Customer Transaction Analytics using Azure & Power BI

Project Overview

This project delivers a complete data analytics pipeline for processing and analyzing customer transaction data using **Azure Data Factory**, **Azure SQL Database**, and **Power BI**. The objective is to transform raw CSV data into meaningful insights for better business decisions.

CSV Files:


transactionfile.csv


transaction_returns.csv


customersfile.csv


customer_feedback.csv


products.csv

Project Objectives

1. **Design a scalable data model** for customer transactions
2. **Ingest raw data using Azure Data Factory (ADF)**
3. **Transform and load data into final tables using Azure SQL Database**
4. **Build Power BI reports** to visualize customer insights

1. Data Modeling

A **star schema** was implemented:

Fact Table

- FactTransaction – transactional records including amount, date, product, and customer.

Dimension Tables

- DimCustomer – customer profile
- DimProduct – product catalog
- DimFeedback – customer feedback responses
- DimReturn – return reasons and counts

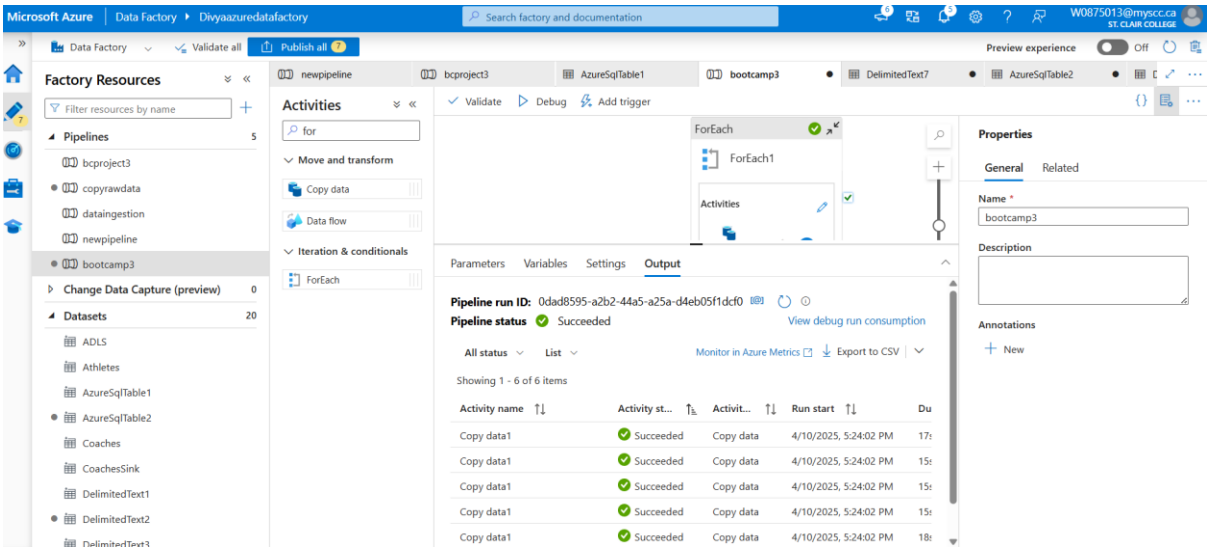
This structure enables fast, flexible analytical queries.

2. Data Ingestion with Azure Data Factory

Ingestion Flow

- **Source**: Azure Blob Storage (CSV files)
- **Destination**: Azure SQL Database (Staging Tables)

- **Pipeline Logic**: ADF pipeline with a **ForEach activity** that loops through multiple file datasets to dynamically copy data.



Files Ingested

File Name	Staging Table
customersfile.csv	Staging_customersfile
products.csv	Staging_products
transactionfile.csv	Staging_transactionfile
customer_feedback.csv	Staging_customer_feedback
transaction_returns.csv	Staging_transaction_returns

ForEach Activity

A **ForEach activity** was used to:

- Loop through each dataset (CSV file)
- Execute **Copy Data** activity per iteration
- Dynamically load into corresponding staging tables

3. Data Transformation with Azure SQL Database

After ingestion, data was transformed via **T-SQL scripts**:

- Renamed columns to match final schema
- Ensured referential integrity with dimension keys

Final Tables

Table Name	Description
DimCustomer	Customer details
DimProduct	Product master with category
FactTransaction	Transaction data (fact table)
DimFeedback	Customer satisfaction ratings
FactTransactionReturn	Product return data

CODE:

```
INSERT INTO dbo.DimCustomer (CustomerID, FirstName, LastName, Email, Phone)
SELECT
    CustomerID,
    FirstName,
    LastName,
    Email,
    Phone
FROM dbo.Staging_customersfile;


INSERT INTO dbo.DimFeedback (FeedbackID, CustomerID, FeedbackDate, Rating, Comm
ents)
SELECT
    FeedbackID,
    CustomerID,
    FeedbackDate,
    Rating,
    Comments
FROM dbo.Staging_customer_feedback;


INSERT INTO dbo.FactTransactionReturns (ReturnID, TransactionID, ReturnDate, Reason,
AmountRefunded)
SELECT
```

```
    ReturnID,
    TransactionID,
    ReturnDate,
    Reason,
    AmountRefunded
FROM dbo.Staging_transaction_returns;

INSERT INTO dbo.DimProduct (ProductID, ProductName, Category, Price)
SELECT
    ProductID,
    ProductName,
    ProductCategory AS Category,
    UnitPrice AS Price
FROM dbo.Staging_products;

SELECT COLUMN_NAME
FROM INFORMATION_SCHEMA.COLUMNS
WHERE TABLE_NAME = 'Staging_products';

INSERT INTO dbo.DimProduct (ProductID, ProductName, Category, Price)
SELECT
    ProductID,
    ProductName,
    Category,
    Price
FROM dbo.Staging_products;

INSERT INTO dbo.FactTransaction (TransactionID, CustomerID, ProductID, TransactionDat
e, Amount)
SELECT
    TransactionID,
```

CustomerID,

ProductID,

TransactionDate,

Amount

FROM dbo.Staging_transactionfile;

4. Power BI Report – Customer Insights

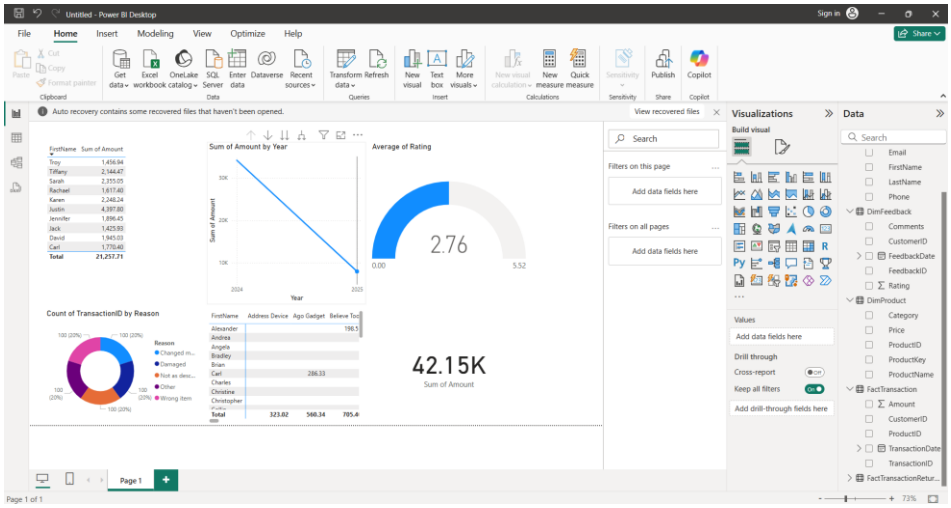
Connection

- Connected Power BI Desktop to Azure SQL Database using DirectQuery.

Visuals Created

Visual Type	Insight Provided
Card	Total Revenue, Customer Count
Table	Top 10 Customers by Spend
Line Chart	Revenue Trend over Time
Donut Chart	Breakdown of Return Reasons
Gauge	Average Customer Feedback Score

Users can interact with the dashboard to explore customer behavior, product performance, return trends, and feedback metrics.



Conclusion

This project demonstrates a modern cloud-based analytics pipeline that leverages Azure tools and Power BI to derive powerful customer insights.