



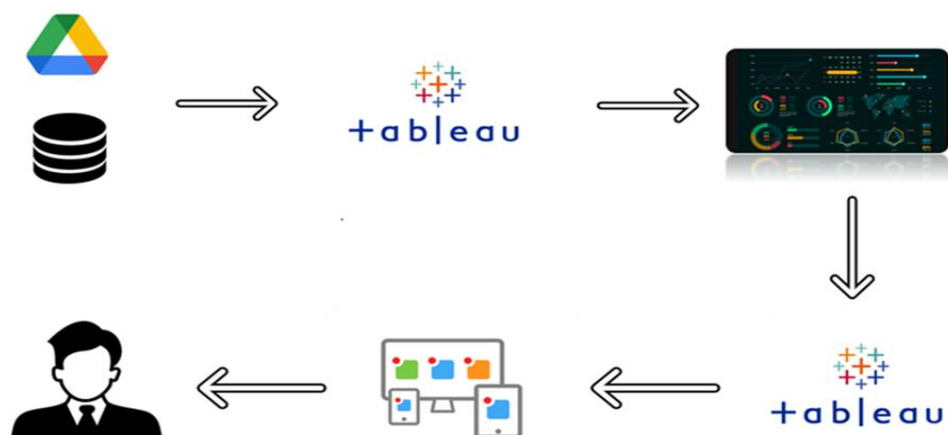
Unlocking Insights into the Global Air Transportation Network with Tableau

Project Based Experiential Learning Program

Unlocking Insights into the Global Air Transportation Network with Tableau.

This Global Air Transportation Network dataset is a comprehensive collection of information on airports, airlines and their routes. It contains information such as names, cities, countries, codes (IATA and ICAO) longitudes, latitudes and altitudes of airports across the world with detailed time zone and daylight saving time data. Additionally, this includes information about airlines including their IDs, name aliases, IATA and ICAO codes, callsigns country of origin and active/inactive status. Similarly, it also covers route details such as airline sources to destination airports along with essential details like codeshare stakeholder if any stops required during this journey along with the type of aircraft being used for that particular journey. This dataset has been compiled through meticulous labor by researchers all over the world to give you a comprehensive detail into air transportation networks from around the globe. It requires your generous donations in order for them to keep updating this data source so please do donate if possible.

Technical Architecture:



Project Flow:

To accomplish this, we have to complete all the activities listed below,

- Define Problem / Problem Understanding
 - Specify the business problem
 - Business requirements
 - Literature Survey
 - Social or Business Impact.
- Data Collection & Extraction
 - Collect the dataset
 - Connect datasets- Airports, Airlines, Airplanes and Routes with Tableau
- Data Preparation
 - Prepare the Data for Visualization
- Data Visualizations
 - No of Unique Visualizations
- Dashboard
 - Responsive and Design of Dashboard
- Story
 - No of Scenes of Story
- Report
 - No of Visualization with detail information
- Performance Testing
 - Amount of Data Rendered to tableau
 - Utilization of Data Filters
 - No of Calculation Fields
 - No of Visualizations/ Graphs
- Publishing
 - Publishing Dashboard and Story to Tableau Public
- Project Demonstration & Documentation
 - Record explanation Video for project end to end solution

- Project Documentation-Step by step project development procedure

Milestone 1: Define Problem / Problem Understanding

Activity 1: Specify the business problem

Refer Project Description

Activity 2: Business requirements

The business requirement of the Global Air Transportation Network- Airports, Airlines, and Routes dataset is to provide stakeholders in the aviation industry with accurate, up-to-date information on the worldwide air transportation network. The dataset is intended to help stakeholders make informed decisions related to business growth, investment, capacity planning, and infrastructure development. Using data analytics and visualization tools like Tableau, the dataset can be analyzed to identify trends and patterns in the air transportation network, providing valuable insights into the state of the industry. This information can be used to optimize routes, improve operational efficiency, and enhance customer experience.

Ultimately, the business requirement of the dataset is to enable stakeholders in the aviation industry to gain a competitive advantage by making data-driven decisions. By providing a comprehensive collection of data related to the air transportation network, the dataset can help stakeholders stay ahead of the curve in a dynamic and rapidly changing industry.

Activity 3: Literature Survey (Student Will Write)

A literature survey for Global Air Transportation Network involves reviewing academic articles, books, and other sources related to the aviation industry including statistical, economic, financial models. It also discusses various factors that affect the flight delay, flight route etc. The survey can provide a comprehensive understanding of the significance, challenges, and opportunities associated with the aviation industry.

Activity 4: Social or Business Impact.

Socially, the dataset can contribute to the development of air transportation networks that are more efficient, safe, and environmentally sustainable. By providing stakeholders with a comprehensive understanding of the air transportation network, the dataset can help to optimize routes and reduce congestion in the air, leading to improved air quality and reduced carbon emissions. This can contribute to the overall well-being of communities around the world, by making air travel more accessible, affordable, and eco-friendly.

From a business perspective, the dataset can have a significant impact on the aviation industry. By enabling stakeholders to make data-driven decisions, the dataset can help airlines, airport authorities, tourism boards, and government agencies to identify new business opportunities, optimize capacity planning, and streamline operations. This can lead to increased profitability and competitiveness, as well as improved customer experience. Moreover, the dataset can be used by investors to identify promising sectors and geographic areas for investment in the aviation industry.

Milestone 2: Data Collection & Extraction from

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

Activity 1: Collect the dataset

Please use the link to download the dataset:

https://drive.google.com/drive/folders/1RJnbcGxvIVuIM3fkZH1Wz3_IbLDP2RjY?usp=share_link

Activity 1.1: Understand the data

Data contains all the meta information regarding the columns described in the CSV files. We have provided a csv file.

Column Description for airports.csv:

Name: The name of the airport. (String)

City: The city the airport is located in. (String)

country: The country the airport is located in. (String)

IATA: The International Air Transport Association code for the airport. (String)

ICAO: The International Civil Aviation Organization code for the airport. (String)

Latitude: The latitude of the airport. (Float)

Longitude: The longitude of the airport. (Float)

Altitude: The altitude of the airport. (Float)

Timezone: The timezone of the airport. (String)

DST: The Daylight Savings Time of the airport. (String)

Tz database time zone: The timezone of the airport in the Tz database. (String)

Type: The type of airport (large_airport, medium_airport etc.). (String)

Source: The source of the data. (String)

Column Description for airplanes.csv:

Name: The name of the airport. (String)

IATA code: International Air Transport Association code, a three-letter code used to identify airports. (String)

ICAO code: International Civil Aviation Organization code, a four-letter code used to identify airports. (String)

Column Description for airlines.csv:

Name: The name of the airport. (String)

IATA: The International Air Transport Association code for the airport. (String)

ICAO: The International Civil Aviation Organization code for the airport. (String)

Country: The country the airport is located in. (String)

Alias: An alternate name for the airport. (String)

Call sign: The call sign of the airline operating at the airport. (String)

Active: An alternate name for the airport. (String)

Column Description for routes.csv:

Airline: The name of the airline operating the route. (String)

Source airport: The IATA code of the airport from which the route originates. (String)

Destination airport: The IATA code of the airport to which the route is headed. (String)

Codeshare: Indicates whether the route is operated by another airline under a codeshare agreement. (Boolean)

Stops: The number of stops on the route. (Integer)

Equipment: The type of aircraft used on the route. (String)

Activity 2: Connect datasets State & County with Tableau

Reference video link:

https://drive.google.com/file/d/1HnZfPj_KEedSmOVdiGecfJr8WAgYSMrm/view?usp=share_link

Milestone 3: Data Preparation

Activity 1: Prepare the Data for Visualization

Data modules are containers that describe data and rules for combining and shaping data to prepare it for analysis and visualization in Tableau. Data module sources. Data modules can be based on data servers, packages, uploaded files, data sets, and other data modules.

Explanation video link 1:

https://drive.google.com/file/d/1Ju_Sd60bf8M70o6HHal9f6VPVaZ4eNB/view?usp=share_link

Milestone 4: Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trends, and outliers in the data.

Activity 1: No of Unique Visualizations

The number of unique visualizations that can be created with a given dataset. Some common types of visualizations that can be used to analyze the performance and efficiency of a project include bar charts, line charts, heat maps, scatter plots, pie charts, Maps etc. These visualizations can be used to compare performance, track changes over time, show distribution, and relationships between variables.

Activity 1.1: World map showing details of all Airports within a Country

Explanation video link:

https://drive.google.com/file/d/1yh2fGVdczHIYOf2jpv5QgD4nc4DBgQBo/view?usp=share_link

Activity 1.2: Number of Airports within the country

Explanation video link: https://drive.google.com/file/d/14mLz-cKmAJui0fYHn5AyRDMqySi9-EJ8/view?usp=share_link

Activity 1.3: Airports at Higher altitude within a country

Explanation video link:

https://drive.google.com/file/d/14nO76TmAmFTqEar2TaDwMfXpiCJOEJK/view?usp=share_link

Activity 1.4: Airports at Higher altitude in the world

Explanation video link:

https://drive.google.com/file/d/1NI8tUzFQSGFCjCOysK8C8CNTVOois4Ov/view?usp=share_link

Activity 1.5: Airlines within a Country

Explanation

video

link:

https://drive.google.com/file/d/1_6eXXaiTP5JsyXuj4MtBQVEjN8F--VSY/view?usp=share_link

Activity 1.6: Number of flights from airport

Explanation video link: https://drive.google.com/file/d/1xl-01Xd6XHBZzhkQmftx_RPLQT6uJyU6/view?usp=share_link

Milestone 5: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

Activity :1- Responsive and Design of Dashboard

The responsiveness and design of a dashboard for Data-Driven insights on U.S. Business Formation Statistics is crucial to ensure that the information is easily understandable and actionable. Key considerations for designing a responsive and effective dashboard include user-centered design, clear and concise information, interactivity, data-driven approach, accessibility, customization, and security. The goal is to create a dashboard that is user-friendly, interactive, and data-driven, providing actionable insights.

Explanation video link:

https://drive.google.com/file/d/1H_8AmXMejQOtd960cvZNrQE8dEBOjgay/view?usp=share_link

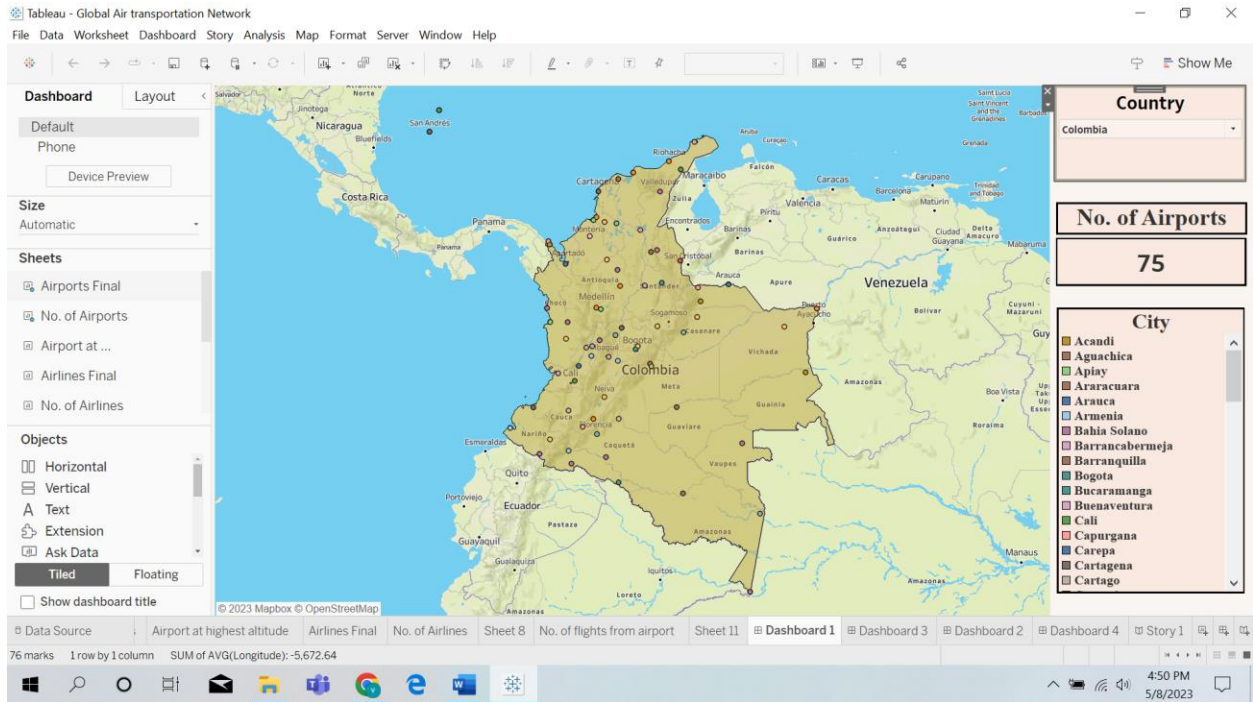


Tableau - Global Air transportation Network

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Dashboard Layout

Default Phone Device Preview

Size Automatic

Sheets

- Airports Final
- No. of Airports
- Airport at ...
- Airlines Final
- No. of Airlines

Objects

- Horizontal
- Vertical
- Text
- Extension
- Ask Data
- Tiled Floating

Show dashboard title

Airports at Higher Altitude within a Country

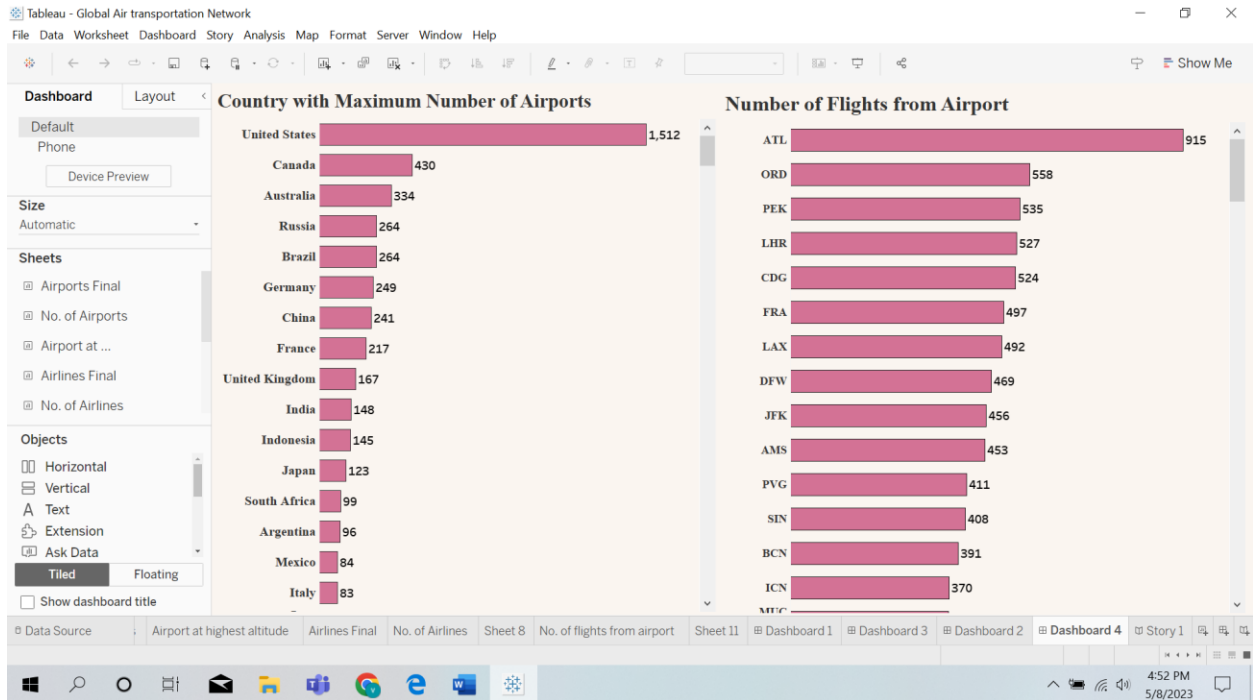
index n..	Airport Name	City	ICAO Code	
1	Kooddoo Airport	Kooddoo	VRMO	29
2	Ifuru Airport	Ifuru	VREI	20
3	Villa Airport	Maamigili	VRMV	6

Airports at Highest Altitude in World

Airport Name	City	ICAO Code	
Capitan Nicolas Rojas Airport	Potosi	SLPO	12,913
Daocheng Yading Airport	Daocheng	ZUDC	14,472
El Alto International Airport	La Paz	SLLP	13,355
Kangding Airport	Kangding	ZUKD	14,042
Ngari Gunsai Airport	Shiquanhe	ZUAL	14,022
Qamdo Bangda Airport	Bangda	ZUBD	14,219

Country: Maldives

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Milestone 6: Story

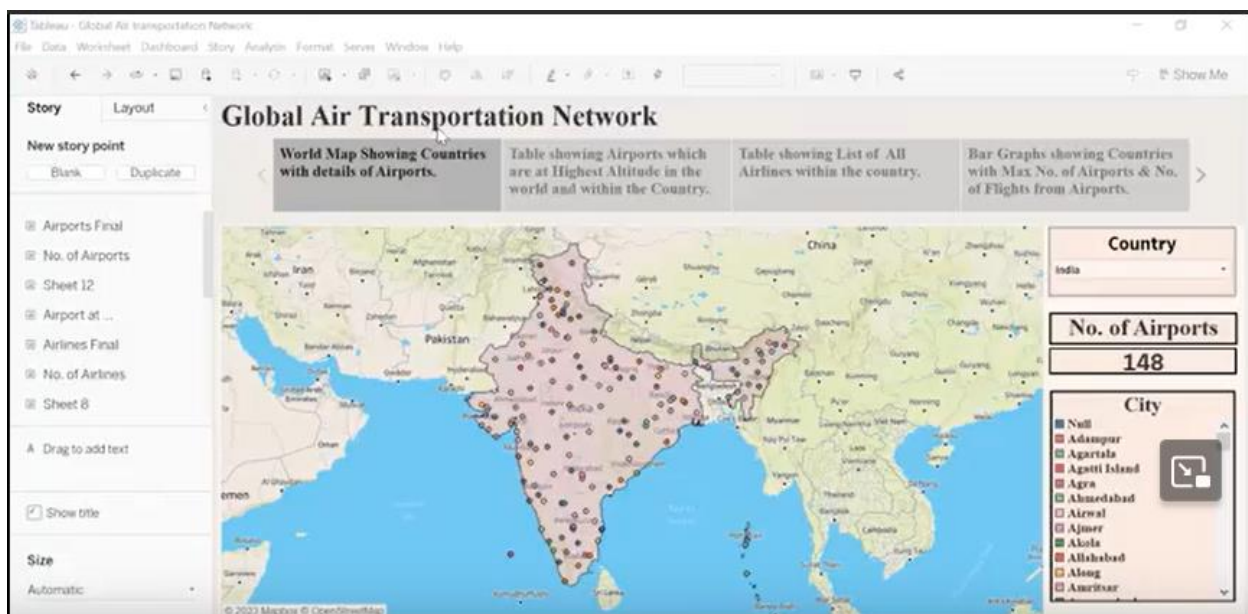
A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

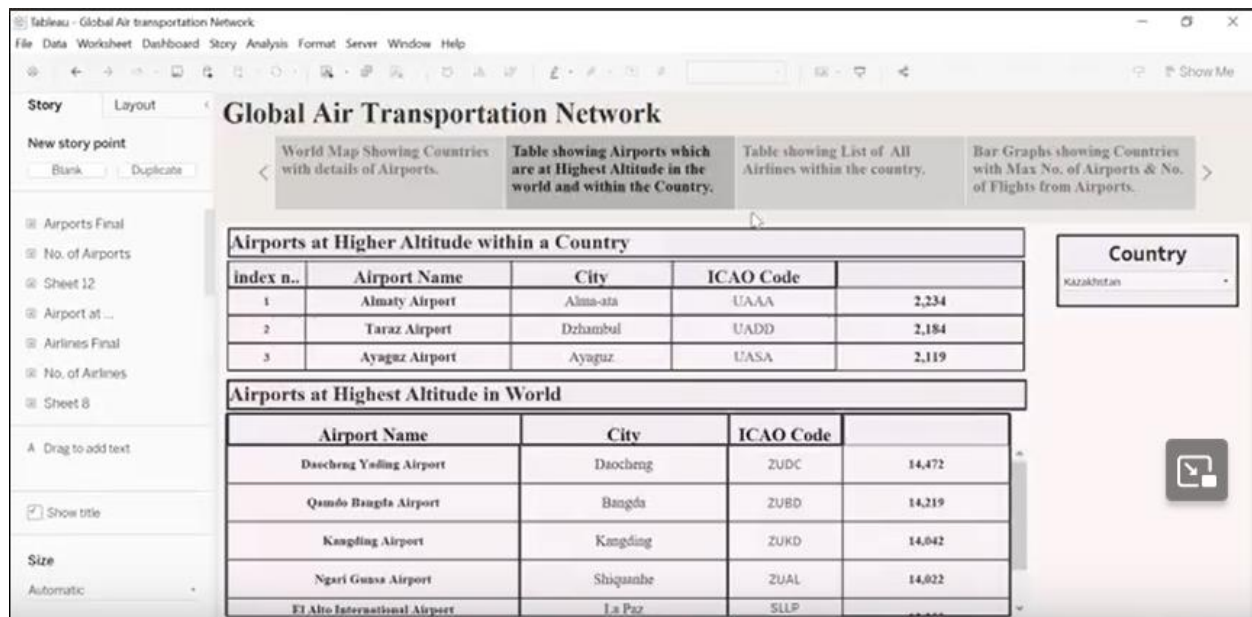
Activity:1- No of Scenes of Story

The number of scenes in a storyboard for Data-Driven insights on U.S Business applications Statistics will depend on the complexity of the analysis and the specific insights that are trying to be conveyed. A storyboard is a visual representation of the data analysis process and it breaks down the analysis into a series of steps or scenes.

Explanation video

link: https://drive.google.com/file/d/14qvTDUkrD9tvtvpUhyikwpT76Zi8Yz14/view?usp=share_link





Milestone 7: Performance Testing

Activity 1: Amount of Data Rendered to tableau

The amount of data that is rendered to a Tableau depends on the size of the dataset

Activity 2: Utilization of Filters

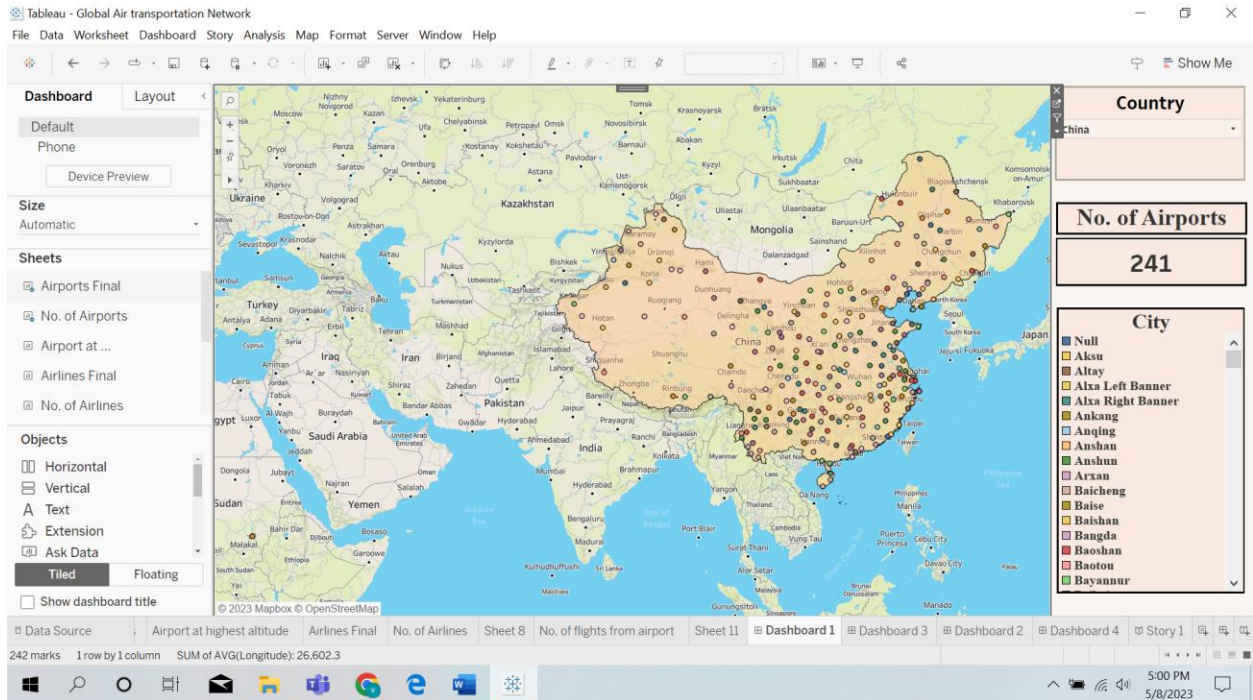


Tableau - Global Air transportation Network

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Dashboard Layout

Default Phone Device Preview

Size Automatic

Sheets

- Airports Final
- No. of Airports
- Airport at ...
- Airlines Final
- No. of Airlines

Objects

- Horizontal
- Vertical
- Text
- Extension
- Ask Data
- Tiled Floating
- Show dashboard title

Airlines within a Country

Airline ID	Name	Icao	Callsign
184	Air Alpha Greenland	AHA	AIR ALPHA
864	Atlantic Helicopters	FAC	FAROECEPTER
921	Air Greenland	GRL	GREENLAND
1078	Air Alsie	MMD	MERMAID
1379	Bel Air Helicopters	BEH	BLUECOPTER
1412	Billund Air Center	BIL	BILAIR
1586	CHC Denmark	HBI	HELIBIRD
1781	Cimber Air	CIM	CIMBER
1859	Company Flight	CYF	COMPANY FLIGHT
1890	Copenhagen Airtaxi	CAT	AIRCAT
1954	DAT Danish Air Transport	DTR	DANISH
1977	Dancopter	DOP	DANCOPTER
1978	Danish Air Force	DAF	DANISH AIRFORCE
1979	Danish Army	DAR	DANISH ARMY
1980	Danish Navy	DNY	DANISH NAVY
2270	Execujet Scandinavia	VMP	VAMPIRE
2330	Faroeceptor	HBL	HELIBLUE
2373	Flexflight	EXT	Null

Country

Denmark

Number of Airlines

32

Active

(All)

Active

N Y

1 mark 1 row by 1 column SUM of CNT(airlines.csv): 32

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Tableau - Global Air transportation Network

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Dashboard Layout

Default Phone Device Preview

Size Automatic

Sheets

- Airports Final
- No. of Airports
- Airport at ...
- Airlines Final
- No. of Airlines

Objects

- Horizontal
- Vertical
- Text
- Extension
- Ask Data
- Tiled Floating
- Show dashboard title

Airlines within a Country

Airline ID	Name	Icao	Callsign	
921	Air Greenland	GRL	GREENLAND	
1781	Cimber Air	CIM	CIMBER	
1954	DAT Danish Air Transport	DTR	DANISH	
3366	Maersk	Null	Null	
4776	Sterling Airlines	SNB	STERLING	
11856	Transavia Denmark	TDK	Null	
17115	Copenhagen Express	CX0	Copex	

Country: Denmark

Number of Airlines: 7

Active: Y

Active: Y

Data Source: Airport at highest altitude Airlines Final No. of Airlines Sheet 8 No. of flights from airport Sheet 11 Dashboard 1 Dashboard 3 Dashboard 2 Dashboard 4 Story 1

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Tableau - Global Air transportation Network

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Dashboard Layout

Default Phone Device Preview

Size Automatic

Sheets

- Airports Final
- No. of Airports
- Airport at ...
- Airlines Final
- No. of Airlines

Objects

- Horizontal
- Vertical
- Text
- Extension
- Ask Data
- Tiled Floating
- Show dashboard title

Airports at Higher Altitude within a Country

index n..	Airport Name	City	ICAO Code	
1	Luxembourg-Findel International Airport	Luxemburg	ELLX	1,234

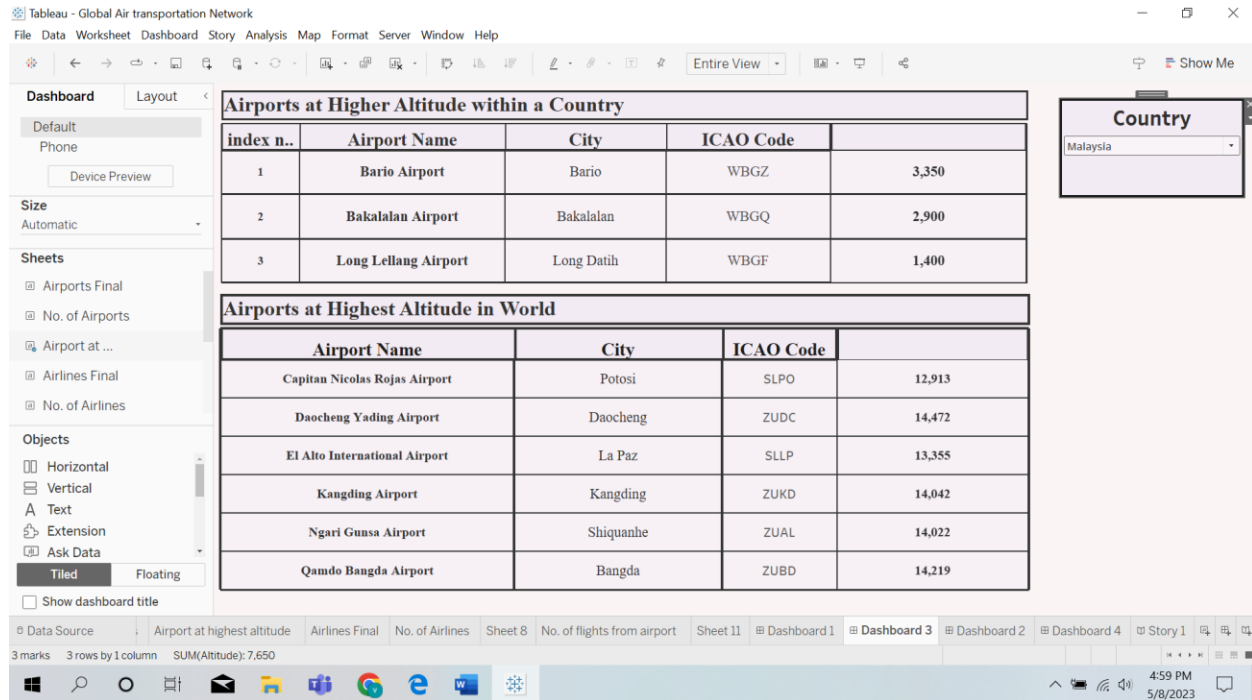
Airports at Highest Altitude in World

Airport Name	City	ICAO Code	
Capitan Nicolas Rojas Airport	Potosi	SLPO	12,913
Daocheng Yading Airport	Daocheng	ZUDC	14,472
El Alto International Airport	La Paz	SLLP	13,355
Kangding Airport	Kangding	ZUKD	14,042
Ngari Gonsa Airport	Shiquanhe	ZUAL	14,022
Qamdo Bangda Airport	Bangda	ZUBD	14,219

Country: Luxembourg

1 mark 1 row by 1 column SUM(Altitude): 1,234

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Activity 3: No of Calculation Fields

Tables

- > **airlines.csv**
- > **airplanes.csv**
- > **airports.csv**
- > **routes.csv**

Abc *Measure Names*

- =# index no.
- =# max altitude
- =# Number of Airports
- =TIF top n
- ⊕ *Latitude (generated)*
- ⊕ *Longitude (generated)*
- # *Measure Values*

- # Altitude
- =G End pt
- # Index (Airports.Csv)
- G Latitude
- G Longitude
- =G start pt
- # Timezone
- # *airports.csv (Count)*

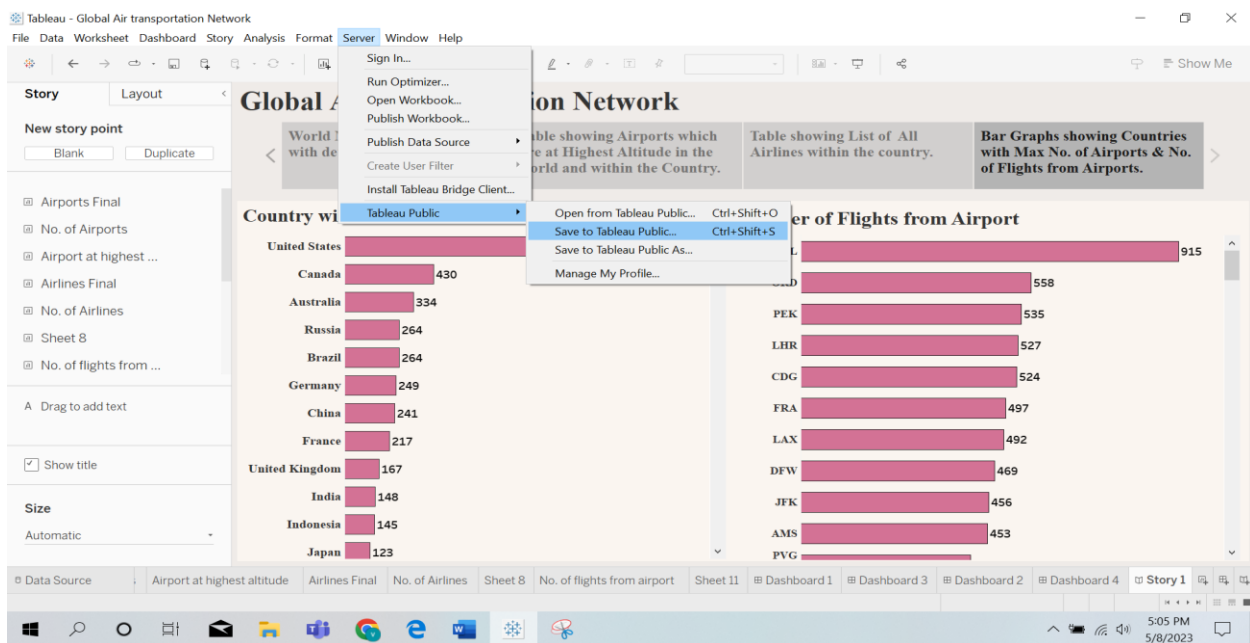
Activity 4: No of Visualizations/ Graphs

1. World map showing details of airport within the country
2. Table showing airports at higher altitude within the country and in the world also.

3. Table showing airlines operating within the country
4. Bar graphs showing no. of flights from airports and no. of airports within the country.

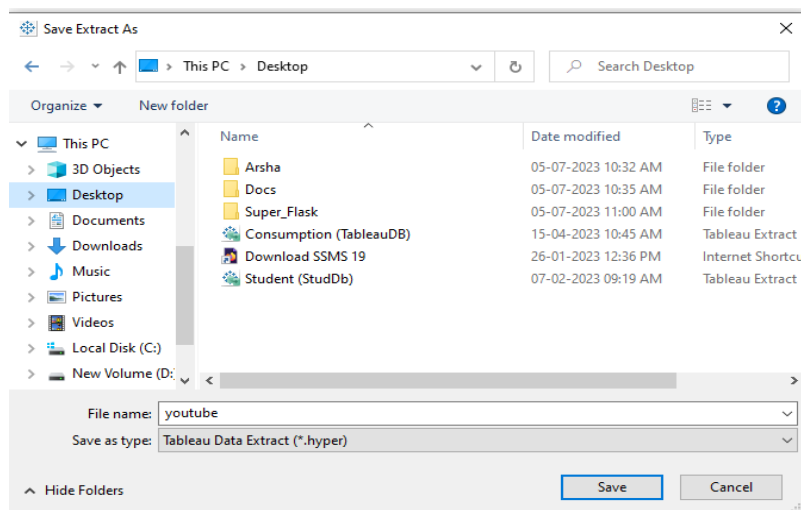
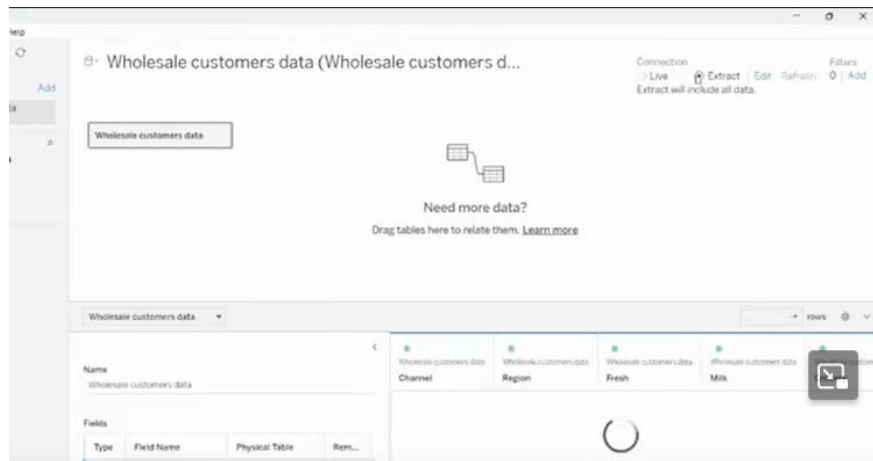
Milestone 8: Publishing

Publishing helps us to track and monitor key performance metrics, to communicate results and progress. help a publisher stay informed, make better decisions, and communicate their performance to others.



Publishing dashboard and reports to tableau public

- **Step 1 :** Go to data Source and Select Extract so that .hyper extension files are created and save it at your desktop.
(please wait for pop up of file to save)



- **Step 2 :** Go to Dashboard/story, click on share button on the top ribbon

Share via Tableau Server or Tableau Cloud

Server:

Quick Connect
[Tableau Cloud](#)

Don't have a Tableau Server or Tableau Cloud account? Quickly create a Tableau Cloud site to share your work.

Give the server address of your tableau public account and click on connect.

Sign in to https://public.tableau.com

Sign In


Email

Password

☐ Remember me

[FORGOT PASSWORD](#) | [CREATE AN ACCOUNT](#)

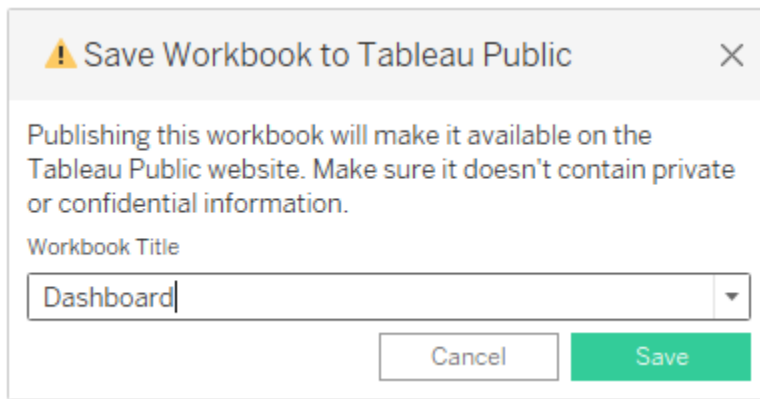
You can now **access all of Tableau and Tableau Public** with **a single user account.**



Sign in to your Tableau Public account or create a new account if you don't have one. You can visit the Tableau Public website (public.tableau.com) and click on the "Sign In" or "Join" button.

In the "Tableau Public Sign In" window, enter your Tableau Public account credentials and click "Sign In."

Next, you'll need to provide a title and description for your workbook. Fill in the appropriate details in the provided field of workbook Title

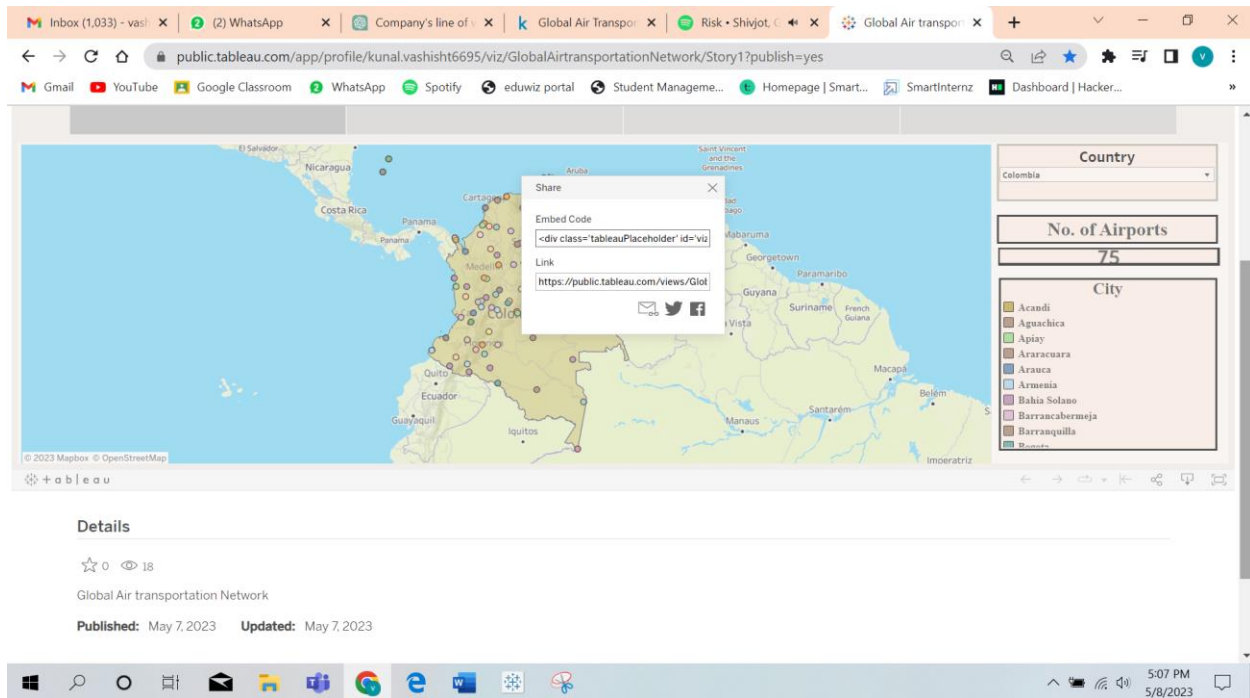


Click on the "Save" button to start the publishing process. Tableau Desktop will upload your workbook to Tableau Public.

Once the upload is complete, a browser window will automatically open, displaying your published workbook on Tableau Public. Review the workbook to ensure that everything appears as expected.

So in Similar way we can also publish Story to tableau public.

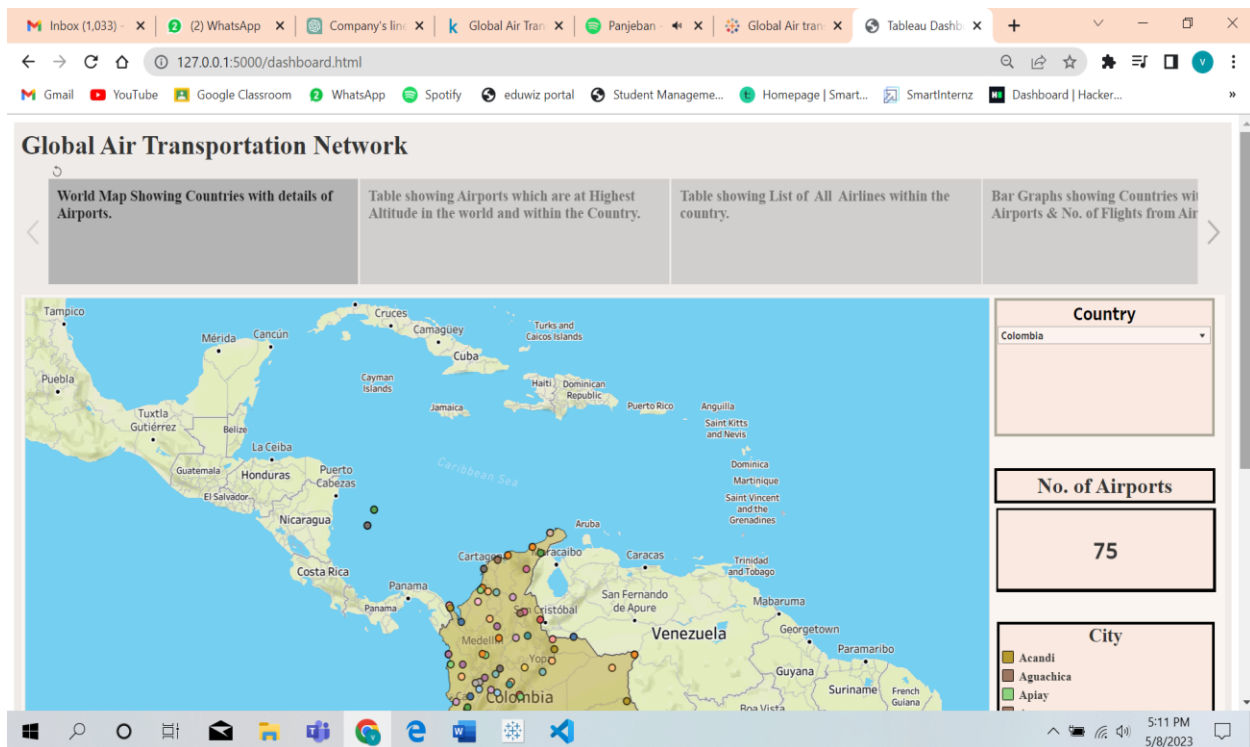
Story



Activity 1: Publishing Dashboard and Story to Tableau Public Server

Explanation Video:

https://drive.google.com/file/d/10toBiehtHbtuIA9YzclnYFXkmvl7BWGo/view?usp=share_link



Global Air Transportation Network

World Map Showing Countries with details of Airports.

Table showing Airports which are at Highest Altitude in the world and within the Country.

Table showing List of All Airlines within the country.

Bar Graphs showing Countries with Max No. of Airports & No. of Flights from Airports.

Airports at Higher Altitude within a Country

index n..	Airport Name	City	ICAO Code	
1	Bamiyan Airport	Bamiyan	OABN	8,367
2	Chakcharan Airport	Chaghcharan	OACC	7,383
3	Sharana Airstrip	Sharona	OASA	7,340

Airports at Highest Altitude in World

Airport Name	City	ICAO Code	
Capitan Nicolas Rojas Airport	Potosi	SLPO	12,913
Daocheng Yading Airport	Daocheng	ZUDC	14,472
El Alto International Airport	La Paz	SLLP	13,355
Kangding Airport	Kangding	ZUKD	14,042
Ngari Gunsa Airport	Shiquanhe	ZUAL	14,022
Qamdo Bangda Airport	Bangda	ZUBD	14,219

Country: Afghanistan

Global Air Transportation Network

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World Map Showing Countries with details of Airports.

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Bar Graphs showing Countries with Max No. of Airports & No. of Flights from Airports.

>

Airlines within a Country

Airline ID	Name	Icao	Callsign	
3200	LAN Airlines	LAN	LAN	■
3204	LAN Express	LXP	LANEX	■
4737	Sky Airline	SKU	AEROSKY	■
9851	Air Comet Chile	\N	Null	■
10650	Pal airlines	\N	Null	■
19827	Regionalia Chile	CR1	Null	■
19971	All America CL	R1R	Null	■
20218	Tomp Airlines	T9P	Null	■

Country

Chile

Number of Airlines

8

Active

Y

Active

■ Y

Global Air Transportation Network

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World Map Showing Countries with details of Airports.

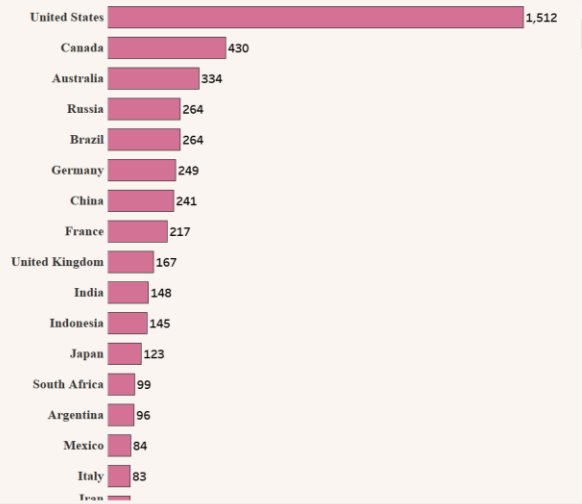
Table showing Airports which are at Highest Altitude in the world and within the Country.

Table showing List of All Airlines within the country.

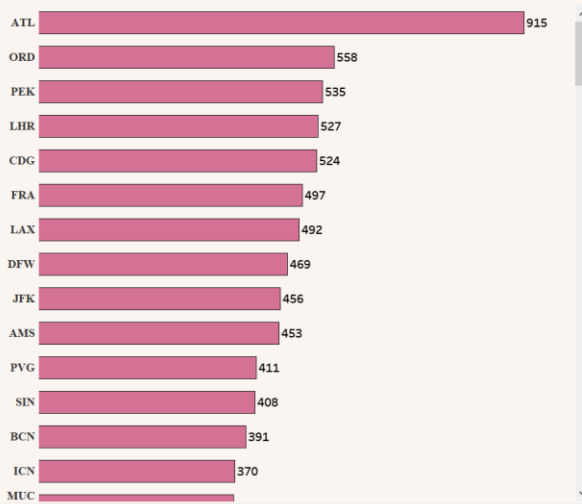
Bar Graphs showing Countries with Max No. of Airports & No. of Flights from Airports.

>

Country with Maximum Number of Airports



Number of Flights from Airport



Milestone 9: Project Demonstration & Documentation

Below mentioned deliverables to be submitted along with other deliverables.

Activity 1:- Record explanation Video for project end to end solution

Activity 2:- Project Documentation-Step by step project development procedure

Create a document as per the template provided.