

Tableau 2019





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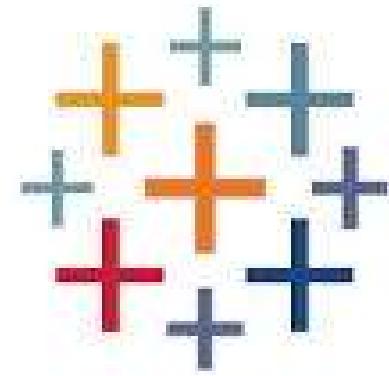
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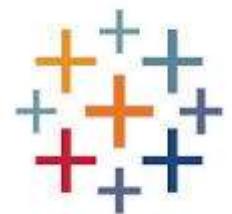
1. Catching Up with Tableau 2019



Catching Up with Tableau 2019

In this first lesson, we'll cover the new features in Tableau's 2019 releases (2019.1 and 2019.2). This lesson will be divided into two parts, as follows:

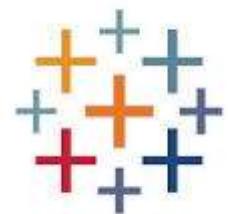
- Connector improvements
- Worksheet enhancement
- New actions
- Empowered Dashboard
- Tableau Server



Connector improvements

There are no changes regarding the way you connect to data or what you can do with data sources. However, the newest version of Tableau includes four new connectors, all of which have been available since Tableau 2019.1:

- Azure SQL Data Warehouse Connector
- Google Ads Connector
- Google Drive
- MariaDB



Connector improvements

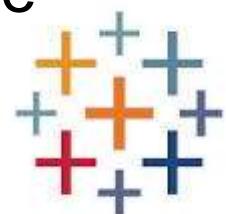
Some other data source improvements are as follows:

- OAuth is enabled for a Snowflake connector (2019.1)
- You can directly use the power of spatial information in a PostgreSQL+PostGIS database without having to export or prep the data (2019.1)
- The JDBC connector was improved for better performance (2019.2)
- You can connect to on-premise Service Now deployments (2019.2)
- You can use Azure Active Directory username and password authentication (2019.2)
- Enhanced SAP Hana and Marketo connectors (2019.2)

Worksheet enhancement

MakePoint and MakeLine (2019.2)

- Since Tableau 10.2, you have been able to connect to a spatial file to create maps using the Geometry field (a Point, a Line, or a Polygon).
- Each new release brought new capabilities, such as using a spatial field directly from a database or the recent spatial join: Intersect.
- Tableau Desktop 2019.2 brings two new functionalities: MakePoint and MakeLine.



Worksheet enhancement

- MakePoint and MakeLine are two new functions.
MakePoint converts Latitude and Longitude into a spatial point.
- MakeLine takes two Points and creates a spatial Line.
- This allows you to create a path between two places on Earth by taking into account the curvature of the earth and joining spatial and nonspatial files with Latitude and Longitude.

Worksheet enhancement

- Open Tableau Desktop and select Microsoft Excel.
- Connect to the Flights.xlsx file you've just downloaded.
- On Sheet1, create a new calculated field. Name it Departure Point and write the following formula:
MAKEPOINT([Departure Latitude],[Departure Longitude]).
- Create a second calculated field for the arrivals. Name it Arrival Point and write the following formula:
MAKEPOINT([Arrival Latitude],[Arrival Longitude]).

Worksheet enhancement

- You have created two calculated fields that contain spatial points that are mapping the departure and arrival airports. You can test your fields by simply double-clicking on them.
- Create a final calculated field for the routes. Name it Air Routes and write the following formula:
`MAKELINE([Departure Point],[Arrival Point]).`
- On a blank Worksheet, double-click on Air Routes; this will automatically generate all the paths on a map.

Worksheet enhancement



Vector Map (2019.2)

- Are you ready for a smoother, faster, and more powerful than ever mapping experience?
- Yes, you are! Using maps in Tableau Desktop 2019.2 never felt better.
- Using the MapBox technology, Tableau maps now use vectors for an incredibly smooth zoom in and out.

Tableau File Data Worksheet Dashboard Story Analysis **Map** Format Server Window Help

Background Maps ► i - Book1
Background Images ►
Geocoding ►

Map Layers... (highlighted)
Map Options...

Map Layers

Background

Style: Satellite

Washout: 0%

Repeat Background

Map Layers

Base
 Streets, Highways, Rout...
 Country/Region Borders
 Country/Region Names
 State/Province Borders
 State/Province Names
 Water Labels
 Cities



1-14

Other improvements

The following is a list of other small visualization improvements:

- **Sort Controls:** On the Worksheet top menu, you'll find a new option, Show Sort Controls, which allows you to choose whether users can change the sort order. (2019.2)
- **Nested sort:** You can now use the nested sort feature on multiple dimensions (2019.1)
- **Tooltip reference line:** On the reference line configuration window, you can now modify and even totally remove the tooltip (2019.2)

New actions

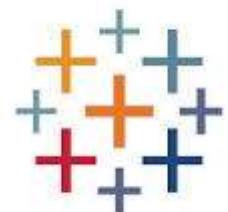
- Tableau's power resides in the ability to build simple and powerful visualizations and dashboards in minutes, but also to create interactivity with only a few clicks thanks to Actions.
- Tableau 2018.3 already introduced two new actions: Go To Sheet and Change Set Values.
- Tableau 2019.1 and 2019.2 continue to improve on these actions with a great enhancement for Go to URL actions and a revolutionary way of working with parameters: Change Parameter.

Improved URL Actions (2019.1)

- **New Browser tab:** Always opens the link in a new browser tab, even if a Web Page object exists in the Dashboard.
- **Web Page object:** Opens the URL in a Web Page object in your Dashboard. You can even have multiple Web Page objects in your Dashboard with multiple URL actions targeting each Web Page object separately.
- **Browser tab if no Web Page objects exists:** The default option; this opens the URL in a browser tab if there is no Web Page object.

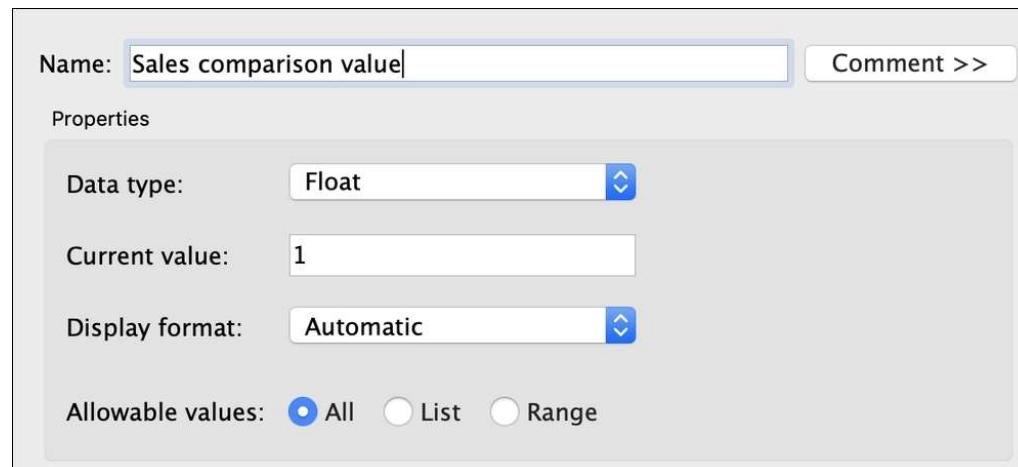
Change Parameter (2019.2)

- The Change Parameter... is the newest action to be introduced in Tableau 2019.2.
- It allows you to change the value of a Parameter based on the value on a Worksheet.
- It was already possible to achieve this thanks to Extensions, but now Tableau has made it official!



Change Parameter (2019.2)

- On a blank Worksheet, create a new Parameter.
- On the Parameter configuration window, name it Sales comparison value, of the Float type with All allowable values, and then click on OK. Your Parameter configuration should look like this:



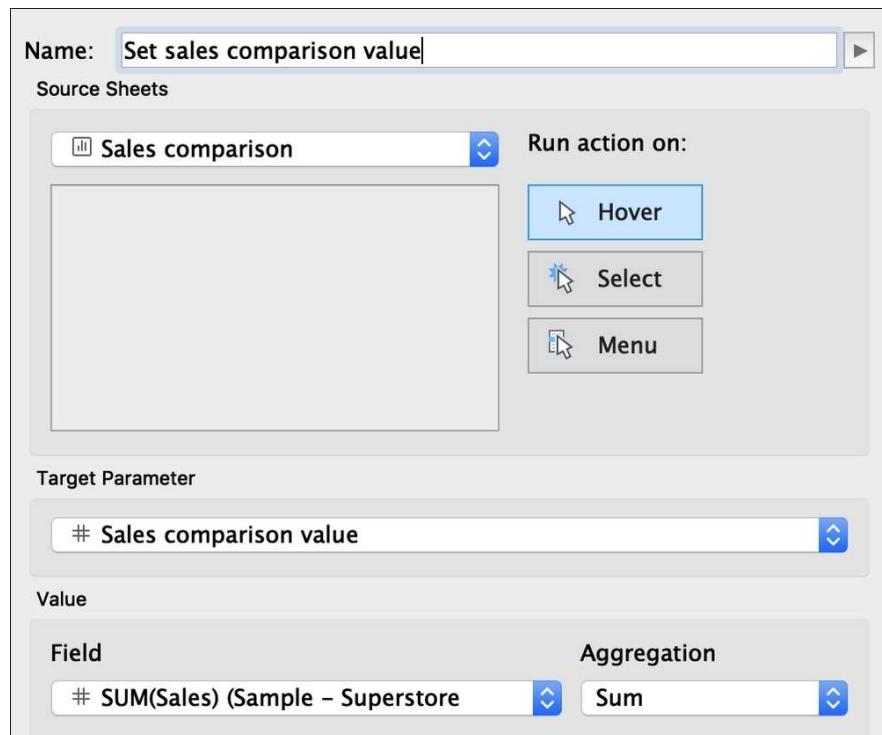
Change Parameter (2019.2)

- Create a new calculated field, name it Sales comparison, and write the following formula: $\text{SUM}([\text{Sales}]) - [\text{Sales comparison value}]$.
- Double-click on State, then put Sales in Detail and Sales Comparison in Color. Your visualization should look like this:

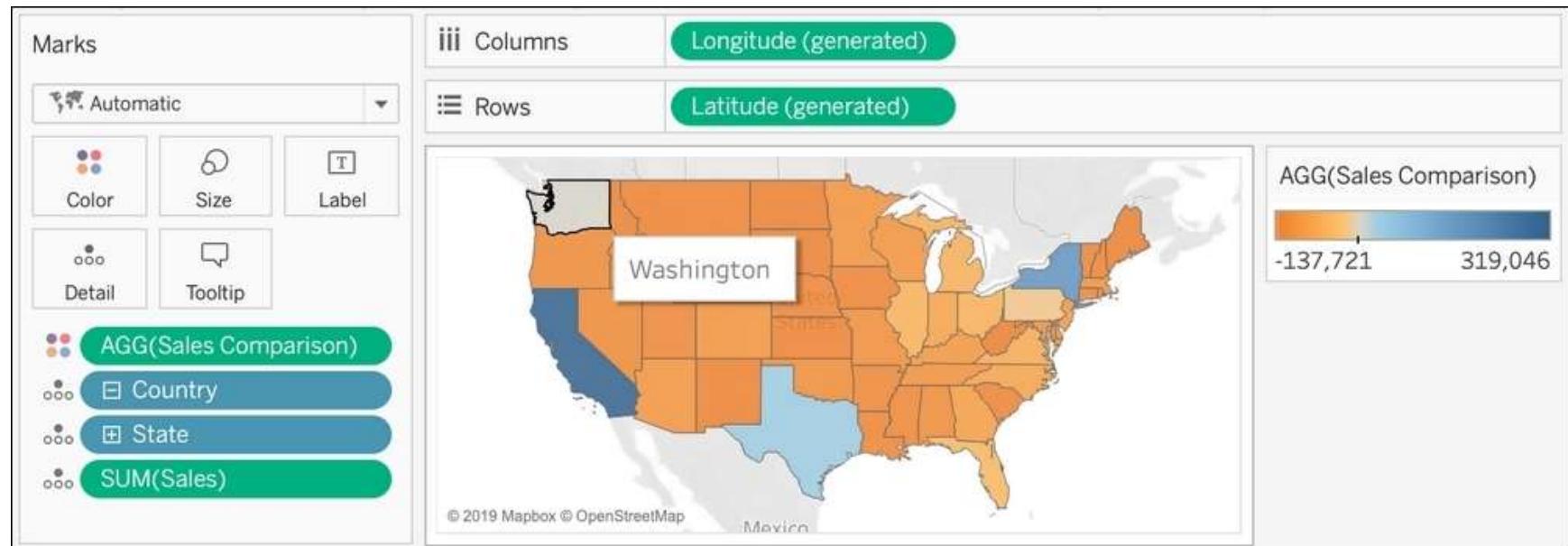


Change Parameter (2019.2)

- Name the action Set sales comparison value and set it to run on Hover.
- In the Target Parameter list, choose Sales comparison value, and in the Value list, choose SUM(Sales).
- Keep the Aggregation as Sum. Your configuration window should look as follows:



- Back in your visualization, hovering over a state should change the value of the parameter and therefore allow you to quickly compare the sales of a state to the others.
- The following is the final result when you hover over Washington:

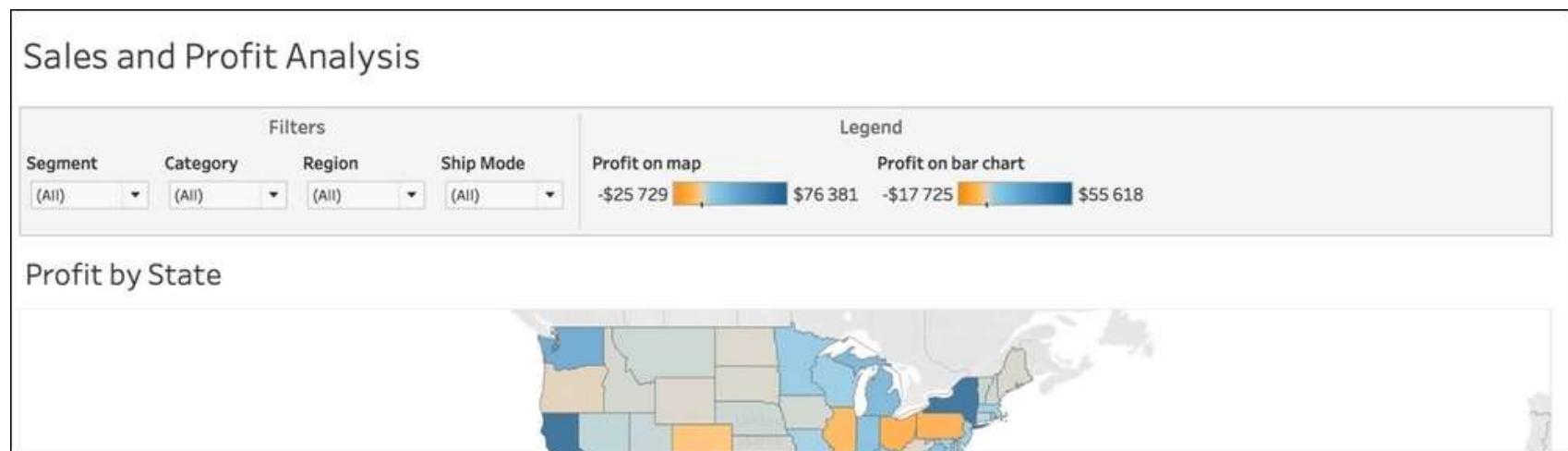


Empowered Dashboard

- Building Dashboards is definitely one of the most important aspects of using Tableau Desktop. Fortunately, building a simple Dashboard is also something very easy and enjoyable to do.
- In the process of always making our life easier, Tableau has developed a few very nice new features.

Show/Hide containers (2019.2)

- If you are not new to Tableau, I'm sure you've already made (or had to make) a Dashboard with lots of filters and legends. You know, something that looks like this:



Show/Hide containers (2019.2)

- If you click on Edit Button... a new window will open. Here, you can choose what Dashboard element will be impacted by the button, the Button Style (image or text), and the Button Appearance.
- The Button Appearance part lets you choose the Image (or Title and Font), Border, Background, and Tooltip when the item is currently shown or hidden.

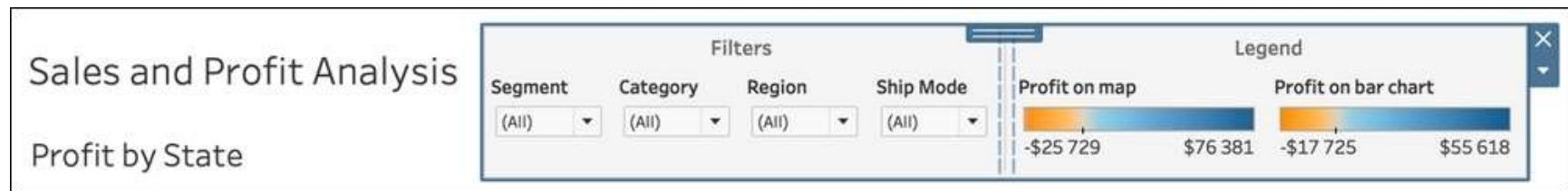
Show/Hide containers (2019.2)

- Open the ToggleButtonStart.twbx workbook.
- Select the filters and legend container, either by double-clicking on the grip part or using the Select Containers option of the items, or by using the Item hierarchy in the Layout pane. You should see the entire horizontal container with a blue outline, like this:



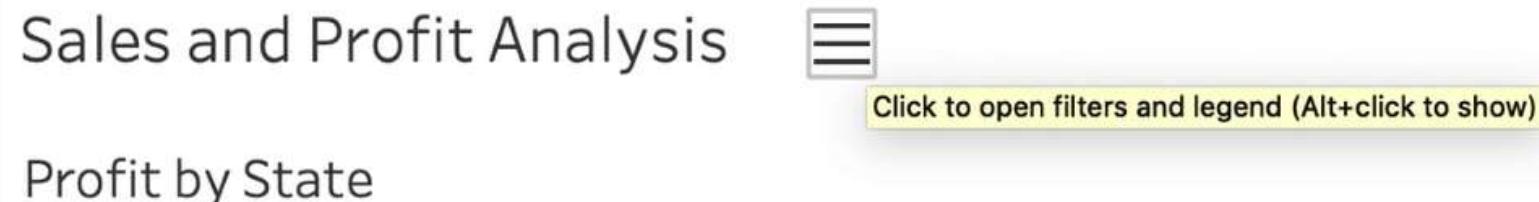
Show/Hide containers (2019.2)

- Go to the option using the descending arrow and select Floating.
- Using the grip part, move the containers at the top left. Then, by selecting the left border, increase its width, as shown in the following screenshot:



Show/Hide containers (2019.2)

- You can now use this button to show and hide the container with the filters and legends.
- To finalize the Dashboard, you can move the button next to the title, increase its size, and add a tooltip among the button options. Here's the final result:

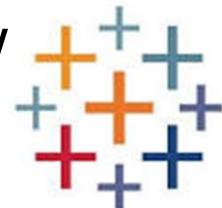


Replace Worksheets (2019.2)

- This is the kind of feature we love: simple and efficient. With Tableau 2019.2, you can now replace any Worksheet in a Dashboard with another new Worksheet.
- This may not sound like a big deal to newcomers, but Tableau veterans know how useful this new feature is.
- To replace a Worksheet, select the existing Worksheet in the Dashboard. Then, on the Sheets pane on the left, hover over the replacement Worksheet and click on the button highlighted in the following screenshot

Other improvements

- Export to PowerPoint: On Tableau Desktop, among the File top menu, you'll find the Export As PowerPoint option.
- On Tableau Server, you'll find the PowerPoint option when you click on the Download button in the toolbar.
- In Tableau 2019.2, this feature was improved to export Stories, with each Story point being a new slide (2019.1).



- Name zone: In the Item hierarchy part of the Layout pane of a Dashboard, you can now give a meaningful name to each item. This is a great feature to combine with the Show/Hide button. Here's an example (2019.1):

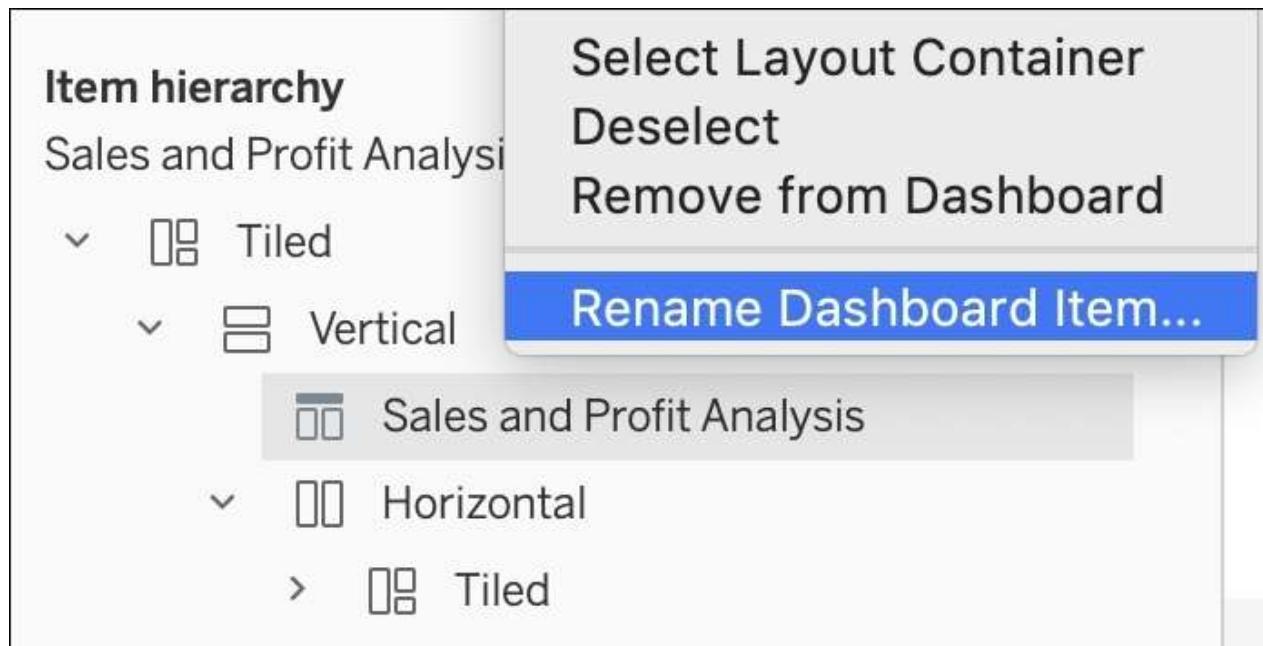


Tableau Server

- Ask Data is without a doubt one of the most important new features of the 2019 releases.
- However, the change that everyone will directly spot is the totally new browsing experience, with a new way to group published content and a fresh look.

New browsing experience (2019.2)

World Indicators Tutorial ☆ ① ...
Owner [Tristan Guillevin](#)

Create Select All Content type: Show all ▾



Country Specific One Pager ☆ ...



Population and Birth Rate (2012)
World Indicators ☆ ...



Extract
Last refresh May 10, 2019, 2:21 PM

New browsing experience (2019.2)

The screenshot displays the new browsing experience interface for version 2019.2. The interface features a sidebar on the left with icons for Home, Explore, Favorites, Recents, Users, Groups, Schedules, Tasks, Site Status, and Settings. The main area is titled "Home" and includes a "Recents" section with a bar chart titled "International Tourism" showing data from January to December. Below it is a "Tourism" card with a star icon and three dots. There is also a "See All" link. The "Others are viewing" section shows four other dashboards: "International Tourism", "Recent Work Items (2019)", "My 2019-2020 Work Items", and "HRIS Current Vacancies". A search bar at the top right includes a magnifying glass icon, a help icon, a bell icon, and a globe icon. A "Create" button is also present.

Ask Data

Connections 1

Extract Refreshes 0

Connected Workbooks 0

Analysis complete ⓘ



[Refresh](#)

Abc Category

🌐 City

🌐 Country

Abc Customer Name

📍 Location

⌚ Manufacturer

📅 Order Date

Abc Order ID

🌐 Postal Code

📍 Product

Abc Product Name

.ini Profit (bin)

Abc Region

Abc Segment

Ask about fields in this data source

Or try one of these suggestions:

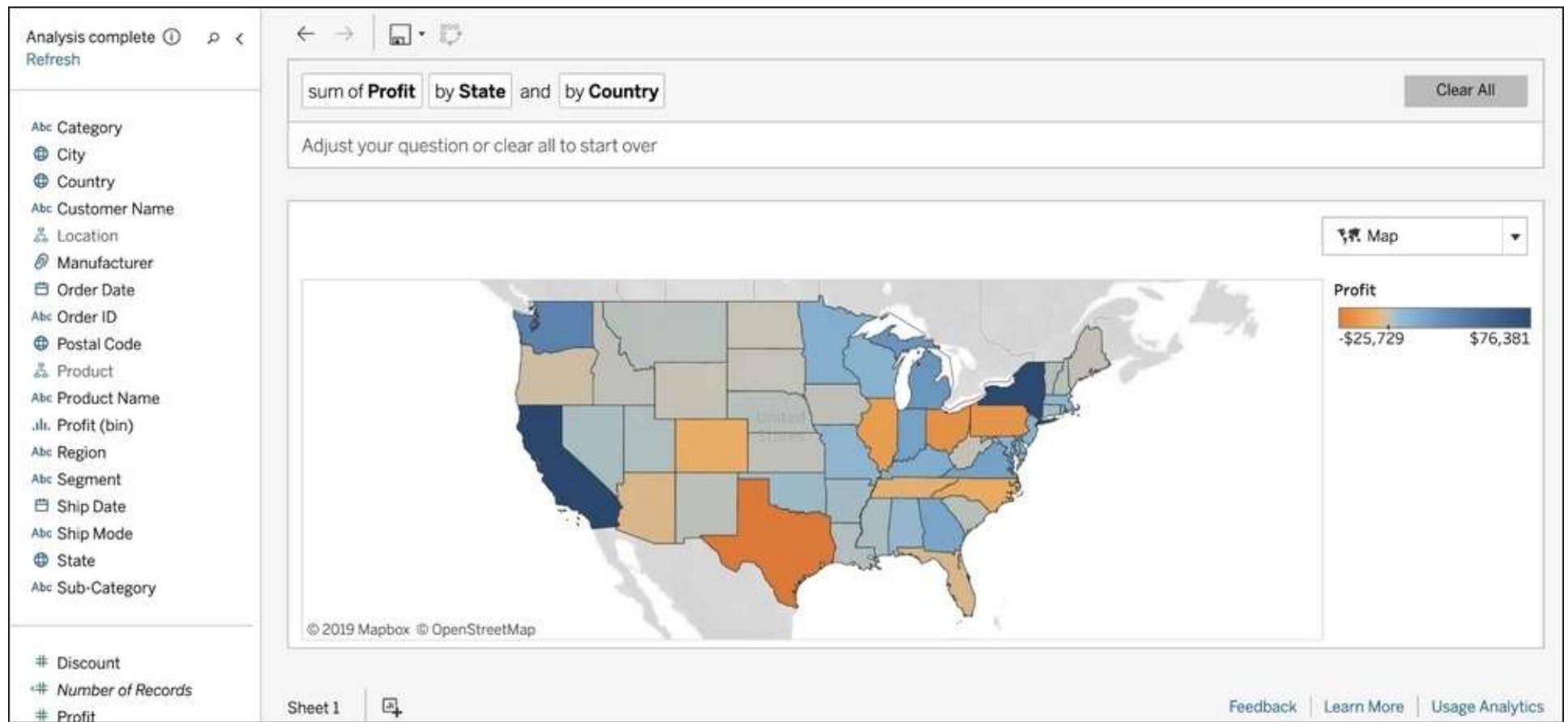
by [Customer Name](#)

sort [Customer Name](#) in alphabetical order

top [Product Name](#) by sum of [Number of Records](#)

sum of [Sales](#)

sum of [Sales](#) by [Order Date's year](#) as a line chart



Ask Data (2019.1)

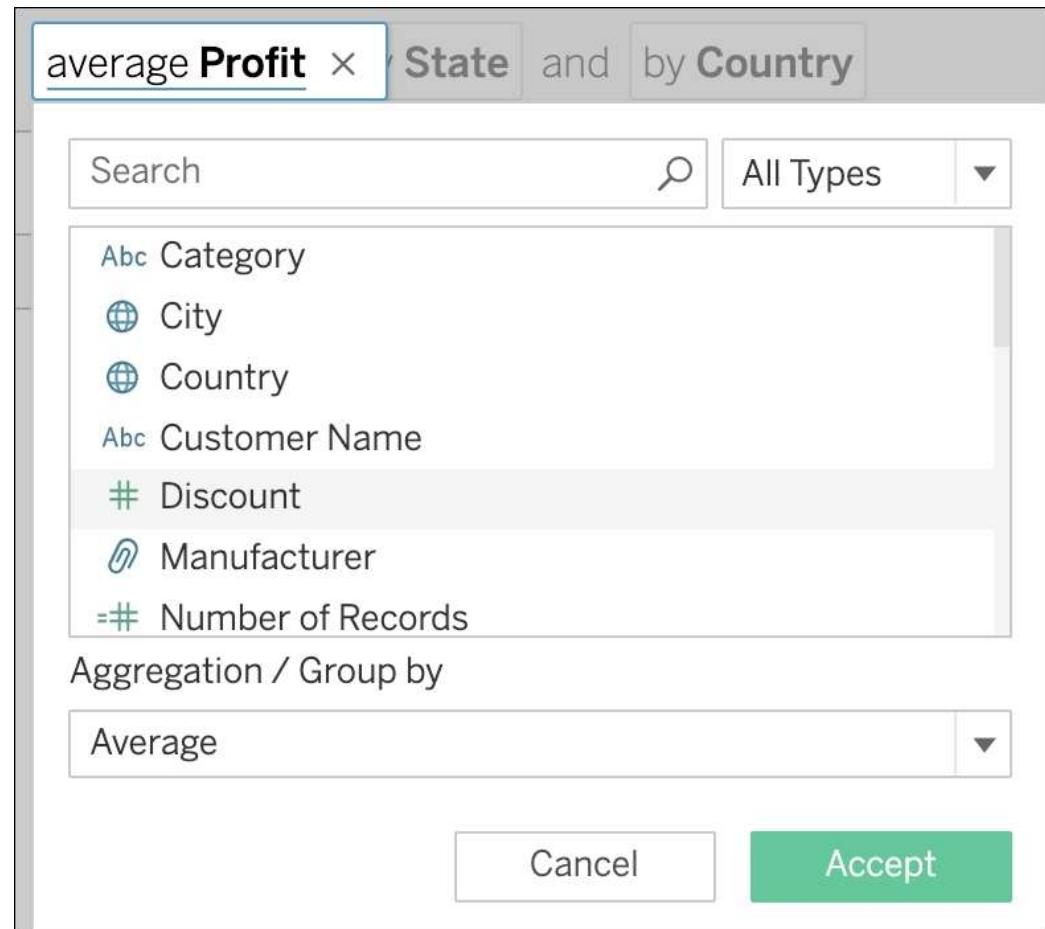
- Without any knowledge of how to use Tableau to create a visualization, Ask Data was able to convert some text into a visualization.
- On the Data pane on the left, when you hover over a field, a nice tooltip gives you some quick insights about the number of values, their distribution, and even the formula (if it's a calculated field).

Ask Data (2019.1)

On the top, you can see that the search bar has expanded and suggested that you can adjust the question or use the Clear All button to start over. Here are some examples of what you can add:

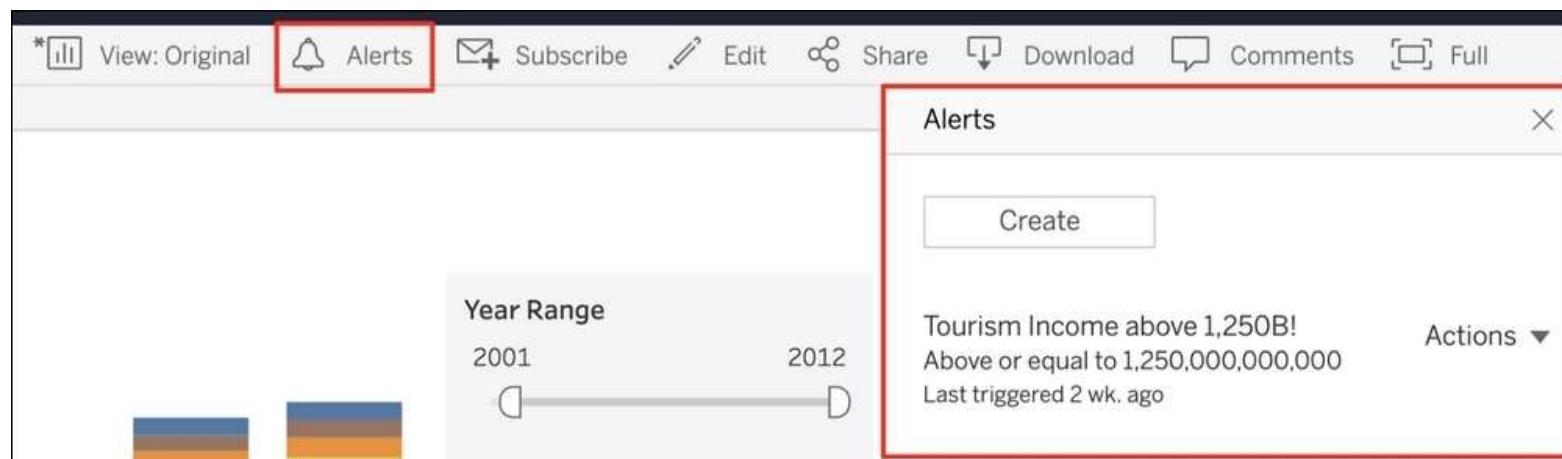
- as a bar chart, changes the viz type to a bar (works with different Marks type)
- by category, adds the category in the View
- in December 2018 filters the order date
- With effect from 2019.2, you can also use replace profit with sales, add sales, or remove profit , which do exactly what they say

- If you are satisfied with the visualization but you want to quickly change a Measure or Dimension, you can click on different fields in the query box to open a menu that allows you to choose a different field and its aggregation.
- For example, if you click on sum of Profit, you can quickly change it to display the discount instead, as you can see in the following screenshot:



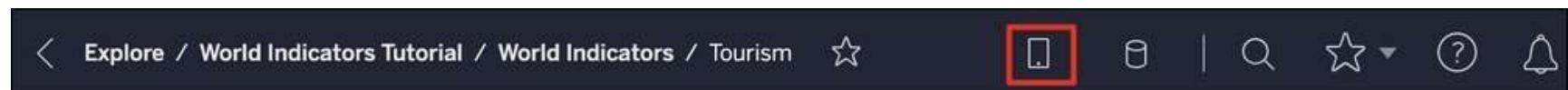
New Alerts view (2019.2)

- Alerts is an amazing feature that you can use to receive emails when your data satisfies a condition. With Tableau Server 2019.2, clicking on the Alerts button in the toolbar doesn't open the alert creation window anymore; instead, it opens a new pane on the right. Here's the Alerts view:



Device preview (2019.1)

- With effect from Tableau 2019.1, you can preview the layouts on Tableau Server.
- Above the toolbar, a new button, Preview Device Layouts, is now available, as highlighted in the following screenshot:



Other improvements

Here is a list of other new features available on Tableau Server:

- New connections: You can connect to Google Big Query, Google Drive, Dropbox, and OneDrive from the web (2019.1)
- Okta improvement: Tableau Server can integrate Okta identity management for users, groups, and roles even better (2019.1)
- Site Start page: Tableau Server admins can set a start page for all users (2019.2)

Summary

- We are in the middle of the year, and with only two new releases, Tableau has already considerably improved its products.
- Your Tableau life is now easier than ever before. You can add buttons to show and hide containers, automatically replace a Worksheet in a Dashboard, customize the reference line tooltip, show the sorts control, name your Dashboard zone, control the URL action targets, and sort without having to think twice.

2. The Tableau Core



The Tableau Core

To begin, we'll go through all the things that every Tableau user should know. The following topics will be covered in this lesson:

- The different Tableau products
- Speaking Tableau
- Dimensions and Measures
- Blue and green – Discrete and Continuous
- The toolbar options
- Live or Extract

The different Tableau products

- There are seven Tableau products:
 1. Tableau Desktop
 2. Tableau Server
 3. Tableau Online
 4. Tableau Reader
 5. Tableau Public
 6. Tableau Mobile
 7. Tableau Prep

Speaking Tableau

- Rather than a big list of all the terms, let's go through the basic Tableau life cycle.
- When you open Tableau Desktop, you start working on a Workbook. After you've finished working, you will save your work in a .twb or .twbx file.
- You can open multiple instances of Tableau, each of them being a different Workbook.

Sample - Superstore

Connection Live Extract

Filters 0 | Add

Orders

Use Data Interpreter
Data Interpreter might be able to clean your Microsoft Excel workbook.

Order ID	Order Date	Ship Date	Ship Mode	Customer Name	Segment
CA-2017-152156	08/11/2017	11/11/2017	Second Class	Claire Gute	Consumer
CA-2017-152156	08/11/2017	11/11/2017	Second Class	Claire Gute	Consumer
CA-2017-138688	12/06/2017	16/06/2017	Second Class	Darrin Van Huff	Corporate
US-2016-108966	11/10/2016	18/10/2016	Standard Class	Sean O'Donnell	Consumer
US-2016-108966	11/10/2016	18/10/2016	Standard Class	Sean O'Donnell	Consumer
CA-2015-115812	09/06/2015	14/06/2015	Standard Class	Brosina Hoffman	Consumer

Data Source **Sheet 1**   

Go to Worksheet 

The screenshot shows the Tableau Data Prep interface. On the left, the sidebar contains:

- Data**: Sample - Superstore
- Dimensions**:
 - Customer:
 - Customer Name
 - Segment
 - Order:
 - Order Date
 - Order ID
 - Ship Date
 - Ship Mode
- Measures**:
 - Discount
 - Profit
 - Profit Ratio
- Sets**: Top Customers by Profit
- Parameters**: Profit Bin Size, Top Customers

At the top, there are sections for **Pages**, **Columns**, and **Rows**. The main workspace is titled "Sheet 1" and contains three "Drop field here" placeholder areas. To the right of the workspace is a "Marks" panel with options: Automatic, Color, Size, Text, Detail, and Tooltip.

Speaking Tableau

- On the left, you can see your Data Source with all the fields split between two elements: Measures and Dimensions.
- Each field has a data type (Text, Number, Boolean, and so on). Later, you'll learn how to create new fields or elements, such as Groups, Bins, Hierarchies, Sets, Parameters, or Calculated Fields.
- The big blank part is the View. It is here that your visualization will be displayed. Around the View, you can see different shelves (Rows, Columns, Pages, Filters, and Marks). To create visualizations, you have to put fields on those shelves. Once a field is on a shelf, it is called a pill. Pills can be green if Continuous, or blue if Discrete.

Dimension and Measure

- When you create a data source, the fields are split between Dimensions and Measures.
- The Measure is what you want to analyze, and the Dimension is the angle of analysis.
- By default, numbers are Measures, and the other data types (Text, String, Date, Geographical Boolean) are Dimensions, However, that's not always the case. Any data type can potentially be either a Dimension or a Measure.

Dimension and Measure

- As you can see, it's hard to give an exact rule to discern Measure and Dimension.
- It's more a concept to understand and a useful way to arrange the fields. Don't worry; it won't prevent you from starting to use Tableau, but understanding the difference will help you when you face your first challenges!

Blue and green – Discrete and Continuous

- A field or pill in blue is Discrete. A field or pill in green is Continuous.
- Dimensions and Measures can be either Continuous or Discrete.
- A Discrete field displays each distinct value. Any data types can be expressed in a discrete way.
- In the View, a Discrete field placed in Rows or Columns is represented with headers.

Blue and green – Discrete and Continuous

iii Columns	YEAR(Order Date)			
≡ Rows	SUM(Profit)			
Order Date				
Profit	2015	2016	2017	2018
\$49 544	Abc			
\$61 619		Abc		
\$81 795			Abc	
\$93 439				Abc



The toolbar options

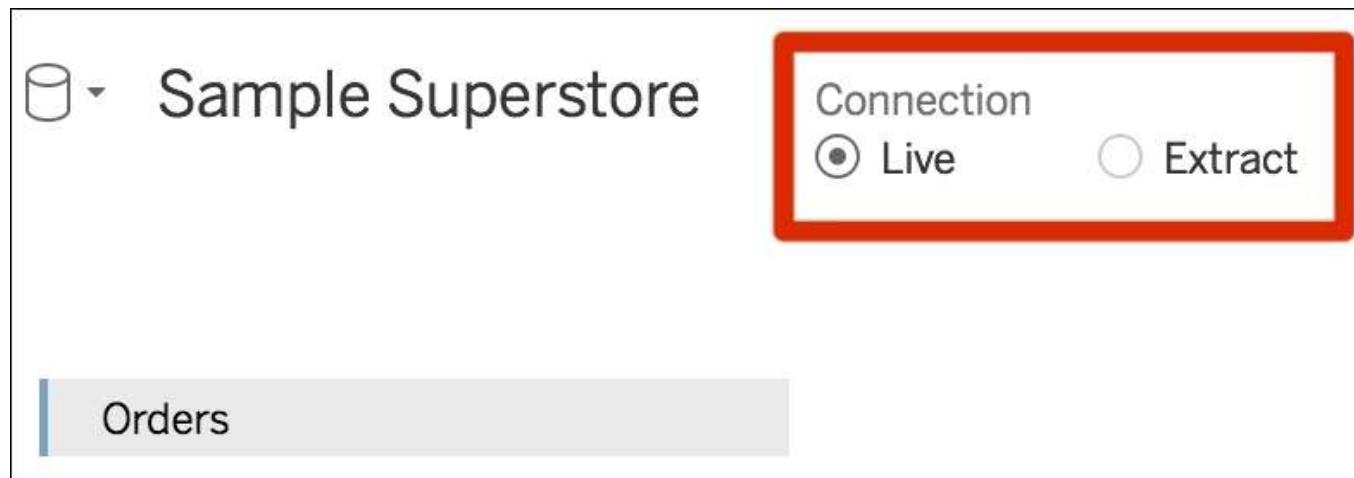
- **Undo The toolbar options:** This reverses your action. The great thing is that you can undo an unlimited number of times, starting back from the very beginning if you want!
- **Add a new Data Source The toolbar options:** This opens the menu to choose a new connection to a file or a server.
- **Duplicate Worksheet The toolbar options:** This creates a copy of the current Worksheet.

The toolbar options

- **Clear The toolbar options:** This removes the pills and formatting in the Worksheet. You can use the arrow to clear only specific parts.
- **Swap The toolbar options:** This replaces the pills in Rows with those in the Columns and vice versa.
- **Sort ascending/descending The toolbar options:** This automatically sorts the selected Dimension.
- **Show Labels The toolbar options:** This is a shortcut to display the labels.

Live or Extract

- When you connect to a file or a server, on the data source workplace, in the top-right corner, you have the option to use a Live or Extract connection, as you can see in the following screenshot:



Live or Extract

- A Live connection creates a direct link between the Tableau data source and your data (server or file).
- It means that, if the data changes, you see the impact in Tableau directly after actualizing the data source, or when you reopen the workbook.
- The problem with a Live connection is that you are dependent on the performance of the database. Large text files, big Excel files, or an unoptimized database can be very slow to analyze in Tableau.

Live or Extract

- When you create an Extract, Tableau copies your database into a .hyper file on your computer.
- Then, the data source is no longer linked to the database but to the .hyper file.
- The first advantage of the Extract is that it's optimized for Tableau, meaning that irrespective of the speed of your initial connection, you will have excellent performance. Keep that in mind.

Summary

- This lesson is theoretical but also necessary. The rest of the course is filled with concrete examples based on real cases.
- However, like every tool, it is important to understand the core principle to build great visualizations. Of course, Tableau is easy, and you can start creating visualizations without any help.
- However, there is nothing worse than starting with bad habits, only to discover that you've been doing it wrong the whole time.

3. Getting Started with Tableau Desktop



Getting Started with Tableau Desktop

In this lesson, we'll cover the following topics:

- Connecting to data
- Creating your first set of visualizations
- Building your first Dashboard
- Using Tableau Desktop for data exploration

Getting Started with Tableau Desktop

There are a few things to remember before we start; don't be afraid; I repeat, don't be afraid. The following two buttons on the toolbar will always save you if something goes wrong:

- Getting Started with Tableau Desktop: This allows you to undo any actions, and, good news, it's unlimited. So, if you make a mistake, use it!
- Getting Started with Tableau Desktop : This allows you to start from the beginning. It removes everything in the Worksheet or Dashboard. You can start afresh if you feel stuck somewhere.

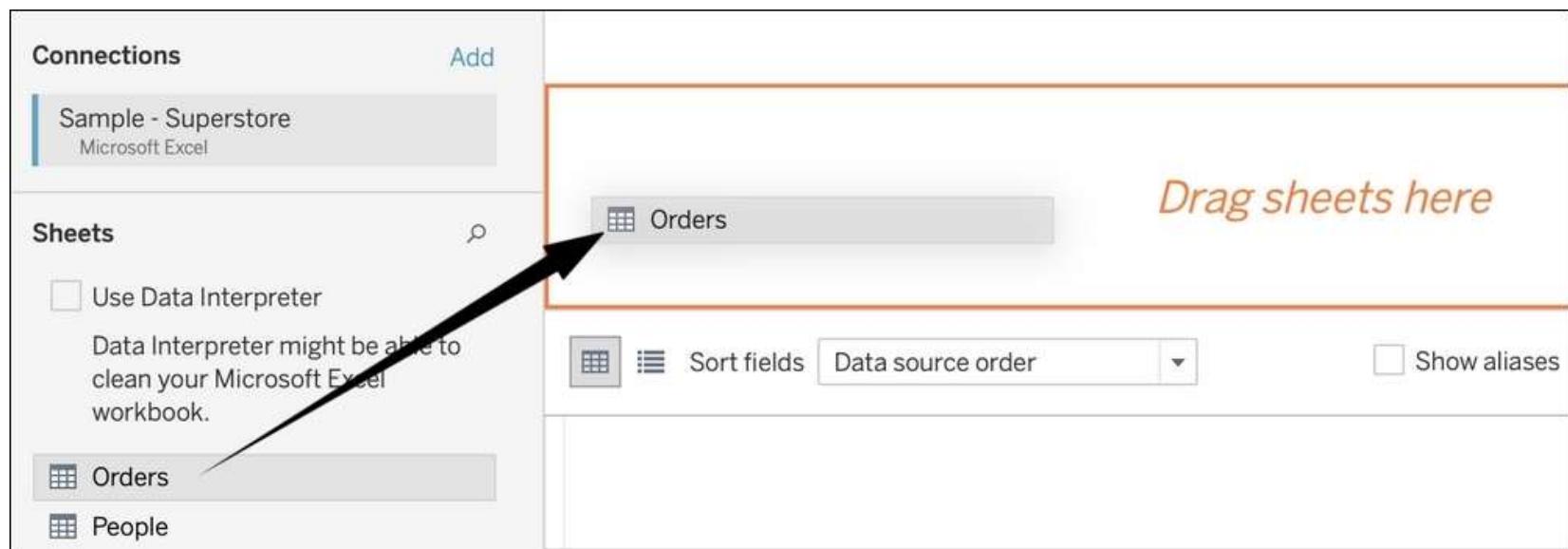
Connecting to data

So, let's connect to this dataset. When you open Tableau, click on Microsoft Excel on the left-hand side:

- If you're a Mac user, navigate to Documents | My Tableau Repository | Data Source | [Your Tableau Version] | en_US-US, and then open the file named Sample Superstore.xls.
- If you're a Windows user, navigate to My Documents | My Tableau Repository | Data Source | [Your Tableau Version] | en_US-US, and then open the file named Sample Superstore.xls.

Connecting to data

- For this example, we'll only use Orders; so, follow Tableau's invitation and drag the Orders table into the middle of the page:



Sales and profit by sub-categories – bar charts

The first question is: What are the product sub-categories that generate the most sales and profits? To answer this, perform the following steps:

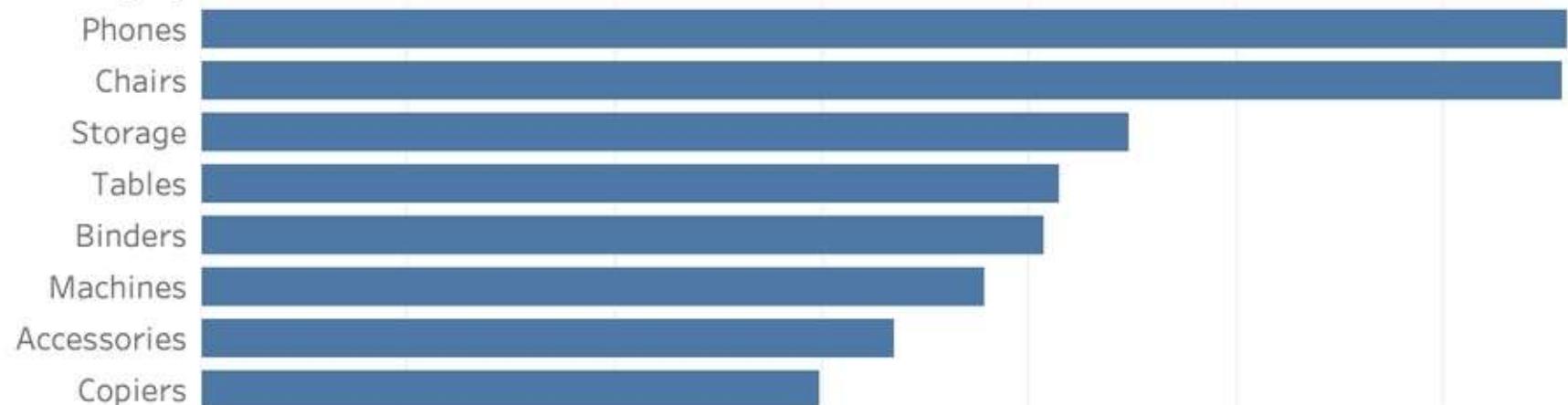
- Double-click on Sales in the Data pane under Measures. You should now see one bar. If you hover the mouse over the bar, you should read Sales: 2,297,201. As a measure is always aggregated, here, you can see the total sum of all the sales.



Creating your first set of visualizations

Sheet 1

Sub-Category



- In Tableau, it's straightforward to use preattentive attributes (such as Color, Size, Shape, and more) in order to add secondary information. Here, simply drag and drop Profit in the Color property:

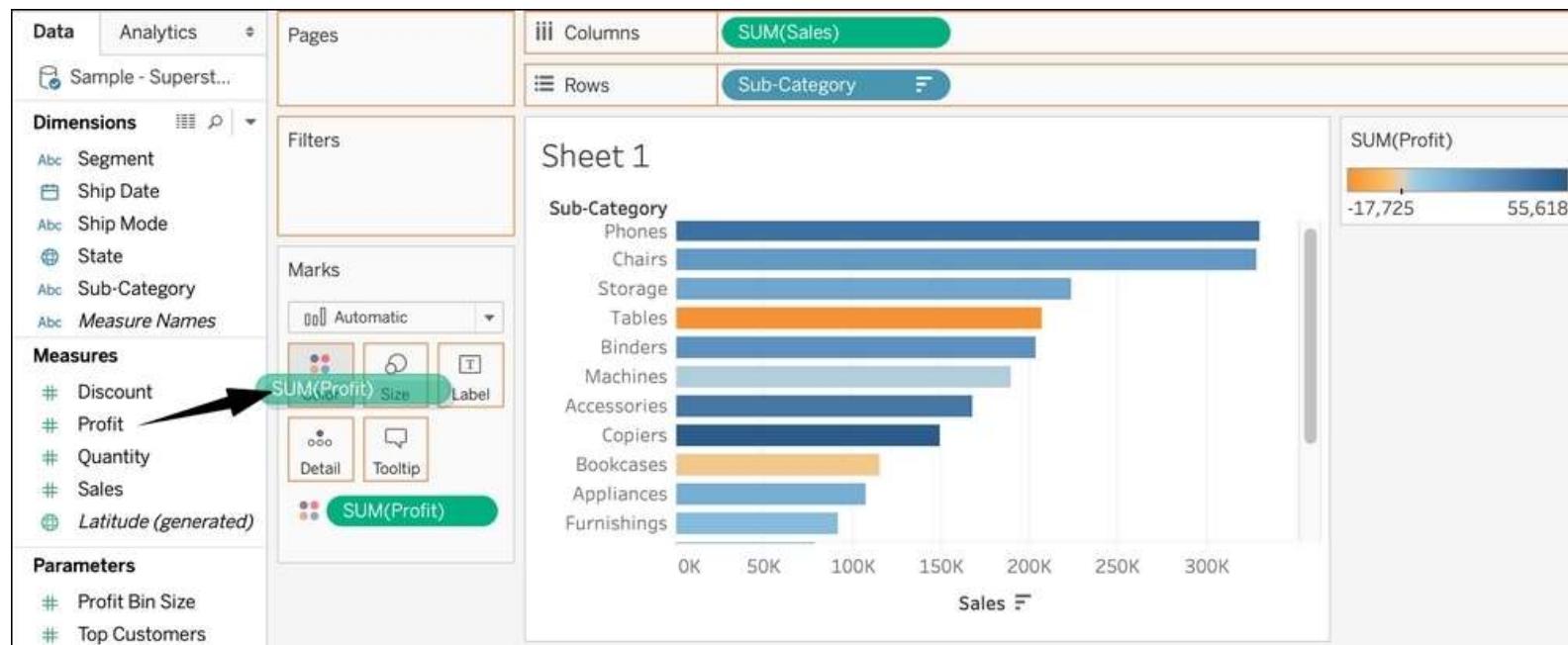


Tableau - Book1

Sales and Profit by Sub-Category

Sub-Category	Sales (K)
Phones	320K
Chairs	310K
Storage	230K
Tables	210K
Binders	200K
Machines	190K
Accessories	160K
Copiers	150K
Bookcases	120K
Appliances	110K
Furnishings	90K

Legend: SUM(Sales) - Blue, SUM(Profit) - Orange

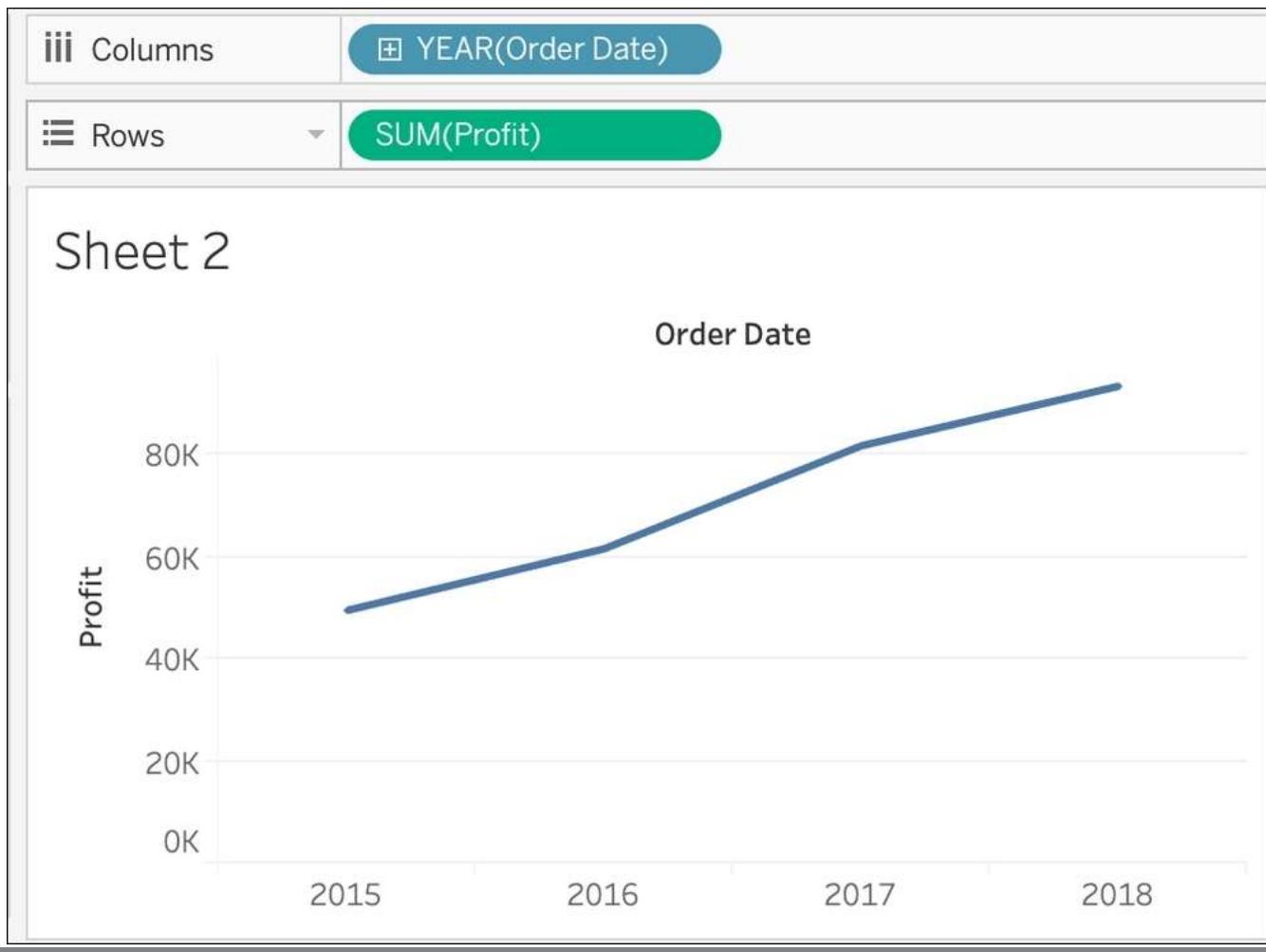
Worksheet Data

- New Worksheet
- Copy
- Export
- Clear
- Actions...
- Tooltip...
- Show Title
- Show Caption
- Show Summary
- Show Cards
- Show View Toolbar
- Show Sort Controls
- Describe Sheet...
- Duplicate as Crosstab
- Auto Updates
- Run Update
- Latitude (generated)

Parameters

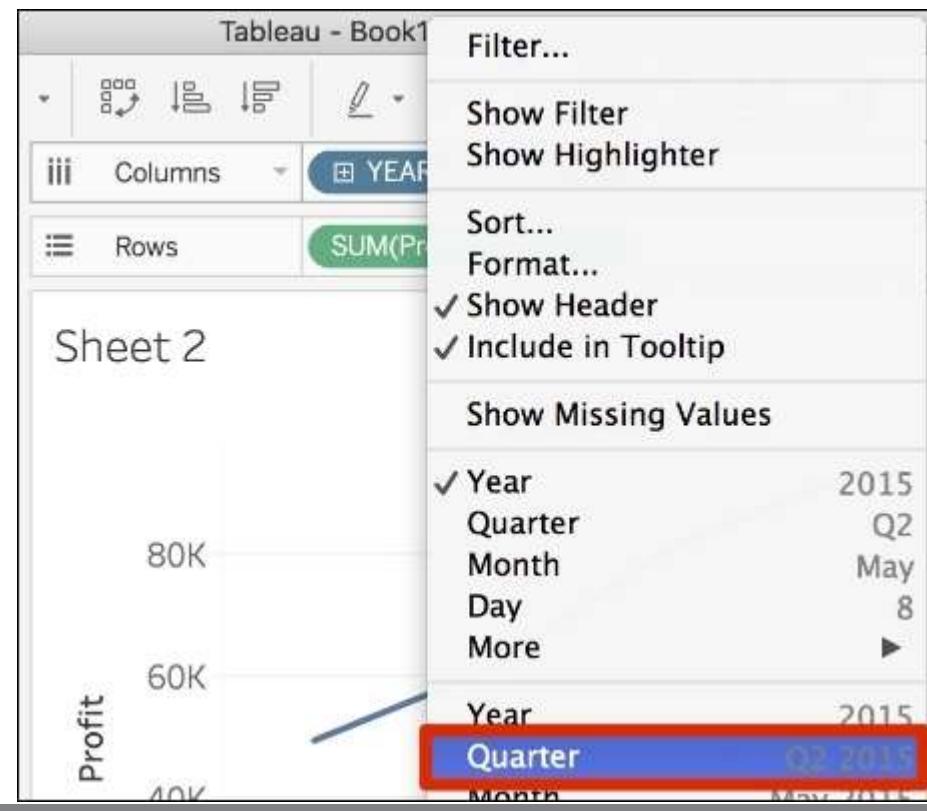
- Profit Bin Size
- Top Customers

Data Source: Sales and Profit by Sub-Categories



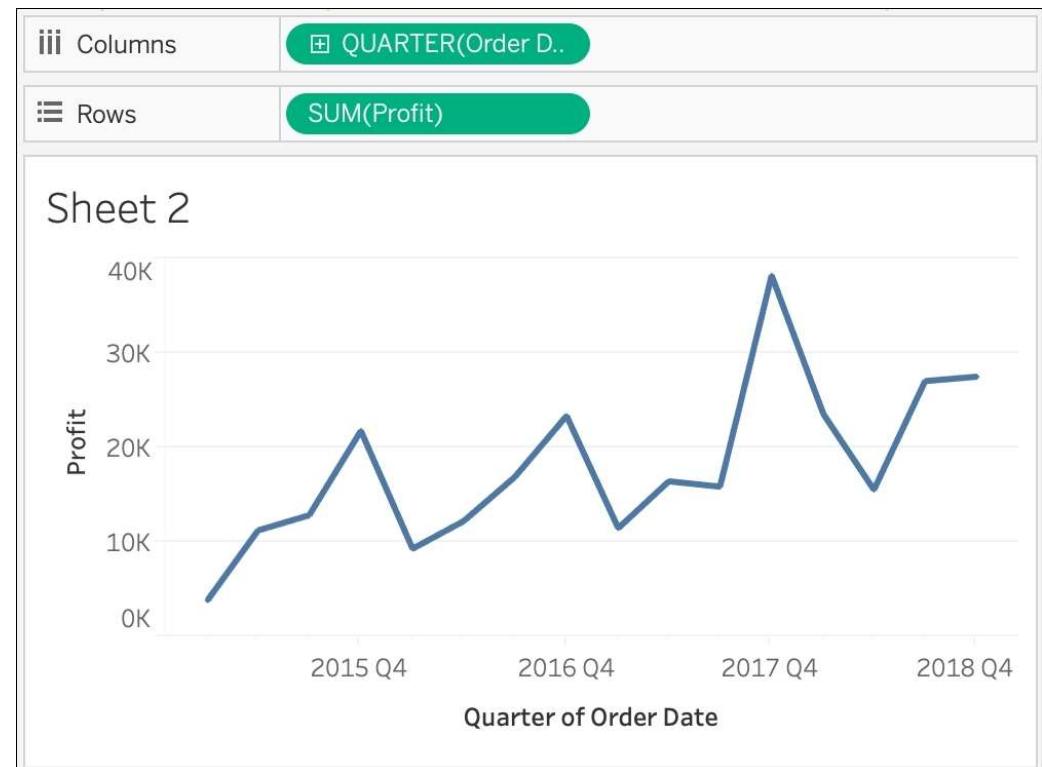
Creating your first set of visualizations

- Right-click on the YEAR (Order Date) pill in the Columns shelf and select the second instance of Quarter, where you will see Q2 2015:



Creating your first set of visualizations

- You can now see the quarterly evolution of the profit and discover that the fourth quarter is always the best:

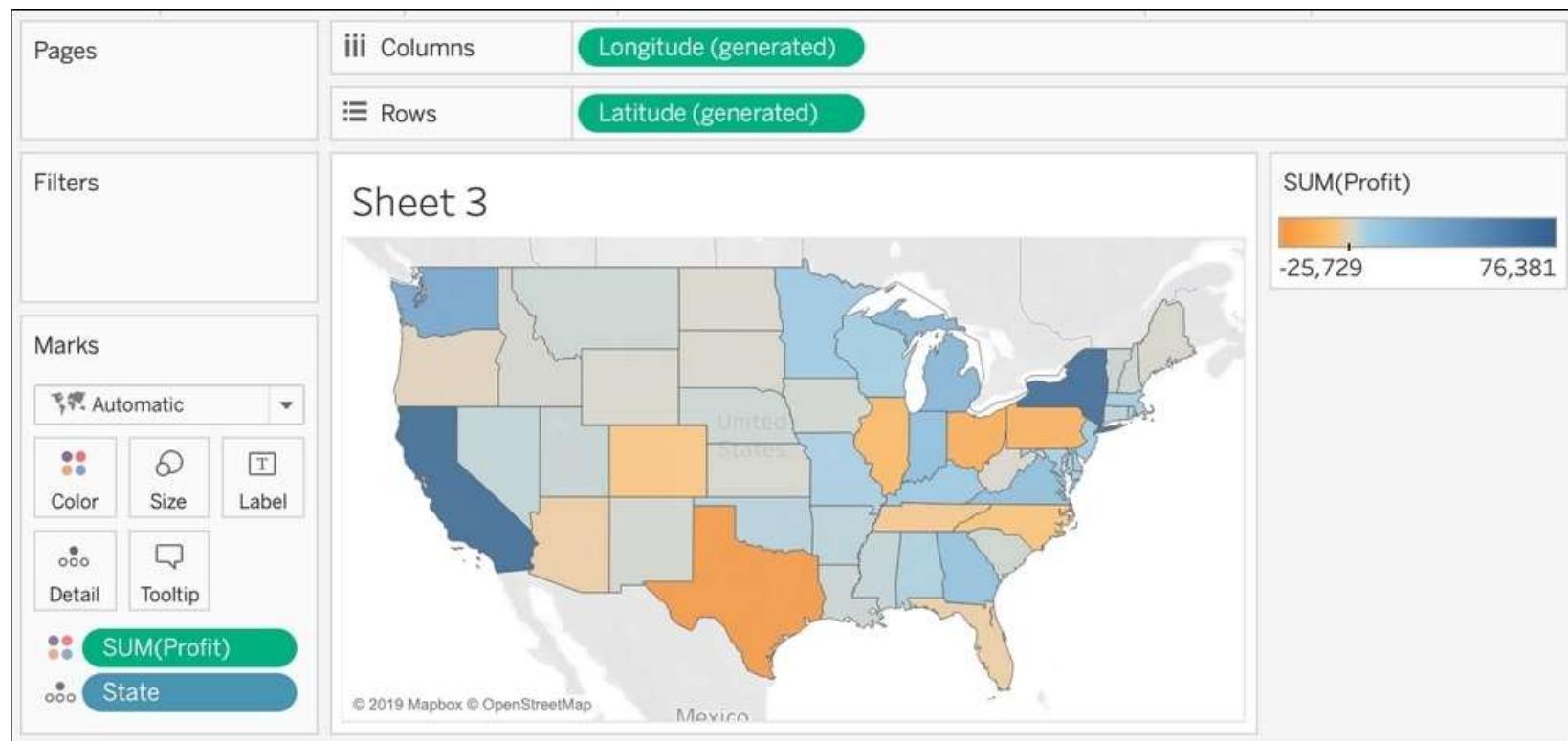


Profit by state – filled maps

Are you ready for the third and final visualization of this tutorial? We are going to examine where the profit is generated and use Tableau's mapping features:

- Start by creating a new Worksheet.
- Double-click on State. Tableau automatically puts Longitude (generated) in Columns and Latitude (generated) in Rows and generates a map. Each point represents a State.

- Drag and drop Profit in the Color property. The following screenshot displays the final result:



Creating your first set of visualizations

Congratulations! You have just built three visualizations to analyze your supermarket sales and profit in the following way:

- By sub-categories using a bar chart
- Over time, that is, quarterly, using a line chart
- By state, using a filled map

Screenshot of Tableau interface showing the creation of a new dashboard.

The top navigation bar includes: Worksheet, Dashboard (highlighted), Story, Analysis, Map, Format, Server, Window, Help.

A context menu is open over a map of the United States, listing:

- New Dashboard (highlighted with a red box)
- Device Layouts
- Show Grid
- Grid Options...
- Format
- Copy Image
- Export Image...
- Clear
- Show Title
- Actions...
- Auto Update
- Run Update

A tooltip at the bottom of the menu indicates: ✓ Auto-Generate Phone Layouts.

The main workspace shows a map of the United States where states are colored by profit, with darker shades representing higher profit. A legend on the left indicates:

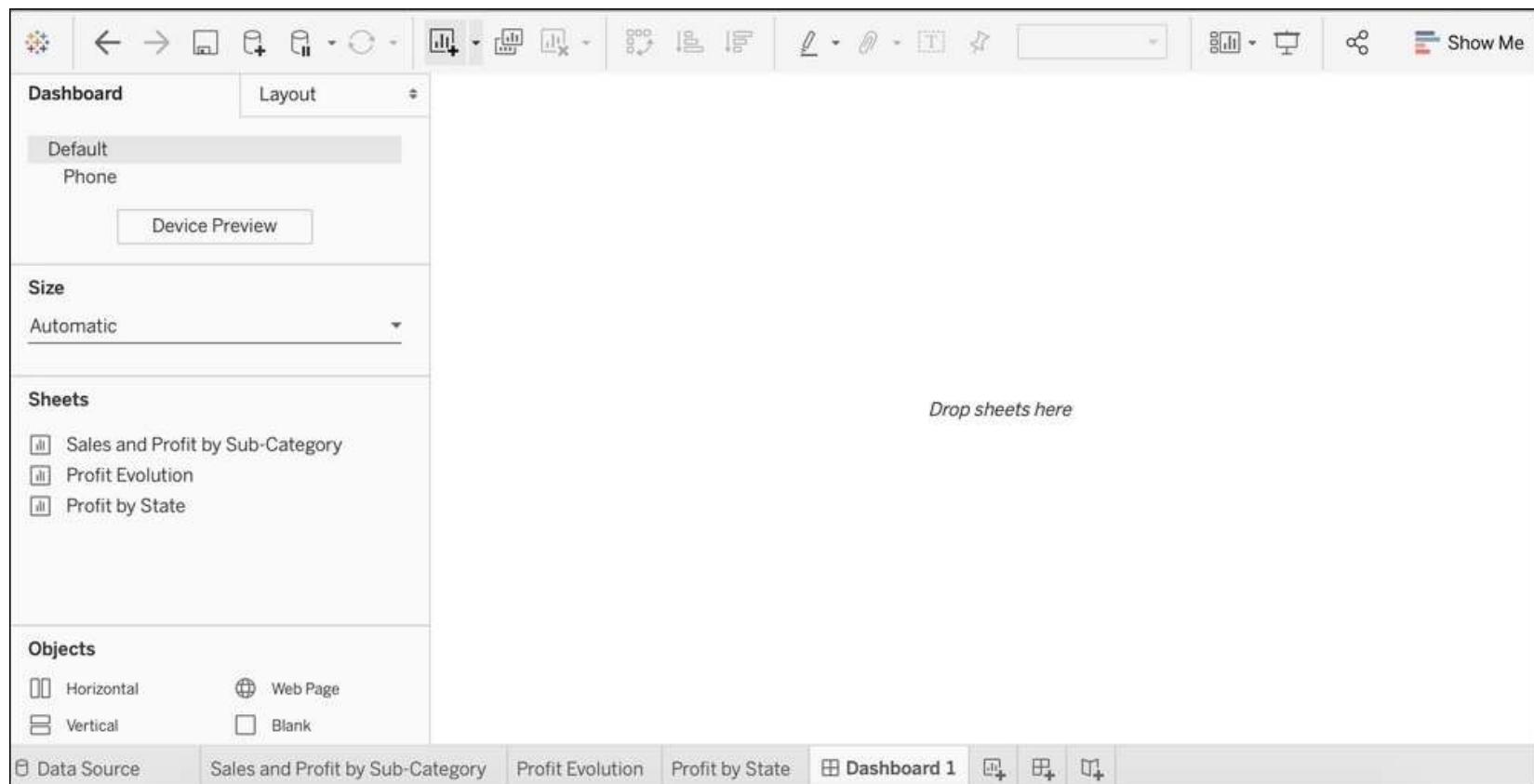
- Automatic
- Color (selected)
- Size
- Detail
- Tooltip

Below the map, the legend shows:

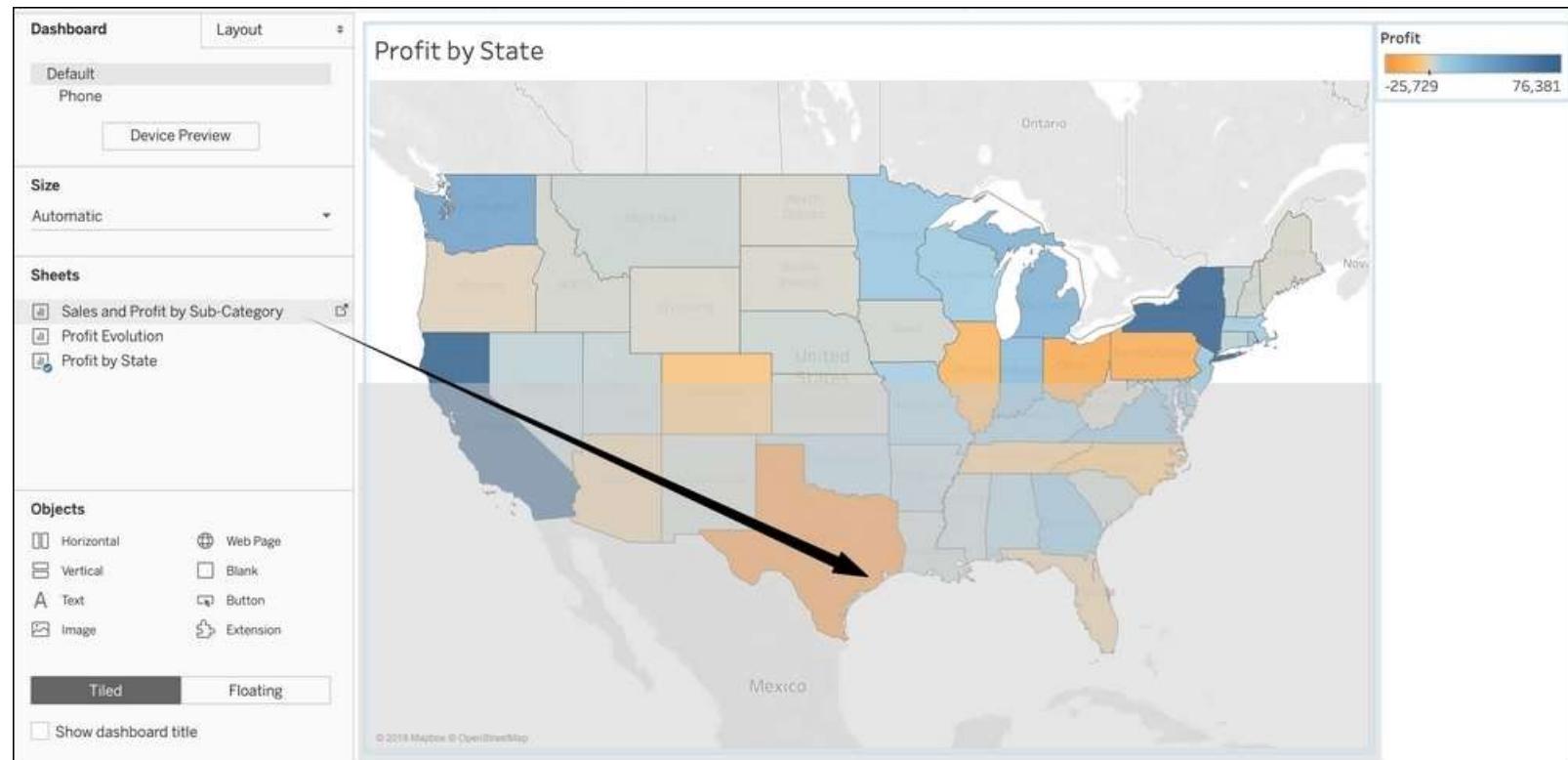
- SUM(Profit) (highlighted with a green box)
- State (highlighted with a blue box)

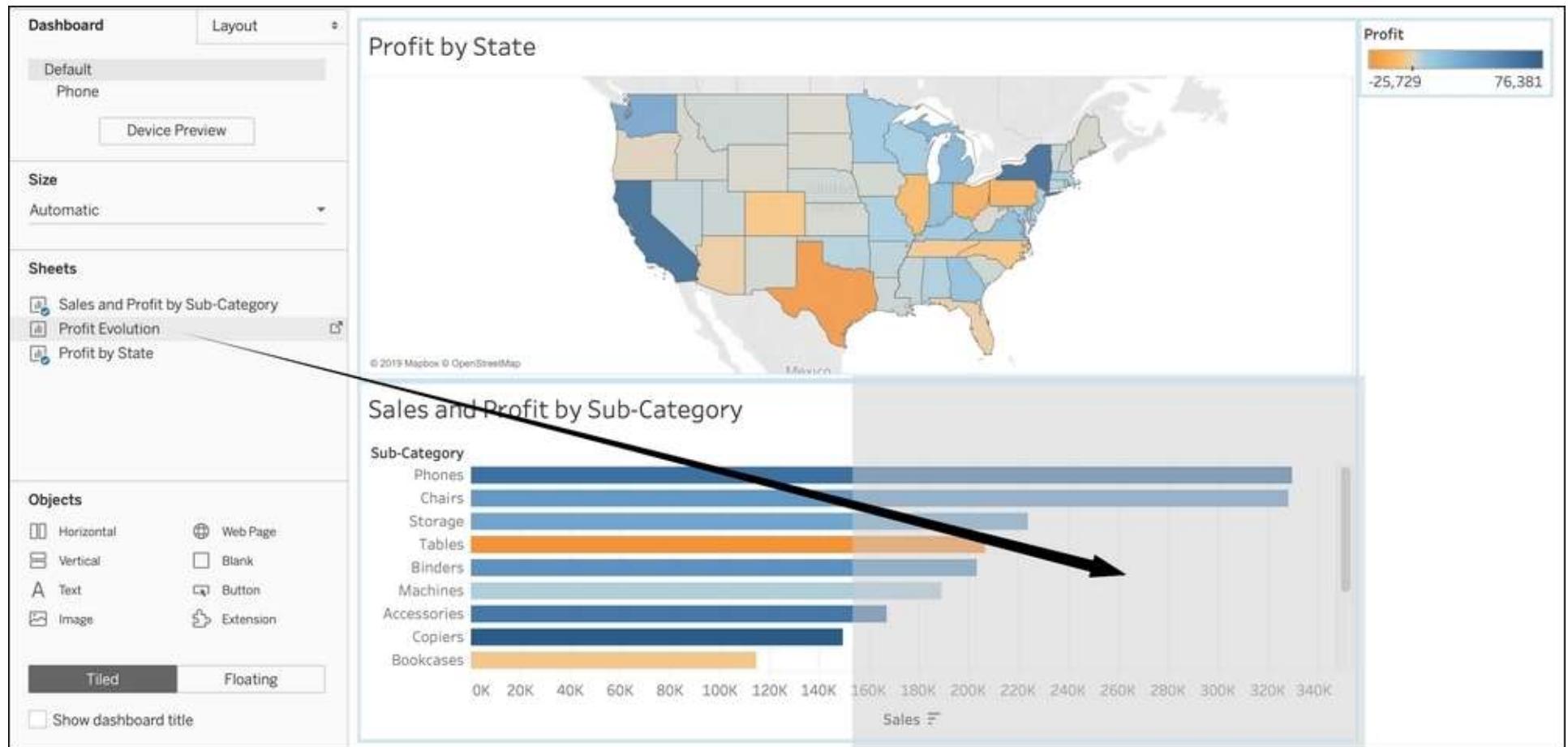
The bottom navigation bar includes: Profit by Sub-Category, Profit Evolution, Profit by State (highlighted with a red box), and three additional icons.

- Welcome to the Dashboard workplace:



Assembling the Dashboard





Building your first Dashboard

- Double-click on Dashboard 1 at the bottom and rename your Dashboard Sales and profit analysis.
- Click on the Show dashboard title checkbox on the left-hand pane to display the title.

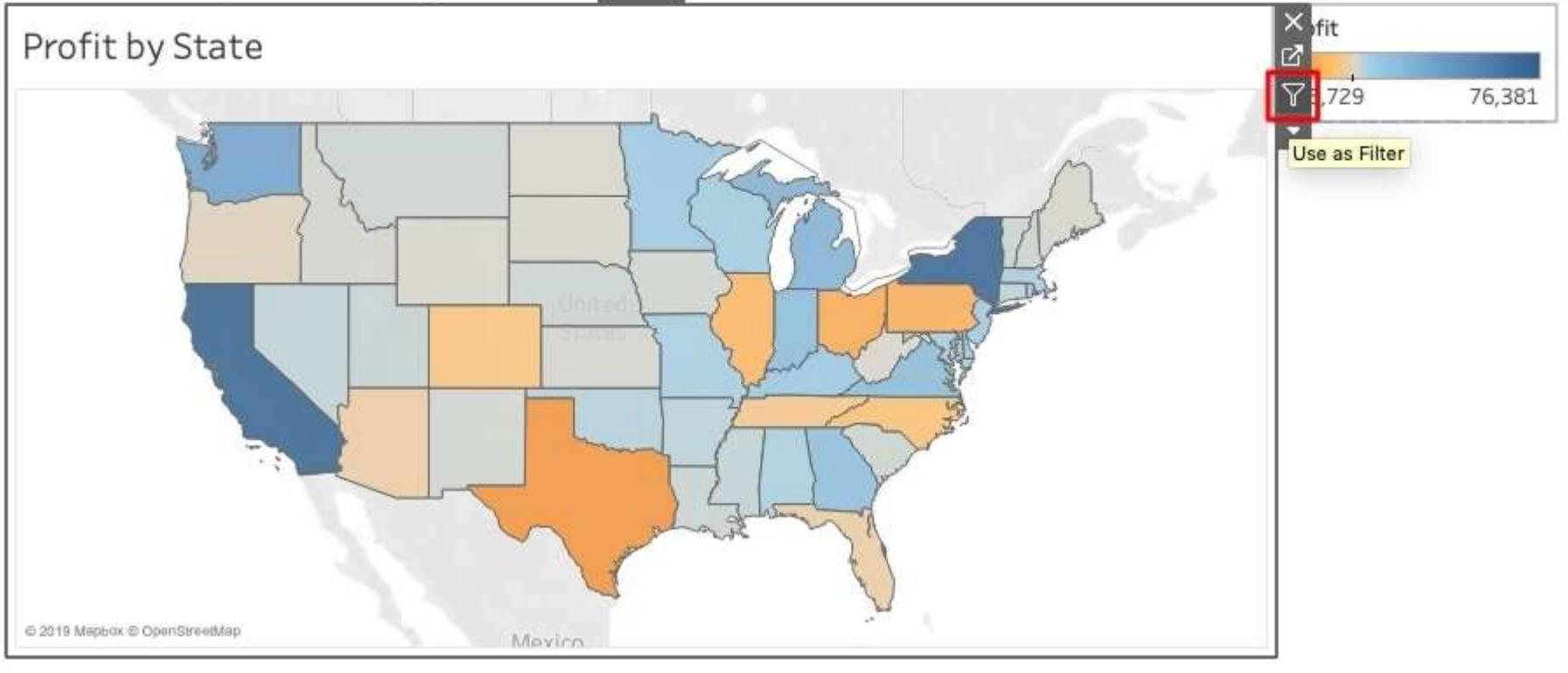
Adding interactivity to your Dashboard

Be careful; this is going to be quick:

- On the Dashboard, click on the Profit by State Worksheet to select it (there is a gray outline once it's selected).
- Click on the funnel icon, that is, the third one that appears. Notice that it turns white once you've clicked on it. The icon is highlighted in the next screenshot:

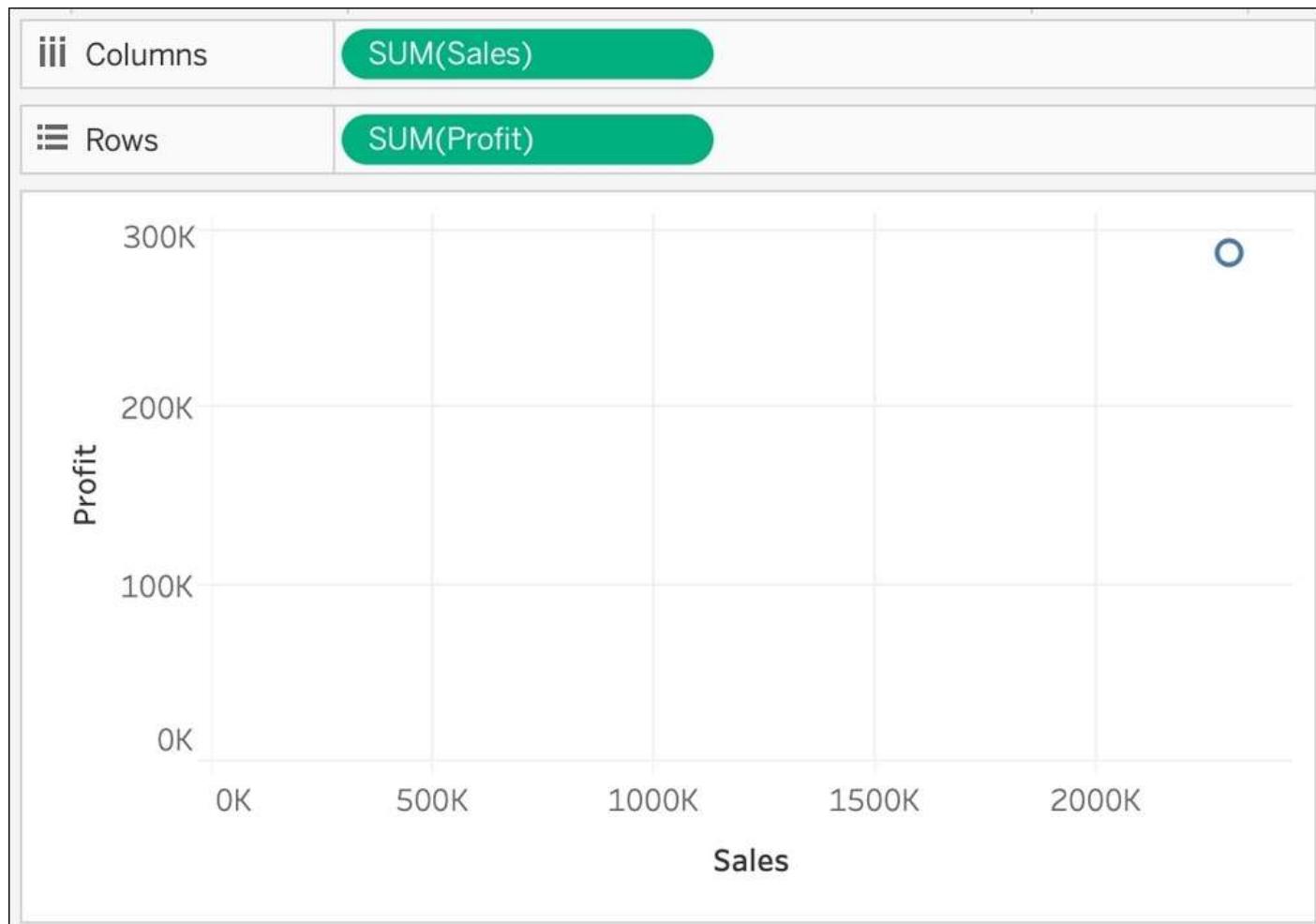
Sales and profit analysis

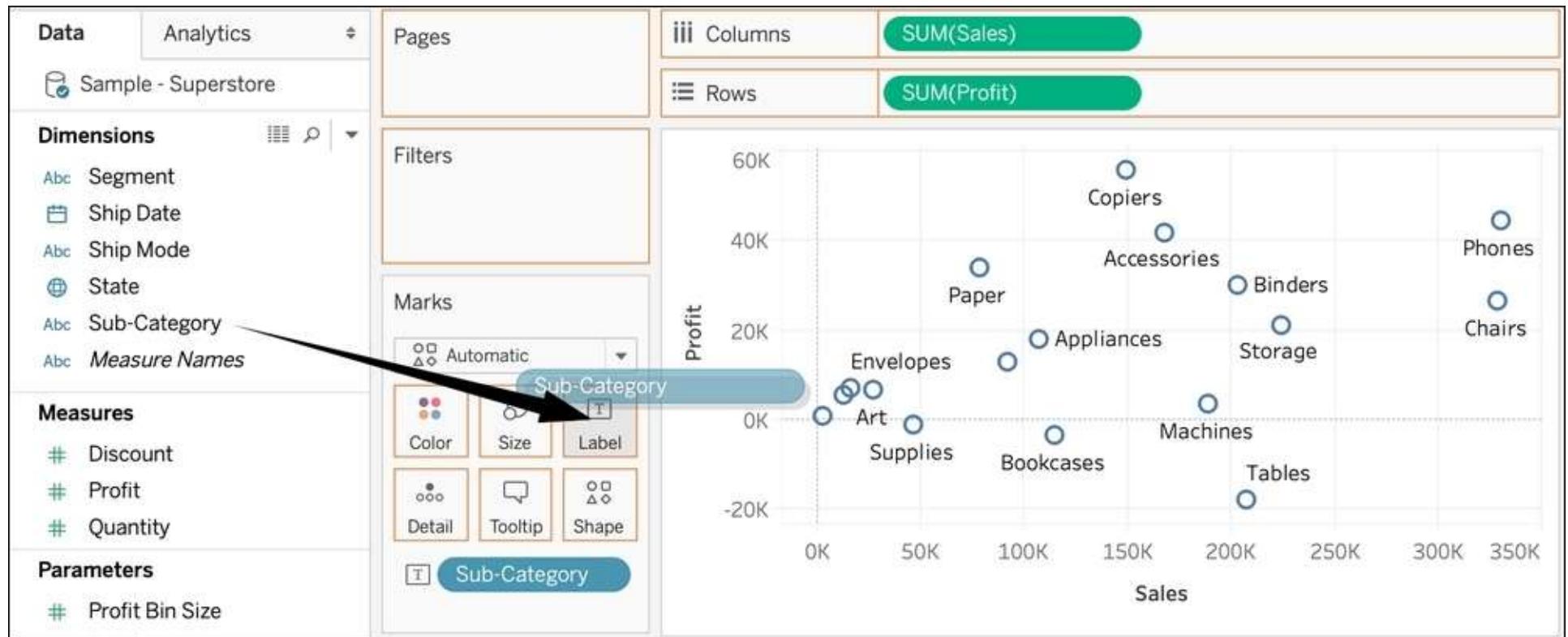
Profit by State



Using Tableau for data exploration

- Tableau can be used to answer business questions easily and visually.
- In this section, we'll explore our data in order to find insights.
- For this example, we will use the Sample - Superstore dataset again.
- If you are starting here, please refer to the preceding section, Connecting to data section.
- If you're continuing from the previous exercise, create a new Worksheet.



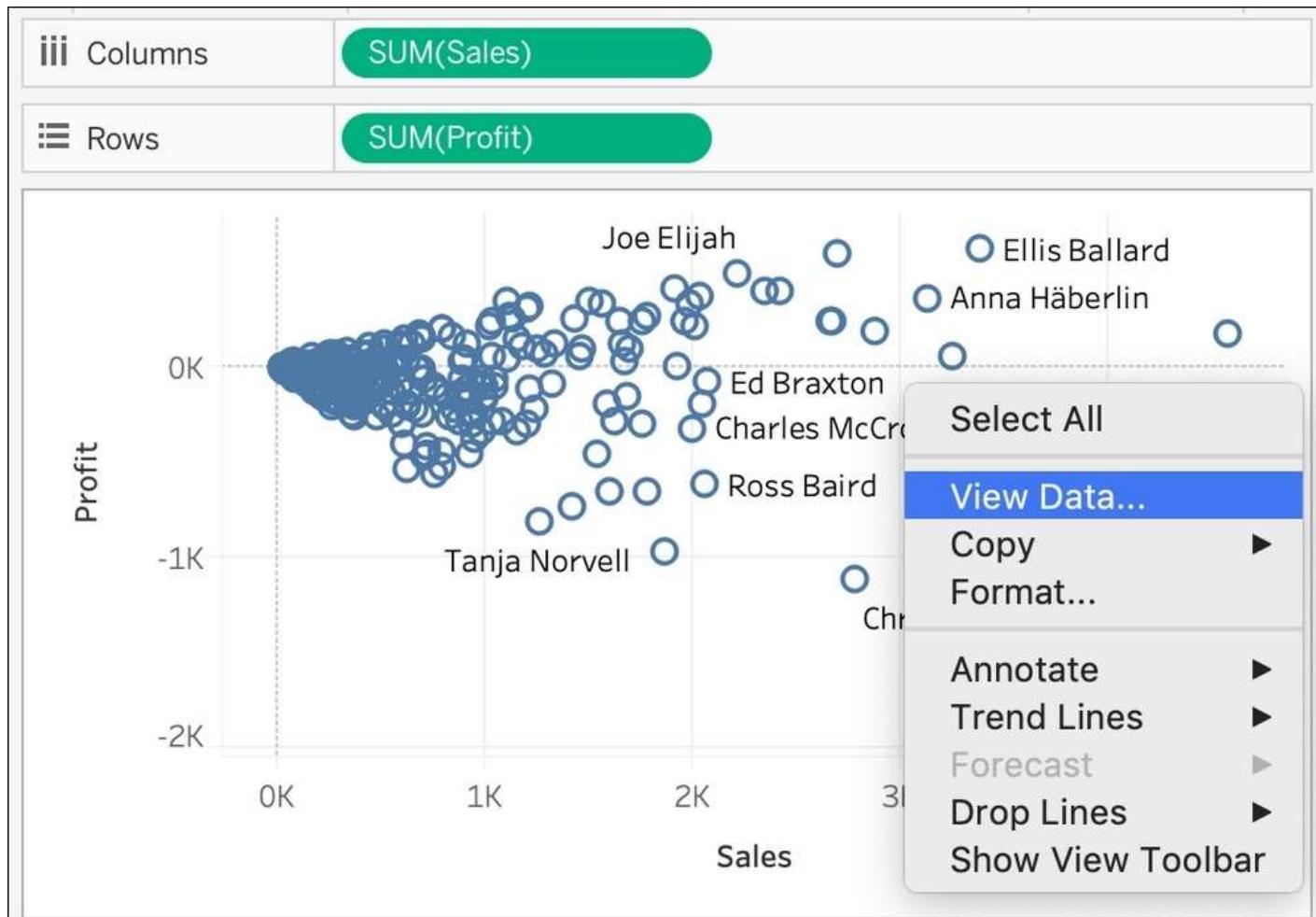


- Click on Tables Mark and select Keep Only, as demonstrated in the following screenshot:



- Drag and drop Customer Name over Sub-Category to replace it, as follows:





- This opens a new window with, on the first tab, a Summary table, and on the second tab, Full Data, which contains all the columns and rows used by Tableau to generate the visualization:

319 Show aliases Show all fields

Category	City	Country	Customer ID	Customer Name	Order Date	Order ID	Postal Code	Product ID	Product Name
Furniture	Fort Lauderdale	United States	SO-20335	Sean O'Donnell	11/10/2016	US-2016-108966	33311	FUR-TA-10000577	Bretford CR4500
Furniture	Los Angeles	United States	BH-11710	Brosina Hoffman	09/06/2015	CA-2015-115812	90032	FUR-TA-10001539	Chromcraft Recta
Furniture	Orem	United States	EB-13870	Emily Burns	25/09/2016	CA-2016-106320	84057	FUR-TA-10000577	Bretford CR4500
Furniture	Seattle	United States	DK-13090	Dave Kipp	02/03/2016	CA-2016-110457	98103	FUR-TA-10001768	Hon Racetrack Ci
Furniture	Bloomington	United States	PF-19165	Philip Fox	20/09/2015	US-2015-134614	61701	FUR-TA-10004534	Bevis 44 x 96 Co
Furniture	Denver	United States	BS-11755	Bruce Stewart	03/08/2015	CA-2015-133690	80219	FUR-TA-10004289	BoxOffice By Des
Furniture	Detroit	United States	DS-13180	David Smith	09/08/2016	CA-2016-163055	48227	FUR-TA-10003748	Bevis 36 x 72 Co
Furniture	Tampa	United States	CS-12400	Christopher Schild	07/04/2018	US-2018-100930	33614	FUR-TA-10001705	Bush Advantage
Furniture	Tampa	United States	CS-12400	Christopher Schild	07/04/2018	US-2018-100930	33614	FUR-TA-10003473	Bretford Rectang
Customer	GL-10001	United States	KL-16645	Karen Landra	04/06/2017	CA-2017-157740	60610	FUR-TA-10002607	KL Conference T

Summary Full Data 319 rows

Summary

- This lesson was your first concrete introduction to Tableau.
- I hope you enjoyed it! In this guided tutorial, you learned how to connect to an Excel file and create three Worksheets using a bar chart, a line chart, and a map.
- Then, you learned how to build a Dashboard and made it interactive. Finally, you explored the data to visually answer business questions.

Section 2: Connecting, Building, and Sharing



Connecting, Building, and Sharing

- This section will give you an insight into how to connect Tableau to the dataset. We'll start by explaining the different connectors and some specificities.
- You will be provided with a clear description of Tableau's connections and their capabilities. The second part will demonstrate how to join data.
- You will understand how to create a key to connect two (or more) tables, and will also learn the differences between inner, left, right, and full joins.

Connecting, Building, and Sharing

This section will include the following lessons:

- lesson 4, Connecting to Data and Simple Transformations
- lesson 5, Building an Efficient Data Source
- lesson 6, Designing Insightful Visualizations
- lesson 7, Powerful Dashboard Stories and Actions
- lesson 8, Publishing and Interacting in Tableau Server

4. Connecting to Data and Simple Transformations



Connecting to Data and Simple Transformations

In this lesson, we'll cover the most important options that Tableau offers when connecting to data, along with the following:

- Data connections
- Join data easily
- Union your data
- Simple transformations

Connecting, Building, and Sharing

To harmonize all the different terms used between the various data providers, we'll use the following terms through the lesson:

- A dataset represents any source of data. It is where your data is located. It could be an Excel file, a database on a server, or a file on the cloud. This is what you want to connect to Tableau.
- Tables represent, no matter the connection, a sheet in Excel or a table in a database.
- Data Source represents the result of your connection after all the transformations.

Data connections

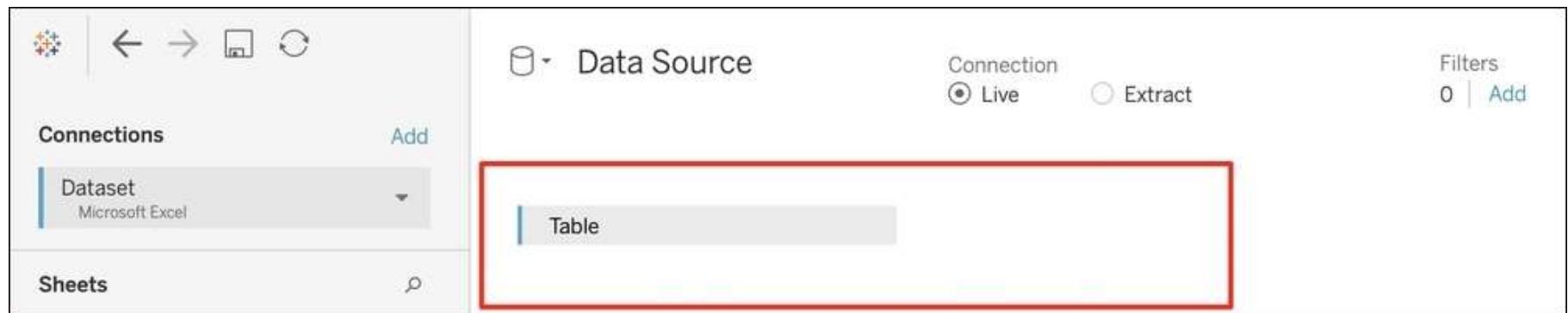
General rules

In this section, we'll see the general rules and options when connecting to a dataset. Of course, with more than 50 different connectors available, it's impossible to look at each in detail. However, the goals when connecting to a dataset in Tableau are always the same:

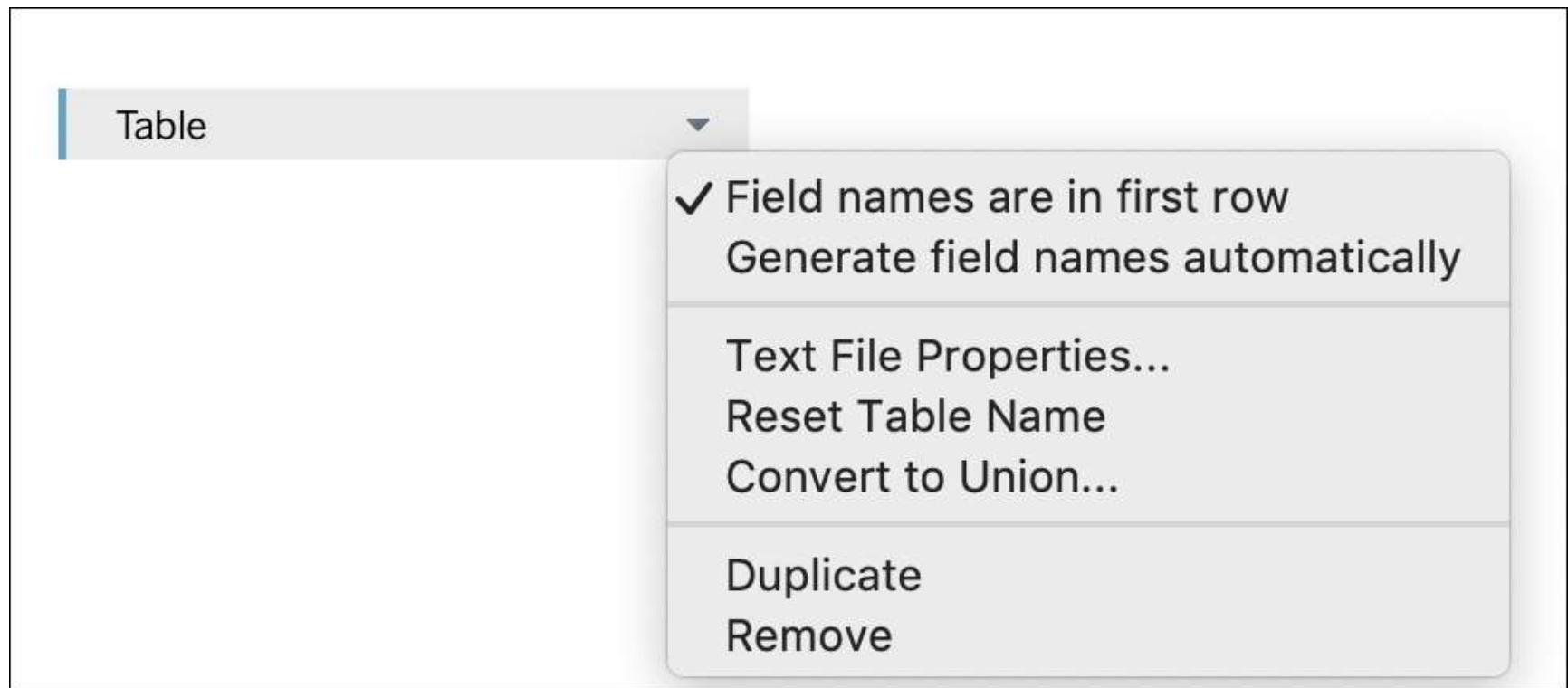
- Choose your connection (file/server).
- Connect to the dataset by selecting the file or entering the login information.

Connecting, Building, and Sharing

- Reach the Data Source workplace and have at least one table in the area highlighted in the screenshot:



Connecting, Building, and Sharing



Connecting, Building, and Sharing

- When you are connected to a server such as Redshift, SQL Server, or MySQL, you need to select the database first before getting access to the tables:

The screenshot shows the 'Connections' section of the Tableau interface. A connection named 'GettingStartedWithTableau' (Amazon Redshift) is selected, indicated by a blue vertical bar on the left and a grey background. At the top right, there is a green 'Add' button. Below the connections, there are three sections: 'Database' containing 'mydatabase', 'Schema' containing 'public', and a dropdown arrow icon.

Connecting spatial files

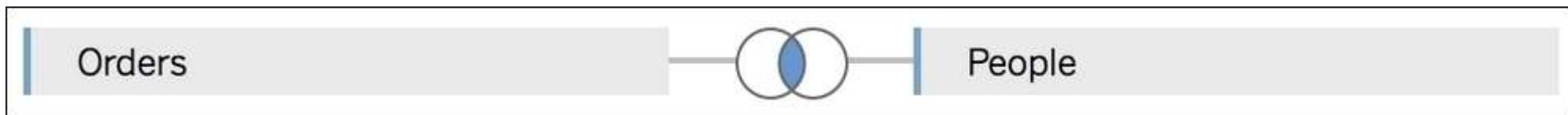
- Tableau offers the possibility to connect to spatial files to display custom maps.
- You can use this feature to create maps with your specific territories or to add new and interesting layers of information.
- When you connect to a spatial file, a special field, Geometry, is available in your data source.
- On a Worksheet, simply double-click on that field to display your custom territories.



Join data easily

The join principle

- So far, we've only used one table.
- A join is automatically created when you drag and drop another table next to an existing one in the data source workplace.
- There is always a left-hand table and a right-hand table.
- In the following screenshot, you can see a join between Orders (the left-hand table), and People (the right-hand table):



Join data easily

The screenshot shows a data grid interface with the following features:

- Toolbar buttons: Sort fields, Data source ord (with a dropdown arrow), Show aliases, Show hidden file..., and a row limit of 1 000 rows.
- Table structure:

# Orders	# Orders	# Orders	# Orders	Abc People	Abc People
Sales	Quantity	Discount	Profit	Person	Region (People)
261.96	2	0.000000	41.91	Cassandra Brandow	South
731.94	3	0.000000	219.58	Cassandra Brandow	South

The data grid displays two rows of joined data from the Sales and People tables. The first row corresponds to a Sales record with ID 261.96, showing a quantity of 2, a discount of 0.000000, and a profit of 41.91. It is associated with the Person 'Cassandra Brandow' and the Region 'South'. The second row corresponds to a Sales record with ID 731.94, showing a quantity of 3, a discount of 0.000000, and a profit of 219.58. It is also associated with the Person 'Cassandra Brandow' and the Region 'South'.

Join requirements and types

- To create a join between two tables, you need at least one column in each table that contains the same values.
- These common columns create the link between the two tables.

Product

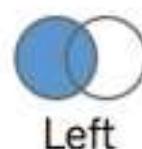


Sales

Join



Inner



Left



Right



Full Outer

Data Source

Enter search text

=

Sales

Product ID (Sal...)



Product ID

Product Name

Create Join Calculation...

Join requirements and types

- Inner Join: Join requirements and types(default): Keeps only the lines where the values match in both tables.
- Left Join: Join requirements and types: Keeps all the lines from the left-hand table and adds the information from the right table if the values match. If the values don't match, Tableau puts null in the columns coming from the right-hand table.

Join requirements and types

- Right Join: Join requirements and types: Keeps all the lines from the right-hand table and adds the information from the left-hand table if the values match. If the values don't match, Tableau puts null in the columns coming from the left-hand table.
- Full Outer: Join requirements and types: Keeps all the lines from the two tables. If the values don't match, Tableau enters null.

Hands-on with a simple join

In this section we'll create a join between the Orders and People tables from Sample – Superstore. Before we start, let's look at what those tables contain:

- Orders is the main table (the left-hand one). We already used it in lesson 3, Getting Started with Tableau Desktop, and this contains the profit.
- People is a table that contains only four lines and two columns. It associates a region with a person.

Join requirements and types

Open a new Tableau file and follow these instructions:

- Select Microsoft Excel in the list of available connections and connect to the Sample-Superstore Excel file in your Tableau repository (use the Connecting to data section from lesson 3, Getting Started with Tableau Desktop, if you don't remember the file's location).
- In the Data Source workspace, drag and drop the Orders table.

Join requirements and types

- Drag and drop the People table next to Orders, as shown in the following screenshot:

The screenshot shows a data modeling interface with a sidebar on the left and a main workspace on the right.

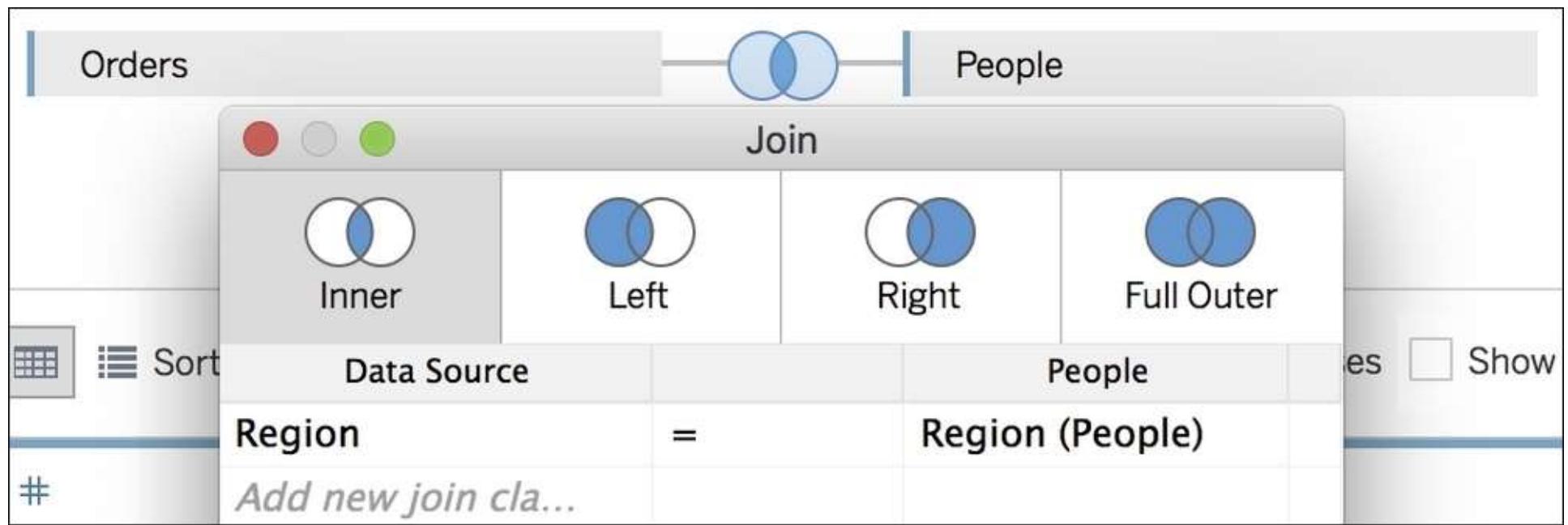
Connections: A 'Dataset Microsoft Excel' connection is selected.

Sheets: The 'Orders' sheet is currently selected. A large black arrow points from the 'People' sheet in the sidebar towards the 'Orders' sheet in the main workspace.

Main Workspace:

- Tables:** 'Orders' and 'People' are listed.
- Filter:** 'Data source order' is set to 'Sort fields'.
- Fields:** The 'Orders' table has columns: Category (Abc), Sub-Category (Abc), Product Name (Abc), Sales (#), Quantity (#), and Discount (#). The 'People' table has columns: Orders (Category), Orders (Sub-Category), Orders (Product Name), Orders (Sales), Orders (Quantity), and Orders (Discount).
- Buttons:** 'Sort fields', 'Data source order' dropdown, 'Show aliases', 'Show hidden fields', and a '1 000' button.

Join requirements and types



Join requirements and types

# Orders Discount	# Orders Profit	Abc People Person	Abc People Region (People)
0.000000	41.91	Cassandra Brandom	South
0.000000	219.58	Cassandra Brandom	South
0.000000	6.87	Anna Andreadi	West

Join risks

- The Data duplication example Excel file contains two sheets: Sales and Product.Sales contains the following data:

Product ID	Sales
1	100
2	100
3	100

Join risks

Product ID	Product Name
1	Shield
2	Bow
3	Fire arrow
3	Ice arrow

- Now, let's join the two tables on the Product ID columns and see what happens. Here's the result in Tableau:

# Product	# Sales	Abc Product	# Sales
Product ID	Product ID (Sales)	Product Name	Sales
1	1	Shield	100
2	2	Bow	100
3	3	Fire arrow	100
3	3	Ice arrow	100

Join risks

When you join tables, be sure that the values you want to analyze won't be duplicated. There are three solutions to dealing with data duplication:

- The easiest solution: Clean the file to remove the duplication.
- In the example, it means changing the ID of a product to 4.
- Use data blending—this is explained in lesson 11, Advanced Data Connections.
- Use Level of Detail (LOD) calculation functions—this is explained in lesson 9, An Introduction to Calculations.

Union your data

If a join adds columns, a union adds rows.

- Unions are useful when you have two (or more) tables with an identical structure (the same columns) that you want to combine to create a unique data source.
- A typical use case is when you have a dataset that contains one table per year, and you need to compare those years.

Hands-on with a union example

The Union example Excel file contains two sheets:

- One named 2017, which contains the data shown in the following screenshot:

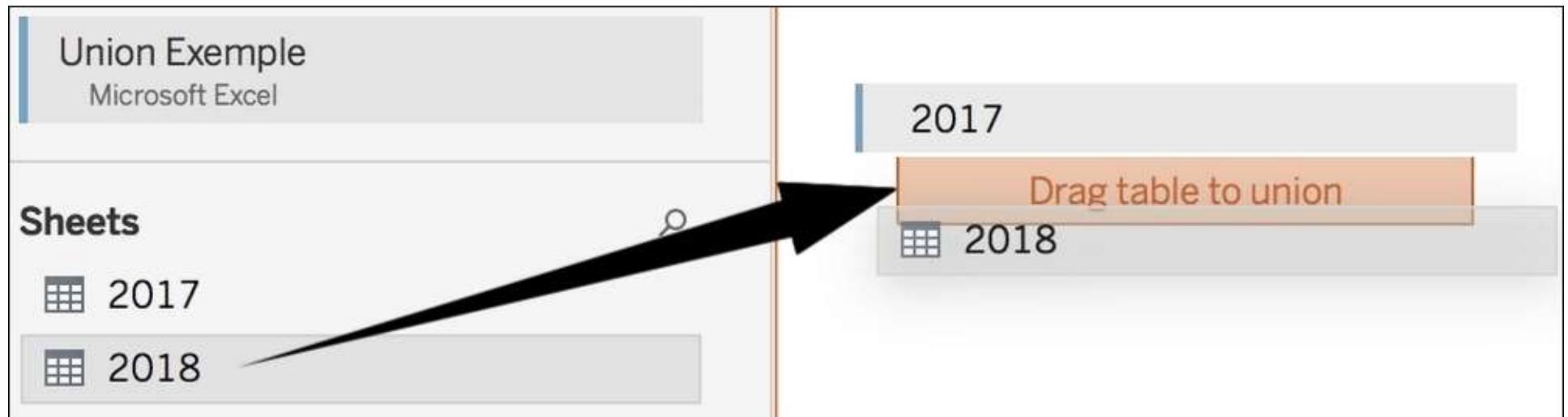
Value	Country
310	United States
120	France
100	Spain

Union your data

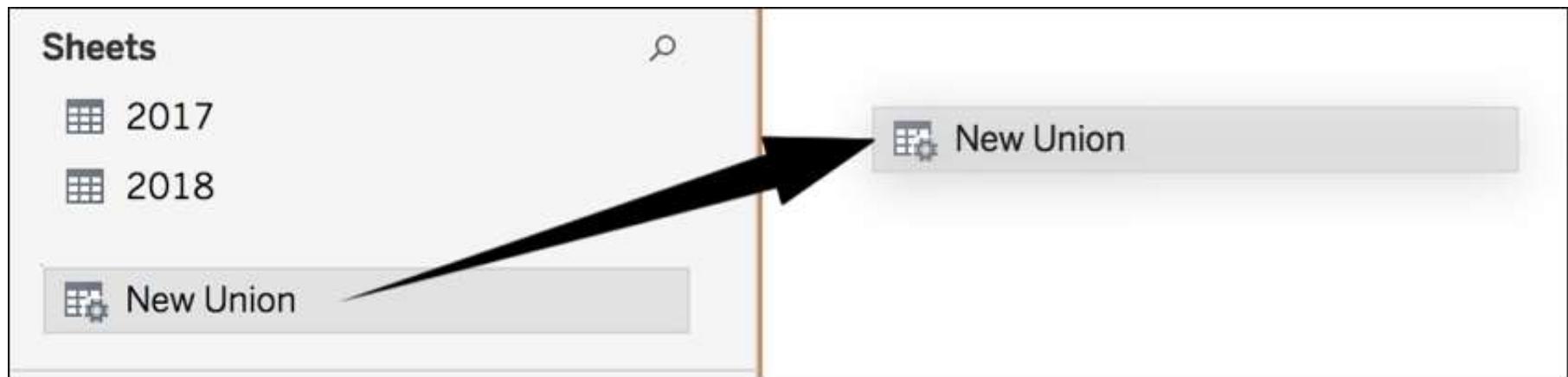
- One named 2018, with the data shown in the following screenshot:

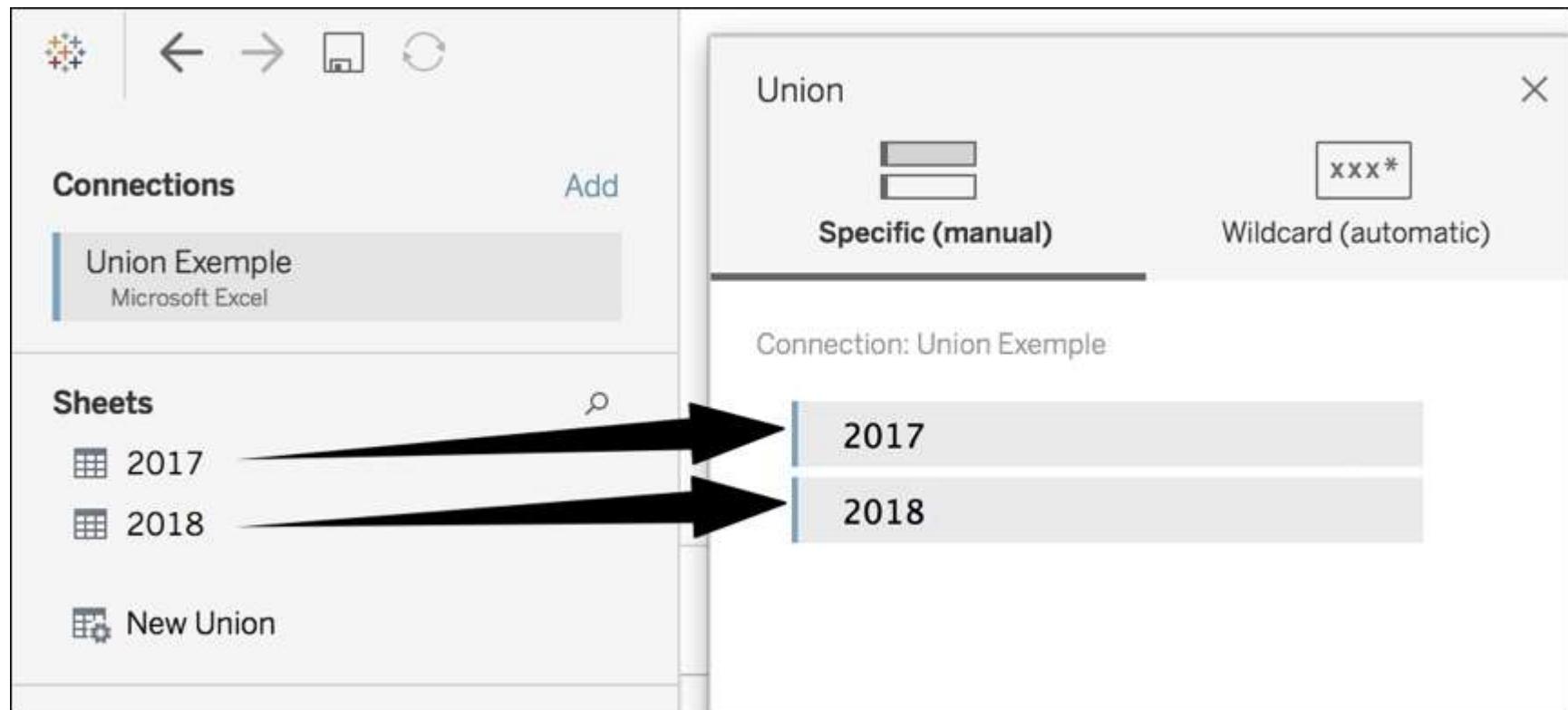
Value	Country
130	United States
60	France
940	Spain

Union your data



Union your data





Union Value	Union Country	Union Sheet	Union Table Name
310	United States	2017	2017
120	France	2017	2017
100	Spain	2017	2017
130	United States	2018	2018
60	France	2018	2018
940	Spain	2018	2018

Simple transformations

- Tableau is not a data preparation tool. It's always better to have a clean file to start with. However, Tableau offers some simple transformation tools.
- When you connect to a dataset, you can, for example, use the Data Interpreter, split a column into multiple columns, or pivot your data. Let's see a case for these transformations.

Simple transformations

- For this section, I created a dataset to clean in Excel, as illustrated here:

Country and City	Year			
	2015	2016	2017	2018
Kenya/Nairobi	74271	13190	40746	22826
Brazil/Rio	52579	17388	30067	1849
United States/Denver	21691	7765	44720	3394
Germany/Berlin	47946	43622	19961	2537
Japan/Tokyo	5072	49598	29861	33979
Finland/Helsinki	59153	80023	61742	65594
Russia/Moscow	22697	38769	21267	12695
Norway/Oslo	61135	20984	42127	28246

Simple transformations

Three things are problematic with this dataset:

- There is a column header for the years
- The countries and the cities are in the same column
- Each year is in a different column, preventing the creation of a simple line chart

- Open Tableau, select Microsoft Excel in the list of connectors, and select the Dataset to clean Excel file.
- Tableau automatically puts the unique sheet, Sales, in the Data pane, but, as you can see in the preview, the connection needs cleansing:

Abc	#	#	#	#
Sales	Sales	Sales	Sales	Sales
F1	Year	F3	F4	F5
Country and City	2015	2,016	2,017	2,018
Kenya/Nairobi	74271	13,190	40,746	22,826

Connections	Add																				
Dataset-to-clean																					
Microsoft Excel																					
Sheets																					
<input checked="" type="checkbox"/> Cleaned with Data Interpreter																					
Review the results. (To undo changes, clear the check box.)																					
 Sales	 Sort fields  Data source order																				
 New Union	<table border="1"> <thead> <tr> <th> Sales Country and City</th> <th># Sales Year 2015</th> <th># Sales Year 2016</th> <th># Sales Year 2017</th> <th># Sales Year 2018</th> </tr> </thead> <tbody> <tr> <td>Kenya/Nairobi</td><td>74,271</td><td>13,190</td><td>40,746</td><td>22,826</td></tr> <tr> <td>Brazil/Rio</td><td>52,579</td><td>17,388</td><td>30,067</td><td>1,849</td></tr> <tr> <td>United States/Denver</td><td>21,691</td><td>7,765</td><td>44,720</td><td>3,394</td></tr> </tbody> </table>	 Sales Country and City	# Sales Year 2015	# Sales Year 2016	# Sales Year 2017	# Sales Year 2018	Kenya/Nairobi	74,271	13,190	40,746	22,826	Brazil/Rio	52,579	17,388	30,067	1,849	United States/Denver	21,691	7,765	44,720	3,394
 Sales Country and City	# Sales Year 2015	# Sales Year 2016	# Sales Year 2017	# Sales Year 2018																	
Kenya/Nairobi	74,271	13,190	40,746	22,826																	
Brazil/Rio	52,579	17,388	30,067	1,849																	
United States/Denver	21,691	7,765	44,720	3,394																	

Splitting a column

- Right-click on the Country and City column and click on Split.
- Tableau automatically recognizes that there is a common character and uses it to split the column into two new ones, Country and City–Split 1, and Country and City–Split 2.
- Right-click on the new columns and select Rename. Rename the first one Country, and the second one City.

- The result is displayed in the following table:

 Sales Country and City	 Calculation Country	 Calculation City
Kenya/Nairobi	Kenya	Nairobi
Brazil/Rio	Brazil	Rio
United States/Denver	United States	Denver
Germany/Berlin	Germany	Berlin
Japan/Tokyo	Japan	Tokyo

To do this, follow these steps:

- Select all the year columns to pivot (click on them while pressing Ctrl (Windows) or command (macOS)).
- Right-click on one of the highlighted columns and select Pivot, as highlighted here:

# Sales Year 2015	# Sales Year 2016	# Sales Year 2017	# Sales Year 2018
74,271	13,190	40,746	
52,579	17,388	30,067	
21,691	7,765	44,720	
47,946	43,622	19,961	
5,072	49,598	29,861	



The screenshot shows a table of sales data for four years: 2015, 2016, 2017, and 2018. The 2018 column has a context menu open, with the 'Pivot' option highlighted in blue.

# Sales Year 2015	# Sales Year 2016	# Sales Year 2017	# Sales Year 2018
74,271	13,190	40,746	
52,579	17,388	30,067	
21,691	7,765	44,720	
47,946	43,622	19,961	
5,072	49,598	29,861	

The Data Interpreter

The result of the pivot is two columns:

- One Dimension: Pivot Field Names
- One Measure: Pivot Field Values

 Pivot	 Pivot	 Sales	 Calculation	 Calculation
Year	Value	Country and City	Country	City
01/01/2015	74,271	Kenya/Nairobi	Kenya	Nairobi
01/01/2015	52,579	Brazil/Rio	Brazil	Rio
01/01/2015	21,691	United States/Denver	United States	Denver
01/01/2015	47,946	Germany/Berlin	Germany	Berlin

Summary

- We have finished our first lesson about data connections.
- We looked at how to connect to different sorts of datasets and use some features, such as join, union, and some data transformations.
- Later in the course, you'll learn other useful and powerful data transformation features.
- Now that you are connected to the data, you have a data source.



5. Building an Efficient Data Source



Building an Efficient Data Source

In this lesson, you'll learn how to build the best possible engine for your analysis. We will cover the following topics:

- Understanding the data source
- Refreshing a data source and dealing with changes
- Field customization and default properties
- Hierarchies
- Groups, sets, and bins

Understanding the data source

- The data source is the result of all your work when connecting to a dataset (such as joins, unions, and transformations), and all the customizations that you can apply afterward.
- The goal for your data source is to be as performant, simple, and easy-to-use as possible.

Data types in Tableau

Each field has a data type. There are seven data types in Tableau, as follows:

- Text (Data types in Tableau), which is also called a string
- Number, decimal, or whole (Data types in Tableau)—these data types all share the same icon.
- Date (Data types in Tableau)
- Date and time (Data types in Tableau)
- Boolean (Data types in Tableau)—this value will either be true or false
- Geographic values (Data types in Tableau)

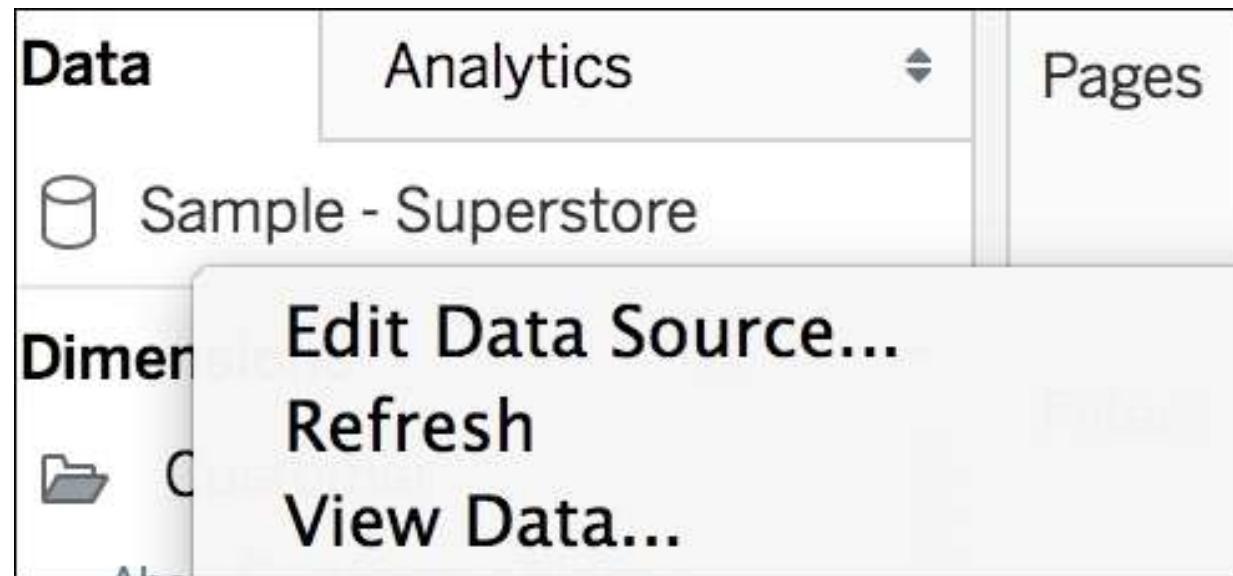
Generated information

Every data source can have up to five generated pieces of information:

- **Number of records:** You can use this to find out how many lines are analyzed.
- **Latitude (generated) and Longitude (generated):** You'll find this information if you have a geographical field in your data source. They are used to create maps.
- **Measure Names and Measure Values:** The first one contains the name of each measure, and the second one contains the values of each measure. They must be combined and you can use them to display multiple Measures at the same time.

Data source options

- All the data source options are available by right-clicking on the name in the top-left corner of the screen:

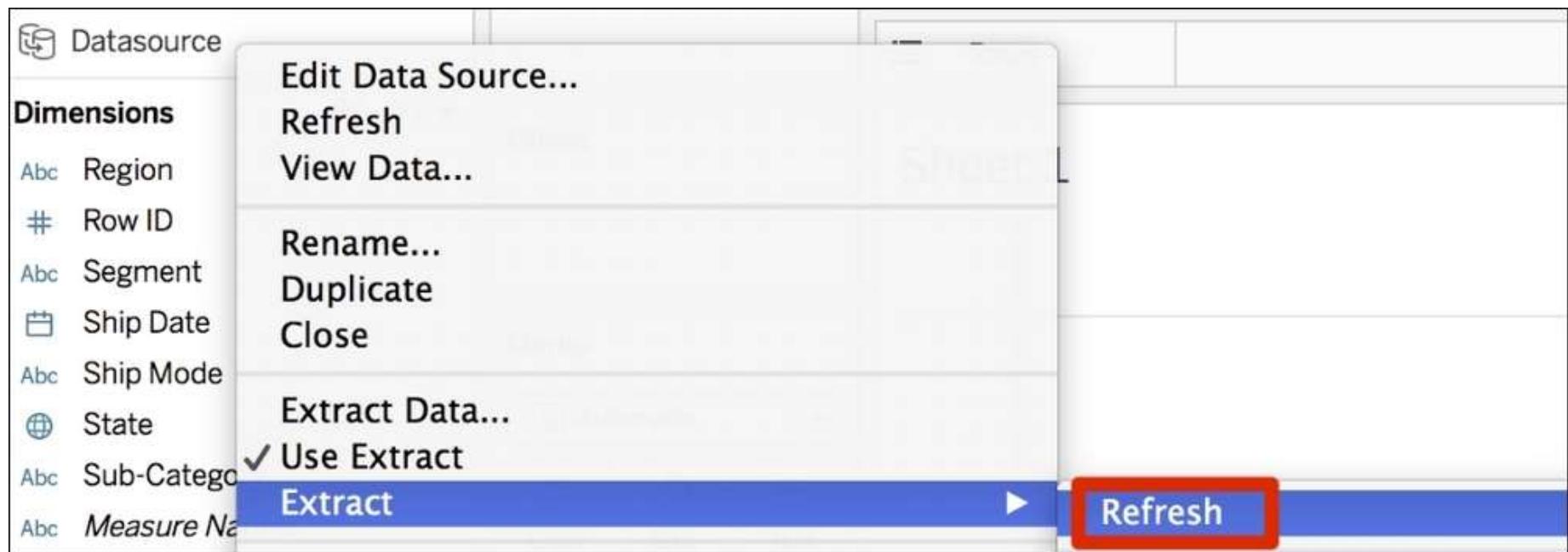


Refreshing a data source and dealing with changes

How to refresh a data source

- Refreshing a data source is simple for both Live and Extract data sources.
- For a Live connection, right-click on the data source and click on Refresh—that's it!
- For an Extract, clicking on Refresh won't work because the extracted data (in the hyper file) hasn't changed.
- Remember that when you create an Extract, you create a copy of your dataset.

Refreshing a data source and dealing with changes



Dealing with changes

- A new column is added to the dataset: If there is a new column in the dataset, then you'll see a new field in the data source. In this case, you don't have to do anything.
- An unused field is removed or renamed: If there is an unused field in your data source that is deleted or renamed from the dataset, you won't even notice it. It'll simply be suppressed or renamed.
- The third and last case, when a field that you use in Tableau is deleted or renamed in the dataset, is a bit more problematic.

Dealing with changes

The screenshot shows the Tableau interface with the following components:

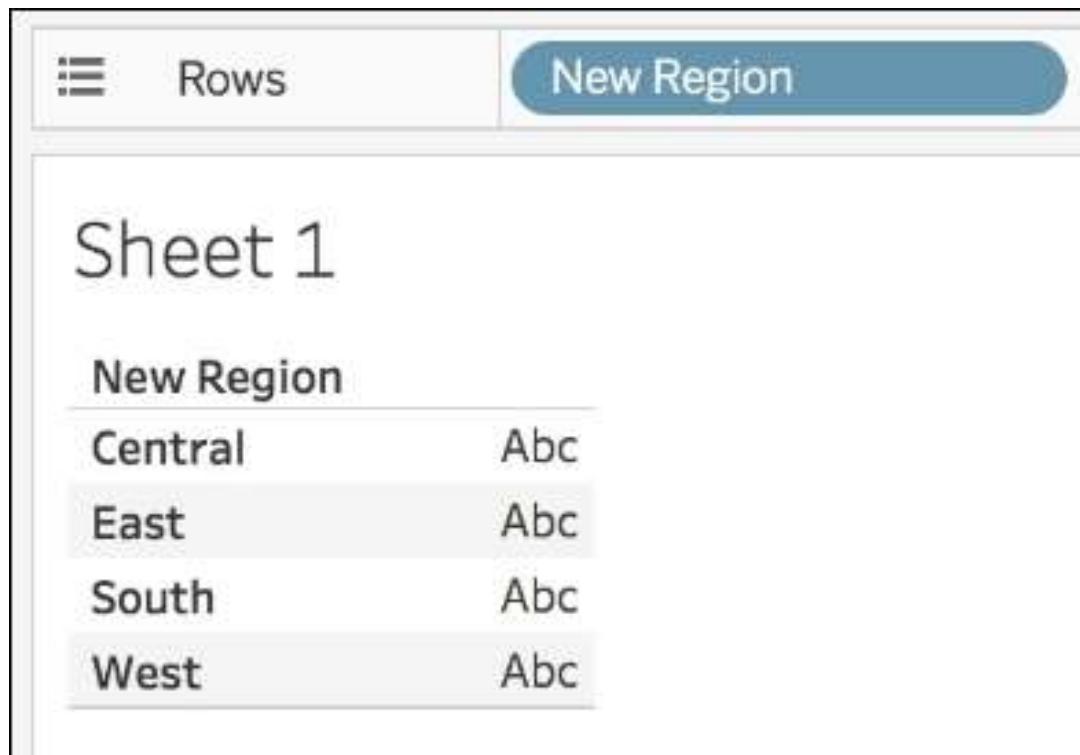
- Datasource:** A sidebar listing dimensions: Customer Name, New Region, Order Date, Order ID, Postal Code, Product ID, Product Name, Region, and Row ID.
- Sheet 1:** A view showing a list of regions: Central, East, South, and West, each associated with the value "Abc".
- Rows:** A tab bar at the top right, with the "Region" tab selected.
- Filters:** A panel containing a single filter entry.
- Marks:** A panel showing settings for automatic marks, with options for Color, Size, and Text.

Dealing with changes

- In order to correct the error, I can right-click on the Region field and select Replace References...:



Dealing with changes



The screenshot shows a software interface with a toolbar at the top. The 'Rows' button is selected, indicated by a blue background. A button labeled 'New Region' is also visible. Below the toolbar, the title 'Sheet 1' is displayed. Underneath the title, there is a section header 'New Region' followed by a horizontal line. Below this line is a table with four rows. The first row contains 'Central' in the left column and 'Abc' in the right column. The second row contains 'East' in the left column and 'Abc' in the right column. The third row contains 'South' in the left column and 'Abc' in the right column. The fourth row contains 'West' in the left column and 'Abc' in the right column.

New Region	
Central	Abc
East	Abc
South	Abc
West	Abc

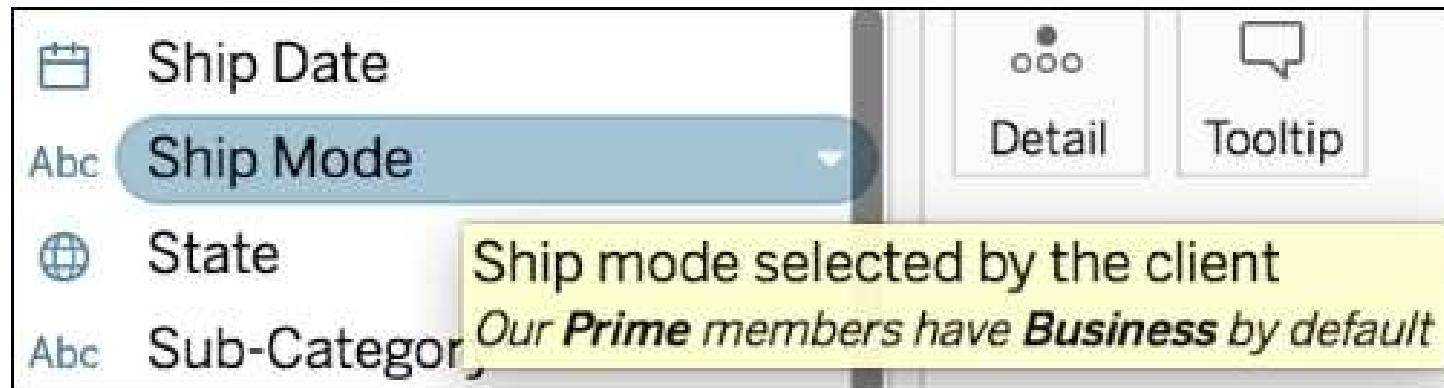
All the field customization options are available with a right-click on any field. There are some straightforward options, so let's take a look at a short description of those that aren't trivial:

- Hide: This hides the field but doesn't suppress it. It's a great way to clean your data source if there are many fields that you won't use. The option is only available if the field is never used. You can show the hidden field by clicking on the arrow next to Dimension and selecting Show Hidden Fields.
- Delete: This suppresses custom fields (such as Bins, Sets, or Parameters) from the data source.
- Aliases...: This allows you to rename the values of a Dimension. It opens a new window with the list of the values and a column to specify the alias.

- Create: This opens a submenu where you can create new fields. All the different options will be examined in detail in this course.
- Convert to Discrete or Convert to Continuous: This only applies to numbers and allows you to switch from a Continuous field to a Discrete field or vice versa.
- Convert to Dimension or Convert to Measure: This allows you to switch from a Measure to a Dimension or vice versa. If you try to convert anything other than a number from a Dimension to a Measure, then an aggregation is automatically applied.

Default properties

- Comment... adds a comment to a field that appears when you hover over it with your mouse; consider the following example:



Number (Custom)

Automatic

Number (Standard)

Number (Custom)

Currency (Standard)

Currency (Custom)

Scientific

Percentage

Custom

Decimal places:

2

Negative values:

-1234

Display Units:

None

Prefix / Suffix:

Include thousands separators

Hierarchies

- Hierarchies are quite special. A hierarchy is a group of multiple dimensions.
- However, a hierarchy doesn't just affect the data source, but also the visualization and the way the users can interact with it.
- A hierarchy creates a relationship between different dimensions, such as a parent-child relationship.
- The dedicated icon for Hierarchies is Hierarchies

Hierarchies

- Dates, for example, are a hierarchy. A day is included in a week, which is included in a month and a year.
- If you use a date in a Worksheet, then Tableau automatically selects the YEAR and shows a small + in the pill, on the left-side of its name.
- This means that the dimension is a parent in a hierarchy where there are children. This is illustrated in the following screenshot:

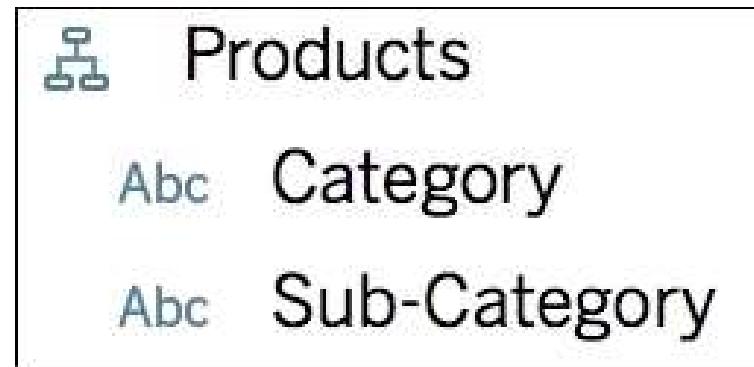


Hierarchies

- Select Category and Sub-Category.
- Right-click on one of the selected Dimensions and go to Hierarchy, and then click on Create Hierarchy....
- A new window opens asking for the name of the hierarchy; let's name it Products.

Hierarchies

- The hierarchy is created, and you should see a new icon in your Data pane, with the Category and Sub-Category fields under it.
- Your hierarchy should look similar to the following screenshot:



Hierarchies

- Let's add Product Name in the hierarchy, at the bottom.
- To do that, you can drag and drop the field under Sub-Category:





Rows



Category

Sheet 1

Category

Furniture 18,451

Office Supplies 122,491

Technology 145,455

Groups, sets, and bins

Groups, sets, and bins are synonyms, but they are fundamentally different in Tableau:

- Groups and sets are created from Dimensions. In comparison to this, bins are created from measures.
- Groups and bins are Dimensions, but sets are a different Tableau element (such as Dimensions and Measures).

Groups

- A group is a way to create a new dimension that gathers different values of another dimension.
- Additionally, a group is static; this means that you need to modify it manually.
- A group is characterized by the Groups icon.

Groups, sets, and bins

Let's start by creating a group, manually, with Sample - Superstore:

- Right-click on Sub-Category, go to Create, and then click on Group. A new window opens where you see the list of the values in that Dimension. In this menu, you can manage the groups.
- To create a new group of values, select some values and click on the Group button at the bottom (or with a right-click).

Field Name: Sub-Category (group)

Groups: Add to:

Bookcases
Chairs
Copiers
Envelopes
Fasteners
Furnishings
Labels
Machines
Paper
Phones
Storage
Supplies
Tables

Show Add Location

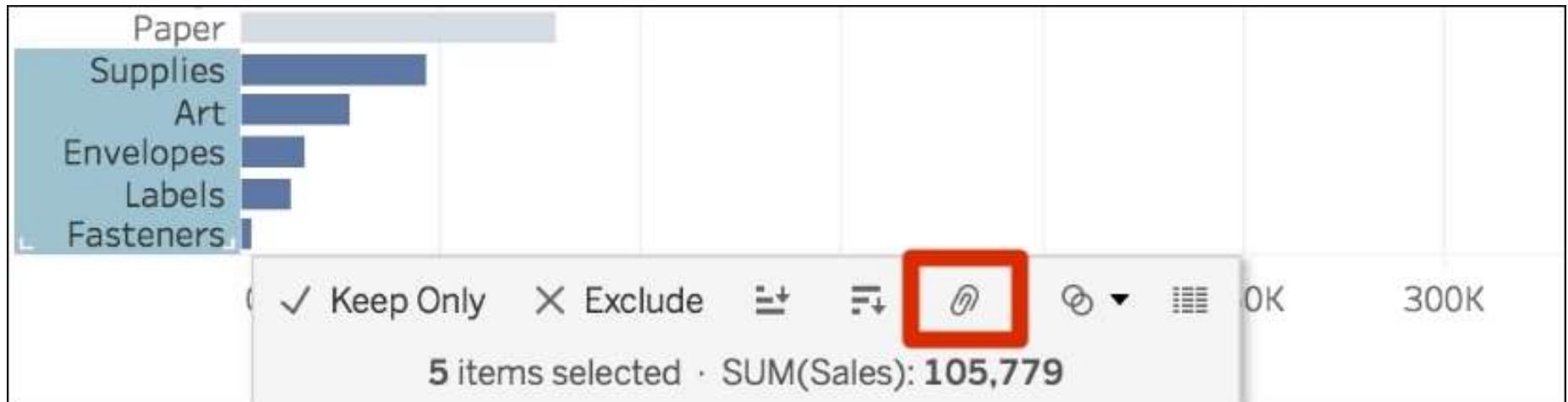
Include 'Other'

Groups, sets, and bins

If you have too many values and you want to group them, you can use the visual way. Let's demonstrate how to do this with Sample - Superstore:

- On a new Worksheet, double-click on Sales, and then double-click on Sub-Category to create a simple visualization.
- Use the button in the toolbar to swap (Groups) and sort (Groups) the values as descending. As you can see, there are some sub-categories with small sales. They are not important, so we will want to group them together.

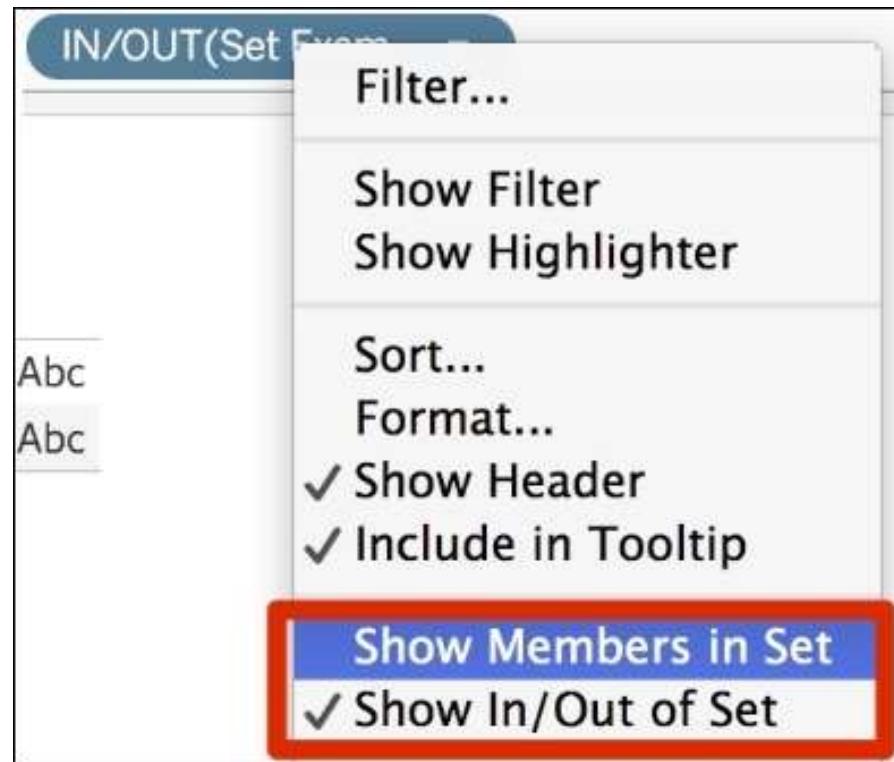
Groups, sets, and bins



Sets

- Sets are a Tableau element. A set is created from a Dimension. Unlike groups, sets are dynamic.
- With sets, the values are either In the set or Out.
- Sets have a special icon: Sets.

Groups, sets, and bins



Groups, sets, and bins

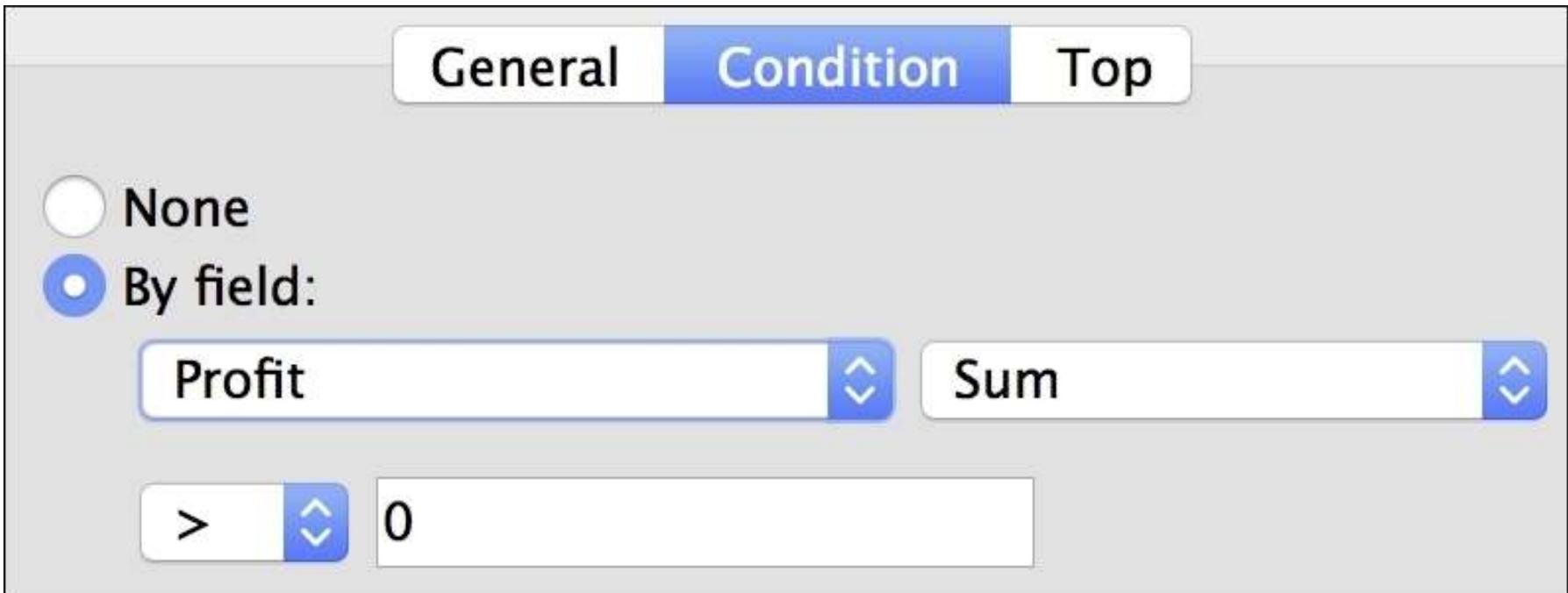
General Condition Top

None

By field:

Profit Sum

> 0



Groups, sets, and bins

So, let's create a concrete sets example using Sample - Superstore:

- On the Data pane, right-click on State, navigate to Create, and then click on Set.
- A new window opens; change the name of the set to Top 5 State by Profit.

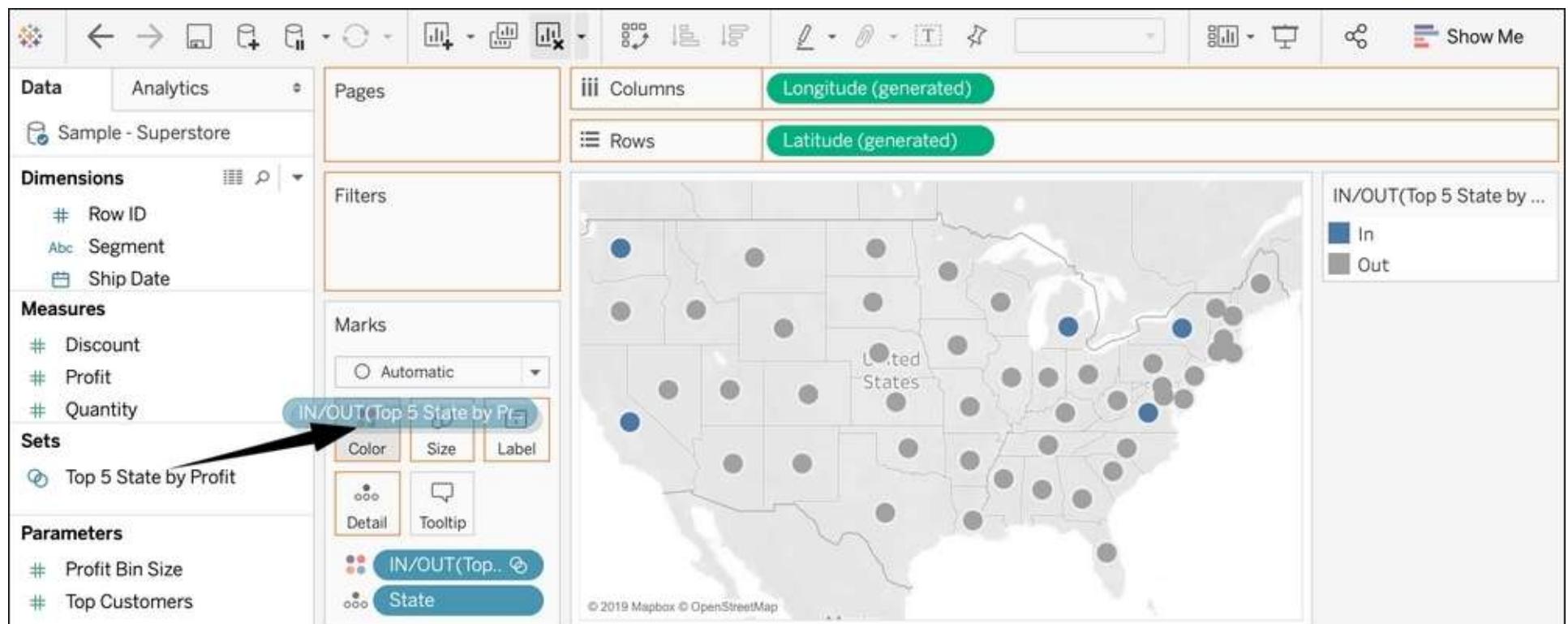
Groups, sets, and bins

The screenshot shows a software interface with a toolbar at the top containing three tabs: "General", "Condition", and "Top". The "Top" tab is currently selected, indicated by a blue background and white text. Below the toolbar, there are two radio button options: "None" and "By field:". The "By field:" option is selected, as indicated by a blue outline around its radio button. Underneath these options, there is a configuration area for grouping. It consists of three input fields: "Top" (with a dropdown arrow), "5" (the current count of items in the group), and "by" (a separator). Below this, there are two more input fields: "Profit" and "Sum", each with a dropdown arrow to their right.

Groups, sets, and bins

- Click on OK. You should see a new set element in your data source:





Bins

- A bin is a Dimension. Unlike groups and sets, bins are based on a Measure.
- The purpose of a bin is to group the different range of values of a Measure inside a bin.
- Bins have a special icon: Bins.



Summary

- So, you've made it! The data source has no more surprises for you (or maybe one or two that we'll see later!).
- In this lesson, you learned about the purpose of a data source, its options, how to refresh it, and how to deal with changes.
- Then, you learned how to customize a data source using the default properties. Finally, you created hierarchies, groups, sets, and bins.



6. Design Insightful Visualizations



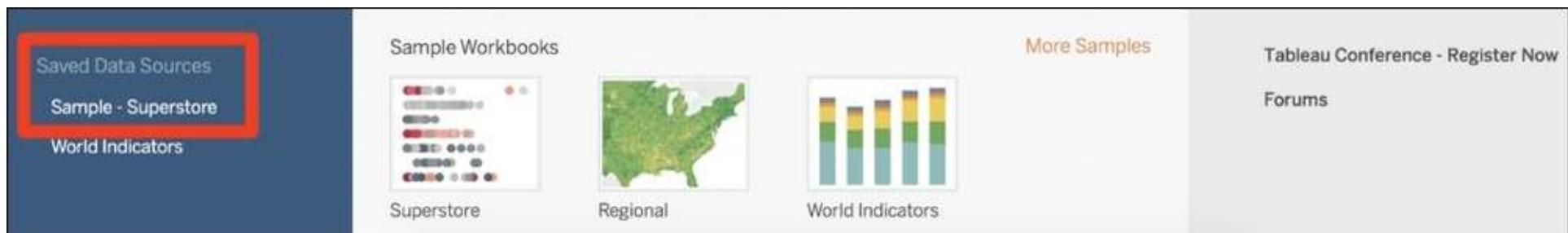
Groups, sets, and bins

Creating visualizations is the core of Tableau and there is a lot to say! In this lesson, we'll cover the following topics:

- Creating visualization
- Mark types
- Mark properties
- Using multiple measures
- Filters
- Pages
- Options and formats

Groups, sets, and bins

- In this lesson, we'll primarily use Tableau's Sample - Superstore saved data source for our examples.
- You can find it on the first page when you open Tableau, in the bottom-left of the screen:



Creating visualizations

- In Tableau, the only way to display a visualization is by adding fields in shelves.
- The different shelves are Rows, Columns, Marks, Filters, and Pages. When you use a field on a shelf, it becomes a pill.
- However, there are two very different ways of adding a field to a shelf: the automatic and the manual way.
- The automatic way is useful when you want to go fast or if you have no idea how to visualize your data.

Building a visualization, the automatic way

- There are two ways of allowing Tableau to do the job for you.
- The first method is one that you've used the most frequently in this course, that is, double-click.
- A simple double-click on a field automatically puts it in a shelf.

Double-click

- When you double-click on a field in your data source, it is automatically added to a shelf in the Worksheet.
- Tableau decides where the field should be, based on data visualization best practices.
- Of course, there are limitations to what you can do with double-clicks.

Show Me

- Show Me is a special menu that can be accessed on the top-right side of the toolbar.
- You can easily spot it by its icon: Show Me. When you click on this icon, you can open or close a list of twenty-four predefined visualizations.
- If no fields are selected in your data source, then all the options are grayed out.

Creating visualizations

Let's take a look at a quick example using Sample - Superstore:

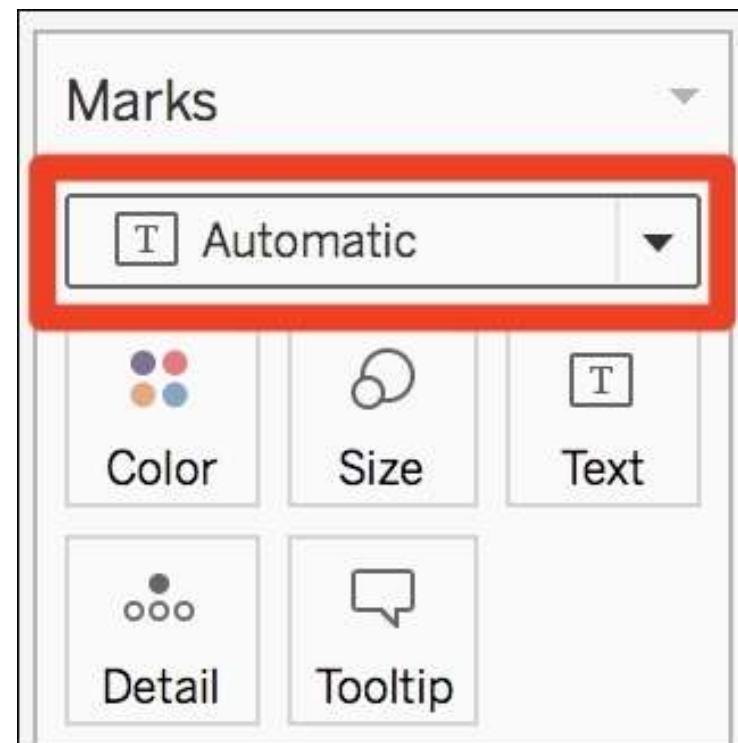
- Simultaneously select Order Date, Category, and Profit in the Data pane (using Ctrl or command).
- Open the Show Me menu.
- Click on some of the options to see different results.

Building a visualization, the manual way

- Put fields in Rows or Columns. If the pill is Discrete (blue), then you'll see a header. If the pill is Continuous (green), then you'll see an axis.
- Put fields in the Marks properties shelf (such as Color, Size, and Text).
- Add fields in Filters.
- Add fields in Pages.

The Mark type

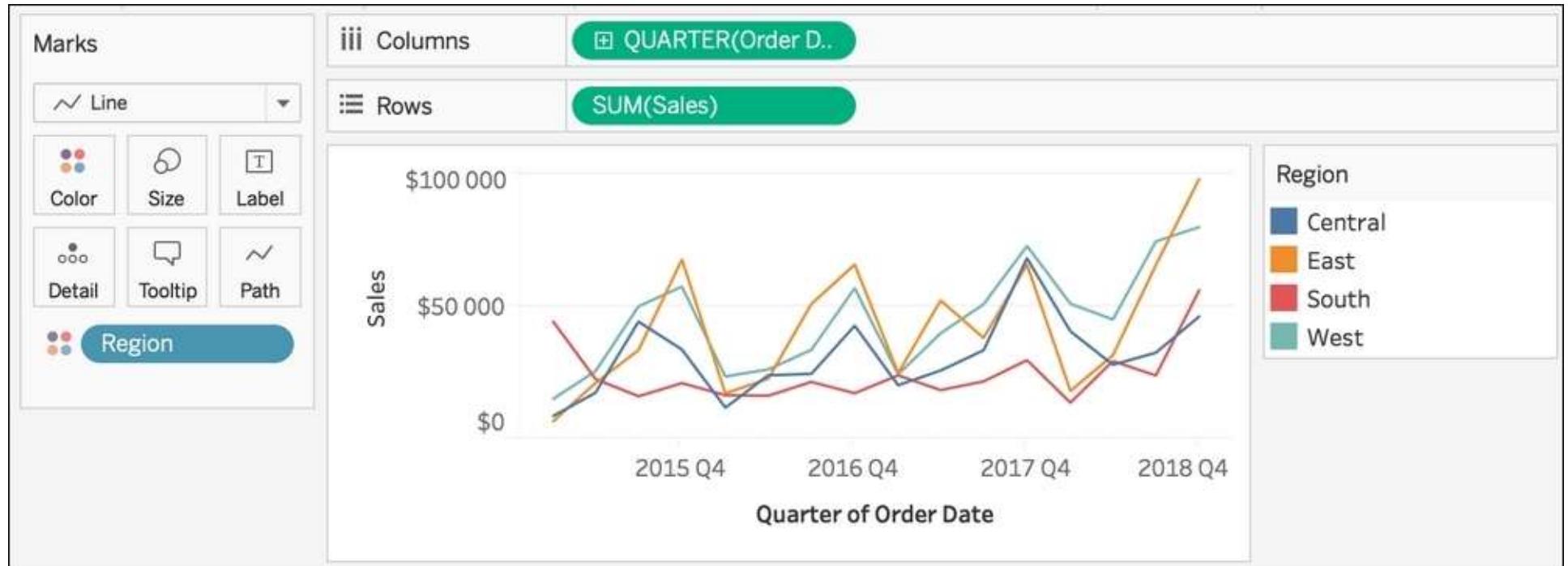
- The menu, highlighted in the following screenshot, allows you to choose the Mark type:



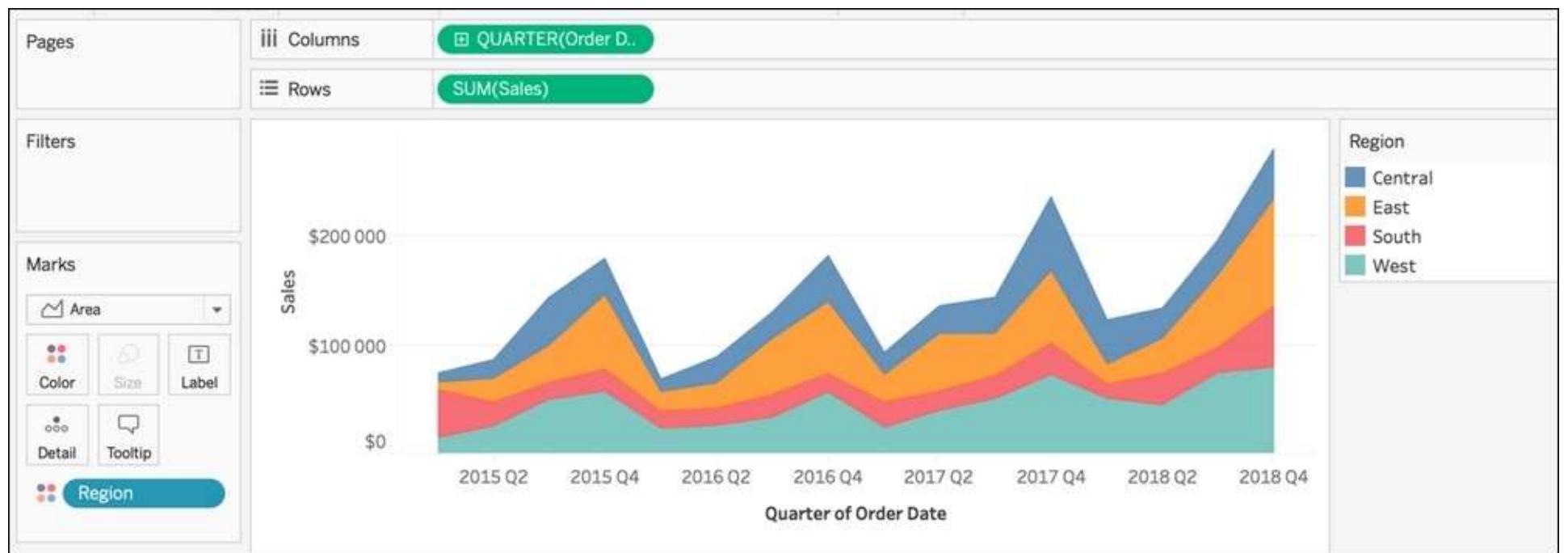
The Mark type



The Mark type

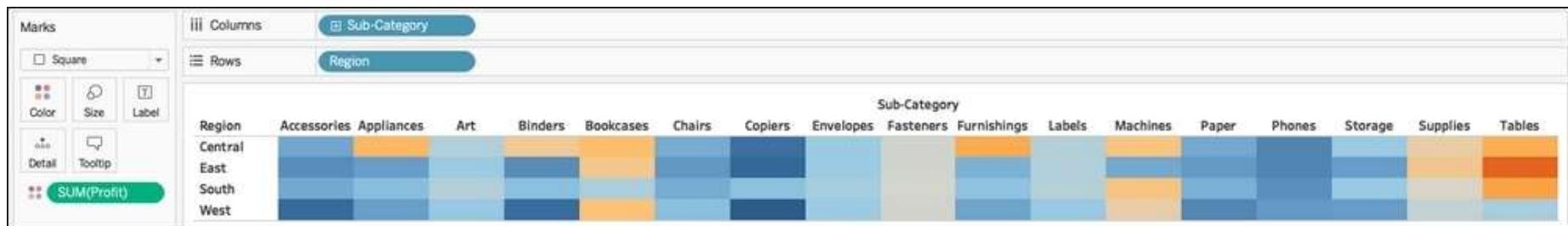


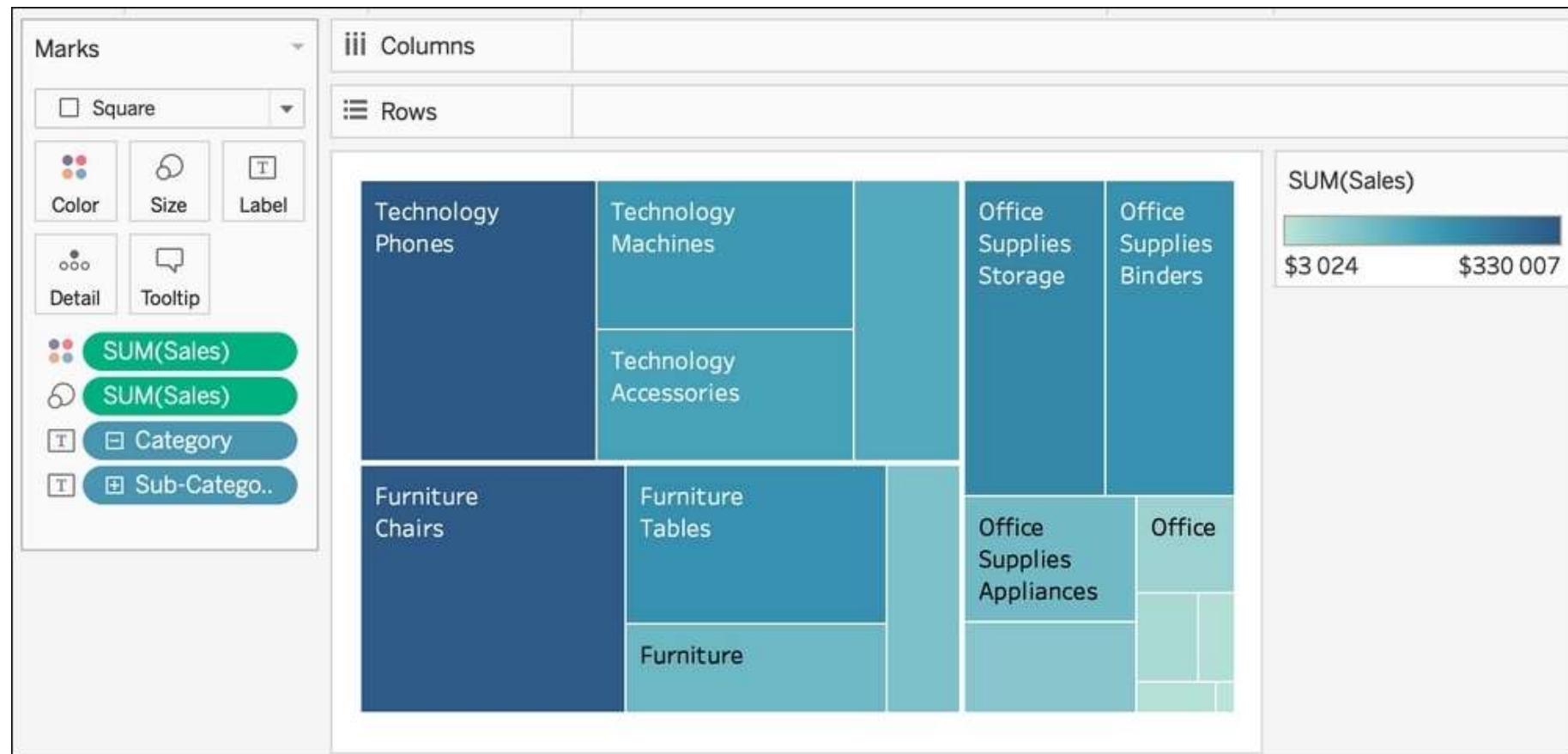
The Mark type

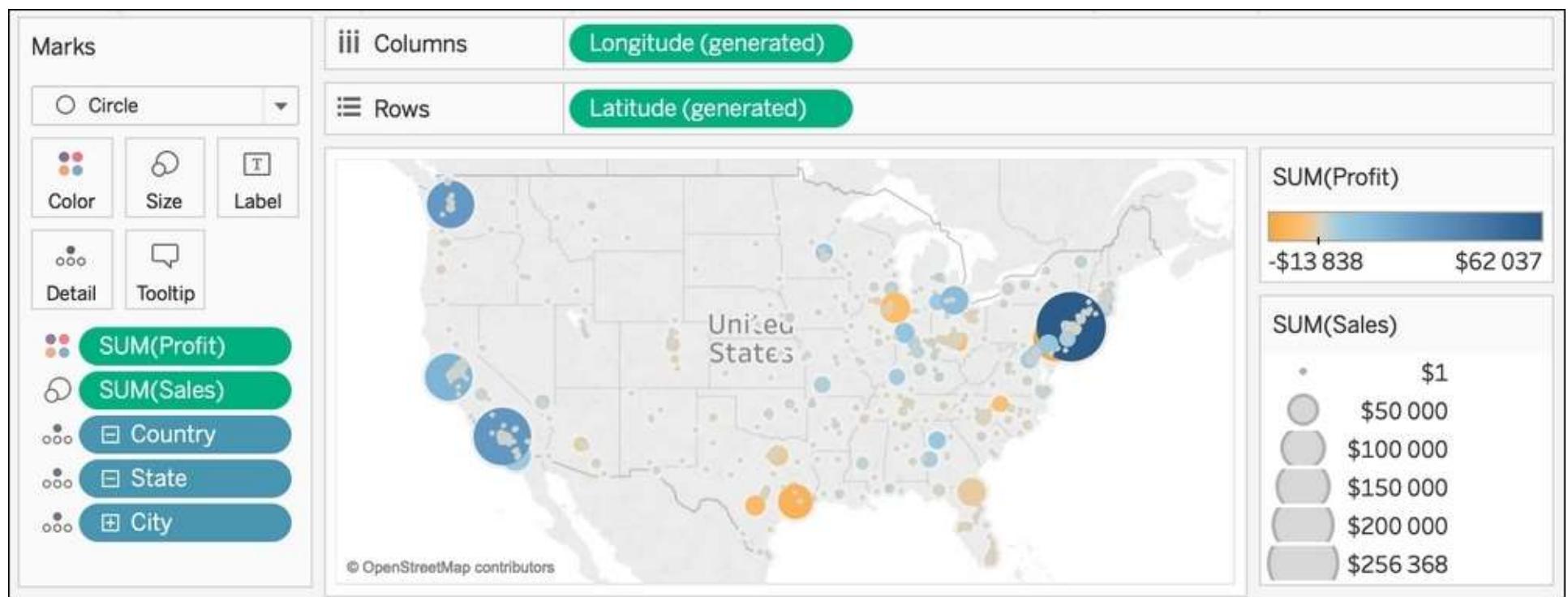


The Mark type

- A heatmap gives the same level of granularity, but with the ability to quickly spot the top and bottom values.
- Here's an example of a heatmap:









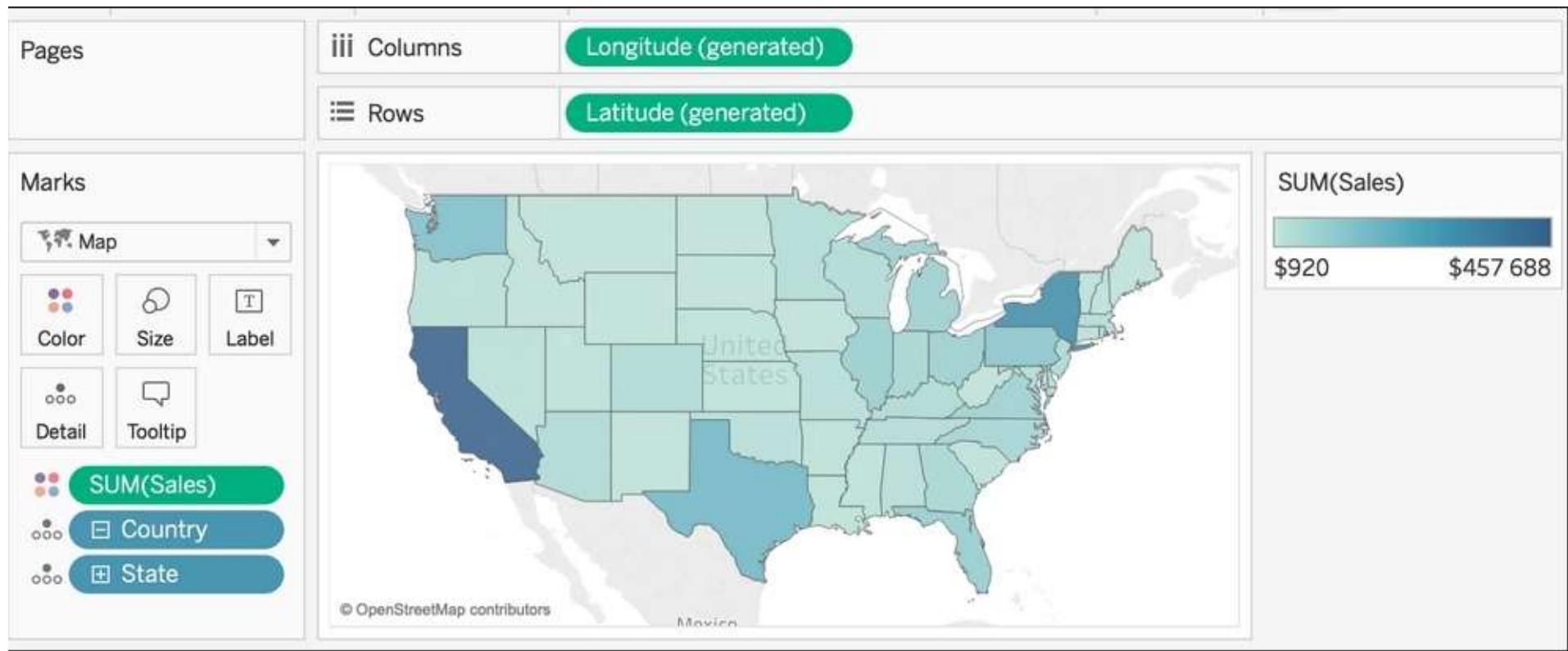
The Mark type

The screenshot shows a Tableau data visualization. The top navigation bar includes 'Marks' (selected), 'Columns' (with 'Category' and 'Region' tabs), and 'Rows' (with 'Segment' tab). The left sidebar contains 'Text' (selected) under 'Type', with options for 'Color', 'Size', 'Text', 'Detail', and 'Tooltip'. A green button labeled 'SUM(Sales)' is also visible. The main data area displays a grid of sales data categorized by Segment (Consumer, Corporate, Home Office) and Region (Central, East, South, West) for three product categories: Furniture, Office Supplies, and Technology. The data values are represented as dollar amounts.

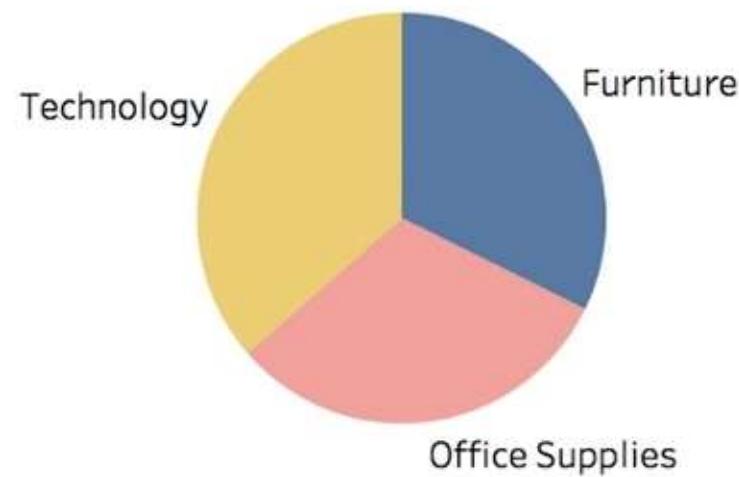
Segment	Furniture				Office Supplies				Technology			
	Central	East	South	West	Central	East	South	West	Central	East	South	West
Consumer	\$86 229	\$114 212	\$70 800	\$119 808	\$93 111	\$101 255	\$59 505	\$110 081	\$72 691	\$135 441	\$65 276	\$132 992
Corporate	\$52 086	\$64 209	\$29 645	\$83 080	\$41 138	\$66 475	\$45 930	\$77 134	\$64 773	\$69 726	\$46 311	\$65 641
Home Office	\$25 482	\$29 870	\$16 853	\$49 725	\$32 777	\$37 786	\$20 217	\$33 638	\$32 953	\$59 807	\$37 185	\$53 359

The Mark type

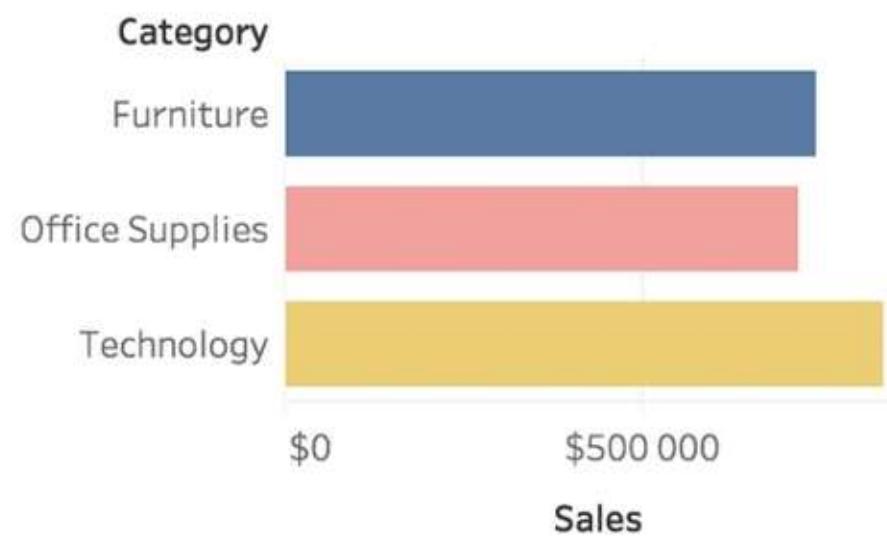


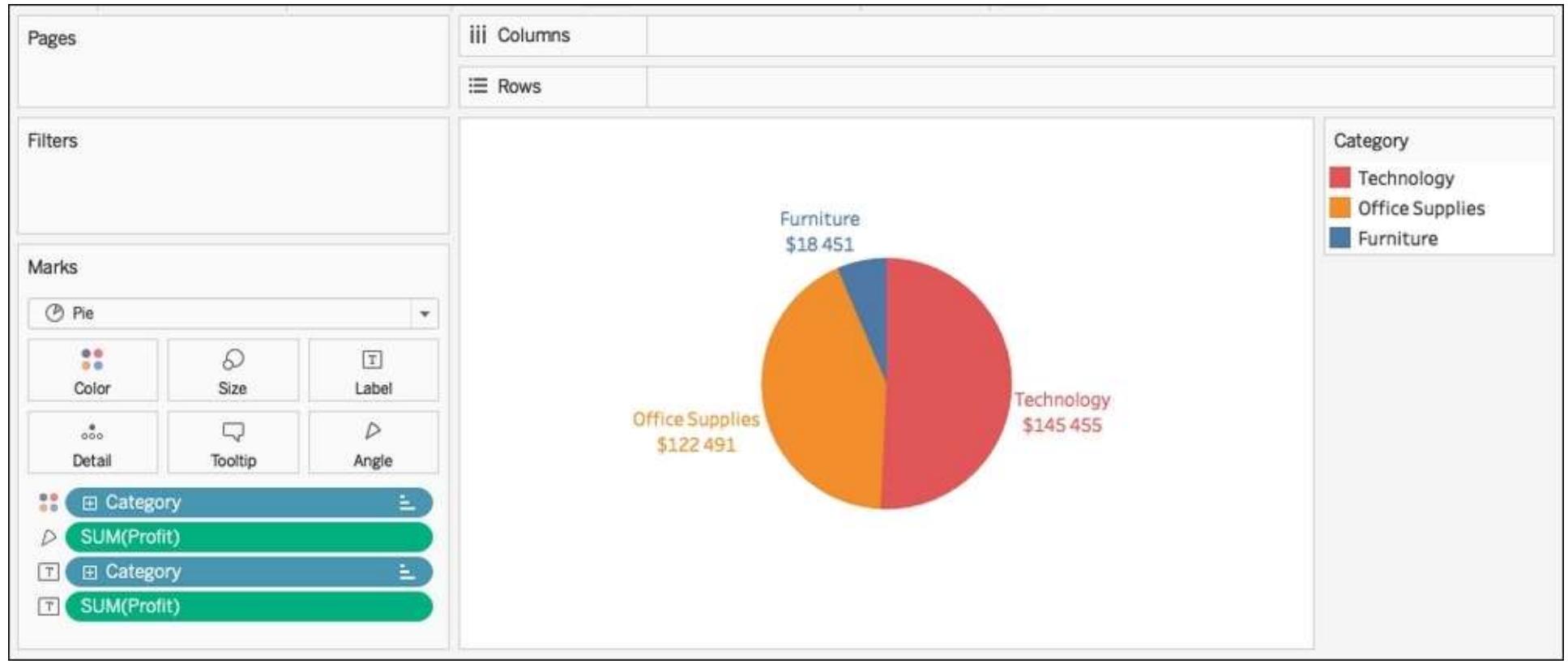


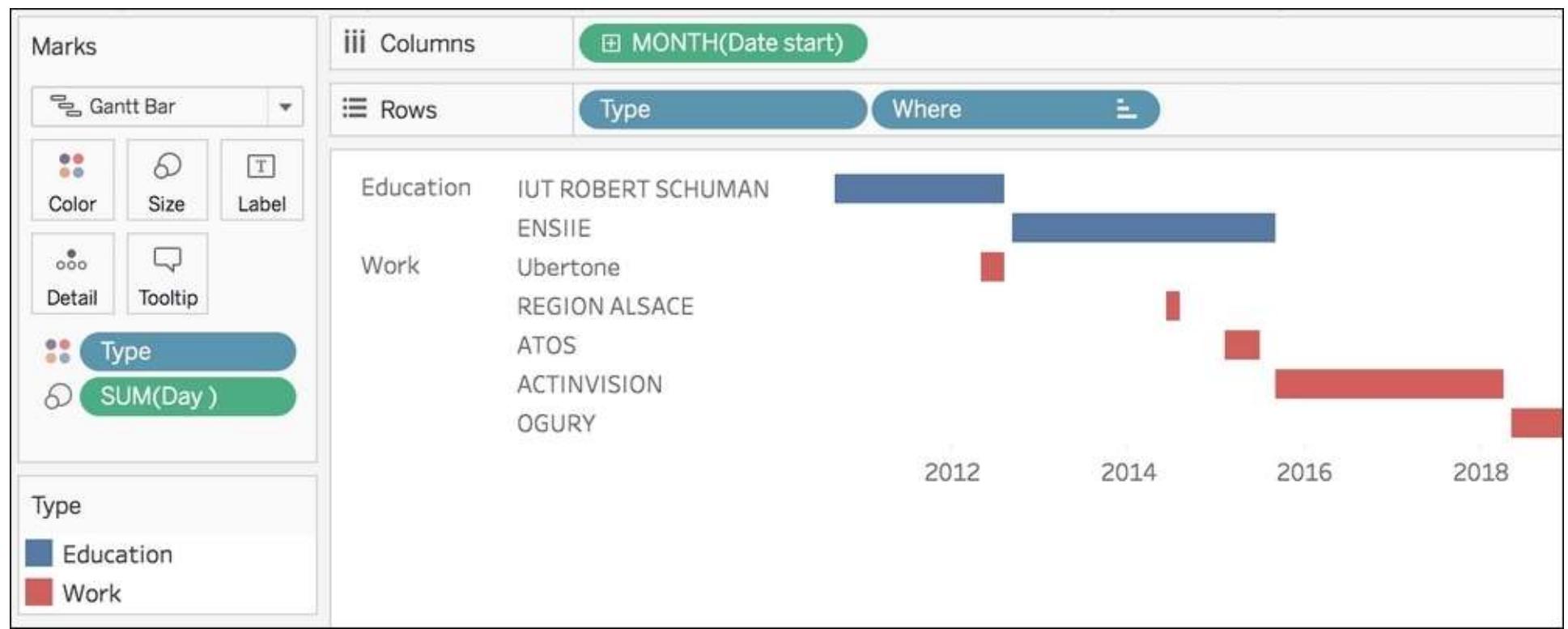
Pie



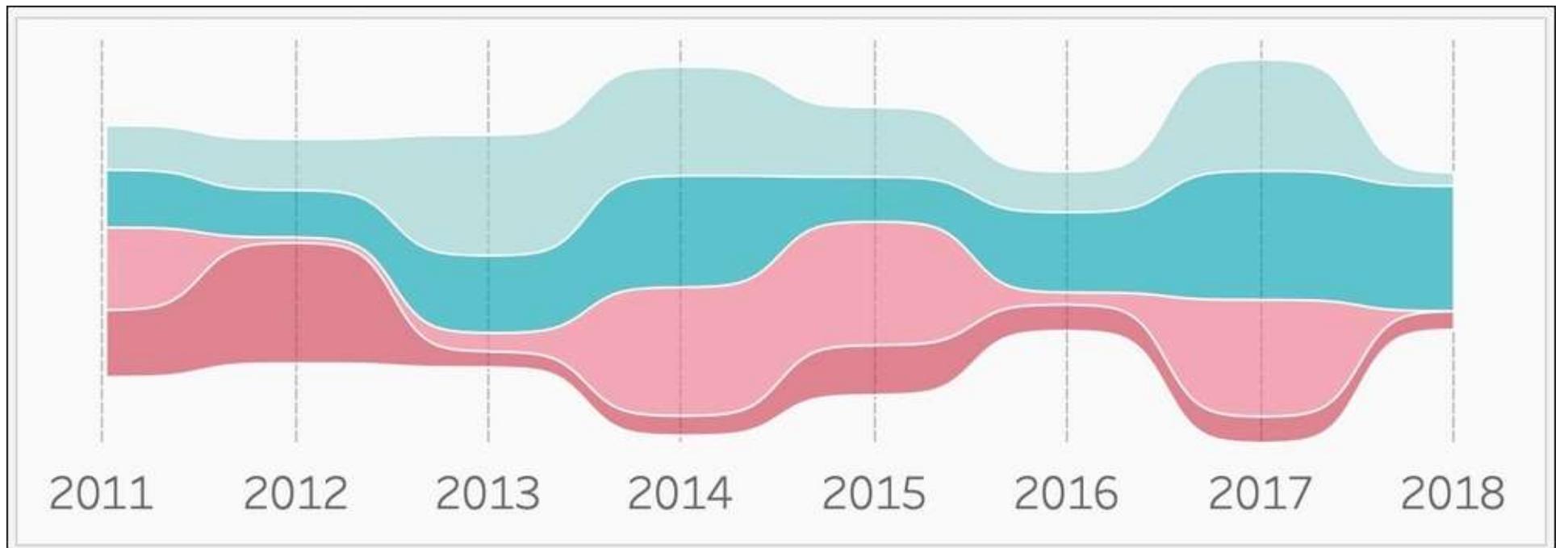
Bar



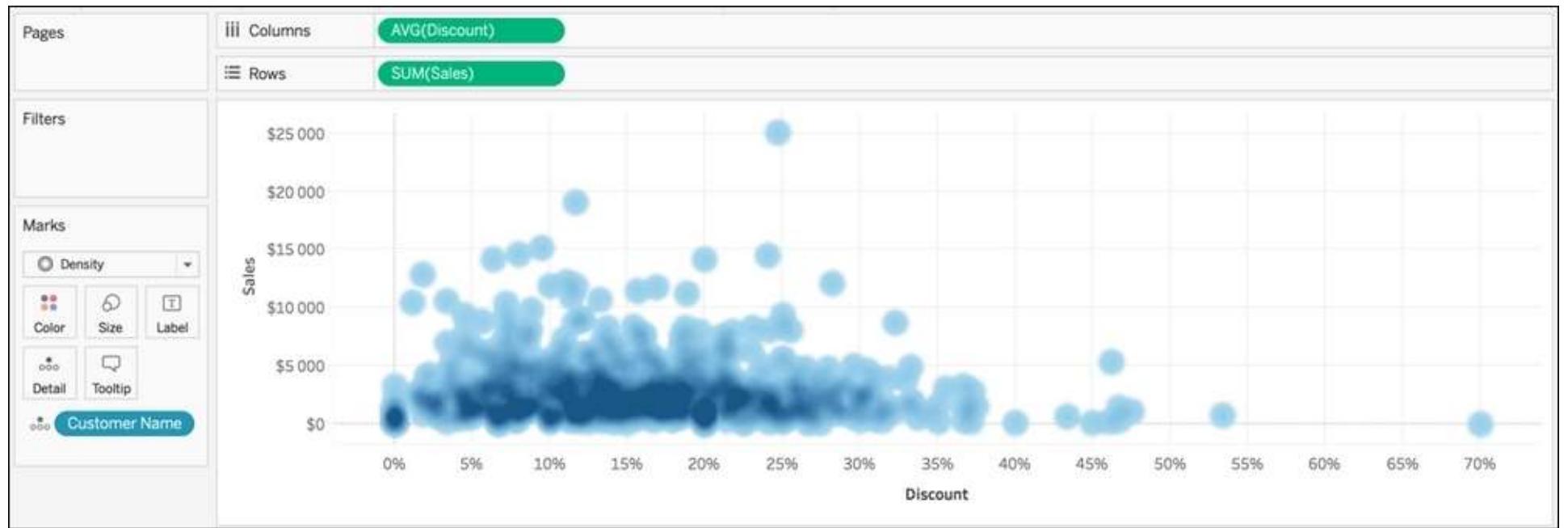




The Mark type



The Mark type



Mark properties

- There are five Mark properties that are always available: Color, Size, Text/Label, Detail, and Tooltip.
- There are also three properties available only when using a specific Mark type: Shape, Path, and Angle.
- Any unaggregated field, returning more than one value that is used in a Mark property splits the number of Marks (except for the Tooltip property).

Color

- Color is represented by the following icon:  Color. It is probably the most useful and widely used property.
- It can be used to change the color of all the Marks, slice a Mark if you use a Dimension, or display another insight if you use a Measure.
- If you don't place any fields on the Color property, then clicking on the Color button opens a menu where you can set the color of the Marks, change the opacity, and add borders and a halo. You can also click on More colors...





Size

- Size is represented by the following icon:  Size, Size is used almost all the time when designing a visualization.
- It can be used to simply change the size of the Marks or, as with Color, to add more information.
- If you don't put any fields on the Size property, then clicking on the Size button opens a small menu where you can change the size of the Marks..

Size



Size

Sample legend:

- 159
- 500
- 1 000
- 1 500
- 1 840

Sizes vary:

Automatically

Mark size range:

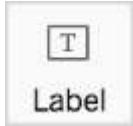
Smallest Largest

Reversed

Start value in legend End value for range:

159 1 840

Label (text)

- Label (or text) is represented by this icon:  Label (text).
- There are two different cases: when you use the text Mark type, and if you use any other type. In both cases, you can drag and drop multiple fields on the property.
- If you use the text Mark type, this property is named Text. If you put a Measure in this property, the aggregated value is displayed.

Label (text)

The global **sales** in our **company** are
\$2 297 201
For 37 873 products sold

Marks

Text: The global sales

Alignment: Center

Tableau Light 12 B I U **<SUM(Sales)>**

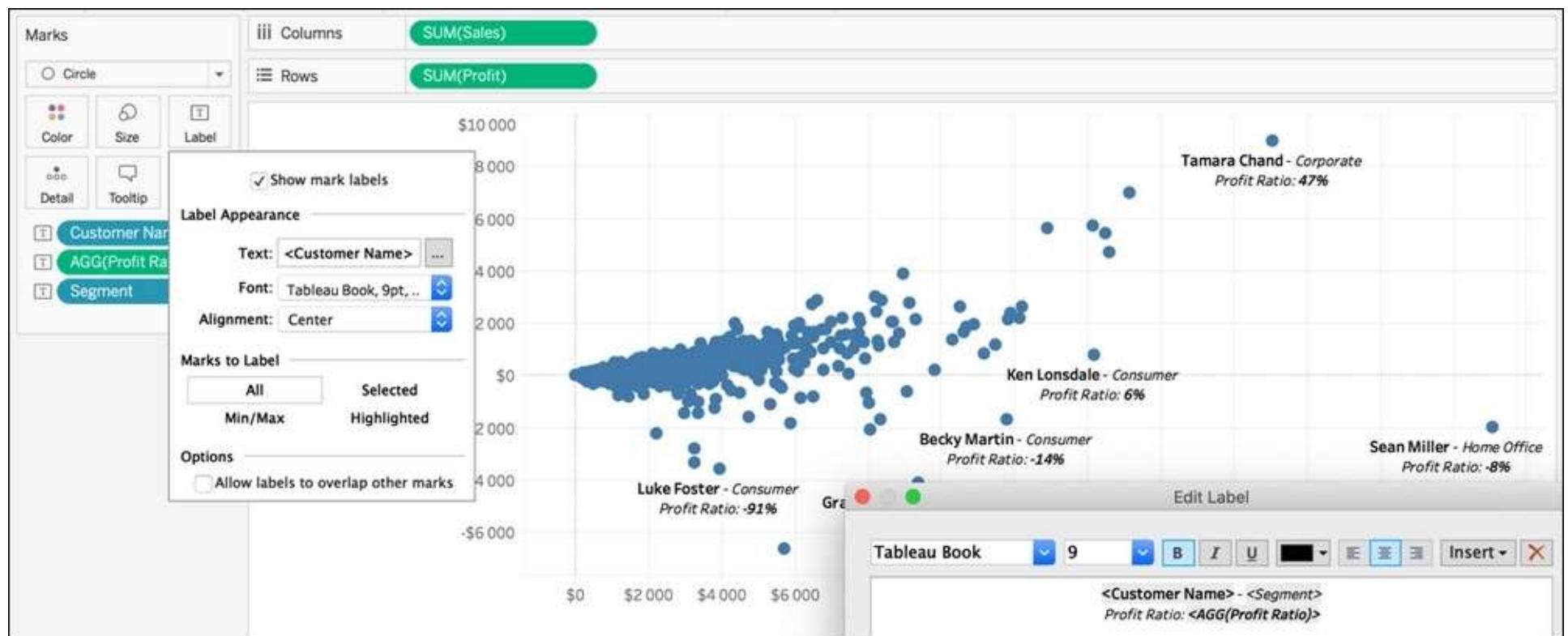
Edit Label

The global **sales** in our **company** are
<SUM(Sales)>
For **<SUM(Quantity)>** products sold

This screenshot shows a Tableau visualization and its associated 'Edit Label' dialog. The visualization displays a summary message with a large dollar amount and product count. On the left, the 'Marks' shelf is visible with various options like Color, Size, and Text selected. A tooltip for the 'Text' button shows the current label content: 'The global sales'. The 'Edit Label' dialog on the right shows the same text with placeholder tags like '<SUM(Sales)>' and '<SUM(Quantity)>' for dynamic values.

Label (text)

- Show Mark labels is the same as clicking on the Label (text) icon in the toolbar.
- The options under Label Appearance allow you to change the text, the font, and the alignment.
- The buttons under Marks to Label allows you to choose which Marks will have a label. You can add a label to all the Marks, to the maximum or minimum only, to only those that are selected, or to the highlighted ones.
- The last option allows the labels to overlap. By default, Tableau chooses to show the labels only if they don't overlap.



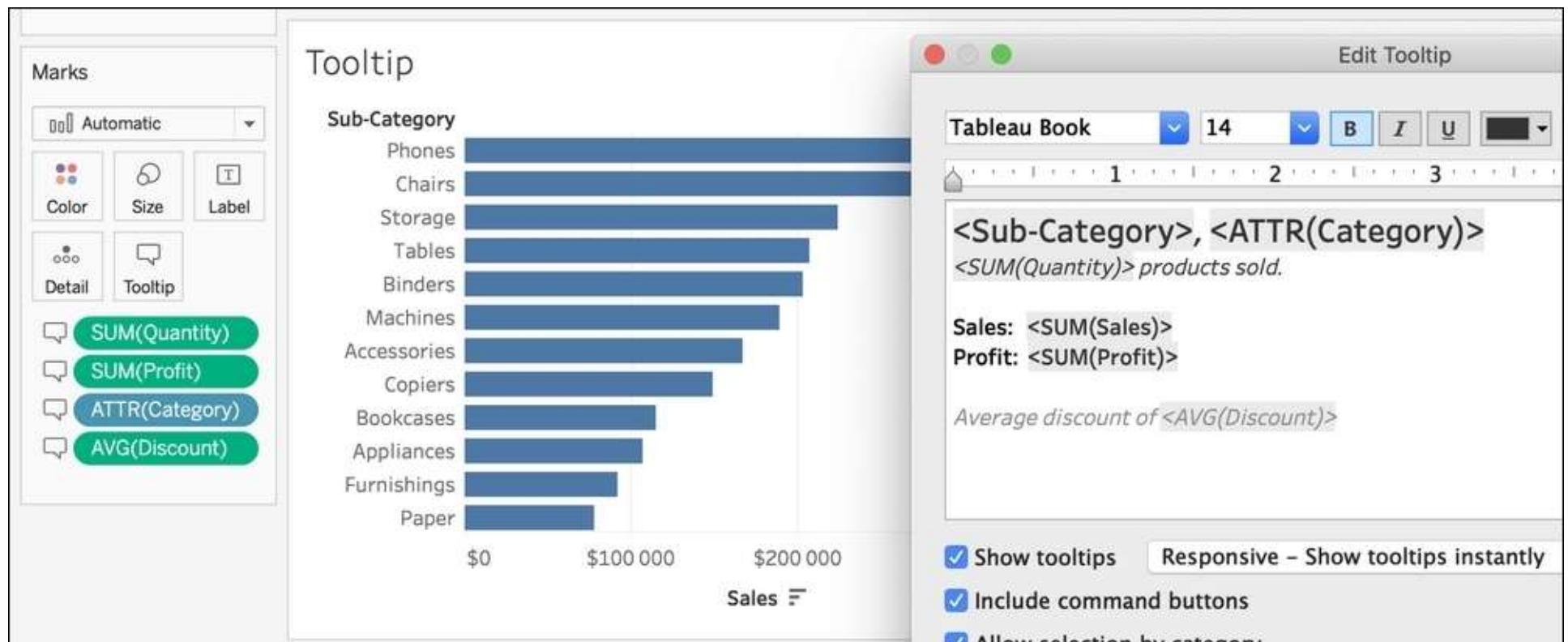
Detail

- Detail is represented by this icon:  Detail.
- Like the previous Mark properties, dropping a Dimension on Detail splits the Marks. And that's it! This property does nothing more than splitting the Marks.
- You can use Detail to show your data at a less aggregated level.
- Tooltip is the next property, and it's the only one that doesn't split the Marks.

Tooltip

- Tooltip is represented by this icon:  Tooltip.
- The tooltip is displayed when you hover over a Mark. Any field that you drop on Tooltip is added to the tooltip box.
- The fields in the tooltip are always aggregated.
- For Dimensions, Tableau uses a special aggregation, ATTR, to display them.

- Here's an example of a customized Tooltip:



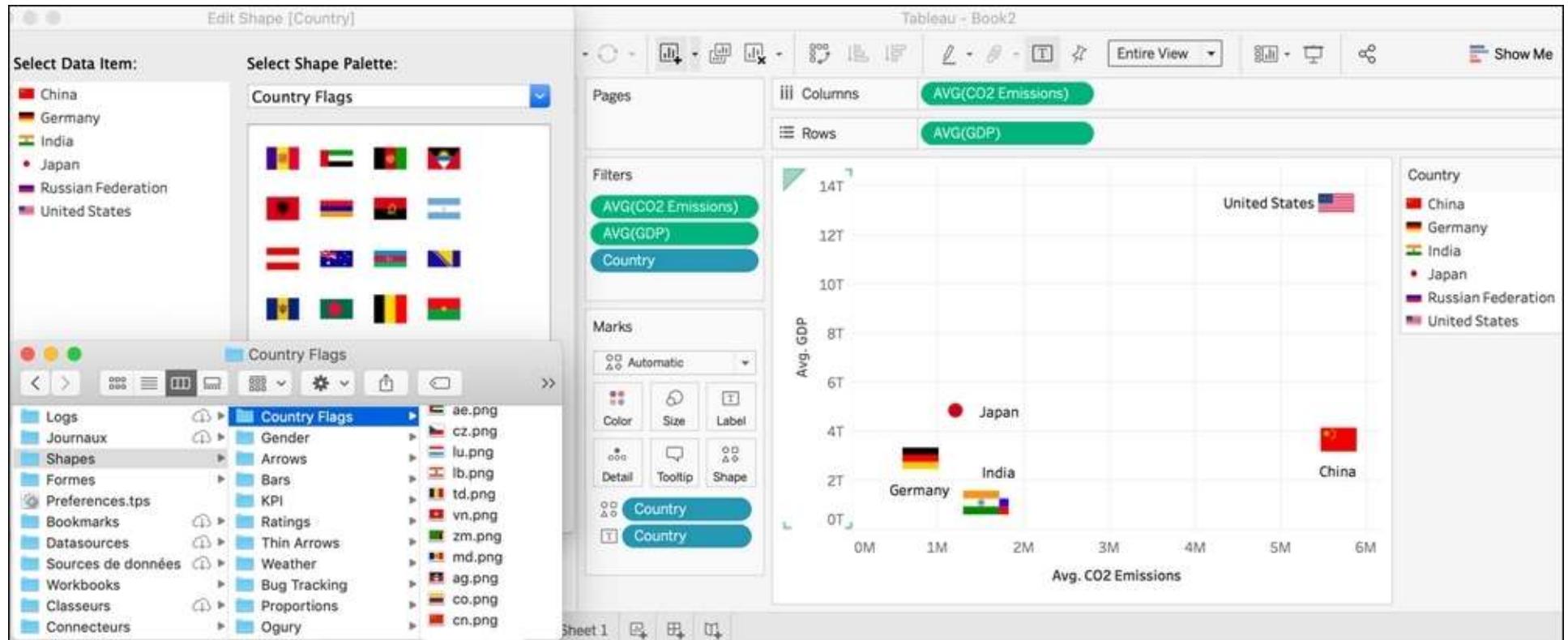
- Here is an example of a visualization using a Viz in Tooltip:



Shape

- Shape is represented by this icon:  Shape You can only use a Discrete field with Shape.
- When you drop a field on the Shape property, the different values of the field are represented with different shapes.
- When you click on the Shape button, Tableau opens the Edit Shape window where you can, as with color, select predefined shape palettes and assign them to the values.

- Here is an example of using country flags:

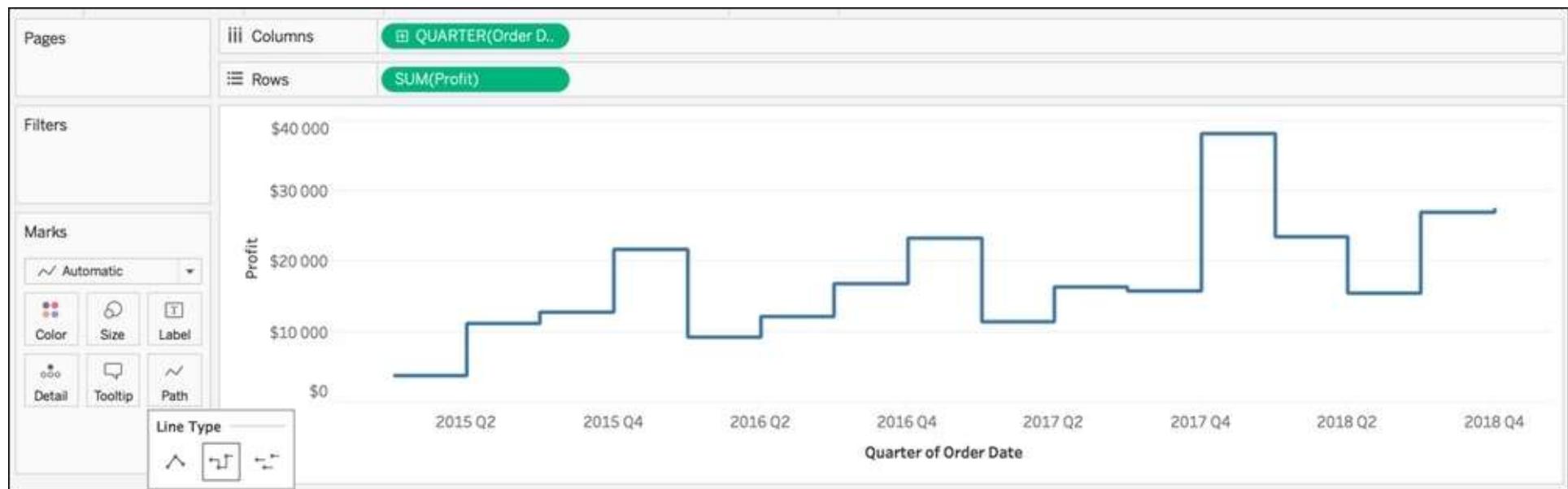


Path

- Path is represented by this icon:  Path.
- This property is available for both line charts and polygons.
- If you click on the Path button, Tableau opens a menu where you can select the Line Type: Linear, Step, or Jump.

Path

- Here's an example of a step line:

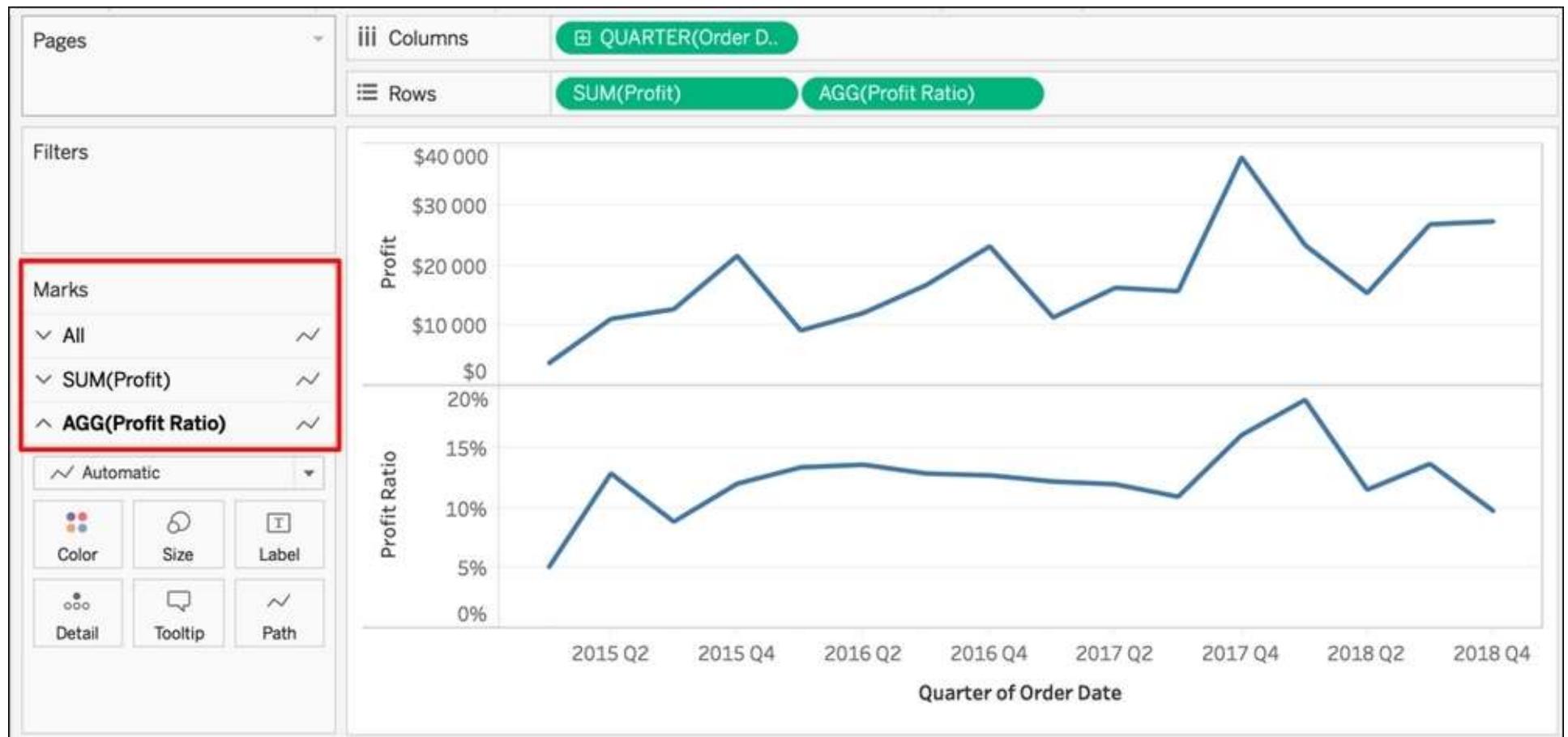


Angle

- Angle is represented by this icon:  Angle.
- You have to use an angle to create a pie chart and you can only use a Continuous field on Angle.
- When you use a field on Angle, the values are used to calculate the angle of the different portions of the pie.

Using multiple Measures

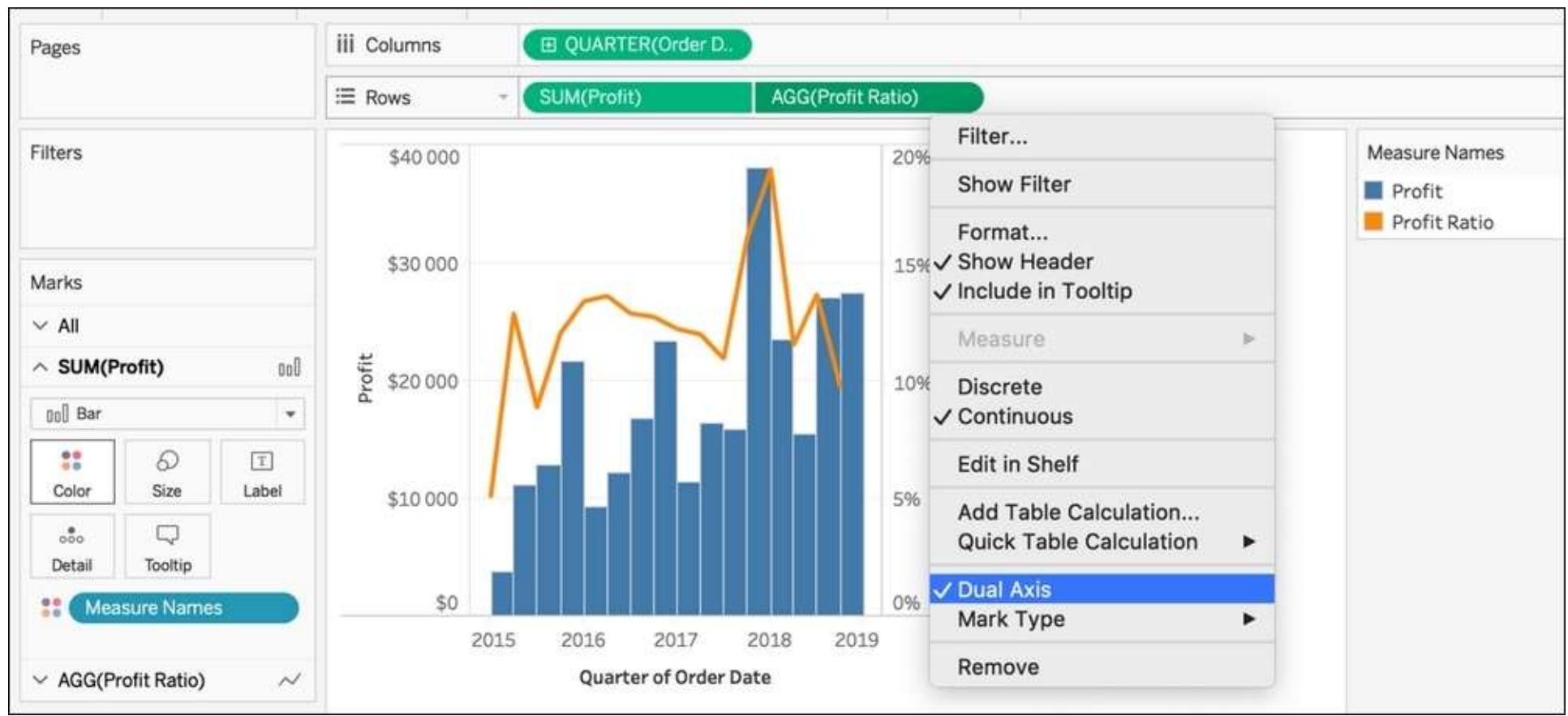
- Until now, you've always used only one Continuous field (usually a Measure) at a time on the Rows or Columns shelf.
- Let's discover what happens when you use more than one.
- If you use more than one Continuous field at a time in Rows or Columns, Tableau creates multiple axes, and the Marks shelf splits according to the number of Continuous fields (plus one for All).





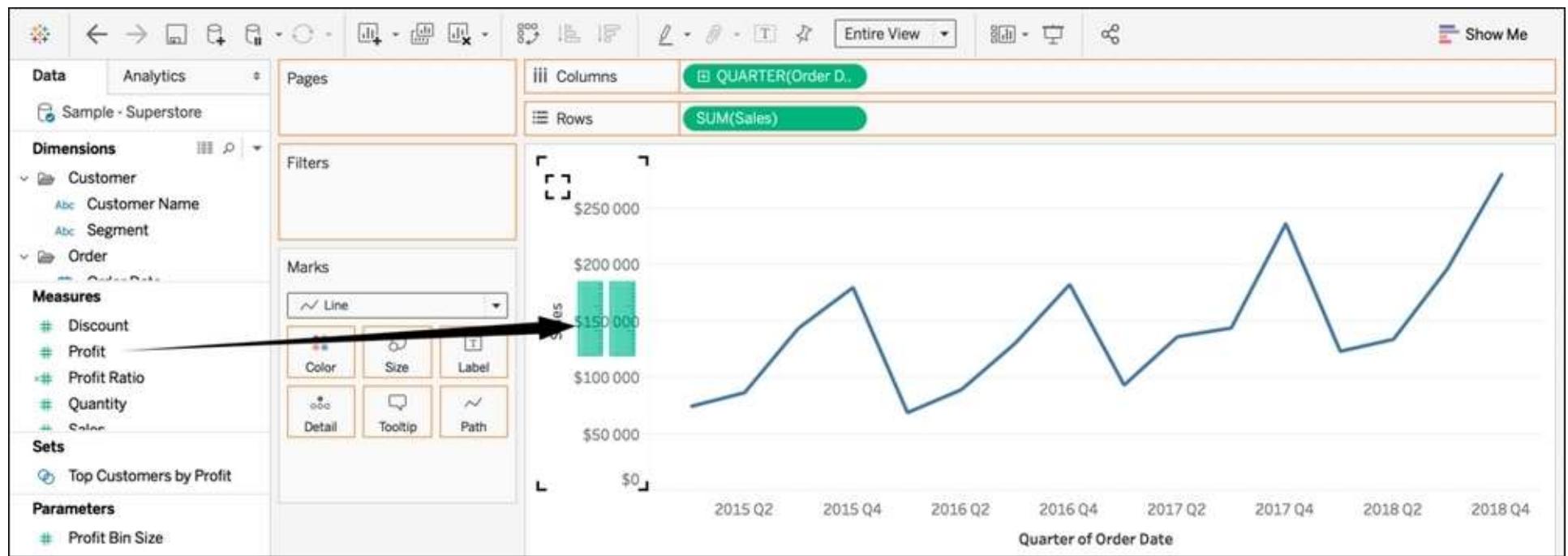
Dual Axis

- When you want to combine two Continuous fields, it is possible to create a dual axis.
- With a dual axis, there is one axis on the left, one on the right, and the Marks are superimposed.
- To create a dual axis, right-click on the second Continuous field and click on Dual Axis, as shown in slide.

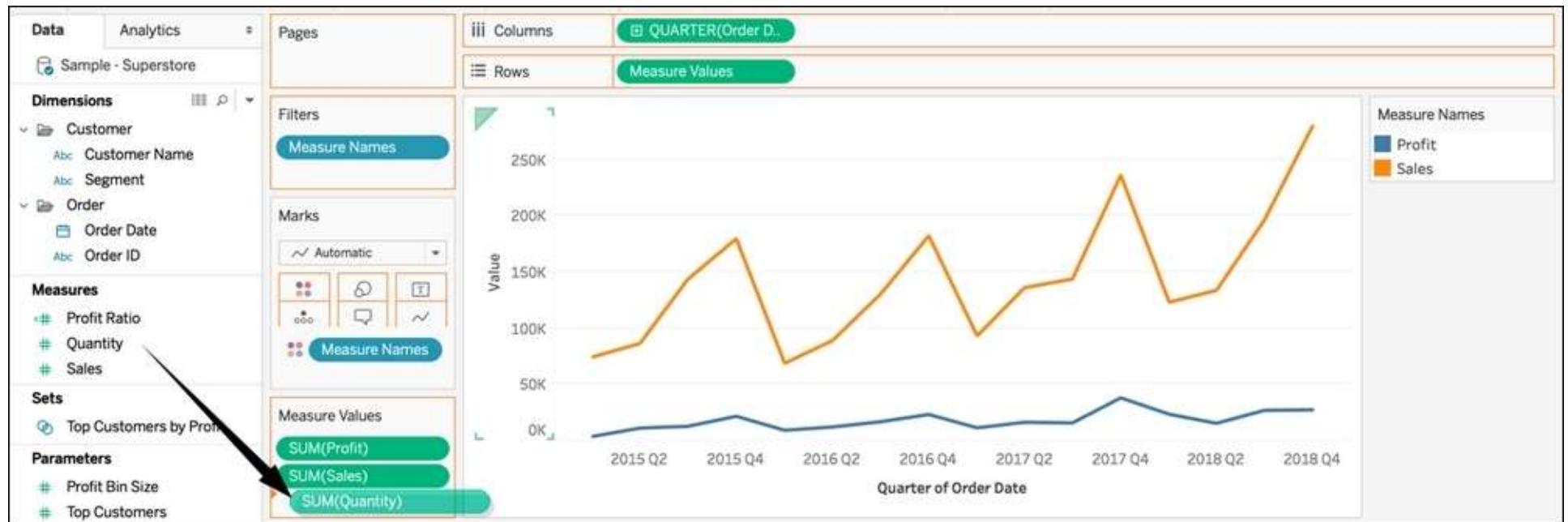


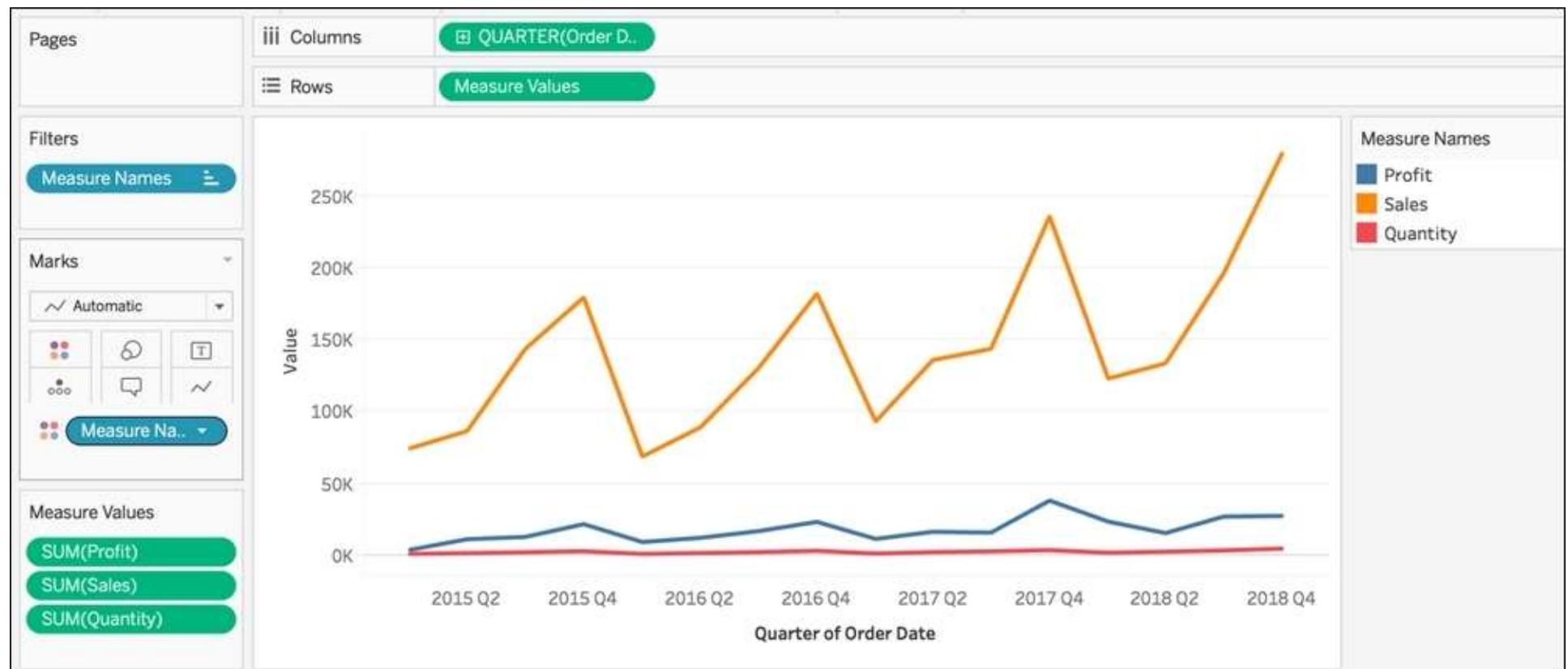
Measure Names and Measure Values

- If you remember, in the data source, there is one special Dimension, Measure Names, and one special Measure, Measure Values.
- Measure values return the values of the different Measures and Measure Names return their names.
- You can use them to display as many Measures as you want.
- When you use Measure values in View, Tableau displays the Measure values shelf where you can add as many Measures as you want.



Using multiple Measures





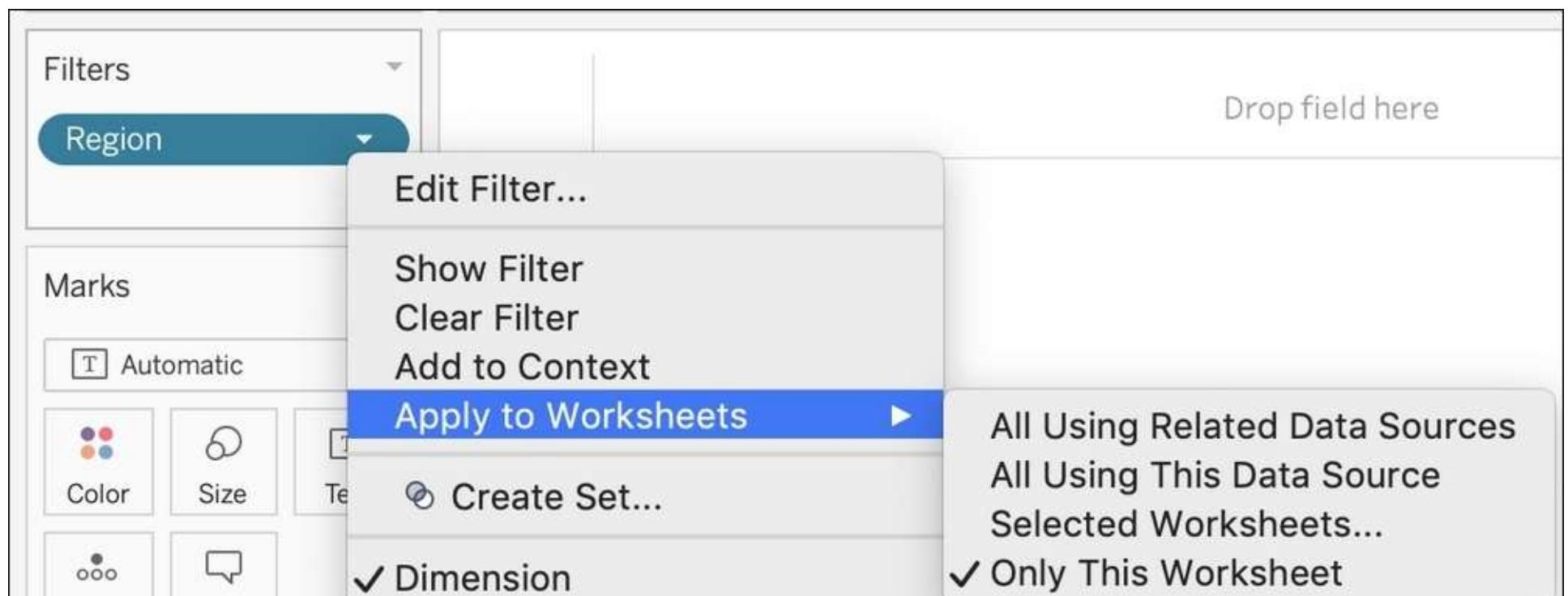
Using multiple Measures

- Another significant difference with a dual axis is that there is only one Marks shelf.
- That's because there is only one Continuous Field, Measure Values.
- This means that you cannot control the Mark type or properties for each Measure.
- With Dual Axis, you can only combine two Continuous fields, but they can have different Mark types, properties, and axis ranges.

Filters

- **All Using Related Data Sources:** Only useful when you have multiple data sources in your Workbook. This option allows you to filter on multiple data sources at the same time.
- **All Using This Data Source:** This option automatically adds the filter to every Worksheet that uses the current data source.
- **Selected Worksheets....:** This option opens a new window where you can manually select the different Worksheets where the filter should be applied.
- **Only This Worksheet:** The filter is only applied to the current Worksheet (by default).

- Here's the menu:



Filtering a Continuous field

- Range of values: Select the minimum and maximum value; everything outside is excluded.
- At least: Select the minimum value; everything lower is excluded.
- At most: Select the maximum value; everything higher is excluded.
- Special: You can filter only the null or only the non-null values

Filtering a Discrete field

- When you use a Discrete field on Filters, a new window automatically opens. In this window, you have four tabs with different options. The conditions you set on each tab are combined. Let's demonstrate how to use the different tabs:
- General: You can select the values you want to keep (or to exclude if you check the Exclude box). At the bottom, there are buttons to select All the values or None; at the top, you can choose between Select from list/Custom value list/Use all

Filters

- Wildcard: You can enter some text so that the filter keeps (or excludes) the values that Contains, Starts with, Ends with, or Exactly matches your text.
- Condition: You can specify a condition based on a field or formula. Only the values that fulfill the condition are kept.
- Top: This filter will only keep the values on top (or at the bottom) based on a value. There are four main drop-down menus to configure the filter.

Quick filters

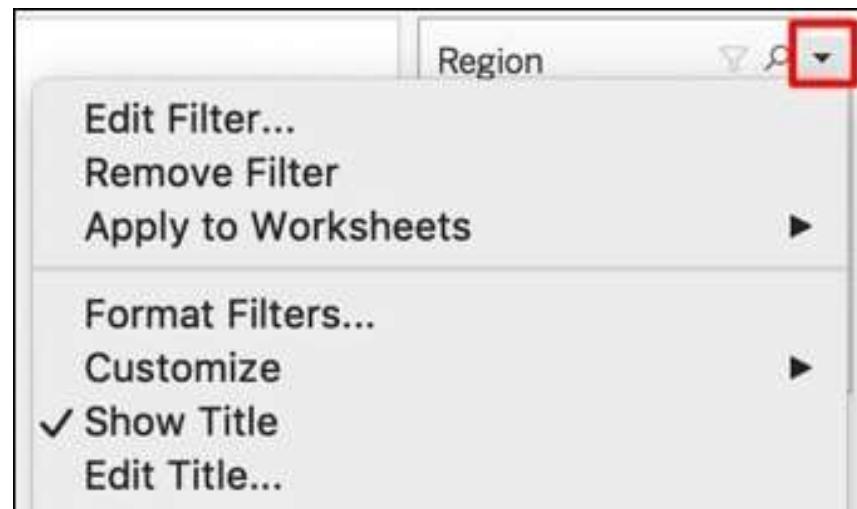
- With a right-click on a pill in the Filters shelf, you can find the Show Filter option.
- It's the first option in this course that adds interactivity in Tableau.
- Clicking on Show Filter opens the quick filter card on the Worksheet.

Quick filters



Quick filters

- There are many interesting options when you click on the arrow in the top-right of the quick filter card:



Filter hierarchy

- All Dimension filters are applied at the same time. There is, by default, no hierarchy between them, but you can add one with context.

Context

Using context is a way to add a hierarchy between the different Dimension filters. Consider the following example using Sample - Superstore:

- Create a visualization with City in Rows and Sales in Columns and use the button in the toolbar to sort the values.

Filter hierarchy

- Add City to the Filters shelf and, on the Top tab, select Top 5 by Sales, as shown in the following screenshot:



- In the quick filter, select only California.
- Tableau combines the two filters and looks for cities that are both in the global top five and in California.
- Tableau returns only two cities, Los Angeles and San Francisco. This is not what we want:



- Right-click on the State pill on the Filters shelf and select Add to Context.
- The pill automatically turns gray and goes above the City pill.
- The result is as expected; you see the top five cities in California:



Global filter hierarchy

- There are six different types of filters that you can add.
- Some are stronger than others, and it's important to know the order in which the filters are applied.
- Always keep this course close to you when using Tableau, and look at the following screenshot if you need to ask yourself a question about the hierarchy between filters.

Global filter hierarchy



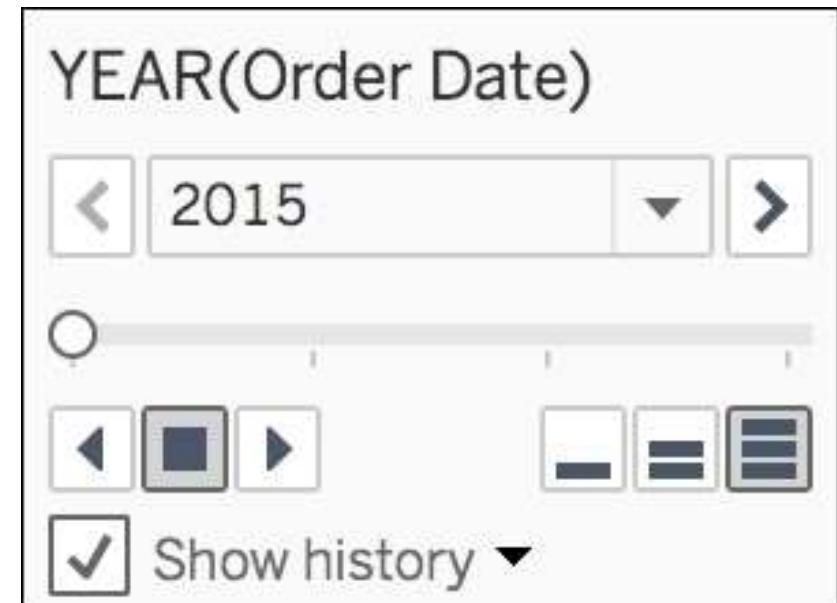
Pages

- Not only do pages add interactivity to your visualization, but they're also the only way to create animations in Tableau.
- You may have never seen a Tableau visualization with animations for a simple reason: Tableau Server and Tableau Public can't display the animations yet. But what exactly are pages?

Pages

There are a few things to bear in mind if you want to use pages, as follows:

- You can only use Discrete fields in pages.
- When you put a field in pages, the pages card, displayed in the following screenshot, automatically opens:



Pages

- In the first part, you specify which Marks should display the history (for example, only the one you selected or all).
- In the second part, you define how many historical Marks to show (for example, all or the last number of your choice).
- The third part allows you to choose between showing the historical Marks, only the trails (that is, the path from the prior point to the next), or both.
- Finally, in the two other parts, you can customize the format of the historical Marks or the trails.

Worksheet options and formats

There are lots of options available in a Worksheet, and you can find them in many different places. The three most usual places to find options are as follows:

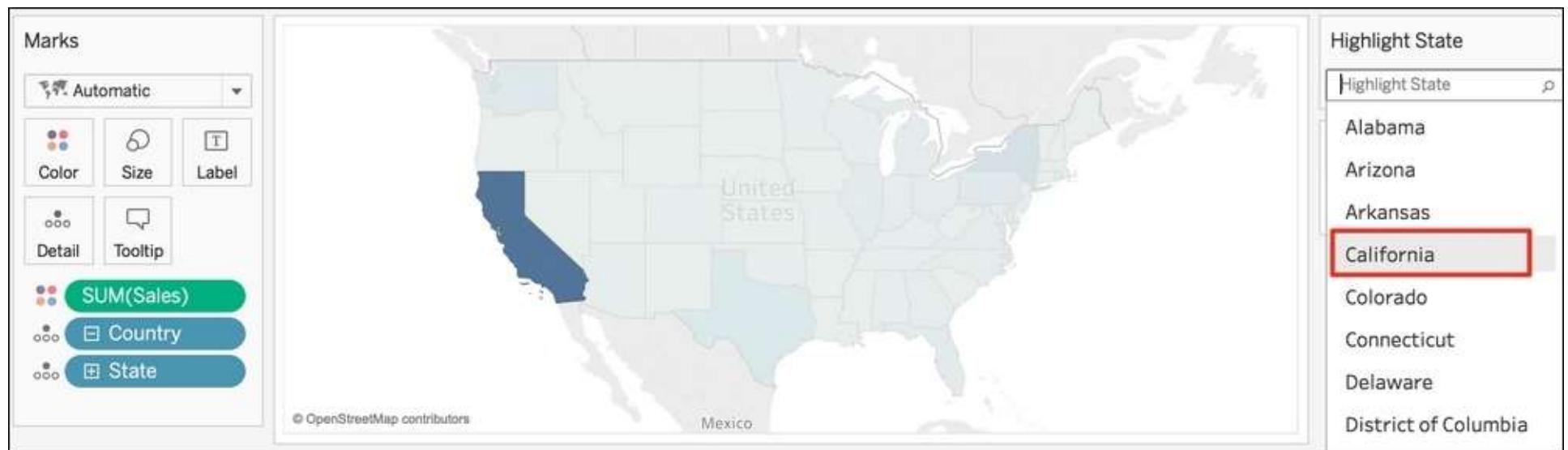
- With a right-click on a pill
- In the Worksheet menu at the top
- By right-clicking on the View (or on a Mark)

Pill options

Among the most important options, you'll find the following:

- **Filter...:** A shortcut to put the current pill in the Filters shelf and open the Edit Filter window.
- **Show Filter:** This automatically puts the pill in the Filters shelf and displays the quick filter (it doesn't open the menu).

- Show Highlighter (only for Discrete pills): This opens the Highlighter card, which allows you to highlight a specific value, as shown in the following screenshot:



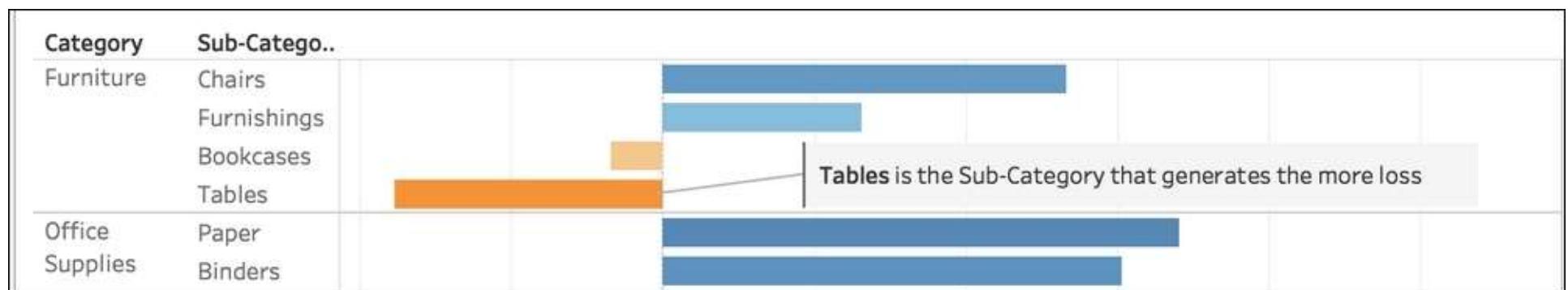
Worksheet menu options

- Export allows you to export the Worksheet as an image, as data (a CSV file), or an Excel cross-tab. If you choose image, a new window opens where you can customize the result. The Data and Excel options both convert the visualization into a table.
- Tooltip... is a shortcut to edit the tooltip.
- With the different Show... options, you can display or hide many different shelves or cards as well as the sort controls. The Caption is a quick description of the Worksheet, and the Summary adds statistical information to the visualization.
- Duplicate as Crosstab duplicates your current Worksheet to create a new one and transforms the visualization into a table.

View options

- View Data opens a new window with, by default, a summary of the displayed data, or the full data, which shows all the lines that are used to build the visualization. From the View Data window, you can also copy or export the current selection to a CSV file.
- Edit Locations... is available when the Mark has a geographical role and lets you configure the locations in a new window.
- With Mark Label, you can force the Mark to always, or never, show the label.

- Annotate lets you add an annotation to a specific Mark, Point, or Area in the View. When you select one of the three options, Tableau opens the Edit Annotation window, where you can customize the text. Adding an annotation is an excellent way to add context to your visualization. Here's an example of an annotation:



Format

Format Font

Fields ▾

Sheet Rows Columns

Default

Worksheet: Tableau Book, 9pt

Pane: Tableau Book, 9pt

Pages

Marks

Automatic

Color Size Label

This screenshot shows the 'Format Font' pane in Tableau. The 'Fields' tab is selected. The 'Sheet' tab is active. The 'Default' section shows 'Worksheet: Tableau Book, 9pt' and 'Pane: Tableau Book, 9pt'. To the right, there are sections for 'Pages' and 'Marks'. The 'Marks' section includes an 'Automatic' dropdown and buttons for 'Color', 'Size', and 'Label'.

Format

- Format Font: Select the font type, size, and color
- Format Alignment: Change the text alignment, direction, and wrapping
- Format Shading: Add a background color, and column or row banding
- Format Borders: Add a border and column or row dividers
- Format Lines: Change the format (to plain or dotted) of the different lines in Tableau (such as grid lines, zero lines, trends lines, and more)

Summary

- You now have all the keys to build your first visualizations, automatically or manually.
- The different Mark types and properties no longer hold any mystery for you.
- You also learned how to build a visualization with more than two Measures using Dual Axis, Measure Names, and Measure Values.
- In this lesson, you also learned how to use filters to focus on the right data.

7. Powerful Dashboards, Stories, and Actions



Powerful Dashboards, Stories, and Actions

In this lesson, we'll cover the following topics:

- Dashboard basics
- Dashboard objects
- Dashboard actions
- Creating a Story

Let's start with the Dashboard basics.

Dashboard basics

- If a Worksheet is one idea, a Dashboard is a way to combine multiple such ideas.
- With a Dashboard, you can create interaction between the Worksheets, and add pictures, web pages, and other objects to create a unique page that will answer all your questions.
- To add a new Dashboard, you can either click on the icon at the bottom-right,  , click on New Dashboard from the Dashboard top menu, or use the New Dashboard button in the toolbar.

The screenshot shows the Tableau Dashboard Editor interface. On the left, there's a sidebar with sections for 'Dashboard' (Default, Phone), 'Size' (Desktop Browser (1000 x 800)), 'Sheets' (Sales and Profit by Sub-Category, Profit Evolution, Profit by State), and 'Objects' (Horizontal, Vertical, Text, Image, Web Page, Blank, Button, Extension). Below these are buttons for 'Tiled' and 'Floating' layout, and a checkbox for 'Show dashboard title'. At the bottom, there are tabs for 'Data Source' and three sheets: 'Sales and Profit by Sub-Category', 'Profit Evolution', and 'Profit by State'. A new sheet tab labeled 'Dashboard 1' is also present. The main area is a large white space with the placeholder text 'Drop sheets here'.

Building a dashboard

- To create a Dashboard, you have to drag Worksheets or objects to the central blank area (you can also double-click on a Worksheet, but as always, you let Tableau build it for you).
- A Worksheet that you add in a Dashboard is the Worksheet itself; this means that if you modify the Worksheet, you'll see the change in both the Dashboard and the Worksheet.

Building a dashboard

- Building a dashboard :  The first removes the Worksheet from the Dashboard.
- Building a dashboard :  The second takes you to the Worksheet to modify it.
- Building a dashboard :  The third is a shortcut to put a filter action on the Worksheet (detailed in a later section).
- Building a dashboard :  The fourth icon is optional, and it can be used to fix the width or height of the Worksheet if it's inside a horizontal or vertical Container.
- Building a dashboard :  The last one, the small arrow, opens the options for the selection Worksheet.

The dashboard and layout panes

- On the left of the Dashboard workplace, you can find two panes, Dashboard and Layout. Simply click on Dashboard or Layout to open the different panes.

The Dashboard pane

- On the top, you'll find the different device layouts available for your Dashboard. You'll learn more about that in a later section of this lesson.

The Layout pane

- The Layout pane is handy when you select a Worksheet or Container in the Dashboard.
- You can show or hide its title, make it float or not, change its position and size (only for floating items), add a border, modify the background, and add outer and inner padding.
- Don't be afraid to try those different options, especially the padding, to add some space to your Dashboard.

The Layout pane

- At the bottom, you'll find the Item hierarchy:

Item hierarchy

Sales and profit analysis

- ▼ Tiled
 - ▼ Vertical
 - Sales and profit analysis
 - ▼ Vertical
 - Sales and Profit by Sub-C...
- ▼ Tiled

Tiled or floating layouts

- When you drag and drop a Worksheet or an object on your Dashboard, you can either use Tiled or Floating layouts.
- Some users don't like Tiled; others consider Floating dangerous. Let's see the pros and cons.

Tiled

Many cons make it hard to create a great Dashboard with Tiled Layouts:

- You have low control over the size and position of the elements.
- Achieving a pixel-perfect Dashboard is a big fight (maybe a little less now that the grid exists).
- You cannot add a border or a background that outlines multiple items.
- You cannot move multiple items at the same time.

Floating

- The Floating Layout often became the default layout for people who had terrible experiences with Tiled.
- With this layout, you can drag and drop any element wherever you want.
- With the Layout pane, you can define the exact position and size of every item.
- Among the options (with the small descending arrow), you can also specify the Floating order to move the element to the back or the front.

Device layouts

- You can create different device layouts on your Dashboard. Then, depending on the device used to open the Workbook (on Tableau Public, Server, or Mobile), the right layout is automatically chosen.
- Since Tableau 2019.1, every Dashboard starts with two layouts: the default layout that you use to build your Dashboard, and an automatic Phone layout generated by Tableau.

Device layouts

- To visualize or add new device layouts, click on the Device Preview button on the Dashboard pane to open the layout toolbar:



Dashboard options

- In the top menu, between Worksheet and Story, you can find the different Dashboard options.
- Among those options, the most important one surely is Actions.... There is a focus on Actions in a later section.
- Format is also handy as you can configure the Dashboard color background, titles, and text objects.

Dashboard objects

Most of the objects are very simple. Drag and drop them on the Dashboard to use them. Here's a list of existing objects:

- Text
- Image
- Web Page
- Blank
- Extensions

Dashboard objects

- Button: Another recent feature to navigate between your Dashboards or Worksheets—it adds a button that you can, with a right-click, configure (to specify where to navigate) and personalize (change the image or add a tooltip).

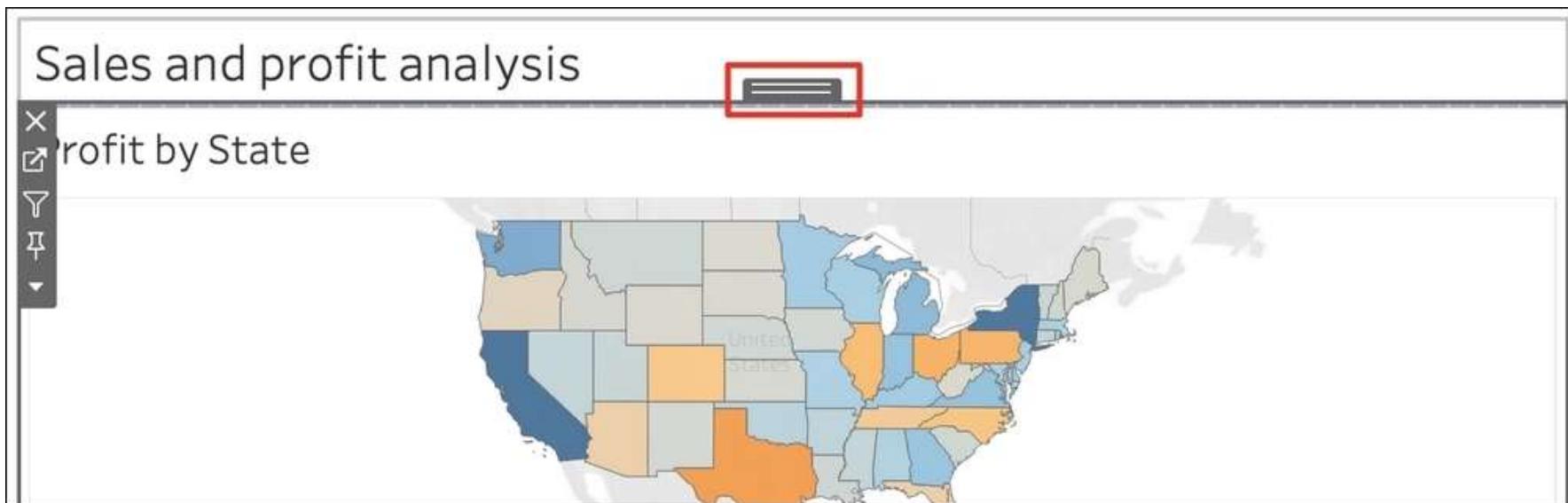
As you can see, most of the objects are easy to understand and use. However, there are two other objects, the containers, that need a bit more explanation.

Containers

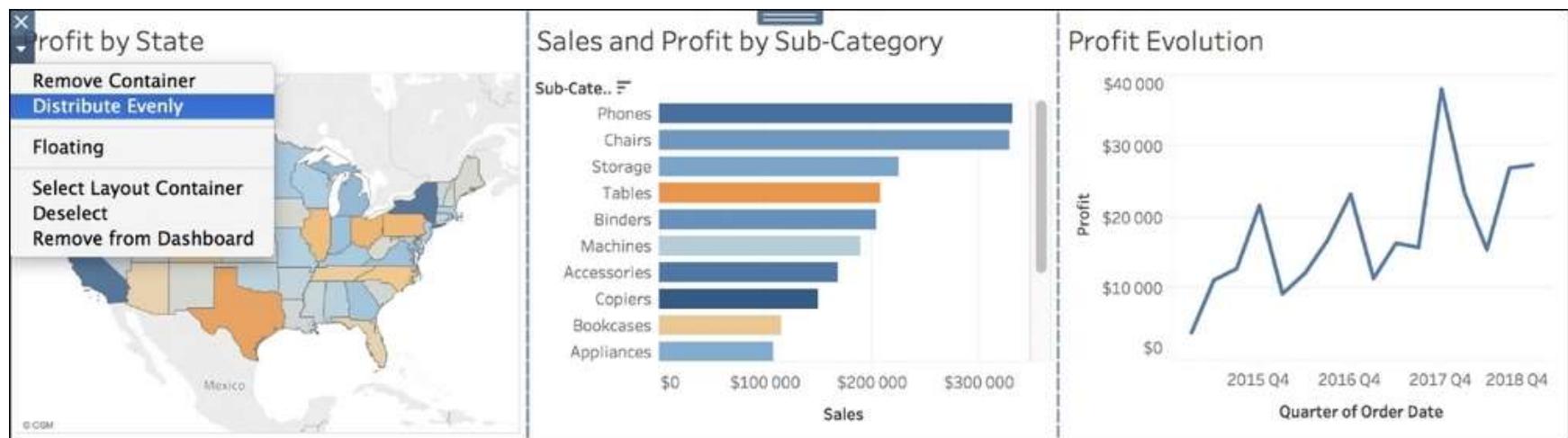
- The purpose of a Container is to group elements inside a shared space and allow you to have better control over those elements inside.
- They can be horizontal or vertical. The following screenshots are an example of three worksheets in a horizontal container:



- If you have Containers inside Containers, you can select the parent Container by clicking on Select Layout Container among the options (available with a click on the small arrow from a select element), or you can also simply double-click on the grip part of every element, as highlighted in the following screenshot:



- The second reason is that among the Container options, you'll find Distribute Evenly, which you can see in the following screenshot:



Dashboard actions

There are three ways to trigger an Action:

- Hover: Just put your mouse over a mark, and the action is triggered.
- Select: The action is triggered when you click on a mark.
- Menu: A link is added at the bottom of the tooltip when clicking on a mark, but the action is only triggered if you click on that link. The text of the link can be customized.

Dashboard actions

A screenshot of a software interface showing a list of dashboard actions and a modal dialog for adding a new action. The main window has columns for Name, Run On, Source, and Fields. A blue button labeled 'Add Action >' is visible. A checked checkbox says 'Show actions for'. The modal dialog lists six action types with icons: Filter..., Highlight..., Go to URL..., Go to Sheet..., Change Parameter..., and Change Set Values... . It also contains 'Edit...', 'Remove', 'Cancel', and 'OK' buttons.

Name	Run On	Source	Fields

Add Action >

Show actions for

Filter...

Highlight...

Go to URL...

Go to Sheet...

Change Parameter...

Change Set Values...

Edit... Remove Cancel OK

The Filter action

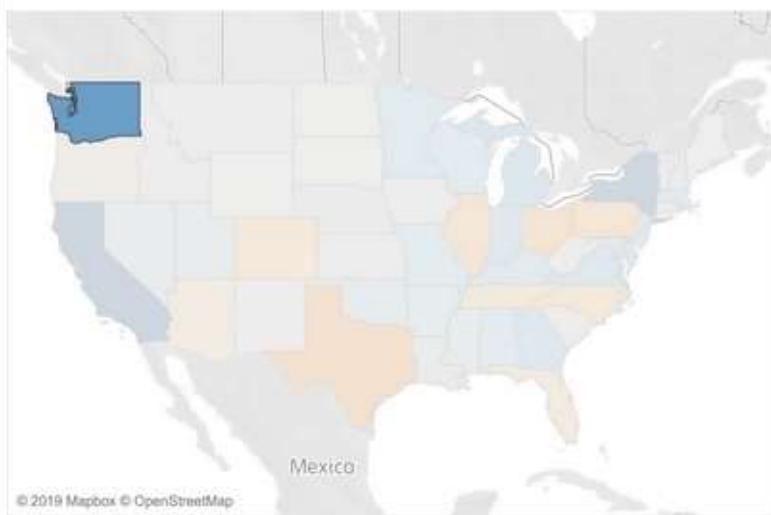
- The Filter action is the most common. From one or multiple Source Worksheets, you can filter one or numerous target worksheets.
- It's the only Action with a quick shortcut: when you select a Worksheet, click on the funnel icon, Use as Filter, and a Filter Action is automatically generated with the selected Worksheet as Source and all the others as targets.
- Of course, if you need more configuration, you'll need to add it from the Action... menu.

Dashboard actions

Sales and Profit Analysis - Filter

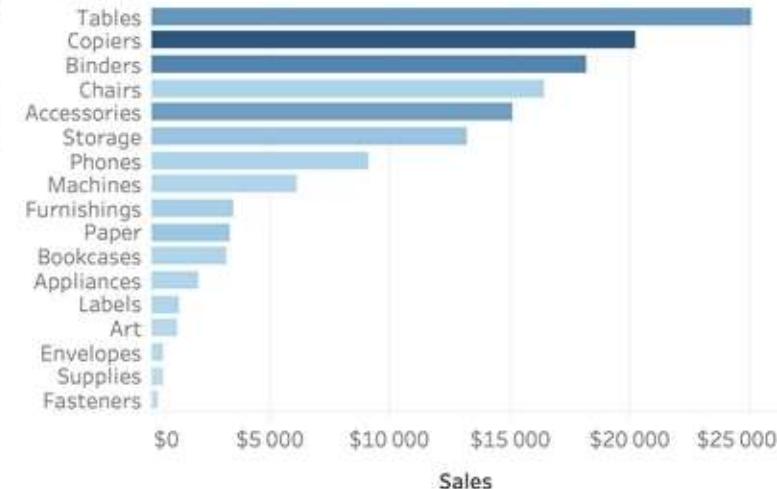
Profit by State

Click on a State to filter



Sales and Profit by Sub-Category

Sub-C.. F



Dashboard actions

- **Leave the filter:** When you clear the selection, the Filter stays as it is. It's the default option for the Menu trigger.
- **Show all values:** When you clear the selection, you'll see all the values. It's the default option for the Select or Hover trigger.
- **Exclude all values:** When you clear the selection, the target Worksheets turn blank, as all values have been excluded. It's only when you trigger the Action again that the selected data is included.

The Highlight action

Profit Analysis - Highlight

Profit by Sub-Category

Hover over a Sub-Category to highlight the Category

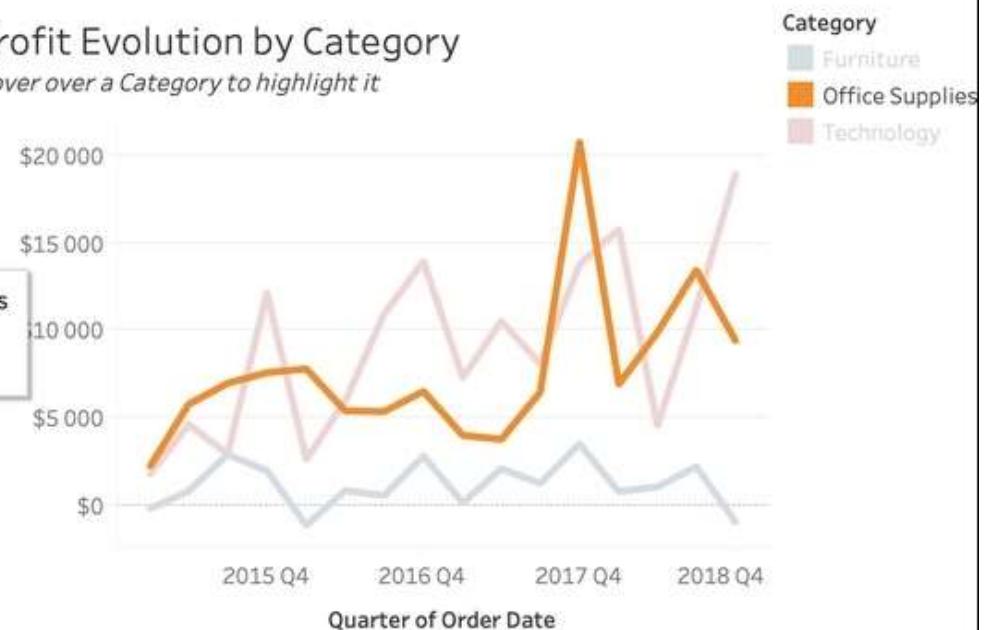
Sub-C.. F

Copiers
Phones
Accessories
Paper
Binders
Chairs
Storage
Appliances
Furnishings
Envelopes
Art
Labels
Machines
Fasteners
Supplies
Bookcases
Tables



Profit Evolution by Category

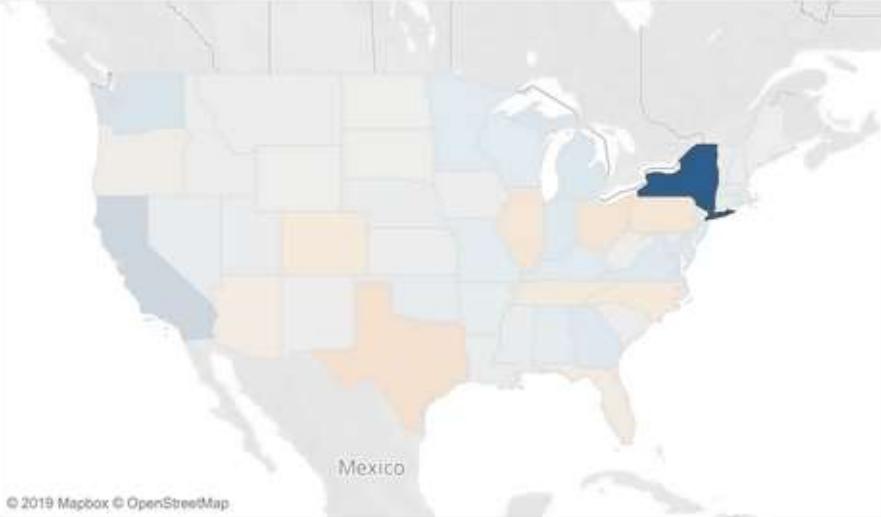
Hover over a Category to highlight it



The Go to URL action

Open Wikipedia - URL

Profit by State
Click on a State to open the menu



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WIKIPEDIA
The Free Encyclopedia

Main page
Contents
Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store

Interaction
Help
About Wikipedia
Community portal

Article Talk Read View source View history Search Wikipedia

New York

From Wikipedia, the free encyclopedia

New York most commonly refers to:

- New York City, the most populous city in the United States, located in the state of New York
- New York (state), a state in the Northeastern United States

New York may also refer to:

Film and television

- *New York* (1916 film), a lost American silent comedy drama by George Fitzmaurice

Contents [hide]

- 1 Film and television
- 2 Literature
- 3 Music

The Go to URL action

Since version 2019.2, you have the ability to choose how to open the URL target:

- New Browser Tab: Always opens the link in a new browser tab, even if a Web Page object exists in the Dashboard.
- Web Page Object: Opens the URL in a Web Page object in your Dashboard. You can even have multiple Web Page objects in your Dashboard with multiple URL actions targeting each Web Page object distinctly.
- Browser Tab if No Web Page Objects Exists: The default option – it opens the URL in a browser tab if there is no Web Page object.

The Go to Sheet action

- The Go to Sheet... action is very simple. From one or multiple source Worksheets, you can navigate to a target Worksheet or Dashboard.
- This action is quite similar to the button object, but with the possibility to add a navigation action on Worksheets.
- The next action allows you to play with Parameter!

The Change Parameter action

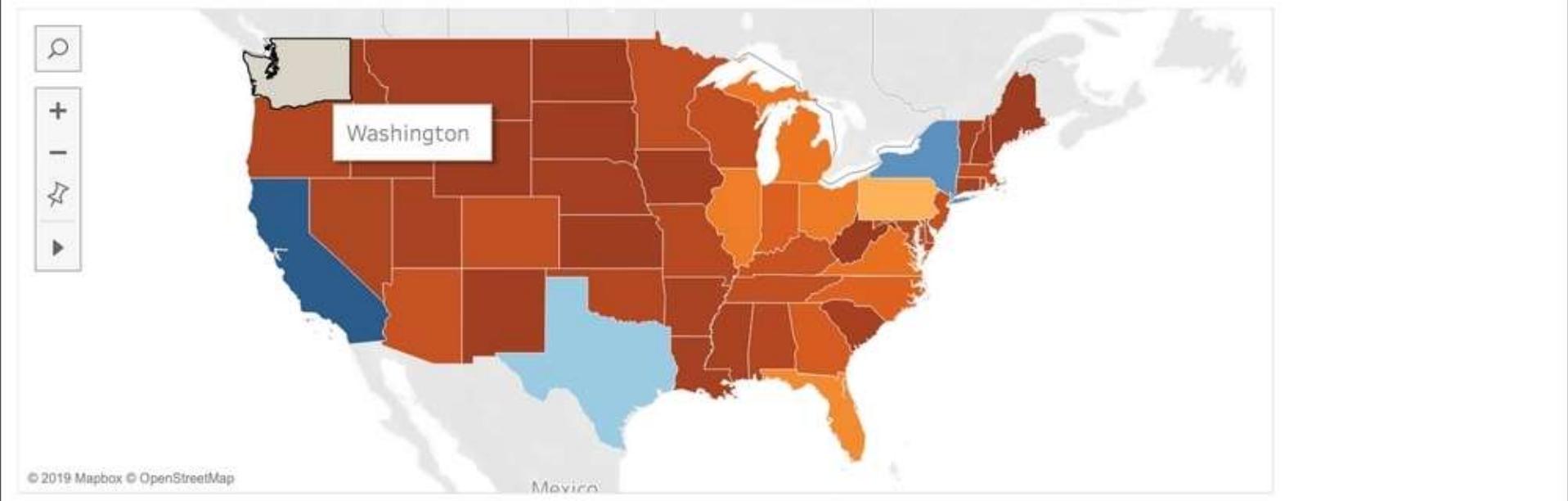
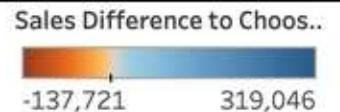
- Change Parameter... is the newest action introduced in Tableau 2019.2.
- It allows you to visually change the value of a parameter based on a Worksheet. Previously, you had to change it from a menu.
- The following screenshot is an example of how to use this new Action.
- When you hover over a State, it updates the value of a parameter based on the sales of the hovered state.

Sales comparison

Hover over a State to change the value of **Sales Parameter** and use the selected State sales as the comparison value

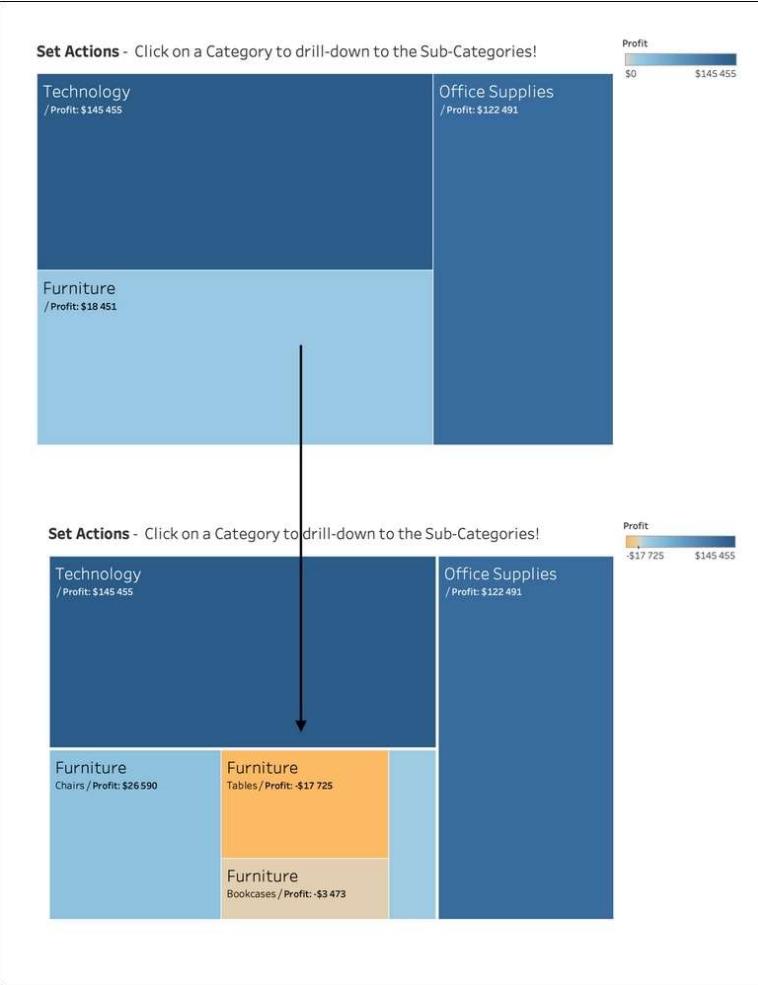
Selected State: Washington

Sales parameter: \$138,641.27



The Change Set Values action

- The Change Set Values... action allows you to select, visually, the values to put in a set.
- The behavior is quite similar the Change Parameter... action.
- One of the biggest differences is that a parameter can only have one value, whereas sets can have multiple values in them.



Dashboard actions

As for the action filter, you can dictate the behavior when clearing the action. There are three different behaviors:

- Keep set value: When you clear the selection, the current values of the set stay as selected.
- Add all values to set: When you clear the selection, all the values are added to the set.
- Remove all values from set: When you clear the selection, all the values will be removed out of the set.

Creating a story

- Stories are designed for data storytelling. You can control what the users will discover, in which order, and add annotations and explanations throughout the Story.
- Creating a new Story is as simple as creating a Dashboard; you can either click on the icon at the bottom-right, click on New Story from the Story top menu, or use the New Story button in the toolbar.

Creating a story

- The main difference with Dashboards is the Story points.
- A Story is usually composed of multiple Story points.
- Each of them can contain only one Worksheet or one Dashboard. Here's an example of three Story points:



Creating a story

- When you hover over a Story point, you'll see these four icons:



Creating a story

Each icon has a unique function:

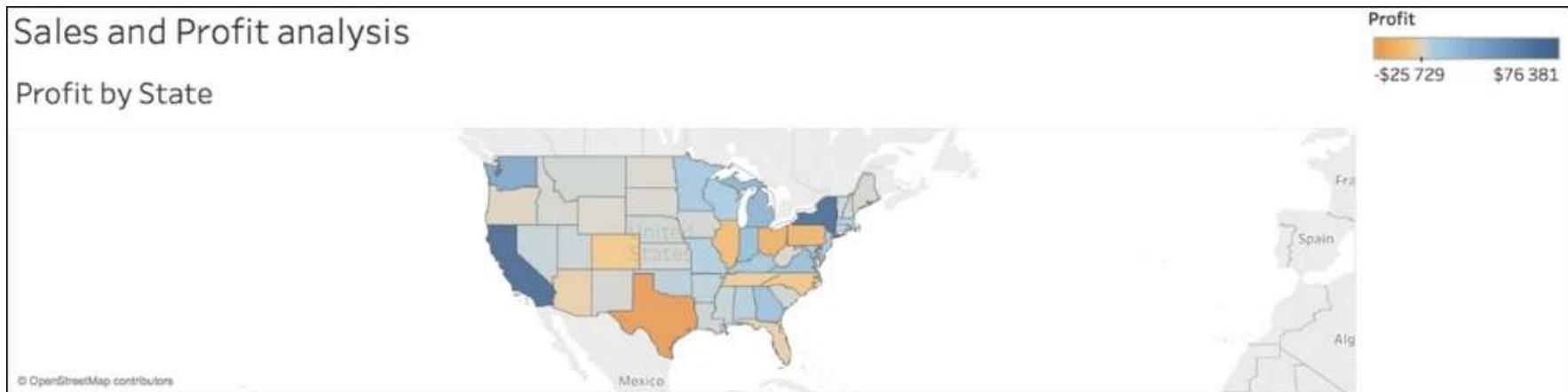
- The first one removes the Story point
- The second icon reverts the changes to the latest updated state
- The third one refreshes the Story point and memorizes the changes in a new state
- The last icon saves the current changes in a new Story point

Building a story

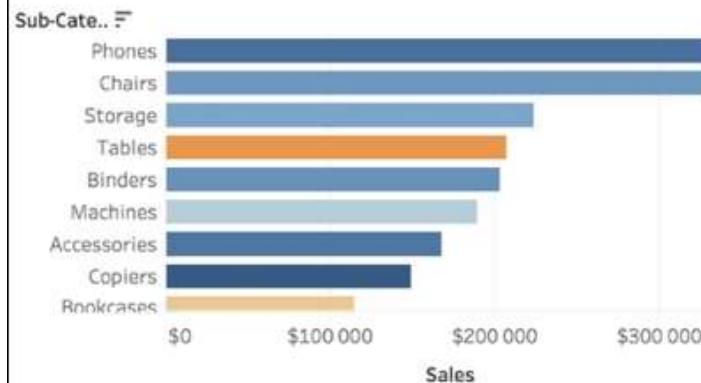
- You begin to build a Story in a Story point. Each Story point contains one Worksheet or one Dashboard.
- You can add them with a simple drag-and-drop to the central blank area (or use a double-click).
- Then, you can create a new blank Story point and add another Sheet or duplicate the existing one to Highlight or Filter a specific element.
- The Story keeps the selection, Highlights, and Filter added on each Story point.

Sales and Profit analysis

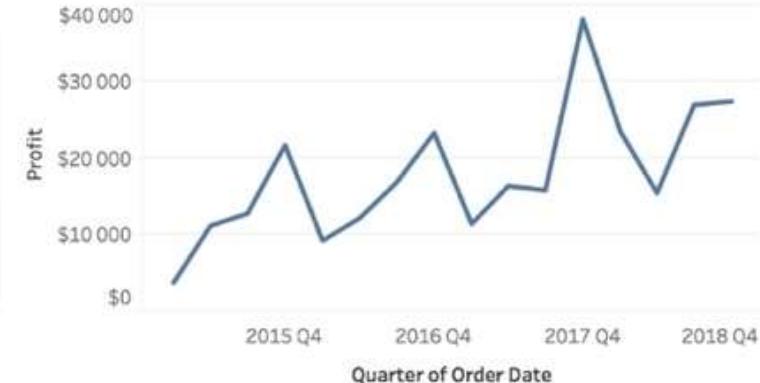
Profit by State



Sales and Profit by Sub-Category



Profit Evolution



Building a story

- Create a new Story and call it Sales and Profit Insights.
- Drag and drop the Sales and Profit Analysis Dashboard in the Story, and change the caption of the Story point to Sales and Profit Analysis.
- Duplicate the current Story point with the button on the left.

Sales and Profit Insights



< Sales and Profit Analysis >

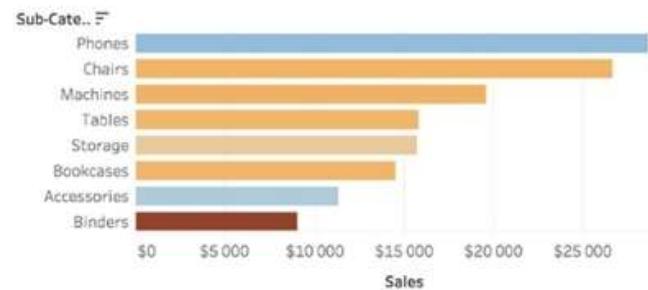
Texas is the less profitable State

Sales and Profit analysis

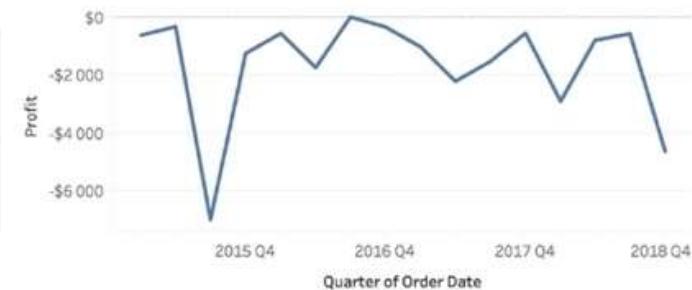
Profit by State



Sales and Profit by Sub-Category



Profit Evolution



Sales and Profit Insights | Profit Evolution | Profit by State | Sales and Profit analysis | Sales and Profit Insights

Sales and Profit Insights



Sales and Profit Analysis

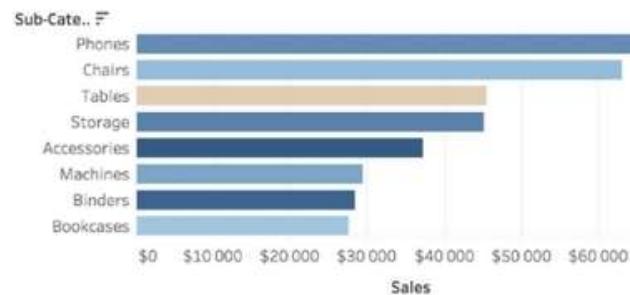
Texas is the less profitable State

Sales and Profit analysis

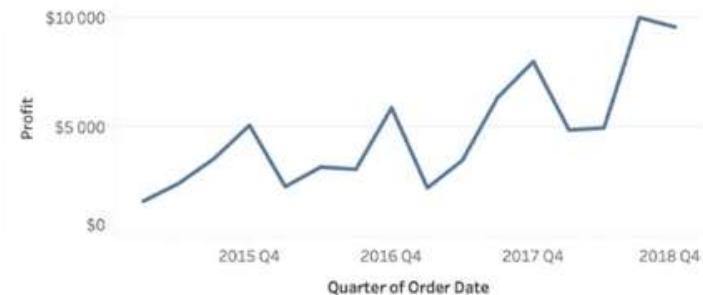
Profit by State



Sales and Profit by Sub-Category



Profit Evolution



it by Sub-Category | Profit Evolution | Profit by State | Sales and Profit analysis

| Sales and Profit Insights

Building a story



Customizing a Story using Story options

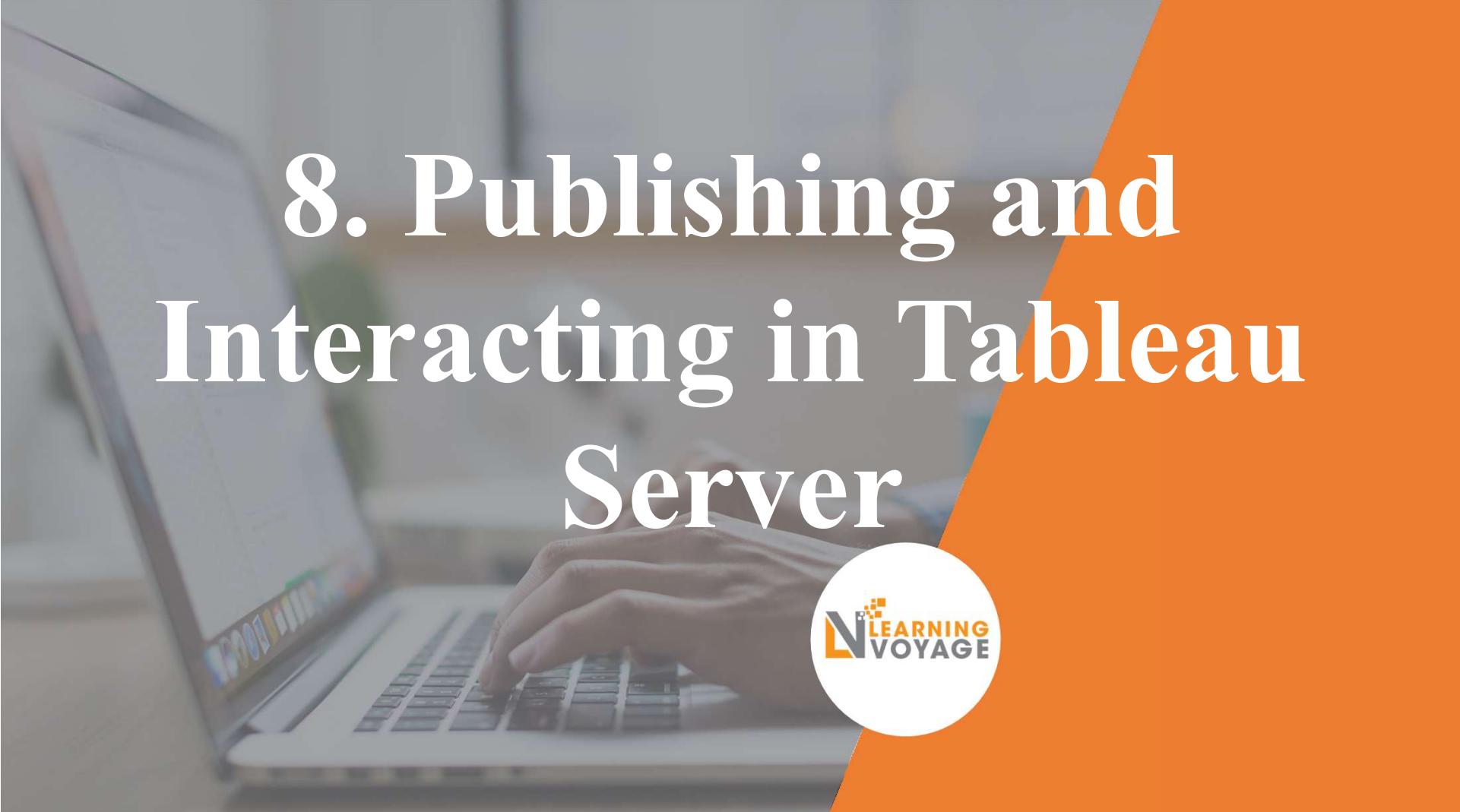
There are not many options to customize a Story.

On the left, at the bottom of the Story pane, you'll find three options:

- Add Floating Text to add some context.
- Show or hide the title of the Story.
- Change the size of the Story.

Summary

- Congratulations! This lesson was one of the longest, while also being one of the most important. Building Dashboards is an essential feature of Tableau.
- We started with the basics of how to build a Dashboard and the different panes in the workplace, and we also saw the objects that you can add to personalize it.



8. Publishing and Interacting in Tableau Server



Publishing and Interacting in Tableau Server

Thanks to Tableau Server, users can connect to new or published data sources to create new analyses and open published Workbooks to interact with them. In this lesson, our main focuses are as follows:

- An introduction to Tableau Server
- Publishing and modifying content
- Interacting with published content

Publishing and Interacting in Tableau Server

- To reproduce the example in this lesson, you will need access to Tableau Server. Additionally, we are going to use a Tableau Workbook example: World Indicators.
- You can find it on the start page when you open Tableau, as highlighted in the following screenshot:



An introduction to Tableau Server

Basics

- Tableau Server is an online tool made for sharing workbooks and data source.
- Usually, only a few people use Tableau Desktop to build data source and workbooks, which they then publish on Tableau Server, making them available to many users using Tableau Server on the web.

An introduction to Tableau Server

There are two ways of using Tableau Server, as follows:

- In a browser: To access the Tableau Server web page and interact with published content (such as data source, workbooks, and views)
- In Tableau Desktop: To publish data source and workbooks, or connect to published data source and open published workbooks

- Once you're logged in, you can access the Home page of Tableau Server, as shown in the following screenshot:

The screenshot shows the Tableau Server Home page. On the left is a navigation sidebar with icons for Home, Explore, Favorites, Recents, Users, Groups, and Schedules. The main area is titled "Home" and "Recents". It features three dashboard cards:

- Tourism**: A stacked bar chart titled "Income By Region" showing income by region and country from 2001 to 2009. The legend includes Europe, Middle East, Africa, Asia, North America, and Latin America.
- Overview**: A map of the United States where states are colored according to their performance, with numerical values ranging from 10,000 to 100,000 displayed above each state.
- Global Indicators**: A map of the world showing various global indicators across continents.

At the top right are search, help, notifications, and user profile icons. Below the dashboard cards are "Create" and "See All" buttons.

- **Home:** It is the first page and it contains information on the most recent dashboards and what the other users are viewing. You can also use the Create button to create a new Project or workbook.
- **Explore:** Here, you can search for the different types of content available in Tableau Server. On the left, you have options to sort, filter, and change the display between a grid and a list.
- **Favorites:** You can click on the star icon of the published content to add it to the favorites page.
- **Recents:** This displays the latest opened content.

An introduction to Tableau Server



Tableau Server content

There are different types of content on Tableau Server:

- Projects
- Workbooks
- Views
- Data sources
- Flows:

Explore / World Indicators Tutorial



World Indicators Tutorial

Owner [Tristan Guillemin](#)

Create

Select All



Country Specific One Pager



World Indicators



World Indicators



Extract

Last refresh May 10, 2019, 2:21 PM

Publishing and modifying the content

- On Tableau Desktop, you can connect to Tableau Server with from the Sign In... option in the Server top menu. When signed in, you are able to publish data source and workbooks.
- Before we start this section, first, create a new project on Tableau Server and name it World Indicators Tutorial – we'll publish our work here.

Why and how to publish a data source

Tableau Desktop is the only tool that allows you to connect to a dataset, create an extract, publish it to Tableau Server, and schedule an automatic refresh. Publishing a data source offers multiple advantages:

- All the customization (such as aliases, default properties, hidden or renamed fields, and more) is saved.
- If you or another Tableau Server user uses a published data source, all the customization work is already done.

Publishing and modifying the content

- Select the project and the name of the data source.
- Add a description and a tag to help understand and find the data source (this is optional).
- Schedule a task to refresh the Extract (optional and only works if the Data Source is an Extract).
- Modify the permissions (you will learn more about this in lesson 13, Dealing with Security).
- Update the workbook to use the published data source (I strongly advise you to use this option).

Publish Workbook to Tableau Online X

Project
World Indicators Tutorial

Name
World Indicators

Description

Tags
[Add](#)

Sheets
All [Edit](#)

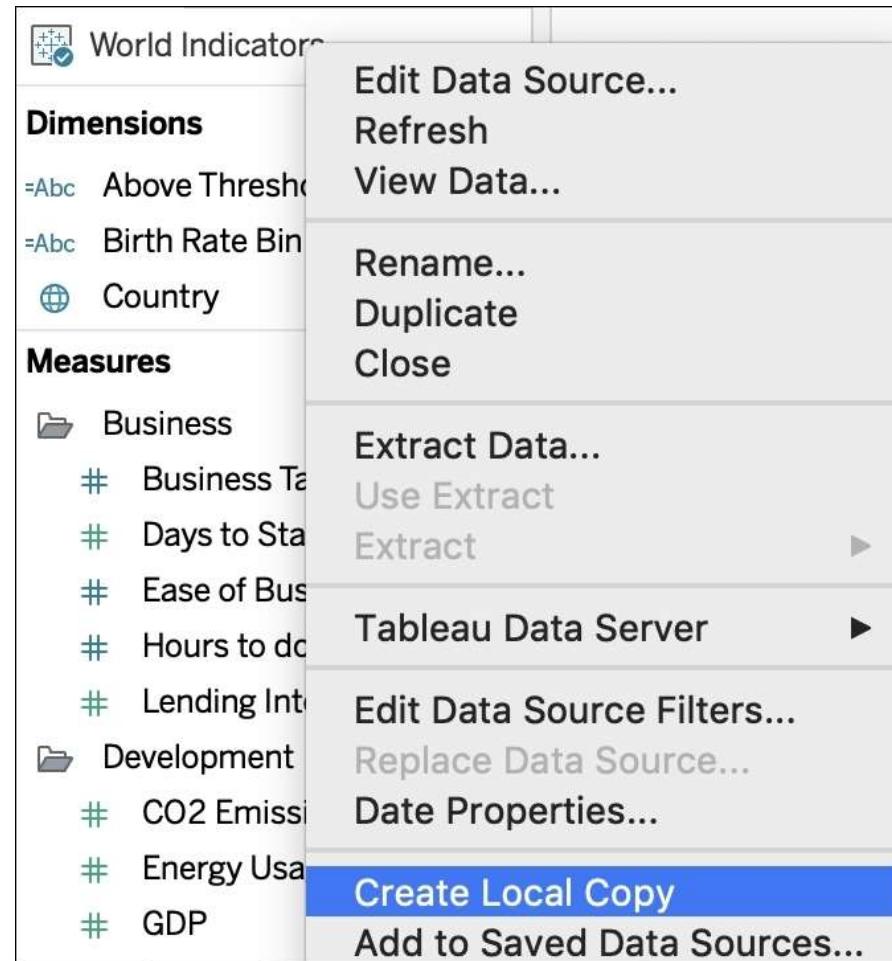
Permissions
Same as project (**World Indicators Tutorial**) [Edit](#)

Data Sources
1 embedded in workbook
1 existing connection [Edit](#)

More Options

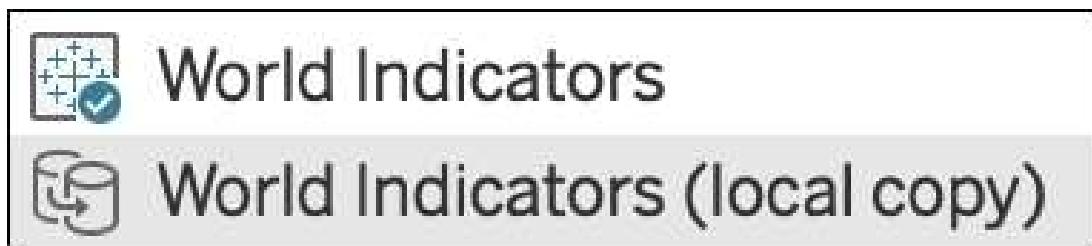
Show sheets as tabs
 Show selections

[Publish](#)



Modifying a published data source

- This option automatically downloads the data source and adds it to the workbook as a new data source.
- When you create a local copy, it appears directly in the Data pane:



Modifying a published data source

Name

World Indicators

Data source name is already in use. Publishing will overwrite the existing data source.

Publishing a workbook

- Publishing a workbook is the best way to share your insights.
- You can control who has access to your visualizations, and Tableau Server users have many ways of interacting with it.
- Again, publishing a workbook is straightforward; in the Server top menu, you have the Publish Workbook... option, as follows:



- **Select the visible sheets:** The sheets that you decide not to publish are hidden in Tableau Server, but they are still available if you open the workbook in Tableau Desktop.
- Decide whether you want to embed the data source inside the workbook or publish it separately and automatically.
- Show the different sheets as tabs or not (this is usually yes, as you'll want to show the different tabs for the different dashboards in your workbook).
- Show the selections or not (this is usually no unless you want to highlight specific information every time a user opens the workbook).
- Include external files or not (this is usually yes to include shapes and pictures).

- Again, as an exercise and for the rest of this lesson, you can publish the World Indicators Workbook in the World Indicators Tutorial Project:

Project
World Indicators Tutorial

Name
World Indicators

Description

Tags
[Add](#)

Sheets
[All](#) [Edit](#)

Permissions
Same as project (**World Indicators Tutorial**) [Edit](#)

Data Sources
1 embedded in workbook
1 existing connection [Edit](#)

More Options

Show sheets as tabs
 Show selections

  **World Indicators Tutorial**   

Owner [Tristan Guillevin](#)



Population and Birth Rate (2012)

Birth Rate (%)

- > 4% (Red)
- 1.5-3% (Orange)
- 1.0-1.5% (Yellow)
- < 1.0% (Green)

Population Total

- 0-100M (Lightest Gray)
- 100-200M (Medium Gray)
- > 200M (Darkest Gray)



Extract

Last refresh May 10, 2019, 2:21 PM

World Indicators  

World Indicators  

Interacting with published data sources

- **Connections:** Here, you can see the different connections of your data source with the ability to edit the information if it is connected to a server.
- **Extract Refreshes:** Here, you'll find here the scheduled refreshes planned for your data source, with the ability to create a new refresh.
- **Connected Workbooks:** Here, you'll find a list of all the workbooks that are connected to this data source.

Ask Data

Ask Data Connections 1 Extract Refreshes 0 Connected Workbooks 1

Analysis complete ⓘ ⚡ <
Refresh

=Abc Above Threshold?
=Abc Birth Rate Bin
🌐 Country
⠀ Ease of Business (cluste...
.iii. GDP per Capita (bin)
Abc Region
📅 Year

Birth Rate

average CO2 Emissions by Country X

Or try one of these suggestions:

GDP at least \$63,101,272
sum of Birth Rate
sum of Birth Rate by Country as a map



Ask Data

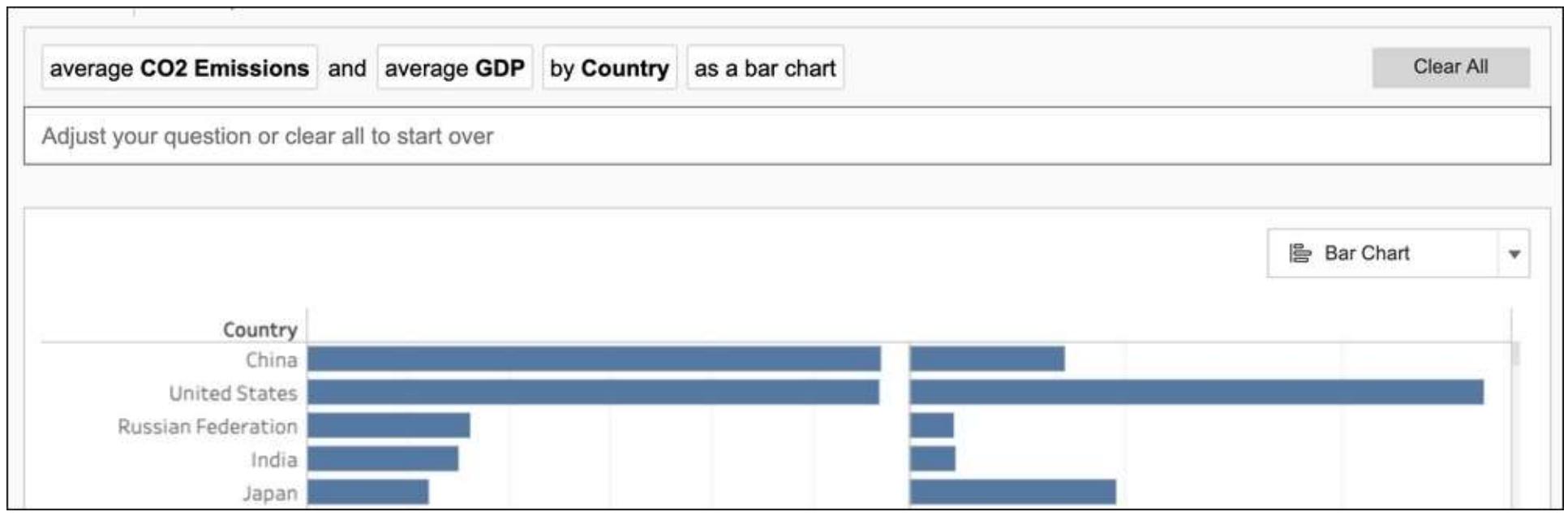
- Without any knowledge on how to use Tableau to create a visualization, Ask Data was able to convert some text into a visualization. I don't know about you, but I'm very excited about that!
- This workplace is quite similar to the good old Worksheet workplace with the Data pane on the left-hand side and the different sheets at the bottom.

Ask Data

- At the top of the page, you can see that the search bar has expanded and suggests that you can adjust the question or use the Clear All button to start over.
- Let's try to add more insights to this map by typing average GPD into the textbox:

The screenshot shows a user interface for data analysis. At the top, there are two input fields: the first contains "average CO2 Emissions" and the second contains "by Country". To the right of these fields is a "Clear All" button. Below this row, there is a single input field containing "average GDP", which is preceded by a small "X" icon indicating it is a suggested or temporary entry. The entire interface is set against a light gray background with a thin black border around the main content area.

Ask Data



average CO2 Emissions and average GDP

by Country

as a bar chart

Adjust your question or clear all to start over



Search



All Types

Population 15-64

Population 65+

Population Total

Population Urban

Abc Region

Tourism Inbound

Tourism Outbound

Aggregation / Group by

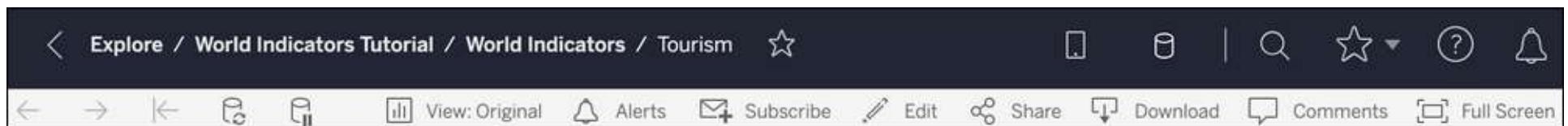
Group By

Cancel

Accept

Interacting with published workbooks

- On top, there is the navigation bar with the current path to the view and some icons allowing you to open the device layout preview, see the data sources, and the other default options (such as search, favorites, help, and notifications):



Interacting with published workbooks

Additionally, there are Height features available only on Tableau Server, including the following:

- Edit is explained in the Web Authoring section
- Share provides a link to the View and the code for embedding it in a web page
- Full Screen speaks for itself

 World Indicators   

Owner [Tristan Guillevin](#) Modified: May 10, 2019, 3:30 PM

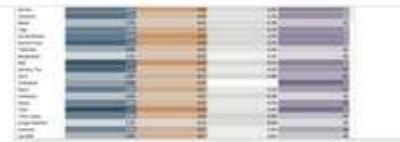
[Edit Workbook](#)

Views 8 Data Sources 1 Subscriptions 0

Select All Sort by: Sheet (First–Last) 



Population



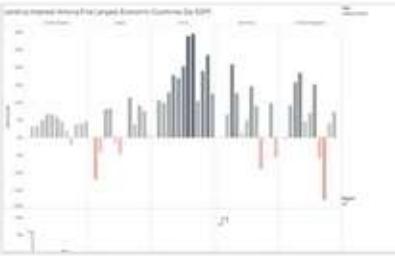
Health Indicators



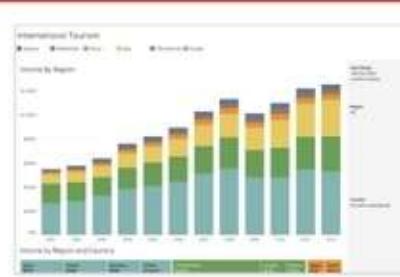
Care Spend



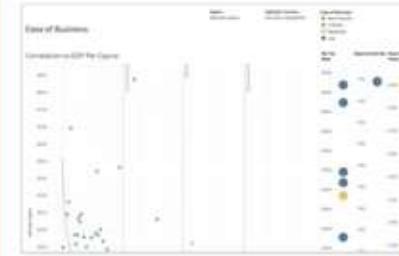
Technology



Economy



Tourism



Business



Global Indicators

Custom views

- A custom view is a way of saving the current state of a visualization to reopen it later.
- Imagine that, in a dashboard, you need to select different values in many different filters to focus the visualization on what really interests you.
- Without custom views, you'll have to apply the different filters each time you open the workbook.

Custom views

- Make it my default: Each time you open the workbook, it will be this custom view that will open by default.
- Make it public: The other Tableau Server users are able to see and use your custom view.
- My Views: The list of all the custom views that you created for this view.
- Other Views: The list of all the other public custom views created by other users.
- Manage: With the Manage button, you can rename, delete, or hide your custom views.

Custom views

Let's take a look at a quick example on the Tourism View together:

- Use the quick filters to start the Year Range filter in 2005 and select Europe in the region.
- Click on View: Original.

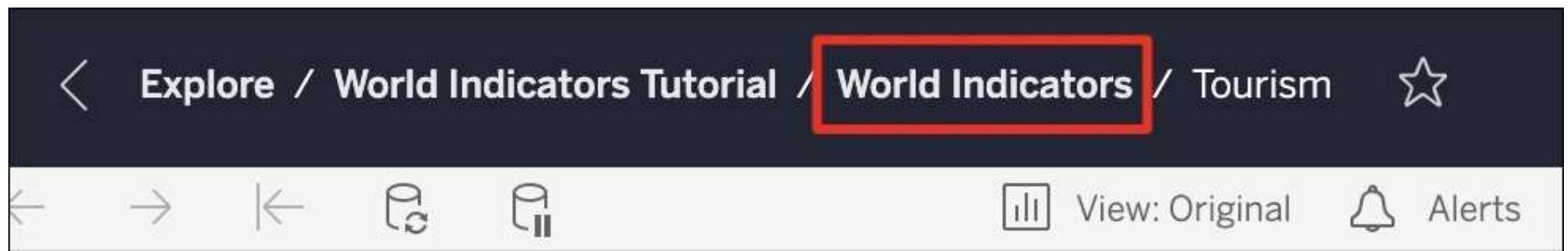
Custom views

- In the configuration window, name your custom view Europe, starting in 2005, make it your default, and then click on Save. The configuration window should look like the following screenshot:



Custom views

- Click on World Indicators in the very top of the window to go back to the list of views:



Alert

- With alerts, Tableau sends you an email when a condition is fulfilled in your View after a refresh.
- For example, if you have a visualization with daily sales, you can configure an alert to receive an email when the sales are above or below a certain amount.
- An alert is a great way to allow you to do something other than checking your dashboard every day on Tableau Server. You can set an alert on any visualization as long as it has an axis.

Alert

- The Condition and the Threshold to trigger the alert.
Tableau indicates to you whether the condition is currently true or not.
- The Subject of the email and the frequency at which it is sent.
- The Recipients of the email (you can specify multiple users who will receive the email).
- The visibility of the alert to allow other users to view and use it.

Alert

Tourism Income above 1,250B!

Actions ▼

Above or equal to 1,250,000,000,000

Never triggered

Remove me

Edit

Change owner

Delete

Alert

Let's create an alert for the Tourism View:

- Click on the Alert button to open the Alerts pane.
- Click on the axis of the Income by Region visualization (it turns blue when selected), and then click on the Create button in the Alerts pane.

Alert

Create Alert X

Send email if 'SUM(Tourism Inbound)' is:

Condition	Threshold
Above or equal to	▼ 1,250,000,000,000

Condition currently true

Subject

Data alert - Tourism income above \$1,250B !

When the condition is true, send email:

Once—the first time it's true ▼

Subscribe

- If you subscribe to a view or workbook, you'll receive, at a chosen frequency, an email with snapshots of your visualizations.
- Like alerts, it's a useful feature that allows you to receive insights directly into your inbox, without having to connect to Tableau Server.
- Each snapshot contains a link to the published visualizations, so if you spot something intriguing, click on the picture to automatically open the View in Tableau Server and start your analysis.

Subscribe

- To subscribe, click on the Subscribe button in the toolbar and configure it on the window that opens.
- Here's a screenshot of the Subscribe configuration window:

Subscribe

Subscribe Users
Tristan Guillevin + 2

Subscribe Users in Groups
Top Management

Include
Entire Workbook ▾

Schedule
5 days a week, at 10:00 ▾

Subject
Tourism

Message
Daily Sales update

Don't send if view is empty

Subscribe me

Manage

Download

- **Image:** This generates a picture of the view.
- **PDF:** This generates a PDF of the current View or the entire workbook. You can specify the scaling and format of the PDF.
- **PowerPoint:** This generates a PPTX file with each view of the workbook in a specific slide.
- **Workbooks:** This downloads the file.

Download

To activate the two other options, you need to click on a visualization. If you click on a mark, you will download the data of that mark. Unfortunately, there is no way to see which Worksheet is selected. The two options are as follows:

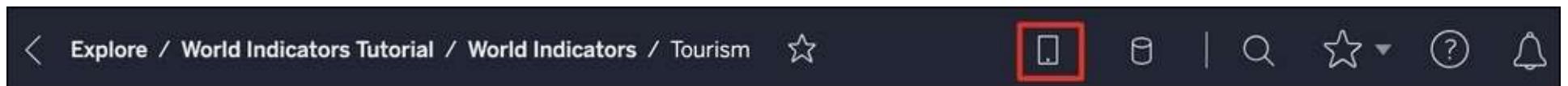
- **Data:** This opens the summary data, but you can also get the full data on the second tab.
- **Crosstab:** This generates a CSV file that you can download.

Comments

- When you click on the Comments button, a Right-hand pane opens where you can chat with other users.
- Each workbook's views have their proper comments.
- Any user (who is allowed to do so) can add a comment, mention other users, and add a snapshot of the current view.

The mobile layout preview

- Since Tableau 2019.1, you can preview the different layouts on Tableau Server.
- Above the toolbar, a new button, Preview Device Layouts, is now available, as highlighted in the following screenshot:

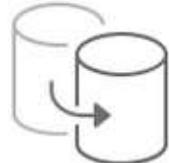


Web Authoring

- Web Authoring is the ability to add new data sources and build new workbooks directly from Tableau Server on the web.
- There are three main ways of opening Web Authoring mode.
- This first way to open Web Authoring mode is by clicking on the Edit button when interacting with a view.

Web Authoring

> Explore / World Indicators Tutorial / World Indicators

World Indicators

Owner **Tristan Guillevin** Last refreshed May 10, 2019, 2:21 PM

☆ ⓘ ...

New Workbook

Web Authoring

- **File:** Drag and drop an Excel file or CSV file on the web page; you can choose the Sheets option and build a new data source.
- **Connectors:** A list of server-hosted databases available directly from Tableau Server.
- **On this site:** Use an existing published data source.
- **Dashboard starters:** Start with prebuilt templates of cloud-based systems.

Summary

- Now that you've learned how to use Tableau Server, you have a complete view of what Tableau can do as a data visualization and analysis tool.
- We looked at connecting data to Tableau Desktop, building your data source, Worksheets and dashboards, and finally publishing all your work online for you and other users to interact with. What a journey!

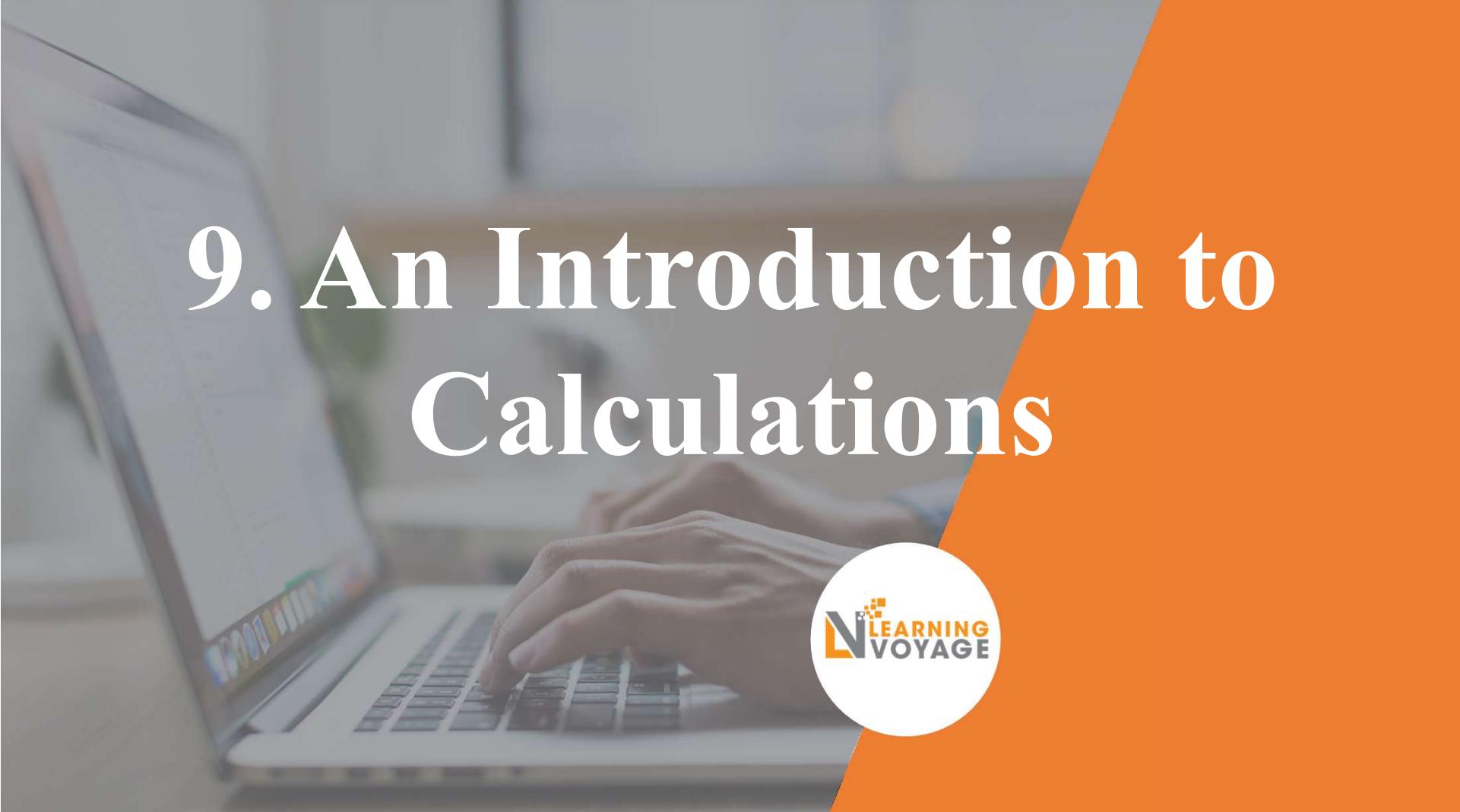
Section 3: Advanced features



Advanced features

This section will include the following lessons:

- lesson 9, An Introduction to Calculations
- lesson 10, Analytics and Parameters
- lesson 11, Advanced Data Connections
- lesson 12, Dealing with Security



9. An Introduction to Calculations



An Introduction to Calculations

This lesson is split into two main sections:

1. Calculated field basics
2. Advanced functions

- In this lesson, some examples use the Sample-Superstore saved data source, but others require special files. You can find the files that are used for the tutorials on my website, <https://tableau2019.ladataviz.com>, in lesson 9, An Introduction to Calculations.

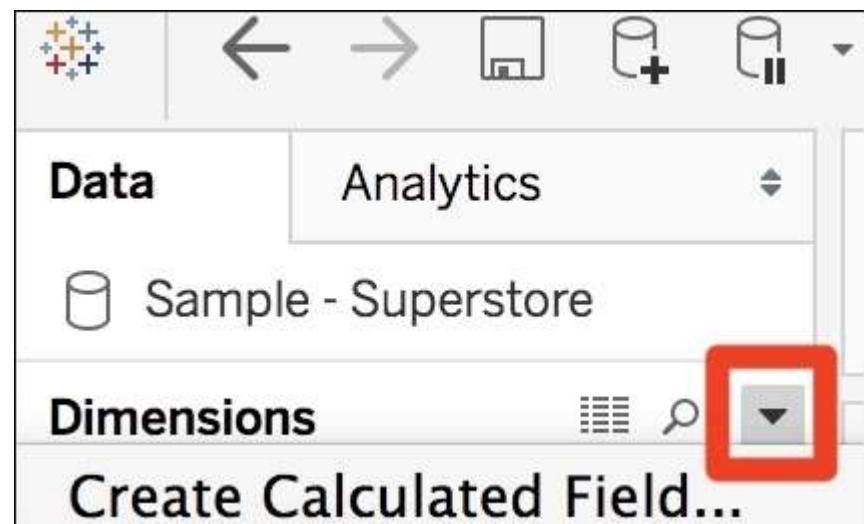
Calculated field basics

- A Calculated Field is a new field in your data source.
- It can have any data type and be a Measure or Dimension.
- To differentiate a field from a calculated field, each data type icon has a small equals (=) symbol in front of it, as you can see in the following screenshot:



Creating a Calculated Field

- Click on the small arrow next to Dimensions in the Data pane, which is highlighted in the following screenshot, and select Create Calculated Field:



Creating a Calculated Field

The screenshot shows a software interface for creating a calculated field. On the left, a dialog box titled "Expenses" contains the formula `sum([Sales])-sum([Profit])`. Below the formula, a message says "The calculation is valid." and there are buttons for "Apply" and "OK". A tooltip at the bottom of the dialog box states: "Changes to this calculation might change the following: Fields: % Expenses, Sheets: Expenses". On the right, a sidebar titled "Profit" shows a list of functions: ABS, ACOS, AND, ASCII, ASIN, ATAN, ATAN2, ATTR, AVG, CASE, and CEILING. The sidebar also indicates "Data type: Float" and has a "Describe..." button.

To aggregate or not to aggregate fields

The main rule when you create a calculated measure is to think about the aggregation. As you already know, a Measure is, by default, aggregated, and so are calculated measures. You can specify the aggregation inside the formula or not:

- If you aggregate the data inside the formula, the pill of the calculated Measure will start with AGG
- If you don't specify the aggregation in the formula, a default one will be added when you use the field in the View, as it would for any normal measure

To aggregate or not to aggregate fields

Expenses

Profit	\$286 397
Sales	2 297 201
Profit Ratio	12%
Wrong Profit Ratio	120242%

Measure Values

SUM(Profit)

SUM(Sales)

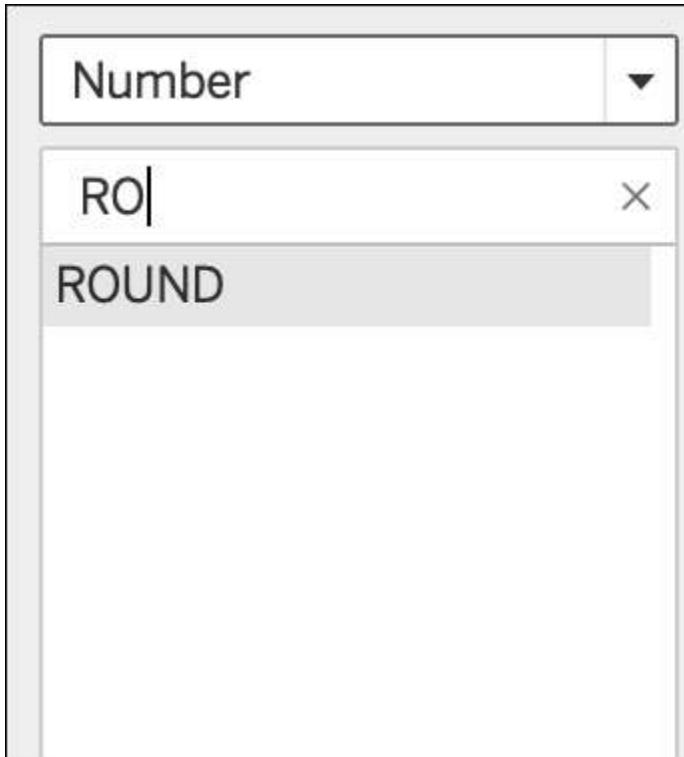
AGG(Profit Ratio)

SUM(Wrong Profit Ratio)

Using calculation functions

- Of course, you can create Calculated Fields based on a calculation between different fields (such as the Profit Ratio); however, the really interesting aspect of Calculated Fields is the functions.
- **There are many different functions;** some basic, some hard to understand. Each function returns a specific data type, and some require arguments.
- **Tableau has made this easy:** each function has a clear description and examples for learning how to use them.

- Here's an example of the round fun



The screenshot shows a software interface with a search bar labeled "Number" containing "RO". Below it is a dropdown menu with "ROUND" selected. To the right, the function is defined and examples are provided.

ROUND(number, [decimals])

Rounds a number to the nearest integer or to a specified number of decimal places.

Example: `ROUND(3.1415, 1) = 3.1`

Example – highlighting values

Probably the most common use of a calculation is to highlight values. Let's create a calculation that returns different text values depending on sales:

- Open Tableau Desktop and click on the Sample – Superstore saved data source.
- Create a new Calculated Field and name it Sales Highlight.
- Write the following formula and check that the calculation is valid: **if SUM([Sales]) > 300000 then "Great" ELSEIF SUM([Sales]) < 50000 then "Bad" else "Average" END.**



Advanced functions

Table Calculation

- The Table Calculation functions are special in many ways. Mastering them requires practice, but they are very useful.
- It's important to understand how they work and how to use them.
- Let's start slowly by using an awesome option called Quick Table Calculation.

Quick Table Calculation

- Quick Table Calculation is an option that becomes available with a right-click on every Measure.
- It automatically changes the Measure to a Calculated Measure using a Table Calculation function.



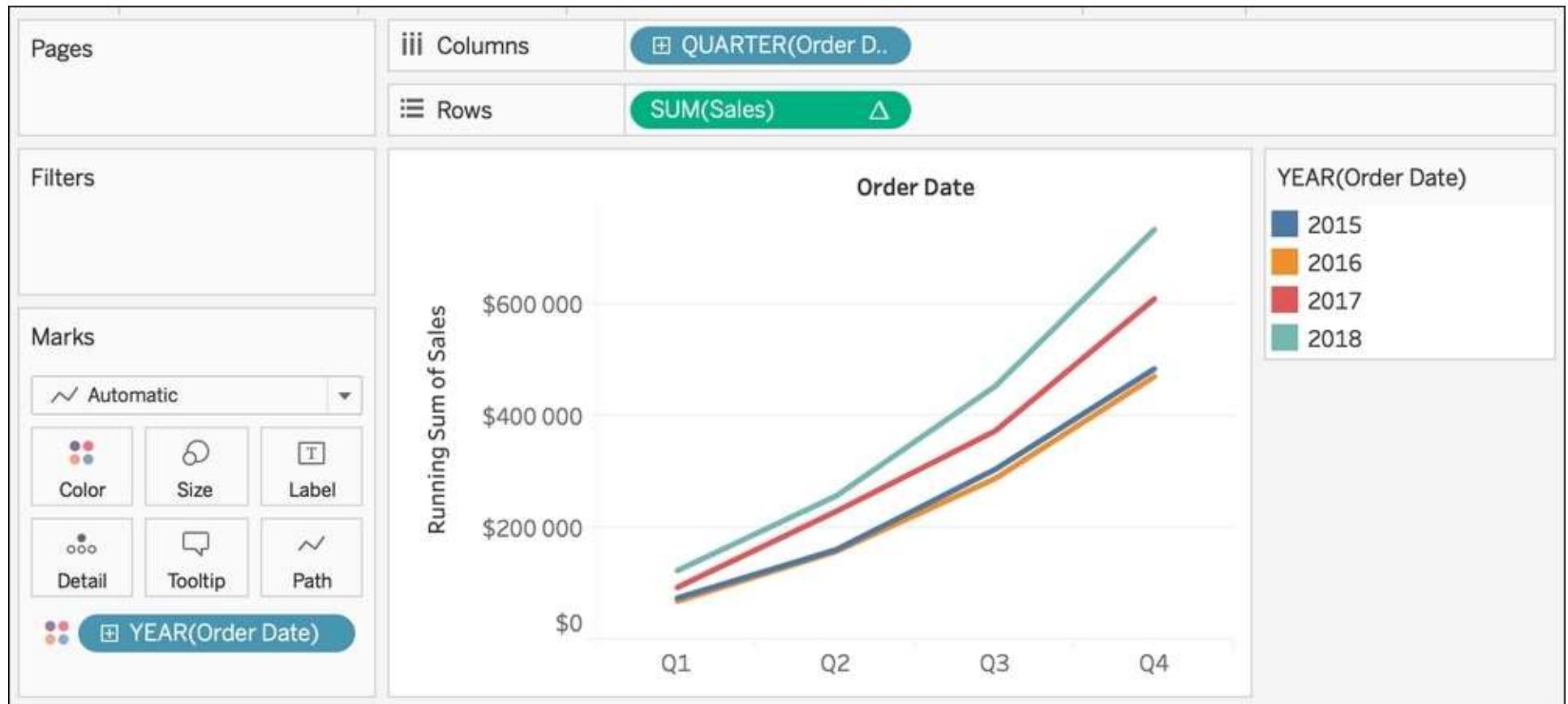
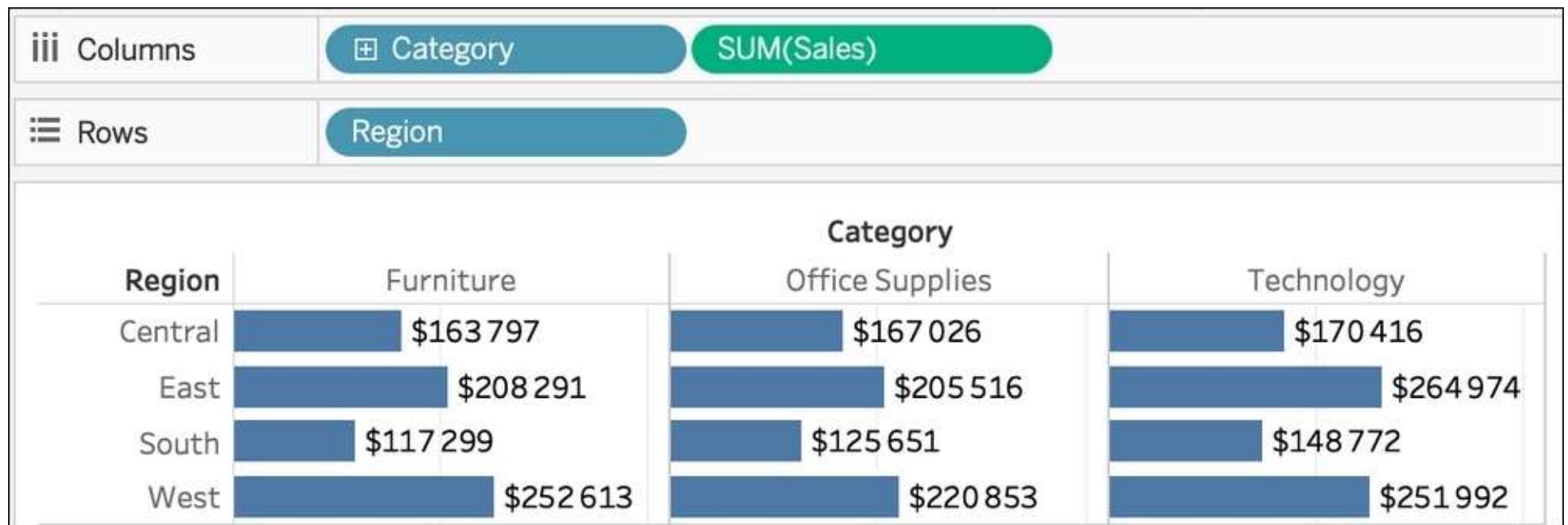


Table Calculation functions

- Table Calculation functions, such as WINDOW, LOOKUP, or INDEX, allow you to create advanced Calculated Fields. You can quickly spot a Calculated Field that uses a Table Calculation function by the triangle icon in its pill:
Table Calculation functions. 
- A standard calculated Measure is computed for every row in the Data Source, and then aggregated when used in the View. When using a Table function, it's a bit different

Hands-on – Table Calculation functions



Hands-on – Table Calculation functions

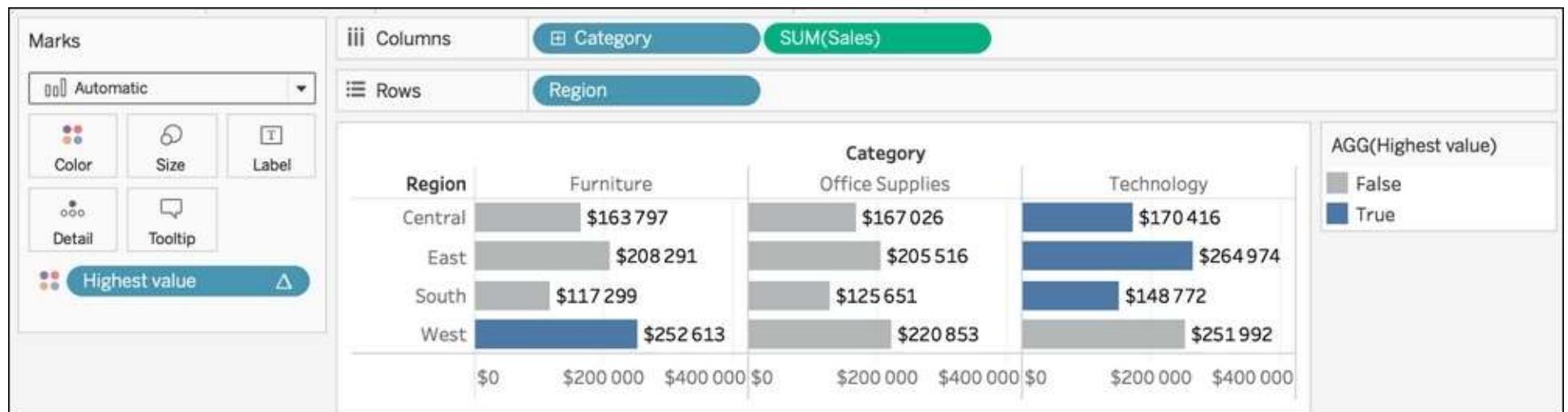
Our goal is to highlight the highest sales value. Since we have two dimensions in the view, there are two options: either show the maximum value for each Region or for each Category. You can easily achieve this with Table Calculation functions. Follow these steps to set this up:

- Create a new calculated field and name it Highest Value.
- Write the following calculation and check that it is valid:
SUM([Sales]) = WINDOW_MAX(SUM([Sales])).

Hands-on – Table Calculation functions



Hands-on – Table Calculation functions



Level of Detail

- Level-of-Detail (LOD) functions were introduced in version 9 of Tableau and, today, it's hard to believe that there was a time without them! These functions are probably the most powerful ones.
- The **FIXED** function, in particular, allows you to ignore Filters, ignore duplication in your data, and return a Measure that's aggregated on the dimension of your choice.

- **INCLUDE** adds the specified Dimensions to the level of detail of the aggregation—for example, the { INCLUDE [Region]: SUM([Sales])} calculation aggregates the Sales by Region and all the other Dimensions in the View.
- **EXCLUDE** removes the specified Dimensions from the LOD of the aggregation—for example, the { EXCLUDE [Region]: SUM([Sales])} calculation aggregates the Sales by all the Dimensions in the View except the Region.
- **FIXED** can do both, as you have to specify all the Dimensions of the level of detail precisely—for example, the { FIXED [Region]: SUM([Sales])} calculation aggregates Sales with Region only, no matter the other Dimensions in the View.

FIXED

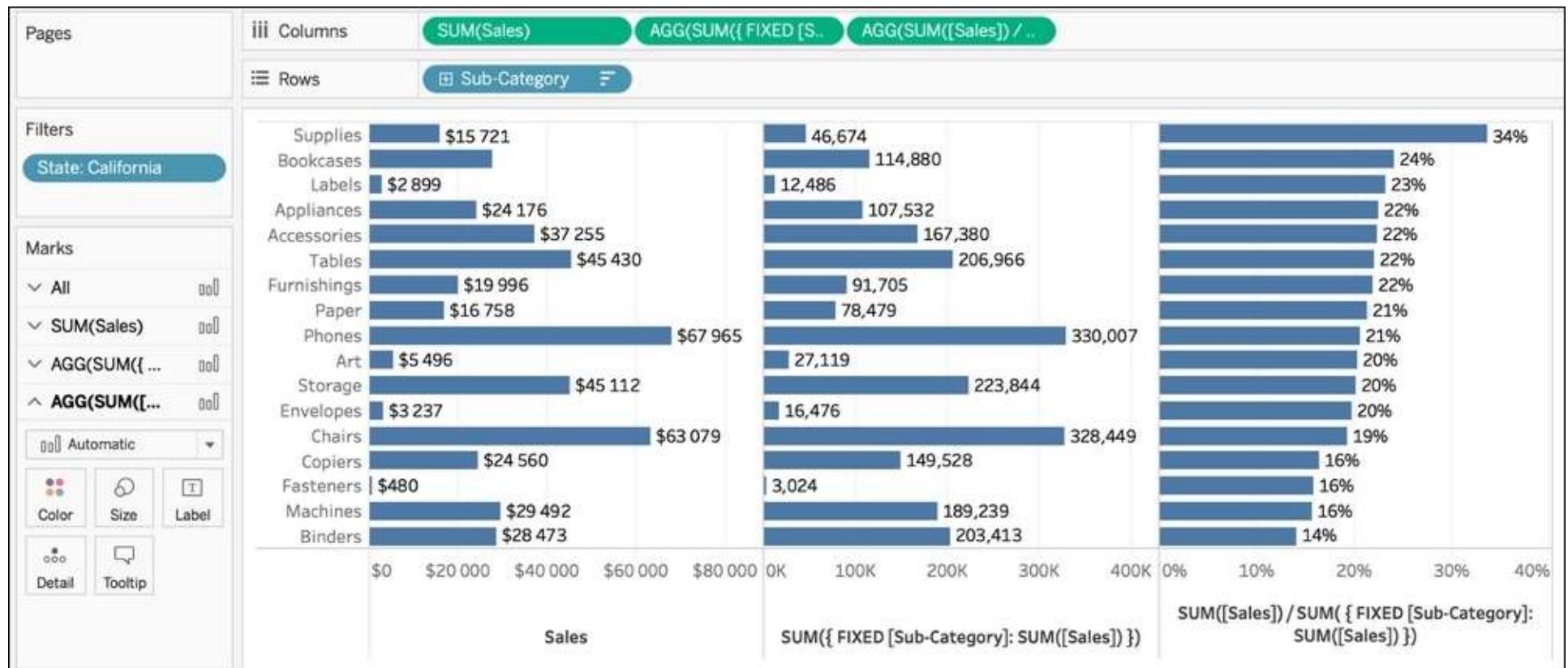
- With FIXED, all the Dimensions that you want to include in the level of detail must be specified, so if you want to exclude an existing Dimension, don't specify it, and if you want to include one, specify it.
- Calculated fields that use a FIXED function have three advantages. First, they are easier to understand than INCLUDE or EXCLUDE.

FIXED



FIXED

- A normal aggregation, that is, the sum of sales:
 $\text{SUM}([\text{Sales}])$
- A FIXED calculation: $\text{SUM}(\{\text{FIXED}[\text{Sub-Category}]: \text{SUM}([\text{Sales}])\})$
- The ratio of the two previous Measures: $\text{SUM}([\text{Sales}]) / \text{SUM}(\{\text{FIXED}[\text{Sub-Category}]: \text{SUM}([\text{Sales}])\})$



using an LOD function to deduplicate your data

- In the following example, we'll add a Target for each Category.
- The Target table contains two columns, Category and Target, as you can see in

Category	Target
Technology	7000
Office Supplies	20000
Furniture	10000

Let's add a target to our orders and deduplicate the data thanks to the FIXED function:

- Open Tableau and connect to the Superstore with Target Excel file.
- Create a Join between the two tables on Category. As you can see, the TargetValue is duplicated

The screenshot shows the Tableau Data Source interface. On the left, under 'Connections', there is one connection named 'Superstore-with-Target Microsoft Excel'. Under 'Sheets', there are three sheets: 'Orders', 'Target', and 'Orders'. A 'Use Data Interpreter' checkbox is checked, with a note explaining it might be able to clean the Microsoft Excel workbook. The main area displays a data preview of the joined 'Orders' and 'Target' tables. The 'Orders' table has columns: Order ID, Customer Name, Ship Date, Ship Mode, State, Sub-Category, and Category (Target). The 'Target' table has a single column: Target Value. The preview shows two rows where the same customer has two different target values assigned.

Customer	Ship Date	Ship Mode	State	Sub-Category	Category (Target)	Target
Customer 1	11/11/2017	Second Class	Kentucky	Bookcases	Furniture	10,000
Customer 1	11/11/2017	Second Class	Kentucky	Chairs	Furniture	10,000

Summary

- This lesson is a door opened to unlimited power. With the right dataset and calculations, you can build absolutely anything you want.
- Yes, it requires a bit, and sometimes, a lot of practice, but mastering Tableau goes through this. As the title of this course says, we're only getting started here!
- In this lesson, you learned the basics of Calculated Fields. With simple examples, you learned why aggregation is so important, created your first calculations, and used your first Tableau functions.

10. Analytics and Parameters



Analytics and Parameters

In this lesson, we'll cover the following topics:

- Using built-in Analytics tools
- How to work with Parameters
- Creating a year-over-year comparison



Using built-in Analytics tools

The screenshot shows a software interface with a toolbar at the top containing various icons. Below the toolbar, there are three tabs: 'Data', 'Analytics' (which is highlighted with a red box), and 'Pages'. To the right of the tabs are sections for 'Summarize' and 'Filters'. The 'Summarize' section contains four items: 'Constant Line', 'Average Line', 'Median with Quartiles', and 'Box Plot'. The 'Filters' section is currently empty.

Data **Analytics** Pages

Summarize

- Constant Line
- Average Line
- Median with Quartiles
- Box Plot

Filters

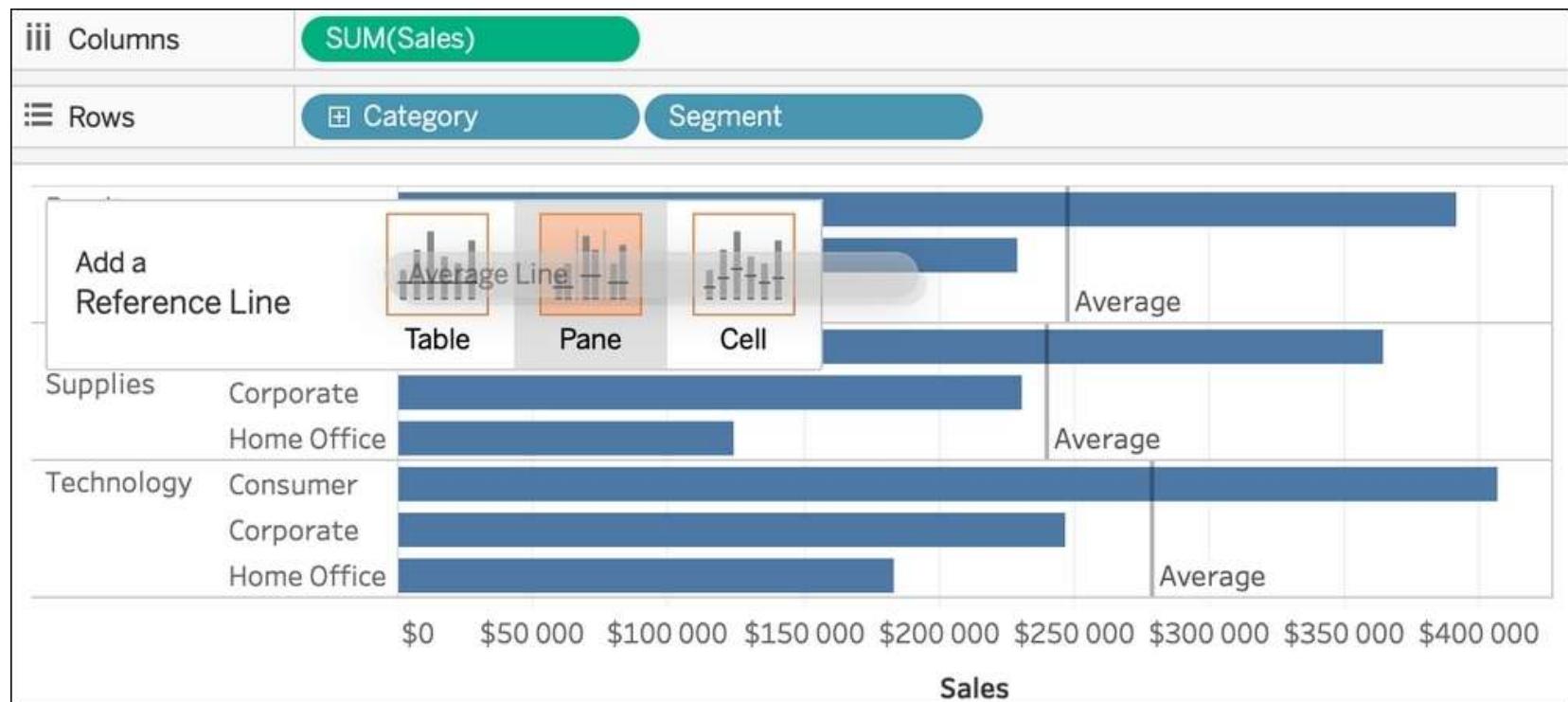
The Summarize tab

- In the Summarize tab, you can find options to add a reference Line, Band, Box Plot, or Totals.
- Let's look at a quick overview of each option, starting with Constant Line.

Constant Line

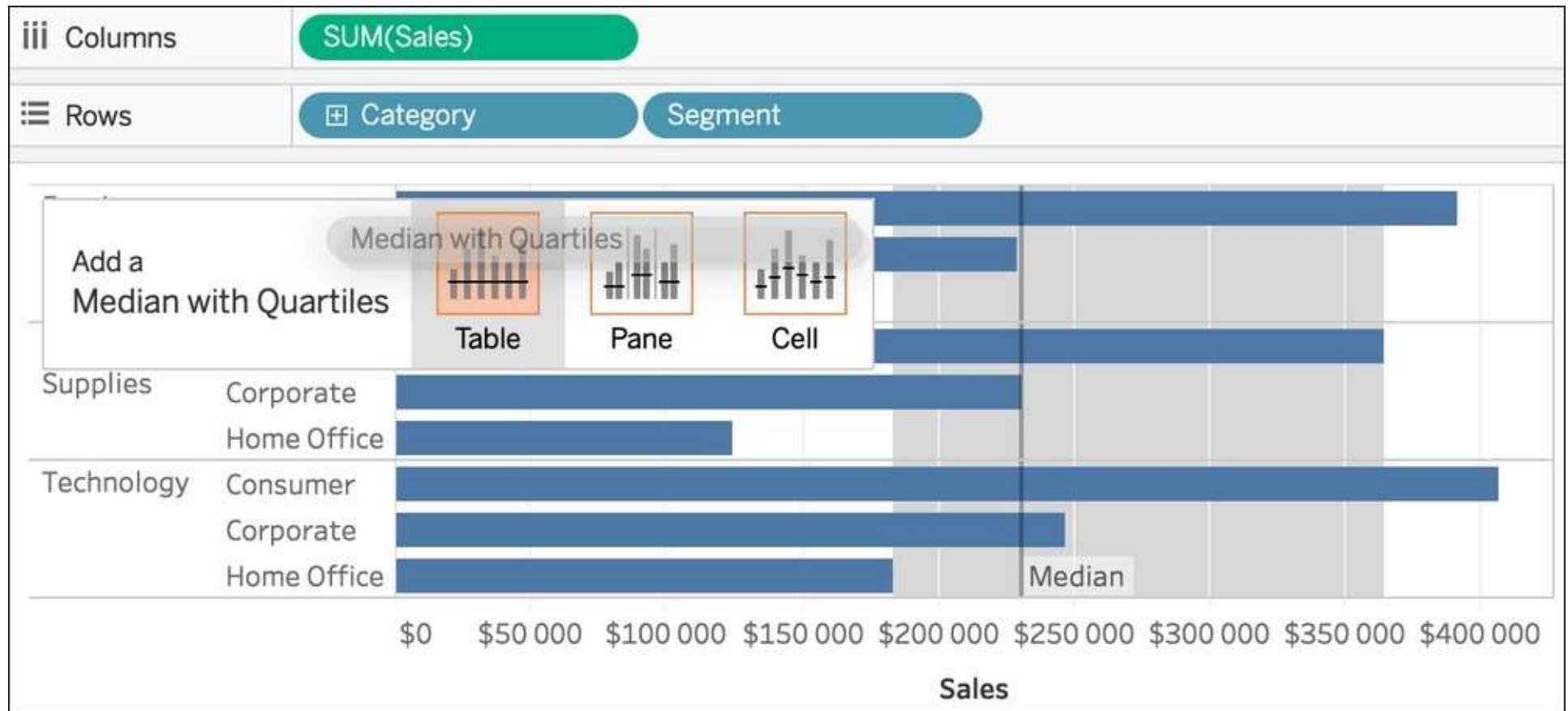


Average Line

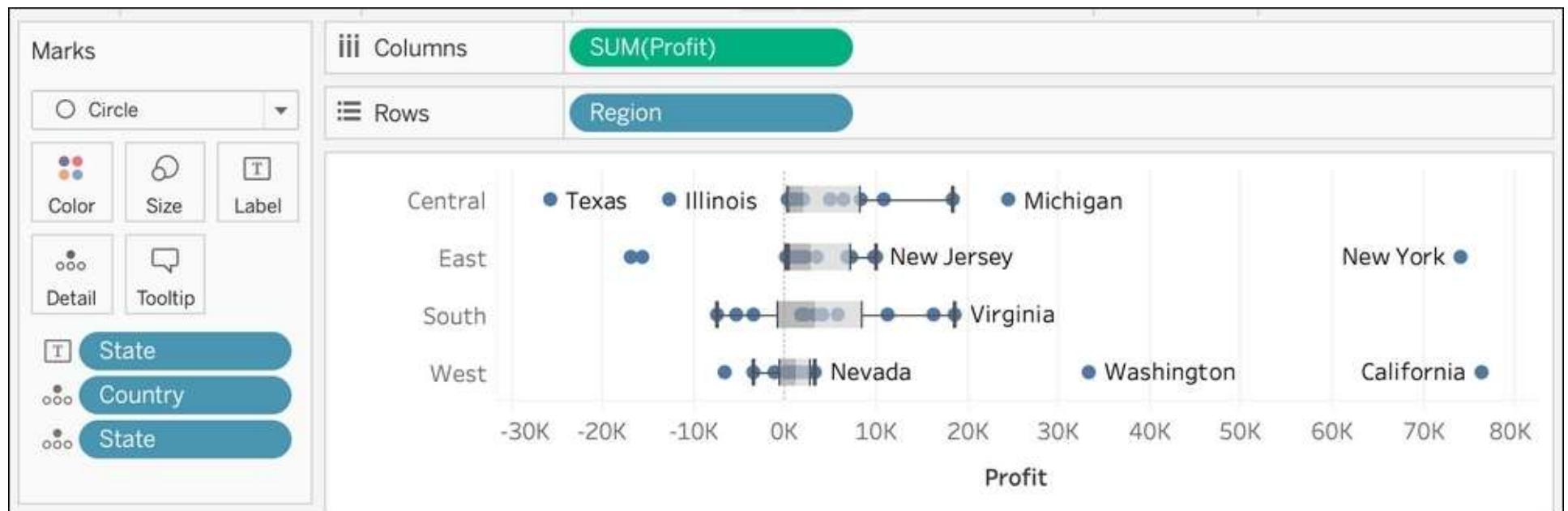


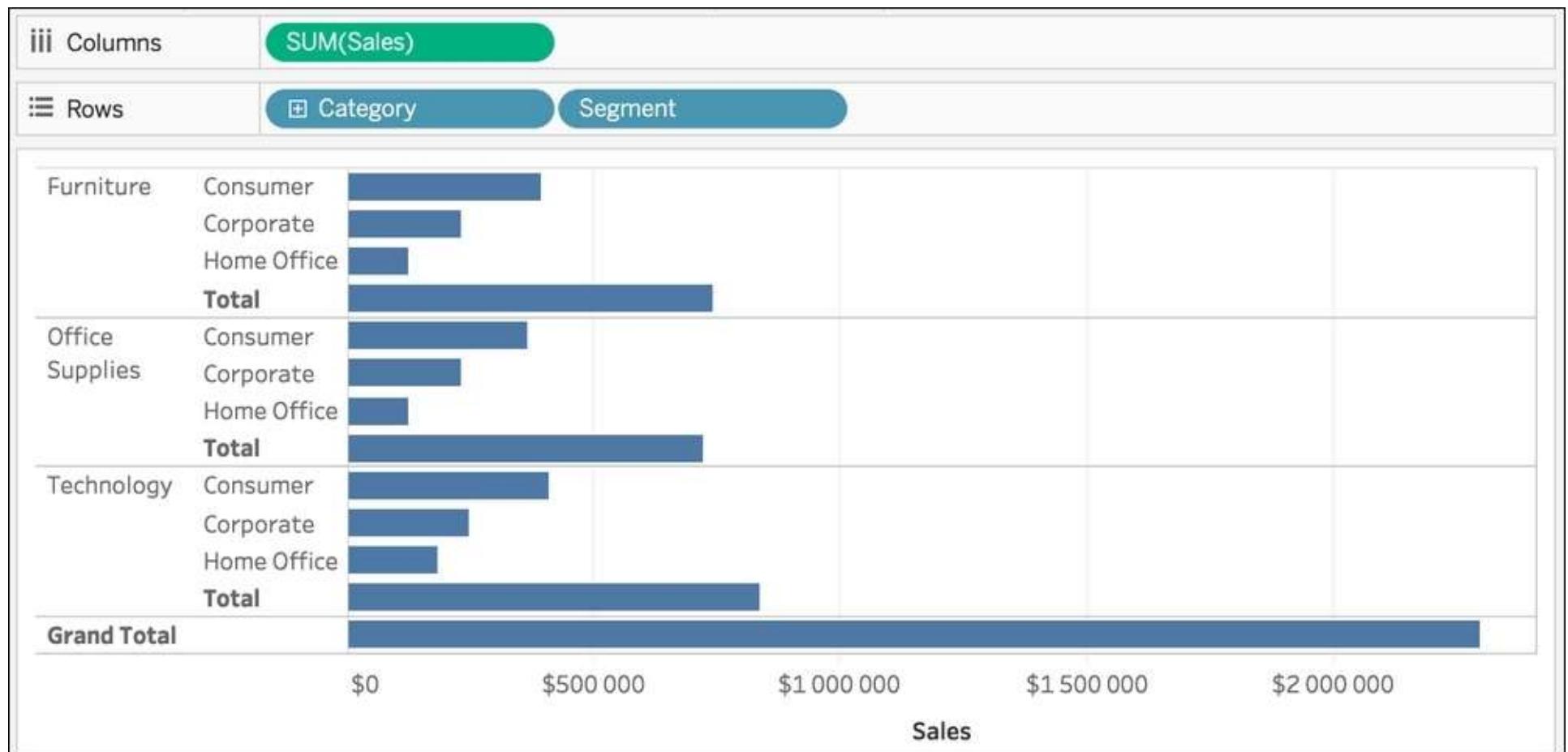
Average Line

- **Table:** Tableau draws a unique line that is the average of all the Marks
- **Pane:** Tableau draws as many lines as there are intersections between the Dimensions (in the preceding example, there are three lines)
- **Cell:** Tableau draws a line for each different value (so it's usually not very useful when using averages)



Box Plot





Using built-in Analytics tools

The Model tab

- The options under Model don't just add a new aggregation to summarize your data, but add new statistical models such as Cluster, Trend Line, and Forecast.
- Using them is as simple as in the previous section; drag and drop them into the View.

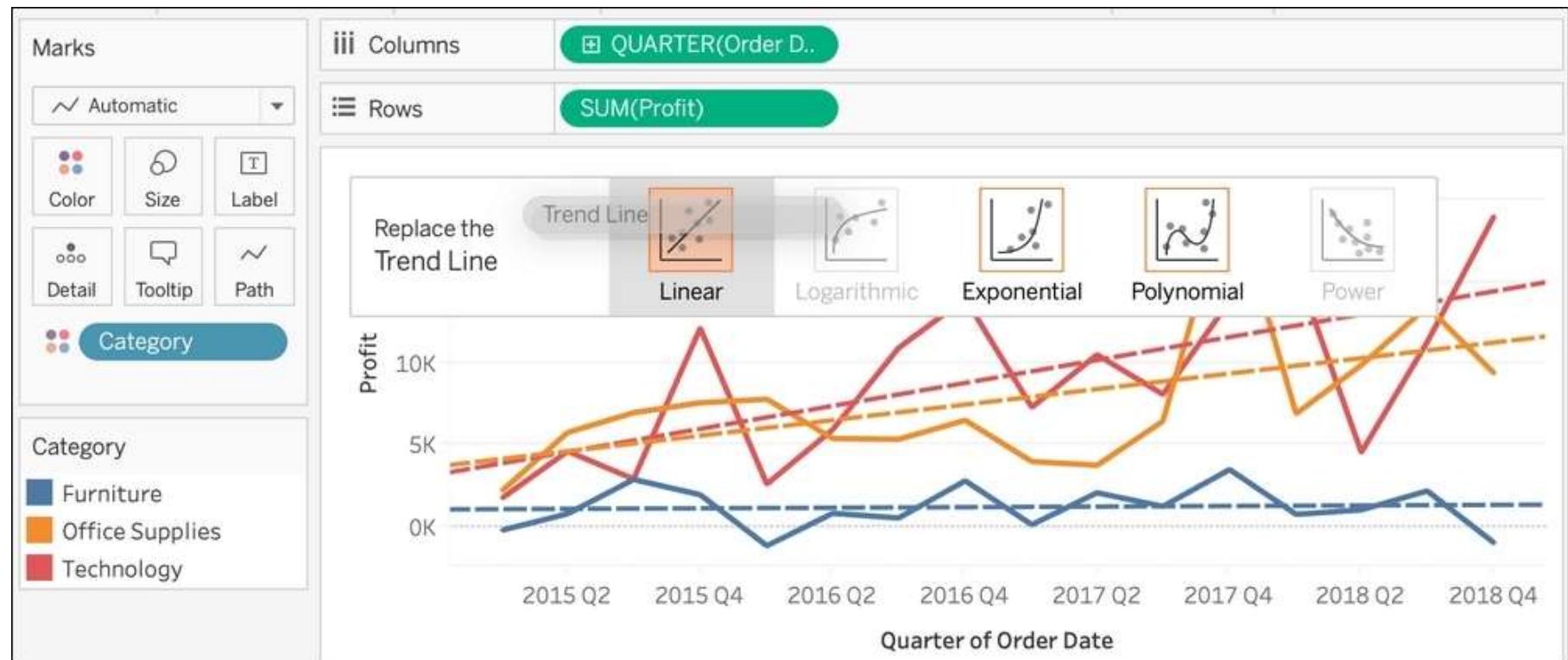
Average or median with a confidence interval

- The first two options are like Average Line or Median Line.
- The only difference is the addition of a confidence interval of 95%.

Trend Line

- You can only add a Trend Line when you have two continuous fields on opposing axes (one on Rows and one on Columns).
- A Trend Line can be used to view a trend of a Measure over time or the correlation between two Measures.

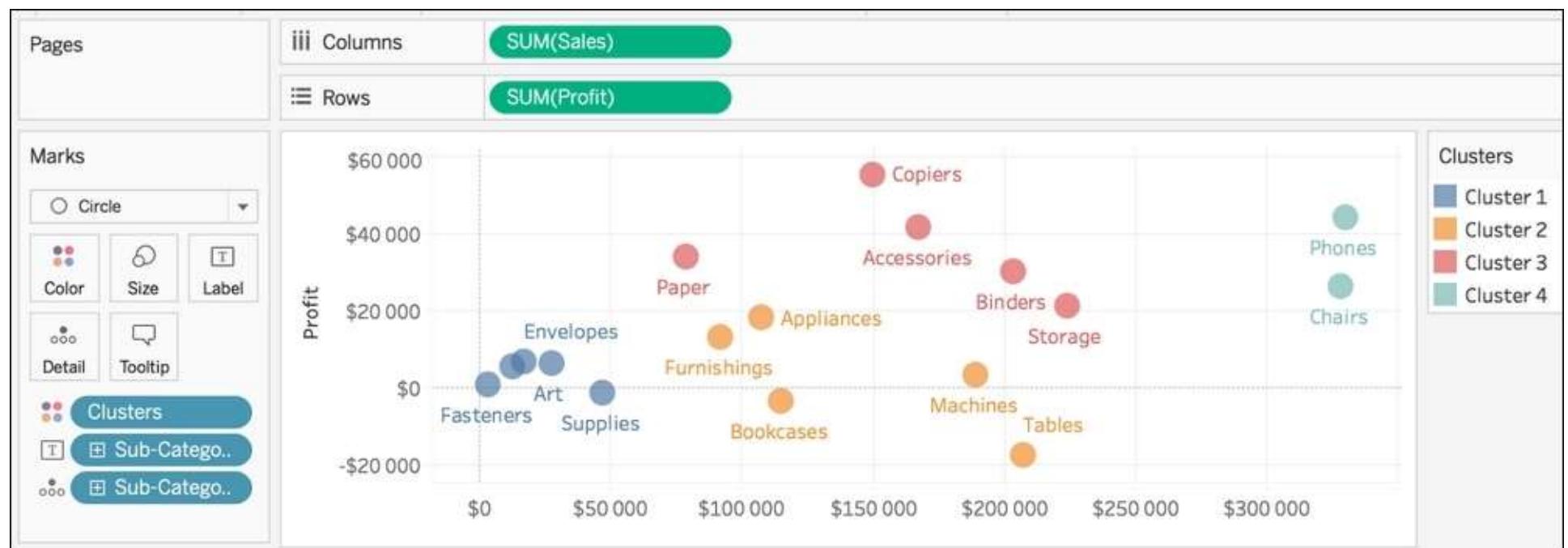
Trend Line



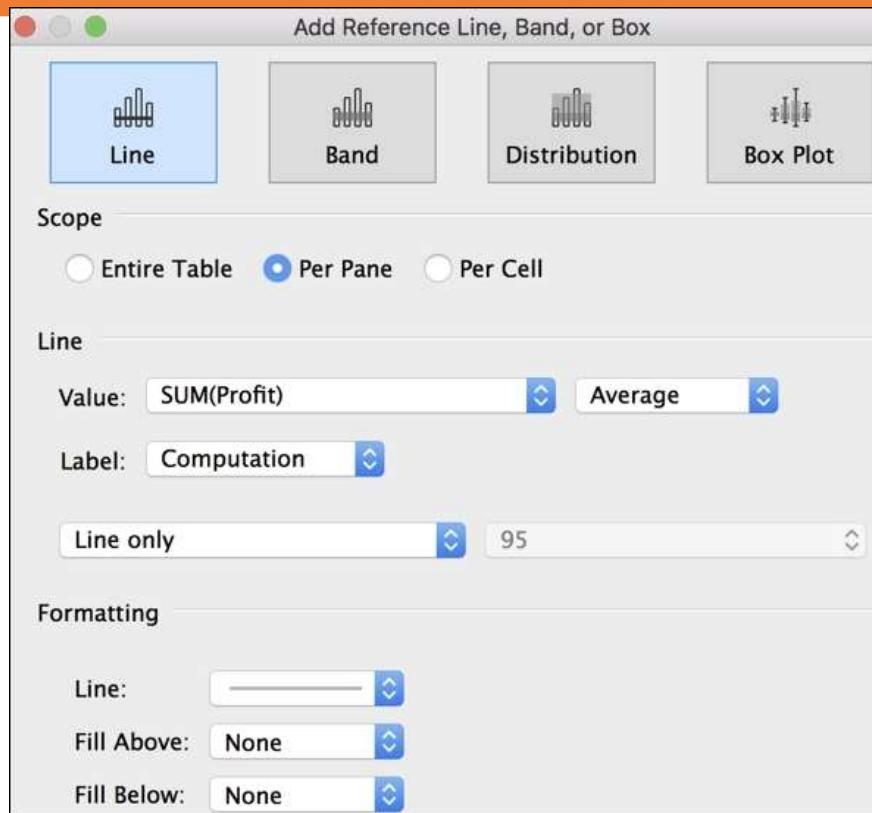
Forecast

- Forecast is a great option when you have Date fields in your data source.
- You can only add a Forecast when you're displaying a Measure through a continuous date.
- Tableau calculates the forecast based on the existing data points.
- To add a Forecast, drag and drop the option into the View or select Show Forecast from the right-click options.

Cluster



The Custom tab



How to work with Parameters

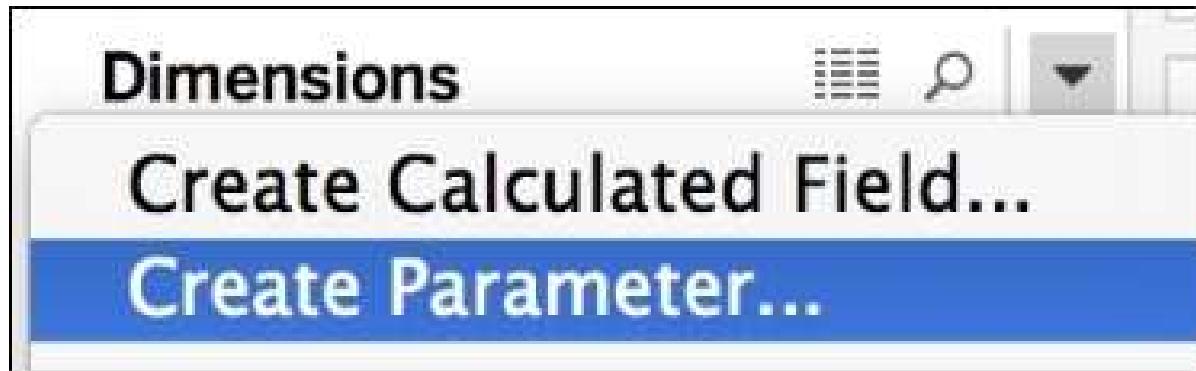
Parameters are a particular element in Tableau, such as Dimensions, Measures, and Sets. They can be Continuous or Discrete, depending on the data type in use. The two major aspects of Parameters are as follows:

- They are not linked to the data source (they don't rely on any field)
- They only return one value at a time

How to work with Parameters

Creating a Parameter

- To create a Parameter, you can use the small arrow next to Dimensions, as highlighted in the following screenshot:



Name:

Comment >>

Properties

Data type:

Float



Current value:

1

Display format:

Automatic



Allowable values:

All

List

Range

How to work with Parameters

List of values

Value	Display As	
1	The first value	Add from Parameter ►
2	The second value	Add from Field ►
Add		Paste from Clipboard

How to work with Parameters

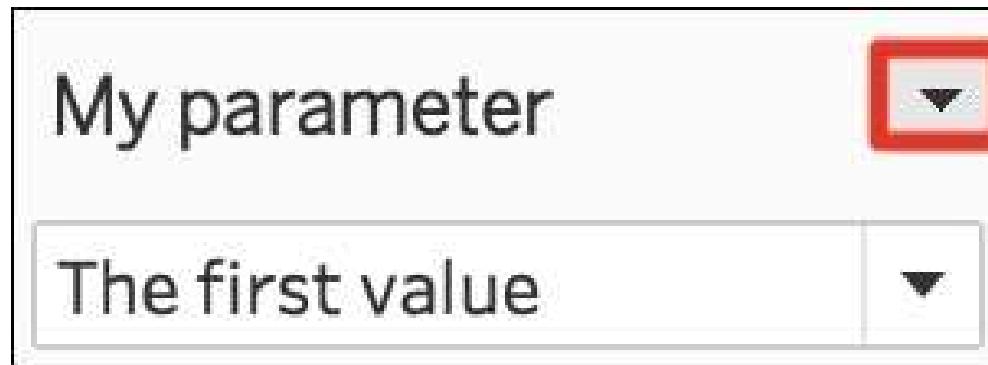
Range of values

<input checked="" type="checkbox"/> Minimum:	1	Set from Parameter ►
<input checked="" type="checkbox"/> Maximum:	1 000	Set from Field ►
<input checked="" type="checkbox"/> Step size:	10	

How to work with Parameters

Using a Parameter

- Using the small arrow next to the parameter card, as highlighted in the following screenshot, you can change the display mode and find other options to customize:

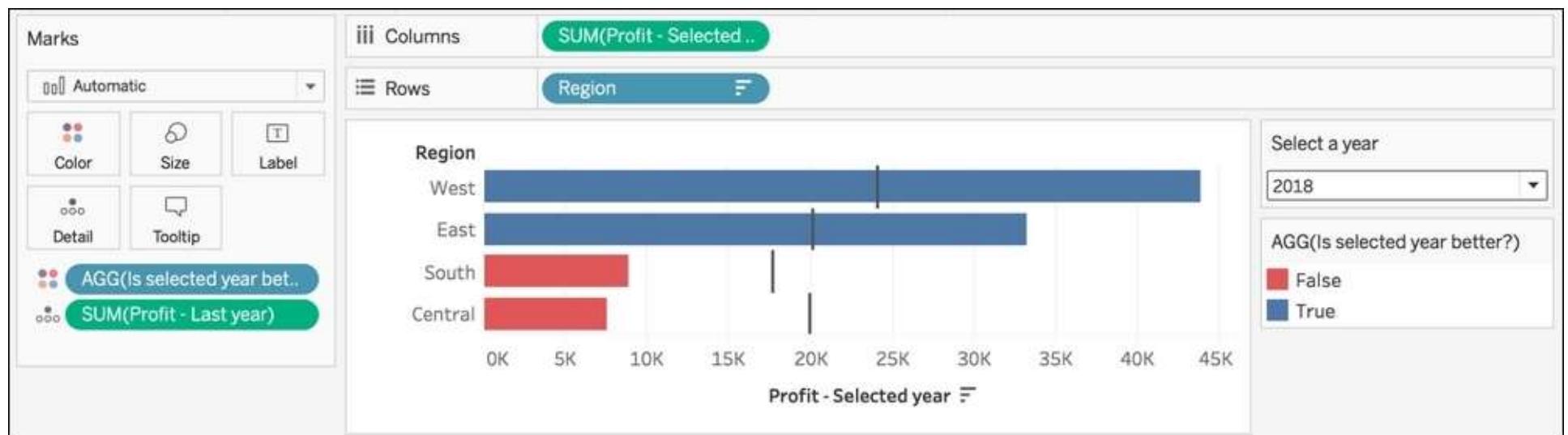


How to work with Parameters

Depending on the data type and the allowable value specified, the parameter can be displayed as follows:

- As a Type In, a free textbox where the users can enter any value they want
- As a Slider, which is usually associated with a ranged parameter
- As a Compact List or Single Value List, usually associated with a list parameter

Creating a year-on-year comparator



Creating a year-on-year comparator

Quite impressive, isn't it? Let's build it! Follow this tutorial to learn how to do this:

- Create a new Parameter and name it Select a year. Configure it as an Integer with a list of allowable values. The list is composed of four values: 2015, 2016, 2017, and 2018.
- If you want to make it perfect, you can change the display of the values to remove the thousand.
- Choose 2018 as the Current value.

Name: Select a year Comment >>

Properties

Data type: Integer

Current value: 2018

Display format: Automatic

Allowable values: All List Range

List of values

Value	Display As
2 015	2015
2 016	2016
2 017	2017
2 018	2018

[Add from Parameter >](#)
[Add from Field >](#)
[Paste from Clipboard](#)

Creating a year-on-year comparator

- Put Profit - Last year in the Detail property. Your Worksheet should look as follows:



 Line  Band  Distribution  Box Plot

Scope

Entire Table Per Pane Per Cell

Line

Value: SUM(Profit - Last year) Average

Label: None

Line only 95

Formatting

Line:

Fill Above: None

Fill Below: None

Creating a year-on-year comparator

- Visually, you should be able to see the current and previous year's profit values, thanks to the reference Line.



Creating a year-on-year comparator

- Finally, put the new Calculated Field, Is selected year better?, in Color. If you want, you can modify the colors.
- In the end, your Worksheet should look as follows:



Summary

- This lesson focused on two ways of enhancing your visualizations. With the Analytics tools, you can use models such as Trend Line, Cluster, and Forecast, but also all sorts of reference Lines, Bands, and Distribution.
- You can use all of these options to visualize your data in new ways and get a deeper understanding of it.
- With Parameters, you can create any input to interact with a visualization.



11. Advanced Data Connections



Advanced Data Connections

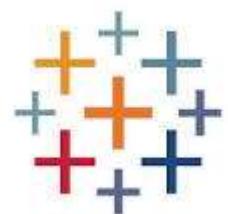
- In a Workbook, you can add as many data sources as you want.
- In a Worksheet, you can see which data source is used thanks to the tick mark (✓) next to its icon, as shown in the following screenshot:



Advanced Data Connections

In this lesson about advanced data connections, we'll see how to work with multiple datasets, as well as some other new features for unions. The three sections of this lesson focus on the following:

- Cross-database join
- Data blending
- Wildcard union



Cross-database join

- In lesson 4, Connecting to Data and Simple Transformations, you saw how to create joins between different tables of the same dataset.
- With cross-database joins, you can create joins between different tables from different connection types.
- It's a great way to add new dimensions to your analysis.

Cross-database join

- Here's what the Reimbursement table contains:

Order ID	Reimbursed	Reason
CA-2015-115812	y	Defect
CA-2017-152156	y	Defect
CA-2017-111682	y	Defect
CA-2017-145583	y	Delay
CA-2017-130162	n	New address
US-2017-123470	y	Wrong product

- Open Tableau and click on the saved data source, Sample - Superstore.
- Click on the Data Source tab at the bottom-left of the window to open the data source workplace.
- Next to Connections, click on Add to connect to another file or server, as highlighted in the following screenshot



Cross-database join

- Add the Reimbursement table as a left join on the Order ID column:



Cross-database join

- In a new Worksheet, you can now create a visualization that combines the sales and the reason for reimbursement (exclude the null):



Data blending

- Data blending is a way of using different fields from different data sources in one Worksheet.
- There is always a primary data source (the tick icon in blue) and one or more secondary data sources (the tick mark in orange).
- As for joins, one or multiple common fields are needed to create the relationships between the data sources.

Data blending

The screenshot shows a data blending interface with the following components:

- Datasets:** Sample - Superstore (selected) and Target (Target).
- Dimensions:** Order Date and Order Number.
- Measure Names:** Abc (highlighted in blue).

Data blending

- Target is a simple Excel file with the Year and the value of the Target, as you can see here:

Year	Target
2015	500000
2016	500000
2017	500000
2018	700000

Data blending

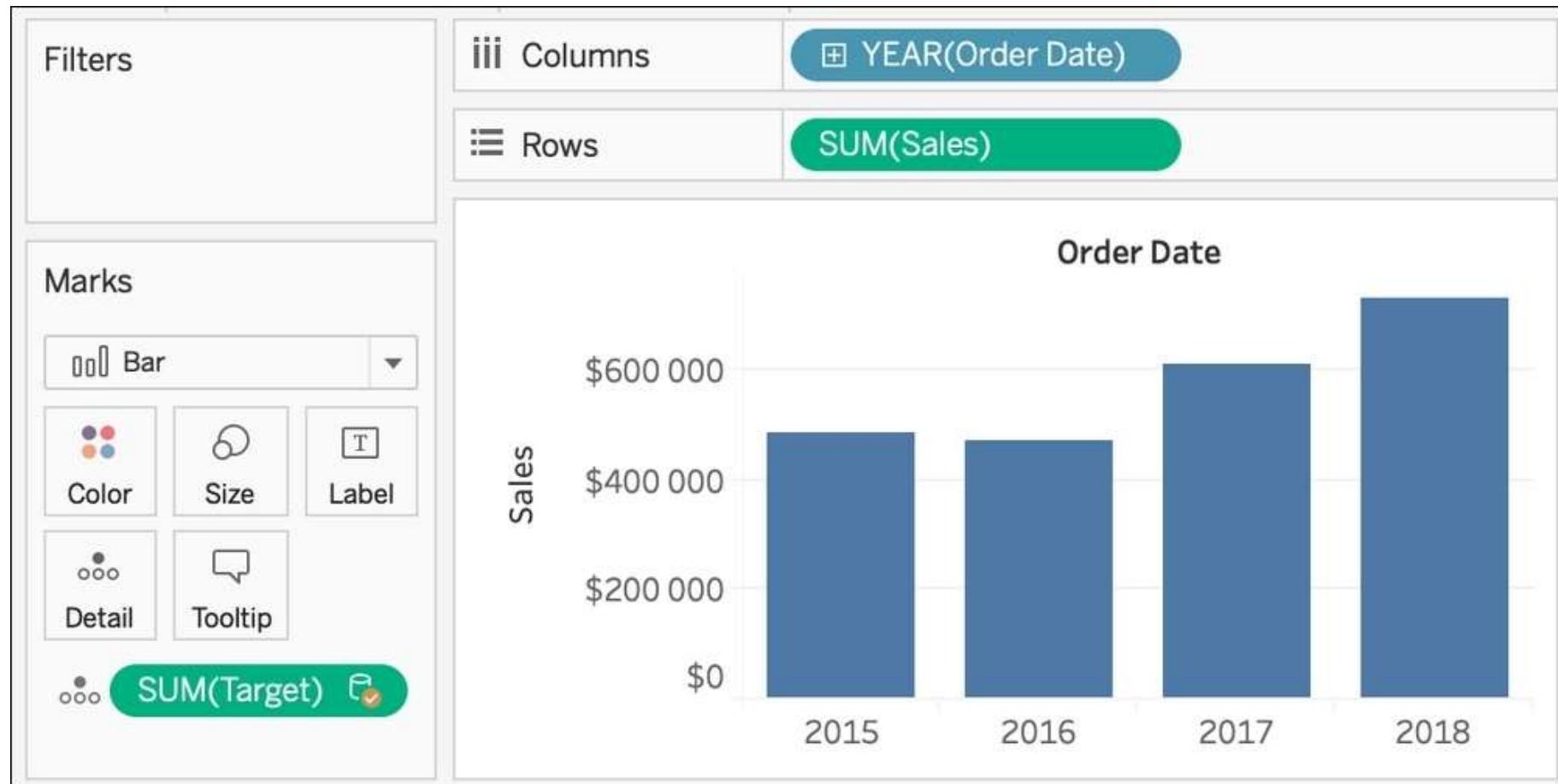
Go through the following steps to add a target to the sales:

- Open Tableau Desktop and select the saved Sample-Superstore data source.
- Click on the New Data Source icon in the toolbar: Data blending. 
- Search and select the Target Excel file that you've downloaded

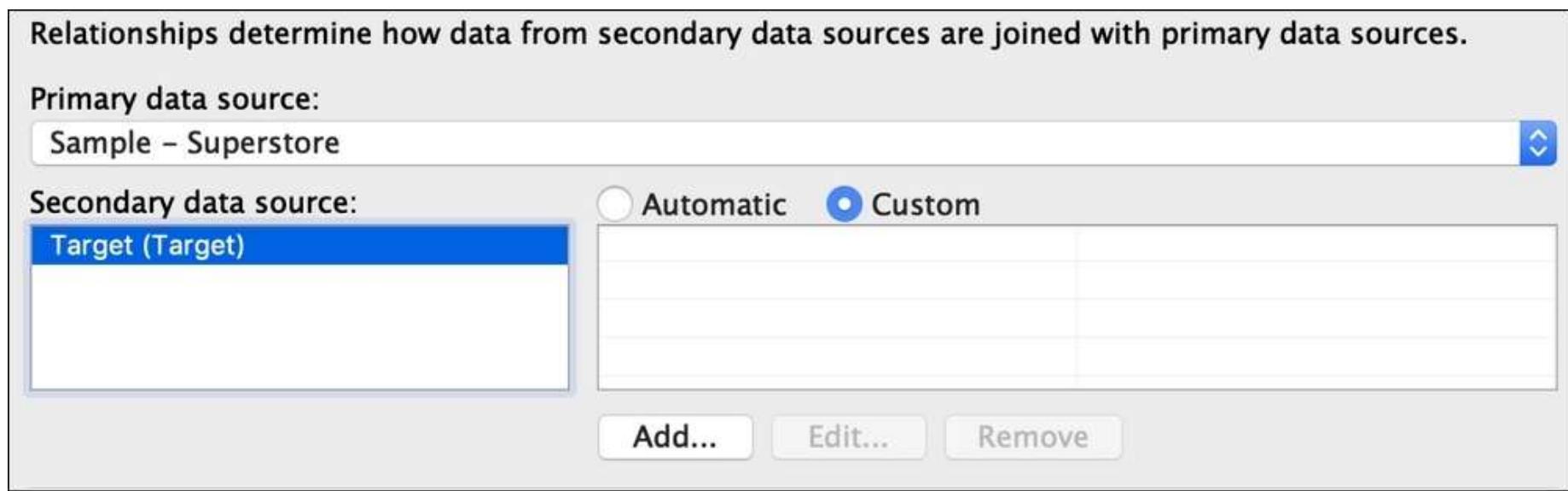
Data blending

- Click on Sheet 1; you should now have two different data sources, as shown in the following screenshot:

The screenshot shows the Tableau interface with the 'Data' pane highlighted by a red box. The 'Data' tab is selected, and two data sources are listed: 'Sample - Superstore' and 'Target (Target)'. To the right of the Data pane are the 'Pages' and 'Filters' panes.



- Choose Sample - Superstore as the Primary data source and Target as the secondary, then select Custom. The configuration window should look as follows:



Primary data source field:

Enter search text

Order Date

▼ Order Date

DAY(Order Date)

MDY(Order Date)

MONTH(Order Date)

MY(Order Date)

QUARTER(Order Date)

WEEKDAY(Order Date)

WEEK(Order Date)

YEAR(Order Date)

8
May
Q2

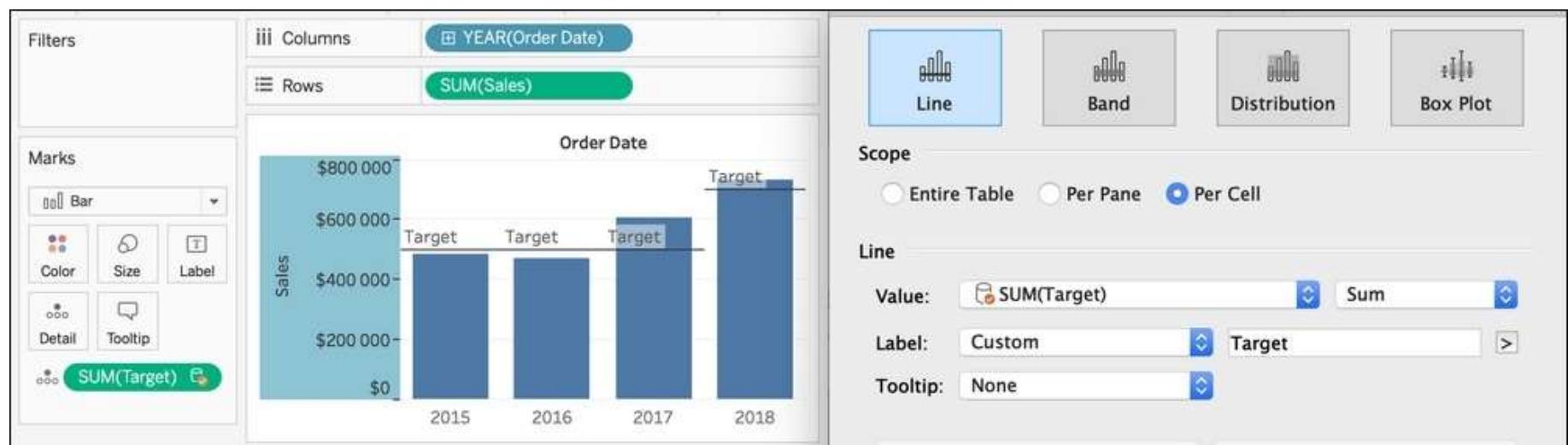
Order ID

Secondary data source field:

Enter search text

Year

- In the visualization, right-click on the axis and select Add Reference Line.
- In the configuration window, change the scope to Per Cell, select SUM(Target) as the value, choose a Custom label, and write Target. Your configuration window and visualization should be similar to this screenshot:



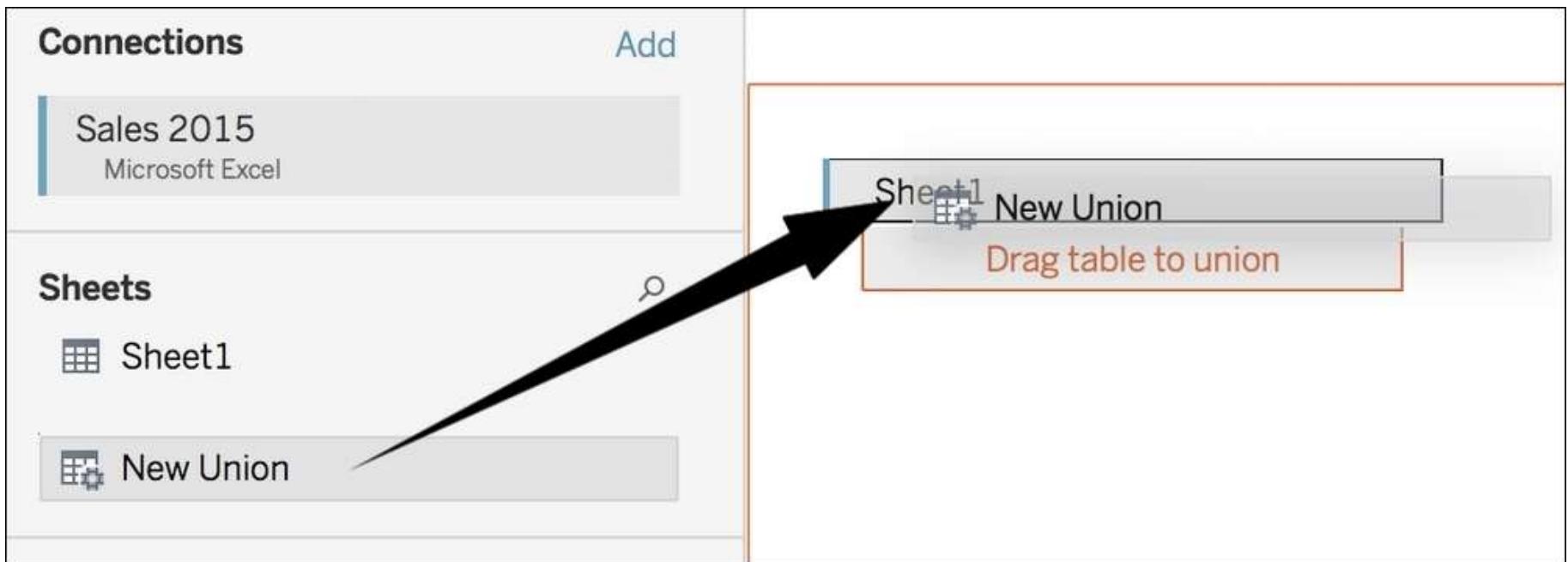
Wildcard union

Let's union those files:

- First, unzip the Sales.zip file you've just downloaded.
- Open Tableau Desktop and chose Microsoft Excel from the list of connectors.
- Navigate to the Sales unzipped folder and select the Sales 2015.xlsx file.

Wildcard union

- Replace Sheet1 with New Union:





Specific (manual)



Wildcard (automatic)

Search in: /Users/tristanguillevin/Downloads/Sales

Sheets

Matching pattern(yyy*)

Include



Sheet1

Workbooks

Include



Sales *.xlsx



Summary

- This lesson was short, but the three new features presented will undoubtedly be useful for you! With a cross-database join, you can create a unique data sources that combine multiple different connections.
- With data blending, you can create a relationship between multiple data sources and use their fields in the same Worksheet.
- Finally, you learned how to give superpowers to unions thanks to wildcard unions, a feature that automatically adds files and tables based on a pattern.

12. Dealing with Security



Dealing with Security

In this last advanced lesson, we'll speak about security, which is an essential aspect of working with data. To add protection, you need to have Tableau Server. In this lesson, we'll focus on three ways of dealing with security, including the following:

- Tableau Server security
- User filters
- Row-level filters

Tableau Server security

User / Group	Project	Workbooks	Data sources	Flows
		Managed by the owner	Managed by the owner	Managed by the owner
All Users (4) ...	Publisher	Custom	Custom	Custom
johnsnow@example... ...	Viewer	Interactor	Connector	Runner
williamplayfair@example... ...	Publisher	Editor	Connector	Runner
+ Add a user or group rule			User	
	.charlesminard@example.com			

Tableau Server security

- Here's an example of permissions with a detailed view for Workbooks:

User / Group	Project »	Workbooks	View	Interact/Edit	Edit	«	Data sources »
		Managed by the owner	Eye icon	Image icon	Filter icon	Table icon	Managed by the owner
All Users (4)	...	Publisher	Custom	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓	✓	Custom
charlesminard@example...	Project Leader	Editor	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	✓ ✓ ✓ ✓ ✓	Editor

User filters

- On Tableau Desktop, click on the Server in the top menu, go to Create a User Filter, and choose the Field to secure.
- Tableau opens a new window where you can select, on the left, a User or a Group and, on the right, the Members of the field that the user or group can see.
- Once you've created the user filter, you'll see a new set in your data source.
- To use a user filter, add the corresponding set to the Filter shelf or, better, as a Data Source Filter (with the Use all option).

User filters

- Create a new User Filter on Region... and name it Region Filter:



User filters

User/Group

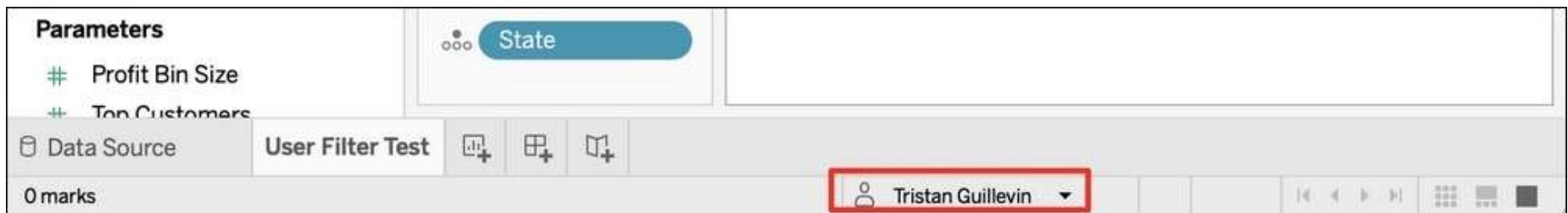
- ▶  **All Users**
- ▶  **Central Users**
- ▶  **East Users**
- ▶  **South Users**
- ▶  **Top Management**
- ▶  **West Users**

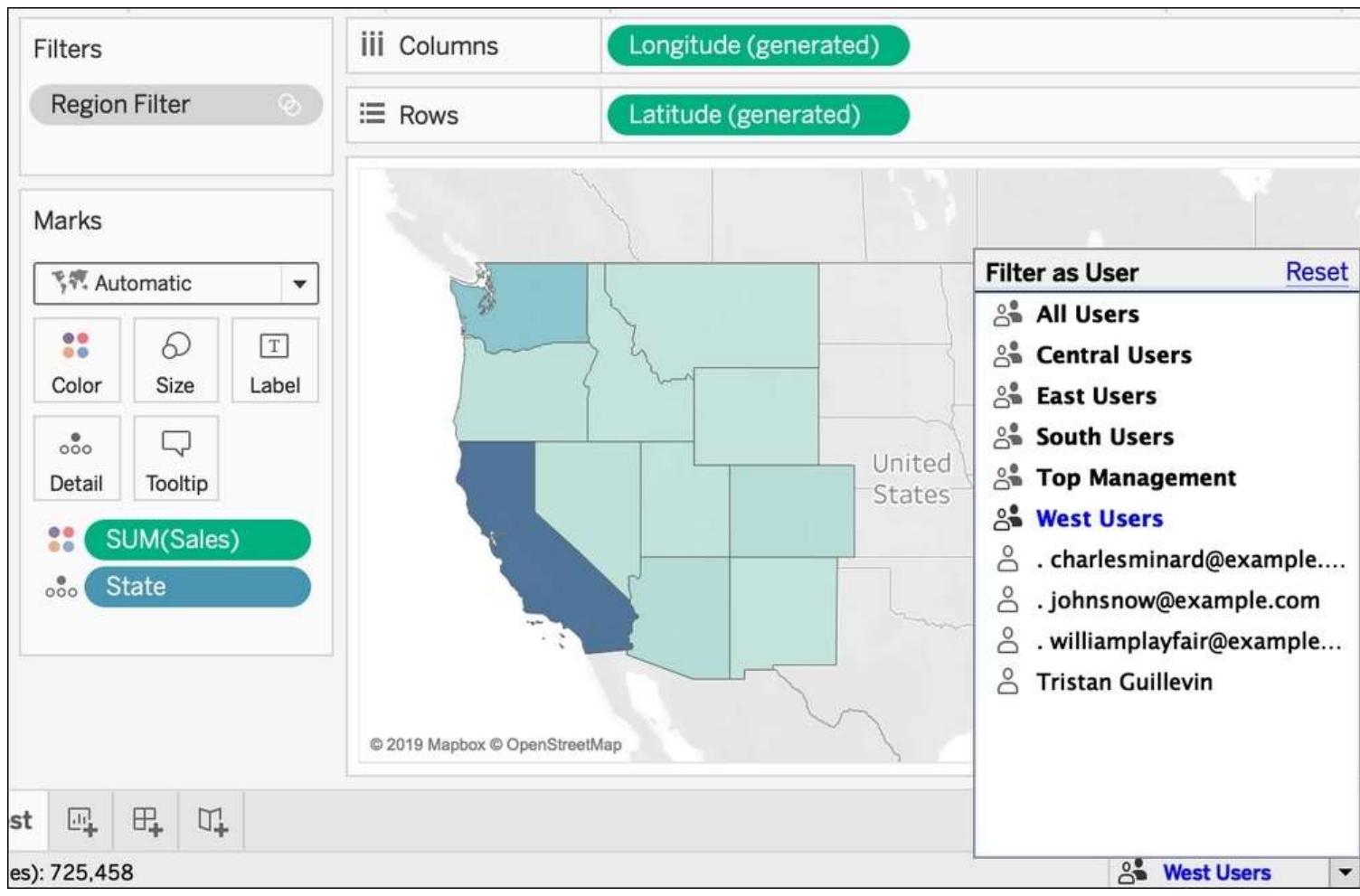
Members for: West Users

- Central
- East
- South
- West

User filters

- At the very bottom of the Tableau window, you can see the currently logged-in user in Tableau Server, as shown in the following screenshot:





User filters

- You can test the same with Top Management—all the regions will be displayed. When you're confident that the User Filter works fine, you can remove it from the Filters shelf.
- Right-click on the Data Source name and select Edit Data Source Filters.
- Click on the Add button and select Region Filter field.

Row-level filters

- To create a row-level filter, your Data Source must contain a field with the name of the Tableau Server Users.
- This solution only works when the access level is already defined in your data.
- This option uses a Tableau function called USERNAME() that returns the username of the currently logged-in user.

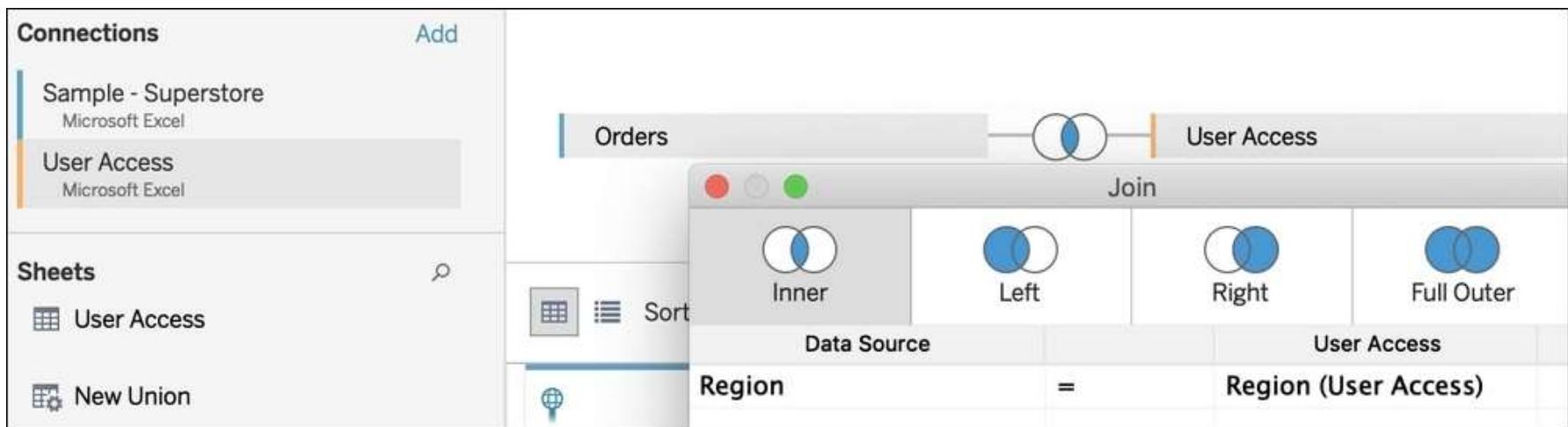
Row-level filters

- In my case, I've created three Users in Tableau Server and the following Excel file, which I named User Access.xlsx:

Region	User
Central	johnsnow@example.com
West	johnsnow@example.com
East	johnsnow@example.com
South	johnsnow@example.com
West	williamplayfair@example.com
Central	charlesminard@example.com

Row-level filters

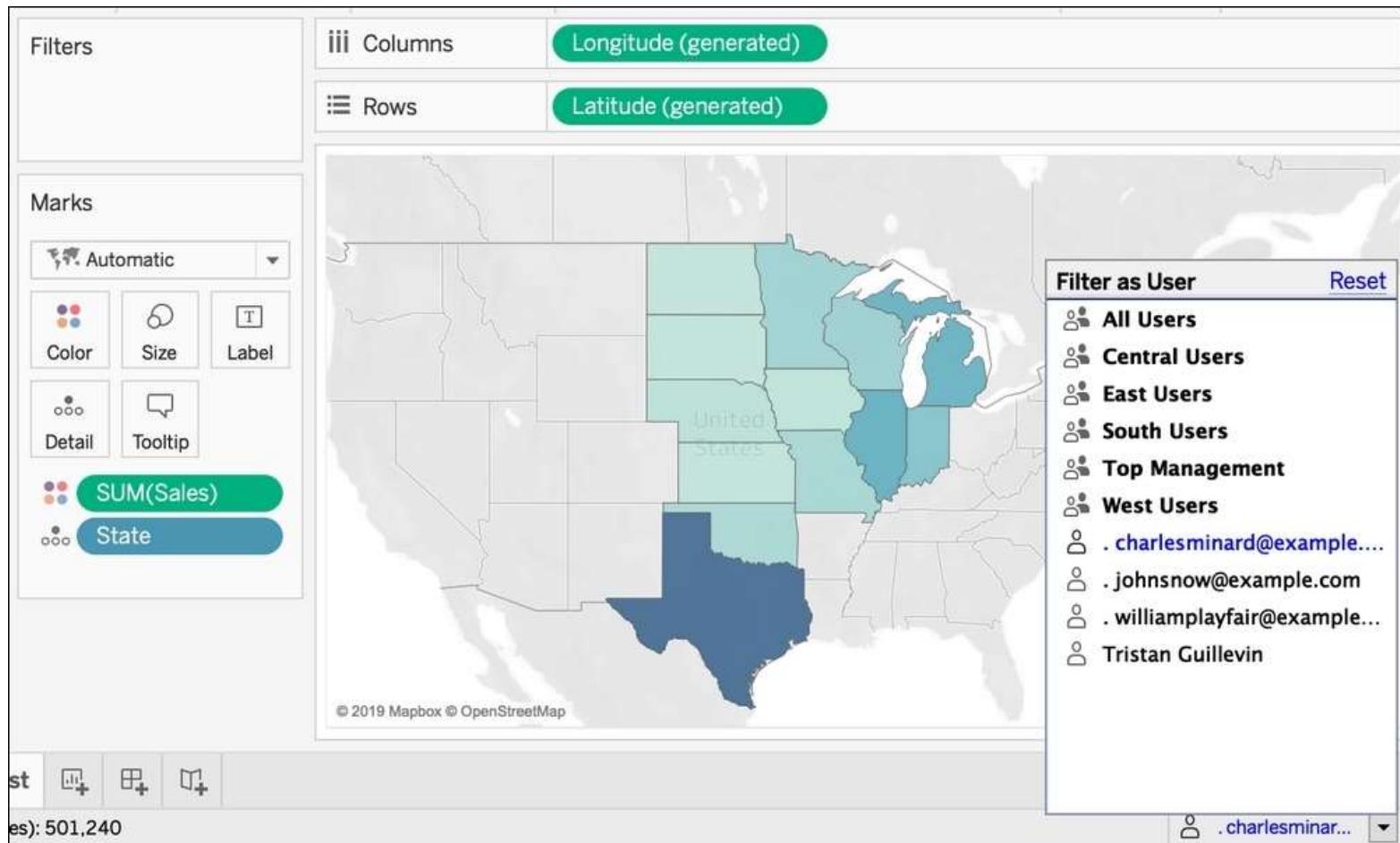
- Create a cross-database join between Orders and User Access on the common Region field:



Row-level filters

- Right-click on the data source name and select Edit Data Source Filters.
- Add the User has access Calculated Field and keep only the value, that is, True. The data source filter should look as follows:

Filter	Details
User has access	keeps True



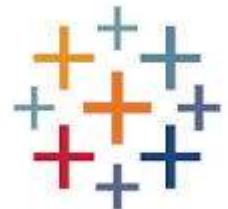
Summary

- In this last technical lesson, you learned how to secure your data and content on Tableau Server.
- The permissions allow you to control who can see your work and what power they have over it (such as to download, save, edit, and more).
- On Tableau Desktop, with user filters and row-level filters, you can control what the users can see in your data.

Section 4: After Finishing the course

It's almost time to say goodbye and close this course. This conclusion is more an opening than an ending. You'll see all the options available to continue your journey with Tableau keep growing your skills.

- This section includes the following lesson:
- lesson 13, How to Keep Growing your Skills





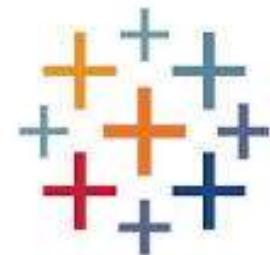
13. How to Keep Growing Your Skills



How to Keep Growing Your Skills

In this short lesson, we'll speak about the following:

- The Tableau Community
- Tableau Public
- Community projects
- Ambassadors, Zen Masters, and Iron Viz



The Tableau Community

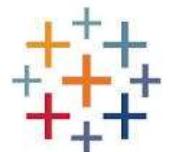
- Tableau is an excellent tool for many reasons, but there are a lot of great tools for data visualization. If you ask me why Tableau is better than the others, my answer would be, the Community.
- When I started using Tableau, the Tableau Community Forums helped me a lot.
- No questions are left unanswered, and you'll find a lot of people that are eager to help you. Don't hesitate to ask any questions here: <https://community.tableau.com/community/forums>.

Tableau Public

- Tableau Public is a piece of software, similar to Tableau Desktop, that you can download and use for free with some limitations: you need to publish your work online in a public environment, and you don't have access to all the connectors that are available in Tableau Desktop.
- Tableau Public is, in fact, much more than that.
- Tableau Public is like a social network where you can only find the best visualizations available.

Ambassadors, Zen Masters, and Iron Viz

- Viz For Social Good – #VizForSocialGood by Chloe Tseng
- Make Over Monday – #MakeOverMonday—by Eva Murray and Andy Kriebel
- Workout Wednesday – #WorkOutWednesday—currently run by Luke Stanke, Ann Jackson, Curtis Harris, Lorna Eden, and guests



Ambassadors, Zen Masters, and Iron Viz

Ambassadors

The first set of amazing people are the Ambassadors. They are split into four groups:

- **Forums Ambassadors:** They are there to answer your questions in the Forum.
- **Social Media Ambassadors:** They are the social network gurus; follow them to get all the latest news.
- **User Group Leader Ambassadors:** They help the Community meet in real life by organizing Tableau User Groups .
- **Tableau Public Ambassadors:** Check their Tableau Public profiles and be ready to be blown away.

Zen Masters

- The second set of amazing people is the Zen Masters. They are the faces of Tableau Community. They passionately dedicate a huge amount of time to help everyone excel in Tableau.
- They not only create great visualizations, but they also share their knowledge as much as they can.
- Everyone in the Tableau Community has learned at least one thing from a Zen Master.

Iron Viz

- As you enhance your skills, you may want to try to compete against other people in the Community.
- For that, you have Iron Viz. The competition is divided into two parts: three qualification contests, called the Feeders, and one Final.
- For the Feeders, only the theme is imposed, and the contestants have approximately one month to find the data and create the best possible visualization. There is one winner per Feeder.

Summary

- This lesson, even though it's not technical, is really important.
- This lesson is the key to continuing your journey with Tableau.
- This lesson is also my tribute to the Community, who kept pushing me higher and higher over the last three years since I started using Tableau.
- Even if you don't plan on sharing a lot or getting involved (which is understandable), keep in mind that the Community Forum is the first place to go if you have any questions regarding Tableau