**Customer 360 Analytics Platform**

**Complete Project Documentation & Presentation**

**🎯 Project Overview**

**Objective**: Build a comprehensive Customer 360 Analytics platform that consolidates customer data from multiple sources to provide unified insights for business decision-making.

**Business Value**:

* Single source of truth for customer information
* Improved customer experience through data-driven insights
* Enhanced marketing campaign effectiveness
* Better customer service through complete customer history

**🏗️ Architecture Overview**

**Data Architecture Layers**

This project implements a **Modern Data Architecture** with the following layers:

**1. Data Ingestion Layer (Bronze)**

* **Purpose**: Raw data ingestion from multiple sources
* **Technology**: Azure Data Factory (ADF)
* **Data Sources**:
  + Online Transactions (E-commerce)
  + In-store Purchases (POS Systems)
  + Customer Service Records (CRM)
  + Loyalty Program Data (Marketing)

**2. Data Storage Layer (Silver)**

* **Purpose**: Centralized data lake for raw and processed data
* **Technology**: Azure Data Lake Storage Gen2 (ADLS)
* **Structure**:
  + /raw/ - Raw CSV files
  + /processed/ - Cleaned and transformed data

**3. Data Processing Layer (Gold)**

* **Purpose**: Data transformation, cleansing, and business logic
* **Technology**: Azure Synapse Analytics
* **Functions**:
  + Data validation and quality checks
  + Business rule application
  + Customer 360 view creation

**4. Data Consumption Layer**

* **Purpose**: Analytics and reporting
* **Technology**: Power BI
* **Outputs**: Interactive dashboards and reports

**🔧 Implementation Details**

**Step 1: Data Ingestion (ADF Implementation)**

**Linked Services Configuration**

{

"name": "LS\_ADLS",

"type": "AzureDataLakeStore",

"typeProperties": {

"dataLakeStoreUri": "https://yourdatalake.azuredatalakestore.net",

"servicePrincipalId": "your-service-principal-id",

"servicePrincipalKey": "your-service-principal-key",

"tenant": "your-tenant-id"

}

}

**Pipeline Configuration**

* **4 Copy Data Activities** (one for each data source)

**Datasets Created**

1. DS\_OnlineTransactions
2. DS\_InstorePurchases
3. DS\_CustomerService
4. DS\_LoyaltyProgram

**Step 2: Data Storage (ADLS Structure)**

customer360/

├── raw/

│ ├── online\_transactions/

│ ├── instore\_purchases/

│ ├── customer\_service/

│ └── loyalty\_program/

└── processed/

└── customer360\_unified/  
  
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**Step 3: Data Transformation (Synapse Analytics)**

**External Tables Creation**

-- Online Transactions External Table

CREATE OR ALTER VIEW ExternalOnline AS

SELECT \*

FROM OPENROWSET(

BULK 'raw/online\_transactions.csv',

DATA\_SOURCE = 'LS\_ADLS\_RAW',

FORMAT = 'CSV',

PARSER\_VERSION = '2.0',

FIRSTROW = 2

) WITH (

CustomerID VARCHAR(10),

TransactionID VARCHAR(10),

Amount FLOAT,

TransactionDate DATE

) AS rows;

-- In-Store Purchases External Table

CREATE OR ALTER VIEW ExternalInstore AS

SELECT \*

FROM OPENROWSET(

BULK 'raw/instore\_purchases.csv',

DATA\_SOURCE = 'LS\_ADLS\_RAW',

FORMAT = 'CSV',

PARSER\_VERSION = '2.0',

FIRSTROW = 2

) WITH (

CustomerID VARCHAR(10),

StoreID VARCHAR(10),

Amount FLOAT,

PurchaseDate DATE

) AS rows;

-- Customer Service External Table

CREATE OR ALTER VIEW ExternalCustomerService AS

SELECT \*

FROM OPENROWSET(

BULK 'raw/customer\_service.csv',

DATA\_SOURCE = 'LS\_ADLS\_RAW',

FORMAT = 'CSV',

PARSER\_VERSION = '2.0',

FIRSTROW = 2

) WITH (

CustomerID VARCHAR(10),

CaseID VARCHAR(10),

Issue VARCHAR(100),

Date DATE

) AS rows;

-- Loyalty Program External Table

CREATE OR ALTER VIEW ExternalLoyalty AS

SELECT \*

FROM OPENROWSET(

BULK 'raw/loyalty\_program.csv',

DATA\_SOURCE = 'LS\_ADLS\_RAW',

FORMAT = 'CSV',

PARSER\_VERSION = '2.0',

FIRSTROW = 2

) WITH (

CustomerID VARCHAR(10),

LoyaltyPoints INT,

LastRedeemed DATE

) AS rows;

**Customer 360 Unified View**

-- Customer 360 Master View

CREATE OR ALTER VIEW Customer360 AS

SELECT

COALESCE(o.CustomerID, i.CustomerID, cs.CustomerID, lp.CustomerID) as CustomerID,

-- Online Transaction Metrics

SUM(o.Amount) as TotalOnlineSpend,

COUNT(DISTINCT o.TransactionID) as OnlineTransactionCount,

MAX(o.TransactionDate) as LastOnlineTransaction,

-- In-Store Transaction Metrics

SUM(i.Amount) as TotalInstoreSpend,

COUNT(DISTINCT i.StoreID) as UniqueStoresVisited,

MAX(i.PurchaseDate) as LastInstorePurchase,

-- Customer Service Metrics

COUNT(DISTINCT cs.CaseID) as TotalServiceCases,

MAX(cs.Date) as LastServiceInteraction,

STRING\_AGG(cs.Issue, '; ') as ServiceIssues,

-- Loyalty Metrics

MAX(lp.LoyaltyPoints) as CurrentLoyaltyPoints,

lp.LastRedeemed as LastLoyaltyRedemption,

-- Calculated Fields

(SUM(ISNULL(o.Amount,0)) + SUM(ISNULL(i.Amount,0))) as TotalCustomerValue,

CASE

WHEN (SUM(ISNULL(o.Amount,0)) + SUM(ISNULL(i.Amount,0))) > 1000 THEN 'High Value'

WHEN (SUM(ISNULL(o.Amount,0)) + SUM(ISNULL(i.Amount,0))) > 500 THEN 'Medium Value'

ELSE 'Low Value'

END as CustomerSegment

FROM ExternalOnline o

FULL OUTER JOIN ExternalInstore i ON o.CustomerID = i.CustomerID

FULL OUTER JOIN ExternalCustomerService cs ON COALESCE(o.CustomerID, i.CustomerID) = cs.CustomerID

FULL OUTER JOIN ExternalLoyalty lp ON COALESCE(o.CustomerID, i.CustomerID, cs.CustomerID) = lp.CustomerID

GROUP BY

COALESCE(o.CustomerID, i.CustomerID, cs.CustomerID, lp.CustomerID),

lp.LoyaltyPoints,

lp.LastRedeemed;

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A screenshot of a customer dashboard

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