



TABLEAU CERTIFICATION PREP:

DESKTOP SPECIALIST + CERTIFIED ASSOCIATE

★★★★★ With Best-Selling Tableau Instructor Dustin Cabral

Course Structure



This is a **project-based** course, designed to help you build skill the exact skills you need to pass both the **Tableau Desktop Specialist** and **Tableau Certified Associate** exams

Additional resources include:

- ★ Downloadable **PDF slides & Project Files** for reference when you're offline or on the go
- ★ **Quizzes & Homework Exercises** to reinforce key concepts, with step-by-step solutions
- ★ Full-scale **Practice Tests** with **solution walkthroughs**, to simulate the exam experience

Course Outline

1 Course Project & Setup

Introduce the course project, set expectations, and install Tableau Desktop

2 Preparing for the Exam

Review Tableau Desktop Specialist & Certified Associate exam details and measured skills

3 Core Skills Review

- Connecting to Data
- Field & Chart Types
- Mapping & Analytics
- Calculations
- Examining & Filtering
- Dashboards & Stories

Practice the core Tableau Desktop skills required for certification

- Connect to sources, join & blend data, edit metadata, compare extracts & live connections, etc.
- Explore field types, pills, row and column shelves, common chart types, etc.
- Create geospatial maps, import custom backgrounds, explore instant analytics tools, etc.
- Define custom calculations using calculated fields, table calculations and parameters
- Examine functions to sort, group, filter, and highlight fields, sets and values
- Combine visualizations to create interactive dashboards and stories

4 Practice Exams

Simulate the actual testing environment with full-scale practice exams and solutions

Course Project

THE **SITUATION**

You've just been hired by **BankMaven**, a prominent financial institution based in the United States. Your role? **Design and build an executive-level BI solution, from scratch.**

THE **BRIEF**

BankMaven needs a way to **track KPIs** (transactions, customer count, etc.), **compare performance** across customer segments, **analyze churn**, and **identify at-risk accounts**.

All you've been given is a folder of Excel files containing information about customer transactions, account details, and member demographics.

THE **OBJECTIVE**

Use **Tableau Desktop** to:

- Connect & transform raw data
- Apply sorting & filtering tools
- Create custom calculations & parameters
- Design interactive reports & dashboards



Setting Expectations

1 This course is for users who already have a **basic level of Tableau proficiency**

- *We'll cover the fundamentals as needed, but you should be able to perform simple tasks not specifically covered in this exam guide (navigating menus, saving files, etc.)*

2 We'll prepare you for the **Desktop Specialist & Certified Associate** exams

- *We will not be covering other certifications offered by Tableau, including Desktop Certified Professional*

3 Our goal is to help you build the skills you need to **ace your certification exam**

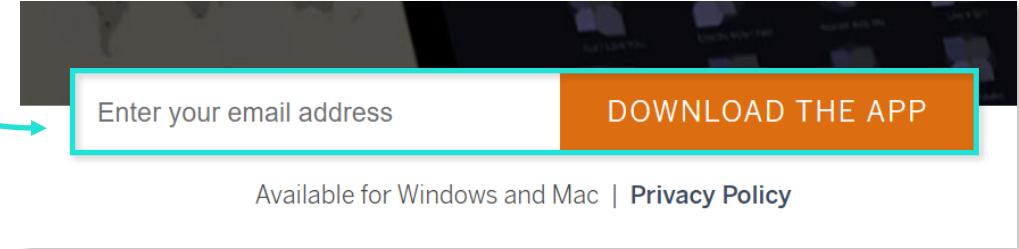
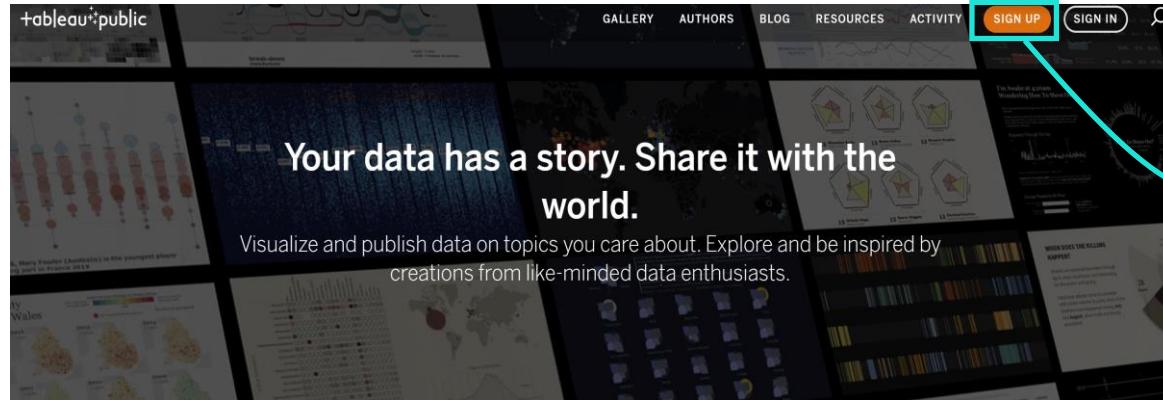
- *This course covers the specific skills measured in the Desktop Specialist and Certified Associate exams, and is NOT a deep dive into all of Tableau's capabilities or advanced features (this is covered in our other courses)*

4 What you see on your screen **may not always match mine**

- *Tableau desktop updates on a **monthly** basis for minor releases and **quarterly/yearly** for major releases, so features and functionality may change over time*

Installing Tableau

Downloading Tableau Public (Free)



IMPORTANT: If you don't already have a Tableau Desktop subscription, we recommend using the **Tableau Public App** to follow along with this course

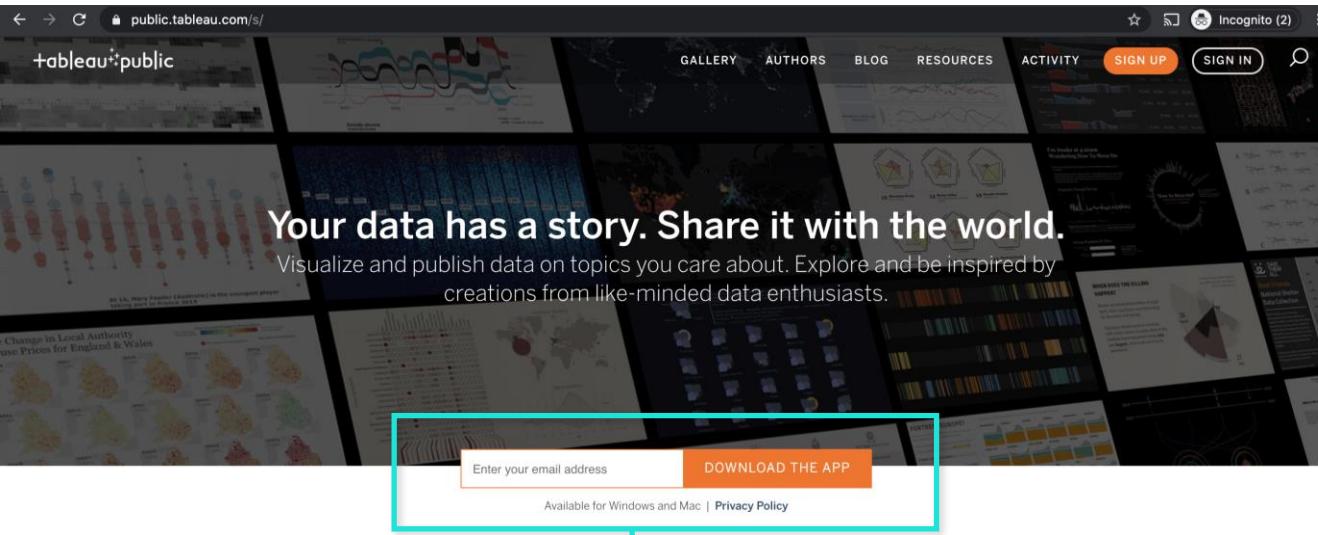
This course is compatible with either version, but keep in mind that:

- Tableau Public is a **free** version of Tableau Desktop / Server, available at **public.tableau.com**
- Tableau Public offers limited data connections (*flat files only*) and can only save files to a public server
- Tableau Public should **NOT** be used with sensitive data or for work-related tasks (*everything published is public!*)



Tableau Public Installation Guide (Mac)

1) Go to **public.tableau.com** and enter an email address to start your download



2) Double click the **dmg** file to create the Tableau Public package file (.pkg)



Tableau Public.pkg

3) Launch the **pkg** file to install the software, and follow the steps (*default settings are OK*)

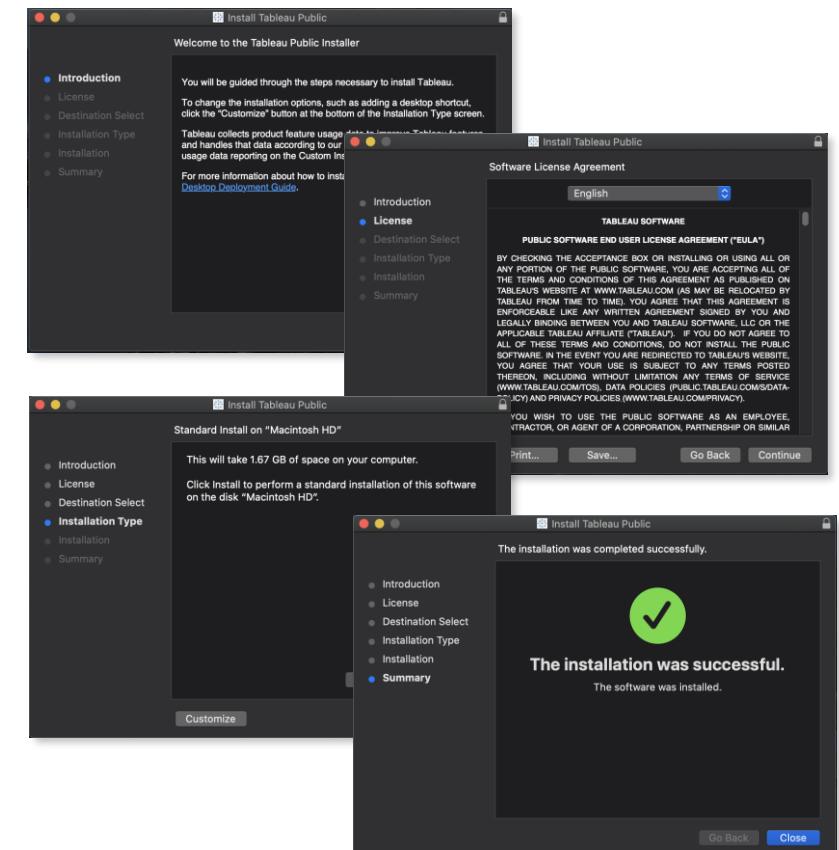
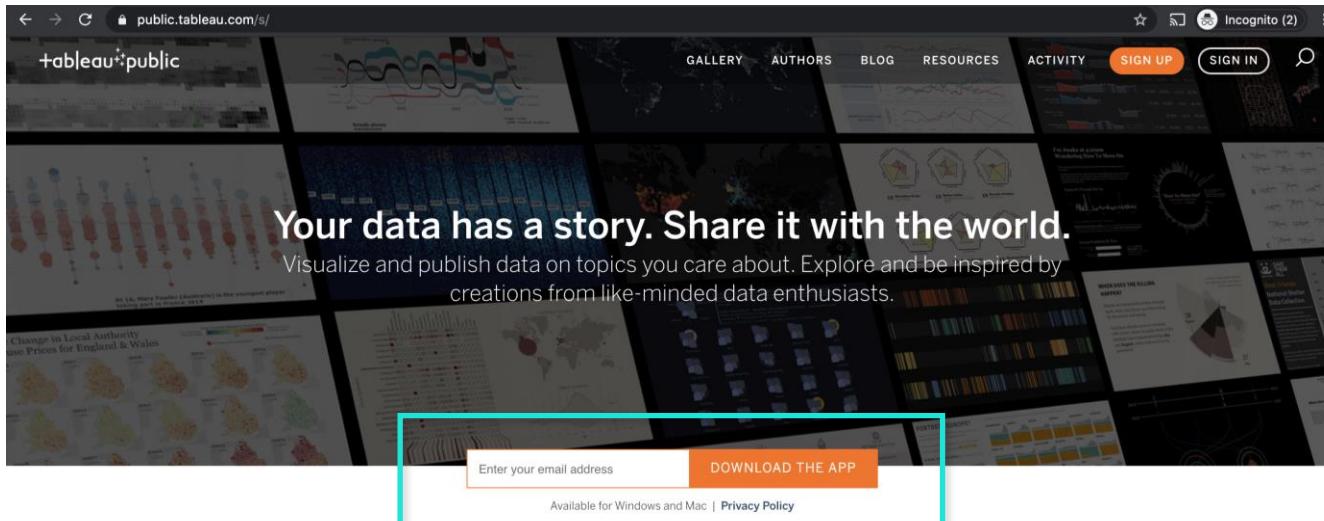


Tableau Public Installation Guide (Windows)



1) Go to **public.tableau.com** and enter an email address to start your download

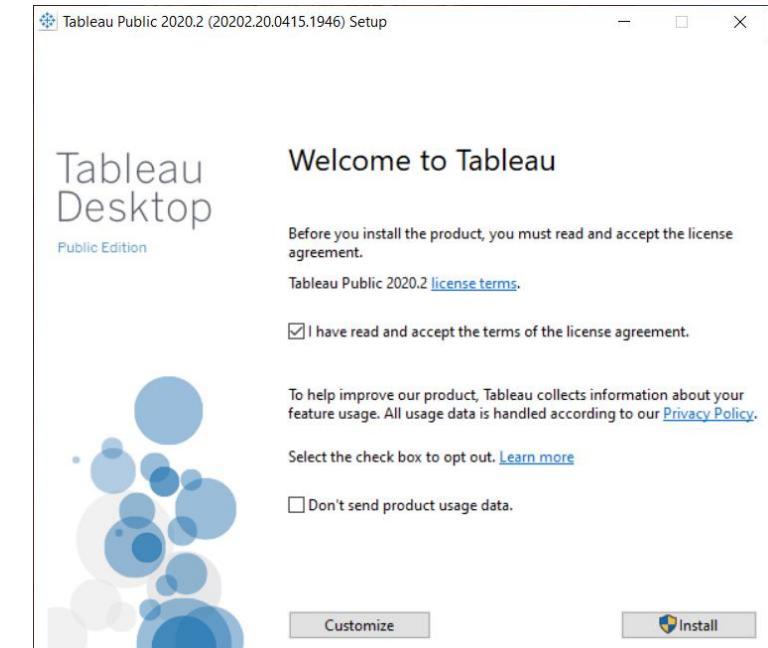


2) Double click the downloaded Tableau Public Desktop **exe** file



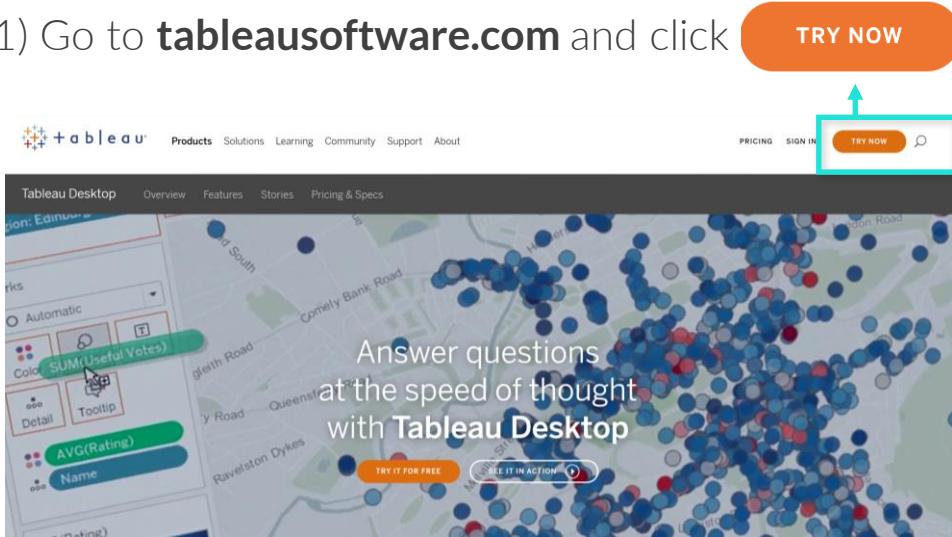
TableauPublicDes
ktop-64bit-2020-
2-0

3) Launch the **pkg** file to install the software, and follow the steps (*default settings are OK*)

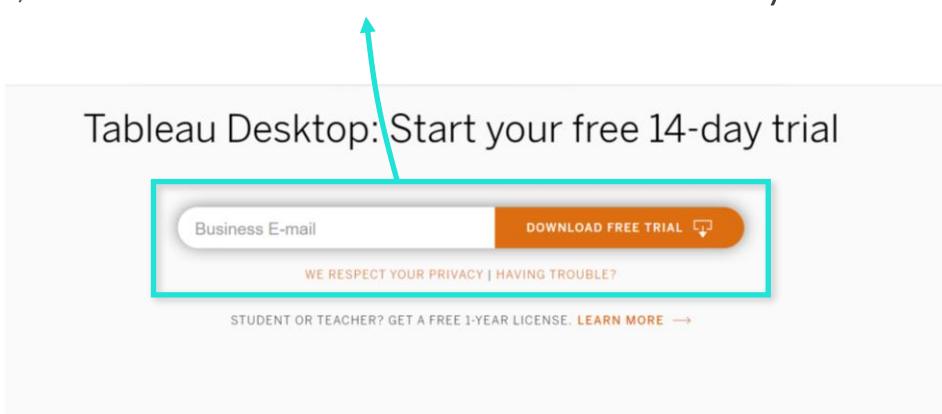


Downloading Tableau Desktop (Trial/Paid)

1) Go to **tableausoftware.com** and click



2) Enter an **email address** to start a 14-day free trial



By downloading a trial version of **Tableau Desktop** (via a “Tableau Creator” subscription), you’ll get **14 days free** before starting a paid monthly subscription

- If you choose to start a subscription, we recommend the **Tableau Creator [For Individuals]** option



REMINDER: If you are working with Tableau for the first time, we recommend using **Tableau Public** to follow along with this course for free (*no subscription required!*)

Preparing for the Exam

Certification Exam Levels

Tableau offers **3 different levels** of Tableau Desktop certification, including **Specialist**, **Certified Associate** and **Certified Professional**

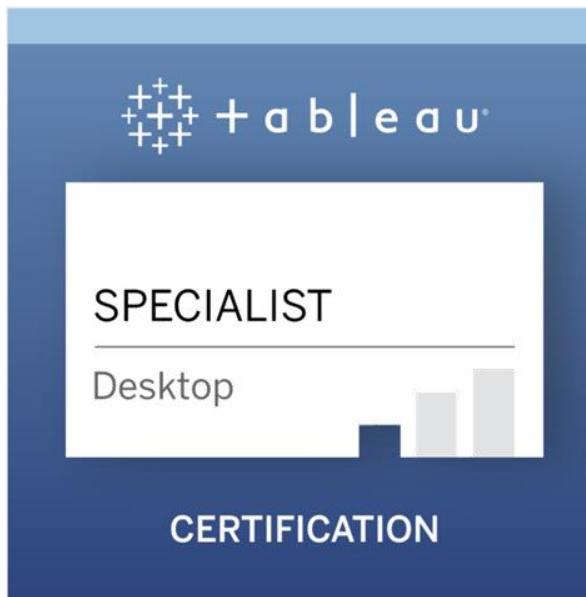


Tableau Desktop Specialist

Prove your basic skills and product knowledge

[EXAM DETAILS →](#)



Tableau Desktop Certified Associate

Prove your comprehensive skills and expertise

[EXAM DETAILS →](#)

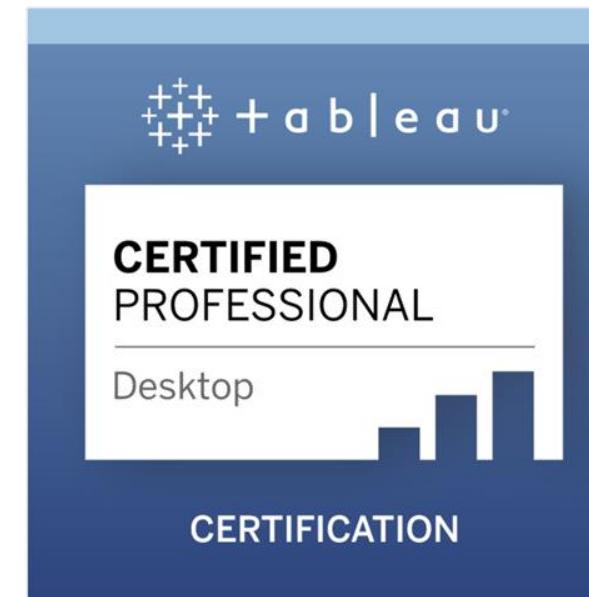


Tableau Desktop Certified Professional

Prove your advanced skills and expertise with visual best practices

[EXAM DETAILS →](#)

Exam Structure

	Desktop Specialist	Certified Associate	Certified Professional
 Platform	Windows Virtual Machine	Windows Virtual Machine	Windows Virtual Machine
 Question Format	Multiple Choice	Multiple Choice	Hands-on / Dashboard Build
 # of Questions	30	36	N/A
 Time Limit	60 minutes	120 minutes	180 minutes
 Passing Score	70%	75%	By Committee
 Expiration	None	2 Years	3 Years
 Cost	\$100	\$250	\$600

*Requires CA Cert Prerequisite

Skills Measured

Desktop Specialist

Connecting to & Preparing Data

- Create and save data connections
- Modify data connections
- Manage data properties

Exploring & Analyzing Data

- Create basic charts
- Organize data and apply filters
- Apply analytics to a worksheet

Understand Tableau Concepts

- Dimensions and measures
- Discrete and continuous fields
- Aggregation

Sharing Insights

- Format view for presentation
- Create and modify a dashboard

Certified Associate

Data Connections [17%]

Connect to data, prepare data for analysis, blend, join, union, etc.

Organizing & Simplifying Data [10%]

Understand how to sort, filter, group, create hierarchies, and sets

Field & Chart Types [15%]

Explain dimensions, measures, discrete continuous and create visualizations

Analytics [15%]

Leverage the analytics pane for reference lines, trend lines, models, forecasting, etc.

Calculations [18%]

Understand how to create string, number, logical calculations, etc.

Mapping [13%]

Navigate maps, modify locations, custom geocoding, background images, etc.

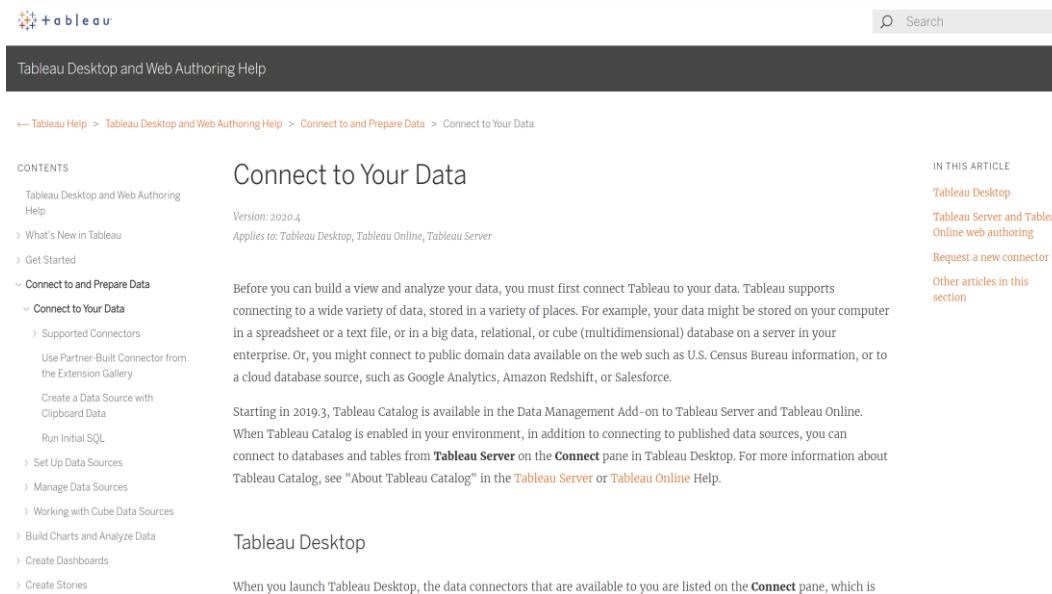
Dashboards [12%]

Dashboards, dashboard actions, device preview, publishing and sharing options

Exam Question Types

Knowledge-Based Questions

Multiple choice questions which reflect core desktop product knowledge related to formulas, menus, field types, etc.

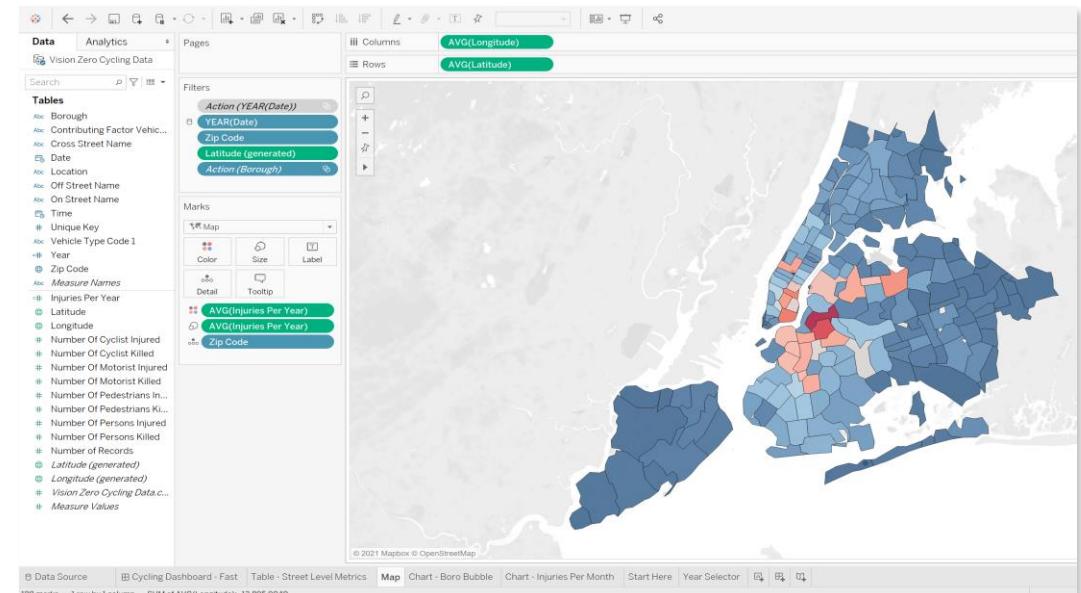


The screenshot shows a web browser displaying the Tableau Help documentation. The URL is [https://help.tableau.com/2020.4/desktop/index.html?#page=connect_your_data](#). The page title is "Connect to Your Data". The content area discusses connecting Tableau to various data sources like spreadsheets, databases, and cloud services. It includes a "Before you can build a view and analyze your data, you must first connect Tableau to your data." section and a "Starting in 2019.3, Tableau Catalog is available in the Data Management Add-on to Tableau Server and Tableau Online." section. The sidebar on the left lists other help topics such as "What's New in Tableau", "Get Started", "Connect to and Prepare Data", "Tableau Desktop", and "Create Stories".

help.tableau.com

Hands-On Questions

Multiple choice questions that require testers to use Tableau Desktop to find an answer using the provided data sources



PRO TIP: Use Tableau's Help Center during the exam if you get stuck on a knowledge-based question (yes, *this is allowed!*)



Example | Knowledge-Based Question

Which of the following is a **reason to use extracts** rather than a live connection?

- a. Your data is housed in an Essbase cube
- b. You need the freshest possible data at all times
- c. You need the best performance possible from your source
- d. You need to join tables that are in the data source



Interpreter

Split a Field into Multiple
Fields

Filter Data from Data
Sources

Understand Field Type
Detection and Naming
Improvements

Extract Your Data

Extract Upgrade to .hyper
Format

Refresh Extracts

Add Data to Extracts

Extracts are saved subsets of data that you can use to improve performance or to take advantage of features functionality not available or supported in your original data. When you create an extract of your data, you can reduce the total amount of data by using filters and configuring other limits. After you create an extract, you can refresh it with data from the original data. When refreshing the data, you have the option to either do a full refresh, which replaces all of the contents in the extract, or you can do an incremental refresh, which only adds rows that are new since the previous refresh.

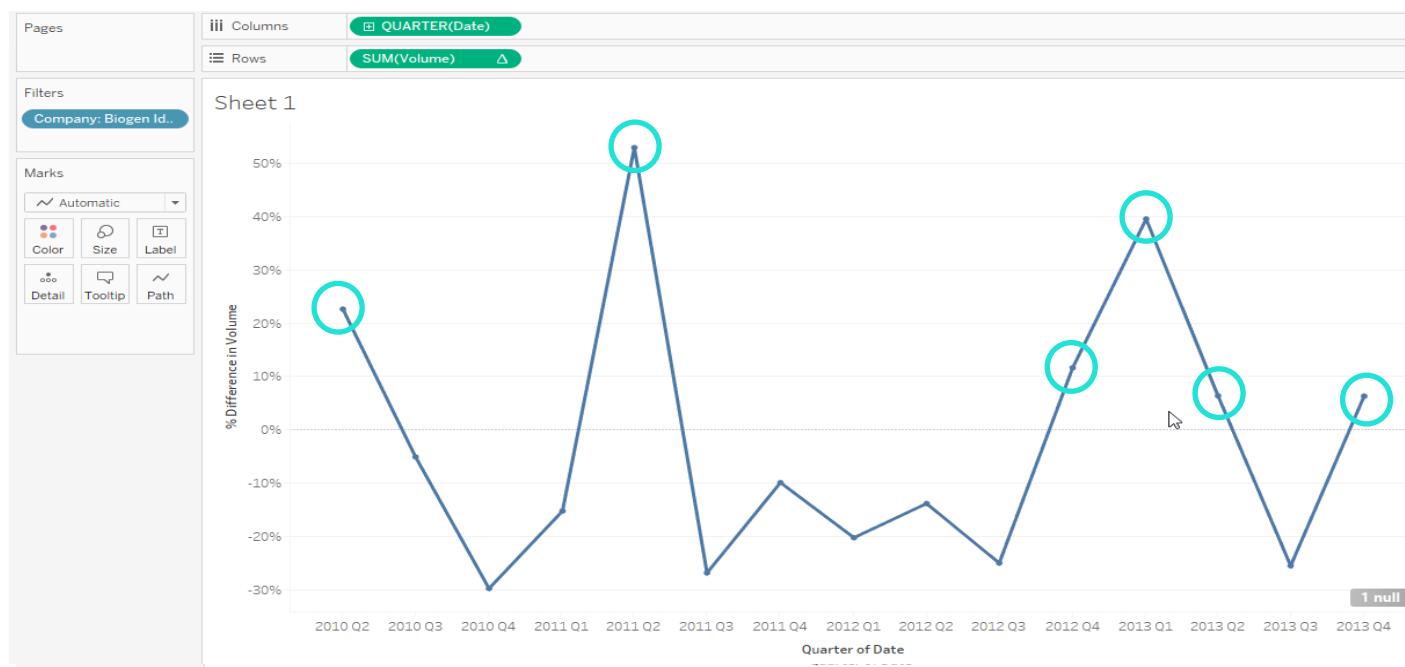
Extracts are advantageous for several reasons:

- **Supports large data sets:** You can create extracts that contain billions of rows of data.
- **Fast to create:** If you're working with large data sets, creating and working with extracts can be faster than working with the original data.
- **Help improve performance:** When you interact with views that use extract data sources, you generally experience better performance than when interacting with views based on connections to the original data.

Example | Hands-on Question

Using the **Stocks 2010-2013 table**, create a chart that shows the **percent difference in volume** for each **company** by **year** and **quarter**. How many **quarters** did Biogen Idec show a **positive** percent difference in volume?

- a. 1
- b. 2
- c. 5
- d. 6



Exam Rules

Tableau certification exams have **specific rules** which are actively enforced by proctors; any violation can result in **disqualification**, so be mindful!



Photo ID Required



Clear Desk



Pass Tech Checks



No phones, headphones, external monitors



Close all programs



No Talking (except proctor questions)



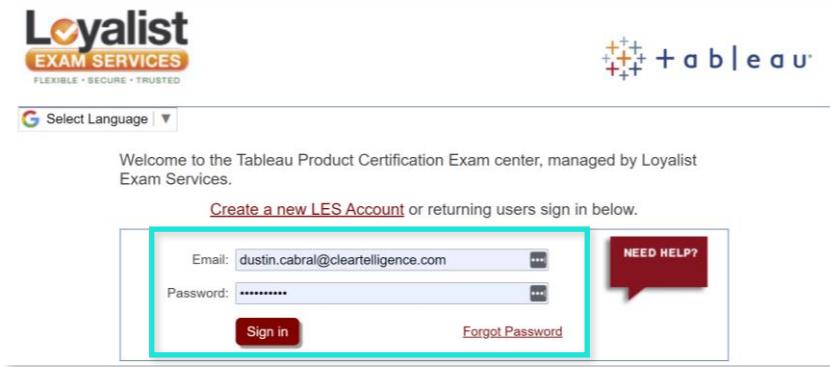
Chrome Installed & Open



Alone in room

Scheduling the Exam

1) Go to **tableau.lcsexams.com** and create an account



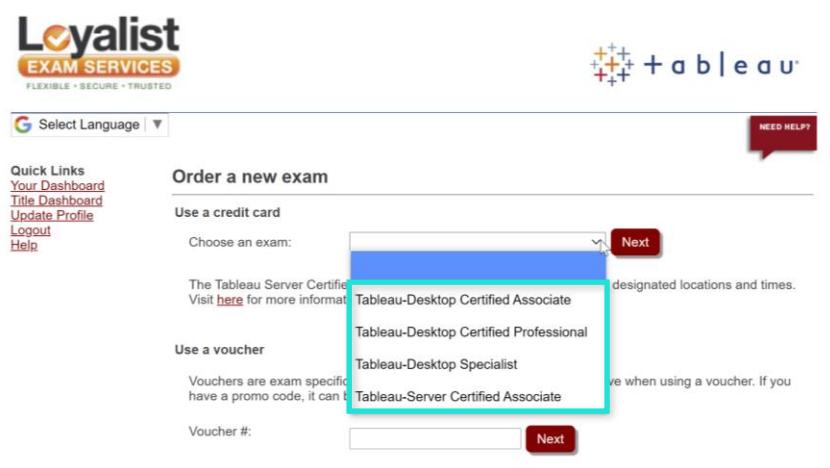
Welcome to the Tableau Product Certification Exam center, managed by Loyalist Exam Services.

Create a new LES Account or returning users sign in below.

Email: Password: Sign in [Forgot Password](#)

NEED HELP?

2) Select the exam and provide payment



Order a new exam

Use a credit card

Choose an exam:

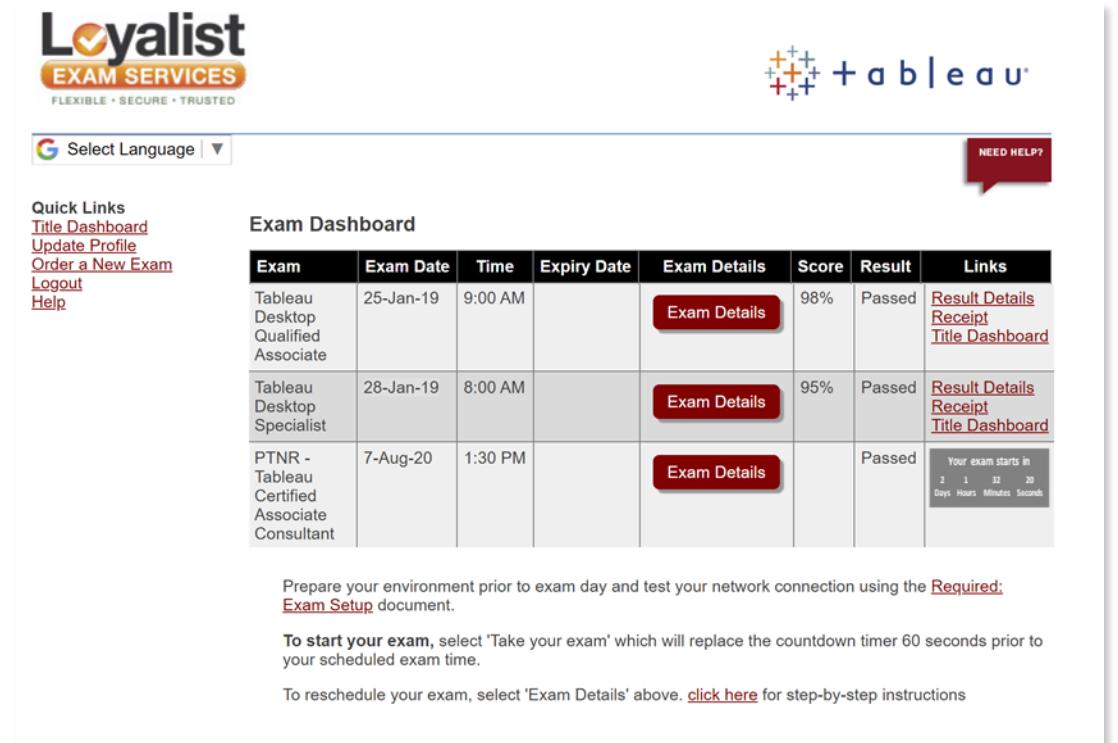
The Tableau Server Certified Associate. Visit [here](#) for more information.

Use a voucher

Vouchers are exam specific. If you have a promo code, it can be used when using a voucher. If you

Voucher #: Next

3) When the scheduled time comes, a **Take Exam** button will appear



Quick Links [Title Dashboard](#) [Update Profile](#) [Order a New Exam](#) [Logout](#) [Help](#)

Exam Dashboard

Exam	Exam Date	Time	Expiry Date	Exam Details	Score	Result	Links
Tableau Desktop Qualified Associate	25-Jan-19	9:00 AM		Exam Details	98%	Passed	Result Details Receipt Title Dashboard
Tableau Desktop Specialist	28-Jan-19	8:00 AM		Exam Details	95%	Passed	Result Details Receipt Title Dashboard
PTNR - Tableau Certified Associate Consultant	7-Aug-20	1:30 PM		Exam Details		Passed	Your exam starts in 2 Days 1 Hours 32 Minutes 20 Seconds

NEED HELP?

Prepare your environment prior to exam day and test your network connection using the [Required: Exam Setup](#) document.

To start your exam, select 'Take your exam' which will replace the countdown timer 60 seconds prior to your scheduled exam time.

To reschedule your exam, select 'Exam Details' above. [click here](#) for step-by-step instructions



REMINDER: Complete the exam setup technical checks (*internet speed, latency, browser compatibility, etc.*) prior to your exam to avoid any issues on exam day!

Exam Results



FLEXIBLE • SECURE • TRUSTED

Basic Exam Info

Basic exam details including date, time, id, and result

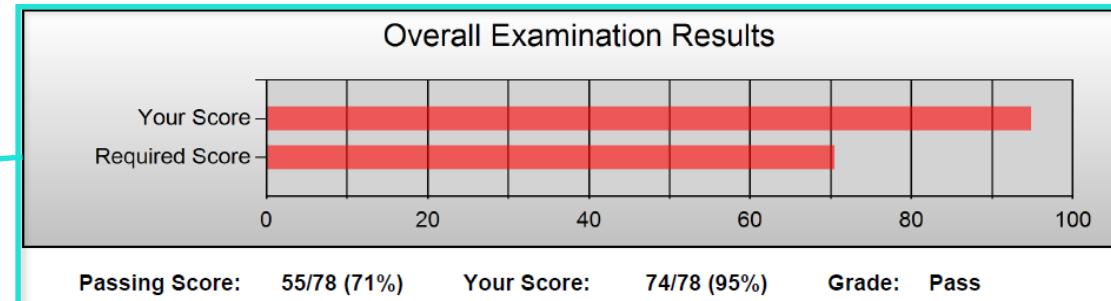
Candidate: Dustin Cabral
Candidate ID: 988830
Exam Date: 28 Jan 2019
Exam Time: 08:00 AM
Your score: 95%
Result: Pass

Exam Summary for Candidate

Exam Location: AA
Association: Tableau Software
Exam Type: Tableau
Exam Name: Desktop Specialist

Overall Result

Your exam score compared to the exam passing benchmark



Category	Percent Correct
Connecting to and Preparing Data	100
Exploring and Analyzing Data	100
Sharing Insights	83
Understanding Tableau Concepts	100

Exam Type

Exam type and location

Tips for Success



Learn by doing – build in Tableau Desktop often

- *Nothing can beat time in the tool, so try to “Tableau Every Day (TED)”*



Remember the rules of the exam (*don’t fail on a technicality!*)

- *Be sure you are alone, in a quiet space, with no phone or other screens/paper on your desk*



Use the Tableau Help website as a reference guide

- *This is the “owner’s manual” for Tableau Desktop and should be the go-to for technical questions*



Skip questions if you get stuck, and go back later to answer them

- *Skipping allows you to move on to familiar questions, and take more time to think about harder ones*

Connecting to Data

Connecting to Data



In this section we'll cover tools used for **connecting to data**, including the data source interface, transformation and modeling tools, extracts, joins, unions, and more

Skills We'll Cover:

Connection Types

Data Source Interface

Transforming Data

Live & Extract Connection

Data Performance

Data Modeling

Joins & Unions

Data Blending

Common Use Cases:

- Connecting to many types of raw source data
- Cleaning and transforming data for analysis
- Managing field types and formats
- Modifying connections to enhance performance
- Combining and modeling data into a single source

Data Connection Types

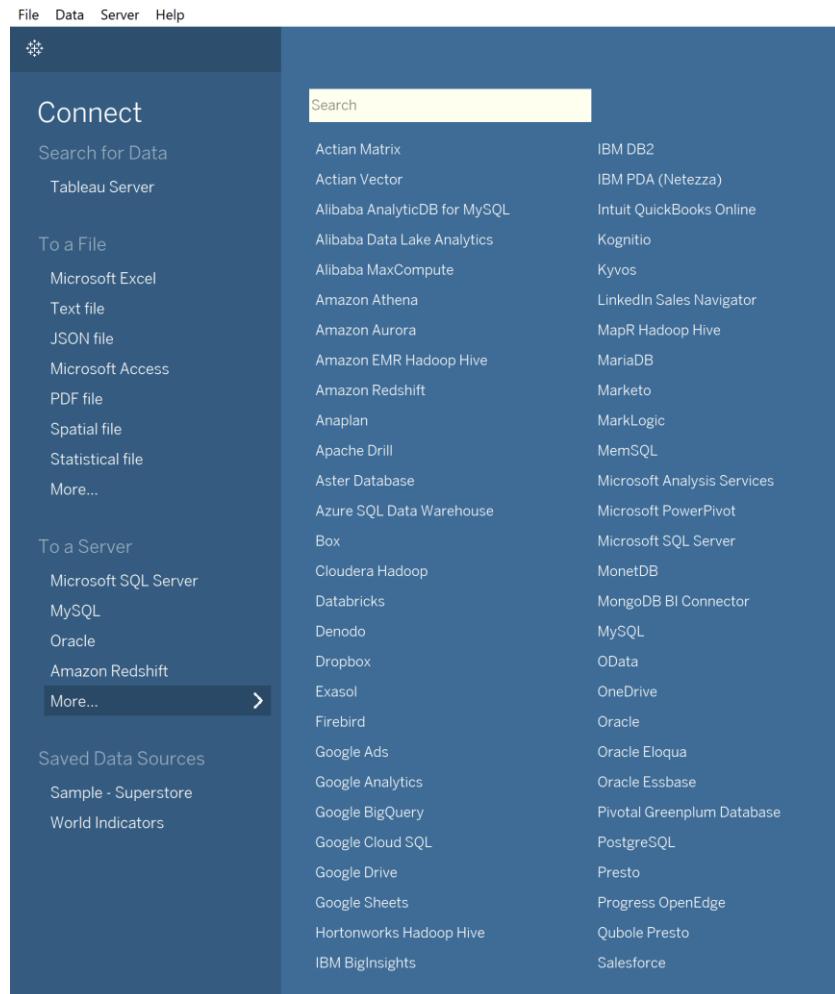
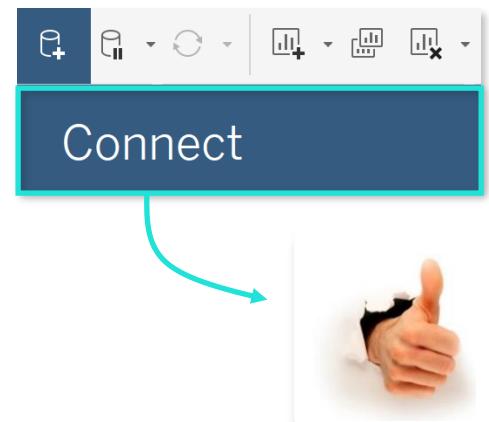


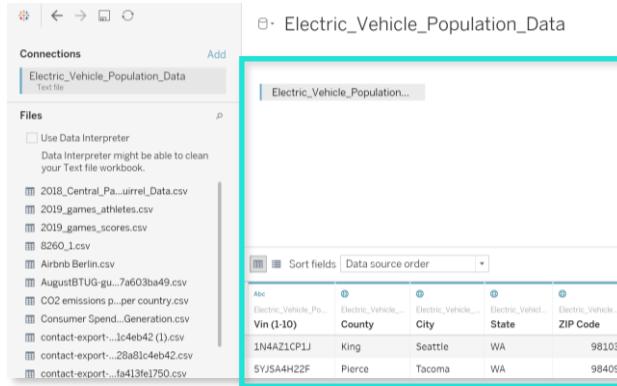
Tableau Desktop enables users to connect to virtually any data source or platform, including:

- **Flat Files** (xlsx, csv, access, pdf, tdsx, etc.)
- **Servers** (SQL, Oracle, Hadoop, Redshift, Tableau Server, etc.)
- **Saved Data Sources** (Bookmarked sources for easy access)



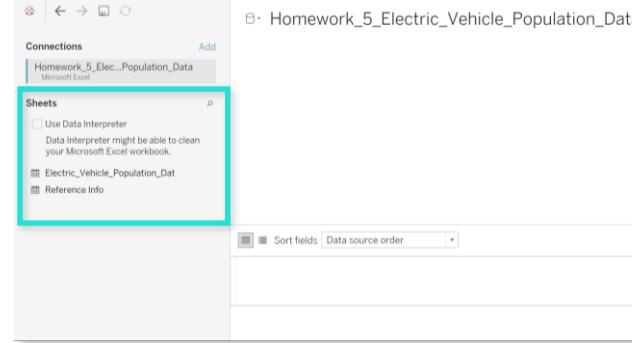
PRO TIP: Don't go back to the main menu to add a new source, use the **New Data Source** menu!

Data Connection Examples



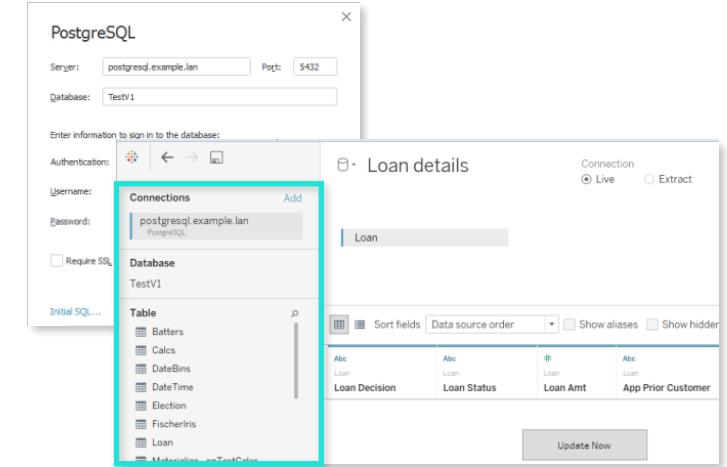
The screenshot shows the Tableau Data Source pane for a CSV file named "Electric_Vehicle_Population_Data". The "Connections" section is visible, and the main pane displays the data with a table structure:

Electric_Vehicle_Population...	County	City	State	ZIP Code
1N4A21CP1J	King	Seattle	WA	98103
SYJSA4H22F	Pierce	Tacoma	WA	98409



The screenshot shows the Tableau Data Source pane for an Excel file named "Homework_5_Elec_Vehicle_Population_Data". The "Sheets" section is visible, and the main pane displays the data with a table structure:

Electric_Vehicle_Population...	County	City	State	ZIP Code
1N4A21CP1J	King	Seattle	WA	98103
SYJSA4H22F	Pierce	Tacoma	WA	98409



The screenshot shows the Tableau Data Source pane for a PostgreSQL database named "TestV1". The "Connections" section is visible, and the main pane displays the data with a table structure:

Loan	Loan Status	Loan Amt	App Prior Customer
1	Approved	10000	Yes
2	Rejected	5000	No

Text Files

When you connect to a simple **CSV/txt** file, Tableau will populate the data pane automatically since it's a single table

NOTE: Data Interpreter is available for text/csv files

Excel Files

When you connect to an **Excel** file, Tableau will display a list of tabs and named ranges contained within the workbook

NOTE: Data Interpreter is available for Excel files

Databases

When you connect to a **database**, you must enter credentials in order to access the schemas, tables and views available

NOTE: Data Interpreter is NOT available for database connections

The Data Source Interface

Connections Pane

View connections, sheets, schemas, tables & views

The screenshot illustrates the Tableau Data Source Interface with various components highlighted:

- Connections Pane**: Located on the left, it shows a list of connections, sheets, and tables. The 'Orders' table is selected, indicated by a blue box and a hand cursor icon.
- Canvas**: Visually represents joins or unions applied to source data. It shows a network of connections between tables like 'Orders', 'People', and 'Returns'.
- Connection Type**: (Live vs. extract) Note: Extract only in Tableau Public App. A radio button for 'Live' is selected.
- Filters**: A box showing '0 | Add' for filters.
- Data Grid**: Displays a preview of the rows and columns in your source data. It shows a grid of order details with columns like Row ID, Order ID, Order Date, Ship Date, Ship Mode, Customer ID, Customer Name, Segment, Country/Region, City, State, Postal Code, and Region.
- Metadata Grid**: Provides basic data source attributes (field names, tables, etc.). It lists field mappings between the source table 'Orders' and the destination table 'Orders'.

Field Name	Table	Remote Field Name
# Row ID	Orders	Row ID
Abc Order ID	Orders	Order ID
Order Date	Orders	Order Date
Ship Date	Orders	Ship Date
Ship Mode	Orders	Ship Mode
Customer ID	Orders	Customer ID
Customer Name	Orders	Customer Name
Segment	Orders	Segment

Metadata Grid Provides basic data source attributes (field names, tables, etc.)

Filters

Allow you to filter down your data source

Data Grid

Displays a preview of the rows and columns in your source data

PRO TIP: The Data Interpreter

The screenshot shows the Microsoft Power BI Data Interpreter interface. A tooltip box is overlaid on the interface with the title 'Sheets' and the message 'Cleaned with Data Interpreter'. Below this, a link says 'Review the results. (To undo changes, clear the check box.)'. The main area shows a table with data, and a note at the bottom says 'Data Interpreter might be able to clean your Microsoft Excel workbook.' A checkbox 'Use Data Interpreter' is checked in the 'Sheets' section.

The **Data Interpreter** dynamically cleans poorly formatted Excel/CSV files (extra rows, merged cells, etc.) with a **single click**

NOTE: Data Interpreter is only available for Excel workbooks & CSVs

A	B	C	D	E	F	G
1	World Indicators Source					
2	2/20/2021					
3						
4	Country/Region	Region	Year	Birth Rate	Business T:CO2 Emiss	Days to Sta
5	Algeria	Africa	12/1/2000	0.02		87931
6	Angola	Africa	12/1/2000	0.05		9542
7	Benin	Africa	12/1/2000	0.043		1617
8	Botswana	Africa	12/1/2000	0.027		4276
9	Burkina Faso	Africa	12/1/2000	0.046		1041

Key:
Data is interpreted as column headers (field names).
Data is interpreted as values in your data source.
Data derived from an Excel merged cell is interpreted as value in your data source.
Data is ignored and not included as part of your data source.
Data has been excluded from your data source.
Note: To search for all excluded data, use CRTL+F on Windows or Command F on the Mac, and then type ***DATA REMOVED***.

Key for the Data Interpreter World Indicators World Indicators_subtables A0004_Z2695

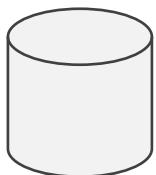
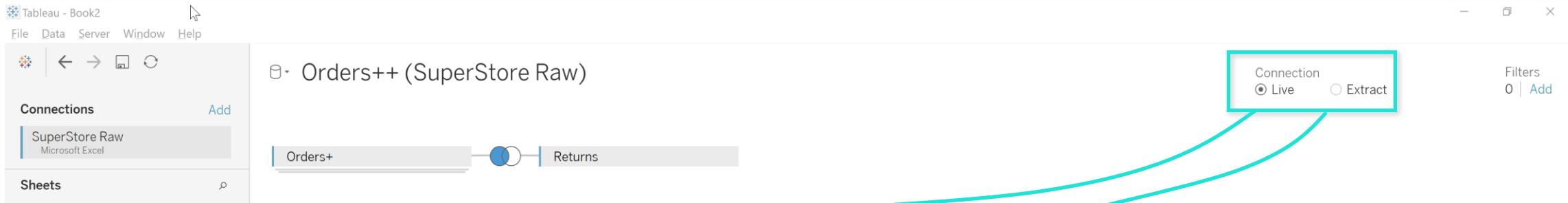
A	B	C	D	E	F	G	H	I
1	World Indicators Source							
2	2/20/2021							
3								
4	Country/Region	Region	Year	Birth Rate	Business T:CO2 Emiss	Days to Sta	Ease of Bus	Energy Usa GDP
5	Algeria	Africa	12/1/2000	0.02	87931		26998	5.48E+10
6	Angola	Africa	12/1/2000	0.05	9542		7499	9.13E+09
7	Benin	Africa	12/1/2000	0.043	1617		1983	2.36E+09
8	Botswana	Africa	12/1/2000	0.027	4276		4276	1836 5.79E+09
9	Burkina Faso	Africa	12/1/2000	0.046			1041	2.61E+09
10	Burundi	Africa	12/1/2000	0.042			301	8.7E+08

Transforming Data

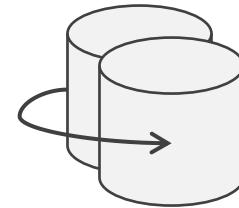
The screenshot shows the Tableau Data Editor interface with a data source containing two sheets: 'Orders' and 'Customers'. The 'Orders' sheet is currently selected, displaying columns for Row ID, Order ID, Order Date (M...), and several 'Abc' columns. A context menu is open over the 'Order Date (M...)' column, listing options like Number (decimal), Number (whole), Date & Time, Date, String, Boolean, Default, and Geographic Role. Another context menu is open over the 'Abc' column, listing Rename, Copy Values, Hide, Aliases..., Create Calculated Field..., Create Group..., Split, Custom Split..., Pivot (select multiple fields), and Describe... A callout box labeled 'Change Field Types or Geographic Roles' points to the 'Geographic Role' option in the first menu. A callout box labeled 'Number (decimal, whole)
Date/Time, String, etc.' points to the 'Default' option in the first menu. Below the screenshot, five sections provide detailed explanations for each menu item:

- Change Field Types or Geographic Roles**
Number (decimal, whole)
Date/Time, String, etc.
- Rename** fields (can also double-click the header)
 - Fields are only renamed in the workbook, not the raw source
- Hide** unneeded columns from end-users
 - Fields are only hidden in Tableau, not the raw source
- Group** entries in fields together
 - A new field will be created, and original values will not change
- Pivot** multiple fields from columns to rows
 - Tip: Use **CTRL** or **Command** keyboard shortcuts
 - This works like Excel's **text-to-column** functionality
- Split** fields using automatic or custom delimiters

Live Connections vs. Extracts



Live Connections query the underlying database / flat file each time a field is used (filter, chart, action, etc.)



Extracts pull data from the underlying source and into Tableau's **Hyper Extract** file format, allowing you to refresh data on regular basis

NOTE: Automatic refresh requires Tableau Server/Online

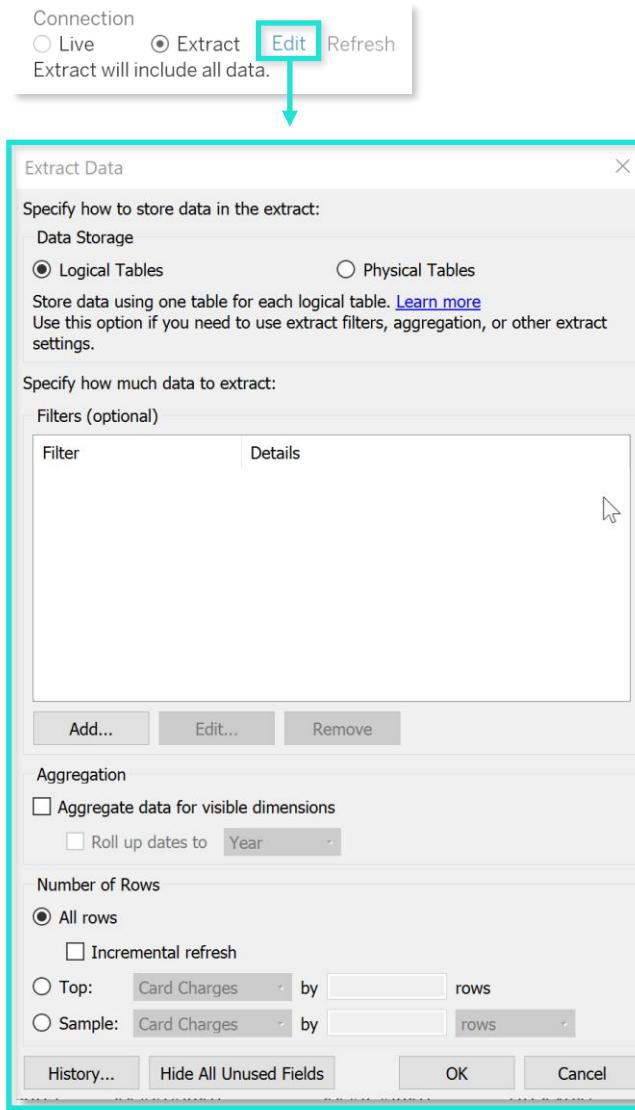
Why Use Extracts?

- Can improve performance (better performance than most database sources)
- Additional functionality (exposes additional features that may be limited with live connections)
- Offline access (work without a connection to the network or database)
- Supports very large datasets (into the billions of rows)
- Fast to create (quick extract times)



NOTE: Live connections are **NOT** supported in the **Tableau Public App**

Extract Options [Trial/Paid Version Only]



Logical Tables keeps logical tables separate and combines physical table joins into a single table within logical tables.

Physical Tables stores extract physical tables separately, and can be used to improve efficiency and leverage row-level security without multiplying data size

Filters are used to limit the amount of data pulled into an extract

- *NOTE: Extract filters cannot be removed or changed outside of the data connection page*

Aggregate rolls up the level of granularity based on visible dimensions (or a specified date field), and is commonly used to reduce data size

- *NOTE: This can impact your calculations, so test thoroughly before publishing!*

All Rows will pull a full data extract each time a refresh is triggered

- *NOTE: Use this option if historical data can change or if data size is not a concern*

Incremental Refresh only pulls in “new” records, based on a specified date field

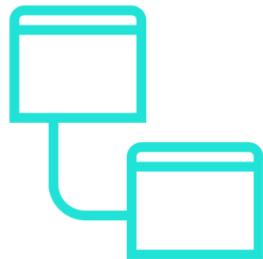
- *NOTE: Use this option for large data sets where historical records do not change*

Top / Sample pulls a specific number of rows from the source (Top N or random)

Combining Data

Tableau Desktop provides many options for combining and modeling your data source connections, including **relationships**, **joins**, **unions**, and **blending**

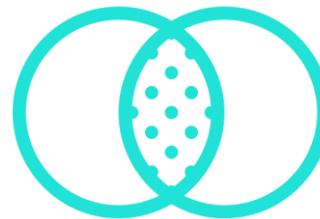
Relationships



Leverages **related fields** between tables to create **contextually-appropriate joins** on the fly

- ✓ Good for **all-around** use cases and optimal performance

Joins



Merges multiple tables based on a **join clause** to create **new fixed table**

- ✓ Used to **add new columns** across row structure

Unions



Appends two or more tables to form a new **combined** table

- ✓ Used to **stack rows** from tables with the same columns & data types

Blending



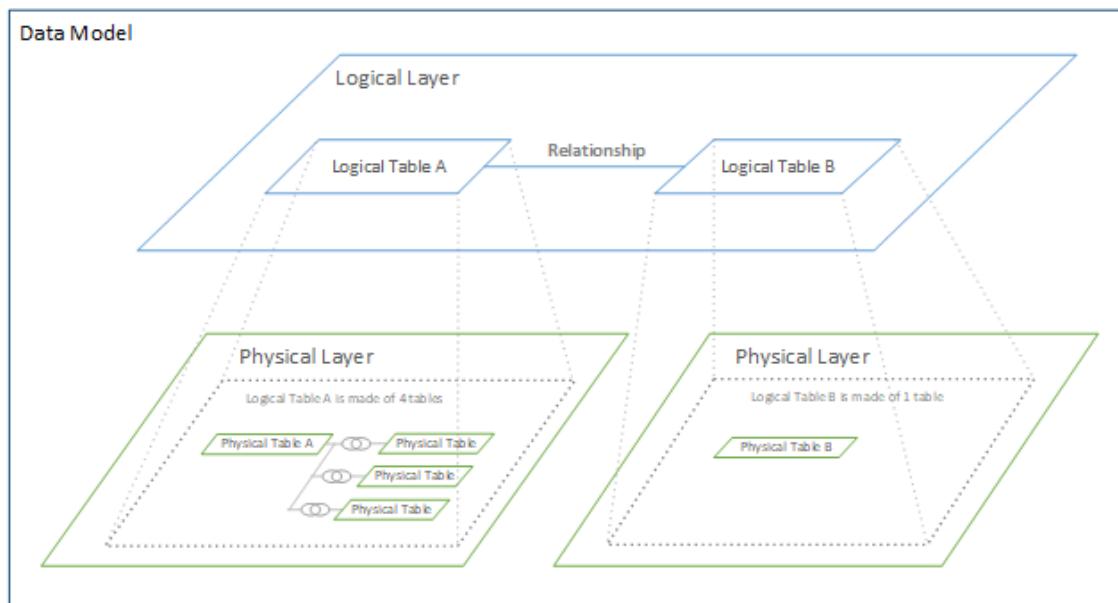
Visualizes data from **separate sources** within the same view via blended fields

- ✓ Good for quickly combining fields from multiple sources at the **sheet-level**

Tableau Data Model

Tableau Desktop's **Data Model** is split into two distinct layers: **Logical & Physical**

- Both layers can be used *in conjunction* with each other
- Source data should be clearly understood prior to enabling either data model layer; however, the logical layer is generally more forgiving than the physical layer



Logical Layer represents the canvas for creating **relationships** between tables

Physical Layer represents the canvas for creating **unions & joins** between tables

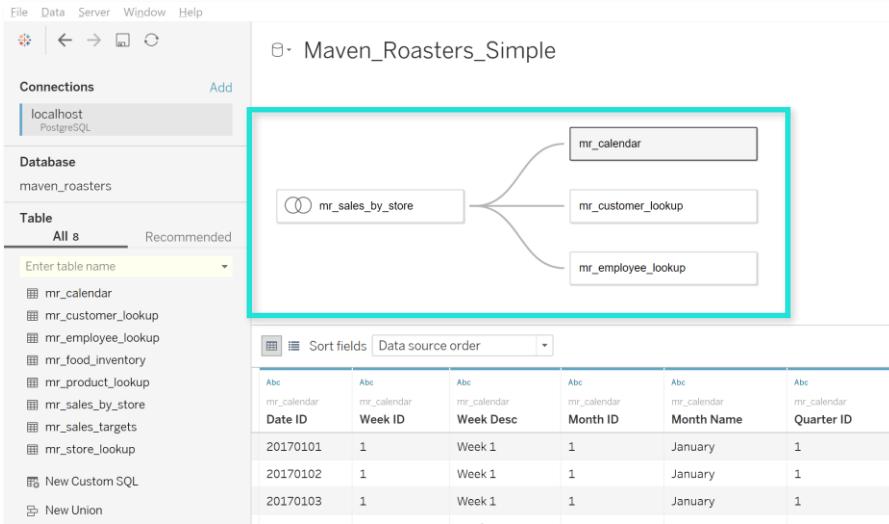
NOTE: The Physical layer is the same data model structure as the original data model prior to 2020.2.



The **Physical Layer** physically joins tables together, while the **Logical Layer** keeps tables separate, but defines relationships between them

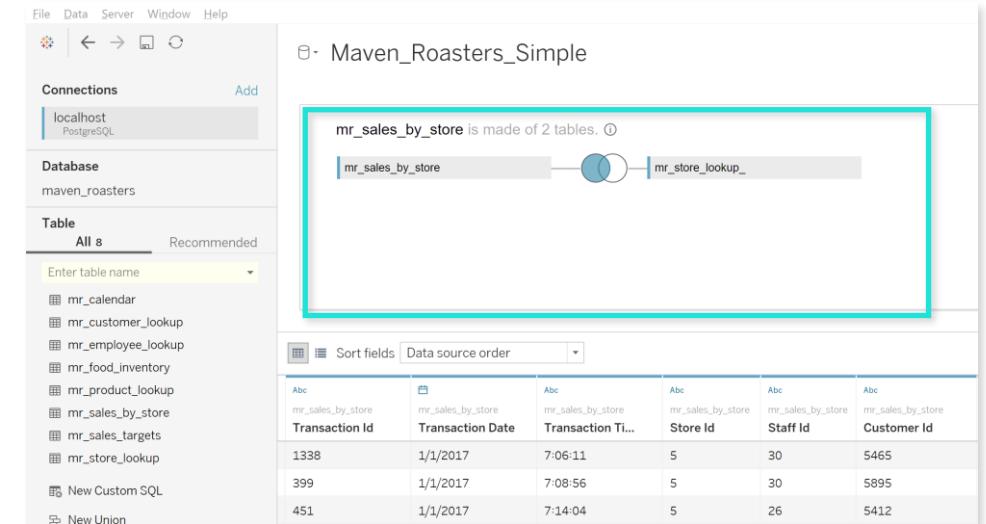
Logical and Physical Layers

Logical Layer



- Tables dragged here are called “**Logical**” tables
- Logical tables are **containers** for “Physical” tables
- Logical tables remain **distinct**, not merged in the data source
- “**Noodles**” connect Logical tables together via related fields

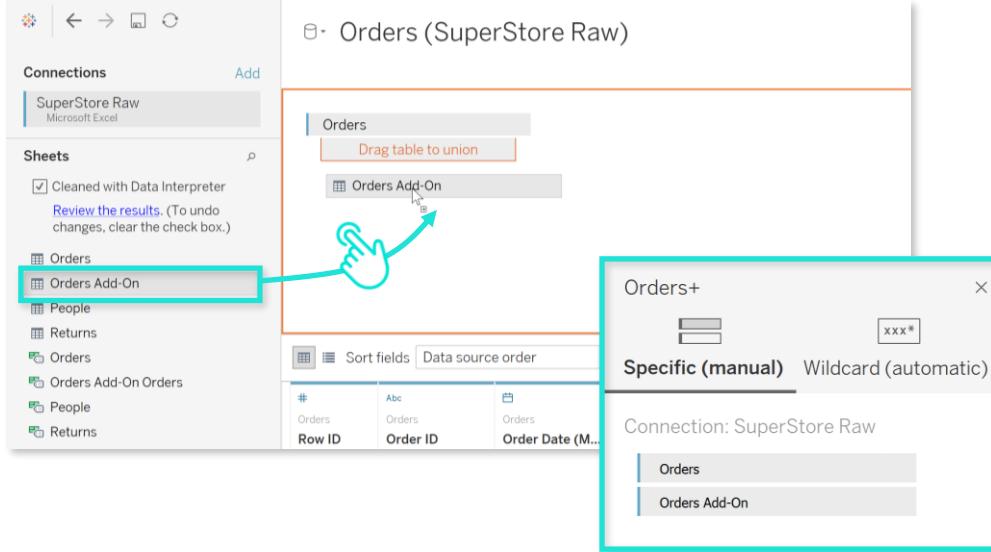
Physical Layer



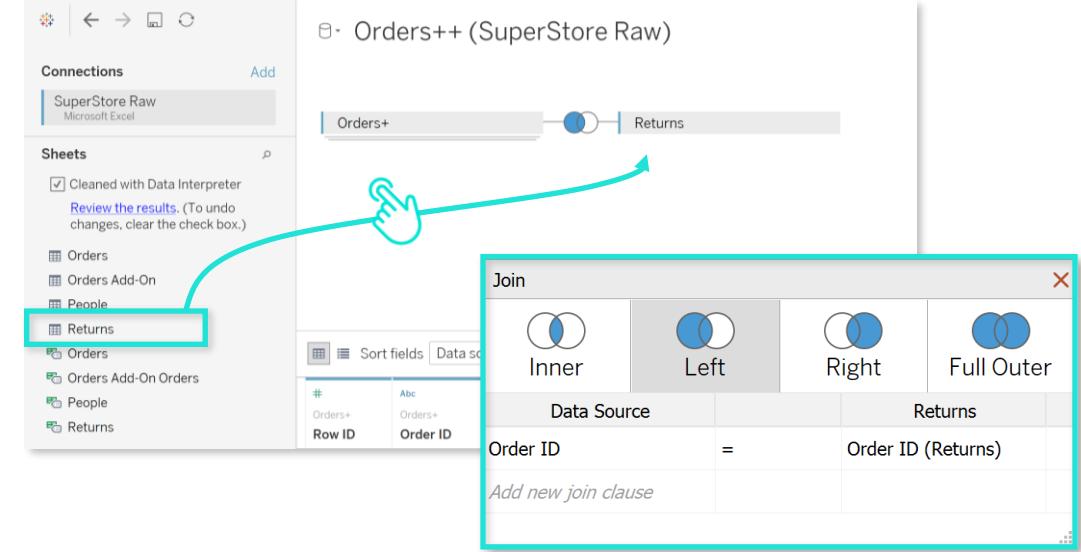
- Tables dragged here are called “**Physical**” tables
- Physical tables are **merged** into a single flat table that defines the logical table.
- **Joins / Unions** connect physical tables together via join clauses

 **PRO TIP:** To access the data model view from pre-2020.2 (i.e. joins, unions, Venn Diagrams), simply double-click the table brought into the data canvas

Unions & Joins



The screenshot shows a 'Connections' panel with 'SuperStore Raw' selected. In the 'Sheets' list, 'Orders' and 'Orders Add-On' are highlighted with a teal box. A modal window titled 'Orders+' is open, showing 'Specific (manual)' selected. It lists 'Orders' and 'Orders Add-On' as data sources. A hand cursor is shown dragging the 'Orders Add-On' table into the union area. The 'Orders' table is also highlighted with a teal box.



The screenshot shows a 'Connections' panel with 'SuperStore Raw' selected. In the 'Sheets' list, 'Orders+' and 'Returns' are highlighted with a teal box. A modal window titled 'Join' is open, showing 'Left' selected. It lists 'Orders+' and 'Returns' as data sources. A hand cursor is shown dragging the 'Returns' table into the join area. The 'Returns' table is also highlighted with a teal box.

Unions append (or “stack”) rows of data from one table into another (not available for all connectors)

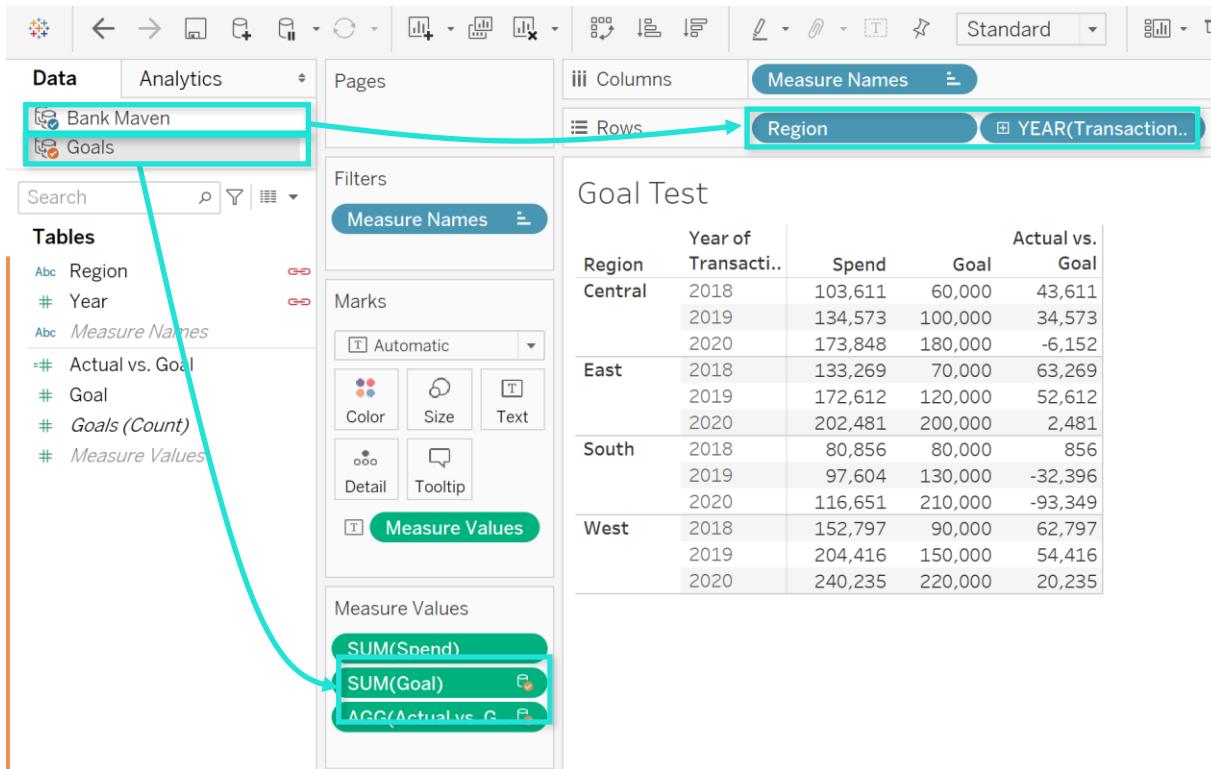
Joins combine data sources using keys; depending on the source, you can perform **inner**, **left**, **right**, or **full outer** joins



PRO TIP: When connecting to a database you will see an additional “Use Custom SQL” option, which can convert visual joins to SQL code

Data Blending

Blending is a method for combining data from multiple sources into a single view at the **sheet-level**, while keeping the sources fundamentally separate (unlike unions or joins)



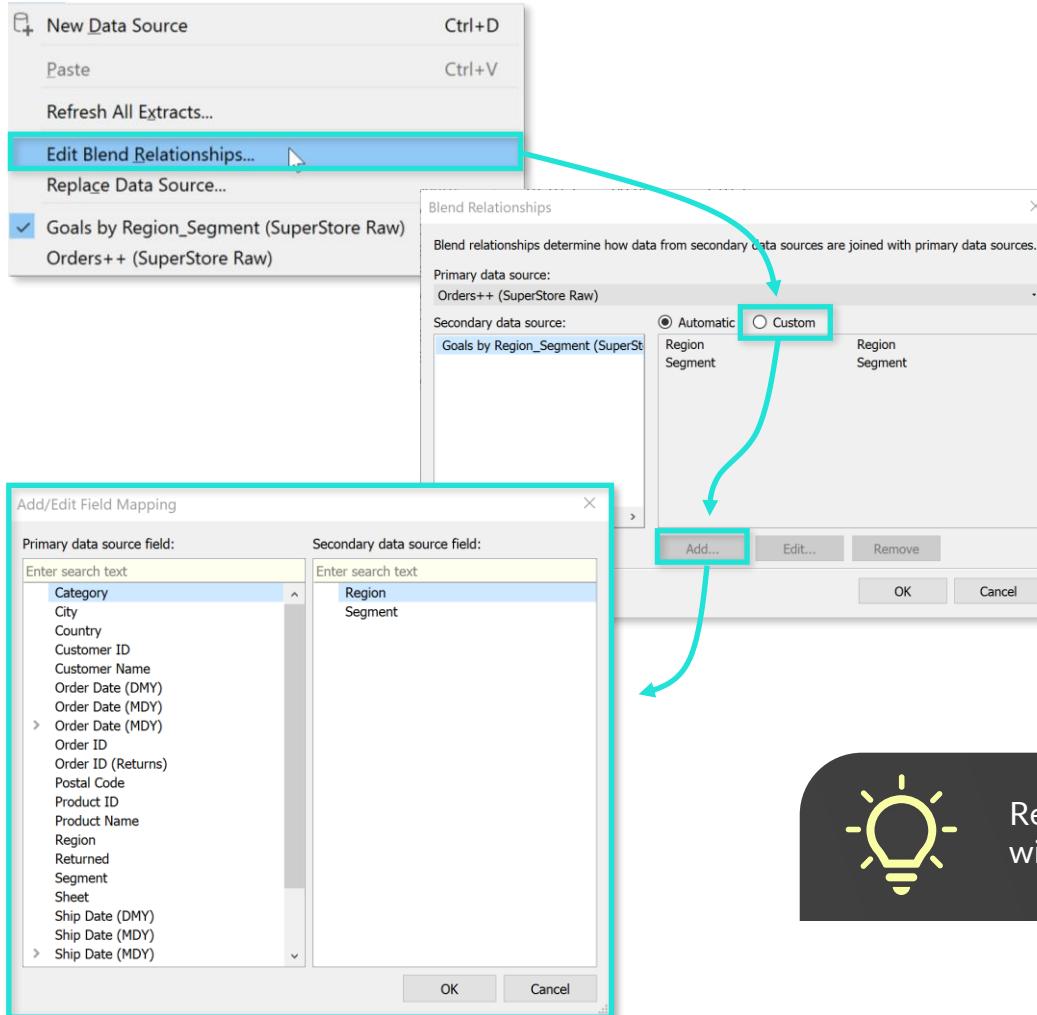
Primary Source is determined by the first field pulled (Bank Maven Spend), and gets a **Blue Check**

Secondary Sources are any other sources that a field is pulled from, and get an **Orange Check**



Dimensions are based on the **Primary Source**; any dimensions that don't exist in the primary table will not be available in the list

Data Blending



- Fields which share the same **name** and **data type** across primary and secondary sources will automatically become available for blending
- To manually define how specific fields map between sources, you can **Edit Blend Relationships** and select the **Custom** option (*helpful when your field names aren't identical*)

Region: West
Segment: Home Office
Customer Name: *
Sales v. Goal: 34,687

NOTE: If you see an **asterisk (*)**, it means that you're trying to display multiple dimensions (which isn't possible using blending); make sure your **display grain is correct!**



Remember that blending applies **per sheet**, and your primary source **can't be changed** without reconstructing your sheet or starting a new one!

Field & Chart Types

Field & Chart Types



In this section we'll cover **common field & chart types**, including dimensions & measures, discrete vs. continuous fields, charts & visuals, mark types and properties, and more

Skills We'll Cover:

Dimensions & Measures

Discrete vs. Continuous

Tableau-Generated Fields

Chart Types

Mark Types

Marks Card Properties

Common Use Cases:

- *Modifying field types & properties to support different types of analyses*
- *Using Tableau-generated fields to visualize geospatial data with maps*
- *Designing visuals to bring various types of data to life*
- *Selecting and tuning mark types and properties to customize the look and feel of your visuals*

Dimensions & Measures

Abc	Attrition Flag
Abc	Card Category
⊕	City
⊕	Country/Region
Abc	Customer ID (Customer Profile)
Abc	Customer Name
Abc	Education Level
Abc	Gender
Abc	Income Category
Abc	Marital Status
Abc	Person
⊕	Postal Code
Abc	Region
Abc	Region (Regional SVP)
⊕	State
Abc	Transaction Count Change Type
#	Avg Open To Buy
#	Avg Utilization Ratio
#	Contacts Count 12 mon
#	Credit Limit
#	Customer Age
#	Dependent count

Dimensions are qualitative fields that contain information used to categorize, segment or filter your data. Common examples include:



Names / IDs



Geographic Fields



Dates / Times

Measures are quantitative, numerical fields that can be **counted** or **aggregated** (sum, average, median, max, etc.). Common examples include:



Sales & Profit



Ratios / Percentages



Quantities

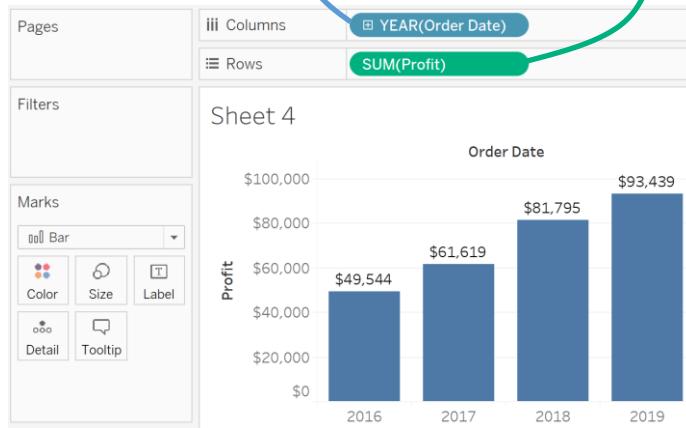
Discrete vs. Continuous

In mathematical terms, data fields can be described as either **discrete** or **continuous**

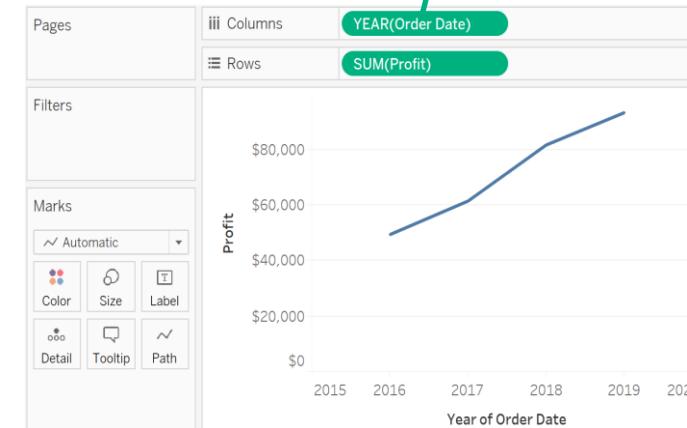
- **Discrete** fields contain a *finite* set of distinct values (Year, Category, Country, etc.)
- **Continuous** fields can contain an *infinite* range of values (Age, Temperature, Profit, etc.)

In Tableau, discrete fields add a new *header* to a view; continuous field add a new *axis* to a view:

1. Discrete Dimension*

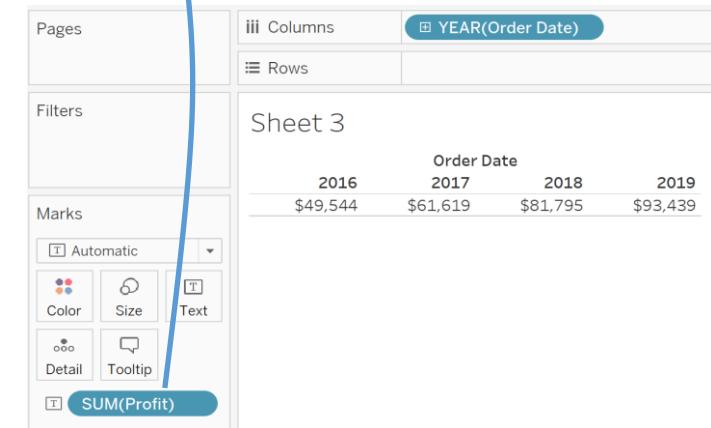


2. Continuous Measure*



3. Continuous Dimension

4. Discrete Measure

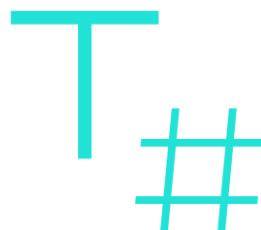


* These are most common

Tableau-Generated Fields

Tableau-generated fields are fields which are automatically created outside of existing datasets

Measure Names & Values



Measure values & names fields are created to contain all continuous values and measure names

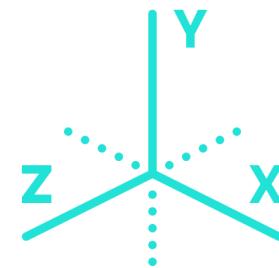
Count of Table



Count columns represent the number of records in a given table *(one field per table in the data model)*

NOTE: Formerly called "Number of Records"

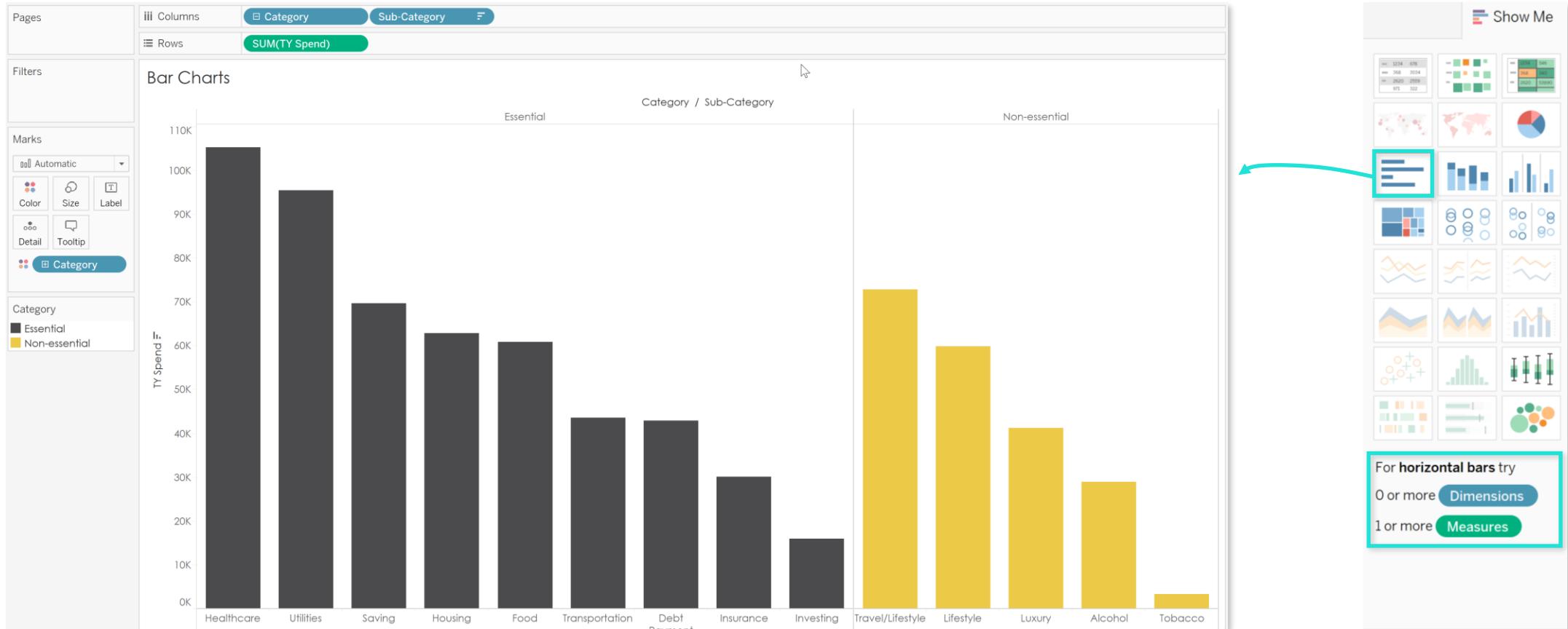
Latitude/Longitude



Geospatial coordinates are automatically generated when geographic fields in Tableau

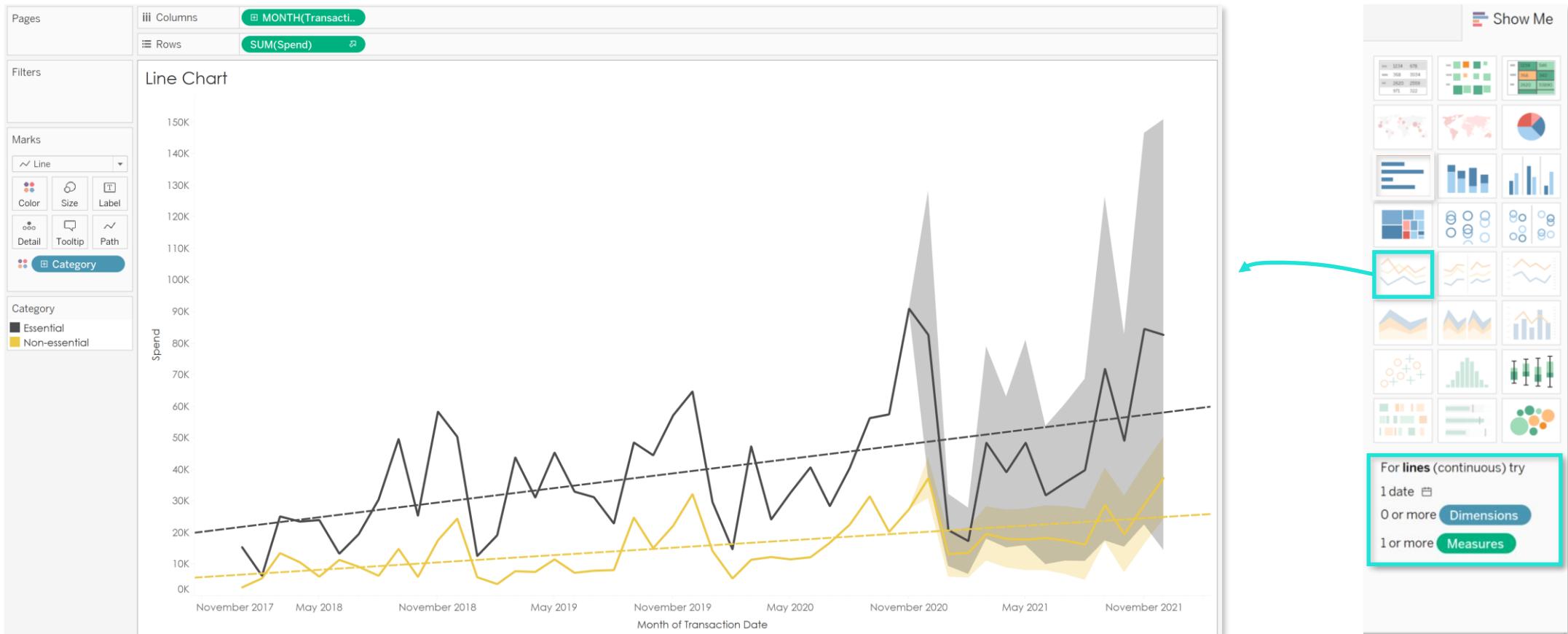
Bar Charts

Bar Charts are used to convey *relative values* between the classes in a dimension



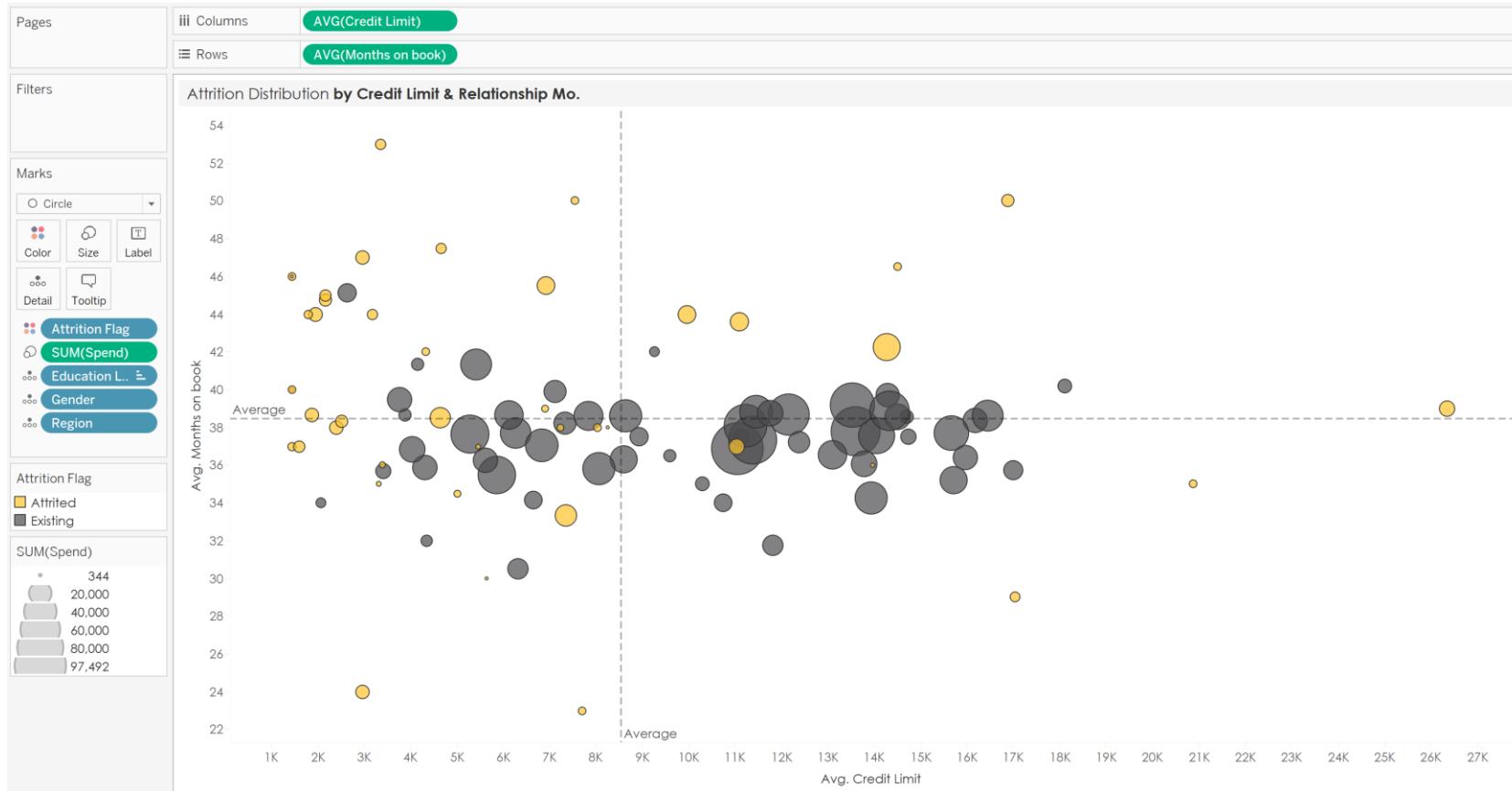
Line Charts

Line Charts are used to show *trending*, using time-based variables (day, month, year) and measures



Scatter Plots

Scatter Plots are used to visualize *relationships* between variables



Crosstabs

Crosstabs (text tables) are used to display numerical values in a *columnar format*

Pages

iii Columns Attrition Flag Measure Names

Rows Gender Region

Filters

Measure Names

Marks

Automatic

Color Size Text

Detail Tooltip

Measure Values

Attrition Distribution by Credit Limit & Relationship Mo.

Gender	Region	Attrited			Existing		
		Avg. Credit Limit	Avg. Months on book	Spend	Avg. Credit Limit	Avg. Months on book	Spend
F	Central	3,497	43	10,538	5,542	38	151,357
	East	4,203	42	26,101	6,827	37	168,317
	South	1,997	40	20,084	5,191	38	86,526
	West	4,239	41	22,307	7,063	37	186,569
M	Central	8,237	41	17,854	13,974	38	232,283
	East	6,314	40	33,802	11,850	37	280,142
	South	15,139	40	14,196	13,419	38	174,305
	West	12,163	39	68,535	14,111	38	320,037

Measure Values

AVG(Credit Limit)

AVG(Months on boo...)

SUM(Spend)

Show Me



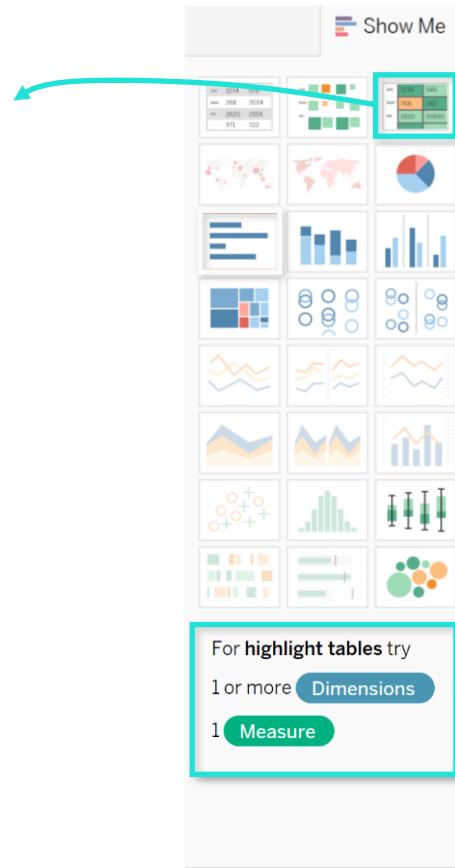
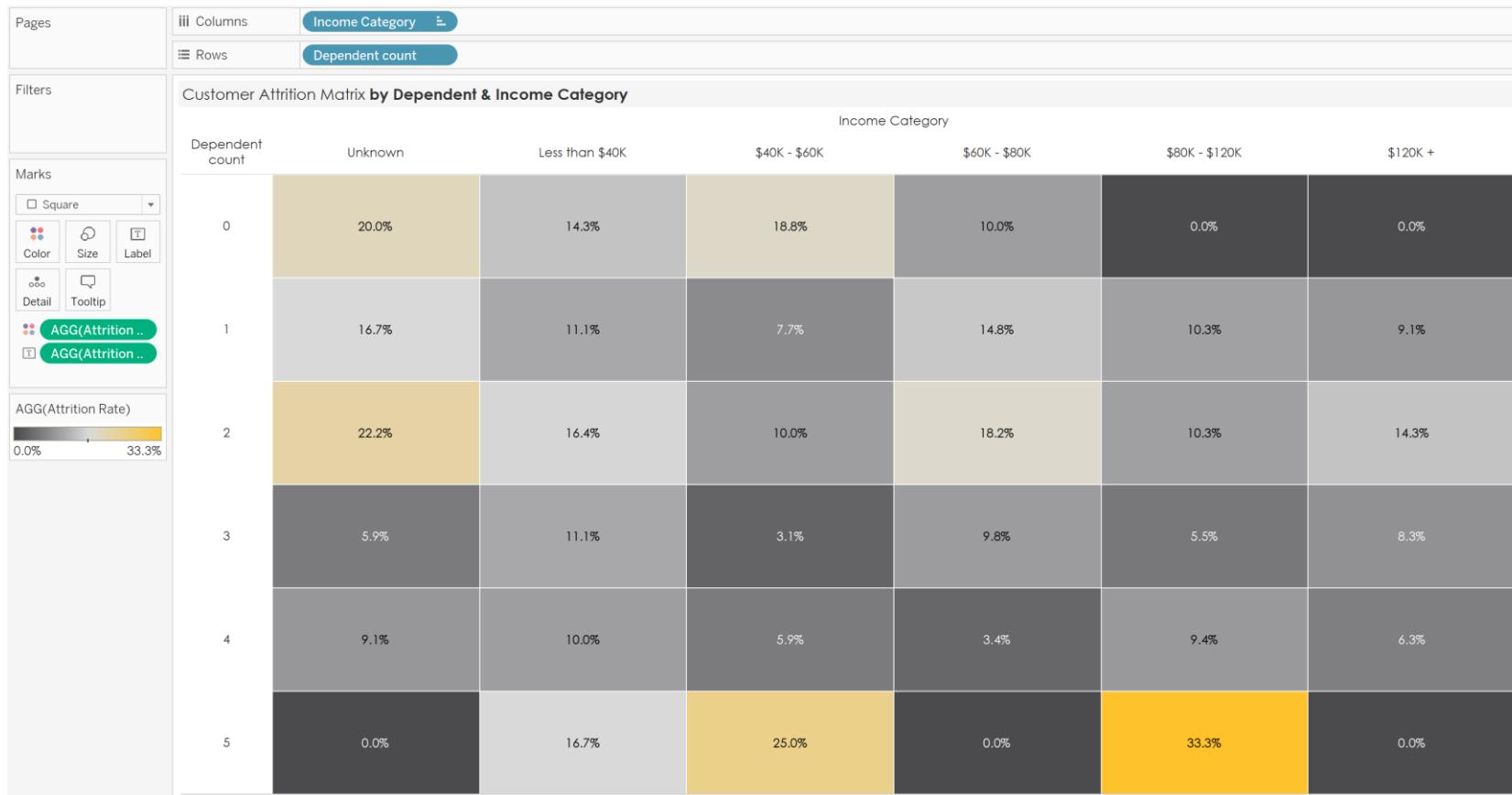
For **text tables** try

1 or more Dimensions

1 or more Measures

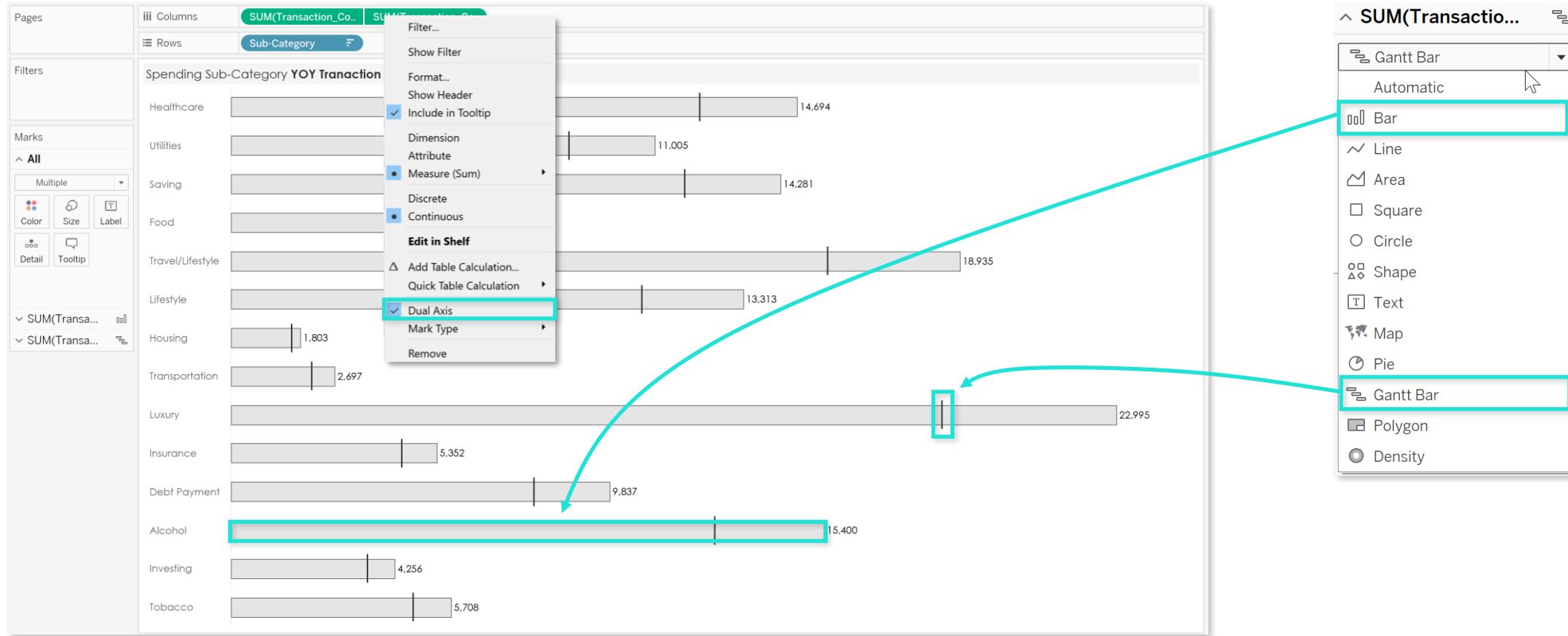
Highlight Tables

Highlight Tables are used to *compare categorical data* using color



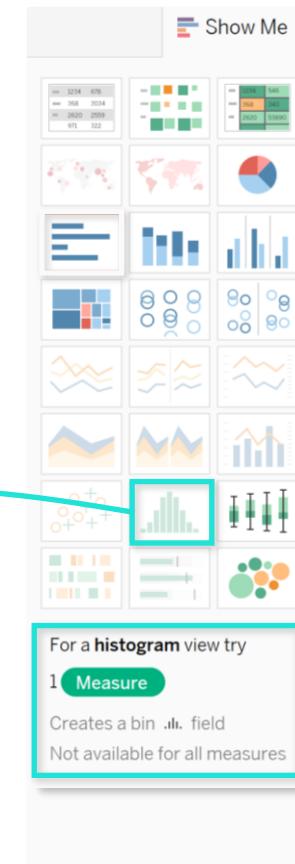
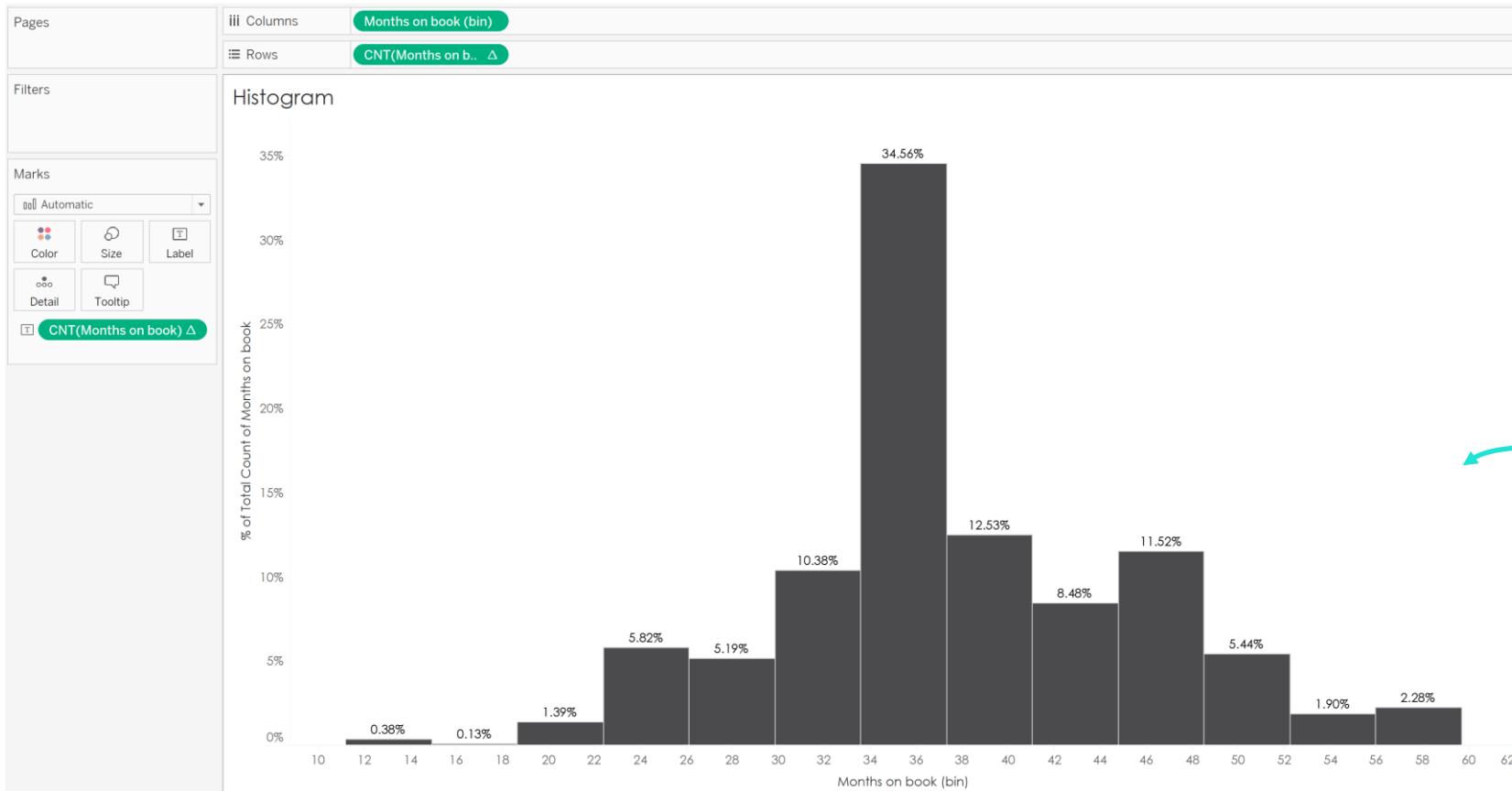
Multi-Axis Charts

Multi-Axis Charts are used to *combine multiple measures* into a single analytic view



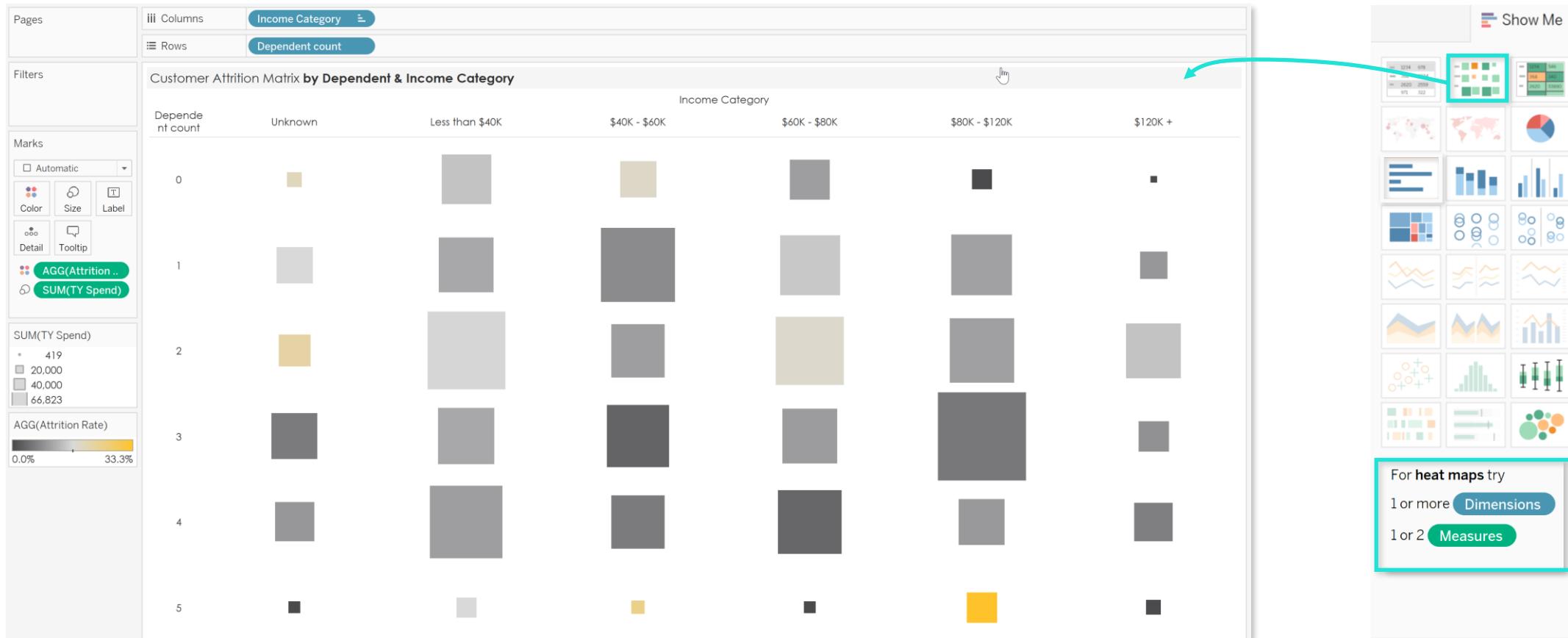
Histograms

Histograms are used to show the *distribution of values* for a given measure



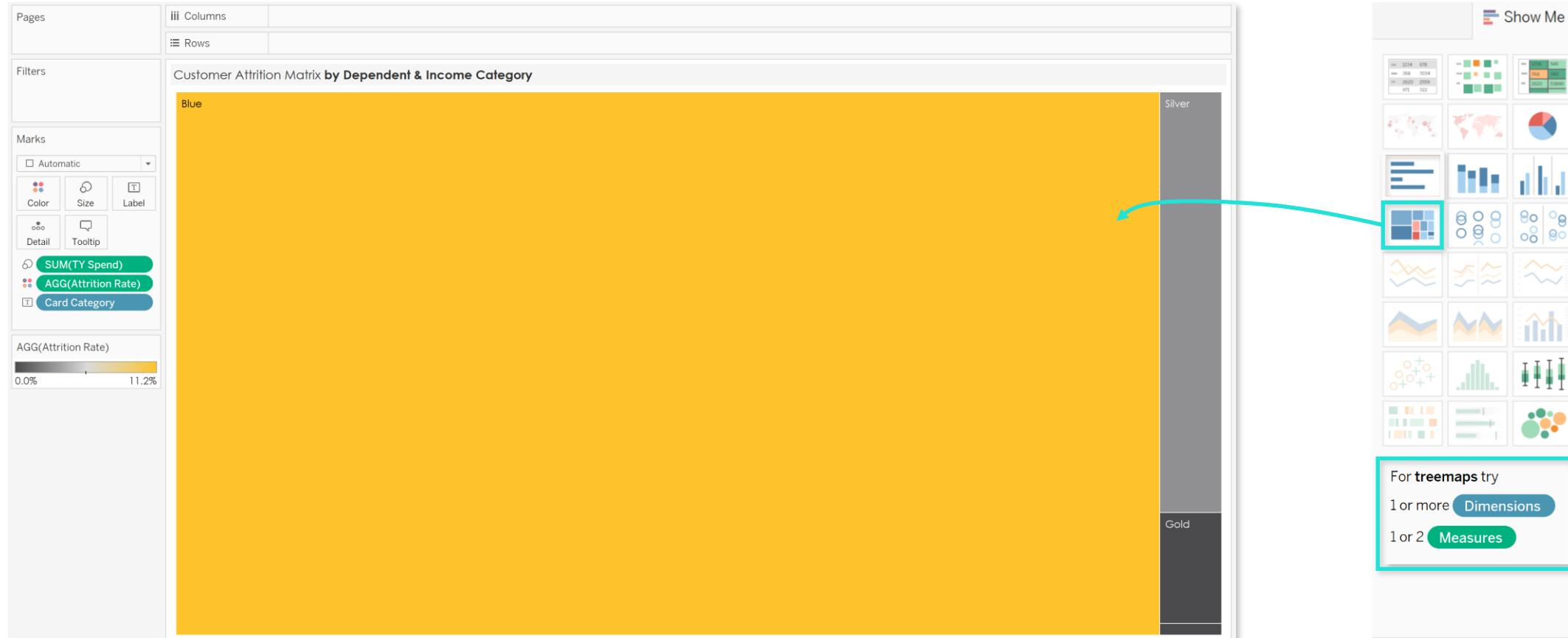
Heatmaps

Heatmaps are used to *compare categorical data* using mark shape, size, and color



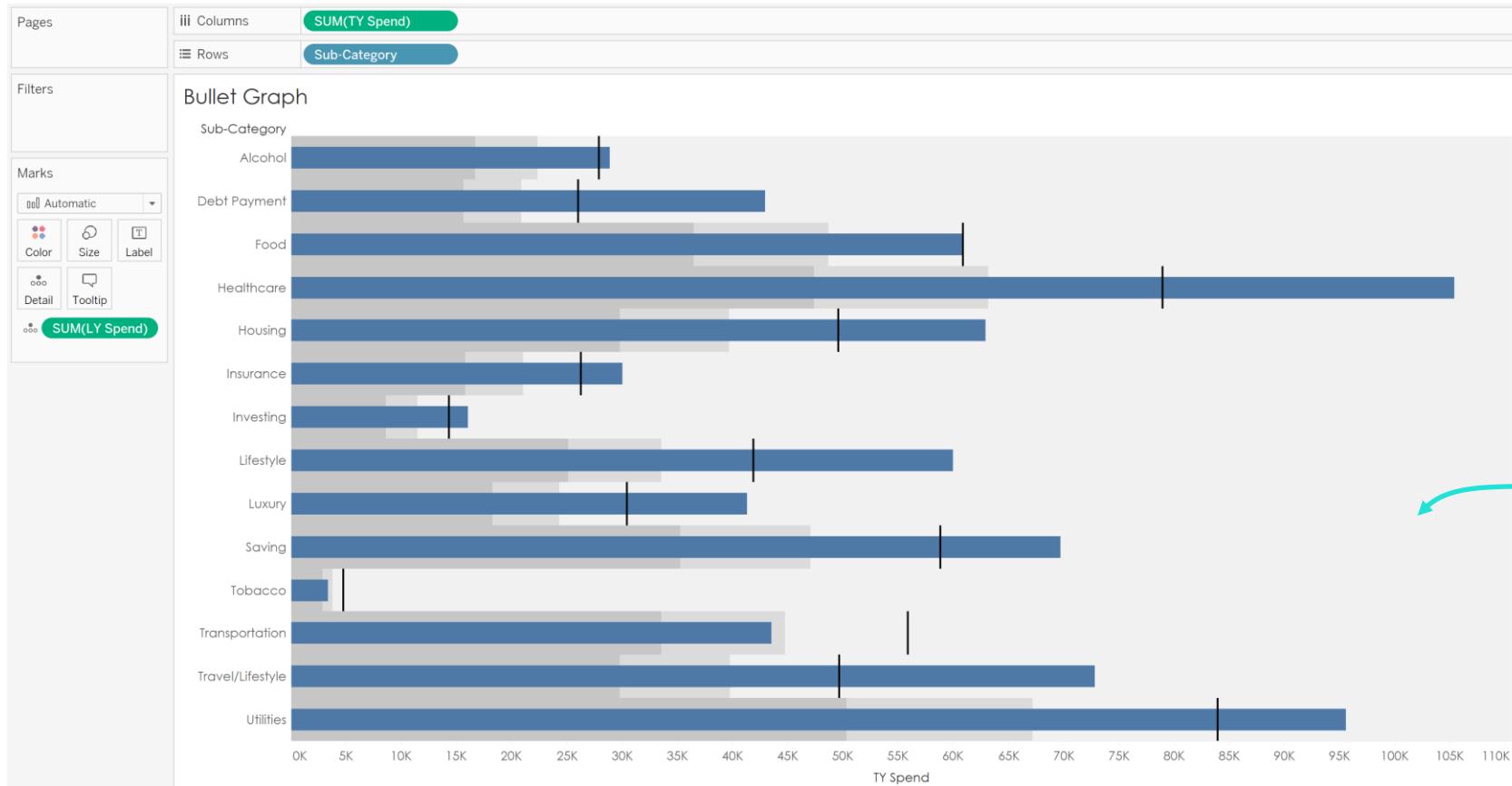
Treemaps

Treemaps are commonly used to visualize *hierarchical data* or *parts of a whole*

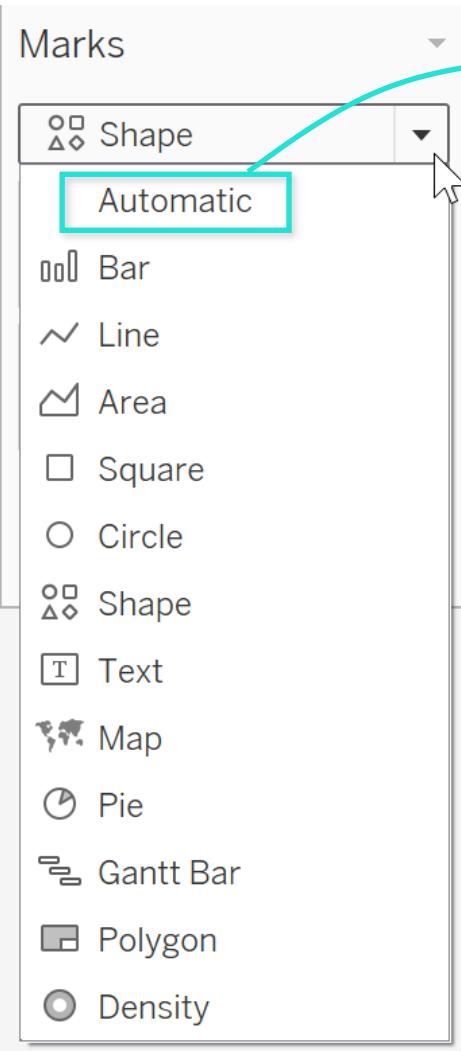


Bullet Graphs

Bullet Graphs are commonly used for *comparing actual values against targets or ranges*

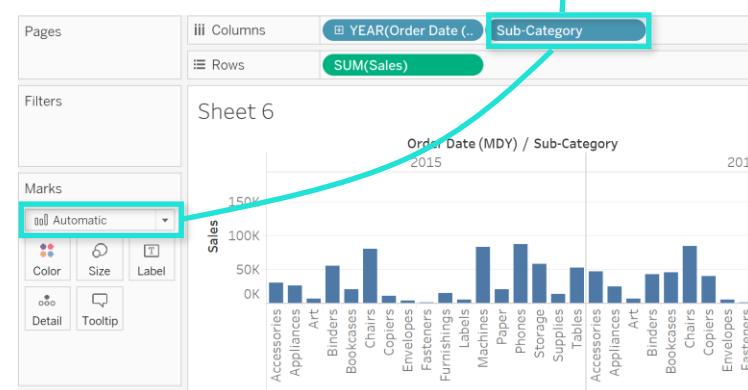


Mark Types

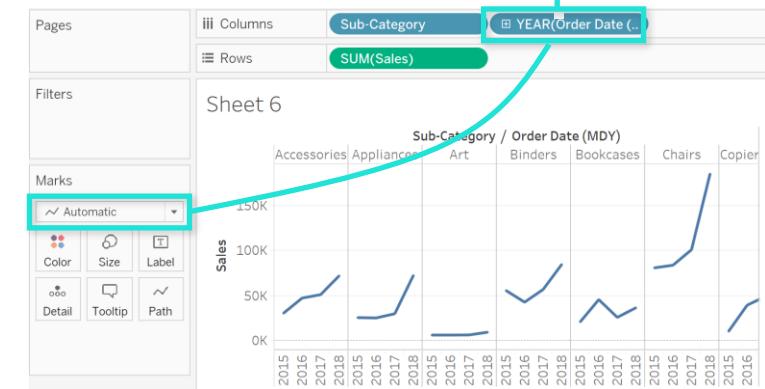


Automatic is the default mark type; Tableau will choose the best visual based on your **field types** and their **position** on rows & columns

Inner-Most Field: **String**



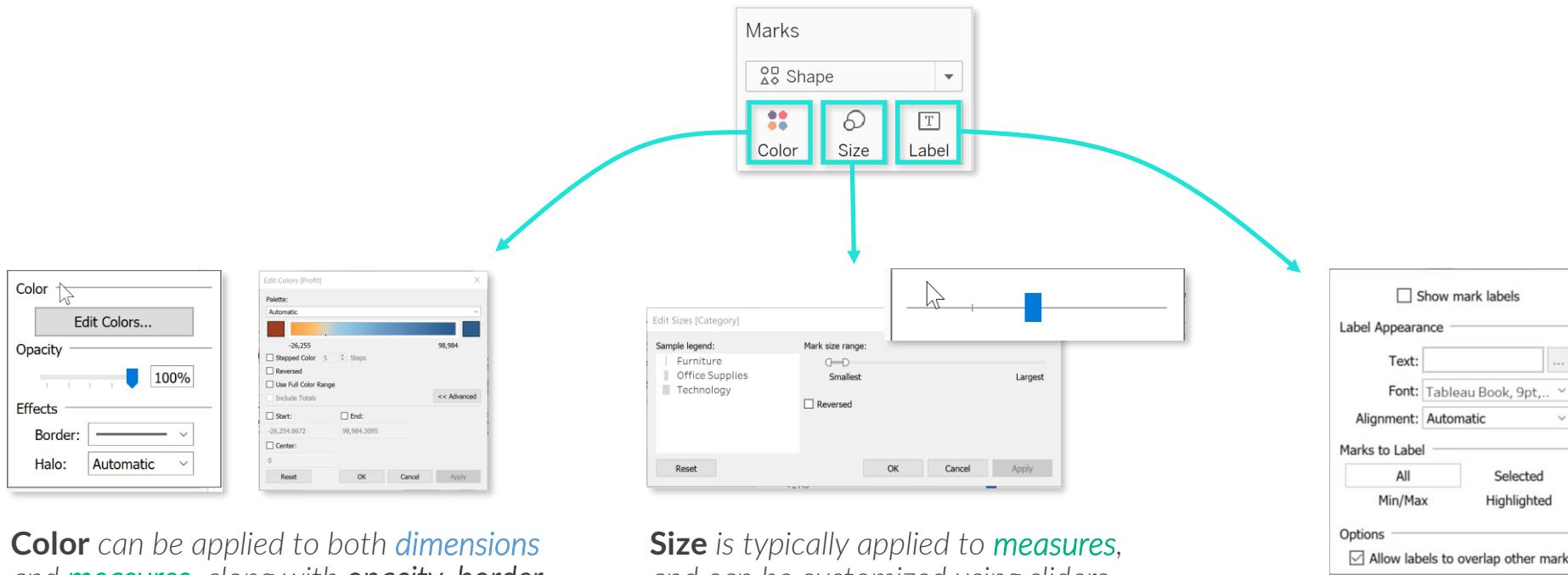
Inner-Most Field: **Date**



The automatic chart generated is determined by the **inner-most (right-side) dimension** on the rows & columns shelves; if the dimension is a **date** field, Tableau will default to a **line chart**, if it's a **string** field, Tableau will default to a **bar chart**, etc.

Marks Card Properties

The **marks card properties** provide users with the ability to control the context and detail of the marks in the view; including Color, Size, Label, Detail, Tooltip, Shape and Line



Color can be applied to both *dimensions* and *measures*, along with opacity, border lines, and halo effects

Size is typically applied to *measures*, and can be customized using sliders

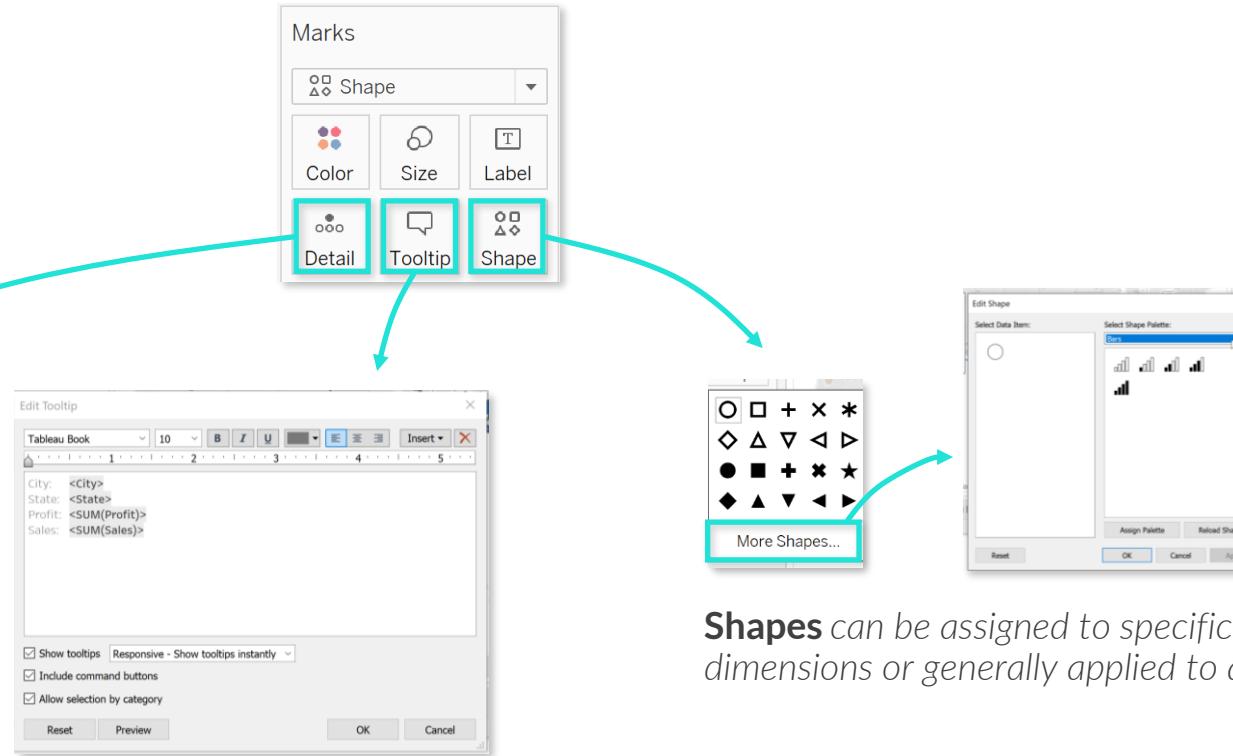
Labels allow you to add custom text to marks, which can be a combination of *field labels* and *flat text*

Marks Card Properties



Detail is determined by the dimensions in the view

Adding dimensions **increases** level of detail, and removing dimensions **decreases** level of detail



Tooltips can display flat text, field values/names, or visualizations

Note: Tooltip dimensions at a lower grain than the view will display as * in tooltips



PRO TIP:

Custom shapes can be uploaded in *Documents > My Tableau Repository > Shapes*

PRO TIP: Titles & Captions

Titles

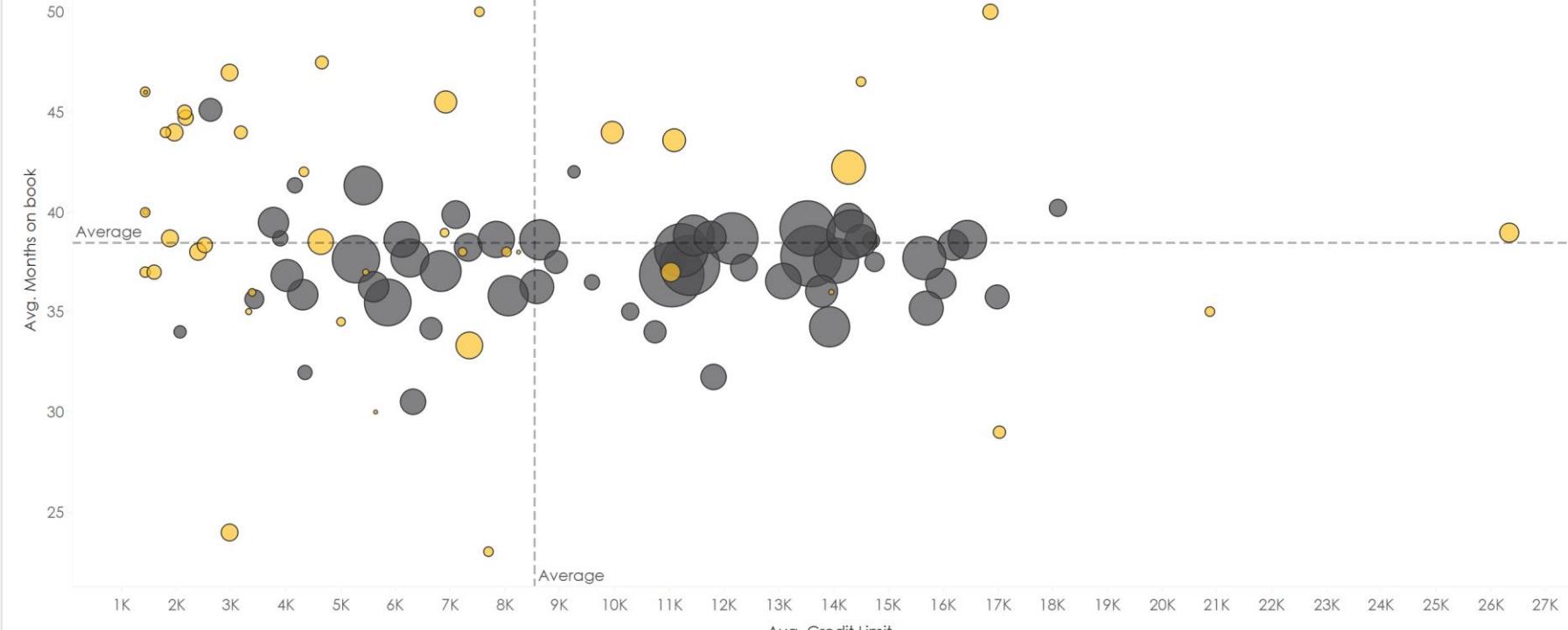
Titles are sheet-level headers which describe your visualization

NOTE: Titles can contain fields and parameters to make them dynamic

Captions

Captions display detail related to the marks, fields, and filters associated with a visualization

Attrition Distribution **by Credit Limit & Relationship Mo.**



Caption

Average of Credit Limit vs. average of Months on book. Color shows details about Attrition Flag. Size shows sum of Spend. Details are shown for Education Level, Gender and Region.

Mapping & Analytics

Mapping & Analytics



In this section we'll cover **mapping & analytics** tools, including geospatial analysis, map layers and workspaces, advanced analytics options, and more

Skills We'll Cover:

Geospatial Data

Mapping Workspace

Map Layers

Custom Mapping

Analytics Pane

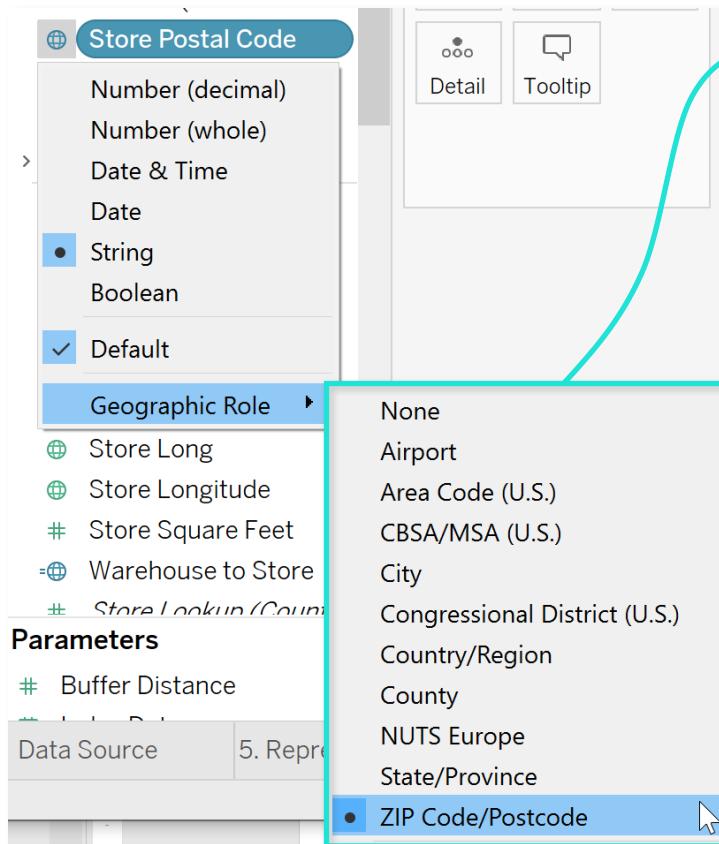
Advanced Analytics

Common Use Cases:

- *Mapping various types and levels of geospatial data*
- *Conducting geographic analysis by layering on demographic and quantitative data*
- *Building custom maps using non-geographic data*
- *Applying regression, forecasting and cluster analysis for predictive analytics*

Geospatial Data

Geospatial data comes in two primary forms: **geographic fields** and **spatial data files**

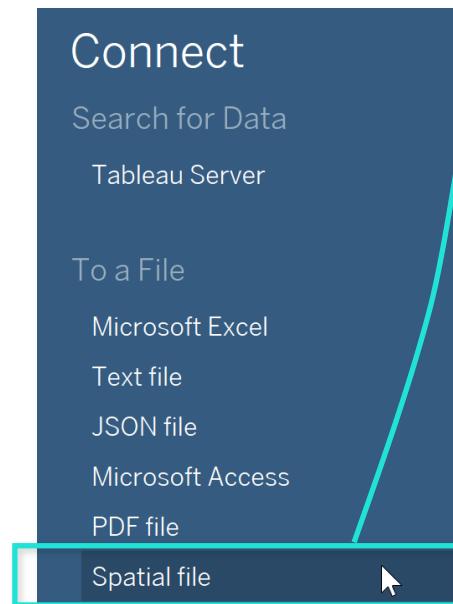


The screenshot shows the Tableau Data Source pane. A field named "Store Postal Code" is selected. In the "Geographic Role" dropdown, the option "ZIP Code/Postcode" is highlighted with a blue box and a cyan arrow pointing to the "Geographic Fields" section. Other options in the dropdown include None, Airport, Area Code (U.S.), CBSA/MSA (U.S.), City, Congressional District (U.S.), Country/Region, County, NUTS Europe, State/Province, and ZIP Code/Postcode.

Geographic Fields

Can be assigned to fields in any source so long as field types and roles are assigned correctly

Location fields are recognized by Tableau automatically (Country, State, City, Zip Code, etc.)



The screenshot shows the "Connect" dialog in Tableau. The "Spatial file" option is highlighted with a cyan box and a cyan arrow pointing to the "Spatial Data Files" section. Other options listed in the dialog include Search for Data, Tableau Server, To a File, Microsoft Excel, Text file, JSON file, Microsoft Access, PDF file, and Spatial file.

Spatial Data Files

Spatial data files are special file types that contain geospatial data using geometry fields (examples include Shape, GeoJSON, etc.)



PRO TIP: Latitude and Longitude fields are automatically generated with standard location fields!

The Mapping Workspace

The **mapping workspace** provides an array of customization and feature enablement tools for geospatial visualizations in Tableau

View Toolbar

Enables map search, panning, zoom, and multiple mark selection

Data Pane Fields

Geographic fields show in the data pane with a globe icon

Marks Card

Adjust map type from the mark drop-down or drag geographic fields to detail to impact the grain of the map

Map Menu

Provides additional map capability including background images and map layers



Map Layers

Control the coloration, level of geographic detail and integrated data layers

Map Options

Control options available to end-users on the map related to exploration, scale, and units

Map Layers

Map layers can be customized to format map colors, boundaries, labels and built-in data layers

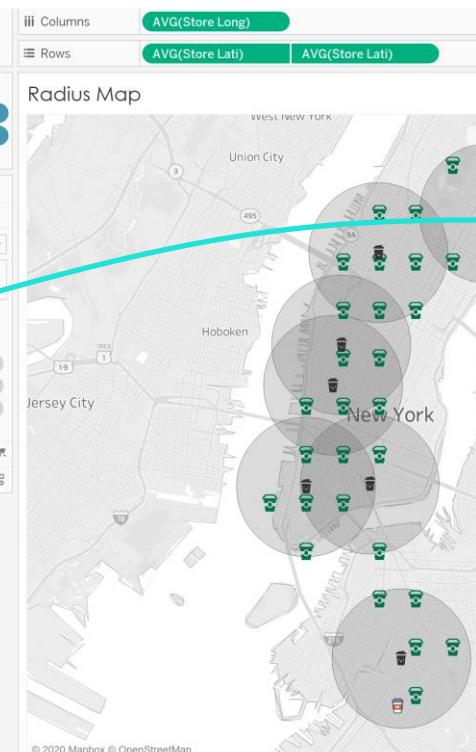
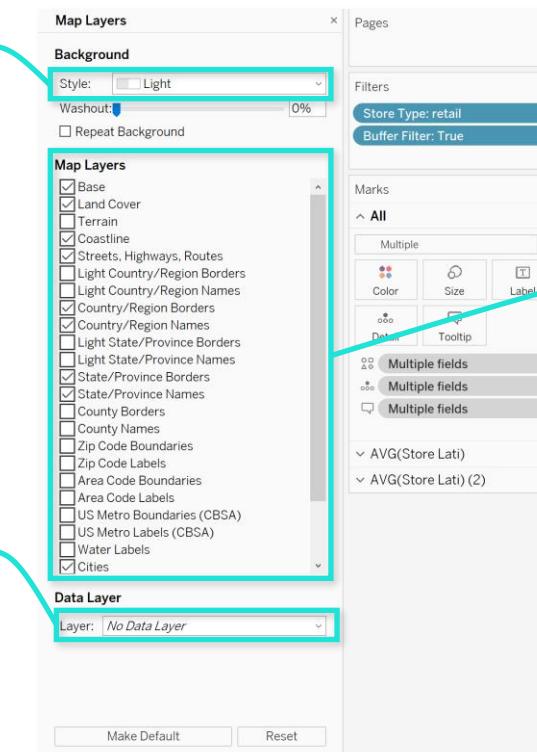
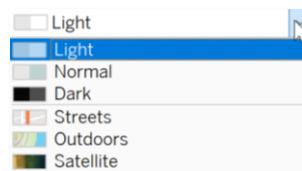
Background

Default mapbox/openstreet map styles built into Tableau

NOTE: Offline maps are available in the main Map menu as well

Data Layer

Additional US layers can be displayed behind the data set's metrics and dimensions



Map Layers

Dimensional layers can be revealed or hidden by the developer (land cover, coastline, zip-code boundaries, etc.)

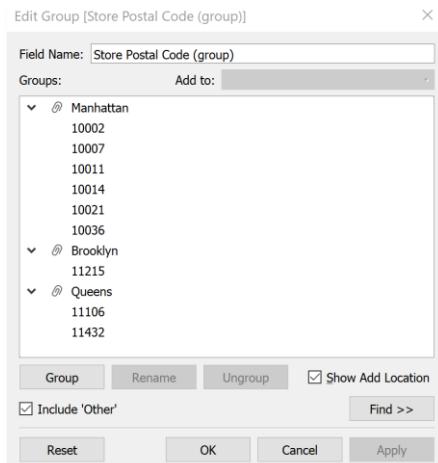
NOTE: Some layers will not be visible until users zoom into a map

Custom Territories

Custom territories allow users to dynamically select or consolidate geographic areas using traditional Tableau grouping functionality

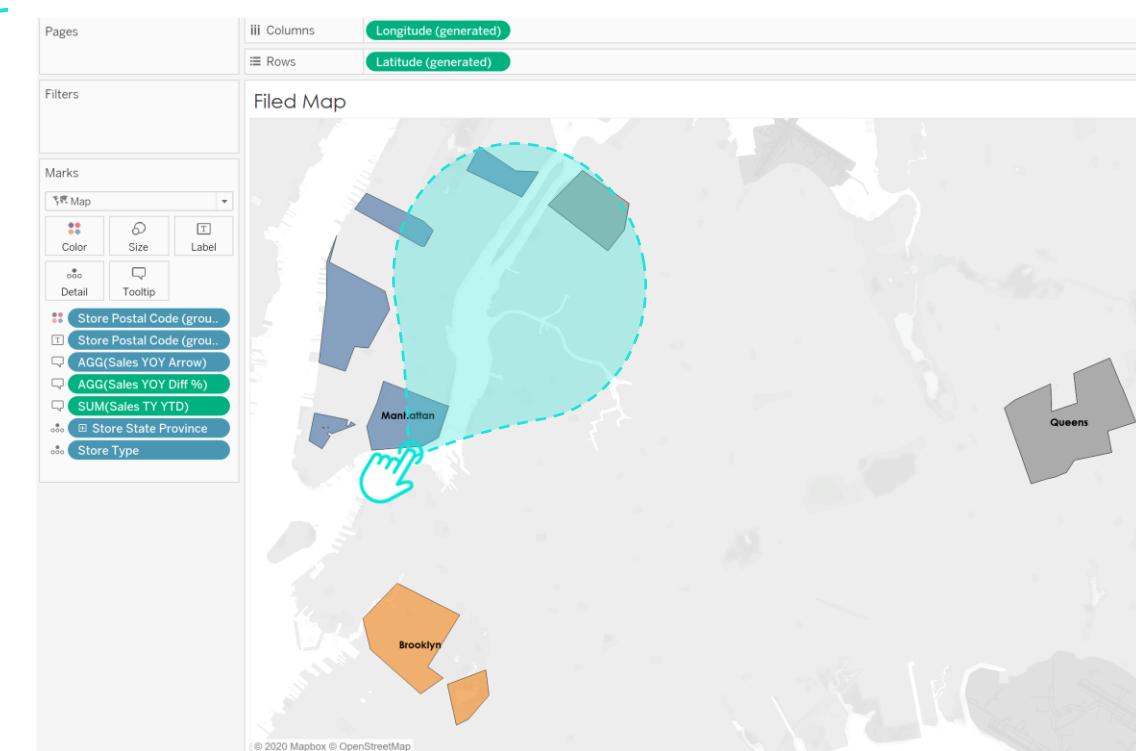
Geographic Group

Groups are created using geographic fields (i.e. State, Zip Code)



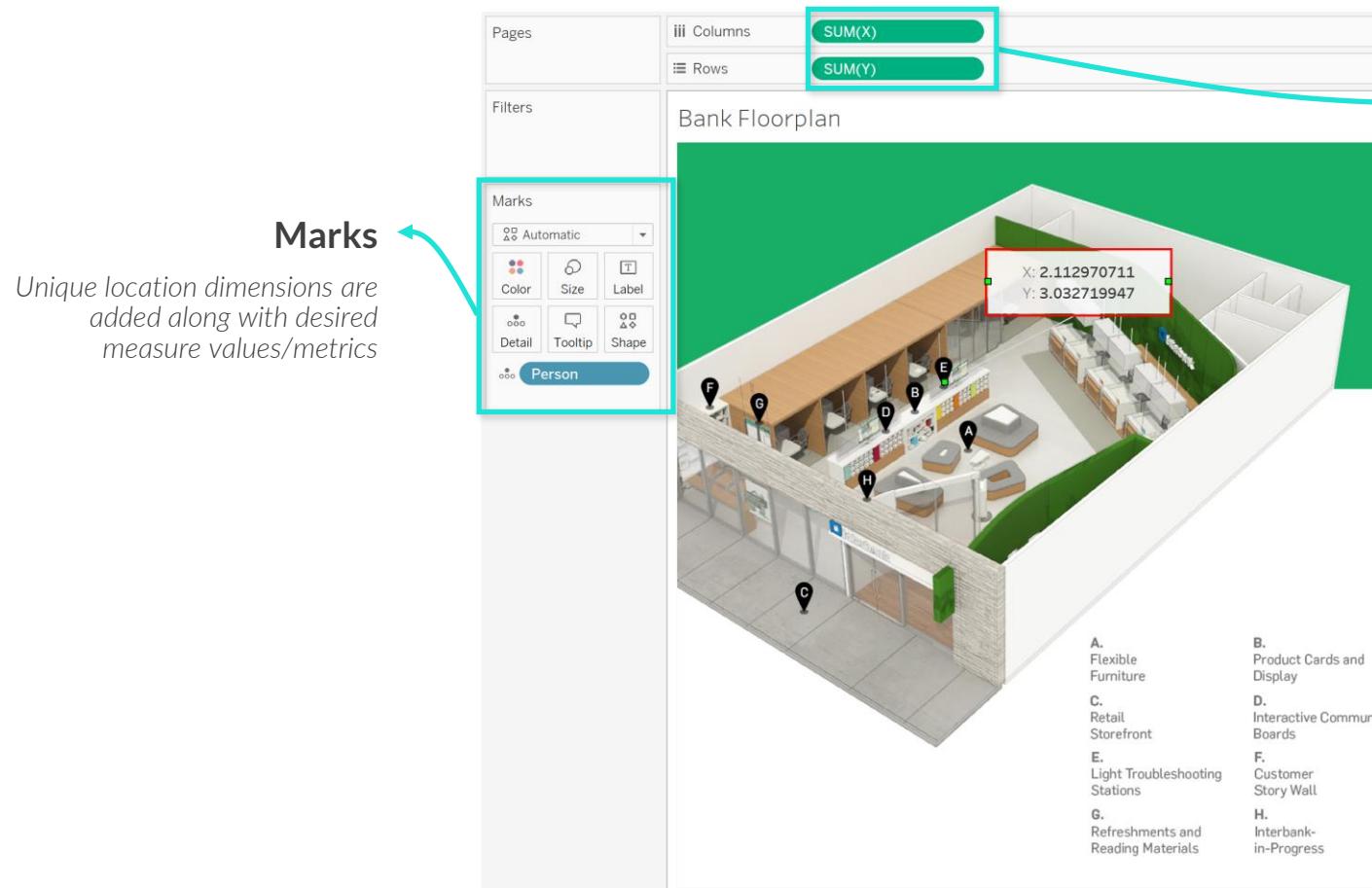
Custom Territory Visualization

Remove other geographic fields except the new Geo Group (polygons will form around the defined areas)

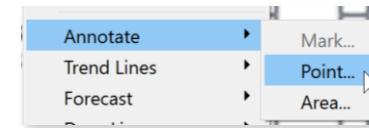


Background Images

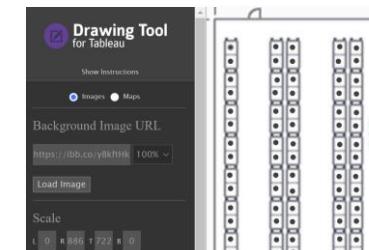
Background images are custom visual layers behind your coordinate-based data points



Native Tableau Annotation:



3rd Party Coordinate Generation:
(Interworks Drawing Tool)



Common Mapping Issues

Common mapping issues can occur when data contains unknown or ambiguous spatial points

The screenshot shows the Tableau interface with a map of the United States. A callout box from the 'Special Values for [Store City]' dialog is highlighted, containing three options: 'Edit Locations...', 'Filter data', and 'Show data at default position'. Arrows point from these options to their respective detailed explanations and screenshots.

- Edit Locations...**: Points to a screenshot of the 'Edit Locations' dialog. It shows a list of locations: Brooklyn, Jamaica, Long Island City, and New York, all marked as 'Ambiguous'. The 'Matching Location' column shows Long Island City and New York.
- Filter data**: Points to a screenshot of the 'Filters' pane, which includes 'Latitude (generated)' and 'Longitude (generated)'.
- Show data at default position**: Points to a screenshot of the map showing a single point at the location of 'Null Island'.

Edit Locations

Used for adding fields to help Tableau identify locations (i.e. adding state to a city map when duplicate cities exist) or defining lat/long points

Filter data

Used to filter out questionable lat/long points (just be careful not to exclude valid records!)

Show data at default position

Null coordinates default to "Null Island", a generic point on Tableau maps that includes missing data (**not recommended**)



PRO TIP: Zip codes are often the source of nulls. Be sure to code zips as **strings** and/or **pad zeros** for zips less than 5 characters!

The Analytics Pane

The **analytics pane** includes helpful drag-and-drop analytics tools, including **reference lines**, **totals**, **forecasts**, **clusters**, **box plots**, and more

- **NOTE:** Some analytics tools may only be available for specific views or configurations

The screenshot shows the Tableau interface with the Analytics pane open. The pane includes options for Constant Line, Average Line, Median with Quartiles, Box Plot, and Totals. A hand cursor is hovering over the 'Average Line' option, which is highlighted with a teal box. A tooltip 'Average Line' is visible. Below the pane, three bar charts are shown, each with a different type of reference line applied. The first chart (Table) has a single horizontal line across the entire chart. The second chart (Pane) has a horizontal line for each category. The third chart (Cell) has a horizontal line for each individual data point.

Applies across the **entire table** (all panes)

Applies to **each individual pane** (all cells)

Applies to **each individual data point/cell**

Regression Models

Regression models in Tableau are represented in the form of **trend lines**

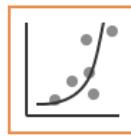
- Regression is a statistical modeling technique used to estimate trends/relationships between variables



Linear



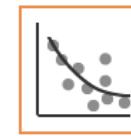
Logarithmic



Exponential



Polynomial



Power

Linear

Used to visualize a simple linear relationship between variables exists (positive or negative)

Example: Income based on hours worked (at a fixed rate)

Logarithmic

Used when a trend increases quickly and then gradually levels off (positive values only)

Example: Efficiency of warehouse workers over time (maxes out)

Exponential

Used when the rate of change between variables rises at increasingly higher rates (positive values only)

Example: Computing power over time (Moore's Law)

Polynomial

Used when variables have a fluctuating relationship (data will appear to have a "bounce" in it)

Example: Revenue over time for a new product launch

Power

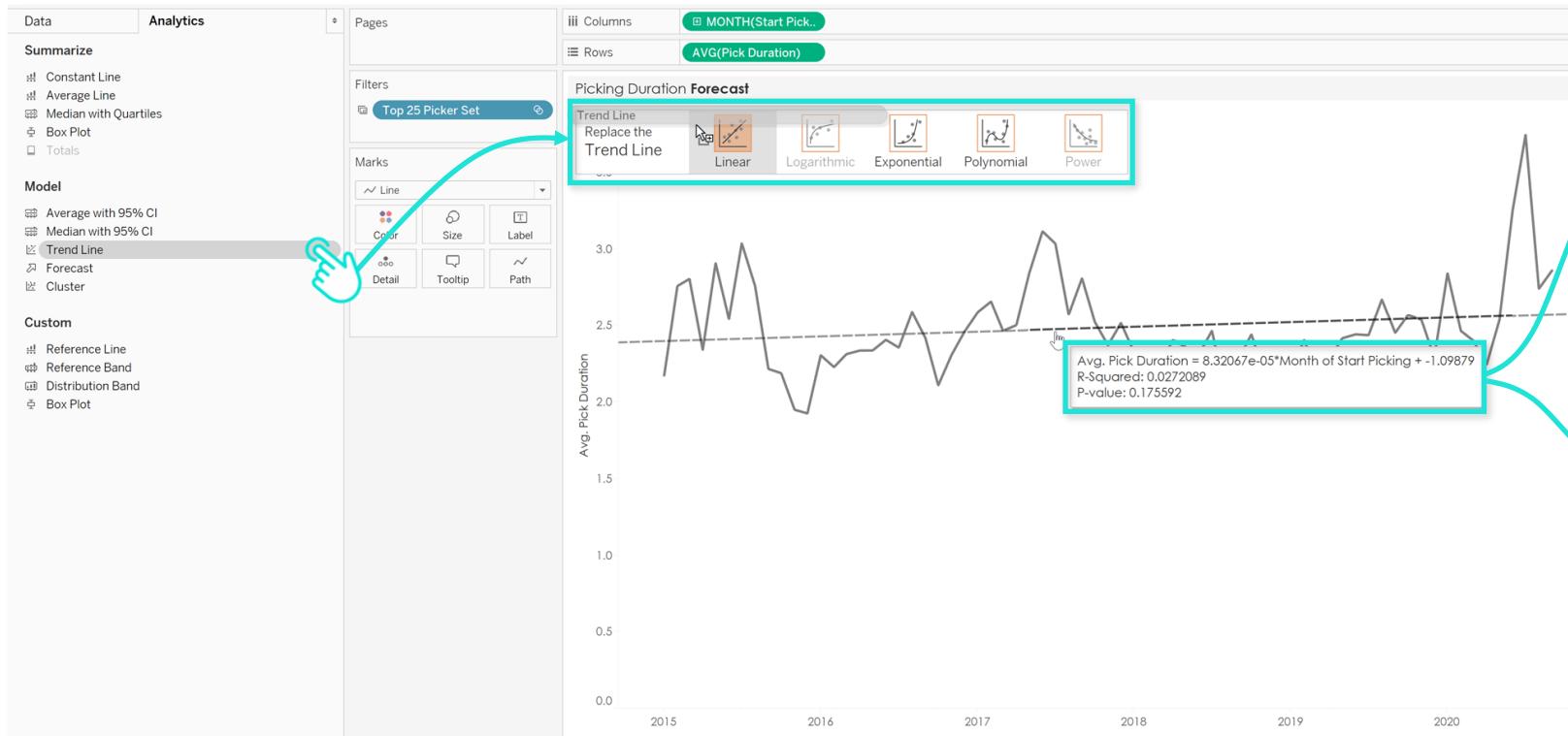
Used when the dependent variable (Y) changes at a pre-determined rate (positive values only)

Example: The trajectory of a skipped stone over time

Trend Lines

Trend lines are used to show the directional trend or “line of best fit” for a series of data points

- Trend lines can be especially useful when your data is “noisy”, or when a trend isn’t immediately clear
- **NOTE:** Trend lines require **two continuous variables** (if using time, needs to be continuous)



 **Is my trendline ACCURATE?**

R-Squared

R-Squared explains how the variance of one variable explains the variance of another, ranging from **0-1** (closer to 1 = more accurate)

Example: If R-Squared = **0.50**, then only half of the observed variation can be explained by the model's inputs

P-Value

P-Value is the probability of obtaining results as extreme as the observed results, ranging from **0-1** (closer to 0 = more accurate)

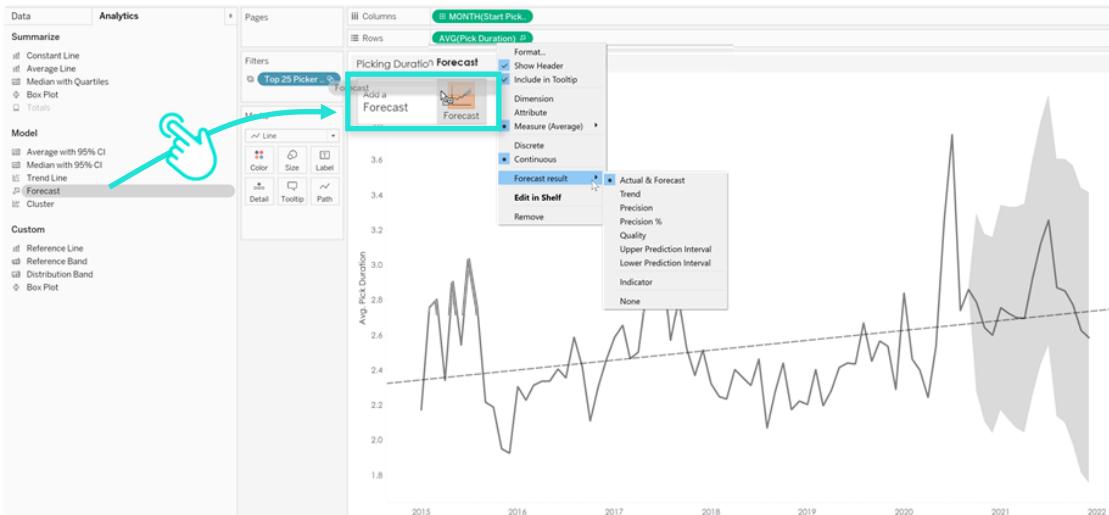
A P-Value of **<0.05** is a common standard for model accuracy and means that your trend-line is strong predictor for future data points

Forecasting

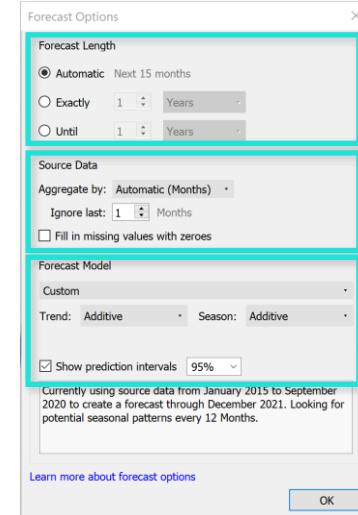
Forecasting algorithms evaluate patterns in historical data to project potential future data points

- Tableau provides several drag-and-drop forecast tools in the **analytics pane**

Adding a Forecast:



Customization:



Forecast Length

Choose how long forecasts will extend; **Exactly** and **Until** will provide fixed dates, and **Automatic** will determine a length via forecast results

Source Data

Aggregate by gives you date granularity options down to the second. You can also ignore a defined number of data points and fill missing values with zero

Forecast Model

- Automatic** (default)
- Automatic without Seasonality** – Removes Seasonality
- Custom** – Adjustable trend and seasonality options:
 - Additive** – Contributions of the model are summed
 - Multiplicative** – Some contributions are multiplied



Exact dates are **not supported** in Tableau for forecasting. Use truncated dates like **Feb 2017** or continuous date parts (**Year**, **Year + Quarter**, etc.). At least 5 datapoints are required for a forecast, at least 2 seasons for seasonality, and at least 24 months for a 12-month seasonal cycle.

Control Charts

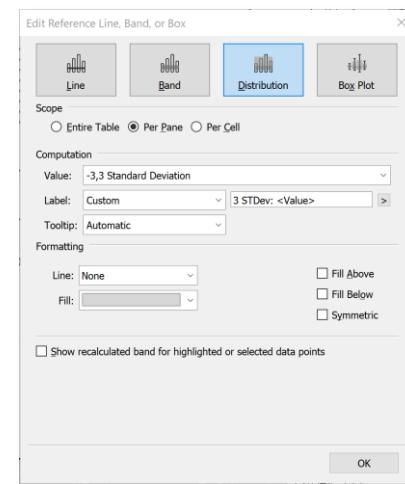
Control Charts are commonly used to *monitor manufacturing or business processes* to ensure they are in a state of control (within limits)

- Control charts can be generated in Tableau using **reference bands**

Adding a Reference Band:



Customization Options:



Scope

Entire Table, Per Pane, or Per Cell

Value

Percentage, Percentile, Quantile, or Std. Dev

Label

None, Computation, Value, or Custom

Tooltip

Automatic, Custom, or None

Formatting

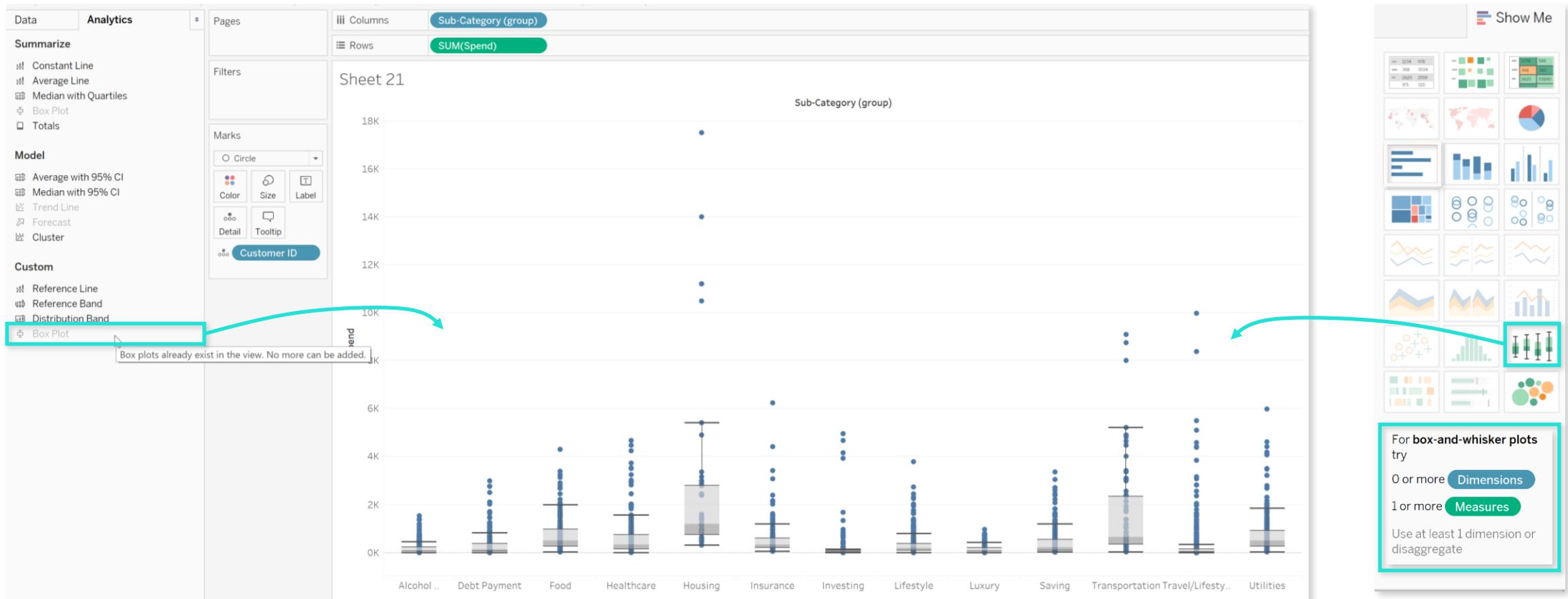
Line, Fill Color, Fill Above/Below, and Symmetry

Show Recalculated Band

Recalculate based on the user selection

Box Plots

Box Plots are used to visualize the *distribution* and *statistical characteristics* of a numerical field, including the minimum/maximum, median, and 1st and 3rd quartiles



Calculations

Calculations



In this section we'll cover **calculation options**, including aggregation, common functions, table calculations, LOD expressions, parameters, and more

Skills We'll Cover:

Aggregation

Creating Calculations

Common Functions

Table Calculations

LOD Expressions

Parameters

Common Use Cases:

- *Developing custom metrics using string, logical, date or other functions*
- *Creating view-specific table calculations*
- *Modifying data granularity to create dynamic views with level of detail (LOD) calculations*
- *Integrating user-controlled parameters to enable “what-if” scenarios or dynamic visuals*

Calculated Fields

Calculated fields enable users to create new data in columns

Calculations can be used to:

- Segment data
- Convert field types
- Aggregate data
- Filter results
- Calculate new metrics



Profit Ratio

```
SUM([Profit]) / SUM([Sales])
```

Profit Ratio

```
{ FIXED [State]: SUM([Sales]) }
```

Profit Ratio

```
RUNNING_AVG(SUM([Sales]))
```

Basic Calculations

Used to solve most regular calculation use cases (aggregation, filtering, etc.)

Note: These calculations are **Excel-like in nature** and should feel very familiar to most analysts

Level of Detail (LOD) Expressions

Computations that support aggregation at dimensionalities other than the view-level

Table Calculations

Computations that are applied to the values within a view, and **computed in Tableau** rather than in the data source (like other calculation types)

Note: Table calcs are like the "Show Values As" calculations used within Excel PivotTables

Calculation Syntax

Sales / Profit Multi

```
//This is a dynamic metric selector!
```

```
IF [Metric Selector] = "Sales" THEN SUM([Sales]) ELSE SUM([Profit]) END
```

Comments

Notes used for documentation or providing additional context

Parameters

Dynamic driving fields that can materially impact calculations, filters, etc.

Operators

Numeric or logical symbols used in calculations, including:

+, -, *, /, %, ==, =, >, <, >=, <=, !=, <>, ^, AND, OR, NOT, ()

Literal Expressions

Constant values, which can be represented as numbers, strings, dates, etc.

Fields

Raw or calculated columns used for dimensional or aggregated values

Functions

Numerical, string, type, date, logical, aggregate, user, table calc, or spatial calculation functions

Creating Calculated Fields

The screenshot shows the Tableau Data pane. In the Measures section, the field '# Discount' is selected. A context menu is open, with the 'Create' option highlighted. A sub-menu shows 'Calculated Field...'. The 'Calculated Field...' option is also highlighted with a red box. In the background, a view on Sheet 7 shows a calculated field 'SUM(Sales)' in the Rows shelf, with a tooltip showing '# Sales' and '# Sales / Profit Multi'. A red box highlights the 'SUM(Sales)' entry in the tooltip.

Create in view

Double-click the columns, rows, or detail shelf and start typing a calculation

Note: These calculations are **temporary** and are not stored with the workbook / data source

Create from Data Pane

Right-click on any field and choose **Create > Calculated field**

Note: If no field is selected, the calculation window will open with no field chosen

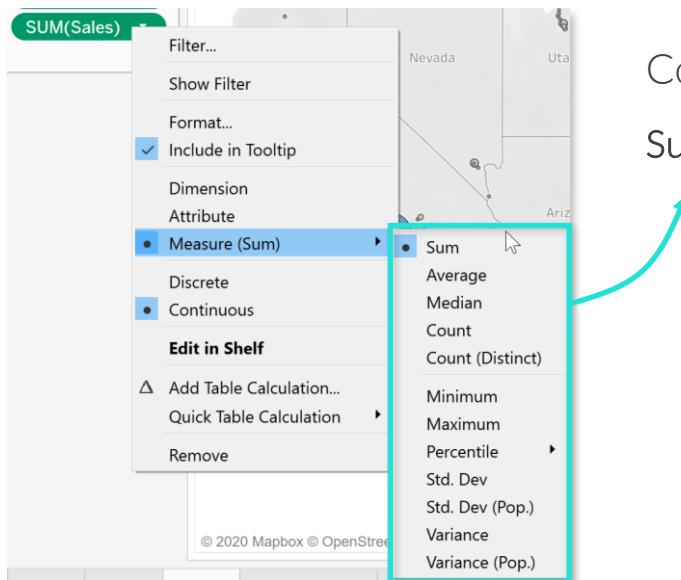


PRO TIP: Drag a calculation that you've created "in view" to the data pane (dimensions/measures) to save it as a permanent field

Aggregation

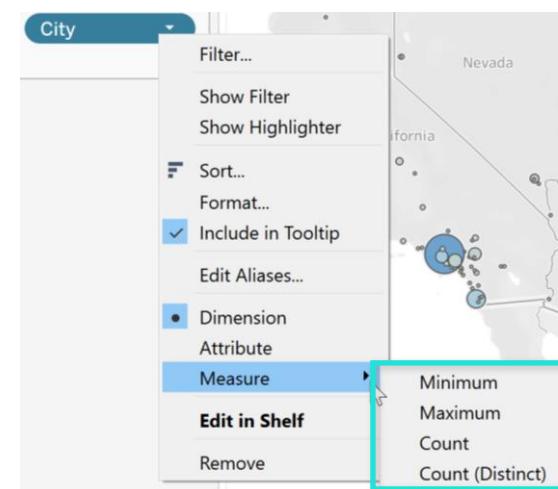
Aggregation is the process of combining or summarizing data into a single representative value

- Both **dimensions** and **measures** can be aggregated, but use different methods (see below)
- Aggregation level is controlled by the **dimensions** in the **view** and the **type of calculation** used



Common **MEASURE** aggregations:

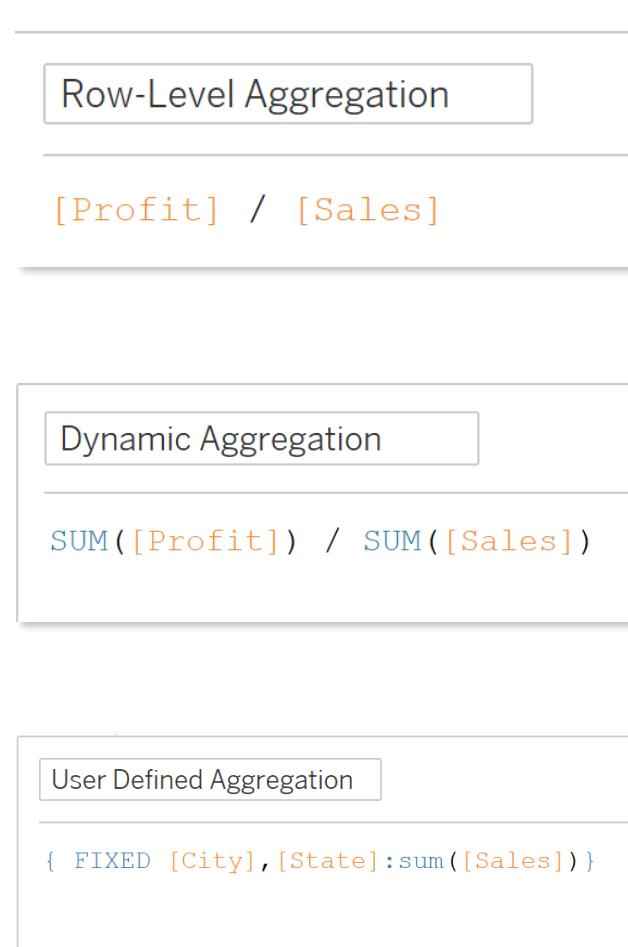
Sum, Avg, Median, Count, Min/Max, Standard Deviation, Variance, etc.



Common **DIMENSION** aggregations:

Min/Max (A-Z), Count, Distinct Count

Aggregation Types

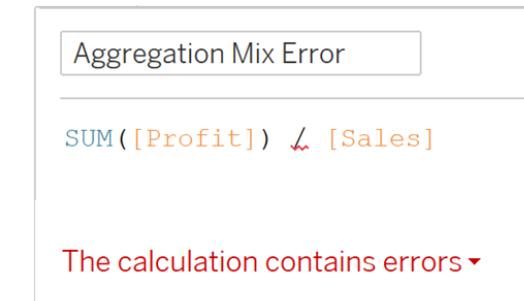


- Row-level aggregation**
Performed at the lowest level (or grain) of the data set (no aggregation defined)
- Dynamic aggregation**
Aggregated at the level of detail in the view
- User-Defined Aggregation**
Aggregated at the level of detail explicitly defined in the LOD expression(s)



HEADS UP!

If you try to use both aggregated and non-aggregated fields within the same calculation, you'll get an **Aggregation Mix Error**



Common Calculation Functions

Aggregate

Summarize or change the *level of granularity* of your data

Common Examples:

- SUM
- AVG
- MIN
- MAX
- MEDIAN
- COUNT
- COUNTD
- ATTR
- PERCENTILE
- STDEV

LOD Expressions:

- INCLUDE
- EXCLUDE
- FIXED

String

Allow for the manipulation of *text-based data*

Common Examples:

- CONTAINS
- LEFT/MID/RIGHT
- LEN
- REPLACE
- SPLIT
- LTRIM/RTRIM/TRIM
- UPPER/LOWER
- REGEX_REPLACE
- REGEX_MATCH

Logical

Determine if a *conditional statement* is true or false

Common Examples:

- IF/IFF
- CASE
- AND
- ELSE
- ELSEIF
- IFNULL/ISNULL
- NOT
- ZN
- OR
- WHEN

Date

Create, modify, and calculate *date/time fields*

Common Examples:

- DAY
- WEEK
- MONTH
- QUARTER
- YEAR
- TODAY
- DATEADD
- DATEDIFF
- DATENAME
- DATEPARSE
- DATEPART
- DATETRUNC

Type Conversion

Convert fields from one data type to another

Common Examples:

- DATE
- DATETIME
- FLOAT
- INT
- STR

Basic Aggregate Functions

SUM

Returns the sum of all values in the expression (only numeric, nulls are ignored)

SUM ([Field Name])

AVG

Returns the average of all values in the expression (only numeric, nulls are ignored)

AVG ([Field Name])

MAX

Returns the maximum of a single expression across all records

MAX ([Field Name])

MIN

Returns the minimum of a single expression across all records

MIN ([Field Name])

COUNT

Returns the number of items in a group (null values are ignored)

COUNT ([Field Name])

COUNTD

Returns the number of distinct or unique items in a group (null values are ignored)

COUNTD ([Field Name])

String Functions

CONTAINS

Returns TRUE if the field contains the defined text

CONTAINS ([Field Name], "Text")

LEN

Returns the number of characters in the given field

LEN ([Field Name])

REPLACE

Replaces all instances of "Old Text" with "New Text" in a text field

REPLACE ([Field Name], "Old Text", "New Text")

SPLIT

Returns a text string based on a given delimiter and starting position

SPLIT ([Field Name], "- ", -2)

TRIM

Removes both leading and trailing spaces from a field

TRIM ([Field Name])

UPPER/LOWER

Converts a text string to all uppercase/lowercase letters

UPPER/LOWER ([Field Name])

Logical Functions

IF

*Evaluates a single logical test; if true the **THEN** result is shown, otherwise the **ELSE** result is shown*

ELSEIF

*Evaluates multiple logical tests; if true the **THEN** result is shown, otherwise the **ELSE** result is shown*

CASE

*Finds and returns values based on each corresponding **WHEN** condition*

ZN

Converts NULL values to 0 (zero), if not NULL will return value

IF Logical Test **THEN** Result-if-True **ELSE** Result-if-False **END**

IF Logical Test1 **THEN** Result-if-True1 **ELSEIF** Logical Test2
THEN Result-if-True2 **ELSE** Result-if-False **END**

*NOTE: Case subject can be either a **Parameter** or **Field Name***

CASE [Parameter] **WHEN** Value1 **THEN** Result1
WHEN Value2 **THEN** Result2 **ELSE** Value3 **END**

ZN ([Field Name])

Date Functions

DAY/ WEEK/ MONTH/YEAR

Returns the integer value of the Day, Week, Month, or Year of a given date field

TODAY/NOW

Returns the current date or current date and time

DATEADD

Adds a defined increment to the date referenced, defined by the interval specified in the calculation

DATEDIFF

Takes the difference between the defined Start Date and End Date, expressed in units of the date interval

DATENAME

Returns a part of the given date as a string, with units defined by the date interval

DATETRUNC

Truncates the date field to the defined date interval and returns the new date

DAY/WEEK/MONTH/YEAR ([Date Field])

TODAY/NOW ()

DATEADD ('Date Interval', 2, [Date Field])

DATEDIFF ('Date Interval', [End Date], [Start Date], 'Start of Week')

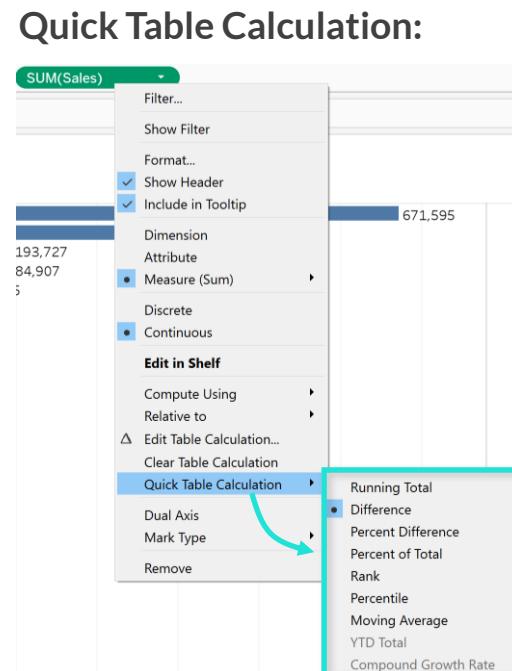
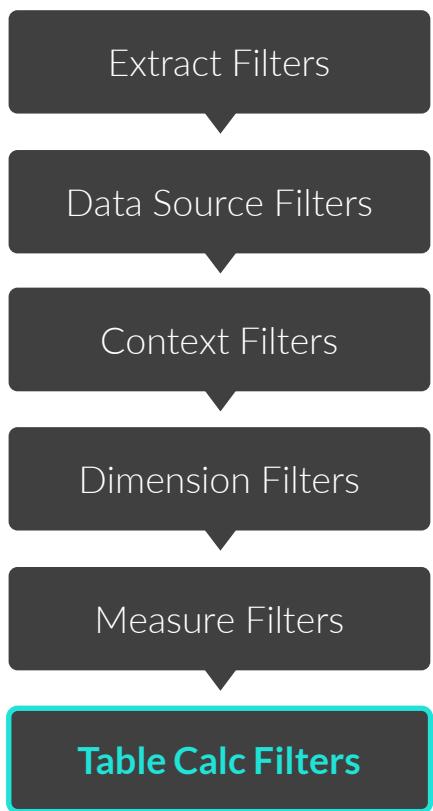
DATENAME ('Date Interval', [Date Field])

DATETRUNC ('Date Interval', [Date Field])

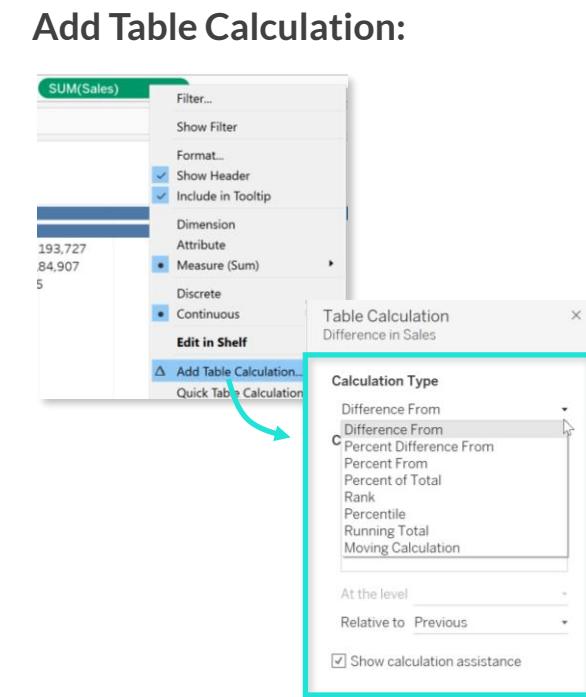
Table Calculations

Table calculations are sheet-based computations that only evaluate within a given visualization

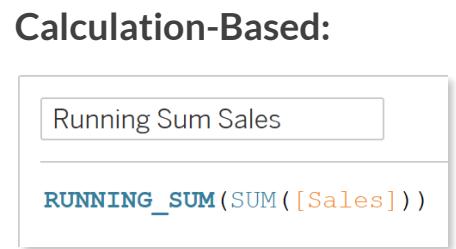
- Table calcs affect how values are computed within a visual, but *do not* change the underlying data
- Table calcs can be created from the **Quick Table Calculation**, **Add Table Calculation** menus, or as a formula



Quick access to common table calculation options, based on fields in the view



Includes more options than Quick Table Calculations



Running Sum Sales

`RUNNING_SUM(SUM([Sales]))`

Created in the calculation pane and then pulled into the view

Addressing & Partitioning

When adding table calculations, you must use all dimensions in the level of detail for either **partitioning** (scoping) or for **addressing** (direction)

Table Calculation
% of Total Sales

Calculation Type
Percent of Total

Compute total across all pages

Compute Using

- Table (across)
- Table (down)
- Table
- Cell
- Specific Dimensions**

Year of Order Date (MDY)

State

At the level

Sort order Specific Dimensions

Show calculation assistance

Addressing Fields

Define the *direction* in which a calculation is evaluated (i.e down, across, across then down)

Partitioning Fields

Define the *level or group* at which table calcs are evaluated (i.e cells, tables, panes)

Pane / Partition

Pages

Filters

Marks

- Automatic
- Color
- Size
- Text
- Detail
- Tooltip

SUM(Sales) △

Across then down

		Order Date			
		2011	2012	2013	2014
Quarter of Order	Month of Order	January	\$4,228	\$368	\$26,161
		February	\$35,693	\$7,100	\$10,657
Q1	March	\$35,407	-\$17,224	\$12,719	\$2,723
	April		\$5,900	\$5,053	\$864
Q2	May		-\$16,464	\$6,483	\$26,559
					-\$11,040

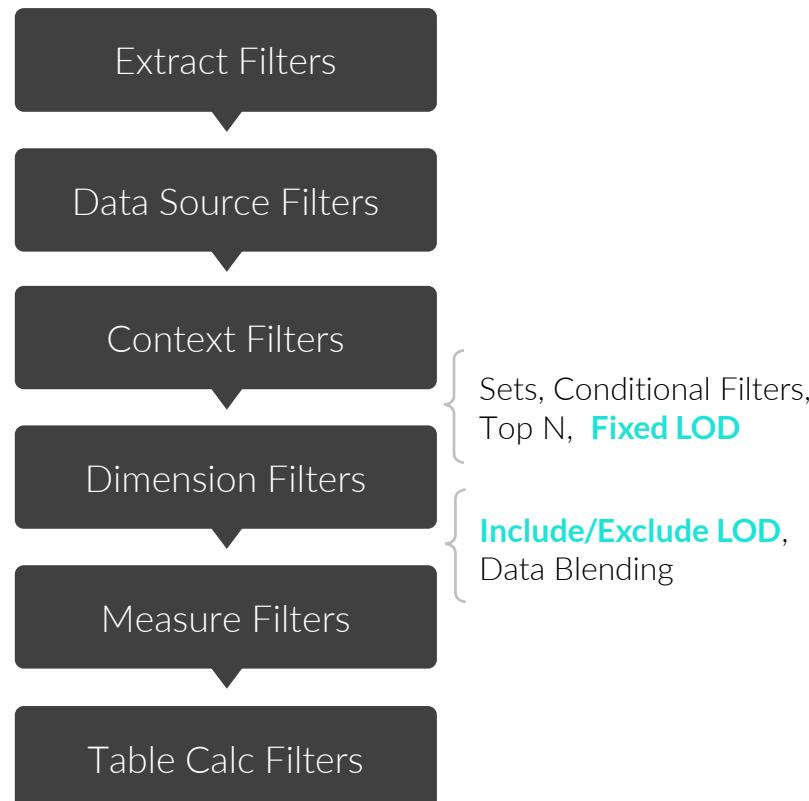


PRO TIP: Re-order the addressing fields to change the direction of the calculation

Level of Detail Expressions

LOD expressions allow users to control the *granularity* at which a calculation is computed

- Unless LOD expressions are used, calculations will always compute at the level of detail shown in the view



Calculation Syntax:

Fixed LOD Expression

```
{ FIXED [State] : SUM ( [Sales] ) }
```

Level of Detail Element

Specified LOD types are *Include*, *Exclude* and *Fixed*

Dimension Declaration

Defines the grain at which the data is aggregated

Aggregate Expression

Calculation to be performed at the grain defined

Choosing an LOD Type

LOD expressions come in three flavors to define the granularity at which the calculation will be performed: **Fixed**, **Exclude**, and **Include**

Exclude LOD

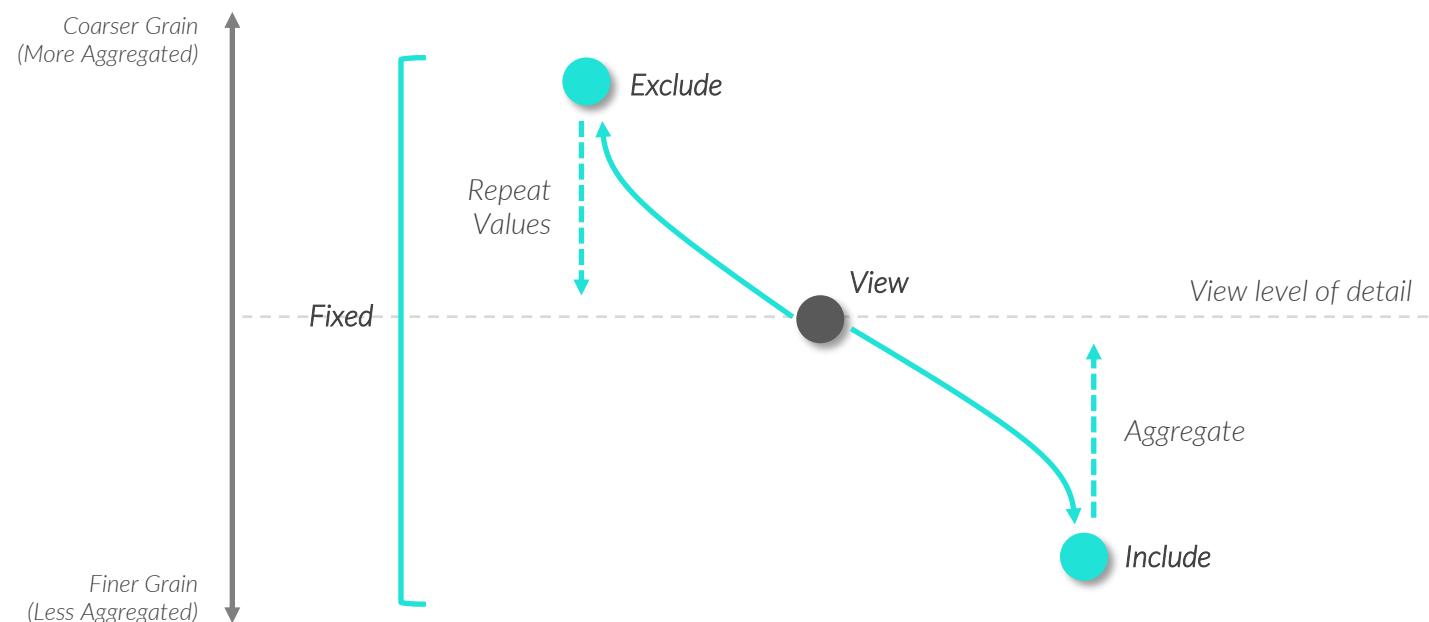
Calculated at a *coarser grain (higher)* than the view. These calculations are *impacted* by filters/dimensions in the view.

Include LOD

Calculated at a *finer grain (lower)* than the view. These calculations are *impacted* by filters/dimensions in the view.

Fixed LOD

Calculated at a *finer or coarser grain* than the view. These calculations are *NOT impacted* by filters/dimensions in the view unless specifically called out or *in context*!



PRO TIP: Use **table-scoped** LOD calculations by adding curly brackets around a field `{min([Order Date])}`, instead of a fixed LOD `{FIXED : min([Order Date])}`

Creating Parameters

Parameters are workbook variables such as a number, string, or date which can replace a constant value in a calculation, filter, or reference line.

The screenshot shows the Tableau interface with a bar chart titled 'Sheet 11 (2)' displaying sales by customer name. The chart is filtered by 'Customer Name' and has a 'Top N Parameter' of 10 applied. The 'Customer Name' field is selected in the 'Dimensions' shelf. A context menu is open on the 'Customer Name' field, with 'Create Parameter...' highlighted. Another context menu is open on the 'Top N Parameter' dropdown in the 'Filter [Customer Name]' dialog, with 'Create a New Parameter...' highlighted. A 'Create Parameter' dialog is open, showing 'Test Parameter' as the name, 'String' as the data type, and 'List' as the allowable values. The 'List of values' section is empty.

Create from Filter

Edit a *Top* filter to create new parameters on the fly

Create from Field

Right-click a field and choose *Create > Calculated Parameter*

NOTE: If no field is selected, the window will open with no field chosen

Examining & Filtering

Examining & Filtering



In this section we'll cover tools used for **examining & filtering** data, including sorting, filtering, grouping, highlighting, creating sets and hierarchies, and more

Skills We'll Cover:

Sorting

Grouping

Sets

Hierarchies

Filtering

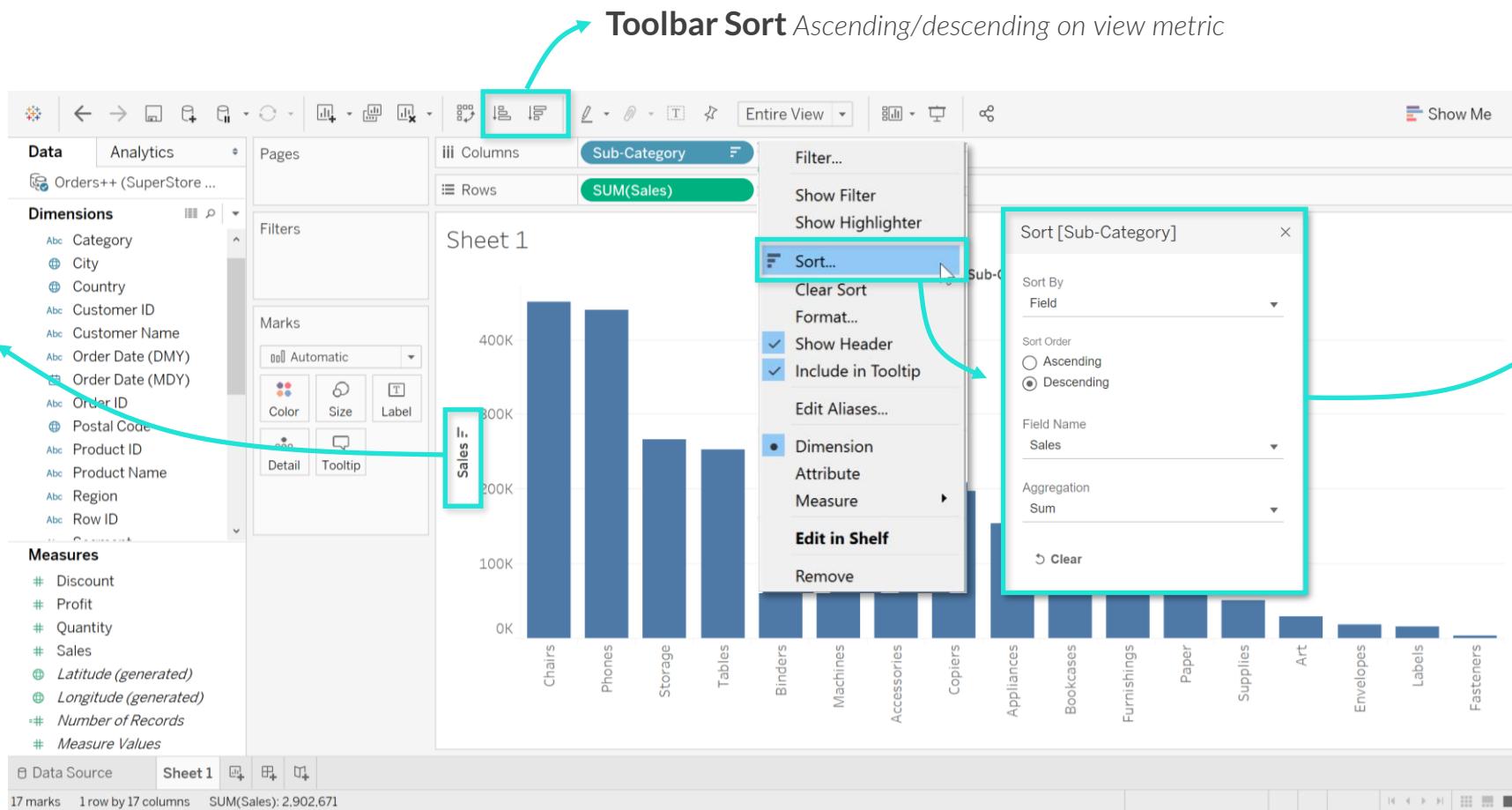
Highlighting

Common Use Cases:

- *Sorting data to spot trends and outliers*
- *Cleaning and combining data with grouping tools*
- *Creating static or dynamic sets based on key thresholds & indicators*
- *Building dynamic drill-down dimensional hierarchies*
- *Filtering data to uncover patterns and insights*

Sorting Data

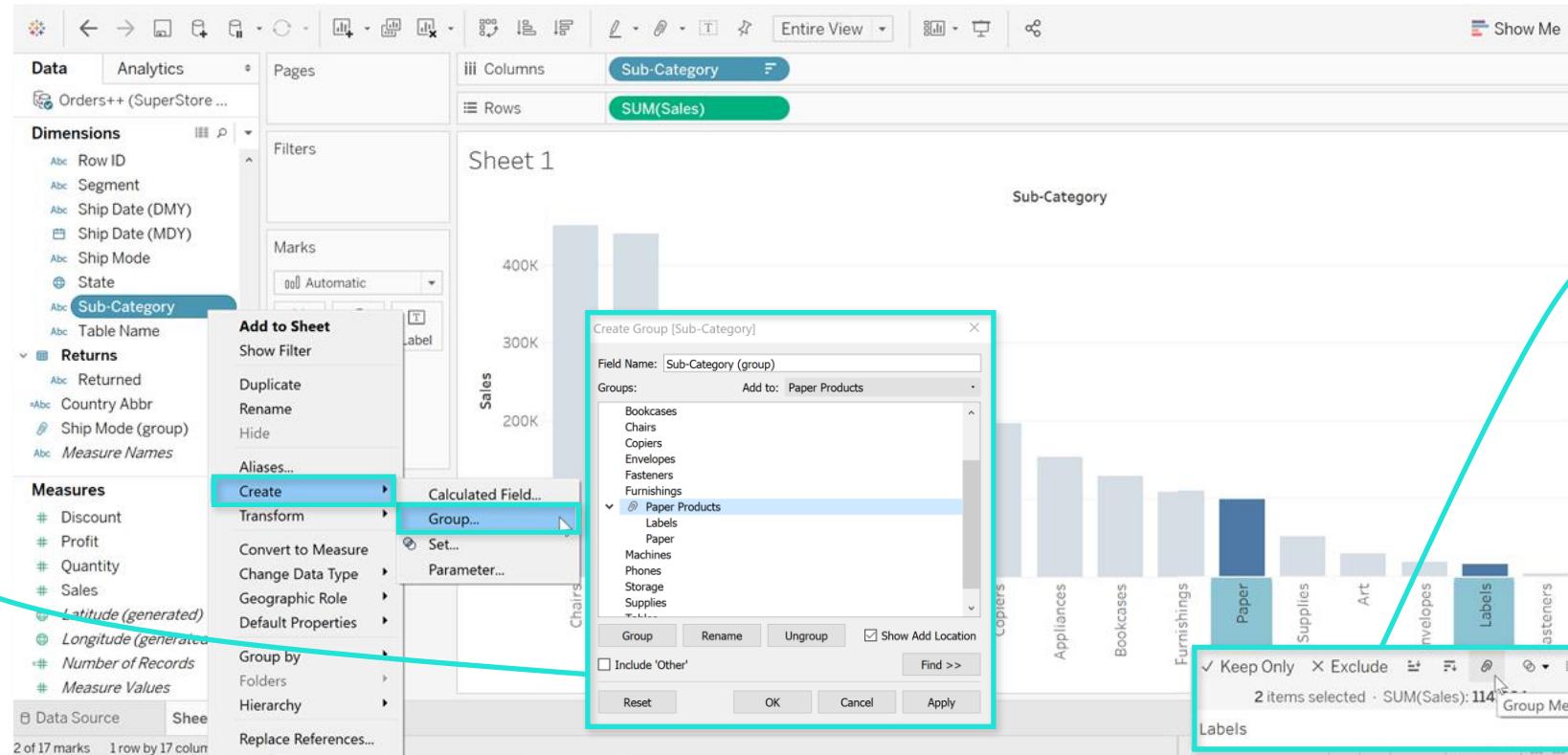
Sorting enables users to quickly scan visualizations for patterns, points of interest and key insights



Grouping Data

Grouping allows you to combine related members of a given field, and is commonly used to:

- Roll up data to a different level of detail (i.e. Product Category vs. Product Name)
- Correct data inconsistencies (i.e. MA, Mass, Massachusetts)
- Explore “What-If” scenarios (i.e. “What if we combined North and East Regions?”)



Field Grouping

Right-click any dimension and click **create>group** to access grouping options

View Grouping

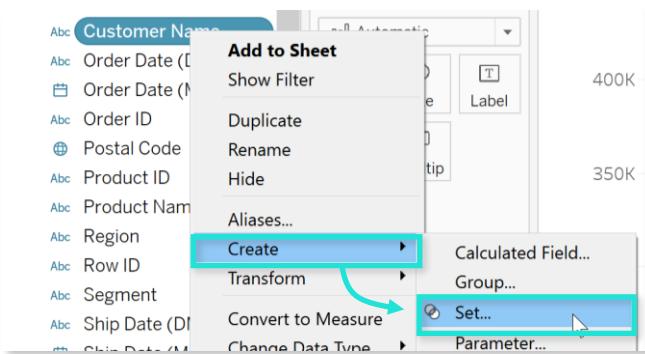
Ctrl + click two or more dimensions and click the paperclip icon to group selected items

Creating Sets

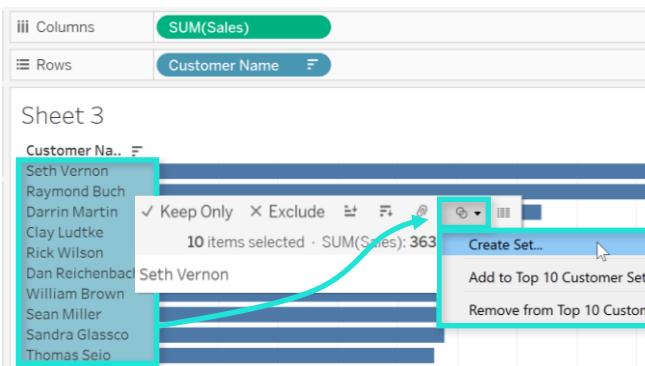
Sets are custom fields that define a subset of data based on some conditions

- Sets can be **Constant** or **Computed**, and can be made more dynamic using **set actions**

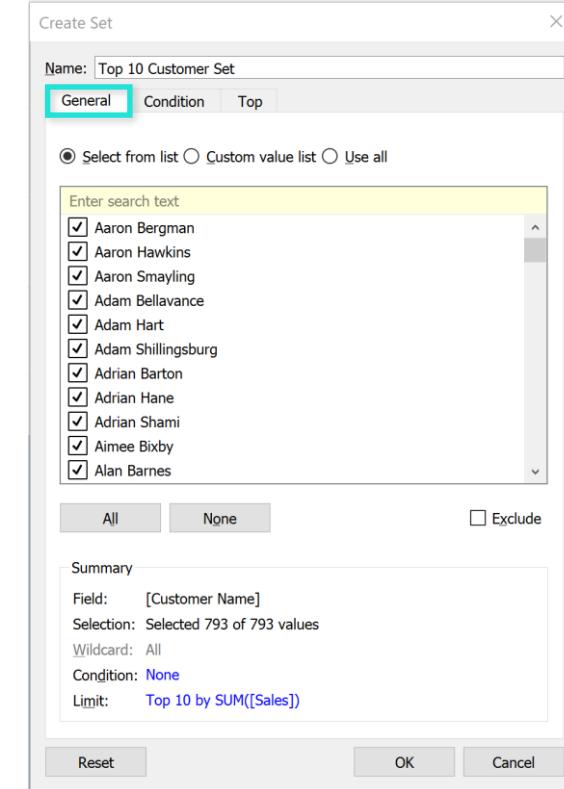
Create sets from the *field*:



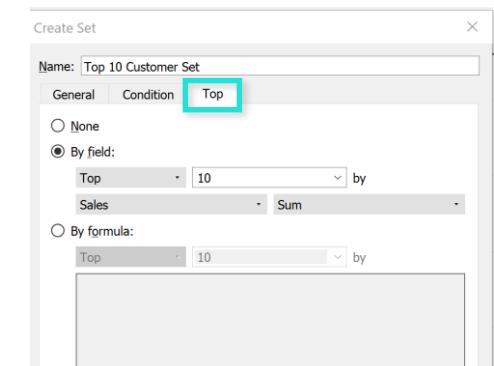
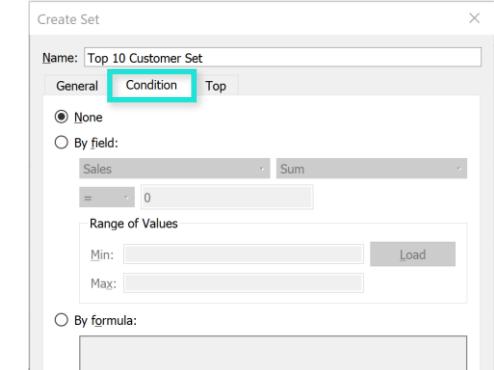
Create sets from the *view*:



Constant Sets
(Manual definition)



Computed Sets
(Rule-based definition)

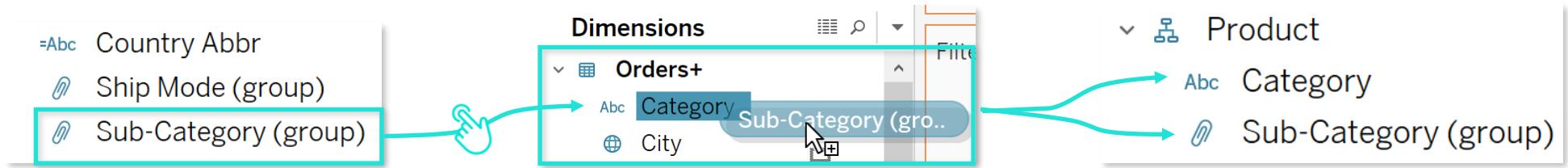


Defining Hierarchies

Hierarchies allow users to define custom levels of detail, and create drill-down functionality

- Dates create automatic hierarchies (*year > quarter > month > week > day*), but you can create custom hierarchies as well

Drag fields to create new hierarchies:



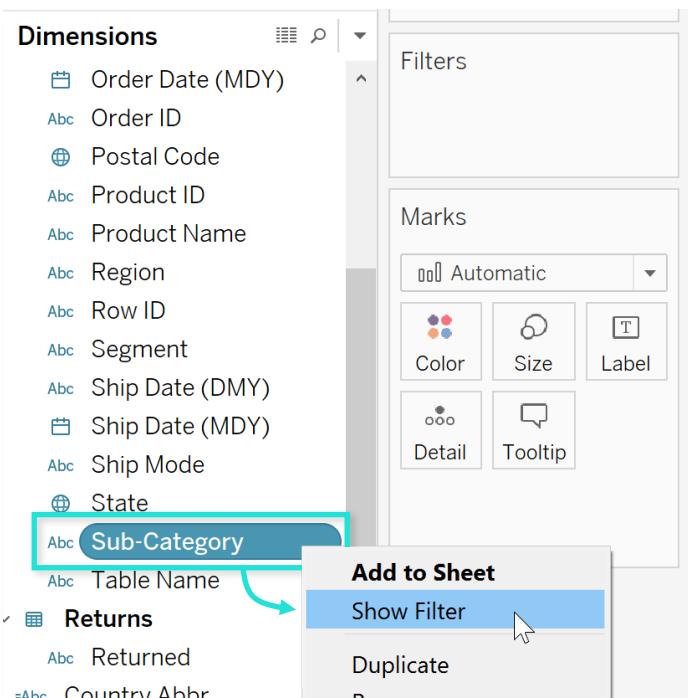
Click the (+) icon to drill down:



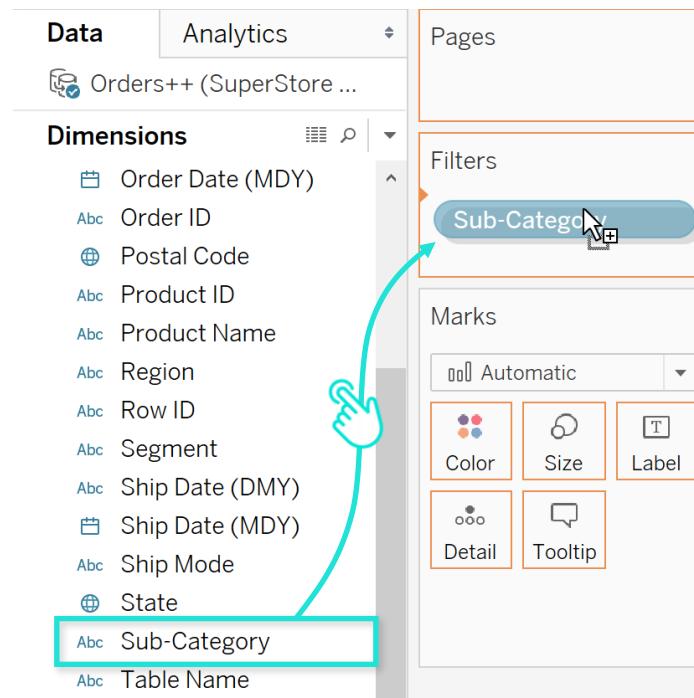
The Filter Shelf

The **filter shelf** shows all filters applied to a sheet or workbook, except data source and **extract** filters

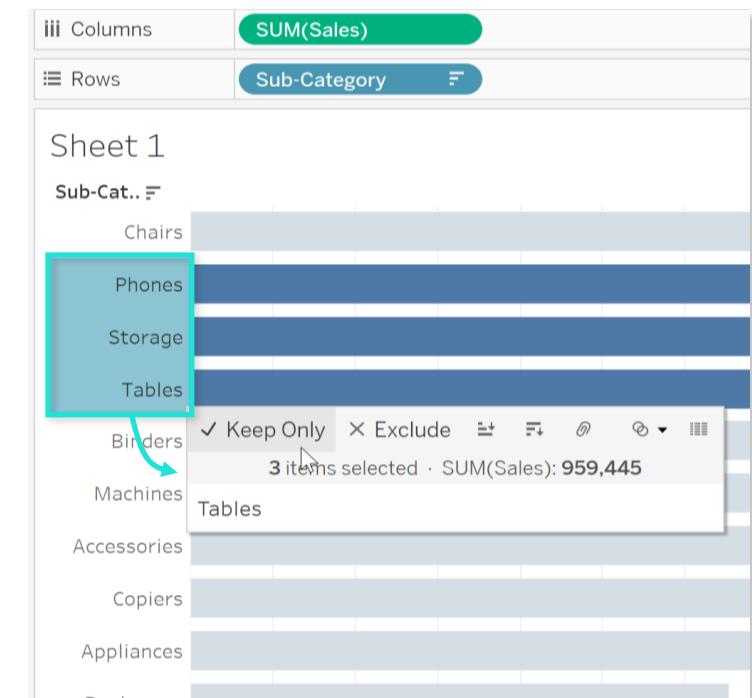
Right-Click & Show Filter:



Drag to Shelf:



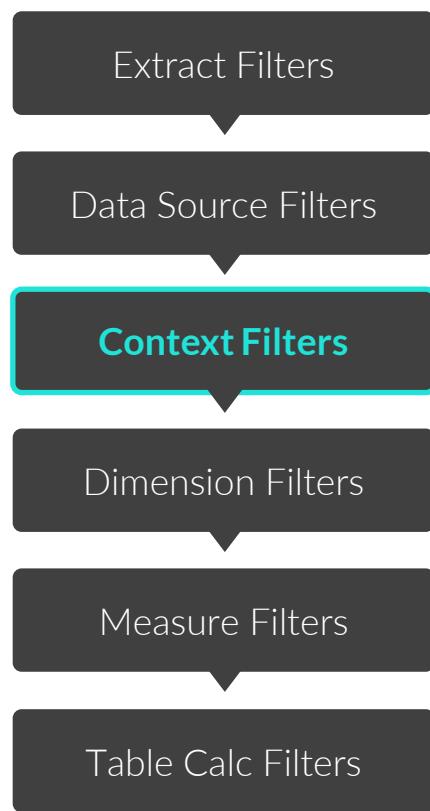
Viz Filter (Command Buttons):



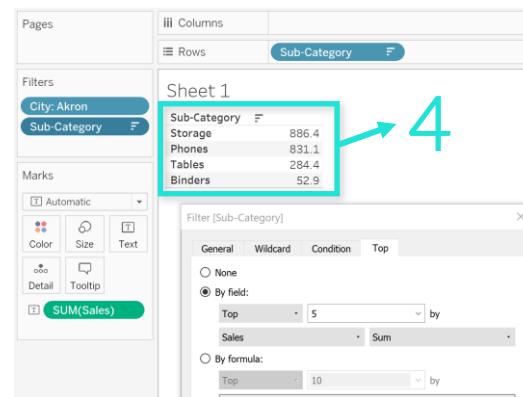
Context Filters

Context filters are dimension filters that **supersede** their normal order of operations

- One of the most common uses of Context Filters is to create **Dependent Top N Filters**
- **NOTE:** Measures and other aggregated fields *cannot* be placed in context filters

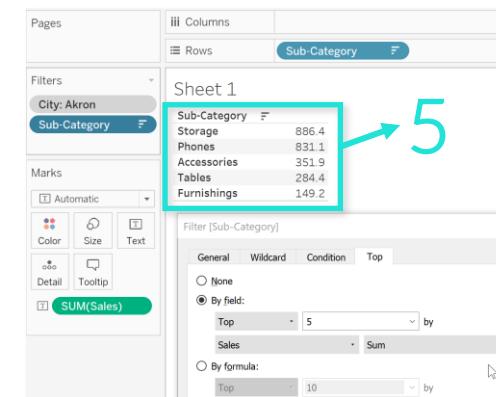


Standard Top N Filter:



Subcategories are *filtered first* (before city), so results are based on the top 5 subcategories *overall* (only 4 of which were sold in Akron)

Dependent Top N Filter:



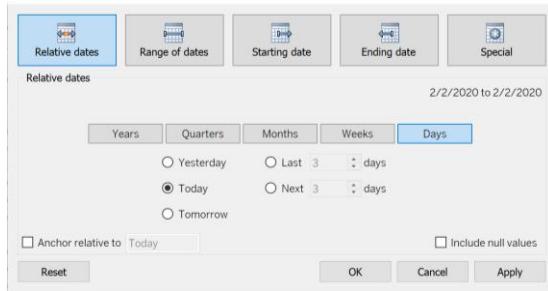
Subcategories are *filtered after* city (since it's a context filter), so results show sales for the top 5 subcategories *within Akron specifically*



PRO TIP: Use Context Filters to improve performance by **filtering out** large chunks of data that you don't need to include in your visuals or dashboards

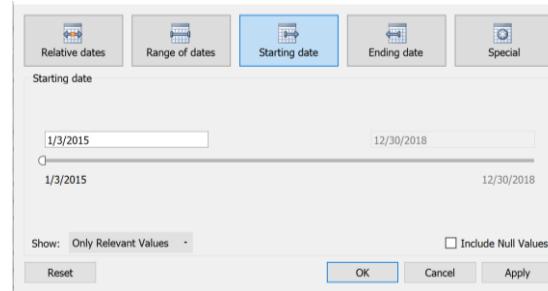
Date Filters

Date filters can be either **continuous** or **discrete**, and include their own set of date-specific options



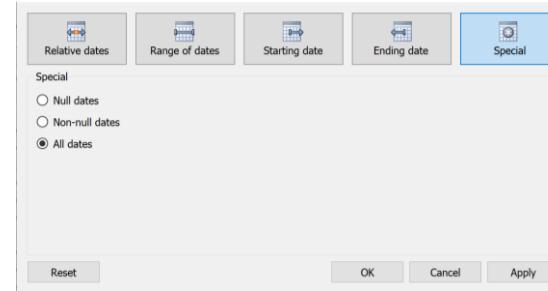
Relative Dates

Various intervals (last N days, weeks, months, etc.)



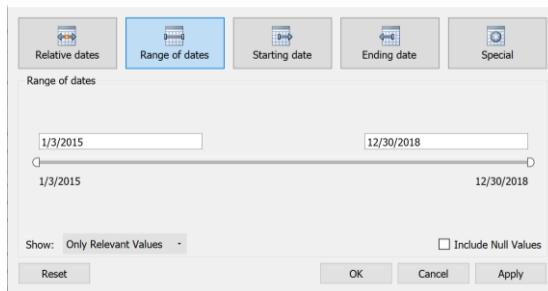
Starting Date

Single left slider to set a starting date



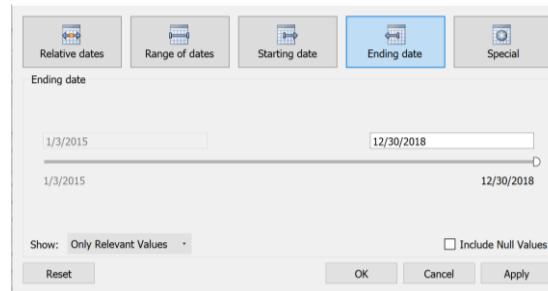
Special

Null, non-null, or all dates



Range of Dates

Pair of sliders to determine a date range



Ending Date

Single right slider to set an ending date

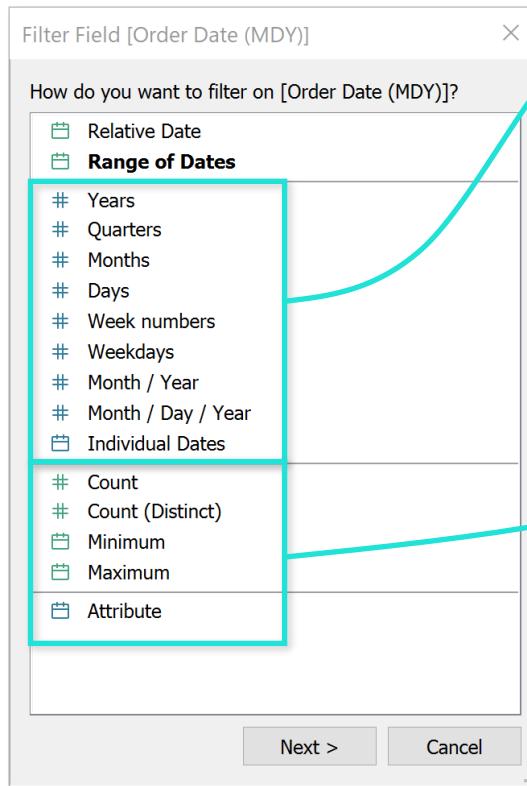


PRO TIP:

Right-click and drag into the filter shelf to choose **discrete** or **continuous** dates

Discrete Date Filters

Discrete date filters provide similar options to regular discrete fields, but can also be aggregated with count, countd, min, max, or attribute



Discrete Date Filters:

- Years
- Quarters
- Months
- Days
- Etc.

Date Aggregation:

- Count
- Count (Distinct)
- Minimum
- Maximum
- Attribute

NOTE: These are rarely used – most often these calculations are done in calculated fields (not filters)

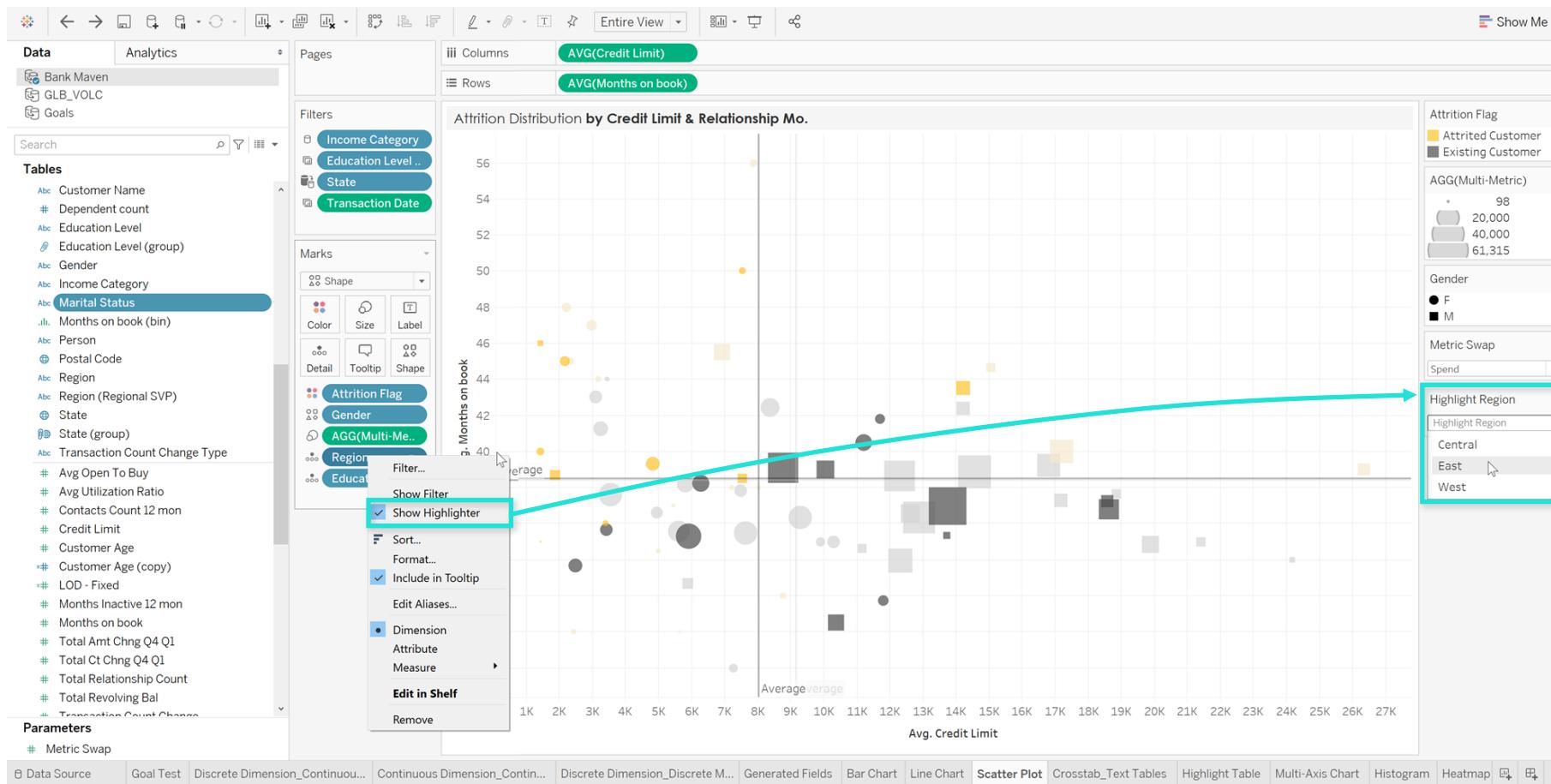
Default Field Properties

Default properties are used to create standardized comments, colors, number formats, and aggregations at the field level



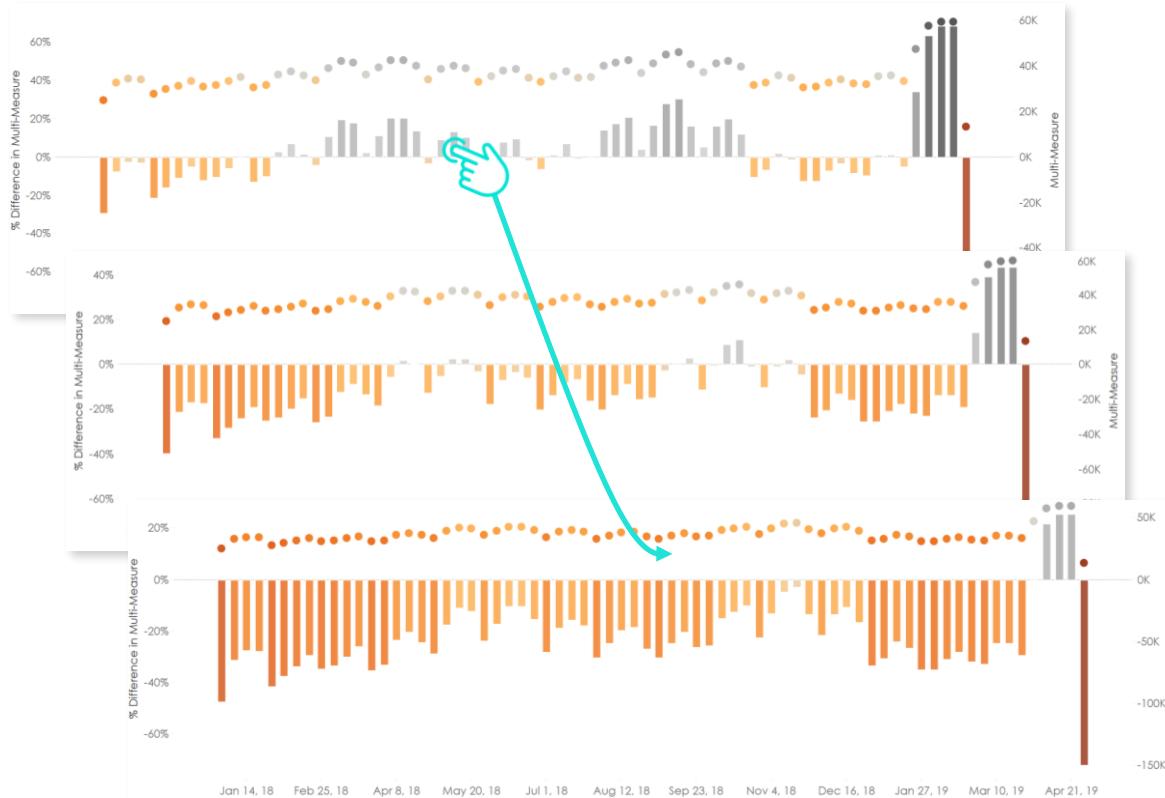
Data Highlighter

Data highlighter is an interactive tool used to draw attention to specific data points in a visual



PRO TIP: Visual Animations

Visual animations provide a dynamic transition setting for visualizations using **filters**, **filter actions**, **calculations** and more



Animations

Workbook Default

On Off

Duration

0.30 seconds (Fast)

Style

Simultaneous

Selected Sheet

Line Chart - Weekly Trend Index

Animation

On (Default)

Duration

0.3 seconds (Default)

Style

Simultaneous (Default)

Workbook Default

By default, *animations* are turned off (but can be turned on at a workbook level)

Duration

Duration can be set from fast (0.3s) to slow (2.0s) or even a custom value

Style

Style can be simultaneous (at the same time) or sequential (in order)

Selected Sheet

Animations can be customized at a sheet level for sheets selected

Dashboards & Stories

Dashboards & Stories



In this section we'll cover **dashboards & stories**, include layouts and objects, formatting and device designer tools, actions, and more

Skills We'll Cover:

Dashboard Layout

Dashboard Objects

Formatting

Actions

Device Designer

Stories

Common Use Cases:

- Designing device-specific dashboards
- Integrating dashboard objects to bring in peripheral content and functionality
- Embedding dynamic dashboard actions to enable app-like user interaction
- Using stories to create engaging narratives

Dashboard Layout

Use **device preview** to view dashboards on different device types

Dashboard Pane

The Dashboard pane is a central workspace for creating dashboards. It includes a toolbar at the top with various icons for file operations. Below the toolbar, the 'Dashboard' tab is selected. A 'Device Preview' button is visible. The 'Size' section shows 'Default Phone' and 'Desktop Browser (1000 x 8...'. The 'Sheets' section lists 'Table - Sales v ...' and 'Bars - Sales by ...', with a preview of the 'Bars - Sales by Sub-Category' sheet showing a bar chart. The 'Objects' section lists categories like Horizontal, Vertical, Text, Image, and Web Page, with 'Tiled' and 'Floating' options selected. A 'Show dashboard title' checkbox is also present. The bottom of the pane shows tabs for 'Data Source', 'Table - Sales v. Goal', 'Bars - Sales by Sub-Category', and 'Dashboard 1'.

Dashboard size can be either fixed, automatic, or range

Preview workbook sheets before bringing them into the dashboard

Dashboard objects enable organization, extensibility, and design

Sheets and Objects can be positioned using either **Tiled** or **Floating** methods

Layout Pane

The Layout pane is used for managing the layout of selected sheets. It shows a 'Selected item' section for 'Subcategory Sales' with options to 'Show title' (checked) and 'Floating' (unchecked). The 'Position' section shows 'x' and 'y' values of 8. The 'Size' section shows 'w' as 824 and 'h' as 784. The 'Border' section shows 'None'. The 'Background' section shows 'None'. The 'Outer Padding' section shows values of 4 for all sides. The 'Inner Padding' section shows values of 0 for all sides. The 'Item hierarchy' section shows a tree structure: Sales Dashboard > Tiled > Horizontal > Tiled > Subcategory Sales > Vertical > Profit.

Control **title** display and **tiled/floating** options for the selected sheet

Control sheet **size** (W,H) and **position** (X,Y)

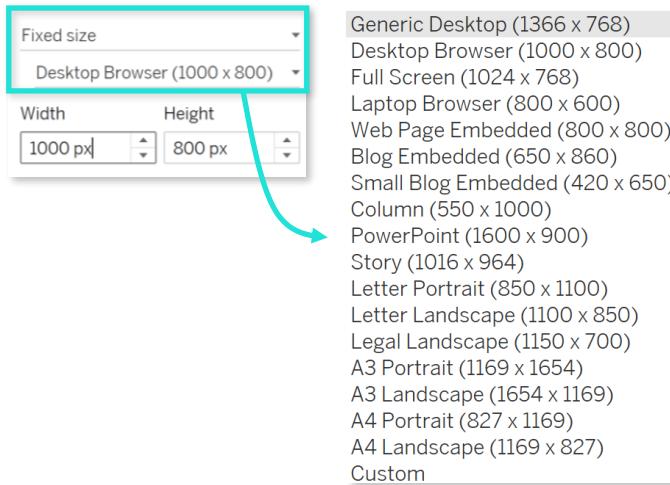
Control sheet **border** color/style and **background color**

Customize **padding** (white space) on inner and outer portions of the sheet

Determine sheet/object **hierarchy** within the dashboard

*Copyright Maven Analytics, LLC

Dashboard Sizing



Fixed size

Desktop Browser (1000 x 800)

Width: 1000 px Height: 800 px

- Generic Desktop (1366 x 768)
- Desktop Browser (1000 x 800)
- Full Screen (1024 x 768)
- Laptop Browser (800 x 600)
- Web Page Embedded (800 x 800)
- Blog Embedded (650 x 860)
- Small Blog Embedded (420 x 650)
- Column (550 x 1000)
- PowerPoint (1600 x 900)
- Story (1016 x 964)
- Letter Portrait (850 x 1100)
- Letter Landscape (1100 x 850)
- Legal Landscape (1150 x 700)
- A3 Portrait (1169 x 1654)
- A3 Landscape (1654 x 1169)
- A4 Portrait (827 x 1169)
- A4 Landscape (1169 x 827)
- Custom

Fixed Size

Defined width and height, either manually defined or assigned by pre-defined templates

Automatic

The dashboard will resize to fit any screen it is displayed on

Size

min 1624x883 - max 1724x983

Range

Minimum size

Width: 1624 px Height: 883 px

Maximum size

Width: 1724 px Height: 983 px



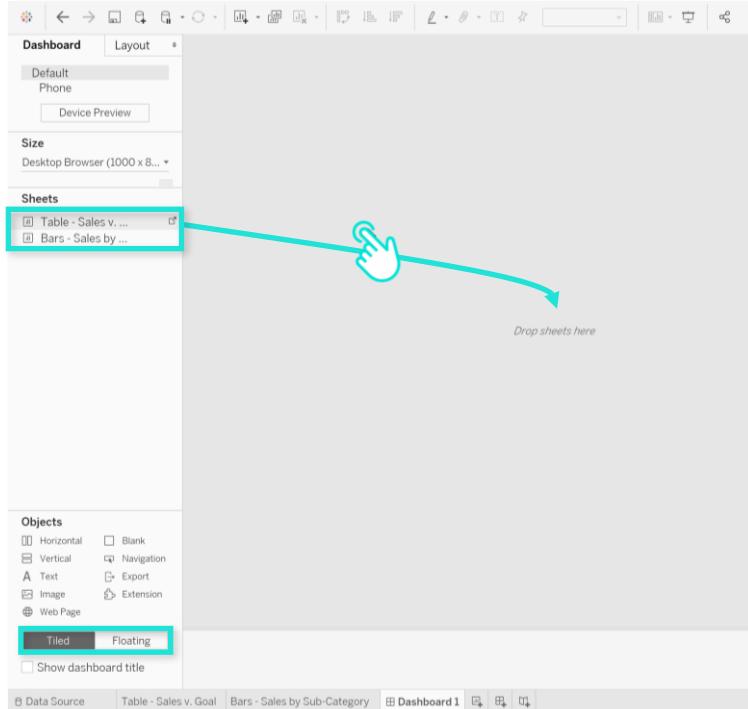
PRO TIP: Automatic and range sizing can negatively impact performance and cause unintended formatting issues; **recommend using Fixed Size and Device Designer for optimal dashboard design**

Range

Min and max limit for dashboard sizes. (this option is not recommended)

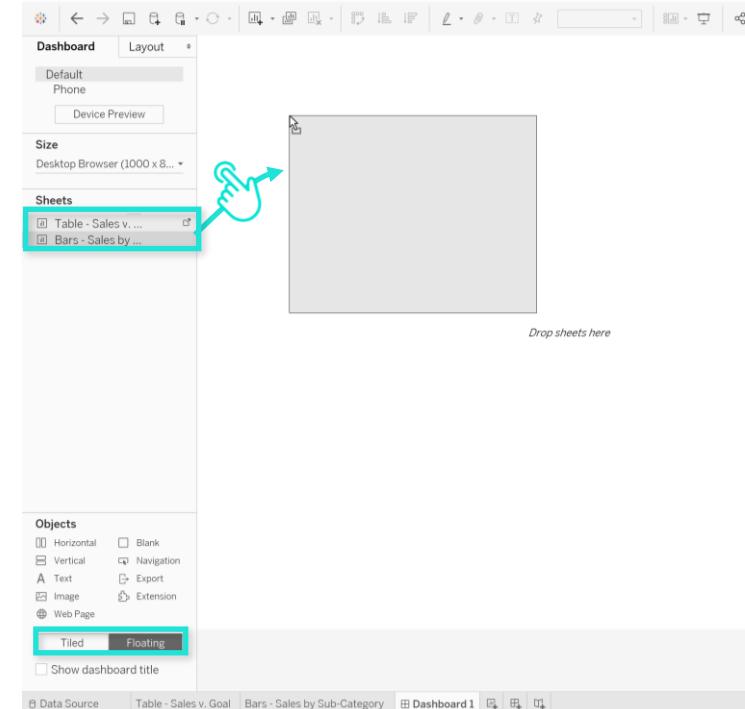
Tiled vs. Floating

Tiled Objects



Tiled mode allows you to snap objects to the dashboard “grid”

Floating Objects

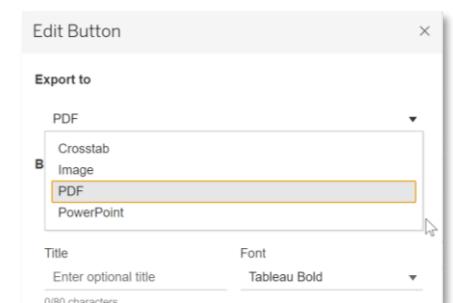
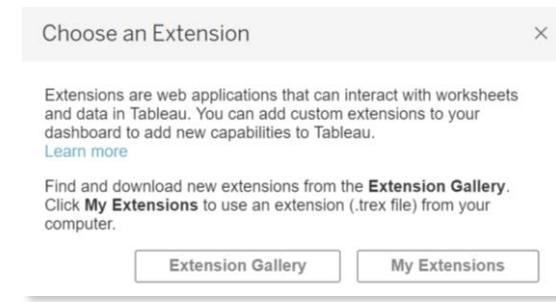
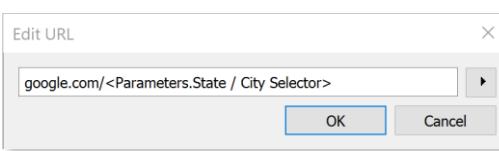
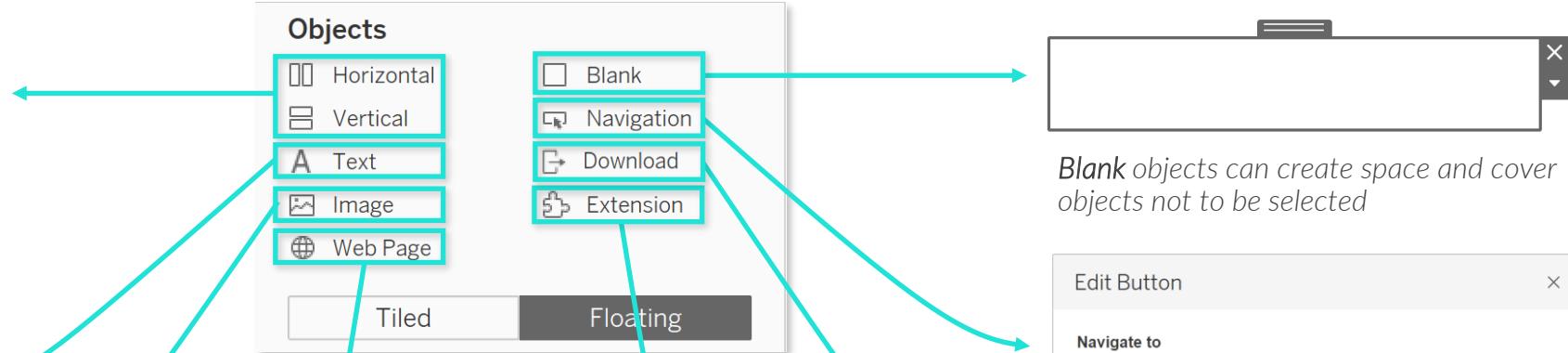
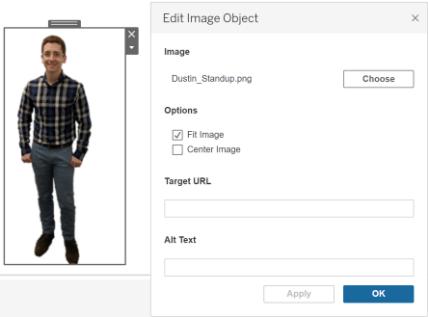
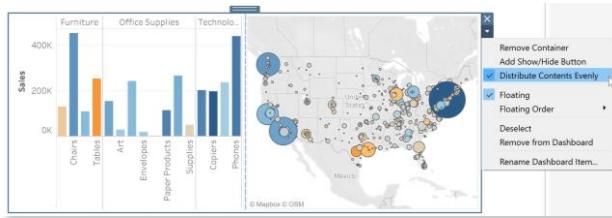


Floating mode allows you to place objects exactly where they are dropped



PRO TIP: Use **tiled** mode when designing for mobile, and **floating** when you need pixel-level precision

Dashboard Objects



Formatting

Formatting tools (font, borders, shading, etc.) can be applied to **fields**, **sheets**, and **workbooks**

Sheet

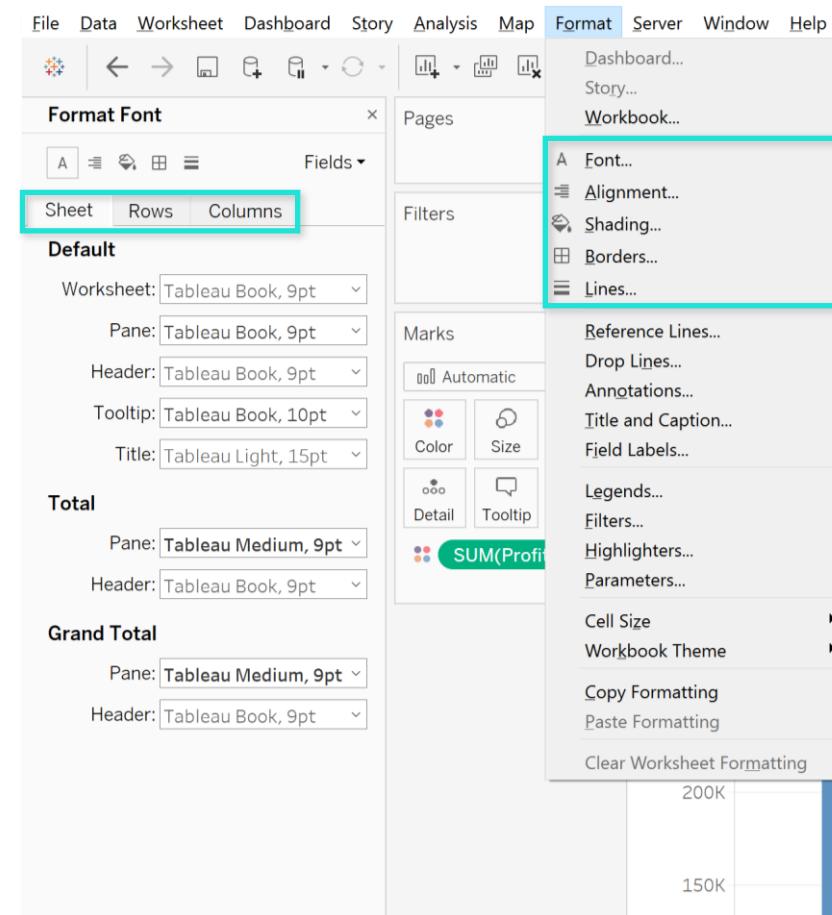
Formatting applies to all fields on on rows & columns shelves

Rows

Formatting applies only to fields on the **rows** shelf

Columns

Formatting applies only to fields on the **columns** shelf



Font

Adjust font sizing, underline, bold, color

Alignment

Adjust alignment vertical & horizontal

Shading

Adjust color and banding

Borders

Adjust border color, thickness

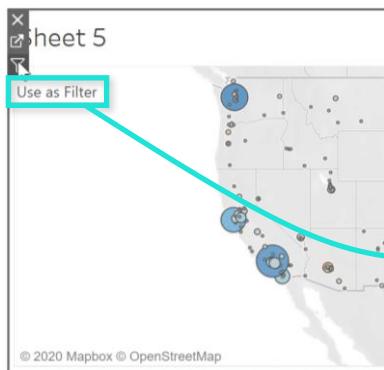
Lines

Adjust axis lines, drop lines, zero lines, etc.

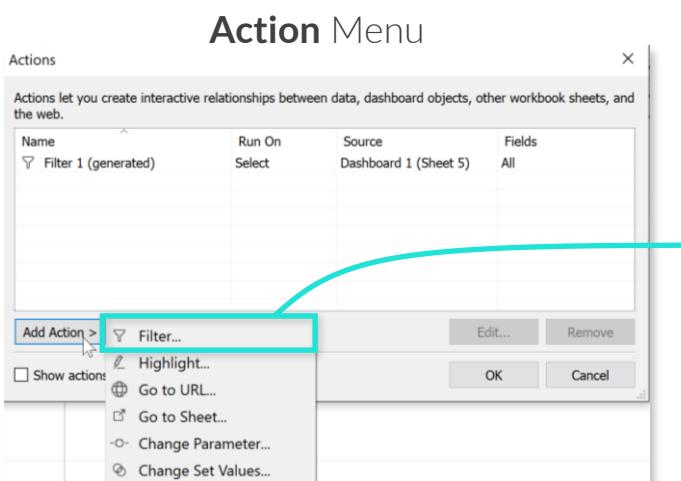
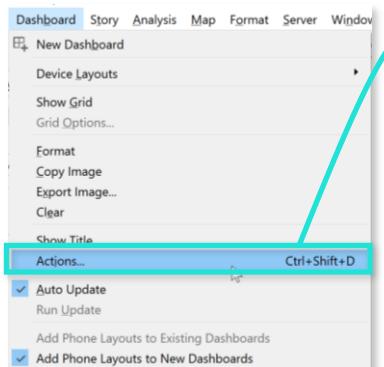
Filter Actions

Filter Actions allow end-users to apply dashboard filters by directly selecting visual components

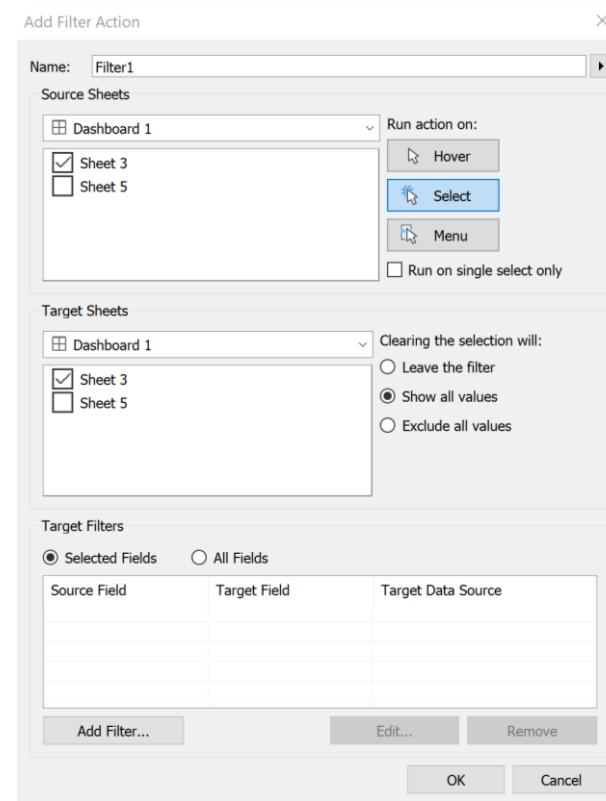
Use as Filter



Dashboard > Actions



Edit Filter Action Menu



Source Sheets:

Select dashboards/sheets to push the action from

Run Action On:

Choose to action on Hover, Select, or Menu

Target Sheets:

Select sheets that will be impacted by the action

Clearing the Selection:

Define what happens when the selection is cleared

Target Filters:

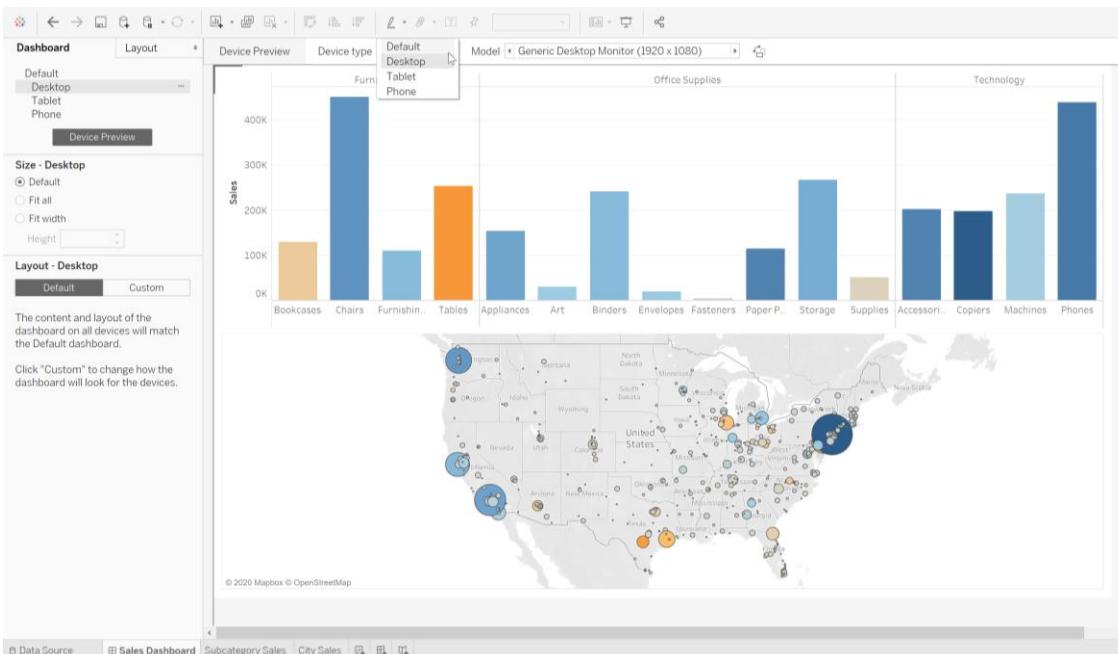
Define which field is used to filter and which field it impacts

Device Designer

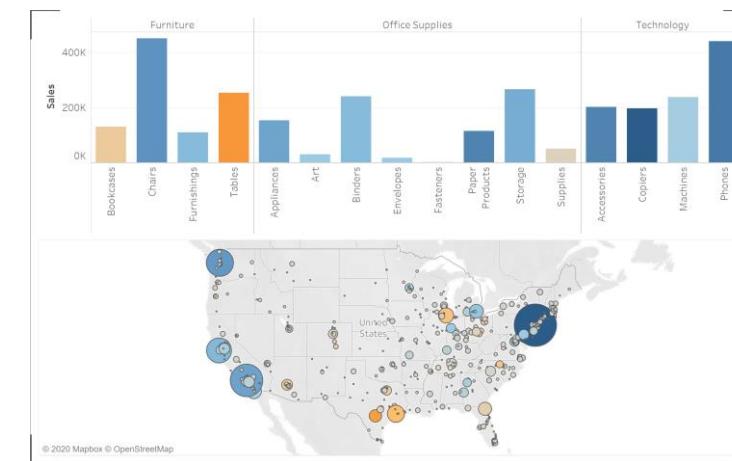
The **Device designer** allows you to create dashboards specifically sized and optimized for different devices

- The **Default** dashboard is the “parent” view which supports desktop, tablet and phone views; any sheet, action, legend, or object **must exist in the default dashboard** in order to be used in another view

Desktop View



Tablet View



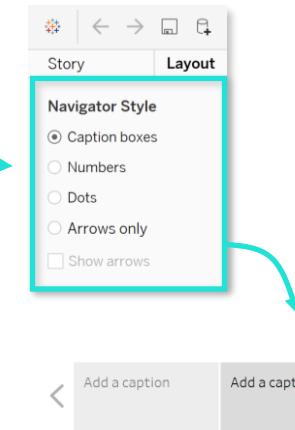
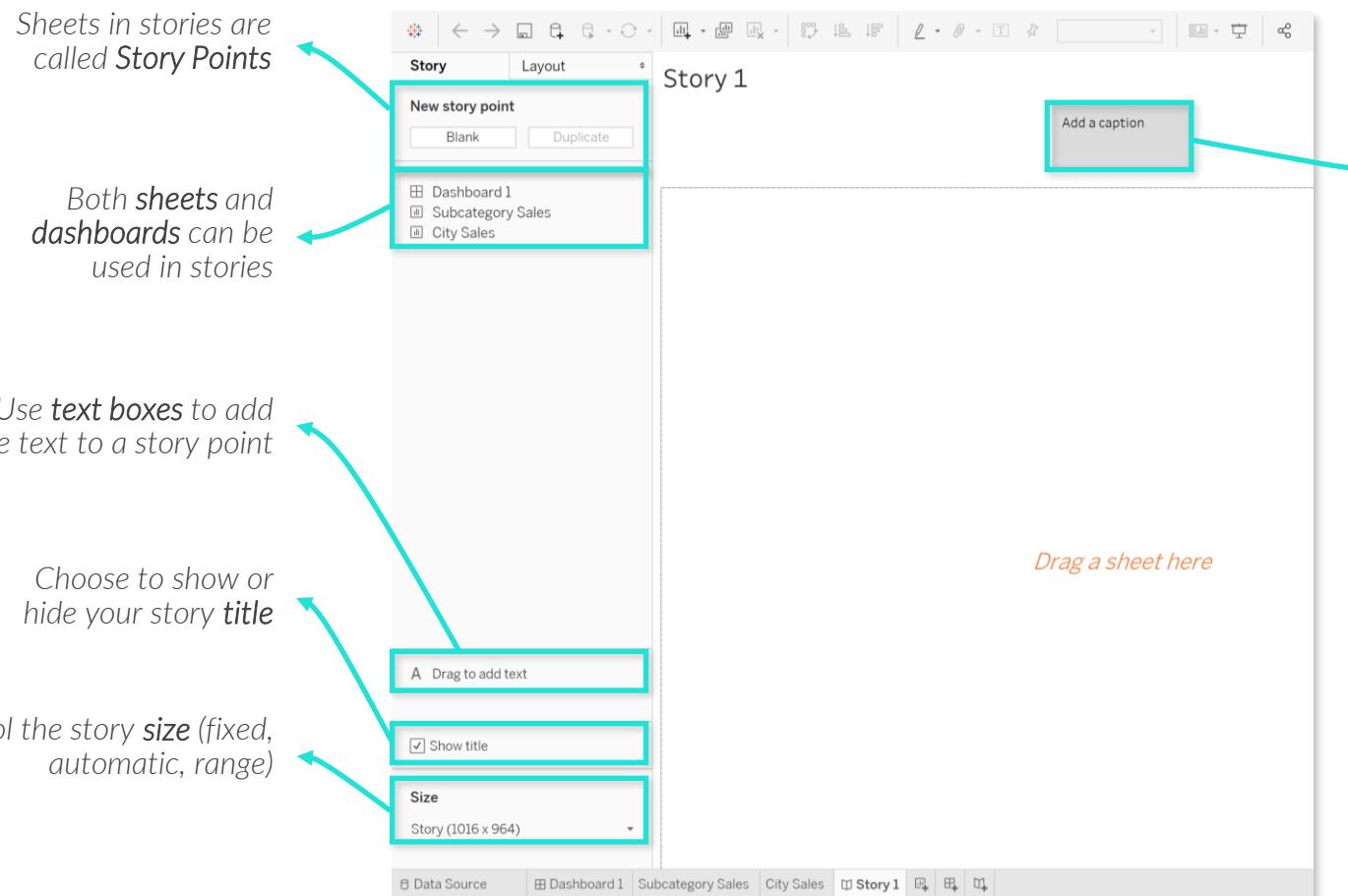
Mobile View



NOTE: To add a phone layout, select **Dashboard > Add Phone Layouts to Existing/New Dashboard**

Stories

Stories allow you to create visual sequences to build narratives, add context, and bring data to life



Caption Boxes

Annotated, text-based story points



Numbers

Sequential, ordered story points



Dots

Subtle progression between story points



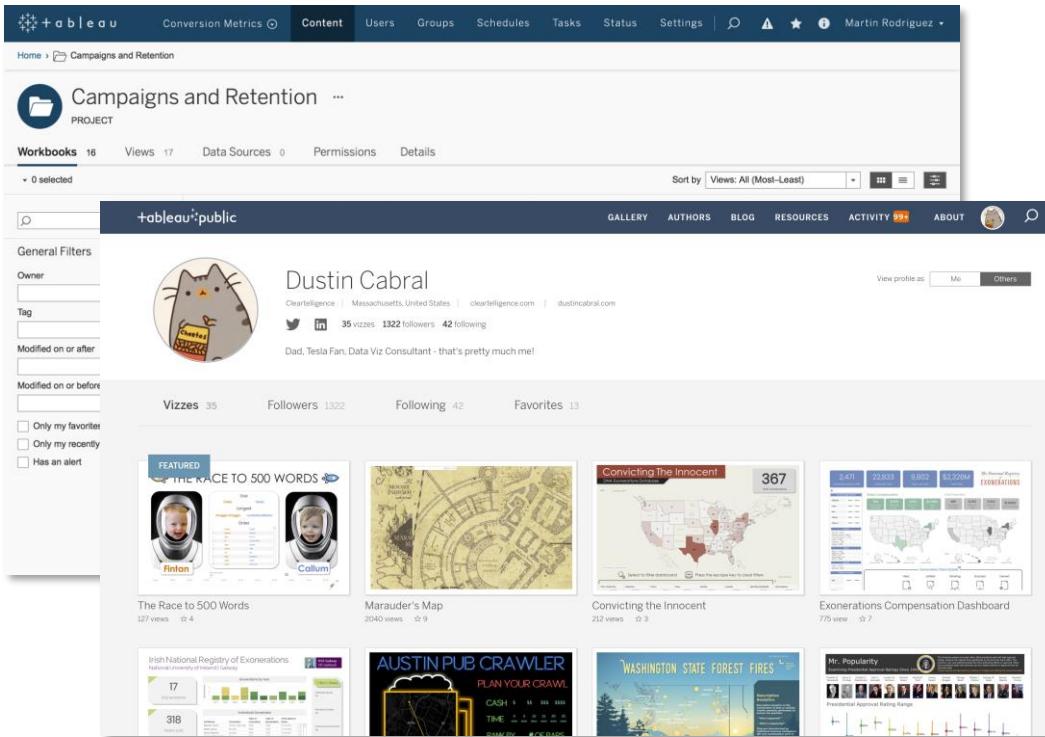
Arrows Only

Minimal controls with numbers & arrows

Sharing Dashboards

Share your dashboards on Tableau Server, Tableau Public, local workbooks, or workbook exports

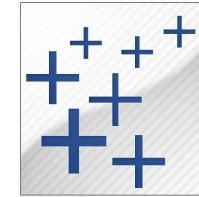
Tableau Public & Tableau Server



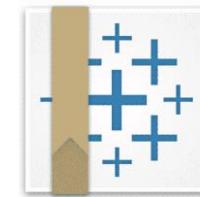
The screenshot shows the Tableau Public interface. At the top, there's a navigation bar with 'Conversion Metrics', 'Content', 'Users', 'Groups', 'Schedules', 'Tasks', 'Status', 'Settings', a search icon, and a user profile for 'Martin Rodriguez'. Below the navigation is a breadcrumb trail: 'Home > Campaigns and Retention'. The main content area is titled 'Campaigns and Retention' and shows a dashboard with several visualizations. On the left, there's a sidebar with filters for 'Workbooks', 'Vizzes', 'Followers', 'Following', and 'Favorites'. The dashboard itself has a dark header with the title and a light body containing various charts and maps. At the bottom, there are links to 'Irish National Registry of Exonerations', 'AUSTIN PUB CRAWLER', and 'WASHINGTON STATE FOREST FIRES'.

Local Workbooks

.twb



.twbx



Workbook Exports



Practice Exams

Practice Exams

This course includes **two practice exams** which are designed to prepare you for the actual **Tableau Desktop Specialist** and **Tableau Desktop Certified Associate** exams

	EXAM 1	EXAM 2
 Data Source	Coffee Chain	Super Store
 Question Format	Multiple Choice	Multiple Choice
 # of Questions	<ul style="list-style-type: none">• 18 Hands-on• 18 Knowledge Based	<ul style="list-style-type: none">• 18 Hands-on• 18 Knowledge Based
 Time Limit	120 minutes	120 minutes