**Use Case 4 - Cash Flow Forecasting**

**What is Cash Flow Forecasting?**

Cash flow forecasting is the process of predicting the future cash inflows and outflows of a business over a certain period. It's essential for ensuring that the company has enough cash on hand to meet its obligations and can plan for future growth. Cash flow forecasts provide insight into whether a company is on track to meet financial goals or needs to adjust spending and investments.

**Why is it Important?**

1. **Liquidity Management**: To ensure that the business can cover short-term expenses like payroll, rent, and suppliers.
2. **Decision-Making**: Provides the management with data to make informed decisions about investments, loans, or cost-cutting measures.
3. **Business Planning**: Helps predict future financial health and aids in long-term planning and strategy.
4. **Risk Mitigation**: Alerts the business of potential cash shortages in advance, allowing time to arrange financing or adjust plans.

### **Banking Business Use Case: Cash Flow Forecasting**

#### ****1. Problem Statement:****

Banks face complex liquidity management issues due to the high volume of transactions and the unpredictability of cash inflows and outflows. Inaccurate forecasting can lead to:

* **Liquidity Shortages**: Failure to meet short-term obligations like withdrawals, loans, and repayments.
* **Over-Liquidity**: Holding excess cash without investing it, which impacts profitability.
* **Regulatory Non-compliance**: Central banks require banks to maintain certain liquidity ratios (e.g., **Liquidity Coverage Ratio (LCR)**, **Net Stable Funding Ratio (NSFR)**) to manage short-term and long-term liquidity risk.

#### ****2. Business Use Case:****

Banks need a cash flow forecasting system that helps predict:

* **Cash Inflows**: Loan disbursements, customer deposits, interbank transfers, bond sales, etc.
* **Cash Outflows**: Withdrawals, loan repayments, operating expenses, interbank transfers, interest payments, etc.

A robust forecasting model helps the bank optimize capital allocation, ensure liquidity compliance, and meet customer demand. It helps answer critical business questions like:

* Will the bank have enough liquidity to meet withdrawal requests during a holiday season?
* Should the bank borrow from the central bank or the market to cover a shortfall?
* Can the bank deploy excess funds into profitable lending or investment opportunities?

Below is a breakdown of the fields/columns required for each source of inflows and outflows:

### 1. Customer Deposits DataFrame

**Description:**  
The Customer Deposits DataFrame captures information about customer deposits, including various deposit types and associated financial details. This data is crucial for understanding inflows from customer deposits and calculating interest expenses.

**Fields:**

* **Deposit\_ID:** Unique identifier for each deposit record.
* **Customer\_ID:** Identifier linking the deposit to the customer.
* **Deposit\_Date:** The date when the deposit was made.
* **Deposit\_Amount:** The amount deposited by the customer.
* **Account\_Type:** Type of account (e.g., Current or Fixed).
* **Term:** The term of fixed deposits (in months).
* **Interest\_Rate:** Interest rate applicable to the deposit.
* **Interest\_Outflow:** Calculated interest payments made to the customer based on the deposit amount and interest rate.

### 2. Loans DataFrame

**Description:**  
The Loans DataFrame contains information about loans issued to customers. It is essential for forecasting cash inflows from loan repayments and interest income

**Fields:**

* **Loan\_ID:** Unique identifier for each loan.
* **Customer\_ID:** Identifier linking the loan to the customer.
* **Loan\_Date:** The date when the loan was issued.
* **Loan\_Amount:** The total amount of the loan.
* **Loan\_Type:** Type of loan (e.g., personal, home, auto).
* **Loan\_Term:** The duration of the loan (in months).
* **Interest\_Rate:** The interest rate charged on the loan.
* **Interest\_Inflow:** The interest income expected from the loan.

### 3. Withdrawals DataFrame

**Description:**  
The Withdrawals DataFrame captures information about customer withdrawals, which are critical for tracking cash outflows.

**Fields:**

* **Withdrawal\_Date:** Date of the withdrawal transaction.
* **Customer\_ID:** Identifier linking the withdrawal to the customer.
* **Withdrawal\_Amount:** Amount withdrawn by the customer.
* **Account\_Type:** Type of account from which the withdrawal occurred.
* **Withdrawal\_Channel:** Channel used for withdrawal (e.g., ATM, branch).
* **Branch/ATM\_ID:** Identifier for the branch or ATM used.

### 4. Bond Sales DataFrame

**Description:**  
The Bond Sales DataFrame contains details about bond sales made by the bank, contributing to cash inflows through interest and sale proceeds.

**Fields:**

* **Bond\_Sale\_Date:** Date when the bond was sold.
* **Bond\_ID:** Unique identifier for each bond.
* **Sale\_Amount:** Amount received from the bond sale.
* **Bond\_Maturity\_Date:** Date when the bond matures.
* **Bond\_Type:** Type of bond sold.
* **Interest\_Rate:** Interest rate applicable to the bond.

### 5. Operating Expenses DataFrame

**Description:**  
The Operating Expenses DataFrame provides information on the bank's operating expenses, which are necessary for understanding cash outflows.

**Fields:**

* **Expense\_Date:** Date of the expense.
* **Expense\_Type:** Type of expense (e.g., salaries, utilities).
* **Expense\_Amount:** Amount spent on the expense.
* **Payment\_Method:** Method used for payment (e.g., cash, bank transfer).
* **Cost\_Center/Department:** Identifier for the department responsible for the expense.

### 6. Interbank Transfers DataFrame

**Description:**  
The Interbank Transfers DataFrame captures data related to transfers between banks, relevant for understanding both cash inflows and outflows.

**ields:**

* **Transfer\_Date:** Date of the interbank transfer.
* **Transaction\_ID:** Unique identifier for the transaction.
* **Counterparty\_Bank:** Bank involved in the transfer.
* **Transfer\_Amount:** Amount transferred.
* **Transfer\_Currency:** Currency in which the transfer was made.
* **Transfer\_Type:** Indicates if the transfer was inbound or outbound.
* **Transfer\_Purpose:** Purpose of the transfer (e.g., settlement, liquidity management).

### Summary

Each DataFrame serves a specific purpose in cash flow forecasting:

* **Customer Deposits:** Analyzes inflows and calculates interest outflows.
* **Loans:** Tracks inflows from loan repayments and interest income.
* **Withdrawals:** Monitors cash outflows from customer accounts.
* **Bond Sales:** Identifies cash inflows from bond sales.
* **Operating Expenses:** Records cash outflows related to operational costs.
* **Interbank Transfers:** Captures inflows and outflows between banks.