# SEA Banking Analytics

## AI-Powered "Talk to Your Data" Platform

*Snowflake Cortex Analyst + Streamlit Demo*

Partner Champion Capstone Project

Rajib Lochan Sur • Manager – Data & AI

Deloitte Consulting SEA• Snowflake Partner Champion (ASEAN)

# Who I Am

## RAJIB LOCHAN SUR

Technical Solution Architect &
Project Manager

I am a technical Solution Architect specializing in data platform modernization and cloud migration with proven expertise in enterprise transformation initiatives. I am also Snowflake Certified.

📍 Location: Kuala Lumpur, Malaysia
💼 Organization: Deloitte Consulting SEA
⏱️ Experience: Data Engineering & Analytics
🎯 Expertise: Snowflake, Azure, AWS, dbt, Fivetran, Power BI
🏦 Industries: Financial Services, Healthcare, Manufacturing, Oil & Gas
🌟 Focus: Data Platform Modernization, AI Enablement

# Project Overview

### Complete Data Pipeline

Bronze → Silver → Gold architecture with realistic SEA banking sample data (Malaysia & Singapore). 12 customers, 28 accounts, 500+ transactions.

### AI-Powered Natural Language Interface

Cortex Analyst with semantic model enables business users to ask questions in plain English with automatic SQL generation and execution.

### Streamlit Application

Executive dashboard, 'Ask Your Data' interface, Data Quality monitoring, and Customer 360 view with complete profile.

### Enterprise Features

Email integration for automated reports, data quality validation framework, role-based access control ready.

# The Business Challenge

**Banks face critical analytics challenges:**

### 📊 Siloed Data & Systems

Customer data scattered across multiple systems with no unified view

### ⏰ Slow Report Cycles

Business teams depend heavily on IT, days or weeks to get simple analytics

### ❌ Data Quality Issues

Inconsistent data reduces trust, no systematic validation framework

### 🔒 Limited Self-Service

Analysts need SQL knowledge, business users can't explore independently

### 💰 High Operational Costs

Manual report generation is expensive, IT teams overwhelmed

### 🐢 Slower Decision-Making

Inability to scale analytics, missed opportunities, reduced competitive advantage

# Solution Objectives

## 1 Build Governed Data Pipeline

- Implement Bronze → Silver → Gold architecture
- Ensure data quality and lineage tracking
- Create curated, analytics-ready datasets

## 2 Implement Data Quality Framework

- Validation rules for all data elements
- Systematic reject handling with metadata
- Quality KPIs and monitoring dashboard

## 3 Enable Conversational Analytics

- Build semantic model for Cortex Analyst
- Natural language to SQL translation
- Business-friendly interface for insights

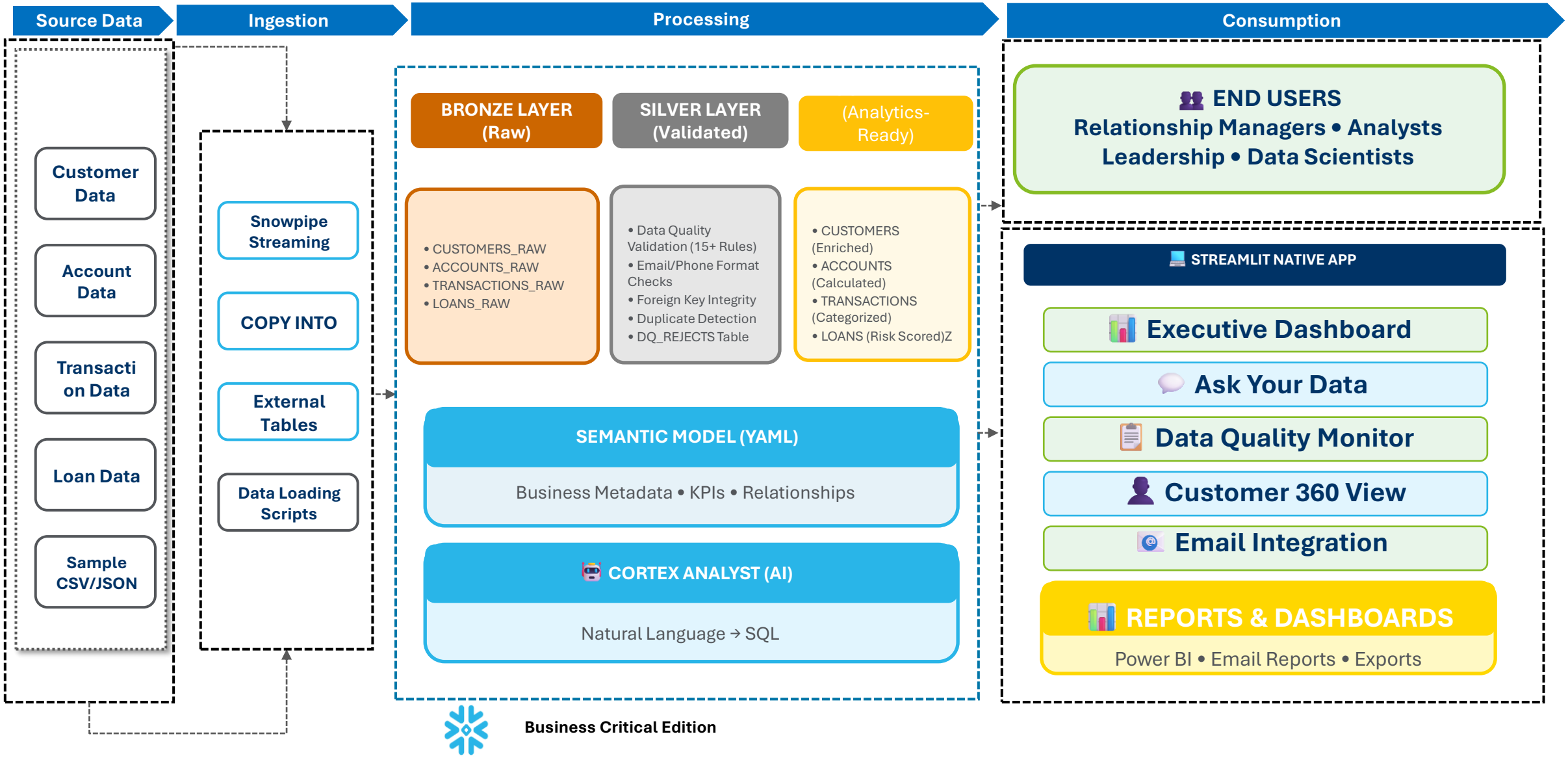
## 4 Create Intuitive User Experience

- Executive dashboards with real-time KPIs
- Self-service 'Ask Your Data' interface
- Customer 360 + Email integration

## 5 Deliver Reusable Asset

- Complete documentation for deployment
- Production-ready code and configuration
- Demonstration-ready for clients

# Solution Architecture



# Data Engineering & Quality Pipeline

## 🥉 BRONZE LAYER

(Raw)

Purpose:
- Store raw data as-is
- Preserve data lineage
- Enable reprocessing

Tables:
- CUSTOMERS_RAW
- ACCOUNTS_RAW
- TRANSACTIONS_RAW
- LOANS_RAW

## 🥈 SILVER LAYER

(Validated)

Purpose:
- Data quality validation
- Cleansing & standardization
- Reject handling

Validation Rules:
- ✓ Email format
- ✓ Phone format
- ✓ FK integrity
- ✓ Duplicate detection
- ✓ Range & domain checks

## 🥇 GOLD LAYER

(Curated)

Purpose:
- Analytics-ready datasets
- Business logic applied
- Performance optimized

Features:
- Denormalized for queries
- Calculated fields
- Business-friendly names
- Optimized for BI

# Semantic Model - Enabling Natural Language Analytics

*A business-friendly layer that translates natural language into SQL queries automatically using Cortex Analyst*

## 📋 Semantic Model Components

1. Logical Tables
   • Customers, Accounts, Transactions, Loans

2. Business-Friendly Attributes
   • customer_name instead of FIRST_NAME || LAST_NAME
   • account_balance instead of CURRENT_BALANCE_MYR

3. KPI Definitions
   • Total Customers, Total Balance, Avg Credit Score

4. Relationship Mappings
   • Automatic JOIN generation

5. Sample Values
   • Helps Cortex understand data patterns

## 💡 Business Value

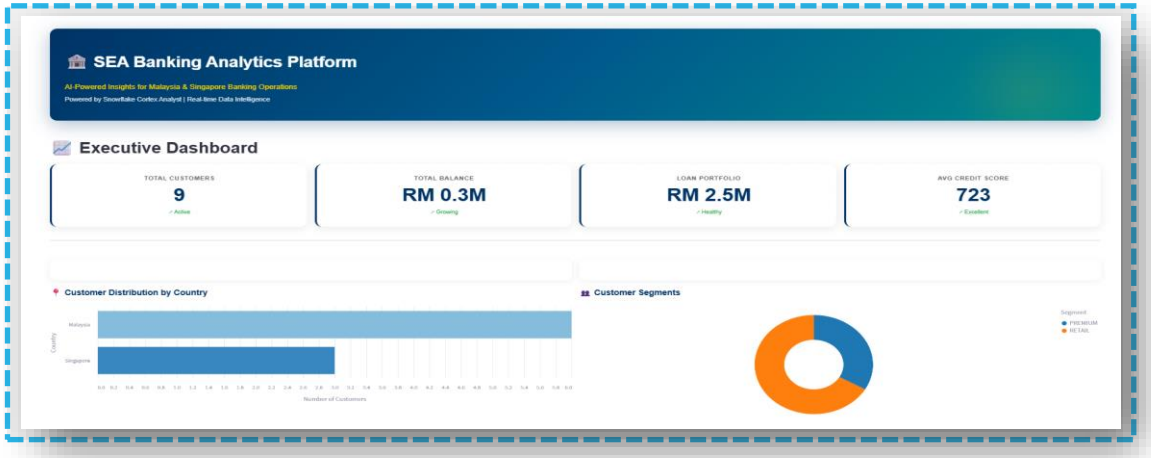
Before:
❌ Users need SQL knowledge
❌ Complex JOIN syntax
❌ Inconsistent metrics

After:
✅ Natural language queries
✅ Automatic SQL generation
✅ Consistent business logic
✅ Self-service analytics

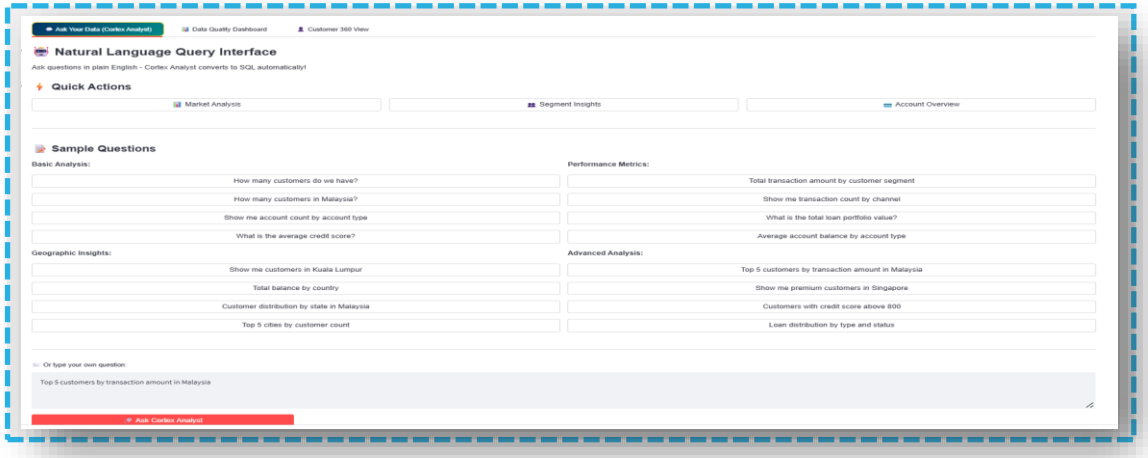
Example Queries:
• "How many customers in Malaysia?"
• "Top 5 customers by balance"
• "Average credit score"

# Streamlit Application - User Experience

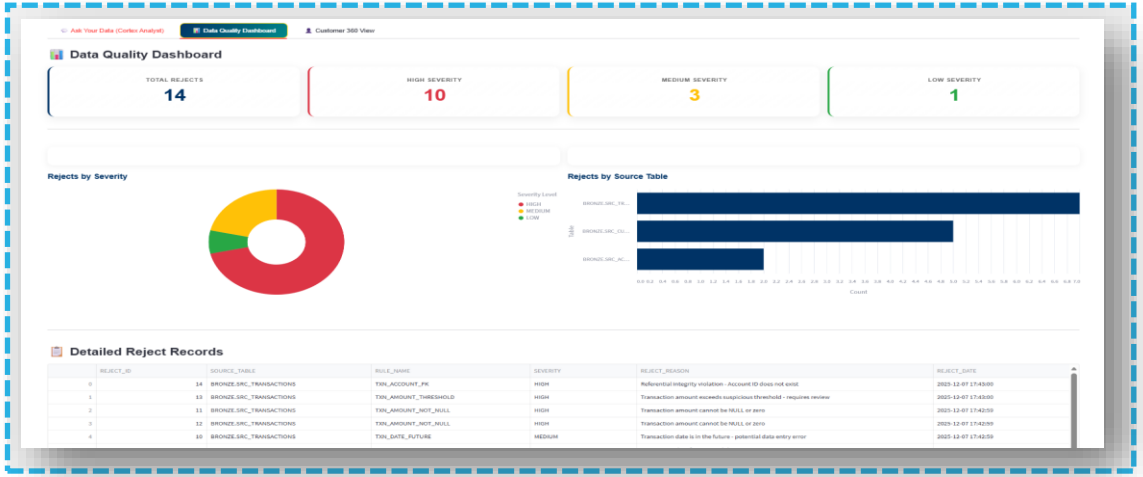
## Executive Dashboard



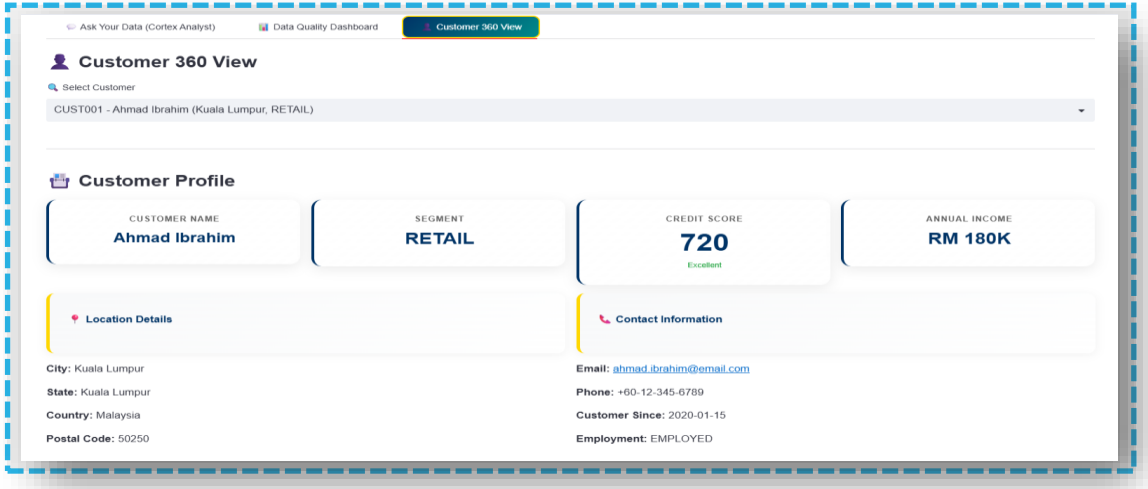

## Ask Your Data




## Data Quality Dashboard




## Customer 360 View



# End-to-End Demo Flow

1. **Executive Dashboard**
   Show real-time KPIs, interactive charts, AI insights

2. **Ask Your Data - Simple Query**
   Click: "How many customers in Malaysia?" → Show Cortex generating SQL

3. **Ask Your Data - Complex Query**
   Type: "Top 5 customers by transaction amount" → Watch AI convert to SQL with JOINs

4. **Email Functionality**
   Enter recipient → Customize subject → Send report → Show professional HTML email

5. **Data Quality Dashboard**
   Show quality KPIs, severity levels, reject charts

6. **Customer 360 View**
   Select premium customer → Show profile → Navigate accounts → Review transactions

# Business Value for Banking Clients

## Operational Excellence

⚡ Faster Decision-Making
Insights in seconds vs. days

💰 Cost Reduction
70% reduction in IT tickets

📈 Scalability
Handles growing data volumes

## User Empowerment

🎯 Self-Service Analytics
No SQL knowledge required

🔍 Data Democratization
Accessible to all levels

✅ Trust & Transparency
Validated data quality

## Technical Excellence

🏗️ Enterprise Architecture
Production-ready platform

🔒 Governance & Compliance
Complete audit trail

🚀 Modern Tech Stack
Cloud-native with AI

### 📊 Measurable Impact:

90% reduction in time to insight • 70% fewer IT support tickets • 50% faster analysis • 95%+ data quality • 100% self-service capability

# Partner Champion - Capstone Submission

## 📦 Project Deliverables

✅ Complete Working Solution
- Deployed in Snowflake
- All features functional

✅ Comprehensive Documentation
- Architecture overview
- Deployment guide
- User manual

✅ Code Repository
- SQL scripts (Bronze/Silver/Gold)
- Semantic model YAML
- Streamlit application

✅ Demonstration Assets
- PowerPoint deck
- Screenshots
- Sample queries

## 🔷 Snowflake Features Used

- Medallion Architecture (Bronze/Silver/Gold)
- Cortex Analyst with Semantic Model
- Streamlit Native Apps
- Snowpark DataFrame API
- Email Integration (SYSTEM$SEND_EMAIL)
- Data Quality Framework
- RBAC & Governance

### 📊 Business Impact Summary

Problem Solved:
SEA banks need faster, self-service analytics with quality governance

Solution Value:
- 90% faster time to insights
- 70% reduction in IT tickets
- 100% self-service capability
- Production-ready, reusable asset

# Thank You

## Questions & Discussion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📍 Location: Kuala Lumpur, Malaysia


🔷 Snowflake Partner Champion Program - ASEAN

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