Paul and Virginia Engler College of Business

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Finance Industry Database

Deliverable 2

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Chapter 1

Introduction

The finance industry is a dynamic and data-intensive sector that relies heavily on the effective management of vast amounts of information. In this Data & Information Management project, we will explore the challenges and opportunities within the finance industry and propose a database solution to address the data management problems it faces. Our chosen area of application is the finance sector, encompassing banking, investment, and financial services.

1-Data Management Problems in the Finance Industry: The finance industry has encountered several data management problems over the years, leading to inefficiencies, errors, and regulatory compliance issues. Some of the prominent challenges include:

a) Data Silos: Financial institutions often have fragmented data stored in various systems and databases, making it difficult to access and consolidate information for accurate decision-making.
b) Data Security: With the increasing frequency of cyberattacks, protecting sensitive financial data has become a paramount concern. Data breaches can lead to financial losses and reputational damage.
c) Compliance and Regulatory Reporting: The finance industry faces stringent regulatory requirements, and ensuring compliance is a complex and resource-intensive process. Inaccurate or incomplete data can result in costly penalties.
d) Data Accuracy and Integrity: Inaccurate data can lead to erroneous financial analyses and investment decisions, potentially causing substantial financial losses.

2- Motivation for Our Database Solution: Our proposed database aims to address these data management problems by offering features such as data integrity, reduced data redundancy, centralized data storage, and robust security protocols. By leveraging these qualities, we intend to mitigate the aforementioned challenges:

a) Data Integrity: Our database will implement data validation rules and integrity constraints to ensure that only accurate and reliable data is stored, reducing the risk of errors and misreporting.
b) Reduced Data Redundancy: By providing a single source of truth and implementing normalization techniques, our database will minimize data redundancy, thereby enhancing data consistency and reliability.
c) Enhanced Data Security: Robust security measures, including encryption and access controls, will be implemented to safeguard financial data and protect against cyber threats.

3- **Potential Benefits:** The implementation of our database in the finance industry can yield several benefits:

a) Improved Decision-Making: Access to reliable and consolidated data will enable financial professionals to make informed and timely decisions, reducing the risk of financial losses.
b) Efficient Regulatory Compliance: Our database will streamline compliance efforts by providing a comprehensive view of relevant data, simplifying reporting, and ensuring adherence to regulatory requirements.
c) Cost Reduction: Reduced data redundancy and improved data quality can lead to cost savings associated with data storage and correction of errors.

4- **Potential Users:** The potential users of our database in the finance industry include:

   a) Financial Analysts: They can benefit from accurate and up-to-date financial data for investment analysis and risk assessment.
   b) Compliance Officers: Our database can assist in simplifying compliance processes, ensuring adherence to financial regulations.
   c) Executives and Managers: Access to real-time financial data will aid in strategic planning and decision-making.
   d) IT and Security Teams: They will be responsible for maintaining and securing the database to protect against data breaches.

In addition to the challenges mentioned earlier, our database solution can also address emerging issues in the finance industry, such as the growing demand for data analytics and the need for faster data retrieval to support high-frequency trading. By offering a robust and integrated data management solution, we aim to empower financial professionals to thrive in this competitive and data-driven sector.

Chapter 2

Business Rules and User Requirements for the Finance Industry Database

As the owner of our finance business, it's imperative to provide clear guidance to our hired database developer to ensure that our database meets our specific needs. In this section, I'll outline the key business rules and user requirements that will shape our database.

Entities and Attributes:
1. **Customer/Client:**
    - We need to track customer information, including their identification, contact details, and social security number (SSN) for compliance purposes.
        - Customer ID (Unique Identifier)
        - Name (Text)
        - Date of Enrolment (Date/Time)
        - Date of Birth (Date/Time)
        - Contact Information (Phone, Email, Address) (Text)
        - SSN (Text)
2. **Accounts:**
    - Accounts are fundamental to our business. We want to store information about different account types, balances, and opening dates.
        - Account ID (Unique Identifier)
        - Account Type (Text)
        - Balance (Numeric)
        - Opening Date (Date/Time)
    - Each account is linked to a specific customer.

3. **Transactions:**
    - We need to record all financial transactions for auditing and analysis. These include details like transaction type, amount, and date.
        - Transaction ID (Unique Identifier)
        - Transaction Type (Text)
        - Amount (Numeric)
        - Transaction Date and Time (Date/Time)
    - Each transaction is associated with a specific account.
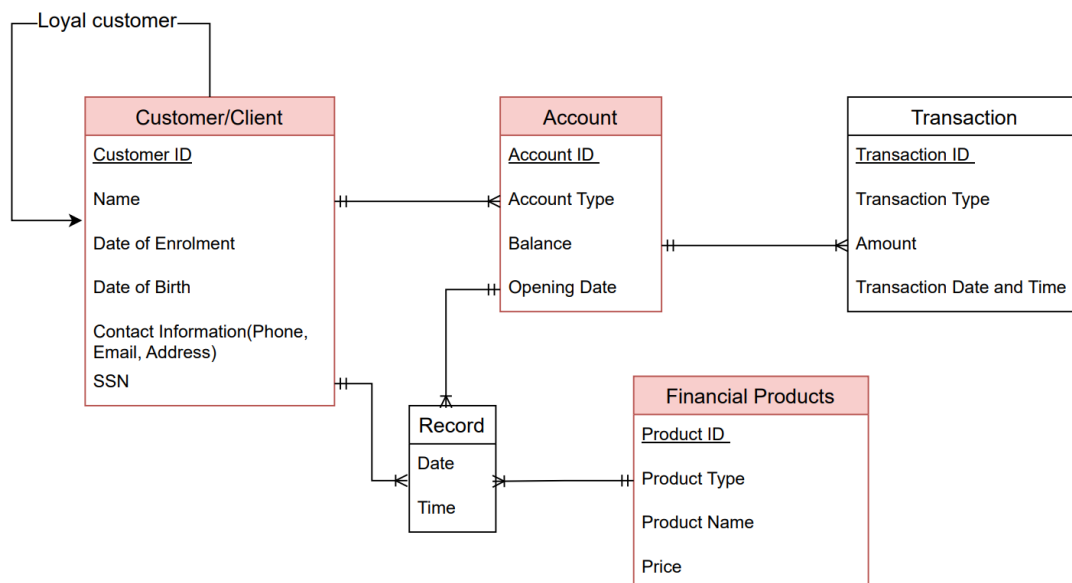4. **Financial Products:**
    - To manage investments, we need to track various financial products such as stocks and bonds.
        - Product ID (Unique Identifier)
        - Product Type (Text)
        - Product Name (Text)
        - Price (Numeric)
    - These products can be linked to multiple accounts.

Relationships and Cardinalities:
- Loyal customer - customer Relationship (Unary)
- Customer-Account Relationship (Binary):
  - Each customer can have multiple accounts.
  - Each account belongs to one customer.
  - Cardinality: One-to-Many (1 Customer to Many Accounts).
- Account-Transaction Relationship (Binary):
  - Each account can have multiple transactions.
  - Each transaction is associated with one account.
  - Cardinality: One-to-Many (1 Account to Many Transactions).
- Financial Product-Account- Customer Relationship (Ternary):
  - This is a ternary relationship involving Financial Products, Accounts, and Customers.
  - Each financial product can be linked to multiple accounts.
  - Each account can have multiple financial products.
  - Each financial product can belong to multiple customers.

Business Rules:
1. Each Customer after one year of enrolment becomes a loyal customer.
2. Each customer must have a unique Customer ID.
3. Protect the privacy of our customers by securely storing or encrypting SSNs.
4. Ensure the uniqueness of Account IDs.
5. All transactions must be associated with a valid account.
6. Financial products can be linked to multiple accounts to support our investment offerings.
7. Implement data validation rules, like minimum balance requirements for specific account types, to maintain data accuracy.
8. Apply robust access controls to safeguard sensitive financial data.
9. Log and audit all transactions for compliance and security.
10. Ensure that all database operations adhere to relevant financial regulations and industry standards.

Chapter 3
Enhanced Entity-Relationship Diagram (EERD)

1. **Entities:**
   - Customer
   - Account
   - Transaction
   - Financial Product
   - Record

2. **Relationships:**

a) **Unary Relation:**
   - Loyal Customer with Customer

b) **Binary Relation:**
   - Customer to Account
   - Account to Customer
   - Account to Transaction
   - Transaction to Account

c) **Ternary Relation:**
   - Product ID, Customer ID, and Account ID.

Financial Product

Product ID	Product Type	Product Name	Price

Record

Product ID	Customer ID	Date	Time	Account ID

Customer

Customer ID	Name	Date of Enrolment	Date of Birth	Phone	Email	Address	SSN

Customer-Account

Customer ID	Account ID

Account

Account ID	Account Type	Balance	Opening Date

Account-Transaction

Account ID	Transaction ID

Transaction

Transaction ID	Transaction Type	Amount	Transaction Date	Transaction Time