Article on JCS Bank Cloud Architecture

Written By: Jigar Patel

Guided By: Dr. Junaid Qazi

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Introduction

A JCS bank is a financial institution that provides a variety of banking services to individuals and small businesses. The primary goal of JCS banking is to meet the everyday financial needs of consumers. Here are some key aspects of JCS banking:

1. Services Offered:

- Savings and Checking Accounts: Basic deposit accounts for personal and business use.
- Loans and Mortgages: Personal loans, home loans, auto loans, and other types of financing.
- Credit and Debit Cards: Issuing cards for purchasing power and cash access.
- Online and Mobile Banking: Digital platforms for managing accounts and performing transactions.
- Investment Services: Financial advice, wealth management, and investment products.

2. Customer Focus:

JCS banks emphasize customer service and convenience, aiming to build strong relationships with clients through personalized service and easy access to banking products.

3. Branches and ATMs:

Physical locations and ATMs provide customers with easy access to banking services, though many JCS banks now offer extensive online and mobile services.

4. Deposit Insurance:

Most JCS banks are insured by government agencies, ensuring that customer deposits are protected up to a certain limit.

JCS banks play a crucial role in the financial system by providing essential banking services that facilitate day-to-day financial transactions and help individuals and businesses manage their finances effectively.

Mission

Our mission is to empower data-driven decision-making by leveraging on Azure Data Lake as a centralized, secure, and scalable platform for ingesting, storing, and analysing data. Enhance customer experiences, optimize operations, and drive innovation across the financial ecosystem.

Objectives

Centralized Data Collection: Aggregate data ATMs, card wallets, POS systems, and marketing platforms into Azure Data Lake.

Data Integration: Create enriched datasets for a unified view of customer behaviour and operational performance.

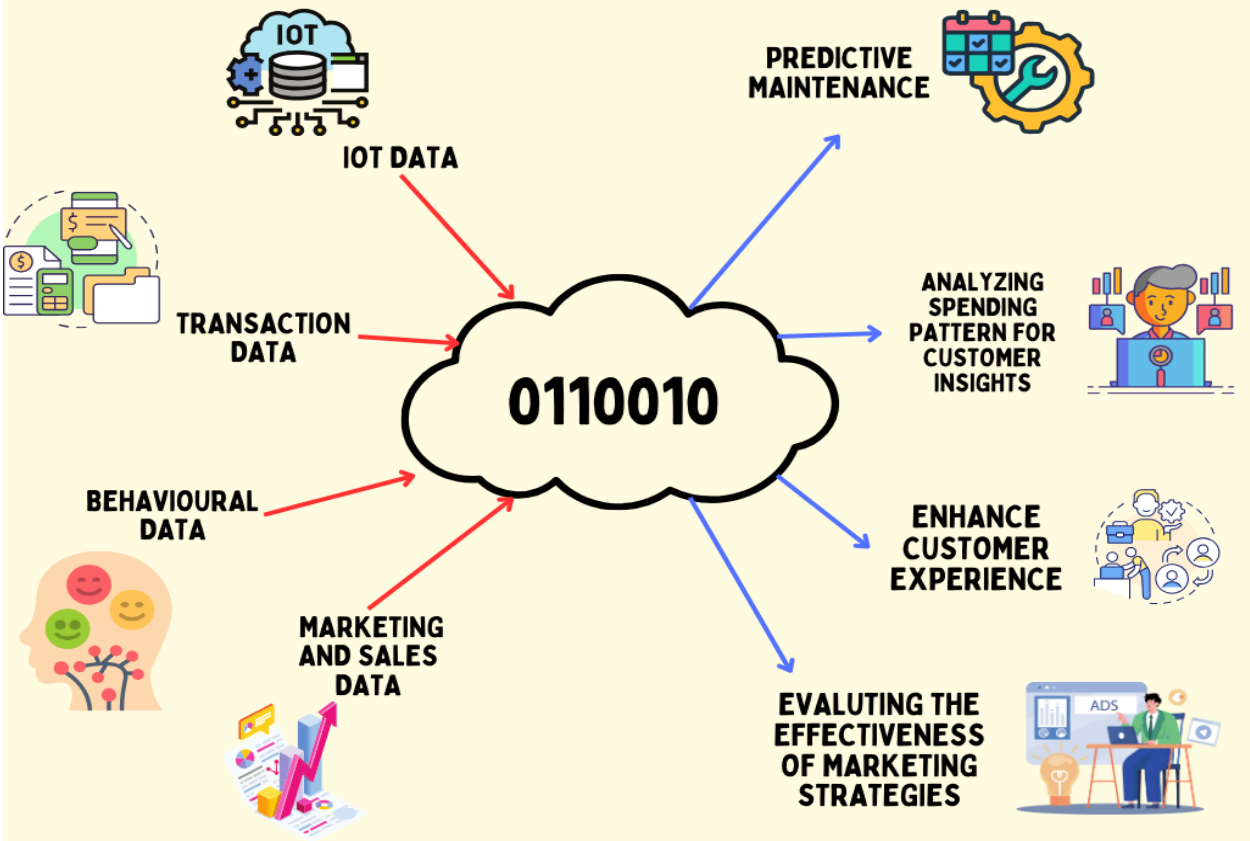
Operational Efficiency & Real-Time Analytics: Enhance ATM uptime, optimize cash management, and reduce costs using predictive analytics. Strengthen security by monitoring device health, transaction patterns, and user behaviour to detect and prevent fraud.

Targeted Marketing: Analyse customer responses to deliver personalized offers and improve marketing ROI.

Compliance and Security: Ensure data privacy and regulatory compliance with robust governance and security frameworks.

Innovation: Continuously leverage insights to develop new products, enhance services, and identify market opportunities.

Architecting the business data lake



Overview of Data Source

1. IoT Devices Integrated into ATMs

- **Data Type:** Structured Data
- **Ingestion Method:** Real-time ingestion
- **Description:** IoT devices in ATMs can include sensors and smart technologies that monitor and report on ATM status, usage, and environmental conditions. These devices help in self-diagnosing malfunctions, tracking foot traffic, and enhancing customer experience through personalized interactions.

2. Transactional Data from ATM

- **Storage Location:** On-prem Relational Database
- **Data Type:** Structured Data
- **Ingestion Method:** Real-time ingestion
- **Description:** This data includes details of every transaction made at an ATM, such as timestamps, user IDs, transaction types, amounts, and locations. It is crucial for maintaining accurate records and ensuring data integrity3.

3. Marketing and Sales Data

- **Description:** Data related to marketing campaigns and customer engagement
- **Data Type:** Unstructured Data
- **Ingestion Method:** Batch Data
- **Sources:** Websites, call centres, chatbots, or in-branch visits
- **Description:** This data encompasses information from various marketing channels and customer interactions, including website analytics, email marketing metrics, social media engagement, and CRM data. It helps in understanding customer behavior and optimizing marketing strategies4.

4. Behavioural Data

- **Data Type:** Structured, Semi-Structured, and Unstructured data
- **Ingestion Method:** Batch processing of behavioural data from digital channels (web or mobile)
- **Sources:** Websites, Apps, Bank Portal, Emails, etc.
- **Description:** This data captures how customers interact with digital channels, such as navigation patterns, page engagements, email interactions, and purchase history. It is used to analyze customer behavior and improve digital experiences.

Overview of Data Sink

Predictive Maintenance for ATMs and Other Devices

Predictive maintenance involves using data analytics and machine learning to predict when an ATM or device might fail before it actually does. By analyzing historical data and real-time performance metrics, banks can schedule maintenance proactively, reducing downtime and improving customer satisfaction. This approach helps in identifying potential issues early, ensuring that ATMs are available when customers need them.

Enhancing In-Branch Experiences with Real-Time Queue Updates

Real-time queue updates provide customers with information about their position in the queue and estimated wait times. This can be done through digital screens, mobile apps, or SMS notifications. By knowing how long they'll have to wait, customers can plan their visit better, reducing frustration and improving their overall experience.

Location-Based Offers for Customers Near a Branch or ATM

Location-based offers use geolocation technology to send personalized promotions to customers when they are near a branch or ATM. For example, a bank might send a discount coupon to a customer's phone when they are within a certain radius of a branch, encouraging them to visit and take advantage of the offer.

Analyzing Spending Patterns for Customer Insight

Analyzing spending patterns involves examining transaction data to understand customer behavior and preferences. This can help banks identify trends, segment customers, and tailor their services to meet individual needs. It can also be used to detect potential fraud by identifying unusual spending patterns.

Fraud Detection by Identifying Unusual Patterns in Transaction Amounts or Locations

Fraud detection uses algorithms to monitor transactions and flag any that deviate from a customer's typical spending patterns. This can include unusual transaction amounts,

locations, or frequencies. By detecting fraud early, banks can take action to prevent losses and protect their customers.

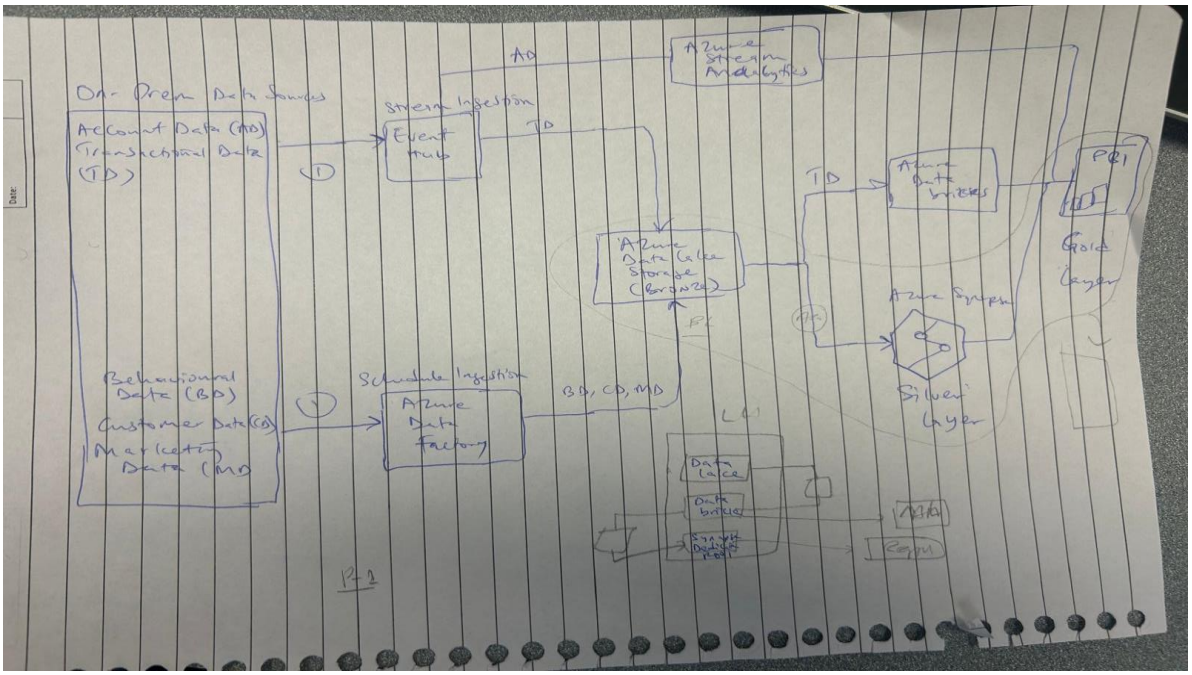
Evaluating the Effectiveness of Marketing Strategy

Evaluating marketing strategy involves tracking the performance of marketing campaigns in real-time and adjusting them as needed. This can include measuring key performance indicators (KPIs) such as customer engagement, conversion rates, and return on investment (ROI). By analyzing this data, banks can optimize their marketing efforts to achieve better results.

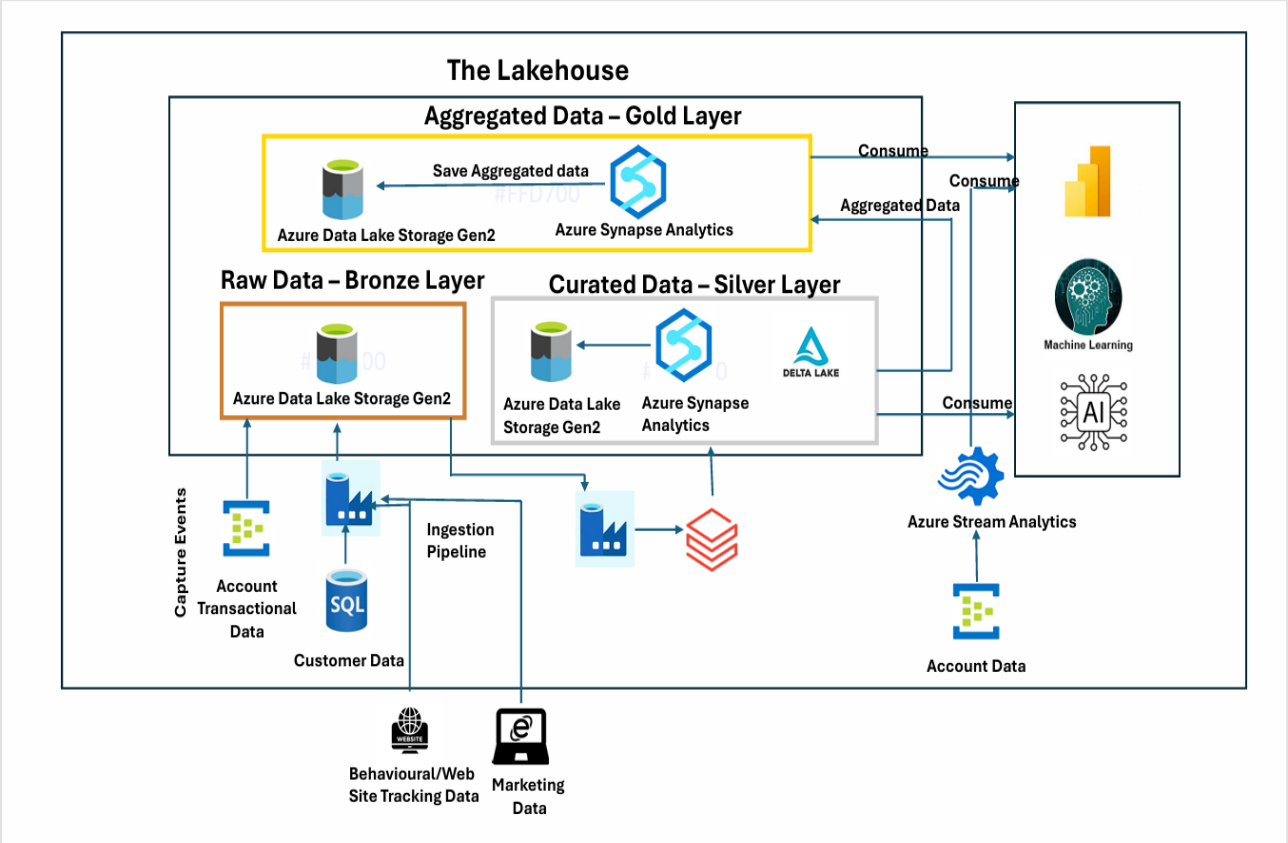
Enhancing Customer Experience

Enhancing customer experience focuses on improving service delivery by analyzing frequently accessed features and customer feedback. This can involve streamlining processes, personalizing interactions, and ensuring that customers have a positive experience with every interaction.

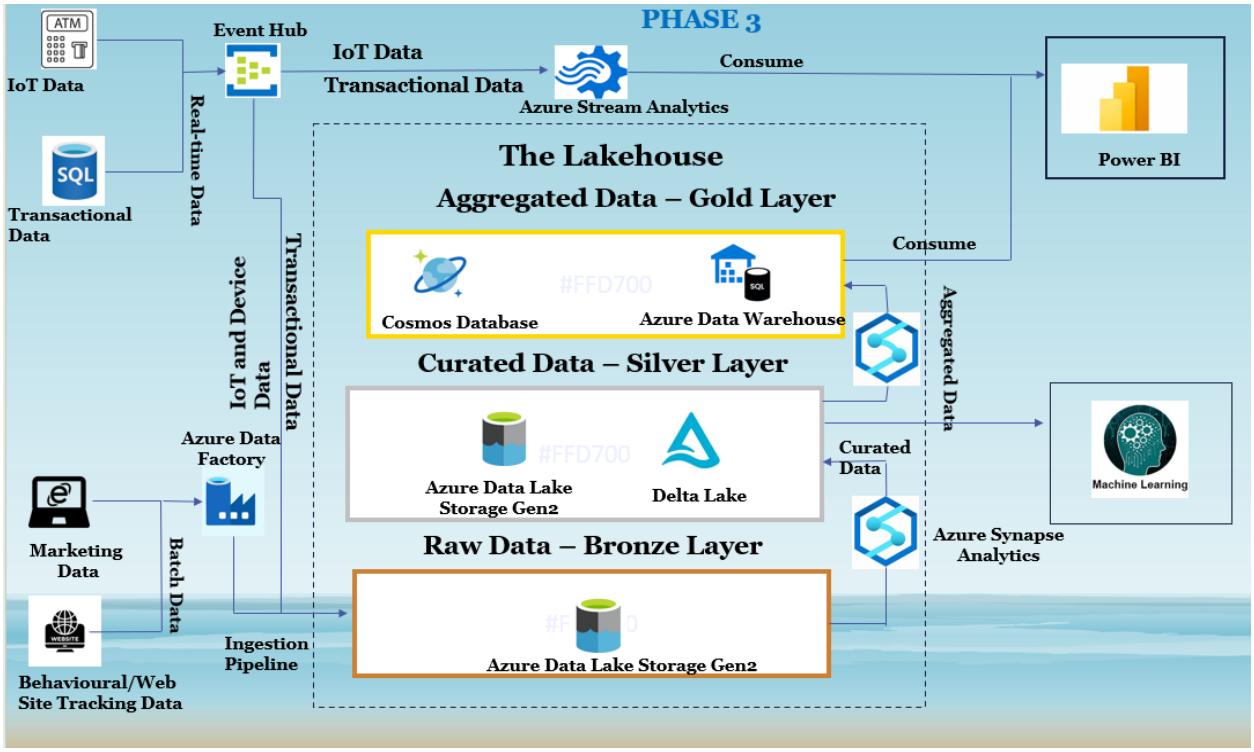
Phase 1 of Cloud Architecture



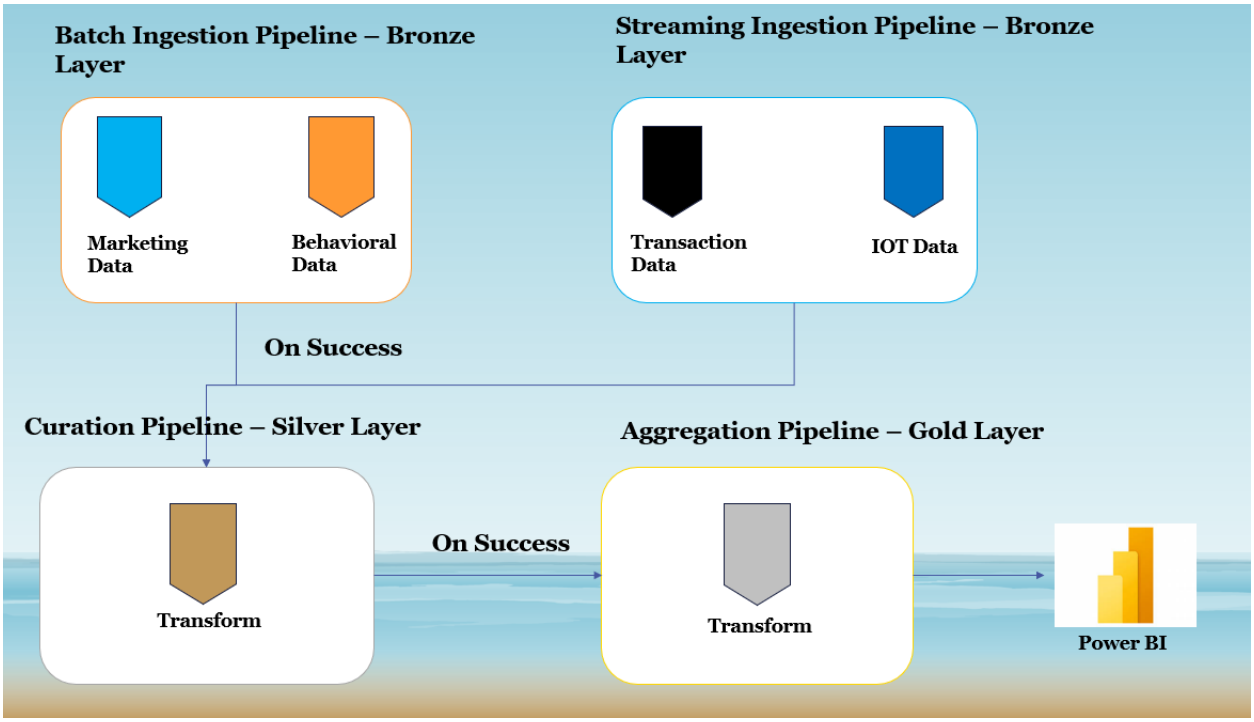
Phase 2 of Cloud Architecture



Phase 3 of Cloud Architecture



Process of Designing Pipeline



Dealing with failure conditions

Rerunning failed activities

Once the error is discovered and fixed, the failing pipeline is rerun as follows:

Rerun:

The entire pipeline can be rerun.

Since some activities might be run more than once, this method has a drawback becaus can duplicate data in the bronze layer.

Rerun from failed activity:

You will only run from the failed activity onward.

While this method is safe from getting duplicates, it tends to ingest inconsistent data because parts of the data might be ingested at different time intervals.