Team Members

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Development of a Scalable and Secure Banking Database System

Background:

As HHLN bank continued to grow, the bank employees started to realize that their current database system just couldn't keep up. Customer data was scattered, transaction processing was slow, and generating reports was a tedious process. The system couldn't handle the increasing volume of accounts, transactions, and new services like loans and credit cards. This led to frustrations for both employees and customers, as errors and delays started to impact the bank's operations.

Seeing these issues, the management decided it was time for a change. They recognized that to keep up with the bank's growth and continue offering top-notch services, they needed a more efficient, secure, and scalable database system. This project was born out of the need to centralize customer data, streamline transactions, improve reporting, and ensure security, all while preparing for the future growth of the bank. The new database would not only make operations smoother but also improve the overall customer experience, allowing the bank to continue evolving with the times.

Purpose:

The purpose of this project is to design and implement a modern, efficient, and secure banking database system that can handle the growing demands of the bank. By centralizing customer data, transactions, and account information, the new system aims to:

1. **Improve Operational Efficiency**: Streamline processes like transaction handling, account management, and reporting to reduce delays and errors.

2. **Ensure Data Security and Compliance**: Protect sensitive customer information by implementing robust security measures and ensuring compliance with industry regulations.

3. **Enhance Reporting and Decision-Making**: Provide accurate, real-time reports and analytics to help the bank make informed business decisions.

4. **Support Future Growth**: Build a scalable system that can easily accommodate new services, products, and an increasing customer base.

Objective:

The main objective of this project is to develop a robust, efficient, and secure database system for the bank that addresses its current challenges and supports future growth. Specifically, the objectives include:

1. **Centralizing Data**: Create a unified database that stores all customer, account, transaction, loan, and employee information in one place for easy access and management.

2. **Improving Transaction Efficiency**: Design a system that processes transactions quickly and accurately, ensuring real-time updates and minimizing errors.

3. **Enhancing Data Security**: Implement advanced security measures to protect sensitive customer data and ensure compliance with industry standards and regulations.

4. **Supporting Reporting and Analytics**: Provide tools for generating detailed reports and insights, allowing the bank to track performance, monitor transactions, and make informed decisions.

5. **Ensuring Scalability**: Build a flexible system that can grow with the bank, accommodating new services, products, and expanding customer data as needed.

6. **Optimizing Customer Experience**: Improve overall customer satisfaction by ensuring faster, more reliable services and more secure banking operations.

Entity Description:

Investment

- Investment_ID (Primary Key)

- Customer_ID (Foreign Key)

- Investment_Type (e.g., Stocks, Bonds, Mutual Funds)

- Investment_Amount

- Risk_Profile (e.g., Conservative, Moderate, Aggressive)

- Maturity_Date

Online Banking

- Online_Banking_ID (Primary Key)

- Customer_ID (Foreign Key)

- Username

- Password_Hash

- Last_Login_Timestamp

- Two_Factor_Authentication_Status

Beneficiary

- Beneficiary_ID (Primary Key)
- Name
- Relationship
- Contact_Information
- Account_Number

Insurance

- Insurance_ID (Primary Key)
- Customer_ID (Foreign Key)
- Policy_Number
- Insurance_Type
- Coverage_Amount
- Premium_Amount
- Policy_Start_Date
- Policy_End_Date
- Claim_Status

ATM

- ATM_ID (Primary Key)
- Branch_ID (Foreign Key)
- Location
- Status (e.g., Active, Out of Service)
- Cash_Balance

Branch

- Branch_ID (Primary Key)
- Branch_Name
- Branch_Code
- Address
- Phone_Number
- Manager_ID (Foreign Key to Employee)

Customer

- Customer_ID (Primary Key)
- First_Name
- Last_Name
- Date_of_Birth
- Address
- Email
- Phone_Number
- SSN (Encrypted)
- Customer_Type

Credit Card

- Card_ID (Primary Key)
- Customer_ID (Foreign Key)
- Card_Number (Encrypted)
- Card_Type
- Expiration_Date
- Credit_Limit
- Current_Balance

Notification

- Notification_ID (Primary Key)
- Customer_ID (Foreign Key)
- Title
- Body
- Date_Time
- Status (e.g., Read, Unread)
- Type (e.g., Account Alert, Security Alert)

Account

- Account_ID (Primary Key)
- Customer_ID (Foreign Key)
- Account_Type
- Account_Number
- Balance
- Interest_Rate
- Opening_Date

- Status (e.g., Active, Closed, Suspended)

Loan

- Loan_ID (Primary Key)
- Customer_ID (Foreign Key)
- Loan_Type
- Loan_Amount
- Interest_Rate
- Term
- Start_Date
- End_Date
- Remaining_Balance
- Status (e.g., Active, Paid Off, Defaulted)

Employee

- Employee_ID (Primary Key)
- First_Name
- Last_Name
- Position
- Branch_ID (Foreign Key)
- Hire_Date
- Salary (Encrypted)
- Contact_Information

Permission

- Permission_ID (Primary Key)
- Employee_ID (Foreign Key)
- Access_Level
- Module_Name
- Grant_Date
- Expiry_Date

Transaction

- Transaction_ID (Primary Key)

- Account_ID (Foreign Key)

- Transaction_Type

- Amount

- Date_Time

- Description

- Status (e.g., Completed, Pending, Failed)
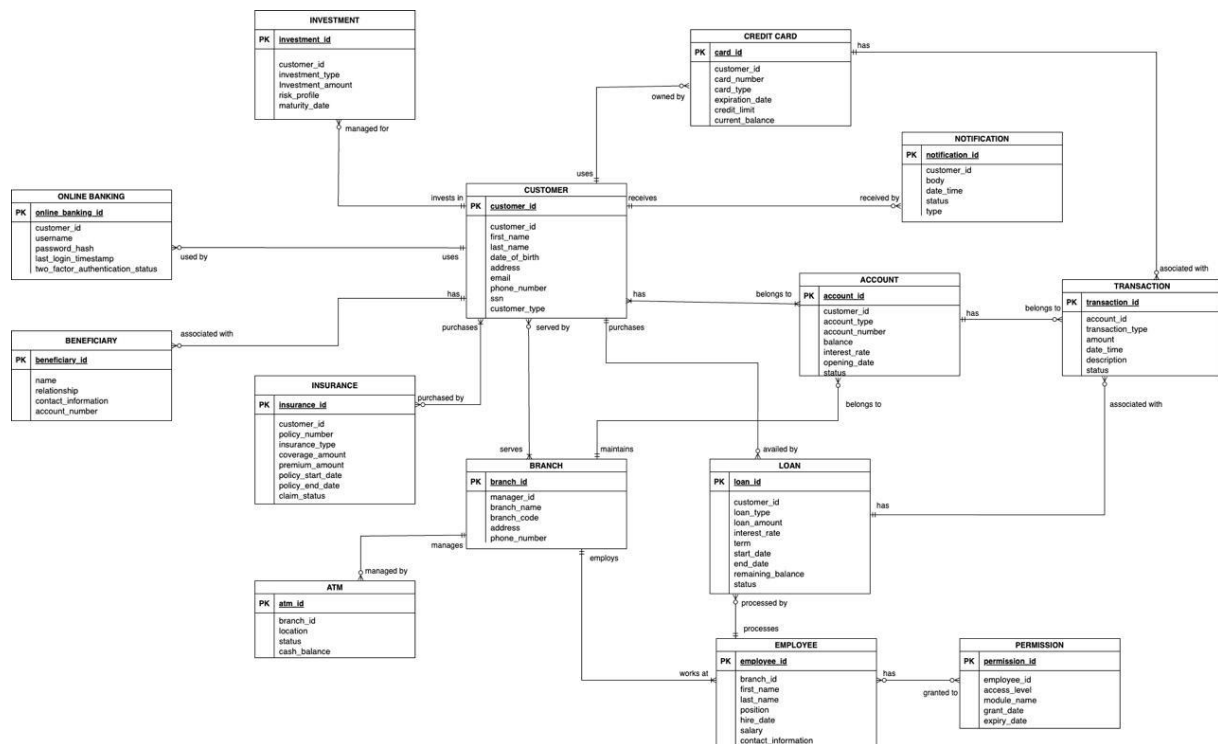
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