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# Data elements together with their definitions.

## Customer:

### Data Elements:

**Customer ID**: Unique identifier for each customer.

**First Name**: Customer's first name.

**Last Name:** Customer's last name.

**Email Address**: Customer's email address for communication.

**Phone Number**: Customer's phone number for contact.

**Address:** Customer's physical address.

### Definitions:

**Customer ID**: A unique identifier assigned to each customer for identification purposes.

**First Name:** The given name of the customer.

**Last Name**: The surname or family name of the customer.

**Email Address**: The electronic mail address of the customer for communication purposes.

**Phone Number**: The telephone number of the customer for contact.

**Address**: The physical location or mailing address of the customer.

## Account:

### Data Elements:

**Account ID**: Unique identifier for each account.

**Customer ID**: Identifier linking the account to its respective customer.

**Account Type**: Type of account (e.g., checking, savings).

**Balance**: Current balance of the account.

**Account Status**: Status of the account (e.g., active, inactive).

### Definitions:

**Account ID** : These IDs are unique identifiers issued to each account for identifying purposes.   
**Customer ID**: An identifier that links the account to the customer.   
**Account Type**: How the account is classified (for example, checking or savings).   
**Balance**: The current amount of money in the account.   
**Account state**: The account's current state (active or inactive).

## Transaction:

### Data Elements:

**Transaction ID**: A unique identifier for each transaction.   
**Account ID**: The identifier that connects the transaction to its appropriate account.   
**Transaction Type**: The type of transaction (for example, a deposit or withdrawal).   
**Amount**: It refers to the transaction's monetary value.   
**Timestamp:** The date and time when the transaction occurred.

### Definitions:

**The transaction ID**: A unique identifier assigned to each transaction for identifying purposes.   
**Account ID**: The identifier that connects the transaction to its appropriate account.   
**Transaction Type**: The transaction's nature or purpose (for example, deposit or withdrawal).   
**Amount:** The monetary value of the transaction.   
**Timestamp**: indicates the date and time when the transaction occurred.

## Project:

### Data Elements:

The **project ID** is a unique identification for each project.   
**Project Name**: The project's name or title.   
**Timeline**: The schedule or time frame for completing a project.   
**Budget**: The financial allotment for the project.   
**Status:** The project's status (for example, ongoing or completed).

### Definitions:

**Project ID**: A unique identifier issued to each project for identifying purposes.   
**Project Name**: The name or title given to the project.   
**Timeline:** The schedule or timescale set for project completion.   
**Budget:** The financial resources allotted to the project.   
**Status:** The project's present state or stage (for example, ongoing or completed).

## Operational Efficiency Metric:

### Data Elements:

**Metric ID** : a unique identifier for each efficiency metric.   
**Metric Name:** The name or description of an efficiency metric.  
**Value:** A numerical value that represents the metric measurement.   
**Date:** The date that the metric was measured or recorded.

### Definitions:

Metric ID: A unique identifier issued to each efficiency metric to facilitate identification.   
Metric Name: The name or description assigned to the efficiency metric.   
Value : The numerical measurement or value linked with the metric.   
Date: The date that the metric was measured or recorded.

# A VISIO diagram illustrating the tables required and the relationships between the tables and the elements within the tables.

A screenshot of a computer

Description automatically generated

# Purpose of Each Element in the Solution Design

1. **Customer**: To store personal and contact information of BMO's customers. This enables personalized service and communication.
2. **Account**: To keep track of different types of accounts (e.g., checking, savings) each customer holds, including balance and account status, facilitating financial management and oversight.
3. **Transaction**: To record all financial transactions for each account, supporting auditing, customer service, and financial analysis.
4. **Project**: To manage information on digital transformation and operational efficiency projects, including timelines, budgets, and statuses, aiding in project management and tracking.
5. **Operational Efficiency Metric**: To track and analyze performance metrics related to operational efficiency projects, enabling assessment of project impacts and decision-making.

# Range of Values for Data Elements

1. **CustomerID**: Numeric, unique identifier for each customer.
2. **Name**, **Address**, **Email**, **Phone**: Text, varying lengths. Email follows standard email format.
3. **AccountID**: Numeric, unique identifier for each account.
4. **Type**: Enumerated values (e.g., "Checking", "Savings").
5. **Balance**: Numeric, can range widely based on account status.
6. **TransactionID**: Numeric, unique identifier for each transaction.
7. **Amount**: Numeric, can be positive (deposits) or negative (withdrawals).
8. **ProjectID**: Numeric, unique identifier for each project.
9. **Budget**: Numeric, representing project budget.
10. **MetricID**: Numeric, unique identifier for each metric.
11. **Value**: Numeric, representing the metric value (can vary based on metric type).

# Primary Keys for Each Table

1. **Customer**: CustomerID
2. **Account**: AccountID
3. **Transaction**: TransactionID
4. **Project**: ProjectID
5. **Operational Efficiency Metric**: MetricID

# Normalization Rules Applied

* **1NF**: Ensured by having atomic values in each column.
* **2NF**: Achieved by ensuring that all information in each table is only dependent on the primary key.
* **3NF**: Ensured by removing columns not dependent on the primary key to separate tables, preventing indirect dependencies.

# Interrelation of Data Elements

* **Customer** and **Account** are linked by CustomerID, allowing accounts to be associated with their owners.
* **Account** and **Transaction** are linked by AccountID, connecting transactions to the accounts they belong to.
* **Project** and **Operational Efficiency Metric** are linked by ProjectID, associating performance metrics with the projects they evaluate.

This structured approach allows for efficient data management, supports the bank's operational and digital transformation goals, and enables data-driven decision-making by providing a comprehensive view of customer interactions, financial transactions, and project performance metrics.

# list of tables and data elements that to the best of your knowledge will be part of your chosen organization for your solution.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Customer table: | Description | Type | Values | Default value |
| CustomerID (Primary Key) | Unique identifier | Int | Yes [10] | No |
| Name | Name of the customer | varchar | Yes [50] | No |
| Address | Address of the customer | varchar | Yes [120] | No |
| Email | Unique email ID | Varchar | Yes [20] | No |
| Phone | Unique phone number | Numeric | Yes [10] | No |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Account table: | Description | Type | Values | Default value |
| AccountID (Primary Key) | Unique identifier | Int | Yes [10] | N/A |
| CustomerID (Foreign Key) | Relation with other table identifiers | Int | Yes [10] | N/A |
| Type | Account Types | varchar | Yes [20] | N/A |
| Balance | Amount figures | numeric | Yes [20] | N/A |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Transaction table: | Description | Type | Values | Default Values |
| TransactionID (Primary Key) | Unique identifier | Int | Yes [10] | N/A |
| AccountID (Foreign Key) | Relation with other table identifiers | Int | Yes [10] | N/A |
| Amount | Amount figures | Numeric | Yes [20] | N/A |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Project table: | Description | Type | Values | Default values |
| ProjectID (Primary Key) | Unique identifier | Int | Yes [10] | N/A |
| Name | Name of the project | varchar | Yes[30] | N/A |
| Timeline | Time deadlines | DATE | Yes [10] | N/A |
| Budget | Cost information | numeric | Yes[20] | N/A |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Operational efficiency metric table: | Description | Type | Values | Default values |
| MetricID (Primary Key) | Unique Identifier | Int | Yes [10] | N/A |
| ProjectID (Foreign Key) | Relation with other table identifiers | Int | Yes [10] | N/A |
| Value | Information | Varchar | Yes[120] | N/A |

## Relationships:

CustomerID in the Customer table -> CustomerID in the Account table, establishing a one-to-many relationship between customers and their accounts.

AccountID in the Account table -> AccountID in the Transaction table, establishing a one-to-many relationship between accounts and transactions.

ProjectID in the Project table -> ProjectID in the Operational Efficiency Metric table, establishing a one-to-many relationship between projects and their associated performance metrics.

## Benefits:

**Efficient data management**: with structured tables, the organization can be easy to manage customer information, account details, financial transactions, project data, and operational metrics.

**Support for digital transformation**: Deciding by utilizing data will give better outcomes in our projects. We can modernize our project and improve out technology work more efficiently.

**Comprehensive view**: Because of inter-connected data it's easy to fetch information. With this, we can see all information about a single person which will have a good impact on the operational activities of an organization.