Tableau Desktop III: Advanced

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Class Agenda

Pacing will be shared by your instructor and will vary based on class schedule.

1. Review: Calculations

2. Advanced Table Calculations

3. Level of Detail Expressions

4. Analyzing Time-Based Data

5. Analyzing Customer Behavior

6. Geographical Analysis

7. Advanced Techniques for Dashboards

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How to Use the Class Materials

- Practice Guide
  - High-level goals and images
  - Direction steps
  - Detailed solution steps in the back of the book

- **Practices** folder
  - **Data** folder, with data sources for reference
  - **Workbooks** folder, with starter and solution .twbx files (plus sample .twbx files)
  - **Workbooks_menu.htm** page, for easy access to starter and solution .twbx files

Selecting your Tableau Environment for Class

Course activities can be completed in the Tableau Desktop application or in the browser.
Refer to your registration email details and instructor guidance to select the best tools.

Authoring in Tableau Desktop Using Tableau Desktop installed on your Computer	Authoring in the Browser Using Tableau Cloud or Tableau Server
• Install Tableau Desktop Follow instructions to download a fully-licensed or trial version.	• Obtain Tableau Administrator approval Approval to use a company-owned site for training purposes is recommended. Alternatively, use a trial.
• Verify your version aligns with course Course activities assume you are using the same version as listed in the manual. If desired, download a trial.	• Confirm **Creator** role and publish permissions Check your site role in My Account Settings. Explorer or Viewer roles may not be able to complete practices.
• Confirm your active license Your Tableau Administrator can help you obtain a license or you can use a trial.	• Select a project folder you'll use in class Use your Personal Space or request a Sandbox/Test project from your Tableau Administrator.

Using Tableau Desktop in class is most common

For additional instructions, see the **Reference** section of your practice manual.

For Mac Users: Keyboard and Mouse Differences

Windows-based instruction	Difference on a Mac
CTRL + click	Press and hold the Command ⌘ key while you click.
Right-click	When using a mouse with no right-click button, press and hold the control key while you click.
Right-click and drag	Press the Option ⌥ Alt) key, and hold it down while you click and drag.
Press CTRL	Press Command ⌘.
Press CTRL + Left Arrow	Press Command ⌘ + Control + Left Arrow

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Review: Calculations
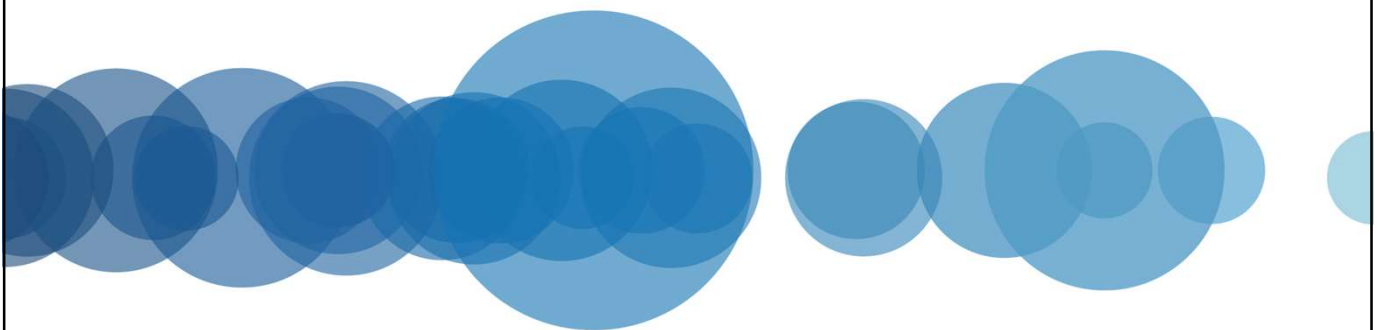
Review: Calculations

- Introduction and Review
  - Number Functions
  - String Functions
- Practice: Review – String Calculations for Customer Names
  - Date Functions
  - Type Conversion Functions
  - Logical Functions
  - Aggregate Functions
  - User Functions
- Considerations for Calculated Fields
- Practice: Using a Date Calculation for a Dynamic Chart

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Number Functions

- Number functions perform mathematical functions on numbers and return the result as another number.
  - Useful when a simple math function was not already present in the underlying data.
- Common number functions:
  - ABS
  - ROUND
  - MIN, MAX
  - ZN

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String Functions

- String functions manipulate or query information about strings.
  - Useful for improving presentation, gaining a deeper understanding about parts of fields.
- Common string functions:
  - LEFT, RIGHT, MID
  - SPLIT
  - CONTAINS, ENDSWITH, STARTSWITH
  - FIND, FINDNTH
  - MIN, MAX
  - REGEXP_REPLACE
  - LOWER, UPPER

Practice: Review – String Calculations for Customer Names

Global Superstore.xlsx

- Create a view that shows Customer Name as last name, first initial, grouped alphabetically on rows.
- Include a filter to select a letter and show customers in that selection.

Date Functions

- Date functions manipulate, compare, or query information about dates.
  - Many date functions use **date_part** to indicate the specific part of the date to be manipulated.
- Common date functions:
  - MONTH, YEAR, DAY, DATEPART
  - DATENAME, DATEPARSE
  - DATEDIFF
  - DATEADD
  - DATETRUNC
  - MIN, MAX
  - TODAY, NOW
  - ISDATE
- Gregorian calendar or ISO-8601?
  - If your business uses a week-based calendar, you can change from Tableau's default Gregorian calendar to the ISO-8601 calendar.

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Type Conversion Functions

- Type conversion functions convert the result of any expression from one data type to another.
  - Use the result in a calculation that requires a different data type.
- Common type conversion functions:
  - DATE, DATETIME, MAKEDATE, MAKEDATETIME, MAKETIME
  - STR
  - INT
  - FLOAT

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Logical Functions

- Logical functions evaluate conditions and return values based on the result.
  - Useful for categorizing, filtering, excluding, combining records.
- Logical functions include:
  - IF-THEN-ELSE-END
  - ELSEIF
  - IIF
  - CASE-WHEN-ELSE-END
  - IFNULL, ISNULL, ZN

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Aggregate Functions

- Aggregate functions perform a calculation on a set of values at the level of granularity of the view, and return a single value.
  - Useful for summarizing data (for example, the average of numbers in a measure).
- Common aggregate functions include:
  - AVG, SUM, MEDIAN, PERCENTILE
  - STDEV, STDEVP, VAR, VARP
  - COUNT, COUNTD
  - MAX, MIN
  - ATTR
  - CORR, COVAR, COVARP

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User Functions (and Additional Functions)

- User functions allow you to reference the identity, domain, and group membership of the current user on Tableau Server or Tableau Cloud.
  - These functions can be used to create filters based on the current user.
- Common user functions:
  - FULLNAME, USERNAME, USERDOMAIN
  - ISFULLNAME, ISUSERNAME, ISMEMBEROF
- Additional Functions
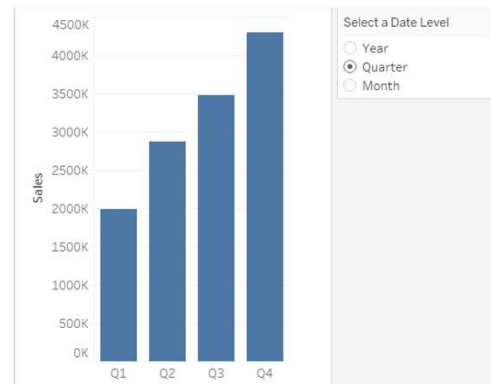 - RAWSQL

Considerations for Calculated Fields

- Can you use a Tableau feature instead of a calc?
  - Examples: custom split from Data pane, groups, sets, bins, other features.
- Some calculation best practices:
  - Choose meaningful names.
  - Include comments.
  - Add indents and line breaks for readability.
- Keep performance in mind when using and choosing calculations.

Practice: Using a Date Calculation for a Dynamic Chart

Global Superstore.xlsx

- Create a view that shows Sales aggregated by Year, Quarter, or Month of the Order Date.
- Include a parameter that allows users to select the date aggregation level.

Advanced Table Calculations

Advanced Table Calculations

- Advanced Table Calculations Review
- Table Calculation Types
- Table Calculation Scope and Direction
- Practice: Review – Secondary Table Calculations
- Practice: Using Specific Dimensions
- Customizing Table Calculations

- Practice: Customizing Table Calculations
- Practice: Difference from Average
- Practice: Weighted Average Sales
- Filters and Table Calculations (2 slides)
- Practice: Filtering Table Calculations
- Pareto Charts
- Practice: Pareto Chart

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Advanced Table Calculations Review

Common Use Cases:
- Make relative comparisons
- Calculate running totals
- Compute percentage of a whole
- Index to an average
- Shift data to be relative to an event or a common baseline
- Display flexible weighted averages
- Perform statistical calculations and rankings

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Table Calculation Types

Types:
- Difference From
- Percent Difference From
- Percent From
- Percent of Total
- Rank
- Percentile
- Running Total
- Moving Calculation

Options:
- Relative to
- Compute compounded rate
- Ascending
- Descending
- Computation
- Secondary Calculation

Table Calculation Scope and Direction

- Scope:
  - Table
  - Pane
  - Cell
- Specific Dimensions: Set scope and direction manually
  - Use when you want to skip over a dimension in the view.
  - Checked dimensions define direction.
  - Unchecked dimensions define scope.

Practice: Review – Secondary Table Calculations

Global Superstore.xlsx

View 1: Show cumulative product sales by segment.
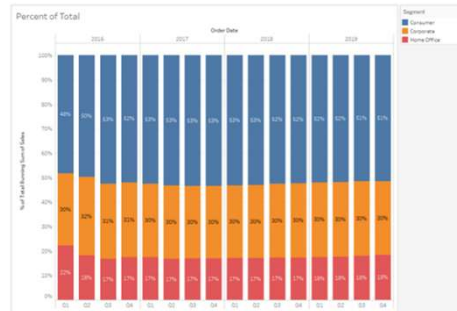
View 2: Add a secondary table calculation to show cumulative product sales by segment as a percent of total sales.

Practice: Using Specific Dimensions

Global Superstore.xlsx

- Create a view that shows Sales for each State by Year of Order Date.
- Show Rank of Sales along State for each Year of Order Date.
- Create an animated bar chart to show yearly top 20 states ranked by Sales.

State	Year of Order Date	Rank of Sales along State	Sales
Alabama	2016	18	$6,139
	2017	30	$3,892
	2018	20	$7,651
	2019	37	$1,828
Arizona	2016	13	$8,295
	2017	12	$9,611
	2018	21	$6,242
	2019	16	$11,134
Arkansas	2016	16	$6,303
	2017	42	$444
	2018	33	$2,224
	2019	35	$2,708

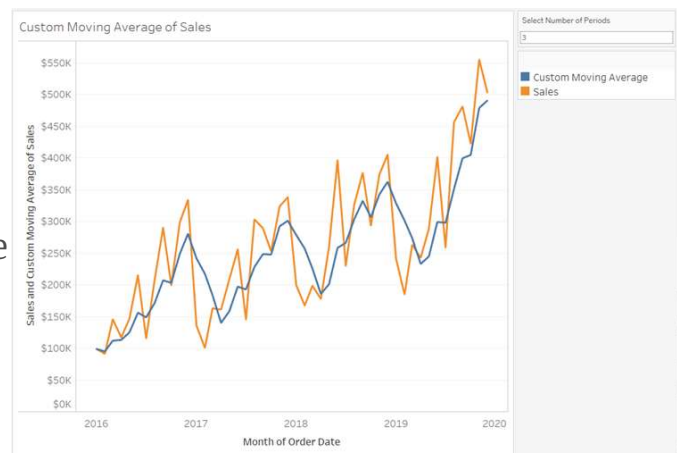## Customizing Table Calculations

- Drag table calc from a card to an open Calculated Field editor.
- Save a table calc (drag to Data pane) and then edit.
- Helper functions:
  - INDEX, FIRST, LAST
  - SIZE
- Primary functions:
  - LOOKUP
  - TOTAL
  - PREVIOUS_VALUE
  - Running calculations (RUNNING_SUM, RUNNING_AVG, etc.)
  - Window calculations (WINDOW_AVG, WINDOWS_SUM, etc.)
  - WINDOW_CORR, WINDOW_COVAR, WINDOW_COVARP
 - RANK

Practice: Customizing Table Calculations

Global Superstore.xlsx

- Create a Moving Calculation table calculation.
- Customize it to use Average instead of Sum.
- Incorporate a parameter to set the number of periods (months) to use in the average.

Practice: Difference from Average

Global Superstore.xlsx

- Show difference between actual quartely sales and the average sales for that year using a customized table calculation.
- Show difference between actual quarterly sales and the average overall sales.
- Show reference lines for average sales for each year and the overall average.
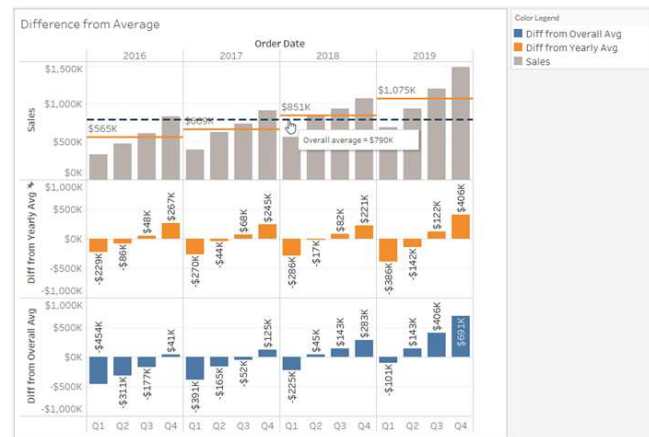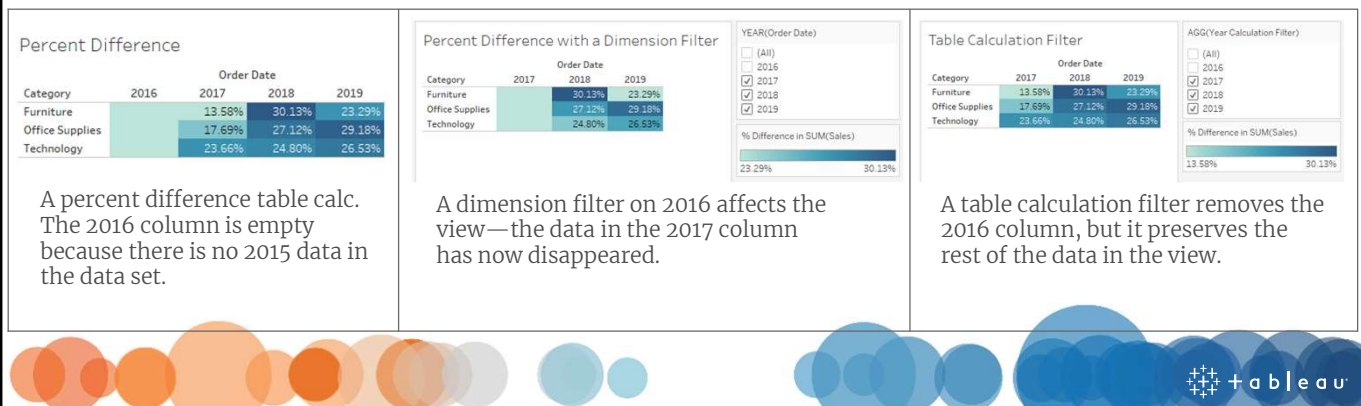

Practice: Weighted Average Sales

Global Superstore.xlsx

- Show average sales by product sub-category.
- Calculate weighting factor based on quantity ordered for each product compared to quantity ordered for all products.
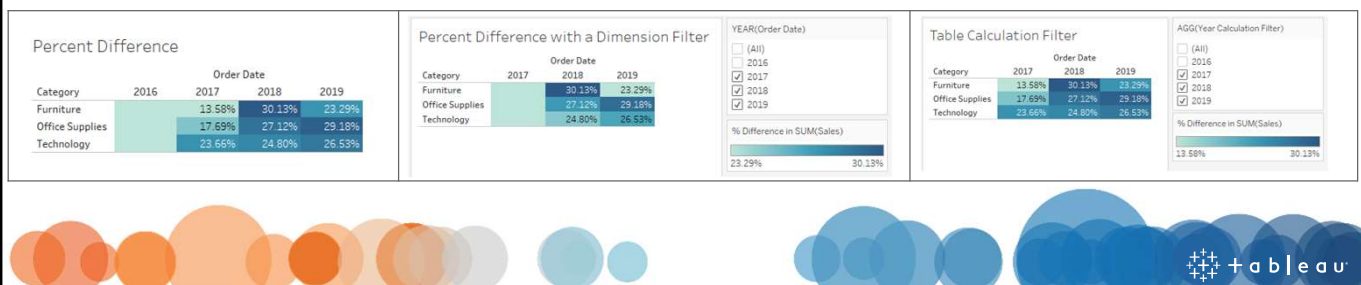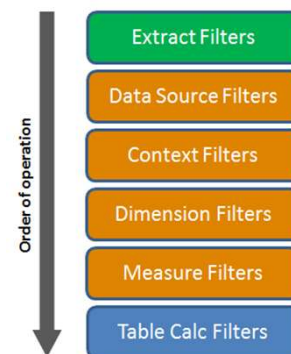- Show weighted average sales for each product sub-category.

Filters and Table Calculations

- A dimension filter on a table calc will filter the underlying data, which can change the data in the view.
- Table calculation filters are a way to filter a table calc and also retain the underlying data.
  - Table calc filters are applied last—after query results have been returned.

A percent difference table calc. The 2016 column is empty because there is no 2015 data in the data set.

A dimension filter on 2016 affects the view—the data in the 2017 column has now disappeared.

A table calculation filter removes the 2016 column, but it preserves the rest of the data in the view.

Filters and Table Calculations

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  - Table calc filters are applied last—after query results have been returned.

Order of operation:
- Extract Filters
- Data Source Filters
- Context Filters
- Dimension Filters
- Measure Filters
- Table Calc Filters

Practice: Filtering Table Calculations

Filter Table Calculations Starter.twbx

Difference in Sales

Business Unit		Quarter		
		Q2	Q3	Q4
Consumer	Sales	30,718	27,635	51,348
	Difference in Sales ..	21,548	-3,083	23,713
Enterprise	Sales	18,354	35,691	48,745
	Difference in Sales ..	3,105	17,337	13,054

Filtered Totals

Business Unit		Quarter	
		Q3	Q4
Consumer	Sales	27,635	51,348
	Difference in Sales ..	-3,083	23,713
Enterprise	Sales	35,691	48,745
	Difference in Sales ..	17,337	13,054
Grand Total	Sales	63,326	100,093
	Difference in Sales ..	14,254	36,767

View 1: Filtered Table Calculations
- Create a dimension filter, observe the results.
- Replace with a table calculation filter, note the difference.

View 2: Filtered Totals
- Show totals by quarter
- Adjust the table calculation filter to also apply to the totals.

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Pareto Charts

- Pareto principle: For many events, roughly 80% of the effects come from 20% of the causes.
- Pareto charts rely on table calculations and secondary table calculations.
- Examples:
  - Showing the percentage of total sales from the top % of products or customers.
  - Seeing how many products account for 80% of the total profit. (Is it 20%? How close?)
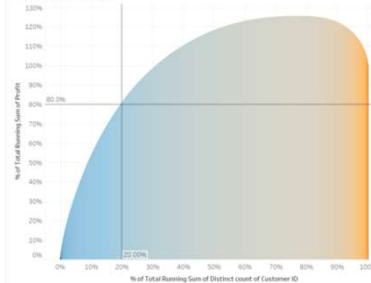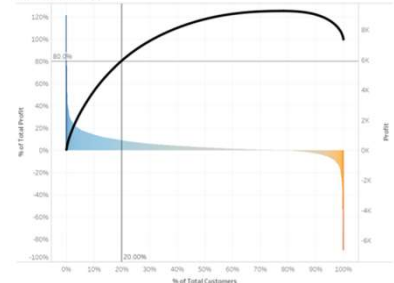
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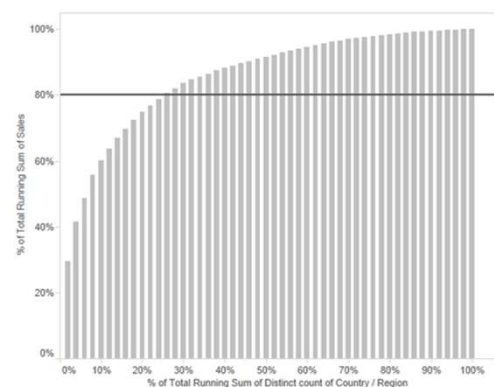
Practice: Pareto Chart

Global Superstore.xlsx
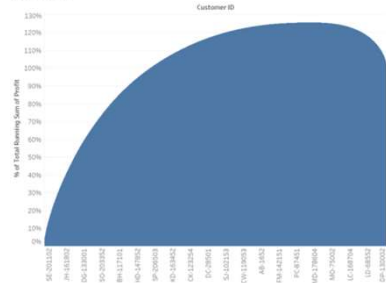
- View 1: Basic
  - Running Total
  - Secondary calc: % of Total
- View 2: Intermediate
  - Colored by Profit
  - 80/20 Reference Lines
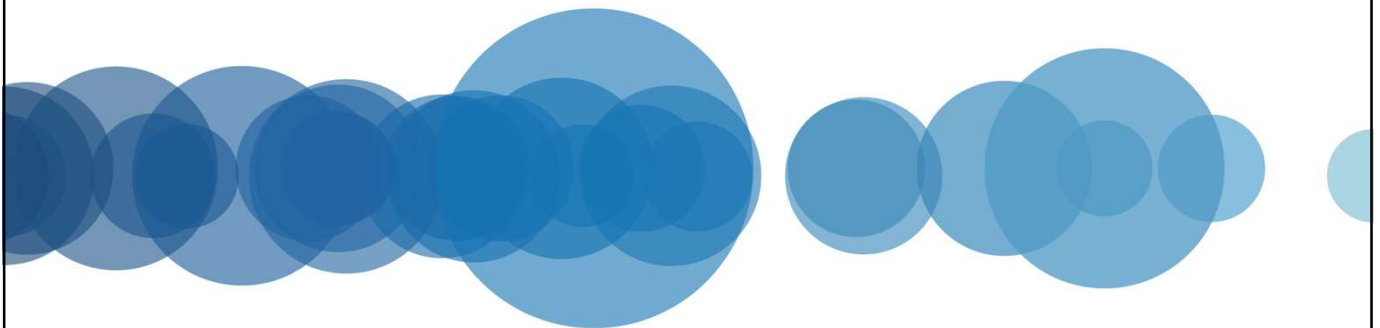- View 3: Complete
  - Profit on secondary axis
  - View SUM (Profit)∆ as line

Level of Detail Expressions

Level of Detail Expressions

- LOD Introduction and Review
- FIXED LOD Expressions
- Practice: Customer Order Frequency (FIXED)
- Filters and LOD Expressions (2 slides)
- INCLUDE LOD Expressions
- Practice: Country and Customer Sales (INCLUDE)

- EXCLUDE LOD Expressions
- Practice: Country and Regional Sales (EXCLUDE)
- Nested LOD Expressions
- Practice: Average Shipping Costs (Nested)
- Discussion: Comparing Types of Calculations (2 slides)
- Practice: Choosing Calculation Types

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LOD Introduction and Review

- Level of detail (LOD) expressions allow you to ask questions of your data that aren't limited or determined by the fields in the view.
- Useful for comparing the values in the view against different or related values independent of the view.

Syntax:

{Keyword [Dimension1], [DimensionN] : Aggregate Expression}

Example:

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

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FIXED LOD Expressions

- A FIXED expression:
  - Associates an aggregate expression to a particular dimension(s) regardless of what dimensions and values are currently in the view.
  - Ignores the level of detail in the view when calculating the expression (although the view can influence how the results are displayed).
  - Can be converted to measures or dimensions.
    - (INCLUDE/EXCLUDE are always measures)
- "Table-scoped" LOD:
  - A FIXED expression that returns the aggregate of all the data for that value.
  - Example: {SUM ([Profit])} returns total sum of Profit for entire table.

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Practice: Customer Order Frequency (FIXED)

Global Superstore.xlsx

- Show number of purchases made by each customer.
- Use FIXED expression as a dimension to determine how many customers made 1, 2, N purchases.

Count of Orders per Customer

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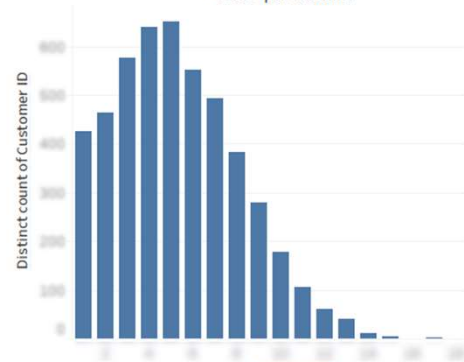
Filters and LOD Expressions
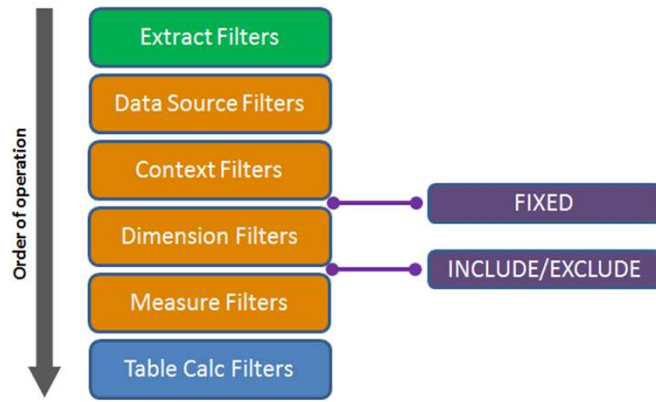
- FIXED: Only affected by context filters and filters on the data source
- INCLUDE and EXCLUDE: Are affected by dimension filters.

Filters and LOD Expressions (cont'd): Example

Region filtered to **EMEA,** LODs using **Segment** and **SUM(Sales)**

Region	Segment	Sales	{FIXED [Segment]: SUM([Sales])}	{INCLUDE [Segment]: SUM([Sales])}	{EXCLUDE [Segment]: SUM([Sales])}
EMEA	Consumer	406,745	6,507,949	406,745	806,161
	Corporate	250,571	3,824,698	250,571	806,161
	Home Office	148,845	2,309,855	148,845	806,161

- **Sales** reflects the sum of sales for each segment in the EMEA region (the most granular level of detail in the view).
- **FIXED** ignores the EMEA filter and instead returns the sum of sales for all regions in each segment, not just EMEA.
- **INCLUDE** includes the Segment dimension in the calculation. In this example, Segment is also in the view, so the results aggregate to the level of detail in the view (Sales).
- **EXCLUDE** omits Segment from the calculation, and therefore returns the sum of Sales at the remaining level of detail in the view (the EMEA region), repeating it for each Segment in the view.

INCLUDE LOD Expressions

- INCLUDE expressions factor in everything in the view including dimensions in the LOD even if those dimensions are not in the view.

- Use when:
  - There is a dimension you want to use but don't want to add to the view.
  - You want the value of the expression to update when you add, remove, or filter on fields in the view.


State	Sales	Avg. { INCLUDE [City]:SUM([Sales])}
Alabama	19,511	2,439
Arizona	35,282	2,714
Arkansas	11,678	1,298
California	457,688	5,650
Colorado	32,108	2,007
Connecticut	13,384	1,338
Delaware	27,451	9,150
District of Columbia	2,865	2,865
Florida	89,474	2,485
Georgia	49,096	4,463
Idaho	4,382	730
Illinois	80,166	2,429
Indiana	53,555	3,570
Iowa	4,580	572

Practice: Country and Customer Sales (INCLUDE)

Global Superstore.xlsx

- Show overall sales and profit for countries in the APAC market.
- Compare those values against the average sales and average profit per customer for that market using INCLUDE expressions.
- Show average profit on color on the Average Sales axis to compare average sales vs. average profit.
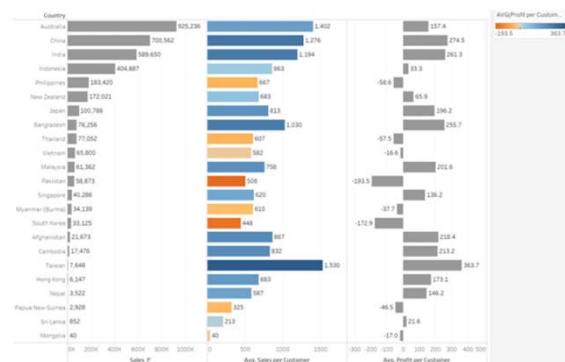
EXCLUDE LOD Expressions

- EXCLUDE expressions factor in everything in the view except the dimensions in the LOD even if they are present in the view
- Use when:
  - You want to maintain focus on a portion of data regardless of whether it is selected.
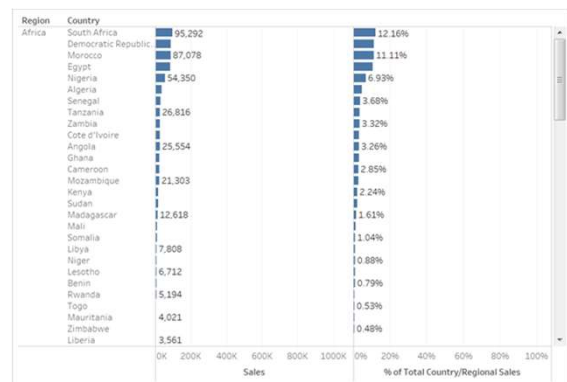 - You want the value of the expression to update when you add, remove, or filter on fields in the view.

Practice: Country and Regional Sales (EXCLUDE)

Global Superstore.xlsx

- Determine overall sales for the countries in the EMEA market.
- Compare those values against the percent of sales for each country's region using an EXCLUDE LOD expression.

Nested LOD Expressions

- An LOD within an LOD

- Examples:

{FIXED [Country] : MAX ({FIXED [Order ID] : SUM ([Sales])})}

{FIXED [State] : AVG ({INCLUDE [Customer ID] : SUM ([Sales])})}

Practice: Average Shipping Costs (Nested)

Global Superstore.xlsx

- Use a nested LOD expression to determine the maximum shipping cost for an order in a given country.
- Show that value averaged across markets and regions, so that each bar represents the average maximum shipping cost for the countries within that region.

Market	Region	Value
APAC	Central Asia	$545.46
	North Asia	$783.69
	Oceania	$737.79
	Southeast Asia	$554.19
EMEA	Africa	$298.96
	Central	$680.34
	EMEA	$293.35
	North	$391.44
	South	$673.00
LATAM	Caribbean	$338.26
	Central	$561.36
	North	$855.43
	South	$420.31
USCA	Canada	$583.15
	Central	$1,288.99
	East	$1,288.99
	South	$1,288.99
	West	$1,288.99

Avg. Largest Order Shipping Cost by Country
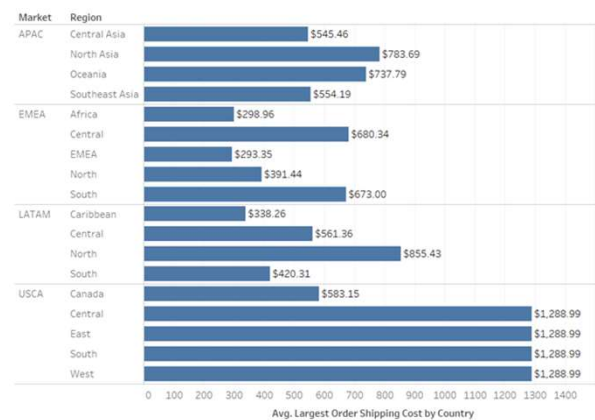
Discussion: Comparing Types of Calculations

<u>General</u> questions to aid decision-making:

- Do you have the data values you need in the visualization?
  - If not, consider a calculated field.
- Do you need results from other rows to perform a row calculation? (does solution require ranking, recursion, moving calcs, inter-row calcs?)
  - If yes, consider a table calculation.
- Does the granularity level in the view match the granularity level of your question?
  - If not, consider an LOD expression.

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Discussion: Comparing Types of Calculations

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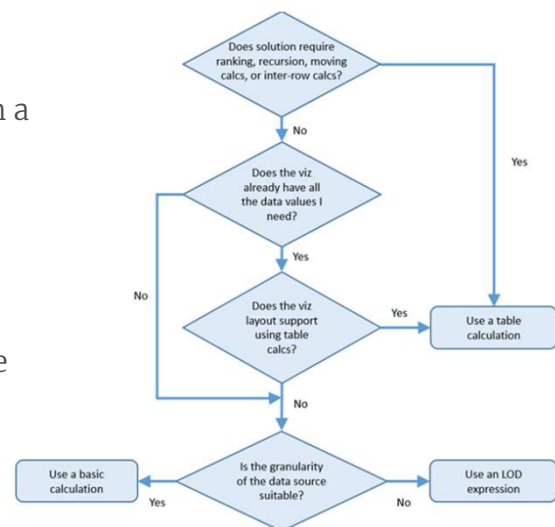
The real answer will often be "it depends"

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Practice: Choosing Calculation Types

Global Superstore.xlsx

- For each question, look at the viz and read the goal.
- Then, decide which calculation type or types could work to achieve the result.
  - You don't need to create each viz (but you can if you like).

- General answers in the back of the book
  - Choosing Calculation Types Practice.twbx.
  - Choosing Calculation Types Solution.twbx.
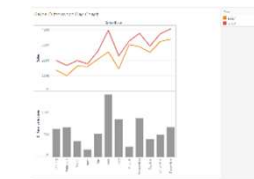
Analyzing Time-Based Data

Analyzing Time-Based Data

- Scenario: Sparklines
- Practice: Creating a Chart with Sparklines
- Scenario: Control Charts
- Practice: Creating a Control Chart
- Scenario: Bump Charts
- Practice: Creating a Bump Chart
- Scenario: Slope Chart
- Practice: Creating a Slope Chart

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Scenario: Sparklines

- Simple condensed lines showing variation over time.
- Remove borders, graph lines to focus on the changes.
- Independent axis:
  - Each sparkline has its own scale.
  - Makes variations within each dimension easier to see.

Central	~~~~~
East	~~~~~
South	~~~~~
West	~~~~~
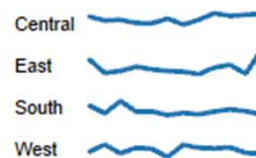
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Practice: Creating a Chart with Sparklines (Requires Tableau Desktop)

Global Superstore.xlsx

- Show sales information for 2015 by Country and filtered by Market, with each row on an independent axis.
- Filter shown to select market.
- Headers for Country and Current Sales (a calculated field).
- Title customized to indicate the selected market.
- End points on lines in orange.
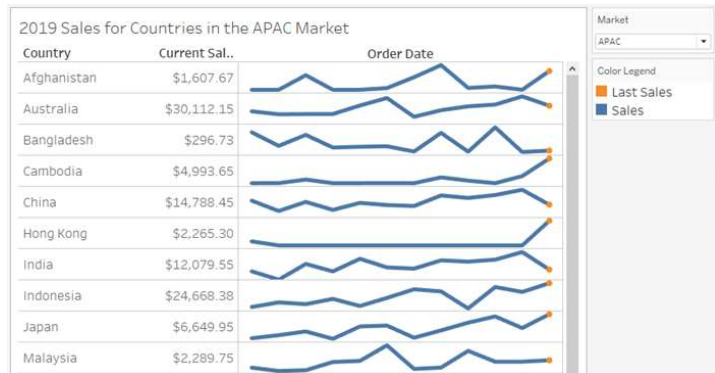
Scenario: Control Charts

- Use to highlight information that is either inside or outside a predefined boundary
- Figures within the boundary are within expected tolerances and are considered "in control."
- Helpful for identifying spikes in your data.
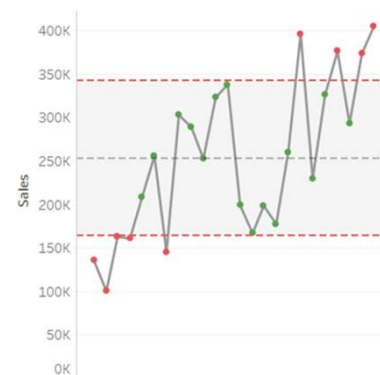
Practice: Creating a Control Chart

Global Superstore.xlsx

- Use a key performance indicator (KPI) of orange data points for sales values outside control limit, and blue for inside.
- Use a parameter to adjust the upper and lower control limits.
- Scope deviations at the yearly level, showing different ranges for multiple years in the view.
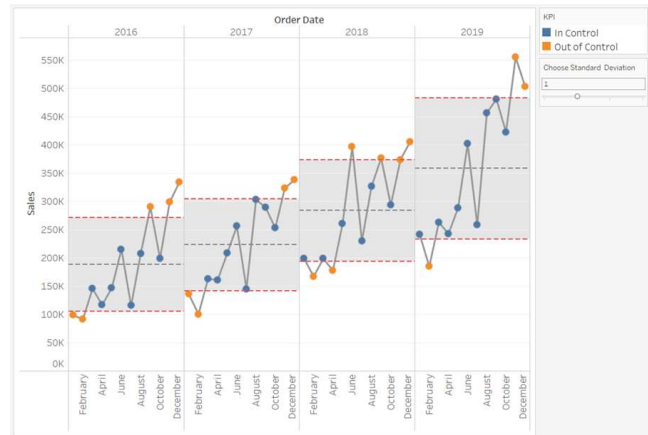
Scenario: Bump Charts

- Utilize several line graphs together in the same view to compare rankings among particular dimensions or sets of dimensions.
- Quickly show how rankings change over time.

Practice: Creating a Bump Chart
(Requires Tableau Desktop)

Global Superstore.xlsx

- Show relative sales rankings by month for each market as a bump chart.
- Convert the view to highlight table using discrete colors for each market.
- Bonus: Create a dashboard showing rank trends in sales for four markets for the 2017 calendar year.

Scenario: Slope Chart

- Shows change in rank or position for a dimension using a start point and an end point.
- Quickly identify increase or decrease and to what degree.
- Useful for showing ranked dimensions that often change.
- Examples:
  - Sports team rankings
  - Popularity
  - Changes in population
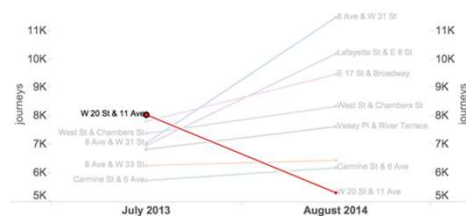
Practice: Creating a Slope Chart
(Requires Tableau Desktop)

NYCBabyNames.xlsx

- Show top ten first names for babies born in New York City.
- List names ranked by popularity for the years 2011 and 2013 on opposite axes.
- Connect names using lines, with circles at the end of each line.
- Show ranking using a stepped color ramp.
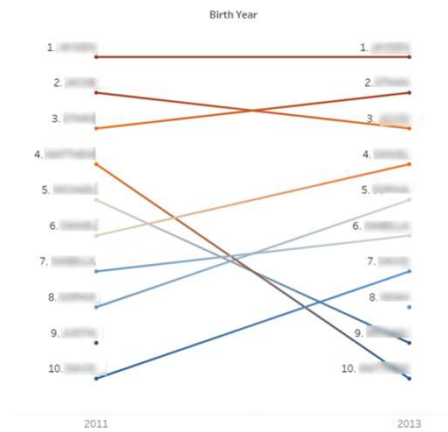
Analyzing Customer Behavior

Analyzing Customer Behavior

- Scenario: Cohort Analysis
- Practice: Annual Purchase Frequency by Customer Cohort
- Scenario: Survey Data
- Practice: Student Survey

Scenario: Cohort Analysis

- Useful for studying behavior or outcomes associated with a group over time (a cohort), such as all customers who made their first purchase in a given year.
- Use LODs to determine how parts of individual cohorts behave.
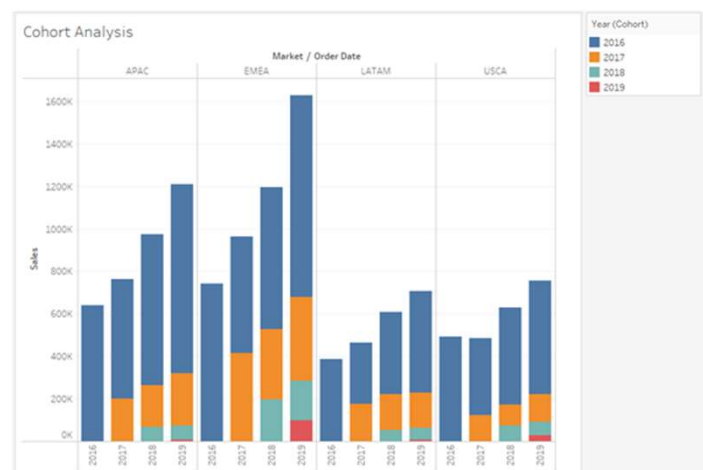
Practice: Annual Purchase Frequency by Customer Cohort

Global Superstore.xlsx

- Show yearly cohort purchase frequency as a percentage.
- Each yearly cohort shown as a separate line.
- Use a filter to select year of order date.
- Format tooltip to provide additional information.
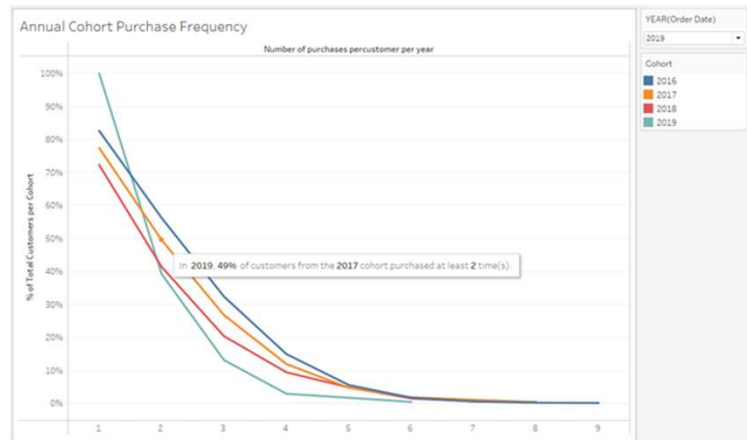
## Scenario: Survey Data

- Likert scale data
- Example:

①	②	③	④	⑤
Highly Dissatisfied	Dissatisfied	Neutral	Satisfied	Highly Satisfied
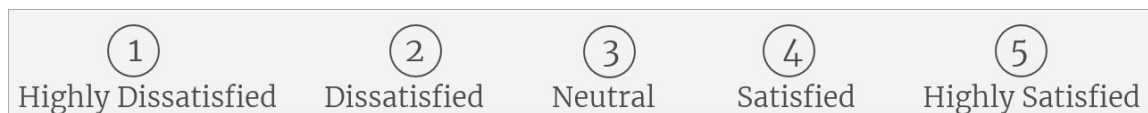
- Stacked bar charts and LOD expressions can make Likert scale data easier to interpret.

Practice: Student Survey
(Requires Tableau Desktop)

Student Satisfaction.xlsx

- Show survey results from students as a stacked bar chart, with responses per question labeled as a percentage.
- Show responses broken out by STEM and non–STEM majors.
- List average response for each question.
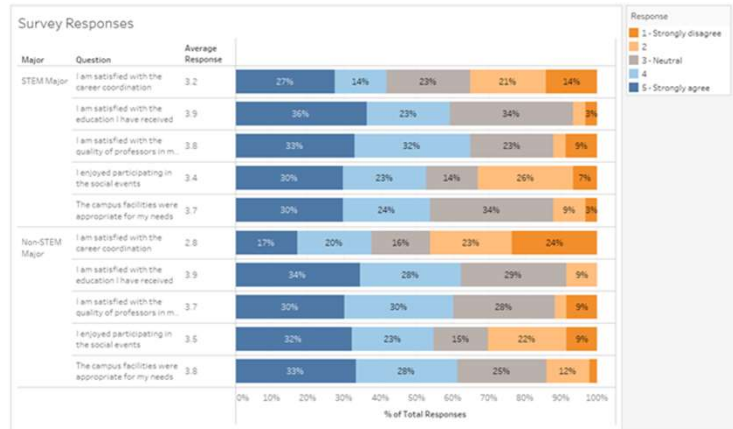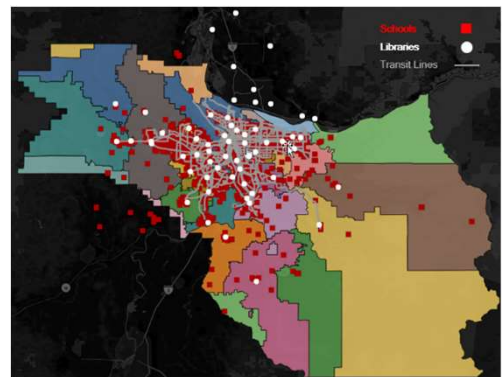

Geographical Analysis

Geographical Analysis

- Scenario: Using Marks Layers for Maps
- Practice: Using Marks Layers for Maps
- Scenario: Mapping Density with Hexbins
- Practice: Creating a Hexbin Map
- Scenario: Spatial Files (2 slides)
- Practice: Advanced Spatial Files

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Scenario: Using Marks Layers for Maps

Marks layers for maps combine multiple layers (transparent overlays) in a single viz. There is no limit to the number of layers you can use. The only restrictions are that the files used to create the map layers contain geographical fields and must come from the same data source.

1. On each layer you can: change the mark type, add captions, format color, add to detail and tooltip.

2. You can also: rename layers, hide layers, disable the on-viz selection of layers, move layers up or down in the layer stack.

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Practice: Using Marks Layers for Maps

Using_Marks_Layers_for_Maps_Starter.twbx

- Create a view that shows school districts, libraries, schools, and transit lines.
- Enable and disable the selection of marks layers per instruction.
- Change the marks for color, mark type, and size per instruction.
- Send a layer back on the layer stack per instruction.
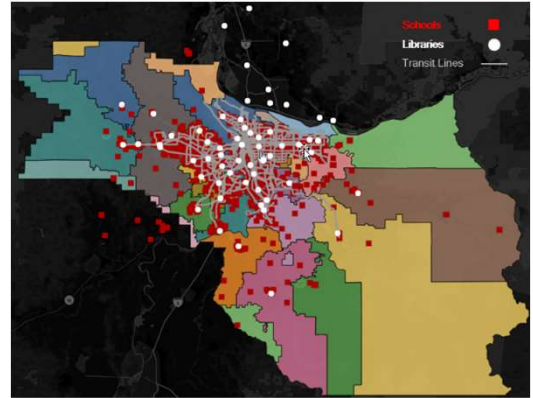
Scenario: Mapping Density with Hexbins

- Use hexbins to group data in a two-dimensional plane (x and y axis).
- Great for showing data density across an area such as a map.
- Remember that resolution of chart cannot exceed resolution of data.
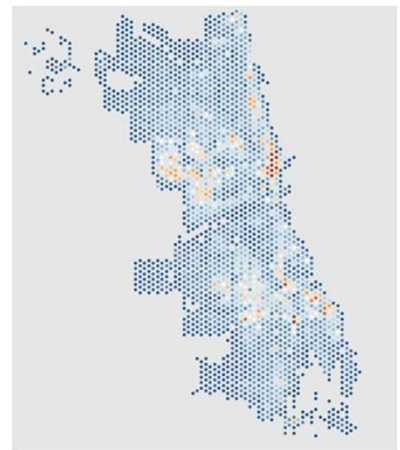
Practice: Creating a Hexbin Map
(Tableau Desktop Required)

Hexbin Map Starter.twbx

- Show density of taxicab pickups in Manhattan, NY for different times of the day.
- Ensure hexbins properly tessellate, or fit together, evenly across the surface.
- Filter the view by time range.
- Show the data in a range from 0-500, with 5 color steps.
- Hide parameter controls.
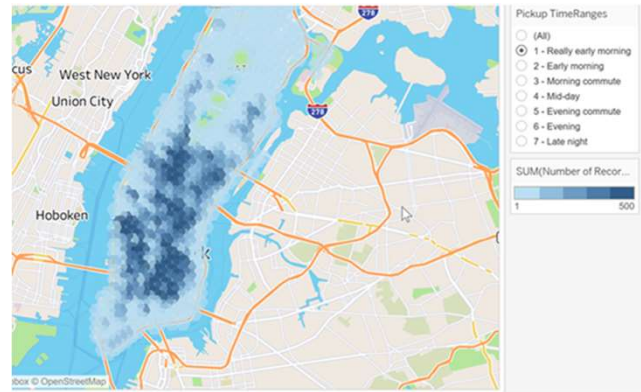
Scenario: Spatial Files

Spatial files provide spatial reference information for geographic geometries not built into Tableau
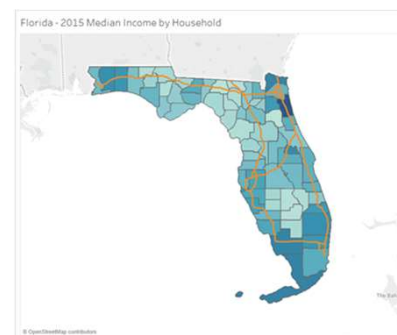- Polygons: school districts, custom sales territories
- Points: stations, hubs, factories
- Lines: roads, rivers, trails

Use a parameter to change between different levels of detail in the view
- State vs. county level, county vs. city level

Use a dual-axis map to overlay different spatial geometric types
- Lines and polygons, points and lines

Scenario: Spatial Files (cont'd)

MakePoint
- Join a non-spatial data source that has longitude and latitude coordinates to a spatial data source by using a join calculation and the MAKEPOINT function.
- Use MakePoint to add points to a map.

MakeLine
- Use MakePoint and MakeLine together to create origin-destination maps, which are useful for tracking where events such as commuting trips and delivery routes begin and end.
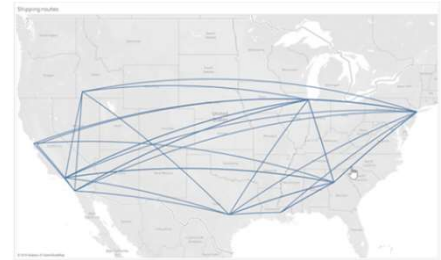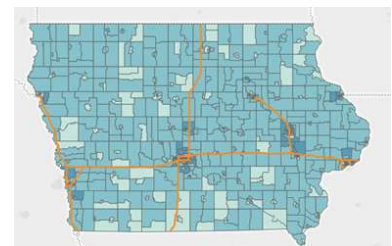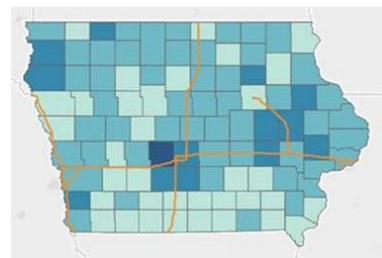

Practice: Advanced Spatial Files (Tableau Desktop Required)
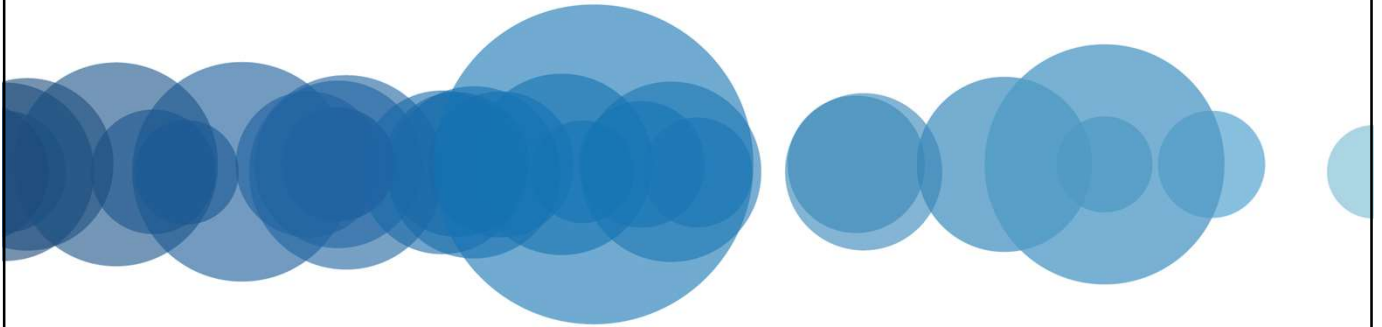
Advanced Spatial Files Starter.twbx

- Show Iowa average median income at both:
  - County level
  - Census tract level
- Interstate highway locations on map
- Parameter for switching views

Advanced Techniques for Dashboards

Advanced Techniques for Dashboards

- Dashboard Audience
- Dashboard Layout
- Dashboard Visual Elements
- Dashboard Interactive Elements (2 slides)
- Practice: Dynamic Zone Visibility in Dashboards
- Practice: Context Filters and Dashboards

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Dashboard Audience

- Know and understand your audience:
  - Influences what information you include.
  - Influences how you present it.

- Use Guided Analytics principles:
  - Direct the user from general to specific.
    - General information on top.
    - More specific information below.
    - Allows user to select and drill down to what interests them.

Dashboard Layout

- Containers create definition with your dashboard.
- Use large container and smaller containers within it.
  - Use empty space to your advantage:
    - As a design element.
    - To separate elements for readability.
    - To hide legends or to prevent interaction.
  - Use Layout tab for precise placement.
  - Border, background, white space (padding)
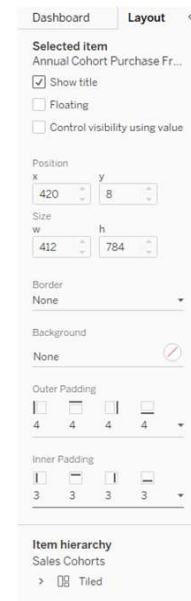
Dashboard Visual Elements

- Color added to text, containers, and borders can create variety
- Animations can engage the user.
- Bolding and borders can provide visual "pop" to your view.
  - Remember: Limited additions recommended—let the data do the talking.
- Unnecessary titles, row and column dividers should be removed.


Dashboard Interactive Elements

- Dynamic Zone Visibility
  - Use parameters and calculated fields.
  - Control the visibility of a view using dynamic zone visibility.
- Context Filters
  - Pre-filter results before other results are applied.
  - On a dashboard, combine with action filters.
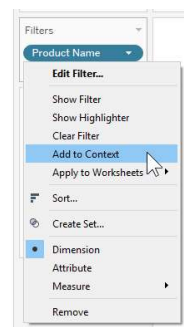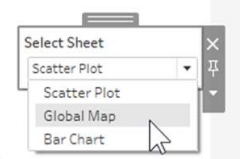
Dashboard Interactive Elements (cont'd)

- Show/Hide Dashboard Containers
  - Click a button to toggle between showing and hiding floating dashboard containers.
  - Saves space when dashboard elements don't need to be visible at all times.
- Set Actions
  - Adjust a dashboard to reflect marks that you select.
  - Allows the user to update sets directly in a dashboard.
- Parameter Actions
  - Change parameters by interacting with marks in a view.
  - Interactively update reference lines, display summary data, and display hierarchies based on selected marks.
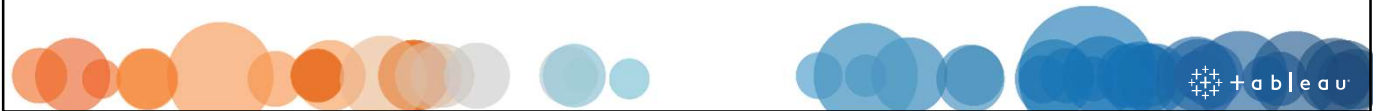
Practice: Dynamic Zone Visibility in Dashboards

Dynamic Zone_Starter.twbx

- Use a parameter and associate it with Boolean calculations.
- Use dashboard dynamic zone controls to displays the selected view and legends.
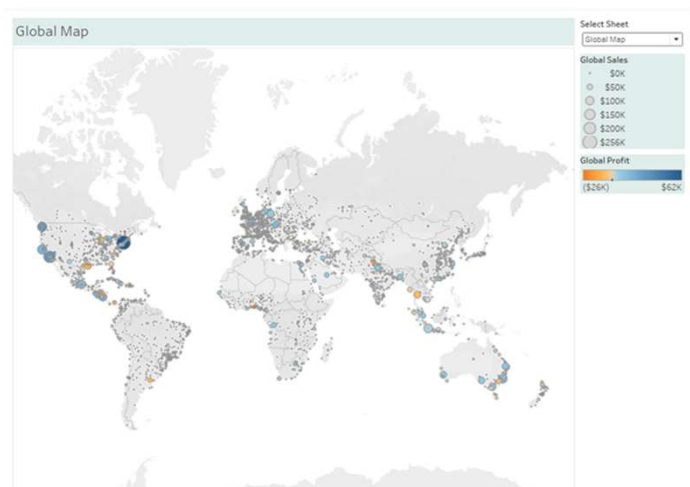
Practice: Context Filters and Dashboards

Context Filters and Dashboard Starter.twbx

- Dashboard contains worksheets for **Market**, **Top 25 Cities for Sales**, and **Top 10 Product Sales**.
- Use filters and context filters to filter view to top cities and products for a given market.
- Use a filter action so that top 10 products are shown when an individual city is selected.

Bonus Material

Bonus Material

- Bonus Practice: Sheet Swapping and Containers

Bonus Practice: Sheet Swapping and Containers

Sheet Swapping and Containers Starter.twbx

- Use a parameter and calculations to swap between sheets.
- Use containers and calculations to show the appropriate Profit color legend for each sheet when selected.

NOTE This practice demonstrates an alternate method to complete the Dynamic Zone Visibility in Dashboards practice. The Dynamic Zone feature, new in Tableau version 2022.3, is the recommended method to swap between sheets on a dashboard using a parameter.

To prepare for Tableau certification exams testing on earlier versions, or to work with workbooks created in Tableau versions 2022.2 and earlier, complete this bonus practice.
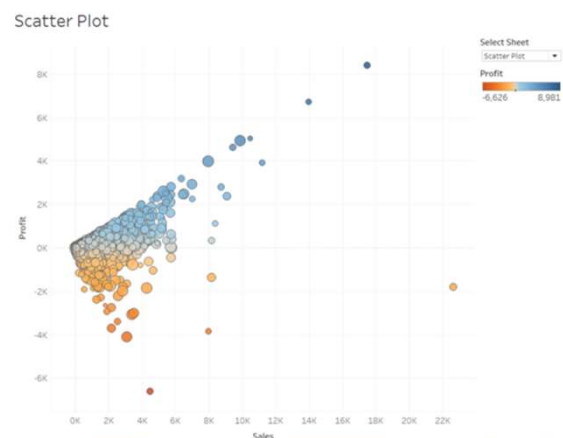
Reference
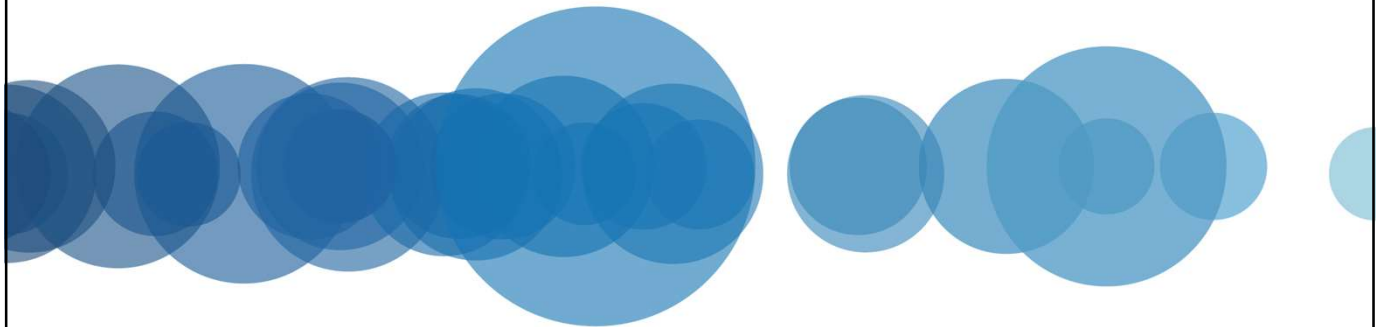
Permissions in Tableau
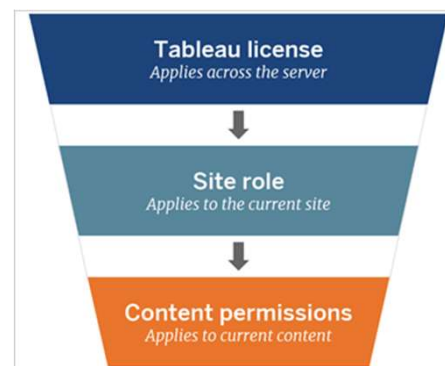
When working in the browser using Tableau Cloud or Tableau Server, there are three factors that impact what actions a user can perform on a site:

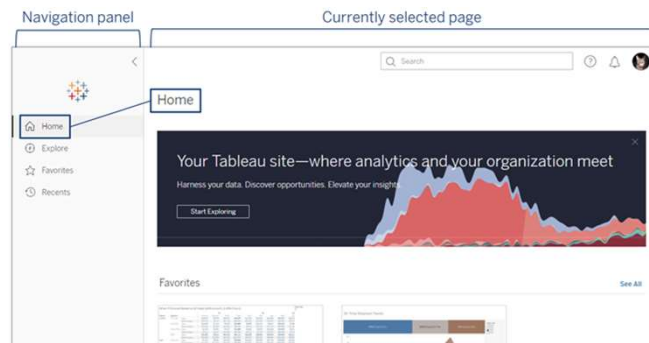- The Tableau license assigned to the user
- A user's current site role
- The actual permissions set on the content

Tableau license
Applies across the server

Site role
Applies to the current site

Content permissions
Applies to current content

Navigating a Tableau Site

See your practice manual to learn how to navigate a site on Tableau Server or Tableau Cloud, including:

- The User Interface (Navigation panel and Explore page)
- Content Types
- Creating New Content
- Finding Help

Resources

Support

- Desktop – tableau.com/products/desktop
- Learning Paths – tableau.com/learn/learning-paths
- Classroom – tableau.com/learn/classroom
- Whitepapers – tableau.com/learn/whitepapers
- Blueprint – tableau.com/blueprint
- Visual Gallery – tableau.com/solutions/gallery
- Tableau Public – public.tableau.com/s/
- Online Help – tableau.com/support/consulting, tableau.com/support/help, tableau.com/support/knowledgebase

Community

- community.tableau.com/welcome

Resources

Support
- Desktop – tableau.com/products/desktop
- Learning Paths – tableau.com/learn/learning-paths
- Classroom – tableau.com/learn/classroom
- Whitepapers – tableau.com/learn/whitepapers
- Blueprint – tableau.com/blueprint
- Visual Gallery – tableau.com/solutions/gallery
- Tableau Public – public.tableau.com/s/
- Online Help – tableau.com/support/consulting, tableau.com/support/help, tableau.com/support/knowledgebase

Community
- community.tableau.com/welcome

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https://www.tableau.com/learn/classroom/

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ROCK STAR

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Exam	Exam Focus
Tableau Desktop Specialist	Prove your core understanding of Tableau Desktop.
Tableau Certified Data Analyst	Prove you can solve business problems with the power of the Tableau Platform.
Tableau Server Certified Associate	Prove your Tableau Server and site administration skills.

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Training Feedback Survey – Please complete!

- **Option 1:** Click the Training Feedback Survey link in the **Practices** folder.
- **Option 2:** Go to https://www.tableau.com/training-csat
- **Option 3:** Use the QR code and complete the survey on your mobile device.

   Be sure to enter the **class code** provided by your instructor, and the **email address** you used to register for the class.

Thank you!

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Wrap Up

Review: Calculations

Advanced Table Calculations

Level of Detail Expressions

Analyzing Time-Based Data

Analyzing Customer Behavior

Geographical Analysis

Advanced Techniques for Dashboards

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