Development of the Portfolio Management Game

Master Project

Authors: Roland Schläfli - rolandschlaefli@gmail.com

Pascal Zehnder - pascal_zehnder@outlook.com

Supervisor IFI: Prof. Dr. Chat Wacharamanotham

Supervisors IBF: Dr. Benjamin Wilding, Anja Zgraggen

Contents

1. Motivation

The Portfolio Management Game is a simulation thought to.....
Both members of the project team work at the Department of Banking and Finance UZH as web developers parallel to their studies achieving their Master's degree in Informatics. Both interested in developing applications from scratch and analyzing the procedure of financial processes. By re-developing the application the Department of Banking and Finance wants to achieve a sustainable simulation of a typical portfolio management process. The simulation should help the students within their learning process by focussing on practical decision making, building up on their theoretical knowledge.

2. Project Description

The "Portfolio Management Game" was initially developed in 2001 by an external company for the Department of Banking and Finance at the University of Zurich. This simulation of a portfolio manager was being used from the DBF over several years by multiple seminars of their departement. A course named "Advanced Portfolio Seminar" has given insights to the portfolio management process for Master students by playing the game in between different rounds playing the game. For the final seminar of the "Executive Education" the game was being played for two days on Uetliberg with all the executive students.

The game has been deprecated by its implemented technologies and after each round the supervisors had to collect a USB-stick where all decisions of the students have been saved to. The supervisors had to collect this data for each group on a central device with administrative access (on a windows native application) to calculate the result of the teams decisions.

3. Methodology

A first task was to understand the concept of a typical investment advisory process.

3.1. Requirements Engineering

User stories

3.2. User Interviews

Interviews with professionals and other people Understanding of the overall process

3.3. Observation of Game Execution

The game observation was separated in following parts:

- Executive Education Students Observation during their final seminar at the Uetliberg

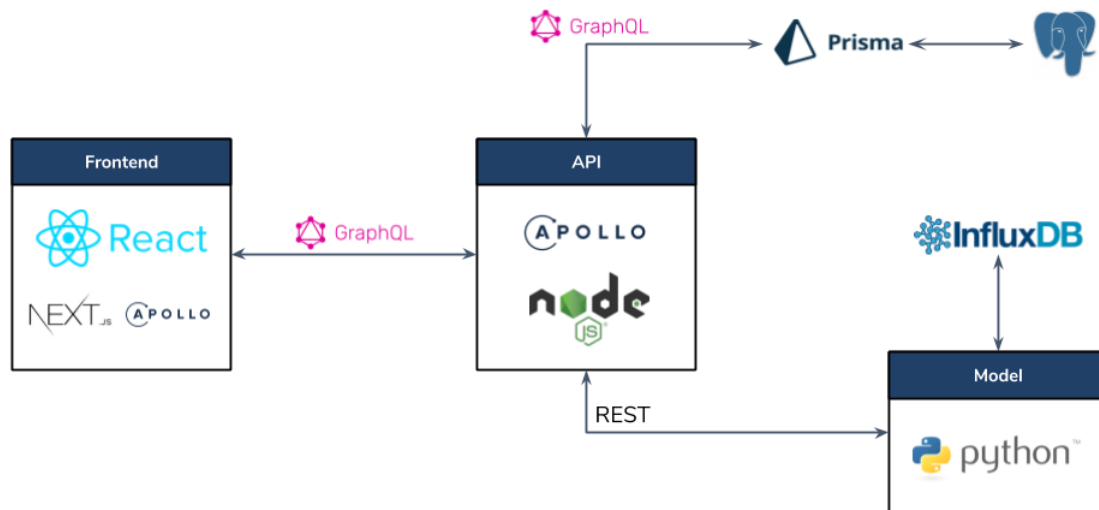- Observation of different knowledges in one room

- Master Seminar: Advanced Portfolio Management Seminar

3.4. Design and Iterative Prototyping

...

4. Architecture

4.1. Frontend

We use the React Framework which is developed by Facebook. Based on NextJS.

4.2. API

Bla

4.3. Model

All calculations of the simulation are performed in a python-model which interacts with the time series data stored on an InfluxDB. A Restful service fetches the data from the model.

4.4. Contnious development

5. Market Model

6. Application Overview

For playing the game an administrator of a specified game and an infinite number of teams have to interact together for playing this simulation.

6.1. Administration

All administrative tasks will be described in this part.

6.1.1. Administrator login

An administrator needs to have a login for having all adminstrative functionalities. Therefore he has to provide his credentials on the following screen which he reach by following the instructions on the start page.

6.1.2. Game management

Game overview As landing page of the administrator the game overview exists. It serves as the control center of the game adminstration.

Game creation For creating a game the administrator needs to define some parameters for playing a game which are structured into three tabs. By pressing on the "next"-button the administrator will be leaded through the form. Some tooltips help users to understand the purpose of the provided input. After submitting the creation of the game, the user will be redirected to the game overview.

6. Application Overview

Game detail   The game detail for each game may be accessed over the game overview list. In this page a user can intialize period, start periods, having an overview about the teams submission and many other features, which will be described in this part:

Game initialization   As the game creation may be done in advance we have splitten the game creation from the game initialization, such that last adjustments of the game may be done just before the start of the game.

Game start   By starting the game the students or teams are finally able to start with their period 0 decisions. Administrators are able to give them some help over messages which will be visible for the teams in their report section.

Team overview   For providing access for all teams an administrator has an overview about the team logins, which are generated automatically when initializing the game.

Running game   Overview about the submission state of all teams. The administrator is able to get an insight about the decisions of all submitted teams. The period can only be finished if all teams submitted and therefore the state of the teams has been green.

Initializing period   After completion of period zero the administrator has to initalize a period in which the team decisions will be compared to the other teams decisions and evaluated. Additionally new customer types for the next period and other settings could be defined in this phase of the game.

Period start   By completing the simulation, respectively evaluation of the previous period, a next period may be started. If the game is still paused the teams cannot access the decisions site. The administrator can define some optional messages which will be displayed in the teams report page. Some adjustments to the simulation results will be edited in this phase of the game.

6.2. Team View

6.2.1. Login

6.3. Period 0 decisions

In period 0 which represents phase 1 of the game, the teams define their SAA for all customer types which are enabled by the administrator of the specific game. The teams need to fullfill
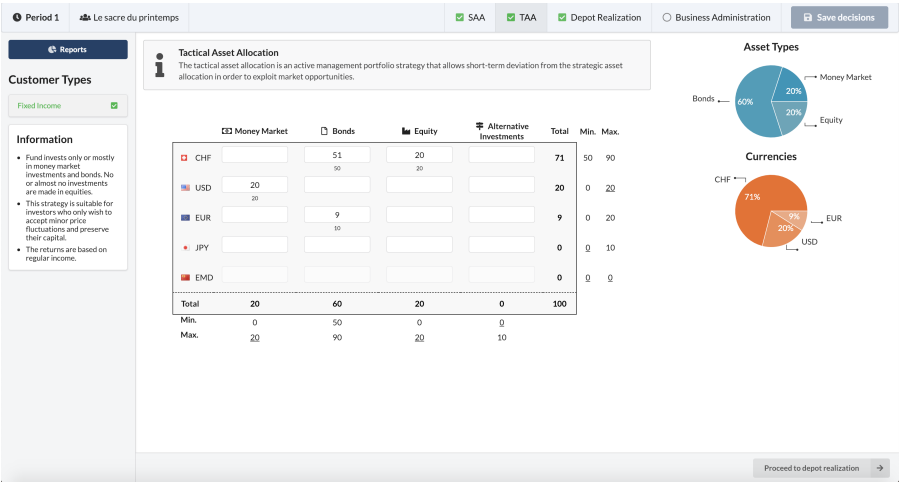
the ranges for all dimensions to submit their decisions. Supportive graphs in form of pie charts help the teams to decide about the share of the two dimensions. Additionaly the players can name their team on the top left corner of the screen.
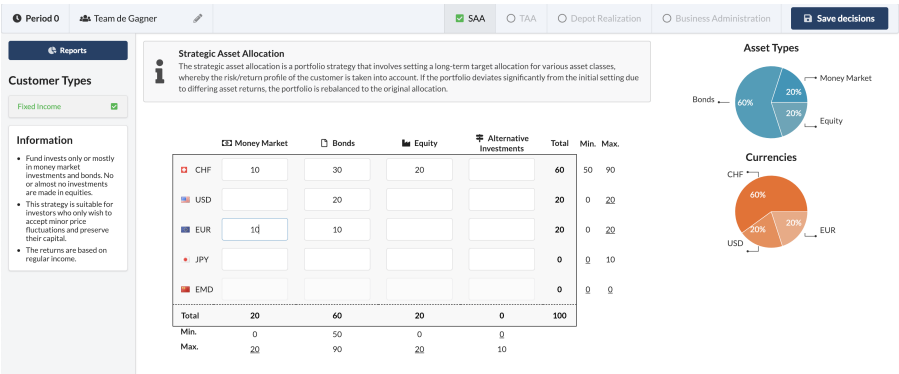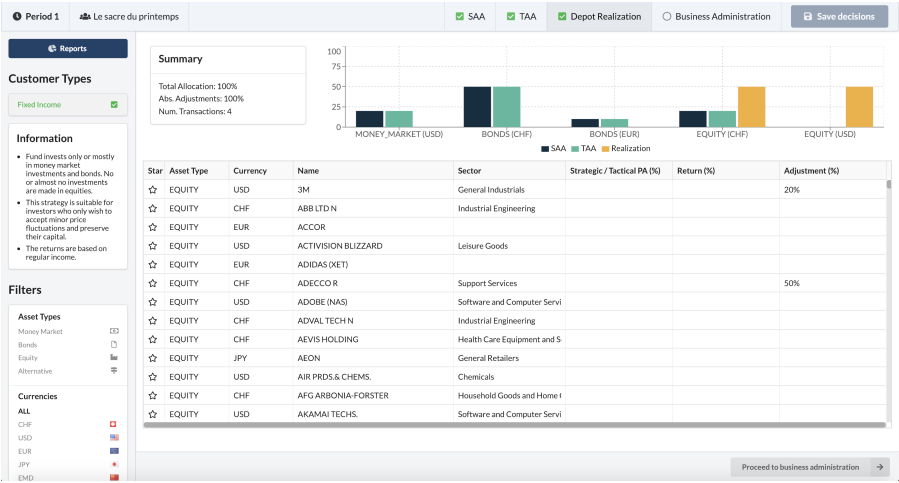

6.4. Other periods decisions

6.4.1. TAA

6.4.2. Depot Realization

7

6.4.3. Business Administration

7. Future Development

A. Exemplary scenario

Follwoing scenario should generalize an exemplary playing of the portflio management game: