

Development of the Portfolio Management Game

Master Project

UNIVERSITY OF ZURICH - DEPARTMENT OF BANKING AND FINANCE

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Contents

1. Motivation	1
2. Project Description	1
3. Methodology	1
3.1. Requirements Engineering	1
3.2. User Interviews	1
3.3. Observation of Game Execution	1
3.4. Design and Iterative Prototyping	2
4. Architecture	2
4.1. Frontend	2
4.2. API	2
4.3. Model	2
4.4. Continuous development	2
5. Market Model	2
6. Application Overview	2
6.1. Administration	2
6.1.1. Administrator login	3
6.1.2. Game management	3
6.2. Team View	6
6.2.1. Login	6
6.3. Period 0 decisions	6
6.4. Other periods decisions	7
6.4.1. TAA	7
6.4.2. Depot Realization	7
6.4.3. Business Administration	7
7. Future Development	8
A. Exemplary scenario	9

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 having a sustainable simulation of a typical portfolio management process.

2. Project Description

The "Portfolio Management Game" was initially developed in 2001 by an external company for the Department of Banking and Finance. This simulation of a portfolio manager was being used from the DBF over several years by multiple seminars of their department. 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:

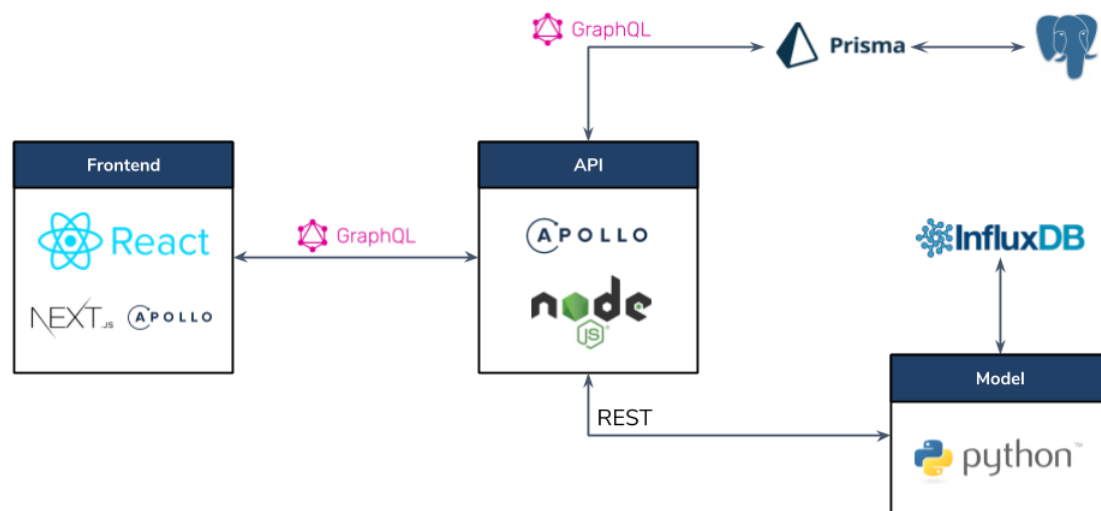
- Executive Education Students Observation during their final seminar at the Uetliberg
- Observation of different knowledges in one room
- Master Seminar: Advanced Portfolio Management Seminar

6. Application Overview

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. Continuous 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 administrative functionalities. Therefore he has to provide his credentials on the following screen which he reach by following the instructions on the start page.

Portfolio Management Game

Email
pascal.zehnder@bf.uzh.ch

Password

Submit

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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 administration.

Portfolio Management Game - Administrator

Game List

My Game
21.12.2018 13:04:38 Running (Period 0)

Lustiges Game
21.12.2018 12:08:17 Running (Period 0)

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.

Portfolio Management Game - Administrator

Game Creation

Game Details

Game Name *
Advanced Portfolio Management Seminar

Game Identifier *
apm19

Description
H519

Number of participating teams *
8

Next

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 initialize 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 splitted the game creation from the game initialization, such that last adjustments of the game may be done just before the start of the game.

Portfolio Management Game - Administrator

Game: "Advanced Portfolio Management Seminar"

Initial Customer Types: Fixed Income

Initial Customer Count: 10000

Initialize 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.

Portfolio Management Game - Administrator

Game: "Advanced Portfolio Management Seminar"

Game Identifier: 10000 Initial Customers: 10000 Simulation Type: Historical

Period Length: 30 days Start Date of Period 0: 2020-01-01

Period 0 (SAA) || Period 1 || Period 2

Economic Outlook

Report

To view the economic outlook for the upcoming period, view the report on...

Messages

Add guiding or misleading messages to the economic outlook of each team (e.g., from the bank CIO or a newspaper).

+ Add new message

Start Period

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.

Portfolio Management Game - Administrator

Team Overview - Advanced Portfolio Management Seminar

Team Name	Login	Password
Team 1	team1	5nd3l3qW
Team 2	team2	u2NIVDOX
Team 3	team3	9FWuqA74
Team 4	team4	hBPpqaMO
Team 5	team5	daJWamuD
Team 6	team6	YALRyRWE
Team 7	team7	hDTWwQJl
Team 8	team8	80lvP1r4

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 initialize 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. Application Overview

6.2. Team View


6.2.1. Login

Portfolio Management Game




Student

OR


Teacher

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Portfolio Management Game

Team Login

Password

There could be some inconsistencies if your team makes their decisions on multiple devices. Ensure that only one logged in user finally decides about the teams choices. Reports may be viewed on multiple devices without any problems.

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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 fulfill 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. Additionally the players can name their team on the top left corner of the screen.

Period 0Team de Gagner

☒ SAA☐ TAA☐ Depot Realization☐ Business Administration

Reports

Customer Types

Fixed Income

Information


- Fund invests only or mostly in money market investments and bonds. No or almost no investments are made in equities.
- This strategy is suitable for investors who only wish to accept minor price fluctuations and preserve their capital.
- The returns are based on regular income.

Strategic Asset Allocation

The strategic asset allocation is a portfolio strategy that involves setting a long-term target allocation for various asset classes, whereby the risk/return profile of the customer is taken into account. If the portfolio deviates significantly from the initial setting due to differing asset returns, the portfolio is rebalanced to the original allocation.

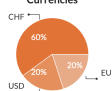
	Money Market	Bonds	Equity	Alternative Investments	Total	Min.	Max.
CHF	10	30	20		60	50	90
USD		20			20	0	20
EUR	10	10			20	0	20
JPY					0	0	10
EMD					0	0	0
Total	20	60	20	0	100		
Min.	0	50	0	0			
Max.	20	90	20	10			

Asset Types



60% Bonds20% Money Market20% Equity

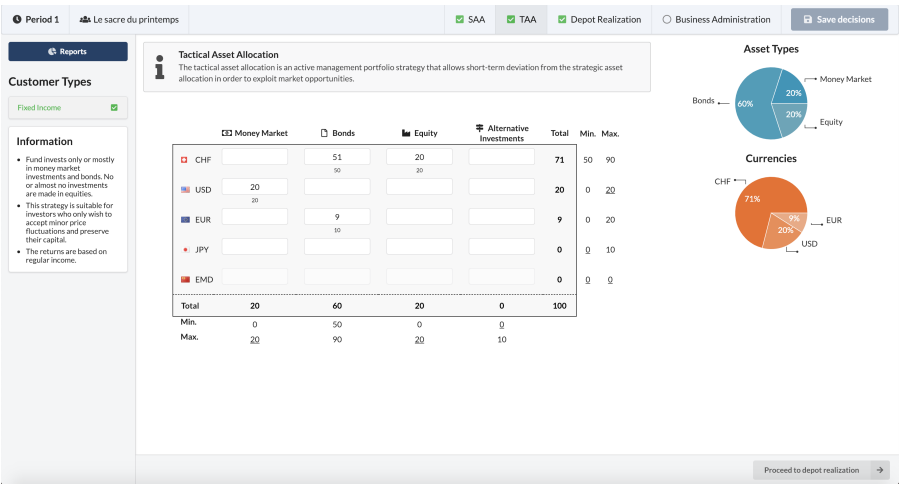
Currencies



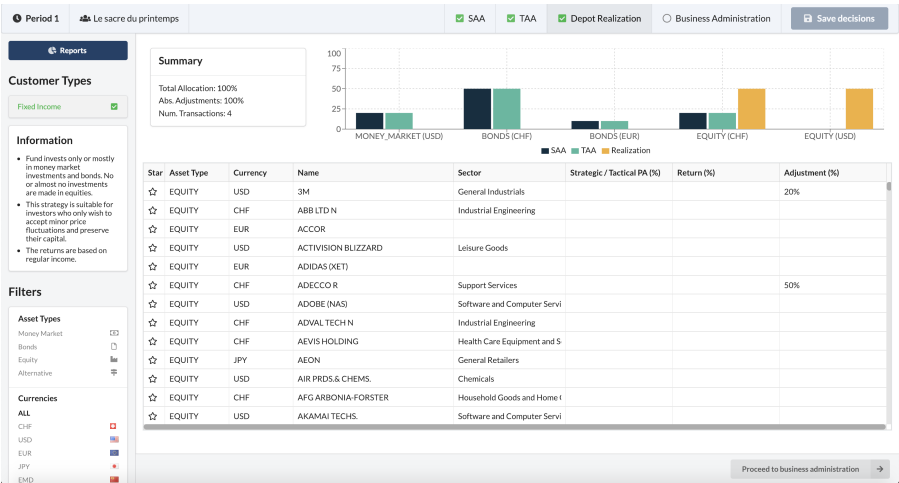
60% CHF20% USD20% EUR

6.4. Other periods decisions

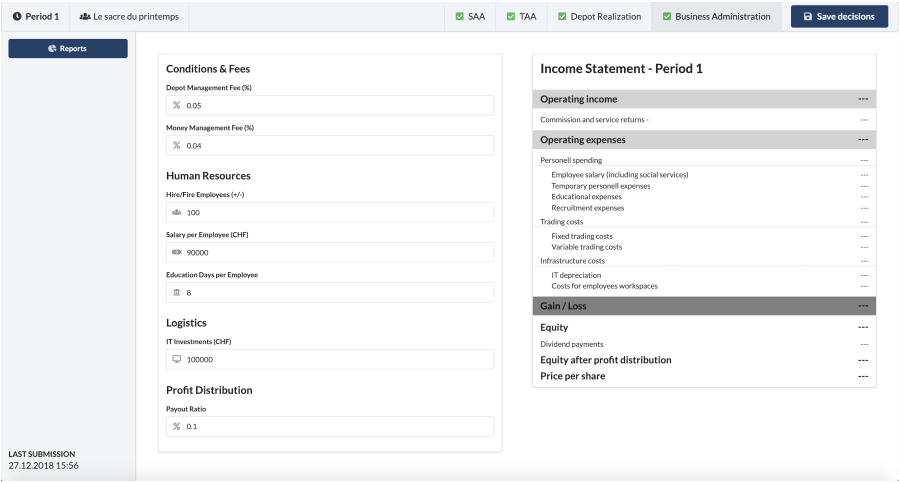
6.4.1. TAA



6.4.2. Depot Realization



6.4.3. Business Administration



7. Future Development

7. Future Development

A. Exemplary scenario

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