CASE STUDY

ROOM-09

PRESENTED BY

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Problem Statement

TechRetail, a mid-sized retail company, wants to create a data pipeline to collect retail data from various sources, process it using advanced analytics, and visualize the results in a dashboard. The goal is to gain insights into sales trends and improve decision-making. The company wants to leverage Azure Databricks for data processing and Microsoft Fabric for data integration and visualization.

SOLUTION PROPOSED

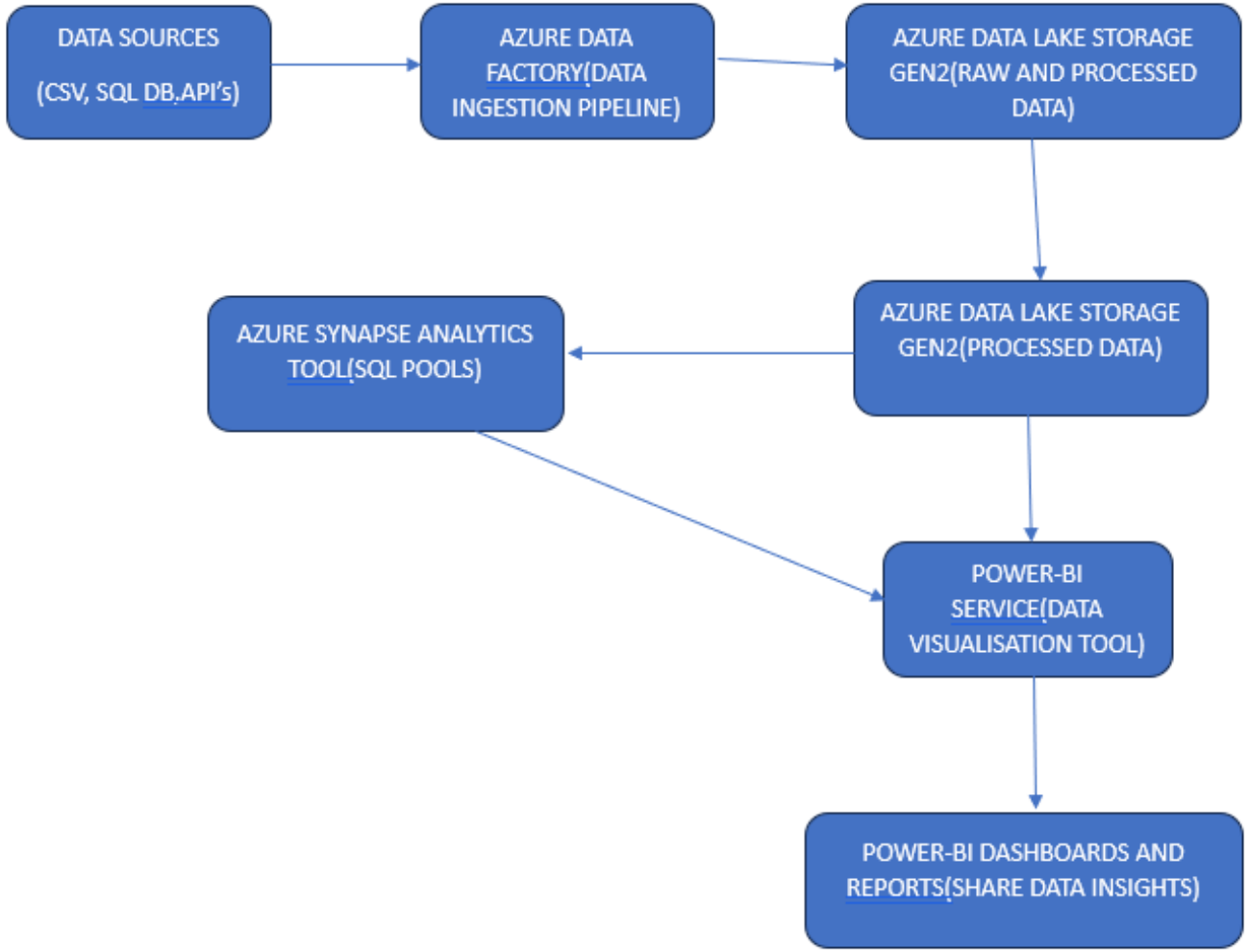
DATA INGESTION – AZURE DATA FACTORY(ADF)

DATA PROCESSING – AZURE DATABRICKS AZURE SYNAPSE ANALYTICS(SQL POOLS)

DATA STORAGE – AZURE DATA LAKE STORAGE GEN-2

DATA VISUALISATION – POWER-BI

Architecture-Diagram



Data Preparation Tasks – Data Cleaning

- Missing Data Handling

Problem: Some fields may have missing values (e.g., customer information or sales amounts).

Solution: Fill missing values with mean, median, or default values where applicable (e.g., missing Customer_Segment can be filled with "Regular").

Data Preparation Tasks – Data Cleaning

- Duplicate Records

Problem: Duplicate rows could exist, such as the same customer making multiple purchases within the same transaction.

Solution: Identify and remove duplicates by comparing the combination of fields like Customer_ID, Order_ID, and Date. Use Power Query or SQL queries in Synapse for this.

Data Preparation Tasks – Transformation Tasks

Aggregating Sales Data

Problem: The dataset includes individual transactions, but we need to aggregate sales data at a customer level or product category level.

Solution: Create new measures that calculate total sales, average order value, etc.

Data Preparation Tasks — Transformation Tasksata Preparation Tasks — Transformation Tasks

Create Time-based Features (e.g., Year, Month, Day of Week)

Problem: The dataset has the Date, but time-based aggregation will be more efficient for analysis (e.g., trends by year or month)

Solution: Extract year, month, and other time-based features like Day of Week for grouping and aggregation.

Total Sales per City

```
CREATE EXTERNAL TABLE gold.retail_table
WITH(
    LOCATION = 'gold/retail_data2',
    DATA_SOURCE = [cnretails_snretails_dfs_core_windows_net],
    FILE_FORMAT = [SynapseDelimitedTextFormat]
)
AS
SELECT City, SUM(Total_Amount) AS Revenue, year
from silver.processed_table
group by City,year;
```

Total Sales per quarter per year

```sql
CREATE EXTERNAL TABLE gold.retail_table
WITH(
    LOCATION = 'gold/retail_data2',
    DATA_SOURCE = [cnretails_snretails_dfs_core_windows_net],
    FILE_FORMAT = [SynapseDelimitedTextFormat]
)
AS
With QuarterSales As(
select year,
case when month in('jan', 'feb', 'mar') then 1
     when month in('apr', 'may', 'jun') then 2
     when month in('jul', 'aug', 'sep') then 3
     else 4
    end as quarter,
Sum(total amount)
from Sales_table
)
select year,
       quarter,
       sum(total amount)
from QuarterSales
group by year,
order by year, quarter;
```

Total products sold per city

```
1   CREATE EXTERNAL TABLE gold.retail_table
2   WITH(
3       LOCATION = 'gold/retail_data2',
4       DATA_SOURCE = [cnretails_snretails_dfs_core_windows_net],
5       FILE_FORMAT = [SynapseDelimitedTextFormat]
6   )
7   AS
8   select city, sum(Total_purchases)
9   from Sales_table
10  group by city;
```

Data Visualisation