

# Introduction To Tableau Public

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# Tableau Public Workshop Handout

This handout was developed with Tableau 2021.2 by Jane Zhao,  
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## Objectives

Participants will be able to

- 1) tell the limitations of Tableau Public
- 2) describe how to connect to an Excel file
- 3) understand how Tableau manipulates data and how Tableau works
- 4) be able to create basic charts such as line chart, bar chart, and text table.
- 5) create a worksheet, a dashboard, and a story
- 6) know how to create a group, a hierarchy, and an interactive filter
- 7) save work to Tableau Public website
- 8) share the created charts

## Outline

1. Workshop objectives
2. Introduction
3. Preparing Data: Data extraction and transformation
4. Using Tableau Public
  - I. Connect to your data
  - II. Create a bar chart with one measure and one dimension
    - i. Dimensions and measures
    - ii. Demonstrate how Tableau manipulates data
    - iii. Show Me menu
    - iv. Create a bar chart with one measure and one dimension
    - v. Sort data
  - III. Use the Marks card to add depth to your chart
    - i. Create a bar chart with one measure and two dimensions
    - ii. Create a circle chart with one measure and two dimensions
    - iii. Create a text table with one measure and three dimensions
  - IV. Drill down into the data
    - i. Drill down the date and time hierarchy
    - ii. Create groups and form custom hierarchy
  - V. Filter data from your view and add interactive filters
  - VI. Use Dashboard to uncover key insights
  - VII. Use Story to present your analysis
  - VIII. Save and publish your work

## Introduction

- Tableau is a data visualization tool that can help you understand data and discover insights of data. With Tableau, you can create beautiful charts, graphs, dashboards and share them with other people conveniently.
- Tableau products
  - Tableau Desktop
    - The full version of Tableau.
    - It can connect to a wide array of data sources.
    - It has very strong security for data.
  - Tableau Prep Builder
    - A brand-new data preparation product designed to empower people to quickly and confidently combine, shape, and clean their data. When it was first released in April 2018, it was named Tableau Prep.
    - Then Tableau Prep version 2019.1.2 had changed its name to **Tableau Prep Builder**.
    - Tableau public doesn't include Tableau Prep Builder.
  - Tableau Server
    - It is for an organization analytical use, available to those who can support a server that is dedicated to Tableau. There's a very large financial investment for an organization.
  - Tableau Online
    - It is the cloud solution for an organization. It doesn't require a large investment of money into a server. It needs accounts setup.
  - Tableau Public
    - Tableau Public is a free solution/service from Tableau Software Company. It involves two products.
      - Tableau Desktop Public – the free version of Tableau Desktop with limitations.
        - The work can't be saved locally. The work can only be saved to the Tableau Public website (i.e. Tableau Public Server).  
***Data privacy caution: Make sure you remove any confidential data such as SSN and ID or private data such as personal financial information before you save and publish a workbook.***

- It works with data from Microsoft Excel, multiple text file formats, statistical files, Google sheets and web data connectors. It doesn't connect to databases.
- A free Tableau Public account is limited to 10GB online storage and 15,000,000 rows of data per workbook.
- Tableau Public (Server): It is the free version of Tableau Server hosted by Tableau Software company. It requires all workbooks are feely accessible to everybody. You have the option to prevent people from seeing the underlying data (i.e. your original data) though.
- To use Tableau Public,
  - Create an account on Tableau Public at <https://public.tableau.com/s/>
  - Download Tableau Desktop Public edition at <https://public.tableau.com/s/download>
- Tableau Academic Programs
 

**Tableau Desktop** and **Tableau Prep Builder** are free for students and instructors around the world.

  - Tableau for Students
 

Students (K12 and postsecondary) at accredited academic institutions worldwide are eligible for a free one-year license to activate Tableau Desktop and Tableau Prep Builder. Fill out a form at <https://www.tableau.com/academic/students-form>
  - See Tableau Academic Programs for more information at <https://www.tableau.com/academic>

## Preparing Data: Data Extraction and Transformation

Preparing data can be very time consuming and intimidating! Your data needs to be correctly prepared. If the data is not prepared correctly, it will be hard for Tableau to recognize and utilize for analyses. Fortunately, we don't have to do anything for the data used in this workshop. The DMC equipment circulation dataset is ready for use. It was prepared by Mang Sun, Fondren System Librarian. He extracted the data from Sirsi's system log file, and transformed it into an Excel spreadsheet file.

# The Tableau Workflow

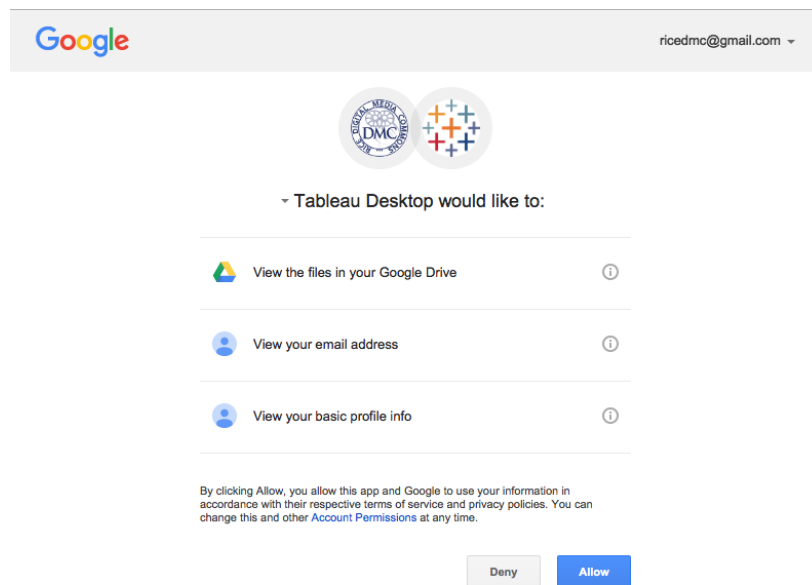
## I. Connect to your data

### 1) Load a data file

The first step is to connect to the data you want to explore or visualize. Launch Tableau Public .

#### a. Connecting to a data file

- Loading a local Excel file.
  - 1) On the left hand side blue navigation area, *Connect*
    - a. *To a File*
    - b. *Excel ->* , locate the .xls file you want to open
  - 2) Or *File -> Open*, locate the .xls file you want to open.
- Loading an online Google Sheet
  - *To a Server*
  - *More... -> Google Sheets*
  - Input your Google Account and password
  - Tableau will ask to have access to:



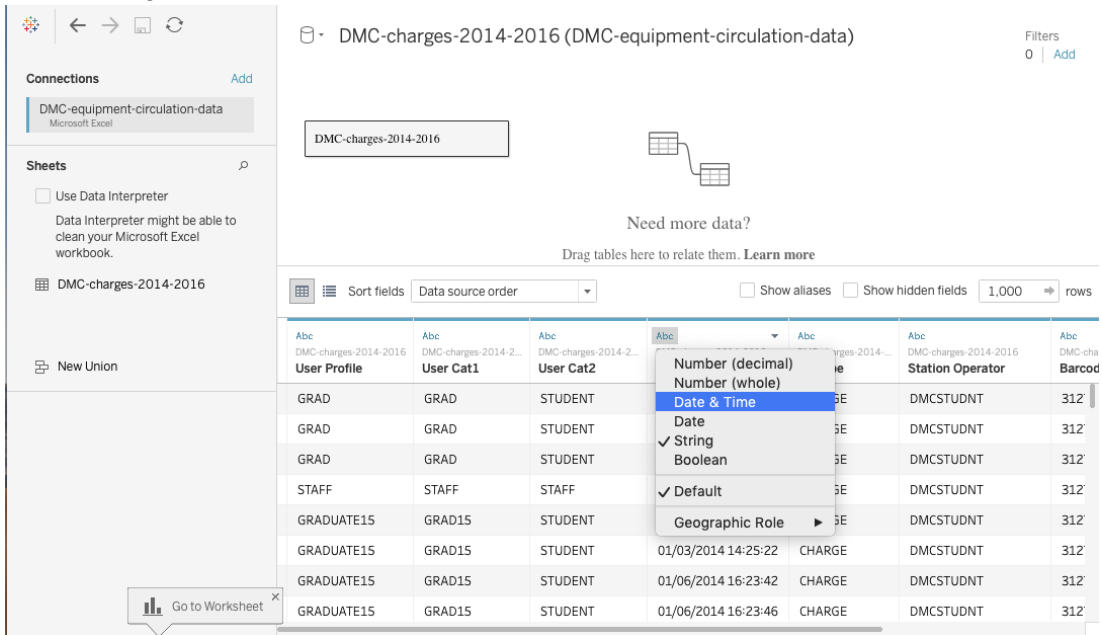
- Click *Allow* to continue
- Then select the Google Sheet you want to connect, click *Connect* to continue.

- Once the file is connected successfully, you will see Tableau load the first 1000 records for preview.

### 2) Verify the automatically assigned data type

After the data is connected, the column headers from your data source are shown as fields. Tableau assigns each field a data type. The data type reflects the kind of information stored in that field, for example, dates (9/18/2017) and strings ("Rice University"). In this DMC equipment circulation data set, User Profile is set to *String*,

User Cat1 is set to *String* too. However, *Time Charge* is set to *String (Abc)*, which is wrong. The wrong default data type needs to be corrected. Click the *Abc* symbol above Time Charge and select *Date and Time*.



The table below shows the Data Types in Tableau.

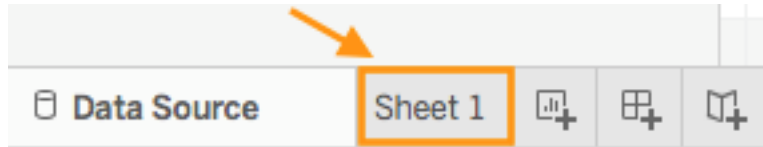
Icon	Data type
Abc	Text (string) values
📅	Date values
📅🕒	Date & Time values
#	Numerical values
T F	Boolean values (relational only)
🌐	Geographic values (used with maps)

Note: Tableau is only referencing the source data. When you work the data within Tableau, your underlying data won't be affected. Your original source data remains intact.

## II. Create a chart with one measure and one dimension

### Activity 2.1 Understanding Dimensions and Measures in the Data Pane

- 1) Click **Sheet 1** at the left bottom next to **Data Source**.

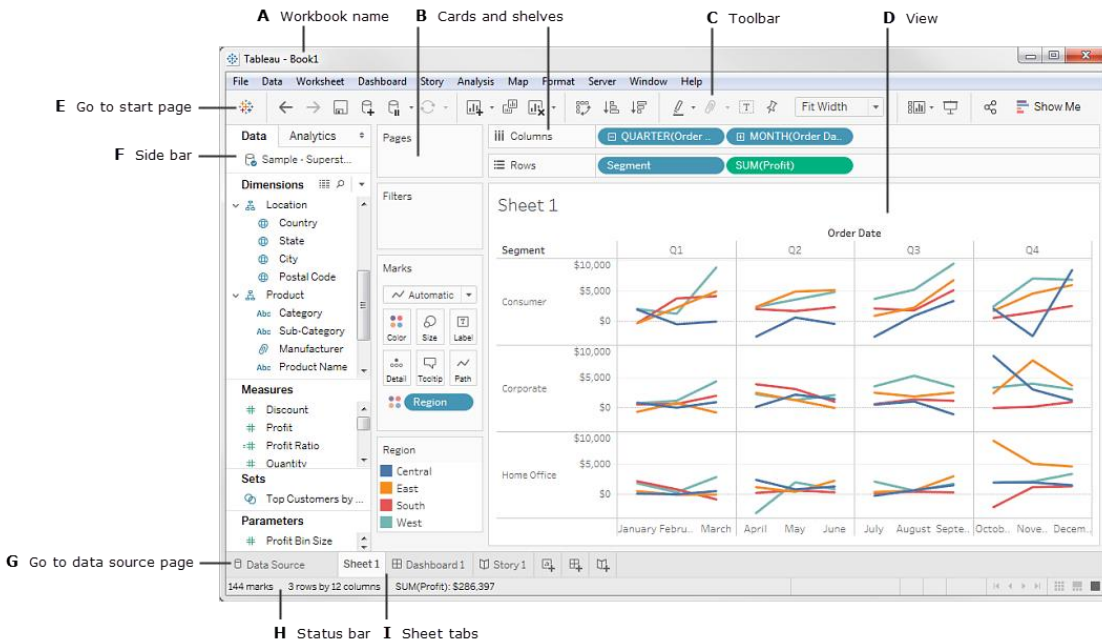


- 2) After the data is loaded, the column headers from your data source are shown as fields. Tableau automatically assigns a data type to each field. It also automatically assigns a role, a *Dimension* role or a *Measure* role, to each field.
- 3) **Dimensions** and **Measures** in the Data pane.
  - a. Dimensions are displayed above the gray line, and measures below the gray line. We build charts/visualizations by adding fields from the Data pane to the view.
  - b. **Dimensions** are qualitative fields. They typically hold categorical or descriptive data that can't be aggregated such as title/call numbers, dates or Boolean values. **Dimensions set the granularity, or the level of detail in the view. We typically want to group our data by some combination of categories. What dimensions we use to build the view will determine how many marks we have.** A mark is a visual representation of a row or a group of rows in your data source.
  - c. **Measures** are quantitative fields. They hold numerical data that can be measured and aggregated such as *number of charges* and *sales*. **They're aggregated up to the granularity set by the dimensions in the view. The value of a measure therefore depends on the context of the dimensions. It provides the measurement for qualitative category.**
  - d. **Dimensions come out onto the view as themselves, measures come out onto the view as aggregates, discrete pills are BLUE, continuous pills are GREEN. When the field is continuous, Tableau draws an axis for the chart. When the field is discrete, it draws a label, or a header, instead of an axis.**
  - e. Dimension fields are generally used for row or column headings. Measures are generally used for plotting or giving values to the sizes of markers.
- 4) Italic fields are automatically generated by Tableau.

### Activity 2.2.01 Understand how Tableau manipulates data

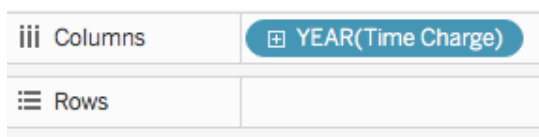
Question: How to break down the total number of charges by year by User Profile?

## Tableau workspace



[http://onlinehelp.tableau.com/current/pro/desktop/en-us/environment\\_workspace.html](http://onlinehelp.tableau.com/current/pro/desktop/en-us/environment_workspace.html)

- 1) Drag a measure *Number of Charges* to the view area, you will see a number **13,178** in the view. When we drop a field on the *Drop field here* grid, we are creating a view from a tabular perspective.
- 2) What Tableau does here is to add the *Number of Charges* in the table. The default aggregation applied is Sum.
- 3) If we want to see the year in this view, drag *Time Charge* to *Columns* shelf. Now we have broken down our single number into three numbers. Basically we have sliced the aggregated number by year. When we add a dimension to the view, members of that dimension will be added as column or row headers.



### Sheet 1

	Time Charge		
	2014	2015	2016
	4,084	4,113	4,981



- 4) If we would rather have row headers, we can drag the YEAR pill to Rows.

Year of Tim..		
2014	4,084	
2015	4,113	
2016	4,981	

Drag YEAR pill back to the Columns shelf.

- 5) If we would like to put *User Profile*, we drag it to the Rows shelf. Now we see we have further broken down the three numbers. We got a table of 13 rows and 3 columns, including 29 numbers and 10 null values.

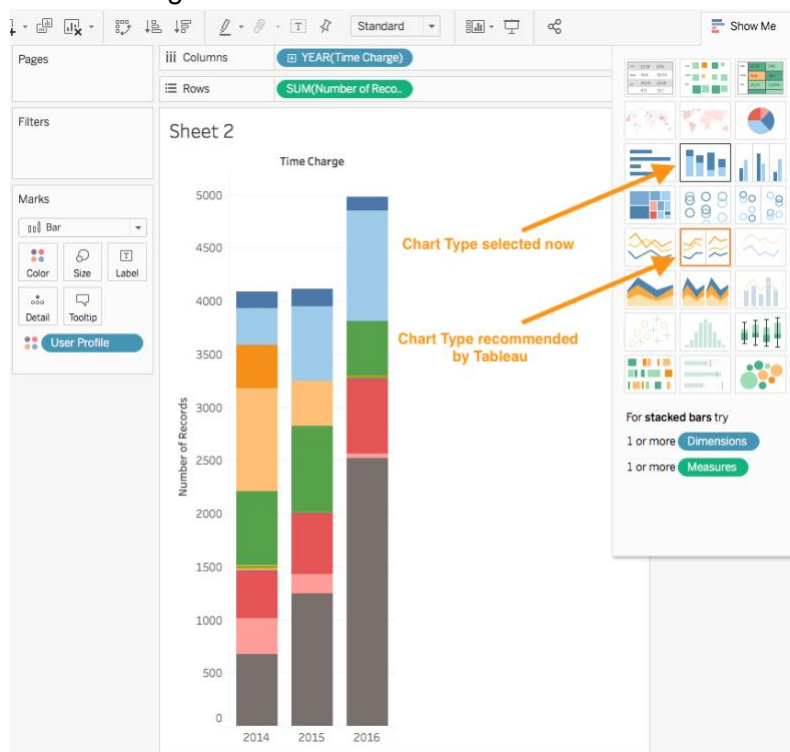
User Profile	Time Charge		
	2014	2015	2016
FACULTY	154	161	132
GRAD	343	703	1,035
GRADUATE14	411		
GRADUATE15	970	428	
GRADUATE16	692	802	517
INACTIVE	11		
INSIDE15	25	9	20
LIBRARYUSE	3		
OUTSIDE4		6	6
OUTSIDE15	3		
STAFF	462	576	709
TERMINATED	333	178	44
UNDERGRAD	677	1,250	2,518

- 6) At any time, you can right click over a number and choose *View Data...* to view the underlying sliced data.
- 7) You can drag both YEAR pill and User Profile to either Columns shelf or Rows shelf. However, this probably will generate either too long or too high table that you have to scroll to view. That's what you want to avoid.
- 8) Right click over *Sheet 1* and rename it to *DMC-Charges-byYear-byUserProfile-Table*.

### Activity 2.2.02 Understand Show Me menu

- 1) Consider *Show Me* to be your expert helper. Show Me tells you what chart to use and why.
- 2) **Show Me** menu lists 24 common chart types. Some of them will be available. Some of the them will be greyed out depending on the context.
- Note: It's possible to build an enormous variety of charts in Tableau, Show Me is one-click options, not a comprehensive list of possibilities.

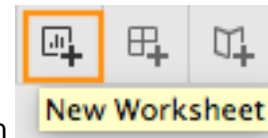
- 3) **Show Me** creates a view based on the fields already used in the view and any fields you've selected in the Data pane.
- 4) Tableau automatically evaluates the selected fields and gives you the option of several types of views that would be appropriate for those fields. *Show Me* also highlights the visualization type with orange color that best matches the data.
- 5) Chart types that are not applicable to your worksheet as it is currently constructed will be grayed out and not selectable until you have the appropriate combination of measures and/or dimensions.
- 6) Any view type that is not greyed out will generate a view of your data. As you hover over each view type, the description at the bottom shows the minimum requirements.
- 7) In this example, because a date dimension and a measure are selected, Tableau suggests you build a line view. A line is often the optimal way to look at how measure values change over time.



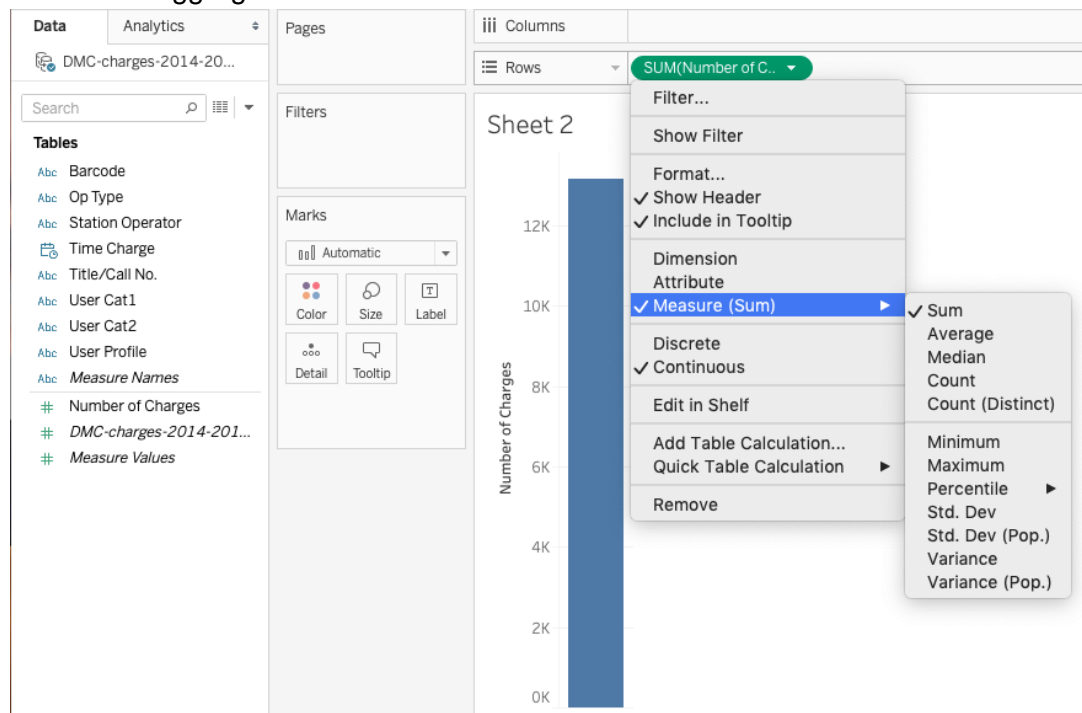
- 8) Charts are most effective and readable when matched to the right data and purpose.
  - a. Line chart – view trends in data over time
  - b. Bar chart – compare data across categories
  - c. Circle chart - show data in a proportional manner. People are drawn to using circles because the varied size of circles provides meaning about the data.
  - d. Histogram – understand the distribution of your data
  - e. Scatterplot – determine correlation between two measures

### Activity 2.2.1 Visualizing the total number of charges by year via bar chart

**Question: What is the total number of charges each year? How did one year compare to the other two years?**

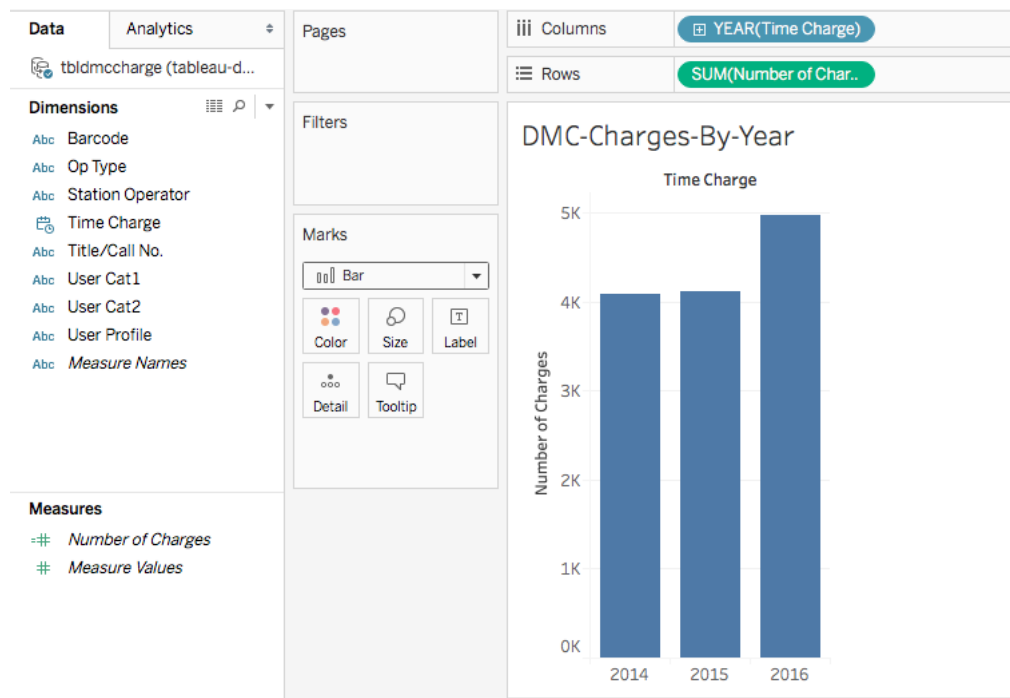


- 1) Create a new worksheet by clicking on New Worksheet button
- 2) Drag *Number of Charges* from *Measures* to the *Rows* shelf
  - a. When we bring a field into the view from the data pane, Tableau creates a pill.
  - b. The *Number of Charges* field is colored green on the *Rows* shelf, indicating that it is continuous.
  - c. The field name changes to *SUM(Number of Charges)*. That's because measures are automatically aggregated when you add them to the view, and the default aggregation for this measure is SUM.
  - d. If you right-click over *SUM(Number of Charges)*, select *Measure (Sum)*, you will see all the Aggregate functions available for this measure.



- i. **SUM** - Returns the sum of all values in the expression.
- ii. **AVG** - Returns the average of all the values in the expression (i.e. the sum of a collection of values divided by the number of values in the collection.). In our example,  $SUM(\text{number of charges}) / COUNT(\text{number of charges}) = 1$
- iii. **COUNT** - Returns the number of items in a group. In our example, the count number is the same as the sum number.
- iv. **COUNTD** - Returns the number of distinct items in a group. In our example COUNTD is 1.
- v. Read more at [Aggregate Functions in Tableau](#).

- 3) Drag *Time Charge* from *Dimensions* to the *Columns* shelf. Tableau creates a line chart by default. Remember line chart is good to view trend in data values over time. We want to compare data across years, so change the Marks from *Automatic* to *Bar*.
  - a. When you drag a field over a shelf, a plus sign indicates that the shelf can accept the field.
  - b. Notice that the field is colored blue, which indicates that it is *discrete*.
  - c. Dimensions set the granularity, or the level of detail in the view. What dimensions we use to build the view will determine how many marks we have. Here we have 3 years of data, 2014-2016 – and we have 3 marks.
  - d. The default date level is determined by the highest level that contains more than one distinct value (for example, multiple years and multiple months). That means that if [*Time Charge*] contained data for only one year but had multiple months, the default level would be month.




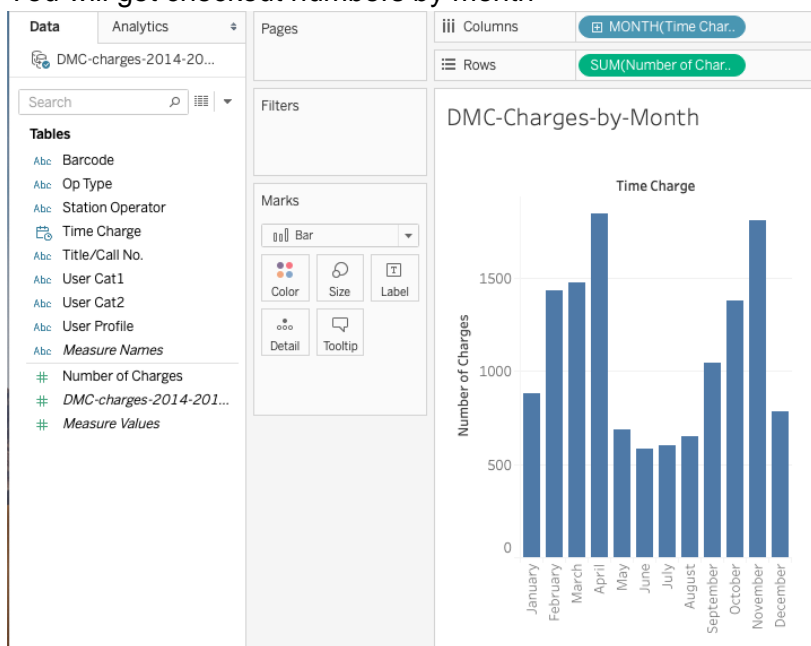
- 4) Right click over *Sheet 2* and rename it to *DMC-charges-by-year*.
- 5) Optional steps
  - a. Right click over the sheet name, choose *Duplicate as Crosstab*, you will get a text table (Crosstab) just like the one created in the previous activity. The text table shows the numbers visualized in the view. Right click over the sheet name, choose *Delete* to delete the sheet.
  - b. Or click on *Show Me*, choose *text tables*, you will get the same text table as the action of *Duplicate as Crosstab*.

## Activity 2.2.2 Visualizing the total number of charges by month via bar chart (one measure and one dimension)

Question: What is the total number of charges each month across years?




- 1) Click  to create a new worksheet.
- 2) Drag *Number of Charges* from *Measures* to the *Rows* shelf and *Time Charge* from *Dimensions* to the *Columns* shelf, and make sure *Bar* is selected in the *Marks Pull-down menu*.
- 3) Click the *Down* arrow in the *YEAR(Time Charge)* pill on the *Columns* shelf and select *Month* (the first one, the Discrete one).
- 4) You will get checkout numbers by month



- 5) Rename the sheet to **DMC-charges-by-month**.

## DIY Activity: Visualizing the total number of charges by weekday via bar chart

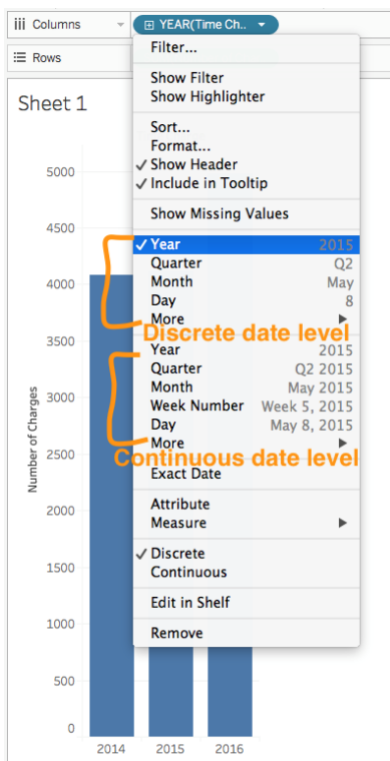


- 1) Click  to create a new worksheet.
- 2) Drag *Number of Charges* from *Measures* to the *Rows* shelf and *Time Charge* from *Dimensions* to the *Columns* shelf, and make sure *Bar* is selected in the *Marks Pull-down menu*.
- 3) Choose *Weekday* from the *Time Charge* pill drop down menu this time.
- 4) You will get checkout numbers by Weekday.
- 5) Rename the sheet to **DMC-charges-by-weekday**.


## DIY Activity: Visualizing the total number of charges by hour via bar chart

- 1) Right click over the sheet of *DMC-charges-by-weekday*
- 2) Select *Duplicate*
- 3) Click the *Down* arrow in the *Year(Time Charge)* pill on the Columns shelf, select *More* and click *Hour*
- 4) You will get checkout numbers by Hour.
- 5) Rename the sheet to *DMC-charges-by-hour*.




Note: On the *Time Charge* field drop down menu, the first set is for discrete date levels and the second list is for continuous date levels. **Discrete means data is individually separate and distinct. Continuous means data can take any value in a range, forming an unbroken whole, without interruption.** Dates can be brought into the view as either continuous or discrete.



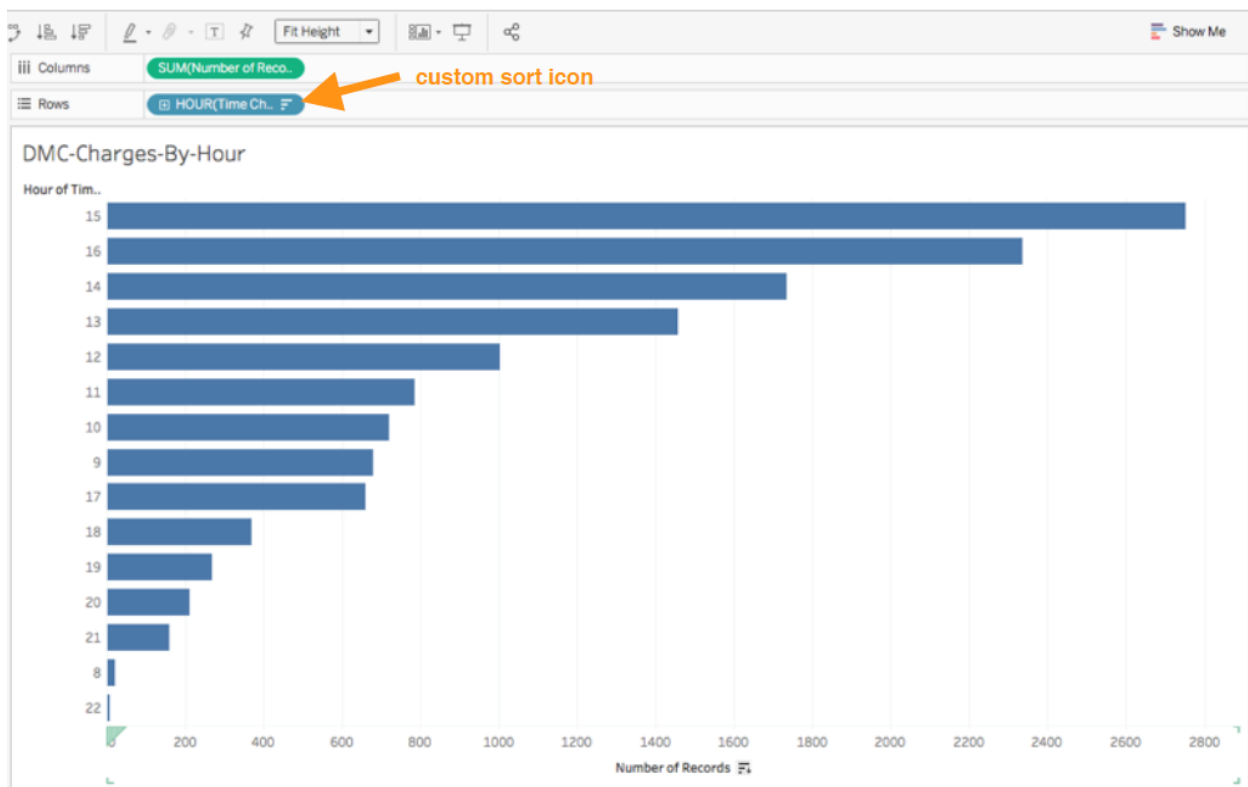
## Activity 2.2.5 Sorting data

- In the *DMC-charges-by-hour*, click  Swap Rows and Columns button on the toolbar to make the bars horizontal.

## Number of Charges

- Hover over the mouse over the sort icon . *One* click sorts the data in ascending order. *Two* clicks sort it in descending order. *Three* clicks clear the custom sort, setting it back to the default sort method.
- Or on the toolbar, click the Descending sort icon  to sort data from highest/most to lowest/least, or the Ascending icon  to do the other way around.
- Or select an hour in a header and drag it up or down, the viz updates with the new sort.


In any way, Tableau provides a visual indication that a customized sort is applied. A sort icon appears on the *HOUR (Time Charge)* (on rows).



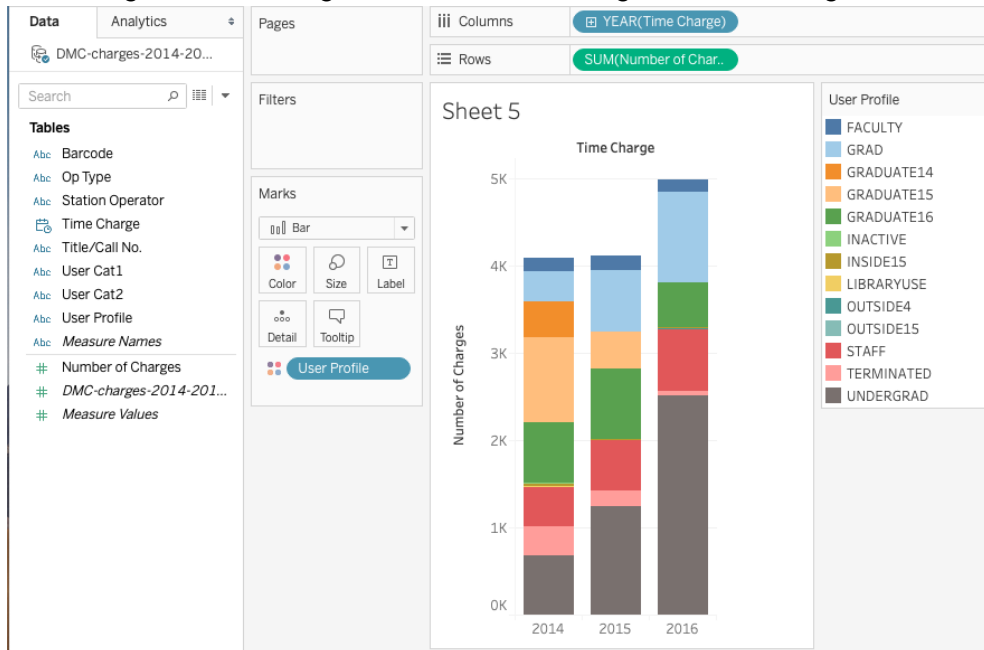
### III. Use Marks card to add depth to your chart

Activity 3.1 Visualizing the total number of charges by year and by user profile via bar chart (*one measure and two dimensions*)

Question: What is the total charges each year and what is the total charges for each user group each year?

- 1) Click  to create a new worksheet.

- 2) Drag *Number of Charges* from *Measures* to the *Rows* shelf and *Time Charge* from *Dimensions* to the *Columns* shelf, and make sure *Bar* is selected in the *Marks Pull-down menu*.
- 3) Drag and drop *User Profile* from *Dimensions* on to the *Color* card in the *Marks* pane.  
*Note: The Marks card is where you drag fields to control mark properties such as type, color, size, shape, and so on.*
- 4) You can get the following screen. The Color legend is on the right side.



- 5) Placing a dimension on *Color* separates the marks according to the members in the dimension and assigns a unique color to each member. The color legend displays each member name and its associated color.
- 6) Rename the sheet to *DMC-Charges-by-year-UserProfile*.

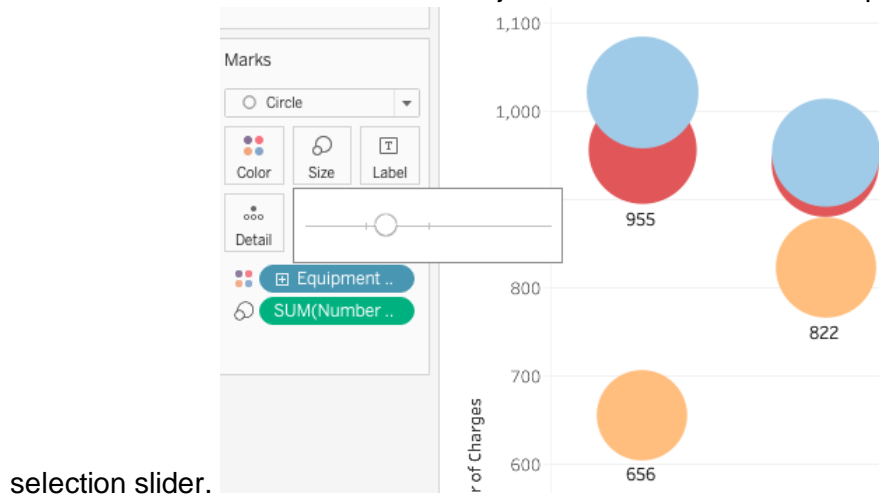
**DIY Activity: Visualizing the total number of charges by year and by Equipment Category via circle chart. Remember people are drawn to using circles because the varied size of circles provides meaning about the data. So make sure the circle size is in proportion of the total number of charges.**

**Question: What is the total charges each year and what is the total charges for each equipment category each year?**

- 1) Create a new worksheet.
- 2) Drag *Number of Charges* from *Measures* to the *Rows* shelf and *Time Charge* from *Dimensions* to the *Columns* shelf.
- 3) Select *Circle* in the *Marks Pull-down menu*.
- 4) Drag *Equipment Category* on to the *Color* card. Then drag *Number of Charges* on to the *Size* card.



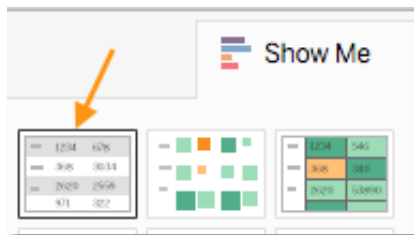
- You can also click the *Size* card to adjust the size of circle via the popped-up *Size*



- Rename the sheet to *DMC-charges-by-year-EquipmentCategory*.

## DIY Activity: Creating a Text Table for the total number of charges by year, by Equipment Category, and User Profile

- Create a new worksheet.
- Select *Number of Charges* from *Measures* and *Time Charge*, *User Profile* and *Equipment Category* from *Dimensions*,
- Click the *text tables* button on the *Show Me* Tool Bar.




- Now you get statistics in tabular format.

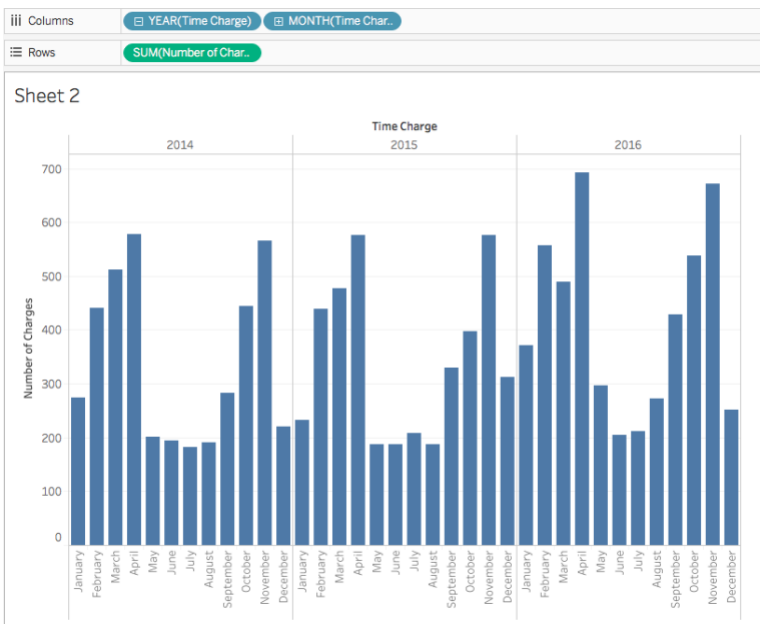
## IV. Drill down into the Data

Drilling down usually means expanding out a hierarchy, getting to the next level of detail. When you connect to a data source, Tableau automatically separates date fields into hierarchies so you can easily break down the viz. You can conveniently traverse (drill down and scroll up) along Tableau generated Date and Time Hierarchy and watch change on numbers.

## Activity 4.1 Drilling down date hierarchy with the DMC-Charges-by-Year chart

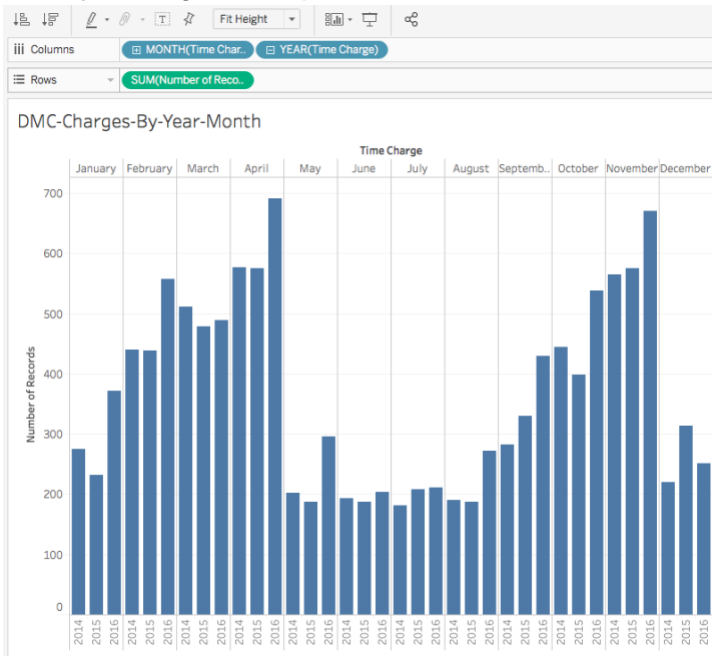
You can modify the view to show quarters, month, etc. in addition to years. As you drill down into the hierarchy, the view changes to become a nested table.

- 1) Right click over the sheet of *DMC-Charges-By-Year*.
- 2) Select *Duplicate*.
- 3) Click the plus button  **YEAR(Time Charge)** on the left side of the field *YEAR(Time Charge)* field on Columns.
- 4) The new expanded dimension divides the view into separate panes for each year.
- 5) You can further drill into months. And delete *QUARTER (Time Charges)* from the Columns shelf.



- 6) Rename the sheet to *DMC-Charges-by-Year-Month*
- 7) Switch *YEAR(Time Charge)* and *MONTH(TIME Charge)* in Rows by dragging *MONTH(TIME Charge)* to the front of *YEAR(Time Charge)*, you will see the nested table is changed to the view below. Tableau generates a view based on where and in what

order you drag and drop fields into the shelf.



8) Click Undo button on the toolbar to undo the change.

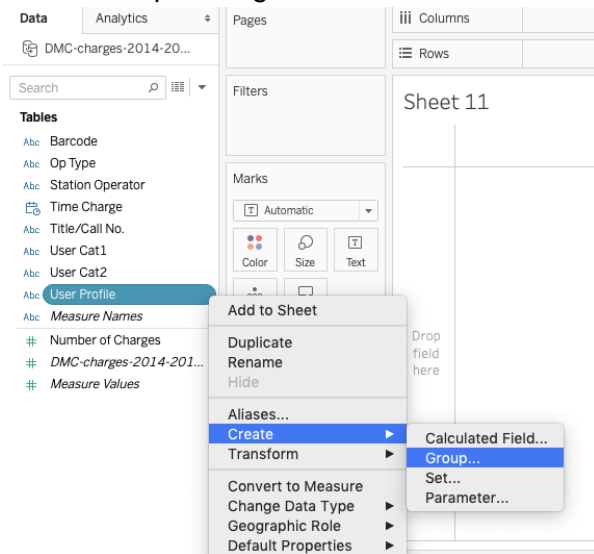
## Activity 4.2 Creating groups and drillable hierarchy

You can also create your own custom hierarchies. For example, if you have a set of fields named Region, State, and County, you can create a hierarchy from these fields so that you can quickly drill down between levels in the viz.

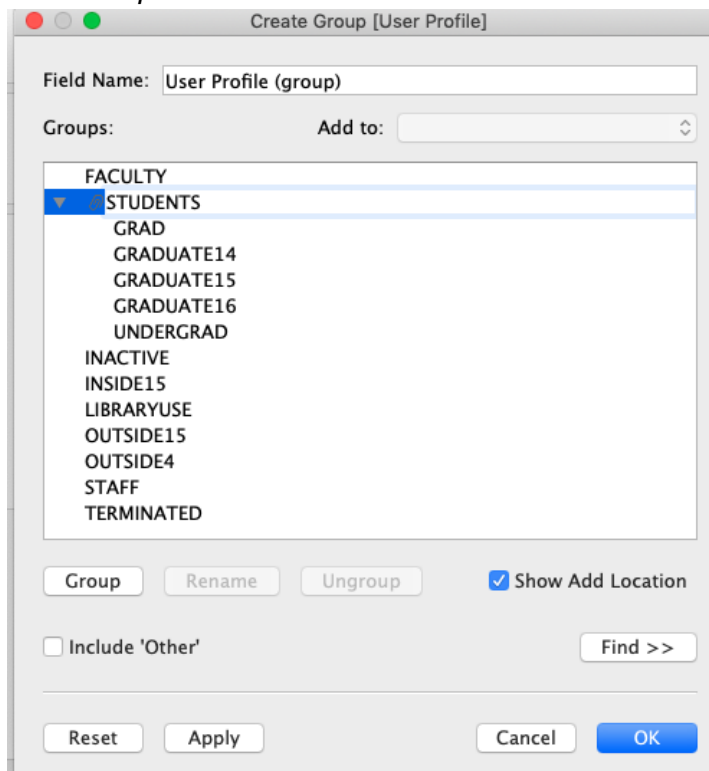
### Activity 4.2.1 Create Groups

Group simplifies large numbers of dimension members by combining them into higher-level categories. The field “User Profile” has too many members. Let’s bring it down to 4 groups (i.e. students, faculty, staff, and others.). This creates a higher-level category.

- 1) In the *Data* pane, right-click *User Profile* and select *Create > Group...*



- 2) In the *Create Group* dialog box, select *GRAD*, *GRADUATE14*, *GRADUATE15*, *GRADUATE16*, *GRADUATE17*, *UNDERGRAD* that we want to group, and then click *Group*. Name it *STUDENTS*.



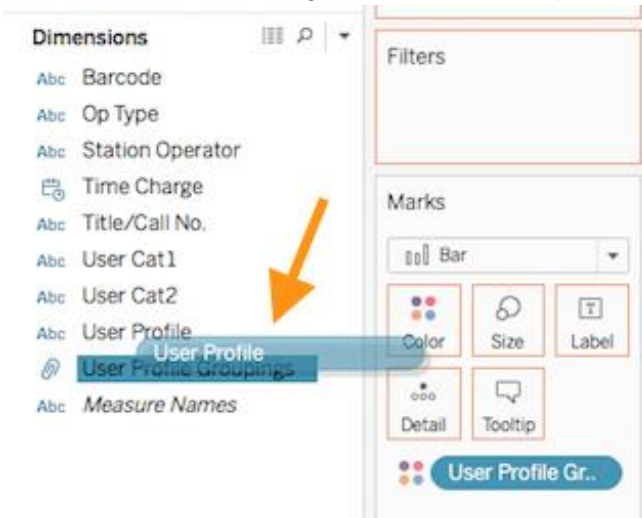
- 3) Select *INACTIVE*, *INSIDE15*, *LIBRARYUSE*, *OUTSIDE4*, *OUTSIDE15*, *TERMINATED*, then click *Group*. Name it *OTHERS*. Click *OK* button on the *Create Group* window dialogue box to close it.

- 4) You will see a new dimension *User Profile (group)* is created and put under Dimensions. Right click over its name and rename it to *User Profile Groupings*.

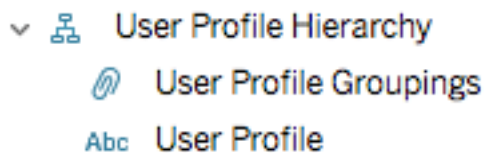
### Activity 4.2.2 Form hierarchies

Hierarchies give end users the option to look at data at a high level or drill down into more detailed levels. We will create a hierarchy with *User Profile Groupings* and *User Profile*. Since '*User Profile Groupings*' is a higher level of categorization of '*User Profile*', it makes sense to have this before '*User Profile*', on the top of the hierarchy.

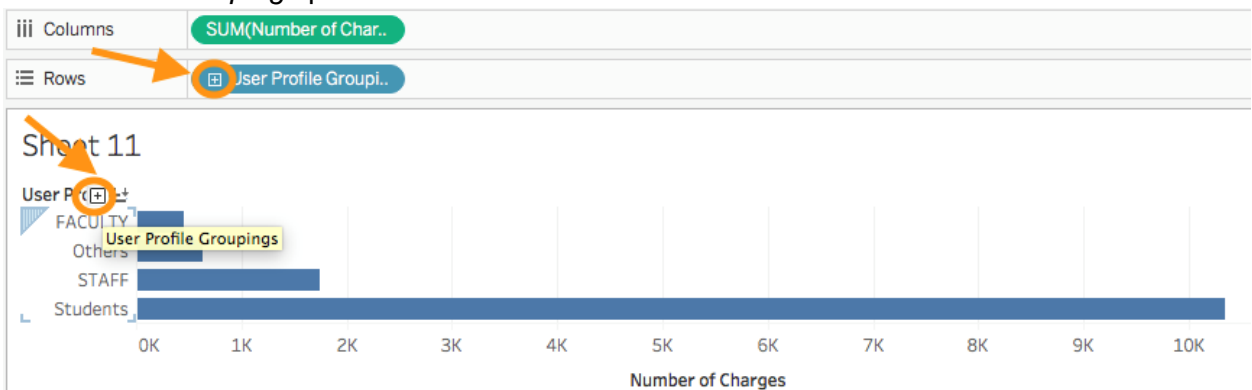
- 1) Under Dimensions, drag *User Profile* on top of *User Profile Groupings*.



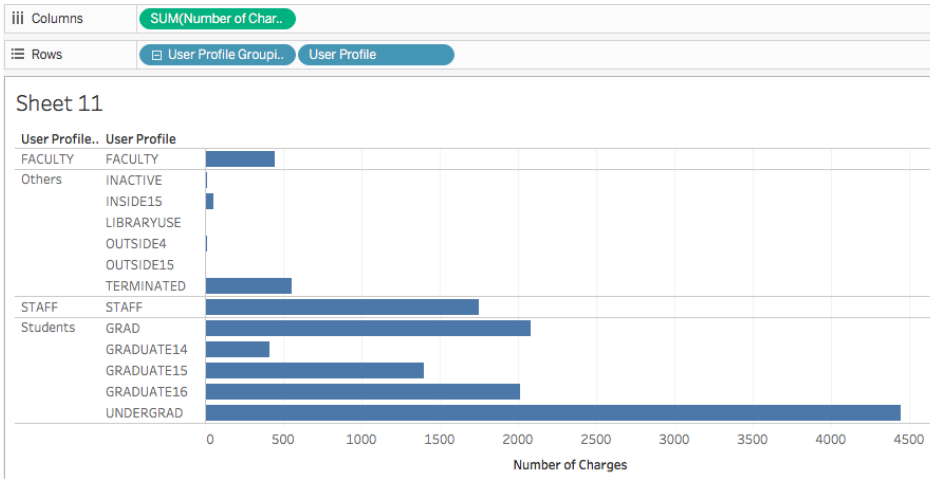
- 2) Change the name of the hierarchy to *User Profile Hierarchy*.



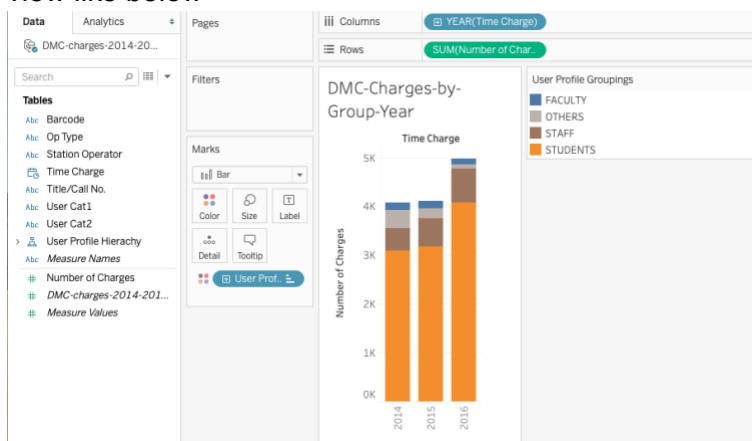
- 3) Build a view by dragging *Number of Charges* to *Columns* shelf and *User Profile Groupings* (or *User Profile Hierarchy*) to *Rows* shelf. You will see the + sign in front of the *User Profile Groupings* pill.



- 4) You can now drill down to the next more detailed level by clicking on the + on the pill in Rows or the + will appear if you mouse over any of the labels in the view.



**DIY:** For the worksheet *DMC-charges-by-year-UserProfile* created in the previous section, duplicate it, change *UserProfile* to *User Profile Groupings* in the view. You should get a similar view like below



**DIY:** Form a data hierarchy with *Equipment Category* and *Title/Call No.* Then create a bar chart with the *Number of Charges* and the data hierarchy you just formed.

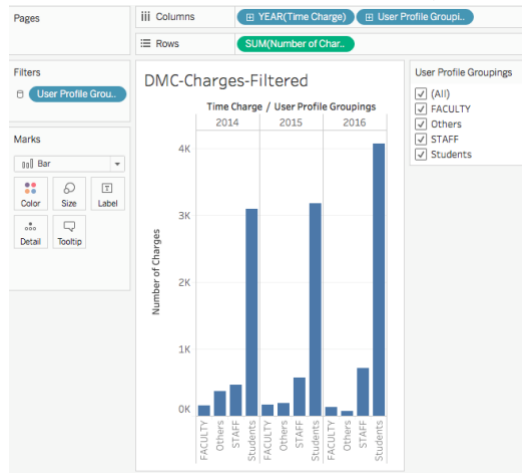
## V. Filter data from your view

Filter allows you to show a subset of the data so that you can focus your analysis. Show the filter in the view will make the filter interactive so that end users can modify filter selections from the view. Interactive filters are a great way to let end users interact with a visualization.

### Activity 5.1 Add an interactive filter

- 1) Create a new worksheet.
- 2) Drag *Number of Charges* to the *Rows* shelf, *Time Charge* and *User Profile Groupings* to the *Columns* shelf.

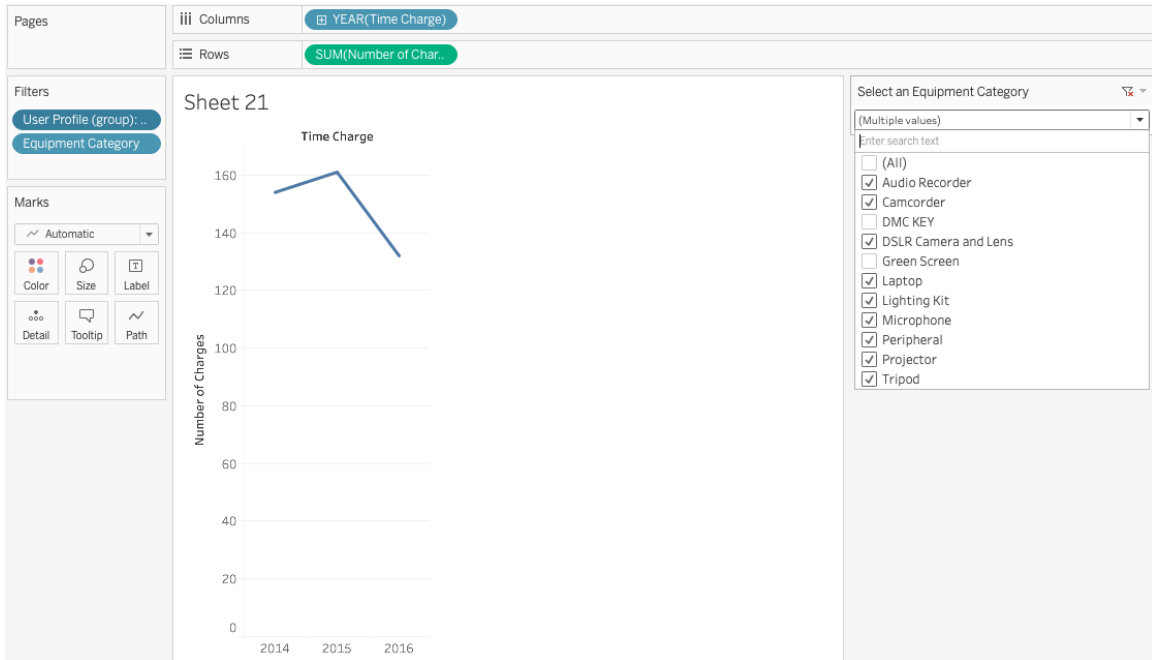
- 3) Drag *User Profile Groupings* to Filters shelf.
- 4) Right click over the *User Profile Groupings* in the Filters shelf, choose *Show Filter*. Now the filter is an interactive filter.
- 5) We can edit the appearance and functionality of the interactive filter by clicking on the drop-down menu.
- 6) Rename the sheet *DMC-charges-by-year-UserProfile-filtered*.



- 7) You can also select to keep or exclude data points in the view or select headers to filter data. This way, you are adding a filter to the Filters shelf too. When a filter is shown, it is an interactive filter.

### Activity 5.2 Create an interactive line chart

- 1) Select Number of Charges, Time Charge on the Data pane
- 2) From Show Me menu, choose Line chart
- 3) Add User Profile Groupings to the Filters shelf, choose Faculty, click OK.
- 4) Add Equipment Category to the Filters shelf, choose All, click OK. Click its drop-down menu, choose Show Filter. Edit Title -> change the title to "Select an Equipment Category". Change the appearance to "Multiple Values(dropdown)".
- 5) Name the worksheet "faculty-trend-line".



6) DIY: Repeat the above steps to create separate worksheet for “students-trend-line” and “staff-trend-line” respectively.

DIY: Create an interactive text table. Specifically, use Number of Charges, Equipment Category, and User Profile Groupings, and Time Charge to create a text table. Add interactive filters so that viewers can select year and Equipment Category respectively.

Equipment Category	Time Charge / User Profile (group)								
	2015				2016				
	FACULTY	OTHERS	STAFF	STUDE...	FACULTY	OTHERS	STAFF	STUDE...	
Audio Recorder	3	19	50	435	10	5	19	423	
Camcorder	50	42	105	756	51	16	147	835	
DSLR Camera and Lens	9	58	151	604	13	8	134	834	
Green Screen				11				2	5
Laptop	5	15	40	52	4	15	137	511	
Lighting Kit	2		9	37			9	30	
Microphone	34	27	58	251	12	2	56	224	
Peripheral	5	2	32	158	4	10	61	191	
Projector	7	7	29	109	6	1	33	115	
Tripod	46	23	102	770	32	13	111	902	

### Activity 5.3 Understanding how Tableau works

Every chart/view that you create in Tableau should start with a question. What do you want to know? Every time you drag a field from the Data pane onto the cards and shelves, you are asking a question about the data and you are forming a Visual Query Language (VizQL) that



Tableau generates based on where and in what order you drag and drop fields into the view. Then Tableau translates the VizQL into SQL/MDX/RQL (Structured Query Language/ MultiDimensional eXpressions/Resource Query Language) and issues it as a query to the data, gets back the results, and renders the visualization.

An example of SQL syntax: SUM function when grouping the results by one or more columns is:  
`SELECT expression1, expression2, ... expression_n,  
SUM(aggregate_expression)`

`FROM tables`

`[WHERE conditions]`

`GROUP BY expression1, expression2, ... expression_n;`

For example, when you drag User Profile and Number of Charges to the Rows and Columns shelf to make a bar chart (i.e. list the sum of the Number of Charges in each User Profile group), Tableau translates your VizQL into the following SQL: `Select User Profile, Sum(Number or Charges) From DMC-charges-2014-2016 Group By User Profile.`

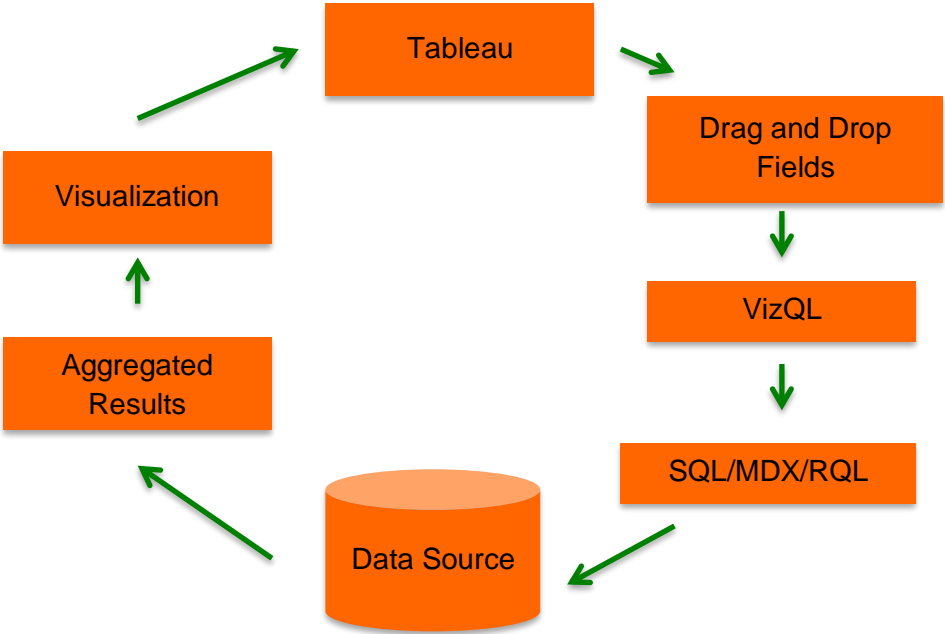


Figure: How Tableau Works.

For every question you ask, the view changes to represent the answer visually - with marks (shapes, text, hierarchies, table structures, axes, color).


See *What is VizQL* At <https://www.tableau.com/drive/what-is-vizql> for more details.

## VI. Use Dashboard to uncover key insights

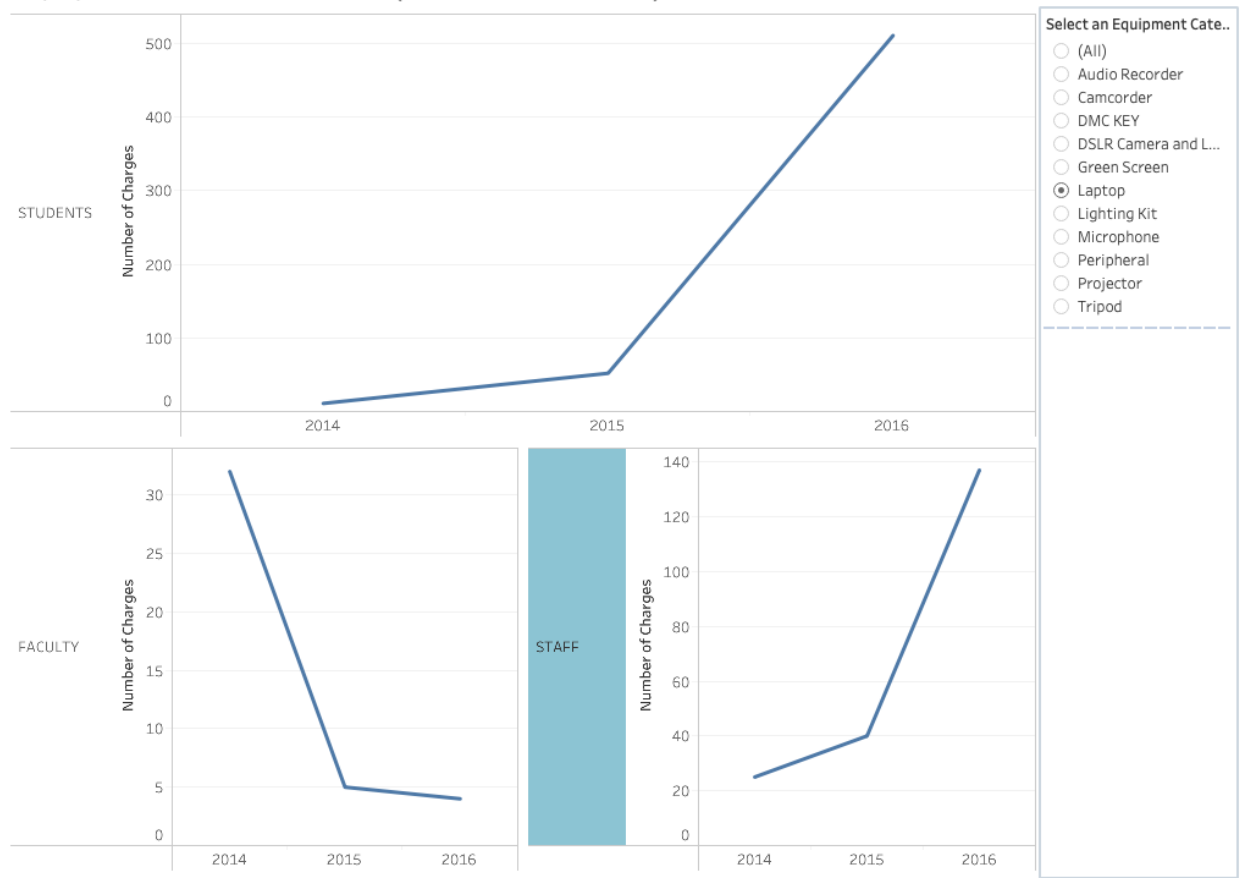
A **dashboard** is a collection of several worksheets in a single place so that you can compare, monitor, and view a variety of data simultaneously. Dashboard is all about interactivity among worksheets.

## Activity 6.1 Create an Equipment Checkout Trend Dashboard



- 1) Click  to create a dashboard.
- 2) Click on Size, from the drop-down menu, choose Fixed, 1024x768
- 3) Drag worksheet of students-trend-line, faculty-trend-line, and staff-trend-line over to the dashboard
- 4) Hide all “Select a User Group” filter
- 5) Make sure “Select an Equipment Category” is applied to all the worksheets on the dashboard
- 6) Adjust some appearance settings

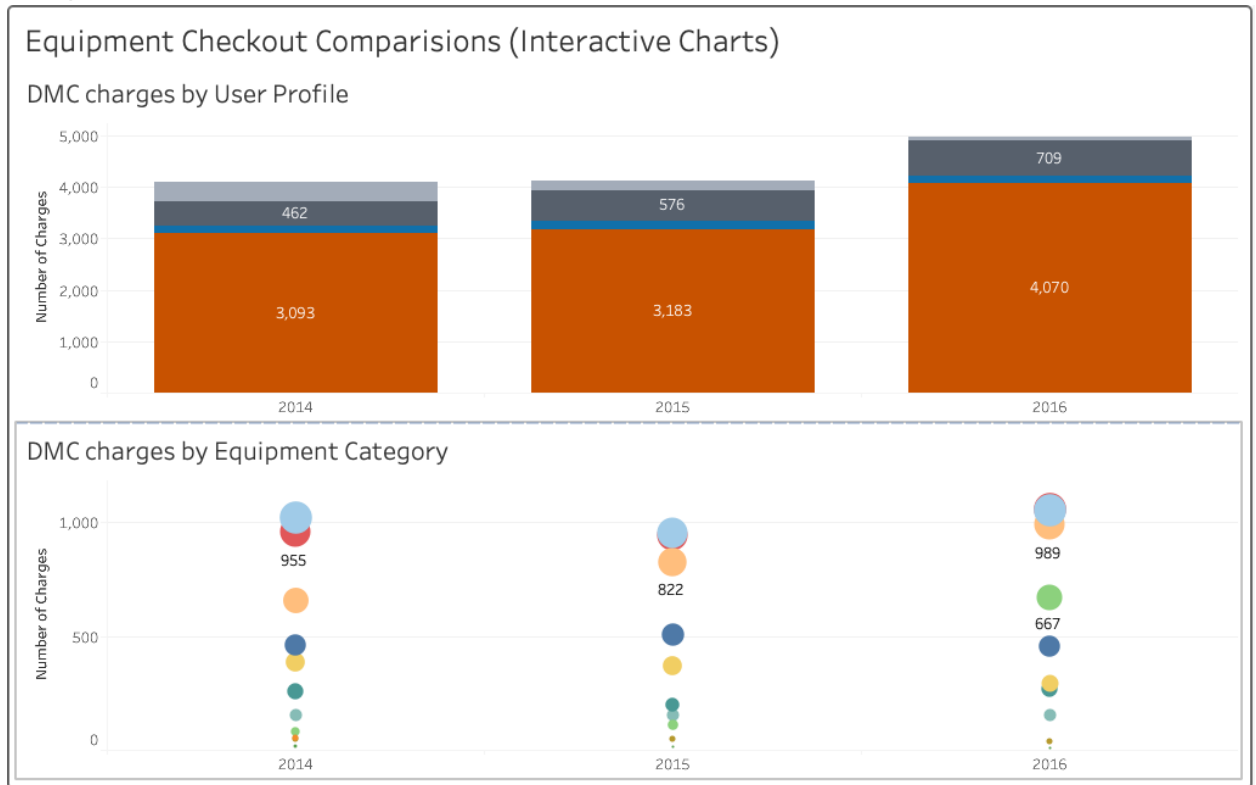
Equipment Checkout Trend (Interactive Charts)





## Activity 6.2.1 Create an Equipment Checkout Comparison Dashboard

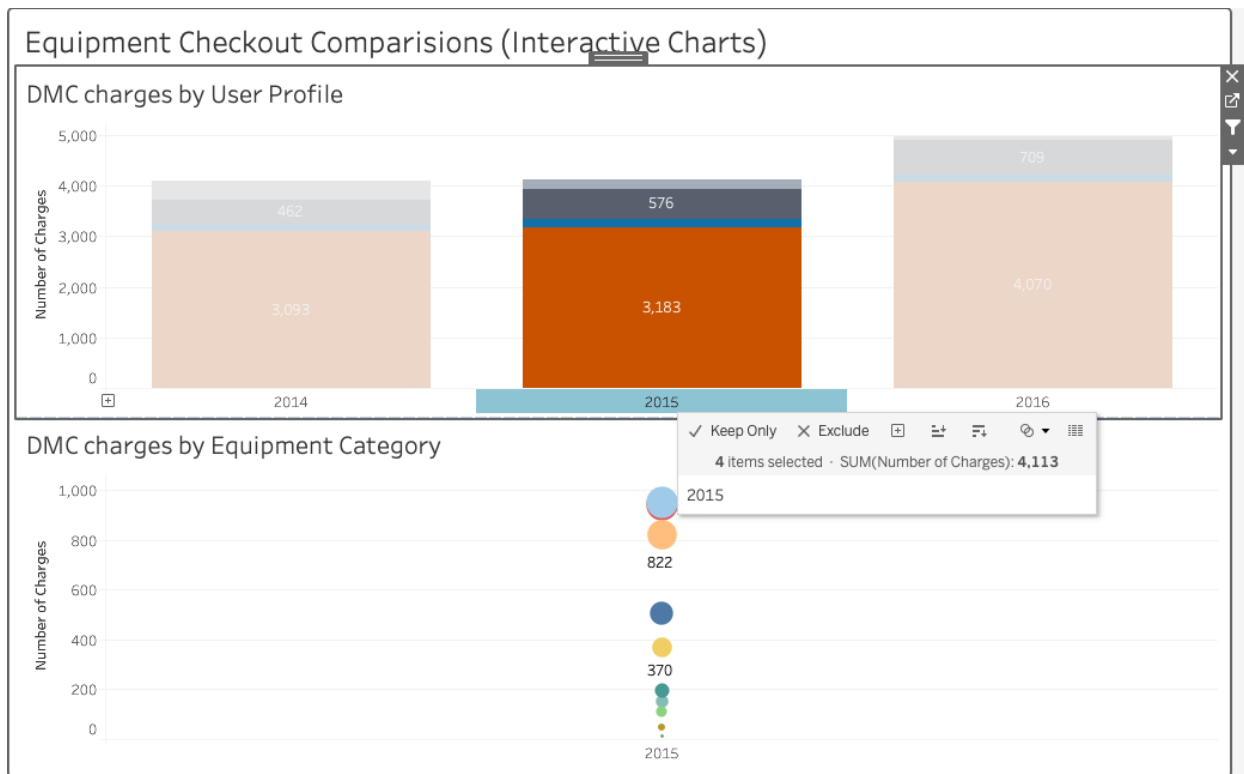
- 1) Create a new dashboard
- 2) Click on Size, from the drop-down menu, choose Range, 1024x644-1124x744
- 3) Drag Sheet *DMC-charges-by-year-UserProfileGroupings* and *DMC-charges-by-year-EquipmentCategory* from the Sheets section and drop them one by one onto the blank dashboard canvas.

- 4) We can close the window of the *User Profile Groupings, Title/Call No, and Number of Charges* by clicking on the Cross button.
- 5) Click *Show dashboard title* in the *Objects* section at the lower left corner.
- 6) Double click the default and change the default title text to *Equipment Checkout Comparisons*.



**Activity 6.2.2 Use the top worksheet as a driver to filter the worksheets below (add interactivity to encourage exploration)**

- 1) Click to select the top sheet. Click on *the Funnel icon*  on the upper right corner of the top chart, *the Funnel icon* turns into white . This enables the top chart to filter all the worksheets in the dashboard.
- 2) Click 2015 in the first chart, the second chart will only display 2015 statistics by *Equipment Category*. Click 2015 again will cancel out the selection and return to the previous view.



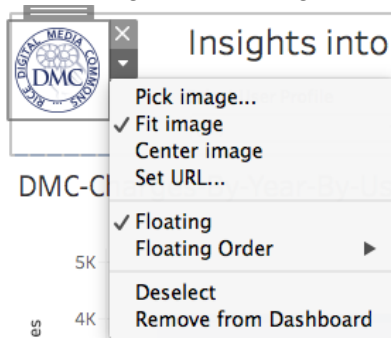
### Activity 6.2.3 Add an interactive filter so that users can filter data by *User Profile Groupings*.

- 1) Click on *the Down Arrow button* next to the Funnel icon on the top worksheet and select filters and then the *User Profile Groupings*.
- 2) Now you will see a new checkbox list for *User Profile Groupings*. Click *the Down arrow* on the top border of the checkbox list and select *Single Value (dropdown)* or *Multiple Values(dropdown)*.
- 3) Click the same down arrow again and select *Floating* and drag the filter window to the place you like.
- 4) Click the same down arrow again, select *Apply to Worksheets->Selected Worksheets...* and select *the bottom worksheet*.
- 5) Change the filter title to *Select a User Group* by double clicking the filter pane and making the change.

### Activity 6.2.4 Customize the look of the Dashboard

- 1) Drag *Blank*, a container, from *Objects* to the top of the dashboard. Adjust its height. This blank container will help you better lay out the objects on your dashboard.
- 2) Drag *Image* from *Objects* pane and drop it to the top of the dashboard (i.e. the blank container), this opens a file selection window, choose *DMC logo blue.png* file. Then set it

to *Floating* and *Fit image*.



- 3) Click on *Set URL...*, to set it to <http://library.rice.edu/dmc>
- 4) Change the setting for the dashboard title to *Floating* and adjust its position.
- 5) Starting Tableau version 10, you can change font for the whole workbook in one place. Click *Format* in the Top menu Bar, then select *WorkBook...* . Try changing some font settings with the popped-up *Format Workbook menu*.

## VII. Use Story to present your analysis

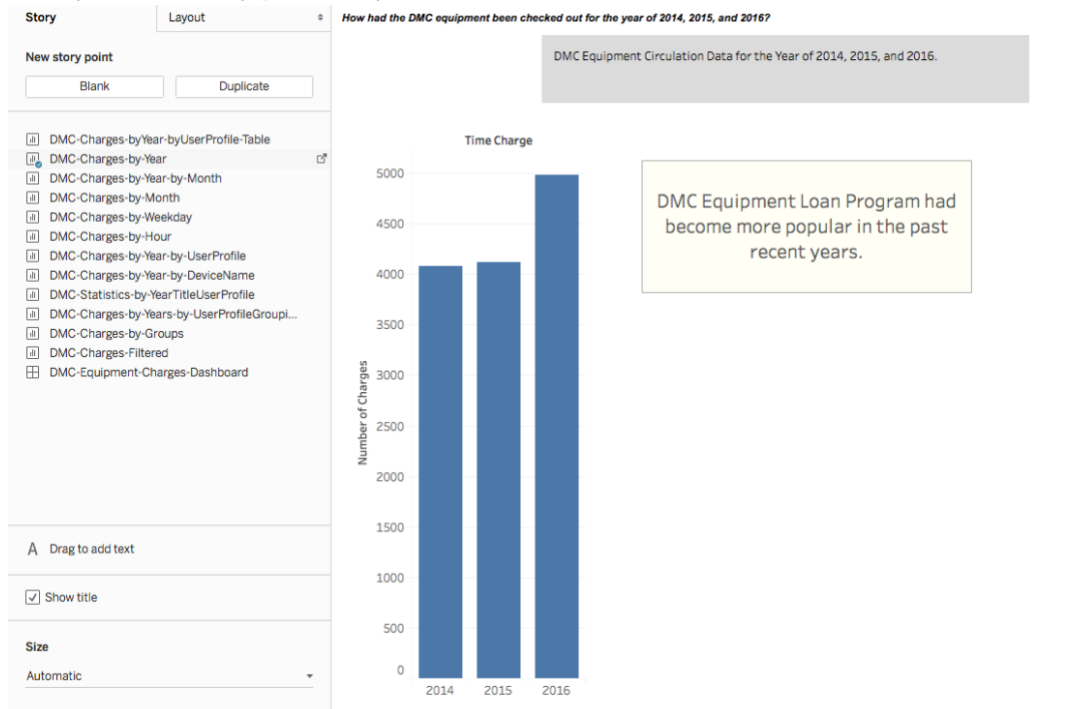
You can tell stories with your data using dashboards or using Story function. A **story** is a sheet that contains a sequence of worksheets or dashboards that work together to convey information.

### Activity 7.1 Create a Story



- 1) Click the new *Story* button or *Story -> New Story*
- 2) Click on *Size*, change it to *Automatic*.
- 3) You open a new story pane. You may drag your any worksheet or dashboard created earlier into this pane.
- 4) Drag *DMC-charges-by-year* into the pane.
- 5) Double click *Add a caption* and add a caption title - *DMC Equipment Circulation Data for the Year of 2014, 2015, and 2016*.
- 6) Double click the default Story title *Story 1* and change it to *How had the DMC equipment been checked out for the year of 2014, 2015, and 2016?* You can add descriptive text to this story pane by clicking the *A Description* and entering your paragraph.

7) Now your first Story point may look similar to below.



- 8) Now we can add a new blank story point by clicking *Blank* button on the left pane.
- 9) Drag the *DMC-charges-by-month* sheet onto this 2nd story pane, change caption title to *DMC Equipment Circulation Data by Month across the years of 2014 through 2016*. Add a comment as you like.
- 10) Following the similar steps, we can add the 3rd and fourth story point pages. Now you



click on **Presentation Mode** button on the toolbar to play the story. User can browse the story page by clicking through the navigation bar.

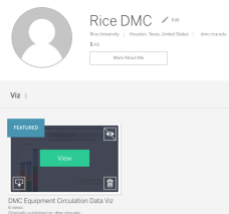
- 11) You can change Story formats like *Font*, *Color* and etc. by clicking *Format* in the Top menu bar and then choosing *Story...*
- 12) Rename the Story to *DMC-Equipment-Circulation-Story*.

## VII. Save and publish your work

Now, so far, all the work you have completed in your Tableau desktop is not saved and you need to do it now. You can't save your work locally. With a free account on Tableau Public, you have 10GB storage.

- 1) *File* -> *Save to Tableau Public*
- 2) Enter Tableau Public account and password
  - a. DMC Tableau Public training account: [erc@rice.edu](mailto:erc@rice.edu)
  - b. Password:
- 3) Type a name for the workbook and click *Save*
- 4) Follow the on-screen prompts to save your Tableau Workbook and publish it. This will take a minute or so depending on your project size.
- 5) Now you should be taken to the Tableau Public server in an opened browser.

- 6) You can also edit your workbook right on the Tableau Public server, which is very convenient. Or you can download the workbook and edit it locally, then save it to the Tableau Public Server.
- 7) If you click on the Settings button, you have the option to Show Sheets and Allow Access.
  - a. Show Sheets  
If you have multiple worksheets, dashboards, and stories in your viz that you'd like the viewer to be able to flip through, you can turn it on to display them as tabs.
  - b. Allow Access  
Let others download or make a copy of this viz.
- 8) You can click the Edit Details button at the bottom of the published Viz
- 9) External link
  - a. By putting a link here, when the viz is shared, it will open the viz as a lightbox over your website. Closing the viz leads to the web page or blog post explaining more.
  - b. If you leave the permalink blank, when the viz is shared, it stays on the default Tableau page.
- 10) When you save to Tableau Public server, the publishing process saves both your data and your workbook. When a Tableau Workbook is downloaded from the Tableau Public server, it is a packaged workbook that contains the workbook and the data. These workbooks are saved with a .twbx file extension. They are no longer linked to the original data sources. Other users can open the packaged workbook using Tableau Desktop or Tableau Reader, and do not need access to the original data sources.
- 11) As soon as a Tableau workbook is published to Tableau Public, **the worksheets, dashboards, and stories are accessible by anyone on the internet**, so make sure what you will publish is not confidential. If you uncheck "Allow Access", the underlying data (i.e. the original data) will be prevented from others. In other words, the original data can be protected. The viz (i.e. the worksheets, dashboards, and stories) can't be protected once it is published.
- 12) Customize your profile
  - a. Click My Profile



- b. Mouse over a Viz. You can *feature* it, *hide* it, *download* it, or *trash* it.
- c. Select *View* to open the Viz.
  - i. Then you can select Edit Details to customize metadata such as workbook name and description, etc.
  - ii. Or click Share button at the lower right corner to get a link to share with others or code to embed in a web page

- iii. Download Workbook button at the upper right corner to download the workbook.
- iv. Download at the lower right corner to download the workbook, data, PDF, or image.

## Resources

- 1) Tableau Public How-to-videos  
<https://public.tableau.com/en-us/s/resources>
- 2) Tableau Public FAQ  
<https://community.tableau.com/s/tableau-public-faq#subhead18>
- 3) Get Started with Tableau Desktop  
<http://onlinehelp.tableau.com/current/guides/get-started-tutorial/en-us/get-started-tutorial-home.html>
- 4) Tableau eLearning <https://www.tableau.com/learn/training/elearning>
- 5) Knowledge base  
<https://www.tableau.com/support/knowledgebase>
- 6) Tableau online help documentation  
<http://onlinehelp.tableau.com/current/pro/desktop/en-us/help.html>
- 7) Tableau Sample Data Sets - A changing sample of datasets for use in teaching and learning. [https://public.tableau.com/s/resources?qt-overview\\_resources=1-qt-overview\\_resources](https://public.tableau.com/s/resources?qt-overview_resources=1-qt-overview_resources)
- 8) Datasets in public domain at Inside Airbnb <http://insideairbnb.com/get-the-data.html>
- 9) Datasets for Teaching and Learning  
[http://libguides.rice.edu/data\\_resources/samples](http://libguides.rice.edu/data_resources/samples)
- 10) Tableau Essentials: Chart Types – Introduction  
<https://interworks.com/blog/ccapitula/2014/08/04/tableau-essentials-chart-types-introduction/>