

**Deloitte.**

Deloitte Analytics  
Tableau Desktop  
200 Level

February 3<sup>rd</sup>, 2017



# About Me

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**Background:** Duquesne University (Economics), Evoke Research and Consulting, Deloitte Consulting

**Experience with Tableau:** ~2 years self-taught

**Fun Fact:** College book-club participant and avid golfer

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# Course Overview

# Course Description and Goals

## Course Description

- This course will introduce users to Tableau to tell rich stories with data. The activities in this course will lead to the development of a Tableau dashboard.

## Course Goals

- To teach students how to connect to data, design visualizations and build interactive dashboards. Users should have a basic understanding of Tableau features including formatting, actions, calculated fields, hierarchies, groups, filters, reference lines and a variety of visualization types.

# Course Objectives

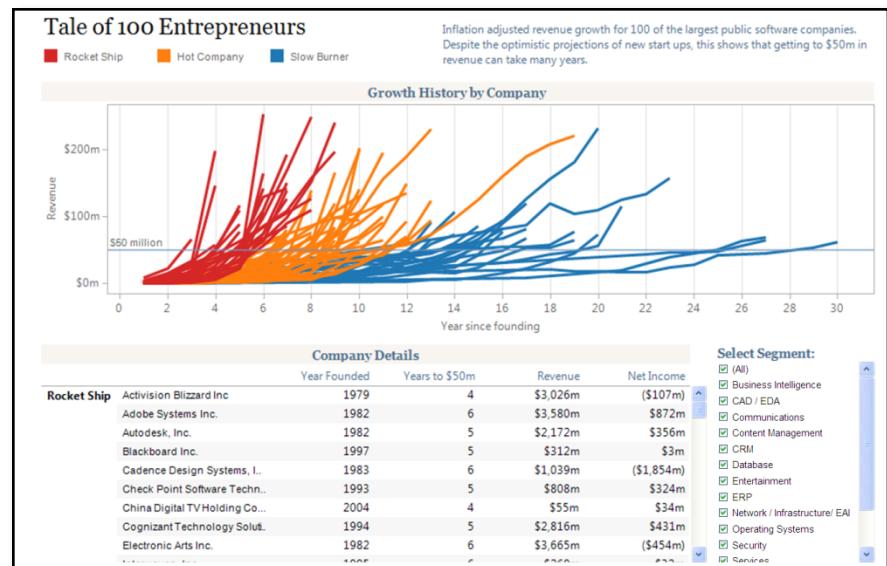
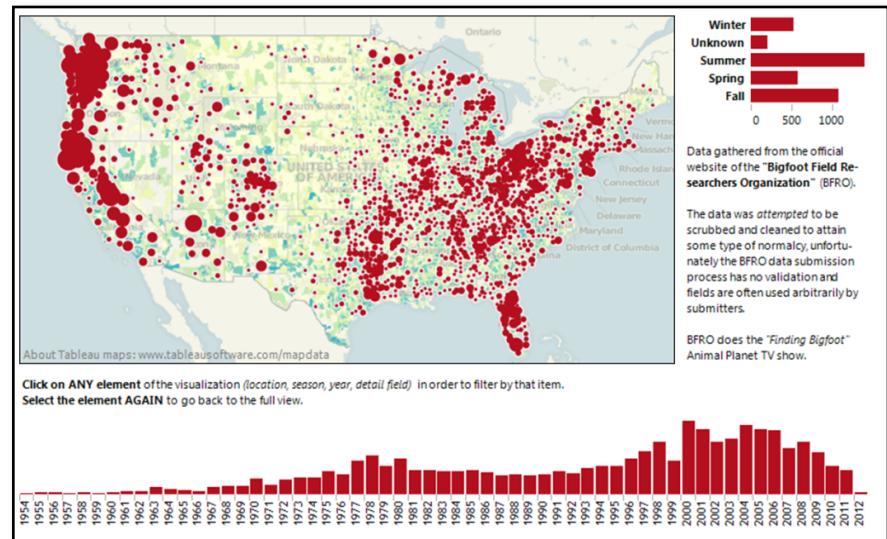
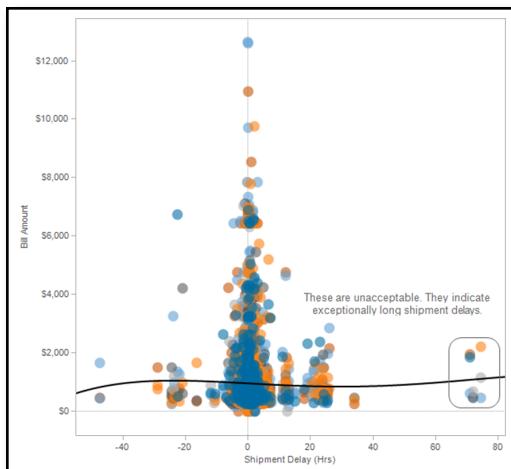
After completing this course, learners will be able to:

- Import multiple types of data sources
- Understand basic controls and navigations of the tool
- Create hierachies and groups
- Be able to pick the right visualization for your data type
- Understand the basic formatting features of Tableau
- Use action filters and highlights
- Incorporate parameters into your visualizations
- Build an interactive dashboard

# Tableau Background

# Tableau Background

- 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.
- You can connect to virtually any data source from spreadsheets to data warehouses and display information in multiple graphic perspectives.



## Tableau is an Excellent Tool For Organizing Visual Data

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### Ease of Use

- Plug and play with data sets, no scripting required
- Link tables to create relational entities
- Drag & drop layout, no programming required

### Designed for Comparison & Patterns

- Specifically designed layouts for
  - Time series
  - Comparative functions
  - Pattern analysis

### High Data to Ink Ratio

- Supports multivariate analysis (X by Y by Z) in a variety of formats
  - Bubble charts
  - Spark lines
  - Bullet Charts
- Highlighting settings cue up data pre-attentiveness
- Expose parameters for event modeling in real time
- Creates dashboards by embedding multiple visualizations into a single entity

### Excellent Engine

- Supports SQL like equation builder
- Creates running totals, percent of, moving average, etc on the fly
- Supports a high level of dynamic use “out of the box”
- Embeds background data in table format for on the fly details

**These factors change the delivery from a presentation to a conversation.**

## Preparing Data

- **Cleaning** – Remove errors/noise, extraneous columns, normalizing
- **Integration** – Blending multiple data sets either in Tableau or Database
- **Transformation** – Preparing data structure for Tableau, Excel Reshaper

	A	B	C	D	E	F	G	H	I	J	K
1											
2		Mean of weekly consumption of fruits <sup>a</sup>				Mean of weekly consumption of soft drinks <sup>a</sup>			Mean of daily TV watching on weekdays <sup>b</sup>		
3		11 yrs	13 yrs	15 yrs		11 yrs	13 yrs	15 yrs	11 yrs	13 yrs	15 yrs
4	REGION										
5	AT	4.6	4.1	3.4	2.7	3.5	4.1	2.2	2.5	2.5	
6	BE-VLG	4.1	4.2	3.8	4.3	5.0	5.4	2.4	2.6	2.5	
7	BE-WAL	4.0	4.5	4.3	3.5	4.3	4.6	1.9	2.2	2.3	
8	BG	4.	4.	3.7	5.	5.	5.3	3.5	3.6	3.1	
9	CA	5.	4.6	4.6	2.6	3.7	3.7	2.7	2.8	2.7	
10	CH	4.6	4.6	4.0	2.9	3.8	4.2	1.3	1.6	1.8	
11	CZ	4.6	4.6	4.1	4.1	4.3	4.2	2.5	2.6	2.4	
12	DE	4.5	4.2	3.8	2.5	3.2	3.6	2.0	2.4	2.4	
13	DK	4.8	4.5	4.1	2.6	2.9	3.5	2.2	2.6	2.5	
14	EE	4.6	4.3	3.7	2.4	2.8	2.6	2.8	2.9	2.6	
15	ENG	5.0	4.8	4.4	3.1	3.8	4.1	2.2	2.5	2.3	
16	ES	4.5	4.1	3.7	3.0	3.7	4.1	2.0	2.3	2.4	
17	FI	3.5	3.1	3.1	2.0	2.9	2.9	2.0	2.1	2.1	
18	FR	4.2	3.8	3.5	3.1	4.2	4.2	2.5	2.4	2.4	
19	GL	2.2	1.9	1.8	3.4	4.2	4.6	1.9	2.2	2.6	
20	GR	4.4	4.2	3.7	2.2	3.1	3.5	2.5	2.9	2.8	
21	HR	4.2	4.0	4.0	2.6	3.1	3.5	2.9	3.1	2.9	
22	HU	4.2	4.0	4.0	2.6	3.1	3.5	2.1	2.5	2.4	
23	IE	4.6	4.2	3.9	3.0	3.8	4.2	2.3	2.3	2.4	
24	IL	4.9	4.5	4.4	4.8	4.9	5.2	3.0	3.0	3.0	
25	IS	4.9	4.0	3.2	2.5	3.2	3.5	2.1	2.4	2.1	
26	IT	4.7	4.1	4.1	4.1	4.1	4.1	2.1	2.3	2.5	
27	LT	3.9	3.5	3.2	2.9	2.8	2.7	2.8	3.1	2.8	
28	LU	4.8	4.1	4.0	2.8	4.1	4.8	1.8	2.0	2.2	
29	LV	3.8	3.9	3.6	2.5	3.1	2.8	3.0	3.1	2.7	
30	MK	4.7	4.6	4.3	4.1	4.5	4.6	2.3	2.7	2.4	
31	MT	4.5	3.9	4.1	4.3	4.7	4.9	-	-	-	
32	NL	4.5	4.1	3.4	4.0	4.8	5.4	2.5	3.1	3.2	
33	NO	5.0	4.5	4.1	2.4	3.0	3.6	1.8	2.1	2.4	
34	PL	4.5	4.5	4.1	3.6	4.1	4.2	2.5	2.8	2.6	
35	PT	5.0	4.7	4.4	3.7	3.6	4.3	2.8	3.3	3.0	

**BAD DATA**  
**WIDE REDUNDANT COLUMNS**  
**BADLY FORMATED**  
**NULS GALORE!**

	A	B	C	D	E	F
1	Year	Country	Category	Genre	Age	Rate
2	2009-2010	AM	Mean of weekly consumption of fruits	Boy	11 yrs	4.7
3	2009-2010	AM	Mean of weekly consumption of fruits	Boy	13 yrs	4.8
4	2009-2010	AM	Mean of weekly consumption of fruits	Boy	15 yrs	5.2
5	2009-2010	AM	Mean of weekly consumption of soft drinks	Boy	11 yrs	3.3
6	2009-2010	AM	Mean of weekly consumption of soft drinks	Boy	13 yrs	3.5
7	2009-2010	AM	Mean of weekly consumption of soft drinks	Boy	15 yrs	4.1
8	2009-2010	AM	Mean of daily TV watching on weekdays	Boy	11 yrs	2.7
9	2009-2010	AM	Mean of daily TV watching on weekdays	Boy	13 yrs	3
10	2009-2010	AM	Mean of daily TV watching on weekdays	Boy	15 yrs	3.2
11	2009-2010	AT	Mean of weekly consumption of fruits	Boy	11 yrs	4.9
12	2009-2010	AT	Mean of weekly consumption of fruits	Boy	13 yrs	4.6
13	2009-2010	AT	Mean of weekly consumption of soft drinks	Boy	15 yrs	3.7
14	2009-2010	AT	Mean of weekly consumption of soft drinks	Boy	11 yrs	2.9
15	2009-2010	AT	Mean of weekly consumption of soft drinks	Boy	13 yrs	3.5
16	2009-2010	AT	Mean of weekly consumption of soft drinks	Boy	15 yrs	4.2
17	2009-2010	AT	Mean of daily TV watching on weekdays	Boy	11 yrs	1.8
18	2009-2010	AT	Mean of daily TV watching on weekdays	Boy	13 yrs	2.2
19	2009-2010	AT	Mean of daily TV watching on weekdays	Boy	15 yrs	2.4
20	2009-2010	BE-VLG	Mean of weekly consumption of fruits	Boy	11 yrs	4.3
21	2009-2010	BE-VLG	Mean of weekly consumption of fruits	Boy	13 yrs	3.8
22	2009-2010	BE-VLG	Mean of weekly consumption of fruits	Boy	15 yrs	3
23	2009-2010	BE-VLG	Mean of weekly consumption of soft drinks	Boy	11 yrs	3.8
24	2009-2010	BE-VLG	Mean of weekly consumption of soft drinks	Boy	13 yrs	4.3
25	2009-2010	BE-VLG	Mean of weekly consumption of soft drinks	Boy	15 yrs	5
26	2009-2010	BE-VLG	Mean of daily TV watching on weekdays	Boy	11 yrs	2.3
27	2009-2010	BE-VLG	Mean of daily TV watching on weekdays	Boy	13 yrs	2.2
28	2009-2010	BE-VLG	Mean of daily TV watching on weekdays	Boy	15 yrs	2.3
29	2009-2010	BE-WAL	Mean of weekly consumption of fruits	Boy	11 yrs	5.2
30	2009-2010	BE-WAL	Mean of weekly consumption of fruits	Boy	13 yrs	5.1

**GOOD DATA**  
**TALL UNIQUE COLUMNS**  
**NO EXTRA ROWS**  
**CLEAN NULLS**

## About the Data

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- For this presentation we are going to be using Capital Trip History BikeShare data
  - On a quarterly basis, Capital BikeShare releases the data associated with every trip that has taken place. Found [HERE](#)
- The original column headers are the following:

Duration (ms)	Start date	End date	Start station number	Start station	End station number	End station	Bike number	Member Type
301295	3/31/2016 23:59	4/1/2016 0:04	31280	11th & S St NW	31506	1st & Rhode Island Ave NW	W00022	Registered

- Using Python and the Google API we can call the exact longitude and latitude of each station number, as well as the zip code

Bike	Duration	End_date	End_station	Start_date	Start_station	Type	End_latitude	End_longitude	End_ZIP	Start_latitude	Start_longitude	Start_ZIP
W00749	1	4/1/2011 0:00	NW	16th & Harvard St 3/31/2011 14th & Harvard St 23:58	NW	Registered	38.9262766	-77.0364703	20009	38.9265705	-77.0324193	20009

- This dataset contains 1,048,576 unique BikeShare trips from 2011.

# Tableau Demo

# Getting Started: Connecting to Data

1. Click Connect to Data on left side of page
2. Select data source type
3. Navigate to file you want to connect to
4. Select how you want to connect to data:
  - **Live:** Direct connect to data. Slows speeds but allows you make updates to source.
  - **Import:** Brings in data to workbook. Improves speed.

The screenshot illustrates the 'Connect' process in Tableau:

- Step 1:** The 'Data' menu is open, showing the 'Connect to Data...' option, which is circled in red. A large red number '1' is positioned to the right of the menu.
- Step 2:** The 'Connect to data' dropdown is open, showing options like 'Tableau Data Extract', 'Microsoft Access', and 'Microsoft Excel'. 'Microsoft Excel' is circled in red. A large red number '2' is positioned to the right of the dropdown.
- Step 3:** The 'Sample - Superstore Sales' workbook is open. The 'Sheets' section shows 'Orders' selected and highlighted with a red box. A large red number '3' is positioned to the right of the sheet list. A red arrow points from the 'Orders' sheet in the list to a red box labeled 'Drag sheets here' on the right side of the interface.

# Screen Basics

The image shows the Tableau software interface with various components labeled for training:

- Data Connect**: The top navigation bar.
- Quick Sort**: The sorting and filtering section on the left.
- Worksheet**: The main workspace where the chart is displayed.
- Workspace Controls**: The controls for the current worksheet.
- Quick Chart Preview**: A preview of the chart in the workspace controls.
- Chart View**: The main chart area showing Profit over Order Date for different Customer Segments and Regions.
- Dimensions Text/Categories**: The dimensions section in the Data Window.
- Measures Numbers**: The measures section in the Data Window.
- Sets Dimension Groups**: The sets section in the Data Window.
- Status Bar**: The status bar at the bottom of the interface.
- Worksheet Tabs**: The tabs for the current worksheet.
- Sheet Sorter**: The sheet sorter icon at the bottom right.

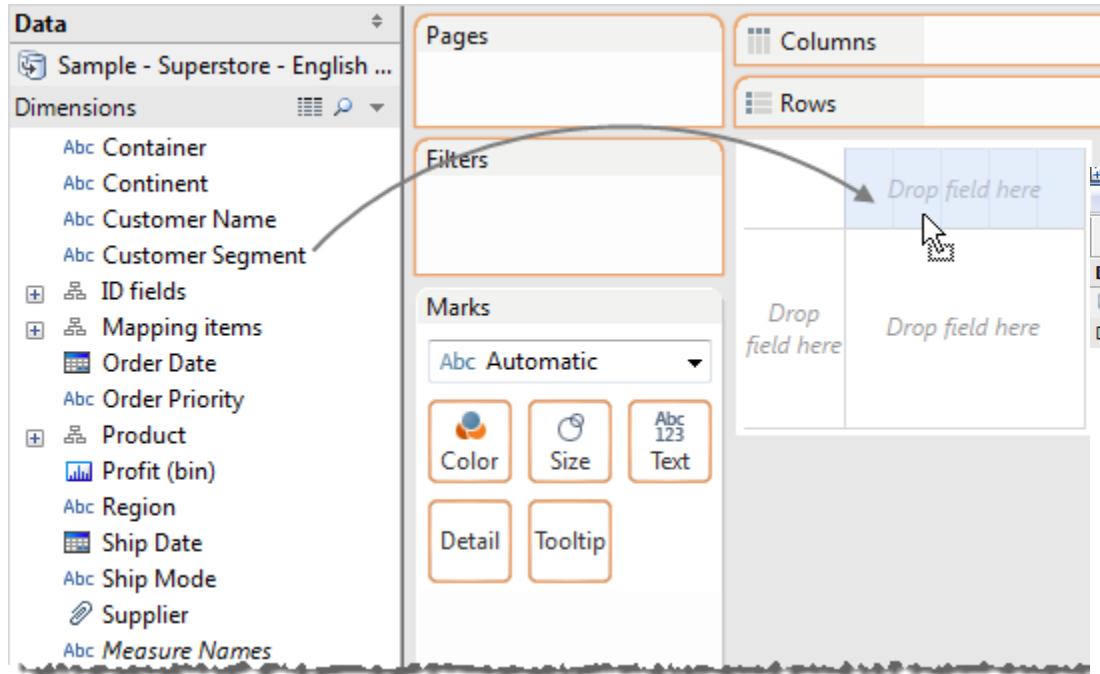
## Card Details

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- **Columns Shelf** – where you can drag fields to add columns to the view
- **Rows Shelf** – where you can drag fields to add columns to the view
- **Pages Shelf** – 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** – use this shelf to use multiple measures along a single axis
- **Quick Filters** – use these cards to easily include and exclude values from the view
- **Parameters** – 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. NOTE: 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

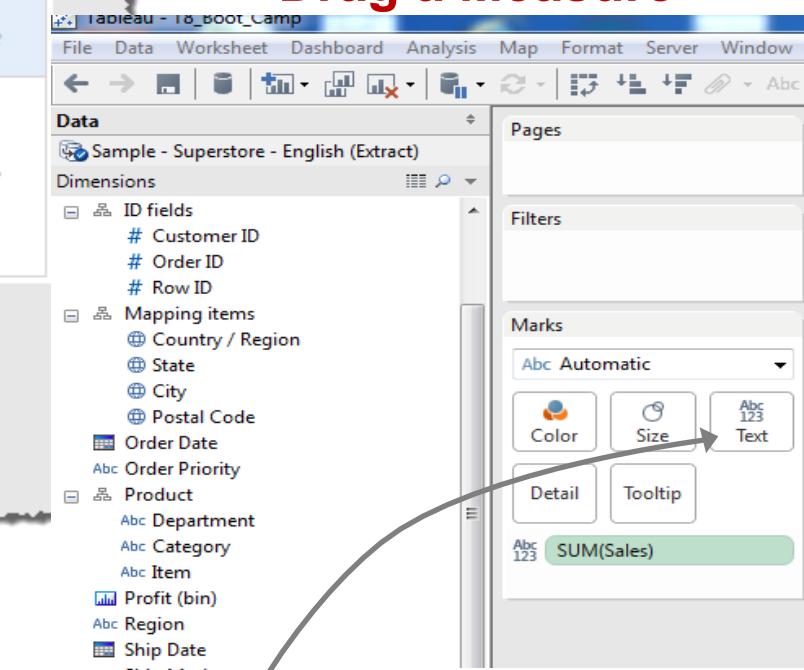
# Getting Started: Drag a Dimension and Measure

## Drag a Dimension



The screenshot shows the Tableau Data pane on the left. It includes sections for Data, Dimensions, and Measures. Dimensions listed include Container, Continent, Customer Name, Customer Segment, ID fields, Mapping items, Order Date, Order Priority, Product, Profit (bin), Region, Ship Date, Ship Mode, Supplier, and Measure Names. Measures listed include SUM(Sales), Profit, Sales, and Shipping Cost. A large orange arrow points from the 'Dimensions' section towards the 'Pages' and 'Filters' sections in the main workspace.

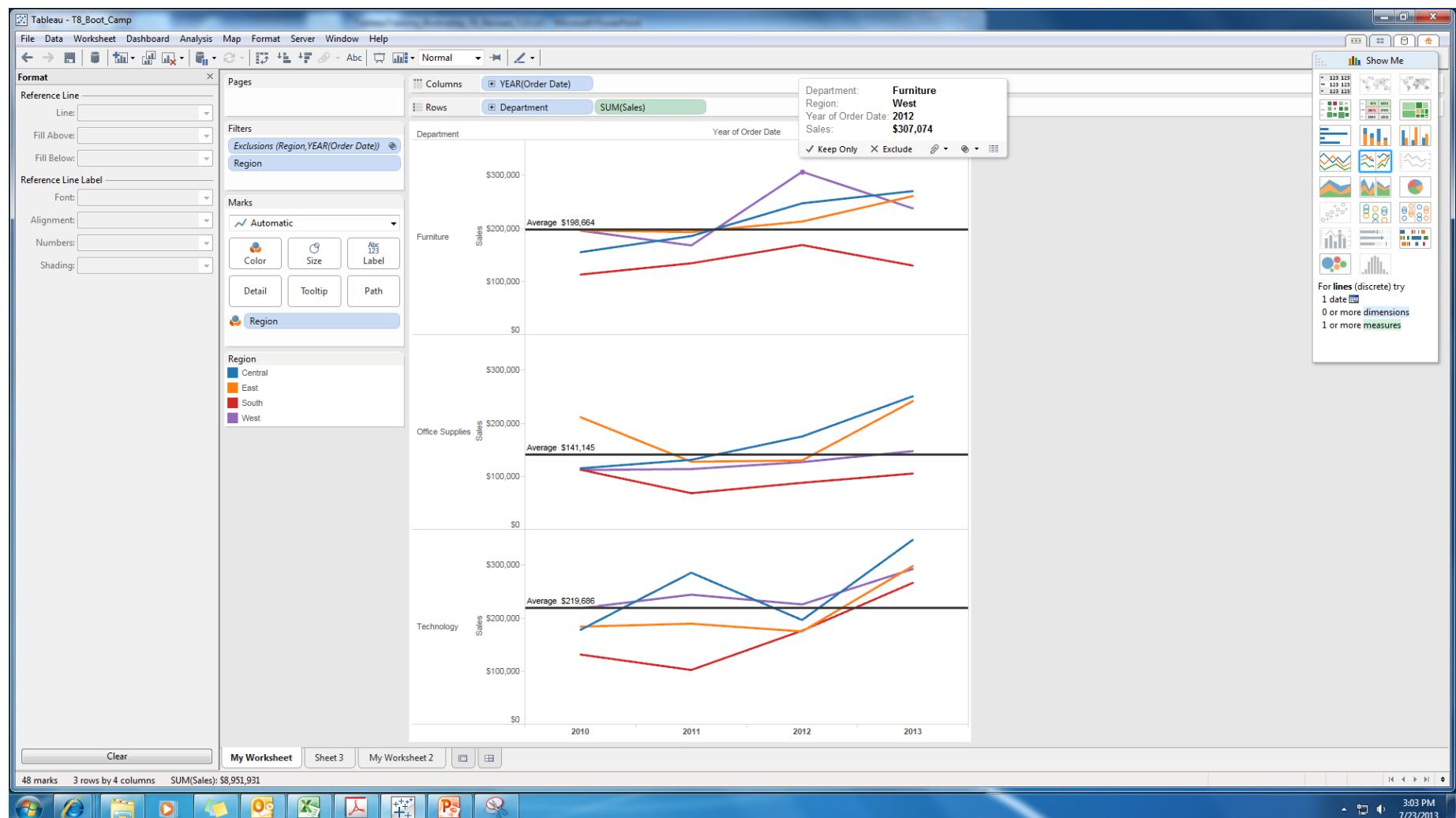
## Drag a Measure



The screenshot shows the Tableau Data pane on the left. It includes sections for Data, Dimensions, and Measures. Dimensions listed include Customer ID, Order ID, Row ID, Country / Region, State, City, Postal Code, Order Date, Order Priority, Department, Product, Category, Item, Profit (bin), Region, Ship Date, Ship Mode, Supplier, and Measure Names. Measures listed include SUM(Sales), Profit, Sales, and Shipping Cost. A large orange arrow points from the 'Measures' section towards the 'Text' button in the Marks section of the main workspace.

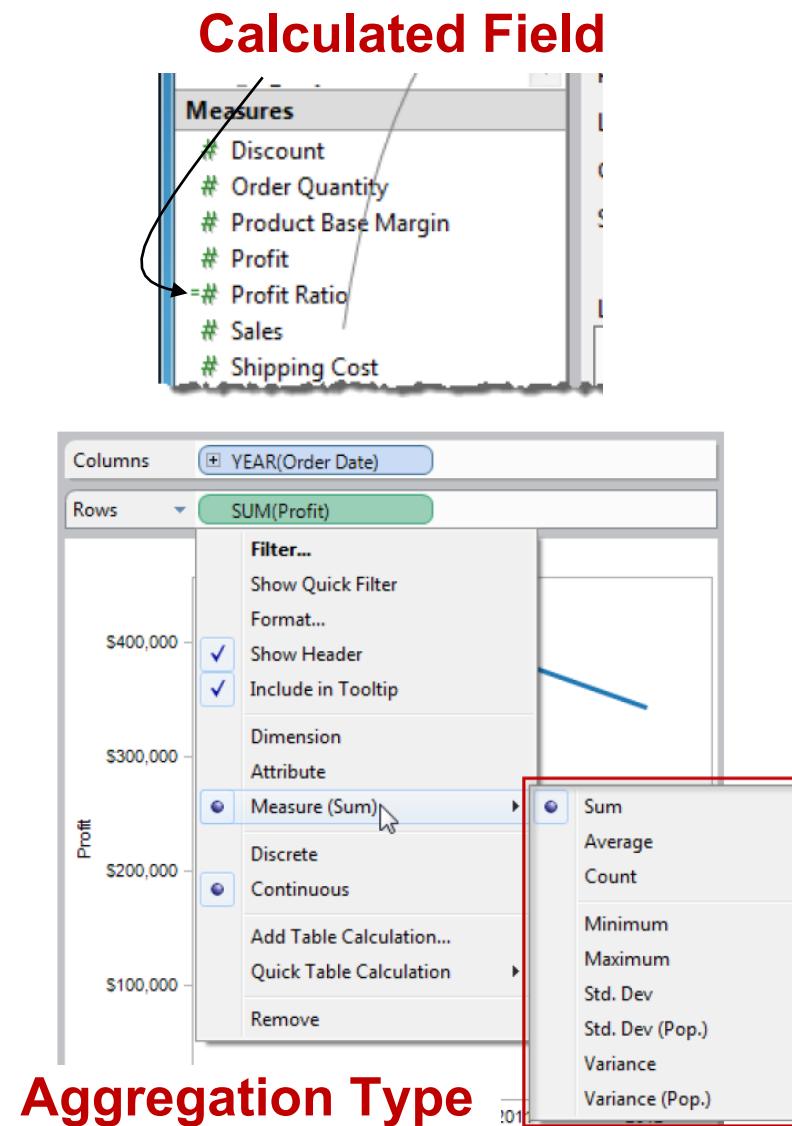
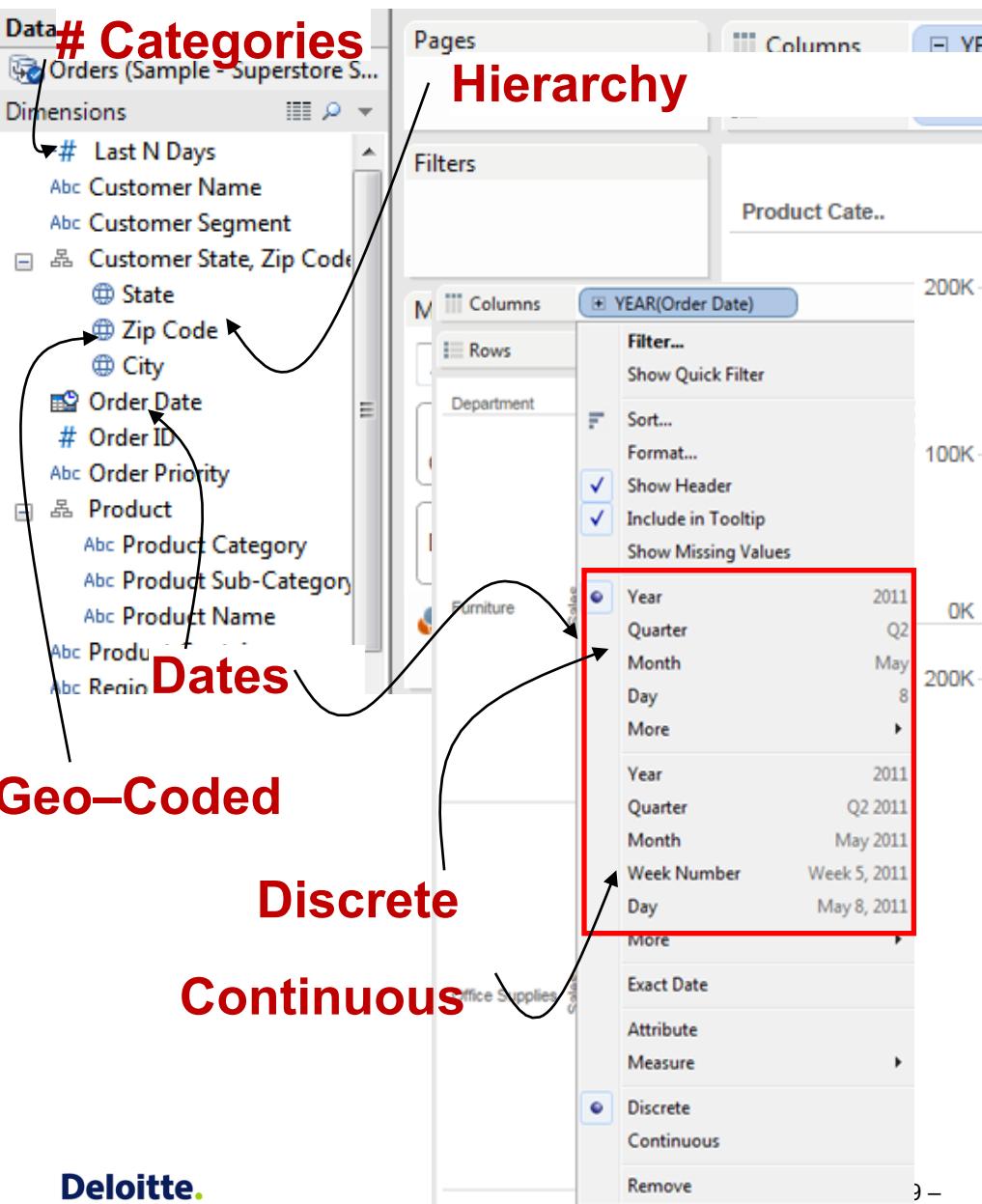
Region	Furniture	Office Supplies	Technology
Central	\$859,218	\$672,769	\$1,008,355
East	\$864,063	\$711,439	\$847,303
International	\$7,358,361	\$5,392,045	\$8,732,120
South	\$546,261	\$373,951	\$677,135
West	\$909,082	\$500,168	\$982,189

# Activity #1 Experiment and Build a Worksheet – 5 Minutes



# Basic Features

## Dimension and Measures



## Drilling Down

The image shows a data visualization interface with two main sections: a summary table on the left and a detailed table on the right. A context menu is open over a cell in the summary table, with an arrow pointing to the detailed table.

**Summary Table (Left):**

		Quarter			
Gen2,Product		Qtr1	Qtr2	Qtr3	Qtr4
Colas		25,048	27,187	28,544	25,355
Root Beer	✓	Keep Only	401	27,942	27,116
Cream Soda	✗	Exclude	736	26,650	25,022
Fruit Soda		Hide	355	22,079	20,648
Diet Drinks			787	27,495	25,665

**Context Menu (Left):**

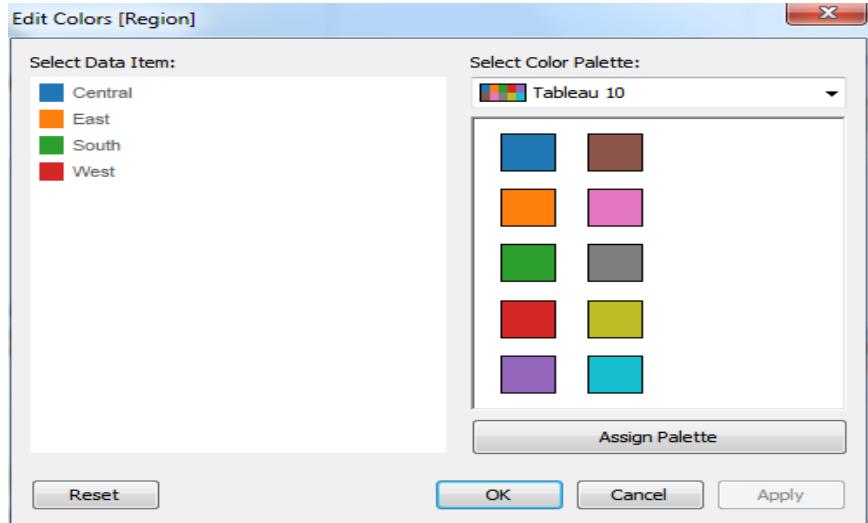
- ✓ Keep Only
- ✗ Exclude
- Hide
- + Drill Down
- Format...
- Rotate Label
- Show Header

**Detailed Table (Right):**

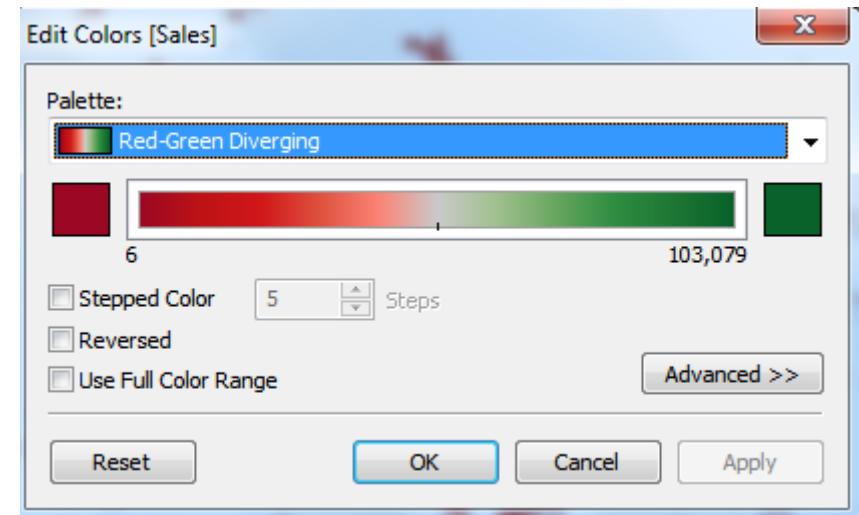
		Quarter			
Gen2,Product	Gen3,Product	Qtr1	Qtr2	Qtr3	Qtr4
Colas		25,048	27,187	28,544	25,355
Root Beer	Old Fashioned	9,894	10,192	10,939	10,512
	Diet Root Beer	9,486	9,725	9,885	9,144
	Sasparilla	4,440	4,562	4,362	4,195
	Birch Beer	2,807	2,922	2,756	3,265
Cream Soda		23,997	25,736	26,650	25,022
Fruit Soda		20,148	21,355	22,079	20,648
Diet Drinks		25,731	26,787	27,495	25,665

## Colors

### Categorical / Nominal Colors

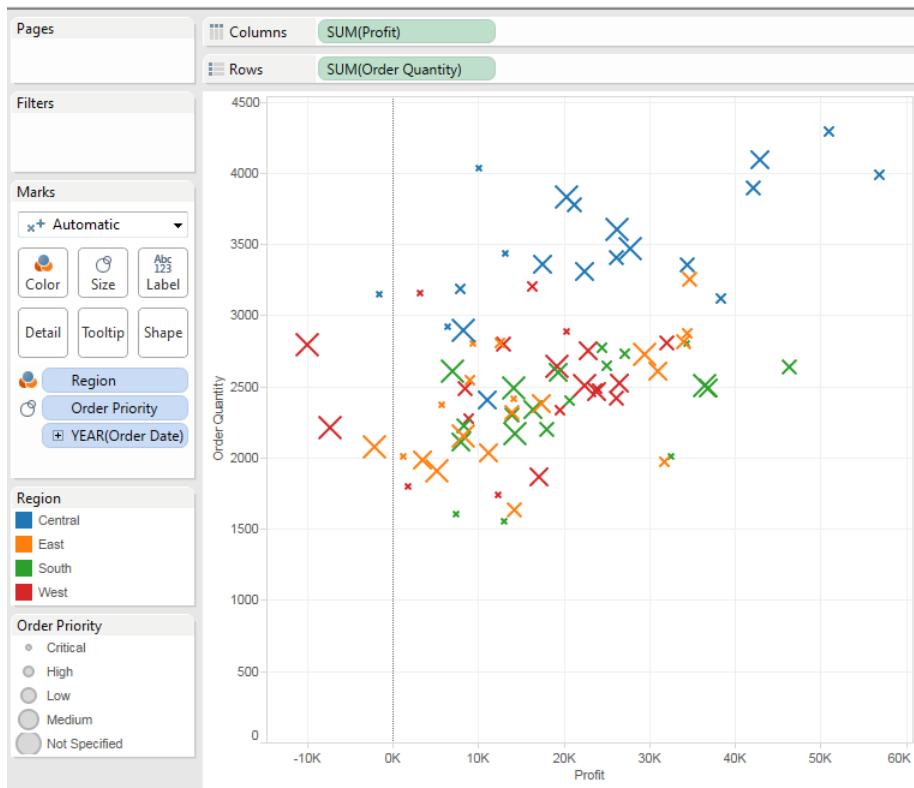
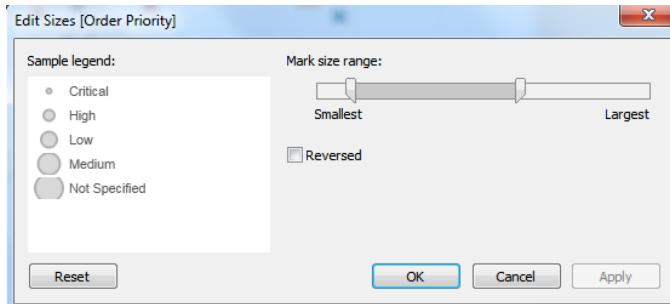


### Quantitative / Scalar Colors

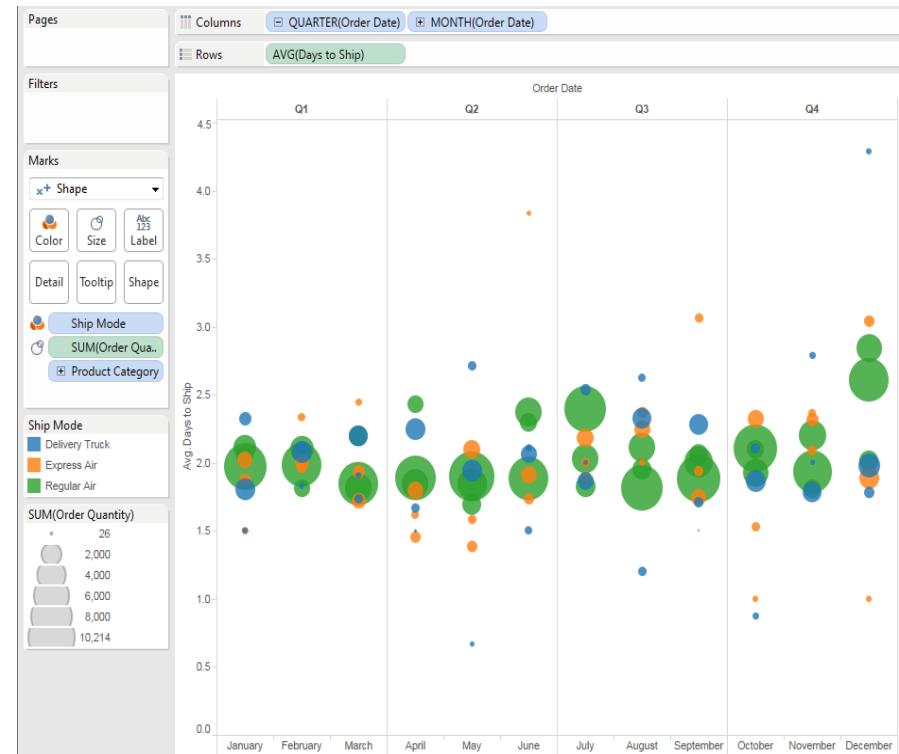
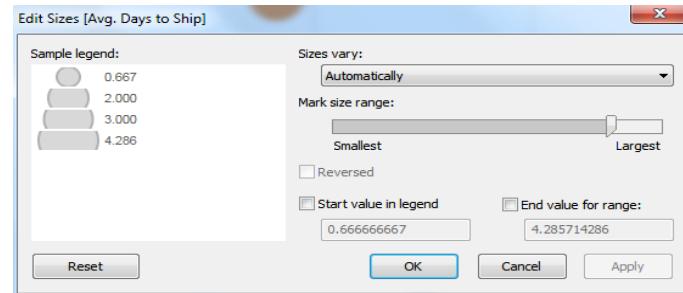


## Size

### Categorical Size

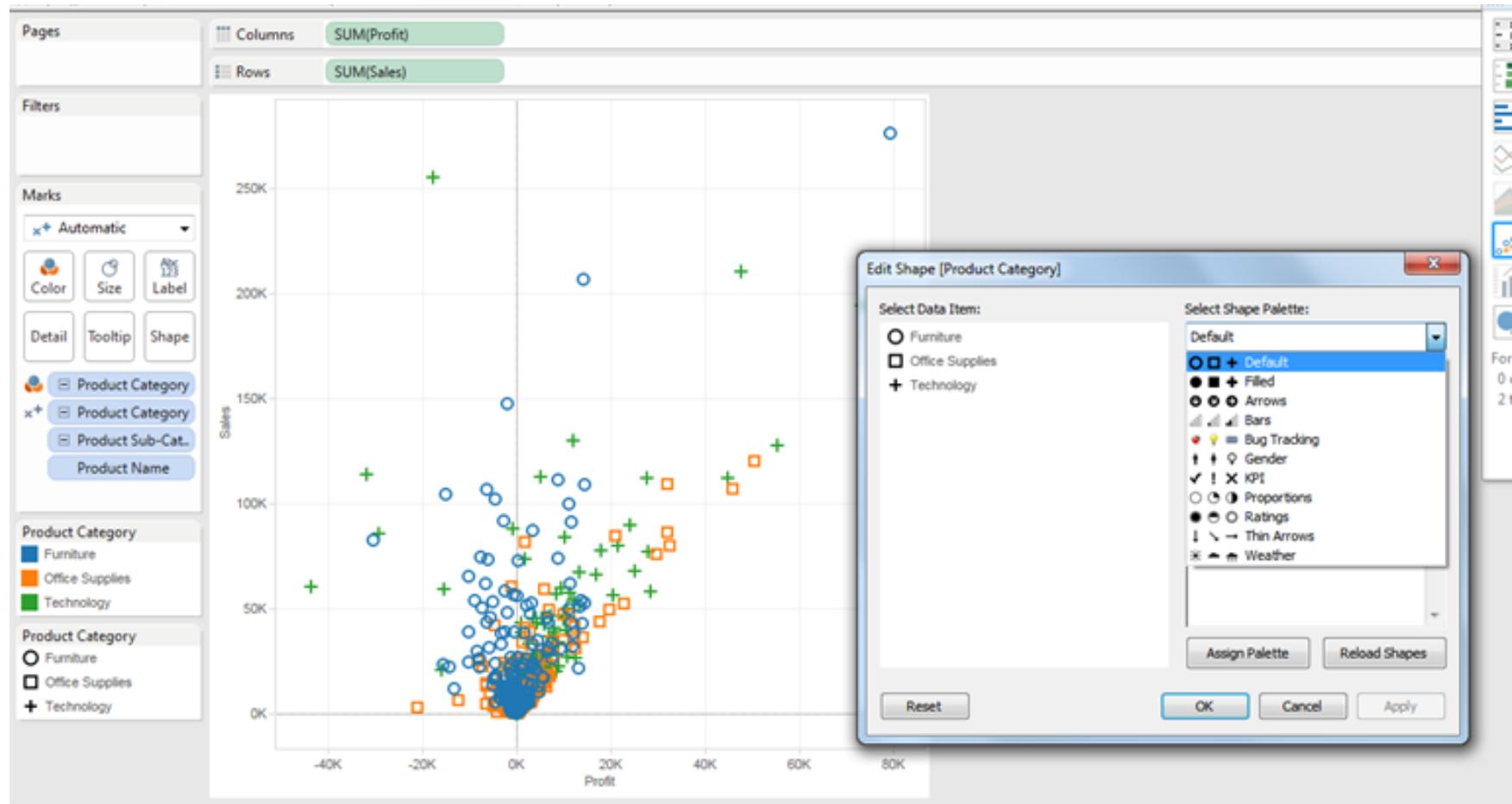


### Quantitative Size

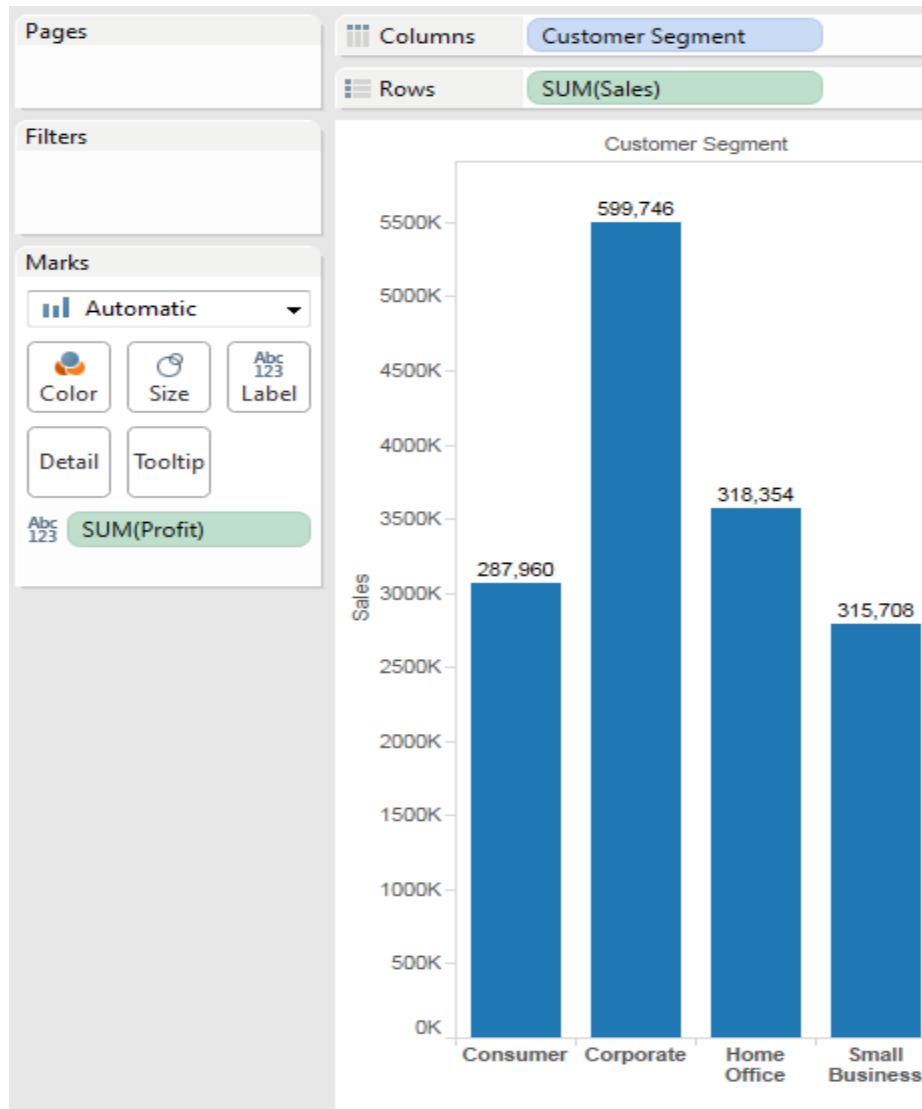


## Shapes

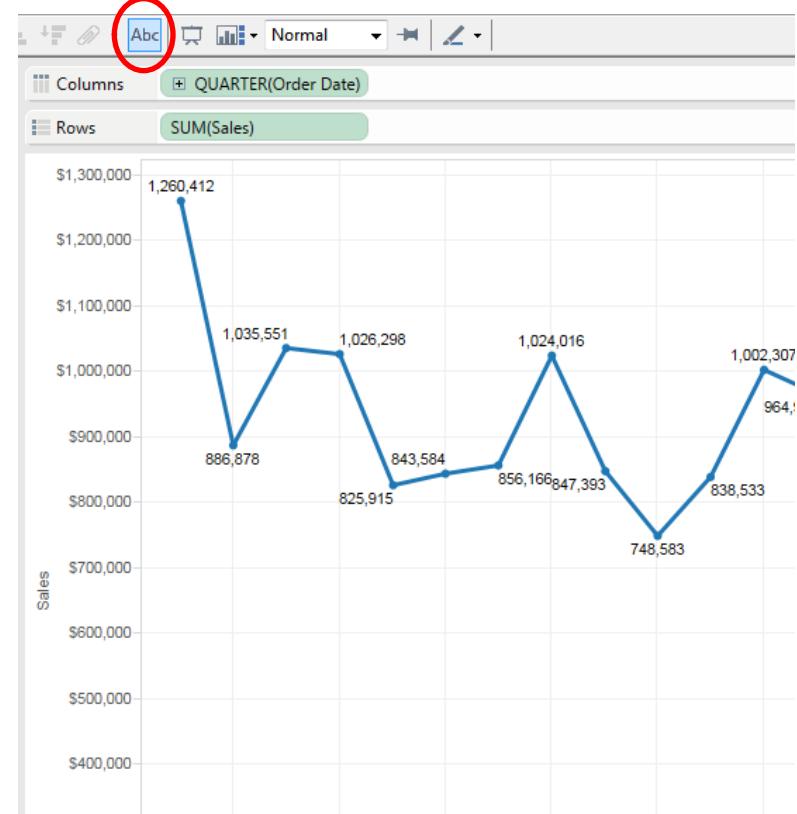
Have the ability to add custom shapes



## Labels

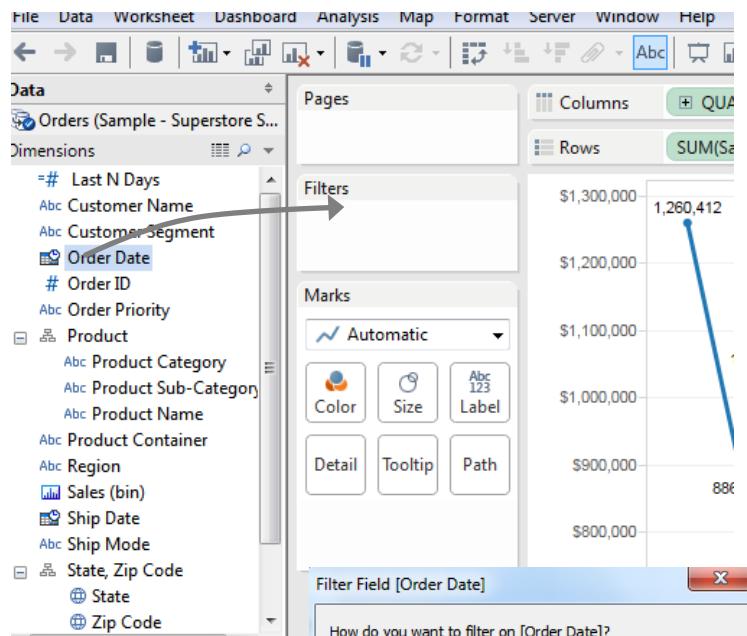


## Quick Mark Labels

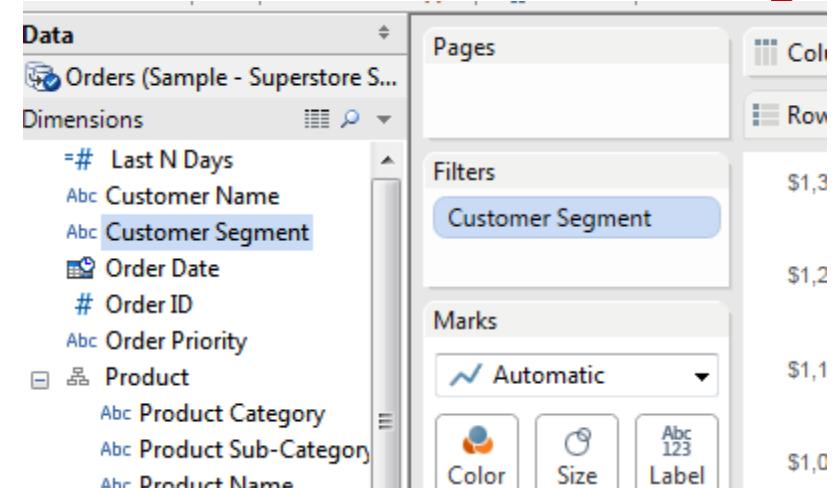
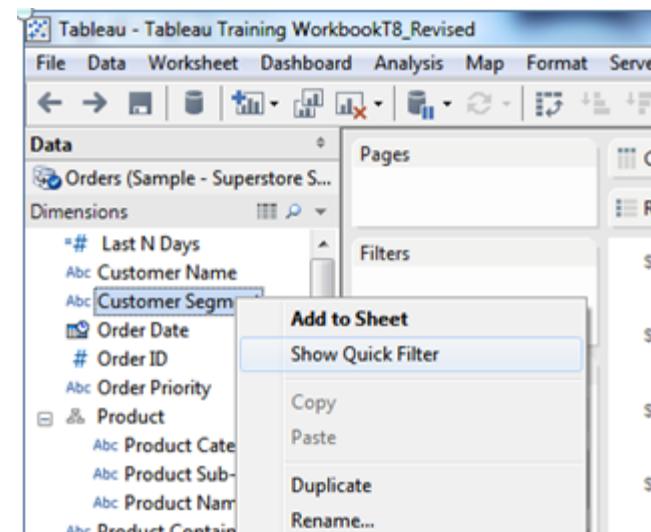


## Filters

Drag and Drop to Card or....

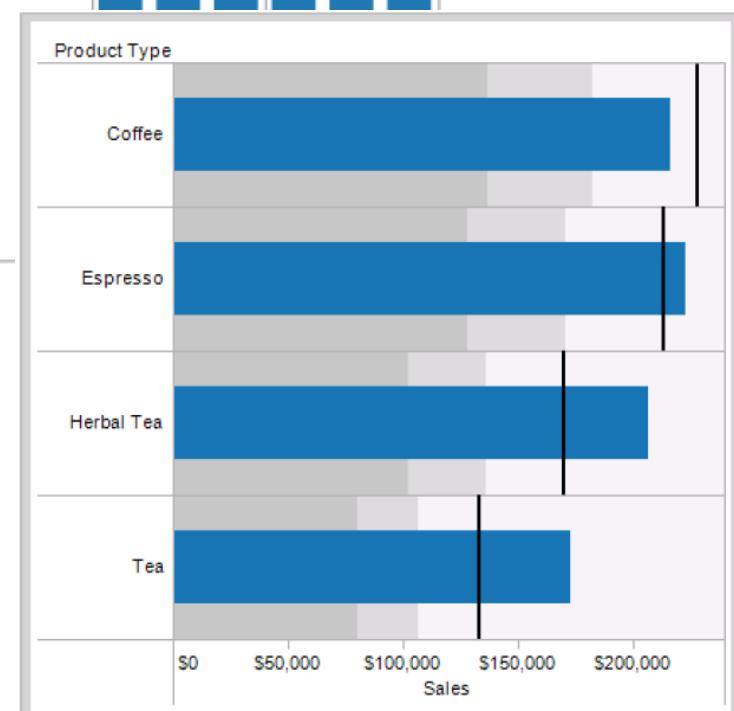
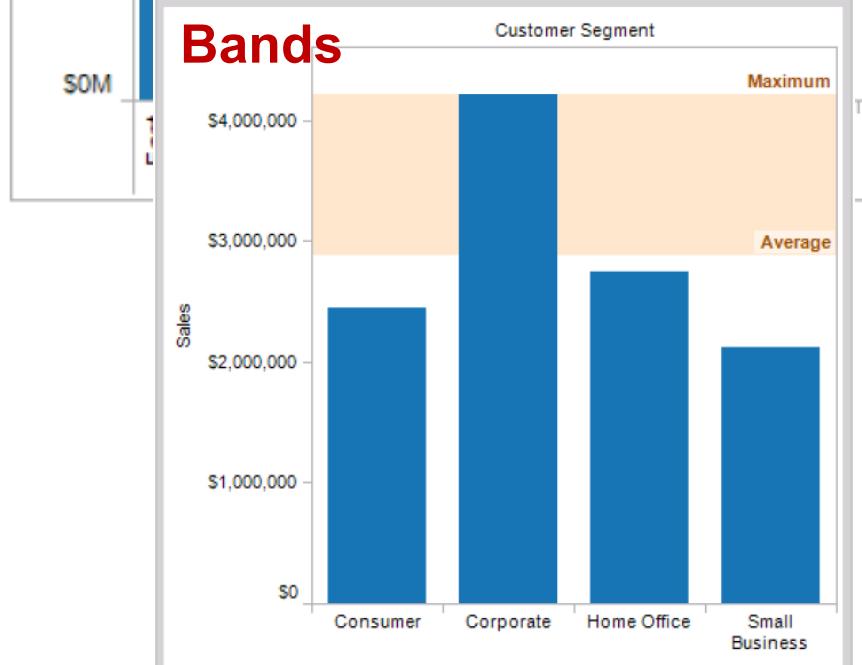
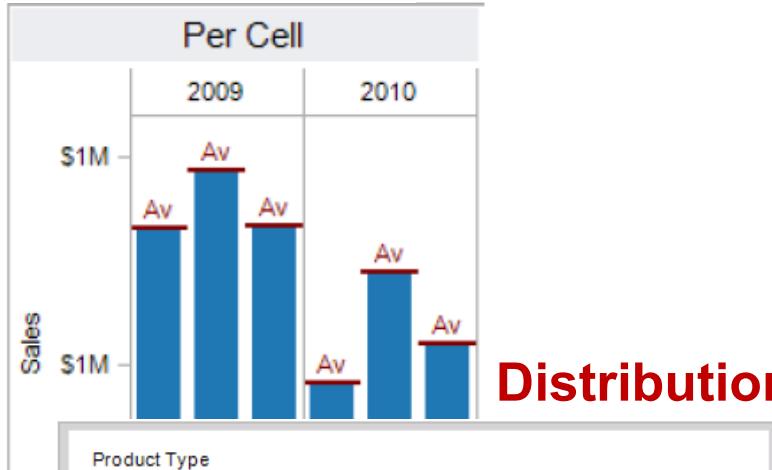
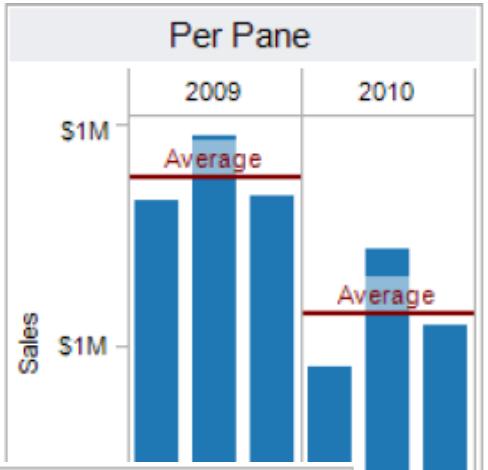
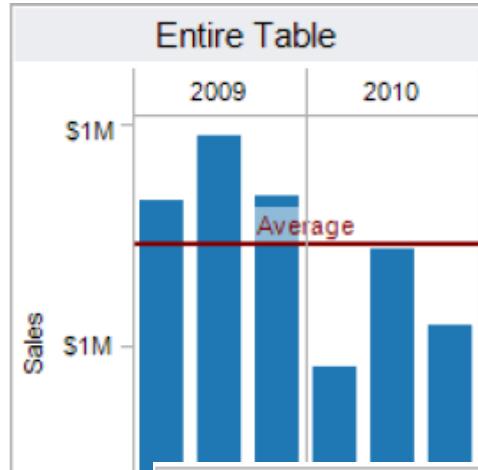


Right-Click on Measure/Dimension



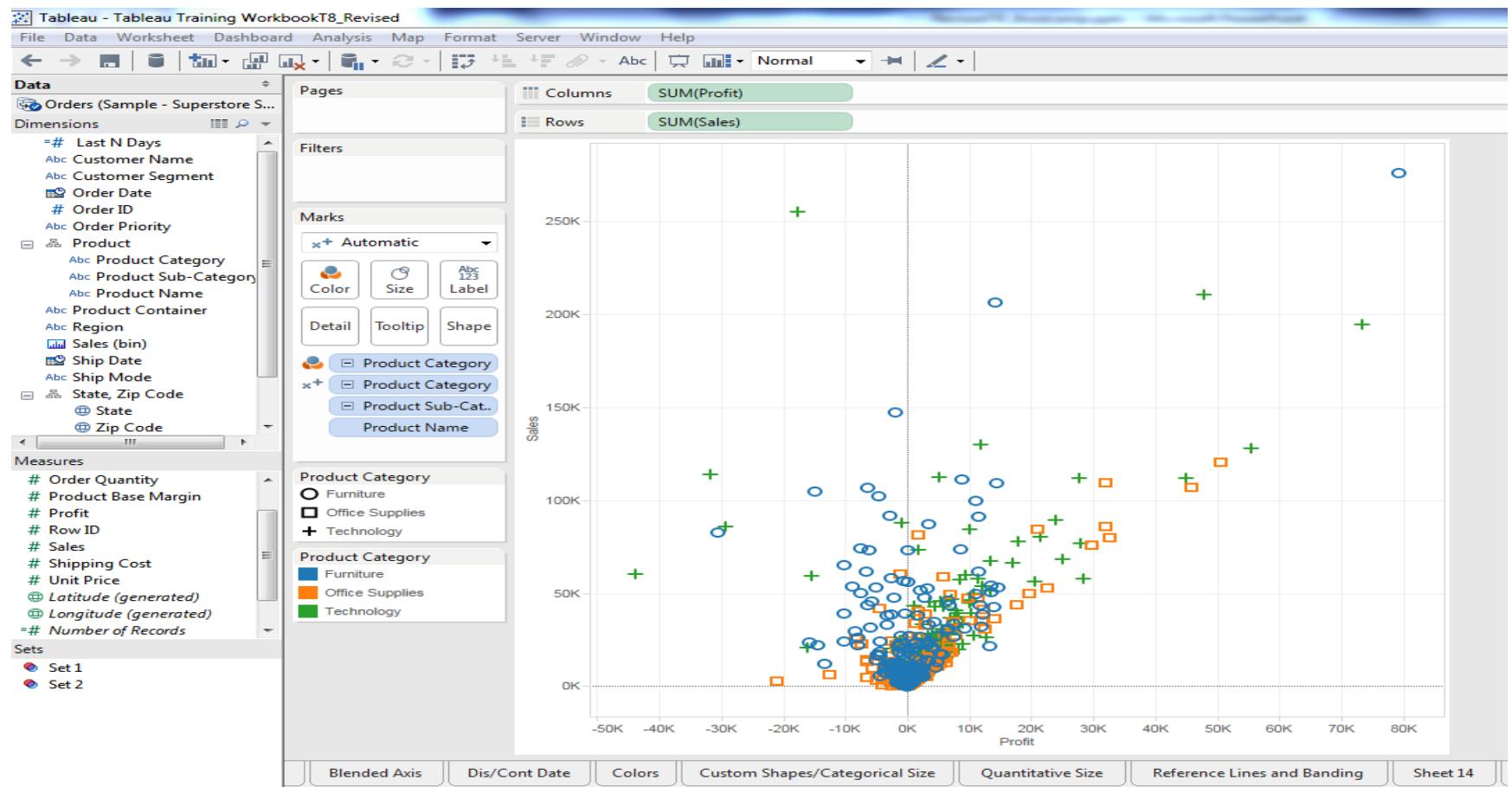
# Reference Lines and Banding

## Lines



## Activity #2 Create a visualization detailing sales and profit by category – 10 Minutes

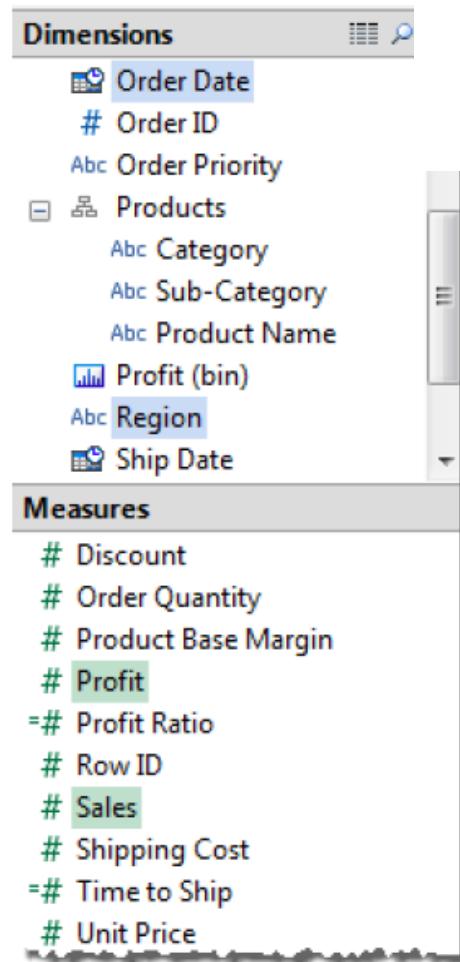
1. Drag Profit & Sales into Row and Column
2. Drag Category into Color
3. Drag Sub-Category into level of detail



# Chart Type & Design Considerations

## Show Me!

Hold CTRL and click a combination of dimension(s) and measure(s)



Dimensions

- Order Date
- Order ID
- Order Priority
- Products
  - Category
  - Sub-Category
  - Product Name
- Profit (bin)
- Region
- Ship Date

Measures

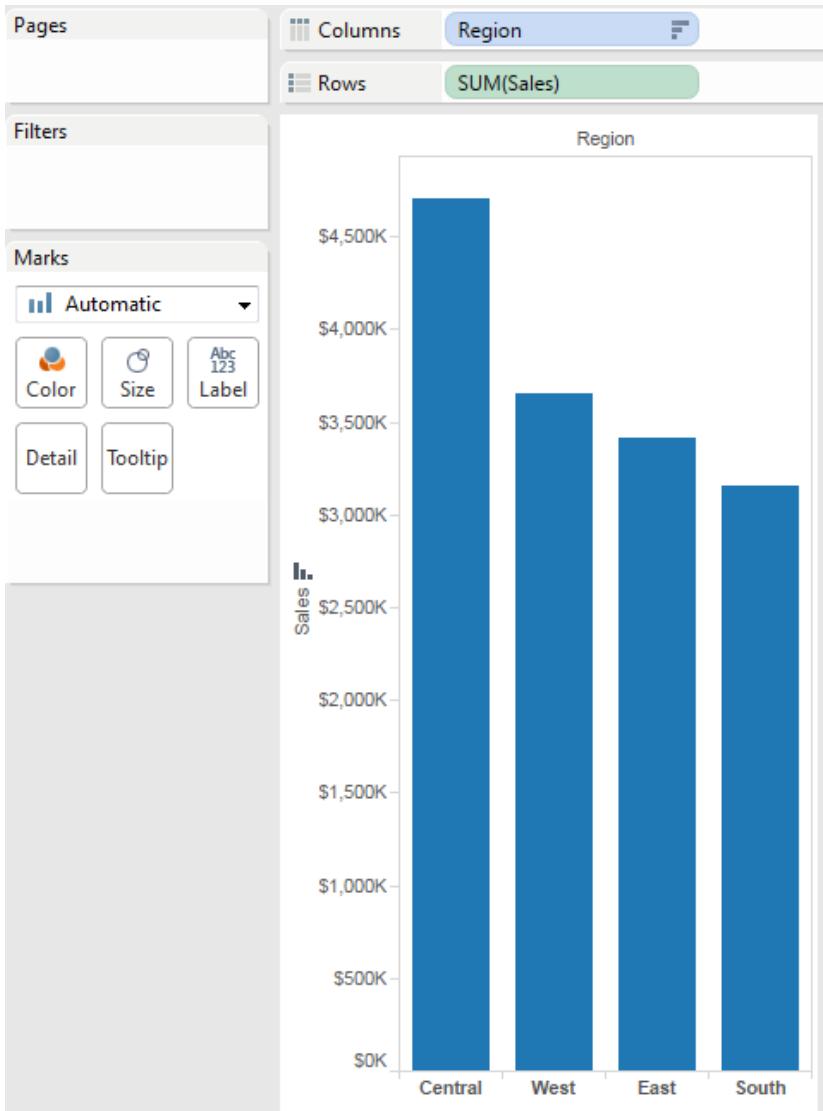
- Discount
- Order Quantity
- Product Base Margin
- Profit
- Profit Ratio
- Row ID
- Sales
- Shipping Cost
- Time to Ship
- Unit Price

Chart options with appear in Show Me!



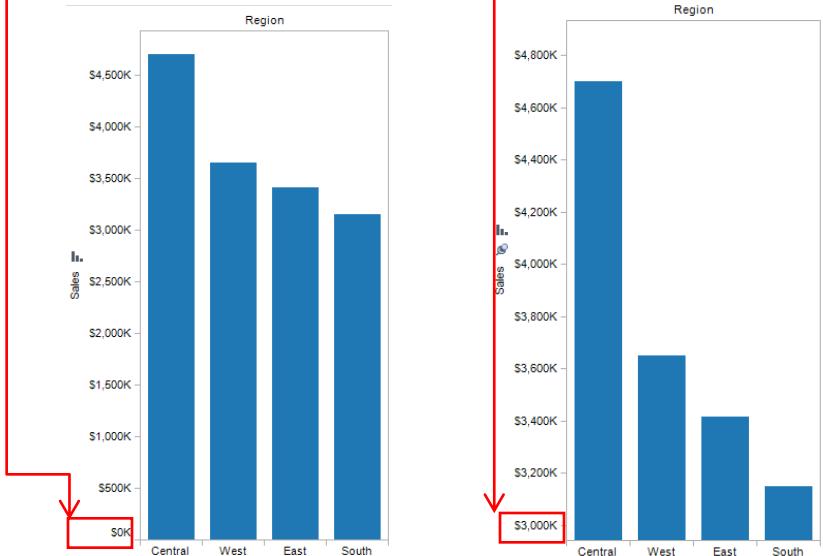
For scatter plots try  
0 or more dimensions  
2 to 4 measures

# Bar Chart



## Leading Practices

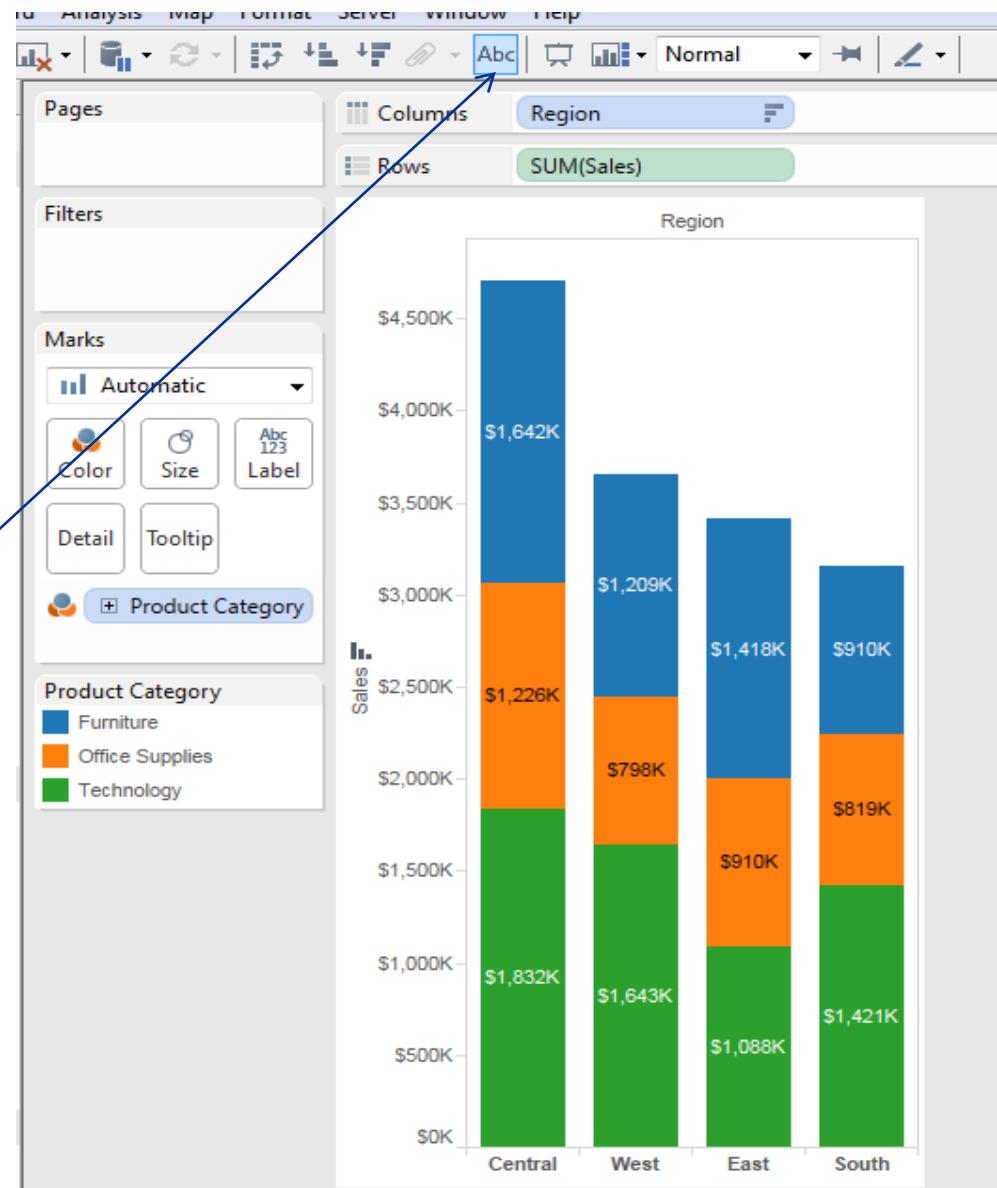
1. Most effective medium for uni-dimensional categorical comparisons
2. Sort in order to show ranking of elements
3. Comparison is facilitated by common base of reference
4. Use 0 for axis floor to ensure data veracity



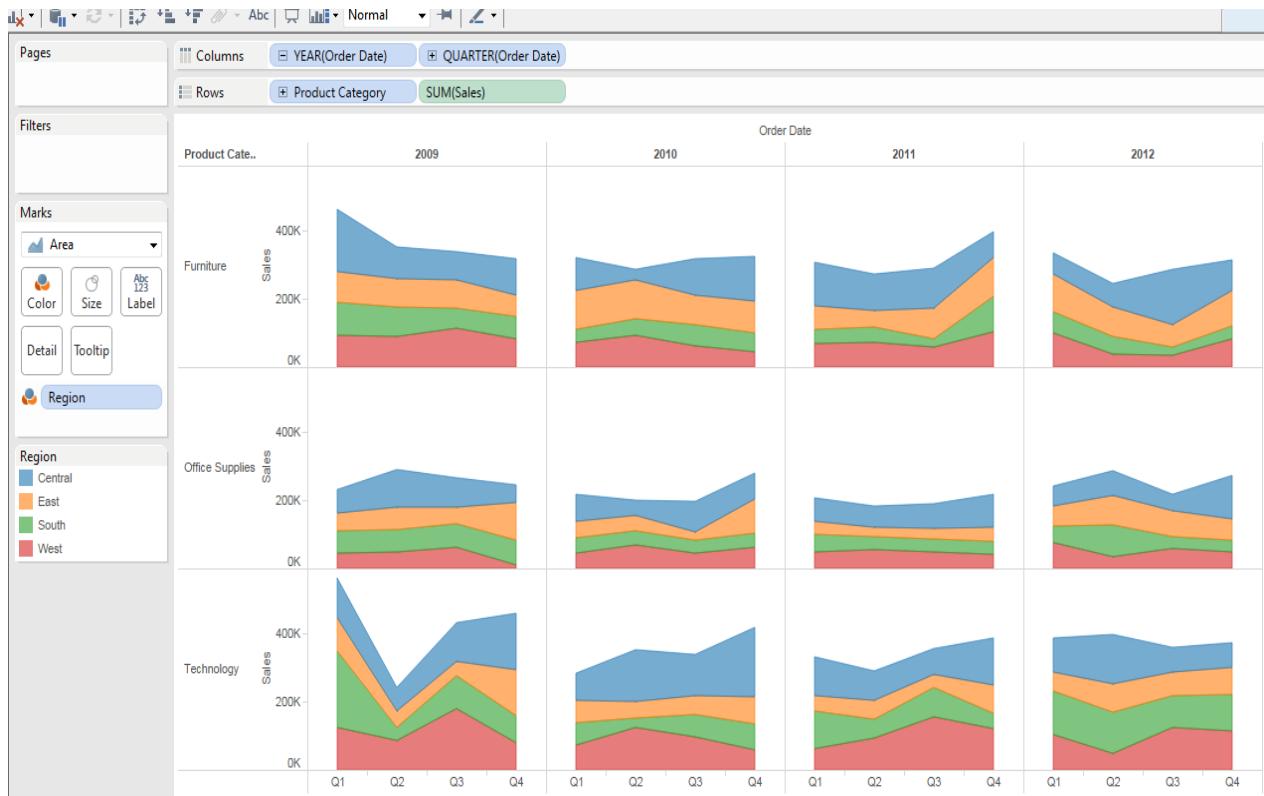
# Stacked Bar Chart

## Leading Practices

1. Comparing categories within a category
2. Sort in order to show ranking of elements
3. Sub-category comparison is diminished through differing baseline reference point
4. Use data labels to mitigate uneven floors
5. Use 0 for axis floor to ensure data veracity



# Nested Charts / Trellis / Small Multiples



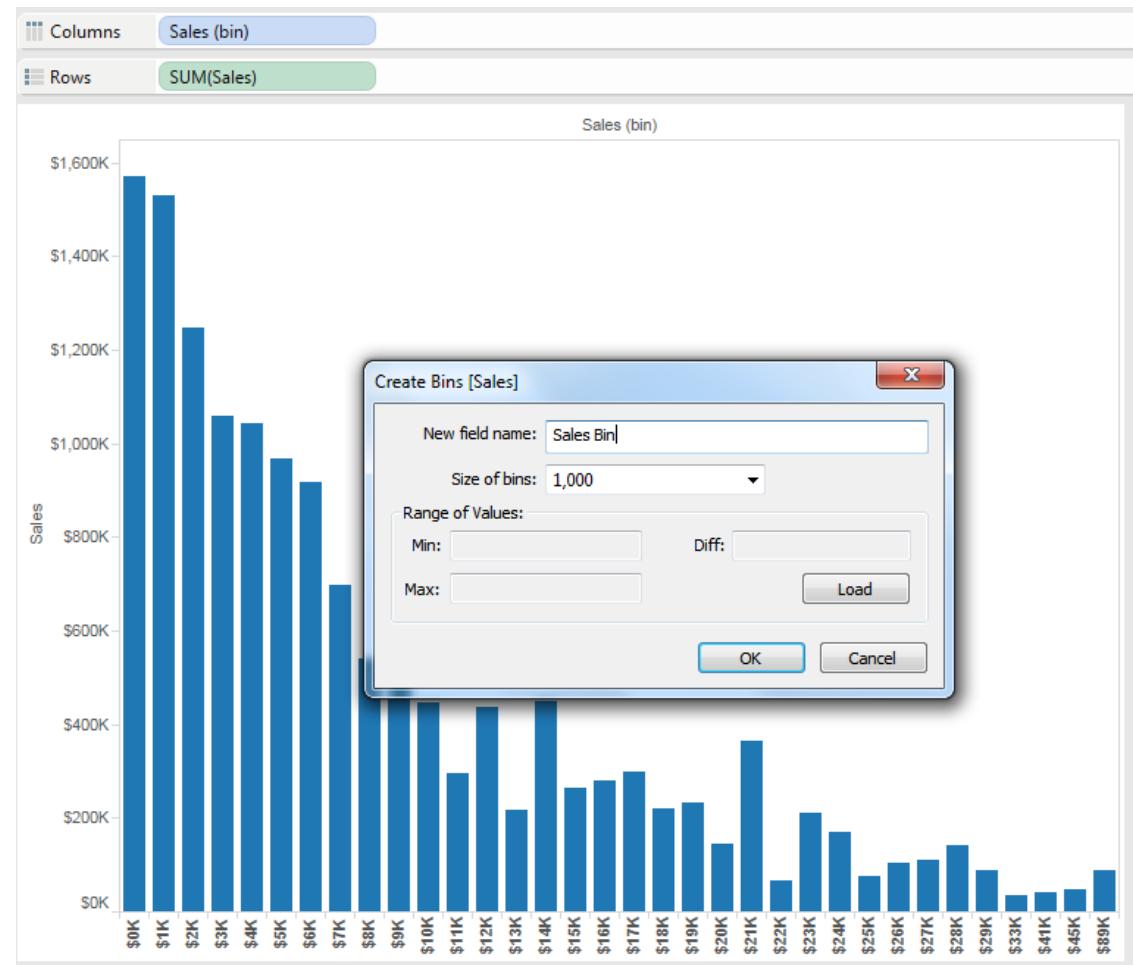
## Leading Practices

1. Comparing across multiple categories and within a category
2. Use filtering or highlighting to guide consumer (if using native functionality)
3. Use red circles and analytical paragraphs if exporting to flat medium (ex: PPT or PDF)
4. Sub-category comparison is nearly impossible
5. Use highlighted data labels to mitigate

# Histogram

## Leading Practices

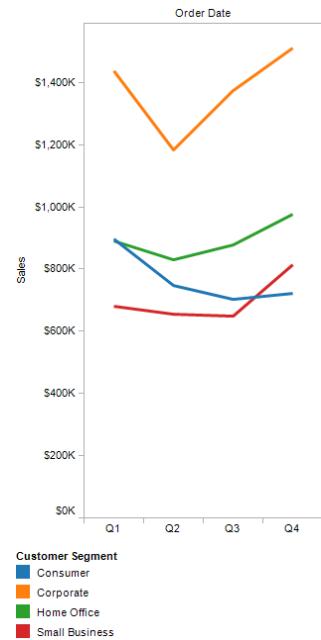
1. Showing distributions across a category (ex: how much sales volume from high dollar sales vs low dollar sales)
2. Turning a measure into a dimension
3. Bins are equal segmentations of the data set (ex: \$1,000 increments)
4. For unequal segmentations (ex: 1-3 years & 4-10 years) use a calculated field



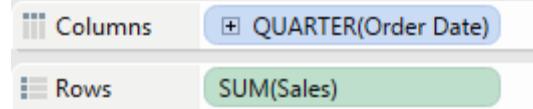
# Line Chart

## Leading Practices

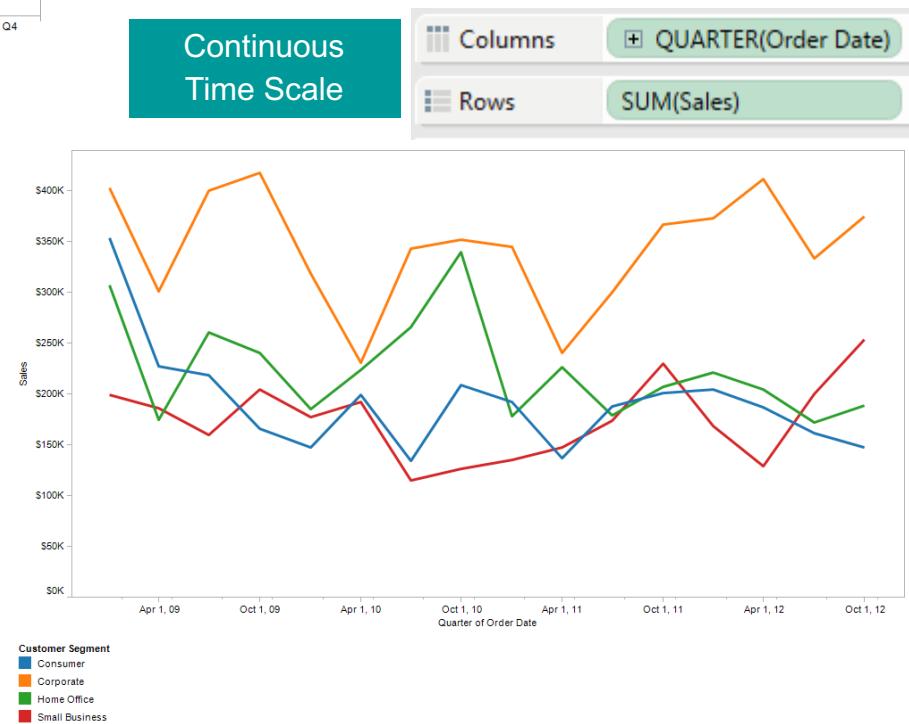
1. Viewing continuous data sets (most often time series data)
2. Dimensional time breaks down into discrete entities and sums them (e.g., Q1 sales over 4 years)
3. Continuous time drills into granularity year, quarter, month, week, day, hour, minute
4. Allows comparison of different dimensions over same period of time



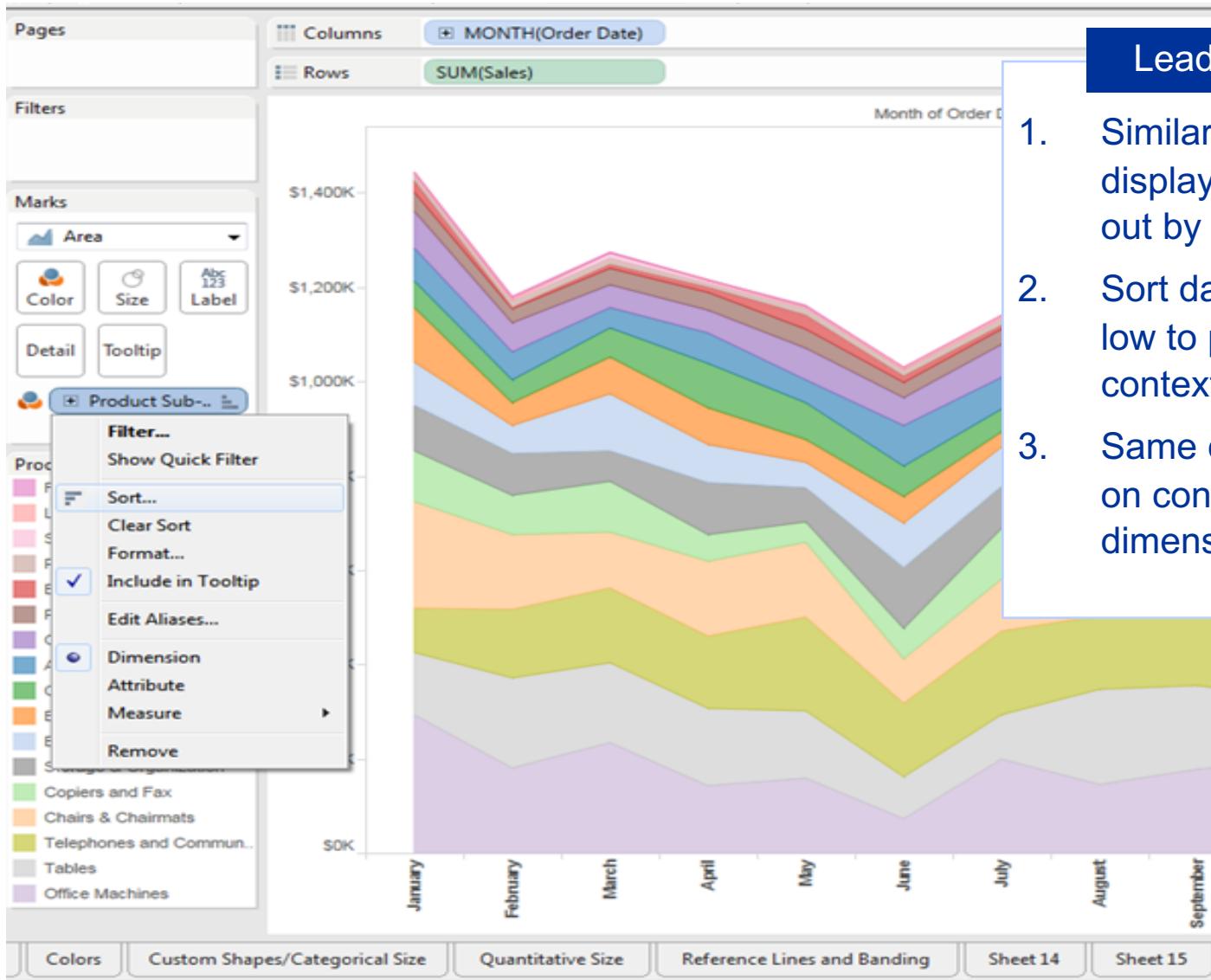
## Dimensional Time Scale



## Continuous Time Scale



# Area Chart



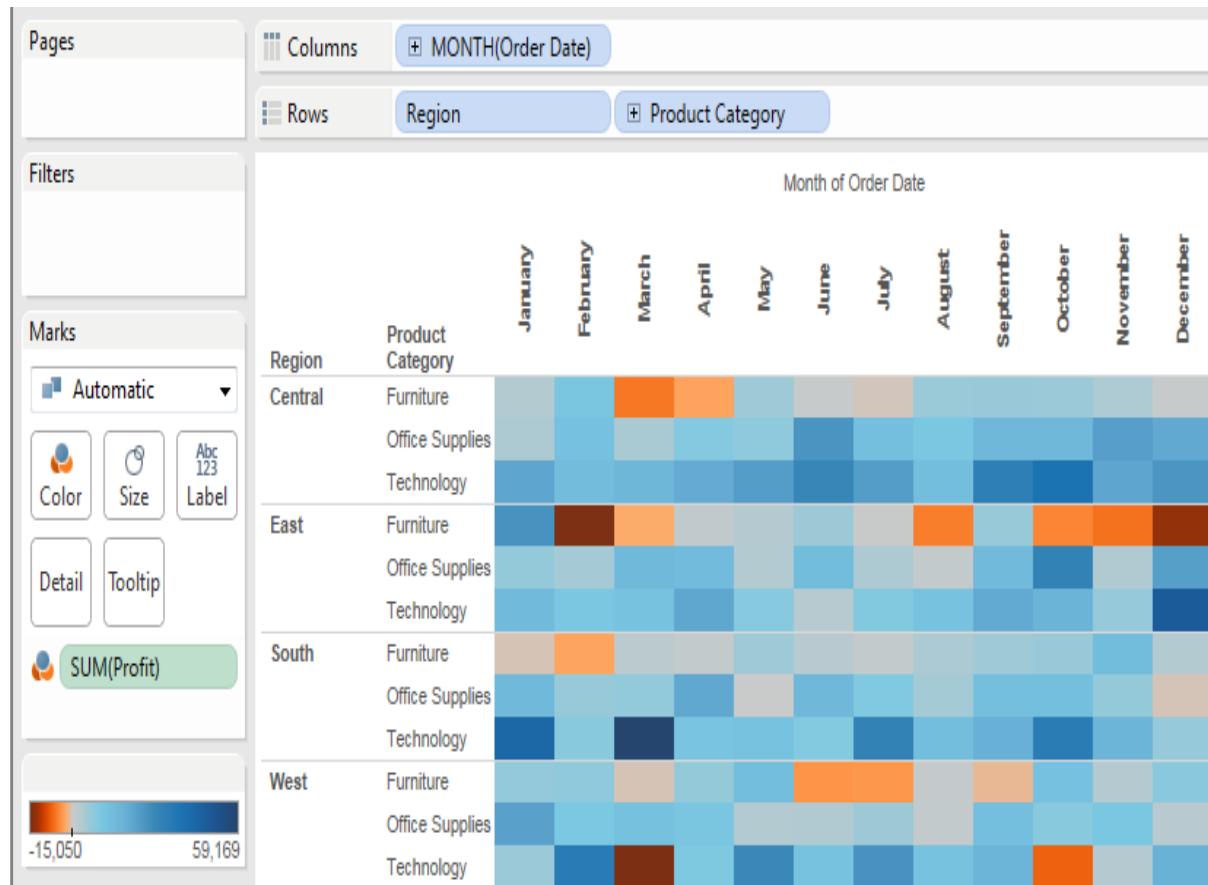
## Leading Practices

1. Similar to a line chart but displays total sum broken out by dimension
2. Sort data from a high to low to provide additional context
3. Same calculations based on continuous / dimension date

# Heat Map

## Leading Practices

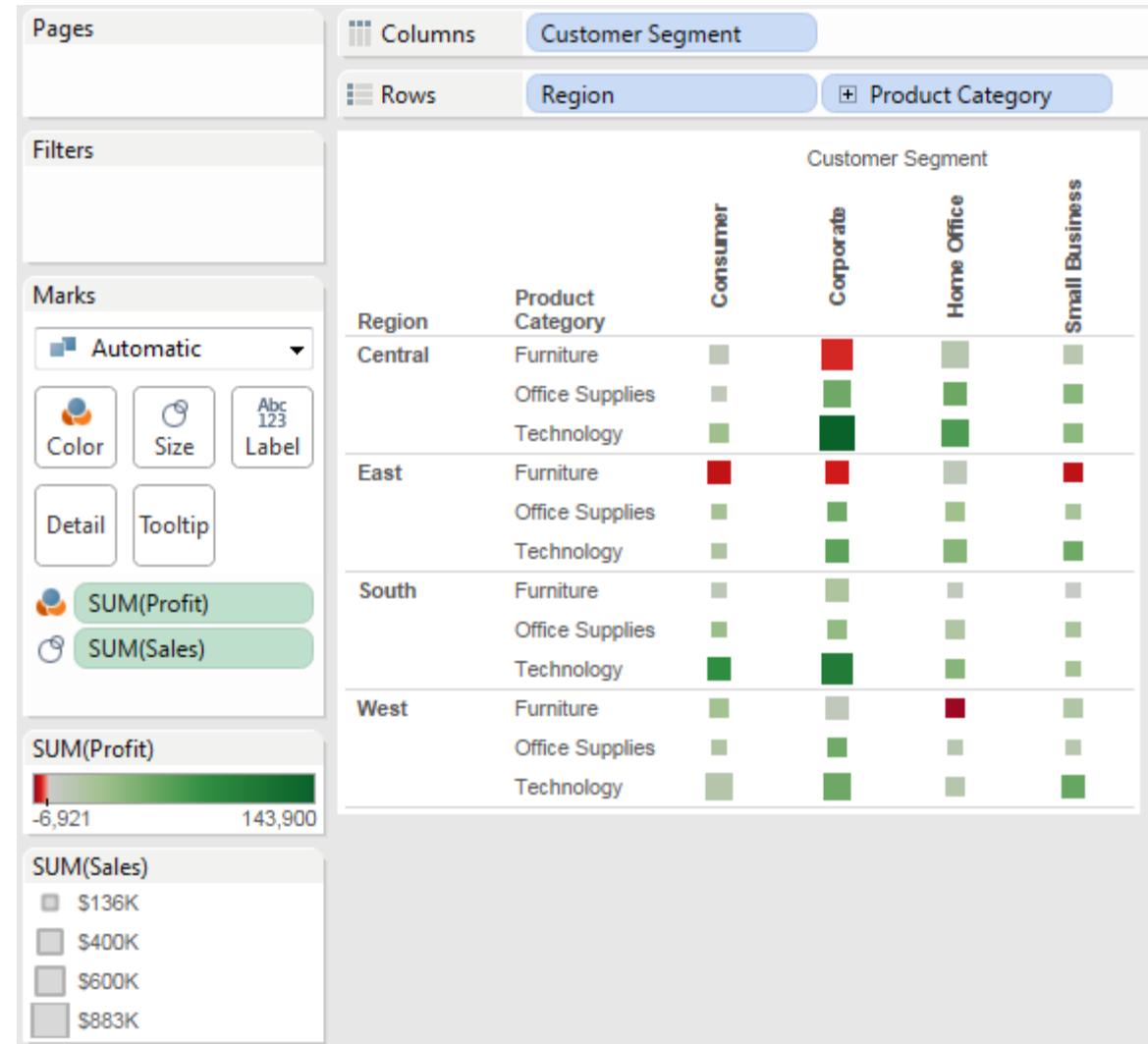
1. Displays metric intensity over a dimensional grid
2. Extremely effective for pinpointing high and low areas
3. Outstanding method for “data discovery” analysis



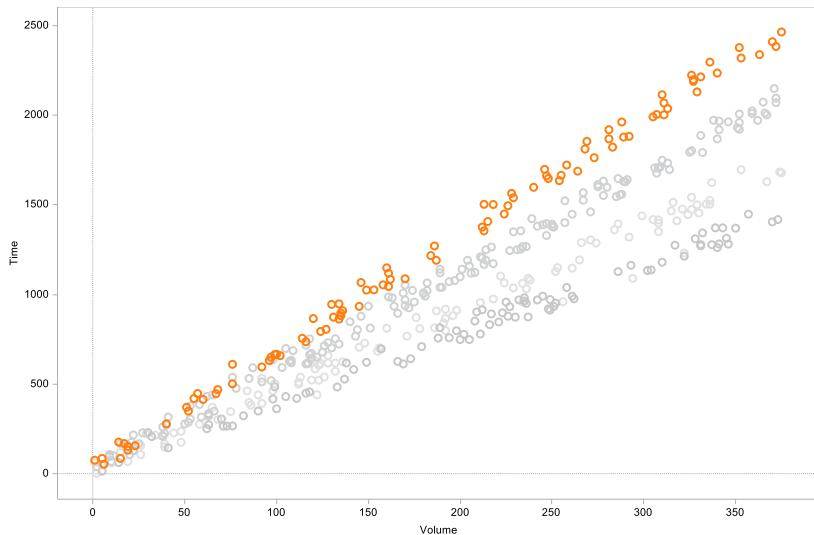
# Size-Encoded Heat Map

## Leading Practices

1. Same advantages as heat map but adds 2<sup>nd</sup> metric measurement
2. Excellent visualization for finding outliers across 2 metrics



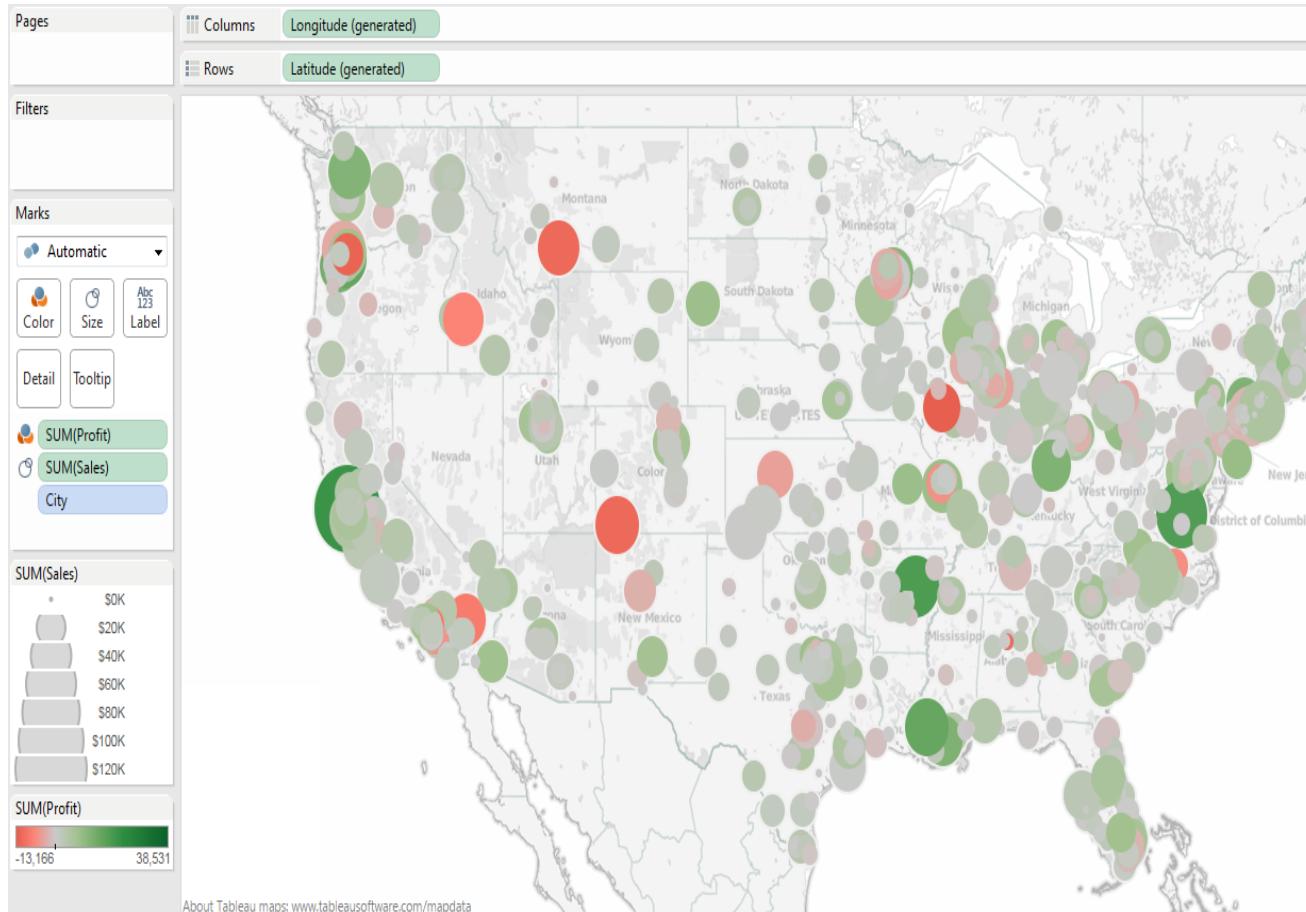
# Scatter Plot



## Leading Practices

1. Showing correlation among variables
2. Showing concentration among variables
3. Can use up to 5 variables, however recommend using no more than 3 in the following order:
  1. Color
  2. Size
  3. Shape

# Bubble Maps

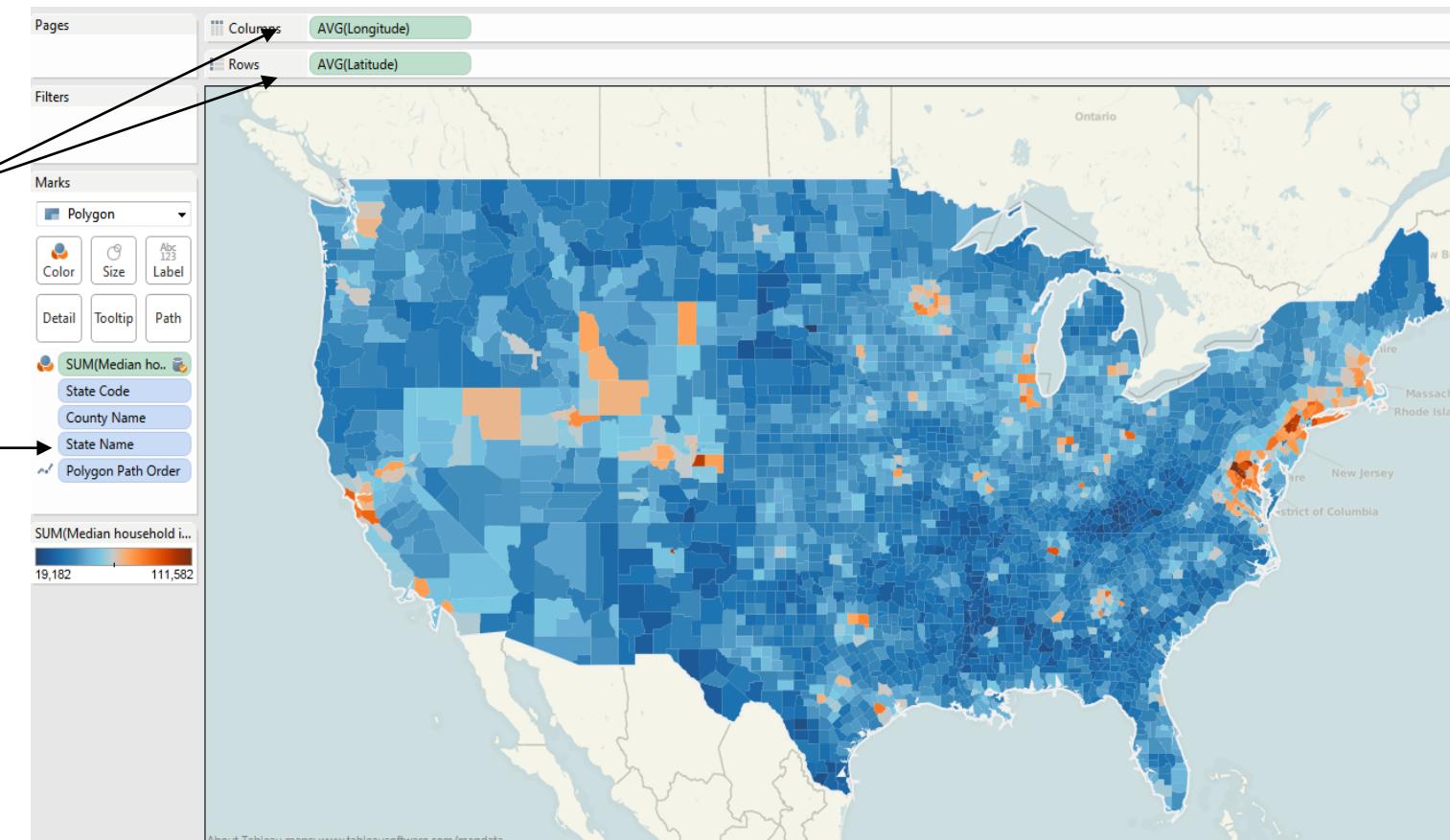


**When to use....**  
Showing multiple values with geo-coded data

## Choropleth or Polygon Map

Auto-  
Generated  
Measures

Need Geo-  
Coded  
Dimension



### Leading Practices

1. Showing geospatial trends
2. Showing data in the context of built in geocoded census data sets

## Text Table

Pages Columns YEAR(Order Date) QUARTER(Order Date)

Rows Product Sub-Category

Filters

Marks

Abc Automatic

Color Size Text

Detail Tooltip

Abc 123 SUM(Sales)

Product Sub-Category	2009				2010		
	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Appliances	\$55K	\$59K	\$33K	\$24K	\$42K	\$40K	\$31K
Binders and Binder Accesso..	\$76K	\$100K	\$105K	\$80K	\$43K	\$35K	\$34K
Bookcases	\$125K	\$43K	\$44K	\$43K	\$58K	\$77K	\$80K
Chairs & Chairmats	\$153K	\$123K	\$112K	\$132K	\$104K	\$85K	\$111K
Computer Peripherals	\$52K	\$77K	\$35K	\$52K	\$37K	\$45K	\$44K
Copiers and Fax	\$32K	\$9K	\$69K	\$163K	\$77K	\$77K	\$75K
Envelopes	\$11K	\$10K	\$4K	\$7K	\$8K	\$11K	\$10K
Labels	\$3K	\$2K	\$5K	\$1K	\$1K	\$3K	\$1K
Office Furnishings	\$82K	\$58K	\$47K	\$34K	\$42K	\$42K	\$40K
Office Machines	\$393K	\$63K	\$154K	\$122K	\$105K	\$122K	\$110K
Paper	\$26K	\$30K	\$27K	\$35K	\$34K	\$26K	\$25K
Pens & Art Supplies	\$11K	\$10K	\$13K	\$9K	\$10K	\$9K	\$10K
Rubber Bands	\$1K	\$1K	\$0K	\$1K	\$1K	\$1K	\$1K
Scissors, Rulers and Trimme..	\$10K	\$2K	\$3K	\$2K	\$2K	\$1K	\$1K
Storage & Organization	\$40K	\$77K	\$76K	\$89K	\$78K	\$76K	\$74K
Tables	\$105K	\$130K	\$136K	\$109K	\$118K	\$84K	\$81K
Telephones and Communicat..	\$86K	\$95K	\$175K	\$124K	\$66K	\$109K	\$101K

When to use....  
Showing a lot of  
detailed  
information

## Highlight Table

Category	Container						
	Jumbo Box	Jumbo Drum	Large Box	Medium Box	Small Box	Small Pack	Wrap Bag
Furniture	\$2,448K	\$1,709K	\$489K	\$230K	\$139K	\$96K	\$68K
Office Supplies		\$339K	\$337K	\$114K	\$2,696K	\$122K	\$145K
Technology	\$373K	\$1,358K	\$1,247K	\$351K	\$2,255K	\$329K	\$72K

### Sales

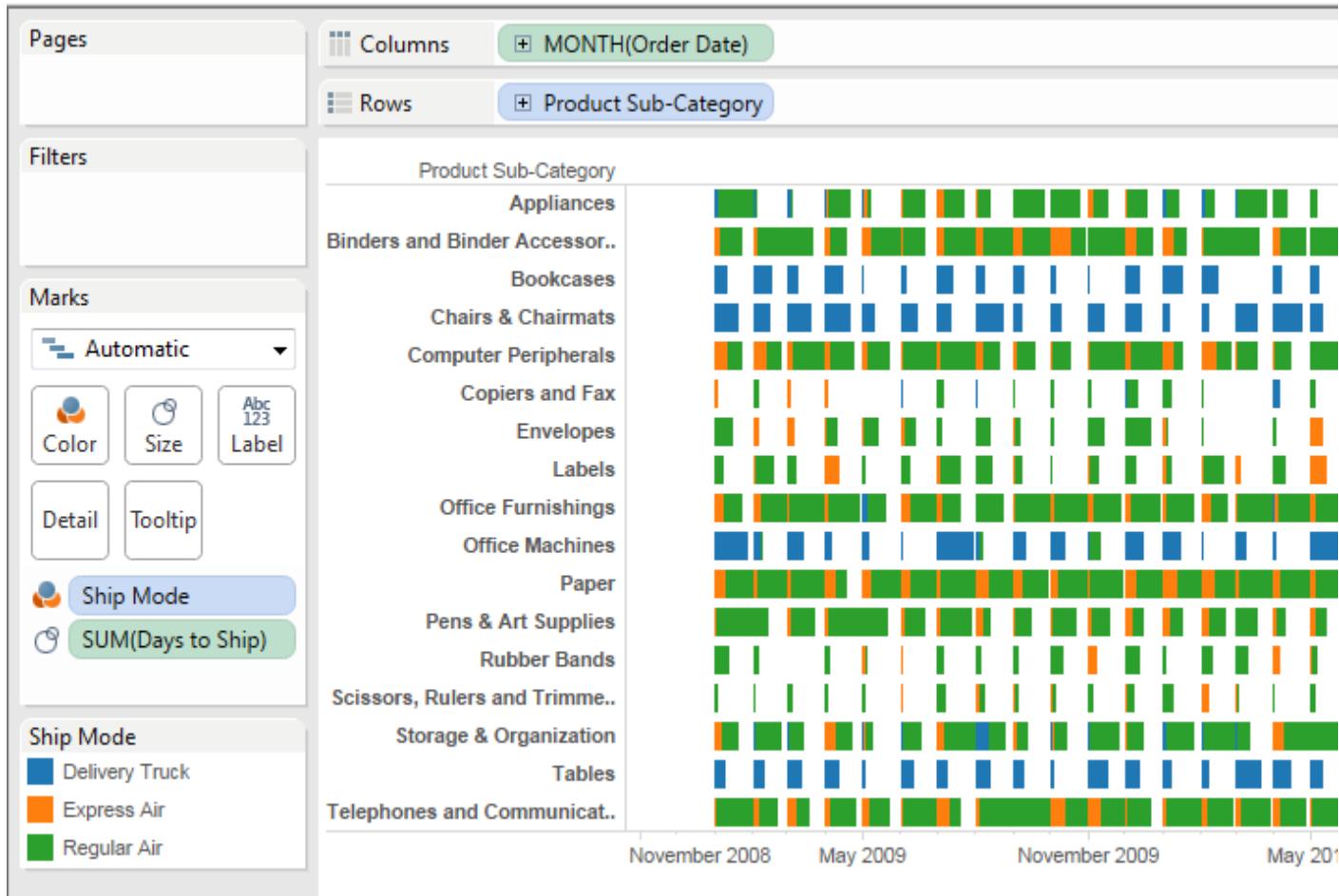


### Leading Practices

1. Showing a lot of detailed information with an aspect of the data color coded for highlights

# Gantt Bar Chart

**When to use....**  
Displaying  
durations over  
time (e.g. project  
schedule)



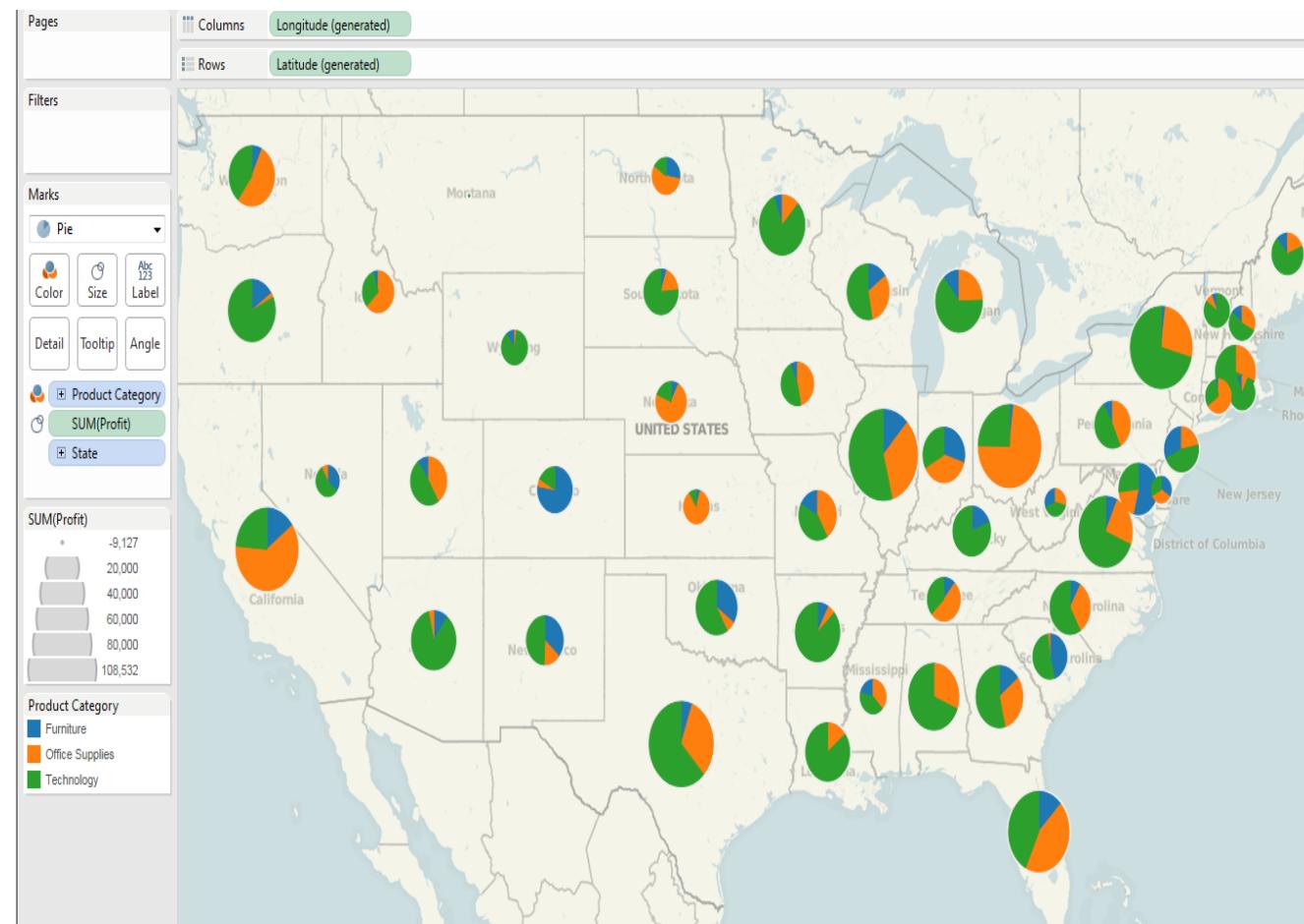
# Pie Charts NOOOOOOOOOOOOOOOOOOO!!!!!!



**When to use....**

Never....or when showing proportions with ONLY two variables

# Pie Chart Maps NOOOOOOOOOOOOOOOOOOOOOOOOOOOOO!!!!!!

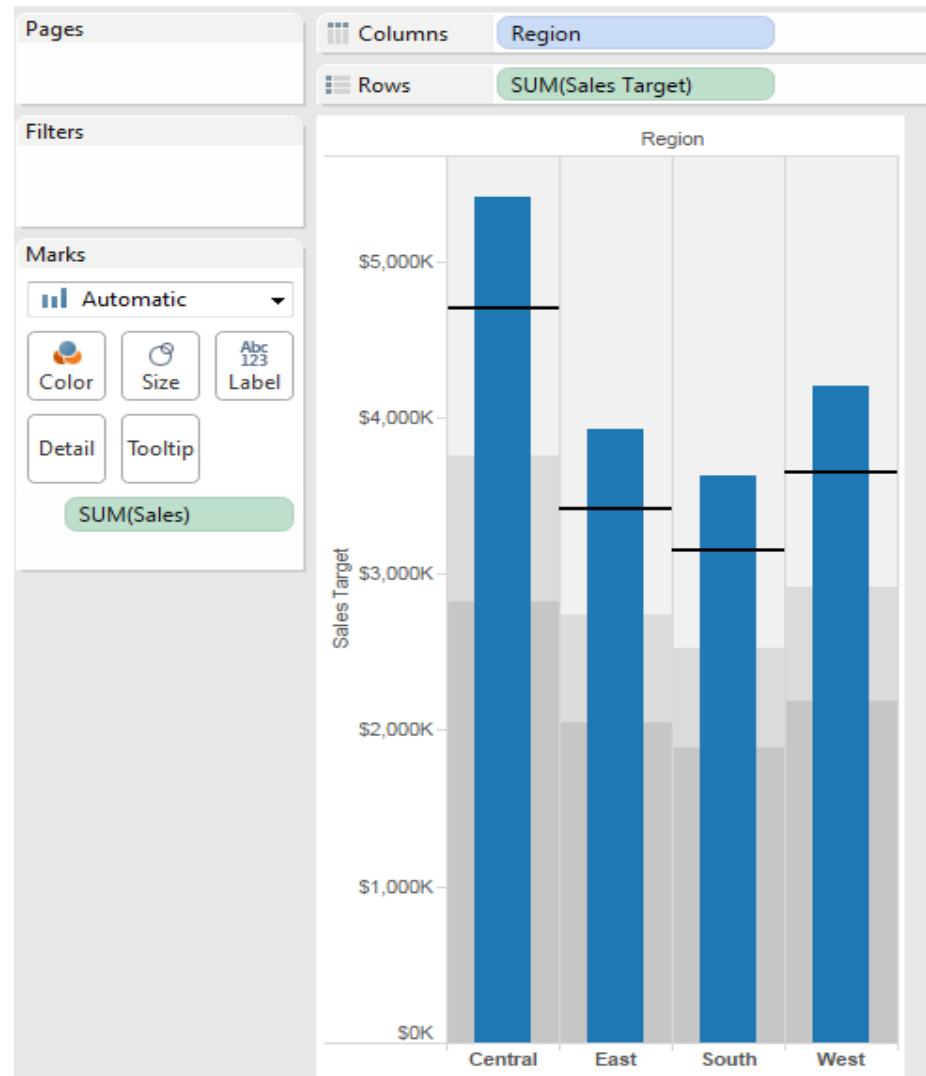
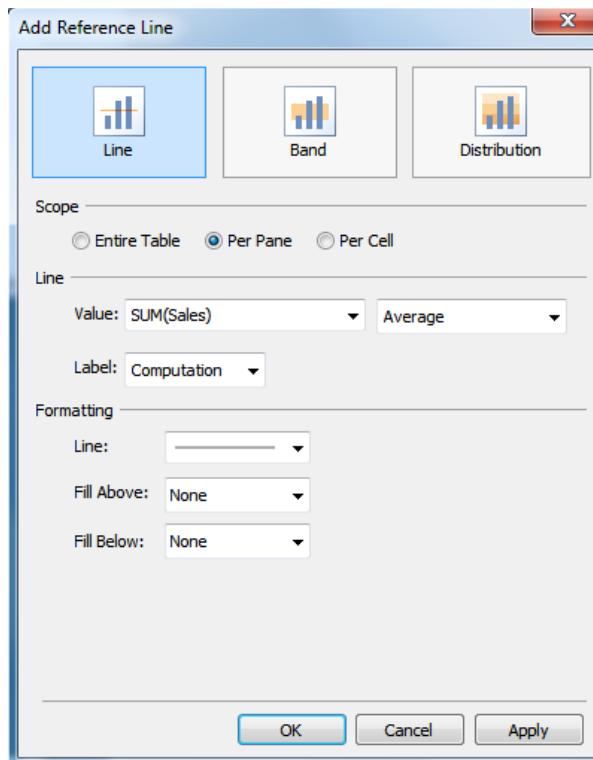


**When to use....**  
Showing  
proportions with  
geo-coded data

## Bullet Chart

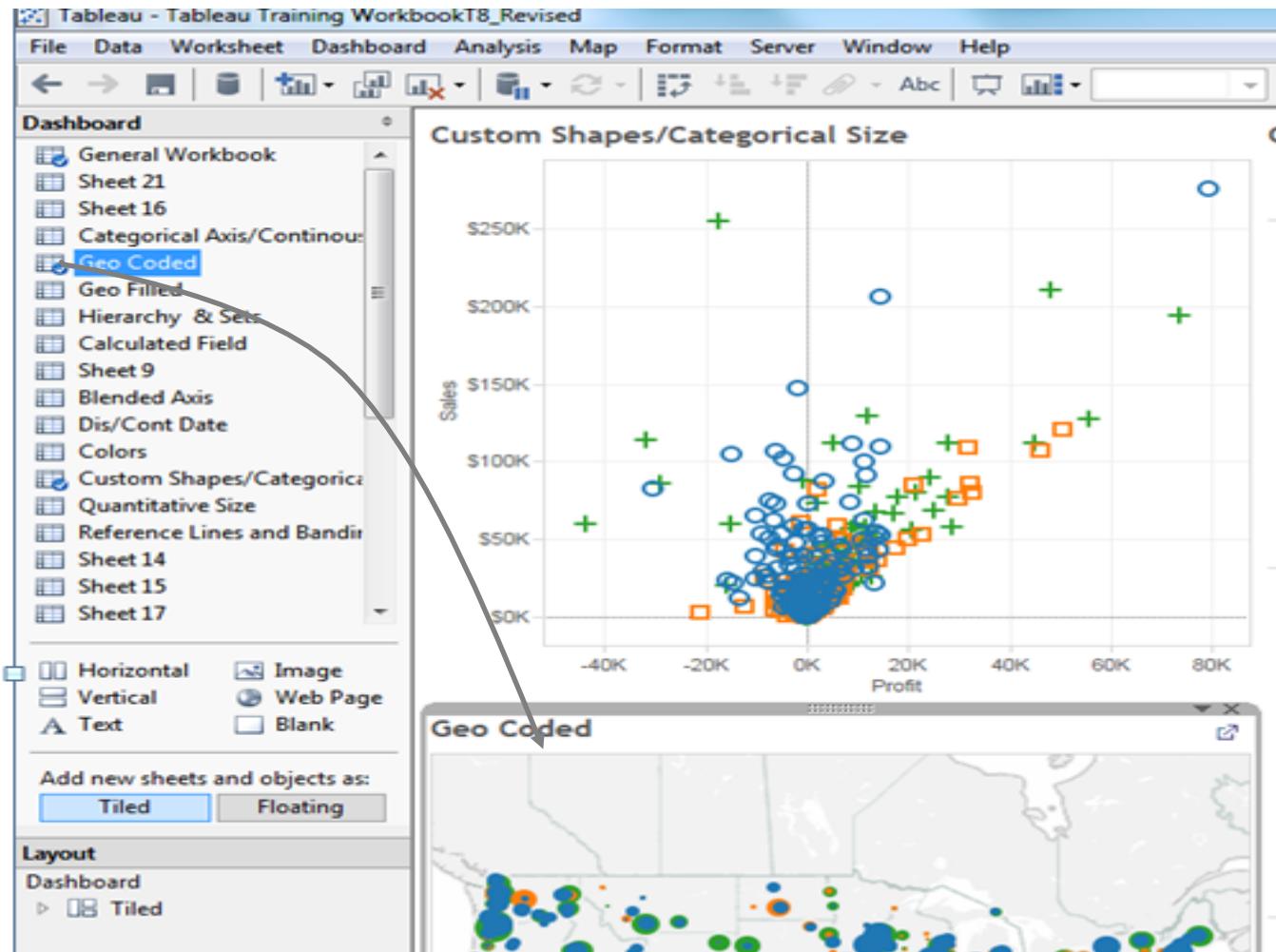
### When to use....

When evaluating performance of a metric against a goal and within a distribution

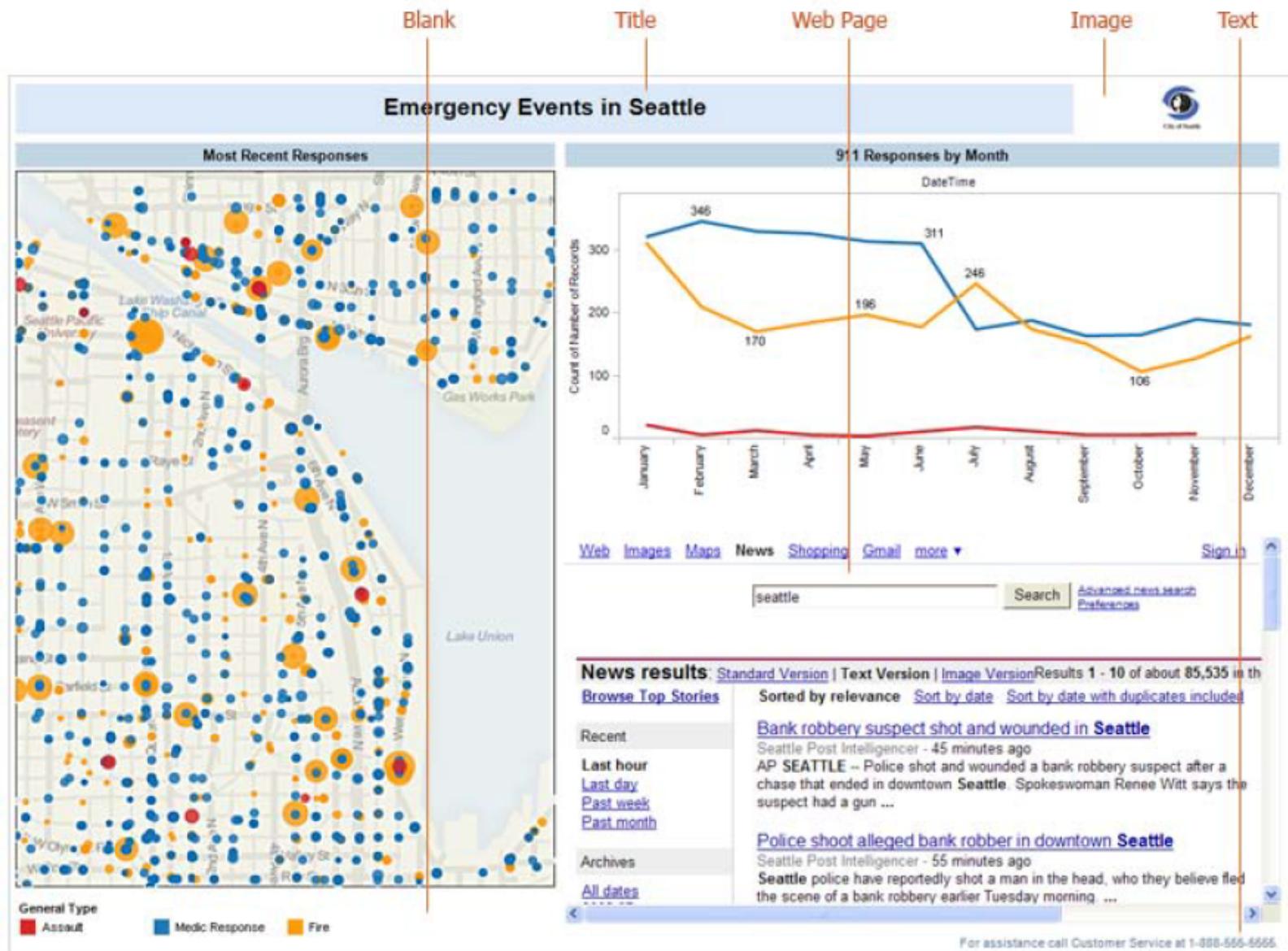


# Creating Dashboards

Drag &  
Drop



## Other Dashboard Elements



## Activity #3 Create 3-4 Visualizations for a Dashboard – 20 Minutes

File Data Worksheet Dashboard Analysis Map Format Server Window Help

Dashboard

- General Workbook
- Sheet 21
- Sheet 16
- Categorical Axis/Continous
- Geo Coded
- Geo Filled
- Hierarchy & Sets
- Calculated Field
- Sheet 9
- Blended Axis
- Dis/Cont Date
- Colors
- Custom Shapes/Categorical
- Quantitative Size
- Reference Lines and Bands
- Sheet 14
- Sheet 15
- Sheet 17

Horizontal Vertical Text Add new sheets and objects as: Tiled Floating

Layout

Dashboard Tiled

Dashboard

Size: Desktop Width: 1000 Height: 800

Custom Shapes/Categorical Size

General Workbook

Product Date.. Order Date

Product Date..	2009	2010	2011	2012
Furniture	\$200K	\$100K	\$100K	\$150K
Office Supplies	\$100K	\$50K	\$50K	\$100K
Technology	\$50K	\$50K	\$100K	\$50K

Geo Coded

Product Category

- Furniture
- Office Supplies
- Technology

Region

- Central
- East
- South
- West

Product Category

- Furniture
- Office Supplies
- Technology

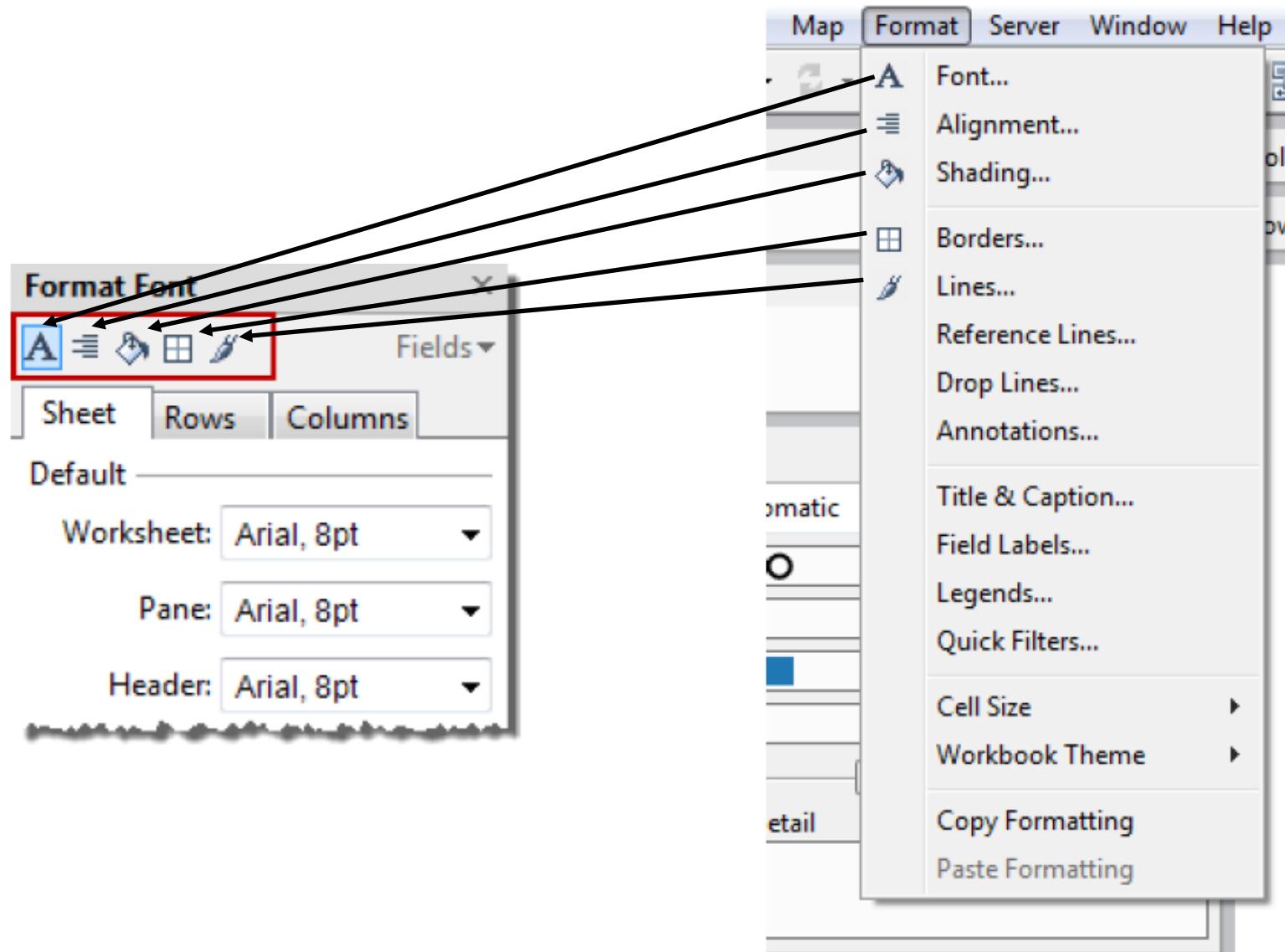
Sales

- \$0K
- \$20K
- \$40K
- \$60K
- \$80K
- \$96K

Chart 14 Chart 15 Chart 17 Chart 10 Chart 20 Chart 22 Chart 23 Chart 24 Chart 25 Chart 26 Chart 27 Chart 28

# Intermediate Features

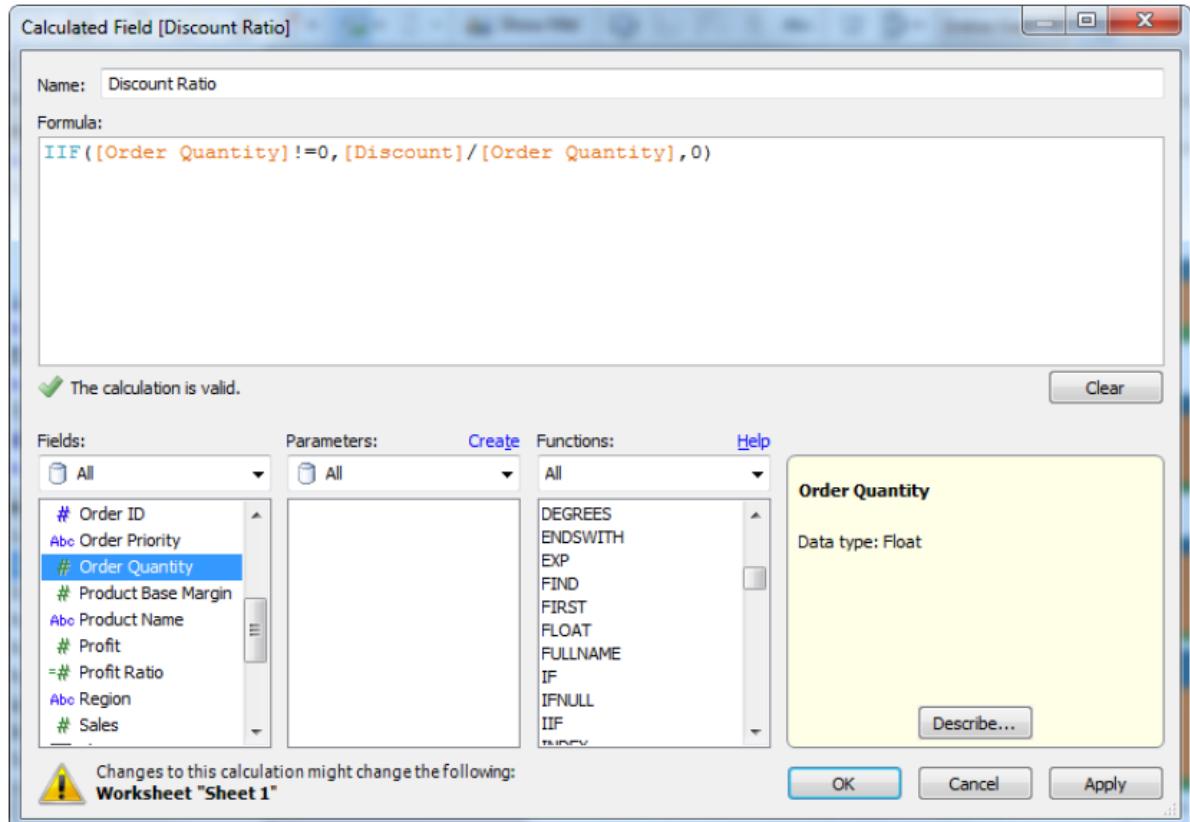
## Formatting



## Custom Calculations

Can create new fields based on existing dimensions and measures

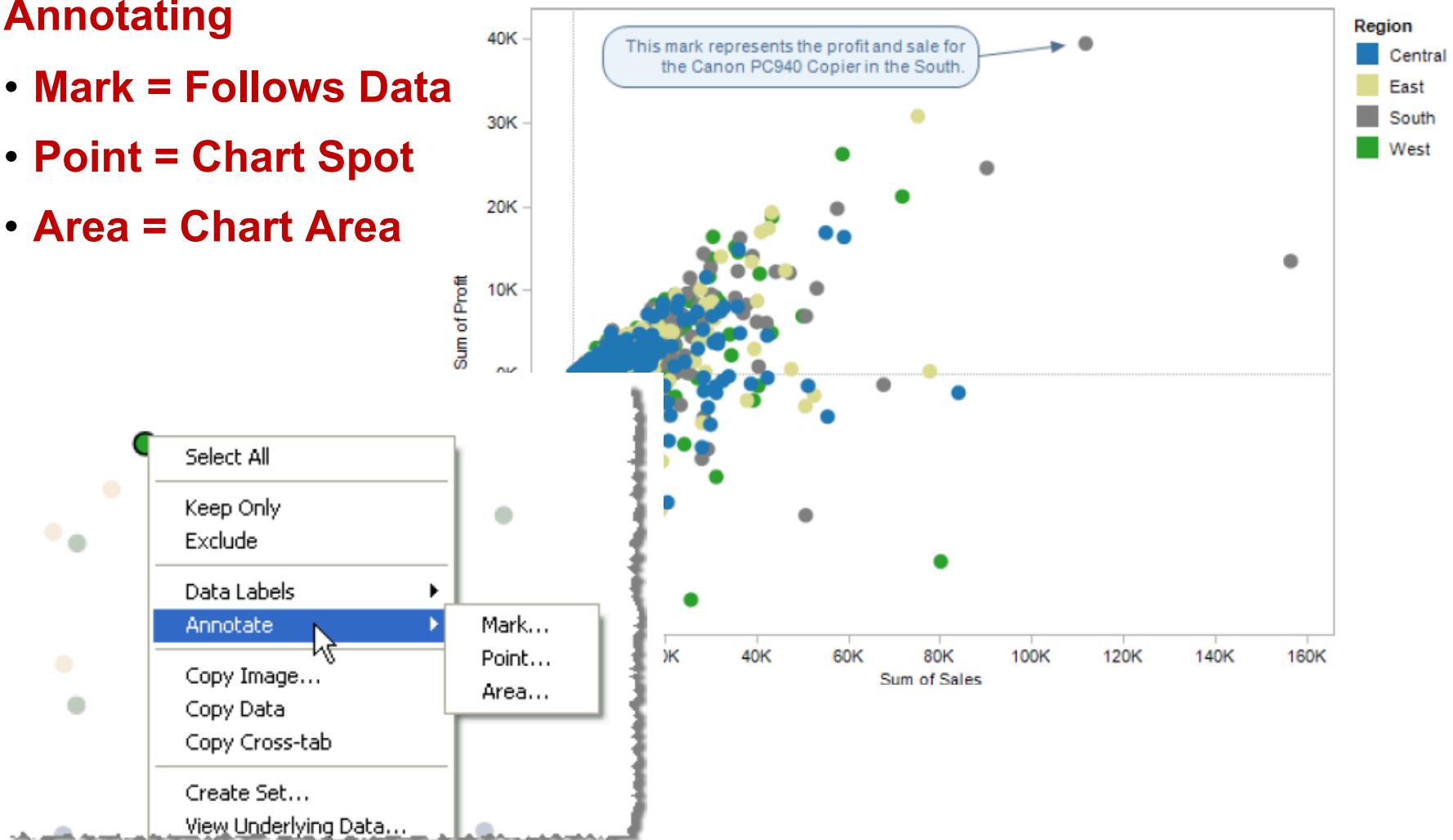
Calculation syntax similar to Excel and MySQL and SAS



## Annotation

### Annotating

- **Mark = Follows Data**
- **Point = Chart Spot**
- **Area = Chart Area**



# Toolips

The screenshot shows the Tableau interface with the 'Worksheet' tab selected in the menu bar. A context menu is open over a data source named 'Orders (S...)' in the 'Data' pane. The 'Tooltip...' option in this menu is highlighted with a red oval. To the right, an 'Edit Tooltip' dialog box is displayed, containing the following text:

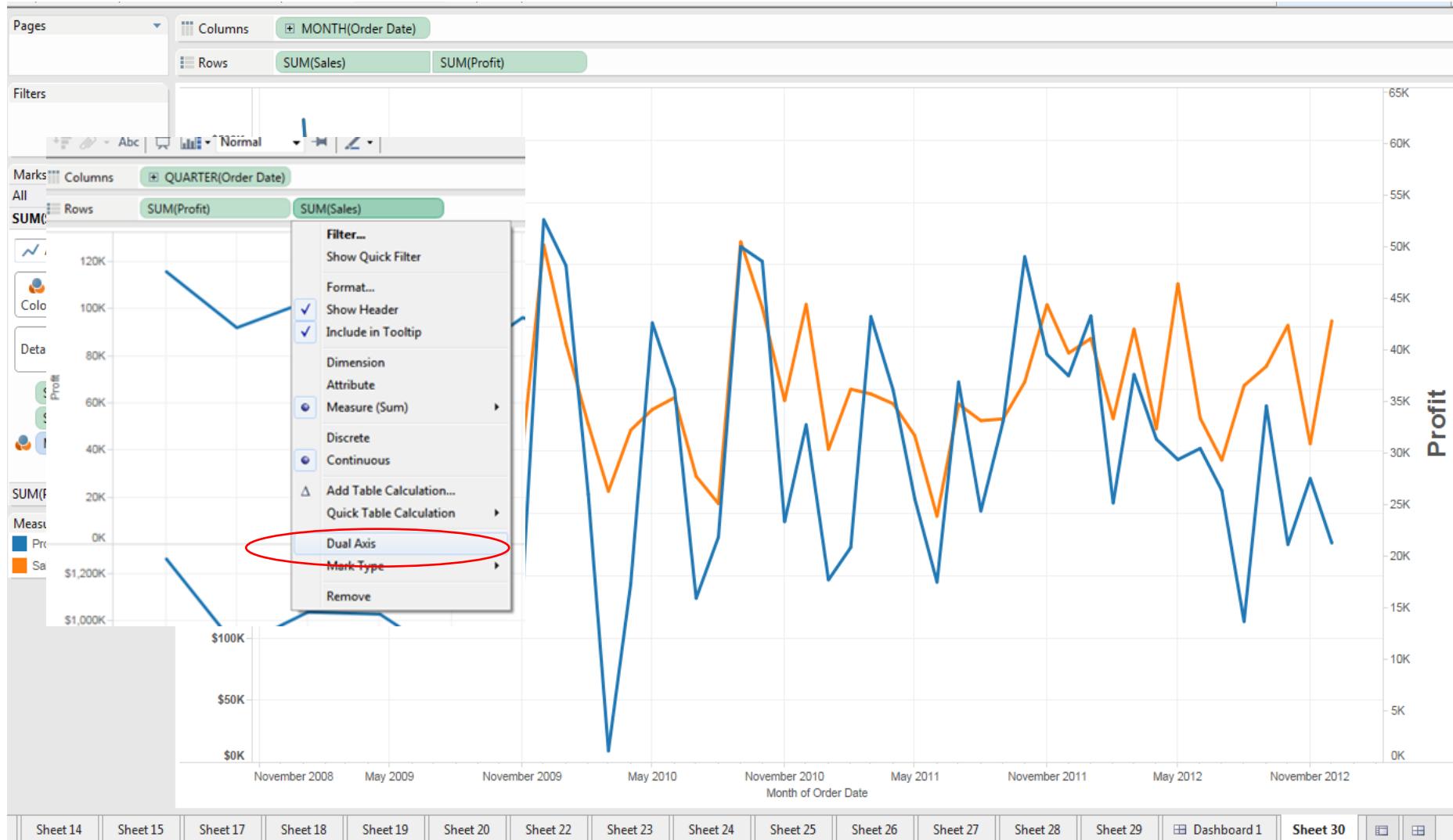
```
Quarter of Order Date: <QUARTER(Order Date)>
Profit: <SUM(Profit)>
Sales: <SUM(Sales)>
```

The dialog also includes a toolbar with font and size controls, a preview area, and buttons for 'OK', 'Cancel', 'Reset', and 'Preview'. Below the dialog, a preview window shows the tooltip content with the following values:

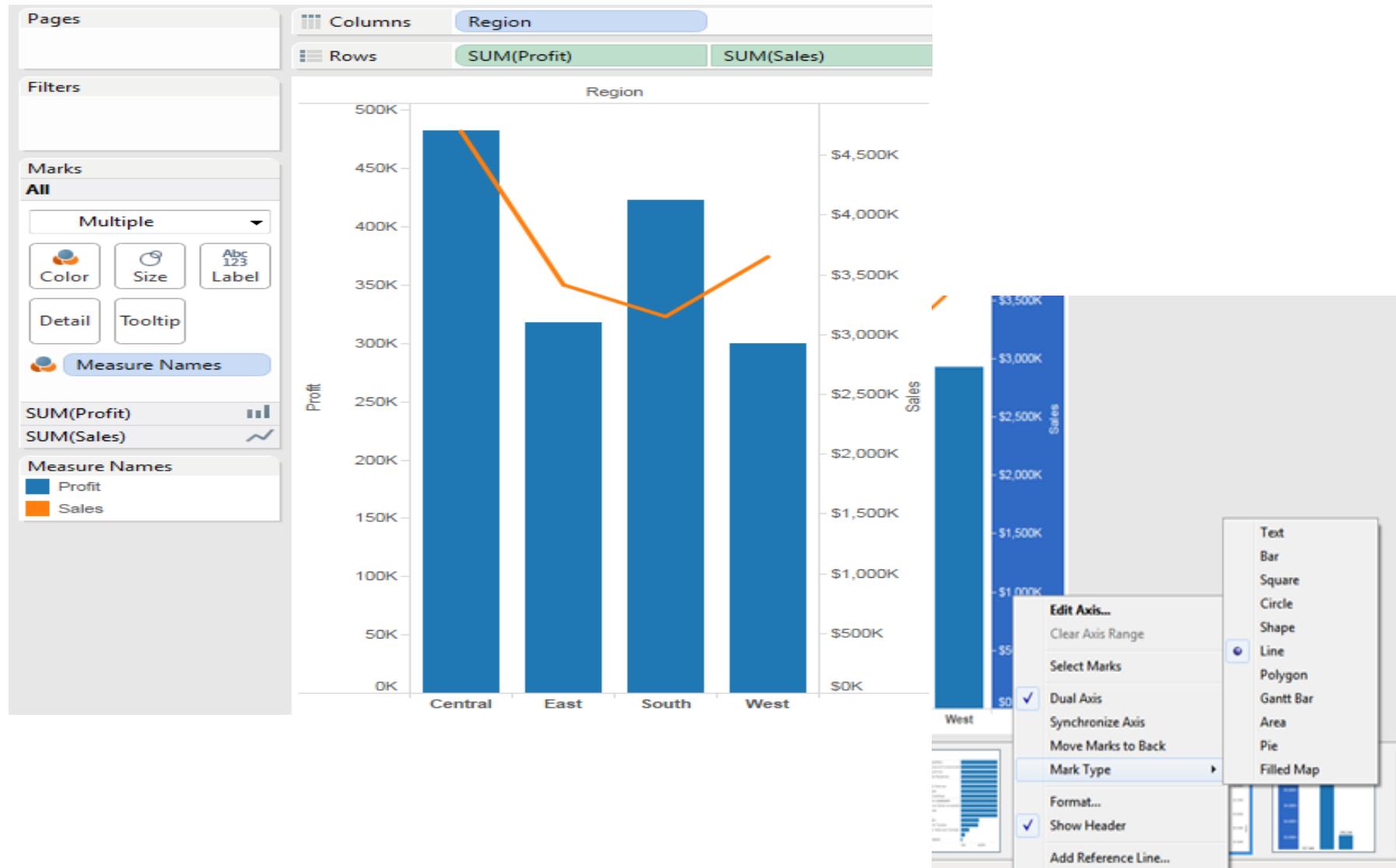
Quarter of Order Date:	April 1, 2009
Profit:	91,809
Sales:	\$887K

At the bottom of the preview window are buttons for 'Keep Only' (checked), 'Exclude', and other options.

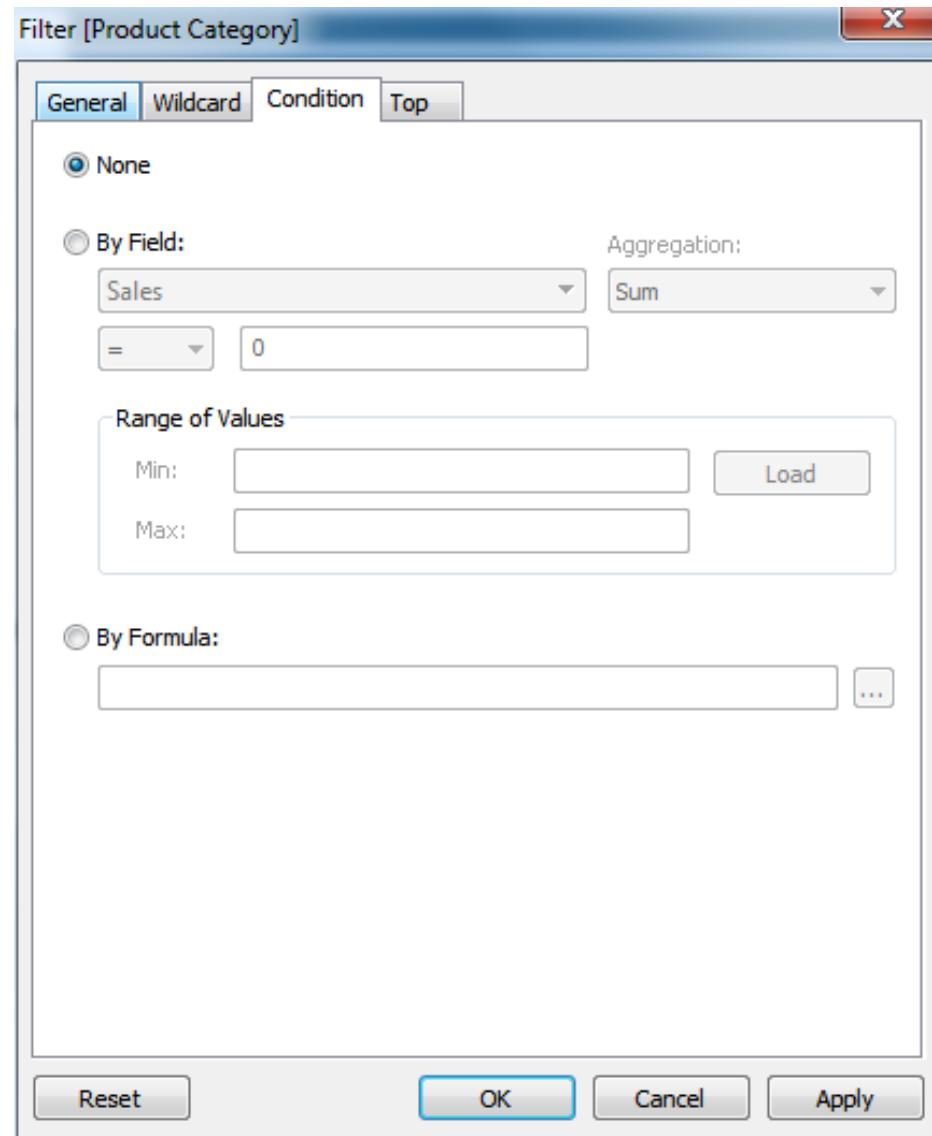
# Dual Axes



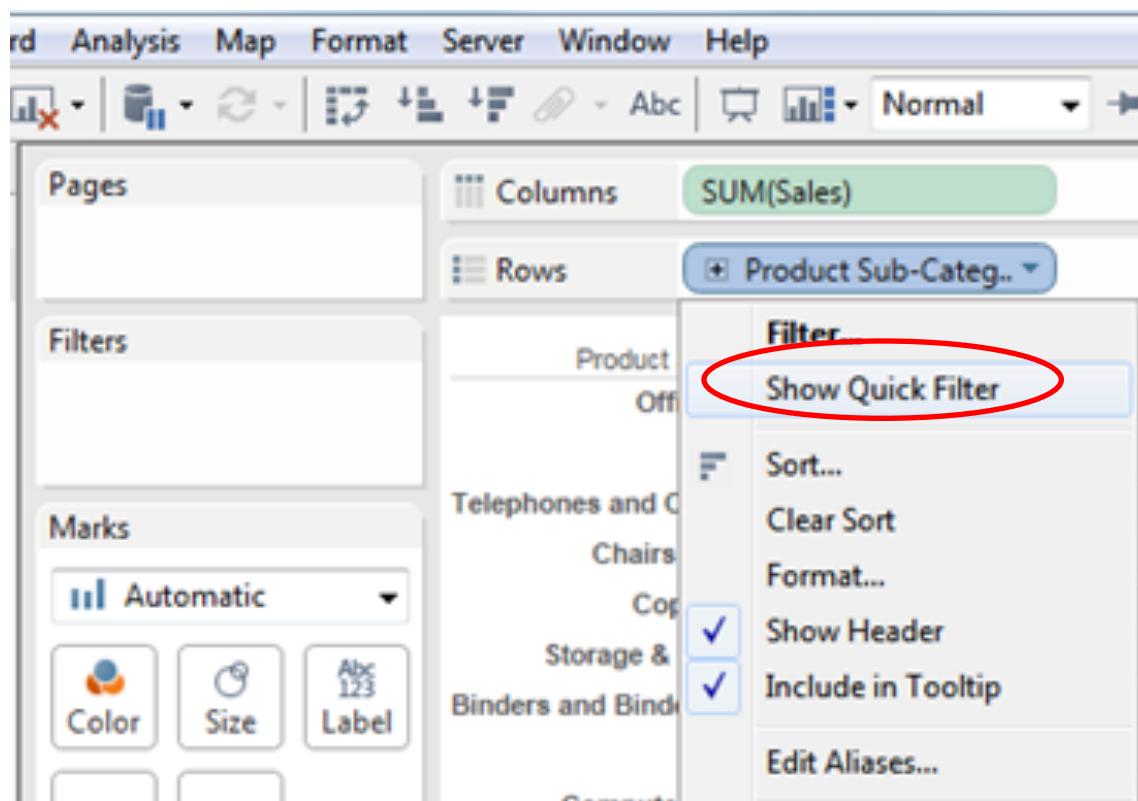
# Combination Charts



## Conditional Filtering

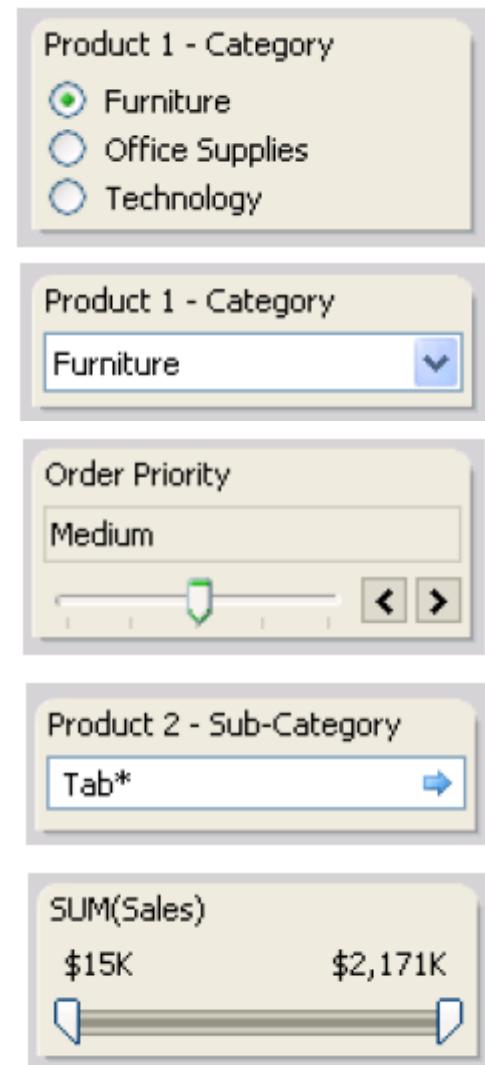


## Quick Filtering



The screenshot shows the Tableau interface with the 'Analysis' tab selected. In the 'Columns' shelf, there is a green box labeled 'SUM(Sales)'. In the 'Rows' shelf, there is a dropdown menu labeled 'Product Sub-Categ..'. A context menu is open over a 'Product' field in the data view, with the 'Filter' option highlighted and circled in red. The 'Show Quick Filter' option is also circled in red. Other options in the context menu include 'Sort...', 'Clear Sort', 'Format...', 'Show Header', 'Include in Tooltip', and 'Edit Aliases...'. The data view shows categories like 'Telephones and C', 'Chairs', 'Cop', 'Storage & Binders', and 'Binders and Bind'.

## Filter Types



**Product 1 - Category**  
Furniture  
Office Supplies  
Technology

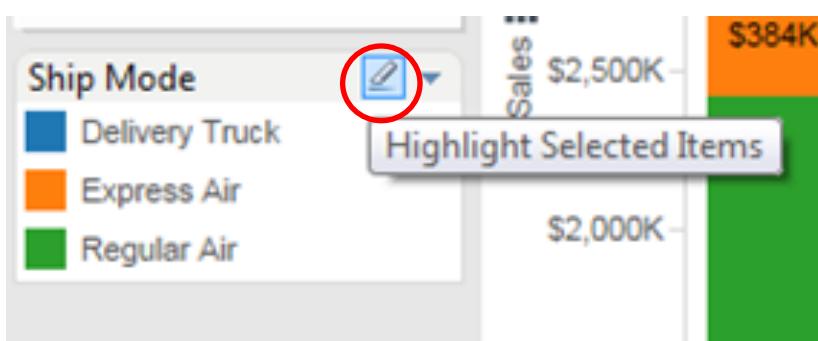
**Product 1 - Category**  
Furniture

**Order Priority**  
Medium

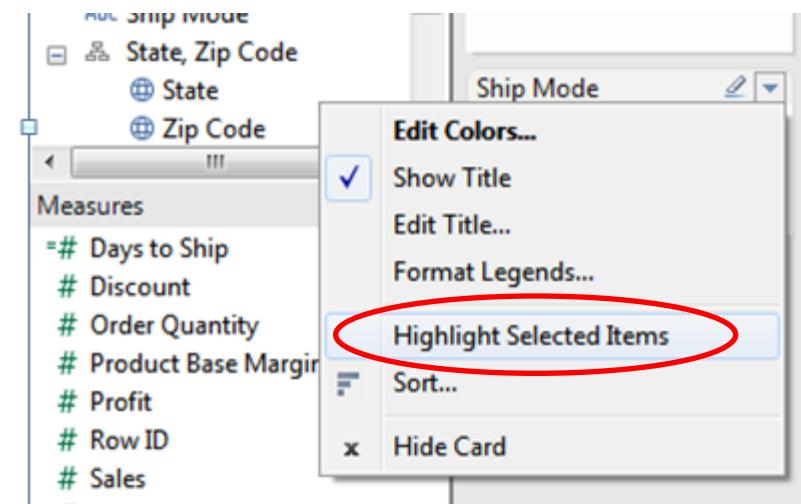
**Product 2 - Sub-Category**  
Tab\*

**SUM(Sales)**  
\$15K \$2,171K

## Color Legend Highlighting

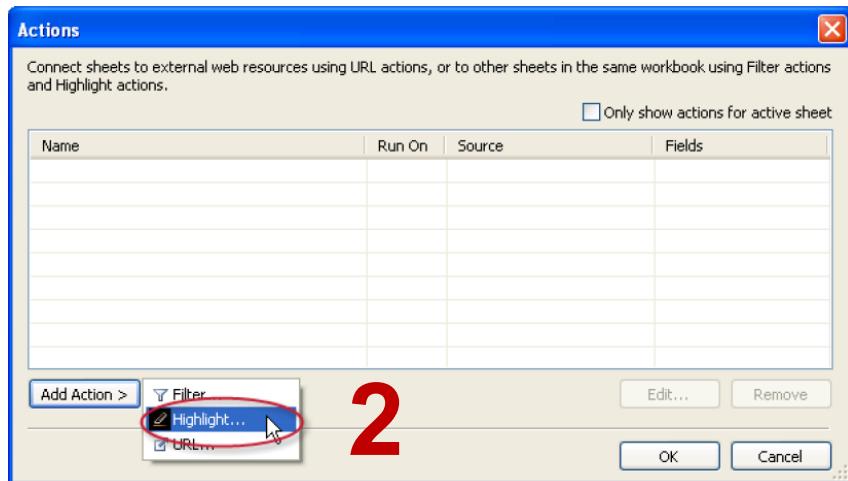


OR

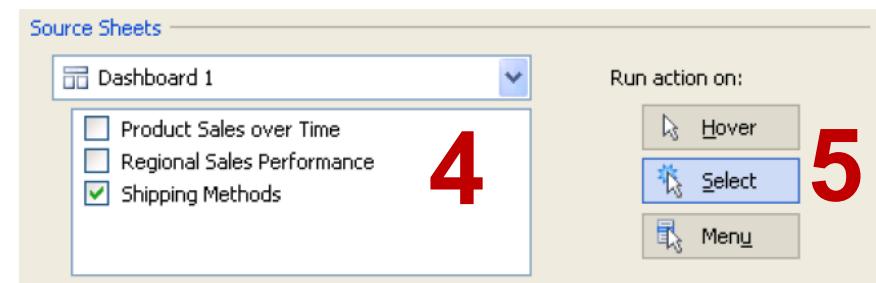


## Actions > Highlights Or Filters

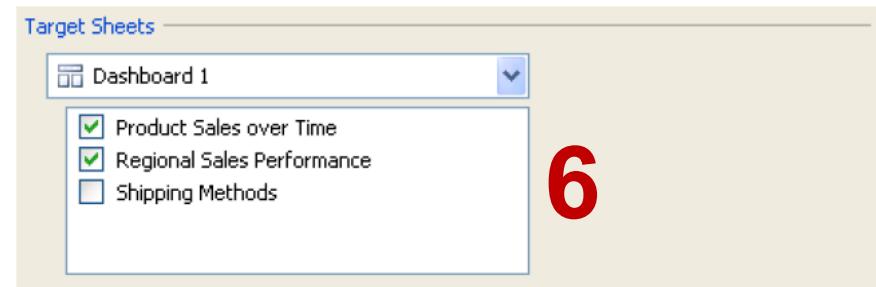
1. Select Worksheet > Actions
2. Add Action > Highlight/Filters
3. Give name
4. Select source sheet
5. Select how you want to launch action
6. Select target sheet
7. Select fields you want to highlight



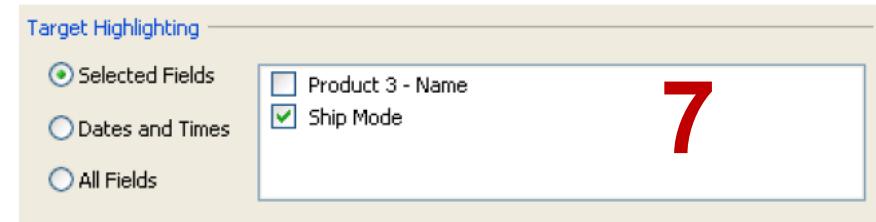
2



5

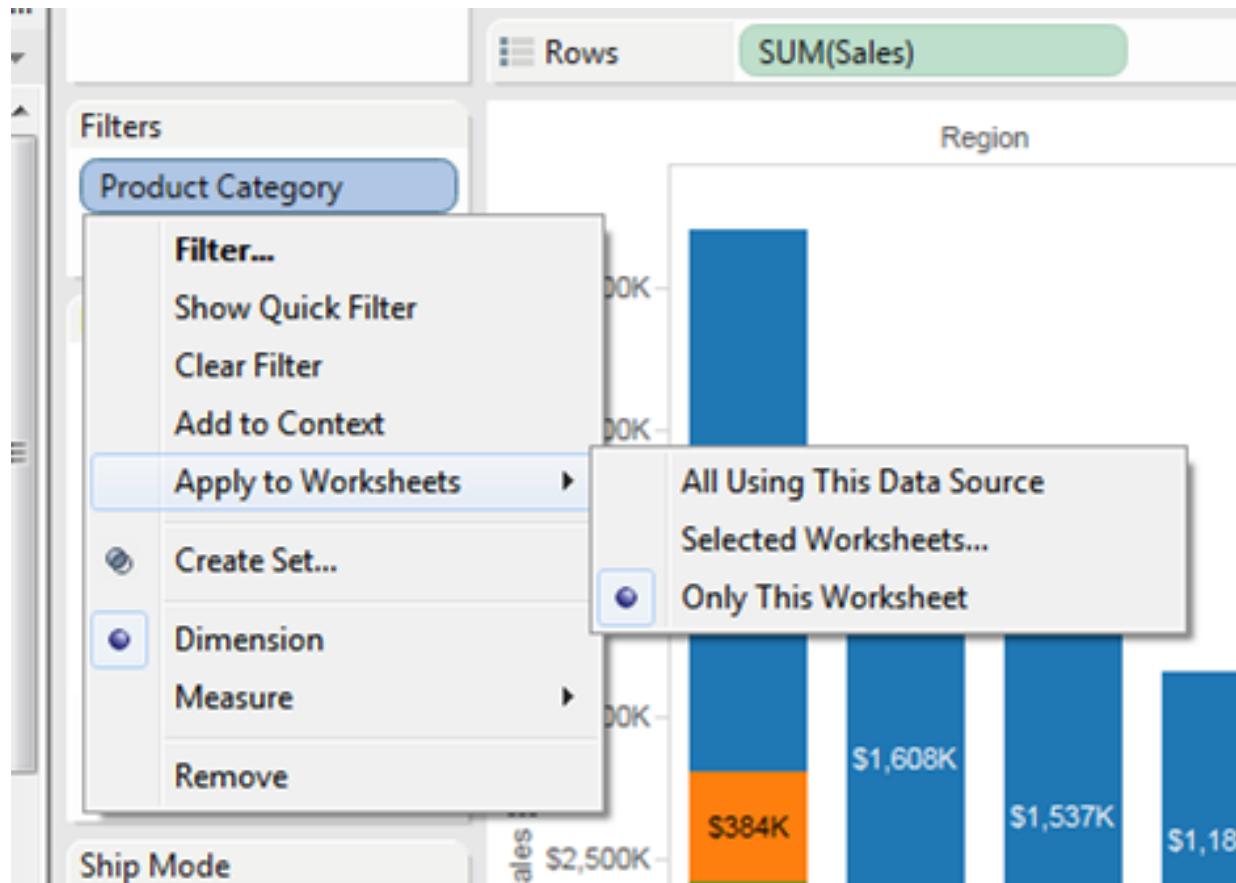


6

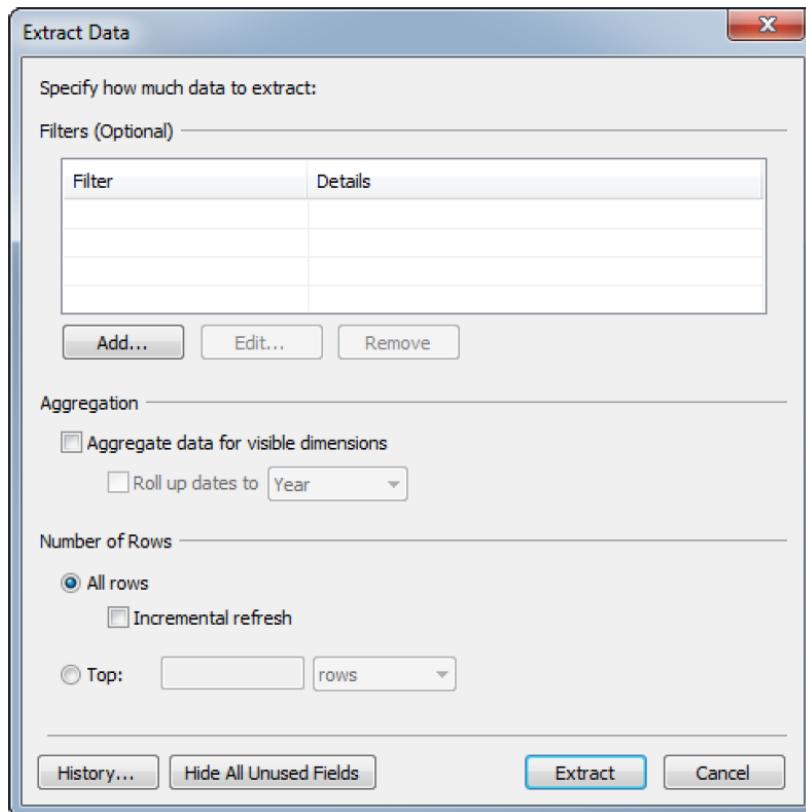


7

Gets rid of the old Global Filter, allows you to selectively filter



## Extracting and Optimizing Data



**When to use....** Done playing with data and views and want to publish and improve speeds and size

## Optimizing Data

Extract > Optimize

**When to use....**

Optimizing moves calculated fields into the extract so they don't have to be computed locally every time

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.

## Multiple Data Connections

Blue Check = Primary

Orange Check = Secondary

Link = Data Relationship

The screenshot shows the Tableau interface with a red circle highlighting the 'Data' shelf on the left. The 'Data' shelf lists several data sources: 'Boroughs (NY\_Data\_Borough...)', 'Housing (NY\_Data\_Housing.x...)', 'Languages (NY\_Data\_Langua...)', 'Organizations (NY\_Data\_Orga...)' (which is selected and highlighted with a blue checkmark), and 'Services Provided (NY\_Data\_S...)'.

The 'Marks' shelf on the left shows 'Automatic' as the mark type, with options for 'Color', 'Size', 'Label', 'Detail', and 'Tooltip'. Below these are three 'Languages' items, each with an orange checkmark indicating it is a secondary data source.

The 'Columns' and 'Rows' shelves on the right are used to build a visualization. The 'Columns' shelf contains the formula 'SUM(Number of R...)' and the dimension 'Zip Code'. The 'Rows' shelf contains the dimension 'Zip Code'.

The main visualization area displays a table of data for 'Zip Code'. The columns are 'Zip Code', 'Null', 'Language 1', and 'Language 2'. The data shows various zip codes with their corresponding primary and secondary languages. For example, zip code 10001 has 'Urdu' as the primary language and 'Unknown' as the secondary language.

Zip Code	Null	Language 1	Language 2
10001	Null	Urdu	Unknown
10002	Null	Spanish	Unknown
10004	Null	Vietnamese	Urdu
10013	Null	Vietnamese	Unknown
10016	Null	Unknown	Unknown
10025	Null	Spanish	French
10027	Null	Spanish	Unknown
10028	Null	Spanish	Unknown
10029	Null	Spanish	Punjabi
10033	Null	Spanish	Unknown
10036	Null	Spanish	Unknown
10038	Null	Urdu	Spanish
10039	Null	Unknown	Unknown

# Animating Through Pages Shelf

Tableau - Tableau Training WorkbookT8\_Revised

File Data Worksheet Dashboard Analysis Map Format

**Data**

Orders (Sample - Superstore Sample)

**Dimensions**

- =# Last N Days
- Abc Customer Name
- Abc Customer Segment
- Order Date
- # Order ID
- Abc Order Priority
- Product**
  - Abc Product Category
  - Abc Product Sub-Category
  - Abc Product Name
  - Abc Product Container
  - Abc Region
  - Sales (bin)
  - Ship Date
  - Abc Ship Mode
- State, Zip Code**
  - State
  - Zip Code

**Measures**

- =# Days to Ship
- # Discount
- # Order Quantity
- # Product Base Margin
- # Profit
- # Row ID
- # Sales
- =# Sales Target
- # Shipping Cost
- # Unit Price
- Latitude (generated)
- Longitude (generated)
- =# Number of Records

Pages

YEAR(Order Date)

2009

Show History

Filters

Marks

Automatic

Color

Size

Abc 123

Label

Detail

Tooltip

SUM(Profit)

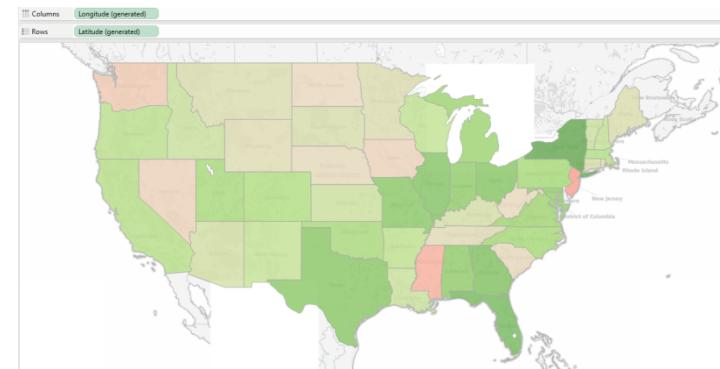
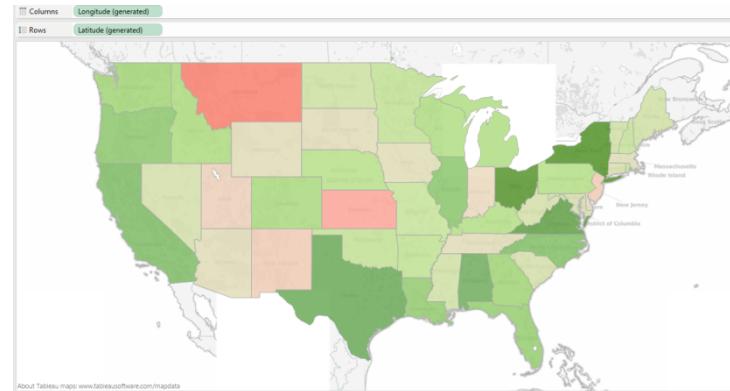
State

SUM(Profit)

-13,329 41,401

1. Drag dimension to Page Shelf

2. Animate design



# Saving Your Workbook

Tableau - Tableau Training WorkbookT8\_Revised

File Data Worksheet Dashboard Analysis Map Format Server Window Help

Data

Dimensions

- Last N Days
- Customer Name
- Customer Segment
- Order Date
- Order ID
- Order Priority
- Product
- Product Category
- Product Sub-Category
- Product Name
- Product Container
- Region
- Sales (bin)
- Ship Date
- Ship Mode
- State, Zip Code
  - State
  - Zip Code

Measures

- Days to Ship
- Discount
- Order Quantity
- Product Base Margin
- Profit
- Row ID
- Sales
- Sales Target
- Shipping Cost
- Unit Price
- Latitude (generated)
- Longitude (generated)
- Number of Records
- Measure Values

Pages

Longitude (generated)

YEAR(Order Date)

Latitude (generated)

YEAR(Order Date)

2012

Save As

Desktop

Organize New folder

Name	Size	Item type	Date modified
Tableau Training WorkbookT8_Revised.twb	367 KB	Tableau Workbook	7/31/2013 8:39 PM
NY_HSTC.twb	532 KB	Tableau Workbook	6/10/2013 8:37 PM
HT_Resource_Gaps_NY.twb	62 KB	Tableau Workbook	6/10/2013 5:49 PM
Security Awareness Videos	2 KB	Shortcut	3/20/2013 9:08 AM
Client Stuff		File folder	7/11/2013 10:51 PM
HSTC NewYork		File folder	7/11/2013 10:30 PM
Data Accuracy		File folder	6/19/2013 10:22 PM
Tableau Training		File folder	6/9/2013 7:35 PM
Home Purchase & Renovation		File folder	6/9/2013 2:07 PM
HSTC Study Ref Documents		File folder	6/9/2013 2:07 PM
Analytics		File folder	6/9/2013 2:06 PM

File name: Tableau Training WorkbookT8\_Revised.twb

Save as type: Tableau Workbook (\*.twb)

Tableau Workbook (\*.twb)

Tableau Packaged Workbook (\*.twbx)

Save Cancel

47 marks 1 row by 1 column SUM(Profit): 341,902

Calculator

Windows Taskbar: 10:36 PM 8/1/2013

WFP Macrocosm presentation/1591\_v2.pptx

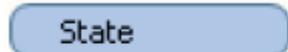
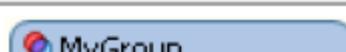
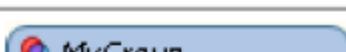
# Appendix A: Visual Cues

## Various Visual Cues (1 of 2)

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 an ad-hoc group.

## Various Visual Cues (2 of 2)

---

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.
<b>State</b>	A bold name indicates a sorted field.
$\Sigma$ Year	The $\Sigma$ icon indicates a calculation filter (slicer).
 MyGroup	The  icon indicates a set.
 <i>MyGroup</i>	An italicized name indicates a filtered set.
 <i>MyGroup</i>	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	

# Appendix B: Glossary

## Glossary (1 of 8)

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**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.

**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

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**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.

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**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.

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**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.

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**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.

**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.

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**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.

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**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.

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**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.

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