# Exploring Insights From Synthetic Airline Data Analysis With Qlik

## 1. Introduction

### 1.1 Overview:

Exploring Insights From Synthetic Airline Data Analysis With Qlik is a deep dive into the capabilities of Qlik, a robust data analytics platform, in dissecting synthetic datasets mimicking real-world airline operations. The study begins with data preparation, where the synthetic airline data undergoes cleansing and structuring to ensure its suitability for analysis. Through exploratory data analysis techniques facilitated by Qlik, such as data profiling and interactive visualization, the analysis uncovers valuable insights into various facets of airline operations, from passenger demographics to flight performance metrics.

The study concludes by highlighting the significance of these findings and suggesting potential avenues for further exploration and analysis in the aviation industry, underscoring the pivotal role of data analytics in driving informed decision-making and operational efficiency within airlines.

### 1.2 Purpose:

In this project,The purpose of Exploring Insights From Synthetic Airline Data Analysis With Qlik is multi-faceted. Primarily, it aims to showcase the capabilities of Qlik, a powerful data analytics and visualization tool, in analyzing synthetic datasets representative of real-world airline operations. By delving into this analysis, the study seeks to uncover valuable insights into various aspects of airline operations, such as passenger behavior, route optimization, and operational efficiency.Ultimately, the study serves as a testament to the transformative potential of data analytics in enhancing operational performance and customer satisfaction within airlines, while also highlighting Qlik's role as a key enabler in this process.

### 1.3 Technical Architecture:

The Technical Architecture of Qlik is shown below;

External Data Sources ---> Synthetic Airline Data ---> Data Storage --->
Data Preprocessing ---> Analytics and Visualization ---> User Access and Interaction

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## 2. Problem Understanding

### 2.1 Specify the Business problem:

In this project, The primary business problem likely revolves around optimizing operational efficiency and enhancing customer satisfaction within the airline industry. This entails delving into various facets such as route optimization, revenue management, customer experience enhancement, operational performance, and safety and compliance. By leveraging Qlik's data analytics capabilities on synthetic airline data, ultimately driving informed decision-making, improving operational performance, and delivering a superior travel experience for passengers.

### 2.2 Business Requirements:

The business requirements for Exploring Insights From Synthetic Airline Data Analysis With Qlik may encompass several key objectives aimed at addressing challenges and improving operational efficiency within the airline industry:

- Data Integration
- Data Cleansing and Preparation
- Exploratory Data Analysis (EDA)
- Visualization and Dashboarding
- Predictive Analytics
- Performance Monitoring
- Security and Compliance
- User Training and Support
- Revenue Management
- Scalability

### 2.3 Literature Survey:

Literature indicates that Qlik's interactive dashboards and associative data model effectively uncover patterns in flight operations, optimize routes, and enhance customer satisfaction by integrating diverse data sources. Studies also highlight Qlik's user-friendly interface, enabling stakeholders to derive actionable insights easily, promoting a data-driven approach within the airline industry.

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## 3. Data Collection

### 3.1 Collect the Dataset:

The project, Exploring Insights From Synthetic Airline Data Analysis With Qlik, the dataset was collected from the "Kaggle". The dataset downloaded from the website Kaggle contains all the meta information regarding the fields in the CSV files. And the dataset containing fields are Passengers ID, First Name, Last Name, Gender, Age, Nationality, Airport Name, Airport Country code, Country Name, Airport Continent, Continents, Depature Date, Arrival Airport, Pilot Name, Flight Status.

### 3.2 Connect Data with Qlik Sense:

Collecting the data from the dataset, then to connect the data with Qlik Sense, upload the dataset in the platform directly or create an analytics app and upload the data in the created Qlik cloud Analytics app.

## 4. Data Preparation

### 4.1 Prepare the Data for Visualization:

To prepare the synthetic airline dataset for visualization in Qlik, clean the data by removing duplicates and handling missing values. Structure it with key attributes like flight ID and departure times, and normalize it.

 Transform the data by creating calculated fields and standardizing formats. Integrate datasets using ETL processes and validate for accuracy. Load the dataset into Qlik Sense or QlikView, model it to establish table relationships, and design interactive dashboards with charts and filters. Finally, test the visualizations and gather user feedback for improvements.
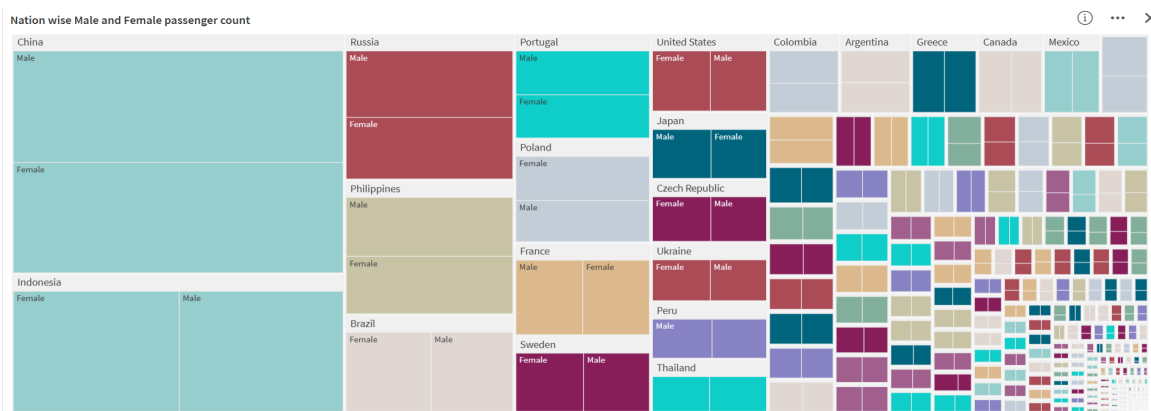
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## 5. Data Visualizations

### 5.1 Visualizations:

Data visualization is the process of representing data and information graphically, often using charts, graphs, and other visual elements. By converting raw data into visual formats, complex datasets become easier to understand and interpret. This simplification facilitates the identification of trends, patterns, and relationships within the data, enabling more effective analysis and decision-making.

**Activity 5.1.1:** Treemap represents National wise male and female passenger count



**Activity 5.1.2:** The pie chart shows Continent wise pilot count
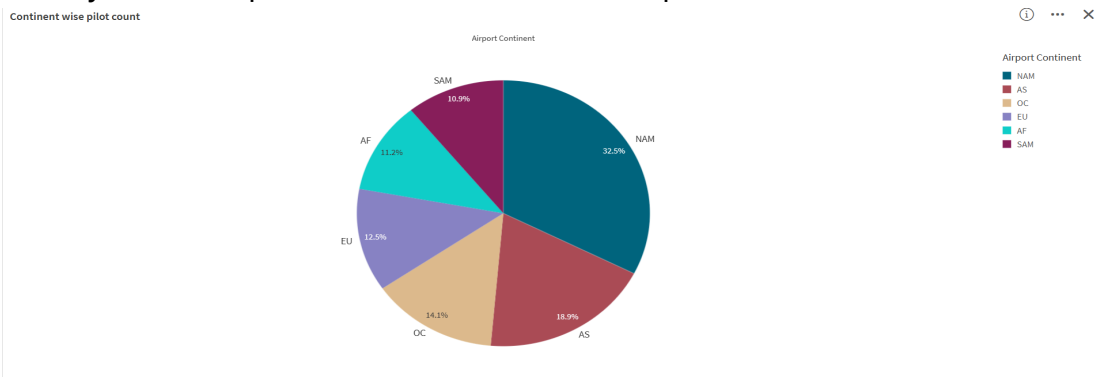
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**Activity 5.1.3:** Line chart shows the age of passengers



Age according to Passender ID
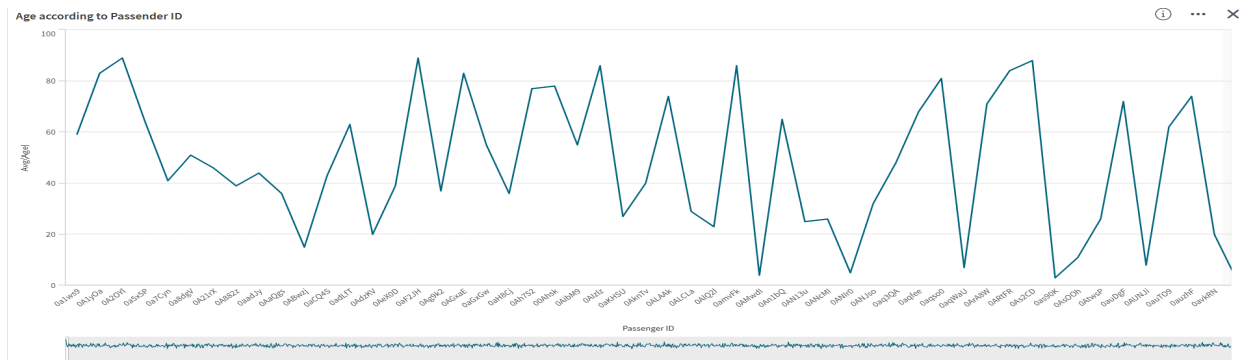
**Activity 5.1.4:** Bar Chart represents the No. of passengers according to their age, gender



No.of Passengers according to their Age, Gender
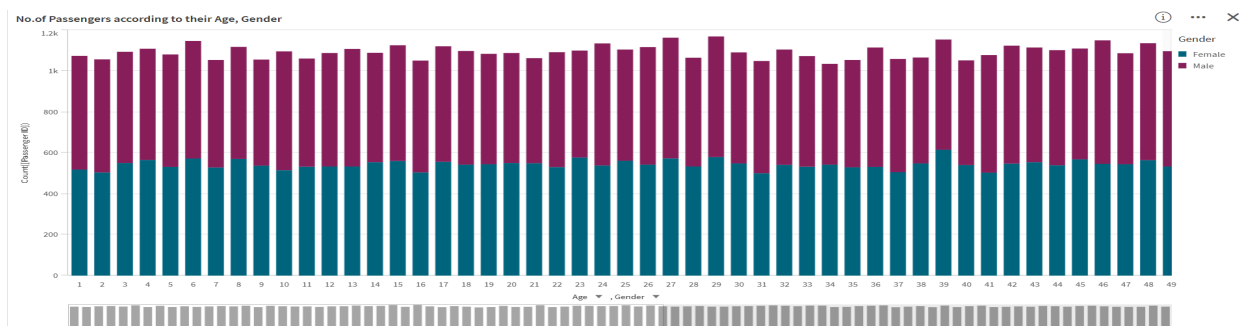
**Activity 5.1.5:** The bar chart shows National wise passenger count



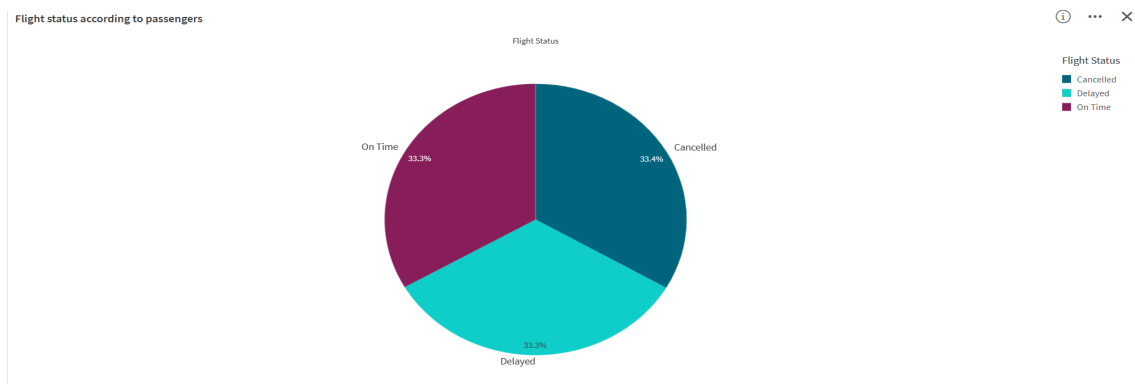National wise Passenger count
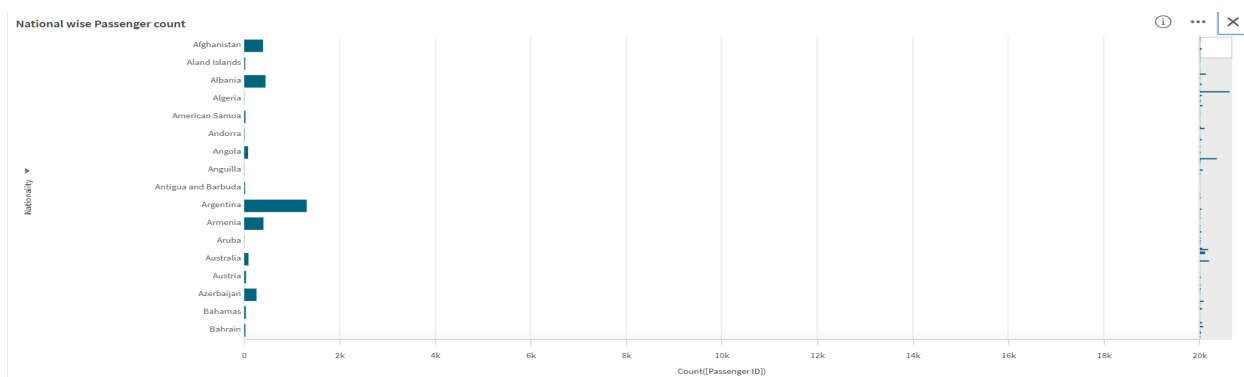
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**Activity 5.1.6:** Bar chart represents the No. of passengers arrived at a particular airport
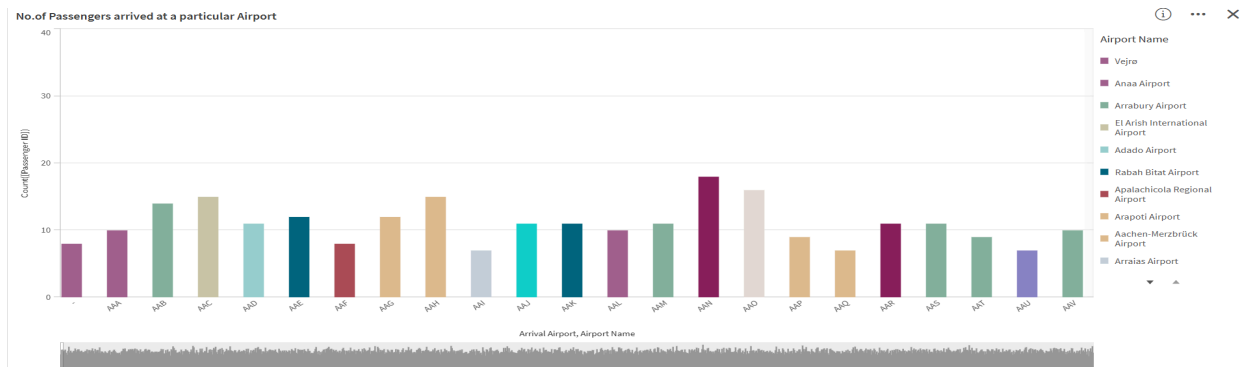


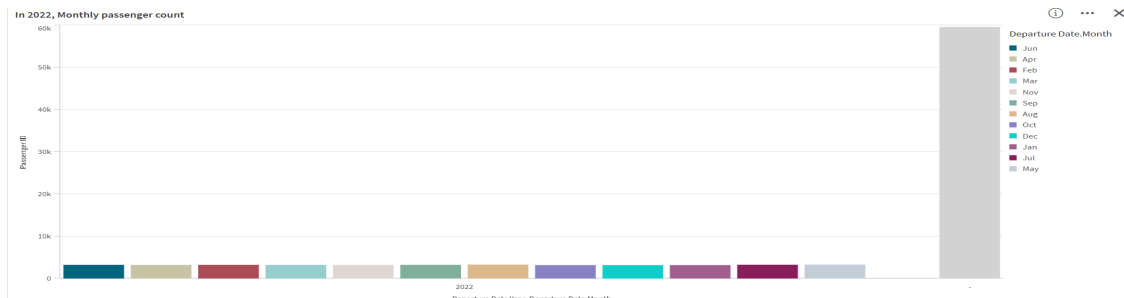**Activity 5.1.7:** The pie chart shows Flight status



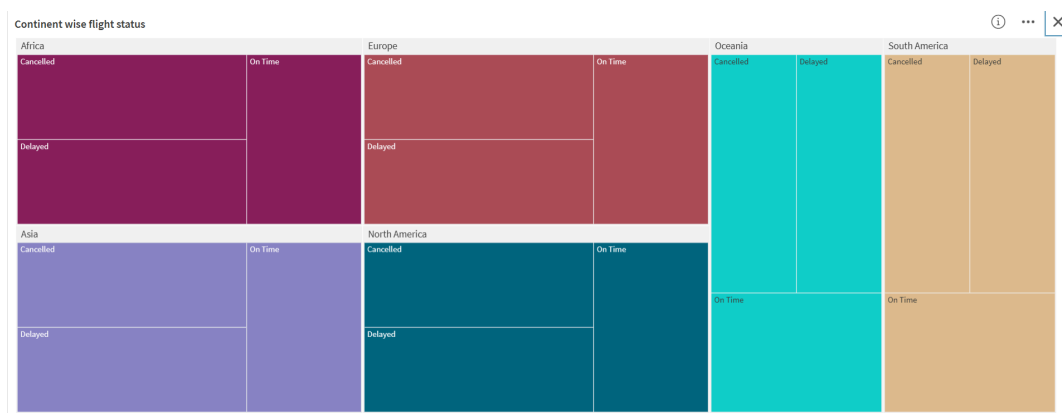**Activity 5.1.8:** The bar chart shows Gender wise passenger count
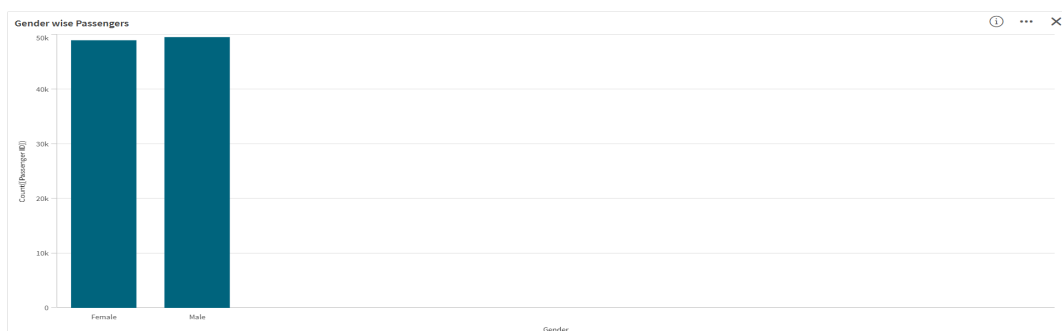
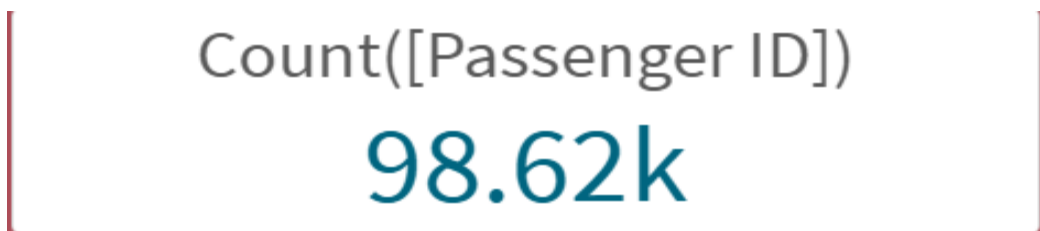# Exploring Insights From Synthetic Airline Data Analysis With Qlik

**Activity 5.1.9:** The bar chart represents Monthly passengers count in 2022



**Activity 5.1.10:** Treemap shows Continent wise Flight status



**Activity 5.1.11:** KPI shows the No. of Passengers

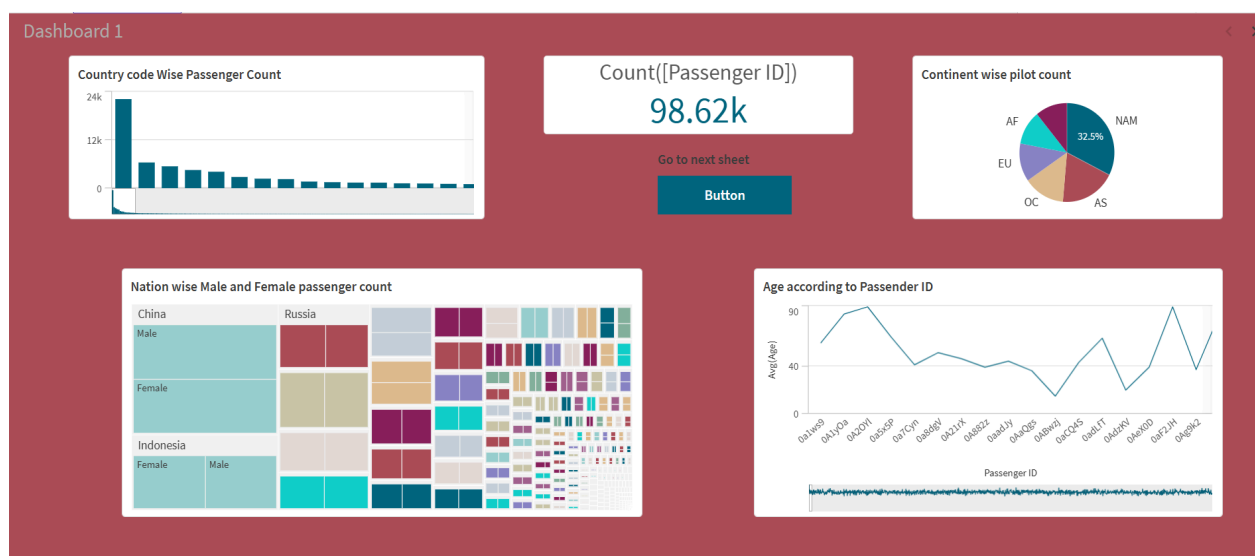# Exploring Insights From Synthetic Airline Data Analysis With Qlik

## 6. Dashboard

## 6.1 Responsive and Design of Dashboard:

Creating a responsive and well-designed dashboard in Qlik for exploring insights from synthetic airline data involves several key steps. Start by defining the objectives, identifying critical metrics such as on-time performance, average delay times, and revenue. Understand the target audience to tailor the dashboard for their needs. Prepare the data by ensuring it mimics real-world airline data and is clean and accurate. Design the dashboard with a user-friendly layout, using responsive design principles to ensure accessibility across devices.

In Qlik, load the synthetic data and create visualizations using the drag-and-drop interface. Set up interactive filters to allow users to customize their views, and ensure the dashboard elements adjust dynamically to different screen sizes. Include features like tooltips for additional context and annotations for significant events. This approach will result in a comprehensive, user-friendly dashboard that provides valuable insights into airline performance.
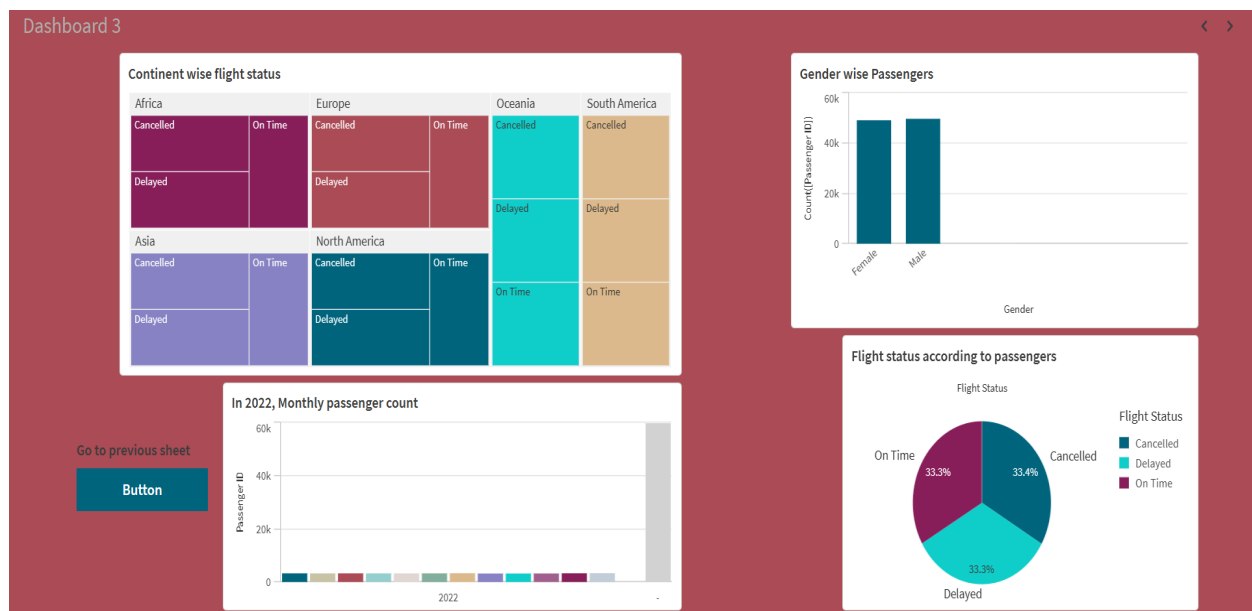
**Dashboard-1:**

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**Dashboard-2:**
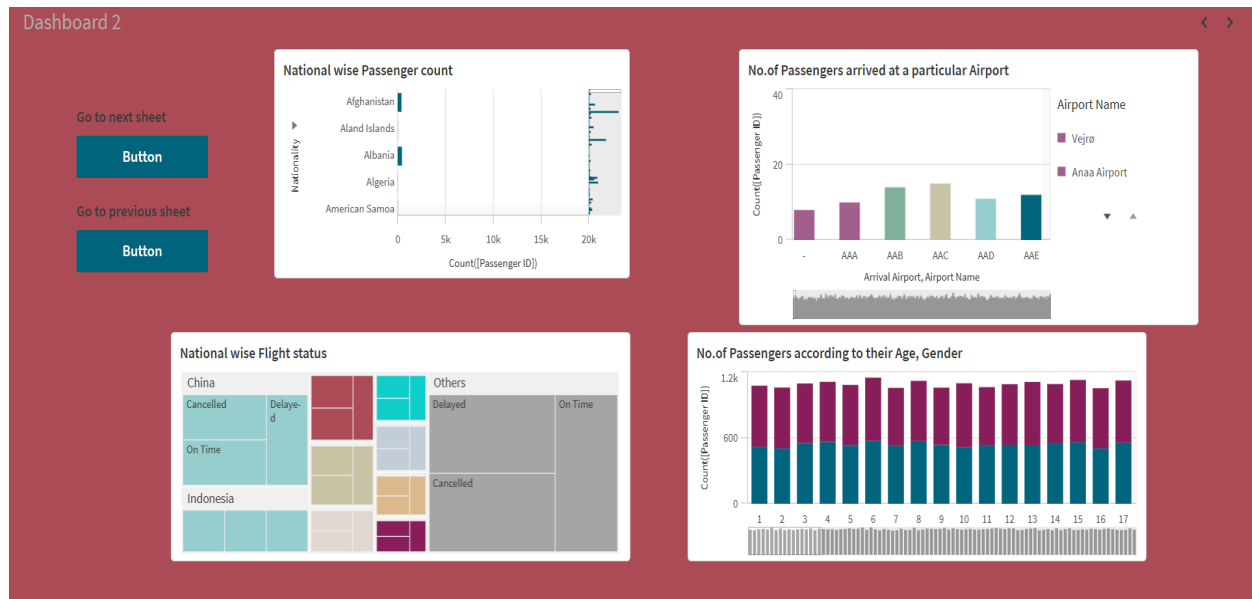


**Dashboard-3:**

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## 7. Report

### 7.1 Report Creation:

Creating a Qlik dashboard for synthetic airline data is about more than displaying numbers; it's about telling a clear story. Start with an overview using summary tiles for key metrics like total flights, average delay, on-time percentage, and passenger satisfaction. This gives stakeholders a quick snapshot of overall performance. Dive deeper with time series charts to show trends and bar charts to compare performance across routes and aircraft types. Use pie charts and heatmaps to identify the main causes of delays and cancellations, such as weather or technical issues, highlighting patterns for further investigation. Conclude by summarizing key insights and offering actionable recommendations.
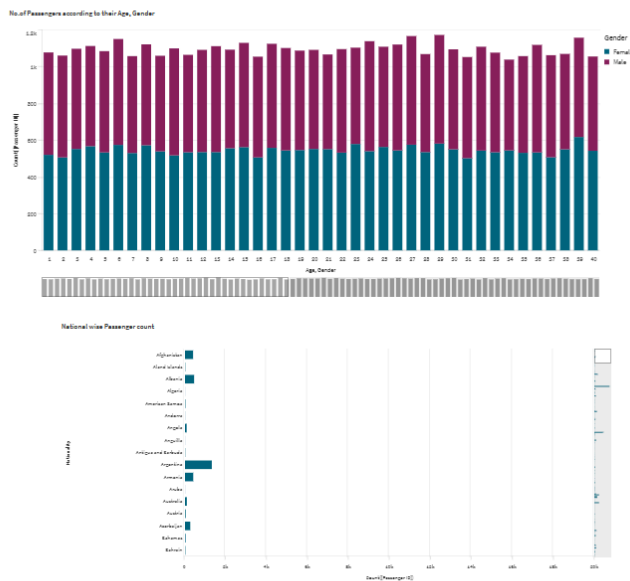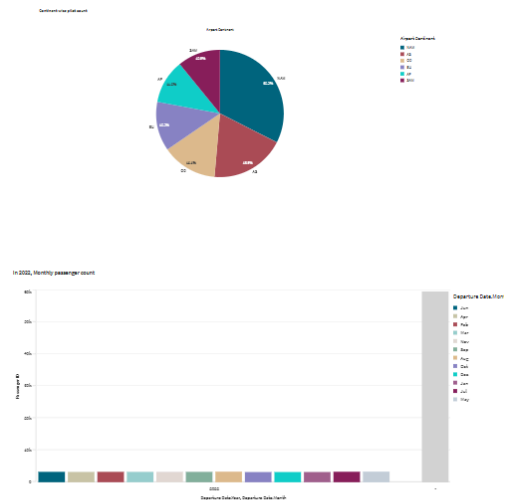
**Story Slide-1:**
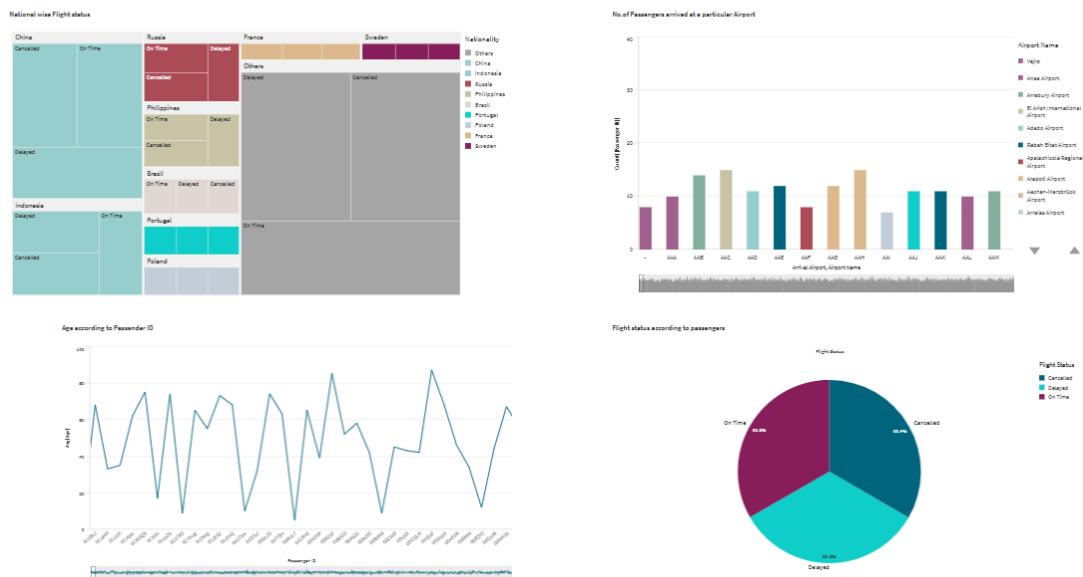
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**Story Slide-2:**



# 8. Performance testing

## 8.1 Amount of Data Rendered:

Perform initial load testing, visualization rendering tests, and interaction tests, followed by stress testing with multiple users. Optimize your data model by simplifying fields and tables, pre-aggregating data, indexing key fields, and ensuring adequate hardware resources. Continuously monitor performance and iterate based on the results, aiming for efficient data handling and a responsive user experience.

- Passengers ID
- First Name
- Last Name
- Gender
- Age

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- Nationality
- Airport Name
- Airport Country code
- Country Name
- Airport Continent
- Continents
- Depature Date
- Arrival Airport
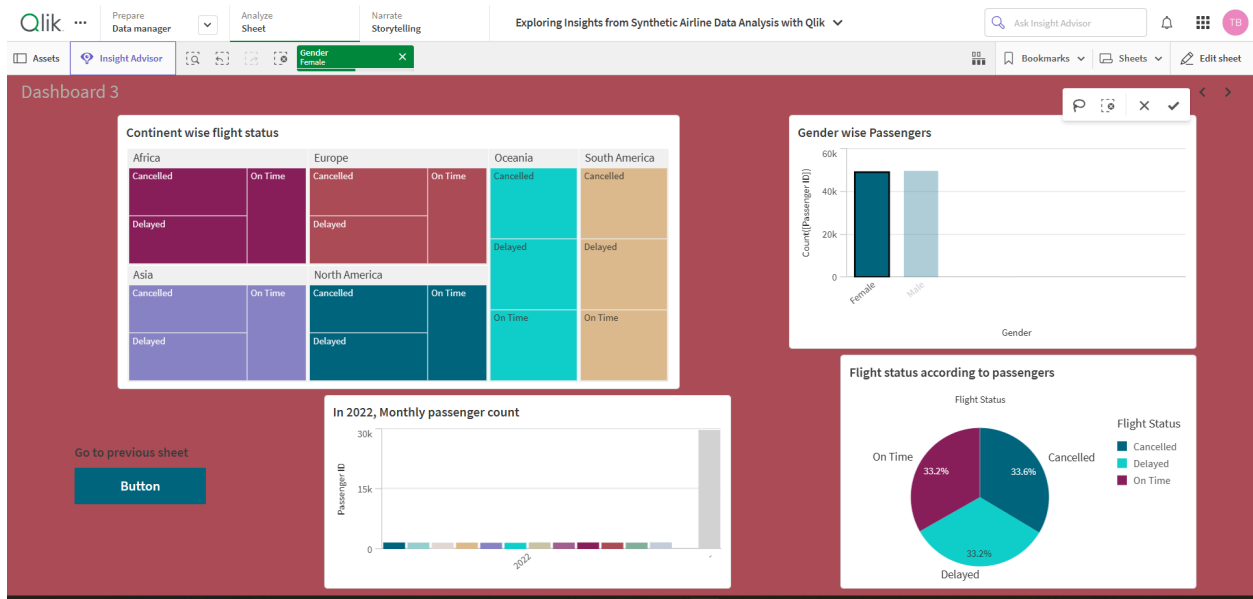- Pilot Name
- Flight Status

## 8.2 Utilization of Data Filters:

**Filter 8.2.1:** From the below , Image filter is used to know Russia passenger count
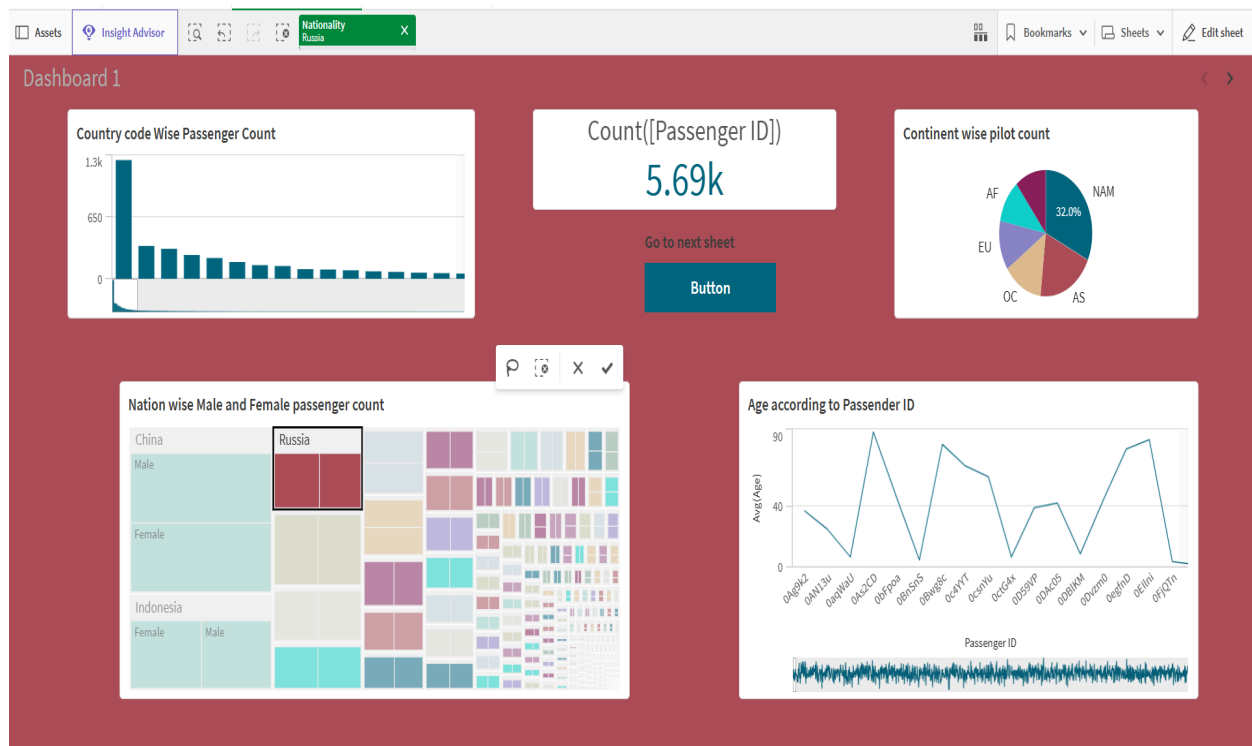
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**Filter 8.2.2:** Filter is used for Female Gender status



**Filter 8.2.3:** For Departure date.month.year