Tableau Desktop

2020.2

Welcome to Tableau Training

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Let’s Learn About You

Student Introductions

- Name
- Role
- Experience with Tableau
- Anything specific you are hoping to learn?
- What do you do for fun?
- What is your favorite vacation spot and why?

Class Agenda

Concepts

- Introduction to Tableau Desktop
- Terminology & Concepts
- Connecting to Data
- Data ‘Strategy’
- Filters
- Groups and Hierarchies
- Parameters
- Sets

Charts

- Creating Charts with ‘Show Me’
- Best Practices on Chart Selection
- Text Tables & Alternatives
- Bar Charts
- Line Graphs and Time Series Analysis
- Multiple Measures in a View
- Scatter Plots
- Mapping

Class Agenda

Calculations

- Terminology & Format
- Basic Calculations
- Table Calculations
- Level of Detail Calculations
- Situational Calculation Awareness

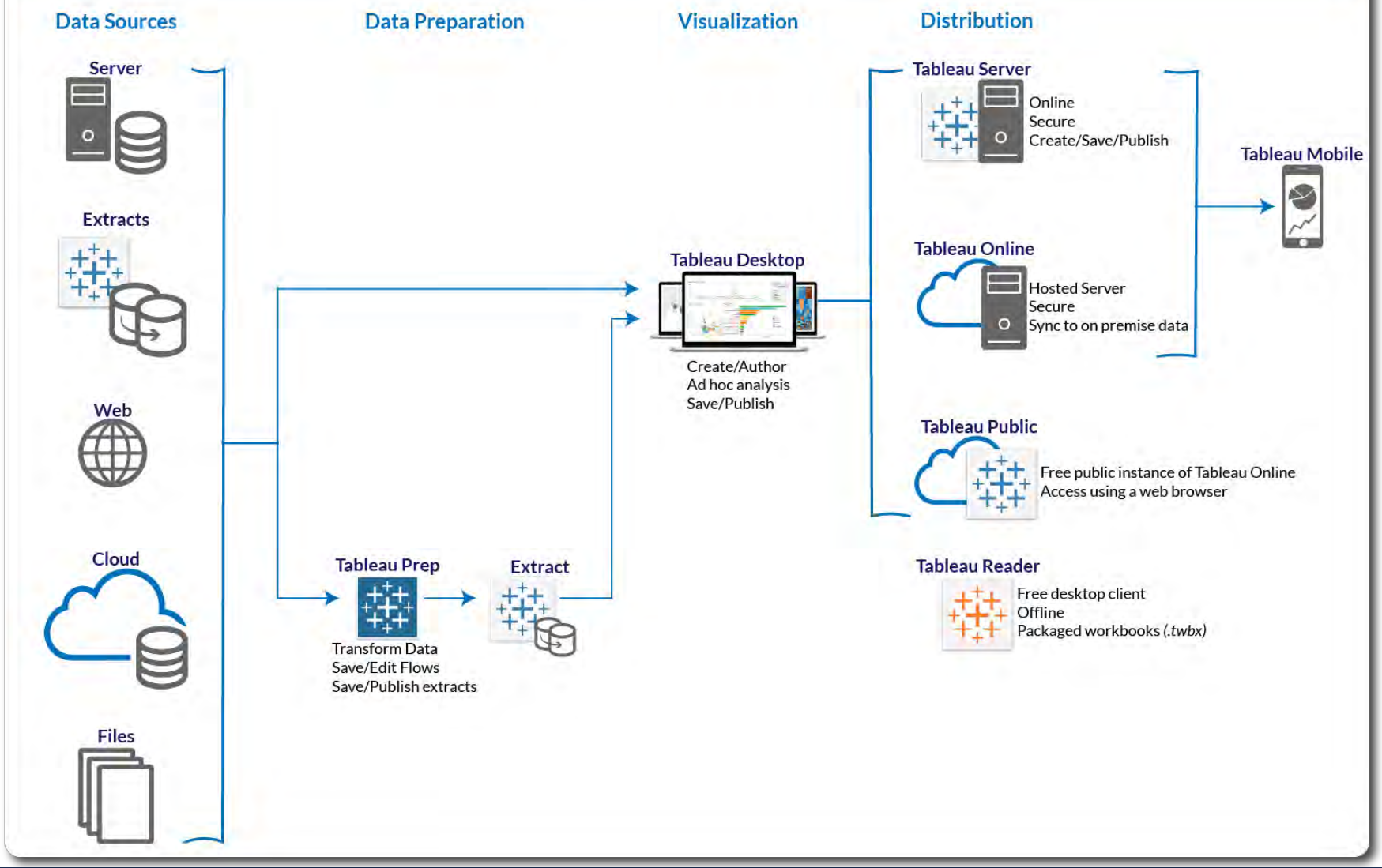
Dashboards

- Introduction to Dashboards
- Interactivity through Actions
- Containers
- Best Practices
- Storypoints

Class Structure

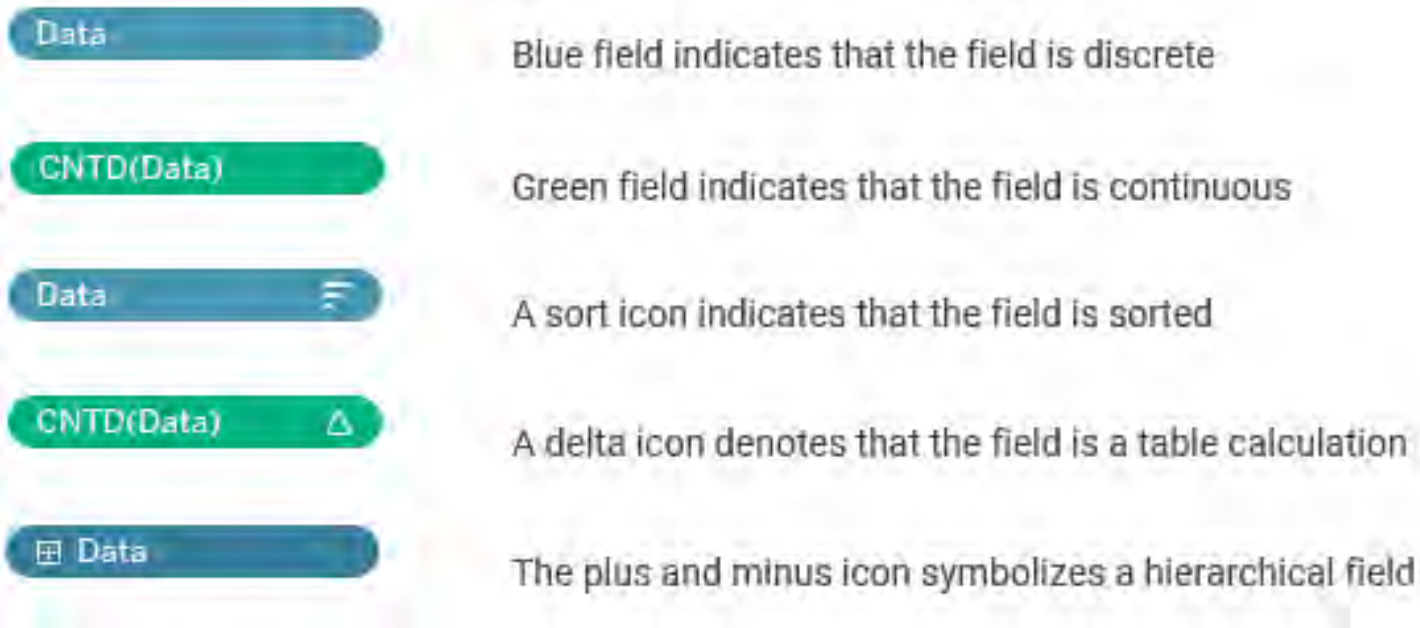
- Topic Introduction
- Discussion
- Demo
- Practice
- Review

Tableau Product Architecture



Application Terminology

Visual Cues


Data
Blue field indicates that the field is discrete
CNTD(Data)
Green field indicates that the field is continuous
Data
A sort icon indicates that the field is sorted
CNTD(Data)
A delta icon denotes that the field is a table calculation
Data
The plus and minus icon symbolizes a hierarchical field

File Types

File Type and Extension	Description
Tableau workbooks (**.twb**)	Contain one or more worksheets and dashboards, and always refer to data outside of the workbook itself.
Tableau Packaged Workbooks (**.twbx**)	Contain a workbook along with any supporting local file data sources and background images. This format is the best way to package your work for sharing with others who don't have access to the data.
Tableau Data Extract files (**.hyper** or legacy **.tde**)	Local copy of an entire data source or a subset that you can use to share data or work offline and improve performance and efficiency.
Tableau Data Connection (**.tds**) files	The underlying data and store metadata (that is, any data customizations you have made in the workbook, such as groups, comments, sets, and so forth) related to the data source. Also serves as a short cut for quickly connecting to data sources you use often.

Data Connection Options

Method	Definition	Use this when…
Join	A relationship of two tables in a single database using a common field.	Your data exists in two separate tables in your database.
Cross Database Join	A relationship across two different databases or text tables based on a common field.	Your data exists in different data sources.
Blend	A combination of data from different databases or text tables based on a common dimension. Behaves like a left join.	Your data exists in different data sources.
Union	Appended rows from different tables with the same column names.	The tables have the same columns but are not stored in the same file.

Joins

Joins relate two or more tables from one database into a single result set

In the tables below, **Product** is the common field:

Sales Table

Product	Customer	Sales
1	A	$5
2	B	$10
3	C	$15

Product Table

Product	Detail
1	Tableau Professional
2	Tableau Personal
4	Tableau Server

Changing the join logic changes the results

Inner Join

Returns only transactions that occur in both tables

Inner Join

Product	Customer	Sales	Detail
1	A	$5	Tableau Professional
2	B	$10	Tableau Personal

Sales Table and Product Table
There are only matches for Product numbers that appear in **both** tables are returned

Not returned:

- Unsold products (no corresponding row in Sales table)
- Sales transactions with no matching records in Product table
  (for example, Product 3 to Customer C doesn't exist in the Product table)

Left and Right Joins

Left and Right Joins

Left joins return ***all*** rows from the left table and ***only*** matching rows from the right table

The left join relationship more accurately reflects the actual sales transactions that have occurred.

Left Join

Product	Customer	Sales	Detail
1	A	$5	Tableau Professional
2	B	$10	Tableau Personal
3	**C**	**$15**	

Right joins change the direction of the join

A right join could help identify products that have not sold

Right Join

Product	Customer	Sales	Detail
1	A	$5	Tableau Professional
2	B	$10	Tableau Personal
4	**D**		**Tableau Server**

Full Outer Joins

Full outer join returns all records from both tables

- Leaves nulls where no matches exist
- A full outer join could help discover where details are missing about a transaction, or where products are not sold.

Outer Join

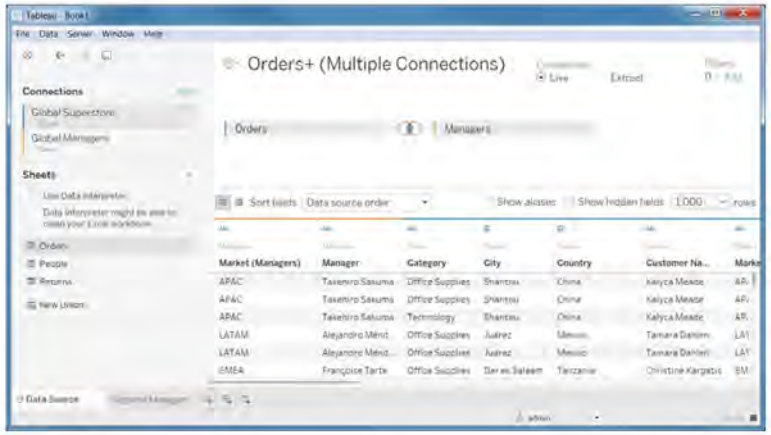
Product	Customer	Sales	Detail
1	A	$5	Tableau Professional
2	B	$10	Tableau Personal
3	C	$15	
4			Tableau Server

Cross Database Joins

Cross database joins relate two or more tables across different databases

Set up a multi-connection data source

Join tables from the different databases



Performance considerations:
This is considered a row-level join and can have a negative impact

Data Blending

An alternative to joining

- Joins require data tables to reside in the same source
- Data blends can combine data from multiple, unrelated sources
- Great way to segment data sources for performance

Blending should not be a replacement for creating joins

Data Blending

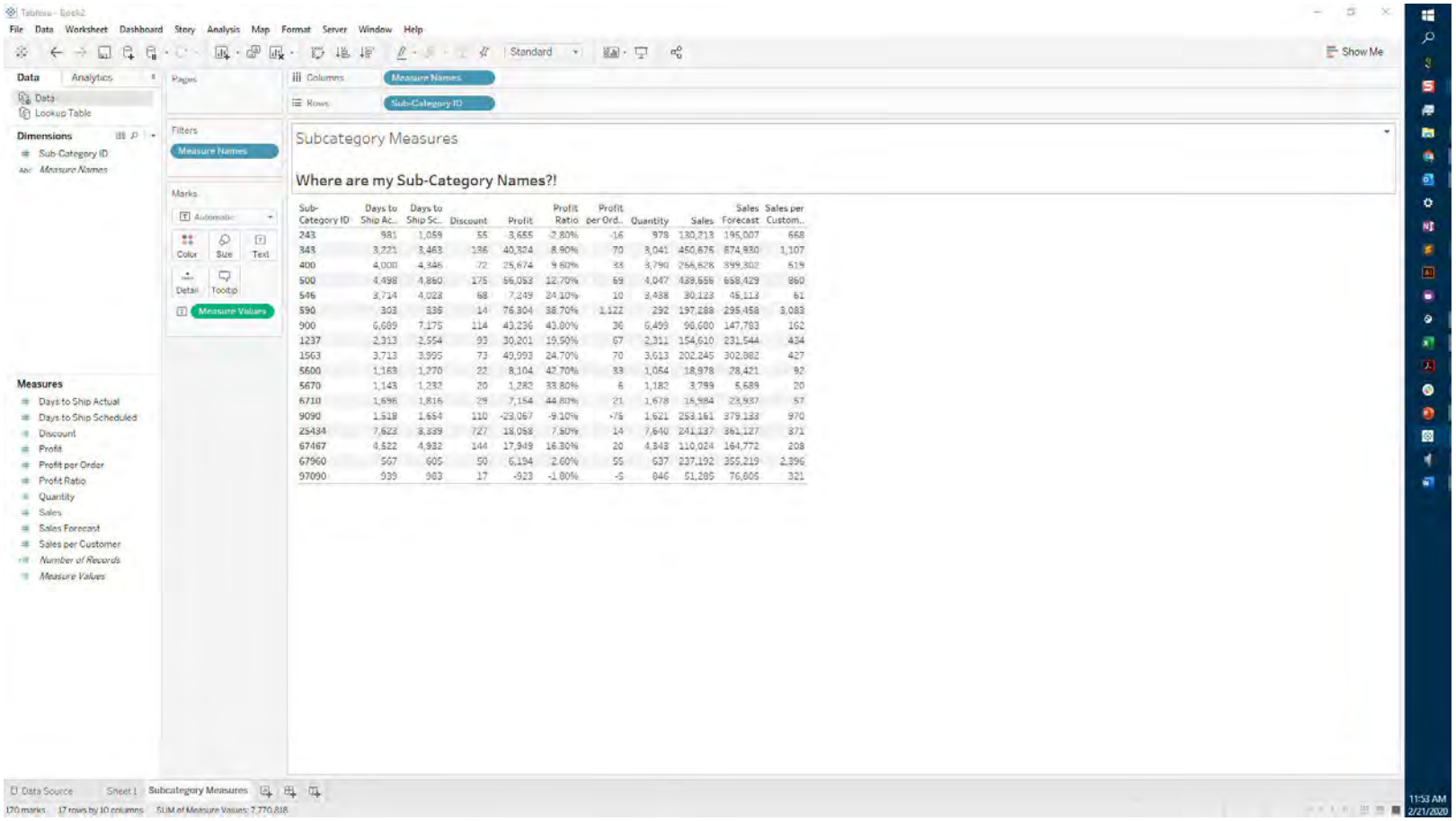
Primary and secondary sources in a blend

- **Primary** source is used first in the view; all others are **secondary**
- Cube sources have to be primary data sources

Calculations in Data Blends

- Data should be aggregated at the same level
- Calculations you create are stored in the primary data source

Use Case – Editing Primary Aliases



Unions

Unions append rows from similar data sources together

- Tables in a single Excel file
- Multiple text files (.txt, .csv, .tab, .tsv) in a common folder or directory

Market	Category	Sales
East	A	$5
East	B	$10
West	B	$15

Market	Category	Sales
West	C	$10
East	A	$20
West	C	$5

Before union

Market	Category	Sales
East	A	$5
East	B	$10
West	B	$15
West	C	$10
East	A	$20
West	C	$5

After union

Merge Fields

- Nulls can occur if columns aren't identical
- Use **Merge mismatched fields** to avoid nulls

Associate	Billing Rate	Bill Rate	Hours
Teresa	A	*null*	25
Sam	B	*null*	2
Sandy	A	*null*	12
Kris	*null*	B	30
Amy	*null*	A	7
Greg	*null*	C	9

Nulls after a union

Associate	Billing Rate & Bill Rate	Hours
Teresa	A	25
Sam	B	2
Sandy	A	12
Kris	B	30
Amy	A	7
Greg	C	9

After **Merge mismatched fields**

Using Data Extracts

USE an extract to:

- Provide a local copy of data to make the workbook “portable”
- Limit access to source database (for example, security, administrative, load reasons)
- Improve performance over direct database access
- Send workbooks to others

AVOID using an extract when:

- You want to control where the data resides
- You want queries to run against latest data

Extract Configuration

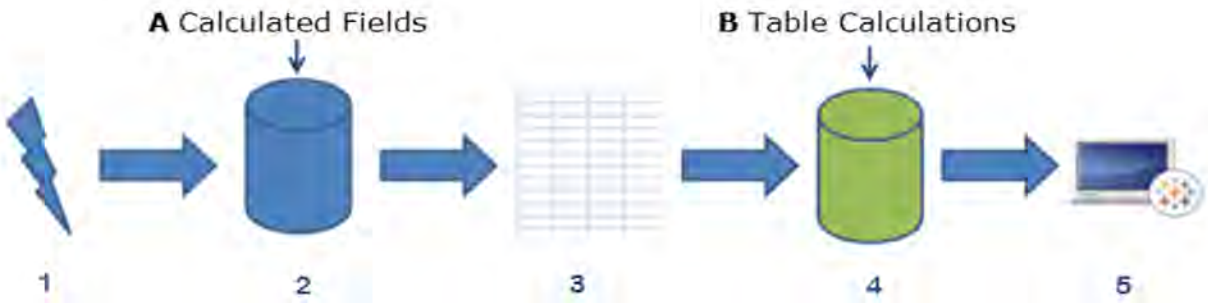
Option	Description
Filters	Choose a field to use as a filter, and then select field members to be included in or excluded from the extract.
Aggregation	Select to summarize the data based on the visible (not hidden) dimensions. For date-based dimensions, you can roll up dates based on criteria in the drop-down list.
Number of rows	Determine how many rows to extract (all rows, or only a limited number). Check the incremental refresh check box to update rows based on date/time field.
History	Displays a dialog box that shows the date and time for past refreshes, whether the refresh was full or incremental, and the number of rows that were added. If the refresh was from a file, it also shows the source file name.
Hide All Unused Fields	Automatically hide any fields in the data pane not used in the current workbook. Hidden fields are not included in the extract.

Calculations

Formula Editing Conventions

Color or Symbol	Description
Red squiggly line	Syntax error Hover over the error to see directions to fix it.
//Grey text	Comments. These are ignored by the calculation but are useful for documenting the calculation logic
[Orange Text]	Field names
Blue Text ( )	Arguments to functions
[Purple Text]	Parameters
Bold Text	Calculation is computed locally within Tableau on the aggregated results.
Plain Text **(not bold)**	Calculation computed at the database level.

Understanding Where Calculations Occur



1. Tableau generates query and sends it to the database.
   All calculations (except table calculations) are passed to the database.
2. Database processes the query.
3. Database returns filtered, aggregated rows of data, included calculated columns.
4. Tableau performs local processes, including table calculations.
5. Tableau renders the visualization.

Using Quick Table Calculations

Using Quick Table Calculations

Predefined computations for data in your view

Utilize default direction for operation, such as “Table (across)”

- A field used in a table calculation displays with an icon: 

Examples

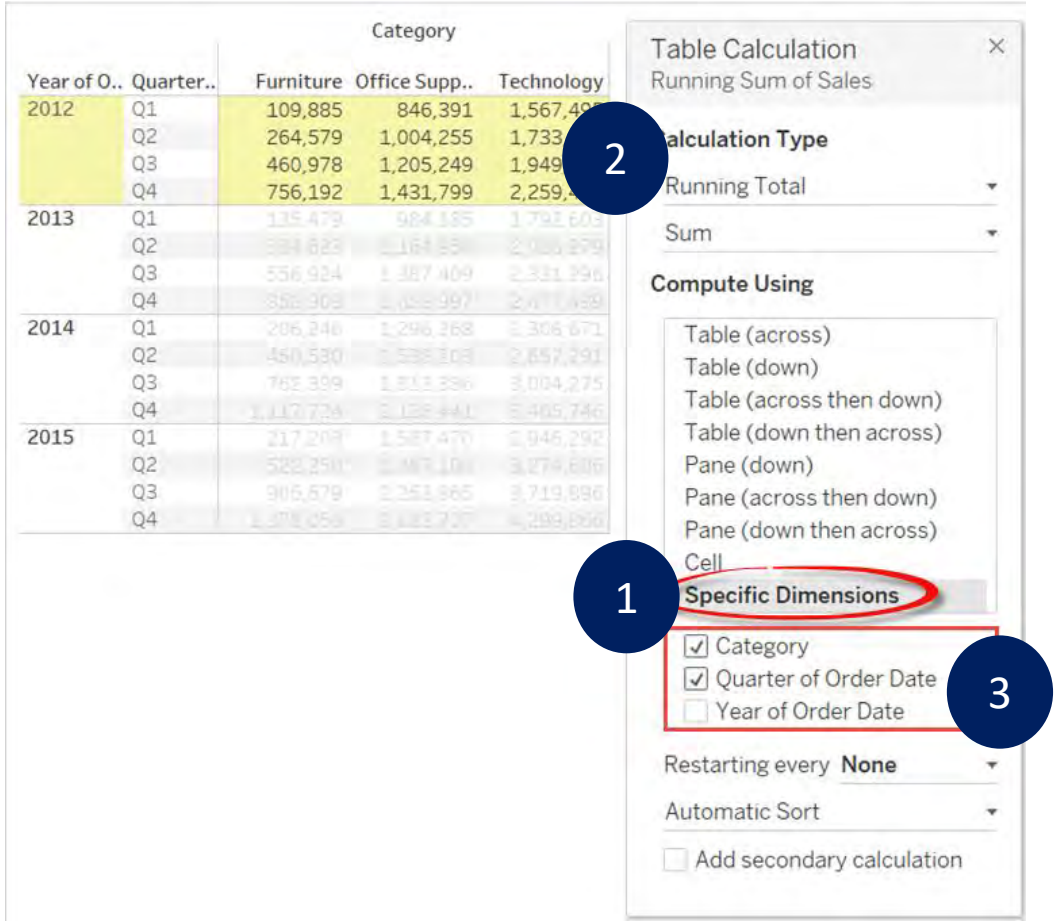
- Running total
- Difference
- Percent difference
- Percent of total
- Rank
- Percentile
- Moving average
- YTD Total
- Compound growth rate
- Year over year growth
- YTD Growth

How to Translate Table Calculations

Start from the bottom and read up

For every:

1. Category and Quarter of Order Date
2. Calculate the Running Total Sum
3. by Year of Order Date



Level of Detail Calculations (LOD)

Level of detail refers to the granularity or aggregation of the data in your view

LOD calculations:

- More precise control over the granularity or aggregation levels shown in your view
- Useful for looking at data that might otherwise be misleading when aggregated

Use for: https://www.tableau.com/about/blog/LOD-expressions

- Cohort Analysis
- Totals and averages across segment
- Aggregates of aggregates
- Binning aggregates

LOD Syntax and Calculation Types

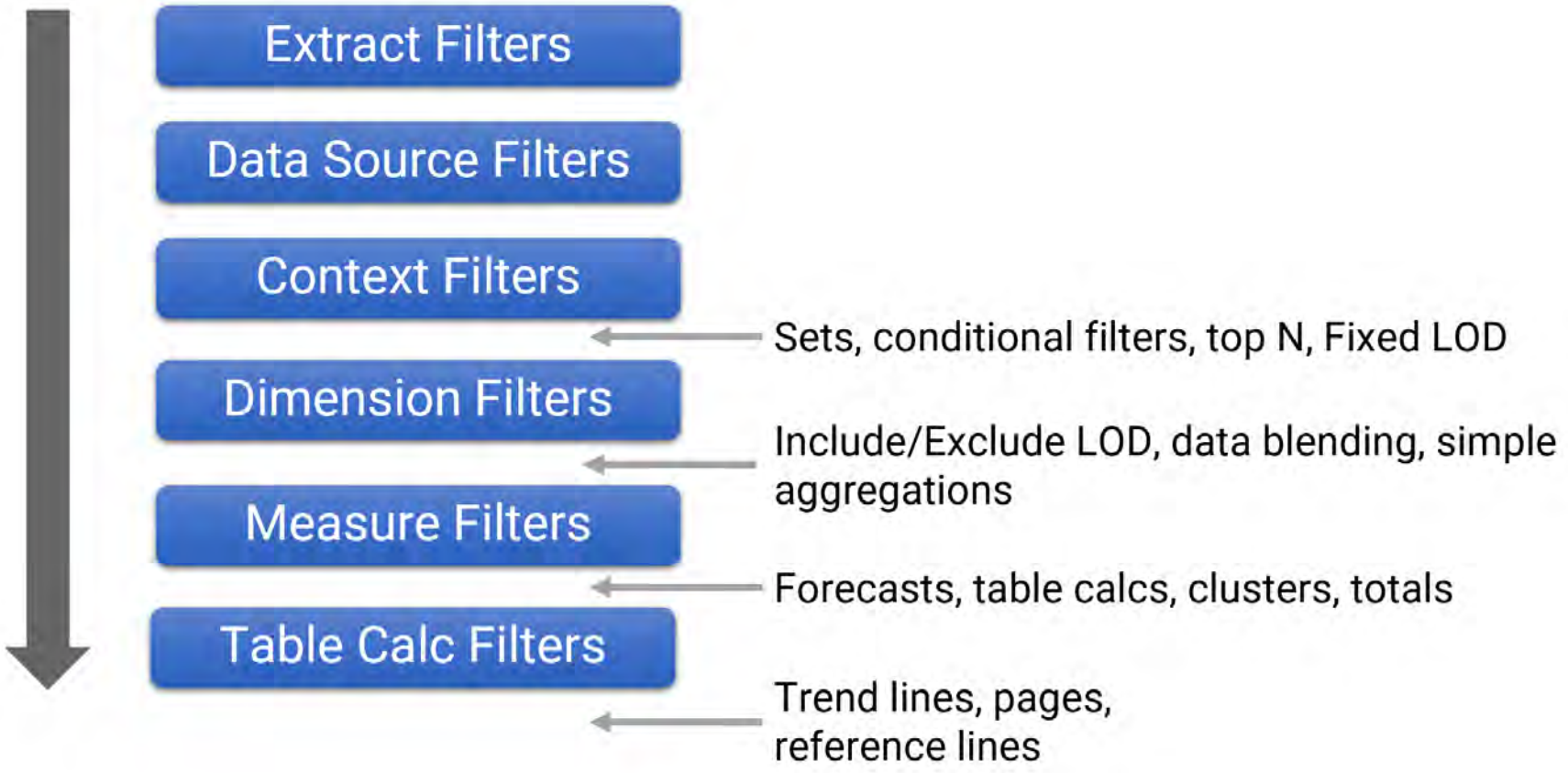
Syntax structure:

```
{Keyword [Column1], [Column2], [ColumnN]: Aggregate Expression}
```

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

Keyword	Description	Example
FIXED	Allows you to specify the aggregation or granularity independent of the fields used in the level of detail of the visualization.	`AVG({FIXED [State]:SUM([Sales])})` Total sales for each state, averaged across all states.
INCLUDE	Calculates results at a level less aggregated than the visualization's level of detail.	`{INCLUDE [City]:SUM([Sales])}` Sum of Sales, including the City level of detail.
EXCLUDE	Calculates results at a level more aggregated than the visualization's level of detail.	`{EXCLUDE [City]:SUM([Sales])}` Sum of Sales, excluding the City level of detail.

Order of Operations (Query Pipeline)



Parameters

Parameters

Parameters can give the audience the ability to explore your data with more flexibility. They are stored with the workbook, not a specific data source or worksheet --- so the parameter can be used across several disparate sources.

Mind Blown!

Parameters

Parameters can give the audience the ability to explore their data and visualizations in many ways:

- Setting values for filters
- User controlled thresholds
- What-if scenarios
- Dynamic fields, axes, titles,
- Filtering across different data sources
- Top/Bottom N

Parameters

When creating parameters remember to:

Make It

Use It

Show It

Putting It All Together

Dashboards

What is a Dashboard?

A dashboard is a visual display of the **most important** information needed to achieve one or more objectives; **consolidated and arranged** on a single screen so that the information can be **monitored at a glance**.

- Stephen Few

Planning

Use these steps to guide your dashboard planning:

1. Define your purpose and audience.
2. Sketch your plan.
3. Build and test your dashboard.
4. Make your dashboard interactive.
5. Apply visual best practices to the final dashboard.

Define Purpose and Audience

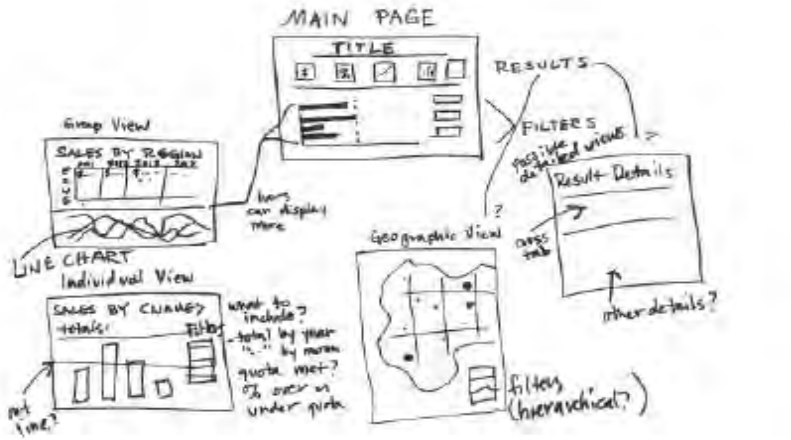
Why are you building this dashboard?

I need to	For example
Share data for discovery	Create a dashboard that gives users access to data in a consumable and interactive format that allows them to ask their own data questions.
Provide an overview of information	Develop a monthly sales dashboard that has filters so users can select which data to view.
Draw attention to specific insights about the data	Use dashboards to tell a specific data story about a scientific discovery.

Who is your audience?

My audience includes	For example
Users looking for specific information (more interactive)	Trainers viewing evaluation scores over time to track performance.
Information consumers (more passive)	Managers and directors who want to know why sales are down in the East region.

Sketch Your Plan



Which worksheets will you use?

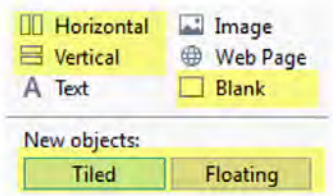
Allow users to drill down from high-level to granular-level detail?

Utilize filters, actions, or parameters for interactivity?

Link to multiple dashboards?

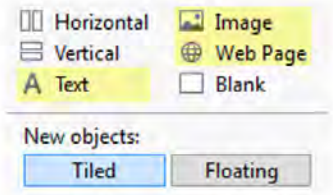
Building Your Dashboard

- Start with layout
  - Decide how best to add worksheets
  - Dependent on worksheet type and layout preferences



Layout options

- Horizontal/Vertical: tiling direction
- Blank: create white space in your dashboard
- Tiled/Floating: set option for adding new items



Non-worksheet options

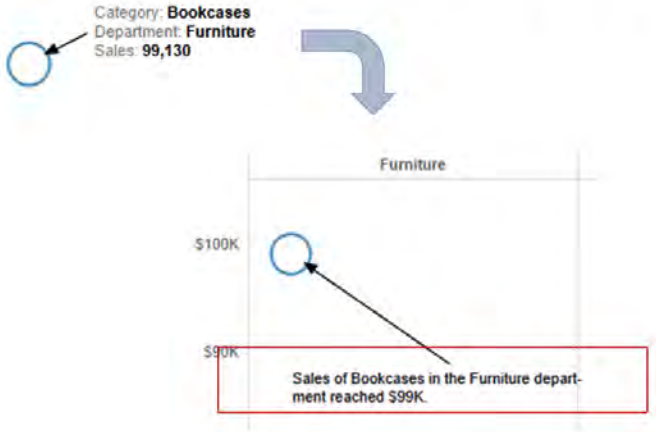
- Text: instructions, notes, descriptions
- Image: company logos, other images
- Web page: URLs

Instructions and Annotations

Add instructions and use a common font color, size, and style

- Rename a filter in the view so it reads as an instruction to the user

- Edit default annotations for clarity



Visual Best Practices

Color

Limit number of colors used; use brightest for most important data. *(Two shades of same hue suggest relationship)*

Sizing

Keep users' screens in mind (Laptops? Tablets? Giant monitors?)

Fonts

READABLE? Sized correctly? Keep it simple—let the data do the talking.

Remove extras

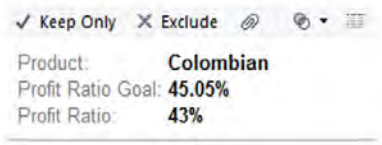
Are all those legends necessary?

Titles

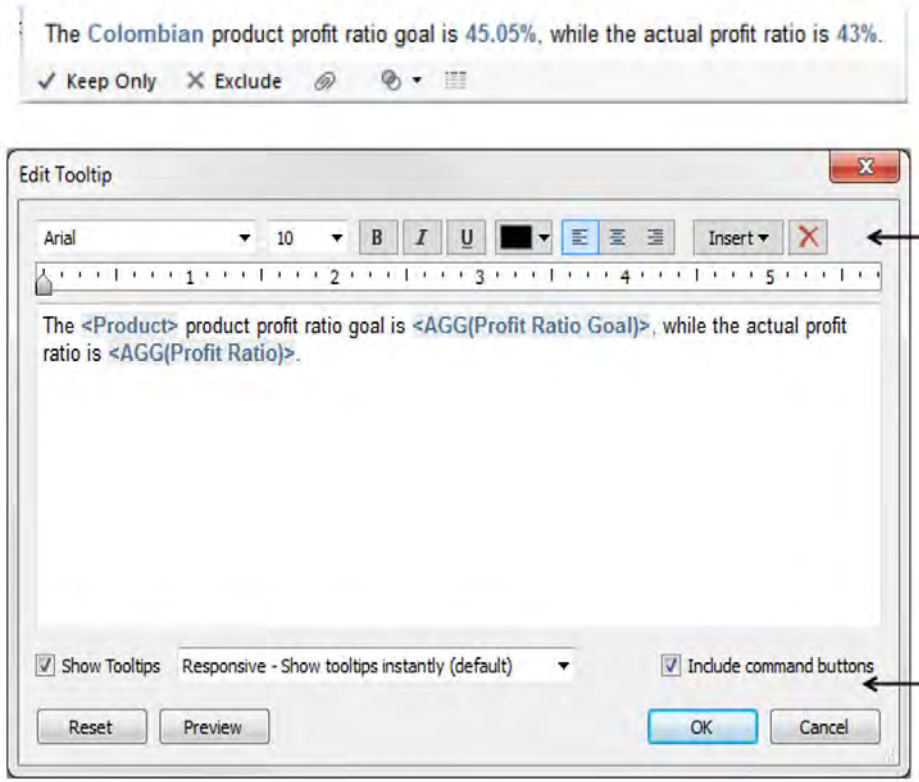
Make them useful (to help navigating dashboard); remove if unnecessary.

Tooltips

Go from this:



To this:



You can edit Tooltip fonts, colors, and alignment.

You can also change how Tooltips display, and include or exclude the command buttons.

Remove Chart Junk

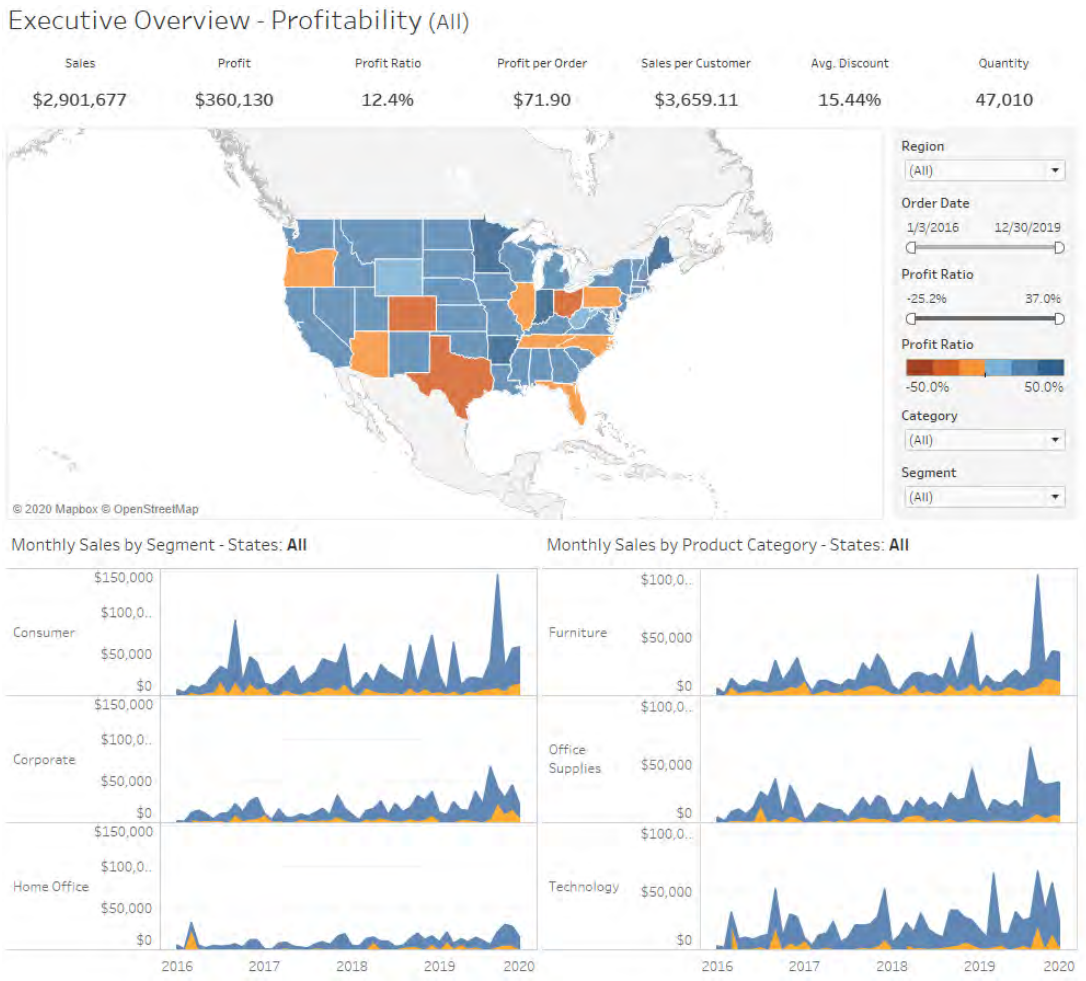
Remove Chart Junk

What is unclear or cluttered?

- Axis values clear and compact?
- Appropriate filters?
  "Cascading filters" help guide users through filter options.
- Dashboard overcrowded with too many worksheets, filters, or legends?
  Use multiple dashboards or even individual visualizations with actions between them.
  Use the Show/Hide containers to simplify the view.

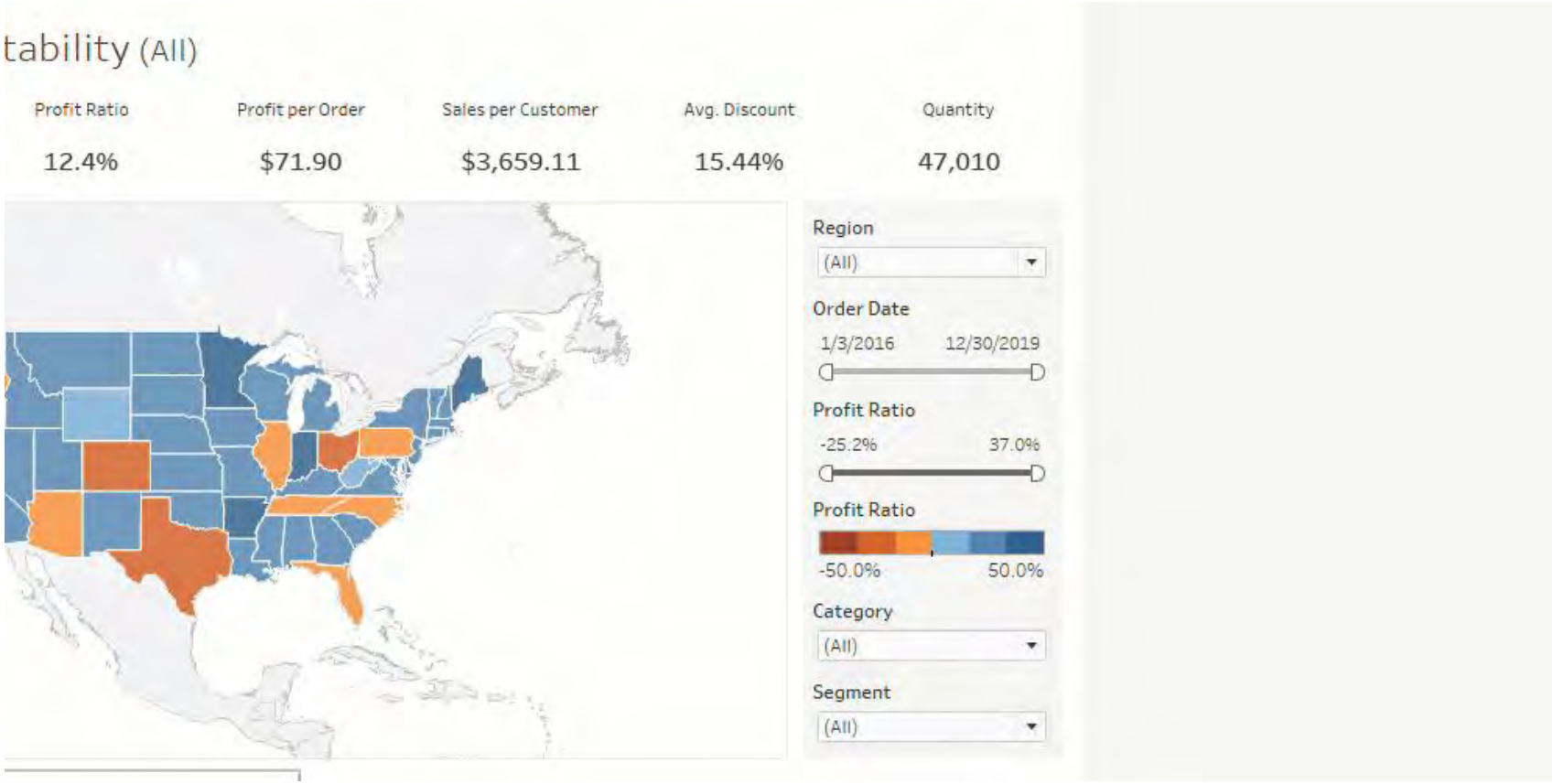
https://www.tableau.com/about/blog/2017/10/7-tips-and-tricks-dashboard-experts-76821

Example



Cluttered

Show/Hide Containers



Improving Performance

Everything in life is better in moderation

Tableau is not faster than your database

If it is slow in Tableau Desktop, it will be slow in Tableau Server

Resources

Support

- **tableau.com/support**
- **kb.tableau.com**
- **tableau.com/support/help**
- **tableau.com/learn/classroom**
- **https://onlinehelp.tableau.com/current/pro/desktop/en-us/shortcut.html**

Calculations:
https://community.tableau.com/community/viz-talk/tableau-community-library/twl

SharePoint Excel:

https://kb.tableau.com/articles/howto/connecting-to-sharepoint-based-excel-file

Community

- **community.tableau.com/welcome**
- Twitter
- Blogs
- Tableau User Groups
- Makeover Monday/Workout Wednesday
- Tableau Conference
  https://tc19.tableau.com/learn/sessions