**HSBC Fund Rebalancing Project**

Business Requirement Document

4/1/2019  
Version 1.2

**Team REST**

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## Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| **Version** | **DATE** | **Name** | **Description of Change** |
| 1.2 | 4/1/2019 | Team REST | Final version |
| 1.1 | 1/24/2019 | Team REST | Update the user cases, risk assessment, and flow charts according to Jan’s feedback |
| 1.0 | 1/23/2019 | Team REST | Initial draft |

## Stakeholder

Categories:

1. Agree with contents
2. Agree, subject to incorporation of comments
3. Disagree, comments included

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Approver Name/Title** | **Signature** | **Sign Date** | **Subject to Category** | **Comments** |
| Wilson Fung |  |  |  |  |
| Clifford Lee |  |  |  |  |
| Jerry Jim |  |  |  |  |

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## Business Requirement Summary

The project develops a set of REST APIs for HSBC to provide high-level investment recommendations to its investors. The project will provide the following features:

1. Create an initial preference for a portfolio with the type of funds to purchase, the asset mix preference and deviation percent from the asset mix.
2. Retrieve a customer’s portfolio preference
3. Change the allocations of funds within a portfolio.
4. Change the allowed deviation percent from the asset mix within a portfolio.
5. Return a set of instructions to set the customer’s portfolio back to the preferred percentages.
6. Apply the set of instructions retrieved to rebalance the customer’s portfolio back to the preferred percentages.
7. Return an updated set of instructions after modifying the recommendations made previously based on the user’s input

In addition to fulfilling the success criteria listed above. Team REST aims to complete the stretch goal, which provides the following features:

1. When the rebalancing logic requires to buy additional funds, calculate the score for each fund based on the risk and associated factors and rank the available funds in each category based on the score.
2. Recommend to the customer the highest-ranked fund.
3. Allow the customer to select a different fund from the list of funds available for a category if the customer is not satisfied with the recommended choice.

The project will not include the following functionalities as they are out-of-scope:

1. A mock system with static data will be provided by HSBC for testing and leverage.
2. No security risk and authentication process except the Customer ID in the request header will be taken into consideration.

## 

## Problem Statement/Project Description

HSBC is looking to develop an online fund rebalancing service as one of the features of the HSBC RoboAdvisor product. The service will focus on helping customers track and manage their fund portfolio online. The goal is to reduce the need for in-person branch visits and improve service. The project will develop a set of REST APIs, along with a simple UI for demonstration and testing services.

## Impacts

### **System Impacts**

* RoboAdvisor product will be impacted as additional APIs will be built to utilize the existing system to perform fund rebalancing.

### **Group/Individual Impacts**

* HSBC clients do not need to go to a bank branch and find their client manager to purchase/sell their fund or change their portfolios.
* HSBC will be able to reduce the cost of human resource on commercial banking.
* Technical administrators need to invest more time and effort to maintain the APIs, technical issues and system updates.

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## Constraints/Assumptions/Dependencies

### **Constraints**

* Language: Java
* Framework: Spring Boot
* Database: MySQL
* Infrastructure: Google Cloud Platform

### **Assumptions**

* CustomerID is a valid integer value.
* Amount value is a reasonable double value.
* Reasonable concurrent user.
* Mock-up services are online when performing transactions.

### **Dependencies**

* There is a dependency on the mock-up system provided by HSBC.

## Summary Risk Assessment

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### **Summary Risk Assessment**

|  |  |  |
| --- | --- | --- |
| **Risk ID** | **Risk Description** | **Severity** |
| 1 | Change in API requirements/scope creep | High |
| 2 | Google Cloud Platform (GCP) goes down | High |
| 3 | The mock system may not respond to our calls or return invalid data | Medium |
| 4 | Inability to handle requests at peak hours may lead to slow response times | Medium |
| 5 | Insufficient data to thoroughly test all endpoints including stretch goals | Medium |
| 6 | Google Cloud Platform (GCP) token not provided by HSBC may need a fallback platform | Low |

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### **Mitigation Strategies**

|  |  |
| --- | --- |
| **Risk ID** | **Risk Mitigation** |
| 1 | Discuss with HSBC stakeholders to ensure requirements are set |
| 2 | Email Google contacts for assistance |
| 3 | We have a direct line of contact with the mock system provider, HSBC, to quickly get this risk resolved |
| 4 | Discuss how much load to expect and potentially implement an API rate limiter |
| 5 | Contact business stakeholder to ensure the proper data is provided or if we should generate our own test data |
| 6 | Contact business stakeholder for GCP token or look into Microsoft Azure / AWS |

## Functional Requirements

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### **Requirement Traceability Matrix (RTM)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID #** | **Reference[[1]](#footnote-0)** | **Requirement Description** | **Type** | **Priority[[2]](#footnote-1)** | **MVP(Y/N)** |
| 1 | UC 1 | Create an initial preference for a portfolio with the type of funds to purchase, the asset mix preference and deviation percent from the asset mix | Functional | 1 | Y |
| 2 | UC 2 | Retrieve a portfolio based on the customer ID and the portfolio ID | Functional | 1 | Y |
| 3 | UC 3 | Change the allocations of funds within a portfolio | Functional | 1 | Y |
| 4 | UC 4 | Change the allowed deviation percent from the asset mix within a portfolio | Functional | 1 | Y |
| 5 | UC 5 | Return a set of instructions that will set the customer’s portfolio back to the preferred percentages for a portfolio | Functional | 1 | Y |
| 6 | UC 6 | Apply the set of instructions retrieved to rebalance the customer’s portfolio back to the preferred percentages for a portfolio | Functional | 1 | Y |
| 7 | UC 7 | Modify the set of rebalance recommendations and return the updated set | Functional | 1 | Y |
| 8 | Appendix I | Returns a set of rebalance recommendation for category type portfolio | Functional | 2 | N |
| 9 | Appendix II | Develop a user interface for demo and testing of the API endpoints | Functional | 1 | Y |

The related test cases and test status for each function requirement is still to be discussed.

### 

### **Use Cases**

A use case is created for each API endpoint the project aims to deliver. The use case for the stretch goal is shown in Appendix I.

**Use Case 1: Create a preference**

|  |  |
| --- | --- |
| **Description** | This method records the customer’s initial portfolio preference |
| **Actors** | HSBC customer |
| **Preconditions** | The customer is in the system |
| **Goal** | An asset mix preference is created for this customer within the system |
| **Failed Conclusions** | Invalid preference values;  Invalid fund; |
| **Steps of Execution** | 1. The customer decides to create preference percentages for current assets 2. The customer enters a deviation percentage 3. The customer selects the funds that he/she holds and indicates a percentage for each fund. 4. The customer submits his/her asset mix preference 5. New asset mix preference is saved in the system |

**Use Case 2: View preference**

|  |  |
| --- | --- |
| **Description** | This method call retrieves the customer’s asset mix preference |
| **Actors** | HSBC customer |
| **Preconditions** | The customer has a portfolio in the system |
| **Goal** | The asset mix preference for this customer is retrieved |
| **Failed Conclusions** | Non-existing portfolio |
| **Steps of Execution** | 1. The customer decides to view his/her asset mix preference 2. The asset mix preference of this customer displays on the screen |

**Use Case 3: Update preference**

|  |  |
| --- | --- |
| **Description** | This method updates the asset mix preference for a customer |
| **Actors** | HSBC customer |
| **Preconditions** | The customer has a portfolio in the system |
| **Goal** | The asset mix preference for this customer is updated |
| **Failed conclusions** | Non-existing portfolio;  Invalid preference values;  Invalid fund; |
| **Steps of Execution** | 1. The customer decides to update his/her asset mix preference 2. The customer Modifies the fields he/she wishes to adjust:  * The percentage for each fund that he/she holds  1. The customer submits the new allocations 2. The asset mix preference of this customer is updated |

**Use Case 4: Update deviation**

|  |  |
| --- | --- |
| **Description** | A customer wants to reset the deviation percentage for its portfolio whose id is provided. This method sets the allowed deviation percentage for the portfolio |
| **Actors** | HSBC customer |
| **Preconditions** | The customer has a portfolio in the system |
| **Goal** | It should update the deviation percentage for a specified portfolio |
| **Failed Conclusions** | Invalid deviation value;  Non-existing portfolio; |
| **Steps of Execution** | 1. The customer wants to update the deviation for his/her portfolio 2. The customer enters the new deviation value 3. The customer submits the value 4. The deviation is reset for the portfolio |

**Use Case 5: Rebalance Recommendation**

|  |  |
| --- | --- |
| **Description** | A customer wishes to rebalance their asset mix into initial preference. This API provides a set of instructions that returns the customer’s portfolio back to the preferred percentages for a “type: fund” portfolio |
| **Actors** | HSBC customer |
| **Preconditions** | The customer has a portfolio in the system and the customer’s portfolio mix percentages is off from the initial preferred percentages |
| **Goal** | The method returns a set of recommended transactions to rebalance each fund in the portfolio into preferred percentages |
| **Failed Conclusions** | Non-existing portfolio; Insufficient fund |
| **Steps of Execution** | 1. The customer’s portfolio is off from initial preference 2. The customer wants to rebalance his/her portfolio 3. The system generates a list of recommended transactions to rebalance each fund under the “type: fund” portfolio:  * If a fund exceeds its preference percentage, the system will recommend selling some units of this fund * If a fund has a lower percentage than its preference percentage, the system will recommend buying more units of this fund |

**Use Case 6: Rebalance Execution**

|  |  |
| --- | --- |
| **Description** | This method executes the set of recommended transactions to rebalance a customer’s portfolio into initial preference |
| **Actors** | HSBC customer |
| **Preconditions** | A set of recommended transactions from provided recommended transactions is executed |
| **Goal** | The method executes the transactions listed on the set and the customer’s portfolio is updated and current asset distribution matches the preference percentage |
| **Failed Conclusions** | Partial/whole transactions fail;  Non-existing portfolio; |
| **Steps of Execution** | 1. The customer is satisfied with the rebalance recommendation 2. The customer provides the rebalance recommendation id 3. A list of transactions of the recommendation list is performed. The customer’s portfolio is updated and current asset distribution matches the preference percentage |

**Use Case 7: Modify Recommendation**

|  |  |
| --- | --- |
| **Description** | This method modifies the set of recommended transactions based on user input and returns the updated list |
| **Actors** | HSBC customer |
| **Preconditions** | A set of recommended transactions for the customers portfolio |
| **Goal** | The method returns the updated set of recommended transactions which reflect the modifications provided by the customer |
| **Failed Conclusions** | Partial/whole transactions fail;  Non-existing portfolio;  Invalid input values; |
| **Steps of Execution** | 1. The customer wants to modify the rebalance recommendation 2. The customer provides the rebalance recommendation id 3. The customer enters the list of modifications 4. The customer submits the input 5. The updated set of rebalance recommendations is returned |

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### **Business Process Flow Chart**

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### **UI Requirements**

A simple UI will be designed for demo purposes. Once the user logs in and selects a portfolio, they are able to view the current fund allocations with the option to create an initial preference as a button below the data. If the user chooses to set the initial preference, a pop-up window will appear for the user to input their values. Once the preference has been determined, the UI will be updated and the options for update deviation, preference, and rebalance will become available. If the user clicks the rebalance button, they will be brought to a new screen that shows the recommended transactions needed for rebalancing with the option to modify the given transactions or to execute the transactions. The UI mockup is attached as Appendix II.

## Non-Functional Requirements

### **Backup Needs**

To backup project documents, we will need to store documents remotely. A Google Drive project that is shared with all the members will allow us to backup project documents. As for the backup of software code, Gitlab will be used for source code repository and version control. As well, the project will be hosted on Google Cloud and the project will need to be backed up by Google regularly in the case that the server crashes.

### **Cost parameters and constraints**

Hosting the project on Google Cloud will require Google Cloud credits. Creating a free Google Cloud account provides $300 CAD in free credit that can be used for hosting. If the $300 CAD is exceeded, we will need to create another account for more credits.

## 

## Appendix I: Stretch Goal

### **Category Type Portfolio Recommendation**

|  |  |
| --- | --- |
| Description | This method recommends a fund for rebalancing for a customer’s category type portfolio |
| Actors | HSBC customer |
| Preconditions | The customer’s category type portfolio requires rebalancing |
| Goal | The method returns a fund as a rebalance recommendation based on the given score calculation |
| Failed conclusions | Non-existing portfolio; Insufficient units;  Insufficient fund; Invalid recommendation id |
| Steps of Execution | 1. The customer wants to rebalance a category type portfolio 2. The customer enters the portfolio id 3. The customer submits the input 4. The recommended fund is returned |

## Appendix II: UI Design

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## References

1. HSBC RoboAdvisor Fund Rebalancing Project Document   
   <https://piazza.com/redirect/s3?bucket=uploads&prefix=attach%2Fjo4zqfjte9v12v%2Fj7b3tb7ez6c2qi%2Fjr9sikfpig5q%2FHSBC__RoboAdvisor__Fund_rebalancing_Service_UBC_v_1.4.doc>
2. CPSC 319 Slides

https://piazza.com/ubc.ca/winterterm22018/cpsc319201/resources

1. UC = Use Case [↑](#footnote-ref-0)
2. Priority levels = 1: High, 2: Medium, 3: Low [↑](#footnote-ref-1)