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## **A. Data Dashboard**

A dashboard created in Tableau using a PostgreSQL connection has been provided as a packaged workbook (a .twbx file). This dashboard addresses executive decisions relating to churn rates of a WGU-provided churn data set of a telecommunications company (referred to as “WGU”) and an external data set of a competitor telecommunications company (referred to as “Competitor”). The dashboard has been designed to be recreated within a default Labs on Demand (LOD) virtual machine provided by WGU.

### **A1. Data Sets**

The data sets have been provided as follows:

- The WGU-provided data set (“WGU”) consists of five tables which are preloaded into the LOD machine and can be accessed using the pgAdmin4 application. These tables have also been provided as the following CSV files:
  - **customer.csv**
  - **contract.csv**
  - **payment.csv**
  - **location.csv**
  - **job.csv**
- Note: only the customer and contract tables are relevant to the creation of this dashboard.
- The external data set (“Competitor”) has been provided as the following CSV file:
  - **comp\_churn\_211.csv**
- Note: this data set, initially titled “Telco Customer Churn,” was obtained from Kaggle at the following URL: <https://www.kaggle.com/datasets/blastchar/telco-customer-churn>.

### **A2. Dashboard Creation Instructions**

Please follow these instructions in creating an operational version of this dashboard on a default version of the WGU-provided LOD machine:

1. Move provided external file “comp\_churn\_211.csv” to the **desktop** of the virtual machine.
2. Ensure external file has necessary permissions:
  - a. Right-click “comp\_churn\_211.csv” on desktop and select “Properties.”
  - b. Select “Security” tab.
  - c. Click “Edit” button.
  - d. Click “Add...” button.
  - e. In box under “Enter the object names to select (examples):” type in “**Everyone**” and click “OK.”

- f. Click “Apply” then “OK.”
  - g. Click “OK.”
3. Open pgAdmin4 application. If loading seems to be frozen, click on blue background and back to the application.
4. Select “churn” database:
  - a. Select dropdown on “Servers.”
  - b. Select dropdown on “PostgreSQL 13.”
  - c. Select dropdown on “Databases.”
  - d. Highlight/click on “churn.”
5. Load external dataset:
  - a. Click “Query Tool,” symbolized by three stacked circles and play button.
  - b. Copy and paste the following into the Query Tool:

```
CREATE TABLE public.comp_churn
("CaseID" numeric,
"Churn" text,
"Tenure" numeric,
"Contract" text,
PRIMARY KEY ("CaseID"));
```

```
ALTER TABLE public.comp_churn
OWNER to postgres;
```

```
COPY public.comp_churn
FROM 'C:\Users\LabUser\Desktop\comp_churn_211.csv'
DELIMITER ','
CSV HEADER;
```

```
SELECT * FROM comp_churn
```

- c. Click “Execute/Refresh (F5)” symbolized by play button.
6. Clean provided dataset:
  - a. Select Query Tool to enter a new query.
  - b. Copy and paste the following into the Query Tool:

```
UPDATE contract
SET duration = 'Two year'
WHERE contract_id = 3;
```

7. Minimize pgAdmin4 application and open Tableau 2021.4 application.
8. Connect to PostgreSQL server:
  - a. From home page of Tableau, underneath Connect, locate “To a Server.”
  - b. Click “More” and locate “PostgreSQL.” Select this option.
  - c. For any of these options that are not prepopulated, enter the given credentials:

- i. Server: localhost
  - ii. Port: 5432
  - iii. Database: churn
  - iv. Authentication: Username and Password.
  - v. Username: postgres
  - vi. Password: Passw0rd!
- d. Click “Sign in.”
- 9. Create relationships between tables:
  - a. From Data Source page of Tableau, locate list of Tables.
  - b. Drag “customer” table to center of page where “Drag tables here” is listed.
  - c. Drag “contract” table to the right of “customer” until an orange line is created. Drop contract table here to create relationship with customer table.
    - i. Near bottom of page, if relationship is not automatically defined, define it as follows:
      - ii. Under “customer,” select “Contract Id.”
      - iii. Under “operator,” select “=.”
      - iv. Under “contract,” select “Contract Id (Contract).”
  - d. Drag “comp\_churn” table to the right of “contract” until an orange line is created. Drop comp\_churn table here to create relationship with contract table.
    - i. Near bottom of page, define relationship as follows:
      - ii. Under “contract,” select “Duration.”
      - iii. Under “operator,” select “=.”
      - iv. Under “comp\_churn,” select “Contract.”
- 10. Create Sheet 1:
  - a. Click “Sheet 1” at the bottom of the page, next to Data Source.
  - b. Create churn rate calculated fields:
    - i. Next to the search bar under the “Data” title on the left side of the screen, locate a dropdown with a first option of “Create Calculated Field...” Select this option.
    - ii. In the text box, copy and paste the following: **100\*(If [Churn]=‘Yes’ then 1 else 0 end) / (If [Churn]=‘Yes’ then 1 else 1 end)**
    - iii. Name the calculation “WGU Churn Rate” and click “OK.”
    - iv. Repeat the process of creating a calculated field. In this text box, copy and paste the following: **100\*(If [Churn1]=‘Yes’ then 1 else 0 end) / (If [Churn1]=‘Yes’ then 1 else 1 end)**. Note the “Churn1” instead of “Churn.”
    - v. Name the calculation “Comp Churn Rate” and click “OK.”
  - c. Create text table for churn rates:
    - i. In the Data list on the left side of the screen, locate WGU Churn Rate. Right-click and select “Add to Sheet.”
    - ii. Where the data has been added (in “Columns” or “Rows”), hover over the bubble representing its aggregation. Locate the dropdown on the bubble’s right side. Click the dropdown and change “Measure (sum)” to “Average.”

- iii. Repeat the process with Comp Churn Rate. Right-click and Add to Sheet. Click dropdown and change Measure (sum) to Average.
- iv. Drag one of the churn rates next to the other, so that they are both represented in Columns or in Rows.
- v. In the top-right corner, click “Show Me” and select the top-leftmost option: **text table**. Click “Show Me” again to remove these options from view.
- vi. Drag “Measure Names” from Rows to Columns.
- d. Enhance the presentation of the sheet:
  - i. Near the top of the page, locate the dropdown box which initially says “Standard.” Change this to “Entire View.”
  - ii. At the bottom of the page, right-click “Sheet 1” and select “Rename.” Rename the sheet “Churn Rate (%)”.
  - iii. Double click the new title where it appears on the sheet. Highlight “<Sheet Name>” and apply the following:
    - 1. Change font to Tableau Bold.
    - 2. Change text alignment from Left to Center.
    - 3. Change font size to 18.
    - 4. Click Apply, then OK.
  - iv. Right-click “Avg. Comp Churn Rate” where it appears on the sheet and select “Edit Alias...” Change the name to “Competitor” and click OK.
  - v. Repeat for “Avg. WGU Churn Rate,” changing name to “WGU.”
  - vi. Right-click Competitor or WGU where they appear on the sheet, select “Format...” and apply the following:
    - 1. Change font to Tableau Bold.
    - 2. Change alignment from Automatic to Center (symbol located under “Horizontal” and “Automatic” but above “Vertical”).
  - vii. Right-click either of the churn rate values where they appear on the sheet, select “Format...” and apply the following:
    - 1. Next to “Pane,” click on Tableau Book. In the pop-up, change the font from Tableau Book to Tableau Bold.
    - 2. Select “Alignment” symbolized by alternating short and longer lines, underneath “Format Font,” which will change to “Format Alignment” when Alignment is selected.
    - 3. Under “Default,” click on “Pane” and change text alignment from Automatic to Center (under Horizontal, above Vertical).

#### 11. Create Sheet 2:

- a. Next to “Churn Rate (%)” at the bottom of the page, select the button to create a new worksheet.
- b. Create text table for tenure rates:
  - i. In the Data list on the left side of the screen, locate Tenure (located in the customer table). Right-click and select “Add to Sheet.”

- ii. Where the data has been added (in “Columns” or “Rows”), hover over the bubble representing its aggregation. Locate the dropdown on the bubble’s right side. Click the dropdown and change “Measure (sum)” to “Average.”
  - iii. Repeat the process with Tenure1 (located in the comp\_churn table). Right-click and Add to Sheet. Click dropdown and change Measure (sum) to Average.
  - iv. In the top-right corner, click “Show Me” and select the top-leftmost option: **text table**. Click “Show Me” again to remove these options from view.
  - v. Drag “Measure Names” from Rows to Columns.
- c. Enhance the presentation of the sheet:
  - i. Near the top of the page, locate the dropdown box which initially says “Standard.” Change this to “Entire View.”
  - ii. At the bottom of the page, right-click “Sheet 2” and select “Rename.” Rename the sheet “Average Tenure (Months).”
  - iii. Double click the new title where it appears on the sheet. Highlight “<Sheet Name>” and apply the following:
    - 1. Change font to Tableau Bold.
    - 2. Change text alignment from Left to Center.
    - 3. Change font size to 18.
    - 4. Click Apply, then OK.
  - iv. Right-click “Avg. Tenure” where it appears on the sheet and select “Edit Alias...” Change the name to “WGU ” (**note the space after WGU, which is intentional**) and click OK.
  - v. Repeat for “Avg. Tenure1”: change name to “Competitor ” **with the space**.
  - vi. Right-click Competitor or WGU where they appear on the sheet, select “Format...” and apply the following:
    - 1. Change font to Tableau Bold.
    - 2. Change alignment from Automatic to Center (symbol located under “Horizontal” and “Automatic” but above “Vertical”).
  - vii. Right-click either of the tenure values where they appear on the sheet, select “Format...” and apply the following:
    - 1. Next to “Pane,” click on Tableau Book. In the pop-up, change the font from Tableau Book to Tableau Bold.
    - 2. Select “Alignment” symbolized by alternating short and longer lines, underneath “Format Font,” which will change to “Format Alignment” when Alignment is selected.
    - 3. Under “Default,” click on “Pane” and change text alignment from Automatic to Center (under Horizontal, above Vertical).

## 12. Create Sheet 3:

- a. Next to “Average Tenure (Months)” at the bottom of the page, select the button to create a new worksheet.
- b. Create side-by-side graphs for churn rate by contract type:

- i. In the Data list on the left side of the screen, locate WGU Churn Rate. Right-click and select “Add to Sheet.”
  - ii. Where the data has been added (in “Columns” or “Rows”), hover over the bubble representing its aggregation. Locate the dropdown on the bubble’s right side. Click the dropdown and change “Measure (sum)” to “Average.”
  - iii. Repeat the process with Comp Churn Rate. Right-click and Add to Sheet. Click dropdown and change Measure (sum) to Average.
  - iv. Drag the churn rates next to each other so that they are both represented in Rows.
  - v. In the data listed under the comp\_churn table on the left side of the screen, drag “Contract” to the Columns.
  - vi. In the top-right corner, click “Show Me” and select “side-by-side bars” option, the rightmost option in the third row. Click “Show Me” again to remove these options from view.
- c. Enhance the presentation of the sheet:
- i. Near the top of the page, locate the dropdown box which initially says “Standard.” Change this to “Entire View.”
  - ii. At the bottom of the page, right-click “Sheet 3” and select “Rename.” Rename the sheet “Churn Rate by Contract.”
  - iii. Double click the new title where it appears on the sheet. Highlight “<Sheet Name>” and apply the following:
    1. Change text alignment from Left to Center.
    2. Click Apply, then OK.
  - iv. Under the “Marks” card, click “Label” and select the option to “Show mark labels.” Click “Label” again to remove these options from view.
  - v. On the y-axis, locate the vertical-aligned “Value.” Right-click and select “Edit Axis...” Under Axis Titles, change the Title to “Churn Rate (%).” Close out of the pop-up.

### 13. Create Sheet 4:

- a. Next to “Churn Rate by Contract” at the bottom of the page, select the button to create a new worksheet.
- b. Create side-by-side graphs for tenure by contract type:
  - i. In the Data list on the left side of the screen, locate Tenure (located in the customer table). Right-click and select “Add to Sheet.”
  - ii. Where the data has been added (in “Columns” or “Rows”), hover over the bubble representing its aggregation. Locate the dropdown on the bubble’s right side. Click the dropdown and change “Measure (sum)” to “Average.”
  - iii. Repeat the process with Tenure1 (located in the comp\_churn table). Right-click and Add to Sheet. Click dropdown and change Measure (sum) to Average.
  - iv. Drag the tenure rates next to each other so that they are both represented in Rows.

- v. In the data listed under the comp\_churn table on the left side of the screen, drag “Contract” to the Columns.
    - vi. In the top-right corner, click “Show Me” and select “side-by-side bars” option, the rightmost option in the third row. Click “Show Me” again to remove these options from view.
  - c. Enhance the presentation of the sheet:
    - i. Near the top of the page, locate the dropdown box which initially says “Standard.” Change this to “Entire View.”
    - ii. At the bottom of the page, right-click “Sheet 4” and select “Rename.” Rename the sheet “Average Tenure by Contract.”
    - iii. Double click the new title where it appears on the sheet. Highlight “<Sheet Name>” and apply the following:
      - 1. Change text alignment from Left to Center.
      - 2. Click Apply, then OK.
    - iv. Under the “Marks” card, click “Label” and select the option to “Show mark labels.” Click “Label” again to remove these options from view.
    - v. On the y-axis, locate the vertical-aligned “Value.” Right-click and select “Edit Axis...” Under Axis Titles, change the Title to “Average Tenure (Months).” Close out of the pop-up.
14. Create the dashboard:
- a. Two buttons over from “Average Tenure by Contract,” select the button to create a new dashboard.
  - b. In the dashboard, on the left side of the screen under Sheets, drag the first sheet (Churn Rate (%)) into the middle of the dashboard.
  - c. Drag the second sheet (Average Tenure (Months)) to the right side of the first sheet, until a gray box will indicate it will be placed on the right side and take up half of the current dashboard.
  - d. Drag the third sheet (Churn Rate by Contract) to the bottom of the first sheet, until a gray box will indicate it will be placed under the first sheet and to the left of the second sheet.
  - e. Drag the fourth sheet (Average Tenure by Contract) to the bottom of the second sheet, until a gray box will indicate it will be placed under the second sheet and to the right of the first and third sheets.
  - f. Enhance the dashboard:
    - i. At the bottom of the page, right-click “Dashboard 1” and select “Rename.” Rename the dashboard “Metrics and Visualizations.”
    - ii. If a box has appeared showing a legend titled “Measure Names” and color labels for Competitor and WGU, highlight this box and remove it from the dashboard using the X. Confirm by clicking “Delete Containers.”
    - iii. On the left side of the screen under “Objects,” drag a “Text” object to the top of the dashboard, until a gray box will indicate it will be placed over the Churn Rate (%) and Average Tenure (Months) sheets (it will place the box above them, not cover them).

- iv. In the text box, write “Metrics and Visualizations.” Highlight this and apply the following:
  1. Change the font to Tableau Bold.
  2. Change the alignment from Left to Center.
  3. Change the font size to 20.
  4. Change the font color to the top-left black option.
  5. Click OK.
- v. On the left side of the screen, under Size, click on the current size and select a new option. It is recommended to select “Laptop Browser (800 x 600),” but this option may be dependent on device and screen size.
- vi. Drag the bottom of the “Metrics and Visualizations” text box to near the top of the screen, such that the text box only takes up the amount of space that a title would.
- vii. Drag the bottom of the “Churn Rate (%)” and “Average Tenure (Months)” sheets towards the top of the screen, such that these sheets combined with the title take up approximately 1/3 of the dashboard height.
- viii. Highlight the “Churn Rate by Contract” sheet so that option markers appear on the top-right of the sheet. Select the third option down, Filter (hovering over this option will display “Use as Filter”).
- ix. Repeat with the “Average Tenure by Contract” sheet, using this sheet as a filter as well.

The completed dashboard has been provided as a packaged workbook (.twbx file). If a password is requested to access the dashboard, enter “Passw0rd!” as the password.

### **A3. Dashboard Navigation Instructions**

The following guidance assists navigation for the Metrics and Visualization dashboard:

- The key performance indicators (KPIs) at the top of the dashboard initially represent the overall churn rate and average tenure for each of the WGU and Competitor data sets. Churn rate is expressed as a percentage and Tenure is expressed in months.
- The data representations below the KPIs represent a breakdown of churn rate and average tenure by contract type. A further explanation of each:
  - **Churn Rate by Contract:** in a side-by-side bar graph, the WGU and Competitor churn rates are broken down into three contract types: Month-to-month, One year, and Two year.
    - The WGU and Competitor churn rates for each contract are labeled accordingly, with the values represented on top of each individual bar.
    - For example, the leftmost pair of bars fall under the “Month-to-month” Contract category, with one bar representing the churn rate for Competitor customers with Month-to-month contracts (42.71%) and the other bar representing the churn rate for WGU customers with Month-to-month contracts (37.28%).



- **Tenure by Contract:** in a side-by-side bar graph, the WGU and Competitor tenure rates are broken down into three contract types: Month-to-month, One year, and Two year.
  - The WGU and Competitor average tenure for each contract are labeled accordingly, with the values represented on top of each individual bar.
  - For example, the middle pair of bars fall under the “One year” Contract category, with one bar representing the average tenure for Competitor customers with One year contracts (42.04 months) and the other bar representing the average tenure for WGU customers with the same contract type (34.21 months).
- For each of these data representations, **interactive filters** have been applied which allow users to **highlight a specific contract**.
  - When a **bar is selected**, all other representations and KPIs are modified to show only the selected group.
  - For example, within the “Churn Rate by Contract” graph, selecting either of the bars underneath the “**Two year**” contract type will filter all representations and KPIs to display **only data for customers with Two year contracts**.
  - This can be used to break down data further than the initial representations can offer. Following the above directions can allow a user to, for example, highlight the discrepancy in average tenure for customers with Two year contracts: Competitor customers on these contracts have much higher average tenure (56.74 months) than WGU customers (35.43 months).

#### A4. SQL Code

The following summarizes all SQL code used to support the creation of the dashboard:

- To create a table within the churn database and load the external data set referred to as Competitor in the table, the following SQL code was used:

```
CREATE TABLE public.comp_churn
("CaseID" numeric,
 "Churn" text,
 "Tenure" numeric,
 "Contract" text,
 PRIMARY KEY ("CaseID"));
```

```
ALTER TABLE public.comp_churn
OWNER to postgres;
```

```
COPY public.comp_churn
FROM 'C:\Users\LabUser\Desktop\comp_churn_211.csv'
DELIMITER ','
CSV HEADER;
```

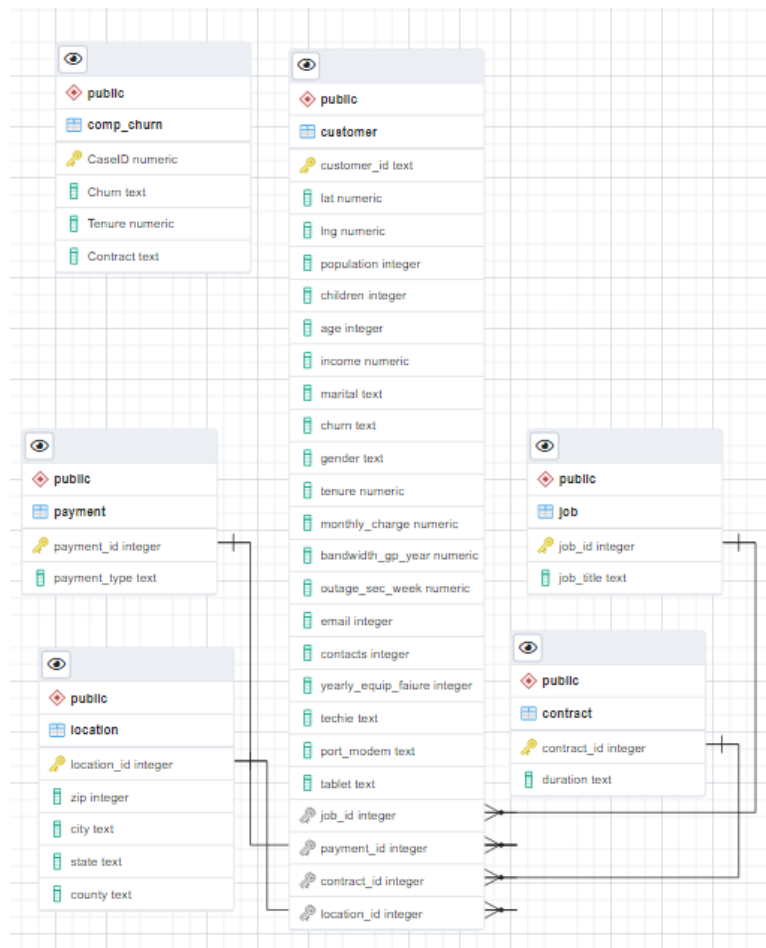
**SELECT \* FROM comp\_churn**

- To alter the provided WGU data set “contract” such that the value for contract lengths of two years is case-consistent with the corresponding values in the Competitor data set, the following SQL code was used:

```
UPDATE contract  
SET duration = 'Two year'  
WHERE contract_id = 3;
```

## **B. Panopto Presentation**

Please refer to the link attached with a Panopto video recording. The video is a presentation of this dashboard to an audience of data analytics peers, including a description of the environment used to create the dashboard, a demonstration of its functionality, the SQL scripts used to support the dashboard creation, and an overview of the database’s entity relationship diagram (ERD) which describes the preparation, alignment, creation, and referential integrity of the data. The ERD is also provided as a screenshot below:



### **C1. Alignment with Company Needs**

The telecommunications company described in the WGU data dictionary, referred to as “WGU,” has identified the clear goal of conducting analysis and enacting service strategies that will retain as many of its customers as possible. Prior research has revealed that acquiring a new customer costs ten times more than retaining an existing customer, so reducing customer churn rate is imperative to making WGU as efficient as possible.

This dashboard uses WGU data to compare its churn rates to its competitor’s churn rates, with an emphasis on analyzing contract type. This factor can be used to break down customers into select groups, where significant differences in churn rates between WGU and the competitor have been found. Understanding these gaps in the telecom market will help inform future research on the factors and characteristics that make customers more or less likely to leave a service. Therefore, this dashboard can be used to help WGU reduce its customer churn rate, and with more customers staying on board in the future, WGU will enjoy an increase in profit and company success.

### **C2. Business Intelligence Tool Justification**

The business intelligence tool **Tableau** has been chosen to create and present this dashboard for its usefulness in describing and displaying patterns in data, particularly in easily comparing the key metrics used in this analysis. The following aspects of the preparation and creation of this dashboard were enhanced by the selection of Tableau as the tool used:

- The churn database containing the preloaded WGU data sets and the external data set were easily connected to Tableau using its ability to connect to the PostgreSQL server.
- The relationships between the data sets were established with Tableau’s user-friendly drag-and-drop method and were pre-determined where possible, with Tableau able to predict the relationship between the customer table and the contract table.
- In order to compare company churn rates, calculated fields were created efficiently and accurately represented the data using Tableau’s quick field calculations.
- Tableau’s “Show Me” tool provided a simple yet powerful manner of creating the desired data displays from many available options.
- The ability to combine several sheets with varying data displays into one dashboard was beneficial in summarizing all key aspects of the analysis in one place.
- Interactive filters set on each side-by-side bar graph allows users to not only look at the metrics and visualizations but also actively change them at their leisure.

### **C3. Data Preparation**

To prepare this data for analysis, the following steps were performed prior to connecting the data sets to the Tableau application:

- For the preloaded WGU churn data, the value for a contract length of two years was updated from “Two Year” to “Two year.” This was done to add case consistency to the

other values within that table (for example, a contract length of one year is represented as “One year”) and with the Competitor data set, where the corresponding contract length was listed as “Two year.” Otherwise, Tableau would not recognize two-year contracts in the WGU data set and the Competitor data set as representing the same contract type. With the replacement, Tableau successfully recognizes the corresponding contract types for the separate data sets.

- After acquiring the initial Competitor data set from Kaggle, select columns were filtered out so that only relevant columns remained: CaseID, Churn, Tenure, and Contract. This was done to simplify the loading process of the data into pgAdmin4.

#### **C4. Dashboard Creation Steps**

A summary of the steps used to create the dashboard within Tableau are as follows, with further detail for each step available in section A2:

1. The external file “comp\_churn\_211.csv” representing the Competitor data set was moved to the desktop of the virtual machine.
2. The permissions of the file were altered so that the file could be successfully read into the pgAdmin4 application.
3. A table was created in the churn database in pgAdmin4 named “comp\_churn.” The external file was loaded into this table so that the table held the Competitor data set. All necessary data cleaning for this data set was performed prior to loading it into the virtual machine.
4. The necessary data cleaning of the pre-loaded WGU data was performed to prepare the data for analysis.
5. In the Tableau Desktop application, a connection to the PostgreSQL server was made which loaded the churn database (containing the WGU and Competitor data sets) into the Tableau workspace.
6. The relationships between tables were defined. A relationship between the customer and contract tables was established using Contract ID. A relationship between the contract and comp\_churn tables was established using contract length (named “Duration” in the contract table and named “Contract” in the comp\_churn table).
7. The first sheet was created which calculated and summarized the overall churn rate for each of the WGU and Competitor data sets, expressed as a percentage.
8. The second sheet was created which calculated and summarized the overall average tenure for each of the WGU and Competitor data sets, expressed in months.
9. The third sheet was created which broke down the overall churn rates for both data sets by contract type and displayed the data in a side-by-side bar graph.
10. The fourth sheet was created which broke down the overall average tenure rates for both data sets by contract type and displayed the data in a side-by-side bar graph.
11. The dashboard was created and set up to display the first and second sheets above the third and fourth sheets. Enhancements to all sheets were made to create a visually pleasing presentation which includes titles, descriptive axes, a preferred size of the dashboard, and interactive filters in the side-by-side bar graphs.

## **C5. Data Analysis Results**

Using the created dashboard, the following results were found from analysis of the WGU and Competitor churn data sets:

- Overall, **WGU has a slightly lower churn rate** (26.500% vs. 26.537%) and a **slightly higher average tenure** (34.526 vs. 32.371 months) than the Competitor.
- This is an indication that WGU is retaining customers at rates which are comparable to the industry standard and drastic changes to services, products, or development **are not required at this time**.
- Although both companies reflect higher overall churn rates for Month-to-month contracts, **WGU has a lower churn rate** (37.28%) than the Competitor (42.71%) for these contracts.
- WGU also has a **significantly higher average tenure** for customers with Month-to-month contracts (34.24 months) than the Competitor (18.04 months).
- With both lower churn rates and higher average tenure in this group of customers, there are multiple items of evidence that **WGU is more successful than the Competitor for customers with Month-to-month contracts**. This **area of strength** can be studied further to determine the causes for relative success in this group, and any insights gained could potentially be applied to other contract types.
- For both One year and Two year contracts, **WGU has a higher churn rate** (14.61% and 12.65%, respectively) than the Competitor (11.27% and 2.83%, respectively). This difference is especially noticeable for Two year contracts.
- WGU also has a **lower average tenure** for customers with One year contracts (34.21 months) than the Competitor (42.04 months) and a significantly lower average tenure for customers with Two year contracts (35.43 months) than the Competitor (56.74 months).
- With both higher churn rates and lower average tenure in these groups of customers, there are multiple items of evidence that **WGU is less successful than the Competitor for customers with One year and Two year contracts**. This **area of improvement** can be studied further to determine whether the Competitor applies specific methods of customer retention for customers with longer-term contracts, and any insights gained could potentially be applied to WGU's One year and Two year contracts in an attempt to bring churn rates and average tenure for these groups closer to the Competitor's.

## **C6. Data Analysis Limitations**

The following are limitations to the data analysis which must be kept in mind before using the analysis to draw conclusions or implement future plans:

- This is only a comparison of one telecommunications company to another. It would be advisable to compare the WGU telecom company's data to several other adjacent companies within the industry before making conclusions about the industry. Though it may appear that WGU is keeping pace with the competitors, the specific competitor company used in this analysis may be an outlier within the field.

- There are several other characteristics about both WGU customers and competitor customers available, and it is certainly possible that differences in churn rates and average tenure between contract types may be the result of confounding variables not used in this analysis. Further research including other customer characteristics should be conducted before concluding that the variable used in this analysis, contract type, is the cause of differences in customer retention.
- A specific timeframe is not listed in either of the data sets used to conduct this analysis. A significant difference in the years in which this data was collected may drastically change the outcome and implications of these results. It does not make sense, for example, to compare churn rates of one company in present day to the churn rates of another company from ten years ago.

#### **D. Sources**

The additional data set used as a comparison to the WGU data set was obtained from:

<https://www.kaggle.com/datasets/blashtchar/telco-customer-churn>

#### **E. References**

There is no content in this analysis which has been quoted, paraphrased, summarized, or otherwise requires direct citation.