



ASSIGNMENT 2

DATA WAREHOUSING AND BUSINESS INTELLIGENCE

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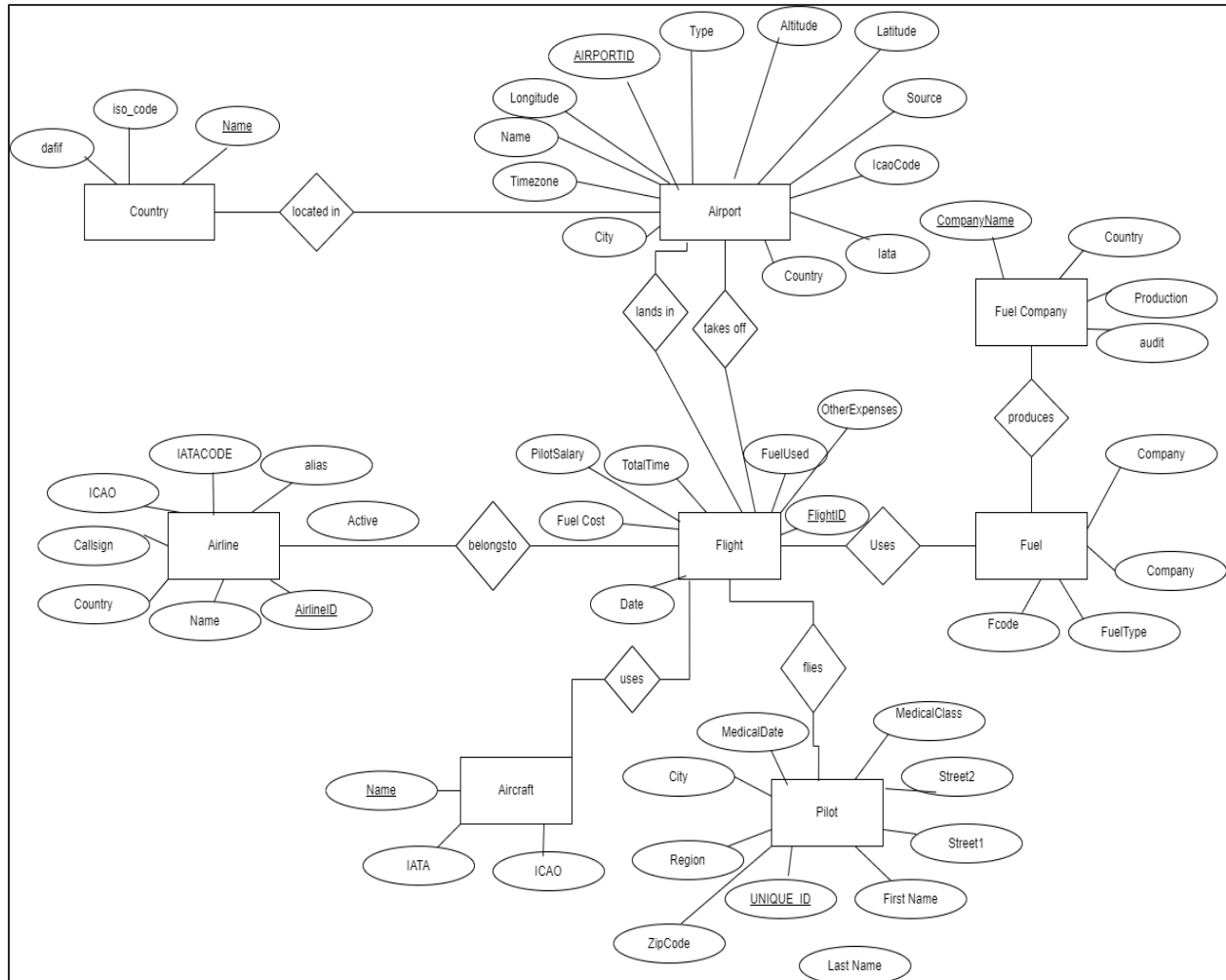
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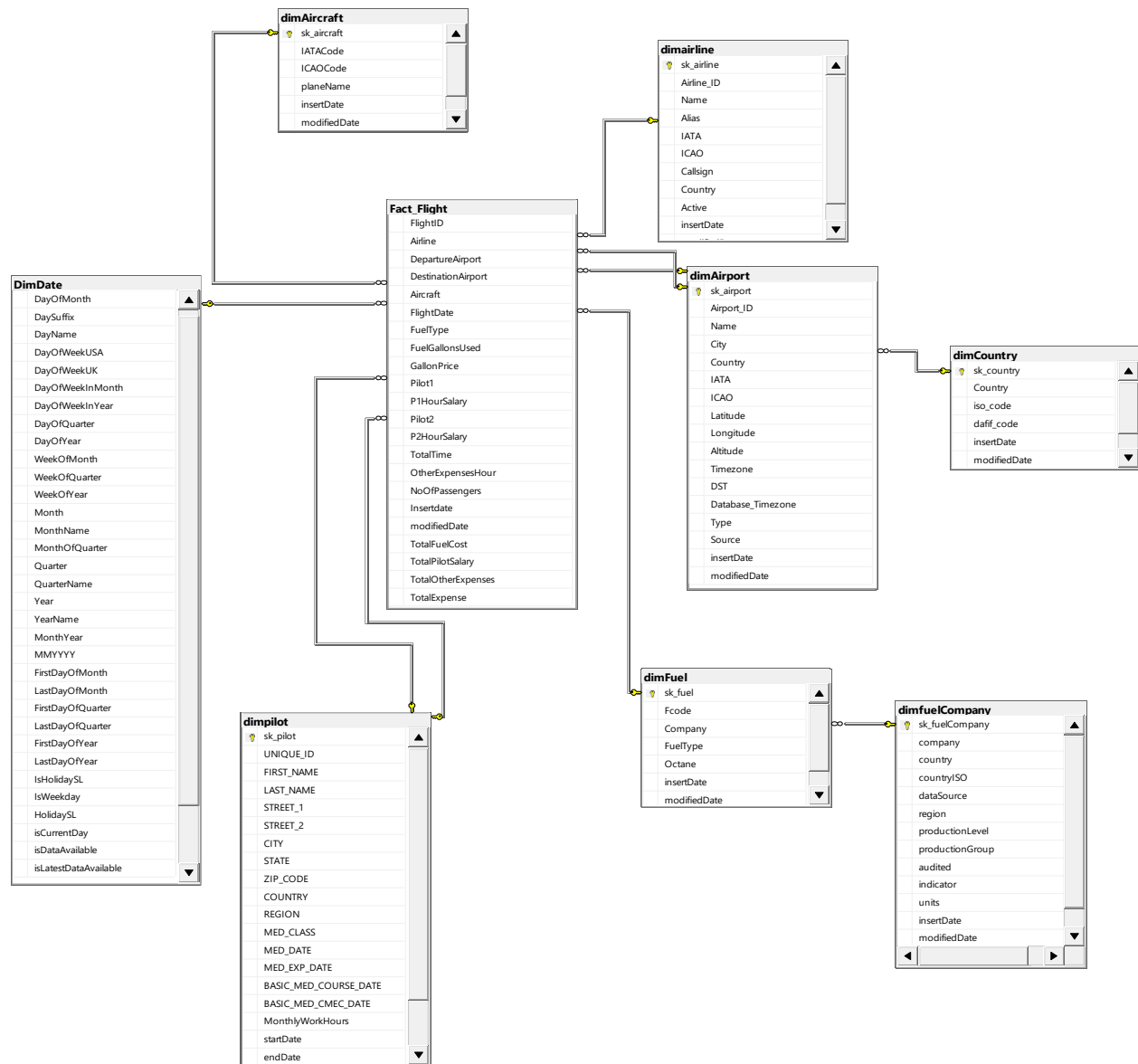
DATA SOURCE

The data source that was used for this project is the data warehouse that was created through the first assignment. Given below is the relational model, Entity-Relationship diagram and a brief description of the data warehouse that has been used.

Entity-Relationship Diagram



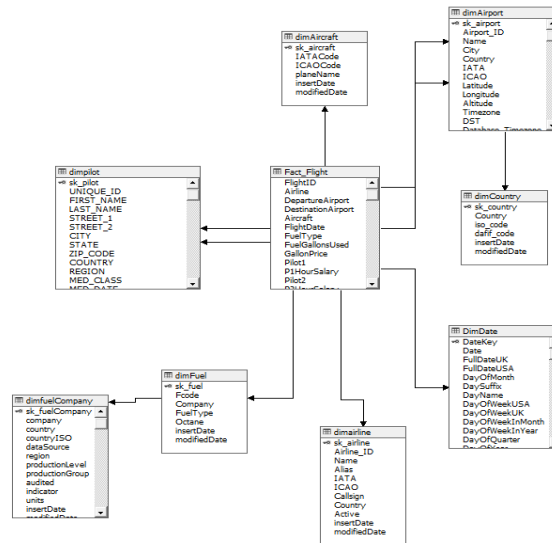
Relational Diagram



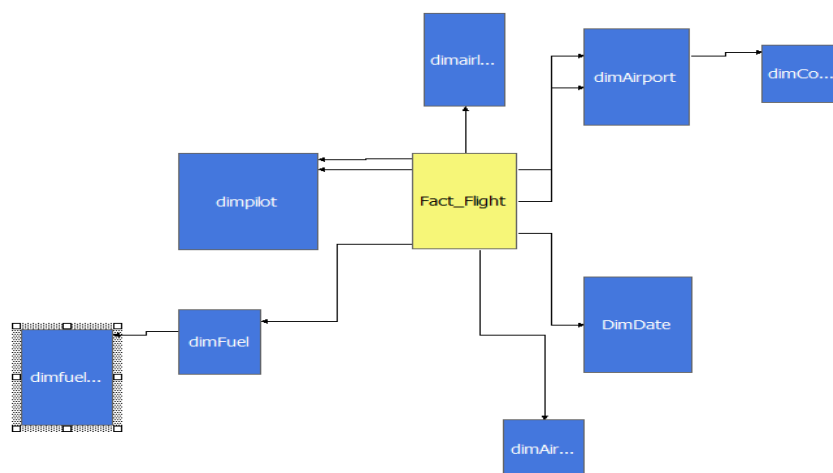
- The data warehouse is designed using the SNOWFLAKE SCHEMA.
- There is one fact table, six dimensions and two inherited dimensions.
- The inherited tables are as follow;
 1. DimAirport-> DimCountry
 2. DimFuel->DimFuelCompany
- The assumption that the pilot table is a slowly changing dimension is made.

SSAS CUBE IMPLEMENTATION

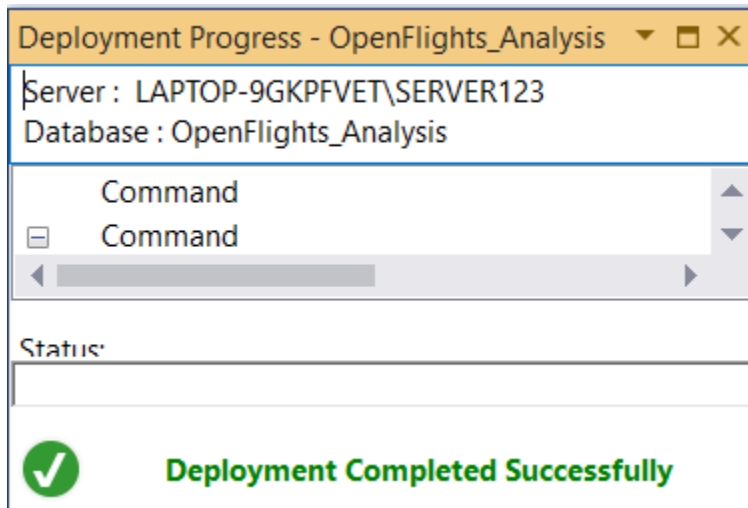
- In order to create the SSAS cube, the data source with the connection to the required database was added.
- Using the connected data base, a data source view was created with necessary facts, dimensions and inherited tables. Accordingly, the following model was formed.



- Inheritance of tables is done by default since the mapping of the dimensions has been done accurately. This eliminates the need to create the dimensions manually.
- Once the cube is created, the following diagram is generated with appropriate mappings between the fact table, dimensions and inherited tables.



The cube is then deployed to the target database. The successful deployment of the cube is shown below,



SSRS REPORTS

REPORT 1: Airline Wise YoY expenses

This report generates the total sum of fuel costs, pilot salaries, other expenses and total expenses of a airline which separated by years.

In order to get a more refined output, the years have been filtered to include only 2012,2013 and 2014 excluding the year 2011.

Given below is the design view of the Aiirline Wise YoY expenses report.

Airline Wise YOY Expenses											
Airline ID	Name	Country	[Year]				Total				Total
			Total Fuel Co	Total Pilot Sa	Total Other E	Total Expenses	Total Fuel Co	Total Pilot Sa	Total Other E	Total Expenses	
[Airline_ID]	[Name]	[Country]	[Sum(TotalFuel	[Sum(TotalPilo	[Sum(TotalOth	[Sum(TotalExpi	[Sum(TotalFuel	[Sum(TotalPilo	[Sum(TotalOth	[Sum(TotalExpi	[Sum(TotalExpi
	Total		[Sum(TotalFuel	[Sum(TotalPilo	[Sum(TotalOth	[Sum(TotalExpi	[Sum(TotalFuel	[Sum(TotalPilo	[Sum(TotalOth	[Sum(TotalExpi	[Sum(TotalExpi
Total			[Sum(TotalFuel	[Sum(TotalPilo	[Sum(TotalOth	[Sum(TotalExpi	[Sum(TotalFuel	[Sum(TotalPilo	[Sum(TotalOth	[Sum(TotalExpi	[Sum(TotalExpi
[&ExecutionTime]											

One the report is processed, the following output is produced.

Accordingly, the sub expenses and total expense of an airline on a yearly basis is calculated.

Airline Wise YOY Expenses															
Airline ID	Name	Country	2012				2013				2014				Total
			Total Fuel Cost	Total Pilot Salary	Total Other Expenses	Total Expense	Total Fuel Cost	Total Pilot Salary	Total Other Expenses	Total Expense	Total Fuel Cost	Total Pilot Salary	Total Other Expenses	Total Expense	Total Fuel Cost
10	40-Mile Air	United States					1650674	9724	185168	1845566					1650674
	Total						1650674	9724	185168	1845566					1650674
24	American Airlines	United States					799722790	3680430	76079906	879483126					799722790
	Total						799722790	3680430	76079906	879483126					799722790
28	Asiana Airlines	Republic of Korea					86908438	402640	8387088	95698166					86908438
	Total						86908438	402640	8387088	95698166					86908438
29	Askari Aviation	Pakistan	394602	2580	68328	465510									394602
	Total		394602	2580	68328	465510									394602
32	Afriqiyah Airways	Libya	6762288	22662	467828	7252778	6961498	43574	888524	7893596					137231
	Total		6762288	22662	467828	7252778	6961498	43574	888524	7893596					137231
35	Allegiant Air	United States									124553904	601948	12340400	137496252	124553904
	Total										124553904	601948	12340400	137496252	124553904
42	ABSA - Aerolinhas Brasileiras	Brazil					1864462	12396	251374	2128232					1864462
	Total						1864462	12396	251374	2128232					1864462

REPORT 2: AVERAGE FUEL PRICE REPORT

This report is used to calculate the average price of a gallon of a particular fuel type produced by a particular company.

Given below is the design view of the report,

Average Fuel Price Report		
Company	Fuel Type	Average Gallon Price
[dimfuelCompany_company]	[dimFuel_FuelType]	[Avg(GallonPrice)]
		[&ExecutionTime]

Two parameters have to be passed to obtain a meaningful report

In this regard, the company parameter has to be passed first.

The first parameter acts as filter to choose the specific fuel types produced by the particular company.

The resulting option that can be chosen for the Fuel type changes with the company parameter that has been selected as demonstrated below,

The image displays two side-by-side screenshots of a report parameter selection interface. Each screenshot shows a 'Company' dropdown menu and a 'Fuel Type' dropdown menu. In the left screenshot, 'Basra Oil Company' is selected in the 'Company' dropdown, and the 'Fuel Type' dropdown is open, showing three options: '(Select All)', 'AVGas', and 'JetA-1'. In the right screenshot, 'Qatar Energy' is selected in the 'Company' dropdown, and the 'Fuel Type' dropdown is open, showing four options: '(Select All)', 'JetB', 'Biokerosene', and 'JetA'.

The above snippets demonstrate that different options for fuel types are available when different companies are chosen.

Accordingly, the following report is generated.

Company

ADNOC

Fuel Type

JetA

Average Fuel Price Report

Company	Fuel Type	Average Gallon Price
ADNOC	JetA	7.48192771084337
CNOOC Limited	JetA	7.48686167575607
CNPC	JetA	7.51078775715003
OOO	JetA	7.45193260654113
Petrotrin	JetA	7.49429846306396
Qatar Energy	JetA	7.4194348041646

REPORT 3: Airline-Aircraft Fuel Usage

This drill down report is generated in order to calculate the total fuel usage of a particular aircraft which belongs to a particular airline.

The design view of the report is shown below,

Airline	Aircraft Name	IATACode	ICAOCode	Fuel Type	Fuel Gallons Used
[Name]					
	[planeName]	[IATACode]	[ICAOCode]	[FuelType]	[Sum(FuelGallonsUsed)]

[&ExecutionTime]

The Airline name is selected as the parent category and can be toggled to reveal the fuel usage details of all aircrafts belonging to the airline. The following report is generated when the design is processed,

Airline-Aircraft Fuel Usage					
Airline	Aircraft Name	IATACode	ICAOCode	Fuel Type	Fuel Gallons Used
40-Mile Air					
Abaet					
ABSA - Aerolinhas Brasileiras					
Abu Dhabi Amiri Flight					
Adria Airways					
Aegean Airlines					
Aer Lingus					
Aereonautica militare					
Aero Condor Peru					
Aero Flight					
Aero Lanka					
Aerocondo					
Aeroflot Russian Airlines					
Aeroflot-Nord					
Aeroline GmbH					
Aerolineas					

Expanding one of the Airline options will reveal information of all aircrafts and the fuel usage of each.

Airline-Aircraft Fuel Usage					
Airline	Aircraft Name	IATACode	ICAOCode	Fuel Type	Fuel Gallons Used
40-Mile Air	BAe 146-100	141	B461	3	66376
	BAe 146-200	142	B462	6	76442
	BAe 146-300	143	B463	8	21716
	Beechcraft 1900	BEH	B190	9	13912
Abaet	McDonnell Douglas MD-82	M82	MD82	14	72924
	McDonnell Douglas MD-83	M83	MD83	15	74040
	McDonnell Douglas MD-87	M87	MD87	16	69220
ABSA -					

REPORT 4: DRILL THROUGH REPORT

This drill through report is used to understand the number of fuel types provided by each company for the operation of flights.

For this purpose, two reports must be created.

The following is the design of the target report. Clicking on a chosen attribute on the source report should redirect to the target report while passing the appropriate parameter.

TARGET REPORT

Fcode	dim Fuel Fuel Type	Octane
[Fcode]	[dimFuel_FuelType]	[Octane]

This is the design view of the target report.

SOURCE REPORT

Design View of the Source Report

FUEL COMPANY		
company	production Level	Count Fuel Type
[company]	[productionLevel]	[Count_FuelType]

Output of the source report

FUEL COMPANY		
company	production Level	Count Fuel
ADNOC	Above 500,000 boe/day	2
BAPCO	Between 100,000 and 500,000 boe/day	2
Basra Oil Company	Above 500,000 boe/day	2
CNOOC	Above 500,000 boe/day	2
CNOOC Limited	Above 500,000 boe/day	2
CNPC	Above 500,000 boe/day	2
CUPET	Between 0 and 100,000	1
Ecopetrol	Above 500,000 boe/day	1
IPIC	Unknown	1
ONGC	Above 500,000 boe/day	1
OOC	Between 0 and 100,000	1
PetroleumBrunei	Between 100,000 and 500,000 boe/day	1
Petronas	Above 500,000 boe/day	2
PetroSA	Between 0 and 100,000	1
Petrotrin	Between 0 and 100,000	1
PetroVietnam	Between 100,000 and 500,000 boe/day	1
PNOC	Between 100,000 and 500,000 boe/day	1
PTT	Between 100,000 and 500,000	1

Clicking on one company name from the above output will redirect to another report.

This is done by configuring action of each the column to run the target report by passing the company surrogate key as the parameter.

This is the output when one company from the company column in the above report is clicked,

Fcode	dim Fuel Fuel Type	Octane
103	JetA-1	97
114	AVGas	88

This reveals details about the fuel types produced by the selected company.