

Data Visualization with Power BI

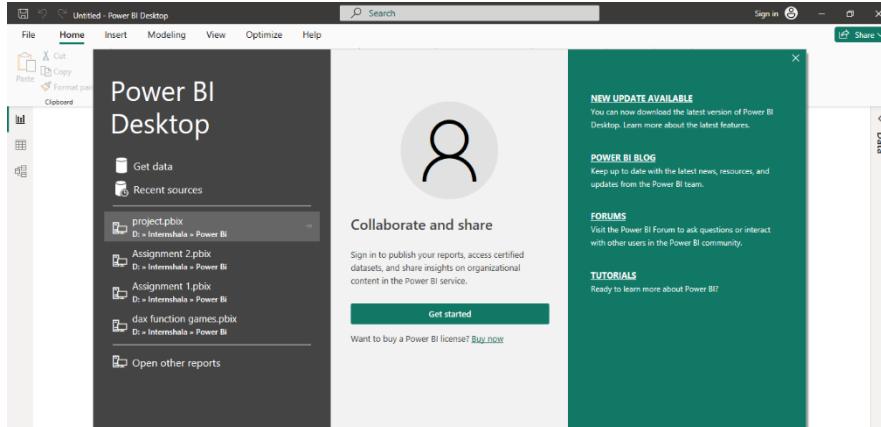
PROJECT

Task 1. Data Preparation and Cleaning

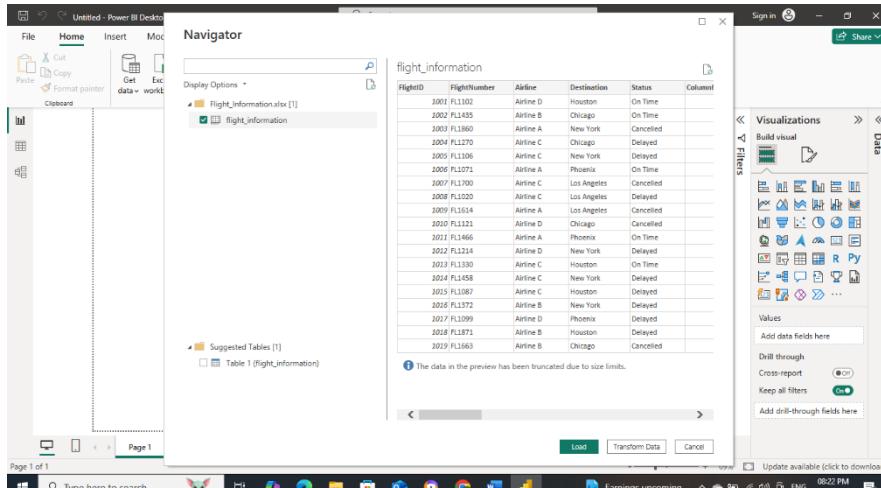
1.1 Extract and transform data in Power Query.

Steps Taken:

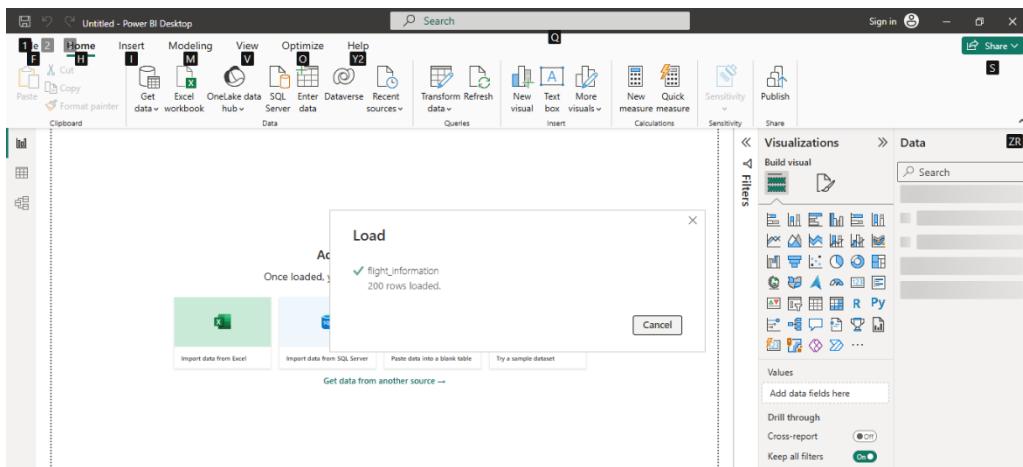
- Open Power BI desktop app.



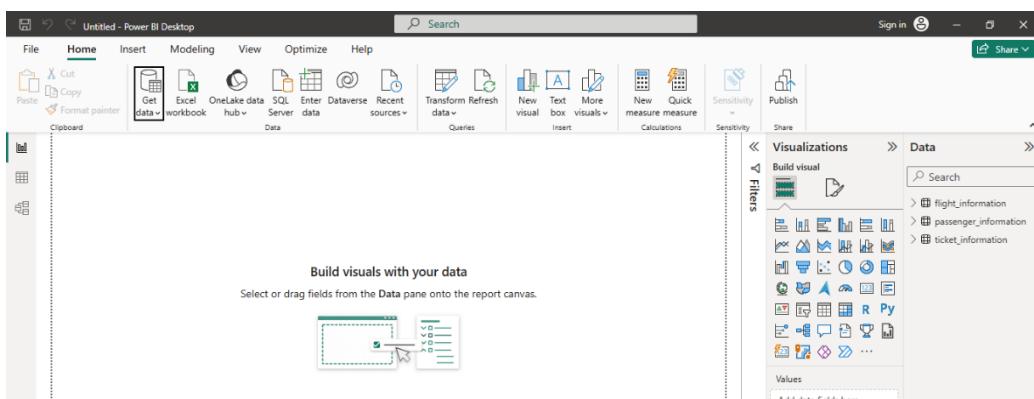
- Click on get data.
- Select excel workbook and click on connect.
- Select flight information file and click on open.
- Select the table and click on transform. Power query editor will be open.



- Click on close and apply and then apply.
- Flight information data will be loaded.



- Again, Click on get data.
- Select excel workbook and click on connect.
- Select Ticket information file and click on open.
- Select the table and click on transform. Power query editor will be open
- Click on close and apply and then apply.
- Ticket information data will be loaded.
- Again, Click on get data.
- Select excel workbook and click on connect.
- Select Passenger information file and click on open.
- Select the table and click on transform. Power query editor will be open
- Click on close and apply and then apply.
- Passenger information data will be loaded.



1.2 Clean data: remove duplicates, handle missing values, and format columns.

Steps Taken:

- Open Power Query Editor. (Click on transform data)
- Cleaning Flight information.
- Remove all the extra columns containing only null values.

The screenshot shows the Power Query Editor interface with three queries listed: flight_information, ticket_information, and passenger_information. The flight_information query is currently selected and displayed in the main pane. It contains a table with columns: FlightID, FlightNumber, Airline, Destination, and Status. The Status column has a data type of Any and contains mostly null values. The Applied Steps pane on the right shows the 'Changed Type' step applied to the flight_information query.

- Select all columns having necessary data right click and click on Remove other columns.

The screenshot shows the Power Query Editor interface with the same three queries. The flight_information query is selected. A context menu is open over the Status column header, specifically on the 'Remove Other Columns' option under the 'Applied Steps' section. This step is highlighted in the Applied Steps pane.

The screenshot shows the Power Query Editor interface with the flight_information query selected. The table now only contains the columns FlightID, FlightNumber, Airline, Destination, and Status, as the other columns have been removed. The Applied Steps pane shows the 'Removed Other Columns' step applied to the flight_information query.

- Now Remove duplicates.
- Select flight information data.
- At home tab click on remove rows and then click on remove duplicates.
- There is no missing values in this table.

- Now, checking for the datatypes.
- All datatypes are also correct as flightID has whole number, flightnumber as Text, airline, destination and status are also text.
- Now go to ticket information table.

ticket_information

TicketID	FlightID	BookingStatus
5001	1178	Pending
5002	1078	Confirmed
5003	1117	Cancelled
5004	1120	Cancelled
5005	1137	Cancelled
5006	1162	Pending
5007	1076	Pending
5008	1035	Cancelled
5009	1001	Cancelled

- Select all columns having necessary data right click and click on Remove other columns.

ticket_information

TicketID	FlightID	BookingStatus
5001	1178	Pending
5002	1078	Confirmed
5003	1117	Cancelled
5004	1120	Cancelled
5005	1137	Cancelled
5006	1162	Pending
5007	1076	Pending
5008	1035	Cancelled
5009	1001	Cancelled
5010	1040	Cancelled

- Now Remove duplicates.
- Select Ticket information data.
- At home tab click on remove rows and then click on remove duplicates.
- There is no missing values in this table.
- All datatypes are also correct.

ticket_information

TicketID	FlightID	BookingStatus
5001	1178	Pending
5002	1078	Confirmed
5003	1117	Cancelled
5004	1120	Cancelled
5005	1137	Cancelled
5006	1162	Pending
5007	1076	Pending
5008	1035	Cancelled
5009	1001	Cancelled
5010	1040	Cancelled
5011	1064	Pending
5012	1150	Cancelled

- Now go to Passenger information table.

The screenshot shows the Power Query Editor interface with the following details:

- File**, **Home**, **Transform**, **Add Column**, **View**, **Tools**, **Help** menu items.
- Queries [3]** pane: `flight_information`, `ticket_information`, `passenger_information`.
- Transform ribbon bar**: Close & Apply, New Query, Data Sources, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Sort, Data Type: Whole Number, Use First Row as Headers, Merge Queries, Append Queries, Combine Files, Text Analytics, Vision, Azure Machine Learning, AI Insights.
- Table View**: A table with columns `PassengerID`, `FlightID`, `SeatNumber`, `Column4`, `Column5`, and `Column6`. The `PassengerID` column has data types: Valid (100%), Error (0%), Empty (0%). The `FlightID` column has data types: Valid (100%), Error (0%), Empty (0%). The `SeatNumber` column has data types: Valid (100%), Error (0%), Empty (0%). The `Column4`, `Column5`, and `Column6` columns have data types: Valid (0%), Error (0%), Empty (100%).
- Properties pane**: Name: `passenger_information`, All Properties.
- Applied Steps pane**: Shows the applied steps: Source, Navigation, Promoted Headers, and **Changed Type**.

- Select all columns having necessary data right click and click on Remove other columns.

The screenshot shows the Power Query Editor interface with the following details:

- File**, **Home**, **Transform**, **Add Column**, **View**, **Tools**, **Help** menu items.
- Queries [3]** pane: `flight_information`, `ticket_information`, `passenger_information`.
- Transform ribbon bar**: Close & Apply, New Query, Data Sources, Manage Parameters, Refresh Preview, Advanced Editor, Properties, Choose Columns, Remove Columns, Keep Rows, Remove Rows, Reduce Rows, Sort, Data Type: Any, Use First Row as Headers, Merge Queries, Append Queries, Combine Files, Text Analytics, Vision, Azure Machine Learning, AI Insights.
- Table View**: A table with columns `PassengerID`, `FlightID`, and `SeatNumber`. The `PassengerID` column has data types: Valid (100%), Error (0%), Empty (0%). The `FlightID` column has data types: Valid (100%), Error (0%), Empty (0%). The `SeatNumber` column has data types: Valid (100%), Error (0%), Empty (0%).
- Properties pane**: Name: `passenger_information`, All Properties.
- Applied Steps pane**: Shows the applied steps: Source, Navigation, Promoted Headers, **Changed Type**, and **Removed Other Columns**.

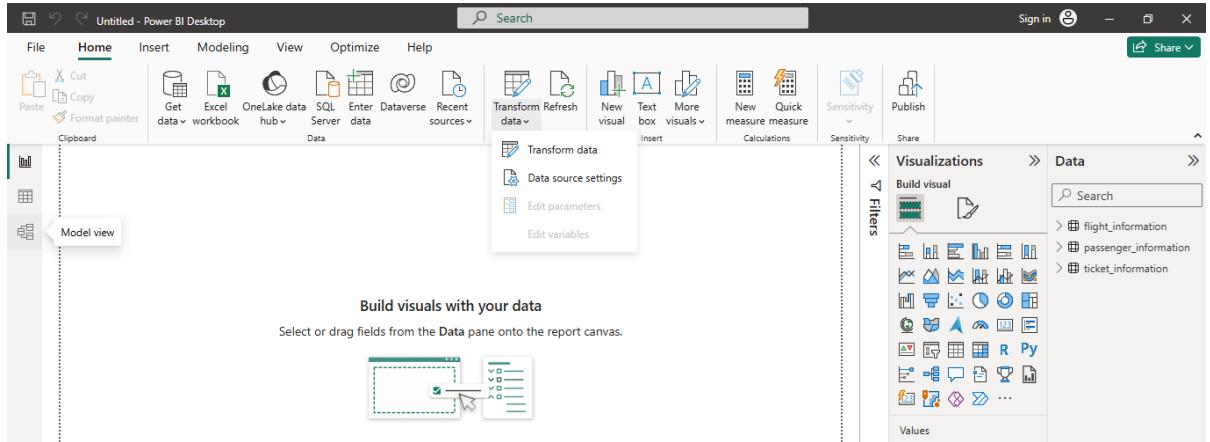
- Now Remove duplicates.
- Select Passenger information data.
- At home tab click on remove rows and then click on remove duplicates.
- There are no missing values in this table.
- All datatypes are also correct.
- Click on close and apply.

Task 2. Data Modeling

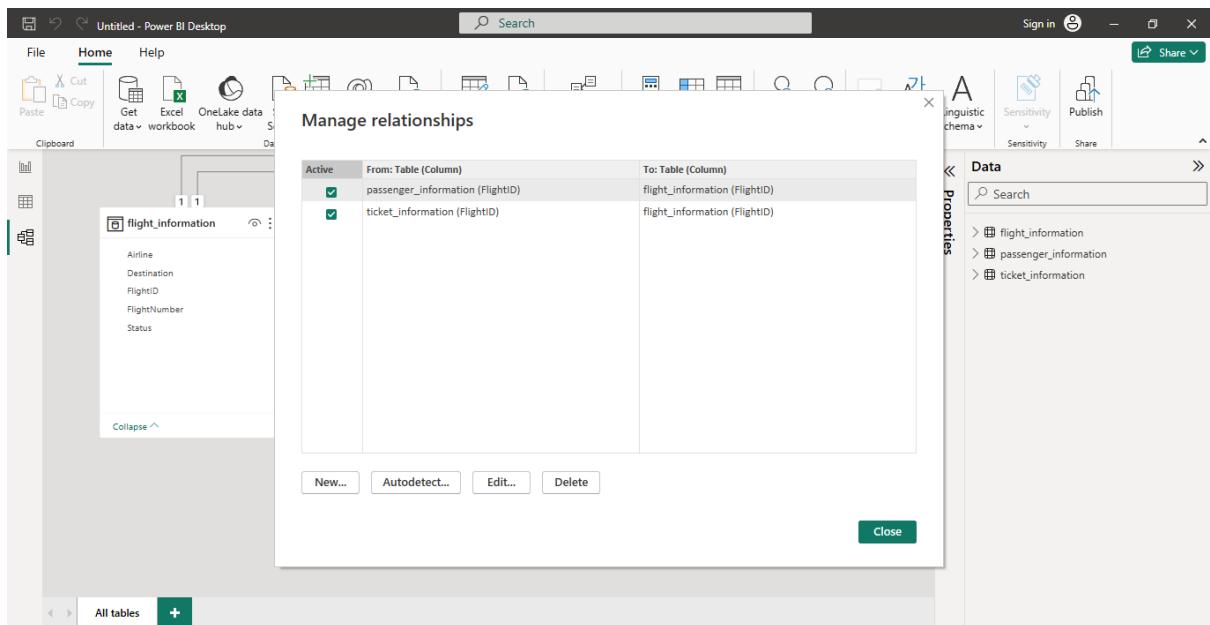
2.1 Create relationships between datasets (FlightID as the key).

Steps Taken:

- Go to the model view.



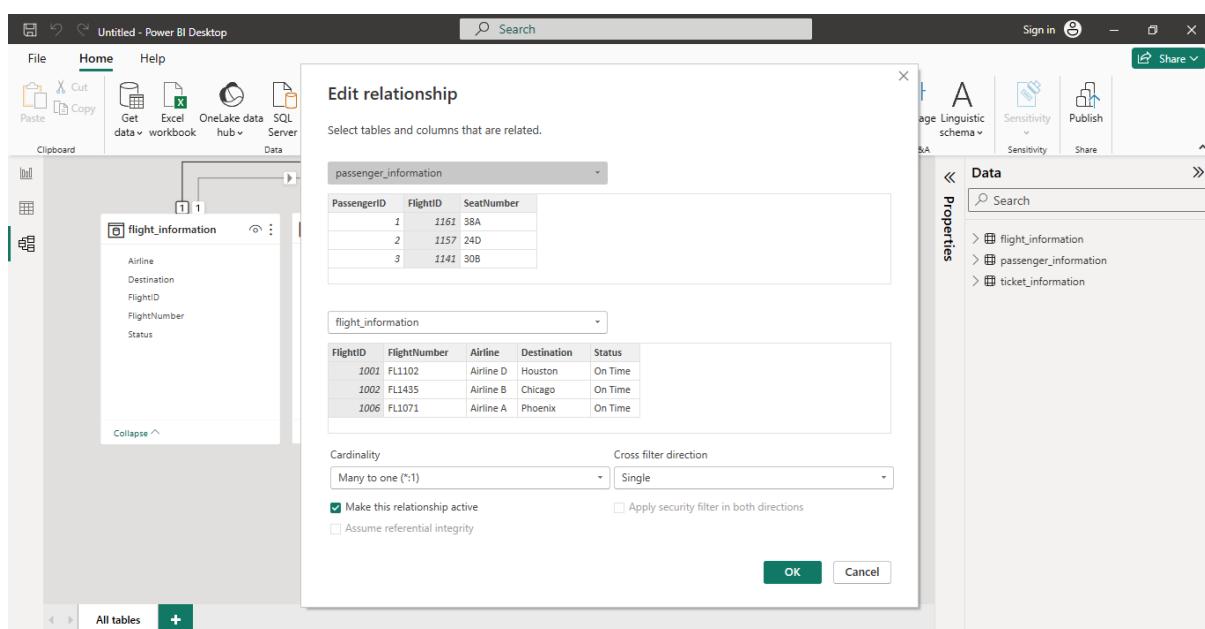
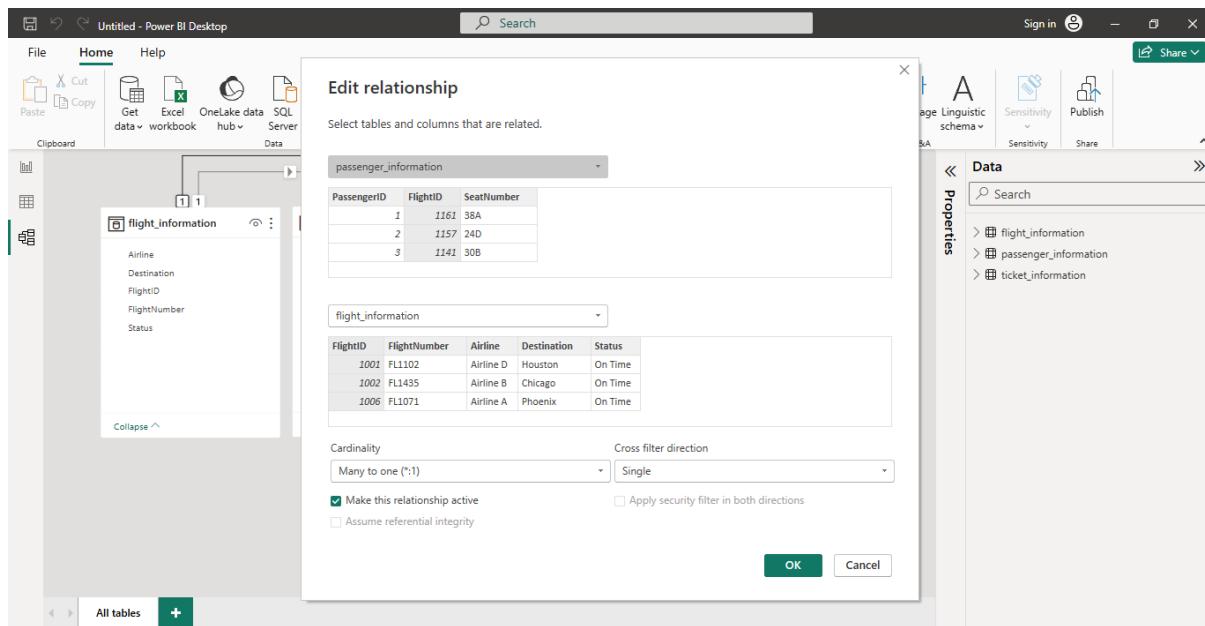
- Drag FlightID from Flight_Information → Ticket_Information
- Drag FlightID from Flight_Information → Passenger_Information



2.2 Understand cardinality and configure the model appropriately.

Steps Taken:

- Relationship 1: Flight_Information → Ticket_Information
- Cardinality: One-to-Many (1:*)
- Relationship 2: Flight_Information → Passenger_Information
- Cardinality: One-to-Many (1:*)



Task 3. Enhanced Data Insights

3.1 Add a conditional column to classify flights as "Best" or "To Be Improved" based on status.

Steps Taken:

- Go to power Query editor. (Click on Transform Data)
- Click on flight information table.
- Select status column.
- In the add column section click on conditional column.
- Add column name as Flight Classification
- If status equals on time then Best else to be improved.
- Click on OK.

The screenshot shows the Microsoft Power Query Editor interface. The 'Add Conditional Column' dialog box is open, prompting the user to create a new column named 'Flight Classification'. The 'If' condition is set to 'Status' equals 'On Time' with the output value 'Best'. The 'Else' condition is set to 'To Be Improved'. The background shows a table with columns: ID, Flight Number, Airline, City, and Delayed. The 'Properties' pane on the right lists steps taken: Source, Navigation, Promoted Headers, Changed Type, Removed Other Columns, and Removed Duplicates.

ID	Flight Number	Airline	City	Delayed
1014	FL1458	Airline C	New York	Delayed
1015	FL1087	Airline C	Houston	Delayed
1016	FL1372	Airline B	New York	Delayed

Queries [3]

	FlightNumber	Airline	Destination	Status	Flight Classification
1	1001 FL1102	Airline D	Houston	On Time	Best
2	1002 FL1435	Airline B	Chicago	On Time	Best
3	1003 FL1860	Airline A	New York	Cancelled	To Be Improved
4	1004 FL1270	Airline C	Chicago	Delayed	To Be Improved
5	1005 FL1106	Airline C	New York	Delayed	To Be Improved
6	1006 FL071	Airline A	Phoenix	On Time	Best
7	1007 FL1700	Airline C	Los Angeles	Cancelled	To Be Improved
8	1008 FL1020	Airline C	Los Angeles	Delayed	To Be Improved
9	1009 FL1614	Airline A	Los Angeles	Cancelled	To Be Improved
10	1010 FL1121	Airline D	Chicago	Cancelled	To Be Improved
11	1011 FL1466	Airline A	Phoenix	On Time	Best
12	1012 FL1214	Airline D	New York	Delayed	To Be Improved
13	1013 FL1330	Airline C	Houston	On Time	Best
14	1014 FL1458	Airline C	New York	Delayed	To Be Improved
15	1015 FL1087	Airline C	Houston	Delayed	To Be Improved
16	1016 FL1372	Airline B	New York	Delayed	To Be Improved
17	1017 FL1099	Airline D	Phoenix	Delayed	To Be Improved
18	1018 FL1871	Airline B	Houston	Delayed	To Be Improved
19	1019 FL1663	Airline B	Chicago	Cancelled	To Be Improved
20	1020 FL1130	Airline A	New York	On Time	Best

3.2 Use "Column from Examples" to extract the flight number from Flight Number.

Steps Taken:

- Go to power Query editor. (Click on Transform Data)
- Click on flight information table.
- Select FlightNumber Column.
- Go to add column and click on columns from example.
- Then click on from selection.
- Write flight no. 1102 in first row. Rest will be filled automatically.
- Click on ok.

Add Column From Examples

Enter sample values to create a new column (Ctrl+Enter to apply).

Transform: Text.AfterDelimiter([FlightNumber], ",")

FlightID	FlightNumber	Airline	Destination	Text After Delimiter
1	1001 FL1102	Airline D	Houston	1102
2	1002 FL1435	Airline B	Chicago	1435
3	1003 FL1860	Airline A	New York	1860
4	1004 FL1270	Airline C	Chicago	1270
5	1005 FL1106	Airline C	New York	1106
6	1006 FL071	Airline A	Phoenix	1071
7	1007 FL1700	Airline C	Los Angeles	1700
8	1008 FL1020	Airline C	Los Angeles	1020
9	1009 FL1614	Airline A	Los Angeles	1614
10	1010 FL1121	Airline D	Chicago	1121
11	1011 FL1466	Airline A	Phoenix	1466
12	1012 FL1214	Airline D	New York	1214
13	1013 FL1330	Airline C	Houston	1330
14	1014 FL1458	Airline C	New York	1458
15	1015 FL1087	Airline C	Houston	1087
16	1016 FL1372	Airline B	New York	1372
17	1017 FL1099	Airline D	Phoenix	1099
18	1018 FL1871	Airline B	Houston	1871

- Rename column as FlightNo.

Task 4. Calculations Using DAX

4.1 Calculate Total passengers for a specific flight.

Steps Taken:

- Go to Report View.
- Add a slicer and drag flightID in the field.
- Now create a new measure

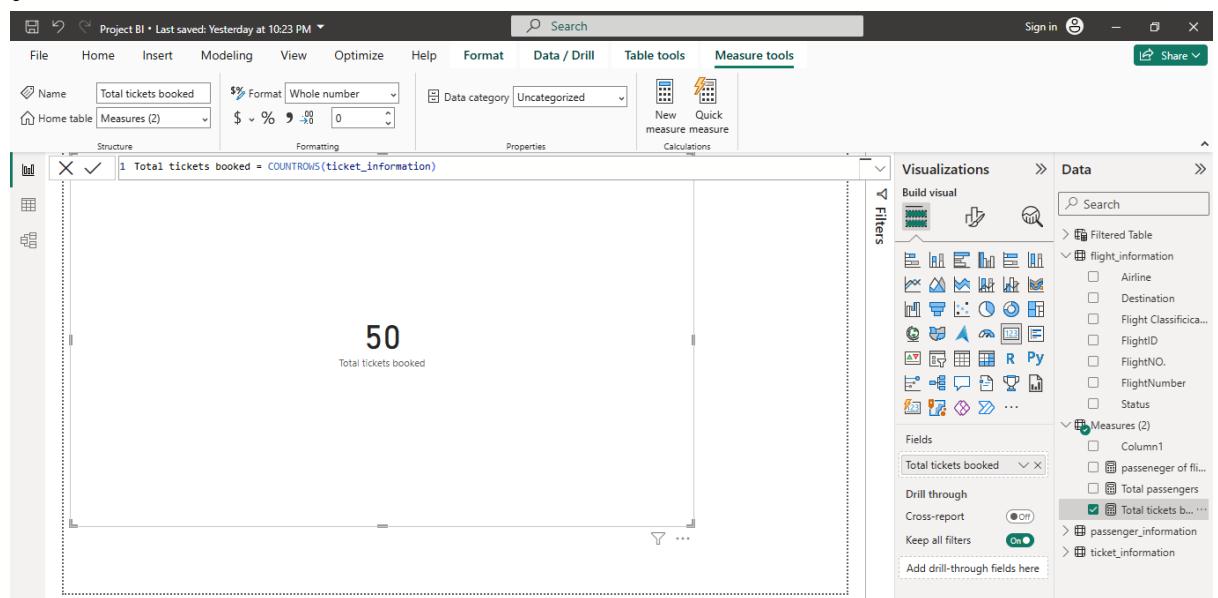
TotalPassengers_SelectedFlight = CALCULATE(COUNTROWS(passenger_information),
ALLSELECTED(passenger_information))

- Insert a card.
- And drag TotalPassengers_SelectedFlight measure on the fields.

4.2 Total tickets booked.

Steps Taken:

- Go to Power BI Report View.
- Click on New measure.
- Total tickets booked = COUNTROWS(ticket_information)
-



4.3 Filtered table showing "Best" flights only.

Steps Taken:

- At home tab, click on New table.
- then type Filtered Table = FILTER(flight_information,flight_information[Flight Classification]="Best").
- Click enter.

The screenshot shows the Microsoft Power BI desktop interface. The ribbon at the top has 'Home' selected. The main area displays a table titled 'Filtered Table = FILTER(flight_information,flight_information[Flight Classification]="Best")'. The table contains the following data:

FlightID	FlightNumber	Airline	Destination	Status	FlightNO.	Flight Classification
1001	FL1102	Airline D	Houston	On Time	1102	Best
1002	FL1435	Airline B	Chicago	On Time	1435	Best
1006	FL1071	Airline A	Phoenix	On Time	1071	Best
1011	FL1466	Airline A	Phoenix	On Time	1466	Best
1013	FL1330	Airline C	Houston	On Time	1330	Best
1020	FL1130	Airline A	New York	On Time	1130	Best
1023	FL1769	Airline A	Chicago	On Time	1769	Best
1025	FL1491	Airline D	Phoenix	On Time	1491	Best
1027	FL1805	Airline D	Chicago	On Time	1805	Best
1028	FL1385	Airline D	Chicago	On Time	1385	Best
1029	FL1191	Airline D	Los Angeles	On Time	1191	Best
1030	FL1955	Airline B	Phoenix	On Time	1955	Best
1031	FL1276	Airline B	New York	On Time	1276	Best
1033	FL1459	Airline D	New York	On Time	1459	Best
1034	FL1313	Airline B	Phoenix	On Time	1313	Best
1036	FL1252	Airline D	Phoenix	On Time	1252	Best
1039	FL1560	Airline B	Chicago	On Time	1560	Best
1043	FL1681	Airline C	Houston	On Time	1681	Best
1044	FL1475	Airline B	Phoenix	On Time	1475	Best
1046	FL1975	Airline D	Chicago	On Time	1975	Best

The Power BI Data view pane on the right shows the structure of the 'flight_information' table, including columns like FlightID, FlightNumber, Airline, Destination, Status, FlightNO., and Flight Classification. It also lists measures such as 'passenger_of flight FL1161', 'Total passengers', 'Total tickets booked', and other related tables like 'passenger_information' and 'ticket_information'.

Task 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.

Steps Taken:

- Go to Report View.
- Insert a card drag total passengers measure on to fields.
- Insert a card drag total Flights measure on to fields
- Insert a card drag total tickets measure on to fields.
- Insert a bar chart and drag airline on y axis and passenger id (summarize to count) on x axis.
- Insert a donut chart and drag booking status on legend and ticket id (summarize to count) on values.
- Insert a matrix chart and drag airline to rows, destination to columns and flight id (summarize to count) to values.
- Insert slicer and drag airline to fields.
- Insert slicer and drag destination to fields.

Screenshot of Power BI Desktop showing a dashboard with three visualizations:

- Count of PassengerID by Airline**: A bar chart showing the count of passengers for four airlines (A, B, C, D). The total is 100.
- Count of TicketID by BookingStatus**: A donut chart showing the distribution of ticket statuses (Cancelled, Confirmed, Pending) with a total of 50.
- Flight Information Matrix**: A matrix table showing flight counts from various cities (Chicago, Houston, Los Angeles, New York, Phoenix) for different airlines (A, B, C, D).

The ribbon shows the "Home" tab is selected. The "Data" pane on the right lists measures like Total passengers, Total_Flights, and total_tickets, along with a filtered table for flight information.

Screenshot of Power BI Desktop showing a dashboard with three visualizations:

- Count of PassengerID by Airline**: A bar chart showing the count of passengers for one airline (Airline A). The total is 6.
- Count of TicketID by BookingStatus**: A donut chart showing the distribution of ticket statuses (Confirmed, Pending) with a total of 2.
- Flight Information Matrix**: A matrix table showing flight counts from various cities (Chicago, Total) for one airline (Airline A).

The ribbon shows the "Format" tab is selected. The "Data" pane on the right lists measures like Total passengers, Total_Flights, and total_tickets, along with a filtered table for flight information where the "Destination" field is set to "Airline".

- Click New Page.
- Add a Slicer for Airline.
- Style it tile format.
- Inset Bar chart drag Destination to axis and FlightID (summarize to count) to values.
- Insert donut chart and drag booking status to legend and ticketid (summarixe to count) to values.
- Insert a card and drag flight Id (summarize to count) on fields.
- Insert a bar chart and drag destination to y axis and flight id (summarize to count) to y axis.
- Insert a matrix chart and drag flightid, seat number and passengerid (summarize to count) on columns.

Project BI • Last saved: Today at 9:12 PM

File Home Insert Modeling View Optimize Help

Cut Copy Format painter Paste Get data Excel workbook OneLake data hub SQL Server Data Enter data Dataverse Recent sources Transform Refresh New visual Text box More visuals Insert New measure Quick measure measure Calculations Sensitivity Publish Share

Auto recovery contains some recovered files that haven't been opened.

Airline

Count of FlightID by Destination

200 Count of FlightID

Count of TicketID by BookingStatus

FlightID Count of PassengerID SeatNumber

FlightID	Count of PassengerID	SeatNumber
1038	1	10E
1039	1	33E
1046	1	17E
1047	1	2E
1047	1	5B
1050	1	23B
1050	1	34B
1051	1	4B
1052	1	5D
1053	1	38C
1054	1	15A
1055	1	35E
1056	1	23C
1057	1	2C
1059	1	49B
1063	1	13B
1065	1	19E
Total	100	

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Project BI • Last saved: Today at 9:12 PM

File Home Insert Modeling View Optimize Help Format Data / Drill

Cut Copy Format painter Paste Get data Excel workbook OneLake data hub SQL Server Data Enter data Dataverse Recent sources Transform Refresh New visual Text box More visuals Insert New measure Quick measure measure Calculations Sensitivity Publish Share

Auto recovery contains some recovered files that haven't been opened.

Airline

Count of FlightID by Destination

48 Count of FlightID

Count of TicketID by BookingStatus

FlightID Count of PassengerID SeatNumber

FlightID	Count of PassengerID	SeatNumber
1038	1	12E
1039	1	46B
1092	1	37D
1095	1	26B
1095	1	45B
1099	1	17B
1115	1	20E
1145	1	10A
1145	1	8B
1146	1	5B
1173	1	3A
1177	1	28B
1177	1	9B
1182	1	30C
1192	1	11D
1193	1	47B
1197	1	28B
1197	1	34E
Total	30	

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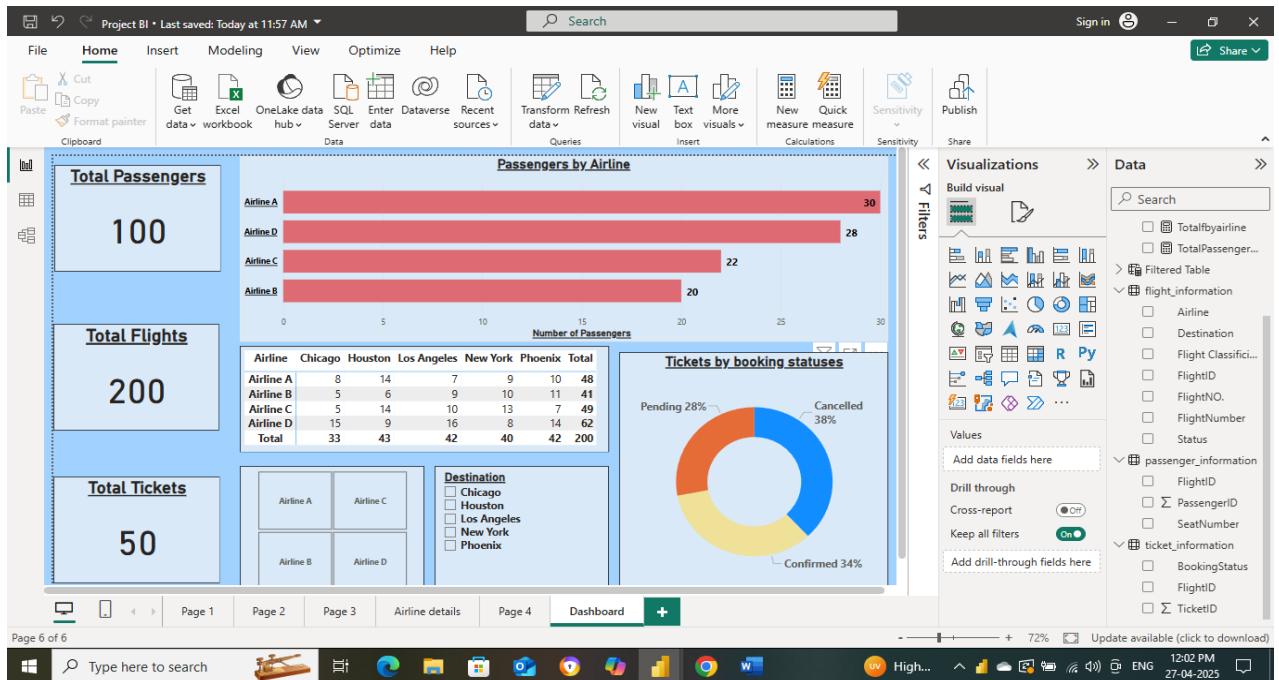
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Tasks 6. Final Dashboard and Power BI Services

6.1 Design a comprehensive dashboard with key visuals and insights.

Steps Taken:

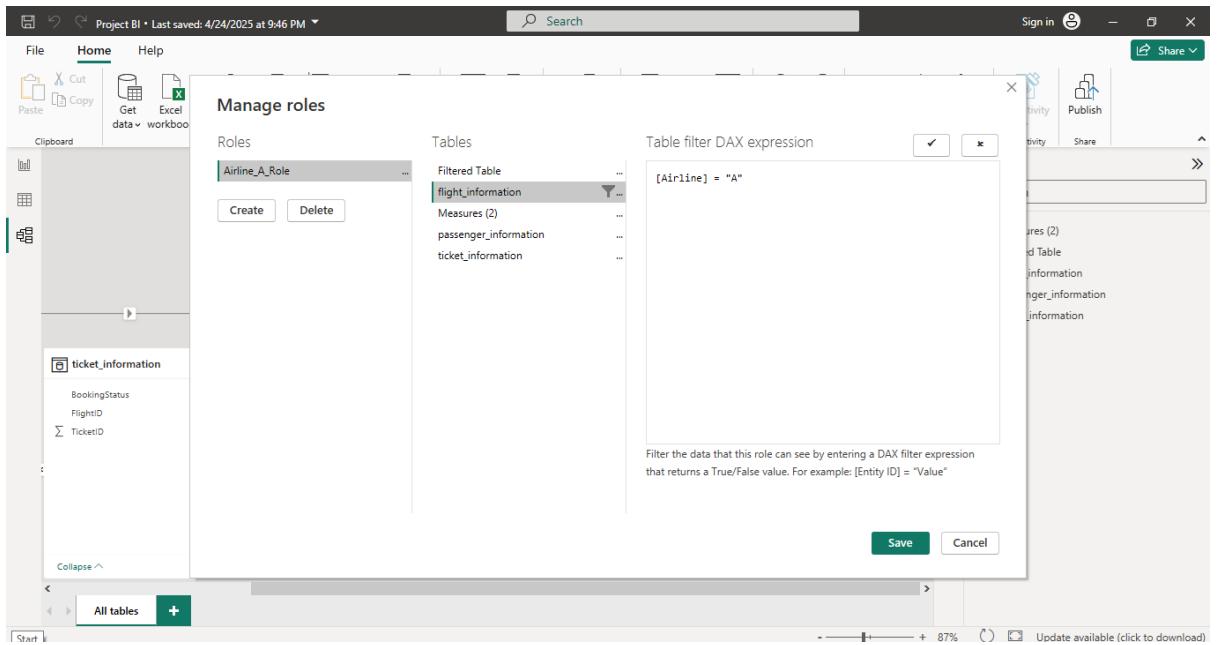
- Go to Report View.
- Insert a card drag total passengers measure on to fields.
- Insert a card drag total Flights measure on to fields
- Insert a card drag total tickets measure on to fields.
- Insert a bar chart and drag airline on y axis and passenger id (summarize to count) on x axis.
- Insert a donut chart and drag booking status on legend and ticket id (summarize to count) on values.
- Insert a matrix chart and drag airline to rows, destination to columns and flight id (summarize to count) to values.
- Insert slicer and drag airline to fields.
- Insert slicer and drag destination to fields.
- Format all the visuals things that is title, background color, borders, spacing etc.



6.2 Configure Row-Level Security (RLS) for Airline A data and assign it to a user.

Steps Taken:

- Create the Role
- Go to Model view and Click Manage Roles (top ribbon).
- Click Create and Name it Airline_A _Role.
- Select Flight_Information table
- Apply this filter : [Airline] = "Airline A"
- Then click on Save.



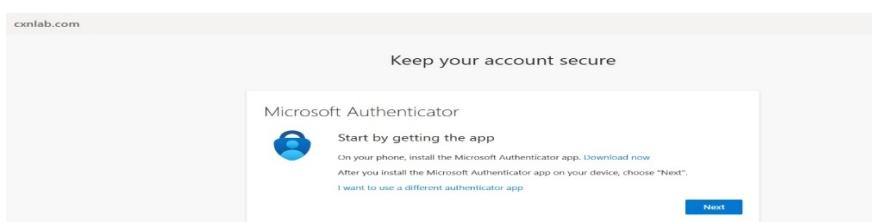
- For assigning user publish it into Power BI Service.
- After publishing, in Power BI Service, go to Workspace then Dataset and then Security
- Select the Airline_A_Role
- Add user email addresses (e.g., dj@mail.com)

6.3 Set up a schedule refresh at 5 PM daily.

Steps Taken:

- Go to Power BI Service.
- Go to Workspace and then Dataset and then Settings.
- Under Scheduled Refresh Turn it On.
- Set the Time: 5:00 PM (select Time zone)

MY POWER BI SERVICE WAS NOTWORKING DUE TO SOME UPDATE BY MICROSOFT ATTACHING SCREENSHOTS FOR THE SAME.



Link For the Video : https://drive.google.com/file/d/1ap-D06J-15O_MD6h68OdSqstWOwip8zW/view?usp=sharing