Churn Analysis Dashboard Installation and Navigation

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The purpose of this document is to aid the user in the installation of the Tableau Software and the Churn Analysis dashboard.

Download and install Tableau

Begin by downloading the Tableau Installer, found at this web address: https://www.tableau.com/products/desktop/download. Once downloaded, run the installer and accept the defaults.

Obtain data sources and prepare

We will need two sources of data to install the churn analysis dashboard. The first data source, churn_clean.csv, is provided by Western Governors University. The second data source, NST-EST2021-POP.xlsx, can be downloaded from the following location: https://www2.census.gov/programs-surveys/popest/tables/2020-2021/state/totals/NST-EST2021-POP.xlsx.

Before importing the data sources, we will need to do some preparation. For churn_clean.csv we will need to convert state abbreviations to full state names.

Begin by importing the pandas and numpy modules.

```
import pandas as pd
import numpy as np
```

Import the data set using the following command.

```
df = pd.read_csv('churn_clean.csv',dtype={'locationid':np.int64})
```

Create a new column "State_Full" and assign it the values in the state column.

```
df['State_Full'] = df['State']
```

Create a dictionary that relates each state to its abbreviation.

```
states = {
        'AL': 'Alabama',
        'AK': 'Alaska',
        'AZ': 'Arizona',
        'AR': 'Arkansas',
        'CA': 'California',
        'CZ': 'Canal Zone',
        'CO': 'Colorado',
        'CT': 'Connecticut',
        'DE': 'Delaware',
        'DC': 'District of Columbia',
        'FL': 'Florida',
        'GA': 'Georgia',
        'GU': 'Guam',
        'HI': 'Hawaii',
        'ID': 'Idaho',
        'IL': 'Illinois',
        'IN': 'Indiana',
        'IA': 'Iowa',
        'KS': 'Kansas',
        'KY': 'Kentucky',
        'LA': 'Louisiana',
        'ME': 'Maine',
        'MD': 'Maryland',
        'MA': 'Massachusetts',
        'MI': 'Michigan',
        'MN': 'Minnesota',
        'MS': 'Mississippi',
        'MO': 'Missouri',
        'MT': 'Montana',
        'NE': 'Nebraska',
        'NV': 'Nevada',
        'NH': 'New Hampshire',
        'NJ': 'New Jersey',
        'NM': 'New Mexico',
        'NY': 'New York',
        'NC': 'North Carolina',
        'ND': 'North Dakota',
        'OH': 'Ohio',
        'OK': 'Oklahoma',
        'OR': 'Oregon',
        'PA': 'Pennsylvania',
        'PR': 'Puerto Rico',
        'RI': 'Rhode Island',
        'SC': 'South Carolina',
        'SD': 'South Dakota',
        'TN': 'Tennessee',
        'TX': 'Texas',
        'UT': 'Utah',
        'VT': 'Vermont',
        'VI': 'Virgin Islands',
        'VA': 'Virginia',
```

```
        'WA': 'Washington',
        'WV': 'West Virginia',
        'WI': 'Wisconsin',
        'WY': 'Wyoming'
    }
```

Then use the replace function to populate the State_Full column with the full state names.

```
df['State_Full'] = df['State_Full'].replace(states)
```

The results can be seen below.

```
df['State_Full']

0           Alaska
1         Michigan
2           Oregon
3       California
4            Texas
           ...
9995       Vermont
9996     Tennessee
9997         Texas
9998       Georgia
9999       Georgia
Name: State_Full, Length: 10000, dtype: object
```

Finally, export the updated data to a CSV file.

```
df.to_csv(r'C:\Users\wstul\d210\churn_clean_perpared.csv')
```

We will edit the NST-EST2021-POP.xlsx spreadsheet using Excel by removing a few rows at the top. See below for the comparison of the original spreadsheet to the reformatted spreadsheet. We will also need to save this reformatted spreadsheet in a CSV format (for this exercise, the reformatted file will be named NST-EST2021-POP-cleaned.csv).

	A	B	C	D
2	Annual Estimates of the Resident Population for the United States, Regions, States, District of Columbia, and Puerto Rico: April 1, 2020 to July 1, 2021			
3	Geographic Area	April 1, 2020 Estimates Base	Population Estimate (as of July 1)	
4			2020	2021
5	United States	331,449,281	331,501,080	331,89
6	Northeast	57,609,148	57,525,633	57,15
7	Midwest	68,985,454	68,935,174	68,84
8	South	126,266,107	126,409,007	127,22
9	West	78,588,572	78,631,266	78,66
10	Alabama	5,024,279	5,024,803	5,03
11	Alaska	733,391	732,441	73
12	Arizona	7,151,502	7,177,986	7,27
13	Arkansas	3,011,524	3,012,232	3,02
14	California	39,538,223	39,499,738	39,23
15	Colorado	5,773,714	5,784,308	5,81

	A	B	C	D
1	Geographic Area	April 1 2020 Estir	July 1 2020 Estin	July 1 2021 Estima
2	United States	331,449,281	331,501,080	331,893,745
3	Northeast	57,609,148	57,525,633	57,159,838
4	Midwest	68,985,454	68,935,174	68,841,444
5	South	126,266,107	126,409,007	127,225,329
6	West	78,588,572	78,631,266	78,667,134
7	Alabama	5,024,279	5,024,803	5,039,877
8	Alaska	733,391	732,441	732,673
9	Arizona	7,151,502	7,177,986	7,276,316
10	Arkansas	3,011,524	3,012,232	3,025,891
11	California	39,538,223	39,499,738	39,237,836
12	Colorado	5,773,714	5,784,308	5,812,069
13	Connecticut	3,605,944	3,600,260	3,605,597
14	Delaware	989,948	991,886	1,003,384
15	District of Columbia	689,545	690,093	670,050
16	Florida	21,538,187	21,569,932	21,781,128

Import data sources

Launch the Tableau application. In the left-hand panel of the screen which is colored blue, look for the section named "To a File". Click the text file option and select the churn_clean_perpared.csv. You will see some details of the churn clean CSV file in the lower pane of the screen.

Locate your NST-EST2021-POP-cleaned.csv file. Click and drag it into the area that says "need more data?" in tableau. You will see three drop-down menus show up in the lower pane. In the churn_clean_perpared.csv dropdown field select the State_Full field. Leave the operator dropdown as an equal sign. In the NST-EST2021-POP-cleaned.csv dropdown select Geographic Area. This completes the relationship between the two tables.

Create calculated fields

Once all the data is imported we will create some calculated fields in tableau. To create each calculated field, begin by clicking the analysis menu at the top of the screen and selecting "create calculated field". Name each calculated field according to the instructions below.

For each calculated field, a brief description and the code needed to create the field will be included.

Backup Count

The backup count field gives us a count of how many customers purchased the backup add-on.

```
IF [Online Backup]='Yes' THEN 1
END
```

Churn Percent

The churn percent field is a calculation of the percentage of customers that churned.

```
SUM([Churn Yes Count])/COUNT([Churn])
```

Churn Yes Count

The churn yes count field gives us a count of the customers that churned.

```
IF [Churn]='Yes' THEN 1
END
```

Device Protection Count

The device protection count field gives us a count of how many customers purchased the device protection add-on.

```
IF [Device Protection]='Yes' THEN 1
END
```

Movie Count

The movie count field gives us a count of how many customers purchased the streaming movies add-on.

```
IF [Streaming Movies]='Yes' THEN 1
END
```

Pct of State

The pct of state field gives us a percent value for how many customers in that state are subscribers compared to the total population estimate.

```
COUNT([State Full])/MAX([July 1 2021 Estimate])
```

Pop Estimate

The pop estimate field is the estimated population for each geographic area.

```
IF [State Full] = [Geographic Area] THEN [July 1 2021 Estimate]
END
```

Region

The region field assigns a region of the country to each state. These were coded using the resource found at the following location: http://www.census.gov/programs-surveys/popest/guidance-geographies/terms-and-definitions.html.

```
IF ISNULL([State Full]) THEN [State Full]
ELSEIF [State Full] = "Connecticut" THEN "Northeast"
ELSEIF [State Full] = "Maine" THEN "Northeast"
ELSEIF [State Full] = "Massachusetts" THEN "Northeast"
ELSEIF [State Full] = "New Hampshire" THEN "Northeast"
ELSEIF [State Full] = "Rhode Island" THEN "Northeast"
ELSEIF [State Full] = "Vermont" THEN "Northeast"
ELSEIF [State Full] = "New Jersey" THEN "Northeast"
ELSEIF [State Full] = "New York" THEN "Northeast"
ELSEIF [State Full] = "Pennsylvania" THEN "Northeast"
ELSEIF [State Full] = "Illinois" THEN "Midwest"
ELSEIF [State Full] = "Indiana" THEN "Midwest"
ELSEIF [State Full] = "Michigan" THEN "Midwest"
ELSEIF [State Full] = "Ohio" THEN "Midwest"
ELSEIF [State Full] = "Wisconsin" THEN "Midwest"
ELSEIF [State Full] = "Iowa" THEN "Midwest"
ELSEIF [State Full] = "Kansas" THEN "Midwest"
ELSEIF [State Full] = "Minnesota" THEN "Midwest"
ELSEIF [State Full] = "Missouri" THEN "Midwest"
ELSEIF [State Full] = "Nebraska" THEN "Midwest"
```

```
ELSEIF [State Full] = "North Dakota" THEN "Midwest"
ELSEIF [State Full] = "South Dakota" THEN "Midwest"
ELSEIF [State Full] = "Delaware" THEN "South"
ELSEIF [State Full] = "District of Columbia" THEN "South"
ELSEIF [State Full] = "Florida" THEN "South"
ELSEIF [State Full] = "Georgia" THEN "South"
ELSEIF [State Full] = "Maryland" THEN "South"
ELSEIF [State Full] = "North Carolina" THEN "South"
ELSEIF [State Full] = "South Carolina" THEN "South"
ELSEIF [State Full] = "Virginia" THEN "South"
ELSEIF [State Full] = "West Virginia" THEN "South"
ELSEIF [State Full] = "Alabama" THEN "South"
ELSEIF [State Full] = "Kentucky" THEN "South"
ELSEIF [State Full] = "Mississippi" THEN "South"
ELSEIF [State Full] = "Tennessee" THEN "South"
ELSEIF [State Full] = "Arkansas" THEN "South"
ELSEIF [State Full] = "Louisiana" THEN "South"
ELSEIF [State Full] = "Oklahoma" THEN "South"
ELSEIF [State Full] = "Texas" THEN "South"
ELSEIF [State Full] = "Arizona" THEN "West"
ELSEIF [State Full] = "Colorado" THEN "West"
ELSEIF [State Full] = "Idaho" THEN "West"
ELSEIF [State Full] = "Montana" THEN "West"
ELSEIF [State Full] = "Nevada" THEN "West"
ELSEIF [State Full] = "New Mexico" THEN "West"
ELSEIF [State Full] = "Utah" THEN "West"
ELSEIF [State Full] = "Wyoming" THEN "West"
ELSEIF [State Full] = "Alaska" THEN "West"
ELSEIF [State Full] = "California" THEN "West"
ELSEIF [State Full] = "Hawaii" THEN "West"
ELSEIF [State Full] = "Oregon" THEN "West"
ELSEIF [State Full] = "Washington" THEN "West"
END
```

Security Count

The Security Count field gives us a count of customers that purchased the security add-on.

```
IF [Online Security]='Yes' THEN 1
END
```

TV Count

The TV count field gives us a count of customers that purchased the streaming TV add-on.

```
IF [Streaming TV]='Yes' THEN 1
END
```

Build Worksheets

For each new worksheet (four total), begin by clicking the "New Worksheet" button at the bottom.

Worksheet 1 - Lowest Subscriber to Population Ratios

1. Drag "State Full" to the columns shelf. From its dropdown menu, select Measure > Count.
2. Drag "Pct of State" to the first position on the columns shelf.
3. Drag "State Full" to the rows shelf.
4. Drag "State Full" to the Filters shelf. From the "Top" tab, enable the "By field:" radio button. From the first dropdown menu, select bottom. In the field to the right, type "5". From the second dropdown menu, select "Pct of State". Then click Apply, and OK.
5. Drag "State Full" to the Color tile on the marks shelf. Click the Color tile and choose "Edit Colors". From the "Select Color Palette" dropdown, choose "Color Blind". Click "Assign Palette", then Apply, and then OK.

Worksheet 2 - Addon Purchases By State

1. Drag "State Full" to the columns shelf.
2. Drag the following fields to the rows shelf: Backup Count, Device Protection Count, Security Count, Movie Count, and TV Count.
3. Click "Show Me" in the top right corner, and select "Side by side bars".
4. Drag "State Full" to the Filters shelf in the first position. From the filter's setting menu, choose "Single Value (dropdown)".
5. From the "Measure Names" filter's setting menu, choose "Hide Card".

Worksheet 3 - Churn % By State

1. Drag "Churn" to the "Columns" shelf.
2. Drag "Churn" to the "Rows" shelf. From its dropdown menu, highlight "Measure" and select "Count".
3. Click "Show Me" in the top right corner, and select "pie charts".
4. In the "Marks" panel, click the "Size" icon (two circles) next to the second "CNT(Churn)" and choose Label. Open that same "CNT(Churn)" dropdown menu, highlight "Quick Table Calculation" and choose "Percent of Total".
5. Drag "Churn" to the "Label" tile in the "Marks" panel.

6. Drag "Region" to the "Filters" shelf in the first position. From the filter's settings menu, choose "Single Value (dropdown)".
7. Drag "State Full" to the "Filters" shelf in the second position. From the filter's settings menu, choose "Single Value (dropdown)".

Worksheet 4 - States: Churn % With Total Population

1. Drag "Churn Percent" to the "Columns" shelf.
2. Drag "Pop Estimate" to the "Rows" shelf.
3. Drag "State Full" to the "Color" tile on the "Marks" shelf. If prompted, choose "Add all members". Click the "Color" tile and choose "Edit Colors". From the "Select Color Palette" dropdown, choose "Color Blind". Click "Assign Palette", then Apply, and then OK.
4. From the main dropdown menu in the "Marks" shelf, choose "Circle".
5. Click the "Size" tile in the "Marks" shelf and slide the slider to the halfway point.

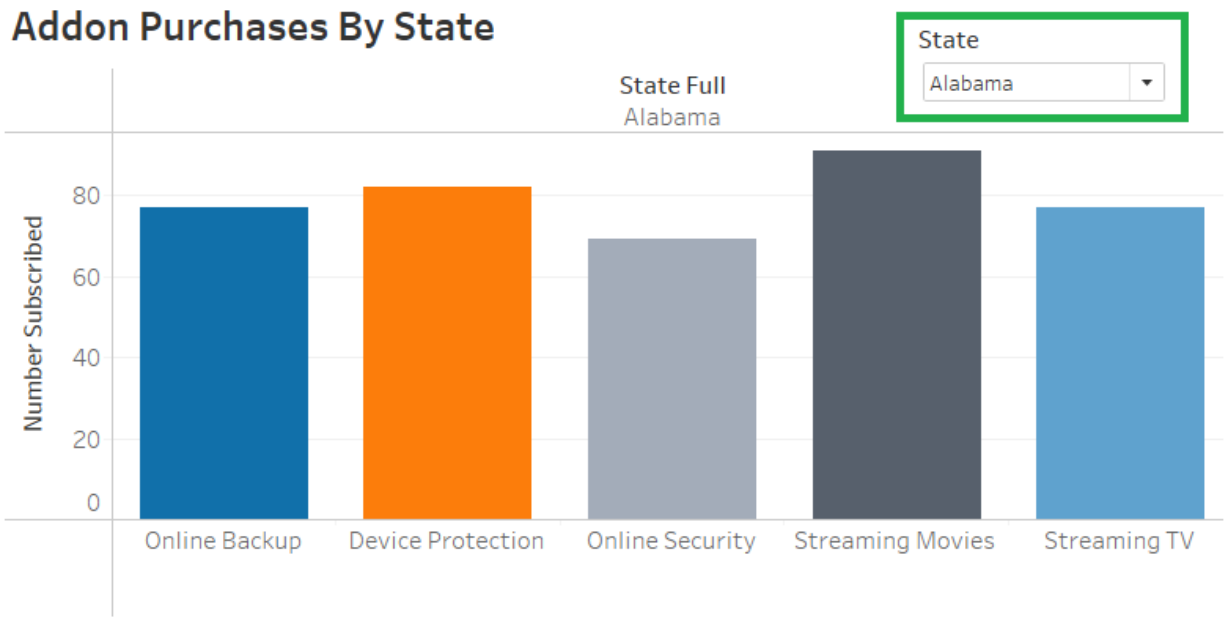
Create the Dashboard

We are now ready to create the dashboard. Click the "new dashboard" button along the bottom toolbar. You may drag each worksheet from the sheets panel over to the right side to fill the space in the dashboard.

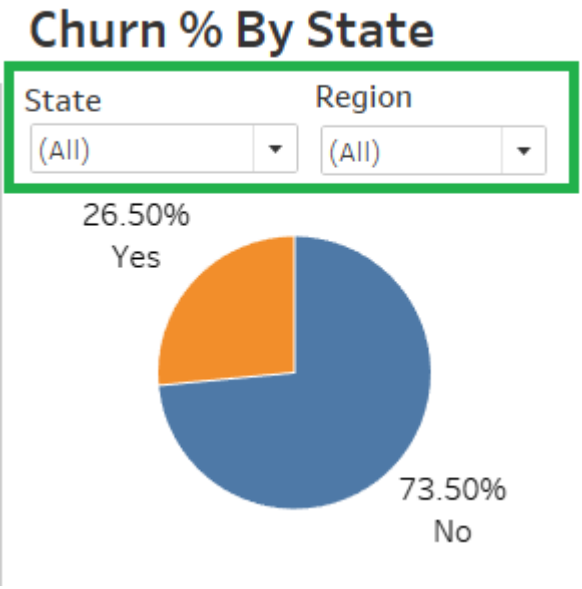
If you would like floating filters, open the settings dropdown for each filter and choose "floating", then drag each filter wherever you would like it to appear in the dashboard. You may also resize the filters if you wish.

Navigating the Dashboard

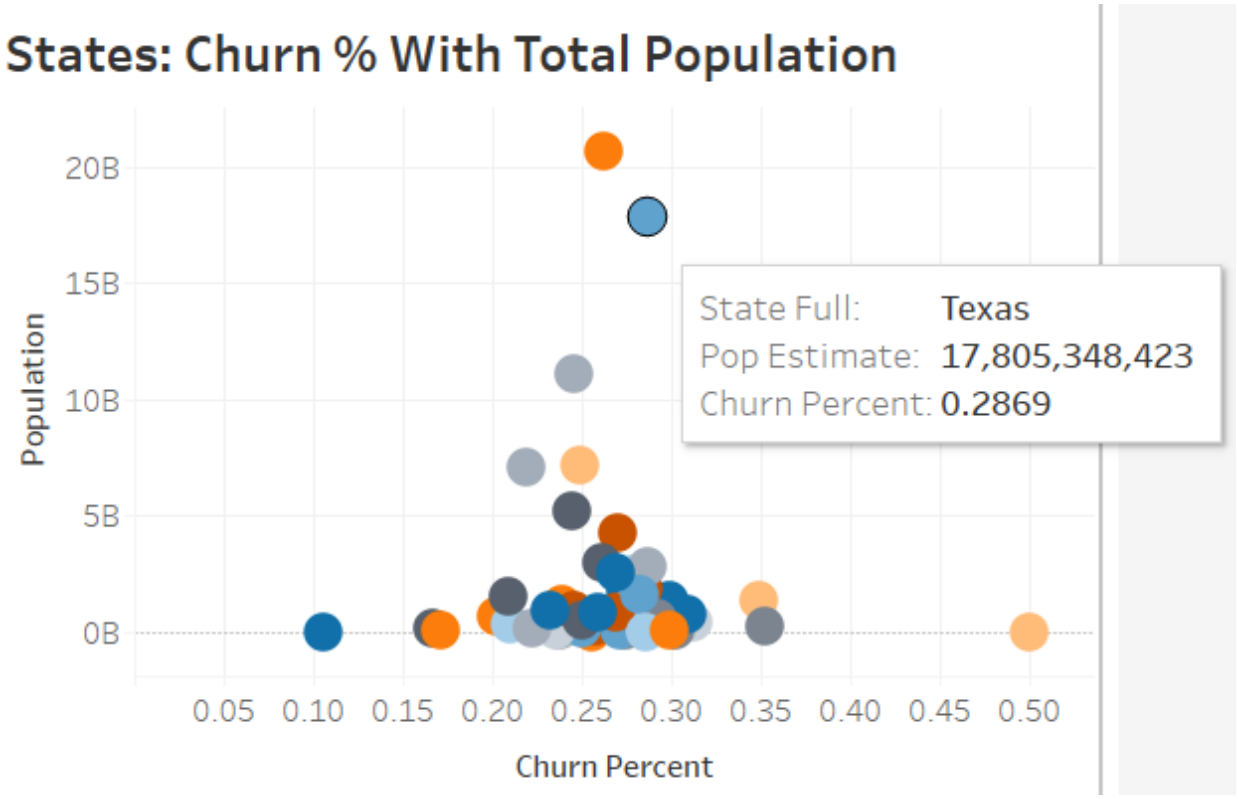
All portions of the dashboard are immediately visible, so no actions need to be taken to reveal hidden sheets or views. There are two sheets in the dashboard which utilize dropdown filters: "Addon Purchases By State" and "Churn % By State". The "Addon Purchases By State" sheet can narrow data presentation to individual states via the filter dropdown highlighted below.



The "Churn % By State" sheet can be filtered by region and state in the same manner. Note that to utilize the region filter, the state filter must be set to "all".



All sheets have elements that will reveal more detailed data (churn percent, population estimate, etc.) when the mouse is hovered over.


States: Churn % With Total Population
20B
15B
10B
5B
0B
Population
0.05
0.10
0.15
0.20
0.25
0.30
0.35
0.40
0.45
0.50
Churn Percent
State Full: Texas
Pop Estimate: 17,805,348,423
Churn Percent: 0.2869