Database Management System Implementation for Horizon Bank

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1. Introduction

North Star Consultants

North Star Consultants is a leading consultancy dedicated to designing and implementing cutting-edge Database Management Systems (DBMS) for businesses across various industries. With a team of highly skilled database experts and a passion for data optimization, we specialize in helping financial institutions harness the full potential of their data resources.

Mission Statement:

"Our mission is to offer comprehensive DBMS solutions that enable financial institutions to unlock the true value of their data assets and ensure that our clients thrive in a rapidly evolving financial landscape."

Vision Statement:

"To be the trusted partner of choice for financial institutions seeking excellence in optimizing data storage, retrieval, and analysis, ensuring our clients stay ahead in today's data-driven world".

Our Services:

- **Data Quality Assurance**: We ensure your data is accurate, consistent, and reliable, eliminating errors and inaccuracies.
- **Data Transformation**: We convert raw data into actionable insights, seamlessly integrating data from multiple sources.
- **Insights for Success**: We provide client-centric insights to empower strategic planning and drive success.
- **Engaging Reporting**: Our visualizations and reports offer clarity and actionable recommendations.

Why Invest in us?

We have a history of over 100+ successful database implementations and satisfied clients in our 2 years of existence. Our solutions are high in demand and our expertise and commitment to excellence ensure investor confidence in our ability to execute and deliver results.

Customer Background

Horizon Bank is a prominent bank with over 50 branches across the United States. The bank wants to launch a new loan product for its loyal customers (more than 2 years with the bank). In addition, the bank is grappling with soaring marketing expenditures and an alarming drain on resources due to inefficient marketing campaigns. Horizon Bank is in dire need of a database with insights for optimizing their marketing strategies targeting the right customers, reducing expenses, and maximizing the effectiveness of their campaigns to maintain a competitive edge in the financial sector.

Value Proposition

1. To Build a relational database for managing the data set of the bank and leverage advanced data analytics and predictive modeling

2. To identify customers who qualify for the loan loyalty product for targeted marketing

3. To provide customer insights to enable the bank to develop a marketing strategy that minimizes expenses while delivering superior results.

Industries of Focus

1. Financial Services:

• Banking: Assisting banks in optimizing customer experience, risk management, and data analytics.

• Insurance: Providing data-driven insights for pricing, underwriting, and claims processing.

2. Retail and E-commerce:

• Retail Chains: Helping retail giants enhance inventory management, customer segmentation, and marketing strategies.

• E-commerce: Supporting e-commerce platforms with data-driven recommendations for product recommendations and customer retention.

3. Healthcare:

• Hospitals and Clinics: Offering data solutions for patient care optimization, resource allocation, and healthcare analytics.

• Pharmaceuticals: Assisting pharmaceutical companies in drug research, clinical trials, and supply chain management.

• Offers real-time production monitoring and supply chain optimization.

Customer Background

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About the Database

The database developed by North Star Consultants is a robust solution designed to meet Horizon Bank's critical needs for data management and marketing optimization. It serves as a central repository for storing and managing essential customer-related information, enabling targeted marketing strategies and in-depth campaign analysis.

Industry or Domain

Horizon Bank operates in the finance industry, specifically the banking sector. Our database solution is tailored to the unique requirements of this industry, focusing on data-driven decision-making, marketing strategy optimization, and customer relationship management.

2. Database Schema

Database Structure

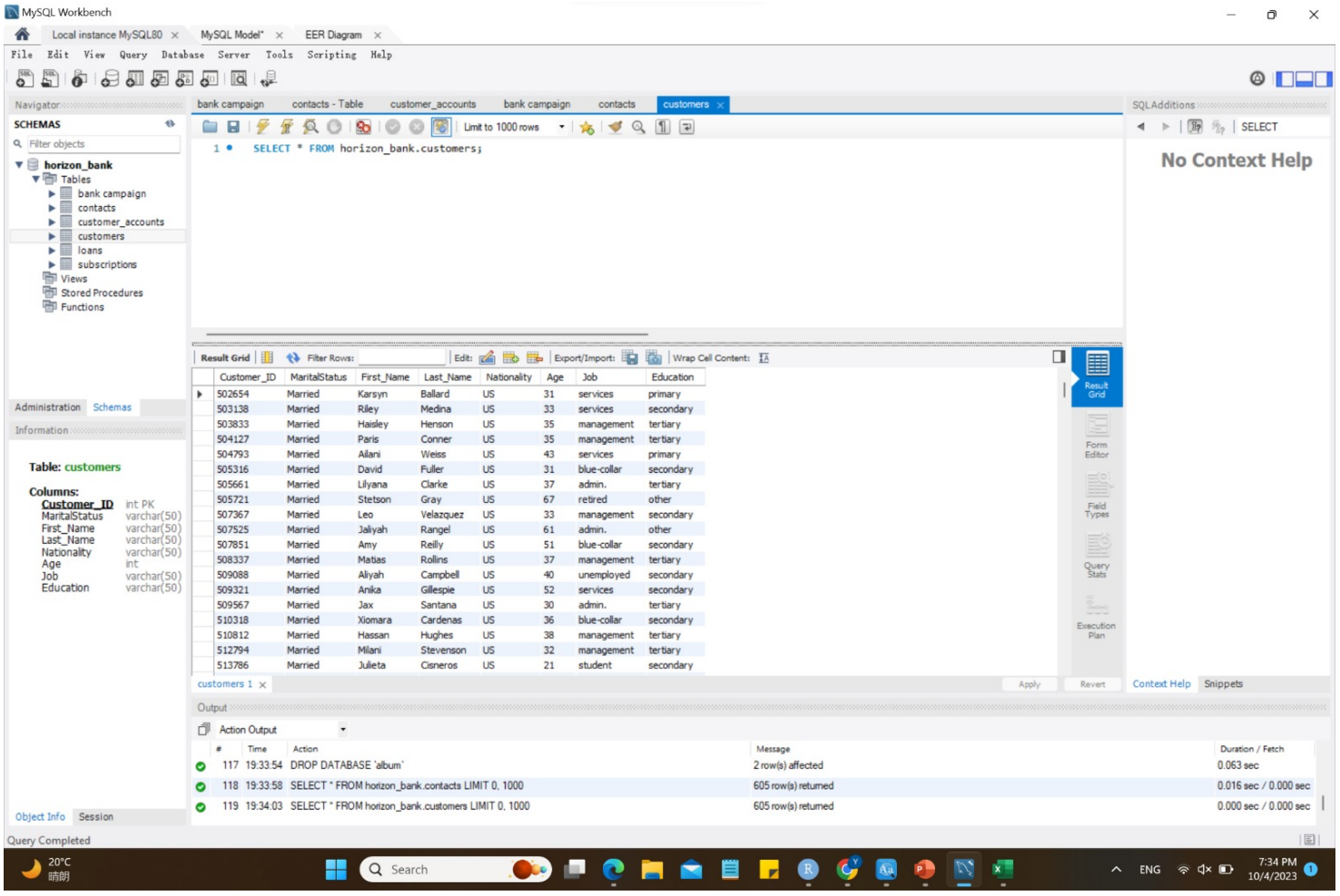
The database comprises five principal tables, each with a well-defined purpose:

- **Customers**: This table holds comprehensive customer data, encompassing demographics and personal details.
- **Customer_Accounts**: It manages customer account-related information, including account balance.
- **Loans**: This table records customer loan details.
- **Contacts**: It tracks customer interactions, campaign data, and contact history.
- **Subscriptions**: This table stores information pertaining to customer subscriptions.

Table Descriptions

Let's delve into the specifics of each table.

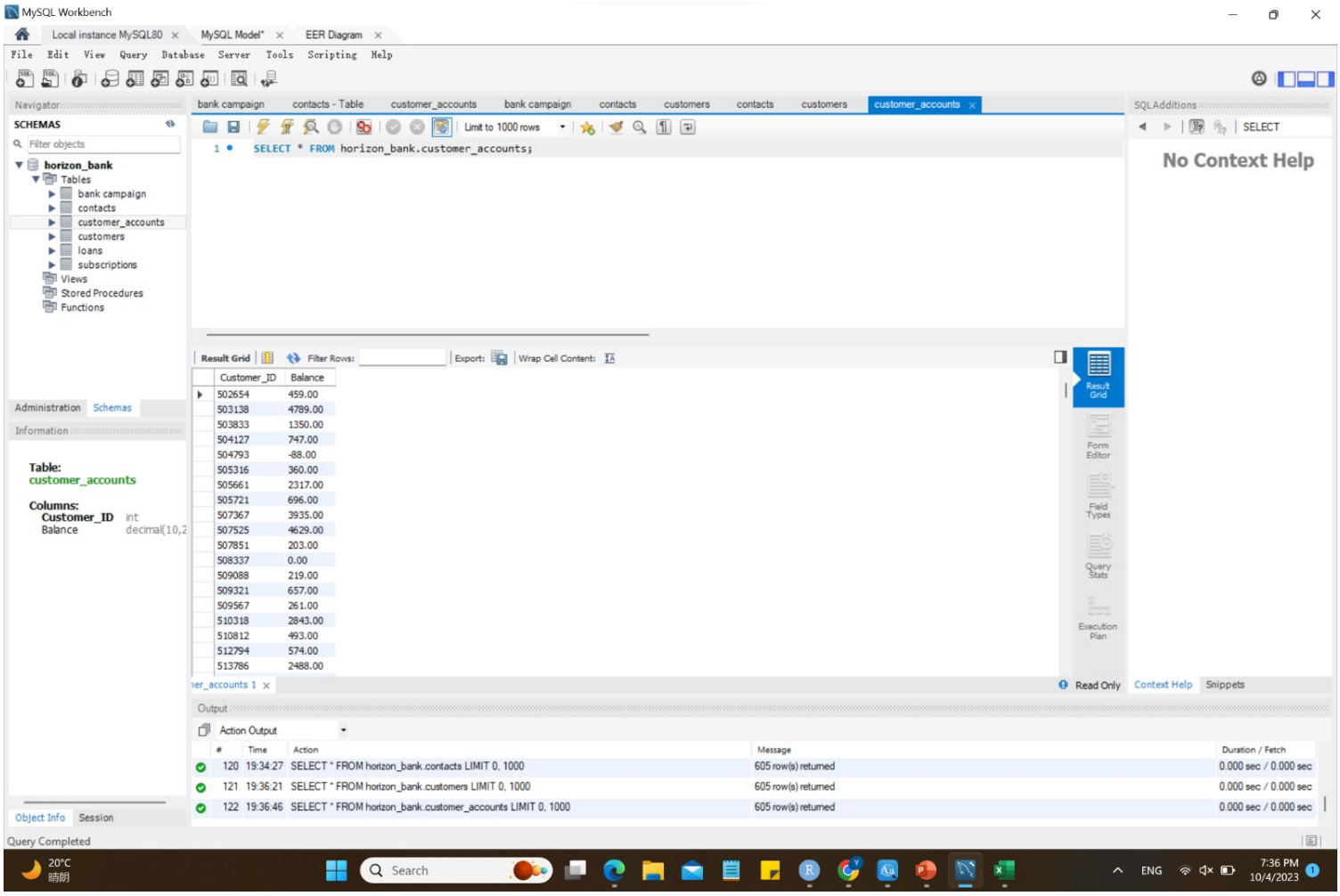
Customers: This table serves as the core of the database, housing essential customer information. It includes fields for demographics, personal details, and identifiers. The customer_ID is the primary key for the table and it uniquely identifies each customer. It has a connection with all the tables.



Use cases

1. **Marketing Department**: They can utilize the customer demographics (e.g., age, marital status) for targeted marketing campaigns.
2. **Customer Relationship Management (CRM) Department**: This will enable them to maintain and update customer profiles for personalized services.

Customer_Accounts: This table is closely related to the customer table and stores account-related data. It establishes a one-to-one relationship with the customer table through the Customer_ID as a foreign key from the customer table.



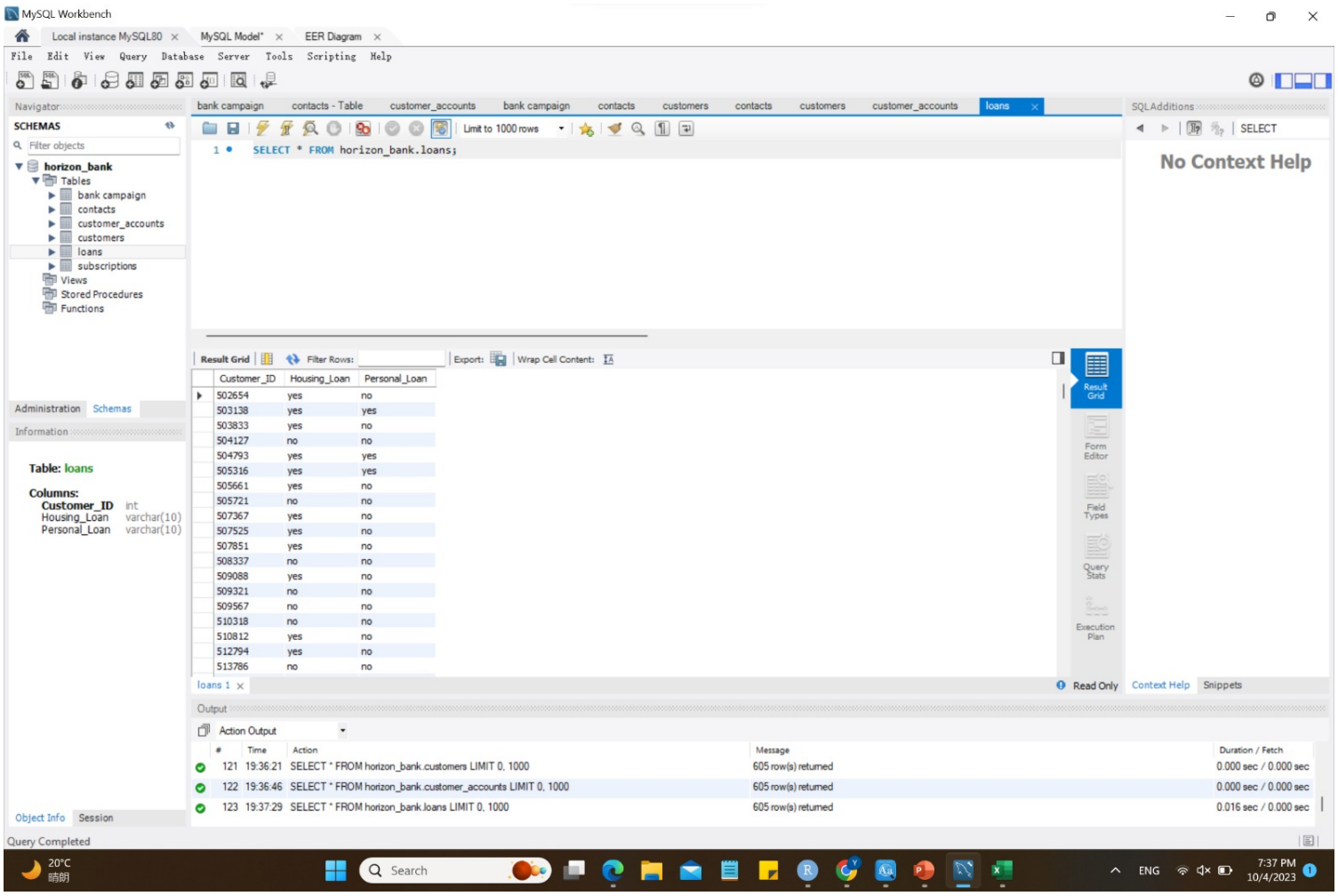
Use cases

1. **Loan and Credit Department:** To access account balance data for loan eligibility assessments.

2. **Risk Management Department:** In order to monitor account balances and financial transactions to assess and mitigate risks.

3. **Finance and Accounting Department:** This will enable the team access account balance and transaction data for financial reporting and auditing.

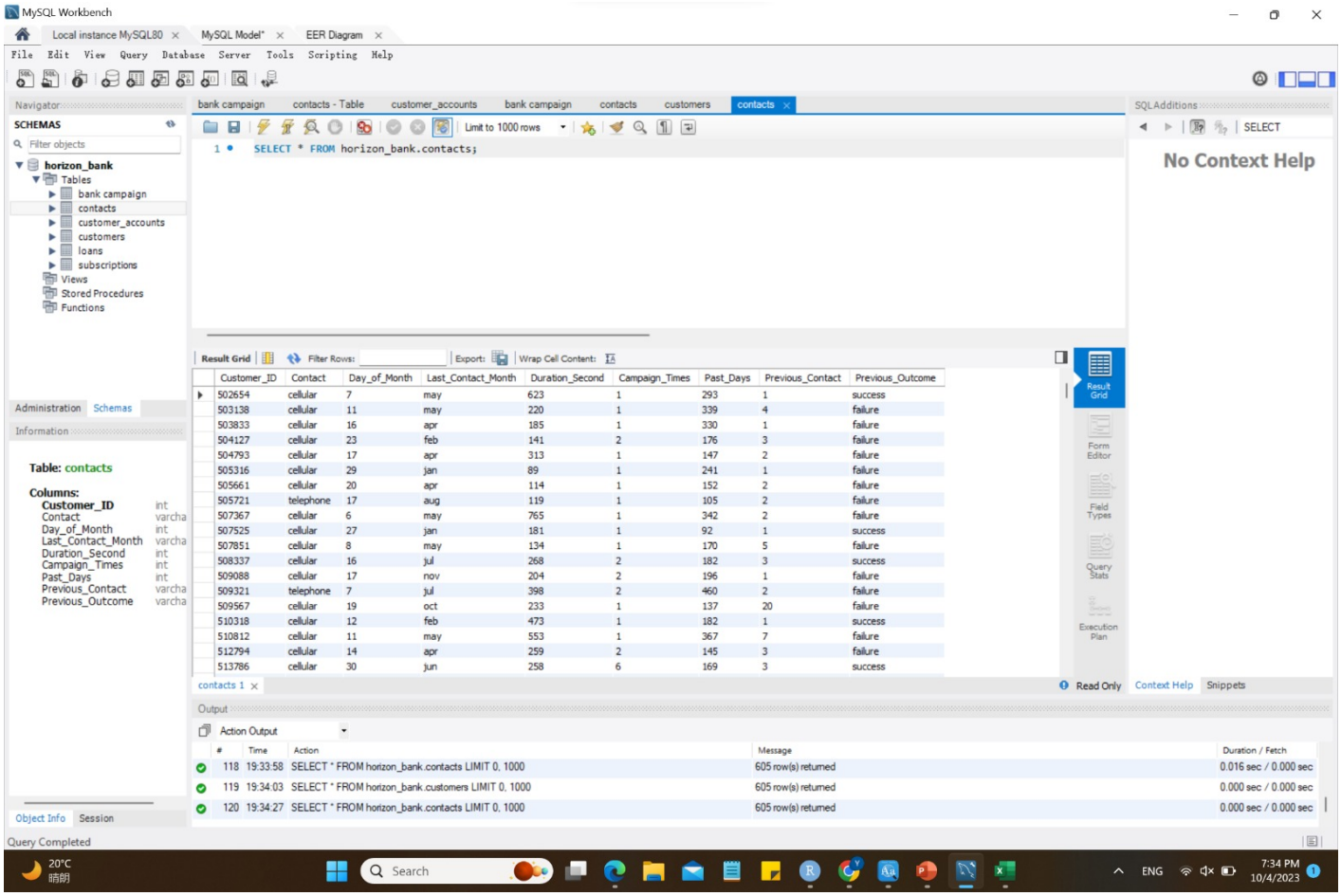
Loans: The loans table records details about customer loans, including types and terms. It maintains a one-to-one relationship with the customer table.



Use cases

Loan and Credit Department: In order to evaluate and manage customer loan history and eligibility for future loan products.

Contacts: This table manages customer interactions, campaign data, and contact history. It establishes a one-to-many relationship with the customer table, allowing multiple contact records for a single customer. This implies that one customer may be contacted multiple times by the bank.



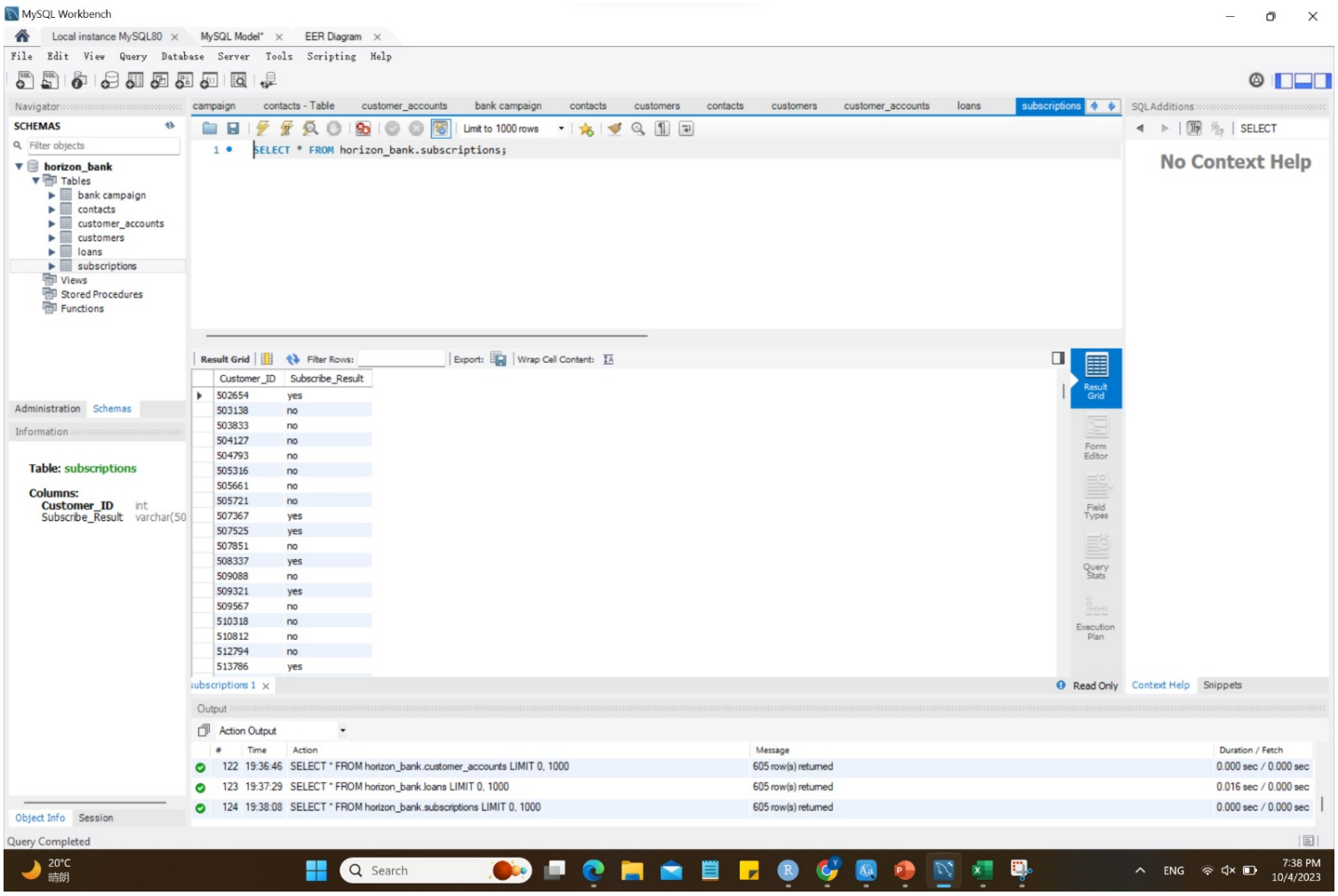
Use cases

1. **Marketing Department**: To track customer interactions and campaign effectiveness.

2. **Customer Relationship Management (CRM) Department**: To store and retrieve historical customer interactions for better customer support.

3. **Operations and Customer Support**: To access contact history to address customer inquiries and issues.

Subscriptions: This table captures information about customer subscriptions. It also maintains a one-to-one relationship with the customers table.



Use cases

Marketing Department: To enable the team to analyze subscription data to tailor marketing strategies for different customer segments.

3. Normalization

First Normal Form (1NF)

All the tables meet the requirements of 1NF because they contain atomic values in each column, each column has a unique identifier and no column is duplicated.

- **Customer**: The Customer table is in 1NF as it contains atomic values in each column. Each column holds single pieces of data, such as First_Name, Last_Name, and Age.
- **Customer_Account**: This table is also in 1NF as each column holds atomic values, such as Balance.
- **Loan**: The Loan table is in 1NF as it contains atomic values, such as Housing_Loan and Personal_Loan and they are independent of each other.
- **Contact**: This table is in 1NF because it holds atomic values, such as Contact, Day_of_Month, and Duration_Seconds.
- **Subscription**: The Subscription table is in 1NF as it contains atomic values, such as Subscribe_Result.

Second Normal Form (2NF)

All the tables meet the requirements of 2NF because they are in 1NF, and there are no partial dependencies.

- **Customer**: This table has a primary key, Customer_ID, and non-key attributes like MaritalStatus, First_Name, Last_Name, Nationality, Age, Job, and Education. All these attributes depend on the entire primary key, Customer_ID, and there are no partial dependencies. Therefore, the Customer table is in 2NF.
- **Customer_Account**: The Customer_Account table has a primary key, Customer_ID, and a non-key attribute, Balance. Balance depends on the entire primary key (Customer_ID), so there are no partial dependencies. Therefore, the table is in 2NF.
- **Loans**: The Loan table has a primary key, Customer_ID, and non-key attributes, Housing_Loan and Personal_Loan. Both attributes depend on the entire primary key, Customer_ID, with no partial dependencies. Therefore, the table is in 2NF.
- **Contacts**: The Contact table has a primary key, Customer_ID, and non-key attributes like Contact, Day_of_Month, Duration_Second, Campaign_Times, Past_Days, Previous_Contact, and Previous_Outcome. All these attributes depend on the entire primary key, Customer_ID, without partial dependencies. Therefore,

the Contacts table is in 2NF.

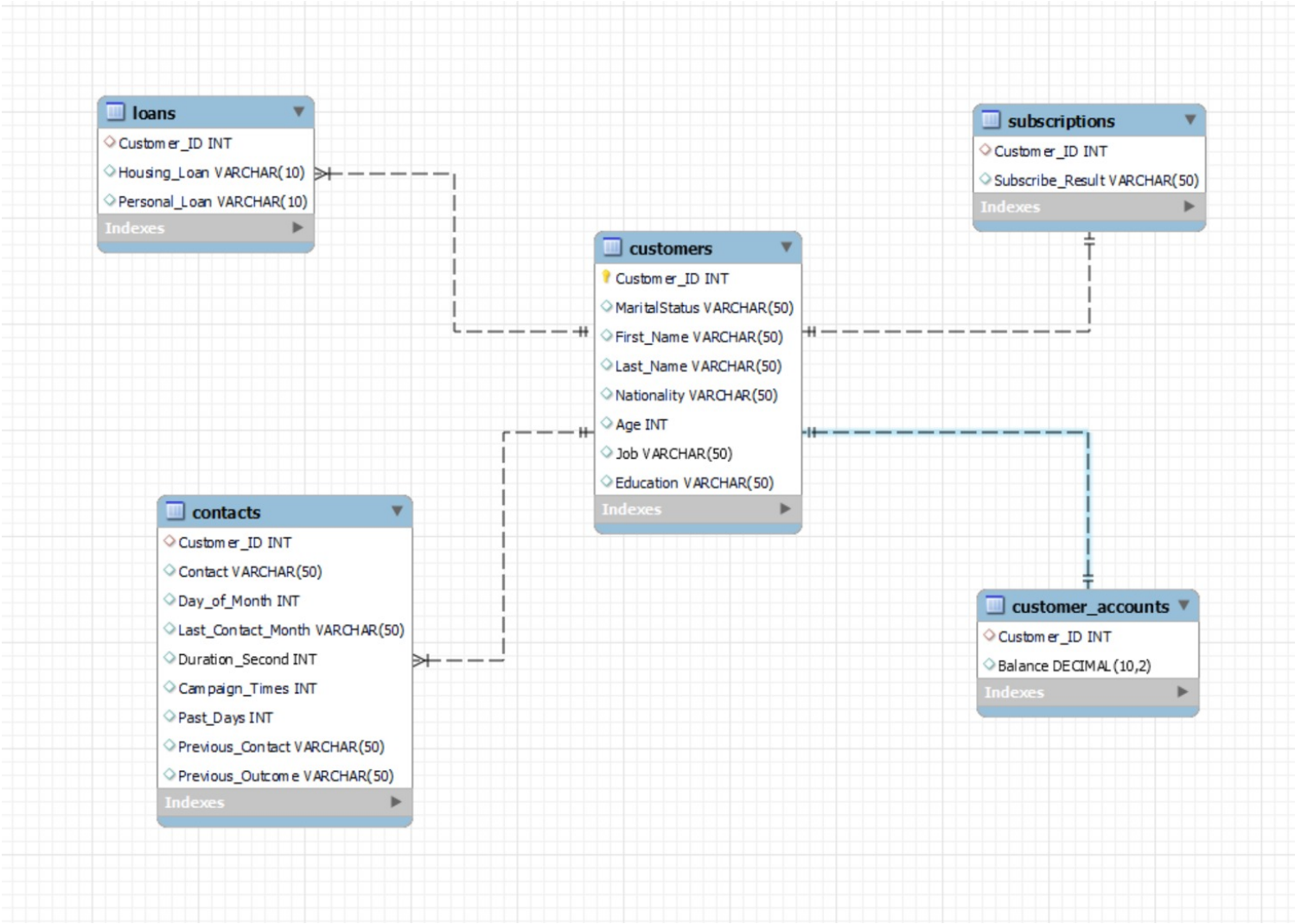
- **Subscriptions**: The Subscription table has a primary key, Customer_ID, and a non-key attribute, Subscribe_Result. Subscribe_Result depends on the entire primary key (Customer_ID), so there are no partial dependencies. This table is in 2NF.

Third Normal Form (3NF)

- **Customer**: The Customer table is in 3NF because all non-key attributes (MaritalStatus, First_Name, Last_Name, Nationality, Age, Job, Education) depend only on the primary key, Customer_ID. There are no transitive dependencies.
- **Customer_Account**: The Customer_Account table has a primary key, Customer_ID, and a non-key attribute, Balance. Balance does not depend on any other non-key attributes; it depends only on the primary key, Customer_ID. There are no transitive dependencies. Therefore, this table is in 3NF.
- **Loan**: The Loan table has a primary key, Customer_ID, and non-key attributes, Housing_Loan and Personal_Loan. These attributes depend solely on the primary key, Customer_ID, without any transitive dependencies. Thus, the Loan table is in 3NF.
- **Contact**: The Contact table has a primary key, Customer_ID, and non-key attributes like Contact, Day_of_Month, Duration_Second, Campaign_Times, Past_Days, Previous_Contact, and Previous_Outcome. All these attributes depend exclusively on the primary key, Customer_ID, with no transitive dependencies. Hence, the Contact table is in 3NF.
- **Subscription**: The Subscription table has a primary key, Customer_ID, and a non-key attribute, Subscribe_Result. Subscribe_Result does not depend on any other non-key attributes; it depends solely on the primary key, Customer_ID. There are no transitive dependencies. Therefore, this table is in 3NF.

4. EER Diagram

The Entity-Relationship Diagram (ERD) provides a visual representation of these relationships



Explanation of Entities and Relationships

In our Entity-Relationship (ER) diagram, several tables work together to form a comprehensive database for managing customer data and interactions within Horizon Bank. The **Customers** table serves as the central hub, representing bank customers. It is linked to other tables, including **Customer_Accounts** for tracking financial accounts, **Loans** for managing loans, **Contacts** for recording customer interactions, and **Subscriptions** for monitoring service. Together, these tables create a holistic view of customer relationships, financial activities, and interactions, enabling Horizon Bank to tailor its services, make informed decisions, and optimize customer engagement.

1. Customers Table (One-to-One and One-to-Many Relationships):

The customers table has a one-to-many relationship with all the tables except the subscription table and contacts table.

2. Customer_Accounts Table (One-to-One): Each customer can have one account, and each account is associated with one customer. This one-to-one relationship links customers to their account details, including balances and transactions.

3. Loans Table (One-to-Many): The loan table maintains a one-to-many relationship with customers. Each customer may have either a Personal Loan or Loan or both.

4. Contacts Table: This table has a Many-to-One Relationship with Customer Table: Many contact records can be associated with one customer. This allows for tracking multiple interactions a customer may have with the bank.

5. Subscription Table: This table has a Many-to-One Relationship with Customer Table: Many subscription records can be associated with one customer.

5. Conclusion

In conclusion, North Star Consultants has delivered a powerful and sophisticated database solution to Horizon Bank. This database serves as a cornerstone for data-driven decision-making, marketing optimization, and customer relationship management. Its implementation marks a significant milestone in Horizon Bank's quest for competitiveness and efficiency within the finance industry.