

# Oracle® Banking Cash Management

## Cash Flow Prediction User Guide



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# Preface

## Purpose

This document explains the machine learning approach used to build the cash flow prediction feature, which is available as part of Oracle Banking Cash Management.

## Audience

This document is intended for the following audience:

- Customers
- Partners

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Personal information used in the interface or documents are dummy and does not exist in the real world. It is only for reference purposes.

## Acronyms and Abbreviations

NA

## Related Resources

The related documents are as follows:

1. Oracle Banking Getting Started User Guide
2. Oracle Banking Common Core User Guide

# 1

## Introduction

Individual currency's future provisioned transactions are the basis for cash position projections.

In real life, timely settlements are seldom expected, resulting in a widening variance between actual and projected cash positions based on this approach.

We model our solution on a transaction-based approach, which involves rebuilding individual transactions, based on the pivots of time delay, spread as in single/multiple tranches, and tranche intervals.

Example,

Basic Individual Transaction: 1000 USD, expected payment date on 26th May 2024

Assumption: Availability of sufficient transactions with varying payment patterns, for models to get trained ~ 2000

Machine Learning Prediction outcomes:

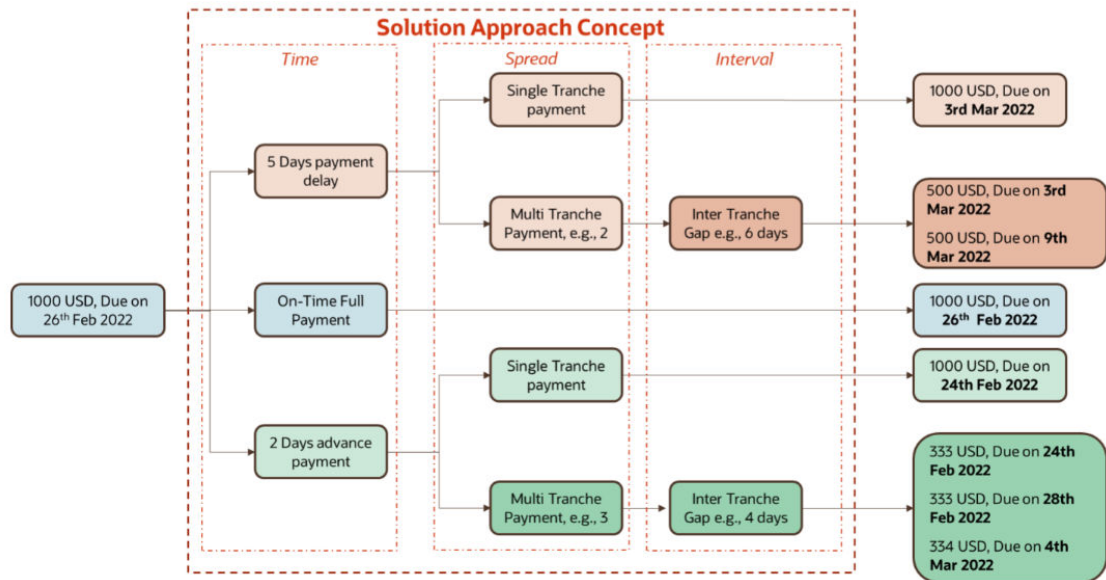
- 2 days advance payment for the first tranche
- Spread 3, i.e. multi-tranche payment.
- Tranche interval of 4 days

New rebuilt Transaction:

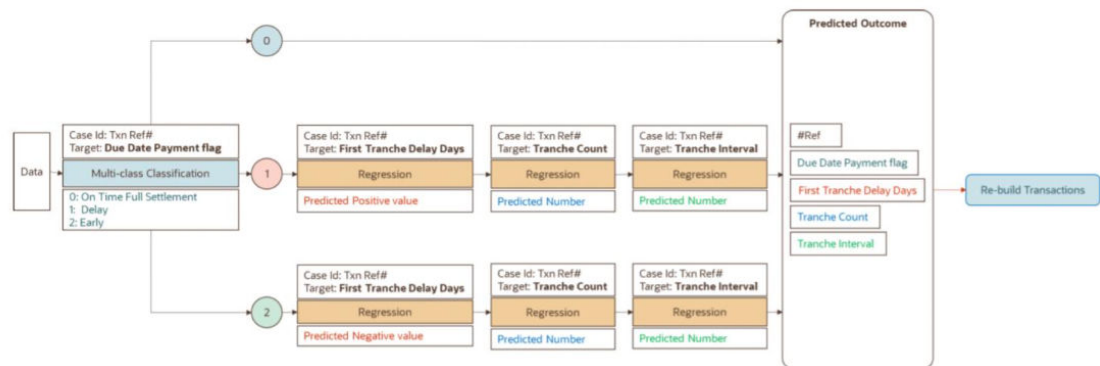
- 333 USD, 24th May 2024
- 333 USD, 29th May 2024
- 334 USD, 3rd June 2024

We aggregate the new transaction breakup, re-built over date and across currencies, to build the projections of final cash flow and cash positions.

### **Solution Concept**



### Implementation Architecture



- Machine Learning Techniques
- Data Model Used

## 1.1 Machine Learning Techniques

The solution uses in-database OML4SQL, which is available by default with database version 19c and above.

### 1. Multi-Class Classification

- The machine learning framework builds individual model, for each of the following industry accepted algorithms,
  - Decision Tree
  - Naive Bayes
  - Random Forest

- iv. Support Vector Machines
  - v. Neural Network
  - vi. Generalized Linear Models
- b. When we compare models, we select the one that best represents the underlying data.
  - c. Model Metrics used to compare models,
    - i. **AUC**(Area Under the Curve) – The model's robustness is measured by this value, which is between 0 and 1. The closer the value is to 1, the better the model.
    - ii. **Accuracy** – Measured as a function of predicted vis-à-vis actual in the testing dataset.
  - d. The important attributes, their individual weights and constant value used in building the model are stored in the database.
- 2. Regression**
- a. The machine learning framework builds individual model, for each of the following industry accepted algorithms,
    - i. Support Vector Machines
    - ii. Neural Network
    - iii. Generalized Linear Models
  - b. The models are compared, and the best model is selected which best represents the underlying data.
  - c. Model Metrics used to compare models,
    - i. **RMSE**(Root Mean Square Error)
  - d. The important attributes, their individual weights and constant value used in building the model are stored in the database.

 **Note:**

Overall, there are one multi-classification model and three regression models for this solution

## 1.2 Data Model Used

Column	Type
Reference Number	CHARACTER
Corporate ID	CHARACTER
Account Number	CHARACTER
Virtual Account Number	CHARACTER
Source Application	CHARACTER
External Reference Number	CHARACTER
Customer Reference Number	CHARACTER
Counterparty ID	CHARACTER
Cashflow Code	CHARACTER
Cashflow Type	CHARACTER

Column	Type
Start Day	NUMBER
Start Month	CHARACTER
Start Year	CHARACTER
Expected Amount	NUMBER
Currency	CHARACTER
Channel	CHARACTER
Payment Due in Days	NUMBER
Disputed	CHARACTER
Due Month End	CHARACTER
Due_ Month_ 1Half	CHARACTER
Due_ Month_ 2Half	CHARACTER
Due Month	NUMBER
Total Settlement Tranche Count	NUMBER
First Tranche Delay Days	NUMBER
Average Tranche gap Days	NUMBER
Total Amount paid	NUMBER
Total Amount paid	NUMBER
Over due Amount	NUMBER
Historic Average gaps between payments	NUMBER
Historic delay ratio	NUMBER
Historic Cashflow code delay ratio	NUMBER
Historic First pay Delay ratio	NUMBER
Historic average prepaid First Tranche Delay	NUMBER
Total prepaid First Tranche Count	NUMBER
Last Paid Status	CHARACTER
Total Paid Count	NUMBER
Total Paid Amount	NUMBER
Total Paid Late Count	NUMBER
Total Paid Late Amount	NUMBER
Total Overdue count	NUMBER



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