the team.

#### To copy a member selection from another user or group:

1. Select the user or group that you want to copy the member selection to.
2. Click the Copy From button at the bottom of the member list.
3. Select the user or group that you want to copy the member selection from.

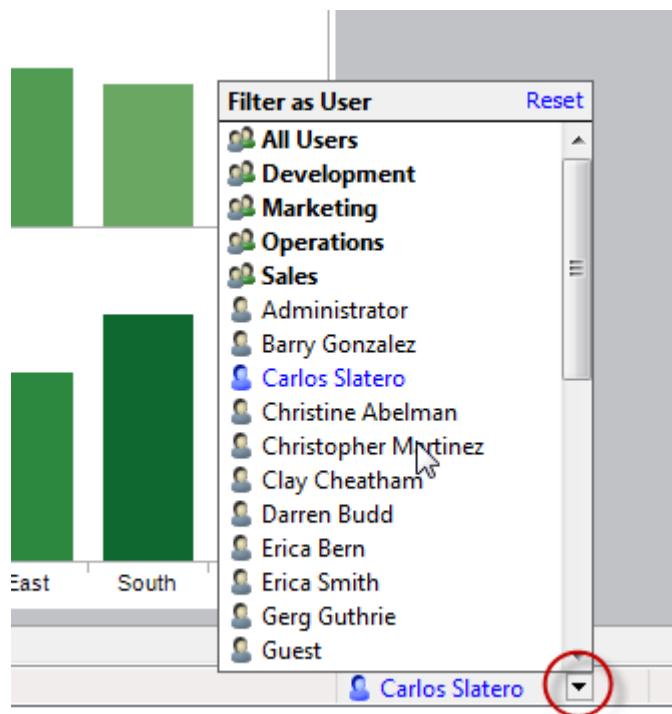


## Previewing User Filters

If a workbook contains one or more user filters, the Filter as User menu displays in the bottom right corner of the workbook window. The Filter as User menu allows you to preview what each user or group will see when they look at the view on Tableau Server.

### To preview a user filter:

1. Open the Filter as User menu by clicking on the black arrow in the bottom right corner of the workbook window.
2. Select a user or group that you want to preview as.
3. The selected user or group is shown in blue at the bottom of the workbook window and the view updates to only show the appropriate data.



### Note:

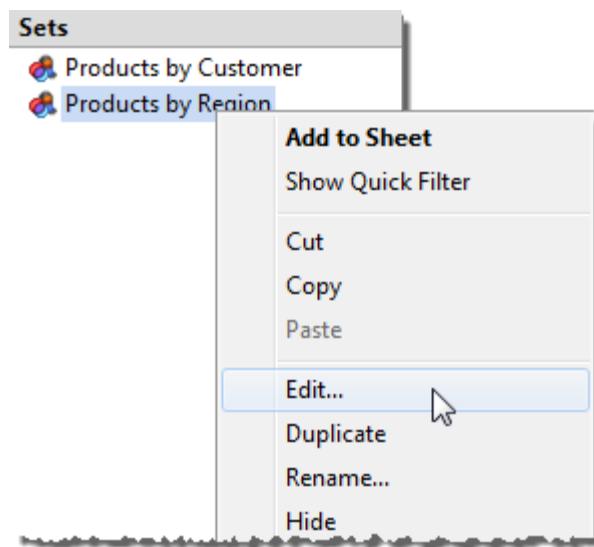
At any time you can return to viewing the workbook as yourself by clicking Reset in the top right corner of the Filter as user menu.

## Editing User Filters

After you create a user filter you can go back and edit it just like you can edit other sets.

### To edit a user filter:

1. Right-click the user filter in the Sets area of the Data window and select Edit.



2. If necessary log in to Tableau Server. Refer to [How to Publish Workbooks to the Server](#) for details on logging into the server.
3. In the User Filter dialog box, make the necessary changes and click OK.

### Note:

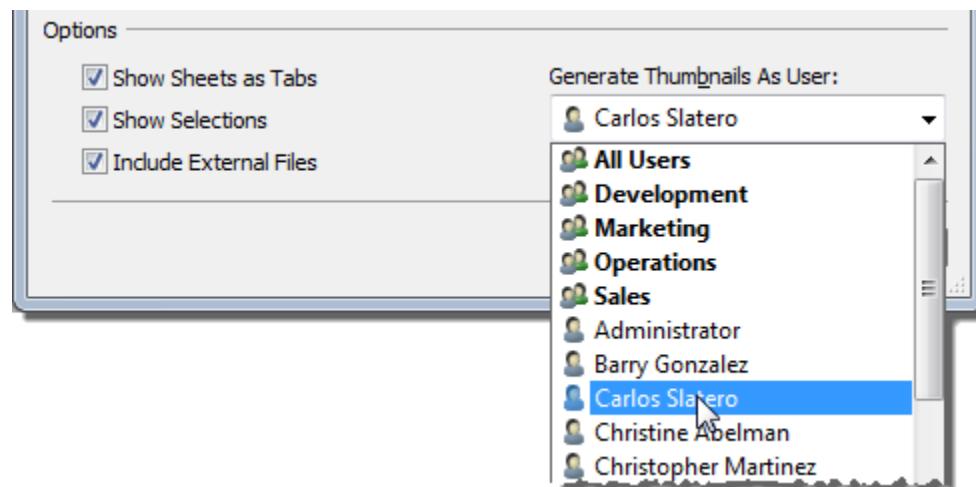
If you modify a user filter while not logged into the server, the set will only show users and groups that have a user filter specified. Log in to see all users and modify the user filter.

## Publishing with User Filters

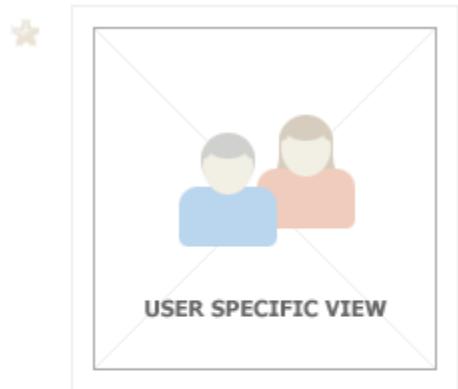
When you publish a workbook it and its contained sheets are represented with thumbnail images on the server. You can specify what these thumbnail images will look like by selecting to generate thumbnails as a specific user. For example, if you want the thumbnail image to show all three regions of a sales forecast, you can select to generate thumbnails as the manager who is allowed to see all regions.

### To specify how to generate the thumbnails:

- In the publish dialog box, select a user or group in the Generate Thumbnails as User drop-down list.



If the user you select cannot see any data, a “blank” thumbnail will be used. The blank thumbnail is shown below.



### Date Calcs

Project: Default

Workbook: Date-Time (Sheet 1 of 2)

Tags:

Last Modified: 0 minutes ago

Publisher: Administrator



### Fiscal Years

Project: Default

Workbook: Date-Time (Sheet 2 of 2)

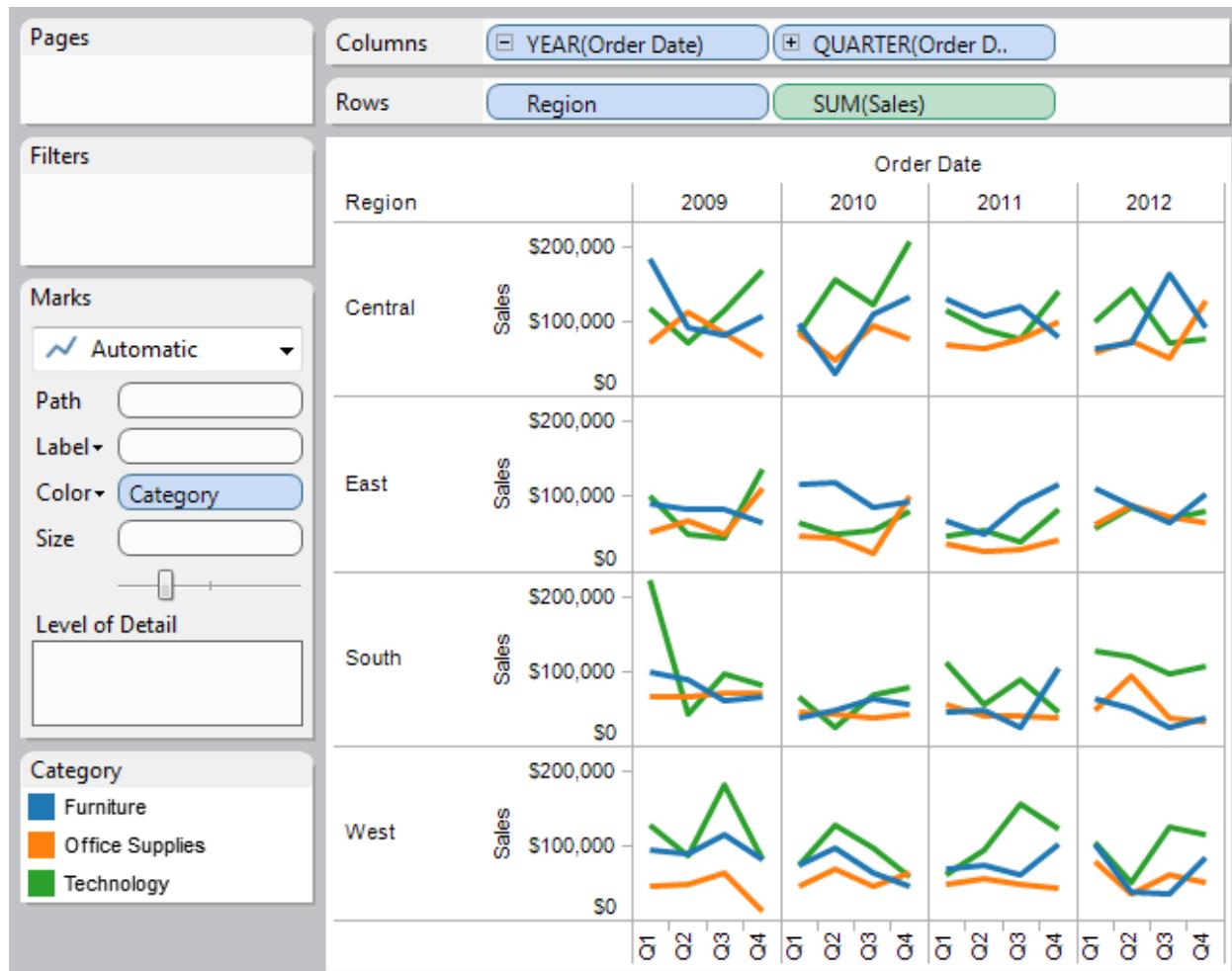
**Note:**

*The Generate Thumbnails as User option in the publish dialog box is only available when the workbook contains one or more active user filters.*

## Example - Setting User Filters

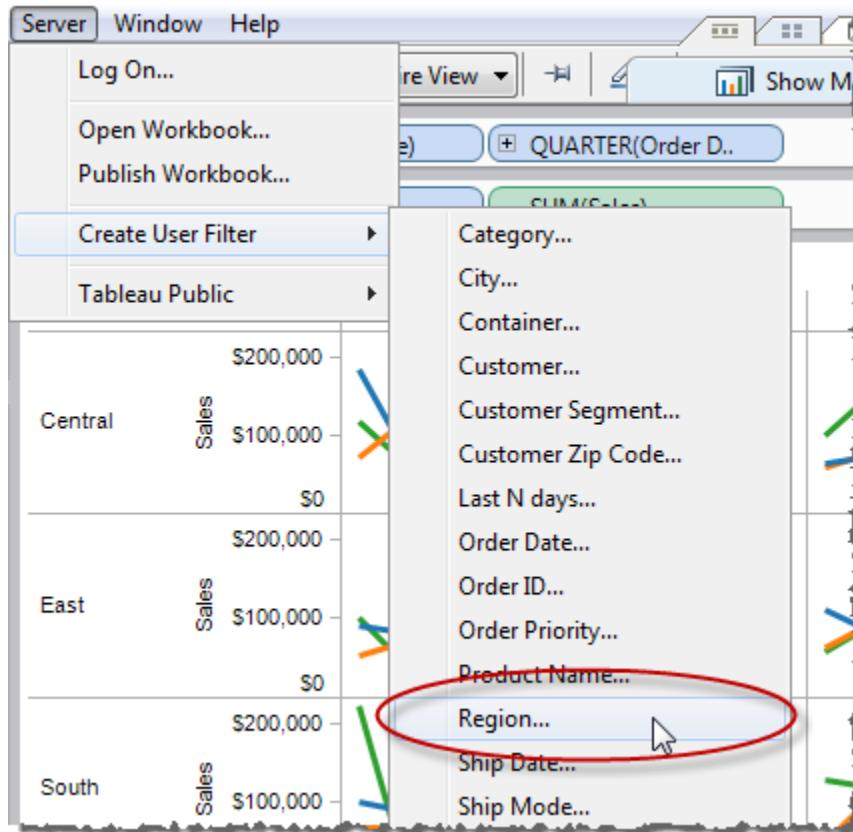
This is a simple example that explains how to set user filters on a sales report so that when it is published regional managers will only see data for their respective region. This example uses the Sample- Superstore Sales (Excel) data source that comes with Tableau.

The sales report is shown below.



As you can see the view shows the quarterly sales over several years for each region and product type. Now suppose you are going to publish this view to the server so each of the three regional managers can track their sales. However, you want to limit each manager to only see data relevant to their region. To do that you need to set up a user filter.

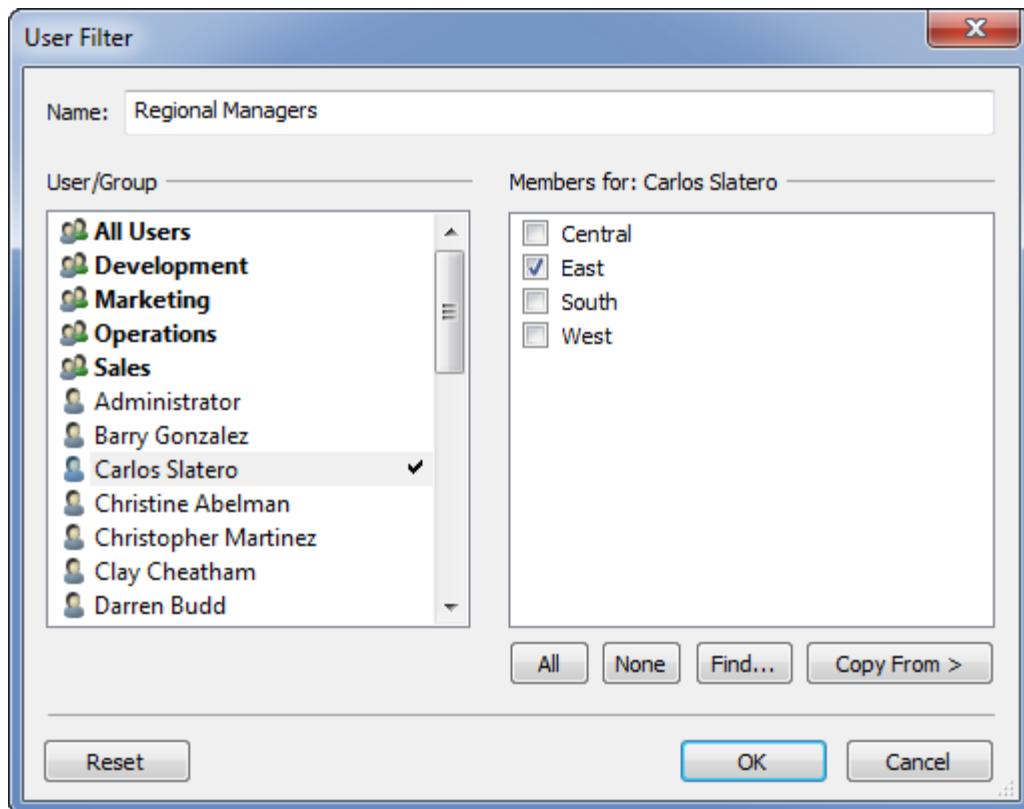
1. Select Server > Create User Filter. Then select Region because that the field you want to use for filtering the view.



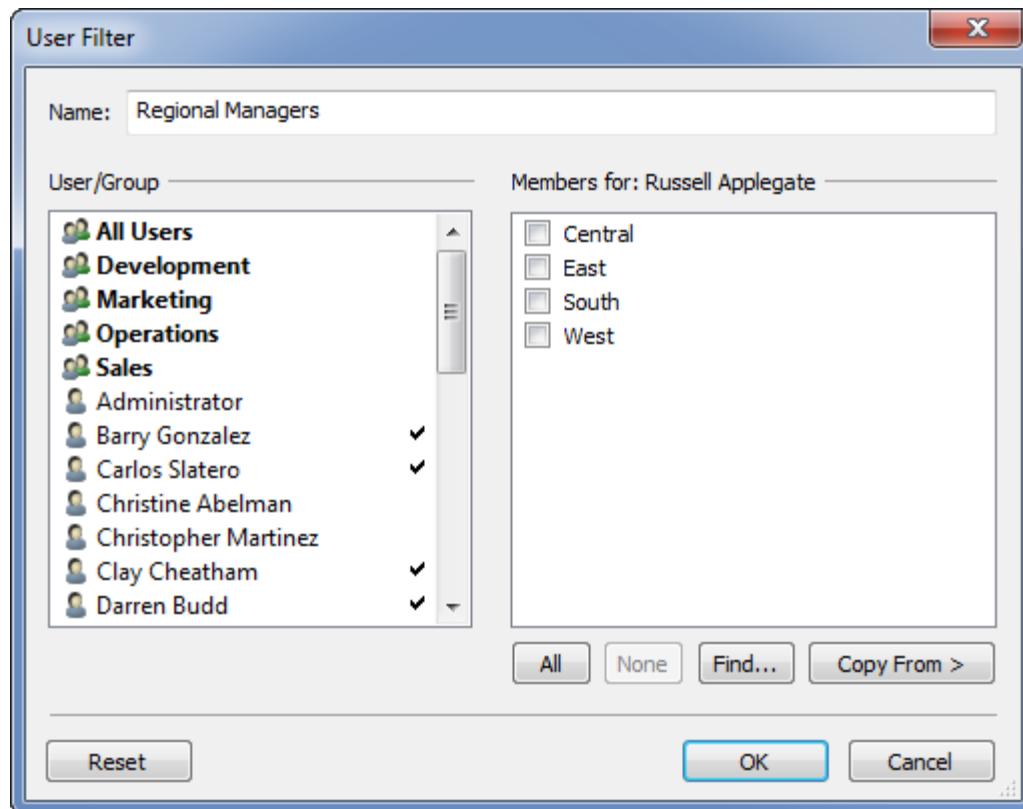
2. You may need to log into the server if are not already logged in. Log in by typing the Server name or URL, your user name, and password. Your user name and password is either specific for the server or is your Windows user name and password.



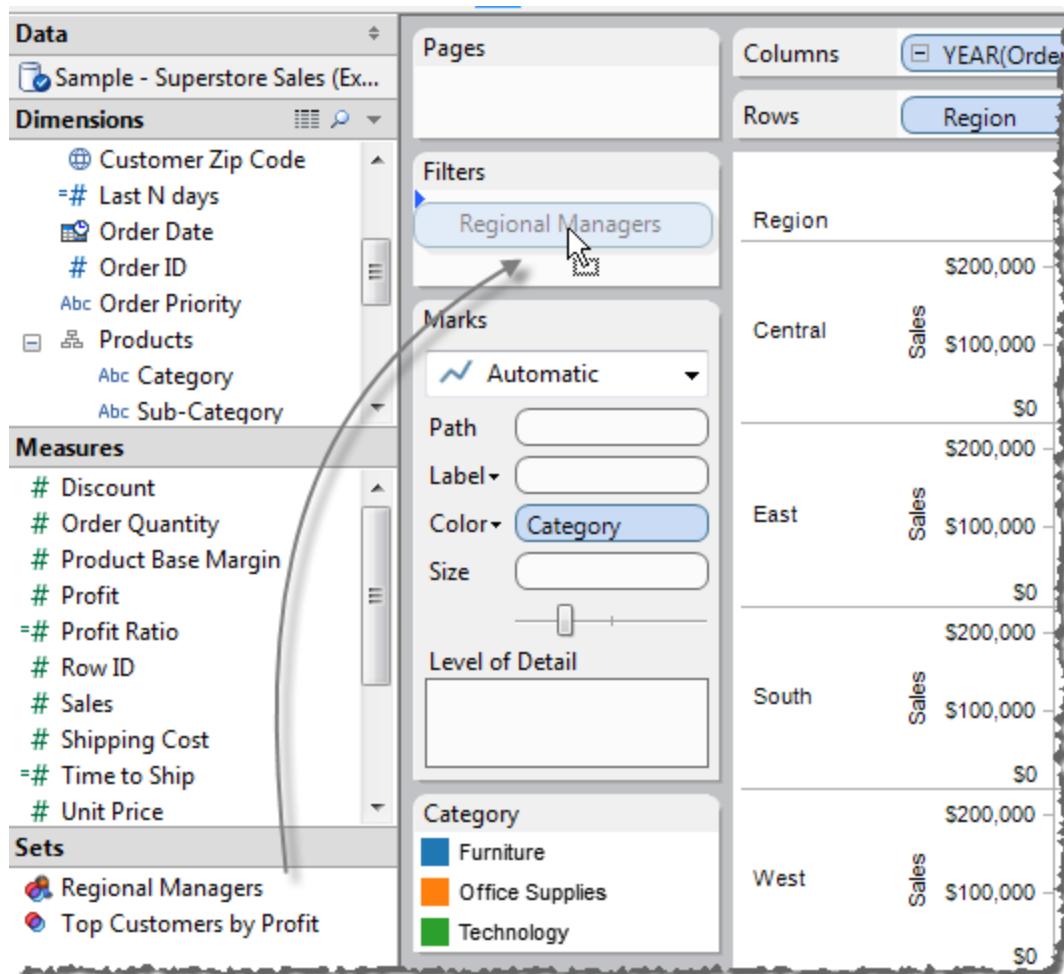
3. *Type a name for the user filter. In this case we'll name it Regional Managers. After specifying the filter, it will display in the Sets area of the Data window by this name.*
4. *Then select one or more users and groups that are allowed to see the East region data. For example, below Carlos Slatero is the Eastern Regional Manager, so his name is selected on the left side and East is selected on the right side.*



5. Repeat this process as many times as necessary. In this example, there are four managers that each correspond to a single region. Carlo Slatero in the East, Clay Cheatham in the South, Barry Gonzalez in the West, and Darren Budd in the Central region. A checkmark displays next to users who have been assigned a region. Everyone else will not be able to see any of the regions.



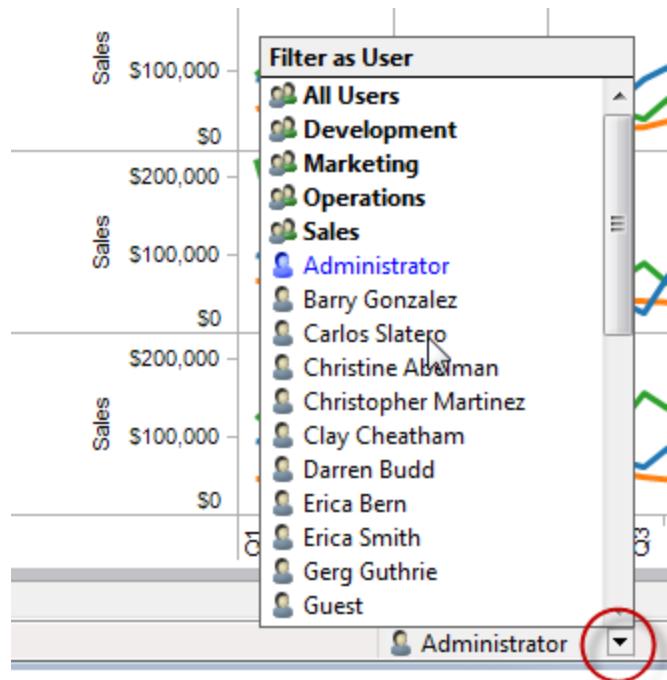
6. When finished click OK.
7. The user filter displays in the Sets area of the Data window. Now that it is defined you need to apply it to a view. Simply drag the Regional Managers user filter to the Filters shelf. The filter becomes a context filter. Refer to [Filtering](#) to learn more.

**Note:**

When you apply a user filter to a view, it's possible that you don't see anything. For example, in this case you have not allowed yourself to see either of the three regions. You can edit a user filter by right-clicking it in the Data window and selecting Edit.

At anytime you can preview what the view will look like for each user using the Filter as User menu in the bottom right corner of the workbook. This menu lists all users and groups. Selecting a user or group lets you preview what the selected user will see after the view is published.

## Tableau Desktop Help

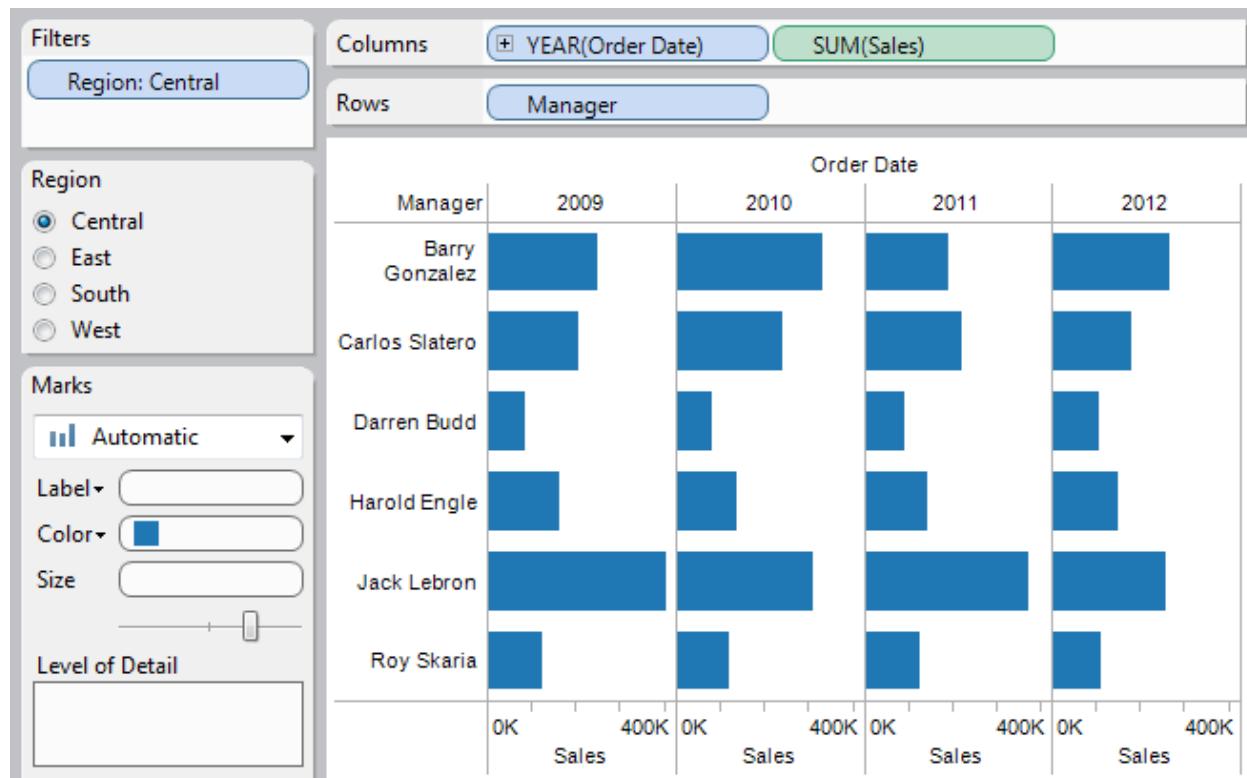


## Filter Using a List of Users in your Data Source

Sometimes you may have a field that contains your users in the data source. You can create user filters based on the names in the field rather than creating a set using the users on the server. For example, in a view showing the sales performance for several employees you could set a filter that only shows the data for the employee that is currently signed into the server. User filters that are based off of users that are part of your data source can be created using a calculated field and the User functions.

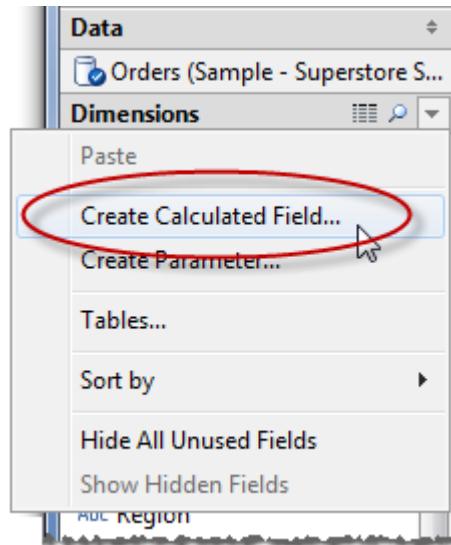
### **Example of a user filter using users from the data source:**

This view shows the annual sales performance for a list of managers. When the view is published, you may only want each manager to see their own sales numbers. In order to do that you need to create a user filter that restricts the manager field to only include the user that is currently logged in.



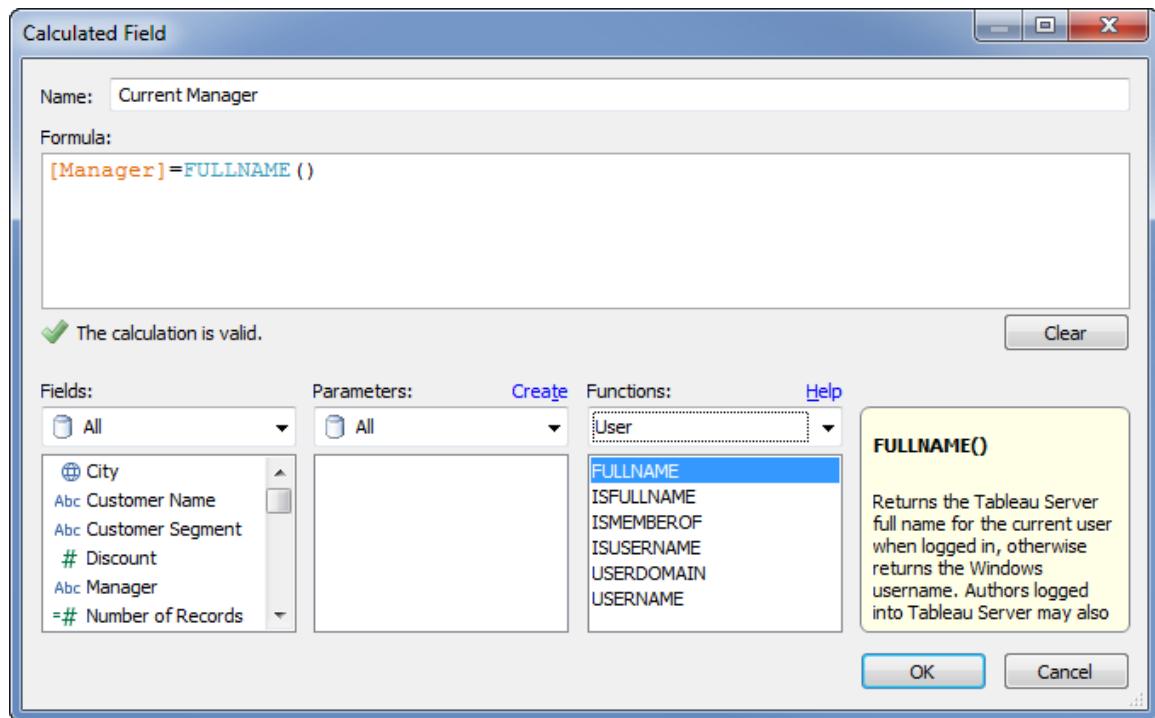
1. If you have not already logged in, select Server > Log On to log into Tableau Server.

2. Create a calculated field by selecting Create Calculated Field on the Data window menu.



3. In the Calculated Field dialog box name the field. In this example we'll call it Current Manager.
4. Then use the Fields and User functions in the bottom half of the dialog box to create calculation that uses the following formula:

`[Manager] = FULLNAME()`



5. When finished click **OK**.
6. The field displays in the Dimensions area of the Data window.

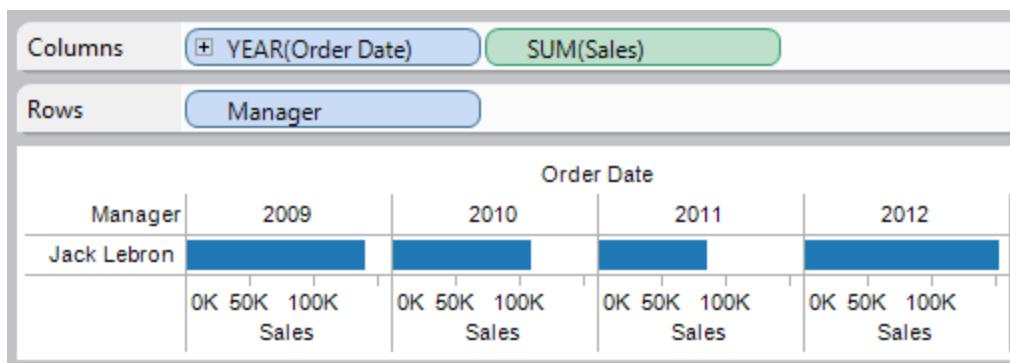
The screenshot shows the Tableau Data window with the 'Dimensions' tab selected. The list of dimensions includes 'City', '=T/F Current Manager' (which is highlighted in blue), 'Customer Name', 'Customer Segment', 'Manager', 'Order Date', 'Order Priority', 'Product Category', 'Product Container', and 'Product Name'. The 'Data' tab is also visible at the top left.

7. Place the new field on the Filters shelf. If you are not one of the users in the view (in this example one of the managers) the only option in the Filter dialog box will be False. In that case you should select nothing and simply click OK. Then you can preview the view as another user and edit the filter to include True.

Otherwise, if you are one of the managers you can select True so you only include managers who match the current user.

You can preview what other users will see using the Filter as User menu in the bottom right corner of the workbook. Refer to [Previewing User Filters](#) to learn more.

The view below shows what Jack Lebron would see if he was logged in.



# Saving and Exporting

## Saving and Exporting

*When you create views in Tableau, you will most likely want to save or share your work. You can export your work in a number of different formats to be used in different applications such as Microsoft PowerPoint and Microsoft Excel.*

- [Saving Your Work](#)
- [Reverting Workbooks](#)
- [Exporting Your Work](#)
- [Exporting the Data Source Connection](#)

## Saving Your Work

### Saving Your Work

*When you create useful views of your data, you should save the results. Tableau provides three ways for you to save your work:*

- *Workbooks – Saves all open worksheets.*
- *Packaged Workbooks – Saves the workbook along with all referenced local file data sources and images into a single file.*
- *Bookmarks – Saves the current worksheet.*

*You can share workbooks and bookmarks with your co-workers provided they can access the relevant data sources. If your co-workers do not have access to the data sources you can save a packaged data file.*

*Note that custom fields such as binned measures, calculated fields, groups, and sets are saved with the workbook or bookmark.*

- [Workbooks](#)
- [Packaged Workbooks](#)
- [Bookmarks](#)

## Workbooks

*When you open Tableau, it automatically creates a new workbook. Workbooks hold the work you create and consist of one or more worksheets. Each worksheet contains a particular view of your data.*

### **To save a Tableau workbook:**

1. Select *File > Save* or type *Ctrl+S*.



2. Specify the workbook file name in the *Save As* dialog box.

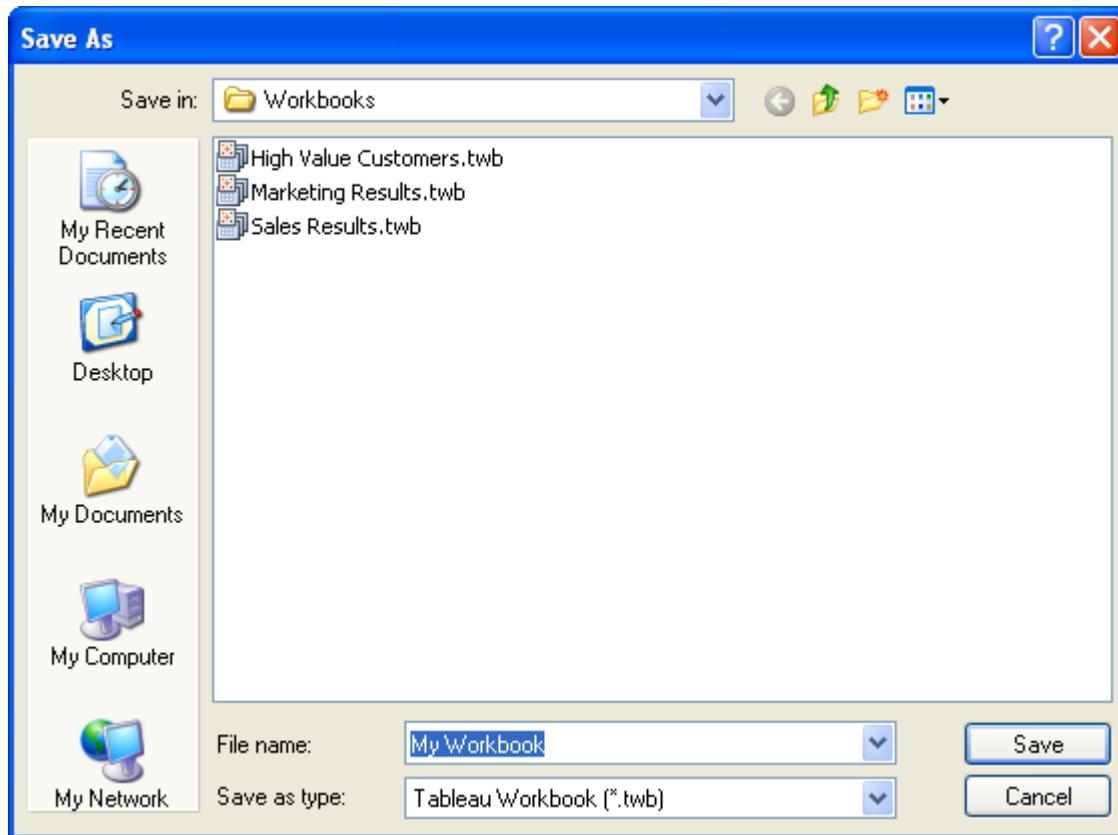


Tableau saves the file with the .twb extension. The default location is the Workbooks folder of the Tableau repository. However, you can save Tableau workbooks to any directory you choose.

**Note:**

Tableau file names cannot include any of the following characters: forward slash (/), backslash (\), greater-than sign (>), less-than sign (<), asterisk (\*), question mark (?), quotation mark ("), pipe symbol ()|, colon (:), or semicolon (;).

To save an extra copy of a workbook that you already have open, select File > Save As and proceed by saving the file with a new name.

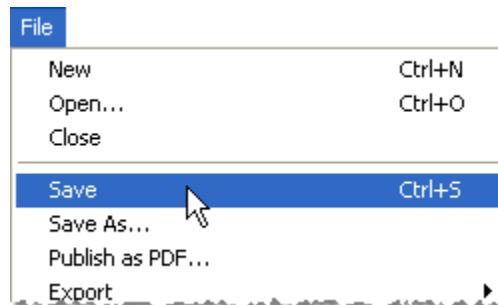
## Packaged Workbooks

*Workbooks often reference external resources. For example, workbooks might reference local file data sources such as Excel, Access, and Extract files and sometimes reference background images. When you save the workbook, it is linked to these resources. The next time you open the workbook the views are automatically updated with any changes made to the data and images. While, in most cases, you will want to save the workbook in this way, if you are sharing it with someone who does not have access to the referenced resources or publishing the workbook to Tableau Server, you can save a packaged workbook instead.*

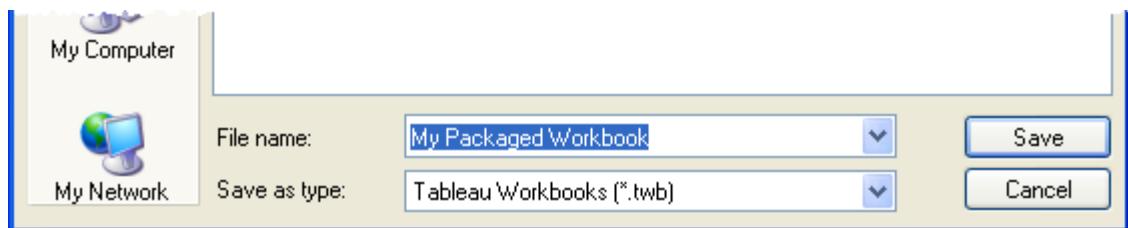
*Packaged workbooks contain the workbook along with a copy of any local file data sources and background images. The workbook is no longer linked to the original data sources and images, rather it points to the copy that is included in the package. These workbooks are saved with the .twbx file extension. Others can open the packaged workbook using Tableau.*

### To save a packaged workbook:

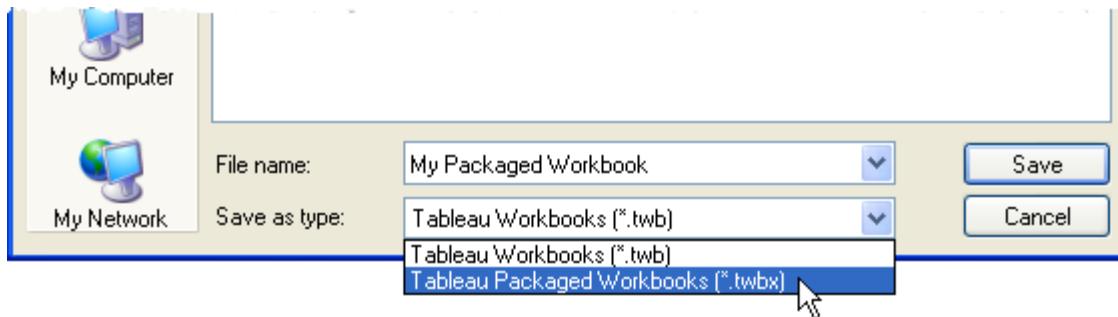
1. Select File > Save As.



2. Specify a file name for the packaged workbook in the Save As dialog box.



3. Select *Tableau Packaged Workbooks* on the Save as type drop-down list.



4. Click Save.

The default location is the Workbooks folder of the Tableau repository. However, you can save packaged workbooks to any directory you choose.

The following files are included in packaged workbooks:

- Excel Files
- Access Files
- Text Files
- Tableau Data Extract Files
- Local Cube Files
- Background Image Files
- Custom Geocoding

**Note:**

If you are sharing packaged workbooks that contain Microsoft Excel or Access 2007 data sources, the people opening the workbook must either have Microsoft Excel and Access 2007 or the Office 2007 Data Connectivity Components installed on their machines. The data connectivity components are available on the Tableau [Tableau Drivers](#) page.

Packaged Workbooks can be unpackaged at anytime in the Windows Explorer.

**To unpack a workbook:**

- *Right-click the packaged workbook file (.twbx) in Windows Explorer and select Unpackage.*

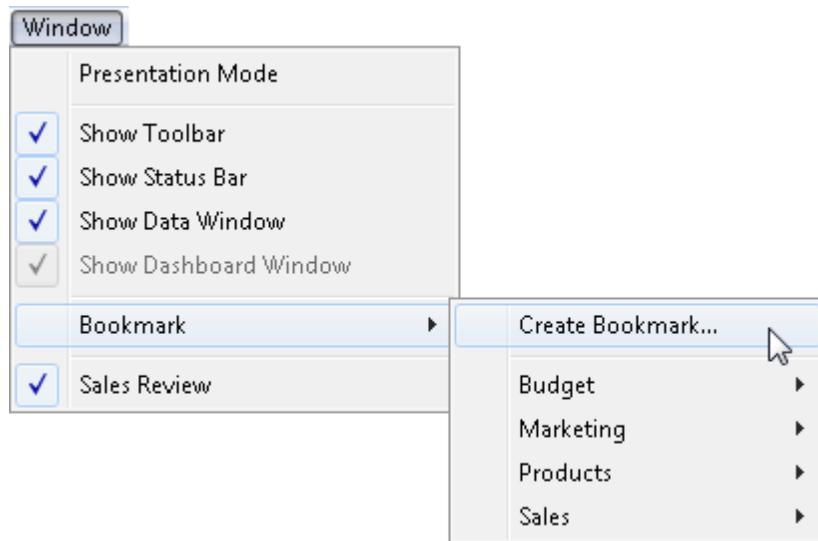
*When you unpackage a workbook you will see the regular workbook file (.twb) along with a folder that contain any data sources and images that were packaged with the workbook.*

## Bookmarks

You can save a single worksheet as a Tableau bookmark. Bookmarks can be accessed from any workbook using the Bookmarks menu. Bookmarks are convenient when you have a variety of worksheets that you like to access frequently.

### To save a Tableau bookmark:

1. Select Window > Bookmark > Create Bookmark.



2. Specify the bookmark file name and location in the Create Bookmark dialog box.

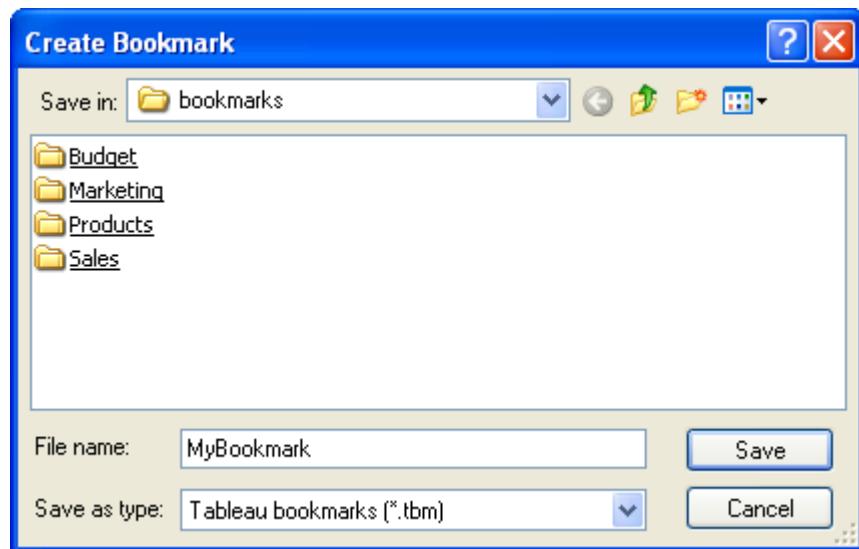


Tableau saves the file with the .tmb extension. The default location is the Bookmarks folder of the Tableau Repository. However, you can save bookmarks to any location you choose. Bookmarks that are not stored in the Tableau repository do not display in the Bookmark menu.

You can organize bookmarks into folders in the same way you organize files or documents. This is especially useful when you have a large number of bookmarks to manage. For example, you might organize bookmarks based on employee name, product types, sales results, and so on. You can organize bookmarks by creating a new folder, renaming an existing folder, renaming existing bookmark files, and so on.

Delete bookmarks in the same way you would delete any other file on your computer. After you delete a bookmark from the Bookmarks folder in the Tableau Repository, it is removed from the Bookmarks menu the next time you start the application.

**Note:**

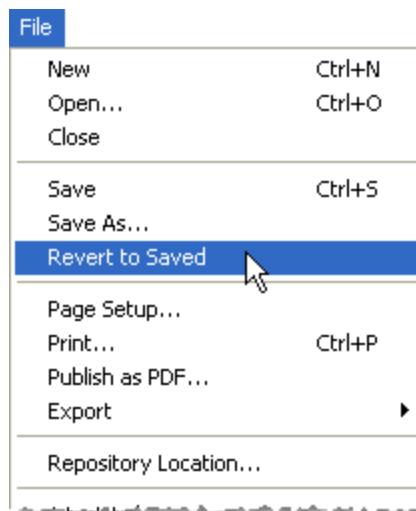
While bookmarks are generally a snap shot of the worksheet and include the data connection, formatting, etc. A bookmark does not include parameter values and the current page setting on the Pages shelf.

## Reverting Workbooks

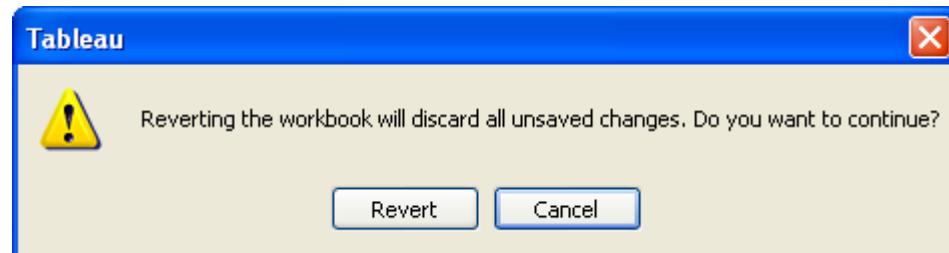
Sometimes you will want to undo all of the changes you've made to a workbook and just start back to how it was when you opened it. Rather than clicking through your history using the Undo button, you can revert the workbook to the last saved state. When you revert to saved all unsaved changes are discarded.

**To revert to the last saved state of a workbook:**

1. Select *File > Revert to Saved*.



2. Click *Revert* in the warning dialog box.



**Note:**

*The Revert to Saved option is only available for workbooks (.twb) that do not have connections to Extract data sources.*

## Exporting Your Work

### Exporting Your Work

*After you have created several data views, you might want to export your results to other applications. Tableau provides several methods for you to export your work:*

- *Export Data – Copy the data from a view to an Excel worksheet or export as an Access database.*
- *Export as and Image – Copy images of your views into other applications such as Microsoft Office or PowerPoint. You can also include the images in web pages.*

*Exporting your results is a convenient way to share your work with coworkers who do not have access to Tableau, or to include your work as part of a presentation or document. You can also use Tableau to present your data.*

- [Export Data](#)
- [Export as an Image](#)

## Export Data

### Export Data

Suppose you want to export data from Tableau to another application, or create a new data source that contains a portion of the records in your original data source. There are several ways to complete these tasks in Tableau.

#### Note:

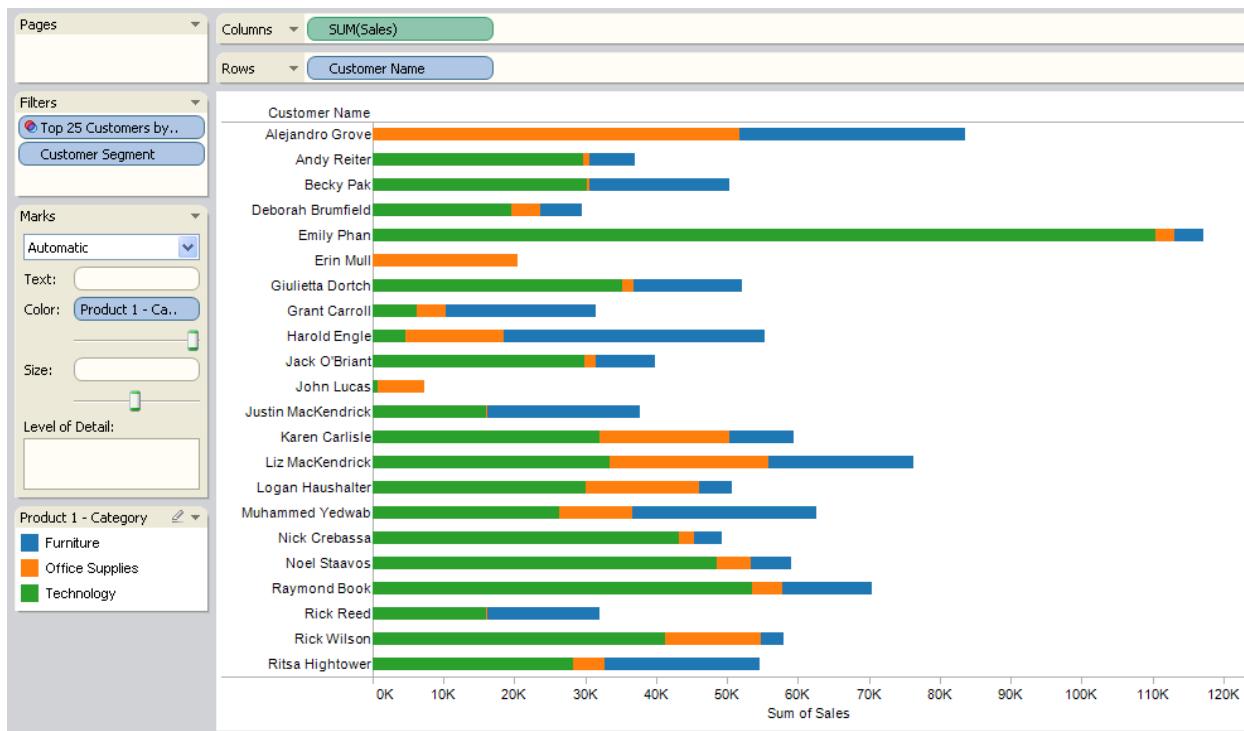
Excel 2003 worksheets hold 64,000 rows of data. If you copy more than this number of rows, Tableau pastes only the first 64,000 rows of the selected set into Excel. For data sets larger than 64,000 it is recommended that you export to Access instead.

When exporting data, you should keep these rules in mind:

- You can select any portion of a data view to export. If you want to export all data in a view, choose Select All on the Edit or right-click context menu. Copying and exporting to a cross tab always exports all the data in the view regardless of what you have selected.
- The fields that are exported to the new data source come from the fields placed on the worksheet shelves. The exception is fields that are external filters, and appear only on the Filters shelf.
- If you want to include other fields (either dimensions or measures) with the exported data without changing the basic view, you should place those fields on the Level of Detail shelf.

For example, you might create a view that contains data consisting of only high value customers, and then create a new data source containing only the data for those customers. The following data view shows high value customers displayed as a bar chart. The view is used in the following two sections, which describe how to export the data to an Excel worksheet, an Access database, and extract the data.

## Tableau Desktop Help



### Note:

When exporting data to a Microsoft Office application, remember that Tableau only supports Office 2000 or higher (including Office 2007).

- [Copy Records To Clipboard](#)
- [Copy Underlying Records to Clipboard](#)
- [Export Records To Microsoft Access](#)
- [Copy Cross-tab to Clipboard](#)
- [Export Crosstab to Excel](#)
- [Extracting Data](#)

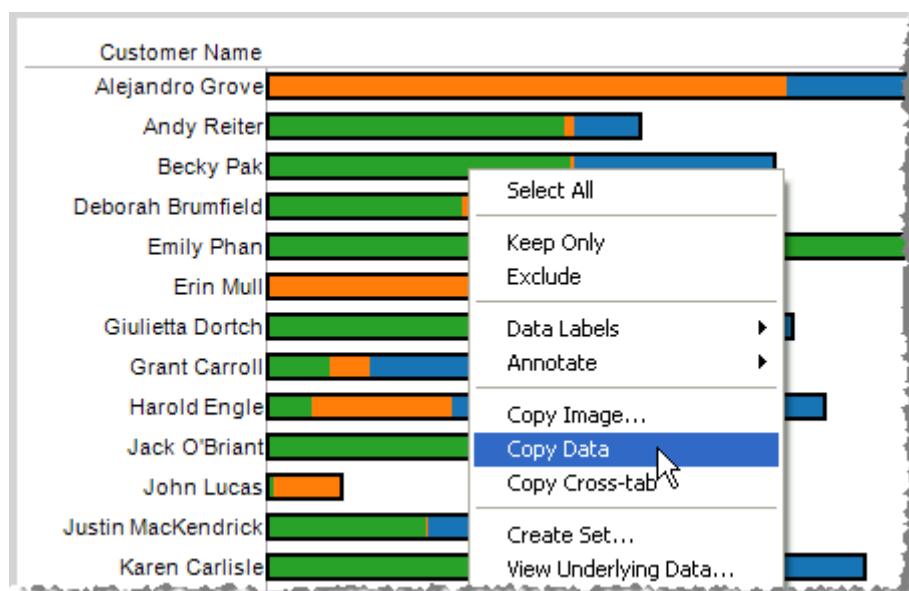
## Copy Records To Clipboard

*Typically this function is used to copy records from Tableau into Microsoft Excel. To create an Excel spreadsheet from Tableau data, follow these three steps:*

1. Select the desired data in Tableau. For this example, all the data are selected.



2. Select Worksheet > Copy > Data or right-click the view and select Copy Data from the context menu (as shown below).



3. Open an Excel worksheet and select Paste from Excel's Edit menu or press **Ctrl+V**. Notice that the fields placed on the Rows, Columns, and Color shelves are copied into the worksheet. However, the Customer Segment field is not copied because it is an external filter (it appears only on the Filters shelf).

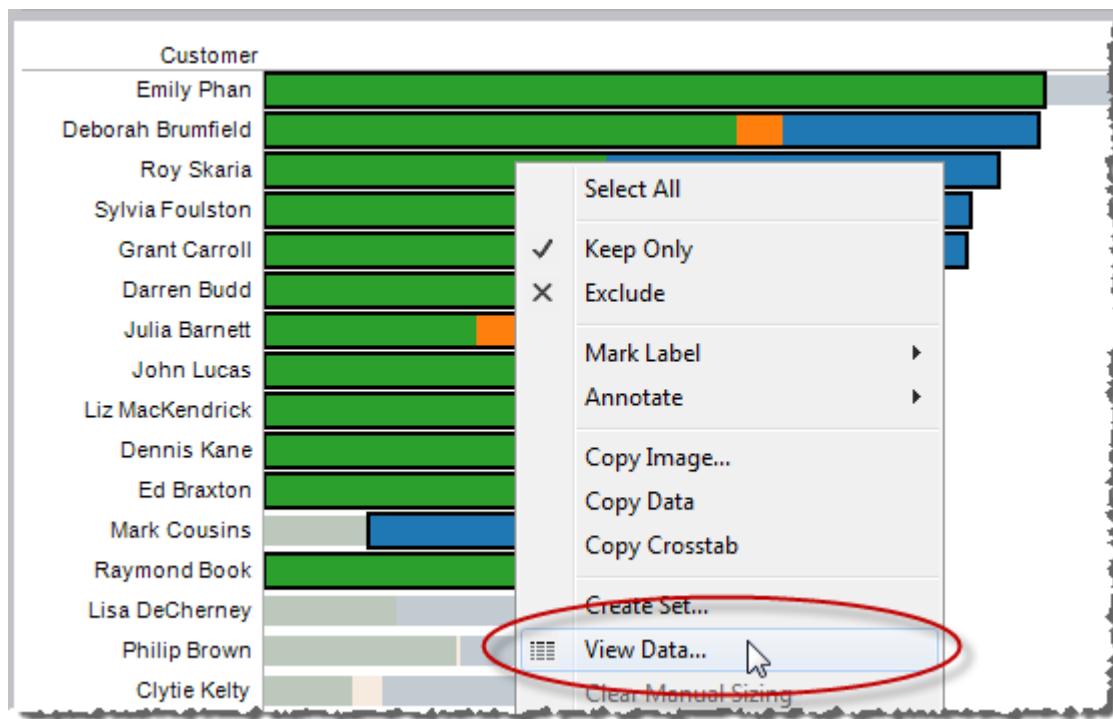
	A	B	C	D	E
1	Customer Name	Product Category	Region	SUM(Sales Total)	
2	Maurice Satty	TECHNOLOGY	CENTRAL	19,214.25	
3	Victor Price	TECHNOLOGY	CENTRAL	12959.78	
4	Deanra Eno	TECHNOLOGY	EAST	10455.7	
5	Speros Goranitis	TECHNOLOGY	EAST	14272.76	
6	Meg Tillman-Sach	FURNITURE	WEST	14584.2	
7	Skye Norling-Chri	TECHNOLOGY	WEST	11106.19	
8	Noel Staavos	TECHNOLOGY	WEST	29689.57	
9	Stephanie Ulprigh	TECHNOLOGY	EAST	51280.73	

## Copy Underlying Records to Clipboard

Copying underlying data can be used to copy the disaggregated data behind a view.

To copy underlying records:

1. Select the desired data in Tableau.
2. Right-click the selected records and select View Data on the context menu.



3. The resulting dialog box shows the Summary data along with the Underlying Data. Select the data you want to copy and then click Copy in the upper right corner of the dialog box.

## Tableau Desktop Help

View Data: Sheet 3

Show Aliases  Show all fields Copy

City	Customer	Customer Segm...	Order Date	Order ID	Order Priority	Category	Contain...
Lakewood	Philip Brown	Home Office	4/2/2009 12:00:...	2754.00	High	Office Supplies	Small Bu...
Lakewood	Philip Brown	Home Office	4/2/2009 12:00:...	2754.00	High	Office Supplies	Small Bu...
North Platte	Liz MacKendrick	Corporate	7/23/2010 12:00:...	3109.00	Low	Furniture	Small P...
North Platte	Liz MacKendrick	Corporate	7/23/2010 12:00:...	3109.00	Low	Technology	Small B...
Auburn	Raymond Book	Consumer	11/2/2012 12:00:...	3297.00	High	Office Supplies	Small B...
Harrisonburg	Lisa DeCherney	Corporate	12/21/2009 12:00:...	3458.00	High	Technology	Small P...
Harrisonburg	Lisa DeCherney	Corporate	12/21/2009 12:00:...	3458.00	High	Office Supplies	Wrap B...
Fruit Cove	Roy Skaria	Corporate	11/23/2009 12:00:...	3492.00	Low	Office Supplies	Small B...
Fruit Cove	Roy Skaria	Corporate	11/23/2009 12:00:...	3492.00	Low	Furniture	Jumbo...
Fruit Cove	Roy Skaria	Corporate	11/23/2009 12:00:...	3492.00	Low	Office Supplies	Wrap B...
Fruit Cove	Roy Skaria	Corporate	5/17/2009 12:00:...	3553.00	Medium	Office Supplies	Wrap B...
Rapid City	Philip Brown	Home Office	6/16/2010 12:00:...	3648.00	Low	Office Supplies	Small Bu...
Rapid City	Philip Brown	Home Office	6/16/2010 12:00:...	3648.00	Low	Technology	Small Bu...
Surprise	Ed Braxton	Consumer	8/20/2012 12:00:...	4099.00	Critical	Office Supplies	Small Bu...
Tempe	Ed Braxton	Consumer	8/20/2012 12:00:...	4099.00	Critical	Office Supplies	Small Bu...
Tempe	Ed Braxton	Consumer	8/20/2012 12:00:...	4099.00	Critical	Furniture	Small P...

Summary \ Underlying / 11 of 354 selected

- Open an Excel worksheet and select Paste from Excel's Edit menu or press Ctrl+V. Notice that the fields placed on the Rows, Columns and Color shelves are copied onto the worksheet.

	A	B	C	D	E	F
1	City	Customer	Customer Segment	Order Date	Order ID	Order Priority
2	Lakewood	Philip Brown	Home Office	4/2/2009 0:00	2754	High
3	Lakewood	Philip Brown	Home Office	4/2/2009 0:00	2754	High
4	North Platte	Liz MacKendrick	Corporate	7/23/2010 0:00	3109	Low
5	North Platte	Liz MacKendrick	Corporate	7/23/2010 0:00	3109	Low
6	Auburn	Raymond Book	Consumer	11/2/2012 0:00	3297	High
7	Harrisonburg	Lisa DeCherney	Corporate	12/21/2009 0:00	3458	High
8	Harrisonburg	Lisa DeCherney	Corporate	12/21/2009 0:00	3458	High
9	Fruit Cove	Roy Skaria	Corporate	11/23/2009 0:00	3492	Low
10	Fruit Cove	Roy Skaria	Corporate	11/23/2009 0:00	3492	Low
11	Fruit Cove	Roy Skaria	Corporate	11/23/2009 0:00	3492	Low
12	Fruit Cove	Roy Skaria	Corporate	5/17/2009 0:00	3553	Medium

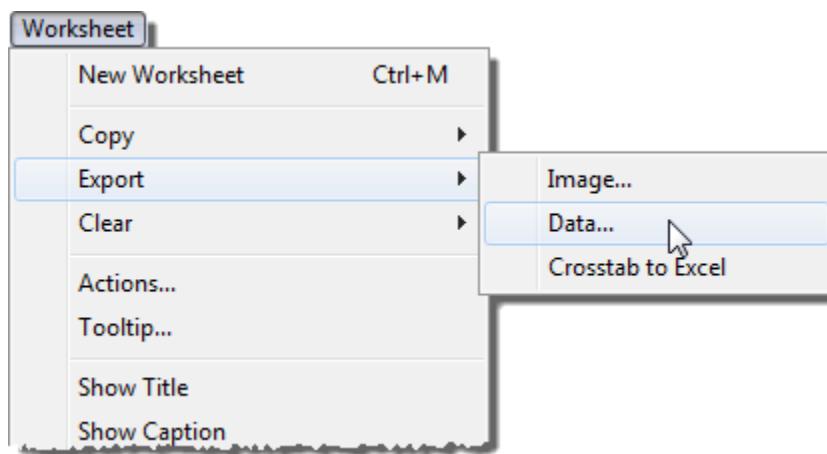
## Export Records To Microsoft Access

To create an Access database from Tableau data, follow these steps:

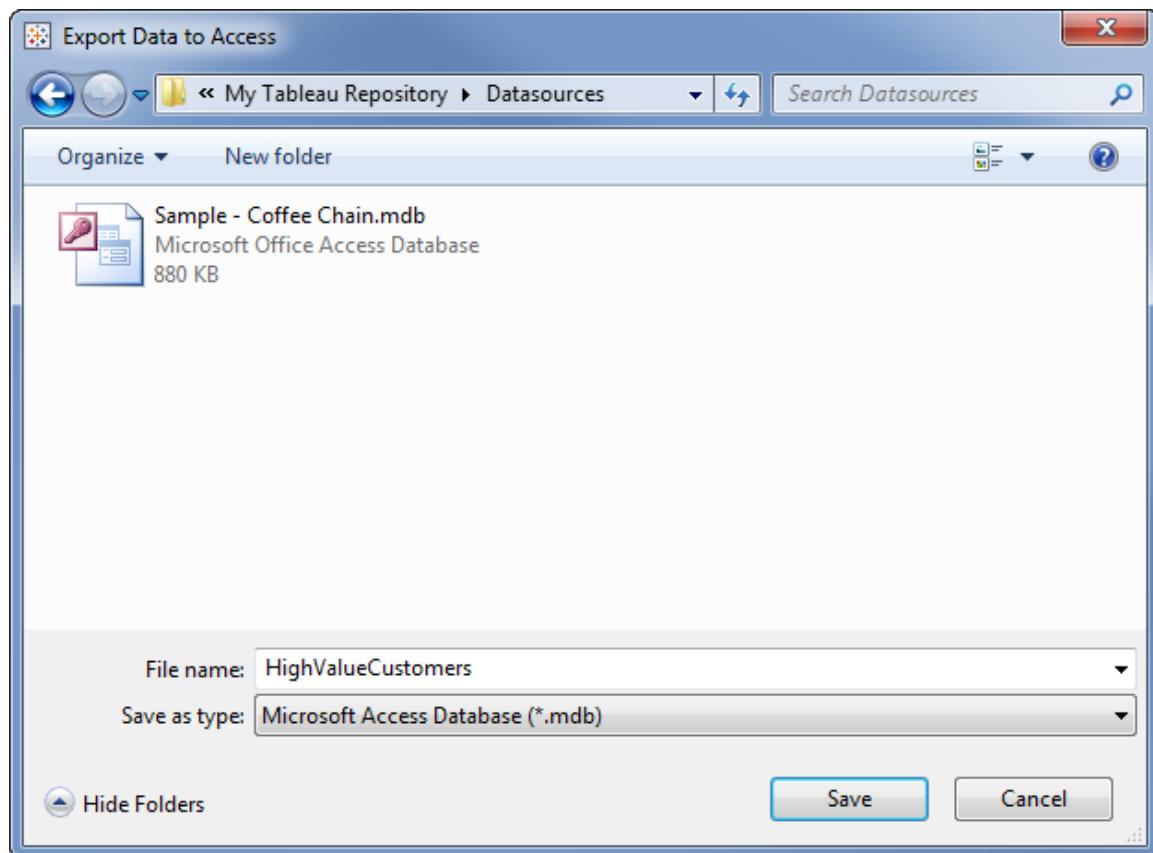
1. Select the desired data in Tableau. For this example, all the data are selected.



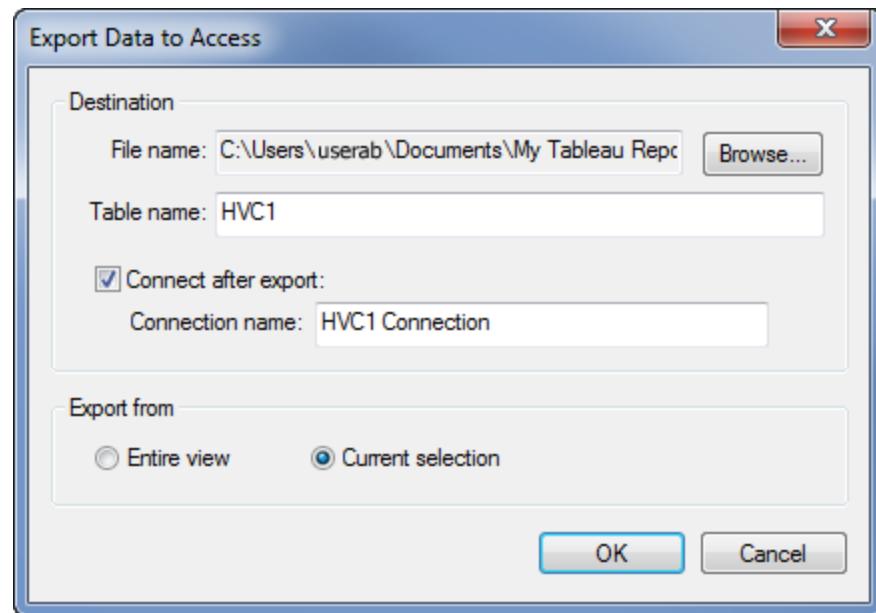
2. Select Worksheet > Export > Data.



3. Select a location and name for your Access database. Access databases end with the .mdb file extension.



4. Complete the *Export Data to Access* dialog box. For this example, name the table *HVC1*. The *Connect after export* option allows you to immediately connect to the new data source and continue working without interrupting your work flow.



## Copy Cross-tab to Clipboard

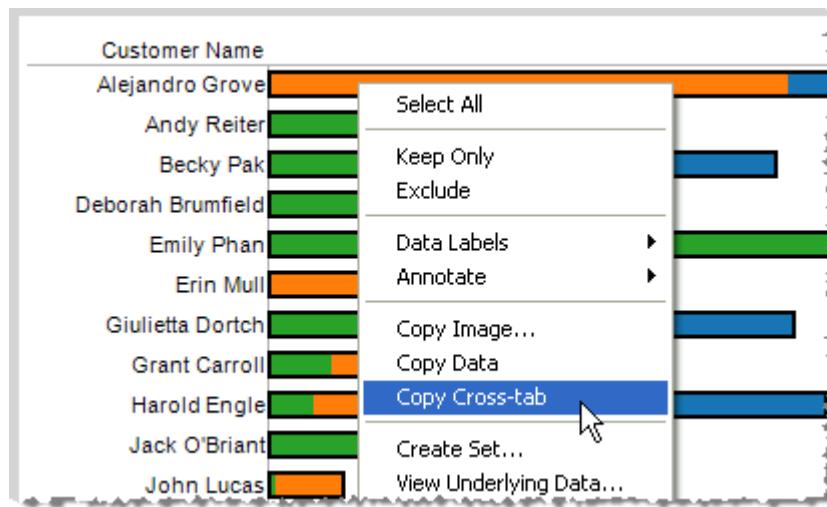
You can copy a cross-tab (text table) version of a view to the clipboard and transfer it to another application. For instance, you might want to transfer a cross-tab in Tableau to a cross-tab in Microsoft Excel. Or you may want to transfer the data behind a graphical view in Tableau to Excel in a cross-tab format. Copying a cross-tab to clipboard is restricted by the following general rules:

- This feature applies to all records in the view. It cannot be used on a subset of records.
- You can use this feature for aggregated views only. It cannot be used on disaggregated views of data, because a cross-tab is by definition an aggregated view of data. In other words, the Aggregate Measures option on the Analysis menu must be on in order for this function to work properly.

Other restrictions may apply depending on the data in your view. You cannot copy a cross-tab if the view contains continuous dimensions such as continuous dates and times.

To copy a view as a cross-tab to the clipboard:

1. Right-click any view in Tableau and select Copy Cross-tab. This copies all data in the current view to the clipboard in a cross-tab format.



2. Open an Excel worksheet and select Paste from Excel's Edit menu or press Ctrl-V.

The screenshot shows a Microsoft Excel window titled "Microsoft Excel - Book1". The menu bar includes File, Edit, View, Insert, Format, Tools, Data, Window, Help, and Adobe PDF. The toolbar below has various icons for file operations like Open, Save, Print, and Insert. A ribbon tab labeled "SnagIt" is visible. The active cell is I110. The data is presented in a grid:

	A	B	C	D	E
1			CENTRAL	EAST	WEST
2	Barbara Fisher	FURNITURE		14,966	
3	Barbara Fisher	OFFICE SUPPLIES	4,211	11,473	1,645
4	Barbara Fisher	TECHNOLOGY	2,362	8,722	2,759
5	Dario Medina	FURNITURE	6,265	2,782	6,766
6	Dario Medina	OFFICE SUPPLIES	5,595	4,403	3,076
7	Dario Medina	TECHNOLOGY	8,782	40,055	7,560
8	Dave Hallsten	FURNITURE		5,063	
9	Dave Hallsten	OFFICE SUPPLIES	1,749	5,414	6,213
10	Dave Hallsten	TECHNOLOGY	3,795	19,642	4,681
11	David Flashing	FURNITURE	58	4,233	2,345
12	David Flashing	OFFICE SUPPLIES	9,860	49,800	15,322
13	David Flashing	TECHNOLOGY	8,074	17,687	26,050

*Notice that the pasted data always appears as a cross-tab in Excel even if the initial view of the data in Tableau was not in a cross-tab format.*

## Export Crosstab to Excel

*There is a more direct way to transfer a cross-tab view of data to Microsoft Excel. Select Worksheet > Export > Crosstab to Excel. Tableau automatically pastes a crosstab version of the current view into a new Excel workbook. This option automatically opens a new instance of the Excel application.*

		Year of Order Date			
Region	Product Category 1	2001	2002	2003	2004
CENTRAL	FURNITURE	98,374	47,966	33,320	51,225
	OFFICE SUPPLIES	117,366	110,357	80,445	87,199
	TECHNOLOGY	339,127	201,592	225,757	304,543
EAST	FURNITURE	325,558	158,932	145,547	132,020
	OFFICE SUPPLIES	289,656	189,820	198,524	215,321
	TECHNOLOGY	854,020	658,766	604,827	696,805
WEST	FURNITURE	155,573	80,463	50,872	51,049
	OFFICE SUPPLIES	121,630	135,122	80,900	103,103
	TECHNOLOGY	501,017	323,484	348,743	365,664

### Note:

*Although, copying a crosstab to Excel is more direct, it can decrease performance because it is copying the formatting as well as the data. If the view you are exporting contains a lot of data, a dialog box opens asking whether you want to copy the formatting options. Disregarding the format saves time.*

## Extracting Data

*Another way to export all or subsets of your data to a new data source is to use Tableau's Extract feature. To learn more about extracts refer to [Extracting Data](#).*

## Export as an Image

### Export as an Image

Suppose you want to transfer your Tableau results into a presentation, report or web page. Tableau gives you several options.

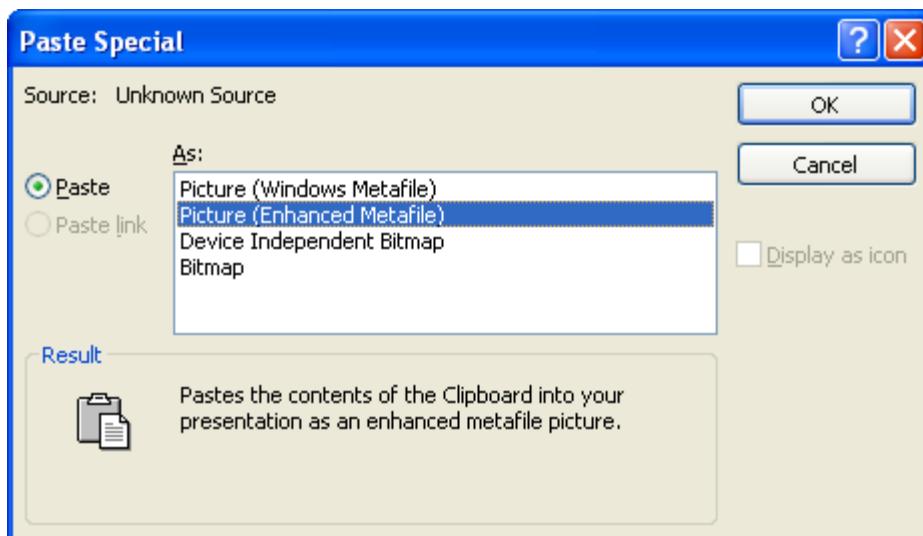
- [Copy to Another Windows Application](#)
- [Export to an Image File](#)
- [Publish as PDF](#)

## Copy to Another Windows Application

To insert an image of your Tableau results into another Windows application such as PowerPoint, Word, or Excel, follow these steps:

1. Select Worksheet > Copy > Image.
2. In the Copy Image dialog box, select the contents you want to include in the image and the legend layout if the view contains a legend.
3. When finished click Copy. When you do this, Tableau copies the current data view to the Windows Clipboard.
4. Open the target application and select one of the following:
  - o Paste from the Edit menu or type Ctrl+V.
  - o Paste Special from the Edit menu. If you select Paste Special you can enable enhanced visual and printer quality options.

In the Paste Special dialog box select how you want to paste the image. The Special dialog box in Microsoft PowerPoint Paste is shown below.



In most cases, paste the images as an Enhanced Meta File to get the best presentation quality.

## Export to an Image File

*The export image command saves the current view as an image file. You can export to an image file with the following three steps.*

1. *Select Worksheet > Export > Image.*
2. *In the Export Image dialog box, select the contents you want to include in the image and the legend layout if you are including a legend. When finished click Save.*
3. *In the Save Image dialog box, navigate to where you want to save the image file and type a file name into the text box. Select a file format from the Save as type drop-down menu. When finished click Save.*

## **Publish as PDF**

*You can publish one or more views to PDF by selecting File > Print to PDF.*

## Exporting the Data Source Connection

*When you first connect to a data source you have the option to save the connection to your repository. Saving the connection creates a shortcut to the data source and lets you avoid having to create a new connection every time you want to use that source. If you decide not to save the data source upon connection, you can always export the data source at any time you are connected. Exporting the data source is useful if you didn't save the connection when you first connected but you want to later or if you have added custom fields such as groups and sets to the Data window.*

# Printing

## Printing

After creating a view or several views in Tableau you can print them. The first thing you should do before printing is specify how you want the printed page to look using the Page Setup settings. Then you can print to a printer or publish to a PDF. You can also print the Tableau Help directly from your web browser or by obtaining a PDF.

- [Printing Results](#)
- [Publish as PDF](#)
- [Printing the Help](#)

## Printing Results

### Printing Results

*Once you have a view or several views created in Tableau, you can print them or publish them as a PDF.*

- [Page Setup](#)
- [Printing](#)

## Page Setup

### Page Setup

*Before printing there are several options you can set to specify how the worksheet will look when it is printed. For example, you can select which elements to include, printed page orientation, where you want to put the legend, margins, and more. These settings are specified in the Page Setup dialog box. You can set different page setup options for each worksheet in the workbook. That way you can have different titles, captions, legend settings, etc. for each worksheet you want to print. To open the page setup dialog box select File > Page Setup.*

*When the Page Setup dialog box opens, the following four categories of settings display:*

- [General](#)
- [Layout](#)
- [Print Scaling](#)
- [Title/Caption](#)

## **General**

*Use the General tab to select the elements you want to show when you print. You can show or hide the title, view, caption, color legend, shape legend, size legend, and map legend.*

*Specify how to handle headers and breaks. The headers refer to the headers in each of your views. When you select the option to repeat the headers and legends on each page the row and column headers will show when a view breaks across several pages.*

*Select the break pages on pane boundaries to avoid page breaks in the middle of a cell in table.*

*If you have used the Pages Shelf to build your view, you can select whether to print the current page only or all pages.*

## **Layout**

*Use the Layout tab to specify the page margins, centering, and legend layout.*

### ***Legend Layout***

*If you include one or more legends, you can specify how you want the legends to appear on the printed page. Select a legend layout from the options at the bottom of the dialog box.*

### ***Margins***

*Specify top, bottom, left, and right margins by typing values into the text boxes.*

### ***Centering***

*Optionally, select whether to center the view horizontally or vertically on the page.*

## **Print Scaling**

*Use the Print Scaling tab to fit the view to a certain size and change the page orientation. These options only affect printed documents. The scaling options you specify here will not affect exported image or PDF publishing from Tableau Desktop. However, the orientation settings will be used as the default when you publish the workbook to Tableau Server or Tableau Public.*

### *Print Scaling*

*You can scale your view to fit within a single page or scale it across multiple pages. Select from the following options:*

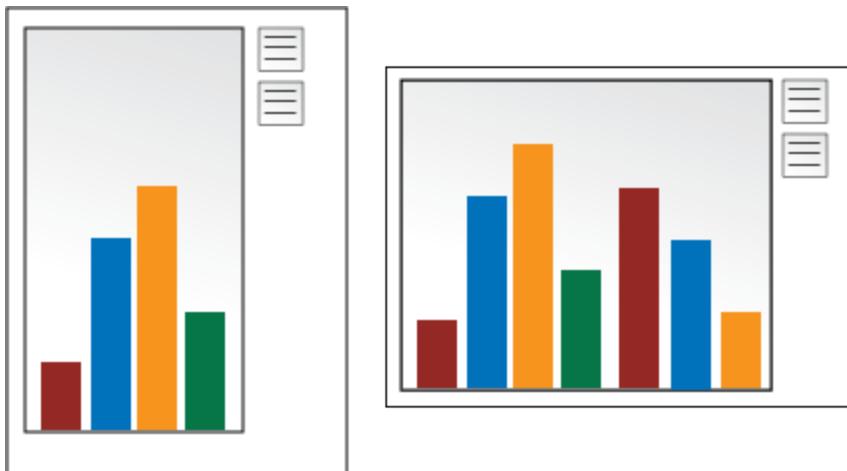
- *Scale to – Scales the view to the specified percentage of its normal size.*
- *Fit to – Scales the view to fit within the specified area. Select the number of printed pages across and down. For example, if you have a really wide view that is not very tall, you can specify to fit it to three pages across by one page down. Leaving the text box blank will allow the view to expand across as many pages as necessary in the given direction.*

### *Page Orientation*

*Use the page orientation settings to specify how you want the view oriented on the printed page. For example, if you have a view that is really wide but not that tall you should select the Landscape orientation. Select from the following page orientation options:*

- *Use Printer Setting – Use the page orientation that is already specified by the printer.*
- *Portrait – Rotates the view so that it is oriented vertically on the printed page.*
- *Landscape – Rotates the view so that it is oriented horizontally on the printed page.*

*The following diagram shows the difference between portrait and landscape page orientations.*



*These page orientation settings are used as the default settings when you publish the workbook to Tableau Server or Tableau Public.*

## Title/Caption

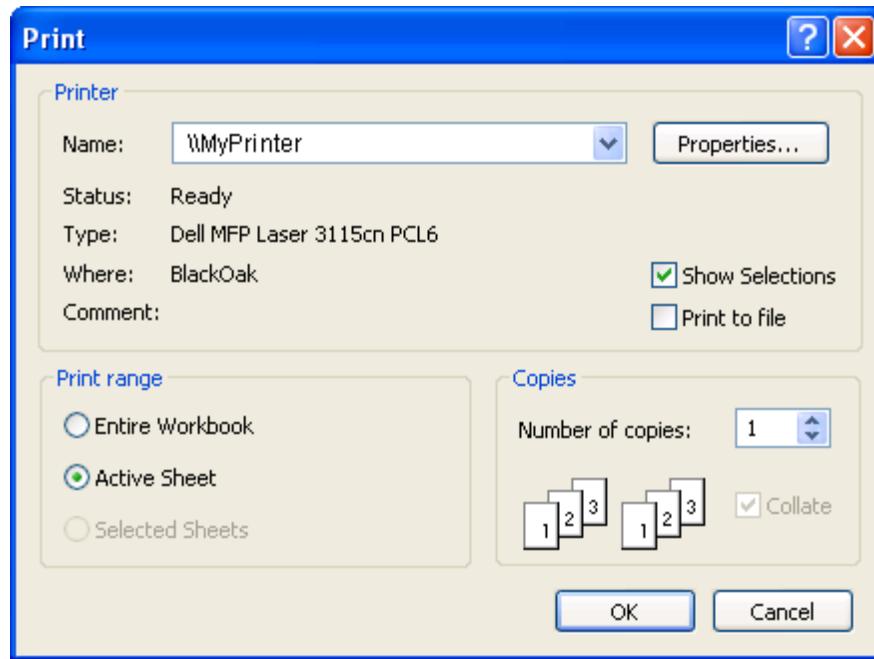
*Use the Title/Caption tab to add custom text that is printed on the top or bottom of every page. An automatic title and caption are created for you based on your view. To modify the title and caption, select Manual and type the text you want into the respective text box.*

*Use the drop-down lists to insert automatic text such as the sheet name, page number, etc. The following automatic text options are supported:*

- *Data Update Time – displays the last time the data was updated. This is especially useful when you are using data extracts.*
- *Sheet Name – displays the name of the worksheet.*
- *Workbook Name – displays the name of the workbook.*
- *PageCount – displays the total number of pages in a worksheet based on the fields on the Pages shelf.*
- *PageName – displays the name of the page based on the fields on the Pages shelf.*
- *PageNumber – displays the page number based on the fields on the Pages shelf.*
- *Full Name – displays the user name and domain of the person logged in. If you are logged into Tableau Server, this is the Server username otherwise the Windows account is used.*
- *User Name – displays the user name of the person logged in. If you are logged into Tableau Server, this is the Server username, otherwise the Windows account information is used.*
- *Field Values – displays the relevant field value for the selected field. This is useful when you are working with filters to that limit the data shown in the view. If multiple values are relevant this option displays as “Multiple.”*

## Printing

After you have specified the Page Setup settings (refer to ), you can print by selecting File > Print. In the Print dialog, select a printer, decide whether to show selections, specify a print range, and select the number of copies you want to print.



### Show Selections

When you print a workbook, you can choose to Show Selections. When this option is selected any selections you've made in the views will be maintained while printing.

### Changing the Print Range

When you print from a workbook with multiple worksheets, each worksheet represents one or more printed pages, depending on the page set-up.

If you select All in the Print range area, all of the sheets will print on their own separate pages. You can print specific sheets by specifying a range of sheets.

Select from the following print ranges:

- *Entire Workbook - Prints all the worksheets in the workbook.*
- *Active Sheet - Prints only the sheet currently displayed in the workbook.*

- *Selected Sheets - Prints the selected sheets.*

**Note:**

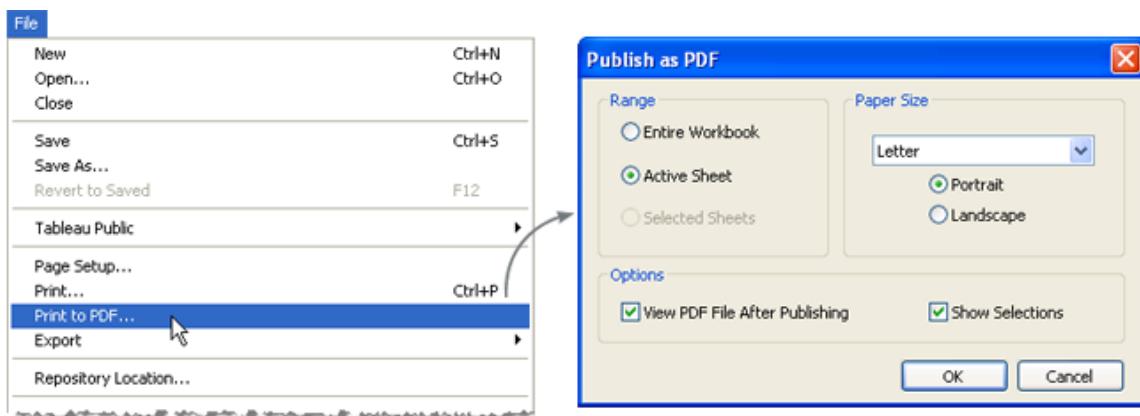
*You can select multiple worksheets in a workbook by holding down the CTRL or Shift keys while clicking the worksheet tabs that you want to select.*

## Publish as PDF

You can publish views as PDF files rather than printing them as hard copies, using the *Publish as PDF* command. You do not need to have Adobe Acrobat installed on your computer.

### To publish as a PDF:

1. Specify page setup options for each sheet in your workbook.
2. Select *File > Publish as PDF*.

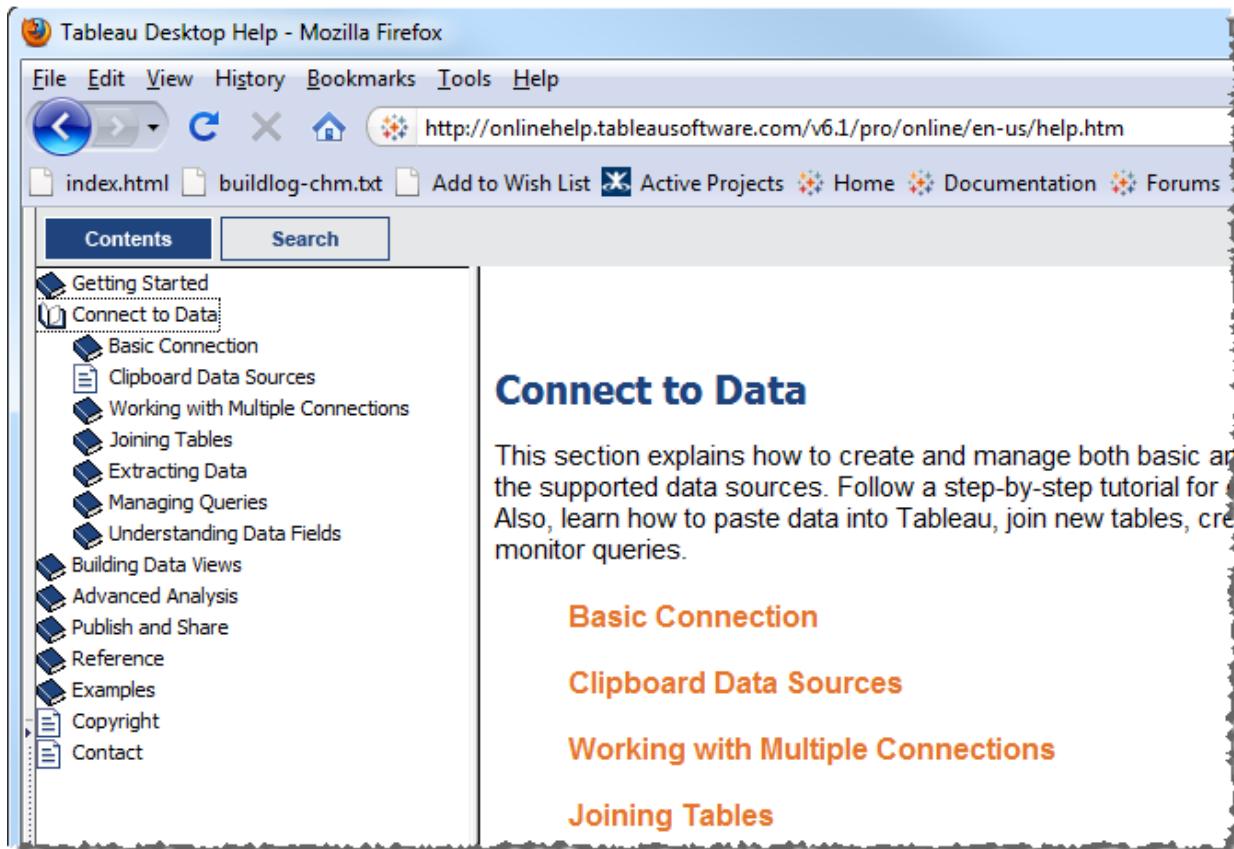


3. In the *Publish as PDF* dialog box, select the print Range:
  - *Entire Workbook* - Publishes all the sheets in the workbook.
  - *Active Sheet* - Publishes only the sheet currently displayed in the workbook.
  - *Selected Sheets* - Publishes the selected sheets.
4. Select a paper size. If you select *Unspecified* the paper size will expand to the necessary size to fit the entire view on a single page.
5. Optionally select *View PDF file after publishing* if you want to automatically open the PDF when you are done publishing. This option is only available if you have Adobe Acrobat Reader or Adobe Acrobat installed on your computer.
6. Optionally select whether to *Show Selections*. When this option is selected the selections in the views are maintained in the PDF.

7. *Click OK and select where you want to save the PDF. Then click Save.*

## Printing the Help

You can print an individual Help topic using the print options in your Web browser.



The screenshot shows a Mozilla Firefox browser window titled "Tableau Desktop Help - Mozilla Firefox". The address bar displays the URL <http://onlinehelp.tableausoftware.com/v6.1/pro/online/en-us/help.htm>. The page content is the "Connect to Data" section of the Tableau help documentation. The left sidebar contains a table of contents with items like "Getting Started", "Connect to Data" (which is expanded), "Basic Connection", "Clipboard Data Sources", etc. The main content area has a large heading "Connect to Data" followed by a descriptive paragraph and four orange-highlighted sub-section titles: "Basic Connection", "Clipboard Data Sources", "Working with Multiple Connections", and "Joining Tables".

In addition to printing individual help topics, you can also download an offline help system and a printable PDF.



# Reference

## Reference

*This section contains reference information for using Tableau. Learn how to use functions and operators when writing calculation formulas. Also, see tips and tricks that can help you become more efficient with the product.*

- [Functions, Operators, & Data Types](#)
- [Performance Tips](#)
- [Tips and Tricks](#)
- [Keyboard Shortcuts](#)
- [Updating the Software](#)
- [Accessing the Help](#)
- [Glossary](#)

# Functions, Operators, & Data Types

## Functions, Operators, & Data Types

*This section explains how to use and combine the various data types supported by Tableau. In addition, this section discusses how to format and use the building blocks of formulas in Tableau. These parts include literal expressions, functions, and operators.*

*All of these features are important to understand when you create custom fields such as calculations.*

- [Data Types](#)
- [Formatting Literals](#)
- [Functions](#)
- [Operators](#)

## Data Types

*Tableau supports string, date/datetime, number, and boolean data types. These data types are automatically handled in the proper fashion. However, if you create calculated fields of your own, you need to be aware of how to use and combine the different data types in formulas. For example, you cannot add a string to a number. Also, many functions that are available to you when you define a calculation only work when they are applied to specific data types. For example, the DATEPART() function can accept only a date/datetime data type as an argument. So, you can write*

*DATEPART('year', #April 15, 2004#) and expect a valid result: 2004. You cannot write DATEPART('year', "Tom Sawyer") and expect a valid result. In fact, this example returns an error because "Tom Sawyer" is a string, not a date/datetime.*

### Note:

*Although Tableau will attempt to fully validate all calculations, some data type errors cannot be found until the query is run against the database. These issues appear as error dialogs at the time of the query rather than in the calculation dialog box.*

*The data types supported by Tableau are described below. Refer to [Type Conversion](#) to learn about converting from one data type to another.*

### STRING

*A sequence of zero or more characters. For example, "Wisconsin", "ID-44400", and "Tom Sawyer" are all strings. Strings are recognized by single or double quotes. The quote character itself can be included in a string by repeating it. For example, 'O'Hanrahan'.*

### DATE/DATETIME

*A date or a datetime. For example "January 23, 1972" or "January 23, 1972 12:32:00 AM". If you would like a date written in long-hand style to be interpreted as a date/datetime, place the # sign on either side of it. For instance, "January 23, 1972" is treated as a string data type but #January 23, 1972# is treated as a date/datetime data type.*

### BOOLEAN

*A field that contains the values TRUE or FALSE. An unknown value arises when the result of a comparison is unknown. For example, the expression 7 > Null yields unknown. Unknown booleans are automatically converted to Null*

## Formatting Literals

When you are using functions you will sometimes want to use literal expressions to represent numbers, strings, dates, and more. A literal expression signifies a constant value that is represented “as is.” For example, you may have a function where your input is a date. Rather than just type “May 1, 2005”, which would be interpreted as a string, you would type #May 1, 2005#, which is equivalent to using a date function to convert the argument from a string to a date (refer to [Date Functions](#)). You can use numeric, string, date, boolean, and Null literals. The way to format each of these literals is described below.

### Numeric Literals

A numeric literal is written exactly like you usually write numbers. If you want to input the number one as a numeric literal you would type 1. Subsequently, if you want to input the number 3.1415 as a numeric literal you would type 3.1415.

### String Literals

A string literal can be written either using single quotations or double quotations. If your string has a single or double quotation within it, simply type the symbol twice. For example, if you wanted to input the string “cat” as a string literal you could type ‘cat’ or “cat”. Additionally, if you want to type the string “She’s my friend.” as a string literal you could type ‘She”s my friend.’ or “She’s my friend.”

### Date Literals

Date literals are signified by the pound symbol (#). If you wanted to input the date “August 22, 2005” as a literal date you would type #August 22, 2005#.

### Boolean Literals

Boolean literals are written as either true or false. If you wanted to input “true” as a boolean literal you would type true.

### Null Literals

Null literals are written simply as Null. If you wanted to input “Null” as a Null literal you would type Null.

## Functions

### Functions

The calculation functions are grouped into categories. These are the same categories used in the Calculation dialog box. The aggregate functions such as sum, average, and so on are described in [Aggregations](#).

- [\*\*Number Functions\*\*](#)
- [\*\*String Functions\*\*](#)
- [\*\*Date Functions\*\*](#)
- [\*\*Type Conversion\*\*](#)
- [\*\*Logical Functions\*\*](#)
- [\*\*Aggregate Functions\*\*](#)
- [\*\*Pass Through Functions \(RAWSQL\)\*\*](#)
- [\*\*User Functions\*\*](#)
- [\*\*Table Calculation Functions\*\*](#)

## Number Functions

### ***ABS(number)***

Returns the absolute value of the given number. For example, `ABS (- 7) = 7``ABS ( [Budget Variance] )` returns the absolute value for all the numbers contained in the Budget Variance field.

### ***ACOS(number)***

Returns the arc cosine of the given number. The result is in radians. For example, `ACOS(-1) = 3.14159265358979`

### ***ASIN(number)***

Returns the arc sine of a given number. The result is in radians. For example, `ASIN(1) = 1.5707963267949`

### ***ATAN(number)***

Returns the arc tangent of a given number. The result is in radians. For example, `ATAN(180) = 1.5652408283942`

### ***ATAN2(y number, x number)***

Returns the arc tangent of two given numbers (x and y). The result is in radians. For example, `ATAN2(2, 1) = 1.10714871779409`

### ***COS(number)***

Returns the cosine of a given number specified in radians. The number is in radians. For example, `COS(PI( ) /4) = 0.707106781186548`

### ***COT(number)***

Returns the cotangent of a given number specified in radians. The number is in radians. For example, `COT(PI( ) /4) = 1`

### ***DEGREES(number)***

Converts a given number in radians to degrees. For example, `DEGREES(PI( )/4) = 45.0`

***EXP(number)***

Returns e raised to the power of the given number. For example, EXP (2) = 7.389EXP(-[Growth Rate]\*[Time])

***LN(number)***

Returns the natural logarithm of a number. Returns Null if number is less than or equal to 0.

***LOG(number [, base])***

Returns the logarithm of a number for the given base. If the base value is omitted, base 10 is used.

***MAX(number, number)***

Returns the maximum of the two arguments, which must be of the same type. Returns Null if either argument is Null. MAX can also be applied to a single field in an aggregate calculation. For example, MAX (4, 7)MAX(Sales, Profit)MAX([First Name], [Last Name])

***MIN(number, number)***

Returns the minimum of the two arguments, which must be of the same type. Returns Null if either argument is Null. MIN can also be applied to a single field in an aggregate calculation. For example, MIN (4, 7)MIN(Sales, Profit)MIN([First Name], [Last Name])

***PI()***

Returns the numeric constant pi: 3.14159.

***POWER(number, power)***

Raises the number to the specified power.

For example, POWER (5, 2) = 5<sup>2</sup> = 25POWER(Temperature, 2)

You can also use the ^ symbol.

For example, 5<sup>2</sup> = POWER(5,2) = 25

### **Radians (number)**

*Converts the given number from degrees to radians. For example, RADIANS(180) = 3.14159*

### **ROUND(number, [decimals])**

*Rounds numbers to a specified number of digits. The `decimals` argument specifies how many decimal points of precision to include in the final result, and it is not required. If the `decimals` variable is omitted, number is rounded to the nearest integer. For example, ROUND(7.3) = 7ROUND(-6.9) = -7ROUND(123.47,1) = 123.5ROUND(Sales) rounds every Sales value to an integer.*

*Note that some databases such as MS SQL Server, allow specification of a negative length, where -1 rounds number to 10's, -2 rounds to 100's, and so on. This is not true of all databases to which you can connect. For example, it is not true of Excel or Access.*

### **SIGN(number)**

*Returns the sign of a number: The possible return values are -1 if the number is negative, 0 if the number is zero, or 1 if the number is positive. For example, if the average of the profit field is negative, then SIGN(AVG(Profit)) = -1*

### **SIN(number)**

*Returns the sine of a number specified in radians. The result is in radians. For example, SIN(0) = 1.0SIN(PI() /4) = 0.707106781186548*

### **SQRT(number)**

*Returns the square root of a number. For example, SQRT(25) = 5*

### **SQUARE(number)**

*Returns the square of a number. For example, SQUARE(5) = 25*

### **TAN(number)**

*Returns the tangent of a number specified in radians. The result is in radians. For example, TAN(PI() /4) = 1.0*

***ZN(expression)***

*Returns the expression if it is not null, otherwise returns zero. Use this function to use zero values instead of null values. ZN([Profit]) = [Profit]*

## String Functions

### ***ASCII(string)***

*Return the ASCII code for the first character of string. For example, ASCII('A') = 65*

### ***CHAR(number)***

*Returns the character encoded by the ASCII code number. For example, CHAR(65) = 'A'*

### ***Contains(string, substring)***

*Returns true if the given string contains the specified substring.*  
`CONTAINS("Calculation", "alcu") = true`

### ***ENDSWITH(string, substring)***

*Returns true if the given string ends with the specified substring. Trailing white spaces are ignored.* `ENDSWITH("Tableau", "leau") = true`

### ***FIND(string, substring, [start])***

*Returns the index position of substring in string, or 0 if the substring isn't found. If the optional argument start is added, the function does the same thing, but ignores any instances of substring that appear before the index position start. The first character in the string is position 1. For example, FIND("Calculation", "alcu") = 2 FIND("Calculation", "Computer") = 0 FIND("Calculation", "a", 3) = 7 FIND("Calculation", "a", 2) = 2 FIND("Calculation", "a", 8) = 0*

### ***LEFT(string, number)***

*Returns the left-most number of characters in the string. For example,*  
`LEFT("Matador", 4) = "Mata"`

### ***LEN(string)***

*Returns the length of the string. For example,* `LEN("Matador") = 7`

### ***LOWER(string)***

*Returns the lower case version of the string. For example,*  
`LOWER("ProductVersion") = "productversion"`

**LTRIM(string)**

*Returns the string with any leading spaces removed. For example, LTRIM(" Matador ") = "Matador "*

**MAX(a, b)**

*Usually applied to numbers, but also works on strings. Returns the maximum of a and b (a and b must be of the same type). With strings, MAX finds the value that is highest in the sort sequence defined by the database for that column. It returns Null if either argument is Null. For example, MAX ("Apple", "Banana") = "Banana"*

**MID(string, start, [length])**

*Returns the string starting at index position start. The first character in the string is position 1. If the optional argument length is added, the returned string includes only that number of characters. For example, MID("Calculation", 2) = "alculation" MID("Calculation", 2, 5) = "alcul"*

**MIN(a, b)**

*Usually applied to numbers, but also works on strings. Returns the minimum of a and b (a and b must be of the same type). With strings, MIN finds the value that is lowest in the sort sequence. It returns Null if either argument is Null. For example, MIN ("Apple", "Banana") = "Apple"*

**REPLACE(string, substring, replacement)**

*Searches the provided string for the given substring and replaces it with the replacement. If the substring is not found, the string is unchanged. For example, REPLACE("Version8.5", "8.5", "9.0") = "Version9.0"*

**RIGHT(string, number)**

*Returns the right-most number of characters in string. For example, RIGHT("Calculation", 4) = "tion"*

**RTRIM(string)**

*Returns the string with any trailing spaces removed. For example, RTRIM(" Calculation ") = " Calculation"*

***SPACE(number)***

*Returns a string that is composed of the specified number of repeated spaces. For example, SPACE(1) = " "*

***STARTSWITH(string, substring)***

*Returns true if the given string starts with the specified substring. Leading white spaces are ignored. For example, STARTSWITH("Joker", "Jo") = true*

***TRIM(string)***

*Returns the string with leading and trailing spaces removed. For example, TRIM("Calculation ") = "Calculation"*

***UPPER(string)***

*Returns the lower case version of the string. For example, UPPER("Calculation") = "CALCULATION"*

## Date Functions

The date functions are given below. Many of the examples use the # symbol with date expressions. Refer to [Formatting Literals](#) for an explanation of this symbol. Additionally, many of these functions use `date_part`, which is constant string argument. The valid `date_part` values that you can use are given in the table below. Make sure to use the `date_part` exactly as it is shown.

<code>date_part</code>	Values
'year'	Four digit year
'quarter'	1-4
'month'	1-12 or "January", "February", and so on
'dayofyear'	Day of the year; Jan 1 is 1, Feb 1 is 32, and so on
'day'	1-31
'weekday'	1-7 or "Sunday", "Monday", and so on
'week'	1-52
'hour"	0-23
'minute'	0-59
'second'	0-60

### ***DATEADD(date\_part, increment, date)***

Returns an increment added to date. The type of increment is that specified in `date_part`. For example, `DATEADD('month', 3, #April 15, 2004#) = #July 15, 2004#`

This expression adds three months to the date `#April 15, 2004#`, and results in `#July 15, 2004#`.

### ***DATEDIFF(date\_part, date1, date2)***

Returns the difference between `date1` and `date2` expressed in units of `date_part`. For example, `DATEDIFF('month', #July 15, 2004#, #April 15, 2004#) = -3`

This expression returns -3 because April is three months before July.

**DATENAME(date\_part, date)**

**Returns** *date\_part* **of** *date* **as a string.** For example, `DATENAME('year', #April 15, 2004#) = "2004"` `DATENAME('month', #April 15, 2004#) = "April"`

**DATEPART(date\_part, date)**

**Returns** *date\_part* **of** *date* **as an integer.** For example, `DATEPART('year', #April 15, 2004#) = 2004` `DATEPART('month', #April 15, 2004#) = 4`

**DATETRUNC(date\_part, date)**

*Truncates the specified date to the accuracy specified by the date\_part. This function returns a new date. For example, when you truncate a date that is in the middle of the month at the month level, this function returns the first day of the month.*

`DATETRUNC('quarter', #August 15, 2005#) = July 1, 2005`

`DATETRUNC('month', #April 15, 2007#) = April 1, 2007`

**DAY(date)**

*Returns the day of the given date as an integer.*

`DAY(#April 12, 2005#) = 12`

**ISDATE(string)**

*Returns true if a given string is a valid date. For example, `ISDATE("April 15, 2004") == true.`*

**MAX(expression) or MAX(expr1, expr2)**

*Usually applied to numbers but also works on dates. Returns the maximum of a and b (a and b must be of the same type). Returns Null if either argument is Null. For example,*

`MAX(#January 1, 2004#, #March 1, 2004#) = #March 1, 2004#`

`MAX([ShipDate1], [ShipDate2])`

***MIN(expression) or MIN(expr1, expr2)***

*Usually applied to numbers but also works on dates. Returns the minimum of a and b (a and b must be of the same type). Returns Null if either argument is Null. For example,*

*MIN(#January 1, 2004#, #March 1, 2004#) = #January 1, 2004#*

*MIN([ShipDate1], [ShipDate2])*

***MONTH(date)***

*Returns the month of the given date as an integer. For example, MONTH(#April 12, 2005#) = 4*

***NOW()***

*Returns the current date and time. For example, NOW() = "5/10/2006 1:08:21 PM"*

***TODAY()***

*Returns the current date. For example, TODAY() = "5/10/2006"*

***YEAR (date)***

*Returns the year of the given date as an integer. For example, YEAR(#April 12, 2005#) = 2005*

## Type Conversion

The result of any expression in a calculation can be converted to a specific data type. The conversion functions are `STR()`, `DATE()`, `DATETIME()`, `INT()`, and `FLOAT()`. For example, if you want to cast a floating point number like `3.14` as an integer, you could write `INT(3.14)`. The result would be `3`, which is an integer. The casting functions are described below.

### Note:

A boolean can be cast to an integer, float, or string. It cannot be cast to a date. `True` is `1`, `1.0`, or `"1"`, while `False` is `0`, `0.0` or `"0"`. `Unknown` maps to `Null`.

### `DATE(expression)`

Returns a date given a number, string, or date expression. For example,

`DATE([Employee Start Date])`

`DATE("April 15, 2004") = #April 15, 2004#`

`DATE("4/15/2004")`

`DATE(#2006-06-15 14:52#) = #2006-06-15#`

Note that the quotation marks are required in the second and third examples.

### `DATETIME(expression)`

Returns a datetime given a number, string, or date expression. For example, `DATETIME("April 15, 2005 07:59:00") = April 15, 2005 07:59:00`

### `FLOAT(expression)`

Casts its argument as a floating point number. For example, `FLOAT(3) = 3.000` `FLOAT([Age])` converts every value in the `Age` field to a floating point number.

### `INT(expression)`

Casts its argument as an integer. For expressions, this function truncates results to the closest integer toward zero. For example, `INT(8.0/3.0) = 2` `INT(4.0/1.5) = 2` `INT(0.50/1.0) = 0` `INT(-9.7) = -9`

When a string is converted to an integer it is converted to a float first and then rounded.

***STR(expression)***

*Casts its argument as a string. For example, STR ( [Age] ) takes all of the values in the measure called Age and converts them to strings.*

## Logical Functions

*CASE expression WHEN value1 THEN return1 WHEN value2 THEN return2...ELSE default return END*

The CASE statement is another method used to perform logical tests and return appropriate values. It is often easier to write than IIF or IF THEN ELSE statements. The CASE statement evaluates expression and compares it to a sequence of values, value1, value2, etc. and returns a result. The first value that matches expression will result in returning the corresponding return expression. If no match is found the default return expression will be used. If there is no default return and no values match, then Null is returned. For example:

```
CASE [Region] WHEN "West" THEN 1 WHEN "East" THEN 2 ELSE 3 ENDCASE  
LEFT(DATENAME('weekday',[Order Date]),3)WHEN "Sun" THEN 0WHEN "Mon" THEN  
1WHEN "Tue" THEN 2WHEN "Wed" THEN 3WHEN "Thu" THEN 4WHEN "Fri" THEN  
5WHEN "Sat" THEN 6END
```

While an IF statement is used to perform a sequence of arbitrary tests, a CASE statement is used to search for a match to an expression. A CASE statement can always be written as an IF statement, although the CASE statement will generally be more concise.

If you need to include numeric comparisons in your conditions, use a nested IF clause. The CASE function compares strings only. For instance, suppose you want to break the values of the Sales field into three custom categories: one for sales less than 200, one for sales between 200 and 300, and one for sales between 300 and 400. The formula would be:

```
IF [Sales] < 200 THEN "Low"ELSEIF [Sales] < 300 THEN "Medium"ELSEIF [Sales] <  
400 THEN "High"ELSE "NULL"END
```

### Note:

Many times you can use a group to get the same results as a complicated case statement.

### *IIF(test, then, else, [unknown])*

The IIF function is used to perform logical tests and return appropriate values. The first argument of an IIF function must be a boolean. A boolean can be a boolean field in the data source, or the result of a logical expression using operators (or a logical comparison of AND, OR, or NOT). If test evaluates to TRUE, then this function returns then. If test evaluates to FALSE, then this function returns else.

A boolean comparison may also yield the value UNKNOWN (neither TRUE nor FALSE), usually due to the presence of Null values in test. The final argument to IIF is returned in the event of an UNKNOWN result for the comparison. If this argument is left out, Null is returned. For example,

```
IIF(7>5, "Seven is greater than five", "Seven is less than five")IIF([Cost]>[Budget Cost],  
"Over Budget", "Under Budget")IIF([Budget Sales]!=0,[Sales]/[Budget  
Sales],0)IIF(COGS>[Budget COGS], IIF(Sales>=[Budget Sales], "Over Cost Budget and  
Over Sales Budget", "Over Cost Budget and Under Sales Budget"), "Under Cost  
Budget")
```

### ***IF test THEN value END / IF test THEN value ELSE else END***

The IF THEN ELSE function is used to perform logical tests and return appropriate values, but has a different format and slightly different semantics than the IIF statement. The IF THEN ELSE statement evaluates a sequence of test conditions and returns the value for the first condition that is true. If no condition is true, the else value is returned. Each test must be a boolean, which may either be a boolean field in the data source or the result of a logical expression. The final ELSE is optional but if it is not provided and there is no true test expression, then the function returns Null. All of the value expressions must be of the same type. For example,

```
IF [Cost]>[Budget Cost] THEN "Over Budget" ELSE "Under Budget" ENDIF [Budget  
Sales]!=0 THEN [Sales]/[Budget Sales] END
```

### ***IF test1 THEN value1 ELSEIF test2 THEN value2 ELSE else END***

There is no built-in limit to the number of ELSEIF test THEN value's in an IF expression, however, individual databases may impose a limit on IF statement complexity. While an IF statement can be rewritten as a series of nested IIF statements, there are differences in how the expressions will be evaluated. In particular, an IIF statement distinguishes TRUE, FALSE and UNKNOWN, while an IF statement only worries about TRUE and not true (which includes both FALSE and UNKNOWN). For example,

```
IF [Region]="West" THEN 1 ELSEIF [Region]="East" THEN 2 ELSE 3 END
```

### ***IFNULL(expression1, expression2)***

Returns the first expression if the result is not null, otherwise returns the second expression.

```
IFNULL ([Profit], 0) = [Profit] if it is not null, otherwise returns 0
```

### ***ISDATE(string)***

*Returns TRUE if the string argument can be converted to a date. Otherwise it returns FALSE. For example:*

*ISDATE ("January 1, 2003") = TRUE*

*ISDATE ("Jan 1 2003") = TRUE*

*ISDATE("1/1/03") = TRUE*

*ISDATE("Janxx 1 2003") = FALSE*

### ***ISNULL(expression)***

*Returns TRUE if the expression is Null. Otherwise, returns FALSE.*

### ***MIN(expression) or MIN(expression1,expression2)***

*Returns the minimum of an expression across all records or the minimum of two expressions for each record.*

## Aggregate Functions

### *AVG(expression)*

Returns the average of all the values in the expression. AVG can be used with numeric fields only. Null values are ignored.

### *COUNT(expression)*

Returns the number of items in a group. Null values are not counted.

### *COUNTD(expression)*

Returns the number of distinct items in a group. Null values are not counted. This function is not available if you are connected to MS Excel, MS Access, or a text file. You can extract your data into an extract file to gain this functionality. Refer to [Extracting Data](#).

### *MAX(expression)*

Returns the maximum of an expression across all records. If the expression is a string value, this function returns the last value where last is defined by alphabetical order.

### *MIN(expression)*

Returns the minimum of an expression across all records. If the expression is a string value, this function returns the first value where first is defined by alphabetical order.

### *STDEV(expression)*

Returns the statistical standard deviation of all values in the given expression based on a sample of the population.

### *STDEVP(expression)*

Returns the statistical standard deviation of all values in the given expression based on a biased population.

### *SUM(expression)*

Returns the sum of all values in the expression. SUM can be used with numeric fields only. Null values are ignored.

***VAR(expression)***

*Returns the statistical variance of all values in the given expression based on a sample of the population.*

***VARP(expression)***

*Returns the statistical variance of all values in the given expression on the entire population.*

## Pass Through Functions (RAWSQL)

The pass-through functions can be used to send SQL expressions directly to the database without being interpreted by Tableau. If you have custom database functions that Tableau doesn't know about you can use the pass-through functions to call these custom functions.

Your database usually will not understand the field names that are shown in Tableau. Because Tableau does not interpret the SQL expressions you include in the pass-through functions, using the Tableau field names in your expression may cause errors. You can use a substitution syntax to insert the correct field name or expression for a Tableau calculation into pass through SQL. For example, imaging you have a function that computes the median of a set of values. You could call that function on the Tableau column [Sales] like this:

`RAWSQLLAGG_REAL("MEDIAN(% 1)", [Sales])`

In addition, because Tableau does not interpret the expression, you must define the aggregation. Use the RAWSQLLAGG functions when you are using aggregated expressions.

`RAWSQL_BOOL("sql_expr", [arg1], ...[argN])`

Returns a Boolean result from a given SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL expression as a substitution syntax for database values.

In the example, %1 is equal to [Sales] and %2 is equal to [Profit].

`RAWSQL_BOOL("IIF( %1 > %2, True, False)", [Sales], [Profit])`

`RAWSQL_DATE("sql_expr", [arg1], ...[argN])`

Returns a Date result from a given SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Order Date].

Example: `RAWSQL_DATE("%1", [Order Date])`

`RAWSQL_DATETIME("sql_expr", [arg1], ...[argN])`

Returns a Date and Time result from a given SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Delivery Date].

Example: `RAWSQL_DATETIME("MIN(%1)", [Delivery Date])`

**RAWSQL\_INT("sql\_expr", [arg1], ...[argN])**

Returns an integer result from a given SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Sales].

Example: RAWSQL\_INT("500 + %1", [Sales])

**RAWSQL\_REAL("sql\_expr", [arg1], ...[argN])**

Returns a numeric result from a given SQL expression that is passed directly to the underlying data source. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Sales]

Example: RAWSQL\_REAL("-123.98 \* %1", [Sales])

**RAWSQL\_STR("sql\_expr", [arg1], ...[argN])**

Returns a string from a given SQL expression that is passed directly to the underlying data source. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Customer Name].

Example: RAWSQL\_STR("%1", [Customer Name])

**RAWSQLAGG\_BOOL("sql\_expr", [arg1], ...[argN])**

Returns a Boolean result from a given aggregate SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL expression as a substitution syntax for database values.

In the example, %1 is equal to [Sales] and %2 is equal to [Profit].

Example: RAWSQLAGG\_BOOL("SUM( %1 ) > SUM( %2 )", [Sales], [Profit])

**RAWSQLAGG\_DATE("sql\_expr", [arg1], ...[argN])**

Returns a Date result from a given aggregate SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Order Date].

Example: RAWSQLAGG\_DATE("MAX(%1)", [Order Date])

**RAWSQLAGG\_DATETIME("sql\_expr", [arg1], ...[argN])**

Returns a Date and Time result from a given aggregate SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL

*expression as a substitution syntax for database values. In this example, %1 is equal to [Delivery Date].*

*Example: RAWSQLAGG\_DATETIME("MIN(%1)", [Delivery Date])*

**RAWSQLAGG\_INT("sql\_expr", arg1, ... argN)**

*Returns an integer result from a given aggregate SQL expression. The SQL expression is passed directly to the underlying database. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Sales].*

*Example: RAWSQLAGG\_INT("500 + SUM(%1)", [Sales])*

**RAWSQLAGG\_REAL("sql\_expr", arg1, ... argN)**

*Returns a numeric result from a given aggregate SQL expression that is passed directly to the underlying data source. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Sales]*

*Example: RAWSQLAGG\_REAL("SUM( %1)", [Sales])*

**RAWSQLAGG\_STR("sql\_expr", arg1, ... argN)**

*Returns a string from a given aggregate SQL expression that is passed directly to the underlying data source. Use %n in the SQL expression as a substitution syntax for database values. In this example, %1 is equal to [Customer Name].*

*Example: RAWSQLAGG\_STR("AVG(%1)", [Discount])*

## User Functions

The user functions can be used to create user filters that are based on user lists in your data source. For example, say you have a view that shows the sales performance for each employee. When you publish that to the server you may want to only allow employees to see their own sales numbers. You can use the special function CURRENTUSER to create a field that returns True if the username of the person logged into the server is the same as the employee name in the view. That way when you filter the view using this calculated field, only the data for the user that is currently logged in is shown.

### **FULLNAME( )**

Returns the name of the person currently using Tableau. This is the Tableau Server username if user is logged in otherwise this function returns the Windows username. Use this function to create calculations that are dependent on the current user.

Example: [Manager]=FULLNAME()

If the manager Dave Hallsten was logged in, this function would only return true if the Manager field in the view is also equal to Dave Hallsten. When used as a filter this calculated field can be used to create a user filter that only shows data that is relevant to the person logged into the server.

### **ISFULLNAME(string)**

Returns True if the full name of the person currently using Tableau matches the given string. The full name for the person currently using Tableau is the Tableau Server full name if they are logged in, otherwise it's the Windows username.

Example: ISFULLNAME("Dave Hallsten")

This returns true if Dave Hallsten is the current user, otherwise it returns false.

### **ISMEMBEROF(string)**

Returns true if the person currently using Tableau is a member of a group that matches the given string. If the person currently using Tableau is logged in, the group membership is determined by groups on Tableau Server. If the person is not logged in, this function returns false.

Example: IF ISMEMBEROF("Sales") THEN "Sales" ELSE "Other" END

***ISUSERNAME(string)***

*Returns True if the username of the person currently using Tableau matches the given string. The username for the person currently using Tableau is the Tableau Server username if they are logged in, otherwise it's the Windows username.*

*Example: ISUSERNAME("dhallsten")*

*This returns true if dhallsten is the current user, otherwise it returns false.*

***USERDOMAIN()***

*Returns the domain for the person currently using Tableau. This is the Tableau Server domain if the user is logged in otherwise this function returns the Windows domain. Use this function in combination with other user functions to create calculations that are dependent on the current user and domain.*

*Example: [Manager]=USERNAME() AND [Domain]=USERDOMAIN()*

***USERNAME( )***

*Returns the username of the person currently using Tableau. This is the Tableau Server username if user is logged in otherwise this function returns the Windows username. Use this function to create calculations that are dependent on the current user.*

*Example: [Manager]=USERNAME()*

*If the manager dhallsten was logged in, this function would only return true if the Manager field in the view is also equal to dhallsten. When used as a filter this calculated field can be used to create a user filter that only shows data that is relevant to the person logged into the server.*

## Table Calculation Functions

*Table calculation functions are used to customize table calculations. Table Calculations are computations that are applied to the values in the entire table and are often dependent on the table structure itself. Refer to [Customizing Table Calculations](#) to learn more about creating and customizing table calculations.*

### *First()*

*Returns the number of rows from the current row to the first row in the partition. For example, the view below shows quarterly sales. When FIRST() is computed within the Date partition, the offset of the first row from the second row is -1.*

First()

		Region			
Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

Value	Offset
\$160,877	0
\$197,213	-1
\$302,678	-2
\$297,208	-3
\$180,609	-4
\$195,785	-5
\$116,613	-6

*Example (when current row index is 3): FIRST() = -2*

### *INDEX()*

*Returns the index of the current row in the partition. The first row index starts at 1. For example, the table below shows quarterly sales. When INDEX() is computed within the Date partition, the index of each row is 1, 2, 3, 4...etc.*

INDEX()

Year of Order Date	Quarter of Order Date	Region			
		Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731



\$160,877	1
\$197,213	2
\$302,678	3
\$297,208	4
\$180,609	5
\$195,785	6
\$116,613	7

Example (for the third row in the partition): INDEX() = 3

### LAST()

Returns the number of rows from the current row to the last row in the partition. For example, the table below shows quarterly sales. When LAST() is computed within the Date partition, the offset of the last row from the second row is 5.

LAST()

Year of Order Date	Quarter of Order Date	Region			
		Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731



\$160,877	6
\$197,213	5
\$302,678	4
\$297,208	3
\$180,609	2
\$195,785	1
\$116,613	0

Example (when the current row index is 3 of 7): LAST() = 4

### LOOKUP(expression, [offset])

Returns the value of the given expression in a target row, specified as a relative offset from the current row. Use FIRST() + n and LAST() - n for a target relative to the first/last rows in the partition. If offset is omitted, the Compare To row may be set on the field menu. Returns NULL if the target row cannot be determined.

For example, the view below shows quarterly sales. When `LOOKUP(SUM(Sales), 2)` is computed within the Date partition, each row will show the sales value from 2 quarters in the future.

		Region			
Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	<b>+2</b> \$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

		Region			
Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$302,678	\$165,201	\$283,806	\$206,512
	Q2	\$297,208	\$226,983	\$214,845	\$230,291
	Q3	\$180,609	\$180,123	\$273,943	\$251,145
	Q4	\$195,785	\$224,882	\$251,391	\$195,976
2010	Q1	\$116,613	\$50,363	\$194,601	\$102,731
	Q2				
	Q3				

Example: `LOOKUP(SUM([Profit]), FIRST() + 2) = SUM([Profit])` in the third row of the partition.

### ***PREVIOUS\_VALUE(expression)***

Returns the value of this calculation in the previous row. Returns the given expression if the current row is the first row of the partition.

Example: `SUM([Profit]) * PREVIOUS_VALUE(1) = running product of SUM(Profit)`

### ***RUNNING\_AVG(expression)***

Returns the running average of the given expression, from the first row in the partition to the current row.

For example, the view below shows quarterly sales. When `RUNNING_AVG(SUM([Sales]))` is computed within the Date partition, the result is a running average of the sales values for each quarter.

**Region**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

Average = \$179,045

**Region**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	160,877	231,411	133,934	185,961
	Q2	179,045	181,162	235,873	199,734
	Q3	220,256	200,509	251,851	201,993
	Q4	239,494	207,127	242,599	209,068
2010	Q1	227,717	201,726	248,868	217,483
	Q2	222,395	205,586	249,289	213,899
	Q3	207,283	183,411	241,476	198,018

Example: `RUNNING_AVG(SUM([Profit]))` = running average of `SUM(Profit)`

### ***RUNNING\_COUNT(expression)***

Returns the running count of the given expression, from the first row in the partition to the current row.

Example: `RUNNING_COUNT(SUM([Profit]))` = running count of `SUM(Profit)`

### ***RUNNING\_MAX(expression)***

Returns the running maximum of the given expression, from the first row in the partition to the current row.

## Tableau Desktop Help

The diagram illustrates the calculation of the running maximum of profit using the `RUNNING_MAX` function. It shows two tables: one for profit data and one for the running maximum values.

**Profit Data Table:**

Year of Order Date	Quarter of Order Date	Region			
		Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

**Running Maximum Table:**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	160,877	231,411	133,934	185,961
	Q2	197,213	231,411	337,813	213,507
	Q3	302,678	231,411	337,813	213,507
	Q4	302,678	231,411	337,813	230,291
2010	Q1	302,678	231,411	337,813	251,145
	Q2	302,678	231,411	337,813	251,145
	Q3	302,678	231,411	337,813	251,145

A red arrow points from the profit data table to the running maximum table, indicating the flow of data. A red box highlights the value \$302,678 in the profit table for Q3 2009, which corresponds to the value 302,678 in the running maximum table for the same period. A blue box highlights the value \$302,678 in the profit table for Q3 2009, and a blue arrow points to a text box containing the formula `Max = $302,678`.

*Example: `RUNNING_MAX(SUM([Profit]))` = running maximum of `SUM(Profit)`*

***RUNNING\_MIN(expression)***

*Returns the running minimum of the given expression, from the first row in the partition to the current row.*

**Region**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	160,877	231,411	133,934	185,961
	Q2	160,877	204,914	133,934	185,961
	Q3	160,877	165,201	133,934	185,961
	Q4	160,877	165,201	133,934	185,961
2010	Q1	160,877	165,201	133,934	185,961
	Q2	160,877	165,201	133,934	185,961
	Q3	116,613	50,363	133,934	102,731

Example: *RUNNING\_MIN(SUM([Profit]))* = running minimum of SUM(Profit)

### *RUNNING\_SUM(expression)*

Returns the running summation of the given expression, from the first row in the partition to the current row.

## Tableau Desktop Help

**Region**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

**Region**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	160,877	231,411	133,934	185,961
	Q2	358,090	436,325	471,747	399,469
	Q3	660,768	1,152,000	755,550	660,768
	Q4	957,976	828,508	970,398	836,272
2010	Q1	1,138,585	1,008,631	1,244,341	1,087,417
	Q2	1,334,369	1,233,513	1,495,732	1,283,392
	Q3	1,450,982	1,283,877	1,690,333	1,386,123

Example: `RUNNING_SUM(SUM([Profit]))` = running sum of `SUM(Profit)`

### Size()

Returns the number of rows in the partition. For example, the view below shows quarterly sales. Within the Date partition, there are seven rows so the `Size()` of the Date partition is 7.

**Region**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

Example (partition has 5 rows): `SIZE()` = 5

***WINDOW\_AVG(expression, [start, end])***

Returns the average of the expression within the window. The window is defined as offsets from the current row. Use FIRST() + n and LAST() - n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.

For example, the view below shows quarterly sales. A window average within the Date partition returns the average sales across all dates.

The diagram illustrates the calculation of `WINDOW_AVG(SUM([Sales]), FIRST(), LAST())` for the first quarter of 2009. It shows two tables: the original data and the result after applying the window function.

**Original Data:**

Year of Order Date	Quarter of Order Date	Region			
		Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,607
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

**Resulting Data (After Applying Window Function):**

Year of Order Date	Quarter of Order Date	Region			
		Central	East	South	West
2009	Q1	207,283	183,411	241,476	198,018
	Q2	207,283	183,411	241,476	198,018
	Q3	207,283	183,411	241,476	198,018
	Q4	207,283	183,411	241,476	198,018
2010	Q1	207,283	183,411	241,476	198,018
	Q2	207,283	183,411	241,476	198,018
	Q3	207,283	183,411	241,476	198,018

A red arrow points from the `FIRST()` and `LAST()` labels to the first and last rows of the Central column, respectively, indicating the range of values used for the average calculation. The resulting average value is shown in the Q1 cell of the Central column for 2009.

Example: `WINDOW_AVG(SUM[Profit], FIRST() + 1, 0)` = Average of SUM(Profit) from the second row to the current row

***WINDOW\_COUNT(expression, [start, end])***

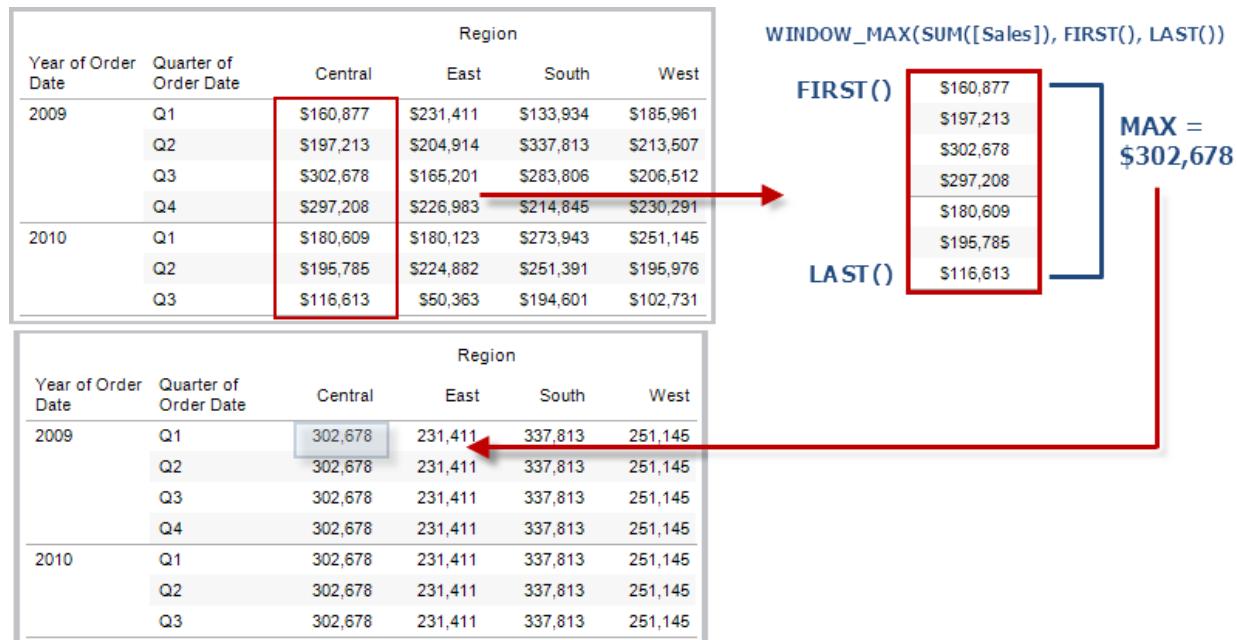
Returns the count of the expression within the window. The window is defined as offsets from the current row. Use FIRST() + n and LAST() - n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.

Example: `WINDOW_COUNT(SUM[Profit], FIRST() + 1, 0)` = Count of SUM(Profit) from the second row to the current row

***WINDOW\_MAX(expression, [start, end])***

Returns the maximum of the expression within the window. The window is defined as offsets from the current row. Use FIRST() + n and LAST() - n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.

For example, the view below shows quarterly sales. A window maximum within the Date partition returns the maximum sales across all dates.



Example:  $\text{WINDOW\_MAX}(\text{SUM}[\text{Profit}], \text{FIRST}() + 1, 0)$  = Maximum of  $\text{SUM}(\text{Profit})$  from the second row to the current row

***WINDOW\_MIN(expression, [start, end])***

Returns the minimum of the expression within the window. The window is defined as offsets from the current row. Use FIRST() + n and LAST() - n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.

For example, the view below shows quarterly sales. A window minimum within the Date partition returns the minimum sales across all dates.

**Region**

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

Year of Order Date	Quarter of Order Date	Central	East	South	West
2009	Q1	116,613	50,363	133,934	102,731
	Q2	116,613	50,363	133,934	102,731
	Q3	116,613	50,363	133,934	102,731
	Q4	116,613	50,363	133,934	102,731
2010	Q1	116,613	50,363	133,934	102,731
	Q2	116,613	50,363	133,934	102,731
	Q3	116,613	50,363	133,934	102,731

*Example: WINDOW\_MIN(SUM[Profit]), FIRST()+1, 0) = Minimum of SUM(Profit) from the second row to the current row*

### ***WINDOW\_STDEV(expression, [start, end])***

*Returns the sample standard deviation of the expression within the window. The window is defined as offsets from the current row. Use FIRST()+n and LAST()-n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.*

*Example: WINDOW\_STDEV(SUM[Profit]), FIRST()+1, 0) = Standard deviation of SUM(Profit) from the second row to the current row*

### ***WINDOW\_STDEVP(expression, [start, end])***

*Returns the biased standard deviation of the expression within the window. The window is defined as offsets from the current row. Use FIRST()+n and LAST()-n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.*

*Example: WINDOW\_STDEVP(SUM[Profit]), FIRST()+1, 0) = Standard deviation of SUM(Profit) from the second row to the current row*

***WINDOW\_SUM(expression, [start, end])***

Returns the summation of the expression within the window. The window is defined as offsets from the current row. Use FIRST() + n and LAST() - n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.

For example, the view below shows quarterly sales. A window sum computed within the Date partition returns the summation of sales across all quarters.

The diagram illustrates the calculation of a window sum for the second quarter of 2009. It shows two tables: the original data and the result after applying the window sum function.

**Original Data:**

Year of Order Date	Quarter of Order Date	Region			
		Central	East	South	West
2009	Q1	\$160,877	\$231,411	\$133,934	\$185,961
	Q2	\$197,213	\$204,914	\$337,813	\$213,507
	Q3	\$302,678	\$165,201	\$283,806	\$206,512
	Q4	\$297,208	\$226,983	\$214,845	\$230,291
2010	Q1	\$180,609	\$180,123	\$273,943	\$251,145
	Q2	\$195,785	\$224,882	\$251,391	\$195,976
	Q3	\$116,613	\$50,363	\$194,601	\$102,731

**Resulting Data (After Window Sum):**

Year of Order Date	Quarter of Order Date	Region			
		Central	East	South	West
2009	Q1	1,450,982	1,283,877	1,690,333	1,386,123
	Q2	1,450,982	1,283,877	1,690,333	1,386,123
	Q3	1,450,982	1,283,877	1,690,333	1,386,123
	Q4	1,450,982	1,283,877	1,690,333	1,386,123
2010	Q1	1,450,982	1,283,877	1,690,333	1,386,123
	Q2	1,450,982	1,283,877	1,690,333	1,386,123
	Q3	1,450,982	1,283,877	1,690,333	1,386,123

**Calculation Details:**

- FIRST()** highlights the first four rows of the 2009 data.
- LAST()** highlights the last three rows of the 2009 data.
- SUM = \$1,450,982** is the total sum of the highlighted values.

Example:  $\text{WINDOW\_SUM}(\text{SUM}[\text{Profit}])$ ,  $\text{FIRST}() + 1, 0$  = Summation of  $\text{SUM}(\text{Profit})$  from the second row to the current row

***WINDOW\_VAR(expression, [start, end])***

Returns the sample variance of the expression within the window. The window is defined as offsets from the current row. Use FIRST() + n and LAST() - n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.

Example:  $\text{WINDOW\_VAR}(\text{SUM}[\text{Profit}])$ ,  $\text{FIRST}() + 1, 0$  = Variance of  $\text{SUM}(\text{Profit})$  from the second row to the current row

***WINDOW\_VARP(expression, [start, end])***

*Returns the biased variance of the expression within the window. The window is defined as offsets from the current row. Use FIRST() + n and LAST() - n for offsets from the first or last row in the partition. If the start and end are omitted, the entire partition is used.*

*Example: WINDOW\_VARP(SUM[Profit]), FIRST() + 1, 0) = Variance of SUM(Profit) from the second row to the current row*

## Operators

To create calculated fields and formulas, you need to understand the operators supported by Tableau. This section discusses the basic operators that are available and the order (precedence) of operations.

### *+ (addition)*

This means addition when applied to numbers and concatenation when applied to strings. When applied to dates, it can be used to add a number of days to a date. For example,

7 + 3

Profit + Sales

'abc' + 'def' = 'abcdef'

#April 15, 2004# + 15 = #April 30, 2004#

### *- (subtraction)*

This means subtraction when applied to numbers and negation if applied to an expression. When applied to dates, it can be used to subtract a number of days from a date. Hence it can also be used to calculate the difference in days between two dates. For example,

7 - 3

Profit - Sales

-(7+3) = -10

#April 16, 2004# - 15 = #April 1, 2004#

#April 15, 2004# - #April 8, 2004# = 7

### *\* (multiplication)*

This means numeric multiplication. For example,  $5 * 4 = 20$ .

### */ (division)*

This means numeric division. For example,  $20 / 4 = 5$ .

## **% (modulo)**

This calculates a numeric remainder. For example,  $5 \% \ 4 = 1$ .

## **= =, =, >, <, >=, <=, !=, <> (comparisons)**

These are the basic comparison operators that can be used in expressions. Their meanings are as follows:  $= =$  or  $=$  (equal to),  $>$  (greater than),  $<$  (less than),  $\geq$  (greater than or equal to),  $\leq$  (less than or equal to),  $\neq$  and  $\neq$  (not equal to).

Each operator compares two numbers, dates, or strings and returns a boolean (`TRUE` or `FALSE`). Booleans themselves, however, cannot be compared using these operators. For example, `TRUE=TRUE` is not a valid expression. To compare booleans in this way, use the logical operators `AND` and `OR`. For example, `TRUE AND TRUE` is a valid expression.

## **$\wedge$ (power)**

This symbol is equivalent to the `POWER` function. It raises a number to the specified power.

For example:

$$6^3 = 216$$

## **AND**

This is a logical operator. An expression or a boolean must appear on either side of it. For example,

$$IIF(Profit =100 \text{ AND } Sales =1000, "High", "Low")$$

If both expressions are `TRUE` (i.e., not `FALSE` and not `UNKNOWN`), then the result is `TRUE`. If either expression is `UNKNOWN`, then the result is `UNKNOWN`. In all other cases, the result is `FALSE`.

If you create a calculation in which the result of an AND comparison is displayed on a worksheet, Tableau displays `TRUE` and `FALSE`. If you would like to change this, use the Format area in the format dialog.

## **OR**

This is a logical operator. An expression or a boolean must appear on either side of it. For example,

*IIF(Profit =100 OR Sales =1000, "High", "Low")*

*If either expression is TRUE, then the result is TRUE. If both expressions are FALSE, then the result is FALSE. If both expressions are UNKNOWN, then the result is UNKNOWN.*

*If you create a calculation in which the result of an OR comparison is displayed on a worksheet, Tableau displays TRUE and FALSE. If you would like to change this, use the Format area in the format dialog. The OR operator employs "short circuit evaluation." This means that if the first expression is evaluated to be TRUE, then the second expression is not evaluated at all. This can be helpful if the second expression results in an error when the first expression is TRUE, because the second expression in this case is never evaluated.*

### *NOT*

*This is a logical operator. It can be used to negate another boolean or an expression. For example,*

*IIF(NOT(Sales = Profit), "Not Equal", "Equal")*

### *Precedence*

*All operators are evaluated in a specific order. For example, 2\*1+2 is equal to 4 and not equal to 6. The reason is that the \* operator is always evaluated before the + operator.*

*The following table shows the order in which operators are evaluated. The first line has the highest precedence. Operators on the same line have the same precedence. If two operators have the same precedence they are evaluated from left to right in the formula.*

Precedence	Operator
1	- (negate)
2	^ (power)
3	*, /, %
4	+, -
5	==, >, <, >=, <=, !=
6	NOT
7	AND
8	OR

*Parentheses can be used as needed. Operators that appear within parentheses are evaluated before those outside of parentheses, starting from the innermost parentheses and moving outward. For example,  $(1 + (2 * 2 + 1)) * (3 * 6 / 3)$  = 31.*

## Performance Tips

### Performance Tips

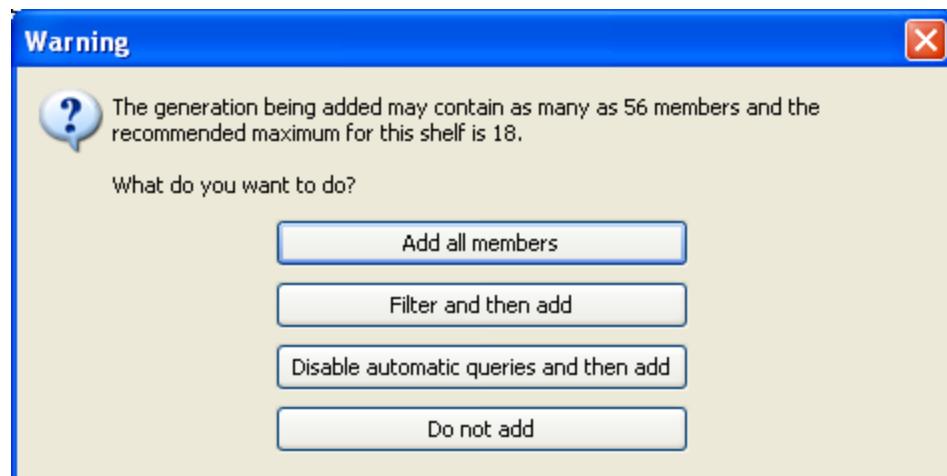
*This section includes tips that will help improve Tableau's performance when you use large data sources. One of the important things to understand is that Tableau is only as fast as your data source. So if your data source responds slowly to queries, then Tableau must wait for the data source before displaying results. As a result, a "best practice" suggestion is to use Tableau with databases that are suitable for real-time querying and analysis.*

- [Performance Tips: All Data Sources](#)
- [Performance Tips: Relational Data Sources](#)
- [Performance Tips: Multidimensional Data Sources](#)
- [Speeding up Context Filters](#)
- [Extracting Large Text and Excel Files](#)

## Performance Tips: All Data Sources

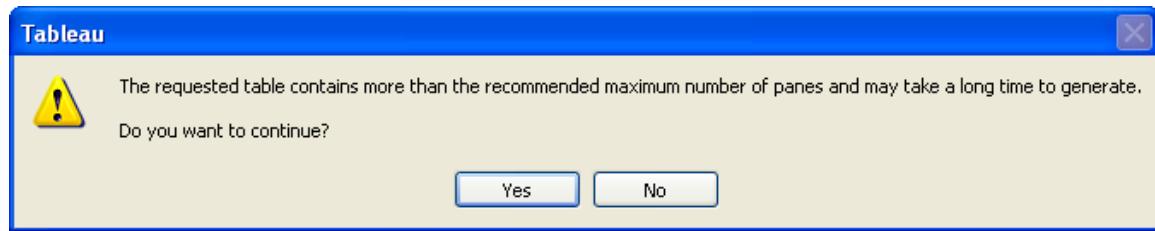
The following performance tips apply to all data sources supported by Tableau.

- Turn off Automatic Updates— When you place a field on a shelf, Tableau generates the view by automatically querying the data source. If you are creating a dense data view, the queries might be time consuming and significantly degrade system performance. In this case, you can instruct Tableau to turn off queries while you build the view. You can then turn queries back on when you are ready to see the result. Refer to [managing\\_queries.html#i999965](#) for more information.
- Look for Warnings— Tableau displays a performance warning dialog box when you attempt to place a large dimension (with many members) on any shelf. The dialog box provides four choices as shown in the figure below. If you choose to add all members, then your might experience a significant degradation in performance.



- Avoid Generating Too Many Panes – If you attempt to create many panes in a table, Tableau will display the warning dialog box shown below. In most cases, you should not display more than the recommended number of panes because such a view is not very useful.

## Tableau Desktop Help



## Performance Tips: Relational Data Sources

The following performance tips apply to relational data sources.

- Context filters – If you are setting filters that significantly reduce the data set size, and that will be used for more than several data views, you should set those filters as context filters. Refer to [filtering.html#i1009893](#) for how to create context filters. For more information about performance improvement with context filters refer to [Speeding up Context Filters](#).
- Aggregate measures – If the views you create are slow, make sure you are working with aggregated measures rather than disaggregated measures. When views are slow it usually means you are trying to view many rows of data at once. You can reduce the number of rows by aggregating the data. In other words, make sure the Aggregate Measures option on the Analysis menu is selected.
- Sets – If you want to filter a dimension to remove members based on a range of measure values, you should create a set rather than using a quantitative filter. For instance, you can create a set that only returns the Top 50 items in a dimension, rather than all of the items in a dimension.

When creating a group from a selection as described in [sorting\\_groups.html#i1002081](#), make sure you've included only the columns of interest. Each additional column included in the set will result in decreased performance.

- Extract Large Text and Excel Files – If your data source is large text or Excel file, you should create a Tableau Extract to improve performance and gain new functionality. Note that if you connect Tableau to a large text file, you will be prompted to extract the data if the file is considered to be too large to perform well.
- Use a database server – You should consider storing your data in a database server like Microsoft SQL Server. The Professional Edition of Tableau can connect to these larger database servers.
- Create indexes for tables – Index the tables in your relational database. To successfully index your data set, you should identify the fields that you frequently filter on and add them to the index. If you have a field that you use as a context filter often, consider setting it as your primary index. If you are working with Access tables that have more than 200,000 rows of data, consider setting indexes on the tables. You can learn how to do this by searching for “index” in the Access online help. Access allows you to store 2 GB of data (approximately 1-2 million rows) in a database, but it performs poorly well below this limit.

- *Break up your data – If you have a lot of data, consider breaking it into smaller pieces. For example, you can create a cluster of Access tables that address specific subsets of your data.*
- *Add filters first - If you are working with a large data source and have automatic updates turned off, it is possible to create a really slow query when adding filters to the view. Rather than build the view and then specify filters, you should first specify the filters and then drag fields to the view. That way, when you run the update or turn on automatic updates, the filters will be evaluated first.*

## Performance Tips: Multidimensional Data Sources

The following performance tips apply to multidimensional data sources.

- *Filtering – If your cube has a single large dimension, you should set a filter directly on that dimension rather than setting a filter on another dimension or measure. For example, suppose you want to reduce the numbers of products being displayed in a data view. It is much more efficient to set the filter directly on Products or to create a computed set based on Products (such as Top 10) rather than filtering other fields such as Location or Profit.*

*Also, you should avoid selecting large numbers of members from a large dimension. When a dimension is large, it is best to keep the size of the filter to less than a thousand members.*

- *Sets – When creating a set from a selection as described in [Create a Set by Selecting Marks](#), make sure you've included only the columns of interest in the Create Set from Selection dialog box. Each additional column included in the group will result in decreased performance. For instance, if you create a set that contains all regions with sales between 8000 and 15000 but you include a column that does not affect the members of the set, you may notice a performance decrease. You can remove extra columns by right-clicking the column and selecting Remove This Column from the context menu.*
- *Sorting – Avoid applying sorts to levels within a very large hierarchy.*
- *Large Root Levels – If you are working with a dimension whose root level is greater than 1000 but it is not too large (greater than 100,000) you should avoid using the filter dialog to filter the data. Instead, drag the dimension to a shelf and use the Exclude command in the headers context menus to limit the data that is displayed in the view. In this particular case, dragging a dimension with this size root level to the filter shelf may cause a long query.*

## Speeding up Context Filters

To improve performance of context filters, especially on large data sources, follow these general rules.

- Using a single context filter that significantly reduces the size of the data set is much better than applying many context filters. In fact, if a filter does not reduce the size of the data set by one-tenth or more, it is actually worse to add it to the context because of the performance cost of computing the context.
- If you do have multiple filters to add to the context it is better to create all of the filters first and then create a context that includes them all. To create a context that includes them all, select Analysis > Set Context and then add the multiple filters to the context all at once. Using the standard Add to Context command in the context menus of each filter will force Tableau to compute the context once per filter which can degrade performance.
- Complete all of your data modeling before creating a context. Changes in the data model such as converting dimensions to measures, require recomputing the context.
- Set the necessary filters for the context and create the context before adding fields to other shelves. Doing this work first makes the queries that are run when you drop fields on other shelves much faster.
- If you want to set a context filter on a date you can use a continuous date. However, using date bins like YEAR(date) or context filters on discrete dates are very effective.

**Note:**

If your data set is heavily indexed, context filters may not provide performance improvement and may actually cause slower query performance.

## Extracting Large Text and Excel Files

*When you connect to large text or Excel files in Tableau, you may experience poor performance because queries are slow. If your file has more than 20,000 rows you should extract the data using the Extract feature in Tableau. If Tableau determines your file to be too large (greater than 10 MB) you are prompted to extract the data. When you extract the data you will not only improve performance but also enable more functions such as count distinct.*

**To extract a text or Excel file into an Tableau extract file:**

1. Create a new connection and select the text or Excel file you want to connect to. For information about connecting to a text or Excel file refer to [Examples - Connecting to Data Sources](#).
2. When you click OK you are prompted to create an extract file. You can also select a data source on the Data menu and then select Extract. You can specify filters and options to define a subset of data or click Extract to include all the data. Refer to [Creating an Extract](#) to learn more about defining an extract.
3. When you click Extract, the data from the text or Excel file is converted and stored with the name you specify.

## Tips and Tricks

### Tips and Tricks

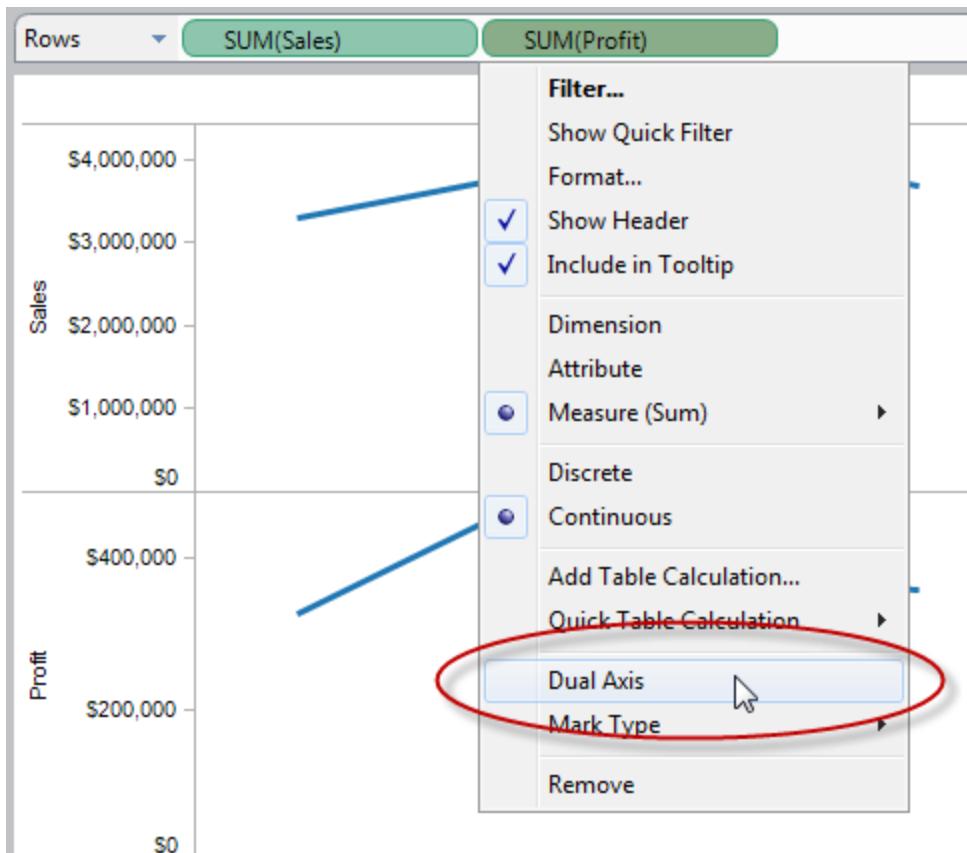
*This section provides a collection of tips to help you use Tableau.*

- [Show Multiple Measures on a Single Axis](#)
- [Convert Measures to Dimensions](#)
- [Convert Dimensions to Measures](#)
- [Duplicate Any View as a Cross-tab](#)
- [Manually Sort Items in the Color Legend](#)
- [Duplicate Fields in the View](#)
- [Resize Individual Views in a Dashboard](#)
- [Use the Pages Shelf to Split Large PDF Reports](#)
- [Specify Page Setup for Multiple Worksheets](#)
- [Visual Cues for Fields](#)

## Show Multiple Measures on a Single Axis

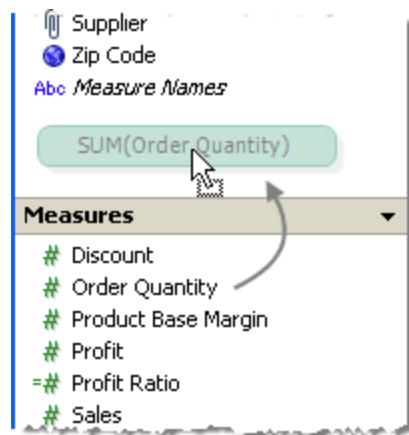
In addition to dragging measures onto shelves, you can drag measures onto the axis created by a previous measure. This allows multiple measures to share a single axis.

In the example below, both the Sales field and the Profit field share a common axis. This view was created by dragging the Sales field to the Row Shelf and then dragging the Profit field onto the axis created by the Sales field. The result is the creation of a “multiple measures” axis that is labeled ‘value.’



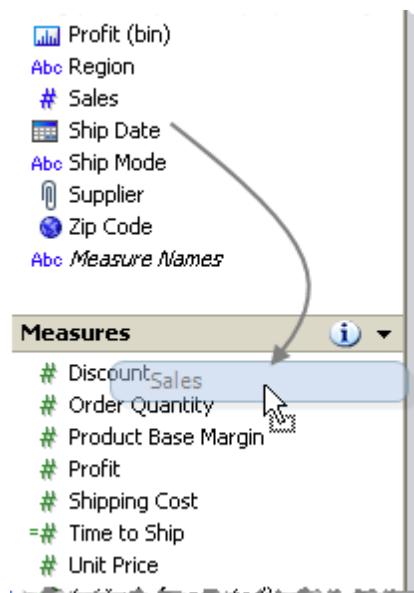
## Convert Measures to Dimensions

By default, Tableau treats all relational fields containing numbers as measures. However, you might decide that some of these fields should be treated as dimensions. For example, a field containing ages may be categorized as a measure by default in Tableau because it contains numeric data. However, if you want to look at each individual age rather than an axis you can convert the Age field to a dimension. Convert a measure to a dimension by dragging it from the Measures area to the Dimensions area in the Data window.



## Convert Dimensions to Measures

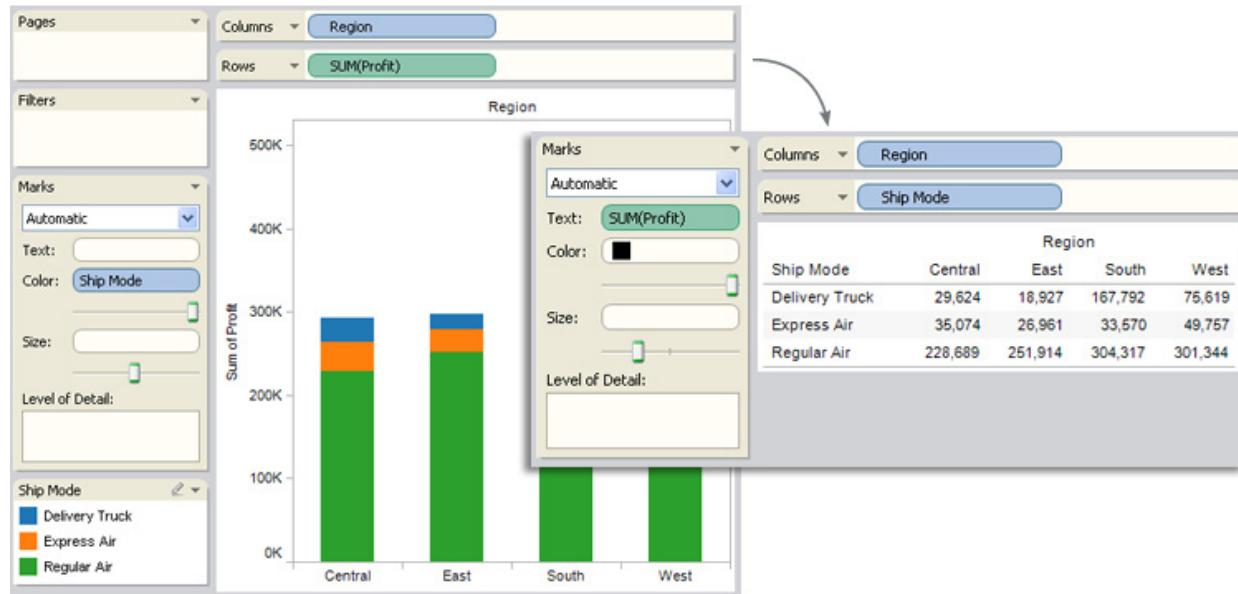
By default, Tableau treats all relational fields containing text or date values as dimensions. However, you might decide that some of these fields should be treated as measures. For example, a field that contains sales figures with null values represented as “N/A” or “\*” may be categorized as a dimension by default in Tableau because it contains text values. You can convert the dimension to a measure first by changing the data type to a number and then by dragging it from the Dimensions area to the Measures area in the Data window.



## Duplicate Any View as a Cross-tab

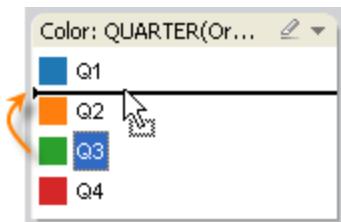
You can duplicate any worksheet in Tableau as a cross-tab by right-clicking the worksheet tab and selecting *Duplicate as Cross-tab*. The result will contain only dimensions in the Rows and Columns shelves. If measure names are part of the original view, they will be displayed in the cross-tab using the *Measure Names* field.

You can also export a cross-tab directly to Microsoft Excel by selecting *File > Export > Cross-tab to Excel*.



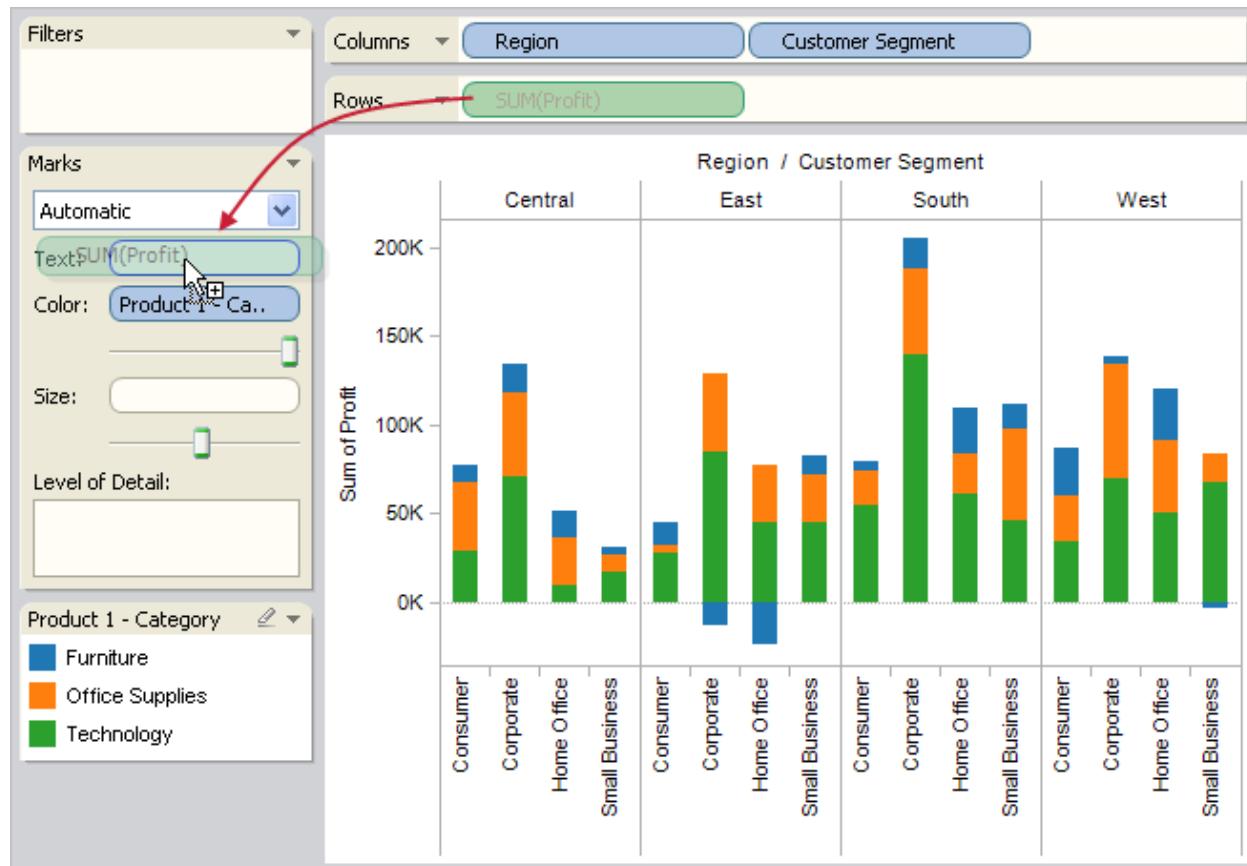
## Manually Sort Items in the Color Legend

Manually sorting the items in the color legend change the drawing order of a field so you can see obscured data in your views. For instance, if you can't see green marks in a scatter plot because they are obscured by orange marks, you can manually sort the items in the color legend so that the green points are drawn on top of the orange points. The marks are drawn in the view according to the order in the legend, from bottom to top. You can manually sort a color legend simply by dragging and dropping the items in the legend.



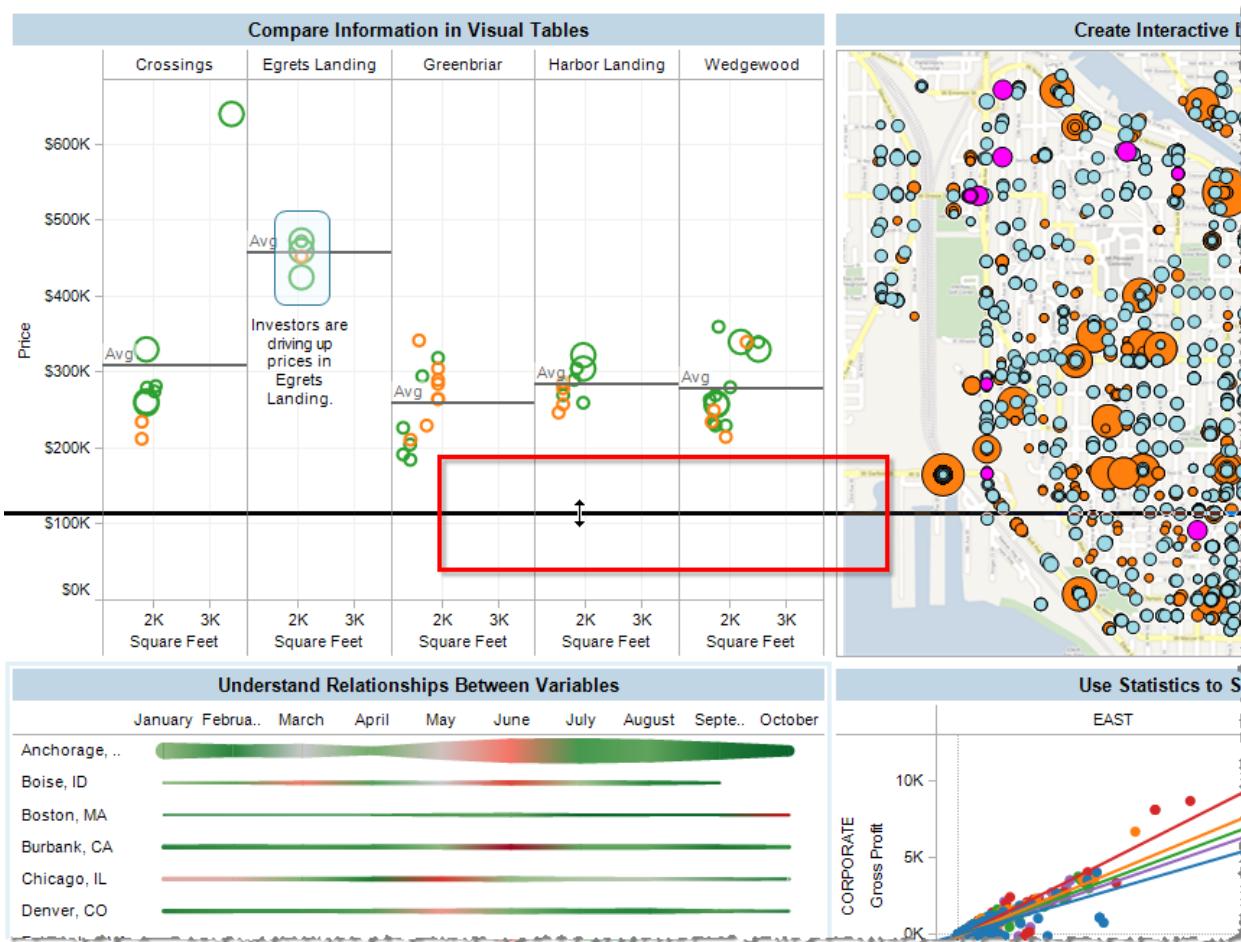
## Duplicate Fields in the View

Once you add fields to the view, you can duplicate them simply by hold down the **Ctrl** key on your keyboard while you drag it to another shelf. For example, in the view below, the **SUM(P)rofit** field is duplicated and placed on the **Text** shelf.



## Resize Individual Views in a Dashboard

When you have several views in a dashboard, you can click and drag the divider lines to resize each area of the dashboard. Typically, dragging a divider line resizes the entire row or column area, as shown below:



However, you can hold down the Shift key on your keyboard while dragging a divider line, to resize an individual view.

## Tableau Desktop Help

Market

Product Type	Product	Central				East		South		West		Grand Total	
		Sum of Sal..	Sum of Profit	Sum of Sal..	Sum of Profit	Sum of Sales	Sum of Profit	Sum of Sal..	Sum of Profit	Sum of Sal..	Sum of Profit	Sum of Sal..	Sum of Profit
Coffee	Amaretto	14,012	5,104	2,994	1,010			9,263	-1,224	26,269	4,890		
	Columbian	28,911	8,525	47,385	27,256	21,663	8,767	30,352	11,256	128,311	55,804		
	Decaf Irish Cream	26,157	9,635	6,262	2,726	11,596	2,935	18,233	-1,307	62,248	13,989		
Espresso	<b>Caffè Latte</b>					15,443	3,873	20,456	7,502	35,899	11,375		
	Caffe Mocha	1,646	-6,232	14,166	5,202	18,874	4,066	84,904	17,678				
	Decaf Espresso	720	2,411	15,381	5,930	30,578	12,302	78,162	29,502				
	Regular Espresso	1,031	10,065							24,031	10,065		
Herbal Tea	Chamomile	1,193	764	11,183	3,178	25,631	8,854	75,578	27,231				
	Lemon	177	7,902	14,494	2,593	32,273	13,121	95,926	29,869				
	Mint	991	-2,243			14,384	4,328	35,710	6,154				
Tea	Darjeeling	1,094	6,600			28,773	11,784	73,151	29,053				
	Earl Grey	507	3,404			27,382	10,426	66,772	24,164				
	Green Tea	5,209	1,227	11,576	5,654	16,065	-7,112	32,850	-231				
<b>Grand Total</b>		265,045	93,852	178,576	59,217	103,926	32,478	272,264	73,996	819,811	259,543		

Keep Only  
Exclude  
Format...  
Rotate Label  
✓ Show Header  
Edit Alias...  
**Show Product Nutrition and Details**

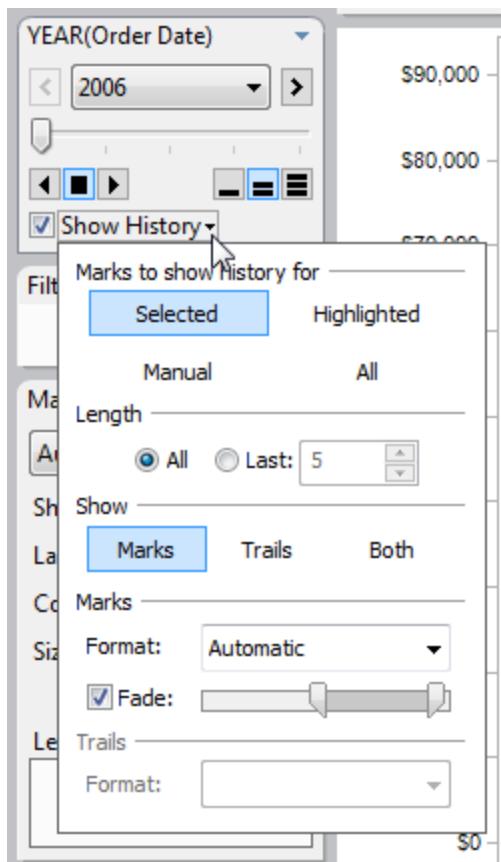
**Caffè Latte**  
Rich, full-bodied Starbucks® espresso in steamed milk lightly topped with foam.

**may we suggest?**  
Try something new  
[Cappuccino](#)

**nutrition facts table** (customize)

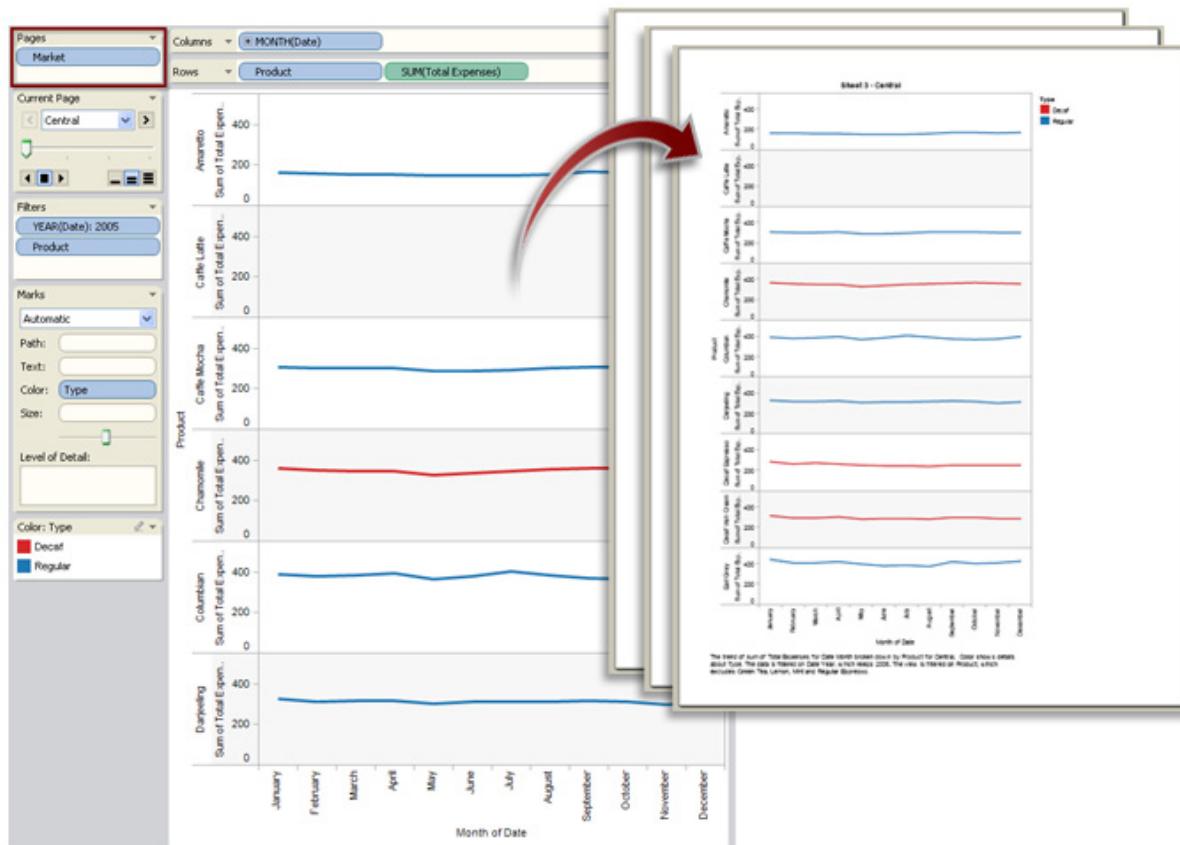
## Use the Pages Shelf to Split Large PDF Reports

When you publish a large view to a PDF, the entire view is either scaled to fit on a single page or the page size is scaled to fit the view. Either way, the view is not split well across several printable pages. You can use the pages shelf to split the report into meaningful sections that are then split into a multiple page PDF report. For example, the view below show the total monthly expenses by Product and Market. When published to a PDF, the page is really long.



If you move the Market field to the Pages shelf, the published PDF fits on a standard letter sized paper and contains four pages — one for each market.

## Tableau Desktop Help

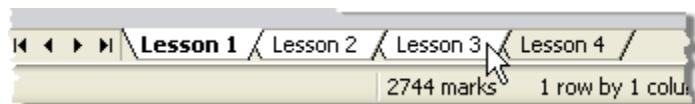


## Specify Page Setup for Multiple Worksheets

Before printing a single worksheet or several worksheets, you can specify how you want the document to look when printed using the Page Setup options. For example, you can specify whether to include the legends, titles, captions, margins, page orientation, and more. Each worksheet can have its own page setup. However, often you will want to specify global page setup options. Hold the Ctrl key to select one or more worksheets and then set the page setup options.

**To specify page setup for multiple worksheets:**

1. Hold the Ctrl key on your keyboard and select one ore more worksheets that you want to specify the page setup for.



2. Select File > Page Setup.
3. Make the necessary changes in the Page setup dialog box and click OK.

## Visual Cues for Fields

Tableau provides many visual cues to help you evaluate the type of data that's displayed in the Data window, and the state of a data view.

### Fields in the Data window

The following table explains each of the icons displayed in the Data window. Each icon in the table can be modified by one of four indicators.

- Blue icons indicate that the field is discrete. 
- Green icons indicate that the field is continuous. 
- Icons preceded by the equal sign (=) indicate that the field is a user-defined calculation or a copy of another field  

- Icons with an exclamation mark on them indicate that the field is invalid. 

Visual Cue	Description
   	The field contains text values.
     	The field contains numeric values.
     	The field contains only date values.
                             	The field contains both date and time values.
 	The field contains geographical data and has been assigned a geographic role. Use these field when building map views.
 	The field contains boolean (true or false) values.
 	The field is a calculation that is defined in the database by an administrator. These fields are marked with a cylinder icon and are not available for all data sources.
 	The field is a user-defined set.
 	The field is a server named set.
 	The field is a user filter, used when publishing to Tableau Server.
 	The field is a numeric bin.
 	The field is a group.

Visual Cue	Description
	The field is an attribute of a cube.
	The field is a varying attribute of a cube.
	The field is a level in a hierarchy. Levels greater than five are shown without numbers.
	The field is a hierarchy in a dimension that contains multiple hierarchies.

### Fields on Shelves

Fields placed on shelves use a combination of icons, colors, and text styles as visual cues.

Visual Cue	Description
State	A blue field on a shelf indicates a discrete field.
Sales	A green field on a shelf indicates a continuous field.
State	A bold name indicates a sorted field.
Year	The $\Sigma$ icon indicates a calculation filter (slicer).
MyGroup	The  icon indicates a set.
MyGroup	An italicized name indicates a filtered set.
MyGroup	A grey field with the  icon and indicates a context filter.
Profit	The delta icon indicates that the field is a table calculation.
Region	The plus and minus controls appear when the field is part of a hierarchy that you can drill down and up in.
Quarter	

# Keyboard Shortcuts

## *General Keyboard Shortcuts*

Tableau keyboard shortcuts are listed below.

Keyboard Shortcut	Description
Ctrl+A	Select all data
Ctrl+B	Smaller table
Ctrl+Shift+B	Larger table
Ctrl+C	Copy selected data
Ctrl+Alt+C	Place selected field on columns shelf
Ctrl+D	Connect to data source
Ctrl+E	Describe Sheet
Ctrl+F	Makes the find command in the Data window active
Ctrl+Alt+F	Place selected field on filters shelf
Ctrl+H	Switch in and out of Presentation Mode
Ctrl+Alt+I	Place selected field on size shelf
Ctrl+L	Flip orientation of column labels at bottom of view.
Ctrl+Alt+L	Place selected field on level of detail shelf
Ctrl+M	New worksheet
Ctrl+N	New workbook
Ctrl+O	Open file
Ctrl+Alt+O	Place selected field on color shelf
Ctrl+P	Print
Ctrl+Alt+P	Place selected field on pages shelf
Ctrl+Alt+R	Place selected field on rows shelf
Ctrl+S	Save file
Ctrl+Alt+S	Place selected field on shape shelf
Ctrl+Alt+T	Place selected field on text shelf

<b>Keyboard Shortcut</b>	<b>Description</b>
Ctrl+V	Paste clipboard
Ctrl+W	Swap rows and columns
Ctrl+X	Cut text selection (e.g., in captions, titles, formulas, etc.)
Ctrl+Alt+X	Place selected field on rows shelf
Ctrl+Y	Redo
Ctrl+Alt+Y	Place selected field on columns shelf
Ctrl+Z, Backspace	Undo
Ctrl + Alt + Backspace	Clear the current worksheet.
Ctrl+(left arrow)	Make rows narrower
Ctrl+(right arrow)	Make rows wider
Ctrl+(down arrow)	Make columns shorter
Ctrl+(up arrow)	Make columns taller
Ctrl+1, Ctrl+Shift+1, Ctrl+!	Show Me!
ENTER	Add the selected field to the sheet. Only works with a single field.
F1	Opens the Help
Ctrl+F4	Deletes the current worksheet or hides the worksheet if it is used in a dashboard
Alt+F4	Closes the current workbook
F4	Starts and stops forward playback on the pages shelf.
Shift + F4	Starts and stops backward playback on the pages shelf.
F5	Refreshes the data source.
Ctrl + .	Skip forward one page.
Ctrl + ,	Skip backward one page.
Ctrl+Tab, Ctrl+F6	Cycle forward through open worksheets
Ctrl+Shift+Tab, Ctrl+Shift+F6	Cycle backward through open worksheets
Ctrl + Click	Zooms out while in zoom mode
F9	Run Query
F10	Toggles Automatic Updates on and off

Keyboard Shortcut	Description
F12	Reverts workbook to last saved state.

## ***Navigation and Selection Shortcuts***

*In addition to the standard keyboard shortcuts there are several key combinations that can make navigating and selecting marks fast and easy.*

Keyboard/Mouse Action	Description
Click	Selects the mark.
Drag	Selects a group of marks.
Ctrl + Click	Adds individual marks to the selection.
Ctrl + Drag	Adds a group of marks to the selection.
Shift + Drag	Pans around the view.
Click and Hold + Drag	Pans around the view.
Double-click	Zooms into a point in the view.
Shift + Double-click	Zooms out.
Ctrl + Shift + Drag	Zooms into an area in the view.

## Updating the Software

*When you upgrade to Tableau 7.0 from previous versions, your repository is upgraded. Any bookmarks, workbooks, and data sources that you had in your old repository will still be accessible by the application. In addition, the new sample data sources and workbooks will replace the old samples unless you have modified them and saved them as your own.*

*If you have participated in the Tableau Software Beta, you also have a beta repository. While this folder will still exist, the application will no longer access it. To make your beta workbooks accessible in Tableau 7.0, copy the workbooks from the beta repository to your new 7.0 repository.*

## Accessing the Help

Tableau offers three ways to access the help topics. First, you can always view the online help by selecting Help > Help Topics in the application. You must have an internet connection to view these pages. However, you can download a copy of the help files to your hard drive so that you can open them even when you are not connected to the internet. Finally, you can choose to download a printable PDF version of the help. This section explains each of the three ways to view the help.

### **Viewing the Online Help**

The online help is the best way to access the most current documentation. You can open the help by selecting Help > Help Topics in the application or by pressing F1 on your keyboard. You must have an internet connection to access this help.

### **Download the Offline Help**

Although it is more efficient to view the help online, there may be times when you do not have access to the internet. In these cases, you may want a copy of the help stored on your computer. Download the offline help from the Tableau Community Center. You can view the Community Center by selecting Help > Community Center in the application.

You must have an internet connection to initially download the help, but any subsequent times you want to access the help you are not required to be online.

If you choose to download the help and use the offline version, please remember to update your local files periodically in order to ensure you are viewing the most recent information. Anytime you want to update your offline help files, repeat the download and overwrite the existing files.

#### **Note:**

If you download the offline help, Tableau will always open the local files when you select Help > Help Topics in the application. You can view the online help by visiting our Community Center. Select Help > Community Center.

### **Download a PDF**

You must have Adobe Reader to view this file. Adobe Reader is a free software that can be found on Adobe's Web site: [www.adobe.com](http://www.adobe.com). You can download the PDF from the Community Center, which can be accessed by selecting Help > Community Center in the application.

# Glossary

## Action

An action is interactivity that you can add to your views. There are three kinds of actions: Filter, Highlight, and URL.

## Aggregation

An aggregation results from a mathematical operation applied to a measure. Predefined aggregations include summation, average, and so on. Dimensions can be converted to measures by aggregating them as a count.

For relational data sources, all measures must be either aggregated or disaggregated (unless they appear on the Filters shelf). Tableau automatically aggregates measures, usually as a summation, when they are placed on a shelf. For multidimensional (OLAP) data sources, aggregations are defined when the cube is created and cannot be modified in Tableau.

## Alias

An alias is an alternative name assigned to a field or to a dimension member. Tableau supports both field aliases and member aliases.

## Axis

An axis is displayed in a table when you place a continuous field on the Rows or Columns shelf. The axis labels are given by the name of the measure.

## Bookmarks

Bookmarks contain the data view from a single worksheet. You can create and display bookmarks using the Bookmark menu.

Bookmarks behave like web browser bookmarks. They can be accessed without opening any other document and are a convenient way to quickly display different analyses. You should save bookmarks in the `bookmarks` folder of the Tableau repository.

## Caption

A description of the current view on the active worksheet. For example, “Sum of Sales for each Market”. Captions can be automatically generated or custom. Show and hide the caption by selecting Worksheet > Show Caption.

## Cell

Any table you create in Tableau has the cell as its basic element. Controlling cells to enhance your data view is useful for text tables and heat maps.

## Color Legend

The color legend displays the colors associated with a measure or dimension members. The default legend is modified when you place a dimension or a measure on the Color shelf.

## Color Shelf

The Color shelf allows you to encode data by assigning different colors to the marks in a data view. The shelf accepts a measures or a dimension.

When you place a dimension on the Color shelf, Tableau separates the marks according to the members in the dimension, and assigns a unique color to each member. When you place a measure on the Color shelf, Tableau draws each mark with a different color using a continuous range. In both cases, a legend describes the color encoding.

## Columns Shelf

The Columns shelf allows you to create the columns of a data table. The shelf accepts any number of dimensions and measures.

When you place a dimension on the Columns shelf, headers for the members of that dimension are created. When you place a measure on the Columns shelf, quantitative axes for that measure are created.

## Cross-tab

In Tableau, a cross-tab is another name for a text table. Text tables provide an easy way to display the numbers associated with dimension members.

## Custom Geocoding

Tableau comes with built in geocoding data so that you can plot your data on a map. Custom Geocoding is when you add your own location data to extend the built in geocoding.

## Dashboard

A dashboard is a collection of several worksheets shown in a single location where you can compare and monitor a variety of data simultaneously.

## Data View / View

A data view, also referred to simply as a view, is a representation of your data in a Tableau worksheet or dashboard. You can create data views by placing fields on shelves.

## Data window

The Data window displays the fields of the data sources to which Tableau is connected. The fields are divided into dimensions and measures. The Data window also displays custom fields such as calculations, binned fields, and groups.

You build views of your data by dragging fields from the Data window onto the various shelves that are a part of every worksheet.

## Data Source

To build data views, you must connect to a data source. Tableau supports many standard relational and multidimensional (OLAP) sources.

When connected, Tableau does not save a copy of your data. Instead, it saves information about where the data source is located. When you build data views, Tableau sends the appropriate queries to your data source. A convenient location to save data sources is the `data sources` folder of the Tableau repository.

## Dimensions

Dimensions are independent fields. Dimensions typically hold discrete data such as hierarchies and members that cannot be aggregated. Examples of dimensions include dates, customer names, and customer segments. Tableau does, however, support continuous dimensions.

## Encoding

In Tableau, encoding refers to a particular visual representation of your data. You can encode your data by color, shape, size, and path using the associated worksheet shelves.

## Fields

Field is another name for a dimension or a measure. All databases contain fields. Fields contain data.

For relational data sources, fields are the columns of a table. For multidimensional (OLAP) data sources, fields are the dimensions of a cube. Each dimension or column contains a unique attribute of the data such as customer name, sales, product type, and so on.

## Field Label

Field labels are titles that indicate the fields that are used in a view. For example, in a view that has rows for East, Central, and West might have a Region field label at the top of the column indicating that each row is a member of the Region field.

## Filters Shelf

The Filters shelf allows you to exclude data from a view. You can filter data using measures, dimensions, and both measures and dimensions at the same time.

You can filter data based on the fields that make up the columns and rows of the table. This is called an internal filter. You can also filter data based on fields that do not compose the table. This is called an external filter.

## Format window

The Format window is a pane that, when open, displays on the left side of the workbook. The Format window contains formatting settings that control the entire worksheet as well as individual fields in the view.

## Group

A group is a field consisting of dimension members that have been combined into higher level categories. For example, a dimension that contains states could be grouped into regions using Groups. Groups are marked with a paper clip icon in the Data window.

## Headers

Headers are displayed in a table when you place a dimension on the Rows or Columns shelf. The header labels are given by the dimension member names.

## Level of Detail Shelf

The Level of Detail shelf allows you to separate the marks in a data view according to the level of detail (members) of a dimension.

The shelf works only if your data are aggregated. If your data are disaggregated, then it isn't possible to separate the marks into additional levels of detail. Additionally, placing a measure on the shelf has no effect on the table structure because measures do not contain members.

## Marks

Marks visually represent one or more rows in a data source. Mark types can be a bar, line, square, and so on. You can control the type, color, and size of marks.

Tableau can automatically select a mark type, or you can manually select the mark type from the Mark menu.

## Measures

Measures are fields that are dependent variables. They are typically quantitative fields or calculated fields like sales, temperature or frequency. Discrete measures can also be created in Tableau.

## Multidimensional Data Source

In Tableau, a multidimensional (OLAP) data source can be a Microsoft Analysis Services cube or an Oracle Essbase cube.

## Pages Shelf

The page shelf lets you split a view into a sequence of pages based on the members and values in a discrete or continuous field. Adding a field to the Page shelf is like adding a field to the Rows shelf except a new page is created for each new row.

## Pane

Tables consist of one or more panes. The number of panes in a view depends on the number and type of fields placed on the Rows and Columns shelves.

## Path Shelf

The Path shelf allows you to encode data by connecting marks using a particular drawing order. The shelf accepts measures and dimensions.

Dimensions connect the marks according to the members in the dimension. If the dimension is a date, the drawing order is given by the date order. If the dimension holds words, the line is drawn based on the order of the words in the data source. Measures connect the marks according to the values of the measure. The measure can be aggregated or disaggregated.

## Query

Tableau communicates with your databases with queries. Queries are questions that databases can understand and answer. Common query languages include SQL and MDX.

Every time you build a view of your data, Tableau translates your actions into queries and retrieves the requested information from the data source. If you are building a dense data view, you can turn queries off until all desired fields are placed on shelves.

## Relational Data Source

In Tableau, a relational data source can be an Excel workbook, an Access database, a comma delimited text file, a MySQL database, an Oracle database, a SQL Server database, a Firebird database, a PostgreSQL database, or a Tableau Data Extract file.

## Repository

The Tableau repository holds workbooks, bookmarks, and data sources. It is located in a folder called `My Tableau Repository` inside of your `My Documents` folder.

## Rows Shelf

The Rows shelf allows you to create the rows of a data table. The shelf accepts any number of dimensions and measures. When you place a dimension on the Rows shelf, headers for the members of that dimension are created. When you place a measure on the Rows shelf, quantitative axes for that measure are created.

## Set

A set is a custom field you create by filtering existing dimensions. They appear at the bottom of the Data window in the Sets area. The three main uses of a set are to create a subset of the data, apply a numerical or a top N filter, and to create unique encodings. You can use sets in data views just like any other dimension.

## Shape Legend

The shape legend displays the shapes associated with dimension members. The legend appears on worksheets that have a dimension placed on the Shape shelf.

## Shape Shelf

The Shape shelf allows you to encode data by assigning different shapes to the marks in a data view. The shelf accepts dimensions only.

When you place a dimension on the shelf, Tableau separates the marks according to the members of the dimension, and a legend describes the encoding. You cannot place a measure on the shelf because measures do not contain members.

## Shelves

You build views of your data by placing fields onto the shelves that are a part of every worksheet.

Some shelves are available only when certain mark types are selected. For example, the Shape shelf is available only with the Shape mark type.

## Size Shelf

The Size shelf allows you to encode data by assigning different sizes to the marks in a data view. The shelf accepts measures and dimensions.

When you place a dimension on the shelf, Tableau separates the marks according to the members in the dimension, and assigns a unique size to each member. When you place a measure on the shelf, Tableau assigns a different size to each mark using a continuous range.

## Table

The visual presentation of a data view is contained within a table. Tables consist of panes, headers, axes, and cells.

## Text Shelf

The Text shelf allows you to view the numbers associated with a data view, and to encode data by assigning text labels to the marks. The most common view using the Text shelf is a text table. The shelf accepts measures and dimensions.

## Undo/Redo

You can undo any action in Tableau by clicking Undo on the toolbar. Likewise, you can redo any action by clicking Redo on the toolbar.

Using Undo and Redo, you can quickly return to a previous view or you can browse all the views of a data source that you have created. The undo/redo history is not saved between Tableau sessions.

## **Workbooks / Packaged Workbooks**

Workbooks hold one or more worksheets and dashboards. By saving a workbook, you can save all open sheets in one file that can then be easily shared.

## **Worksheets**

Worksheets hold your data views. You can save individual worksheets as bookmarks.

Each worksheet can be connected to only one data source. However, different worksheets in a workbook can be connected to different data sources.

# Examples

## Examples

*This section includes detailed examples that show you how to build data views. The examples are categorized first by chart type, and then by other criteria such as encodings, sorting, and so on. All examples use the Superstore Sales Excel data source that's included with Tableau.*

*There are many types of data views you can create in Tableau, and this collection of examples cannot include every type. However, many basic types are included in one form or another.*

### Note:

*For simplicity, the terms “Dimension” and “Measure” in this section are shorthand for “Discrete Dimensions” and “Continuous Measures.” The features described here, however, may also apply to Continuous Dimensions and Discrete Measures. For a full discussion of data types and data roles refer to [understand\\_datafields.html#Id1129G0190E6](#).*

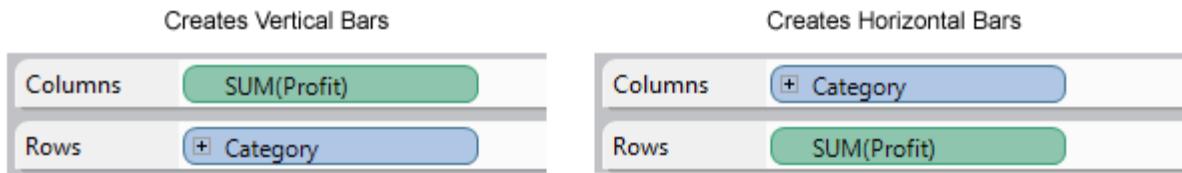
- [Bar Chart](#)
- [Text Table](#)
- [Line Chart](#)
- [Scatter Plot](#)
- [Heat Map](#)
- [Gantt Bar Chart](#)
- [Pie Chart](#)

# Bar Chart

## Bar Chart

Bar charts are a great way to compare data across categories, or when you want to break data down into stacked bars. In Tableau, you typically create a bar chart by placing a dimension and a measure as the inner fields on the Rows and Columns shelves (or vice versa).

A bar chart uses the bar mark type. Tableau can automatically select this mark type if the data view matches one of the two types shown below and the Mark menu is set to Automatic. You can have as many fields as you like on these shelves provided a dimension and a measure are innermost.



Alternatively, you can manually select Bar from the Mark menu for any data view. Refer to [Bar Mark](#) for information about this mark type.

The following examples show you how to use bar charts to explore your data:

- [Bar Chart–Basic](#)
- [Bar Chart–Color-Encoded](#)
- [Bar Chart–Color Encoded Nested Table](#)
- [Bar Chart–Filtered and Color-Encoded](#)
- [Bar Chart–Color Encoded and Sorted](#)
- [Bar Chart–Filtered, Color Encoded, and Level of Detail](#)

## Bar Chart–Basic

*This view displays the sum of the sales for each year as a bar chart. You can create the view with the following procedure.*

1. Place the Order Date dimension on the Columns shelf.

*The date is automatically aggregated by year and headers are created with labels given by the dimension member names.*

2. Place the Sales measure on the Rows shelf.

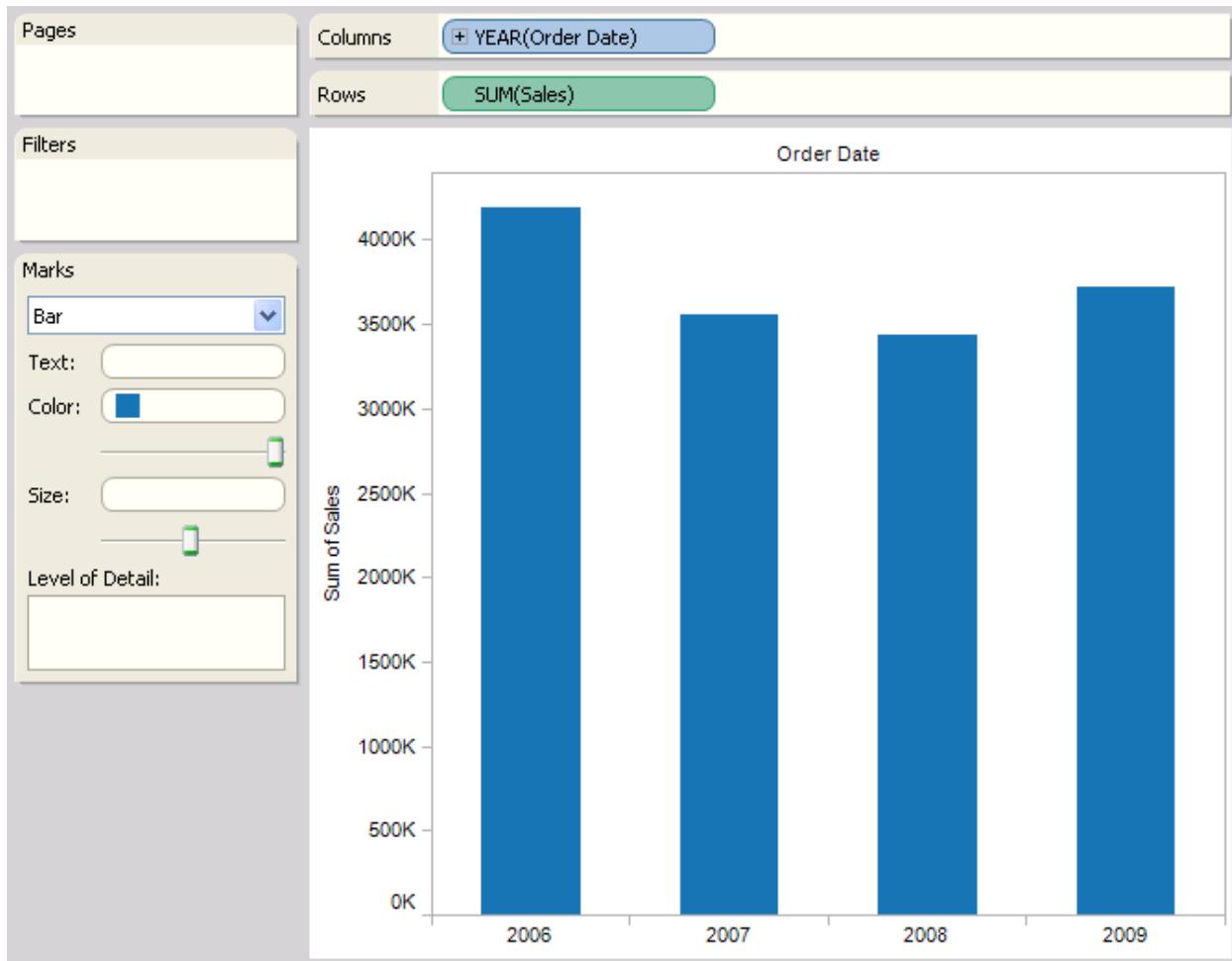
*The measure is automatically aggregated as a summation and an axis is created with a label given by the name of the field.*

3. Select Bar from the Mark menu.

*Tableau automatically selects Line as the mark type because a date dimension is displayed. If a different dimension was used that was not a date, Tableau would have automatically selected Bar. For this particular example, the Bar mark makes it easier to analyze the data.*

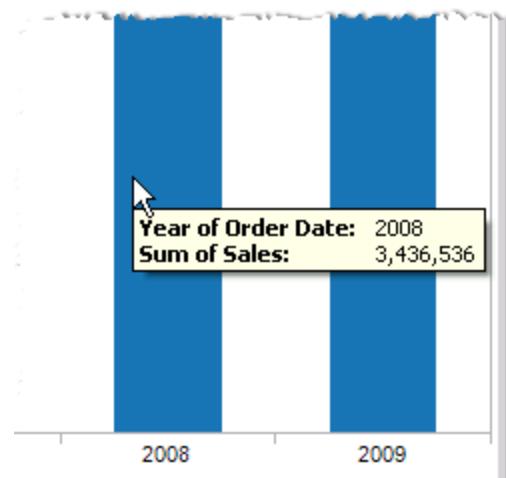
*The view is shown below.*

## Tableau Desktop Help



*The marks are vertical because the axis is vertical. The length of each mark represents the sum of the sales for each year. For example, the sum of the sales in 2008 is \$3,436,536.*

*You can display this number with tool tips by placing the mouse cursor over the mark.*



## Bar Chart—Color-Encoded

This view displays the sum of the sales for each product category and is color-encoded by ship mode. You can create the view with the following procedure.

1. Place the Product 1 - Category dimension on the Columns shelf.

*Headers are created with labels given by the product categories..*

2. Place the Total measure on the Rows shelf.

*The measure is automatically aggregated as a summation, and an axis is created with a label given by the field name.*

3. Place the Ship Mode dimension on the Color shelf.

*Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.*

*The view is shown below.*

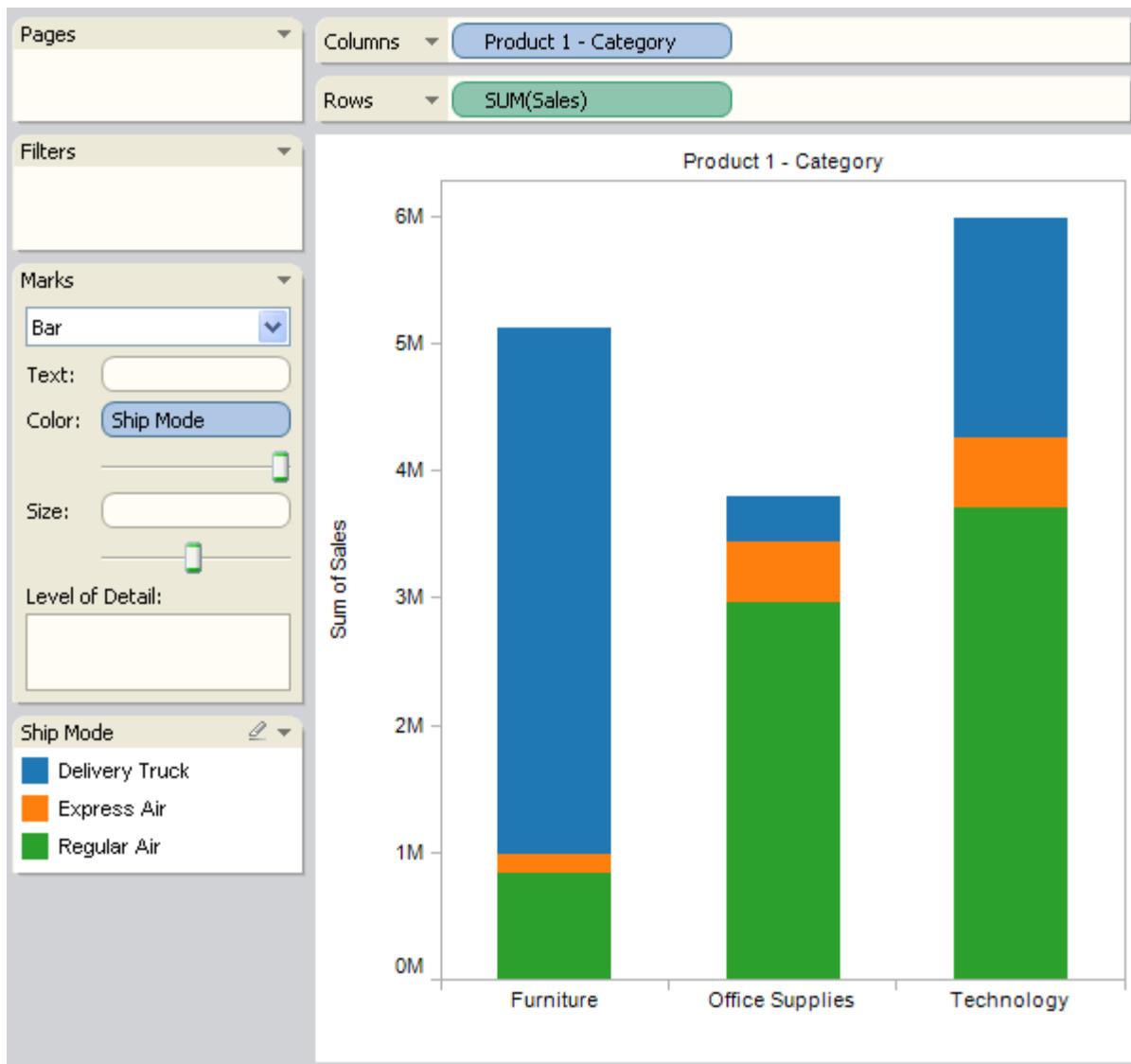
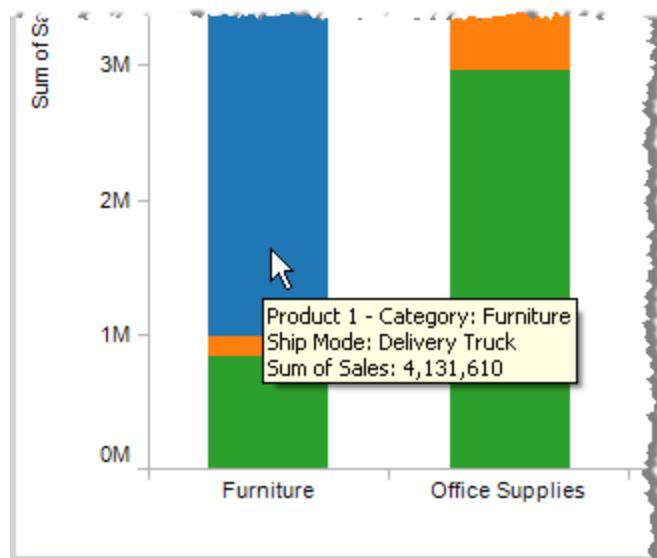


Tableau automatically stacks the marks, which means the bars are drawn cumulatively and “stacked” on each other. The stacking order is reflected in the color legend. Refer to [Stacking Marks](#) for more information. The length of each colored bar segment represents the sales for the products that are categorized in one of the three categories and were shipped using one of the three ship modes. For example, the sum of the sales for furniture shipped by delivery truck is \$4,131,610.

## Tableau Desktop Help



## Bar Chart—Color Encoded Nested Table

This view displays the sales in a nested table as a function of year, region, and customer segment. Additionally, the data are color-encoded by product category. You can create the view with the following procedure.

1. Place the Order Date and Region dimensions on the Columns shelf.

The date is automatically aggregated by year, and headers are created for each dimension with labels given by the dimension member names.

2. Place the Sales measure and the Customer Segment dimension on the Rows shelf.

The measure is automatically aggregated as a summation, and an axis is created with a label given by the field name. Headers are created for the dimension with labels given by the dimension member names.

3. Place the Product 1 - Category dimension on the Color shelf.

Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

The view is shown below.

## Tableau Desktop Help



## Bar Chart—Filtered and Color-Encoded

This view displays the sales and profit for all regions for the consumer market for each quarter in the year 2008. Additionally, the data are color-encoded by product category.

You can create the view with the following steps.

1. Place the Order Date and the Region dimensions on the Columns shelf.

The date is automatically aggregated by year, and headers are created for each dimension with labels given by the dimension member names. Change the date aggregation to quarter by selecting Quarter from the context menu.

2. Place the Sales and Profit measures on the Rows shelf.

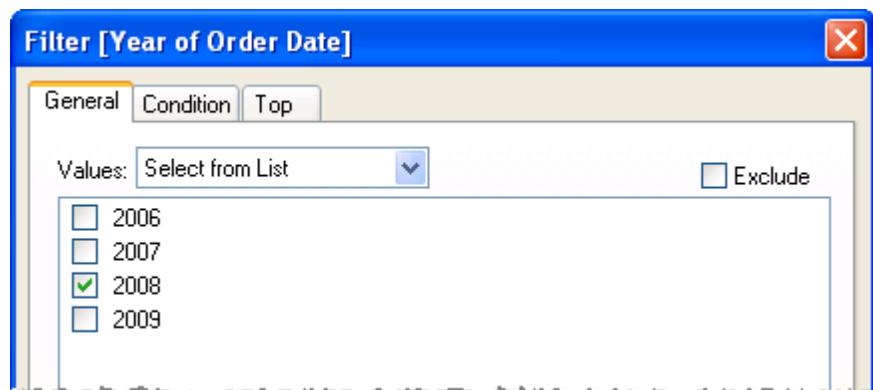
The measures are automatically aggregated as a summation, and axes are created with labels given by the field names.

3. Place the Product 1 - Category dimension on the Color shelf.

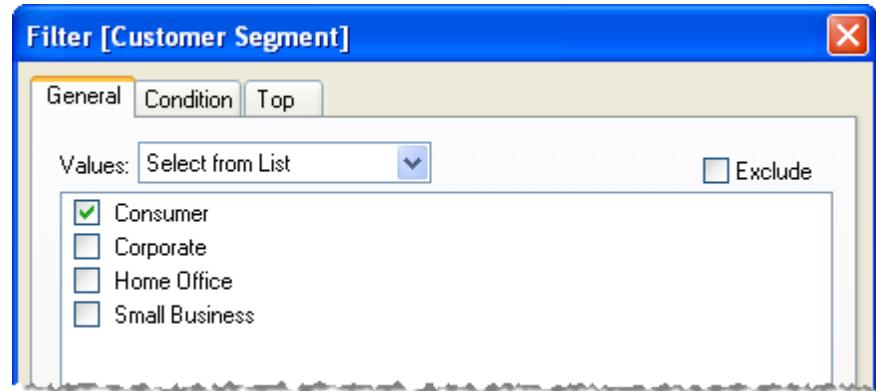
Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

4. Place the Order Date and Customer Segment dimensions on the Filters shelf.

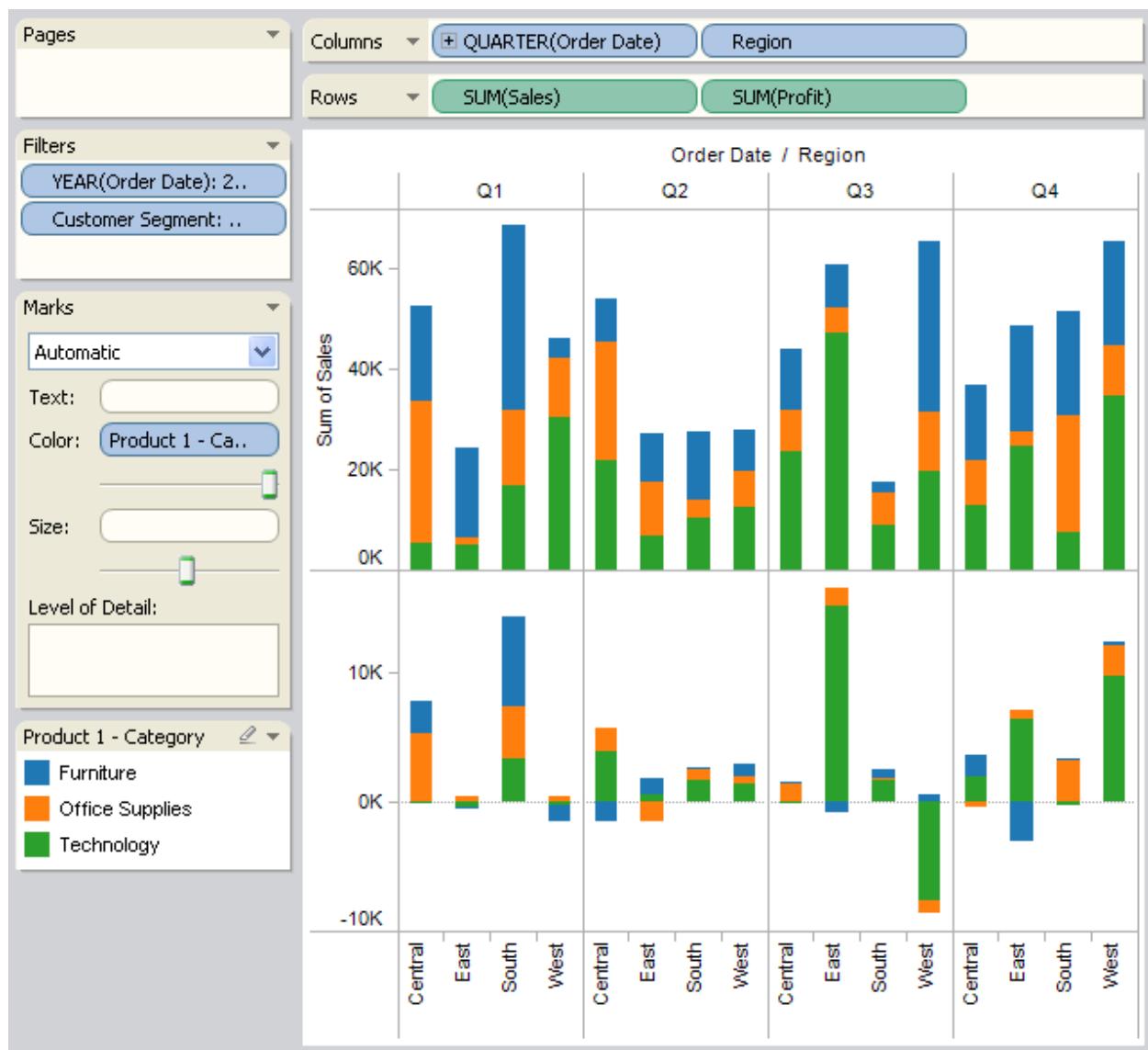
Filter Order Date to include only the year 2008. You open the filter dialog box by selecting Filter from the field's context menu.



*Filter Customer Segment to include only the consumer market. You open the filter dialog box by selecting Filter from the field's context menu.*



*The view is shown below. Note that the mark borders are not displayed so that color encodings are more easily identified.*



## Bar Chart—Color Encoded and Sorted

This view displays the sum of the profit for each customer and is color-encoded by the average sales. The data are sorted from highest to lowest profit for the top 15 customers. You can create the view with the following procedure.

1. Place the Profit measure on the Columns shelf.

The measure is automatically aggregated as a summation and an axis is created with a label given by the name of the field.

2. Place the Customer Name dimension on the Rows shelf.

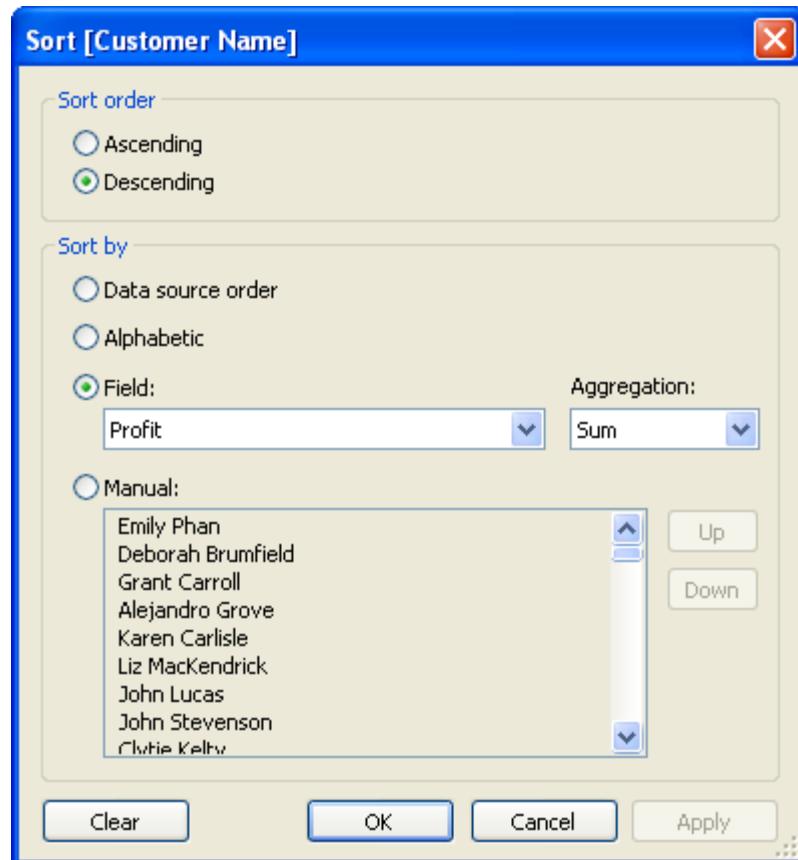
Row headers are created with labels given by the dimension member names.

3. Place the Sales measure on the Color shelf.

The measure is automatically aggregated as a summation. Change the aggregation to an average by selecting Average from the field's context menu. The color legend reflects the continuous data range.

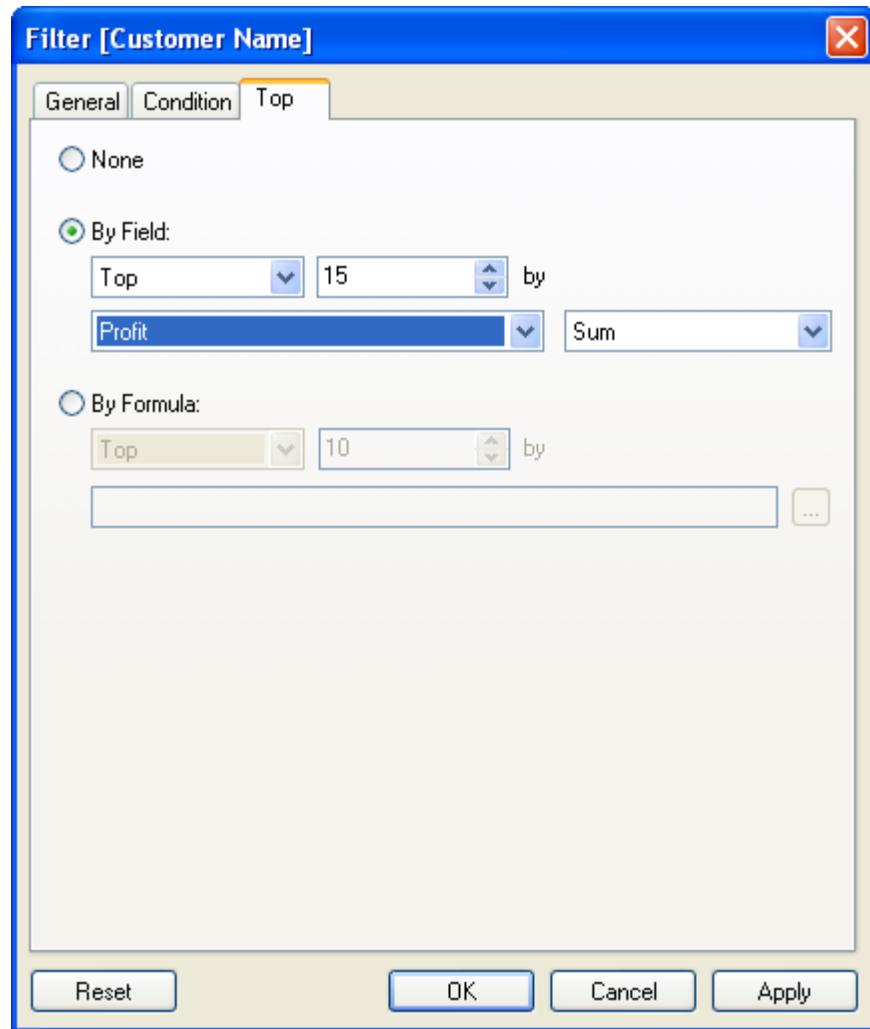
4. Sort Customer Names.

Complete the Sort dialog box so that Sort order is Descending and Sort by is Profit aggregated as a summation.



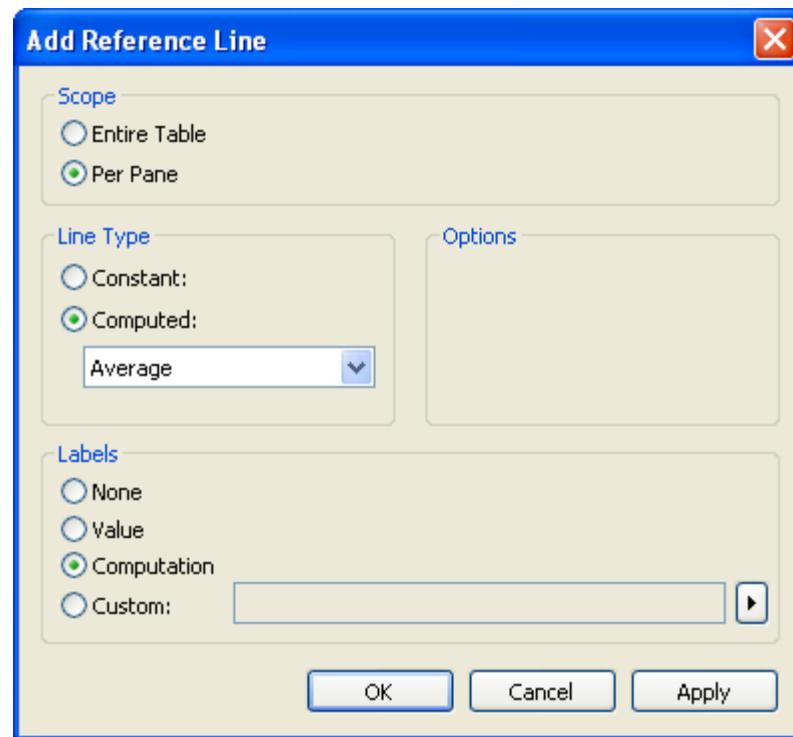
5. Filter the data to include only the top 15 customers based on profit.

You can create this filter using the Limit tab in the filter dialog box. Select By Field and complete the definition by making selections on the drop-down lists. To learn more about defining filters refer to [Adding Filters](#).

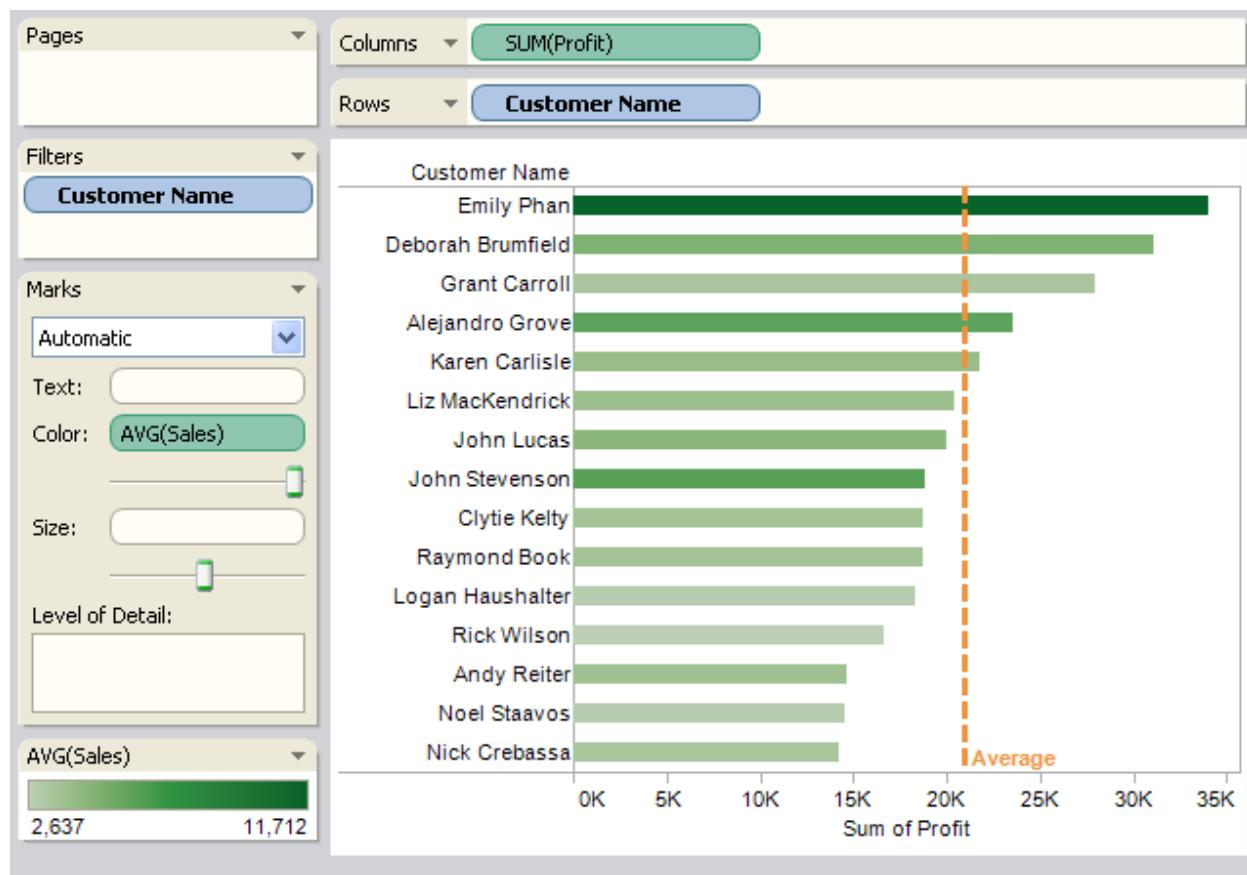


6. Add a reference line that indicates the average profit.

*Right-click the SUM(Profit) axis and select Add Reference Line. In the subsequent dialog box, select Average for the computed line type and computation for the label.*



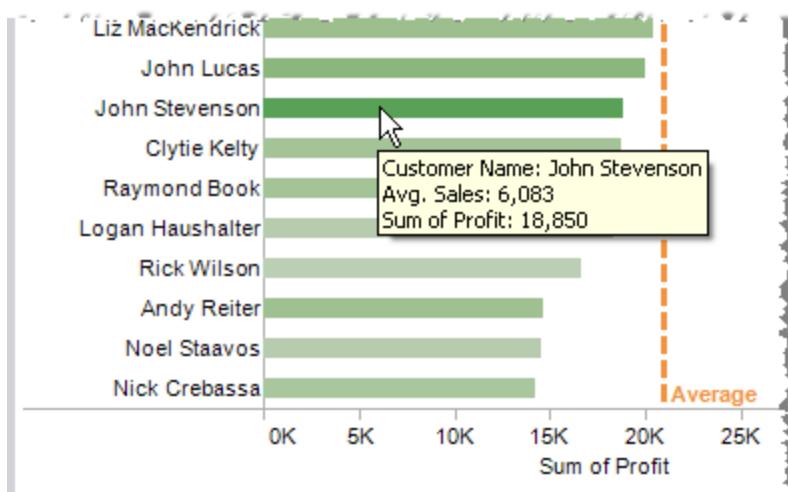
*The view is shown below.*



*The marks are horizontal because the axis is horizontal. The length of each mark represents the sum of the profit for customer and the color of each mark gives the average sales. For example, the average sales for John Stevenson is \$6,083 and his profit is \$18,850. You can display these numbers with tool tips by placing the mouse cursor over the mark.*

**Note:**

*You can format reference lines by right-clicking on the line itself and selecting Format. Refer to [Reference Lines and Bands](#) to learn more.*



Notice that for similar profit sums, there is a wide range of average sales as indicated by the bottom six rows in the table. For example, John Stevenson and Clytie Kelty have essentially the same profit, but John has a much higher average sales as indicated by the darker color.

## Bar Chart—Filtered, Color Encoded, and Level of Detail

This view displays the sum of the sales for a product category and is color-encoded by year. Additionally, the data display a level of detail given by the customer segment and are filtered to display a sales sum that is greater than \$100,000.

You can create the view with the following steps.

1. Place the Sales measure on the Columns shelf.

The measure is automatically aggregated as a summation and an axis is created with a label given by the name of the field.

2. Place the Product 3 - Name dimension on the Rows shelf.

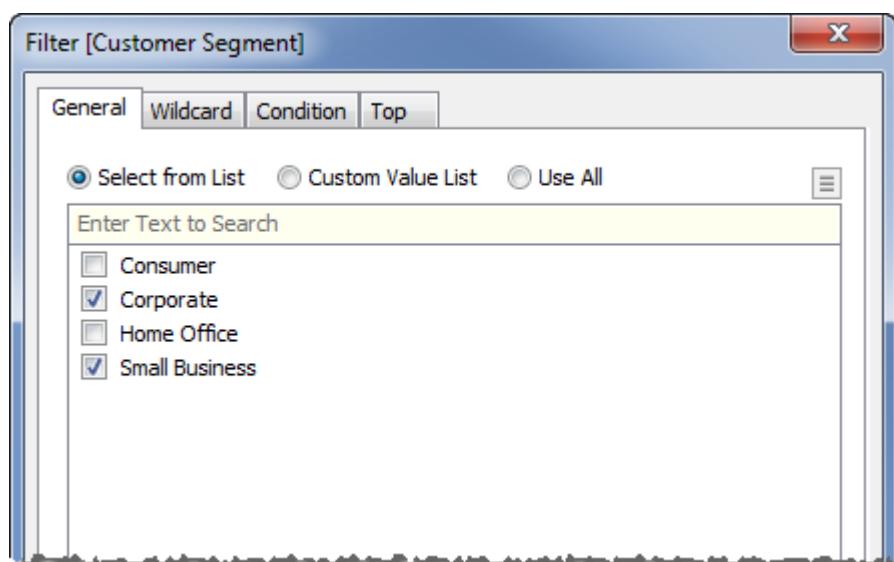
Row headers are created with labels given by the dimension member names.

3. Place the Order Date dimension on the Color shelf.

Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

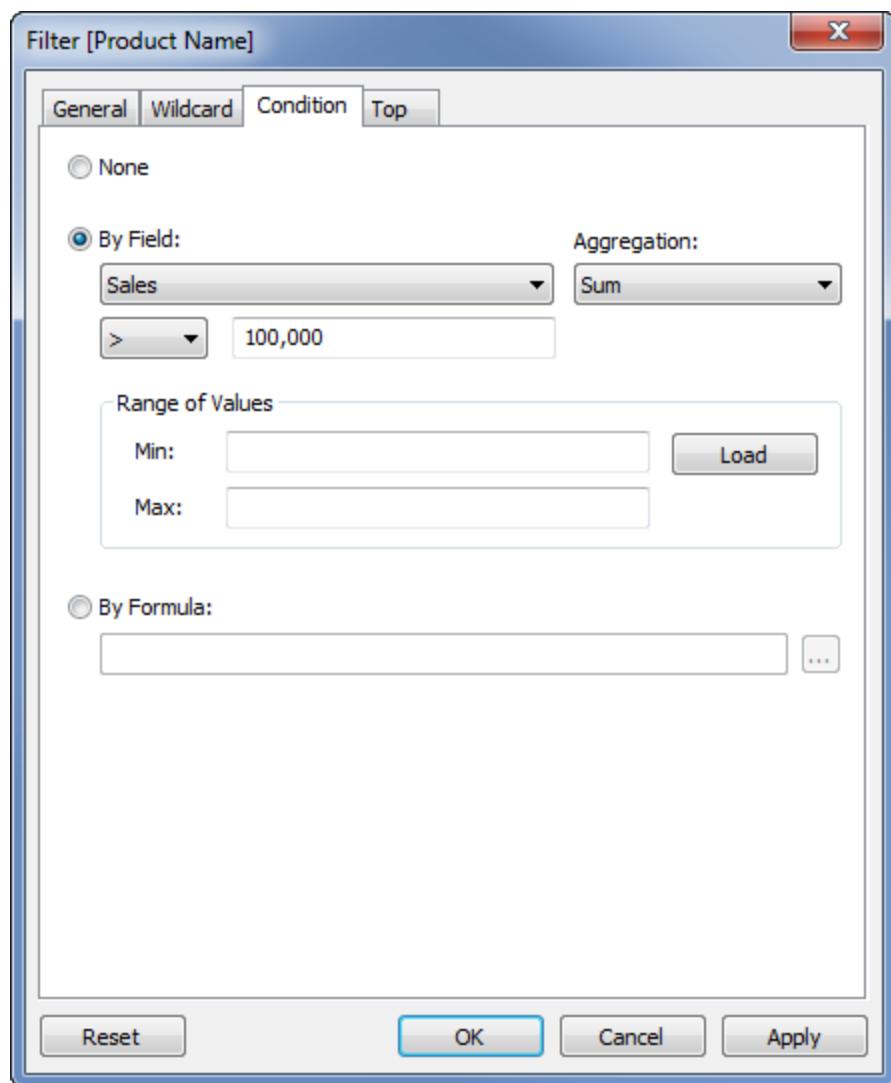
4. Place the Customer Segment dimension on the Level of Detail shelf.

Filter the dimension to include only the Corporate and Small Business customer segments.



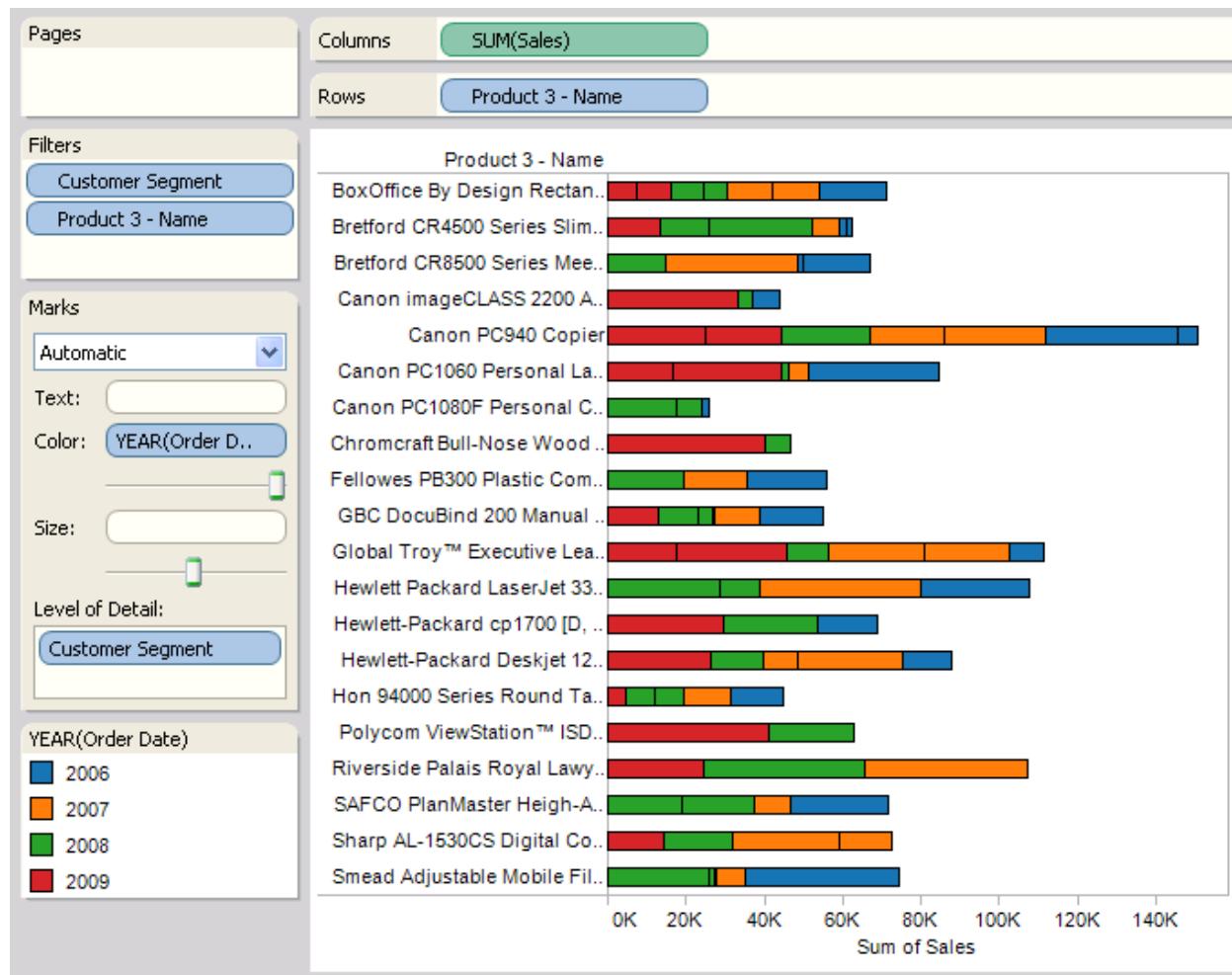
5. Filter Product 3 - Name by sales.

Filter the Product 3 - Name field to include only products whose sales are greater than \$100,000. To filter a dimension by a measure, use the Condition tab in the Filter dialog box. Select By Field and define the filter using the drop-down lists. Refer to [Adding Filters](#) to learn more about defining filters.



The view is shown below.

## Tableau Desktop Help



*The total length of a given mark represents the sum of the sales for the associated product. Additionally, each mark is color-encoded by year. The length of a colored segment represents the contribution to the sales for the associated year. Finally, each colored segment can be separated into two levels of detail: corporate and small business.*

### Note:

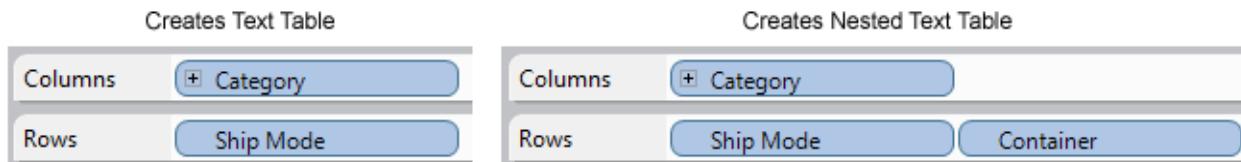
*By default, mark borders are turned off. However, in this case it makes more sense to have them turned on so that the customer segment detail can be identified. You can turn off mark borders by selecting the Format > Marks menu item.*

# Text Table

## Text Table

*Text tables (also called cross-tabs or Pivot Tables) provide an easy way to display the numbers associated with categorical data. In Tableau, you typically create a text table by placing a dimension as the innermost field on both the Rows and the Columns shelf. Given this description, a typical text table will use only dimensions for the rows and columns of a table. You then complete the view by placing a field (usually a measure) on the Text shelf.*

*A text table uses the text mark type. Tableau can automatically select this mark type if the view is constructed using only dimensions as shown below, and the Mark menu is set to Automatic.*



*Alternatively, you can manually select Text from the Mark menu for any data view. Refer to [Text Mark](#) for information about this mark type.*

*The following examples show you how to use text tables to explore your data:*

- [Text Table–Basic](#)
- [Text Table–Filter and Color Encode](#)
- [Duplicate as Crosstab](#)

## Text Table—Basic

This view displays the profit as a function of product category, year, and region as a text table.

You can create the view with the following procedure.

1. Place the Order Date dimension on the Columns shelf.

The date is automatically aggregated by year, and column headers are created with labels given by the dimension member names.

2. Place the Product 2 - Sub-Category dimension on the Rows shelf.

Row headers are created with labels given by the dimension member names.

3. Place the Sales dimension on the Text shelf.

The measure is automatically aggregated as a summation.

The view is shown below.

		Order Date			
	Product 2 - Sub-Category	2006	2007	2008	2009
Appliances	170,657	216,660	168,657	191,359	
Binders and Binder Accesso..	360,210	178,639	185,123	300,550	
Bookcases	253,942	263,566	140,664	163,810	
Chairs & Chairmats	518,011	380,704	451,249	394,181	
Computer Peripherals	215,565	175,327	191,042	214,620	
Copiers and Fax	273,287	339,713	280,821	236,541	
Envelopes	31,376	51,093	39,308	54,521	
Labels	10,364	7,393	12,937	8,350	
Office Furnishings	194,770	162,197	164,979	143,966	
Office Machines	732,505	446,780	428,749	563,308	
Paper	118,093	119,516	100,490	111,397	
Pens & Art Supplies	42,340	46,728	42,671	35,786	
Rubber Bands	3,142	3,754	4,375	3,969	
Scissors, Rulers and Trimme..	16,653	6,877	10,645	46,821	
Storage & Organization	297,775	289,979	243,495	268,525	
Tables	478,981	429,657	500,322	478,255	
Telephones and Communica..	472,252	442,048	471,010	504,005	

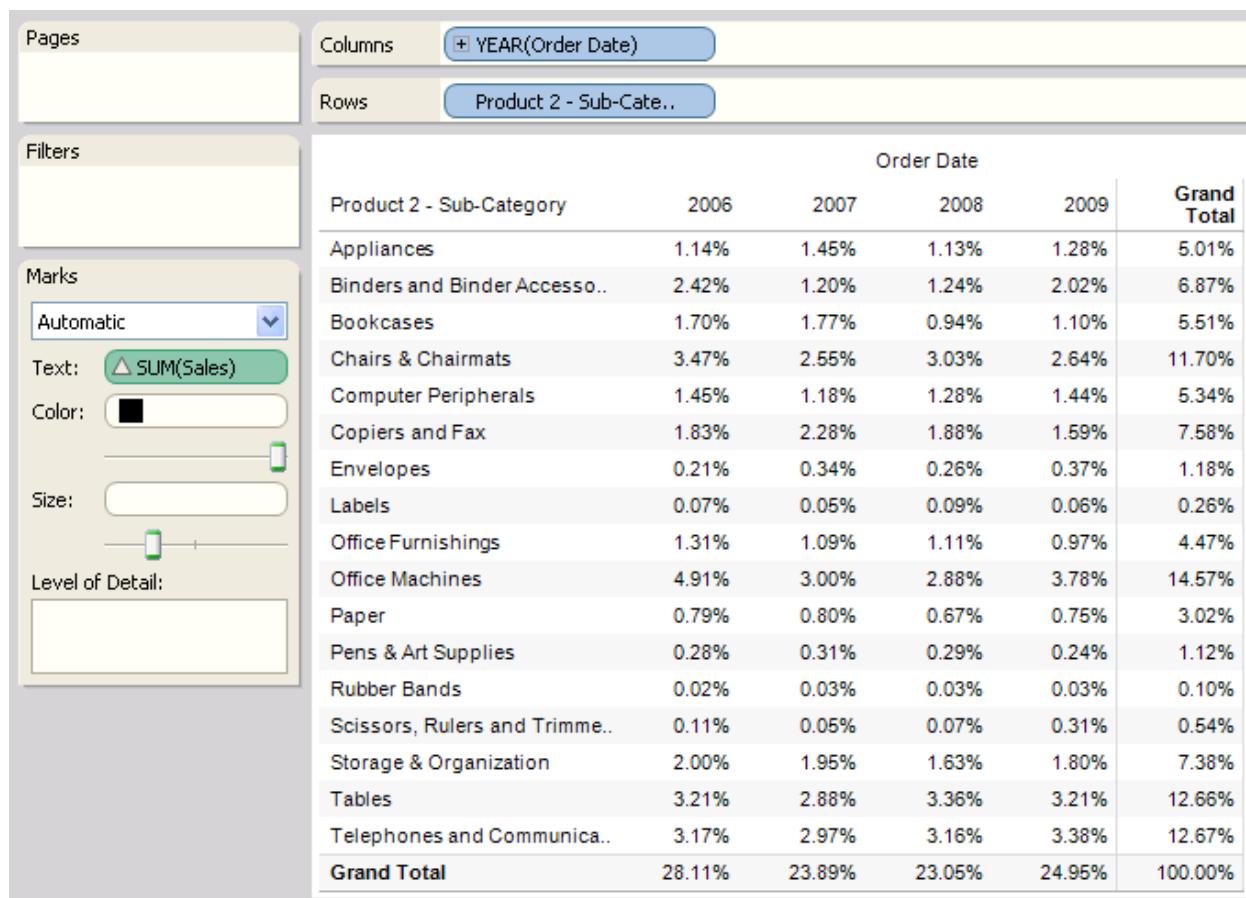
Tableau automatically selects the mark type as text and the mark color as black. Each cell in the table displays the sum of the sales.

The data show that office machines account for the largest sales almost all of the four years. Suppose that instead of displaying the raw numbers, you want to display:

- The percentage of each cell with respect to the entire table.
- The grand totals for the rows and columns.

When your data are displayed in a text table, it is easy to do. To display percentages, select one of the percentage options on the Analysis > Percentage of... menu, and to show grand totals select either Table > Grand Totals for Columns or Table > Grand Totals for Rows.

The view is shown below.



*The interpretation of the data is as follows:*

- *Each data cell reflects the percentage of the entire table. For example, computer peripherals in 2006 accounted for 1.45% of the total sales across all years and all products.*
- *The grand totals for rows is the bottom-most row in the table. Each cell reflects the percent contribution for a given year. For example, 2007 contributed 23.89% of the total sales across all years and all products.*
- *The grand totals for columns is the right-most column in the table. Each cell reflects the percent contribution for a given product. For example, envelopes accounted for 1.18% of the total sales across all years and all products.*

Refer to [Percentages](#) for more information about displaying percentages.

## Text Table—Filter and Color Encode

This view is a text table that displays the profit as a function of product category, year, and region. Additionally, the data are color encoded by product category and filtered to exclude negative profits.

You can create the view with the following procedure.

1. Place the Order Date dimension on the Columns shelf.

The date is automatically aggregated by year, and headers are created with labels given by the dimension member names.

2. Place the Product 2 - Sub-Category dimension on the Rows shelf.

Row headers are created with labels given by the dimension member names.

3. Place the Sales measure on the Text shelf.

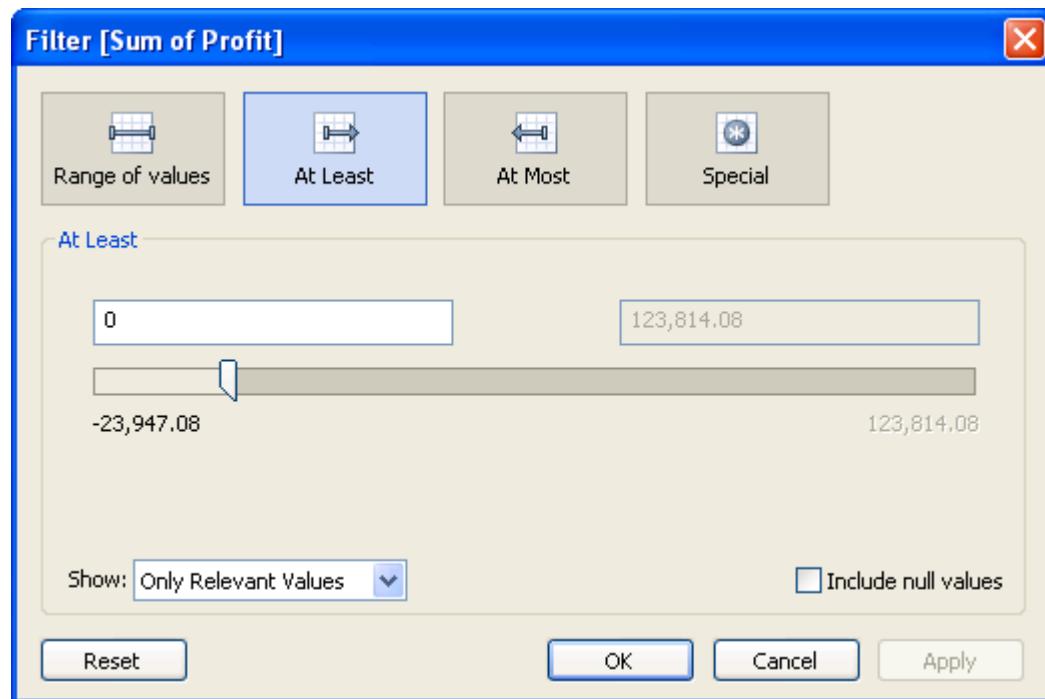
The measure is automatically aggregated as a summation.

4. Place the Product 1 - Category dimension on the Color shelf.

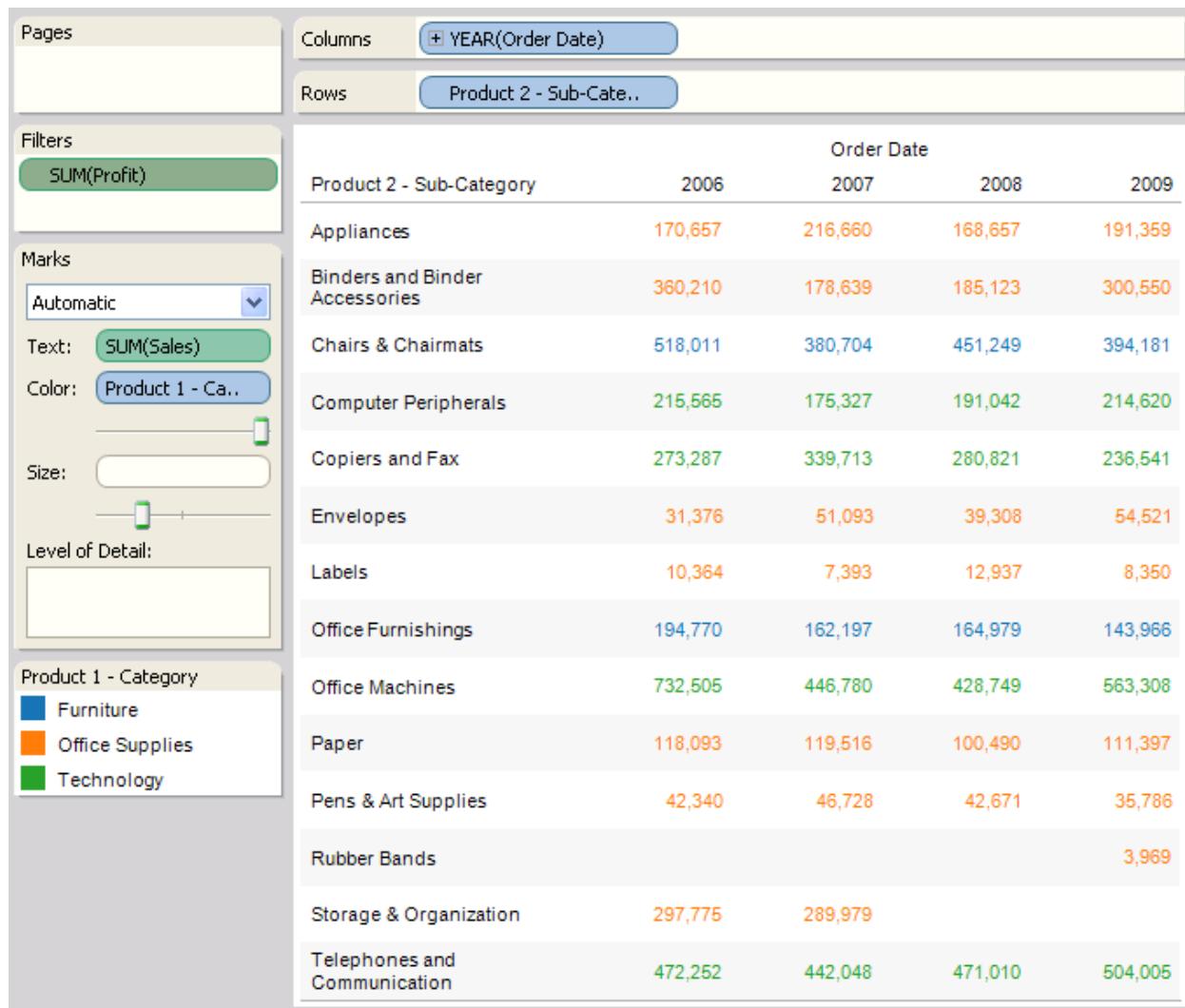
Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

5. Filter by Profit.

Place the Profit measure on the Filters shelf and filter the data so that every row with negative profits is excluded from the view.



*The view is shown below.*



The data show the sales for all products excluding rows with negative profits. Note that Rubber Bands only had rows with positive profits in 2009, the other negative values are excluded from the view.

## Duplicate as Crosstab

The view shown below was generated as a crosstab from the bar chart example [Bar Chart–Color-Encoded](#). Additionally, the rows and columns were swapped.

You can duplicate any view as a crosstab by selecting *Worksheet > Duplicate as Crosstab*. The result will contain only dimensions in the *Rows* and *Columns* shelves. If measures are part of the original view, the measure names will be displayed in the crosstab using the *Measure Names* field. Views that are disaggregated cannot be duplicated as a crosstab.

		Product 1 - Category					
Quarter of Order Date	Region	Furniture		Office Supplies		Technology	
		Sum of Profit	Sum of Sales	Sum of Profit	Sum of Sales	Sum of Profit	Sum of Sales
Q1	Central	-1,228	10,322	978	10,574	8,780	33,540
	East	-246	22,020	762	14,203	264	5,173
	South	-122	268	-174	789	310	4,585
	West	7,997	40,836	-603	7,005	658	6,453
Q2	Central	3,065	22,927	3,677	18,452	1,703	11,339
	East	-845	5,009	1,455	9,798	3,181	23,372
	South	548	14,073	1,019	3,963	-534	1,937
	West	3,963	34,875	5,810	25,174	6,531	27,678
Q3	Central	-725	16,888	2,001	13,628	843	5,299
	East	67	6,898	-241	704	2,479	14,780
	South	-948	12,518	1,588	14,172	339	2,326
	West	-653	9,749	457	6,696	-9,269	30,462
Q4	Central	-1,626	10,729	4,872	14,262	-385	5,487
	East	1,575	23,649	808	8,740	-5	7,030
	South	-1,614	20,038	4,837	20,851	14,934	45,137
	West	-1,712	17,097	706	12,427	1,638	22,697

Notice that the fields *Measure Names* and *Measure Values* appear on the *Columns* shelf and the *Text* shelf, respectively. These fields were automatically included by

*Tableau so that the headers and text values are included for the Profit and Sales measures.*

## Line Chart

### Line Chart

*Line charts connect individual data points in a data view. They provide a simple way to visualize a sequence of values, and are especially useful when you want to see trends over time.*

*In Tableau, you create a line chart by selecting the line mark type. This mark type is automatically selected if the Mark menu is set to Automatic and you place one or more measures on either the Columns shelf or the Rows shelf, and then plot the measures against a continuous quantity. You can also plot the measures against a discrete or continuous date or time field. Refer to [Line Mark](#) for more information about the line mark type.*

*The following examples show you how to use line charts to explore your data:*

- [Line Chart–Basic](#)
- [Filter and Color Encode a Nested Table](#)
- [Line Chart–Filter and Color-Encode Multiple Measures](#)
- [Line Chart–Filter and Path Encode](#)

## Line Chart—Basic

*This view displays the sum of the sales and the sum of the profit for all years. You can create the view with the following procedure.*

1. *Place the Order Date dimension on the Columns shelf.*

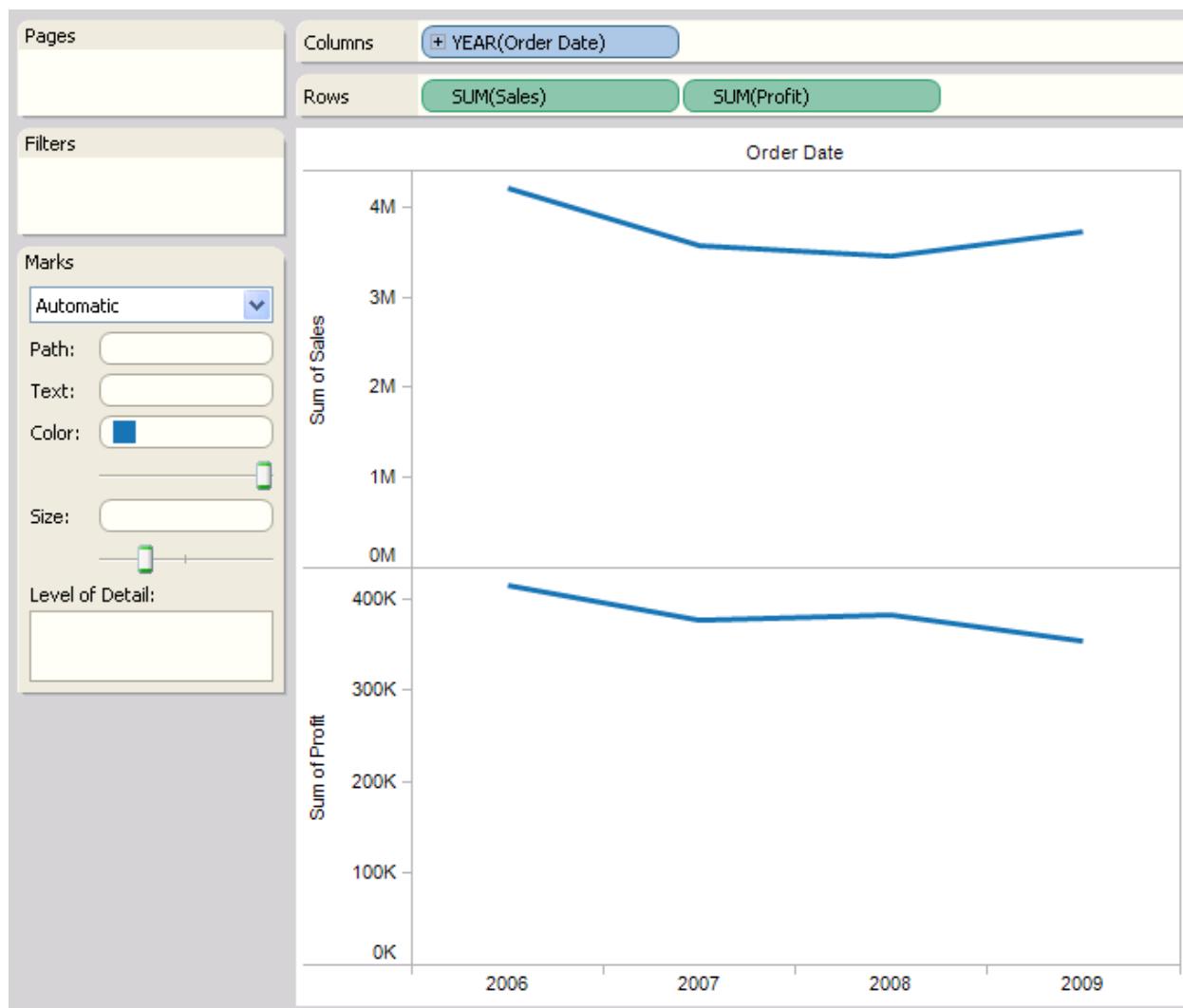
*The date is automatically aggregated by year, and headers are created with labels given by the dimension member names.*

2. *Place the Sales and Profit measures on the Rows shelf.*

*The measures are automatically aggregated as summations, and axes are created with labels given by the field names.*

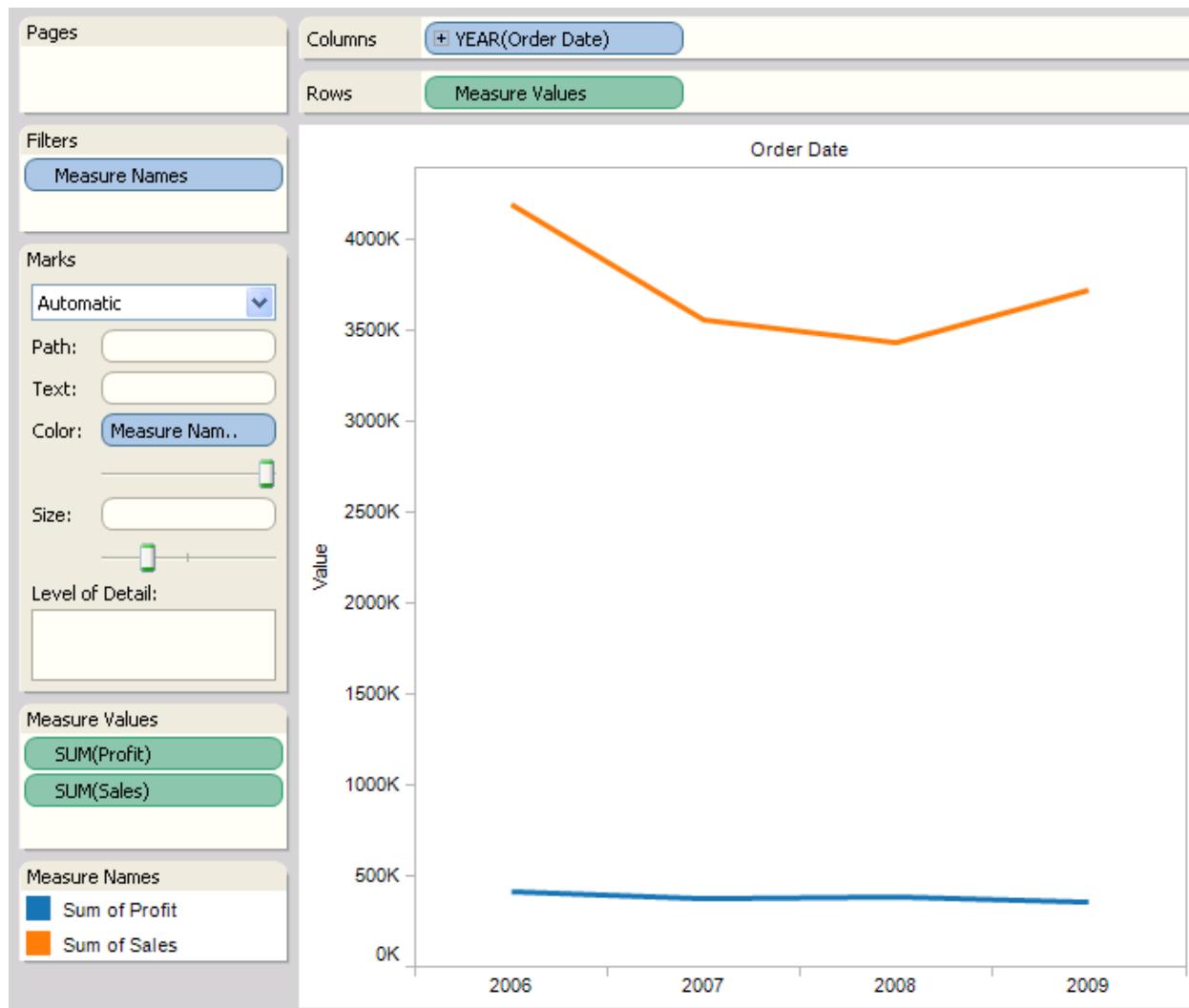
*The view is shown below.*

## Tableau Desktop Help



You might find that the view is more useful if you display both measures in the same pane. This way, the measures use the same scale and are easier to compare. To do this, drag one of the measures off the Rows shelf and then drag that measure from the Data window to the axis.

The view is shown below. Tableau automatically placed the Measure Names dimension on the Color and Filters shelf, and placed the Measure Values measure on the Rows shelf.



## Filter and Color Encode a Nested Table

This view displays the sum of profit in 2008 for all regions and customer segments as a nested table using the line mark type. Additionally, the data are color-encoded by product category.

You can create the view with the following procedure.

1. Place the Customer Segment and Order Date dimensions on the Columns shelf.

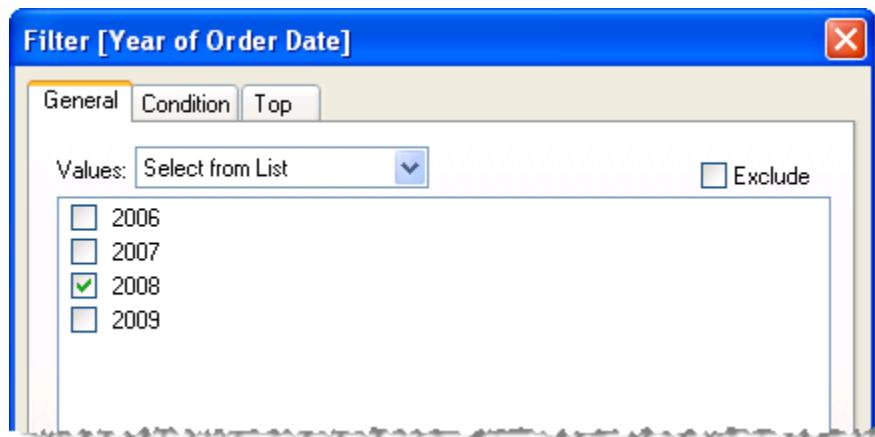
The date is automatically aggregated by year, and headers are created for each dimension with labels given by the dimension member names. Display the data by quarter by selecting Quarter from the field's context menu.

2. Place the Profit measure and the Region dimension on the Rows shelf.

The measure is automatically aggregated as a summation, and an axis is created with a label given by the field name. Headers are created for the dimension with labels given by the dimension member names.

3. Filter Order Date.

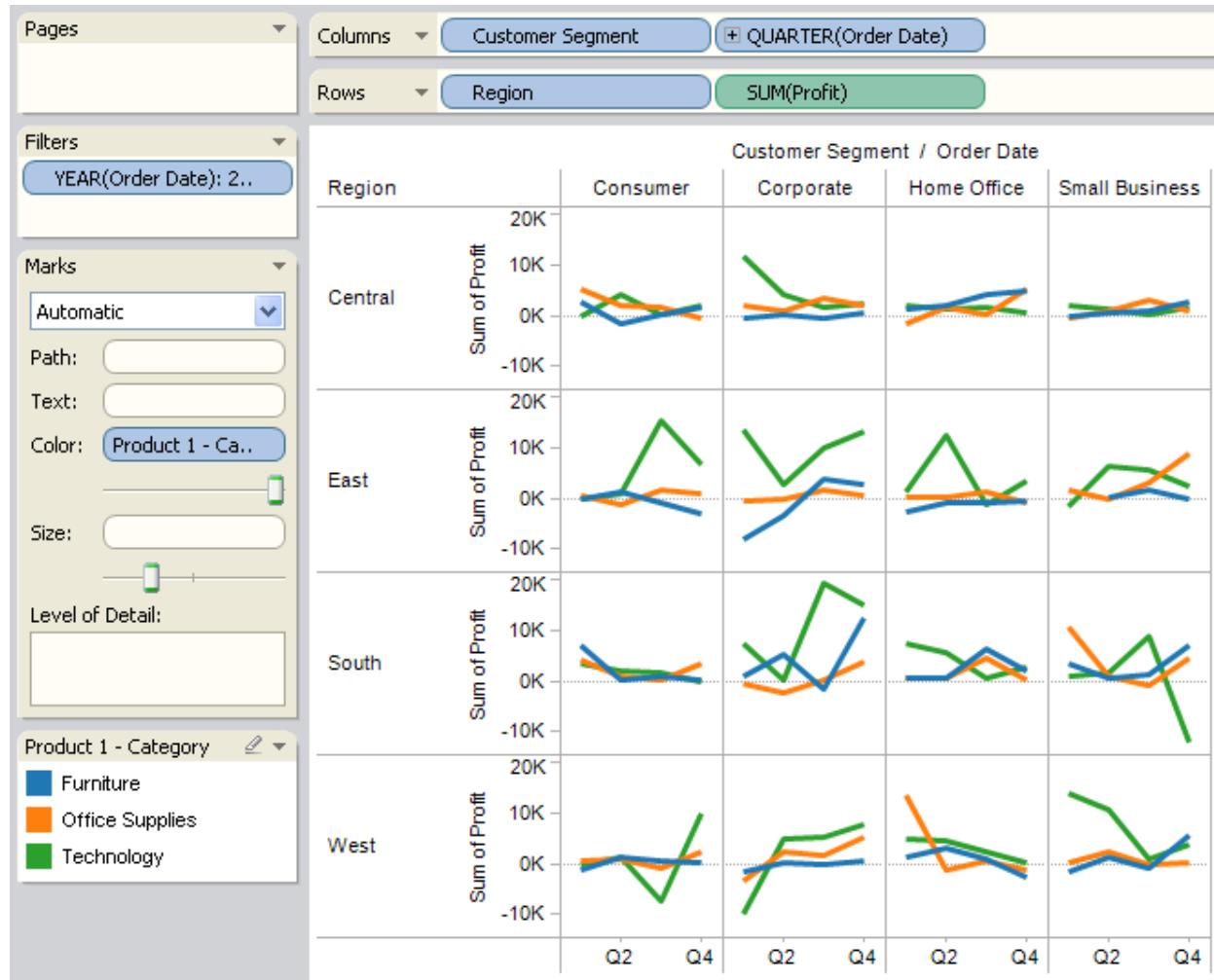
You open the Filter dialog box by selecting Filter from the field's context menu. As shown below, include only 2008.



4. Place the Product 1 - Category dimension on the Color shelf.

*Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.*

The view is shown below.



## Line Chart—Filter and Color-Encode Multiple Measures

*It displays multiple measures in a single pane as a function of month. The data are filtered for a specific year, region, customer segment, and product category. Additionally, the data are color-encoded by measure names.*

*You can create the view with the following procedure.*

1. *Place the Order Date dimension on the Columns shelf.*

*The date is automatically aggregated by year, and headers are created with labels given by the dimension member names. Change the aggregation to month by selecting Month from the field's context menu.*

2. *Place the Measure Values measure on the Rows shelf.*

*By default, all measure are selected and an axis is created with the label Value, indicating multiple values are displayed.*

3. *Remove all measure except Sales and Profit.*

*Drag all measures except the Sales and Profit measures off the Measure Names/Values shelf.*



*Note that the Measure Names dimension was automatically placed on the Filters shelf after removing the measures.*

4. *Place the Measure Names dimension on the Color shelf.*

*Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.*

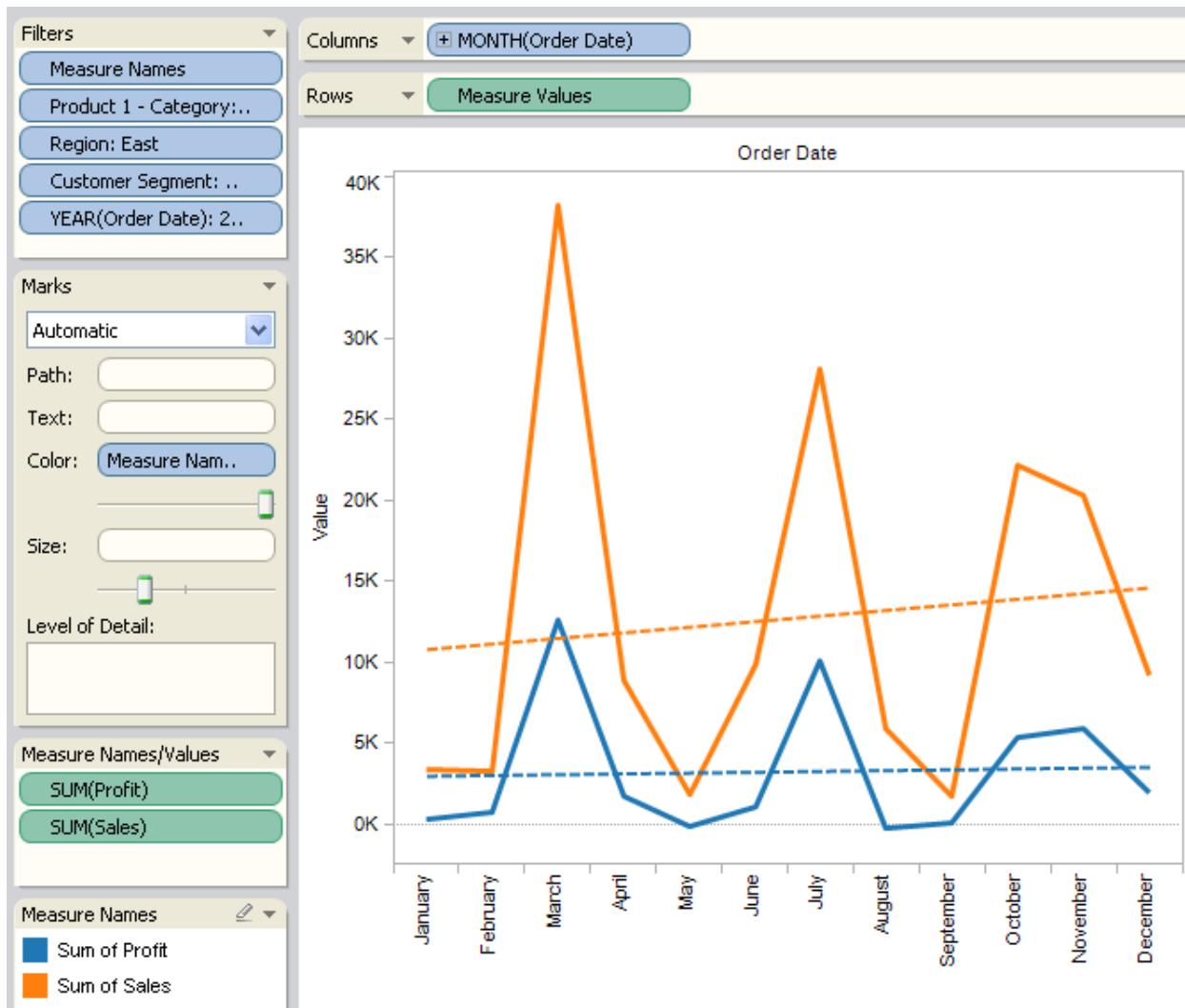
5. *Place the Order Date, Customer Segment, Region, and Product 1 - Category dimensions on the Filters shelf.*

- *Filter Order Date to include only the year 2008.*
- *Filter Customer Segment to include only the Corporate market.*
- *Filter Region to include only the East region.*
- *Filter Product 1 - Category to include only Technology*

## 6. Add trend lines to the view.

*Right-click on the view and select Trend Lines from the context menu. Two trend lines are shown, one for profit and the other for sales. You can edit the trend lines right-clicking and selecting Edit Trend Lines.*

*The view is shown below.*



*Notice that the Month labels along the bottom of the view are oriented vertically. You can easily toggle between vertical and horizontal alignment for headers along the bottom of the view by pressing Ctrl + L.*

## Line Chart—Filter and Path Encode

This view displays the profit and sales in a single table pane. The data are filtered for a specific year, region, customer segment, and product category. Additionally, the data are path-encoded by order date.

You can create the view with the following procedure.

1. Place the Profit measure on the Columns shelf.

The measure is automatically aggregated as a summation and an axis is created with a label given by the name of the field.

2. Place the Sales measure on the Rows shelf.

The measure is automatically aggregated as a summation and an axis is created with a label given by the name of the field.

3. Disaggregate the measures by selecting Analysis > Aggregate Measures.

4. Place Order Date (twice), Customer Segment, Region, and Product Category 1 on the Filters shelf.

- Filter the first Order Date field to include only the year 2008.
- For the second Order Date field, select Quarter from the field's context menu and filter the field to include only Q4.
- Filter Customer Segment to include only the Corporate market.
- Filter Region to include only the East region.
- Filter Product 1 - Category to include only Furniture

**Note:** There are five data points that pass through all the filters.

5. Select Line from the Mark menu.

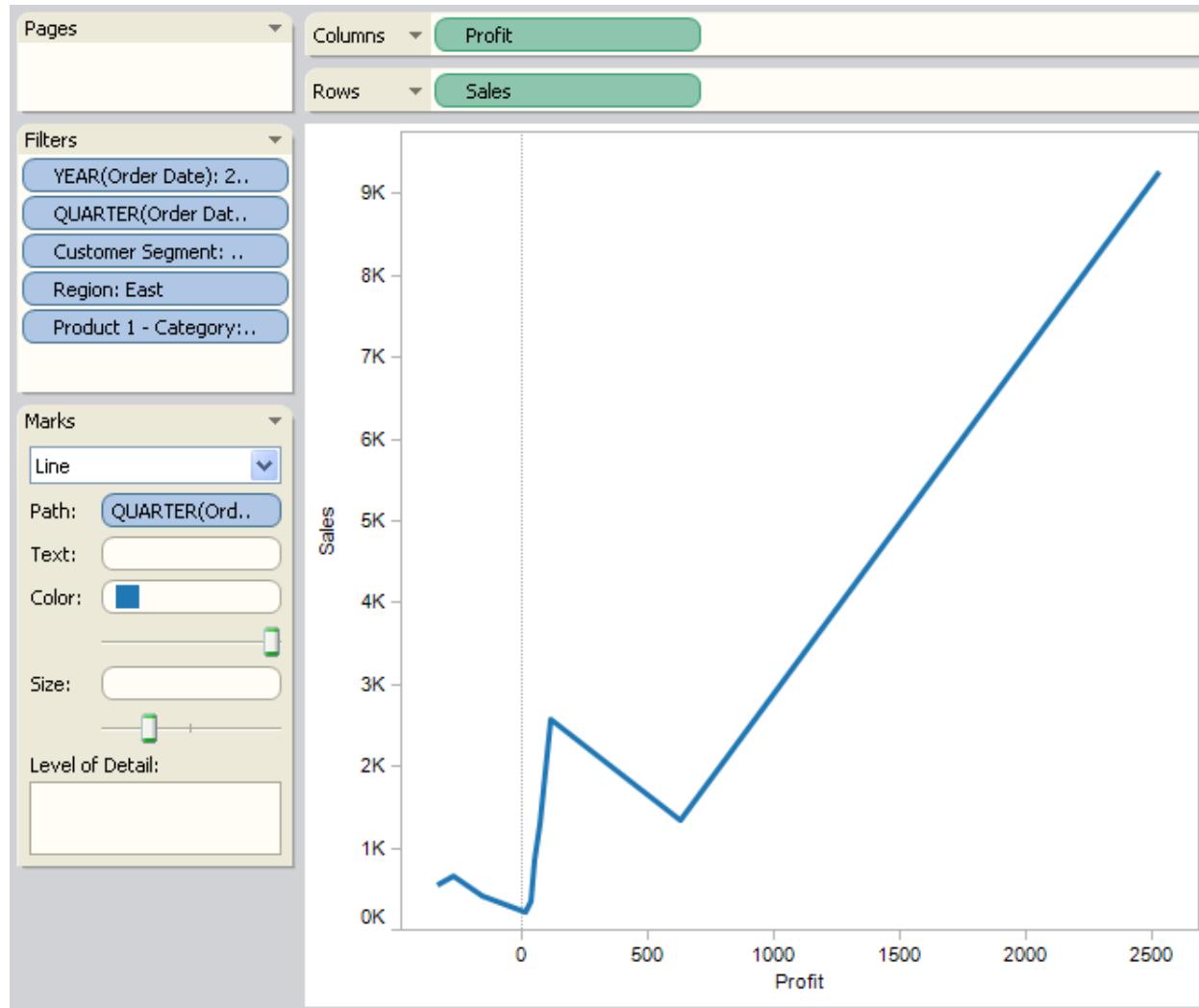
Note that the data points are connected from lowest profit value to highest value, in order.

6. Place the Order Date dimension on the Path shelf and select Quarter as the aggregation.

The data points are now connected in the chronological order.

## Tableau Desktop Help

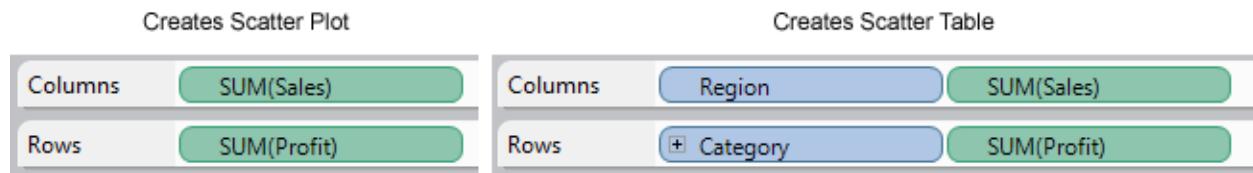
The view is shown below.



# Scatter Plot

## Scatter Plot

*Scatter plots provide an easy way to visualize relationships between numerical variables. In Tableau, you create a scatter plot by placing at least one measure on both the Columns and the Rows shelf. If these shelves contain both dimensions and measures, Tableau automatically places the measures as the innermost fields.*



*A scatter plot can use several mark types. By default, Tableau uses the shape mark type. However, depending on your data, you might want to use another mark such as a circle or a square. Refer to [Mark Types](#) for more information.*

*By default, measures are aggregated as a summation when placed on a shelf. Therefore, Tableau displays only one data point in each pane of a data table. You can view more data by disaggregating the measures or by placing one or more dimensions on another shelf such as Level of Detail, Shape, or Color.*

*The following examples show you how to use scatter plots to explore your data:*

- [Scatter Plot–Basic](#)
- [Scatter Plot–Filter and Color Encode](#)
- [Scatter Plot–Filter and Level of Detail](#)
- [Scatter Plot–Filter, Level of Detail, and Color Encode](#)
- [Scatter Plot–Filter, Level of Detail, Color Encode, and Shape Encode](#)

## Scatter Plot—Basic

*This view displays the disaggregated profit and sales in a single pane as a scatter plot. You can create the view with the following procedure.*

1. Place the Profit measure on the Columns shelf.

*The measure is automatically aggregated as a summation and an axis is created with a label given by the name of the field.*

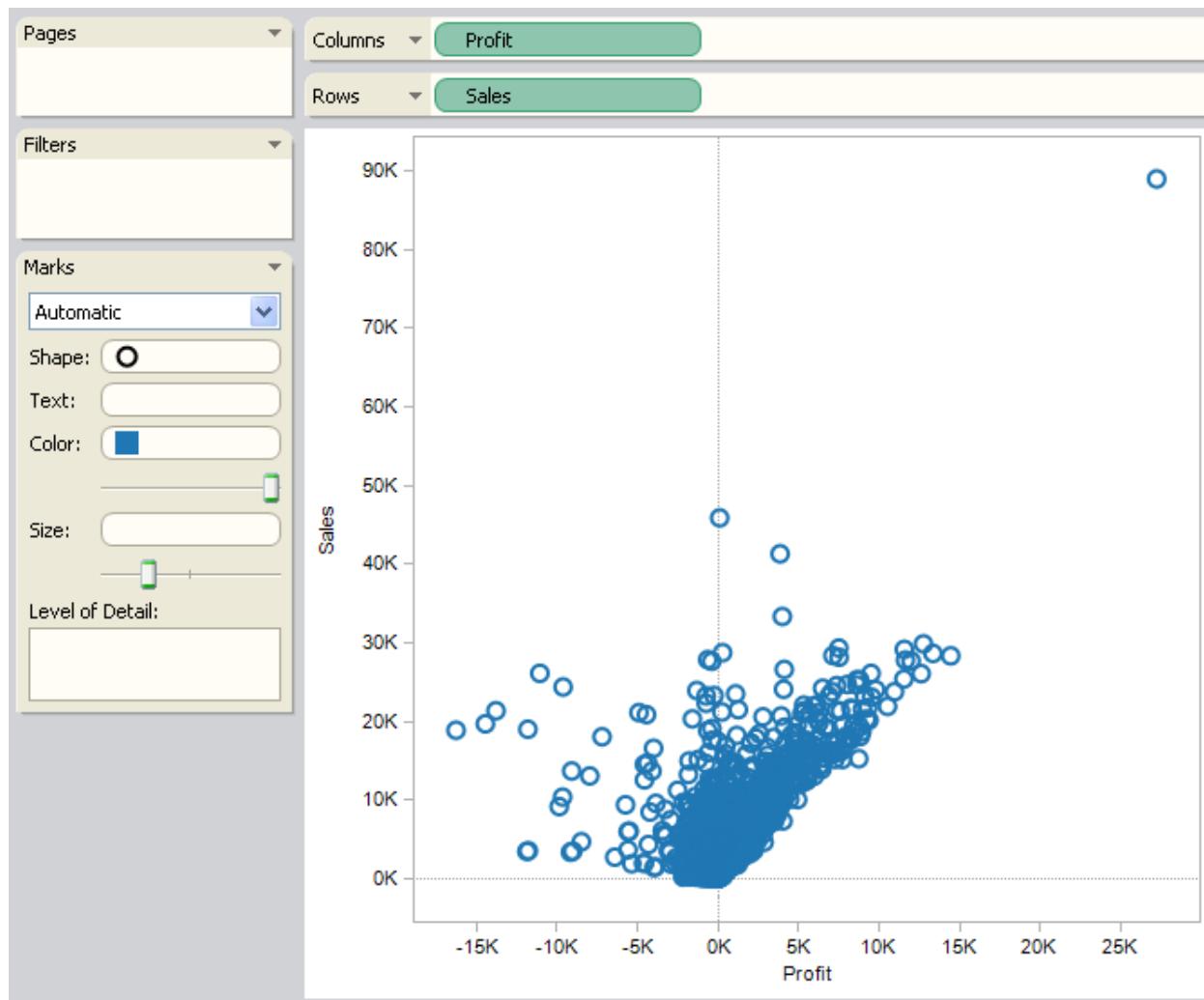
2. Place the Sales measure on the Rows shelf.

*The measure is automatically aggregated as a summation and an axis is created with a label given by the name of the field.*

3. Disaggregate the measures.

4. Select Aggregate Measures from the Analysis menu. This instructs Tableau to display all the data from your source as a scatter plot.

*The view is shown below. Note that Tableau automatically selects the mark as Shape, the mark shape as an open circle, and the mark color as blue.*



## Scatter Plot—Filter and Color Encode

This view displays the disaggregated profit, sales, ship time, and discount as a scatter table. Additionally, brushing is used to visualize the relationships among the data. You can create the view with the following procedure.

1. Place the Profit and Time to Ship measures on the Columns shelf.

The Profit measure is automatically aggregated as a summation while Time to Ship is aggregated as a maximum.

2. Place the Sales and Discount measures on the Rows shelf.

The measures are automatically aggregated as a summation and axes are created with labels given by the field names.

3. Disaggregate the measures.

Select the Analysis > Aggregate Measures menu item. This instructs Tableau to display all the data from your source as a scatter plot.

4. Place the Product 1 - Category, Ship Mode, and Container dimensions on the Filters shelf.

- Filter Product 1 - Category to include only furniture.
- Filter Ship Mode to include delivery truck and regular air.
- Filter Container to include large box.

5. Place the Region dimension on the Color shelf.

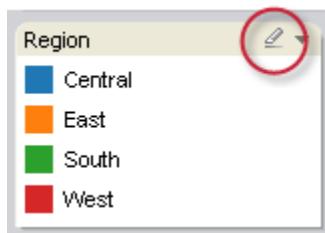
Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

The view is shown below.



You can easily highlight a specific set of data using color legend highlighting. Legend highlighting is a powerful analytical mode that allows you to focus on selected items in the color legend.

Turn on color legend highlighting by clicking the Highlight button in the title of the color legend.



*Then select an item in the color legend. Marks that are associated with the selected member are colored while all other marks are gray.*

*The view below highlights items that are out of stock. You can easily see that all of orders with long delivery times are for products that are out of stock.*



## Scatter Plot—Filter and Level of Detail

This view displays the aggregated profit and sales as a scatter plot using a circle as the mark type. The data are displayed with a level of detail given by the year, region, customer segment, and product category.

You can create the view with the following procedure.

1. Place the Profit measure on the Columns shelf.

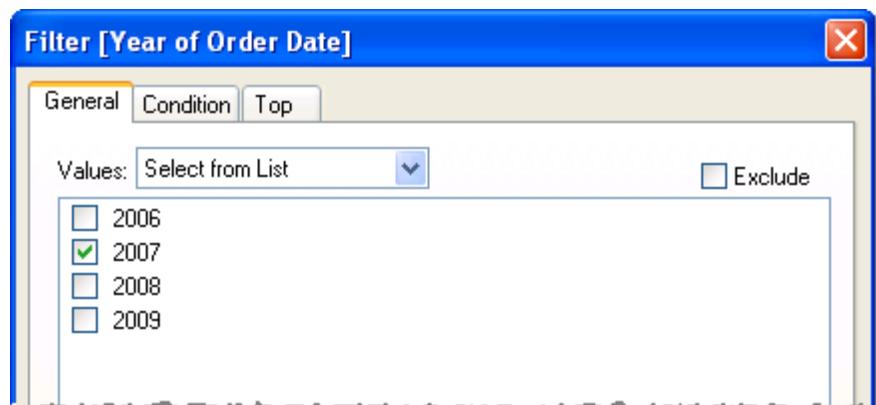
The measure is automatically aggregated as a summation and an axis is created with labels given by the field name.

2. Place the Sales measure on the Rows shelf.

The measure is automatically aggregated as a summation and an axis is created with labels given by the field name.

3. Place the Order Date dimension on the Filters shelf.

Filter Order Date to include only the year 2007. You open the Filter dialog box by selecting *Filter* from the field's context menu.



4. Place the Region, Customer Segment, and Product 1 - Category dimensions on the Level of Detail shelf.

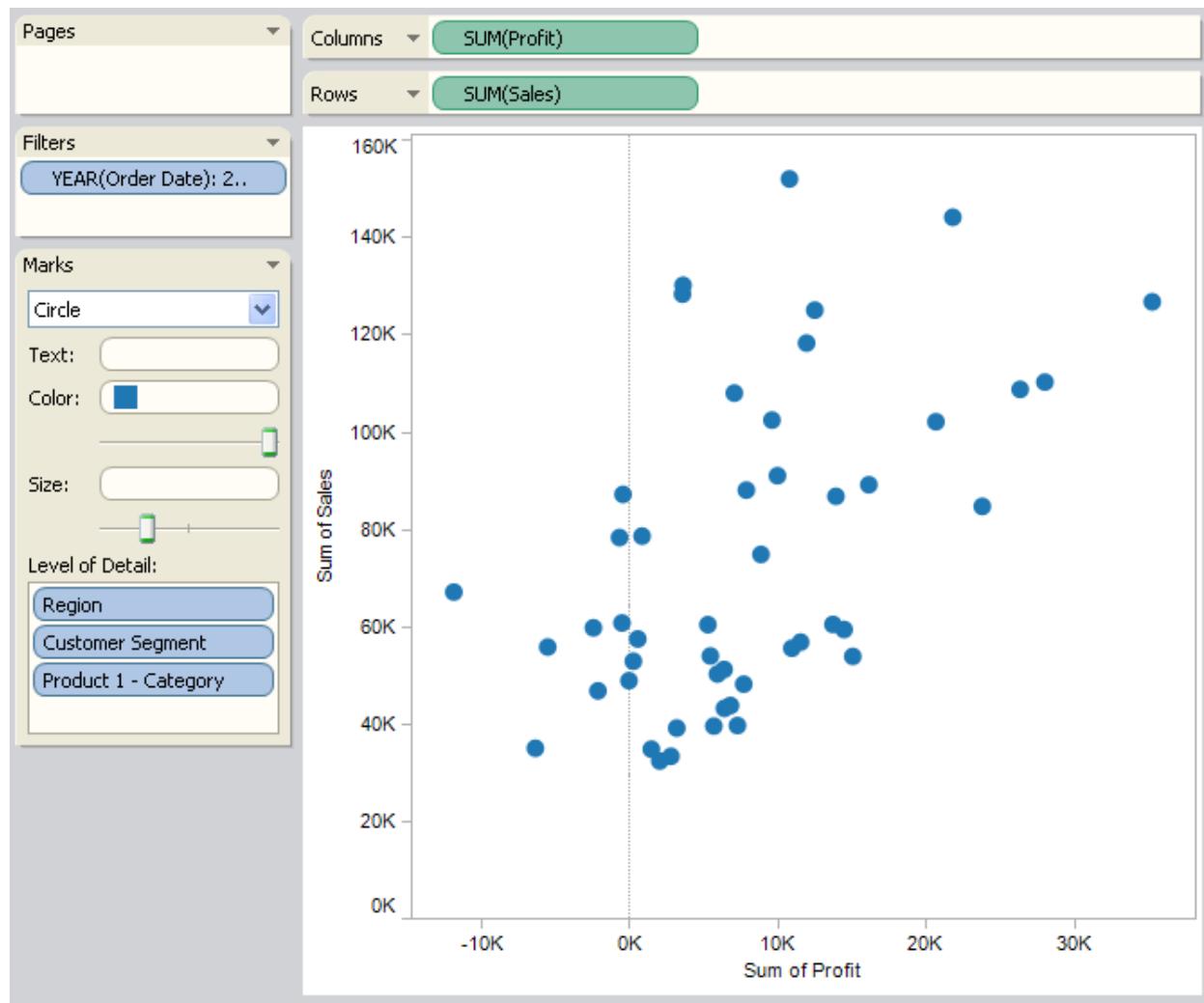
Placing a dimension on the Level of Detail shelf instructs Tableau to display the data according to the level of detail given by the dimension members. For

example, the Region dimension separates the data points into four levels of detail: East, West, South and Central.

5. Select *Circle* from the *Mark* menu.

Using a circle as the mark type allows you to better distinguish between closely spaced data points.

The view is shown below.



**Note:**

By default, mark borders are turned off. However, in this case it makes more sense to have them turned on to distinguish between closely spaced data points. You can turn on mark borders by selecting the *Format > Show Mark Borders* menu item.

## Scatter Plot—Filter, Level of Detail, and Color Encode

This view displays the aggregated profit and sales as a scatter plot using a circle as the mark type. The data are displayed with a level of detail given by the year, region, customer segment, and product category. Additionally, the data are color-encoded by product category.

You can create the view with the following procedure.

1. Place the Profit measure on the Columns shelf.

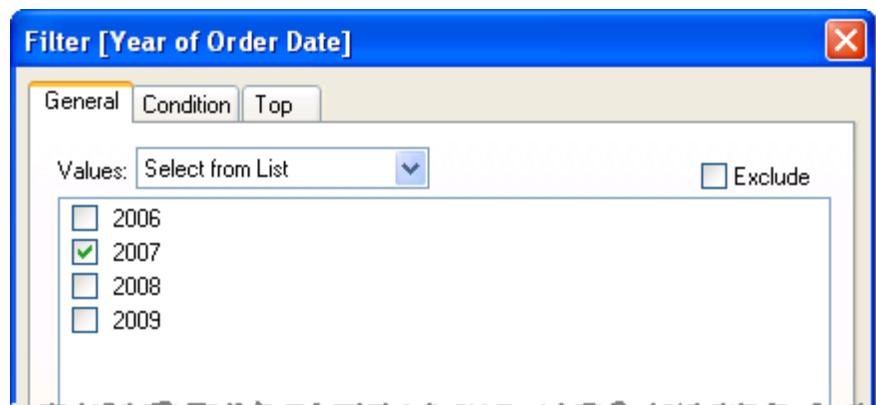
The measure is automatically aggregated as a summation and an axis is created with the label given by the field name.

2. Place the Sales measure on the Rows shelf.

The measure is automatically aggregated as a summation and an axis is created with the label given by the field name.

3. Place the Order Date dimension on the Filters shelf.

Filter Order Date to include only the year 2007. You open the Filter dialog box by selecting *Filter* from the field's context menu.



4. Place the Region, Customer Segment, and Product 1 - Category dimensions on the Level of Detail shelf.

Placing a dimension on the Level of Detail shelf instructs Tableau to display the data according to the level of detail given by the dimension members. For

example, the Region dimension separates the data points into three levels of detail: East, West, and Central.

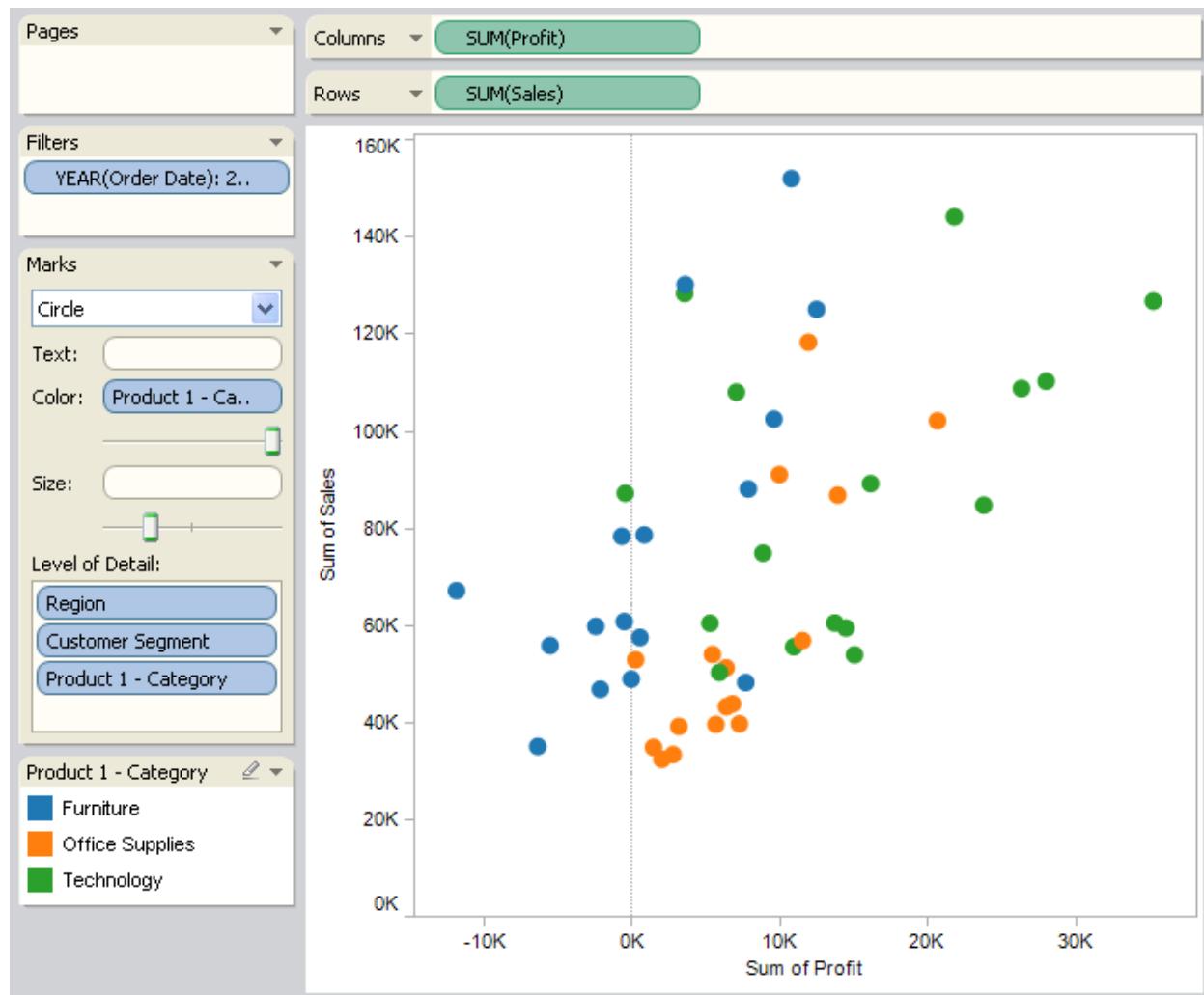
5. Select *Circle* from the *Mark* menu.

Using a circle as the mark type allows you to better distinguish between closely spaced data points.

6. Place the Product 1 - Category dimension on the Color shelf.

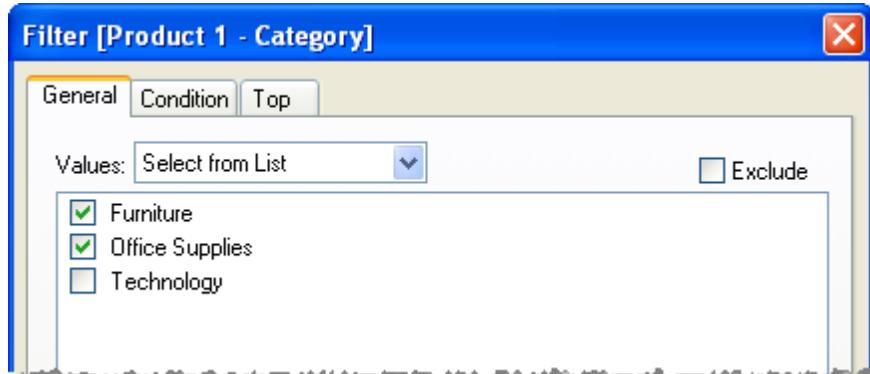
Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

The view is shown below.

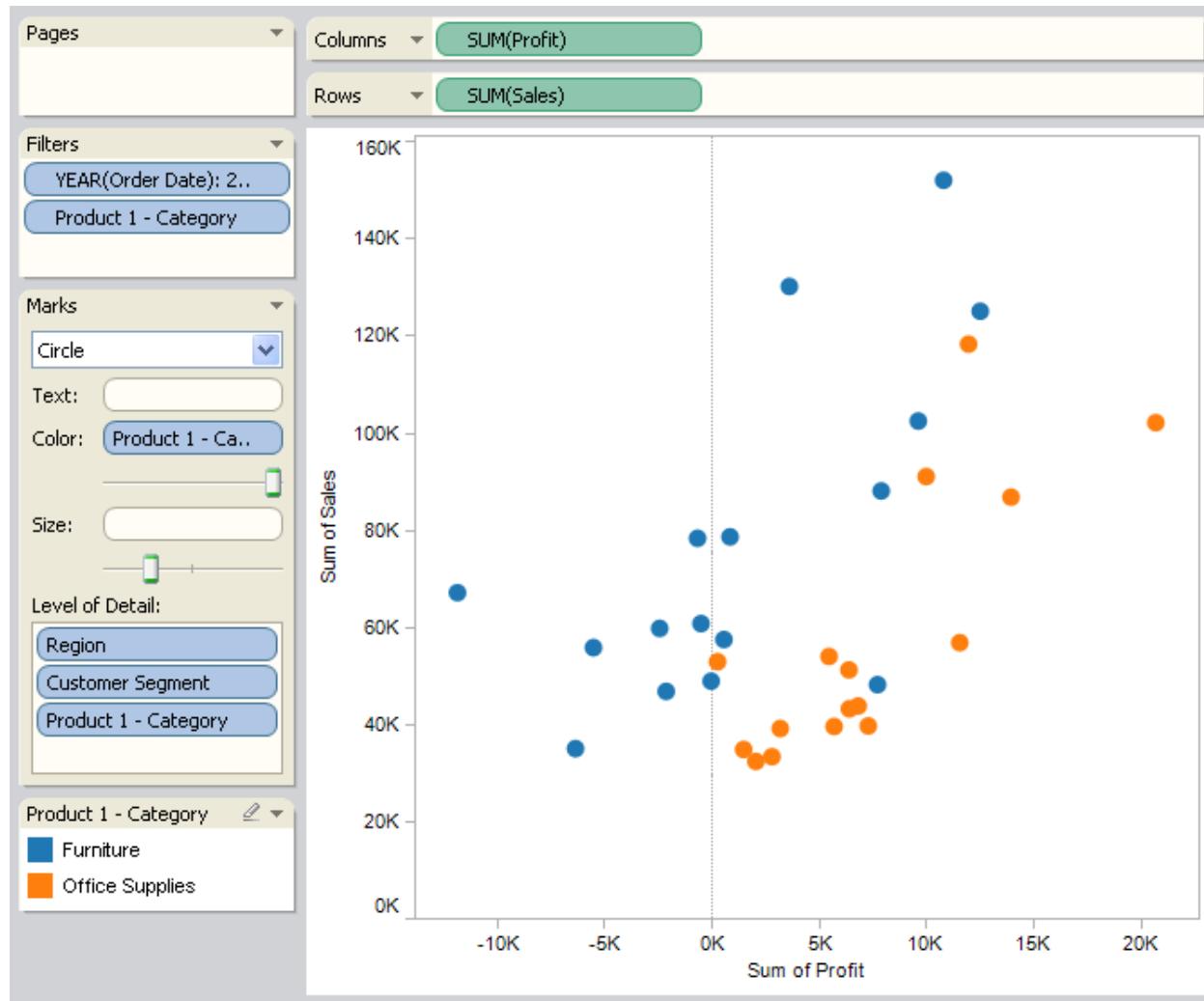


As you can see, the data points are clustered according to product type. For example, the profit for technology (green) is consistently positive, has the largest values, and appears to have a strong linear relationship to the sales. Office supplies appear to have mostly positive profits, while furniture appears to have mostly negative profits.

To gain additional insight into the data, filter Product 1 - Category to include only furniture and office supplies. Open the Filter dialog box by selecting *Filter* from the field's context menu.



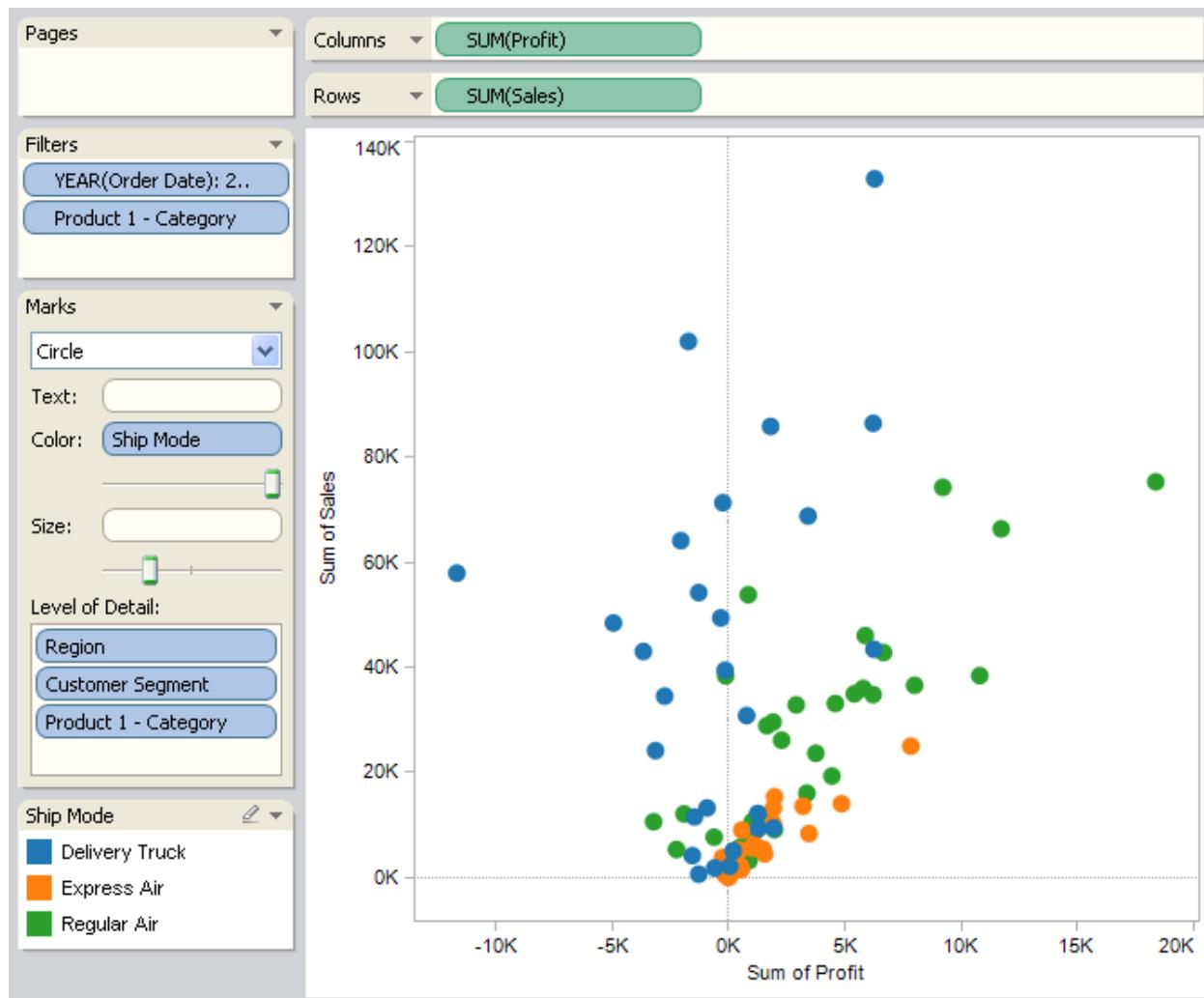
The view is shown below.



Now let's look at an additional level of detail by placing the Ship Mode dimension on the Color shelf.

Placing this dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

The view is shown below.



*It appears that the items with large positive profits are all shipped by regular air, while the items with large negative profits are all shipped by delivery truck.*

## Scatter Plot—Filter, Level of Detail, Color Encode, and Shape Encode

This view displays the aggregated profit and time to ship as a scatter plot using a shape as the mark type. The data are displayed with a level of detail given by the year, region, customer segment, and product category. Additionally, the data are color-encoded by ship mode.

You can create the view with the following procedure.

1. Place the Profit measure on the Columns shelf.

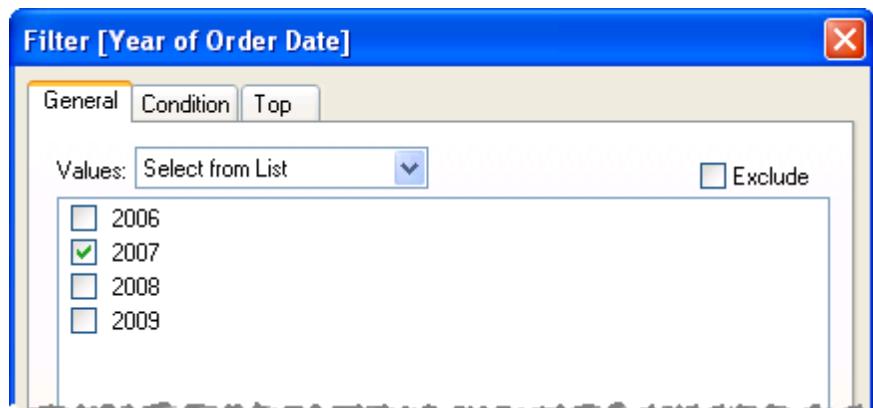
The measure is automatically aggregated as a summation and an axis is created with the label given by the field name.

2. Place the Time to Ship measure on the Rows shelf.

The measure is automatically aggregated as a maximum and an axis is created with the label given by the field name. Change the aggregation to an average by selecting Average from the field's context menu.

3. Place the Order Date dimension on the Filters shelf.

Filter Order Date to include only the year 2007. Open the Filter dialog box by selecting Filter from the field's context menu.

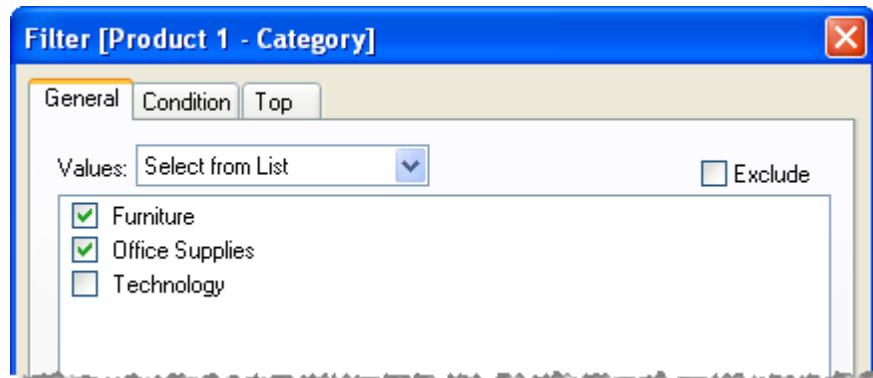


4. Place the Region, Customer Segment, and Product 1 - Category dimensions on the Level of Detail shelf.

*Placing a dimension on the Level of Detail shelf instructs Tableau to display the data according to the level of detail given by the dimension members. For example, the Region dimension separates the data points into three levels of detail: East, West, and Central.*

5. Filter Product Category 1.

*You open the Filter dialog box by selecting Filter from the field's context menu. Include only furniture and office supplies as shown below.*



6. Select Shape from the Mark menu.

7. Place the Ship Mode dimension on the Shape shelf.

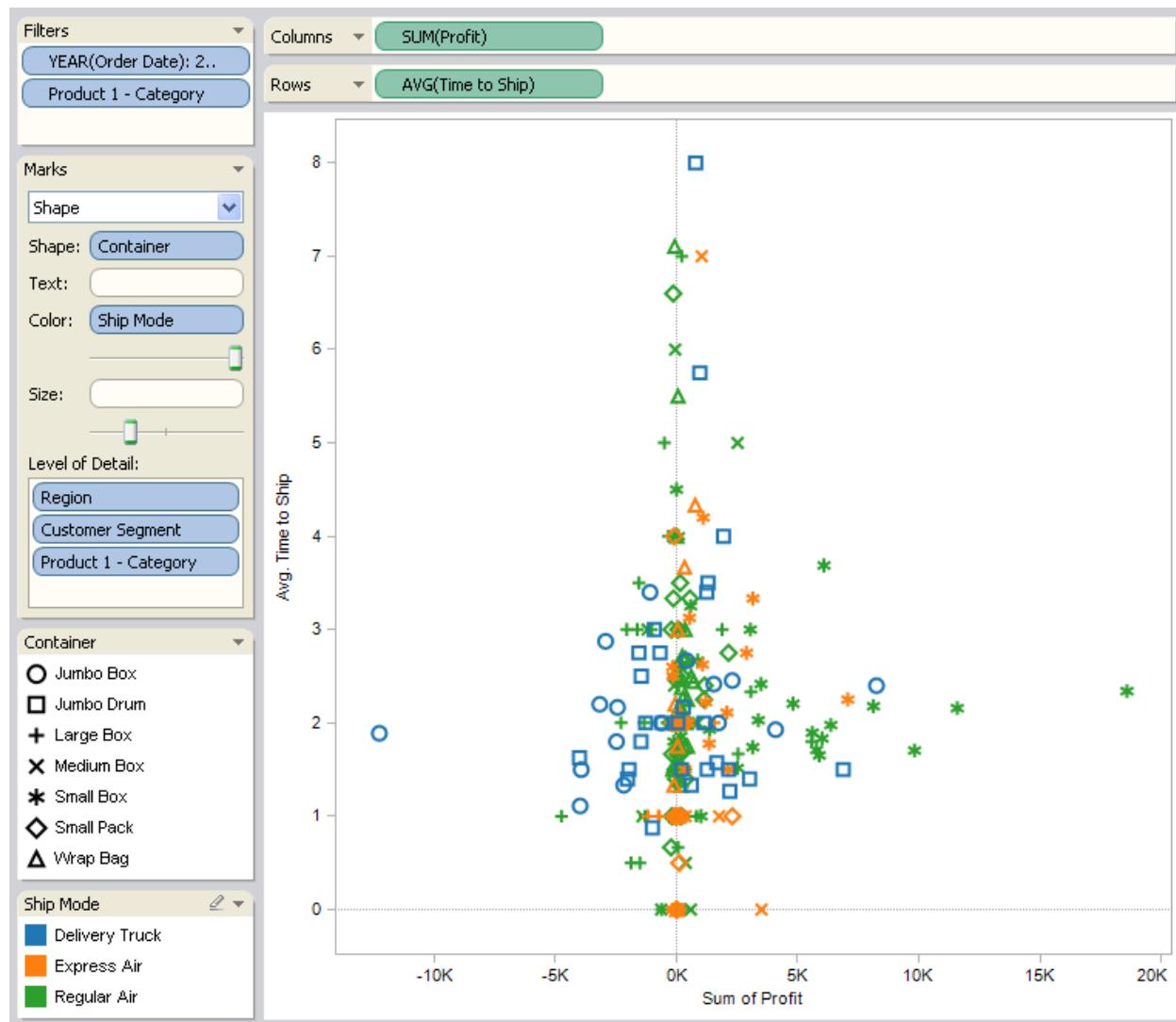
*The Shape shelf separates the marks according to the members in the dimension, and assigns a unique shape to each member. The shape legend displays each member name and its associated shape.*

8. Place the Container dimension on the Color shelf.

*Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.*

*The view is shown below.*

## Tableau Desktop Help



Here are a few things you can learn from the data:

- *The large profit values are associated with items shipped in a small box and delivered via regular air. Additionally, these items have a consistent and relatively short average time to ship.*
- *There are several outliers with very long average time to ship.*

# Heat Map

## Heat Map

*Heat maps are a great way to compare categorical data using color. They are typically constructed as a table using colored squares to represent the data, and a continuous range of colors. Heat maps allow you to see variations in the data via variations in color.*

*In Tableau, you create a heat map by placing one or more dimensions on the Columns shelf and one or more dimensions on the Rows shelf. You then select the mark type as Square and place a measure of interest on the Color shelf.*

*Of course, you are not limited to this type of heat map. You can build any view that is meaningful to you. For example, you can color-encode the data using a dimension, as well as size-encode and shape-encode the data. Some of these views certainly stretch the definition of a heat map. The common thread between them is the display of color-encoded categorical data.*

*The following examples show you how to use heat maps to explore your data:*

- [Heat Map–Basic](#)
- [Heat Map–Size Encoded](#)
- [Heat Map–Shape and Size Encoded](#)

## Heat Map—Basic

This view shows a basic heat map. It is constructed as a table of categorical data and is color-encoded by a measure. The view shows the profit across all markets, regions, and products.

You can create the view with the following procedure.

1. Place the Customer Segment dimension on the Columns shelf.

Headers are created with labels given by the dimension member names.

2. Place the Region and Product 1 - Category dimensions on the Rows shelf.

Headers are created with labels given by the dimension member names. You have now created a nested table of categorical data.

3. Place the Profit measure on the Color shelf.

The measure is automatically aggregated as a summation. The color legend reflects the continuous data range.

4. Select the mark type to be Square.

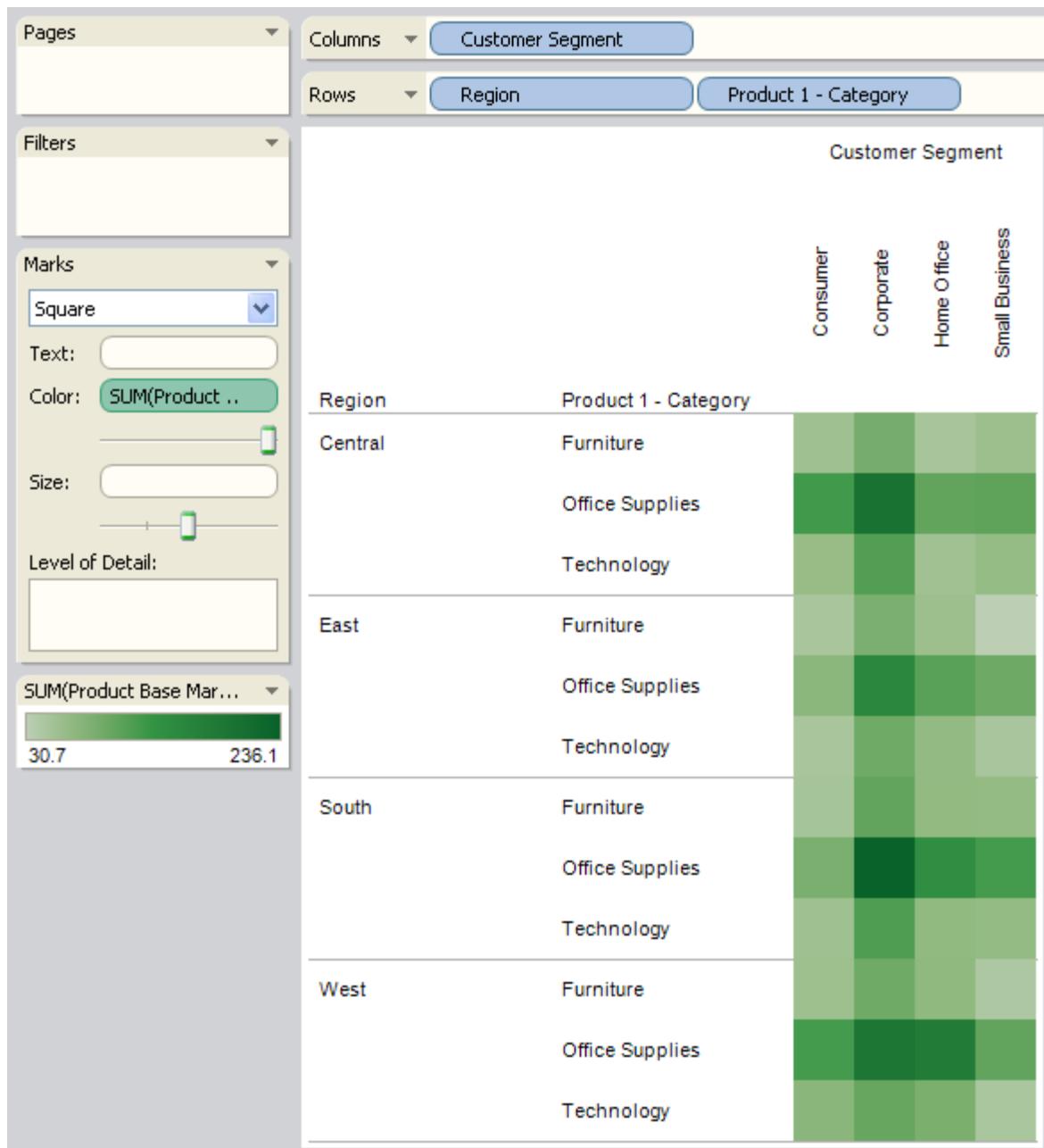
5. Optimize the view format.

- Select the Format > Cell Size > Square Cell menu item.
- Increase the mark size with the Size slider so that the marks fill almost the entire table cell.



- Increase the size of the table using Ctrl + Shift + B.
- Rotate the column headers by right-clicking on one of the headers and selecting Rotate Labels.

The view is shown below.



You can see that technology has the highest profit across all regions and segments, while furniture has the lowest profit across all markets.

The heat map allows you to easily pick out values that are near either edge of the continuous color map. For example, it's easy to see that technology in the eastern corporate market has the highest profit.

## Heat Map—Size Encoded

This view shows a basic heat map that is modified by size-encoding the data. It is constructed as a table of categorical data and is color-encoded by a measure.

Two examples are presented. The first example size-encodes the data using a measure. The second example size-encodes the data using a dimension.

You can create the view with the following procedure.

1. Place the Customer Segment dimension on the Columns shelf.

Headers are created with labels given by the dimension member names.

2. Place the Region and Product 1 - Category dimensions on the Rows shelf.

Headers are created with labels given by the dimension member names. You have now created a nested table of categorical data.

3. Place the Profit measure on the Color shelf.

The measure is automatically aggregated as a summation. The color legend reflects the continuous data range.

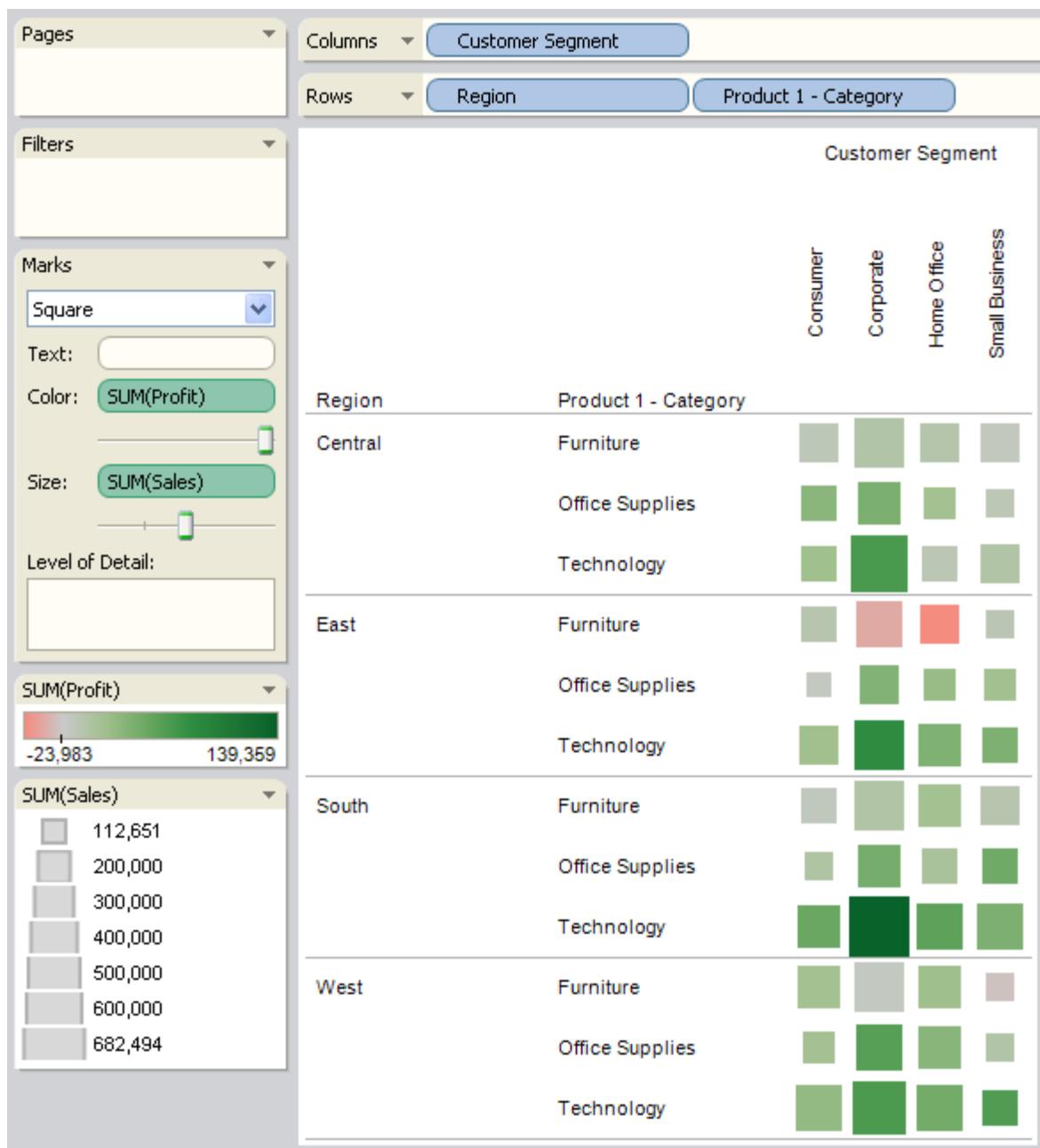
4. Place the Sales measure on the Size shelf.

The measure is automatically aggregated as a summation. Change the aggregation to an average by selecting Average from the field's context menu.

5. Select the mark type to be Square.

6. Optimize the view format. Refer to the previous example [Heat Map—Basic](#) for more information.

The view is shown below.

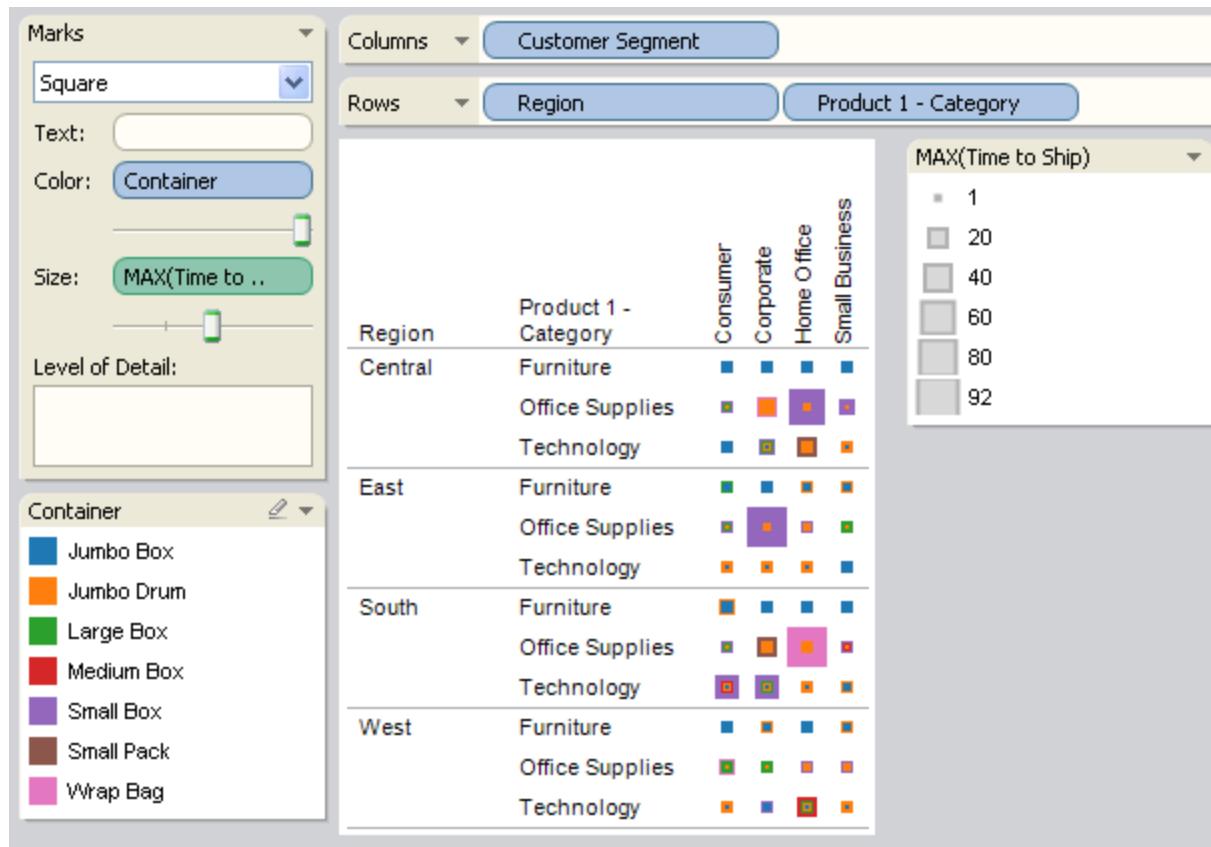


As in the previous example, you can see that technology has the highest profit across all regions and markets, while furniture has the lowest profit across all regions and markets.

Placing a measure on the Size shelf yields a continuous range of sizes. Because there is a wide range of average sales, there is a wide range of sizes. For example, the size encoding tells you that the average sales for office supplies in all regions and markets is much smaller than for technology and furniture. You can also conclude that the average sales for technology in the eastern region is about the same for all markets.

The size-encoded heat map allows you to easily pick out extremes in color and size. For example, it's easy to see that furniture in the central small business market has a negative profit and a small average sales. To create the second view, place the Container dimension on the Color shelf and the Time to Ship measure on the Size shelf. Aggregate the measure as an average by selecting Average from the field's context menu.

The modified view is shown below.



Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color. Because many of the marks are close together, their colors are obscured by the mark borders. Therefore, mark borders are turned off.

You should use caution when building this type of data view because some of the marks might be obscured. For example, suppose the average times to ship for corporate furniture in the western region were the same for the jumbo box and the large box. In this case, the mark sizes would be the same and would overlap. Therefore, you would see only the last mark displayed in the view.

## Heat Map—Shape and Size Encoded

This view shows a basic heat map that is modified by shape-encoding and size-encoding the data. You can create the view with the following procedure.

1. Place the Customer Segment dimension on the Columns shelf.

Headers are created with labels given by the dimension member names.

2. Place the Region and Product 1 - Category dimensions on the Rows shelf.

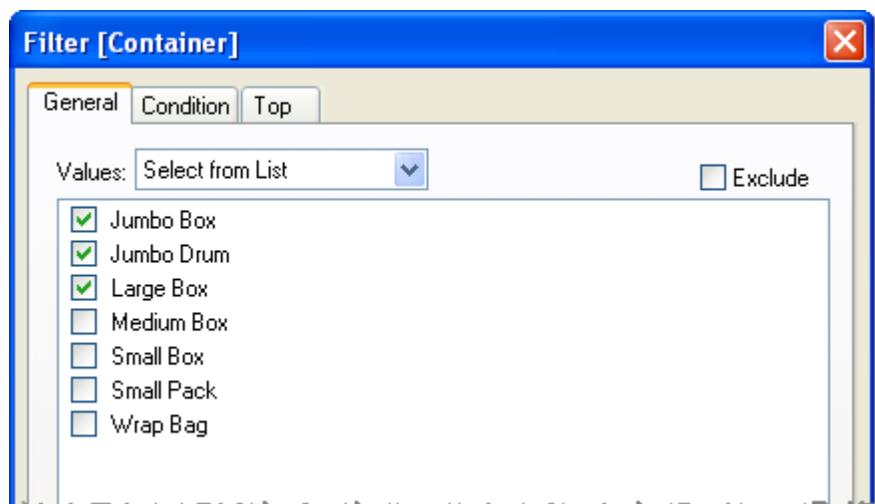
Headers are created with labels given by the dimension member names. You have now created a nested table of categorical data.

3. Place the Container dimension on the Color shelf.

Placing a dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

4. Filter Container so that only the first three members are displayed.

Filtering the data creates a less dense view so that you can more easily see individual marks. You open the Filter dialog box by selecting *Filter* from the field's context menu.



5. Place the Time to Ship measure on the Size shelf.

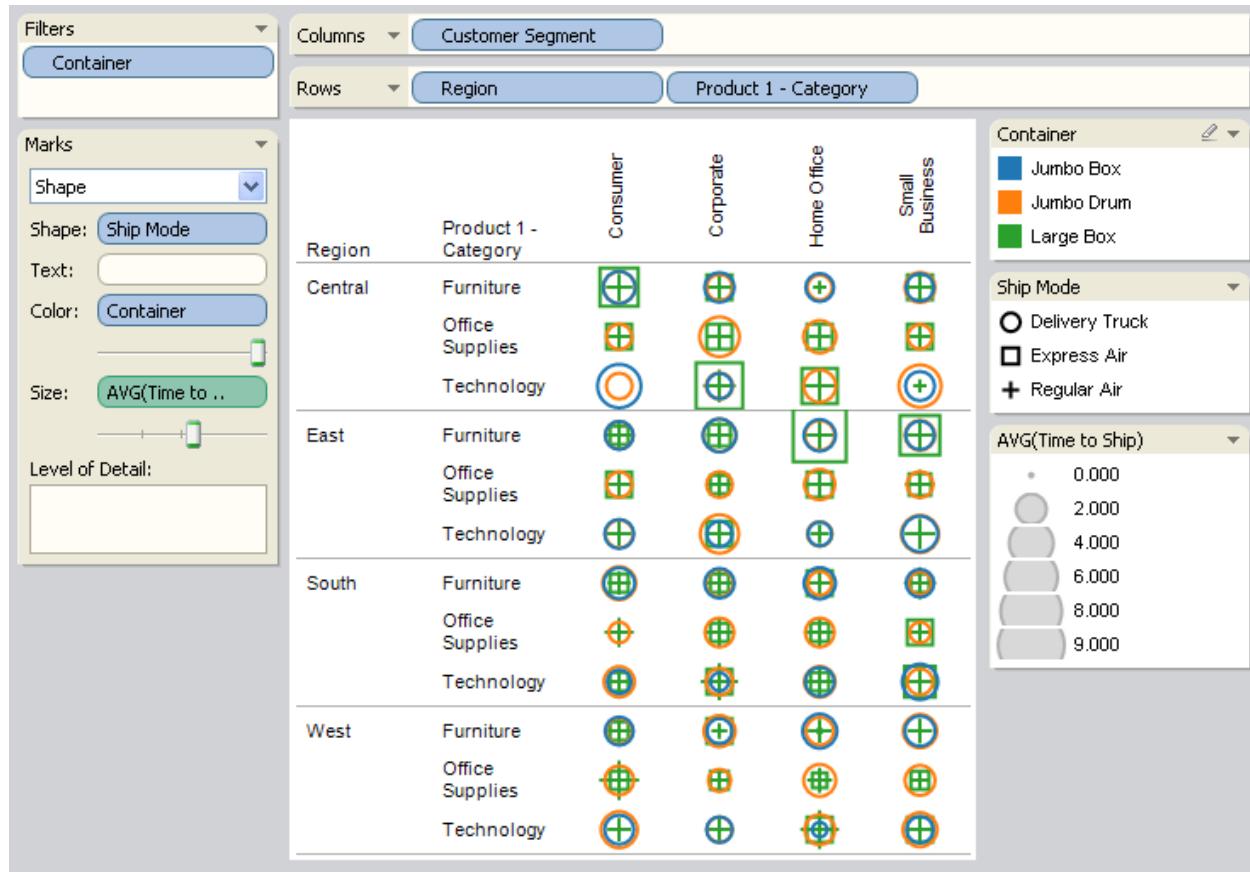
*The measure is automatically aggregated as a maximum. Change the aggregation to an average by selecting Average from the field's context menu.*

6. Select *Shape* as the mark type and place the *Ship Mode* dimension on the *Shape shelf*.

*Placing a dimension on the Shape shelf separates the marks according to the members in the dimension, and assigns a unique shape to each member. The shape legend displays each member name and its associated shape.*

7. Optimize the view format. Refer to the previous example [Heat Map–Basic](#) for more information.

*The view is shown below.*



## Gantt Bar Chart

### Gantt Bar Chart

*Gantt charts are typically used when you want to display the duration of one or more categories of interest against the progression of time. Each category uses a separate mark (usually a bar), where the length of the mark gives the duration of the category. For example, you could use a Gantt chart to display a product line versus order date with a mark length that gives the average delivery time.*

*You create a Gantt chart by selecting the Gantt bar mark type. This mark type is automatically selected if the Mark menu is set to Automatic and you place one or more dimensions on either the Columns shelf or the Rows shelf, and then plot the dimensions against a continuous quantity. Refer to [Gantt Bar Mark](#) for more information about the this mark type.*

*In Tableau, a standard Gantt chart would have a continuous date on the horizontal axis and a dimension on the vertical axis. You would then complete the view by placing another time-related field on the Size shelf. Of course, you are not limited to this type of Gantt chart. You can build any view that is meaningful to you. For example, the length of the mark does not have to represent time. It can represent profit, sales, or any other quantity that provides insight into your data. Indeed, you do not need to include time anywhere in the view.*

*The following examples show you how to use Gantt charts to explore your data:*

- [Gantt Bar Chart–Standard](#)
- [Gantt Bar Chart–Nonstandard](#)

## Gantt Bar Chart—Standard

This view shows a particular product category for the first half of 2011 as a Gantt chart. The view is size-encoded by the time to ship and is color-encoded by the ship mode. The view shows the time it takes to deliver certain products during a specified (continuous) time period. It is a standard Gantt chart application.

You can create the view with the following procedure.

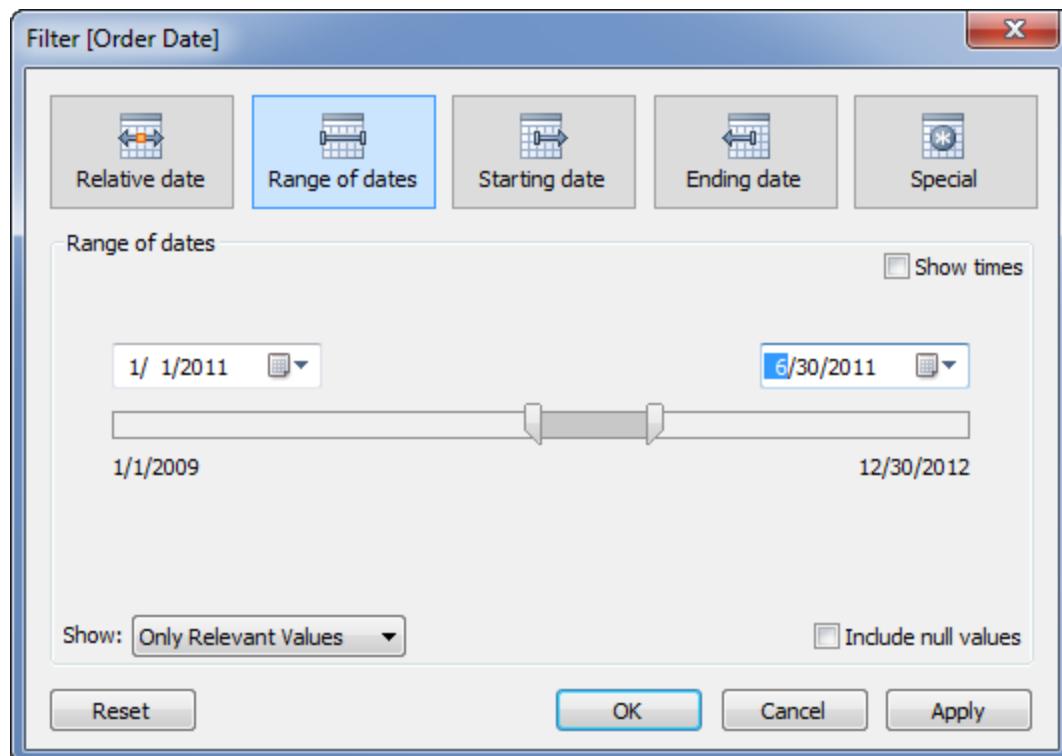
1. Place Order Date on the Columns shelf.

The date is automatically aggregated by year, and headers are created with labels given by the dimension member names. Display exact dates by selecting Exact Date on the field's context menu.

2. Place Product 2 - Sub-Category on the Rows shelf.

Headers are created with labels given by the dimension member names.

3. Place Order Date on the Filters shelf and select Range of Dates. Define the filter to include only the first half of 2011.



4. Place Time to Ship on the Size shelf.

**Note:**

When the measure is placed on the Size shelf, the units are automatically assumed to be days. For example, a value of 20 will map to a length corresponding to twenty days.

5. Place Ship Mode on the Color shelf.

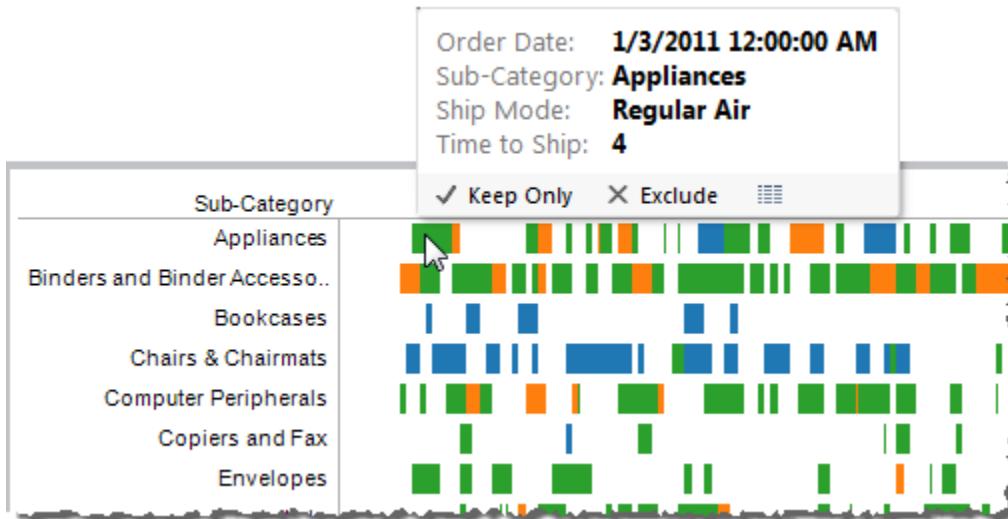
Placing this dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

The view is shown below.



Each row of the table gives you all the orders for a given product during the first half of 2011. The beginning (left edge) of each mark corresponds to the time the order was placed, the length of the mark corresponds to the time it took to ship, and the color of the mark corresponds to the delivery mode.

You can display the data associated with each mark using tooltips. For example, the data for the first appliance order is shown below. As you can see, the order was placed January 3, 2011 and the delivery time was 4days by regular air.



## Gantt Bar Chart—Nonstandard

This view shows the maximum sales for a particular product category as a Gantt chart. The data are color-encoded by the shipping mode and size-encoded by maximum profit. This is a nonstandard Gantt chart in that time is not included anywhere in the view.

You can create the view with the following procedure.

1. Place Sales on the Columns shelf.

The measure is automatically aggregated as a summation. Change the aggregation to a maximum by selecting Maximum from the field's right-click context menu.

2. Place Product 2 - Sub-Category on the Rows shelf.

Headers are created with labels given by the dimension member names.

3. Select the Mark type as Gantt bar.

4. Place Profit on the Size shelf.

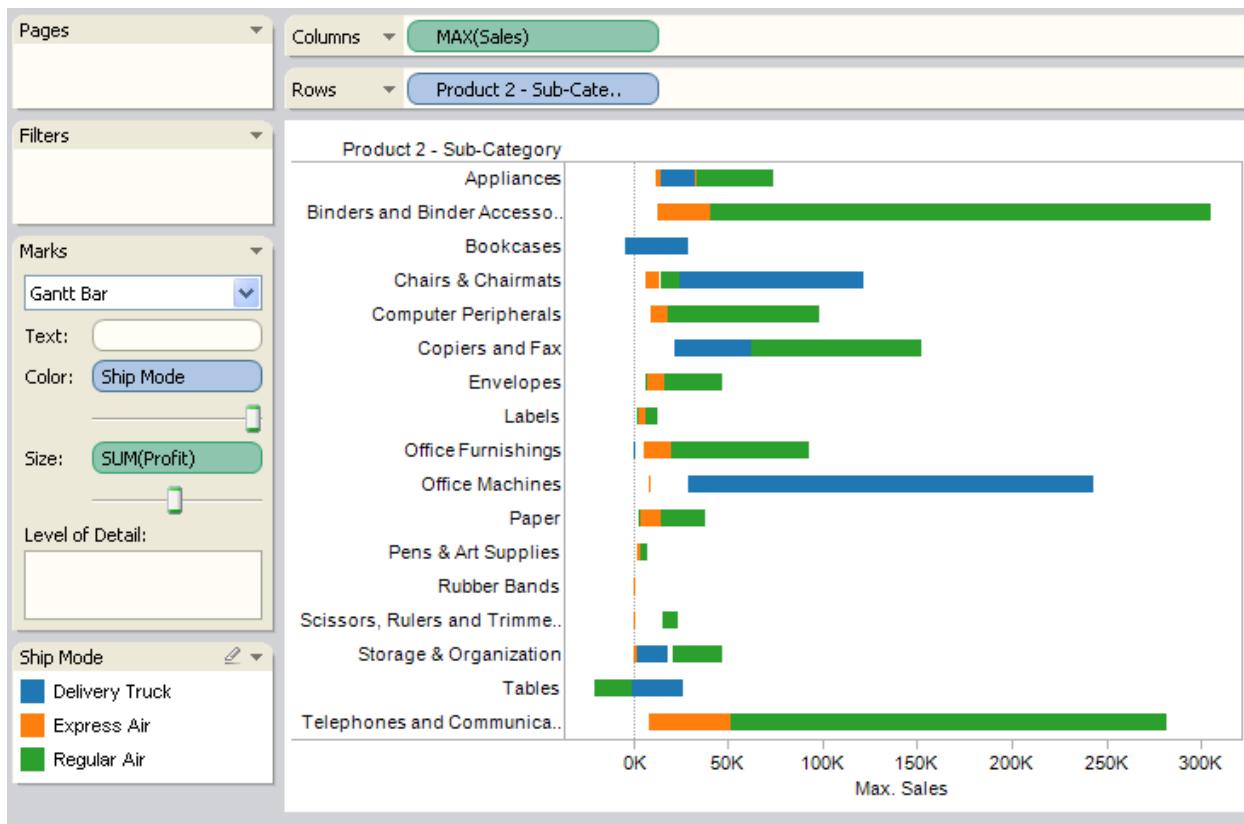
The measure is automatically aggregated as a summation. Change the aggregation to a maximum by selecting Maximum from the field's right-click context menu.

5. Place Ship Mode on the Color shelf.

Placing this dimension on the Color shelf separates the marks according to the members in the dimension, and assigns a unique color to each member. The color legend displays each member name and its associated color.

The view is shown below.

## Tableau Desktop Help



*Each row of the table gives you the maximum sales and profit totals for a given product. The left edge of each mark corresponds to the maximum sales, the length of the mark corresponds to the sum profit, and the color of the mark corresponds to the delivery method.*

# Pie Chart

## Pie Chart

The pie mark can be used to show proportions. Although generally this type of information can be better shown using stacked bar charts (refer to [Pie Mark](#)), there are cases where using pie marks can be very effective. For example, pie marks are very useful when you are trying to convey the percentage allocation of marketing expenses by state where the spending of geographically close states are very relevant. The following example shows you how to use a pie chart to explore your data.

- [Pie Chart– Maps](#)

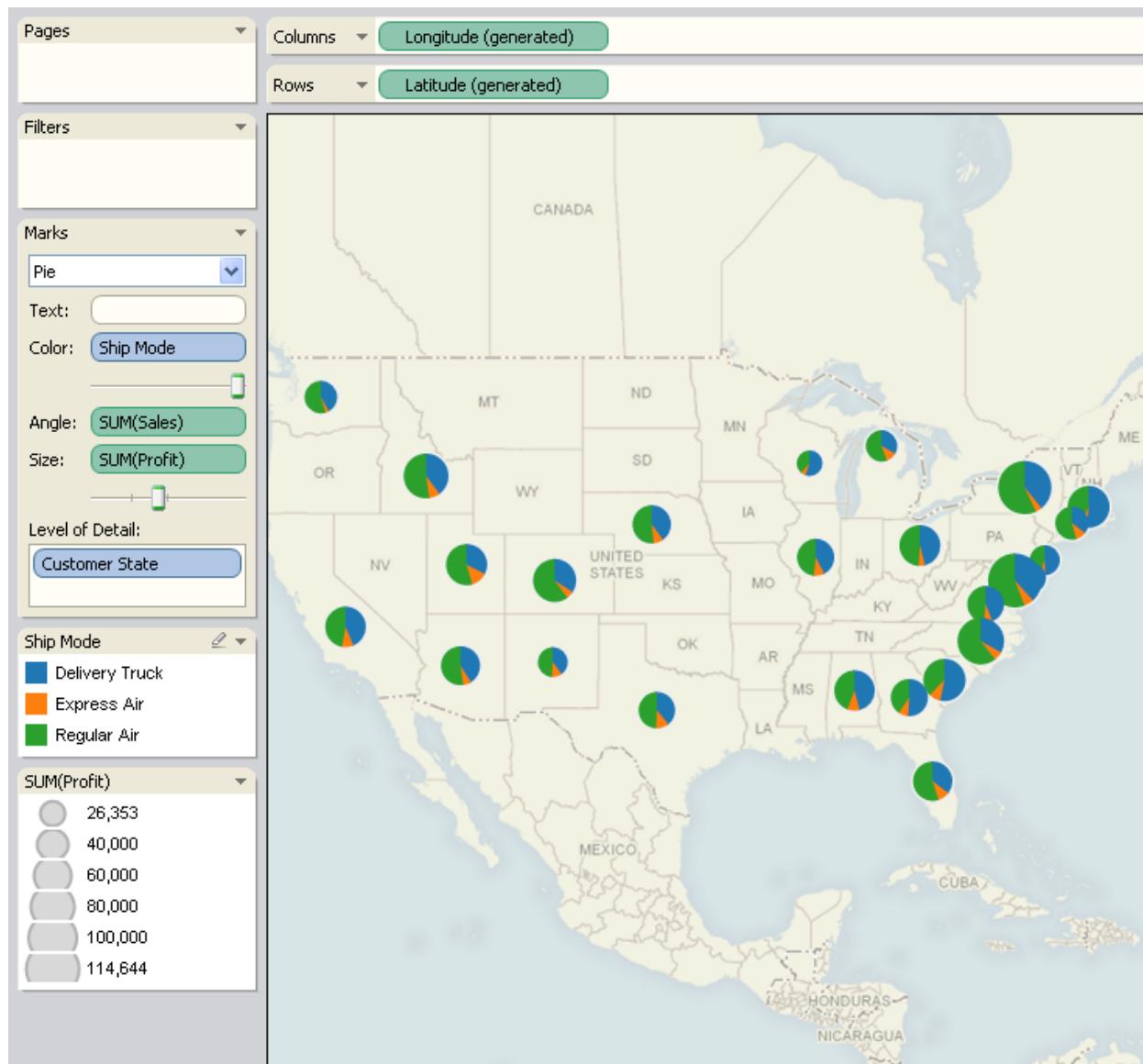
## Pie Chart– Maps

This view shows the profit and sales by ship mode for a variety of stores across the United States. It uses the pie mark to show the proportion of sales for each ship mode and location. Then the overall size of the pie indicates the profit from those sales.

Follow the steps below to build this view using the Sample - Superstore Sales data source.

1. Double-click the State field in the Data window. Note that it automatically assigned a geographic role. You can assign geographic roles by right-clicking the field and selecting Geographic Role.
2. Drag the Ship Mode field and drop it on the Color shelf.
3. Select the Pie mark type on the Mark menu.
4. Drag the Sales measure and drop it on the Angle shelf.
5. Drag the Profit measure and drop it on the Size shelf.

The final view is shown below. You can use the size slider on the Marks card to increase the overall scale of the marks.





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*Tableau's installation includes an unmodified executable version of the Firebird database. The source code for that database can be found at <http://www.firebirdsql.org>*

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