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# Development of the Portfolio Management Game

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## Master Project

UNIVERSITY OF ZURICH - DEPARTMENT OF BANKING AND FINANCE

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# 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:

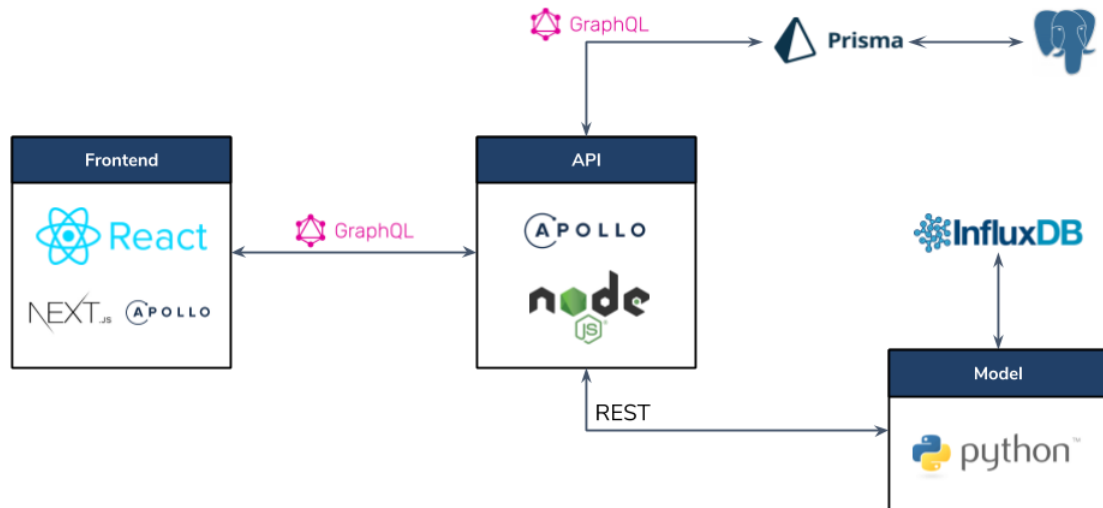
- Executive Education Students Observation during their final seminar at the Uetliberg
- Observation of different knowledges in one room
- Master Seminar: Advanced Portfolio Management Seminar

## 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.

### 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.

**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 lead 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 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: 10000

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: spm19 Initial Customers: 10000 Simulation Type: Historical

Period Length: 30 days Start Date of Period 0: 2000-01-01

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 | 5nd33qW  |
| Team 2    | team2 | u2NIVD0X |
| Team 3    | team3 | 9FWqA74  |
| Team 4    | team4 | hBPpcoMO |
| Team 5    | team5 | dauWamuD |
| Team 6    | team6 | YALRyRWE |
| Team 7    | team7 | hDTWwQJI |
| Team 8    | team8 | 80lvP1x4 |

**Running game** Overview about the submission state of all teams

Portfolio Management Game - Administrator pascal.rehder@bf.uzh.ch

**Users**  
Users  
**Games**  
Games  
**Entities**  
Assets  
Asset Types  
Currencies  
Customer Types  
Sectors

Game: "Advanced Portfolio Management Seminar"

Game Identifier: apm19 Initial Customers: 10000 Simulation Type: Historical  
Period Length: 30 days Start Date of Period 0: 2000-01-01

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

**Teams**

✓ Julius Bull > Last submitted: 21.12.2018 17:49

✎ Team 2

✎ Team 3

✎ Team 4

✓ Students Kantonalbank > Last submitted: 21.12.2018 17:51

✎ Team 6

✎ Team 7

✎ Team 8

Finish period

## 6.2. Team View

### 6.2.1. Login

Portfolio Management Game

Student

apm19

OR

Teacher

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Portfolio Management Game

Team Login

team1

Password

\*\*\*\*\*

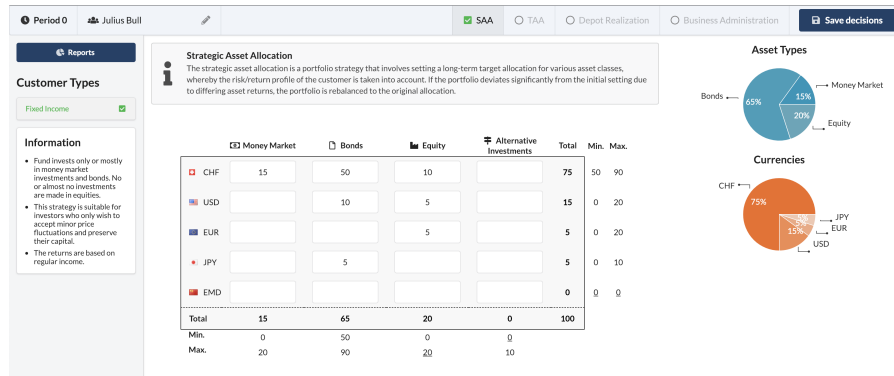
There could be some inconsistencies if your team make their decisions on multiple devices. Ensure that only one logged in user finally decides about the teams choices. Reports may be viewed on multiple devices without any problems.

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## 6.3. Period 0 decisions

Giving a name and SAA

## 7. Future Development



## 7. Future Development



## **A. Exemplary scenario**

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