

Project 3

Power BI

Airline Data Management and Analysis Using Power BI

Video Link :

<https://www.loom.com/share/f2f966e8dee44bec9ad5cdf08ff9ff91?sid=bffffc19e-9ccb-4715-aeb7-e483521834da>

Problem Statement: The airline industry operates with numerous complexities, requiring effective data management and insights into flight schedules, passenger details, and ticketing systems. This project aims to analyze airline operations for improving efficiency and customer satisfaction.

Objective: To analyze and visualize airline data for operational insights, passenger management, and ticket booking trends using Power BI.

1. Data Preparation and Cleaning

- Extract and transform data in Power Query.
- Clean data: remove duplicates, handle missing values, and format columns.

In Power Query, I removed duplicate rows from the Passenger_Information table, Flight_Information table and Ticket_Information Table, removed null values in the SeatNumber column. This ensured data consistency for analysis.

The screenshot shows the Power Query Editor interface with the 'Flight_Information' query selected. The main area displays a table with 184 rows and 5 columns: FlightID, FlightNumber, Airline, Destination, and Status. The 'APPLIED STEPS' pane on the right lists the steps taken: 'Source', 'Use First Row as Headers', 'Change Type', 'Filtered Rows', 'Removed Duplicates', and 'Filtered Rows1'. The status bar at the bottom indicates 'PREVIEW DOWNLOADED AT 22:54'.

Untitled - Power Query Editor

Home Transform Add Column View Tools Help

Close & Apply - Close New Source Recent Sources Data Data source settings Manage Parameters Choose Columns Remove Columns Keep Rows Remove Rows Split Column Group By Replace Values Sort Data Type: Text Use First Row as Headers - Merge Queries Append Queries Combine

Queries [3]

Flight_Information Ticket_Information Passenger_Information

	PassengerID	TicketID	FlightID	SeatNumber	Flight_Information.FlightNumber
1	54		1001 20A		FL1102
2	44		1003 47C		FL1860
3	4		1046 17E		FL1975
4	5		1035 29D		FL1021
5	17		1005 23C		FL1106
6	39		1006 15B		FL1071
7	10		1047 2E		FL1782
8	13		1010 47A		FL1121
9	24		1011 22E		FL1466
10	74		1012 20D		FL1214
11	14		1056 23C		FL1831
12	15		1030 16D		FL1955
13	19		1033 27E		FL1459
14	21		1065 19E		FL1273
15	26		1026 5A		FL1413
16	27		1063 12B		FL1840
17	30		1027 45C		FL1805
18	29		1059 49B		FL1484
19	61		1032 44C		FL1160
20	62		1034 42A		FL1313
21	38		1055 35E		FL1243
22	91		1038 10E		FL1856
23	66		1039 33E		FL1560
24	47		1053 38C		FL1875
25	73		1050 36B		FL1686
26	100		1052 5D		FL1562

4 COLUMNS, 65 ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED AT 23:17

30°C Mostly cloudy ENG IN 23:17 27-09-2025

Untitled - Power Query Editor

Home Transform Add Column View Tools Help

Close & Apply - Close New Source Recent Sources Data Data source settings Manage Parameters Choose Columns Remove Columns Keep Rows Remove Rows Split Column Group By Replace Values Sort Data Type: Whole Number Use First Row as Headers - Merge Queries Append Queries Combine

Queries [3]

Flight_Information Ticket_Information Passenger_Information

	TicketID	FlightID	BookingStatus	Flight_Information.FlightNumber
1	5009	1001	Cancelled	FL1102
2	5024	1005	Confirmed	FL1106
3	5008	1035	Cancelled	FL1021
4	5010	1040	Cancelled	FL1474
5	5017	1011	Cancelled	FL1466
6	5019	1014	Confirmed	FL1458
7	5021	1030	Confirmed	FL1955
8	5045	1023	Confirmed	FL1769
9	5032	1042	Confirmed	FL1510
10	5037	1039	Pending	FL1560
11	5040	1032	Cancelled	FL1160
12	5013	1060	Cancelled	FL1818
13	5046	1063	Cancelled	FL1840
14	5011	1064	Pending	FL1166
15	5016	1072	Pending	FL1345
16	5007	1076	Pending	FL1091
17	5025	1083	Cancelled	FL1942
18	5015	1093	Confirmed	FL1565
19	5044	1097	Confirmed	FL1476
20	5018	1105	Cancelled	FL1995
21	5003	1117	Cancelled	FL1719
22	5004	1120	Cancelled	FL1878
23	5026	1123	Cancelled	FL1921
24	5042	1125	Cancelled	FL1763
25	5030	1132	Pending	FL1812
26	5047	1143	Confirmed	FL1498

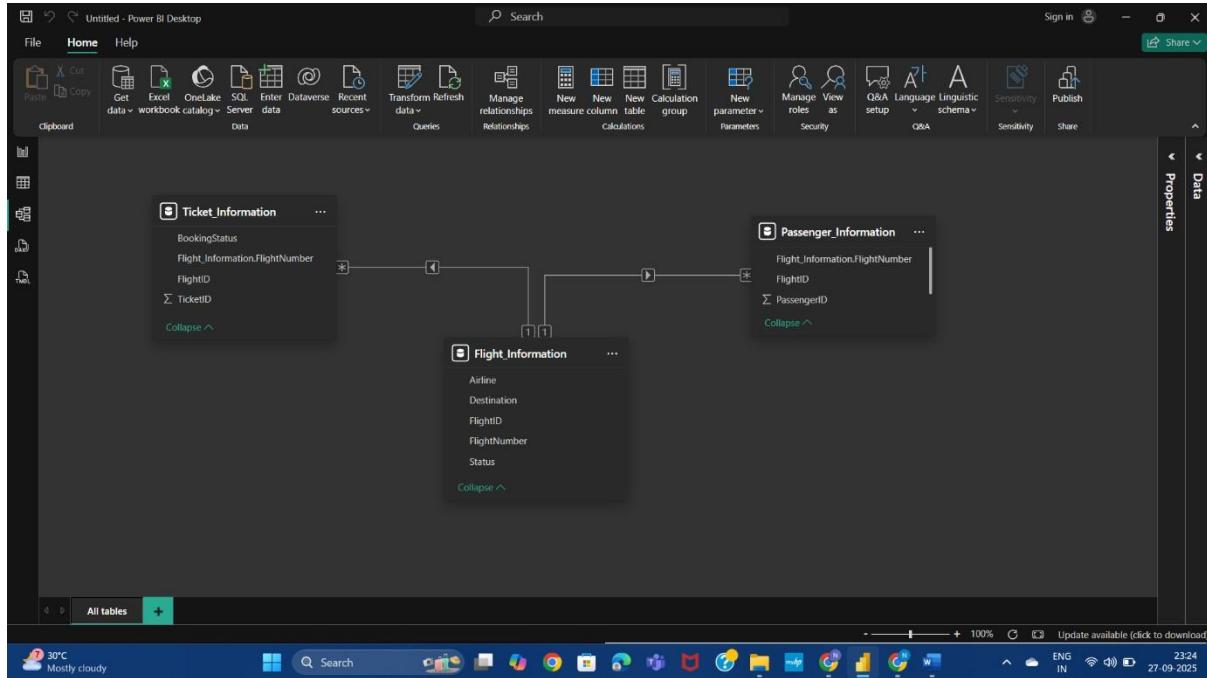
4 COLUMNS, 36 ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED AT 23:10

30°C Mostly cloudy ENG IN 23:18 27-09-2025

2. Data Modeling

- Create relationships between datasets (FlightID as the key).
- Understand cardinality and configure the model appropriately

I created relationships using FlightID as the primary key between the three datasets. The model has a **one-to-many relationship** between Flight_Information (one) and both Passenger_Information (many) and Ticket_Information (many). This allows filtering of passenger and ticket data based on flight details.



3. Enhanced Data Insights

- Add a conditional column to classify flights as "Best" or "To Be Improved" based on status.
- Use "Column from Examples" to extract the flight number from FlightNumber.

I added a conditional column that classifies flights as '**Best**' if the status was 'On Time' or 'Completed,' and '**To Be Improved**' if the status was 'Delayed' or 'Cancelled.'

Using the 'Column from Examples' feature, I extracted the numeric part of the Flight Number (e.g., AI-203 → 203), which helps in creating cleaner visuals.

The screenshot shows the Microsoft Power Query Editor interface. The main area displays a table with columns: FlightID, FlightNumber, NewFlightNumber, Airline, Destination, Status, and Outcome. The 'Status' column contains values like 'On Time', 'Completed', 'Delayed', and 'Cancelled'. The 'Outcome' column is a newly added conditional column. The 'NewFlightNumber' column is a result of using the 'Column from Examples' feature to extract the numeric part of the original 'FlightNumber'. The 'Applied Steps' pane on the right lists the following steps: Source, Use First Row as Headers, Change Type, Filtered Rows, Removed Duplicates, Filtered Rows1, Added Conditional Column, Inserted Text After Delimiter, Reordered Columns, and Renamed Columns. The bottom status bar shows the date and time as 27-09-2025 23:33.

4. Calculations Using DAX

- Calculate:
 - Total passengers for a specific flight.
 - Total tickets booked.
 - Filtered table showing "Best" flights only.

Untitled - Power BI Desktop

File Home Help

Cut Copy Format Comment Uncomment Find Replace Command palette Copilot (preview) copilot

DAX queries will be saved to your model. They won't be visible when published in the Power BI service. Learn more.

Run Update model with changes (0)

```

1 // Welcome to DAX query view! Learn more about DAX queries at https://aka.ms/dax-queries.
2 // Right-click on tables, columns, or measures in the data pane to access quick queries, or ask Copilot for help writing DAX.
3
4 //Total passengers for a specific flight.//
5 EVALUATE
6 SUMMARIZE(Flight_Information, Flight_Information[Airline], "Total Passengers", COUNT(Passenger_Information[PassengerID]))
7
8
9
10
11
12

```

Results Result 1 of 1 Copy ▾

	Flight_Information[Airline]	Total Passengers
1	Airline D	22
2	Airline B	11
3	Airline A	17
4	Airline C	15

Share feedback Data Tables Model

Flight_Information Airline Destination FlightID FlightNumber New Flight Number Outcome Status Passenger_Information Flight_Information[FlightNumber] FlightID PassengerID SeatNumber Ticket_Information BookingStatus Flight_Information[FlightNumber] FlightID Outcome for Booking Status TicketID

Success (31.7 ms) Query 1 of 1 Result 1 of 1 2 columns, 4 rows 100% Update available (click to download)

29°C Mostly cloudy

DAX queries will be saved to your model. They won't be visible when published in the Power BI service. [Learn more](#)

Run Update model with changes (0)

```
// Total tickets booked.//  
EVALUATE  
ROW("Total Tickets Booked", COUNT(Ticket_Information[TicketID]))
```

Results Result 1 of 1

	[Total Tickets Booked]
1	36

Success (29.7 ms) Query 1 of 1 Result 1 of 1 1 column, 1 row

DAX queries will be saved to your model. They won't be visible when published in the Power BI service. [Learn more](#)

Run Update model with changes (0)

```
//Filtered table showing "Best" flights only.//  
EVALUATE  
FILTER(Flights,Flight_Information[FlightID], Flight_Information[Airline],Flight_Information[Destination],Flight_Information[FlightNumber],Flight_Information[Outcome], Flight_Information[Outcome] = "Best")
```

Results Result 1 of 1

	Flight_Information[FlightID]	Flight_Information[Airline]	Flight_Information[Destination]	Flight_Information[FlightNumber]	Flight_Information[Outcome]
1	1001	Airline D	Houston	FL1102	Best
2	1002	Airline B	Chicago	FL1435	Best
3	1006	Airline A	Phoenix	FL1071	Best
4	1011	Airline A	Phoenix	FL1466	Best
5	1013	Airline C	Houston	FL1330	Best
6	1020	Airline A	New York	FL1130	Best
7	1023	Airline A	Chicago	FL1769	Best
8	1025	Airline D	Phoenix	FL1491	Best
9	1027	Airline D	Chicago	FL1805	Best

Success (25.6 ms) Query 1 of 1 Result 1 of 1 5 columns, 78 rows

Data

Tables Model

Search

Flight_Information

- Airline
- Destination
- FlightID
- FlightNumber
- New Flight Number
- Outcome
- Status

Passenger_Information

- Flight_Information[FlightNumber]
- FlightID
- PassengerID
- SeatNumber

Ticket_Information

- BookingStatus
- Flight_Information[FlightNumber]
- FlightID
- Outcome for Booking Status
- TicketID

29°C Mostly cloudy

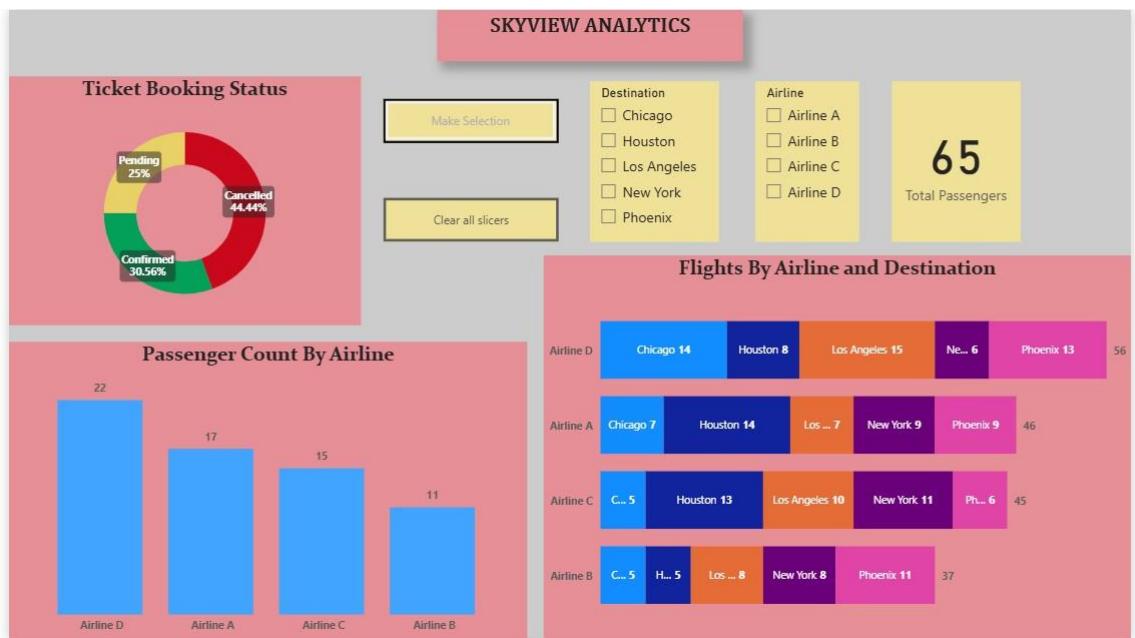
ENG IN 23:58 27-09-2025

5. Visualization and Interactive Features

- Create visuals for:
 - Passenger count by airline.
 - Ticket booking statuses.
 - Flights by airline and destination.

- Add interactive features for:
 - Destination and Airline.
 - Quick views.
 - Airline-specific pages.
- The visuals highlight key insights:

- **Passenger Count by Airline:** Airline D carried the highest number of passengers, followed by Airline A.
- **Ticket Booking Status:** Around 30.56% of tickets were confirmed, while 44.44% were cancelled.
- **Flights by Destination:** Houston and Los Angeles were the top destinations served. I added slicers for Airline and Destination, as well as quick views to switch between airline-specific dashboards.





Airline	Destination	Count of PassengerID
Airline A	Chicago	3
Airline A	Houston	4
Airline A	Los Angeles	1
Airline A	New York	3
Airline A	Phoenix	6
Total		17



FlightID	BookingStatus
1039	Pending
1064	Pending
1072	Pending
1076	Pending
1132	Pending
1146	Pending
1154	Pending
1162	Pending
1178	Pending

6. Final Dashboard and Power BI Service

- Design a comprehensive dashboard with key visuals and insights.
- Configure Row-Level Security (RLS) for Airline A data and assign it to a user.
- Set up a schedule refresh at 5 PM daily.

The screenshot shows a Power BI service dashboard titled "first dashboard". The dashboard contains three visualizations:

- A bar chart titled "Passenger Count By Airline" showing the count for four airlines: Airline D (22), Airline A (17), Airline C (15), and Airline B (11).
- A treemap visualization titled "Flights By Airline and Destination" showing flight counts for various destinations across four airlines. The data is summarized in the following table:

Airline	Destination	Count
Airline D	Chicago	14
Airline D	Houston	8
Airline D	Los Angeles	15
Airline D	New York	6
Airline D	Phoenix	13
Airline D	Total	56
Airline A	Chicago	7
Airline A	Houston	14
Airline A	Los Angeles	7
Airline A	New York	9
Airline A	Phoenix	9
Airline A	Total	46
Airline C	Chicago	5
Airline C	Houston	13
Airline C	Los Angeles	10
Airline C	New York	11
Airline C	Phoenix	6
Airline C	Total	45
Airline B	Chicago	5
Airline B	Houston	5
Airline B	Los Angeles	8
Airline B	New York	8
Airline B	Phoenix	11
Airline B	Total	37

- A table titled "BookingStatus, FlightID" showing flight IDs and their booking status. The data is summarized in the following table:

FlightID	BookingStatus
1039	Pending
1064	Pending
1072	Pending
1076	Pending
1132	Pending
1146	Pending

The left sidebar shows navigation options like Home, Create, Browse, OneLake catalog, Workspaces, and first dashboard. The bottom status bar shows the date as 28-09-2025 and the time as 04:36.

The screenshot shows the Power BI desktop application interface. The main area displays a bar chart titled "Passenger Count By Airline" with one visible bar for "Airline A" with a value of 17. The ribbon menu is open, showing the "Modeling" tab selected. The right side of the screen features the "Build" pane, which includes sections for "Suggestions" (with a search bar and a list of items like "Flight_Information", "Passenger_Information", and "Ticket_Information"), "Filters", and "Data" (with a "+Add data" button). The bottom status bar shows the date as 28-09-2025 and the time as 04:56.

The screenshot shows the 'Row-Level Security' page in the Power BI service. On the left, there's a sidebar with navigation links: Home, Create, Browse, OneLake catalog, Apps, Metrics, Workspaces, and a list of projects including 'internshala' and 'PROJECT 3'. The main area is titled 'Row-Level Security' and shows a role named 'NANCY (1)'. Below it, a section titled 'Members (1)' lists 'Nancy Miller' with an 'x' button to remove her. There's a text input field 'Enter email addresses' with an 'Add' button. At the bottom are 'Save' and 'Cancel' buttons.

The screenshot shows the 'Settings/datasets' page in the Power BI service. The sidebar includes 'internshala', 'first dashboard', and 'PROJECT 3'. The main area has a 'Refresh' section with a 'Time zone' dropdown set to '(UTC+05:30) Chennai, Kolkata, Mumbai'. Below it is a 'Configure a refresh schedule' section with a 'On' toggle switch, a 'Refresh frequency' dropdown set to 'Daily', and a 'Time' dropdown set to '5 PM'. There's also an 'Add another time' link. Under 'Send refresh failure notifications to', two checkboxes are checked: 'Semantic model owner' and 'These contacts'. A text input field 'Enter email addresses' is provided for contacts. At the bottom are 'Apply' and 'Discard' buttons.

I configured **Row-Level Security** for Airline A so that users assigned to that role can only view Airline A's data.

A **scheduled refresh at 5 PM daily** was set up in Power BI Service to keep the dashboard updated.