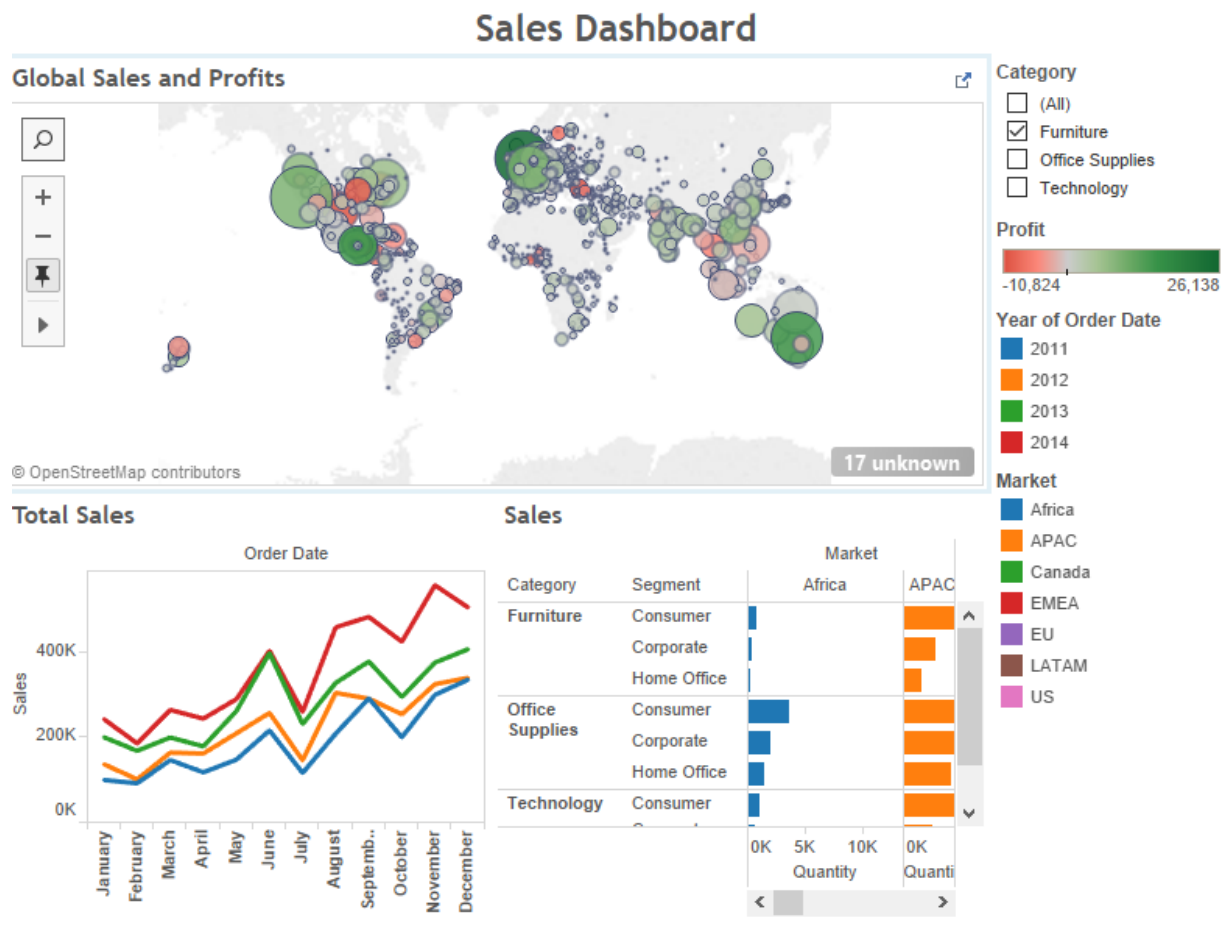


MIS 304: Using and Managing Information Systems

Lab Session 6: Data Visualization with Tableau

The goal of this lab is to help you get started with Tableau for data visualization. Data visualization is the process of describing information through visual rendering. Data visualization helps people understand the significance of data by placing it in a visual context. Patterns, trends and correlations that might go undetected in text-based data can be exposed and recognized easier with data visualization. Tableau makes the data visualization process available to users of every background and industry.



We will first install Tableau public version. Then we will analyze a global superstore dataset with Tableau and build visualization dashboards.

1. Install Tableau

(1) Download the Tableau public version (free): <https://public.tableau.com/s/download>.

tableau:public

GALLERY AUTHORS BLOG RESOURCES ACTIVITY SIGN IN

You'll Be Exploring In Minutes

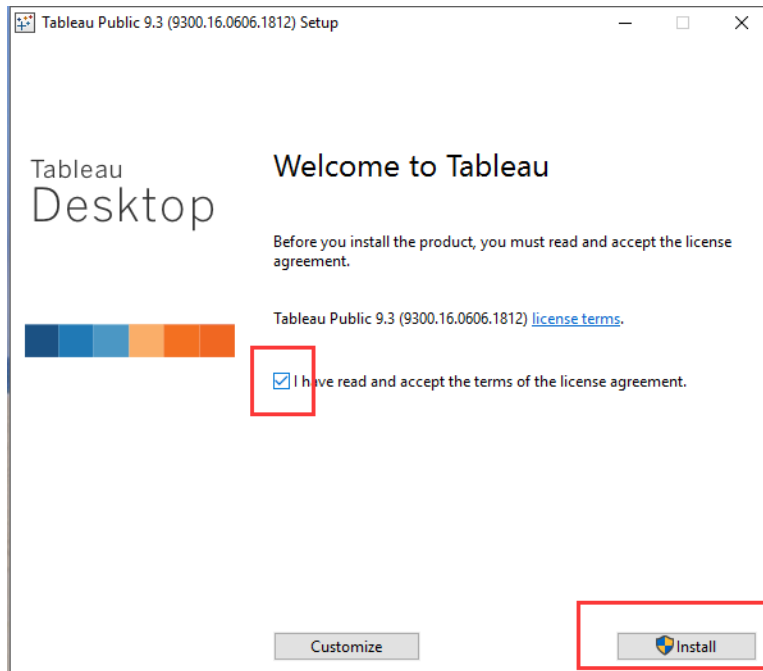
(1) Create and share interactive charts and graphs, stunning maps, live dashboards and fun applications in minutes, then publish anywhere on the web. Anyone can do it, it's that easy—and it's free.

(2)

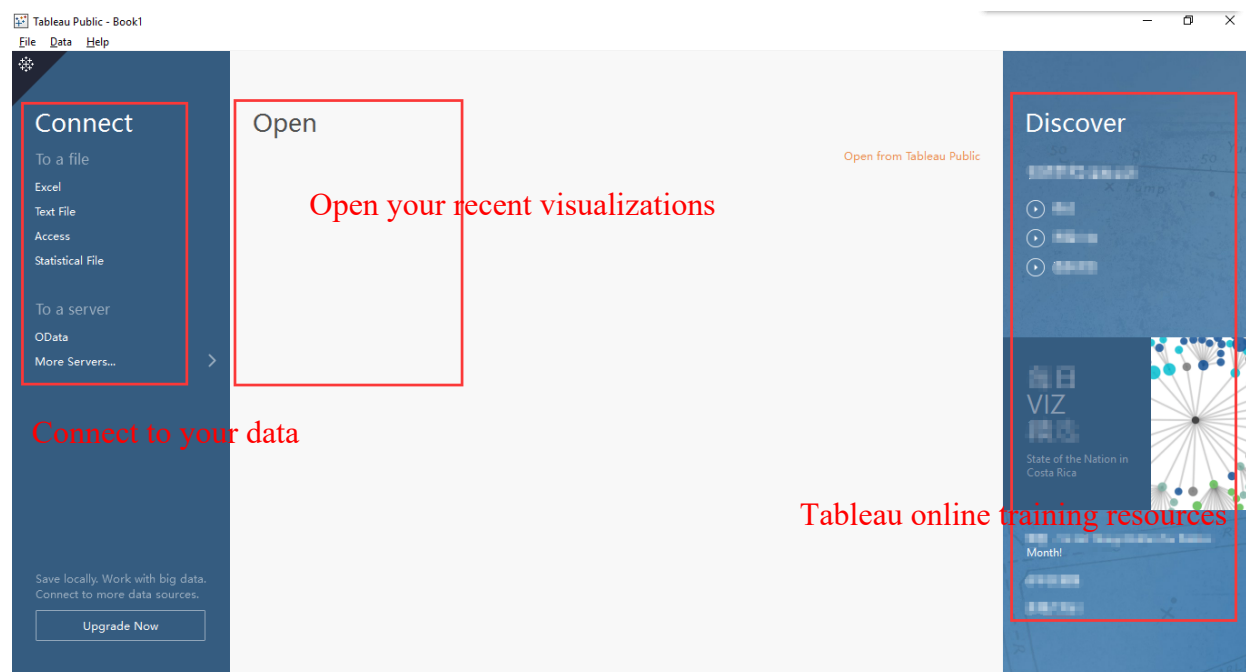
Available for Windows and Mac (OS X) | System Requirements

	Public	Personal	Professional
Price	Free <input type="button" value="Download"/>	\$999 per user <input type="button" value="Free 14 Day Trial"/>	\$1,999 per user <input type="button" value="Free 14 Day Trial"/>
File Sharing	• Vizires can be shared via email, Twitter, Facebook, LinkedIn, Google+, and/or embedded on your site(s).	• Creates package files for Tableau Reader	• Creates package files for Tableau Reader • Connects to Tableau Server for web-based analytics
Save Files To	• Your Tableau Public profile	• Your computer/network • Your Tableau Public profile	• Tableau Server • Tableau Online • Your computer/network • Your Tableau Public profile
Data Sources	• Microsoft Excel 2007 or later • Microsoft Windows Azure Marketplace DataMarket • OData	• Microsoft Access 2003 or later ¹ • Microsoft Excel 2007 or later • Microsoft PowerPivot 2008 or later ¹ • Microsoft Windows Azure Marketplace	• Actian Vectorwise 2.0 or later ¹ • Amazon Redshift • Cloudera Hadoop Hive and Impala; Hive CDH3u1, which includes Hive 71 or later

(2) Double-click on the file that was downloaded above. You may have a question asking you if you really want to run the file. Click “OK”. Then click “Next”.



(3) Open your Tableau.

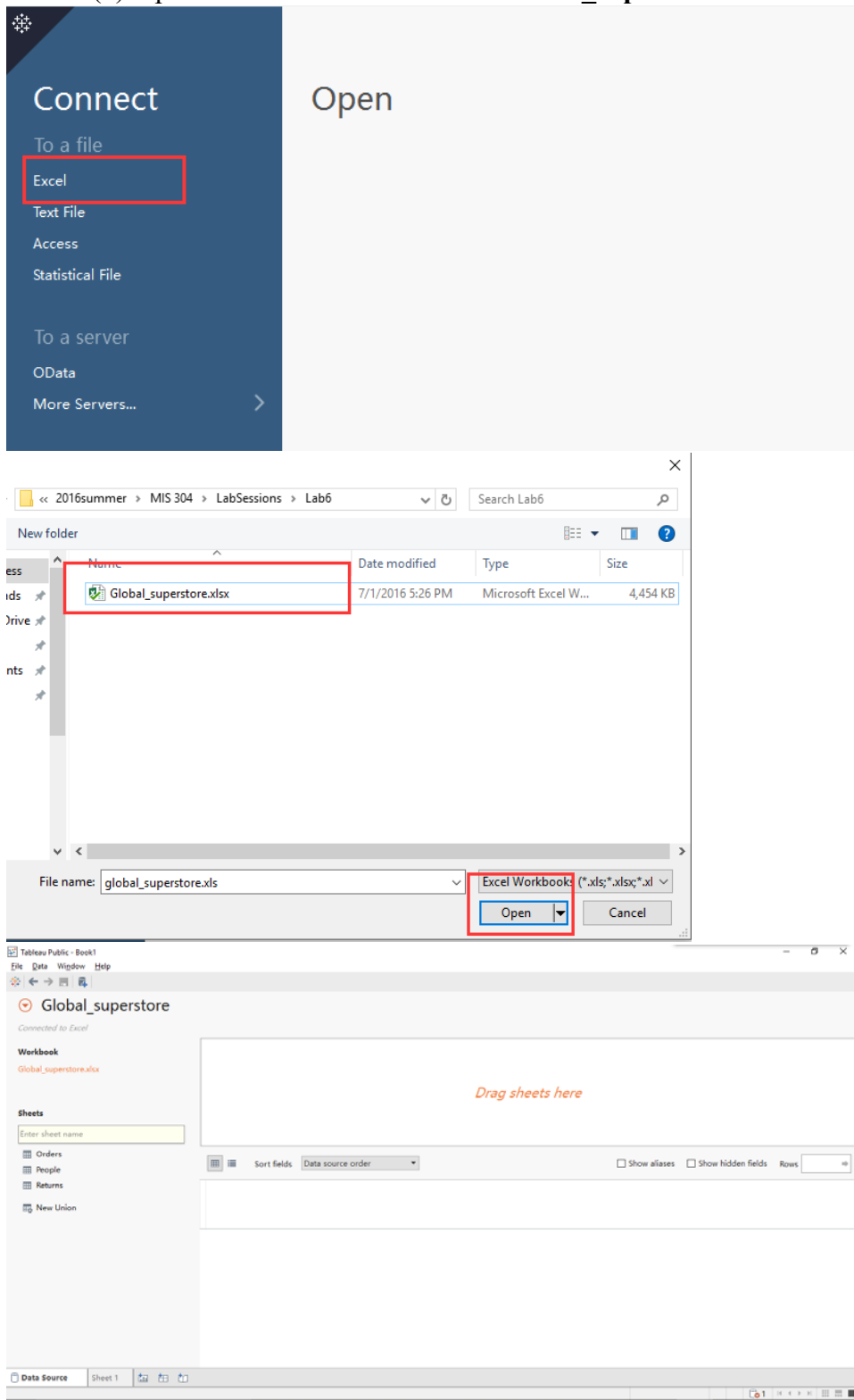


2. Download **Global_superstore.xlsx** from Blackboard. Take a look at the worksheets in this data file.

	Name Box	B	C	D	E	F	G	H	I	J	K	L	M	N	
	Country	Postal Code	Market	Region	Product ID	Category	Sub-Category	Product Name	Sales	Quantity	Discount	Profit	Shipping Cost	Order Priority	
1	United States	10024	US	East	TEC-AC-1C	Technology	Accessories	Plantronics	2309.65	7	0	762.1845	933.57	Critical	
3	Australia		APAC	Oceania	FUR-CH-1C	Furniture	Chairs	Novimex	3709.395	9	0.1	-288.765	923.63	Critical	
4	Australia		APAC	Oceania	TEC-PH-1C	Technology	Phones	Nokia Smartphone	5175.171	9	0.1	919.971	915.49	Medium	
5	Germany		EU	Central	TEC-PH-1C	Technology	Phones	Motorola	2892.51	5	0.1	-96.54	910.16	Medium	
6	Senegal		Africa	Africa	TEC-SHA-1C	Technology	Copiers	Sharp Wireless	2832.96	8	0	311.52	903.04	Critical	
7	Australia		APAC	Oceania	TEC-PH-1C	Technology	Phones	Samsung	2862.675	5	0.1	763.275	897.35	Critical	
8	New Zealand		APAC	Oceania	FUR-CH-1C	Furniture	Chairs	Novimex	1822.08	4	0	564.84	894.77	Critical	
9	New Zealand		APAC	Oceania	FUR-TA-1C	Furniture	Tables	Chromcraft	5244.84	6	0	996.48	878.38	High	
10	United States	95823	US	West	OFF-BI-10	Office Supplies	Binders	Fellowes	5083.96	5	0.2	1906.485	867.69	Low	
11	United States	28027	US	South	FUR-TA-1C	Furniture	Tables	Chromcraft	4297.644	13	0.4	-1862.31	865.74	Critical	
12	United States	22304	US	South	OFF-SU-1C	Office Supplies	Supplies	Martin's	4164.05	5	0	83.281	846.54	High	
13	Afghanistan		APAC	Central Asia	FUR-TA-1C	Furniture	Tables	Bevis Com	4626.15	5	0	647.55	835.57	High	
14	Saudi Arabia		EMEA	EMEA	TEC-CIS-1C	Technology	Phones	Cisco Smartphone	2616.96	4	0	1151.4	832.41	Critical	
15	Brazil		LATAM	South	FUR-CH-1C	Furniture	Chairs	Harbour Com	2221.8	7	0	622.02	810.25	Critical	
16	China		APAC	North Asia	OFF-AP-1C	Office Supplies	Appliance	KitchenAid	3701.52	12	0	1036.08	804.54	Critical	
17	France		EU	Central	OFF-AP-1C	Office Supplies	Appliance	Breville	1869.588	4	0.1	186.948	801.66	Critical	
18	United States	42420	US	South	TEC-AC-1C	Technology	Accessories	Logitech	2249.91	9	0	517.4793	780.70	Critical	
19	Italy		EU	South	OFF-AP-1C	Office Supplies	Appliance	Hoover	St	7958.58	14	0	3979.08	778.32	Low
20	Australia		APAC	Oceania	TEC-CO-1C	Technology	Copiers	Brother	F	2565.594	9	0.1	28.404	766.93	Critical
21	Tanzania		Africa	Africa	OFF-KIT-1	Office Supplies	Appliance	KitchenAid	3409.74	6	0	818.28	763.38	High	
22	Poland		EMEA	EMEA	FUR-HON-1C	Furniture	Tables	Hon Comp	1977.72	4	0	276.84	759.47	Critical	
23	United States	60610	US	Central	TEC-PH-1C	Technology	Phones	Apple iPhone	2735.952	6	0.2	341.994	752.51	High	
24	China		APAC	North Asia	FUR-CH-1C	Furniture	Chairs	SAFCO Ex	2754	6	0	358.02	752.47	Critical	
25	United Kingdom		EU	North	OFF-AP-1C	Office Supplies	Appliance	KitchenAid	5273.7	10	0	1898.4	730.91	High	
26	Mexico		LATAM	North	TEC-PH-1C	Technology	Phones	Motorola	1713.84	4	0	445.52	728.97	Critical	
27	El Salvador		LATAM	Central	FUR-TA-1C	Furniture	Tables	Hon Comp	2106.496	8	0.2	526.496	728.39	Critical	
28	Taiwan		APAC	North Asia	FUR-TA-1C	Furniture	Tables	Lesro Com	1715.16	2	0	720.36	725.57	Critical	
29	Germany		EU	Central	OFF-AP-1C	Office Supplies	Appliance	Hoover	St	3069.738	6	0.1	1364.238	725.34	Critical
30	United States	90008	US	West	TEC-PH-1C	Technology	Phones	Apple iPhone	4158.912	8	0.2	363.9048	714.66	High	
31	India		APAC	Central Asia	FUR-CH-1C	Furniture	Chairs	Office Sta	1878.72	4	0	582.36	704.08	Critical	
32	Dominican Republic		LATAM	Caribbean	TEC-PH-1C	Technology	Phones	Samsung	1696.64	5	0.2	-148.46	704.06	Critical	
33	France		EU	Central	TEC-MA-1C	Technology	Machines	Okidata Ir	2402.865	9	0.15	763.155	699.55	Critical	
34	United States	79109	US	Central	FUR-CH-1C	Furniture	Chairs	HON 5400	2453.43	5	0.3	-350.49	690.42	High	
35	Australia		APAC	Oceania	OFF-AP-1C	Office Supplies	Appliance	Breville	St	2526.93	5	0.1	561.48	689.80	Critical
36	United States	60000	US	West	TEC-AC-1C	Technology	Accessories	Plantronics	2309.65	7	0	762.1845	933.57	Critical	
		Orders	Returns	People											

3. Tableau data analysis and dashboards building

(1) Open Tableau and connect it to **Global_superstore.xlsx**



(2) Choose which sheets we want to use. Drag the “Orders” into the canvas. We can see a preview of the data.

Tableau Public - Book1

File Data Window Help

Orders (Global_superstore)

Connected to Excel

Workbook

Global_superstore.xlsx

Sheets

Enter sheet name

Orders

People

Returns

New Union

Data doesn't look right? Tableau Data Interpreter might be able to help. Turn on

Sort fields Data source order

Show aliases Show hidden fields Rows 1,000

Country	Postal Code	Market	Region	Product ID	Category	Sub-Category	Product Name	Sales
United States	10024	US	East	TEC-AC-10003033	Technology	Accessories	Plantronics CS510 - ...	2
Australia	null	APAC	Oceania	FUR-CH-10003950	Furniture	Chairs	Novimex Executive L...	3
Australia	null	APAC	Oceania	TEC-PH-10004664	Technology	Phones	Nokia Smart Phone, ...	5
Germany	null	EU	Central	TEC-PH-10004583	Technology	Phones	Motorola Smart Pho...	2
Senegal	null	Africa	Africa	TEC-SHA-10000501	Technology	Copiers	Sharp Wireless Fax, ...	2
Australia	null	APAC	Oceania	TEC-PH-10000030	Technology	Phones	Samsung Smart Pho...	2
New Zealand	null	APAC	Oceania	FUR-CH-10004050	Furniture	Chairs	Novimex Executive L...	1

Go to Worksheet

(3) Data preparation

Find “Row ID”, change it from “Number (Whole)” to “String”.

Orders

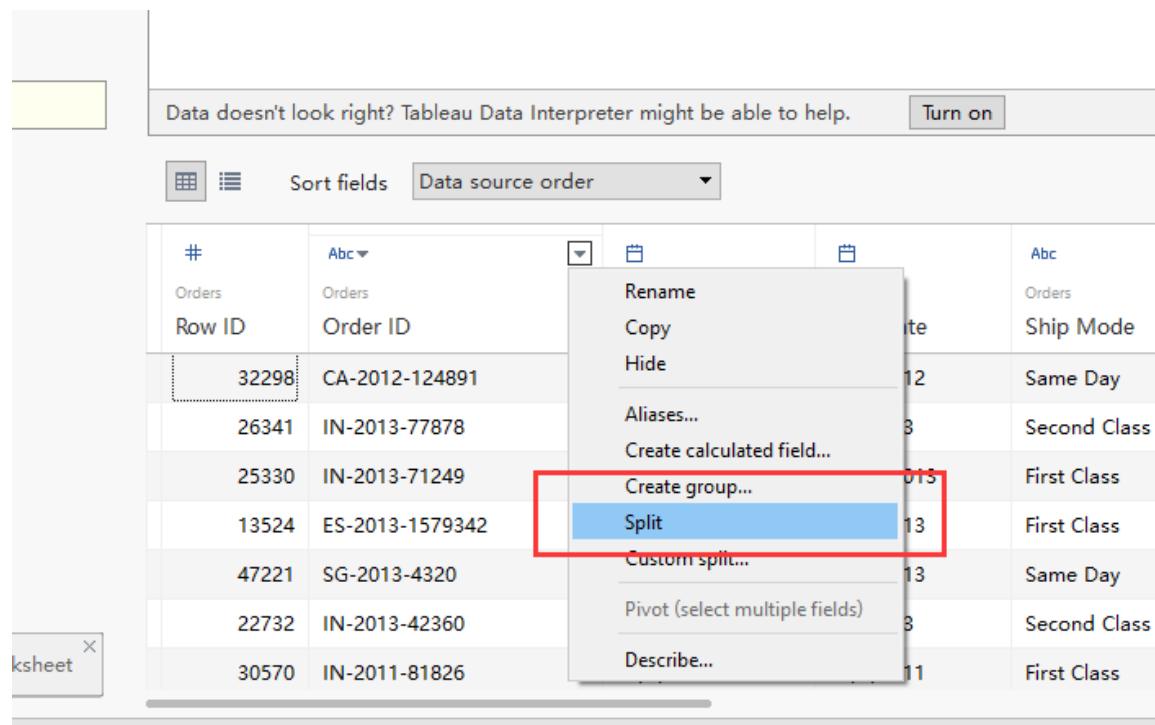
Data doesn't look right? Tableau Data Interpreter might be able to help. Turn on

Sort fields Data source order

Show aliases Show hidden fields Rows 1,000

Row ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	
4891	7/31/2012	7/31/2012	Same Day	RH-19495	Rick Hansen	Consumer	
378	2/5/2013	2/7/2013	Second Class	JR-16210	Justin Ritter	Corporate	
249	10/17/2013	10/18/2013	First Class	CR-12730	Craig Reiter	Consumer	
79342	1/28/2013	1/30/2013	First Class	KM-16375	Katherine Murray	Home Office	
20	11/5/2013	11/6/2013	Same Day	RH-9495	Rick Hansen	Consumer	
22732	IN-2013-42360	6/28/2013	7/1/2013	Second Class	JM-15655	Jim Mitchum	Corporate
30570	IN-2011-81826	11/7/2011	11/9/2011	First Class	TS-21340	Toby Swindell	Consumer

Find “Order ID”, it has three parts, the distribution center code, the year, and the product ID. We want to split this field and keep only the distribution center code. Click on the drop-down next to the field name and select “Split”.



You should get something like this.

Data doesn't look right? Tableau Data Interpreter might be able to help. [Turn on](#)

Sort fields Data source order ☐ Show aliases

#	Orders	Row ID	Order ID	Calculation	Calculation	Calculation	Order
				Order ID - Split 1	Order ID - Split 2	Order ID - Split 3	Ord
32298	CA-2012-124891			CA	2012	124891	7/31
26341	IN-2013-77878			IN	2013	77878	2/5/
25330	IN-2013-71249			IN	2013	71249	10/1
13524	ES-2013-1579342			ES	2013	1579342	1/28
47221	SG-2013-4320			SG	2013	4320	11/5
22732	IN-2013-42360			IN	2013	42360	6/28
30570	IN-2011-81826			IN	2011	81826	11/7

Now we have a column for each of those pieces. We can use that drop-down again to delete splits 2 and 3 and just keep the 1st. Let's rename that field "Distribution Center".

Summer II 2016

Sort fields Data source order ☐ Show aliases ☐ Show

#	Abc	=Abc	=#	=#	
Orders	Orders	Calculation	Calculation	Orders	
Row ID	Order ID	Order ID - Split 1	Order ID - Split 2	Order Date	
32298	CA-2012-124891	CA	20	12/31/2012	
26341	IN-2013-77878	IN	20	7/5/2013	
25330	IN-2013-71249	IN	2013	71249	10/17/2013
13524	ES-2013-1579342	ES	2013	1579342	1/28/2013
47221	SG-2013-4320	SG	2013	4320	11/5/2013
22732	IN-2013-42360	IN	2013	42360	6/28/2013
30570	IN-2011-81826	IN	2011	81826	11/7/2011

Sort fields Data source order ☐ Show

#	Abc	=Abc				
Orders	Orders	Calculation		Orders		
Row ID	Order ID	Order ID - Split 1	Date	Ship		
32298	CA-2012-124891	CA	12/2012	Same		
26341	IN-2013-77878	IN	2013	Secor		
25330	IN-2013-71249	IN	8/2013	First		
13524	ES-2013-1579342	ES	7/2013	First		
47221	SG-2013-4320	SG	7/2013	Same		
22732	IN-2013-42360	IN	2013	Secor		
30570	IN-2011-81826	IN	7/2011	First		

Then click “Sheet 1”.

Orders (Global_superstore)

Connected to Excel

Workbook
Global_superstore.xlsx

Sheets

Enter sheet name

- Orders
- People
- Returns
- New Union

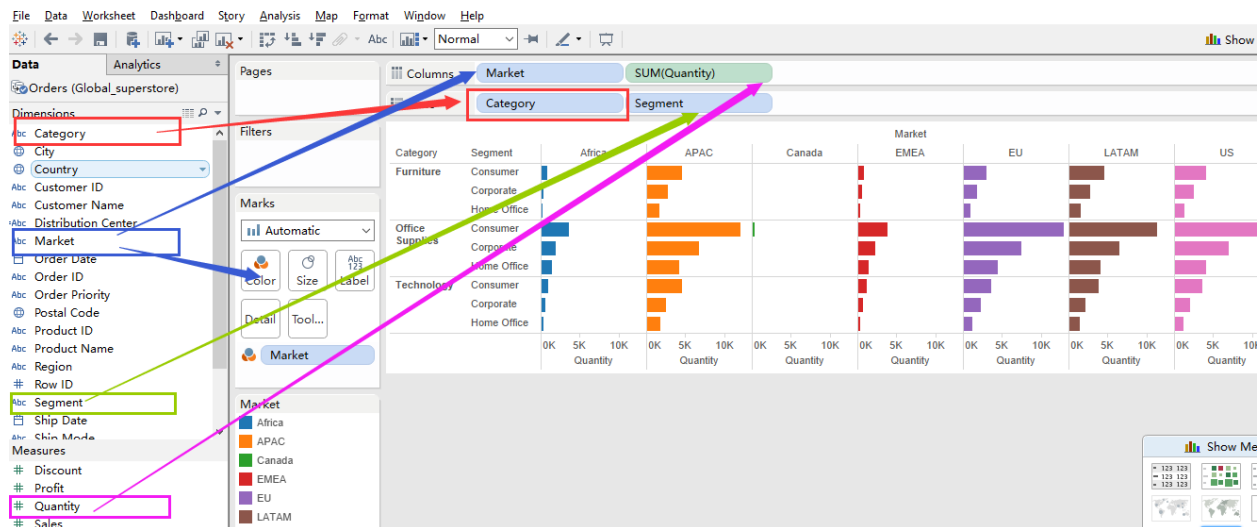
Data doesn't look

Sort f

#	At
Orders	On
Row ID	O
32298	CA
26341	IN
25330	IN
13524	ES
47221	SC
22732	IN
30570	IN

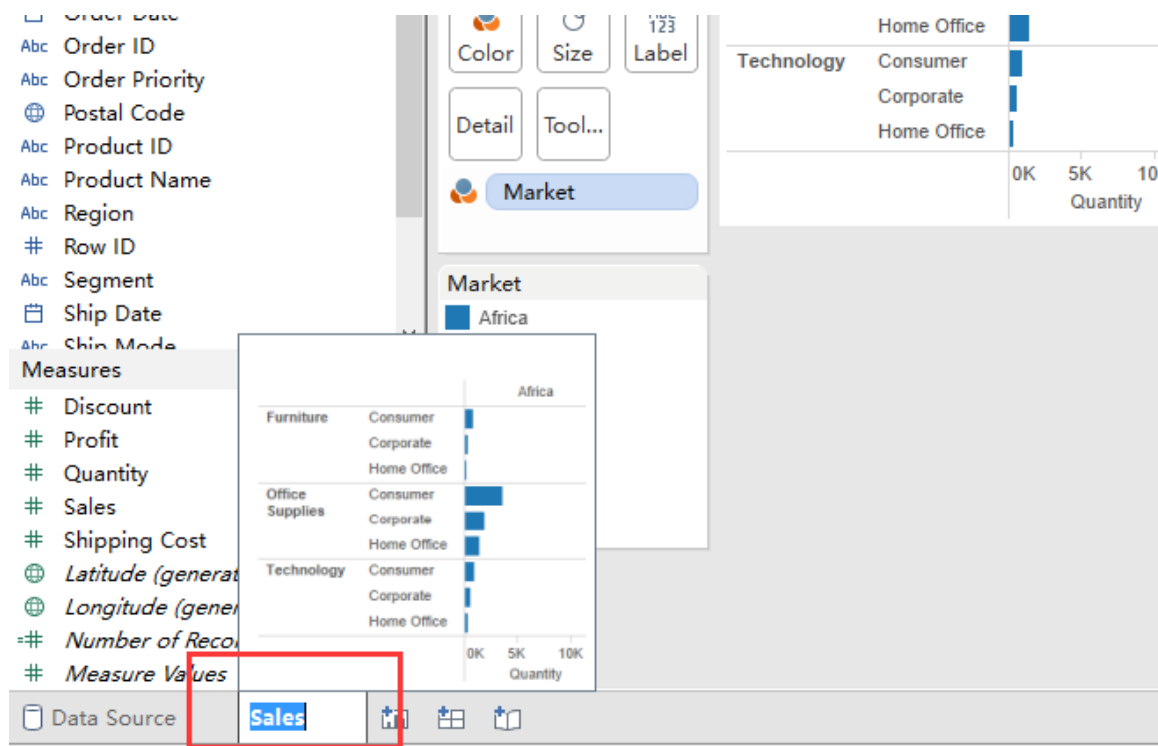
Data Source Sheet 1

- (4) We now want to create a visualization of how our Sales are looking per category, customer segment and market. We simply drag the fields out, let's bring "Category" to rows, "Quantity" to columns, Customer "Segment" to Rows, "Market" to Columns, and let's bring Market to Color, as well.

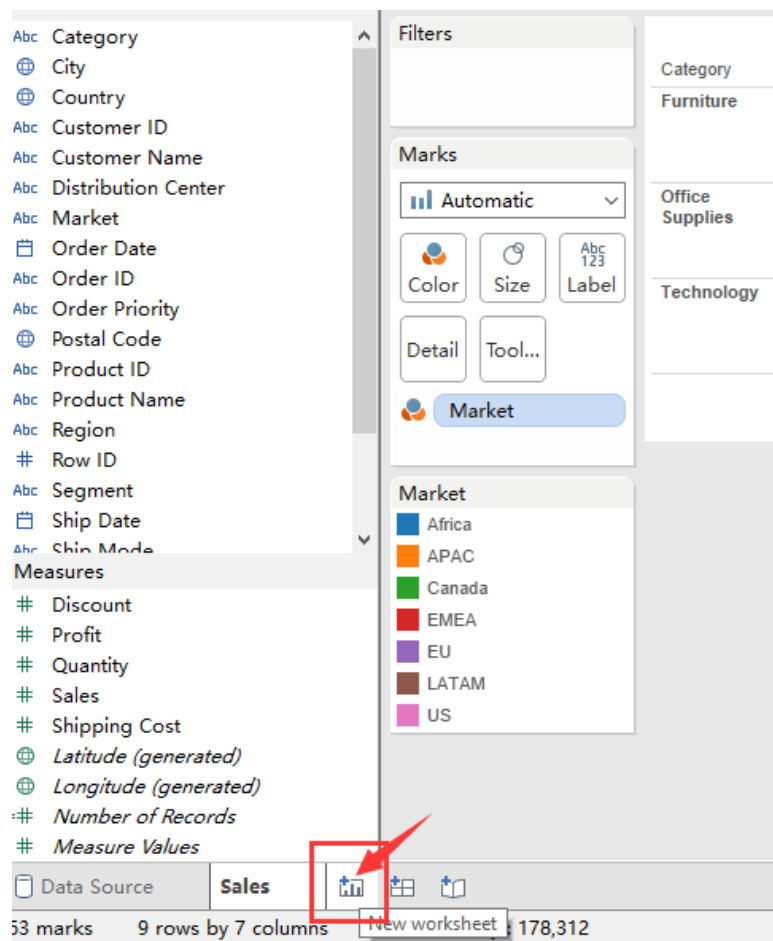


This is how we create a visualization of how our Sales are looking per category, customer segment and market, in terms of number of items sold. We can quickly see that Canada is an emerging market for us.

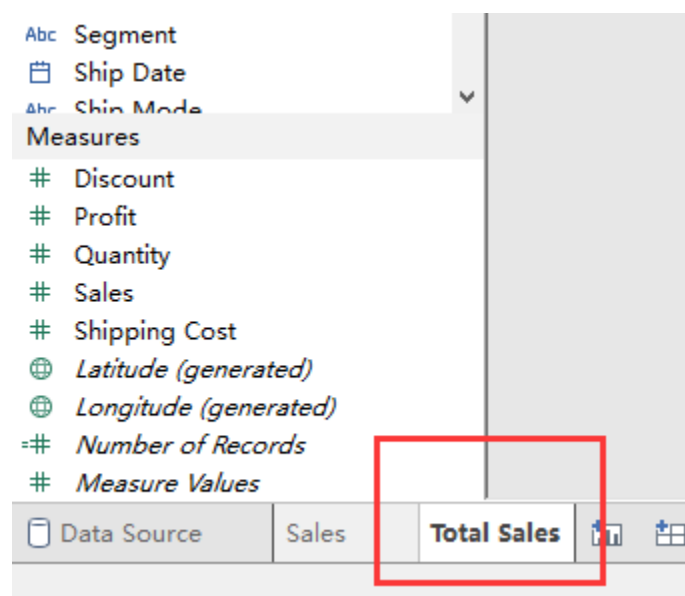
Double click "Sheet 1", rename the worksheet as "Sales".



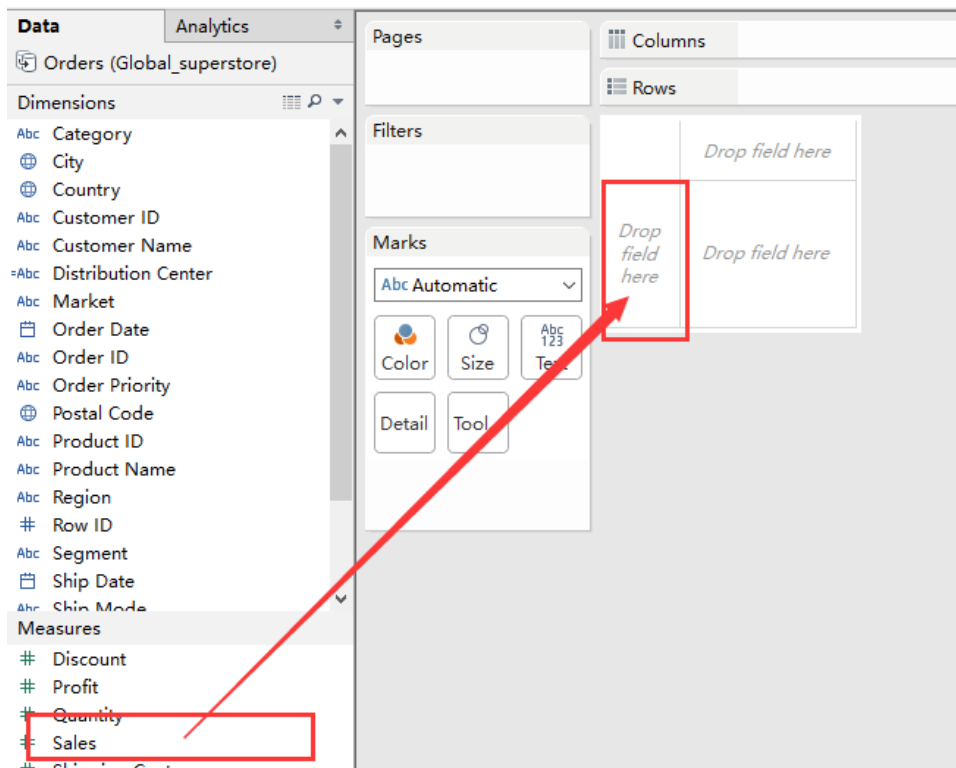
- (5) Now we are interested in our total sales number. Create a new worksheet.



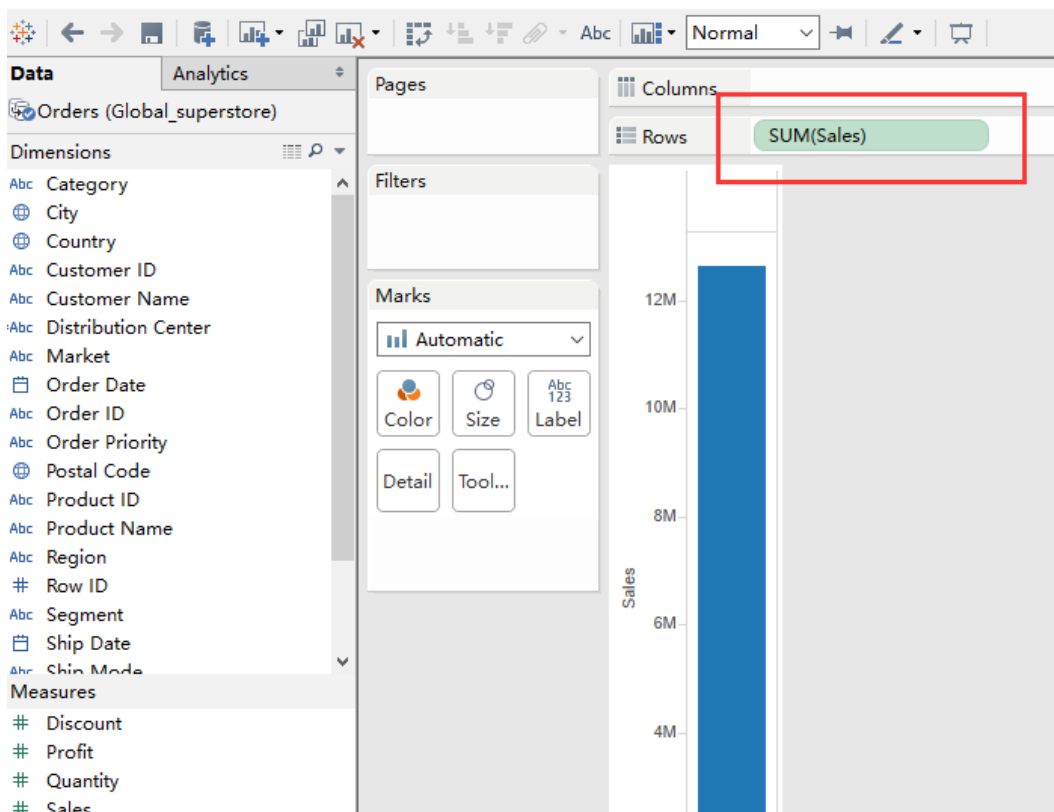
Rename it as “Total Sales”.



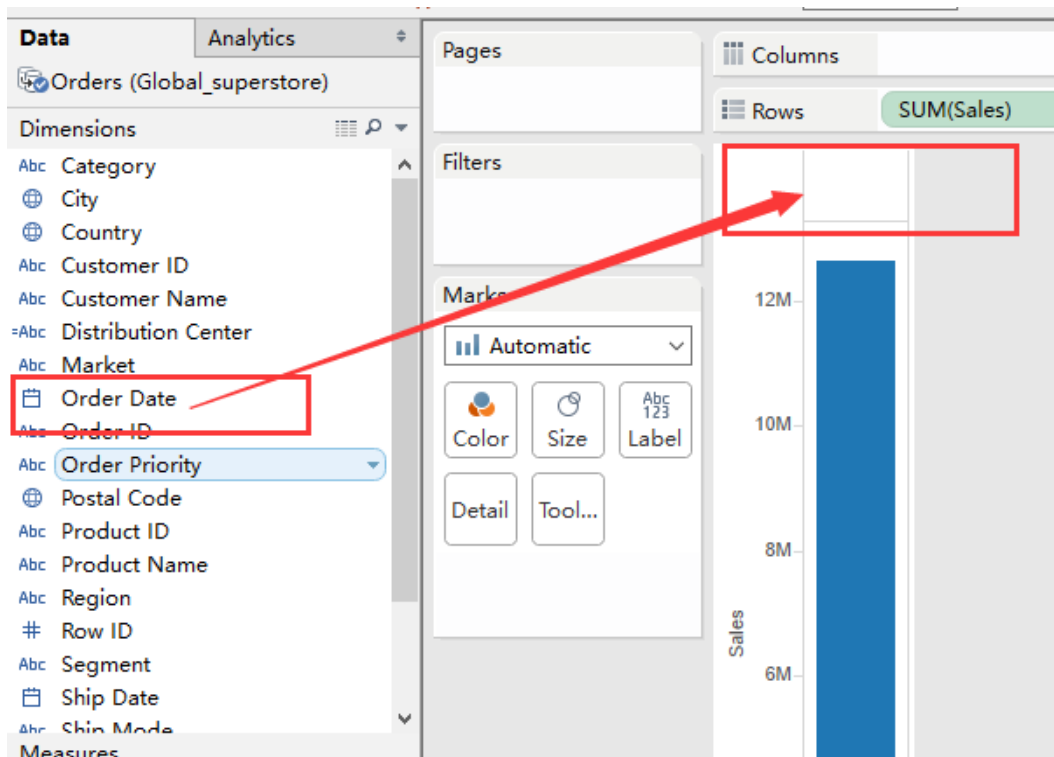
Place Sales in the view.



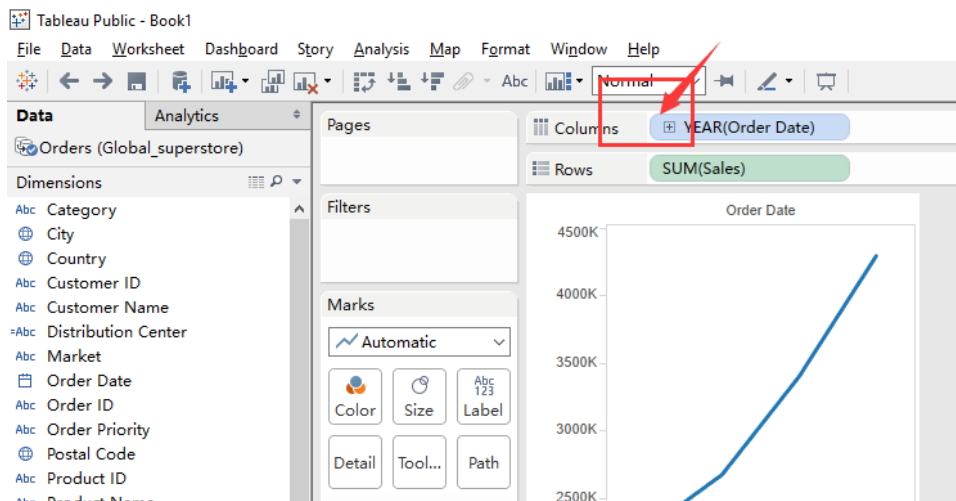
We can see that Tableau queries the database and returns a single result giving us the sum of Sales.



If we want to see this over time, we can drag “Order Date” to the top of the view.

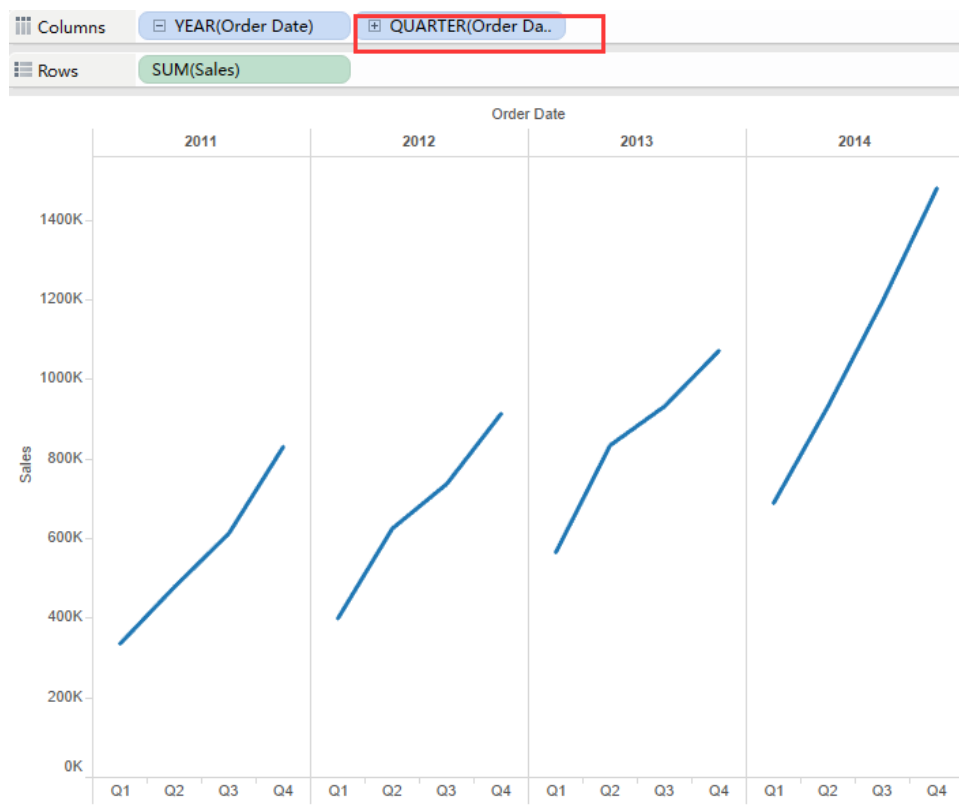


This aggregates our dates at the year level. We can choose to expand this with the plus (+) symbol.

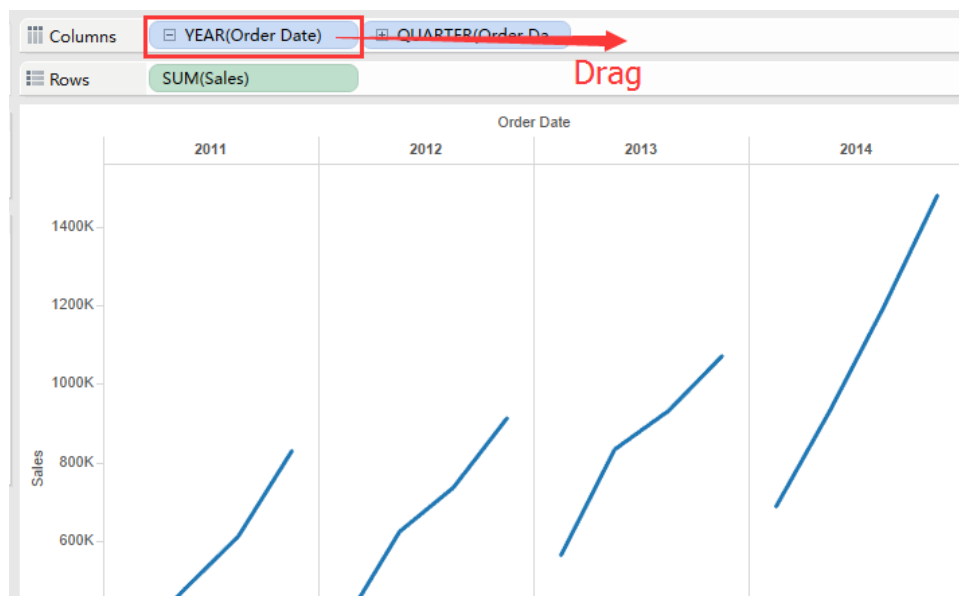


Now we see both quarters and years in the view.

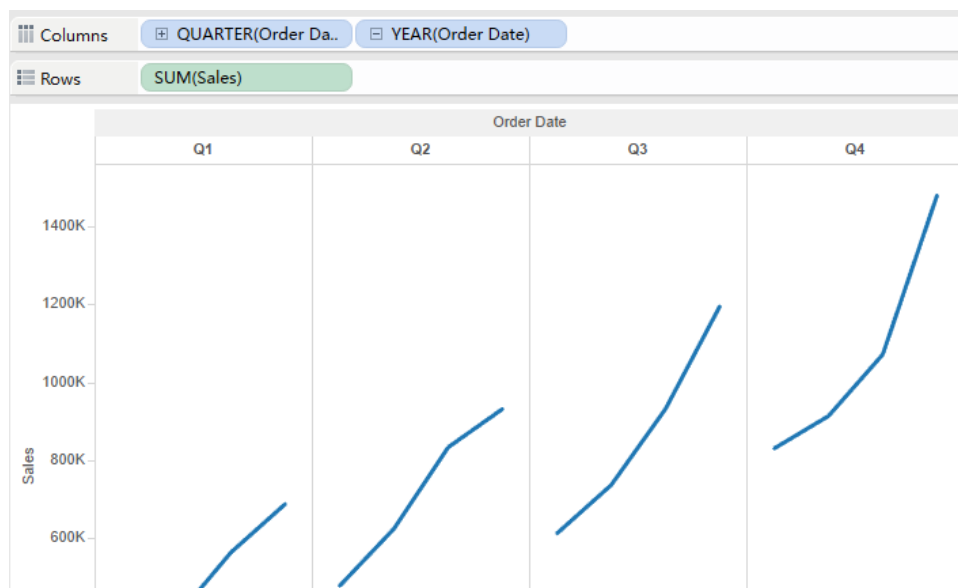
Summer II 2016



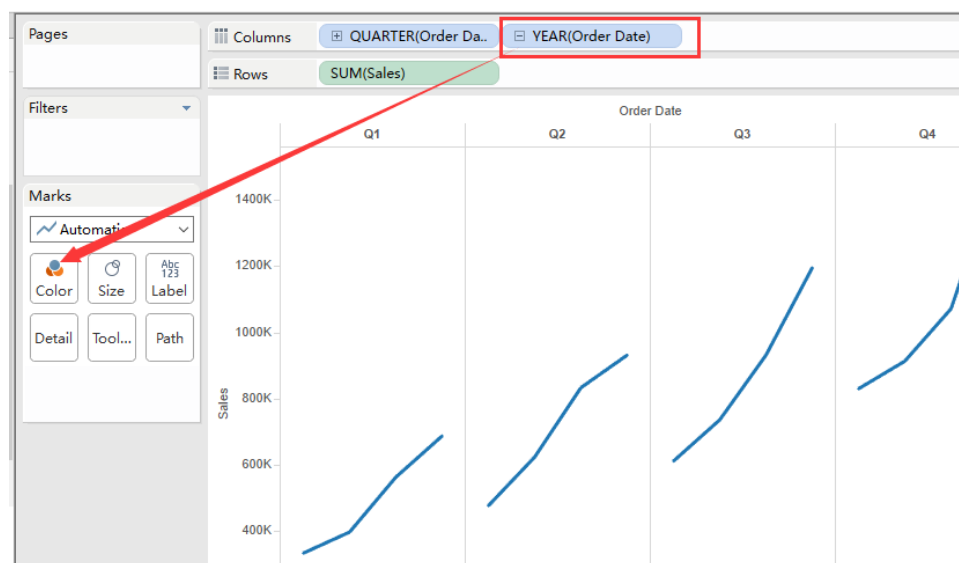
To see how all our Q1s are doing over the years, we can easily pivot the data so Quarter is in front of Year. Now we can compare how our growth looks by quarter across the years.



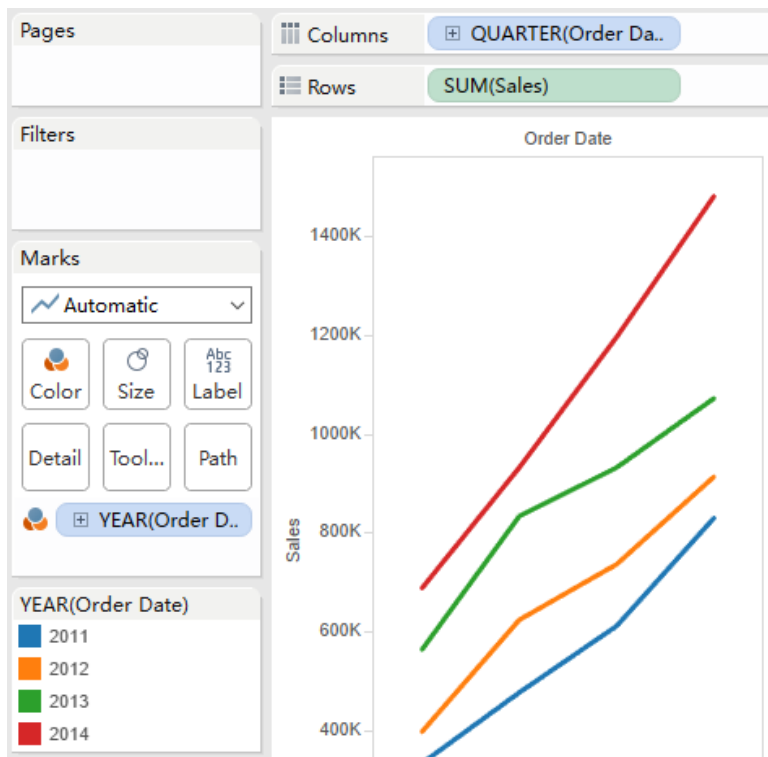
You should get:



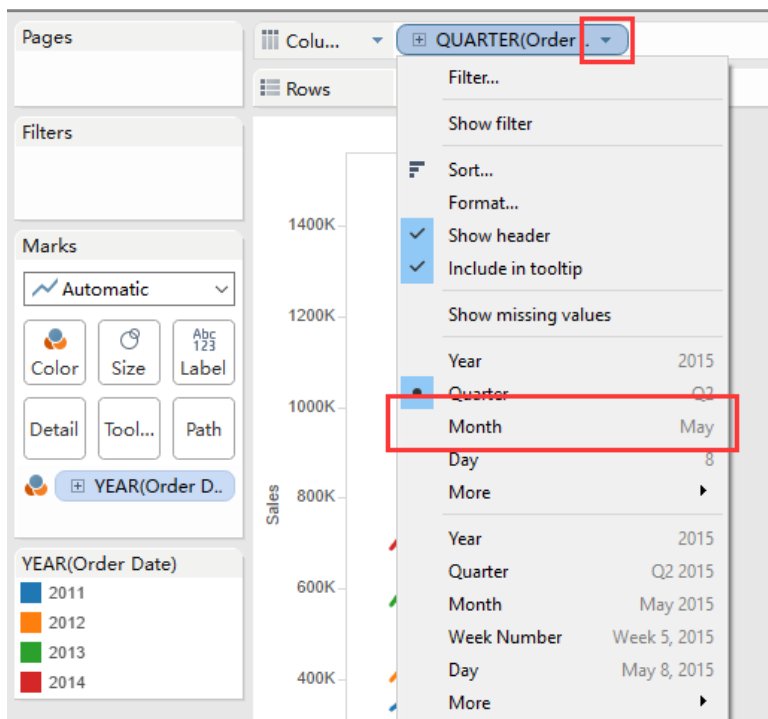
Moving Year to Color shows us all the years on top of each other.



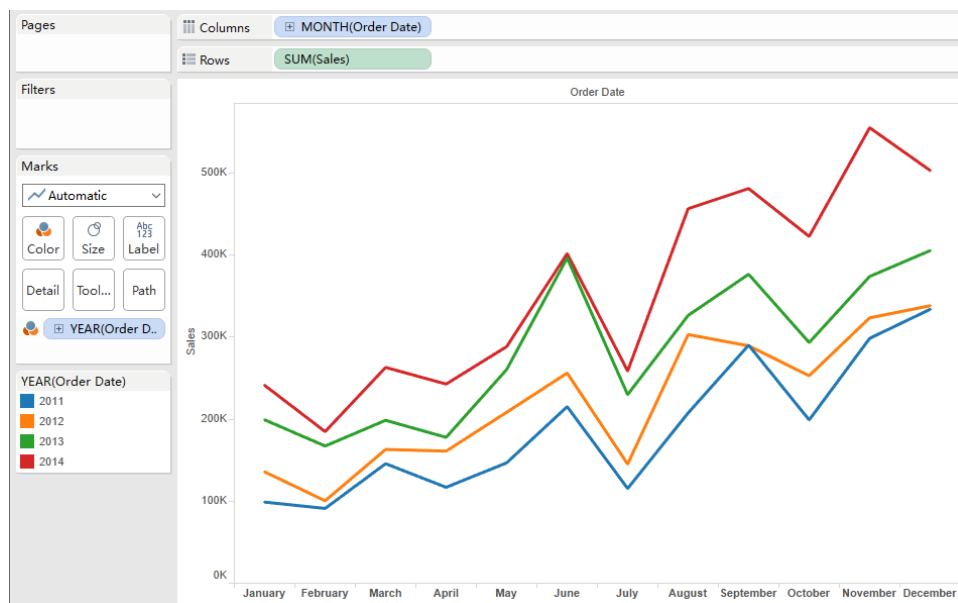
You should get something like this.



We want to change quarters to months, we can click on the pill to access the drop-down menu and change it.



You should get something like this.



- (6) What if we know that furniture’s profits are bad, but we don’t know where furniture is doing poorly, and we don’t necessarily know how we want to view the data? Let’s create a new worksheet and rename it “Global Sales and Profits”.

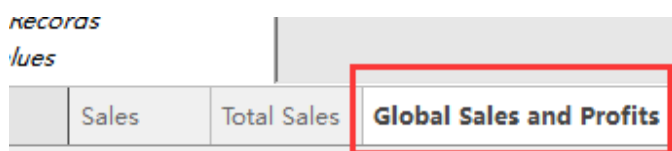
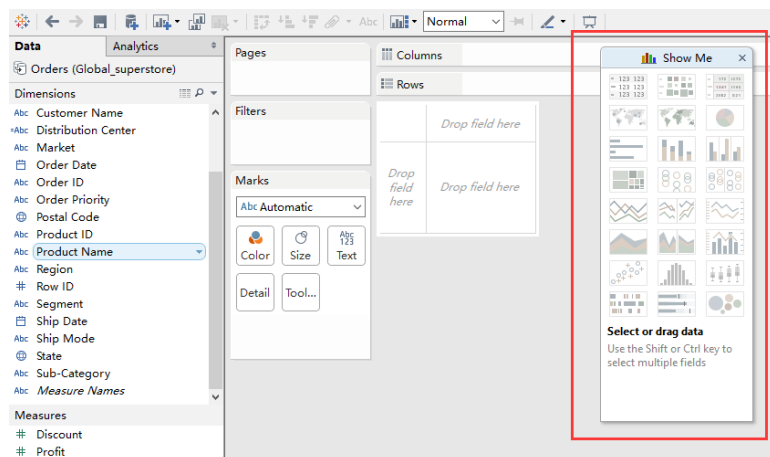
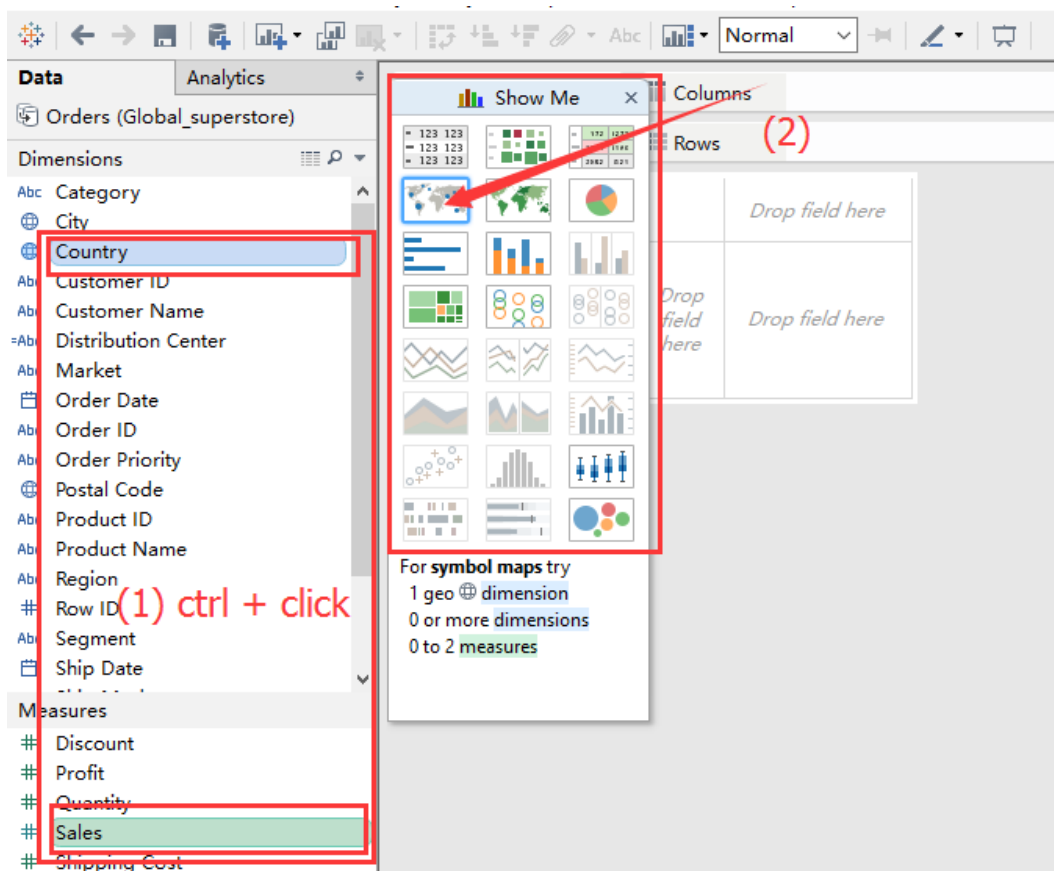


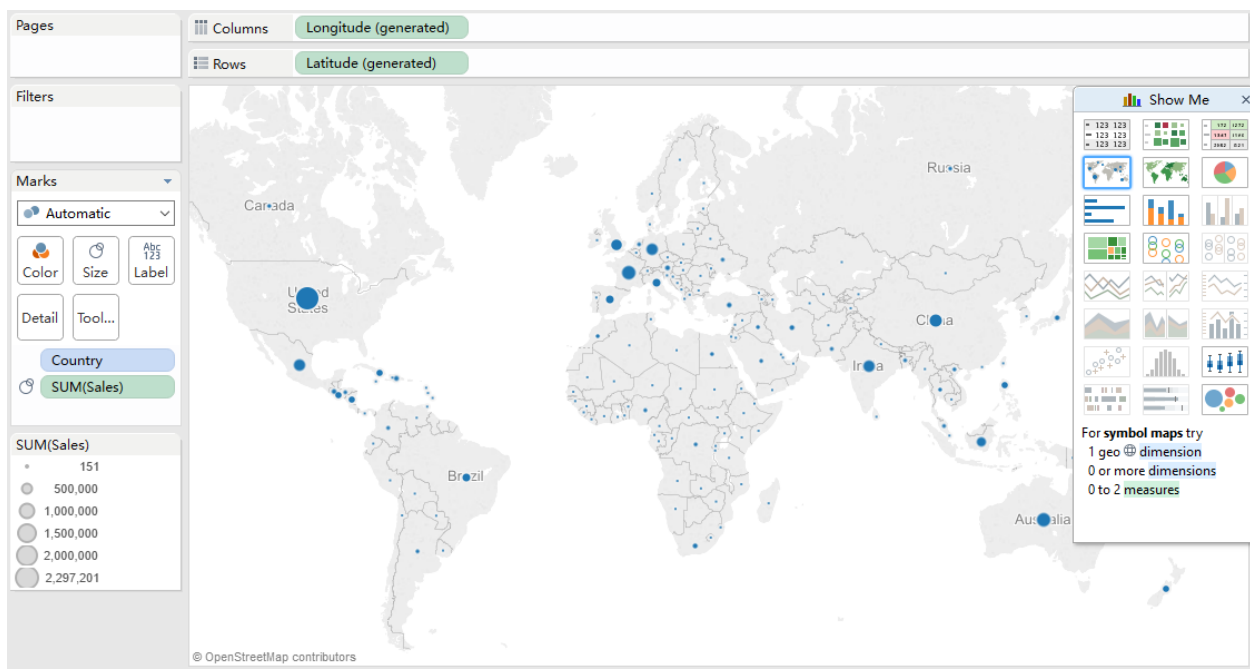
Tableau provides a simple tool called “Show Me” to help in cases where we know the data we want to look at, but don’t know how to create an effective view. “Show Me” contains a list of common chart types that can help you start your analysis.



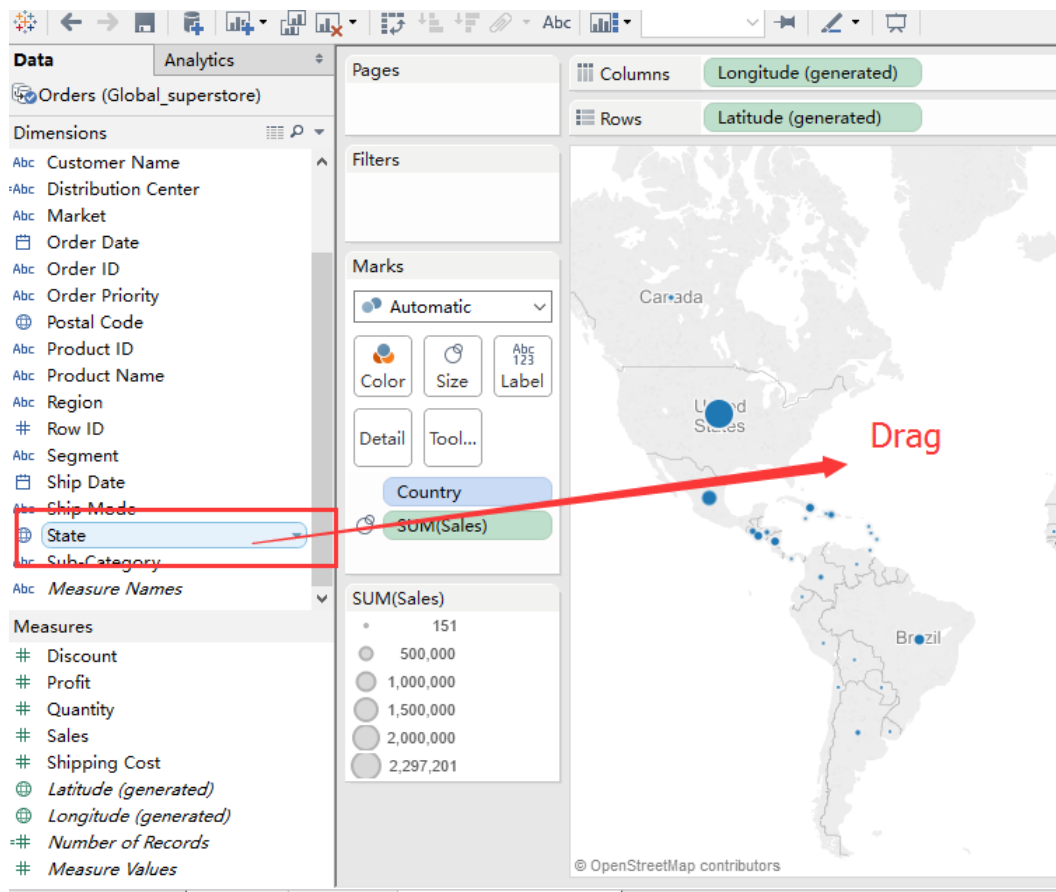
We’re curious about our Sales, and how they’re doing in different Countries. Selecting “Sales” and “Country” while holding down the control key. Notice how different chart types will highlight based on what measures and dimensions we’ve chosen. Symbol maps look like a good choice for these fields.



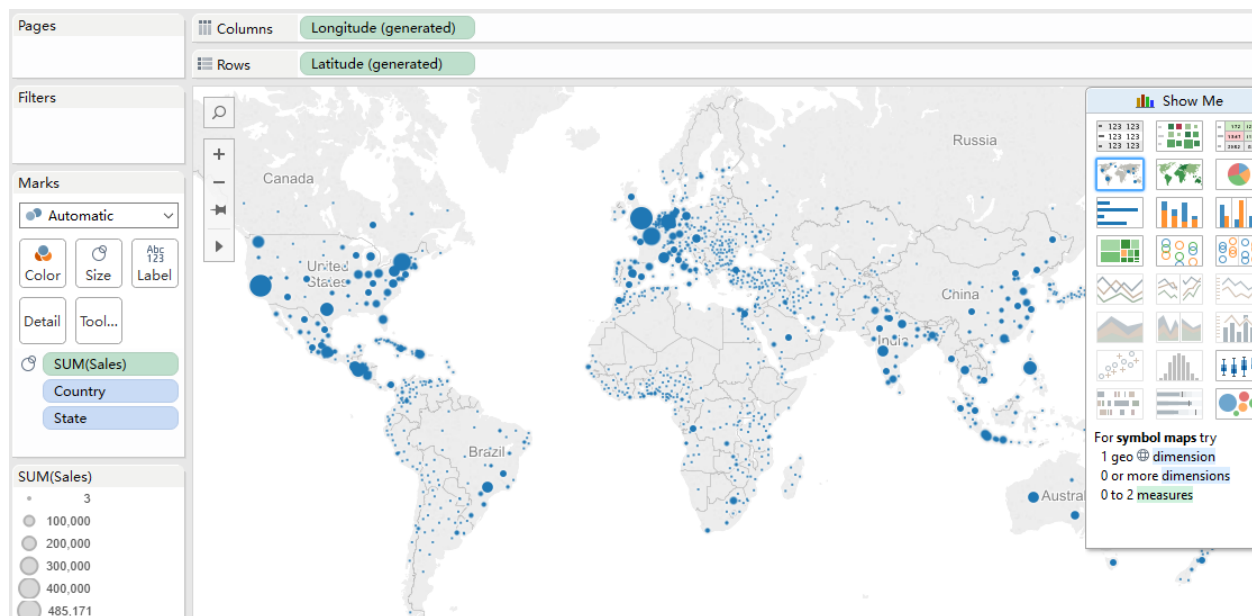
You should get something like this.



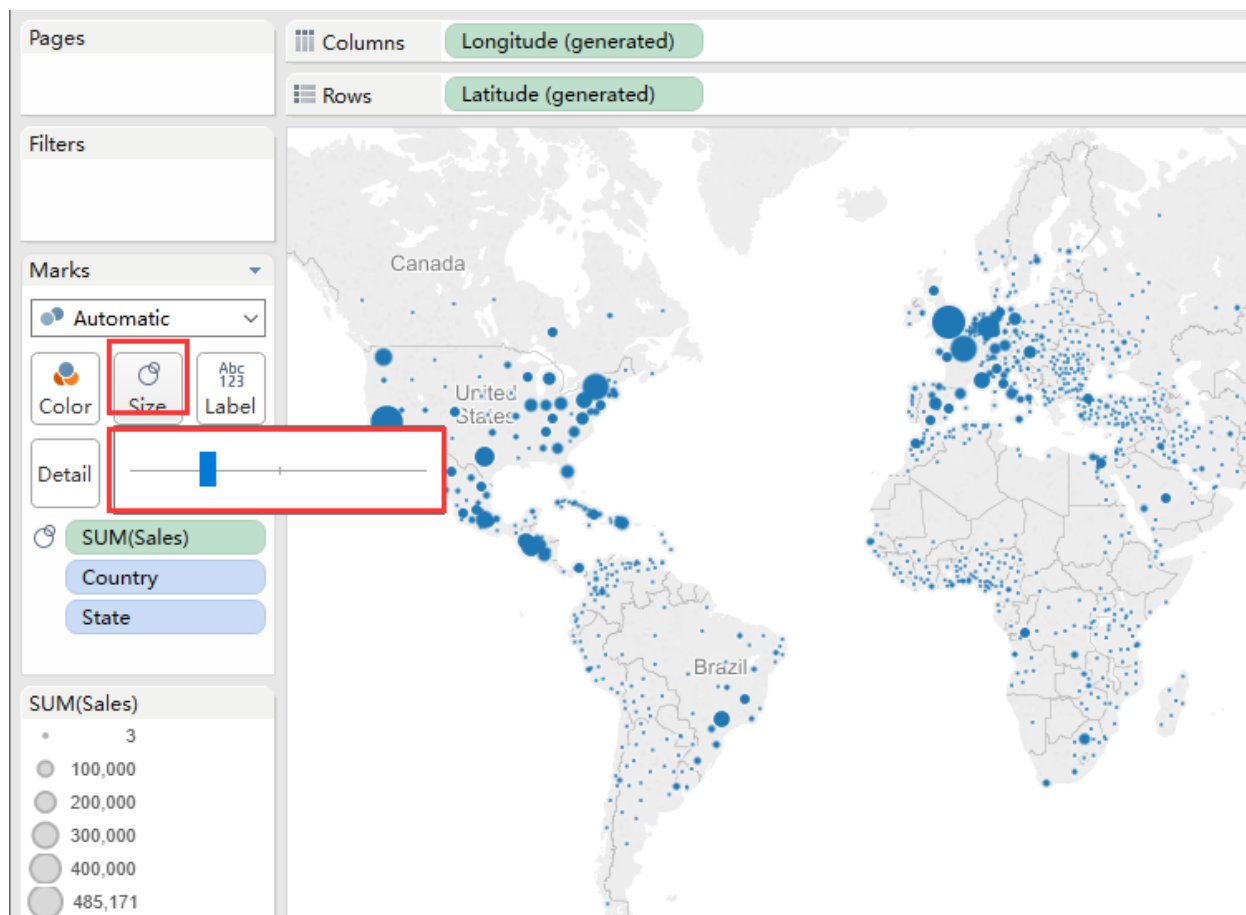
Let's also add State.



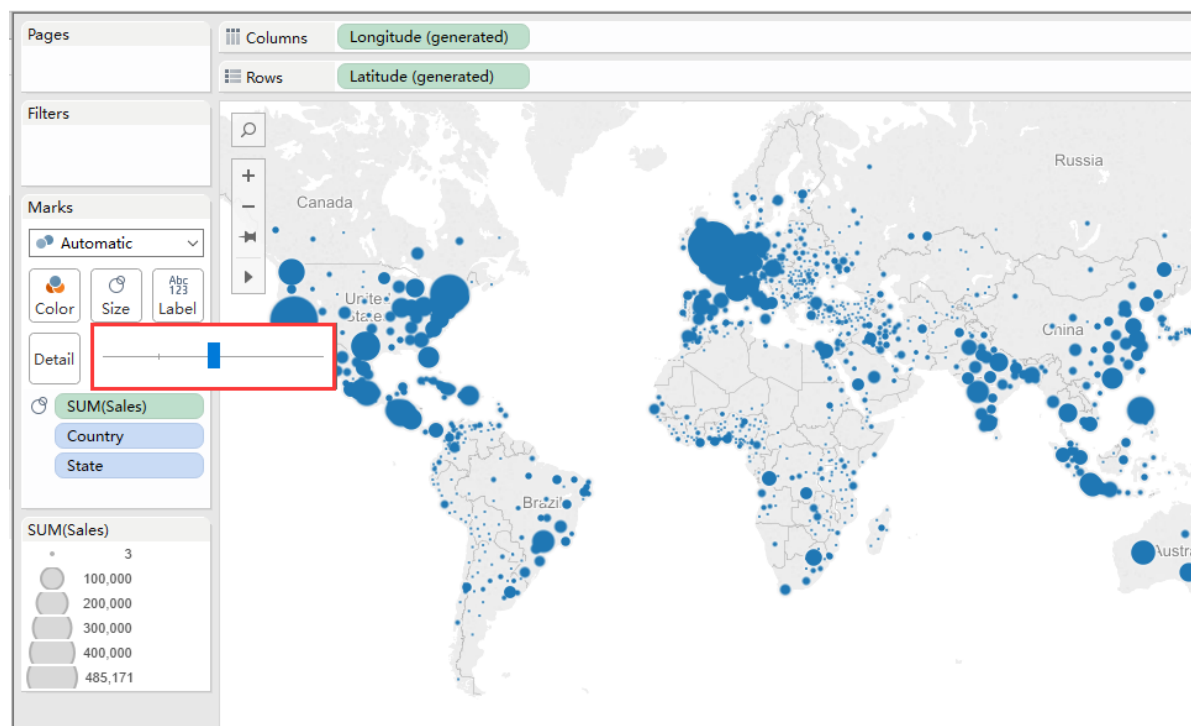
You should get something like this.



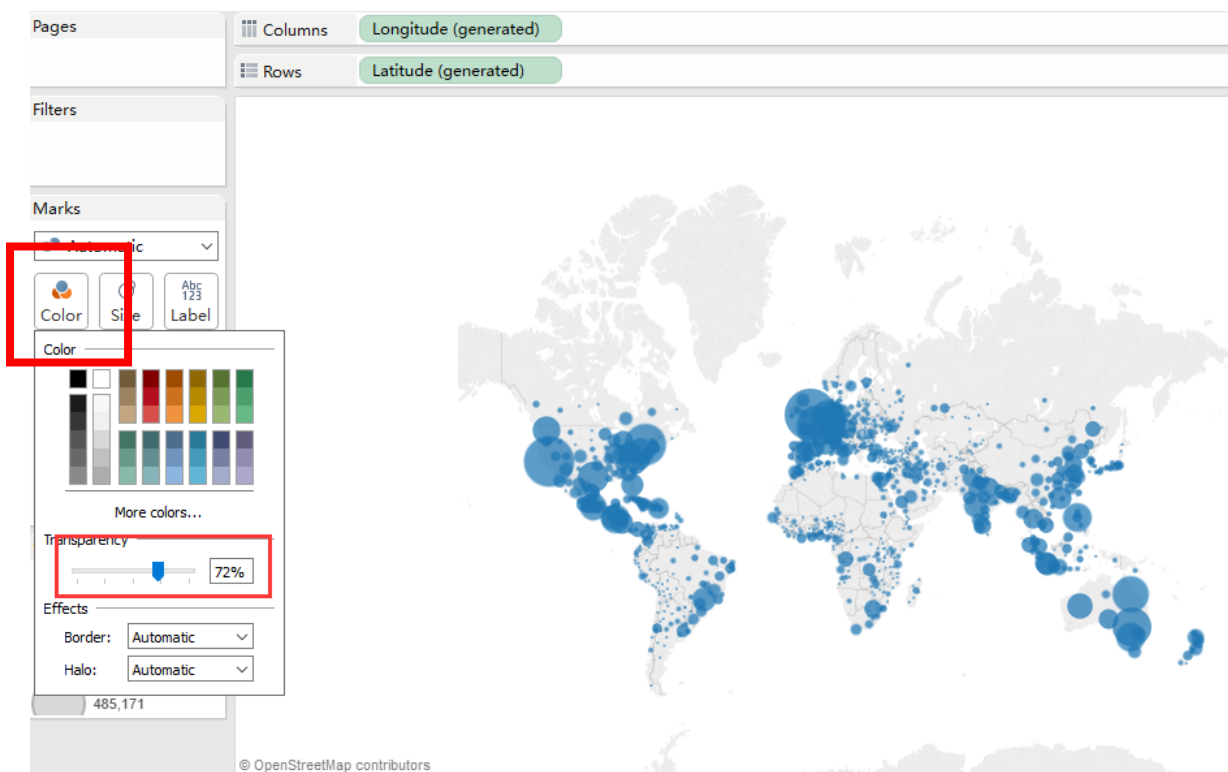
Now increase the size of these dots by clicking on the size shelf.



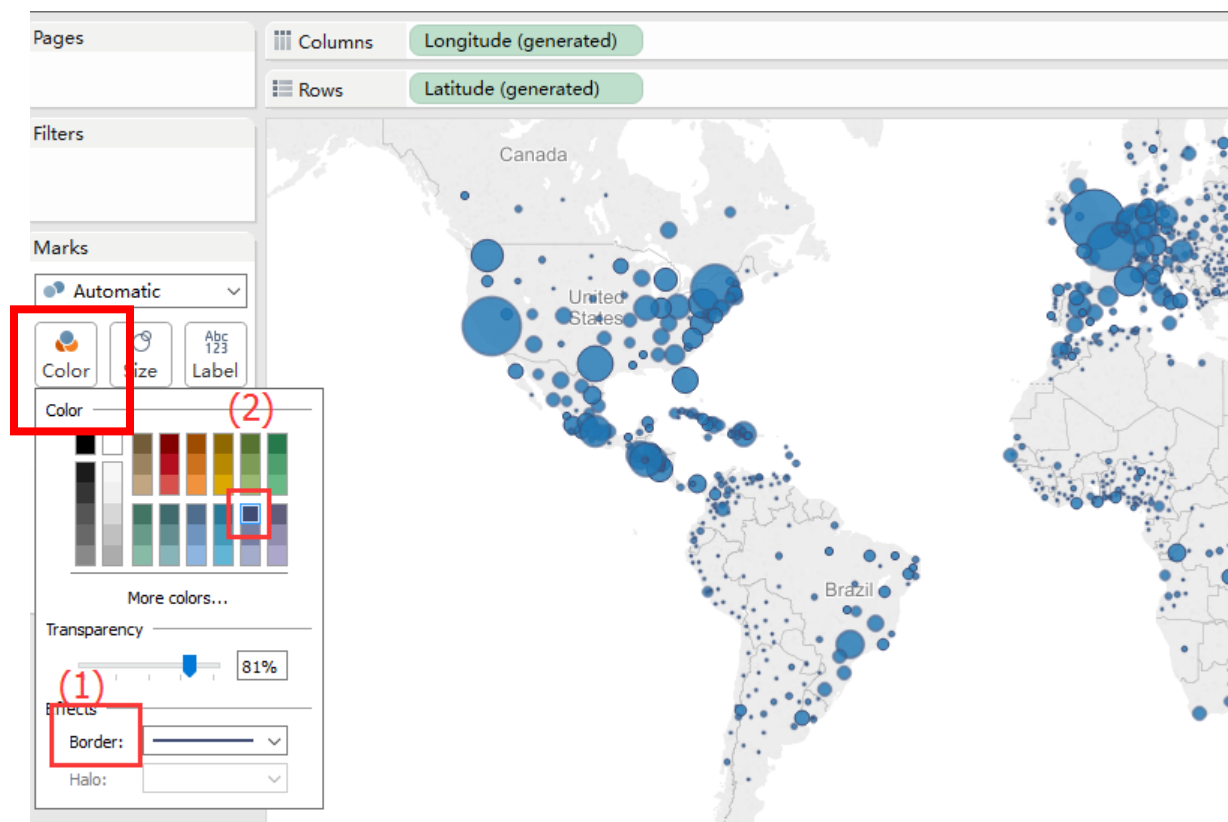
You should get something like this.



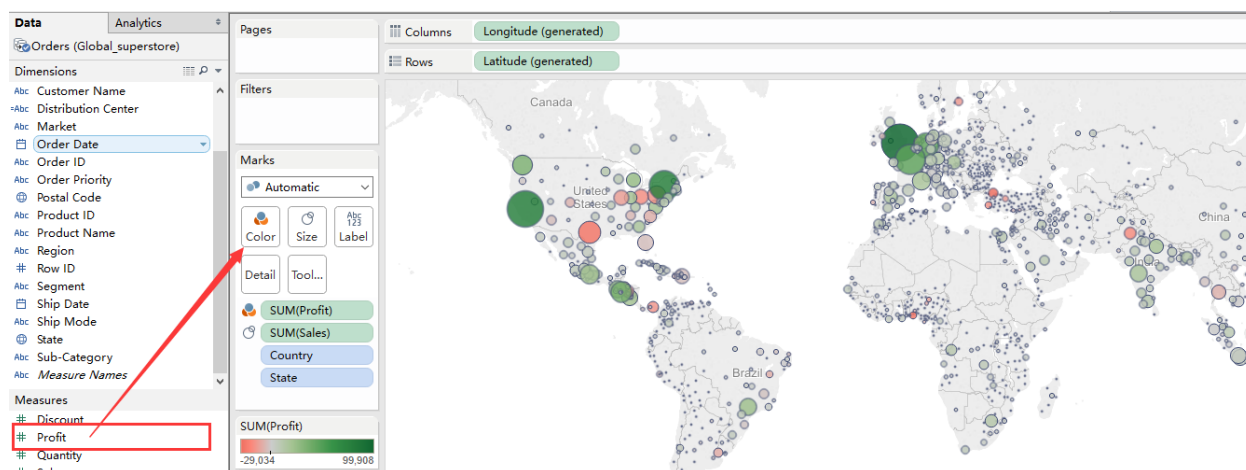
Next adjust the transparency.



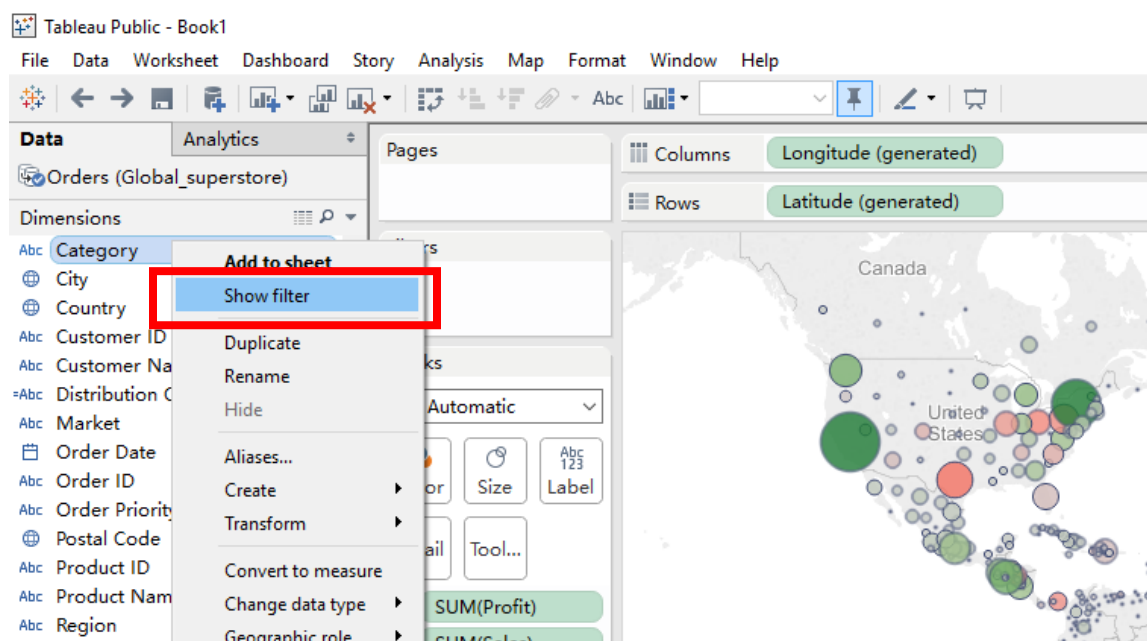
Now add some borders.



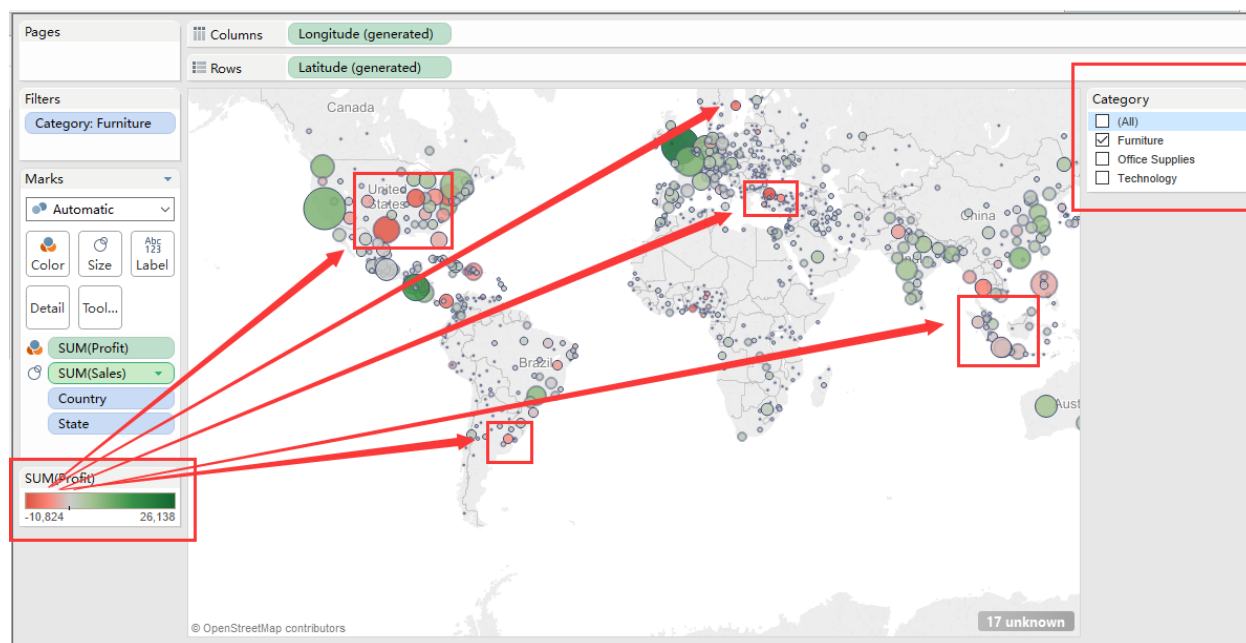
Then color these states by Profit.



To investigate this further, we can create quick filters for “Category” by **right-clicking** the field’s name and selecting “Show Filter”.

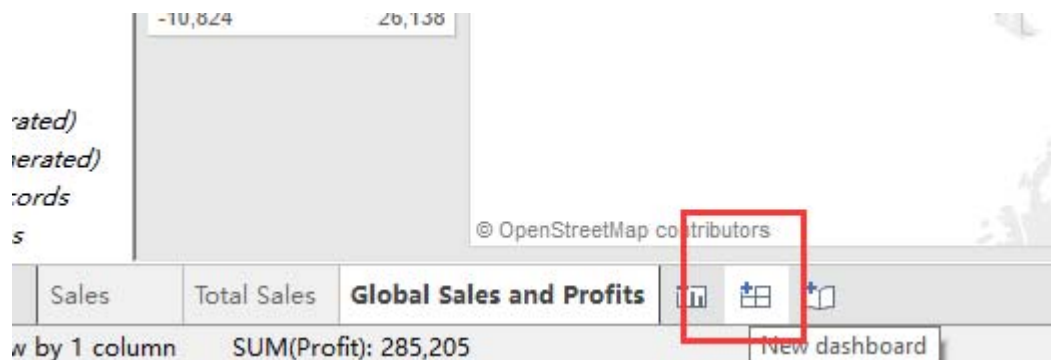


Now anyone can easily choose the categories they’re interested in, such as Furniture. Check all these areas where furniture had poor profits.

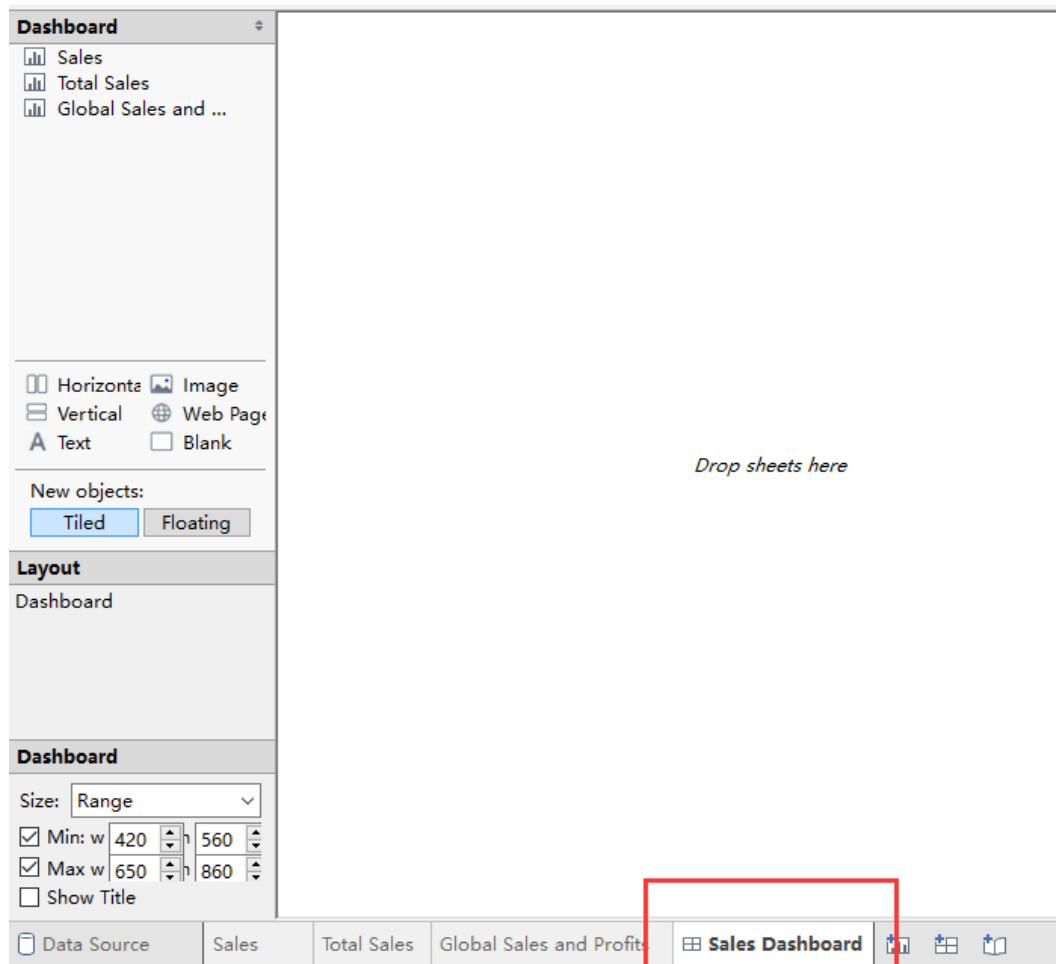


- (7) We've created some insightful views of this data set. Now, we want to share this with our team and compile a dashboard. Multiple individual views can be combined into a single dashboard.

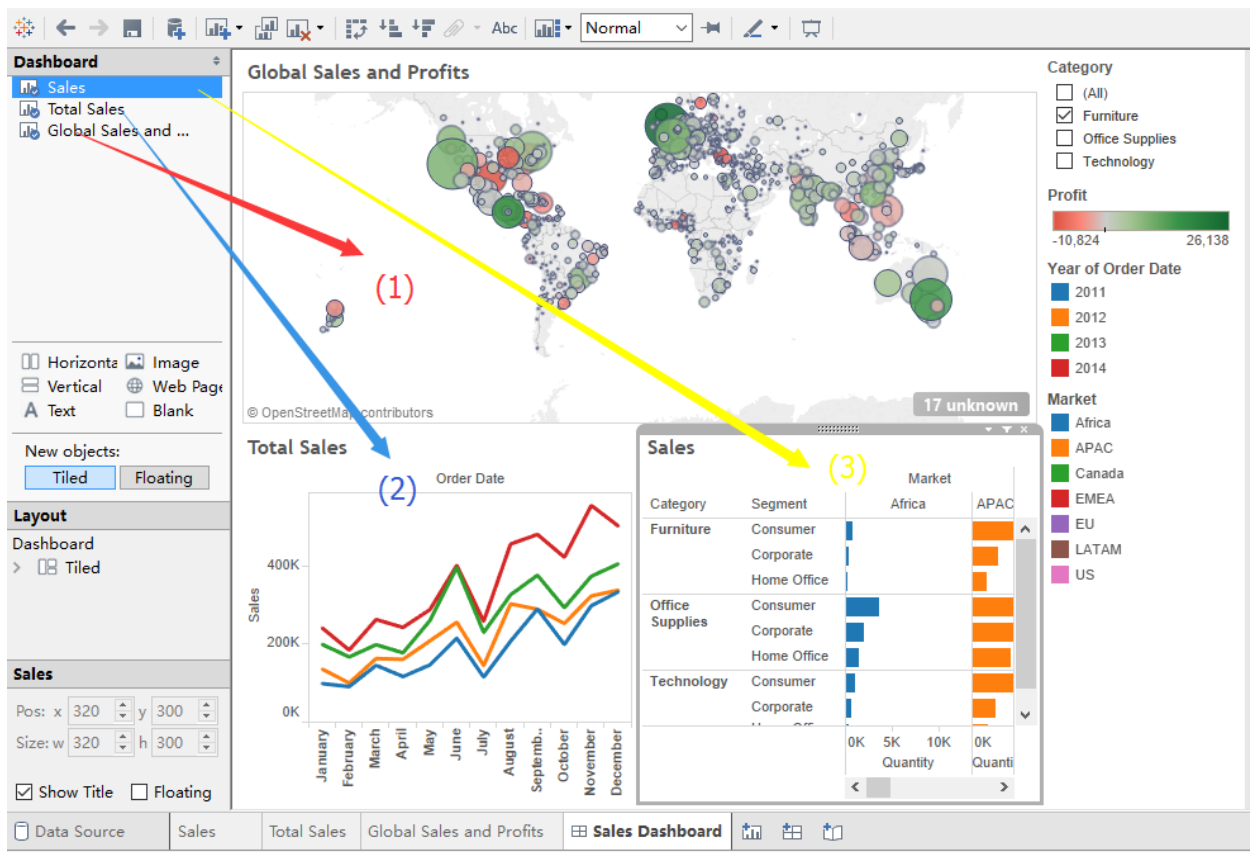
Click on this icon to create a dashboard



Double click on "Dashboard 1" to rename it as "Sales Dashboard".



All of our sheets are here to the left. We'll drag our Map into the view, and place "Sales" and our "Total Sales" below it.

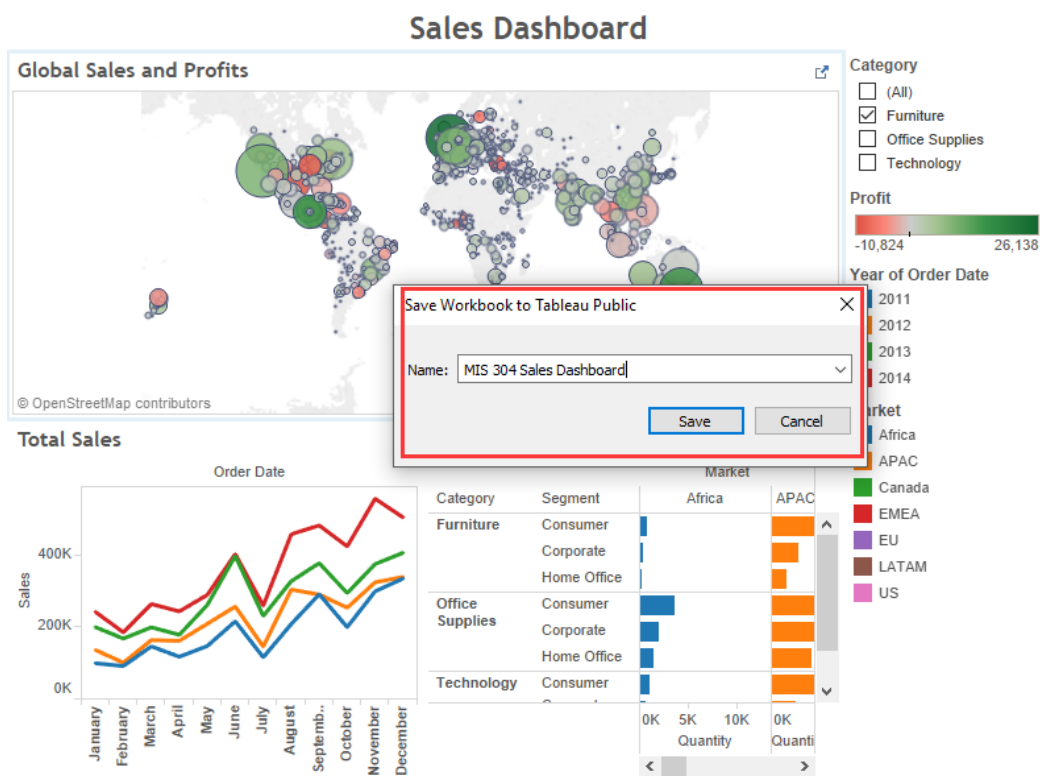
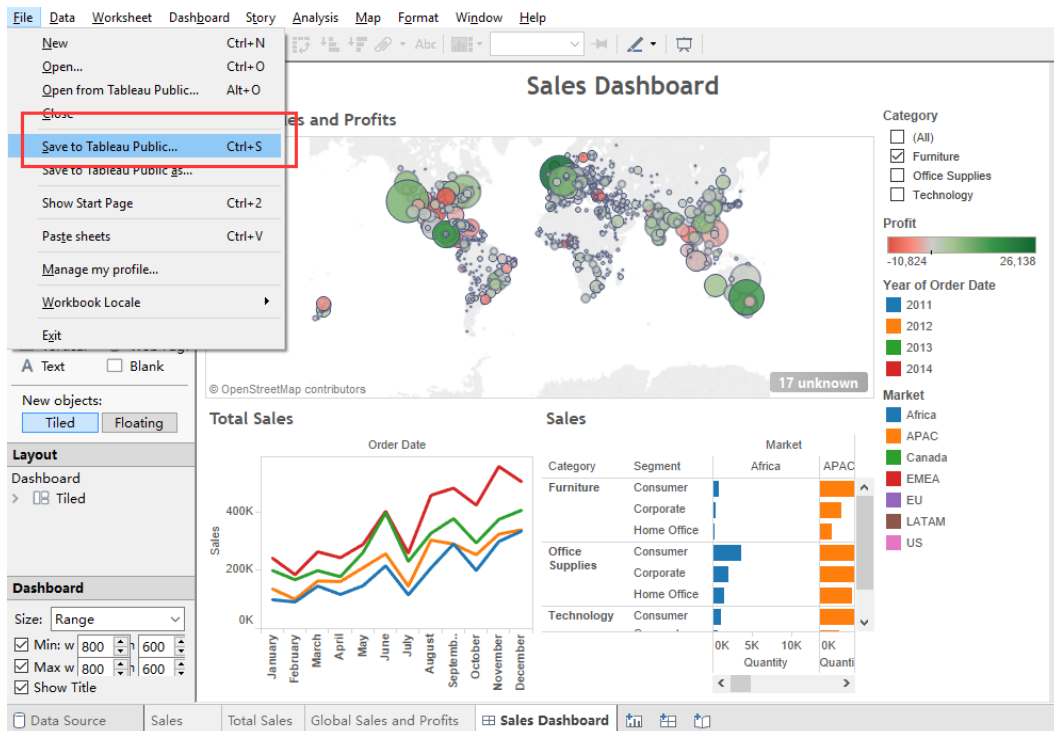


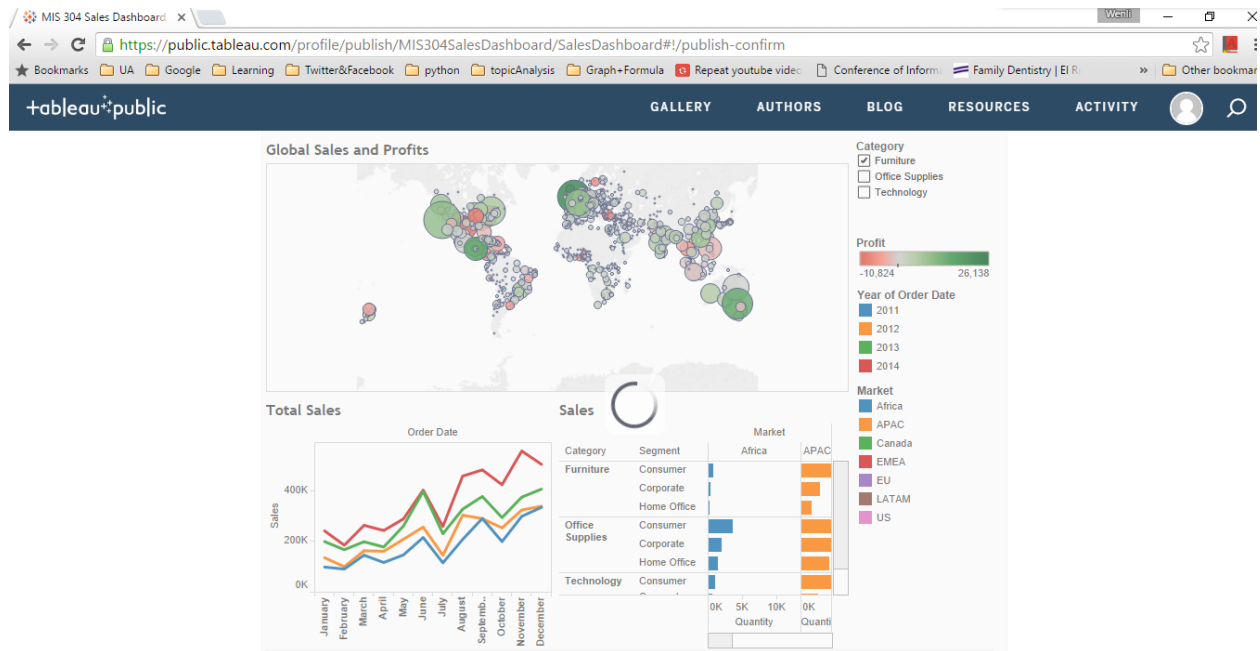
We can add the title to this dashboard as well.



4. Sharing

Now we have gone from raw data to this visualization dashboard, we want to think about how to distribute it with others. The most effective way to share it is to publish it with Tableau Server or Tableau online. Click “File”→ “Save to Tableau Public”.





Deliverables

Take a screen shot of your final visualization dashboard and paste it on a word file **yourNetID_L6.docx**, submit in TurnItIn.

*** Copyright: Originally created by Tableau (www.tableau.com). Was later updated and modified by Wenli Zhang for MIS 304.*