

Communicating with Data – Intro to Tableau

Dr. Ab Mosca (they/them)

Slides based off slides courtesy of Jordan Crouser (<https://jcrouser.github.io/>)

Plan for Today

- Introduction to Tableau
- Lab pt. 1 - Getting started:
 - Connecting to a data file
 - Creating views
 - Using “Show Me”: a recommender system for views
- Lab pt. 2 - Exploring other datasets
- Discussion (time permitting)

Reminder

- hwo1 is released today!
(<https://amoscao1.github.io/SDS-CS109/> > Homework > hwo1)
- Due next Thursday (09/19) at midnight
 - You have extensions if you need them, but you MUST tell me if you're taking one
 - Revise and resubmit also exists!
- Work alone or with a partner (you choose!)

**I won't always remind you there is a homework released/due, make sure you stay up to date with the course schedule! **

Introduction to Tableau




- A drag-and-drop tool for mapping data dimensions onto visual dimensions
- Today we will learn:
 - How to load data into Tableau
 - A little bit about how Tableau organizes data
 - How to tell Tableau which facets of the data to display, and how

What is



- Visualization and business analytics software with a strong focus on **relational data**
- Idea originally developed at Stanford University
- Now owned by Salesforce

What is
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?

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What's relational data?

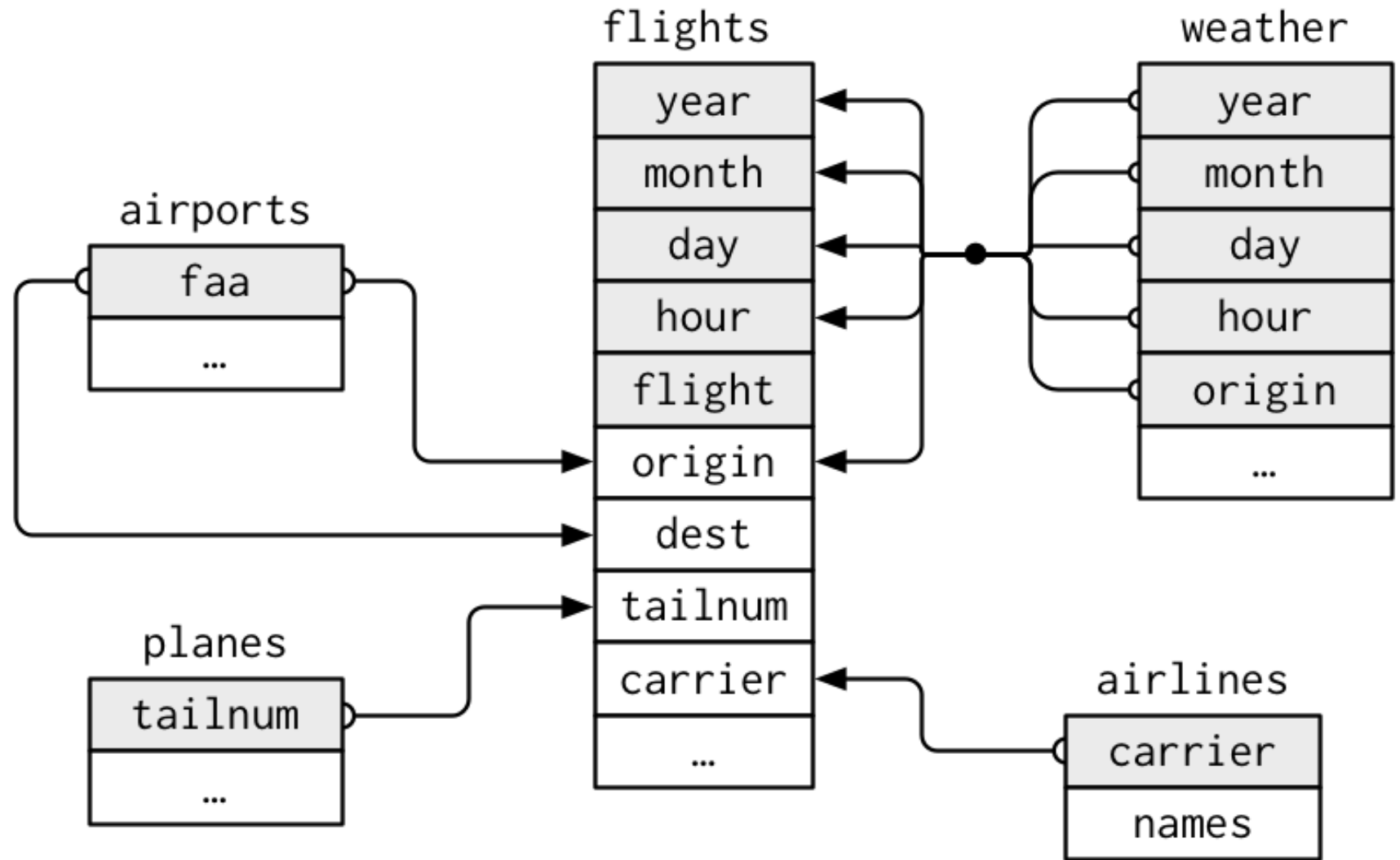
```
airlines
#> # A tibble: 16 × 2
#>   carrier name
#>   <chr>   <chr>
```

```
airports
#> # A tibble: 1,458 × 8
#>   faa   name          lat   lon   alt   tz dst  tzone
#>   <chr> <chr>         <dbl> <dbl> <dbl> <dbl> <chr> <chr>
```

```
planes
#> # A tibble: 3,322 × 9
#>   tailnum year type      manufacturer model engines seats speed engine
#>   <chr>   <int> <chr>      <chr>          <chr>   <int> <int> <int> <chr>
```

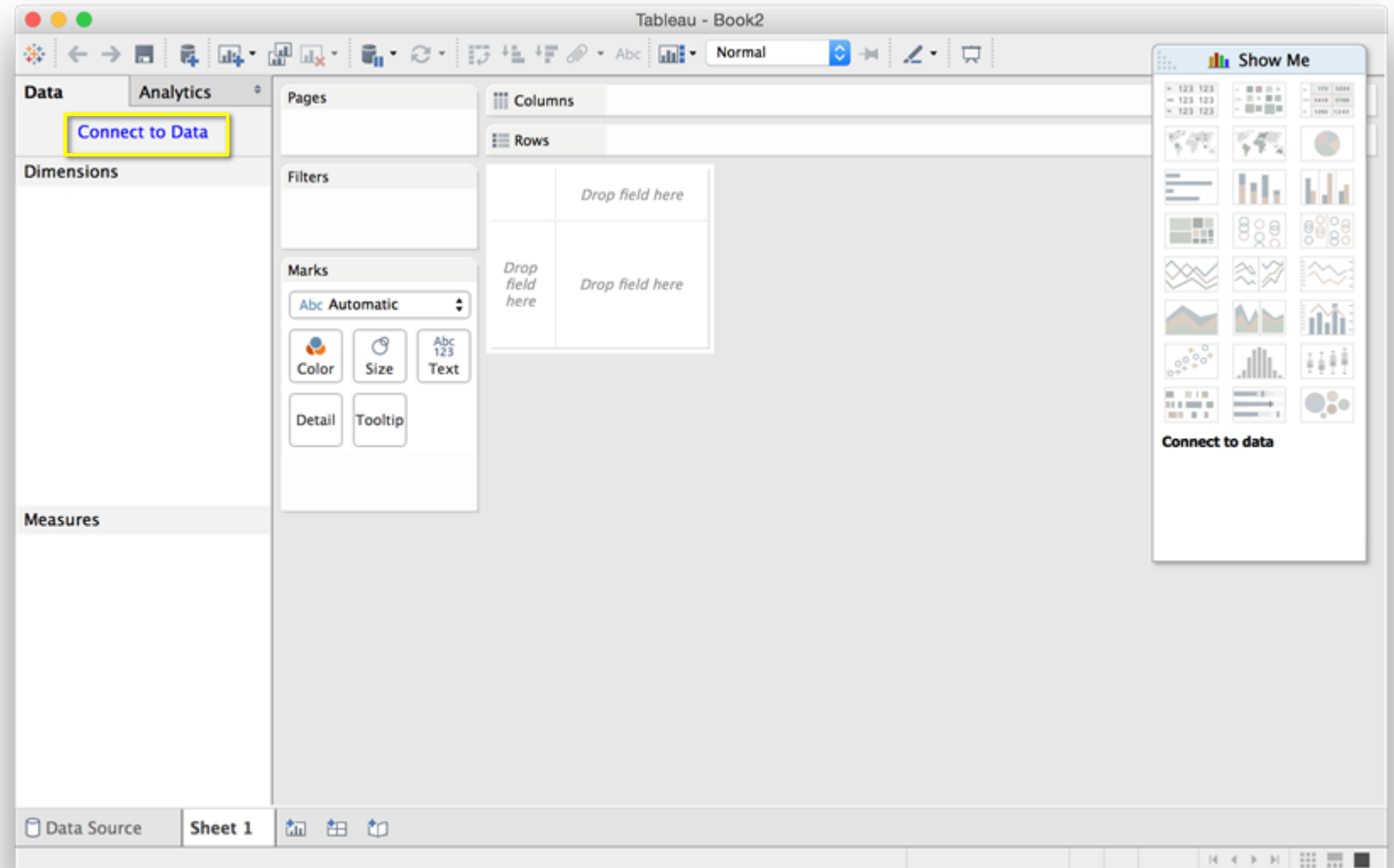
```
weather
#> # A tibble: 26,115 × 15
#>   origin year month day hour temp dewp humid wind_dir wind_speed wind_gust
#>   <chr>   <int> <int> <int> <int> <dbl> <dbl> <dbl>   <dbl>      <dbl>      <dbl>
#> 1 EWR    2013     1     1     1  39.0  26.1  59.4     270       10.4        NA
#> 2 EWR    2013     1     1     2  39.0  27.0  61.6     250        8.06        NA
#> 3 EWR    2013     1     1     3  39.0  28.0  64.4     240       11.5        NA
#> 4 EWR    2013     1     1     4  39.9  28.0  62.2     250       12.7        NA
#> 5 EWR    2013     1     1     5  39.0  28.0  64.4     260       12.7        NA
#> 6 EWR    2013     1     1     6  37.9  28.0  67.2     240       11.5        NA
#> # i 26,109 more rows
```

Relational Data



Main Window: New Workbook

Tableau basics



Main Window: with Data and Views

Tableau basics

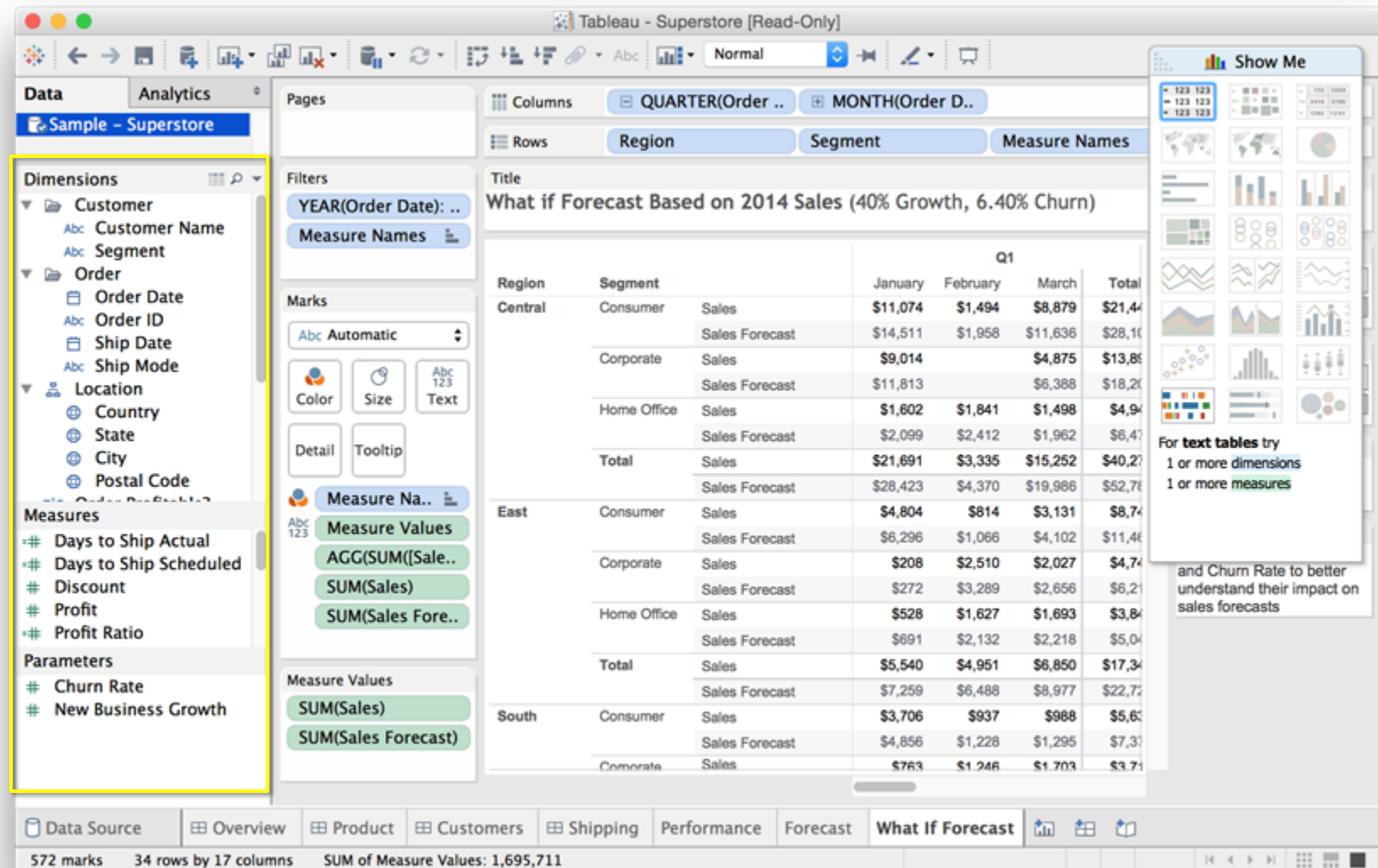





Tableau basics

Data Types

- All data fields are assigned one of the following types:

Icon	Description
Abc	Text values
	Date values
	Date & Time values
#	Numerical values
T/F	Boolean values (relational only)
	Geographic values (used with maps)

- Occasionally the auto-detected type is wrong; this can be manually overridden using the menu

Main Window: with Data and Views

Tableau basics

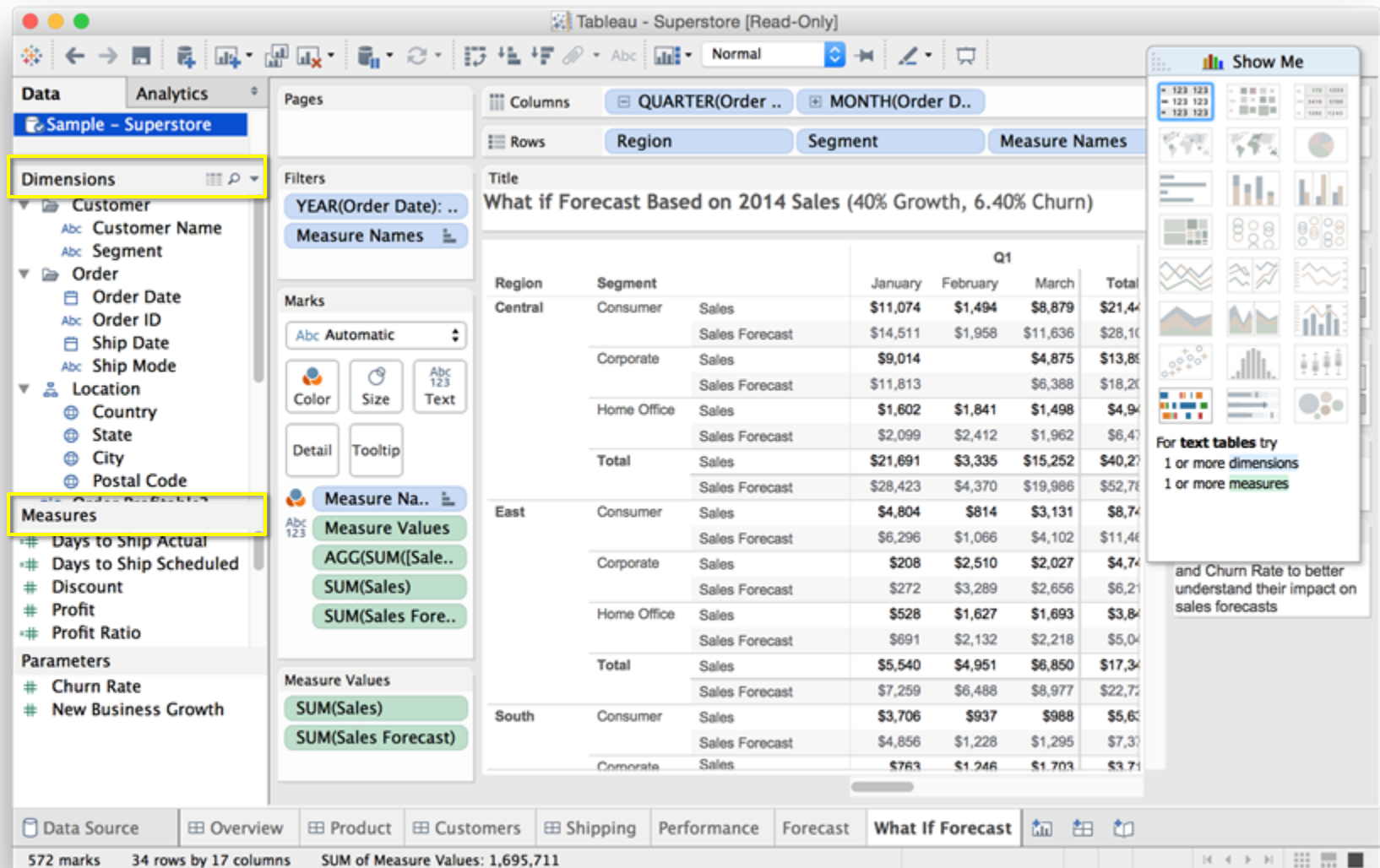


Tableau basics

Data Roles: Dimensions

- In general, any field containing qualitative or categorical information is treated as a dimension (e.g. text, dates)
- In relational data, dimensions are the independent variables
- Data can be aggregated using the values of a dimension
- When added as rows/columns, dimensions produce headers

Tableau basics

Data Roles: Measures

- In general, any field containing quantitative information is treated as a measure (e.g. numerical data, etc.)
- In relational data, measures are the dependent variables
- The values of a measure are a function of one or more dimensions
- When added as rows/columns, measures produce axes

Tableau basics

Data Roles: Dimensions vs. Measures

measure

Which is which?

dimension

↪ **total number of students** in each house ↪



Main Window: with Data and Views

Tableau basics

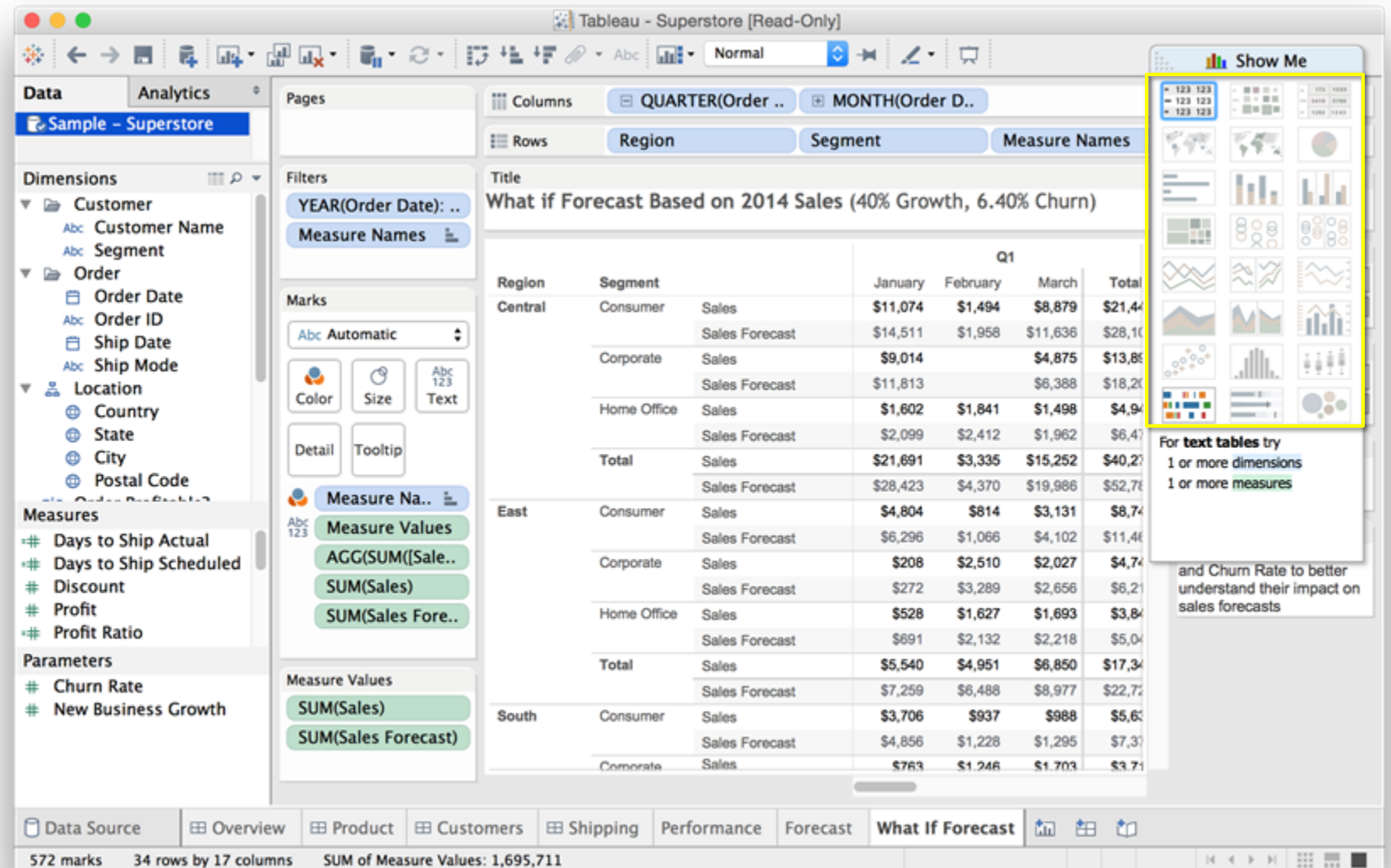


Tableau basics

21 Available Views



- Tables
- Maps
- Pie charts
- Bar charts
- Treemaps
- Circle views
- Line charts
- Area charts
- Combination charts
- Scatterplots
- Histograms
- Box-and-whisker plots
- Gantt
- Bullet plots
- Packed circles

Lab pt. 1: Getting Started

Tableau basics

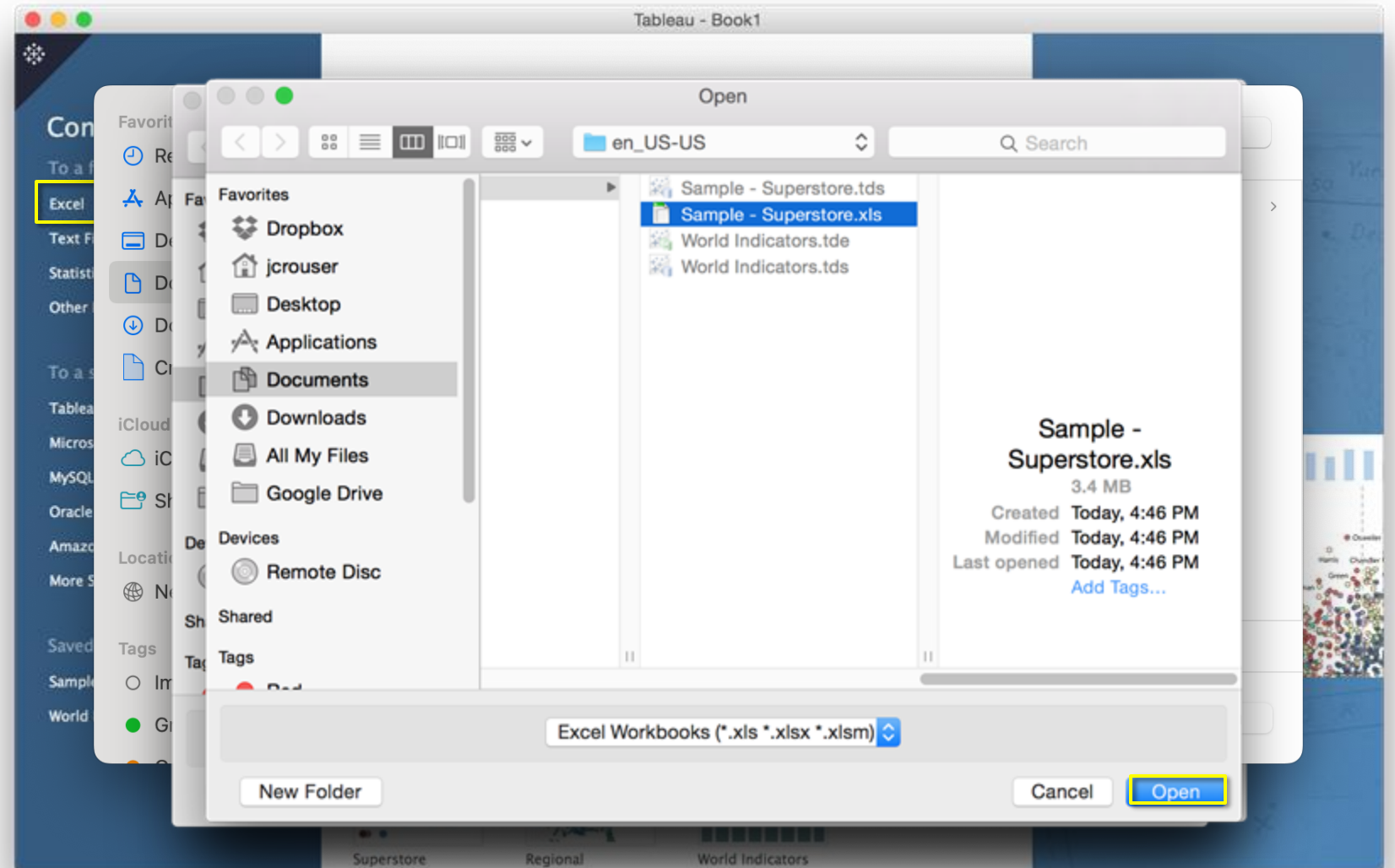
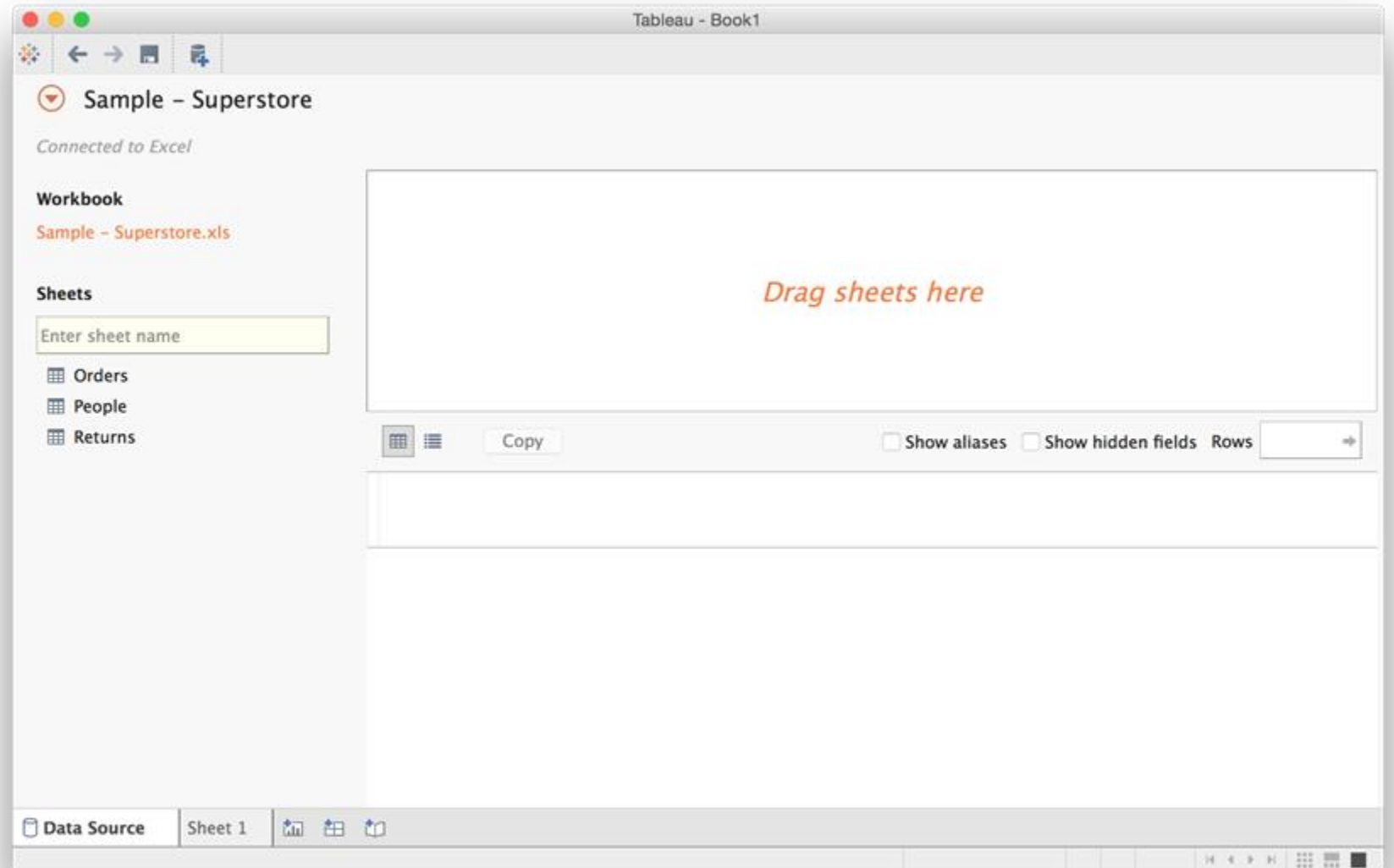


Tableau basics

Connecting to a Data File



Connecting to a Data File

Tableau basics

Tableau - Book1

Orders (Sample - Superstore)

Connected to Excel

Workbook: Sample - Superstore

Sheets: Enter sheet name, Orders, People, Returns

Connection: ☒ Live ☐ Extract

Filters: 0 | Add...

Copy

Show aliases Show hidden fields Rows: 9,994

Row ID #	Order ID Abc	Order Date	Ship Date	Ship Mode Abc	Customer ID Abc	Customer Name
1	CA-2013-1521...	11/9/13	11/12/13	Second Class	CG-12520	CG-12520
2	CA-2013-1521...	11/9/13	11/12/13	Second Class	CG-12520	CG-12520
3	CA-2013-1386...	6/13/13	6/17/13	Second Class	DV-13045	DV-13045
4	US-2012-108966	10/11/12	10/18/12	Standard Class	SO-20335	SO-20335
5	US-2012-108966	10/11/12	10/18/12	Standard Class	SO-20335	SO-20335
6	CA-2011-1158...	6/9/11	6/14/11	Standard Class	BH-11710	BH-11710

Go to Worksheet

Data Source: Sheet 1

Tableau basics

Creating Views

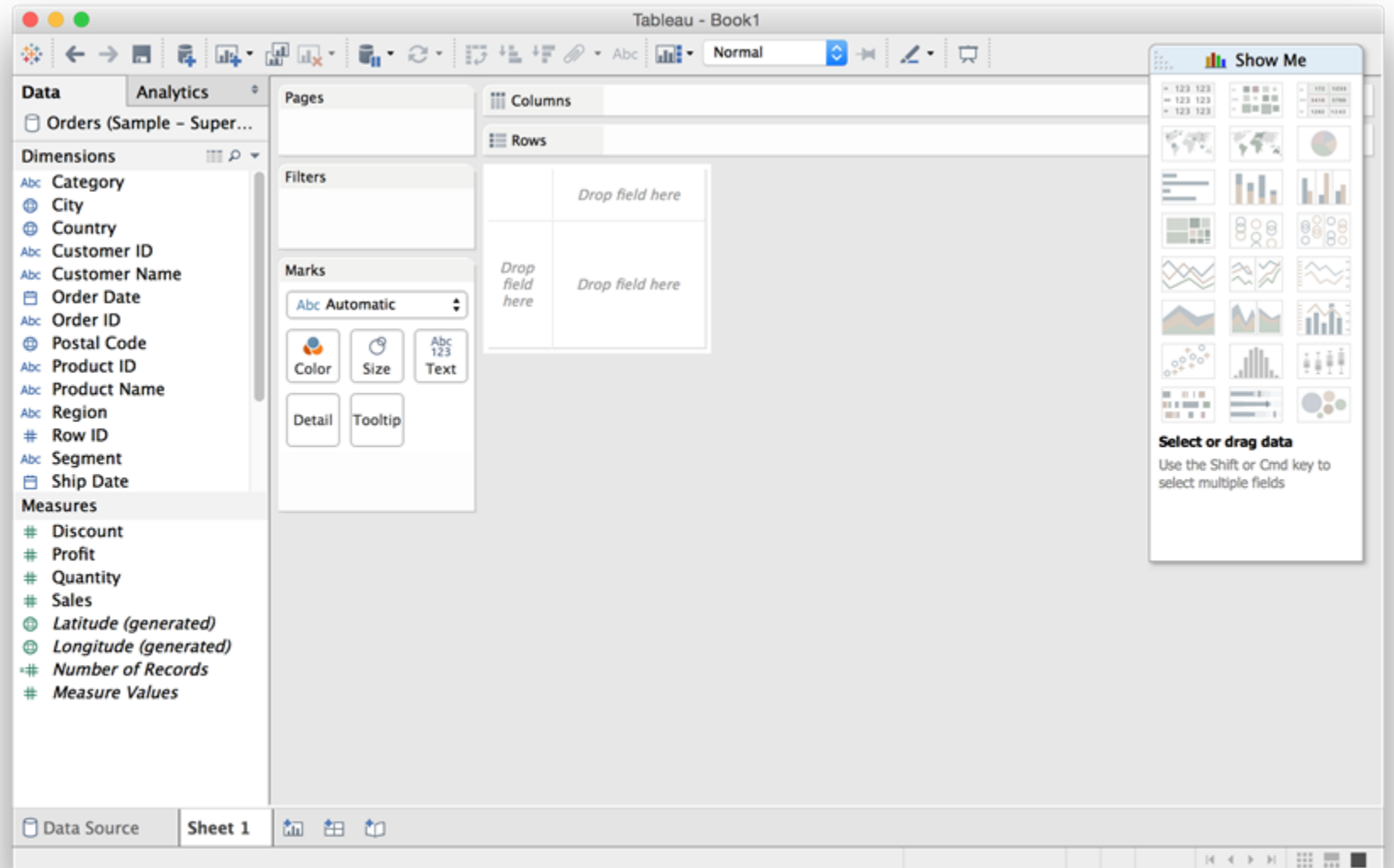
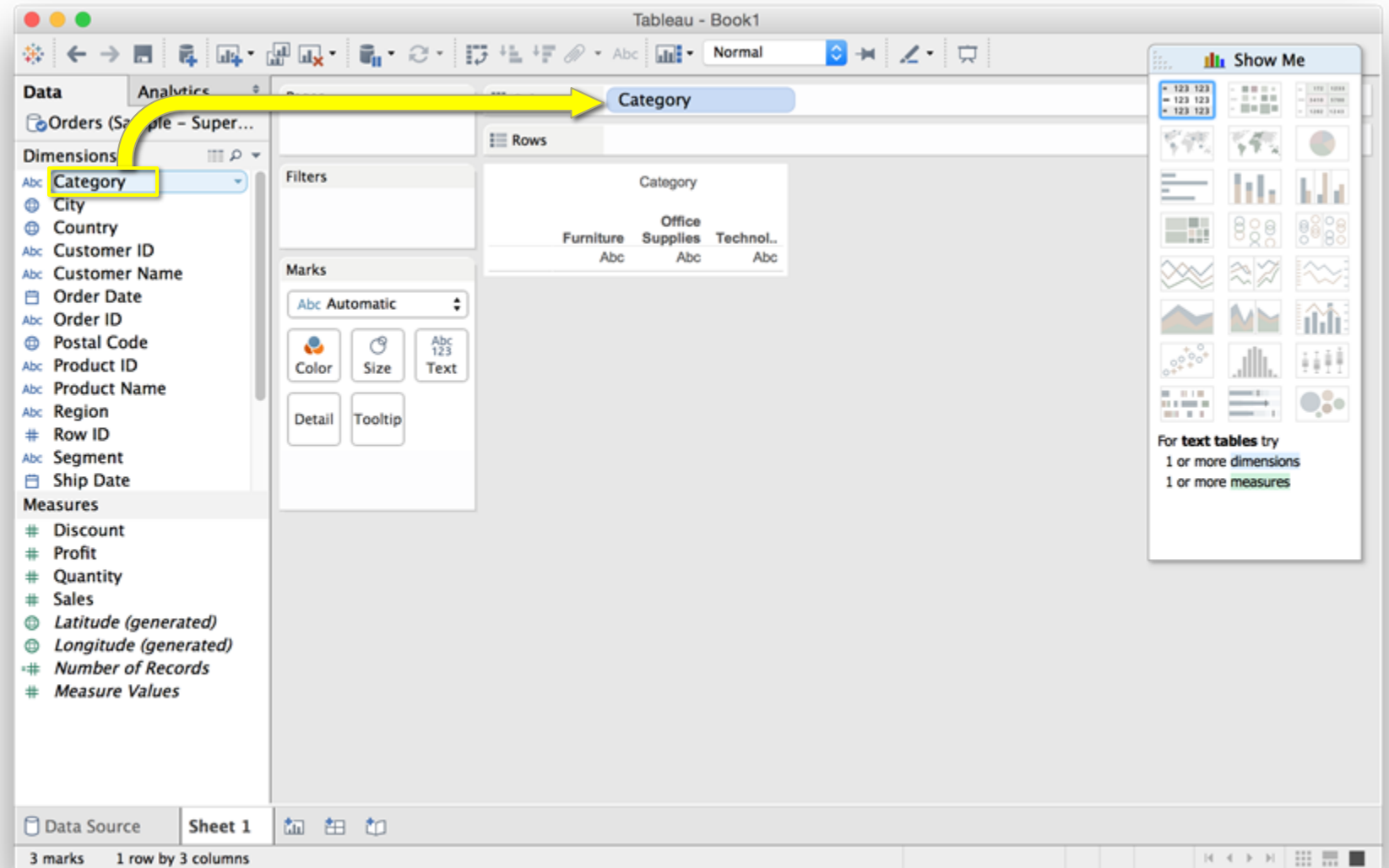


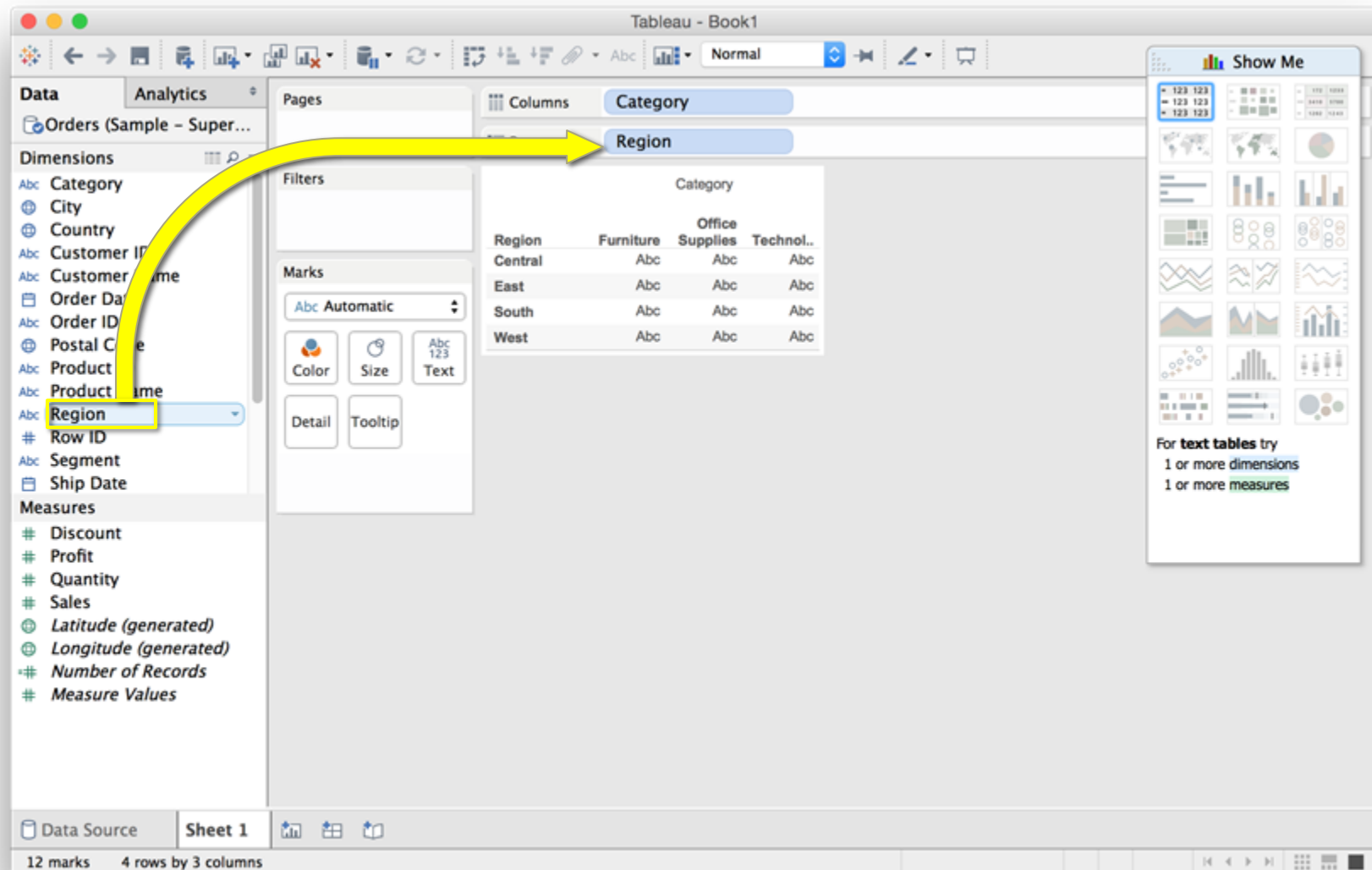
Tableau basics

Drag a dimension to "Columns"



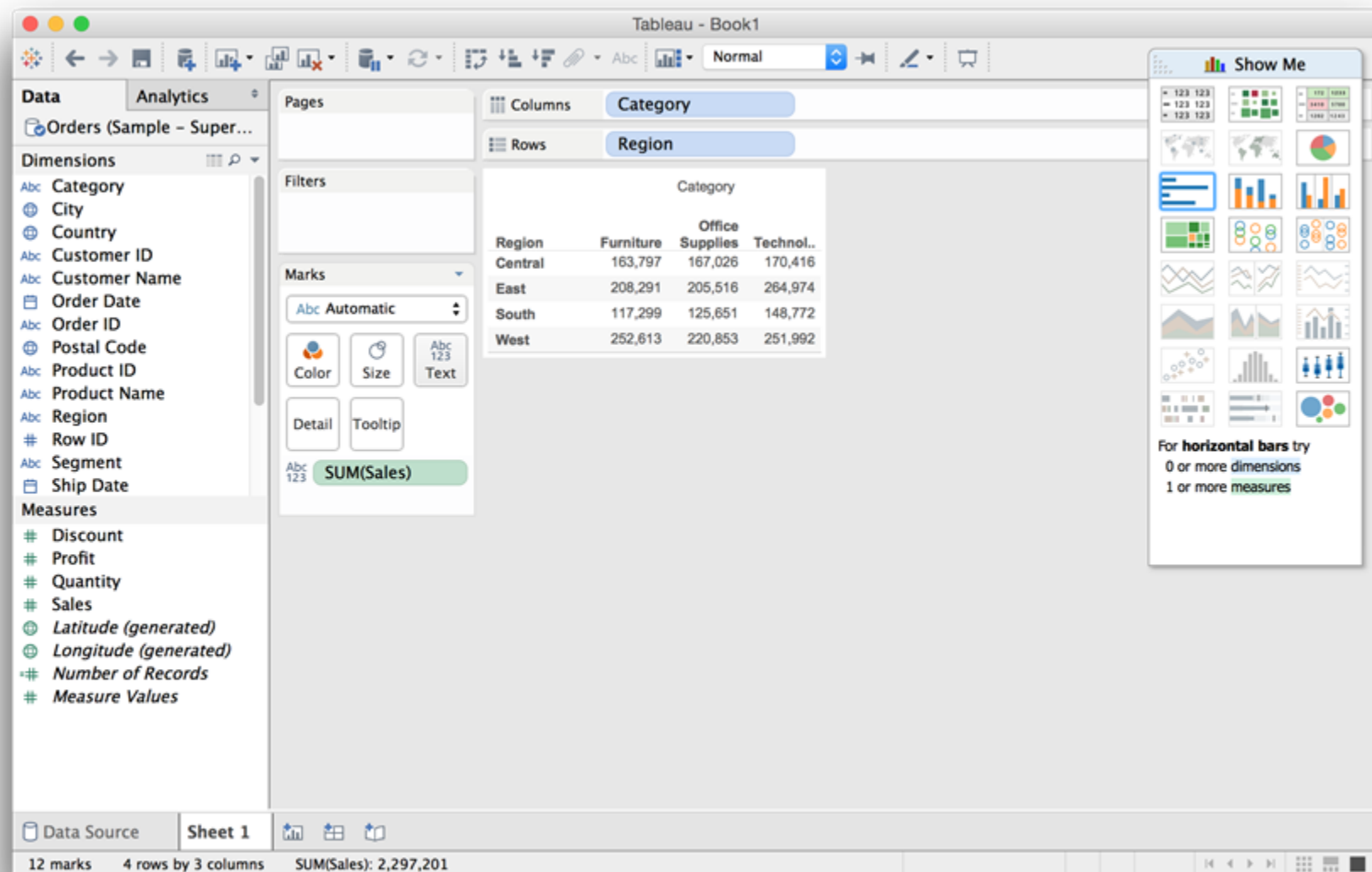
Drag a dimension to "Rows"

Tableau basics



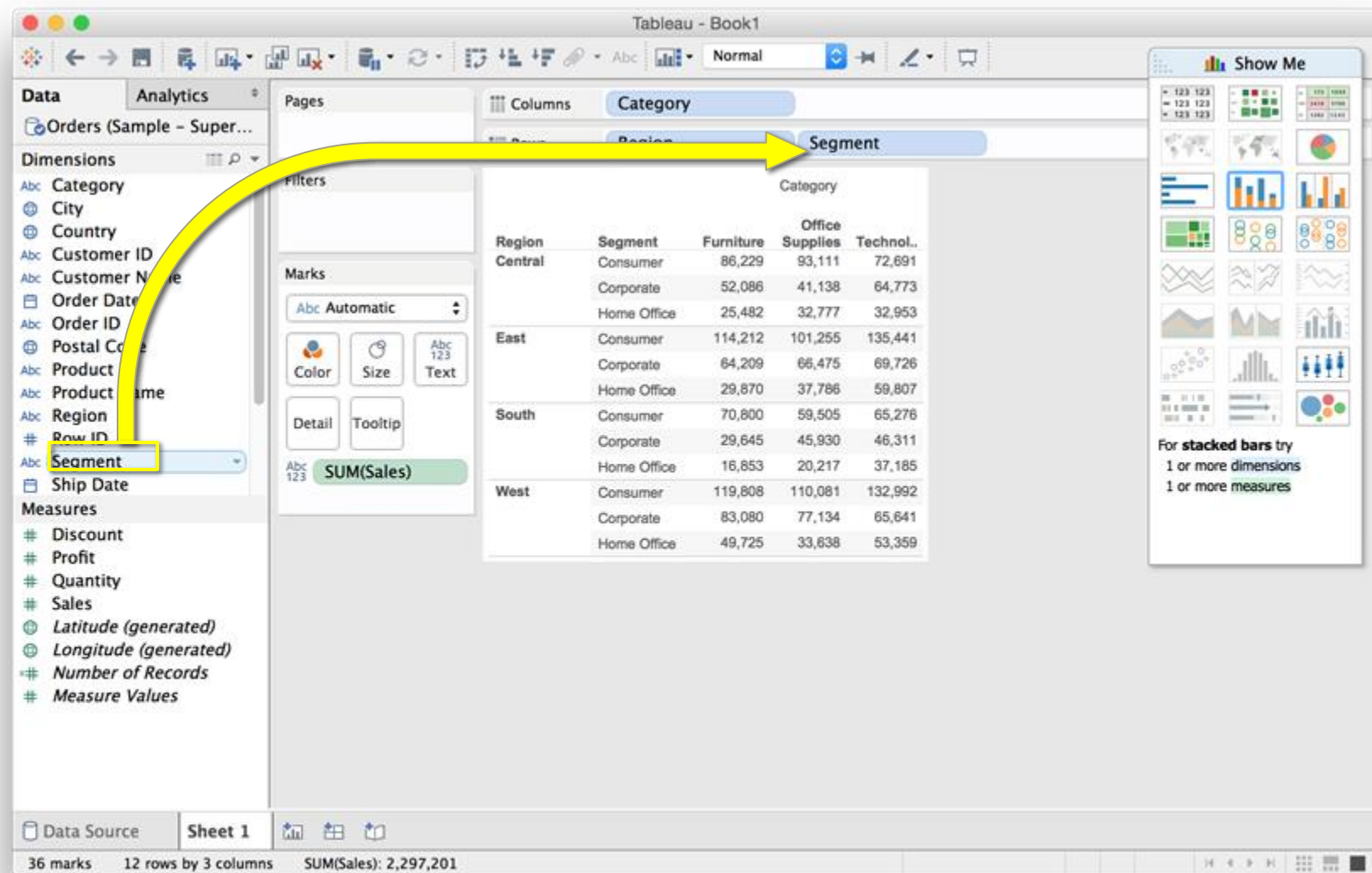
Drag a measure onto "Text"

Tableau basics



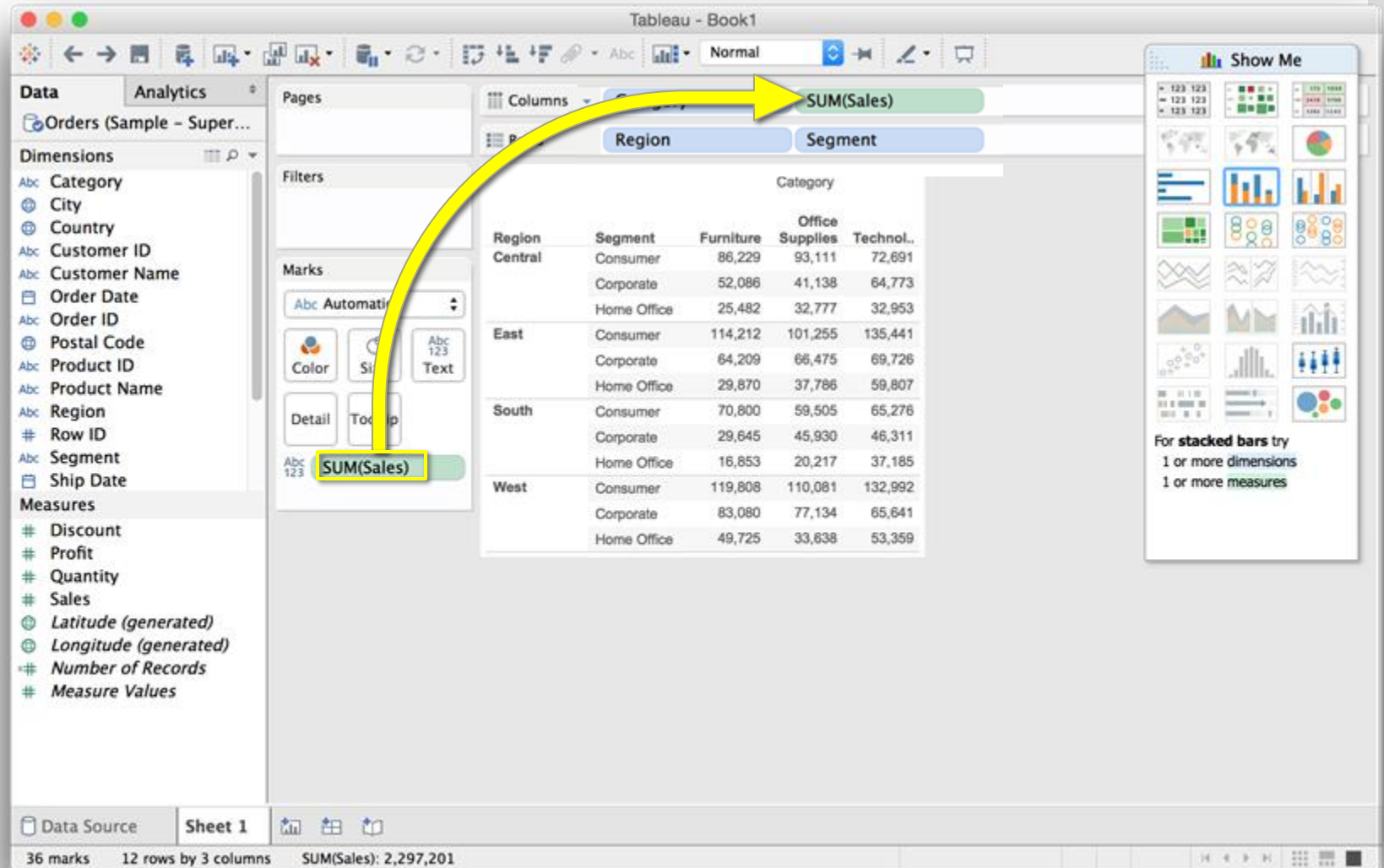
Further refine by subdividing

Tableau basics



From Text Table to Bar Chart

Tableau basics



Dual encoding using color

Tableau basics

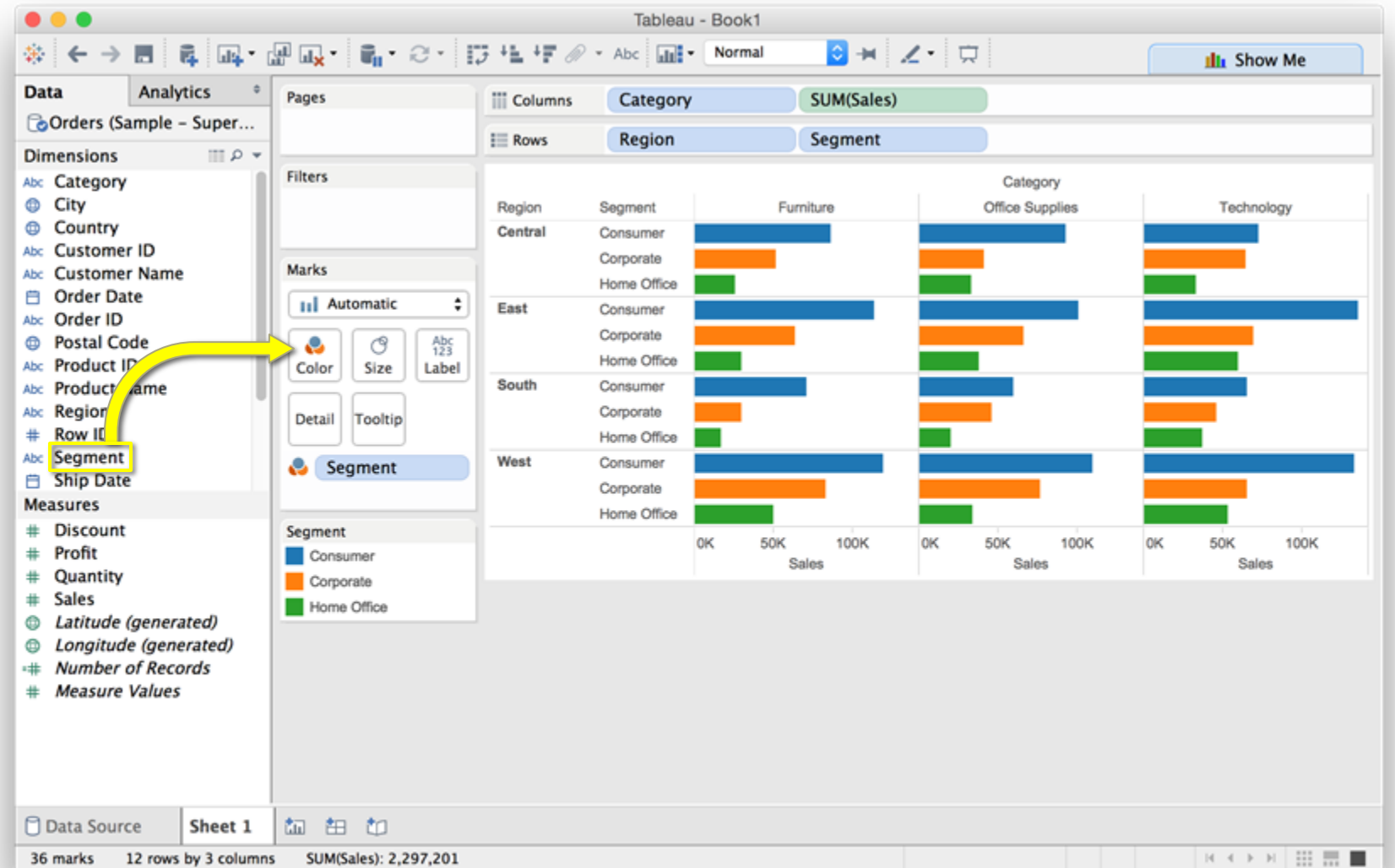
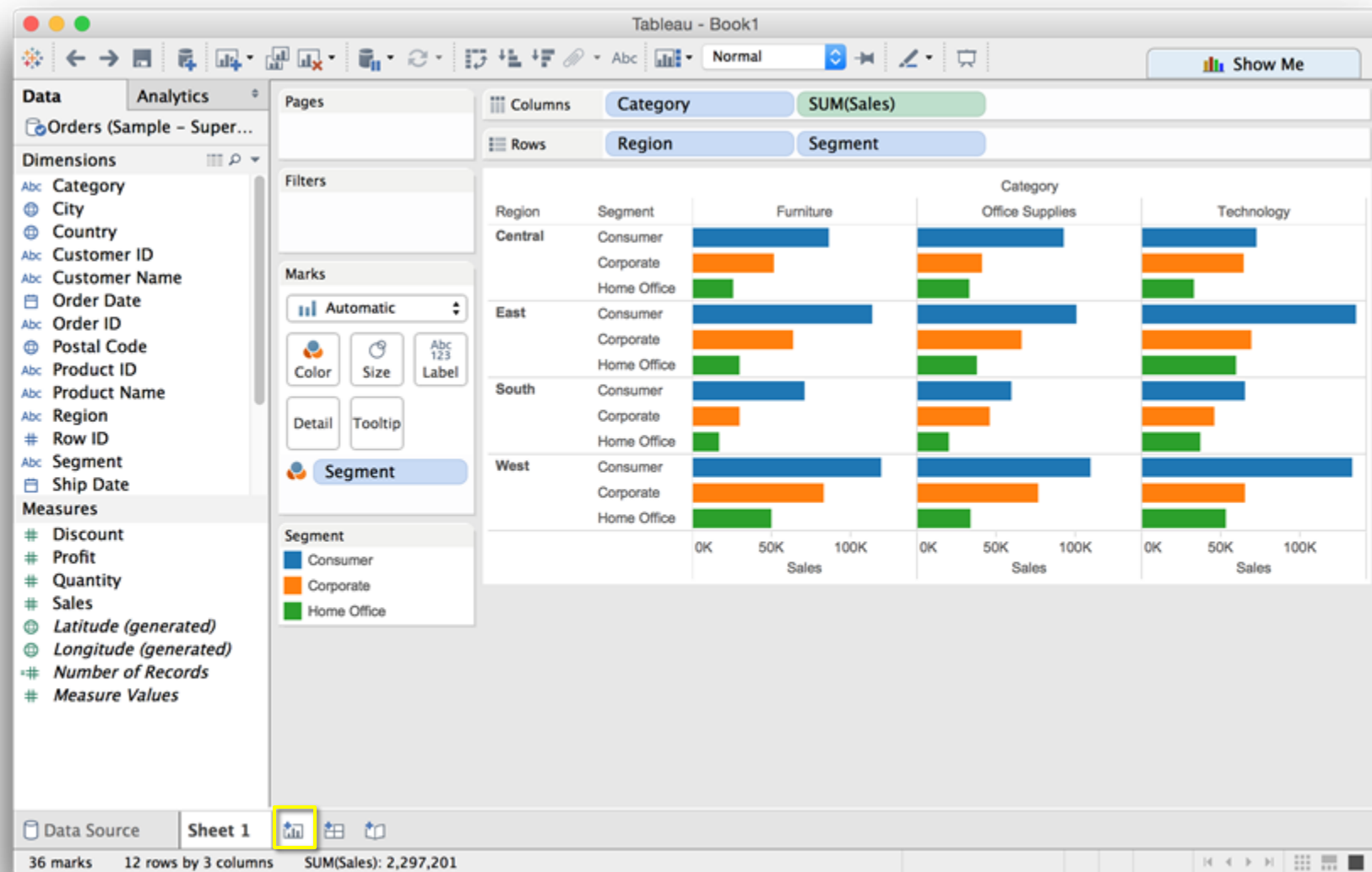


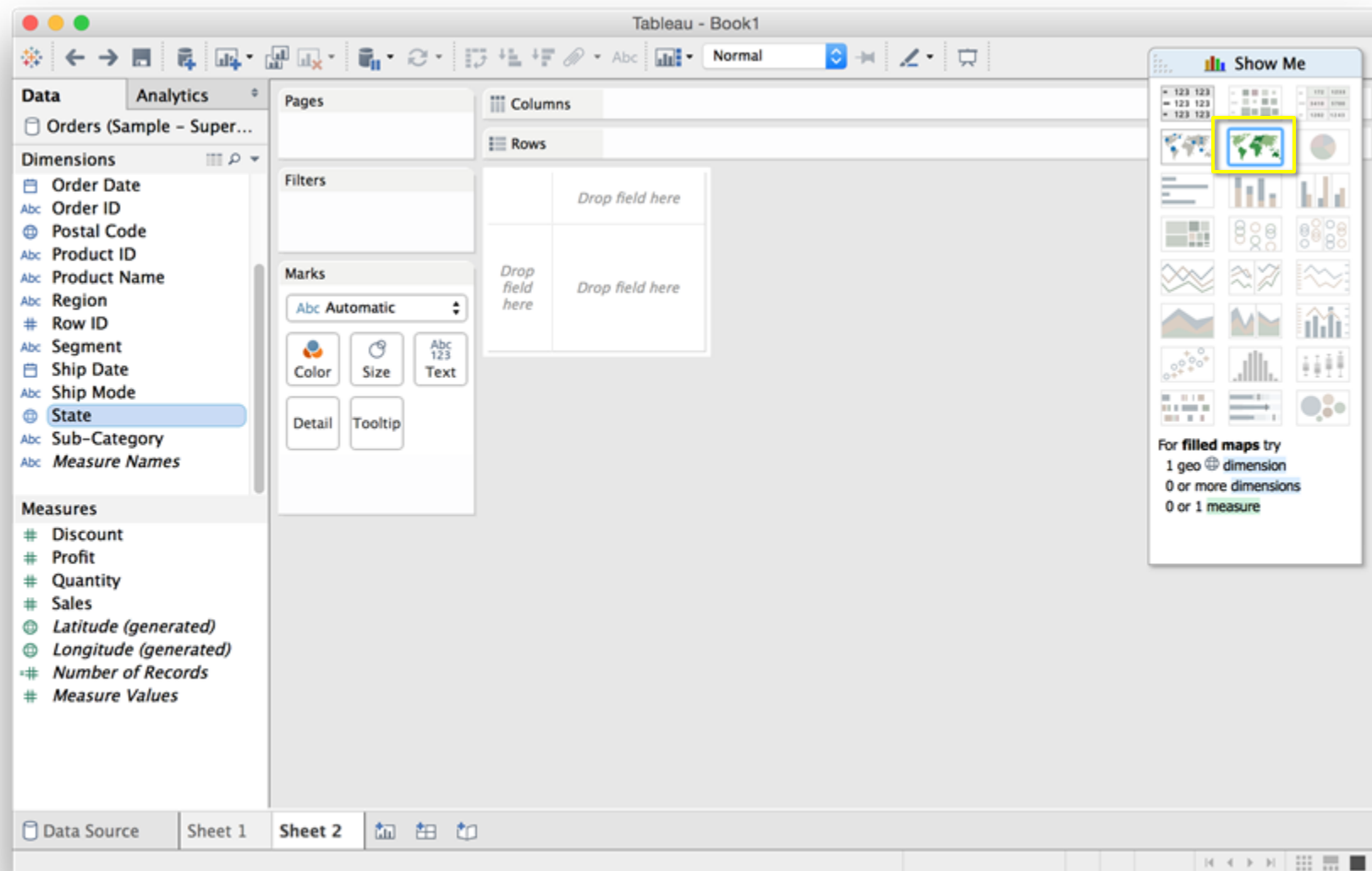
Tableau basics

Creating a new sheet



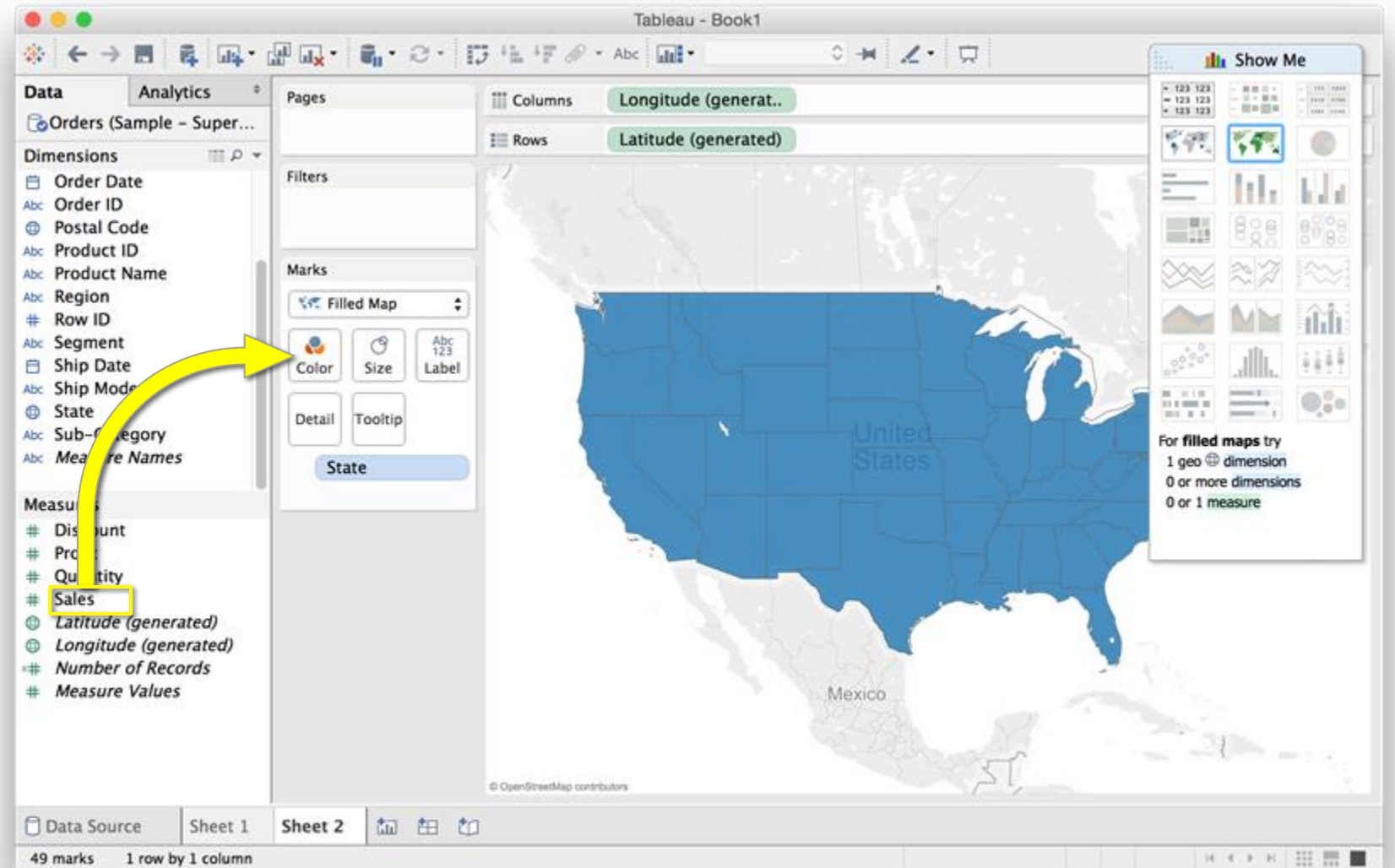
Using “Show Me”: a VIS recommender

Tableau basics



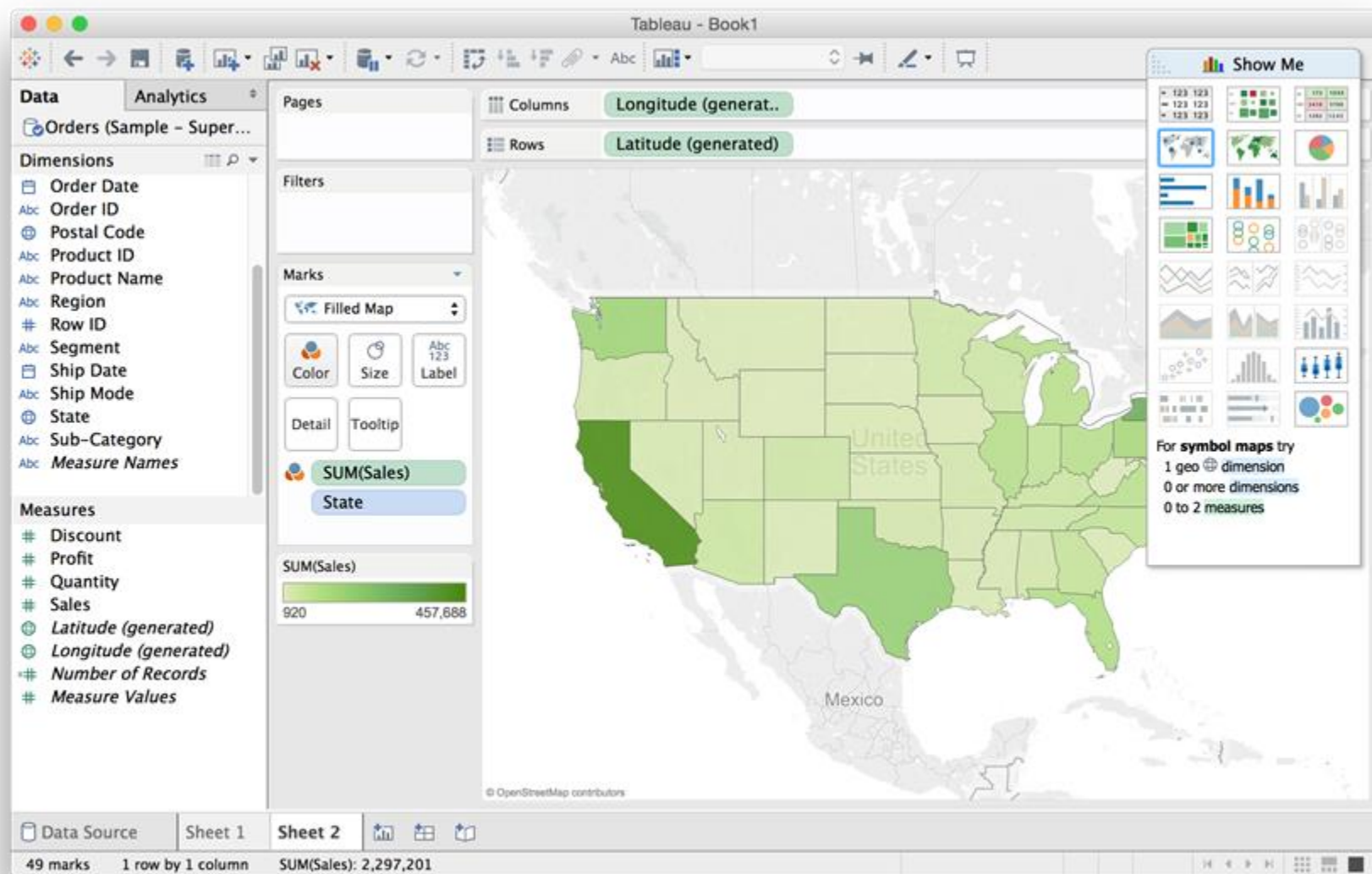
Using “Show Me”: a VIS recommender

Tableau basics



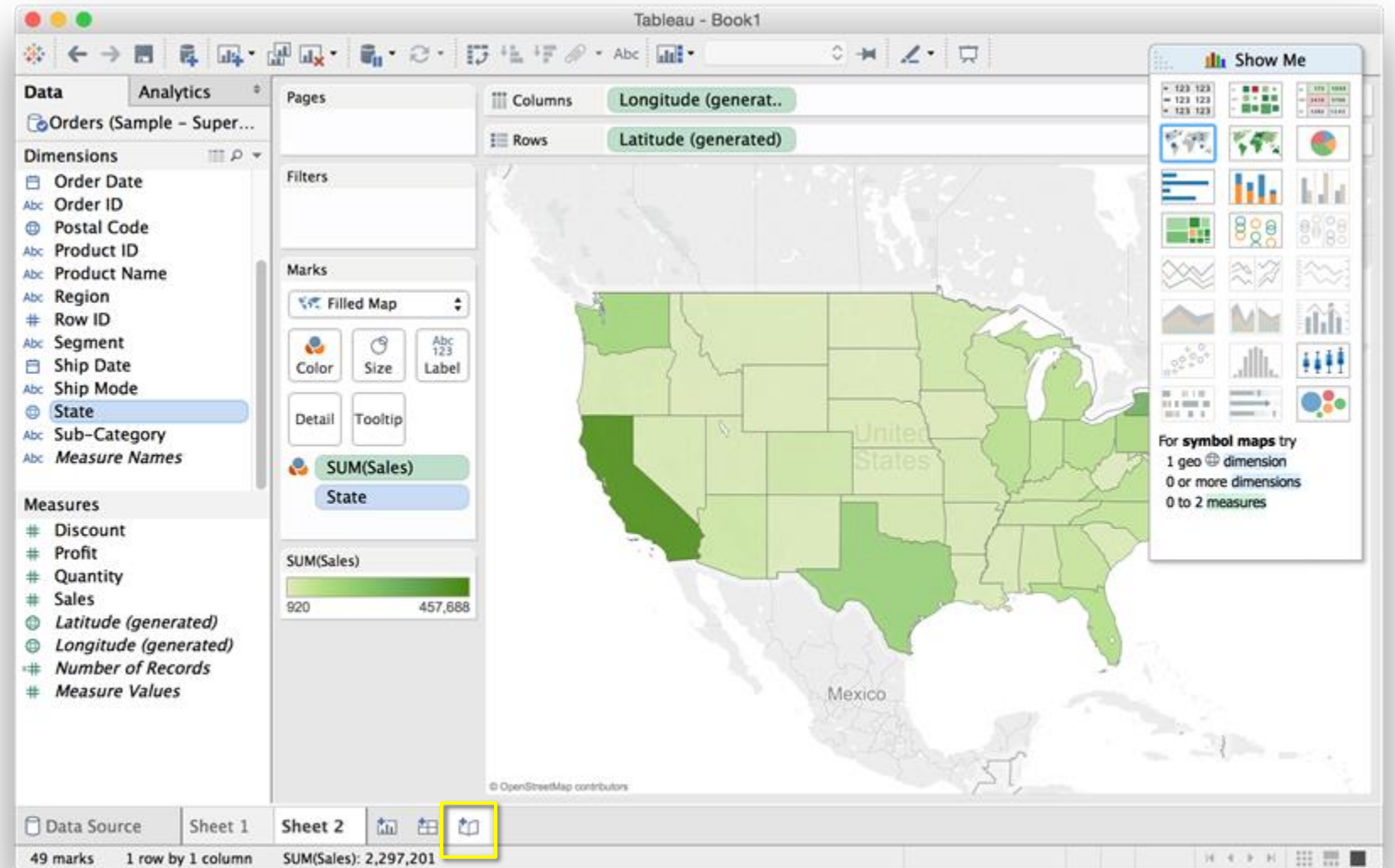
Using “Show Me”: a VIS recommender

Tableau basics



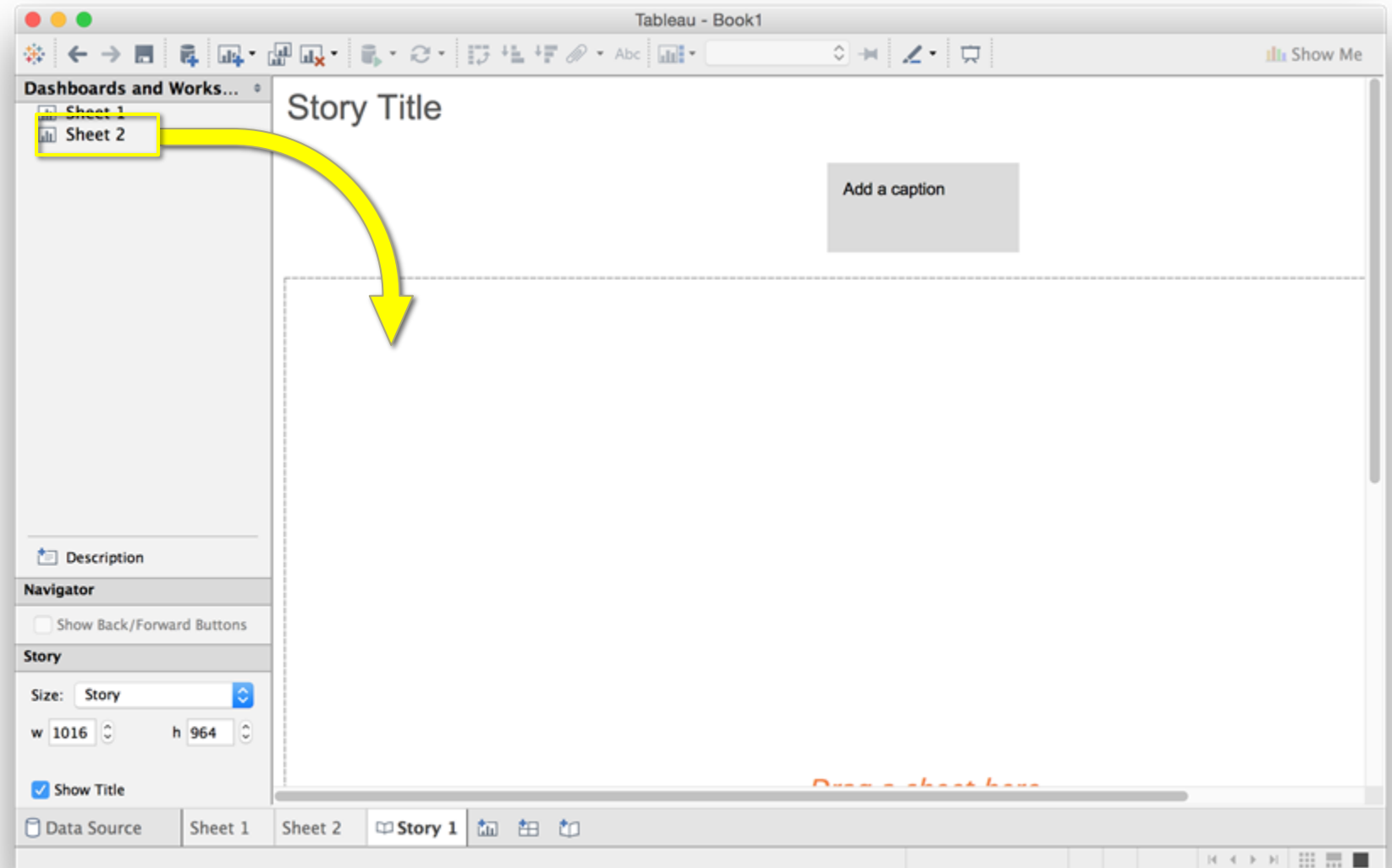
Building Stories from Multiple Views

Tableau basics



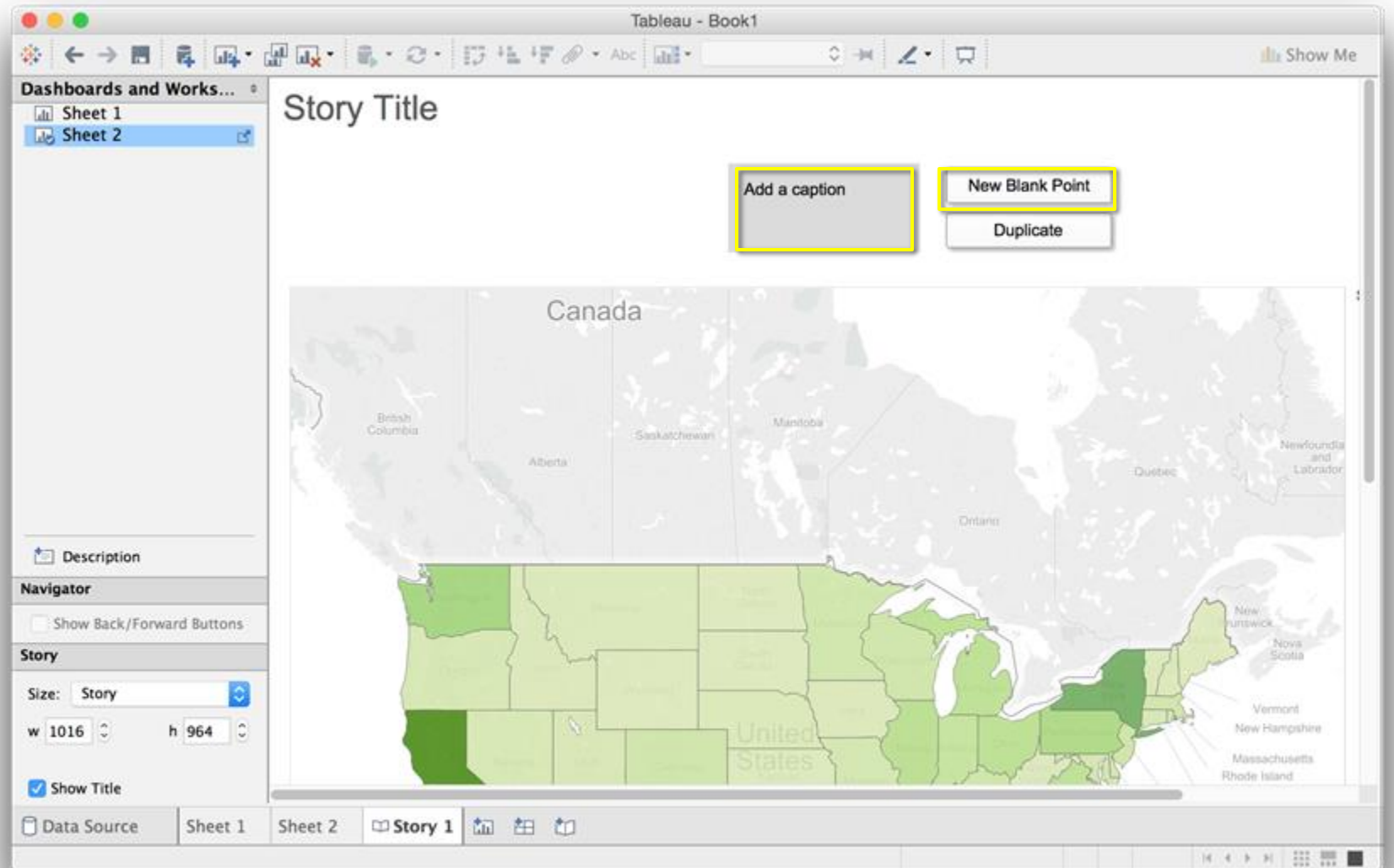
Building Stories from Multiple Views

Tableau basics



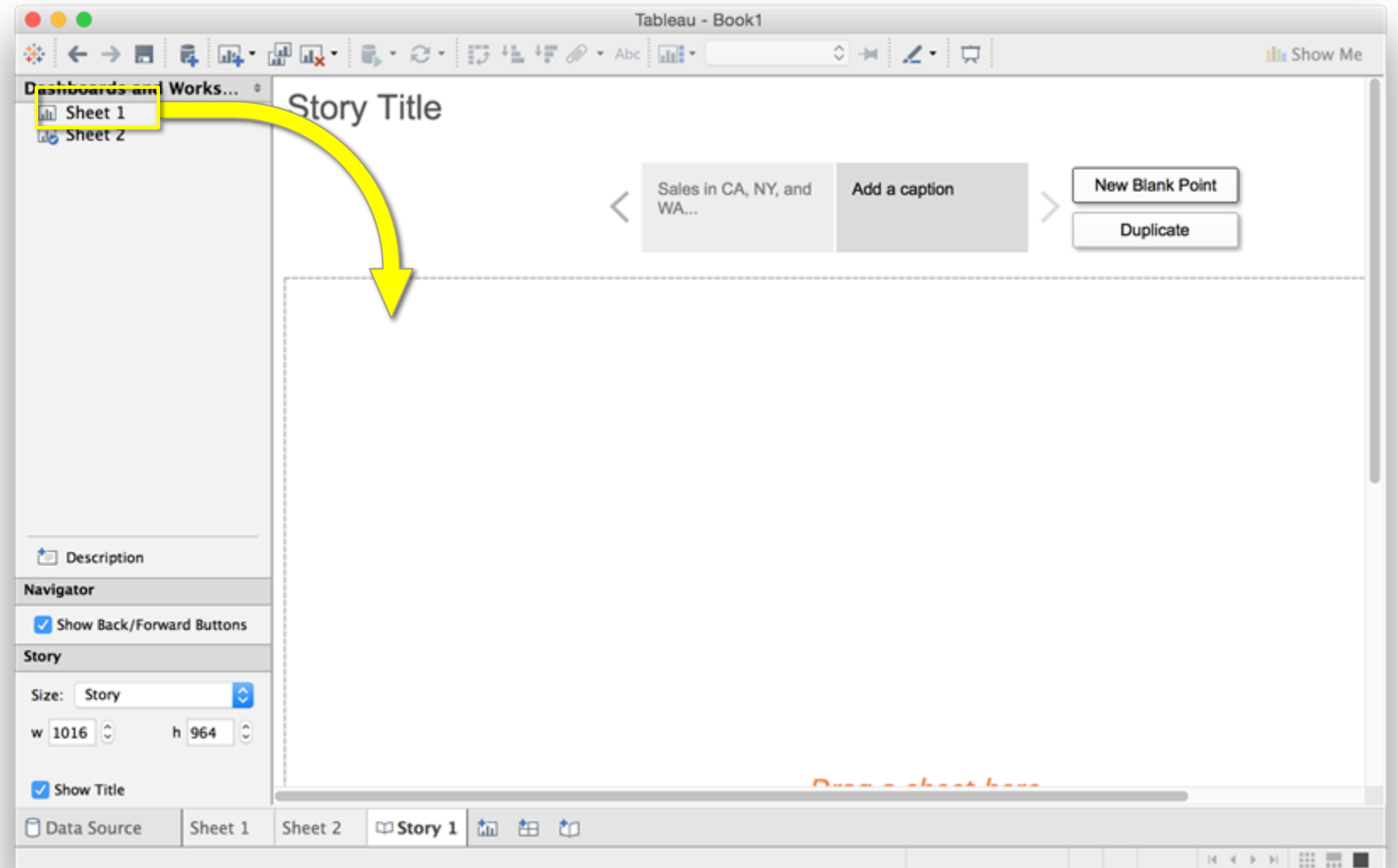
Building Stories from Multiple Views

Tableau basics



Building Stories from Multiple Views

Tableau basics



Building Stories from Multiple Views

Tableau basics

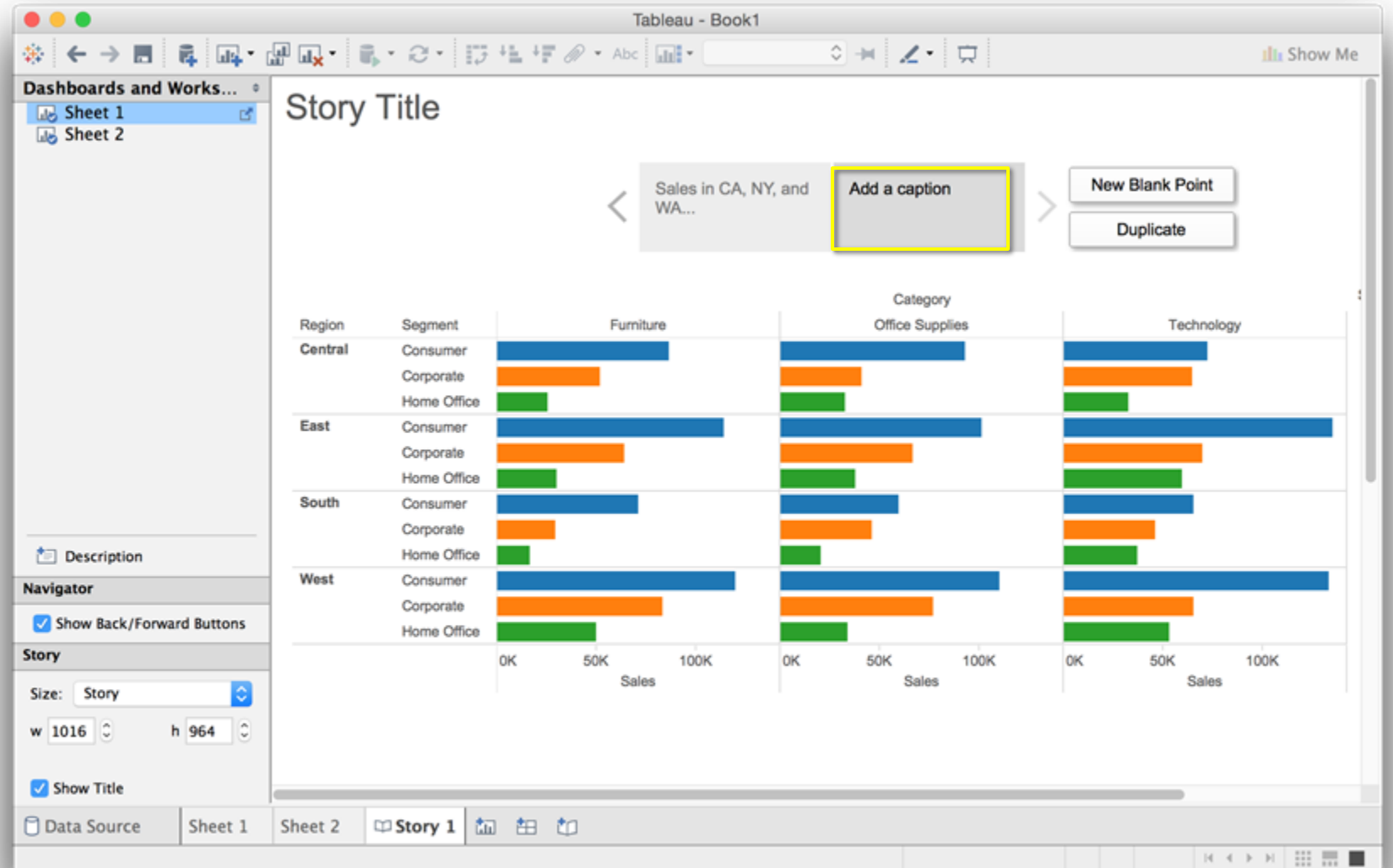
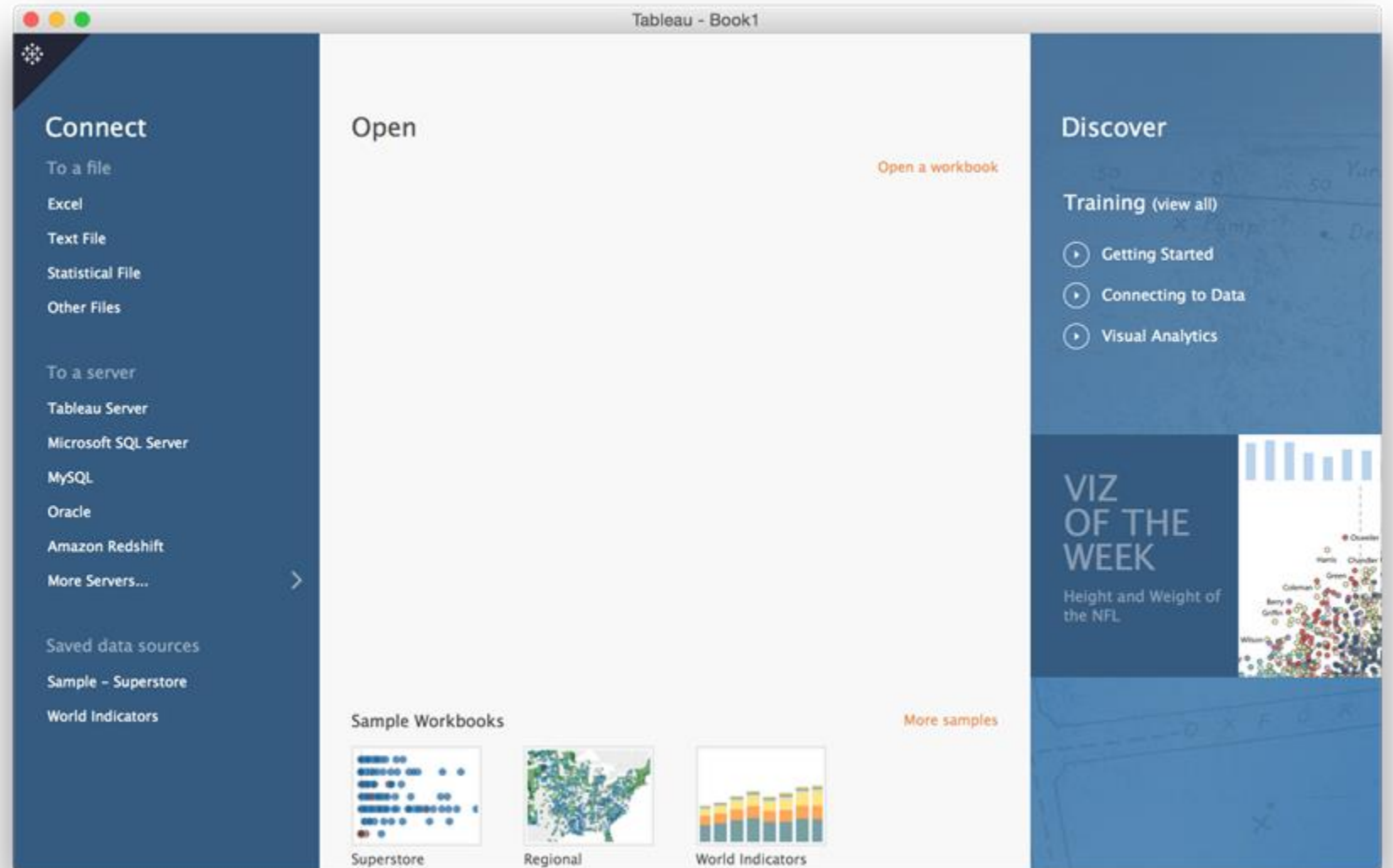


Tableau basics

Questions?

Lab pt. 2: Exploring Other Datasets

Tableau basics



Lab pt. 2: Pair with another person, pick a new dataset, and *create a story* about the data

goo.gl/kcbqfc

Tableau basics

The screenshot shows the Tableau Public website's 'Resources' page. The navigation bar includes 'tableau public', 'GALLERY', 'AUTHORS', 'BLOG', 'RESOURCES', 'ACTIVITY', and a 'SIGN IN' button. The main heading is 'Resources / How-to Videos' with a subtext: 'A buffet of materials to help get you started, or take you to the next level.' Below this is a tabbed interface with 'How-to Videos', 'Sample Data Sets', and 'Live Training'. The 'Sample Data Sets' tab is active, showing a list of datasets under the 'Government' category. Each dataset entry includes a title, a brief description, and a download link for a 'Dataset' file in either CSV or XLSX format.

How-to Videos	Sample Data Sets	Live Training	Tableau User Forums
Government			
	2016 Presidential Candidate Spending	Records are as of mid May 2016. Data comes from the Federal Election Commission.	Dataset (csv)
	UK Big Lottery Fund since 2004	Basic grants data from the UK BIG Lottery Fund, for grants made from 2004 onwards, via data.gov.uk.	Dataset (xlsx)
	113th US Congress Voting Record	Every vote of the 113th US Congress via the Sunlight Foundation's OpenCongress.org. There are two sheets, "Bills" contains the vote data whereas "Sunlight Info" contains additional meta data. You can join them on "Source URL"	Dataset (xlsx)
	Military Equipment Transfer to Local Police via the 1033 Program	All military equipment transfer requests to local police via the 1033 program from September 2011 to September 2013 courtesy of muckrock.com.	Dataset (xlsx)
Education			
	UK University Research Excellence Framework Ratings 2014	The UK 2014 University results via Research For Excellence. REF is the new system for assessing the quality of research in UK higher education institutions.	Dataset (xlsx)

Tableau basics

Discussion

- What are some of Tableau's strengths? Weaknesses?
- Was there anything you couldn't figure out?