Case Study: Azure → Snowflake with Snowpark, then Power BI

Scenario

You're the data engineer at **ItTechGenie Retail**. Sales teams drop monthly CSVs into an **Azure Storage** container. You must:

1. upload the CSV to Azure,
2. ingest it into **Snowflake** using **Snowpark**,
3. model it into proper **database/schema/table**, and
4. build a quick **Power BI** report for business users.

Introduction

The objective of this case study is to ingest sales data stored in Azure Blob Storage, load it into Snowflake using Databricks, and create an interactive Power BI dashboard for business users.

The dashboard provides key metrics, trends, and insights into sales, profit, and customer behavior.

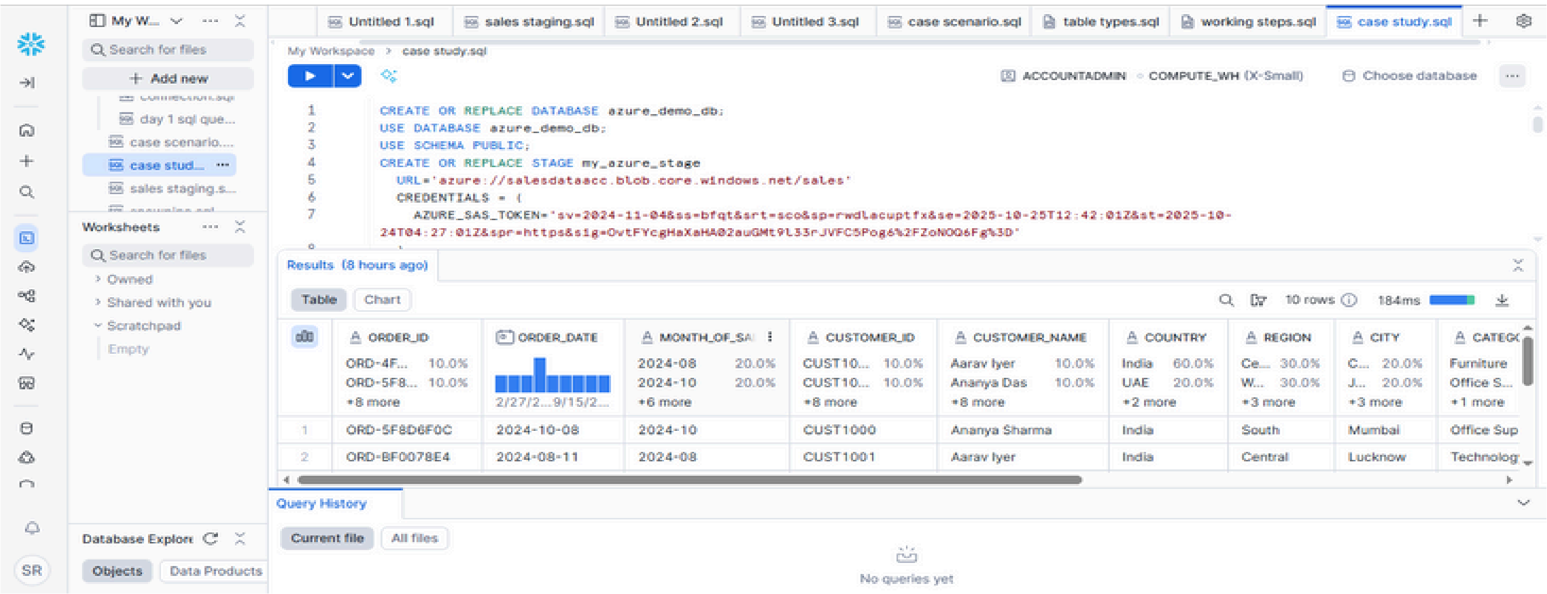
This workflow demonstrates the data pipeline:

- Data Storage: Azure Blob Storage
- Data Ingestion: Azure Databricks using Snowflake connector
- Data Modeling: Snowflake (SALES table)
- Visualization: Power BI

Step 1: Azure Storage Setup

Steps Taken:

1. Logged into Azure Portal → Storage Accounts.
2. Clicked Create Storage Account, provided required details, and created the account.
3. Created a new container inside the storage account:
   - Clicked + New Container, entered a name, and created it.
4. Uploaded the CSV sales file to the container.
5. Generated a Shared Access Signature (SAS) token:
   - Navigated to Security + Networking → Shared Access Signature
   - Selected read/list permissions → copied SAS token and container URL.
   -



```sql
CREATE OR REPLACE DATABASE azure_demo_db;
USE DATABASE azure_demo_db;
USE SCHEMA PUBLIC;
CREATE OR REPLACE STAGE my_azure_stage
  URL='azure://salesdataacc.blob.core.windows.net/sales'
  CREDENTIALS = (
    AZURE_SAS_TOKEN='sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacuptfx&se=2025-10-25T12:42:01Z&st=2025-10-24T04:27:01Z&spr=https&sig=OvtFYcgHaXaHA02auGMt9L33rJVFC5Pog6%2FZoNOQ6Fg%3D'
```

	ORDER_ID	ORDER_DATE	MONTH_OF_SA	CUSTOMER_ID	CUSTOMER_NAME	COUNTRY	REGION	CITY	CATEG
	ORD-4F... 10.0% ORD-5F8... 10.0% +8 more	2/27/2...9/15/2...	2024-08 20.0% 2024-10 20.0% +6 more	CUST10... 10.0% CUST10... 10.0% +8 more	Aarav Iyer 10.0% Ananya Das 10.0% +8 more	India 60.0% UAE 20.0% +2 more	Ce... 30.0% W... 30.0% +3 more	C... 20.0% J... 20.0% +3 more	Furniture Office S... +1 more
1	ORD-5F8D6F0C	2024-10-08	2024-10	CUST1000	Ananya Sharma	India	South	Mumbai	Office Sup
2	ORD-BF0078E4	2024-08-11	2024-08	CUST1001	Aarav Iyer	India	Central	Lucknow	Technolog

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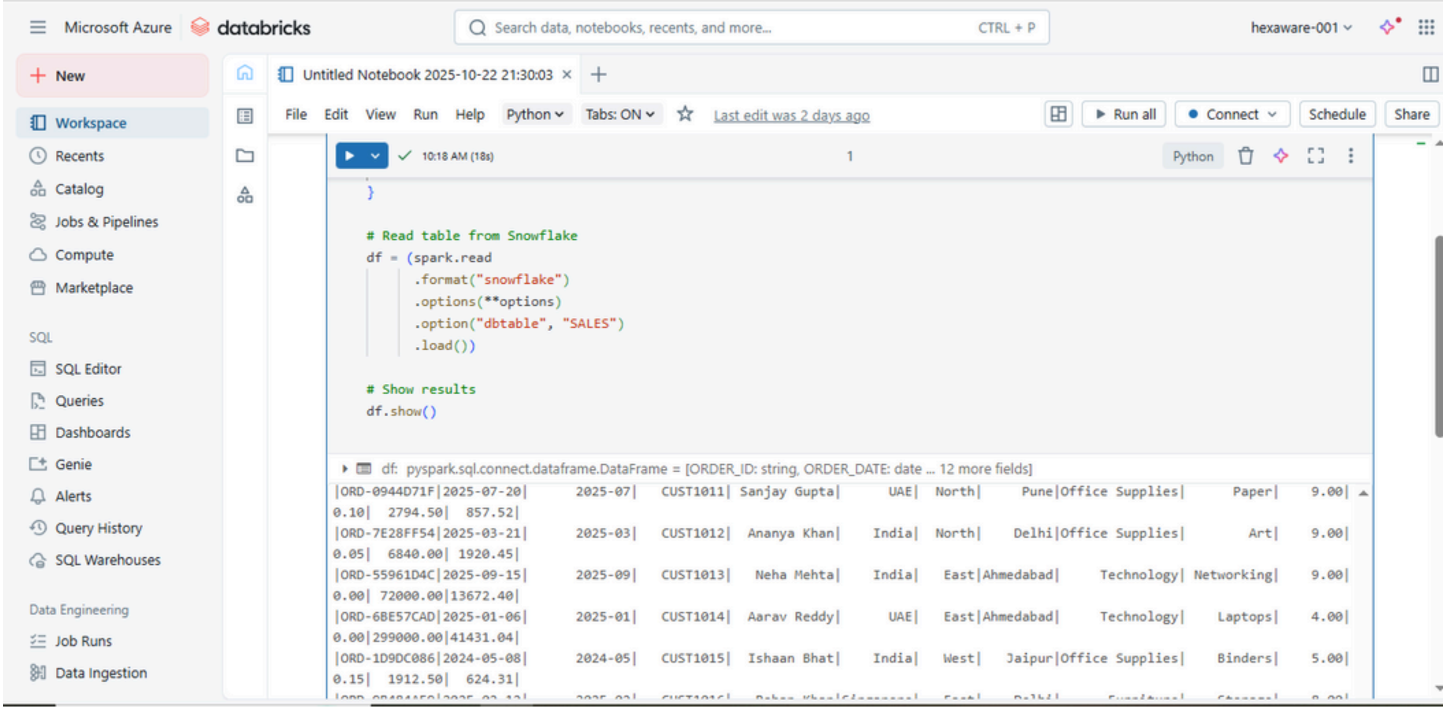
Step 2: Data Ingestion into Snowflake using Databricks

Steps Taken:

1. Opened Azure Databricks workspace.
2. Installed Snowflake connector library:

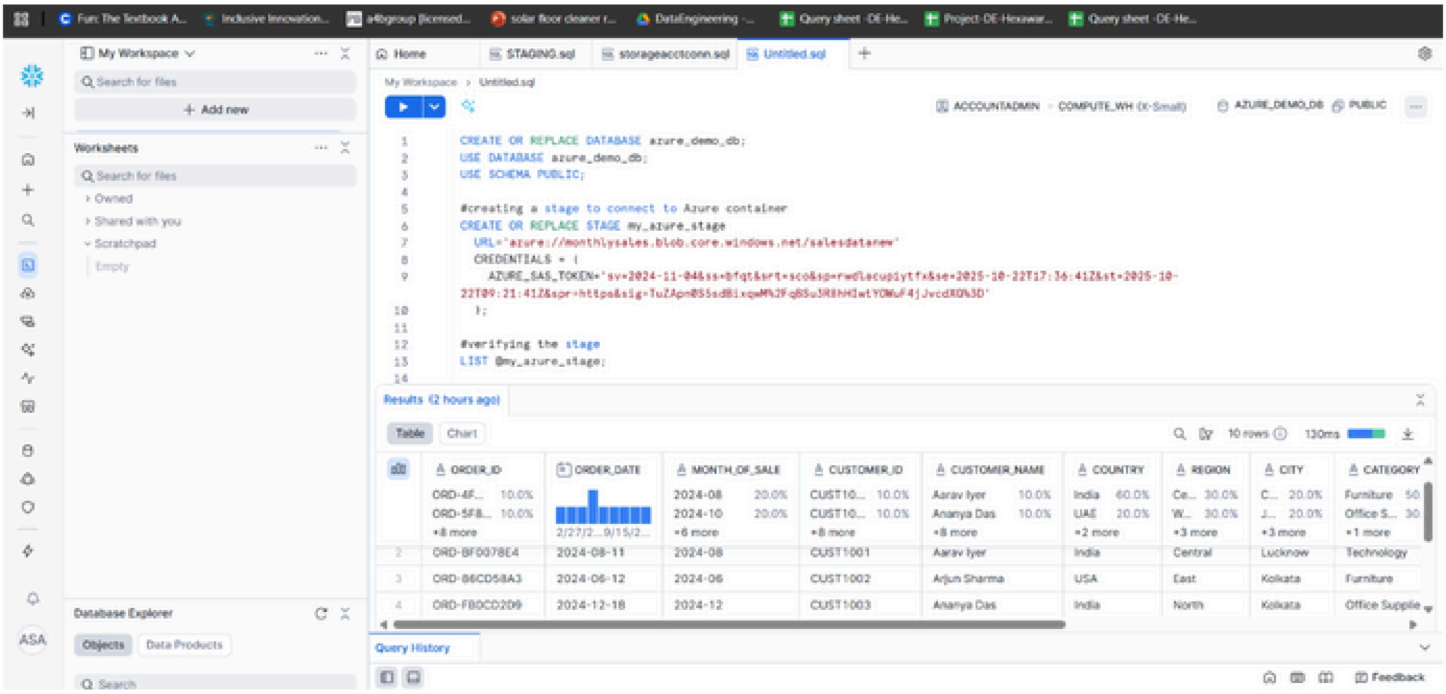


```
}

# Read table from Snowflake
df = (spark.read
      .format("snowflake")
      .options(**options)
      .option("dbtable", "SALES")
      .load())

# Show results
df.show()
```

df: pyspark.sql.connect.dataframe.DataFrame = [ORDER_ID: string, ORDER_DATE: date ... 12 more fields]

```
|ORD-0944D71F|2025-07-20|      2025-07|   CUST1011| Sanjay Gupta|       UAE|  North|      Pune|Office Supplies|       Paper|    9.00|
0.10|   2794.50|   857.52|
|ORD-7E28FF54|2025-03-21|      2025-03|   CUST1012|  Ananya Khan|     India|  North|     Delhi|Office Supplies|         Art|    9.00|
0.05|   6840.00|  1920.45|
|ORD-55961D4C|2025-09-15|      2025-09|   CUST1013|   Neha Mehta|     India|   East|Ahmedabad|      Technology|  Networking|    9.00|
0.00|  72000.00| 13672.40|
|ORD-6BE57CAD|2025-01-06|      2025-01|   CUST1014|  Aarav Reddy|       UAE|   East|Ahmedabad|      Technology|     Laptops|    4.00|
0.00|299000.00| 41431.04|
|ORD-1D9DC086|2024-05-08|      2024-05|   CUST1015|  Ishaan Bhat|     India|   West|    Jaipur|Office Supplies|     Binders|    5.00|
0.15|   1912.50|   624.31|
```

1. Configured connection options for Snowflake:
2. Created a Spark DataFrame reading from Snowflake SALES table:
3. Verified the loaded data:



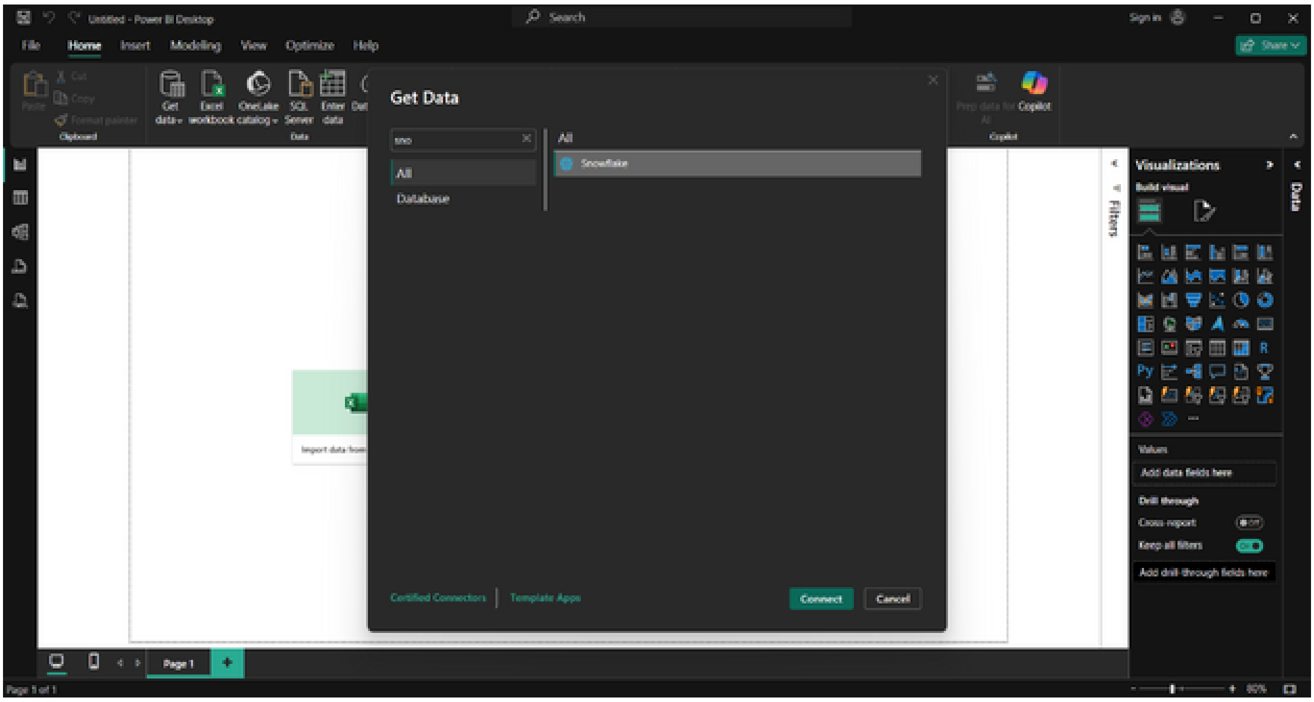
```
CREATE OR REPLACE DATABASE azure_demo_db;
USE DATABASE azure_demo_db;
USE SCHEMA PUBLIC;

#creating a stage to connect to Azure container
CREATE OR REPLACE STAGE my_azure_stage
  URL='azure://monthlysales.blob.core.windows.net/salesdatanew'
  CREDENTIALS = (
    AZURE_SAS_TOKEN='sv=2024-11-04&ss=bfqt&srt=sco&sp=rwdlacupiytfx&se=2025-10-22T17:36:41Z&st=2025-10-22T09:21:41Z&spr=https&sig=TuZApn0S5sdBixqwM%2FqBSu3R8hHIwtYOWuF4jJvcdRD%3D'
  );

#verifying the stage
LIST @my_azure_stage;
```

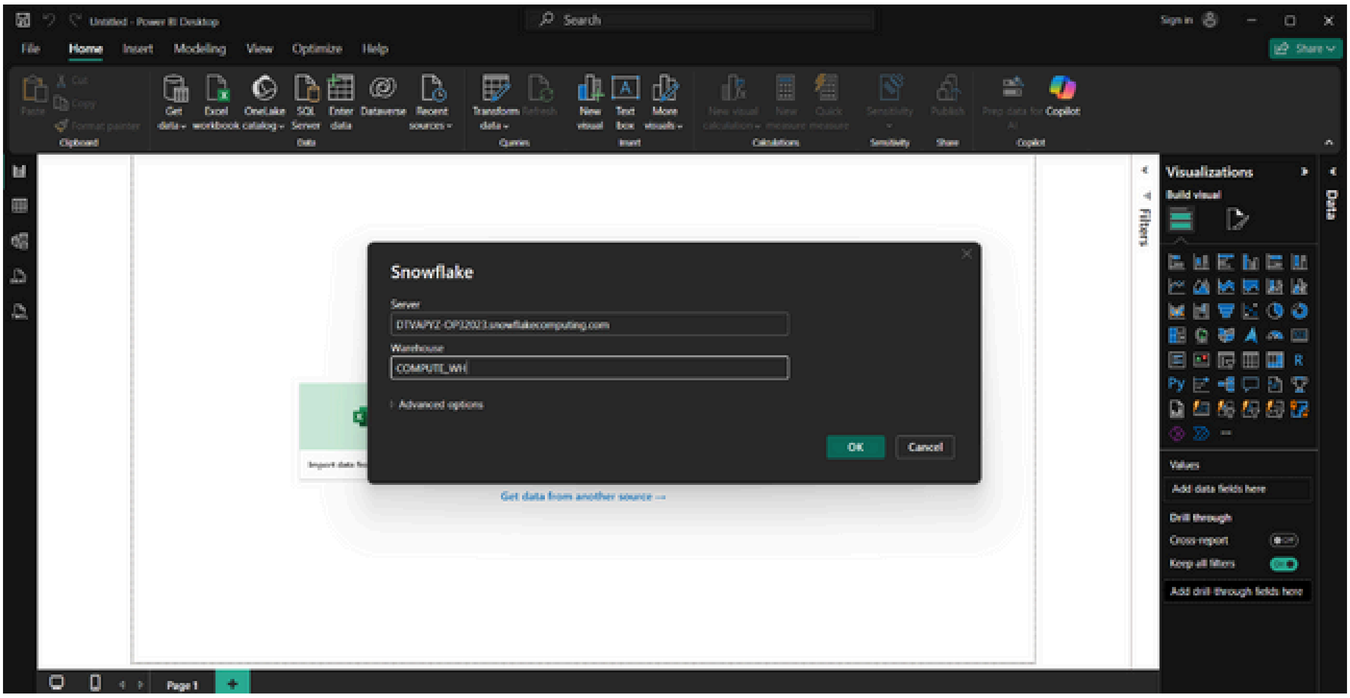
	ORDER_ID	ORDER_DATE	MONTH_OF_SALE	CUSTOMER_ID	CUSTOMER_NAME	COUNTRY	REGION	CITY	CATEGORY
	ORD-4F... 10.0% ORD-5F8... 10.0% +8 more	2/27/2... 9/15/2...	2024-08 20.0% 2024-10 20.0% +6 more	CUST10... 10.0% CUST10... 10.0% +8 more	Aarav Iyer 10.0% Ananya Das 10.0% +8 more	India 60.0% UAE 20.0% +2 more	Ce... 30.0% W... 30.0% +3 more	C... 20.0% J... 20.0% +3 more	Furniture 50 Office S... 30 +1 more
2	ORD-BF0078E4	2024-08-11	2024-08	CUST1001	Aarav Iyer	India	Central	Lucknow	Technology
3	ORD-86CD58A3	2024-06-12	2024-06	CUST1002	Arjun Sharma	USA	East	Kolkata	Furniture
4	ORD-F8DCD2D9	2024-12-18	2024-12	CUST1003	Ananya Das	India	North	Kolkata	Office Supplie

Step 3: Power BI Report Creation

Steps Taken:

1. Opened Power BI Desktop.
2. Clicked Get Data → Snowflake, entered Snowflake server, warehouse, database, schema.
3. Selected Import mode to load SALES table.
4. Opened Power Query Editor:
   - ○ Verified data types (Text, Date, Decimal).
   - ○ Removed duplicate rows.
5. Loaded the cleaned data into Power BI.





Snowflake

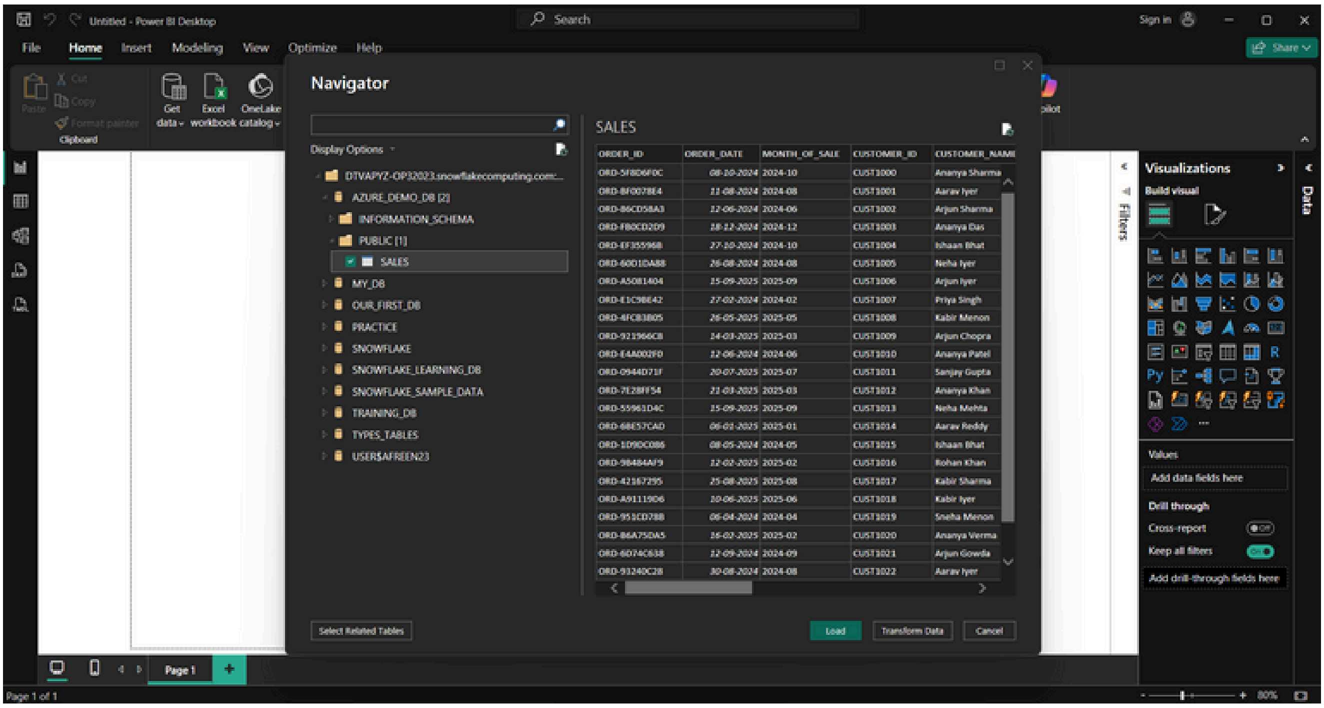
Server

DTVAPYZ-OP32023.snowflakecomputing.com

Warehouse

COMPUTE_WH

› Advanced options

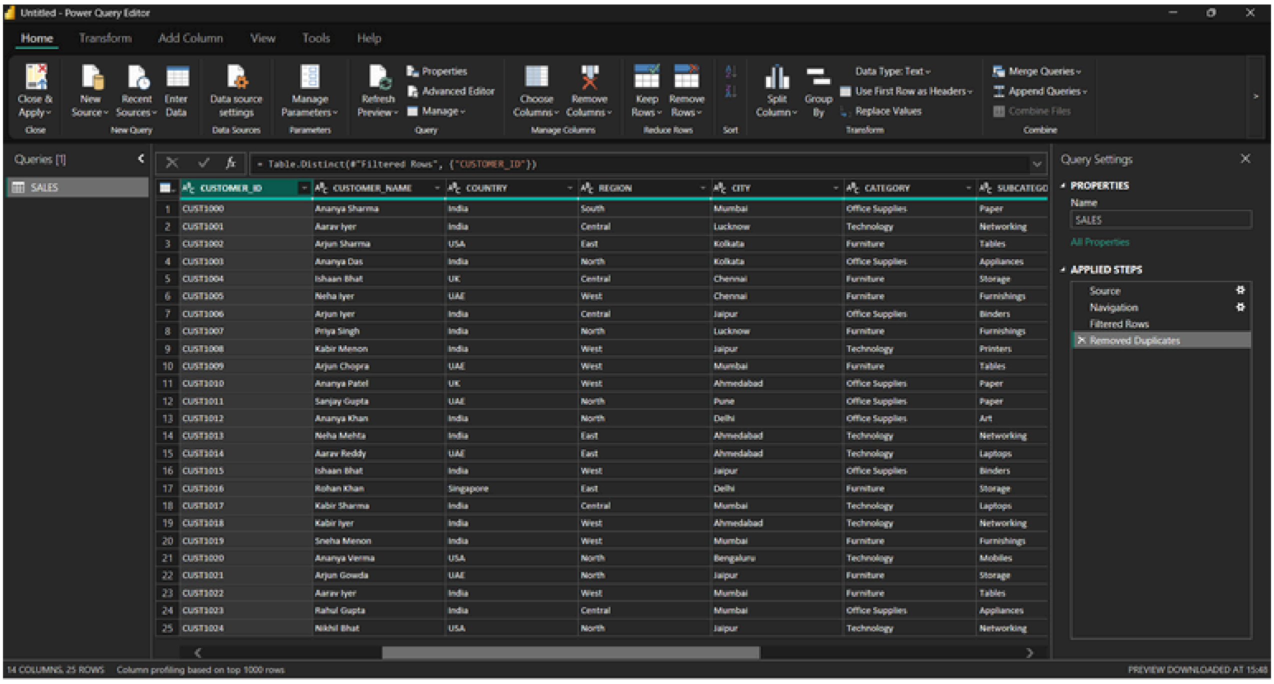


Navigator

- DTVAPYZ-OP32023.snowflakecomputing.com:...
  - AZURE_DEMO_DB [2]
    - INFORMATION_SCHEMA
    - PUBLIC [1]
      - ☑ SALES
  - MY_DB
  - OUR_FIRST_DB
  - PRACTICE
  - SNOWFLAKE
  - SNOWFLAKE_LEARNING_DB
  - SNOWFLAKE_SAMPLE_DATA
  - TRAINING_DB
  - TYPES_TABLES
  - USER$AFREEN23

SALES

ORDER_ID	ORDER_DATE	MONTH_OF_SALE	CUSTOMER_ID	CUSTOMER_NAM
ORD-5F8D6F0C	08-10-2024	2024-10	CUST1000	Ananya Sharma
ORD-8F0078E4	11-08-2024	2024-08	CUST1001	Aarav Iyer
ORD-86CD58A3	12-06-2024	2024-06	CUST1002	Arjun Sharma
ORD-F80CD2D9	18-12-2024	2024-12	CUST1003	Ananya Das
ORD-EF35596B	27-10-2024	2024-10	CUST1004	Ishaan Bhat
ORD-60D1DA88	26-08-2024	2024-08	CUST1005	Neha Iyer
ORD-A5081404	15-09-2025	2025-09	CUST1006	Arjun Iyer
ORD-E1C9BE42	27-02-2024	2024-02	CUST1007	Priya Singh
ORD-4FCB3805	26-05-2025	2025-05	CUST1008	Kabir Menon
ORD-921966C8	14-03-2025	2025-03	CUST1009	Arjun Chopra
ORD-E4A002F0	12-06-2024	2024-06	CUST1010	Ananya Patel
ORD-0944D71F	20-07-2025	2025-07	CUST1011	Sanjay Gupta
ORD-7E28FF54	21-03-2025	2025-03	CUST1012	Ananya Khan
ORD-55961D4C	15-09-2025	2025-09	CUST1013	Neha Mehta
ORD-68E57CAD	06-01-2025	2025-01	CUST1014	Aarav Reddy
ORD-1D9DC086	08-05-2024	2024-05	CUST1015	Ishaan Bhat
ORD-98484AF9	12-02-2025	2025-02	CUST1016	Rohan Khan
ORD-42167295	25-08-2025	2025-08	CUST1017	Kabir Sharma
ORD-A91119D6	10-06-2025	2025-06	CUST1018	Kabir Iyer
ORD-951CD78B	06-04-2024	2024-04	CUST1019	Sneha Menon
ORD-86A75DA5	16-02-2025	2025-02	CUST1020	Ananya Verma
ORD-6D74C638	12-09-2024	2024-09	CUST1021	Arjun Gowda
ORD-93240C28	30-08-2024	2024-08	CUST1022	Aarav Iyer



```
= Table.Distinct(#"Filtered Rows", {"CUSTOMER_ID"})
```

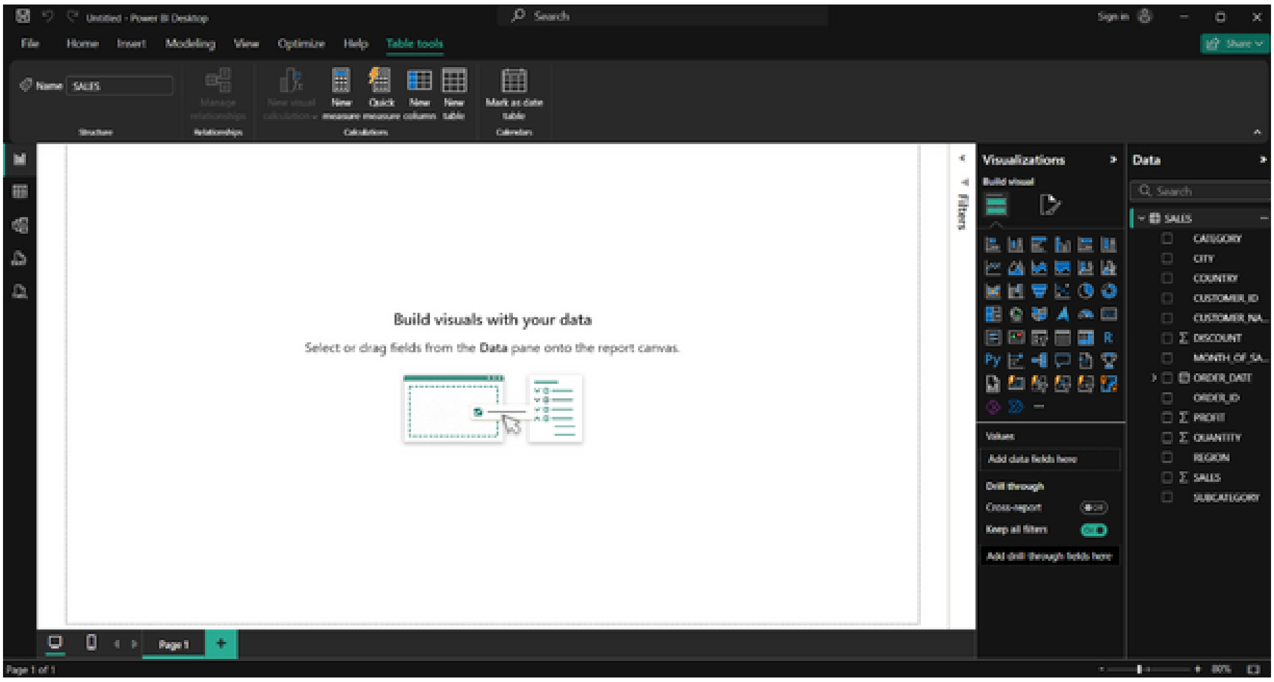
	CUSTOMER_ID	CUSTOMER_NAME	COUNTRY	REGION	CITY	CATEGORY	SUBCATEGO
1	CUST1000	Ananya Sharma	India	South	Mumbai	Office Supplies	Paper
2	CUST1001	Aarav Iyer	India	Central	Lucknow	Technology	Networking
3	CUST1002	Arjun Sharma	USA	East	Kolkata	Furniture	Tables
4	CUST1003	Ananya Das	India	North	Kolkata	Office Supplies	Appliances
5	CUST1004	Ishaan Bhat	UK	Central	Chennai	Furniture	Storage
6	CUST1005	Neha Iyer	UAE	West	Chennai	Furniture	Furnishings
7	CUST1006	Arjun Iyer	India	Central	Jaipur	Office Supplies	Binders
8	CUST1007	Priya Singh	India	North	Lucknow	Furniture	Furnishings
9	CUST1008	Kabir Menon	India	West	Jaipur	Technology	Printers
10	CUST1009	Arjun Chopra	UAE	West	Mumbai	Furniture	Tables
11	CUST1010	Ananya Patel	UK	West	Ahmedabad	Office Supplies	Paper
12	CUST1011	Sanjay Gupta	UAE	North	Pune	Office Supplies	Paper
13	CUST1012	Ananya Khan	India	North	Delhi	Office Supplies	Art
14	CUST1013	Neha Mehta	India	East	Ahmedabad	Technology	Networking
15	CUST1014	Aarav Reddy	UAE	East	Ahmedabad	Technology	Laptops
16	CUST1015	Ishaan Bhat	India	West	Jaipur	Office Supplies	Binders
17	CUST1016	Rohan Khan	Singapore	East	Delhi	Furniture	Storage
18	CUST1017	Kabir Sharma	India	Central	Mumbai	Technology	Laptops
19	CUST1018	Kabir Iyer	India	West	Ahmedabad	Technology	Networking
20	CUST1019	Sneha Menon	India	West	Mumbai	Furniture	Furnishings
21	CUST1020	Ananya Verma	USA	North	Bengaluru	Technology	Mobiles
22	CUST1021	Arjun Gowda	UAE	North	Jaipur	Furniture	Storage
23	CUST1022	Aarav Iyer	India	West	Mumbai	Furniture	Tables
24	CUST1023	Rahul Gupta	India	Central	Mumbai	Office Supplies	Appliances
25	CUST1024	Nikhil Bhat	USA	North	Jaipur	Technology	Networking

APPLIED STEPS

- Source
- Navigation
- Filtered Rows
- Removed Duplicates

14 COLUMNS, 25 ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED AT 15:48



Build visuals with your data

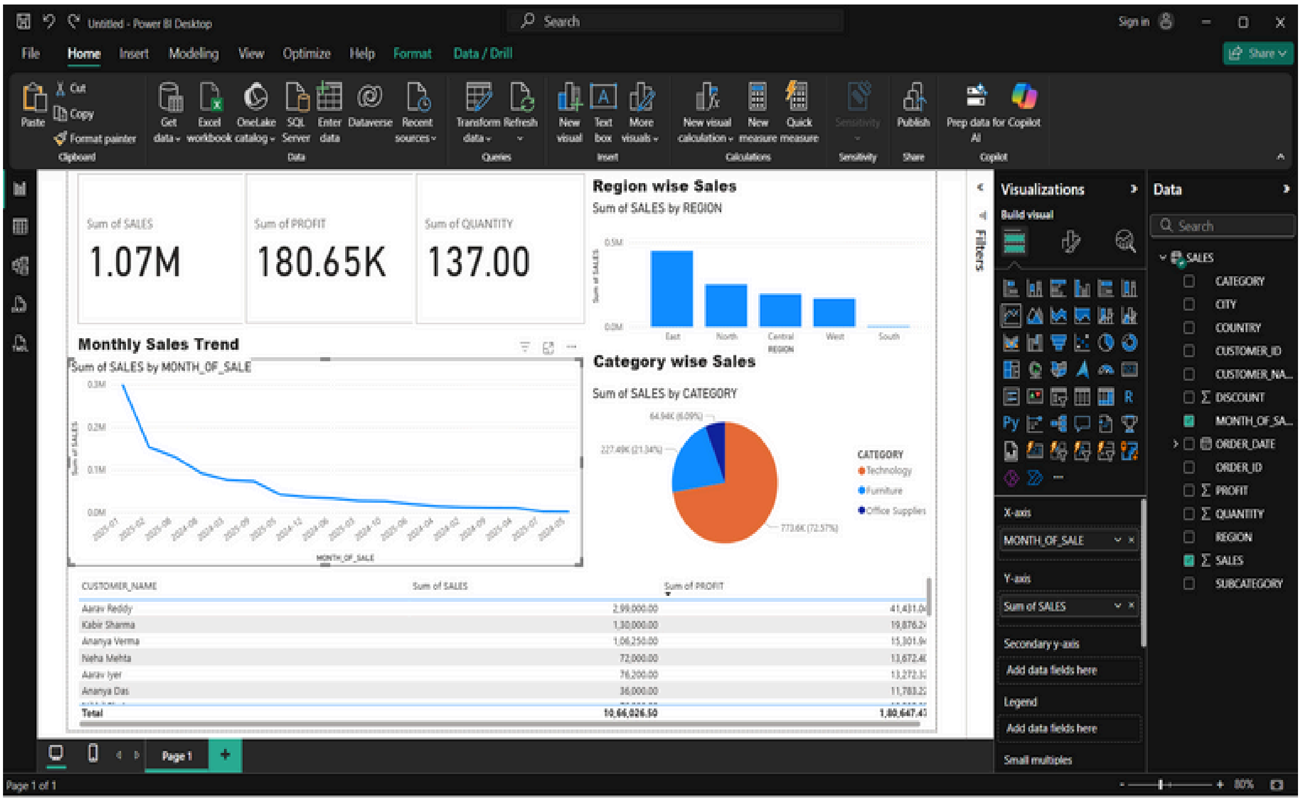
Select or drag fields from the **Data** pane onto the report canvas.

6. Step 4: Dashboard Creation in Power BI

Visuals Created:

1. **Top Metrics (Cards)**
   - Total Sales → Sum(SALES)
   - Total Profit → Sum(PROFIT)
   - Total Quantity Sold → Sum(QUANTITY)
2. **Monthly Sales Trend (Line Chart)**

   - X-axis: MONTH_OF_SALE
   - Y-axis: Sum(SALES)
3. **Region-wise Sales (Clustered Column Chart)**
   - X-axis: REGION
   - Values: Sum(SALES)
4. **Category-wise Sales (Pie Chart)**
   - Legend: CATEGORY
   - Values: Sum(SALES)
5. **Top Customers (Table)**
   - Rows: CUSTOMER_NAME
   - Values: Sum(SALES), Sum(PROFIT)
   - Sorted descending by SALES



Sum of SALES 1.07M

Sum of PROFIT 180.65K

Sum of QUANTITY 137.00

X-axis: MONTH_OF_SALE

Y-axis: Sum of SALES

CUSTOMER_NAME	Sum of SALES	Sum of PROFIT
Aarav Reddy	2,99,000.00	41,431.0
Kabir Sharma	1,30,000.00	19,876.2
Ananya Verma	1,06,250.00	15,301.9
Neha Mehta	72,000.00	13,672.4
Aarav Iyer	76,200.00	13,272.3
Ananya Das	36,000.00	11,783.2
Total	**10,66,026.50**	**1,80,647.4**

Conclusion

- Successfully loaded CSV from Azure Storage to Snowflake using Databricks.
- Verified the data in Snowflake using Databricks.
- Built a Power BI dashboard with key metrics and trends.
- Workflow demonstrates an end-to-end pipeline from Azure → Databricks → Snowflake → Power BI.