Application

KAF Agency Portal

Module

Security & User Management

Business Process

Notification & Alert

Reporting

Administration

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# SYSTEM DESIGN

## 1.0 Introduction

KAF Agency Portal System aims to provide a secure online agency platform for agents and investors to gain access to the investment asset details online. This portal system mainly allows the KIF agents and investors to view and download the latest Unit Trust Funds statements in a secure portal.

Agency Portal will provide the global platform for KAF agents and both local and international investors, where the agents will have access to their corresponding list of clients and its details and the investors will have access to their holdings.

### Goal and Objective

The main goal for this project is to develop a secure online agency portal that has specific features to display account holding details, user profile, interactive dashboard, interactive and informative data charts and fund statements.

### 1.2 Scope of System Statement

KAF Agency System is a web-based application that is designed and developed by KAF IT department as a product for internal (Back Office users) and external (Agents & Investors) clients.

It is used by both agents and investors to view Unit Trust Funds details and download the latest statements. The application allows social media-based login for user authentication.

### 1.3 System Context

In order to make the smooth transition to an entire KAF Agency System, one needs to see some strategic issues:

* What is the structure in the system and how can it handle the organization task?
* What are the user roles and organization in leveraging and supporting this KAF Agency System?

### 1.4 Major Constraints in Development

#### 1.4.1 Authentication

A social login, also known as a social sign-in, is a kind of single sign-on for end-user where the user uses existing login information of a social network like Facebook, LinkedIn, Google to log on to a third party website instead of creating a new log-in account specially for that website.

Social login is mainly designed for simplifying the login process for users and to optimise a higher conversion rate for registration. Of course, it is easier when the user does not have to create a new login account that requires them to remember a new username and password each time when the new registration is needed. However, there is few constraints need to be considered of using social media login as system authentication.

* **Lack of trust from users**

People often do not fully trust the company or website to use their personal data in a correct manner. They do not want the company to post useless junk information on their social media profile. They may be worried that they will be spammed.

Recommendation: The service provider (KAF) must ensure the Portal is designed to provide personal data privacy without causing data breach issue in system authentication through third party social login.

* **Excluding users (agents & investors) who are not active on social media**

There are people that do not use social media for all different kind of reasons. Therefore, this approach may exclude a big part of our target audience.

Recommendation: Recommend and suggest users to sign up and be active on Google account as alternative for the Portal service if other social accounts are not used.

* **Social logins can contain false information (data accuracy)**

People do not want always use accurate information when they create their social media account, or they have no longer use the email account that they signed up anymore. It also depends on the privacy settings of the person whether gain access to their information or not.

Recommendation: Limit the option of social login available that is convenient and actively used by users to use and subscribe the Portal. This approach can help user give correct information for actual social account.

* **Social networks login are sometimes blocked**

The use of social login through platform like Facebook or LinkedIn cannot be used at certain workplace as the social media network is blocked for productivity reasons.

Recommendation: Recommend and suggest the users to have Google account activated for Portal use. This could avoid any inconvenience of access with social networks.

* **Security issues**

If one of these social identity providers is hacked, all accounts they use to login might be affected too.

Recommendation: Google 2-step authentication provides stronger security for Google account that could avoid this sort of threat.

* **Lack of email address for the client service**

Not every social media login provider gives access to email address.

Recommendation: Google account itself is the access to email address.

* **User forgets which social login that they use**

Unless they always use the same social media account for all social logins, user often tend to forget which social login they have used with for registration in the Portal.

Recommendation: Recommend and suggest the users to use Google account as a best option of social login and preference.

#### 1.4.2 Third-Party Library Dependencies

* XML To PDF Converter library
* Spire.PDF for .NET
* A professional PDF component applied to creating, writing, editing, handling and reading PDF files without any external dependencies within .NET (C#, VB.NET, ASP.NET, .NET Core) application. Using this .NET PDF library, it has rich capabilities to create PDF files from scratch or process existing PDF documents entirely through C#/VB.NET without installing Adobe Acrobat.
* Limitation: Free version is limited up to 10 pages of PDF. This limitation is enforced during loading and creating files. When converting PDF to Image, the first 3 pages of PDF files will be converted to Image format successfully.
* Recommendation: Purchase premium plan that provides unlimited access and usage.
* Google Chart Tools
* Google Charts API
* Limitation: Limited custom pie charts provided.
* Recommendation: Search alternatives of APIs for similar chart functionalities.

## 2.0 Functional and Data Description

### 2.1 System Architecture

System architecture is shown as below.

Figure : System architecture

System Interfaces

Security & User Management Module

Security & User Management

Data Access Layer

Other Operations

Common Operation Manager

Data Layer

Business Services

Notification & Alert Module

Notification & Alert

Messaging gateway

Templates Manager

Data Access Layer

Reporting Module

Reporting

Data Access Layer

Business Logic Module

Assessments & Services

Data Access Layer

Other Operations

Administration Module

Administration

Data Access Layer

Other Operations

Data Source

Database

XML

Data Access Components

Data Helpers / Utilities

UI Components

UI Process Components

KAF Agency is designed using N-tier architecture. *N-tier* data applications are data applications that are separated into multiple *tiers*. Also called "distributed applications" and "multi-tier applications," n-tier applications separate processing into discrete tiers that are distributed between the client and the server.



Figure : N-tier Application Architecture

### 2.2 System Components (Technology Requirements)

#### 2.2.1 Presentation Layer

The top-most level of the application is the *presentation tier* (User Interface) which users interact with an application. The main function of the interface is to translate tasks and results to something so that the user can understand.

This web application is built using .NET technology, which is ASP.NET framework 4.x.x, and Bootstrap as the presentation layer.

Bootstrap is currently the most popular front-end web framework for developing responsive web applications. It offers a number of features and benefits that can improve your user experience with your web site, whether you are a novice at front-end design and development or an expert. Bootstrap is deployed as a set of CSS and JavaScript files, and it is used to help the design of website or application scale efficiently from phones to tablets to desktops in responsive manner. Current version of framework would be v4.0.

#### 2.2.2 Business Logic Layer

This layer coordinates the application, processes commands, makes logical decisions and evaluations, and performs calculations. It also moves and processes data between the two surrounding layers. This layer contains all application business logics.

#### 2.2.3 Data Access Layer

This layer is to stored and retrieved information from database or file system. The information is then passed back to the logic tier for processing, and then eventually back to the users. KAF Agency Portal is built using MySQL and XML files as data storage.

The database structure design would be many-to-one and one-to-many. For instance, the user (Agent) is able to login with multiple social account IDs, and those IDs can only match with single Agent’s ID in the Back Office system. The Agent’s ID can access to a list of clients that is service by him/her.

### 2.3 System Authentication Workflow Design

#### 2.3.1 Active Directory (Internal Users)

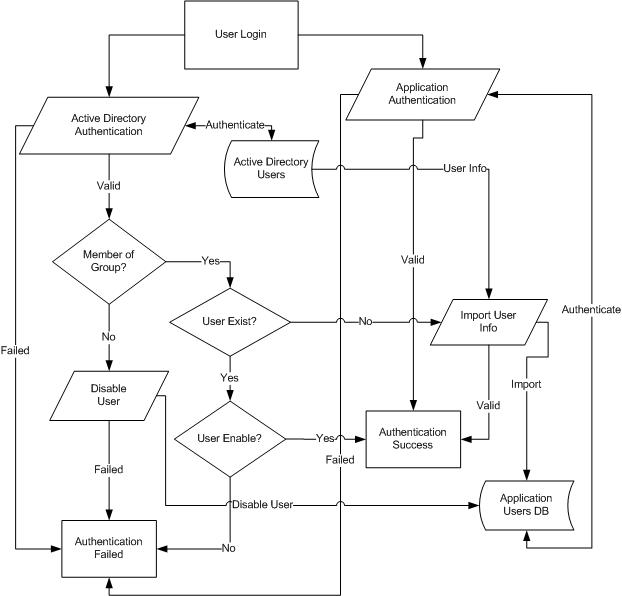


Figure : Internal Authentication Flowchart

#### 2.3.2 Social Media Login Provider (External Users)

Advantages of using third-party social login provider for security reasons are as follows:

* **Faster registration**

The user of social login can make the registration process easier and faster without more work or any hassle.

* **Less login information to remember**

With multiple user accounts created for the same purpose, it is very difficult for users to remember all their login information. When they use a social media login, they do not have to remember new login information and keep it in mind all the time.

* **Multiple identities**

User can log on to the Portal with multiple social identities, so they have better control over their account.

* **Social login offers familiarity**

When visitor (user) sees social media logos like Facebook or LinkedIn, it can enhance the feeling of familiarity and comfort to use the Portal system.

* **Possible less failed login**

With the help of third-party social login, most likely it will be less failed login to happen, as the user does not need to remember more new usernames and passwords as long as they still know what social login that they use.

* **Easy for mobile platform**

It is often not easy to login on a Smartphone; a social login can be an easy solution for Smartphone users.



Figure : External Authentication



Figure : Authentication Flow via Social Media Authentication Provider

### 2.4 User Registration Process Workflow Design

Following is an example of workflow of KAF Agency Portal System for User Registration.

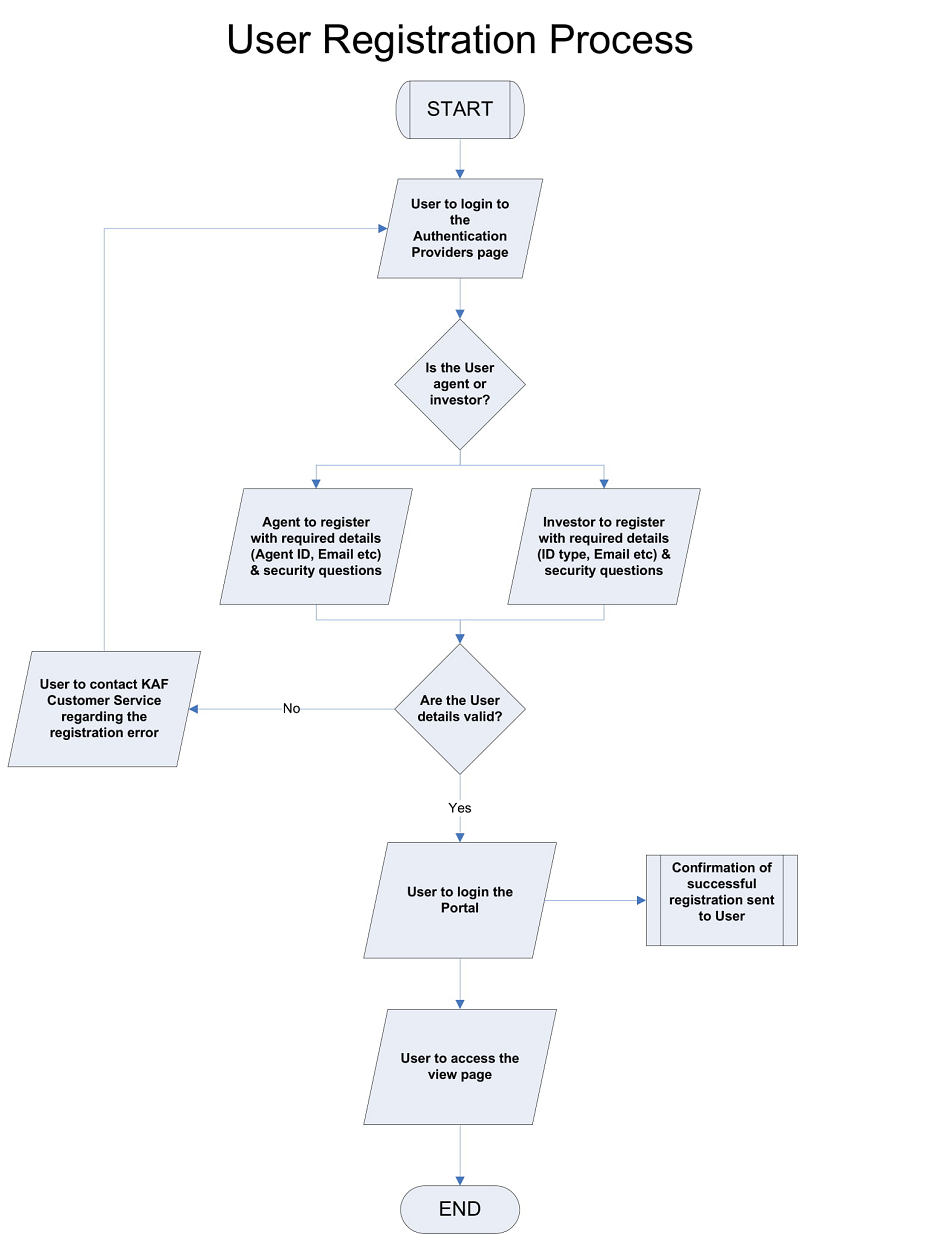


Figure : User Registration Process

## 3.0 Software Requirements

### 3.1 Server

* Internet Information Services (IIS)
* .NET Framework 4.0
* ASP.NET Web Forms
* Bootstrap (responsive web design)
* MySQL
* BIRT Report

### 3.2 Client

* Web browser (cross browsers and devices)

### 3.3 Software and Tools Constraints

* **Bootstrap Framework – AdminLTE**

While it is easy to build a responsive Portal with Bootstrap Admin Dashboard template using AdminLTE, the end results can be quite a bit heavy for the users in terms of slower loading times, as well as battery drain issues for mobile platform. In addition, the files generated by Bootstrap can be huge in size, which can slow things down for system quite heavily.

Recommendation: Seek other framework such as Foundation framework as alternative to solve slow performance issue.

* **Web Browser – Resolution Constraint**

A range of devices is used to access a website. With different screen resolutions for different devices (desktop and mobile), it is important for product developer to ensure that the screen resolution is optimized for all devices to ensure a user-friendly experience for all viewers. Sometimes, the issue raises when the Portal only could function properly in certain web browser like Google, however, it breaks for other browsers such as I.E, Opera, Firefox. The web developer has to design the interface in such a way that it appears aesthetically and functions without any hitches on any screen in different web browsers.

Recommendation: Responsive design is the answer to screen resolution issues. In addition, since mobile phones are the most used device to access websites, product designer must focus on this screen, which is the smallest one. The layout may then be adapted proportionately to more columns as the screen size get wider.

### 3.4 Assumptions and Dependencies

* End user is the person with enough knowledge to use system.
* User can only register once with selected social media login.

## 4.0 Database Design

Following are database table for KAF Agency Portal.

### 4.1 Data Description

* Identity Type

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | smallint(6) | Id |
| Id\_Type | varchar(50) | Identity Type |

* State

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | smallint(6) | Id |
| MFStateCode | varchar(3) | State Code |
| Name | varchar(256) | Name |

* Country

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | smallint(6) | Id |
| ISOCountryCode | varchar(2) | ISO Country Code |
| Name | varchar(256) | Name |

* CIF (Customer Information File)

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | smallint(6) | Id |
| Active | tinyint(4) | Active |
| CIF\_No | varchar(17) | CIF Number |
| Name | varchar(256) | Name |
| Id\_Type | smallint(6) | Identity Type |
| Id\_New\_No | varchar(12) | New Identity Number |
| Id\_Old\_No | varchar(20) | Old Identity Number |
| Email | varchar(256) | Email |
| Tel\_No | varchar(15) | Telephone Number |
| EPF\_No | varchar(15) | EPF Number |
| EPF\_Eff\_Date | datetime | EPF Effective Date |
| EPF\_Ac\_Type | varchar(1) | EPF Account Type |
| Add\_1 | varchar(100) | Address 1 |
| Add\_2 | varchar(100) | Address 2 |
| Add\_3 | varchar(100) | Address 3 |
| State | smallint(6) | State |
| Postcode | varchar(10) | Postcode |
| Country | smallint(6) | Country |

* Investor

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | int(11) | Id |
| Active | tinyint(4) | Active |
| Investor\_Id | varchar(12) | Investor Id |
| CIF\_No\_Fapp | varchar(17) | CIF Number of First Applicant |
| CIF\_No\_Sapp | varchar(17) | CIF Number of Second Applicant |

* Agent

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | smallint(6) | Id |
| Active | tinyint(4) | Active |
| Agent\_Id | varchar(15) | Agent Id |
| Name | varchar(256) | Name |
| Id\_Type | smallint(6) | Identity Type |
| Id\_New\_No | varchar(12) | New Identity Number |
| Id\_Old\_No | varchar(20) | Old Identity Number |
| Email | varchar(256) | Email |
| Tel\_No | varchar(15) | Telephone Number |

* Ledger

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | int(11) | Id |
| Investor\_Id | varchar(12) | Investor Id |
| Scheme | varchar(18) | Scheme |
| Plan | varchar(6) | Plan |
| Proc\_Date | datetime | Processing Date |
| Tran\_Date | datetime | Transaction Date |
| InvLedger\_Ref | varchar(17) | Investment Ledger Reference |
| Reference\_Id | varchar(17) | Reference Identity |
| Tran\_Type | varchar(6) | Transaction Type |
| Gross\_Amount | decimal(15,2) | Gross Amount |
| Total\_Charges | decimal(15,2) | Total Charges |
| Amount\_Invested | decimal(15,2) | Amount Invested |
| Sales\_Charges | decimal(15,2) | Sales Charges |
| GST\_Percent | decimal(15,2) | GST Percent |
| GST\_Charges | decimal(15,2) | GST Charges |
| Unit\_Price | decimal(15,4) | Unit Price |
| Units | decimal(15,4) | Units |
| Dividend | decimal(15,2) | Dividend |

* Agent & Investor

|  |  |  |
| --- | --- | --- |
| **Column Name** | **Data Type** | **Description** |
| Id | int(7) | Id |
| Agent\_Id | varchar(15) | Agent Identity |
| Investor\_Id | varchar(12) | Investor Identity |

### 4.2 Data Relationships

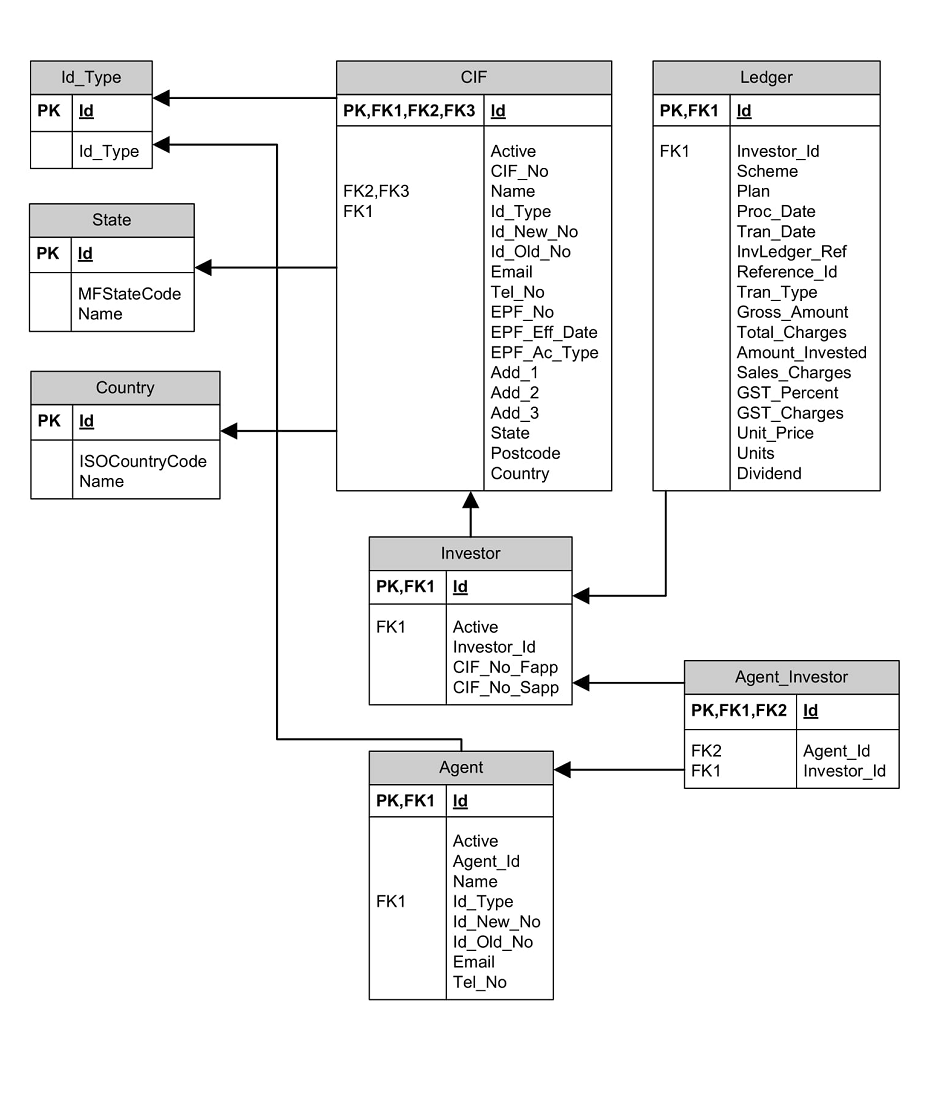
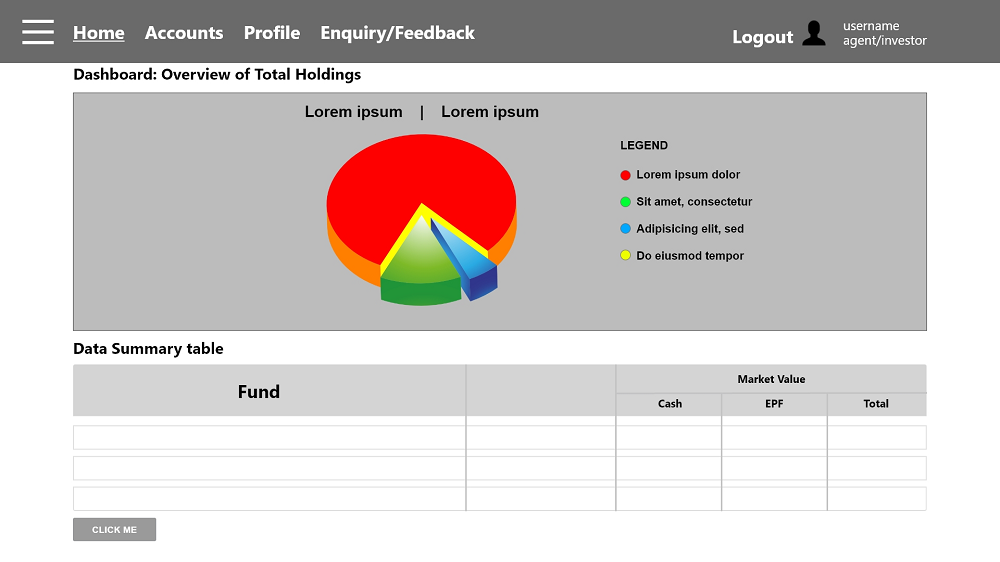


Figure : Database Relationship Example 1

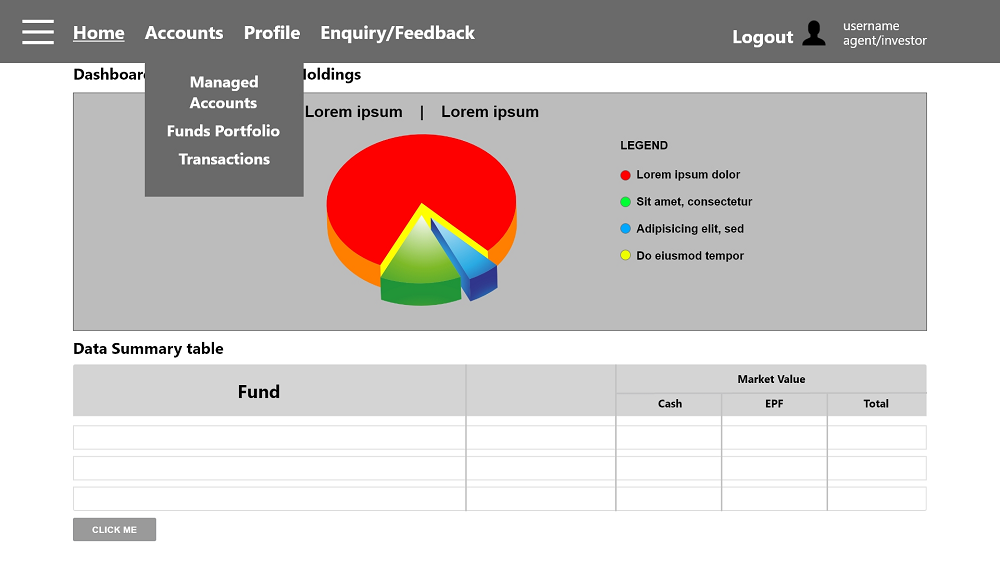
## 5.0 Portal Wireframes Design

Below are screenshots of wireframes design for Agency Portal.

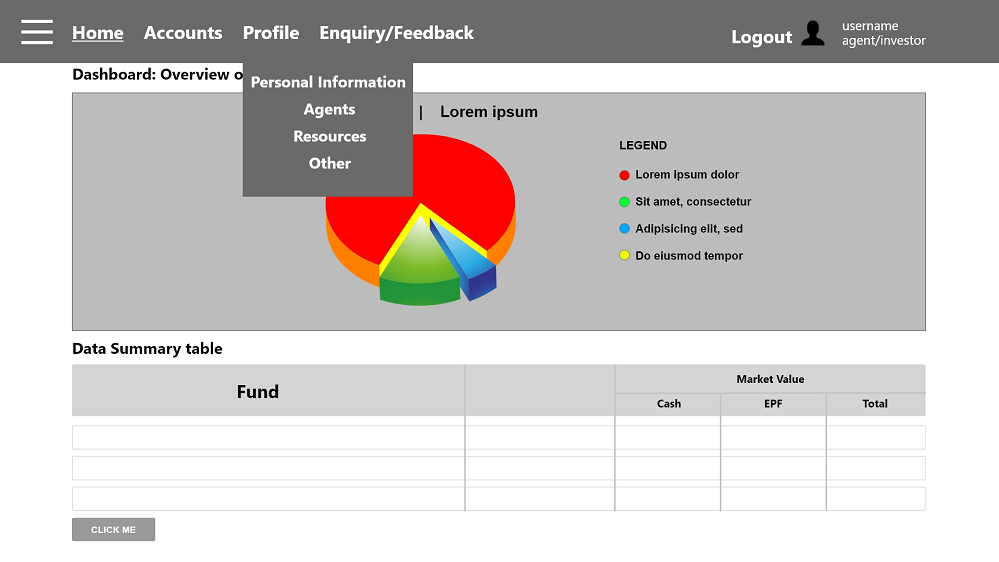
### 5.1 Home Page



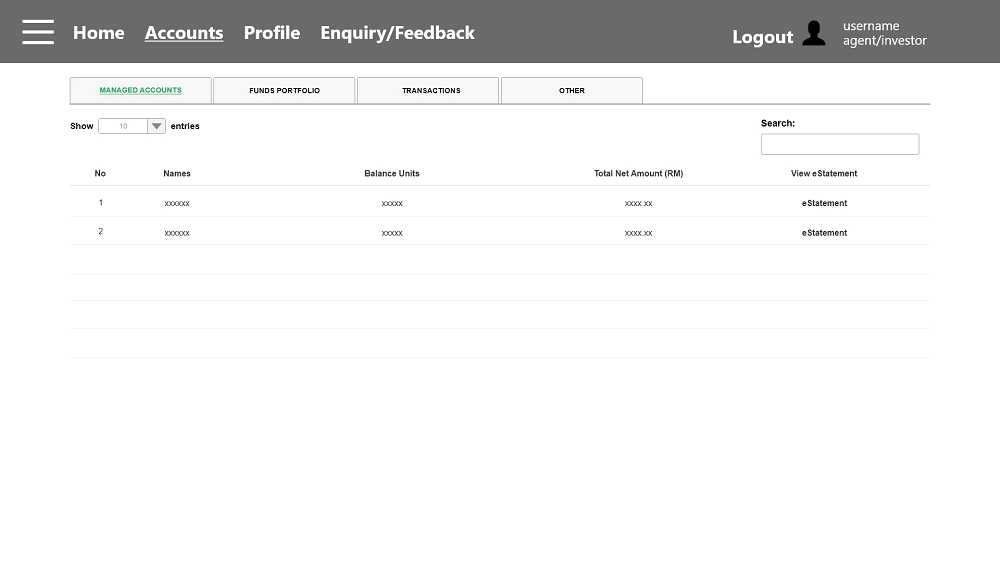
### 5.2 Accounts (Submenus)



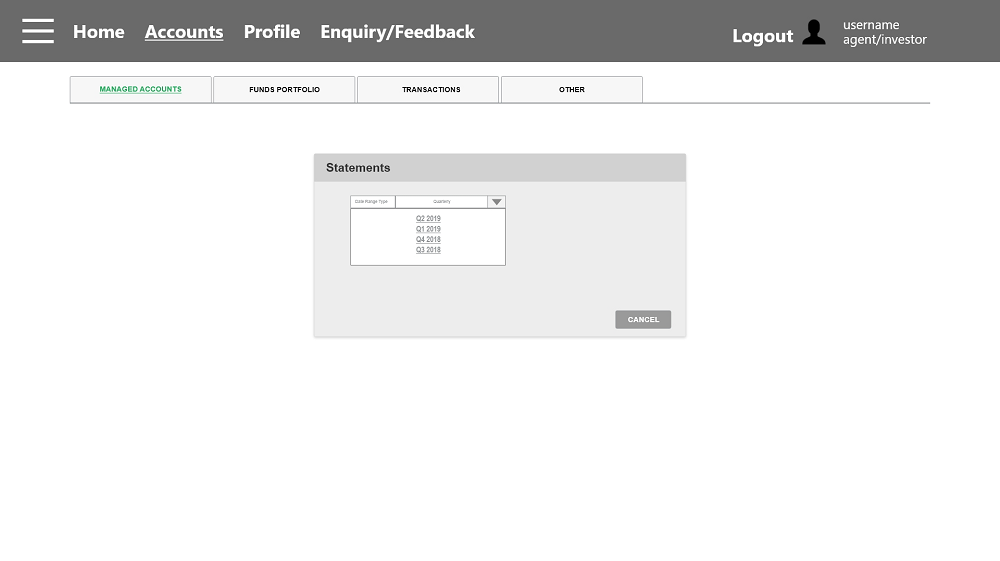
### 5.3 Profile (Submenus)



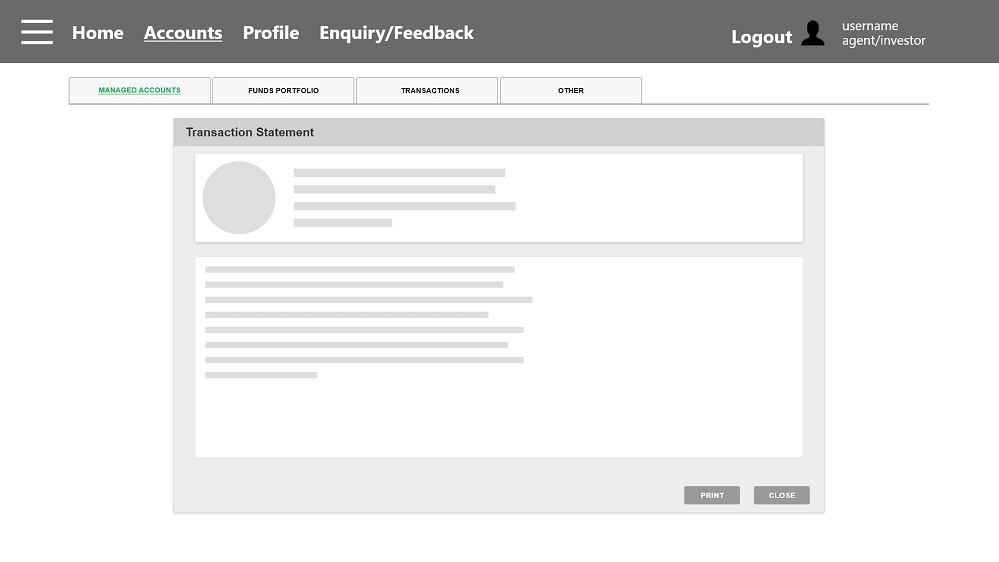
### 5.4 Managed Accounts Section in Accounts Page



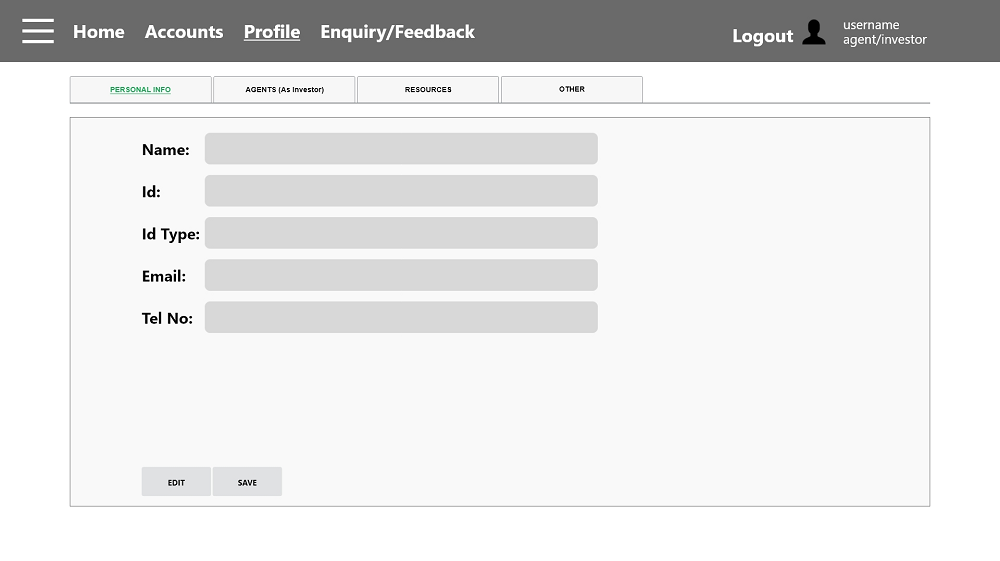
### 5.5 eStatement Links



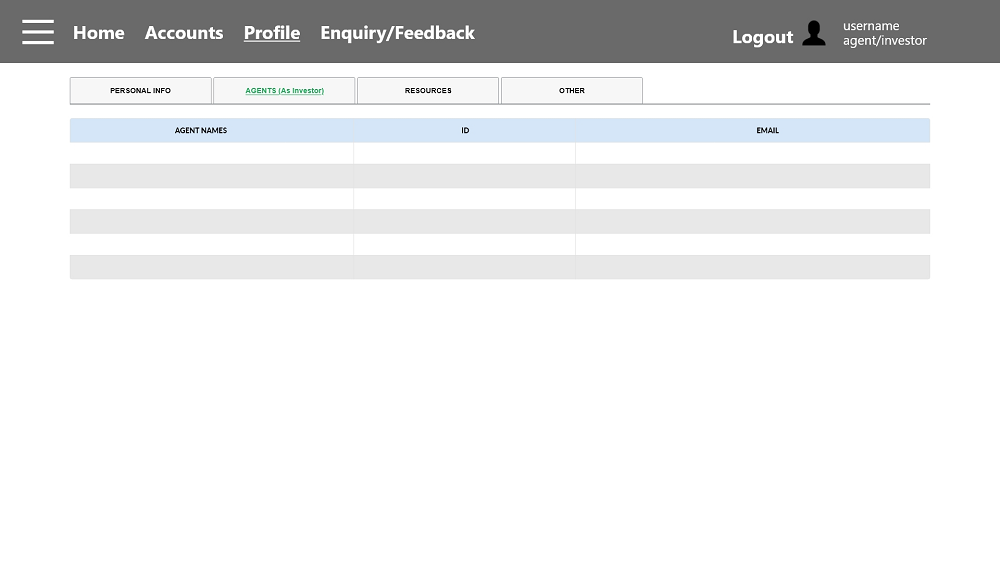
### 5.6 Transaction Statement



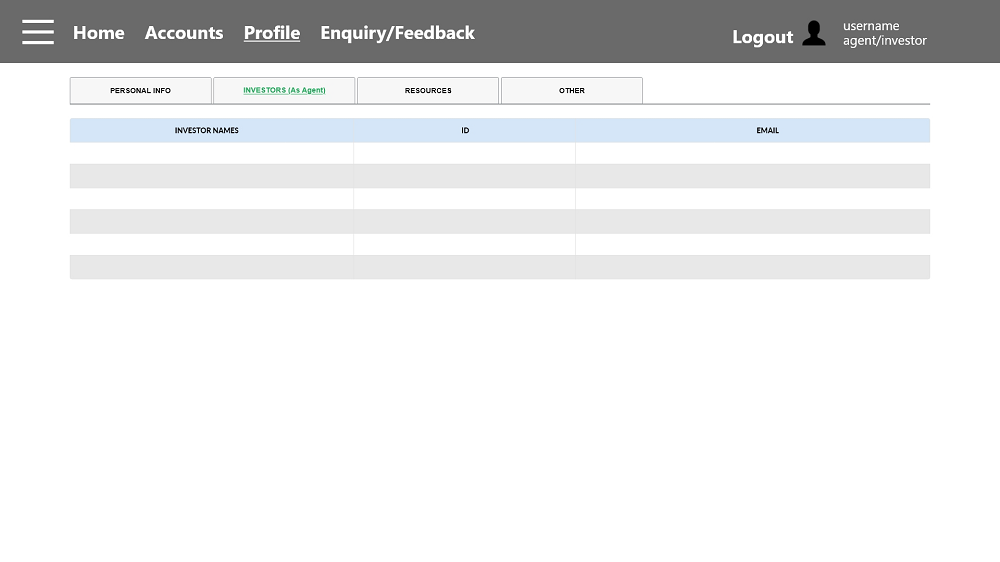
### 5.7 Personal Information in Profile Page



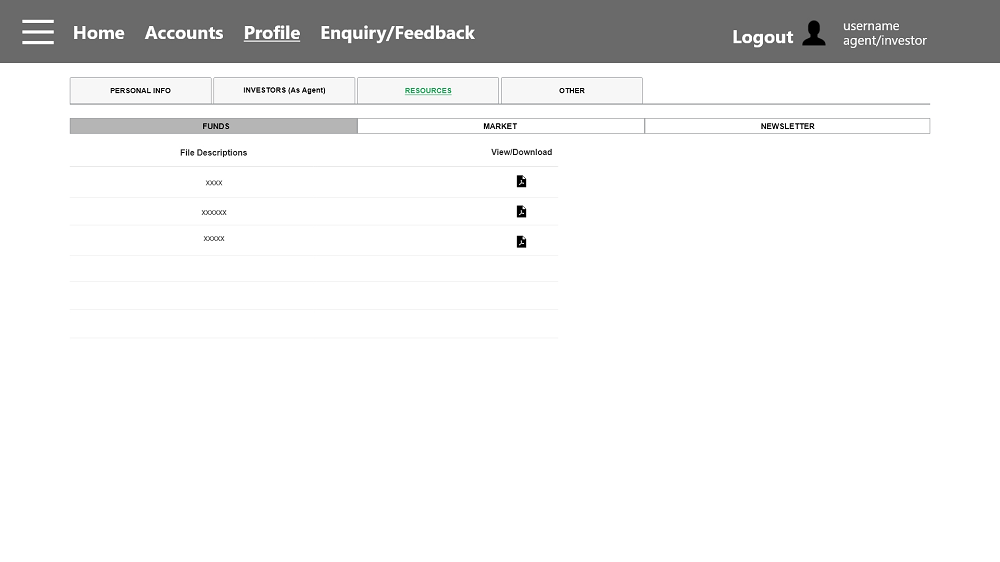
### 5.8 Agents Section (As Investor)



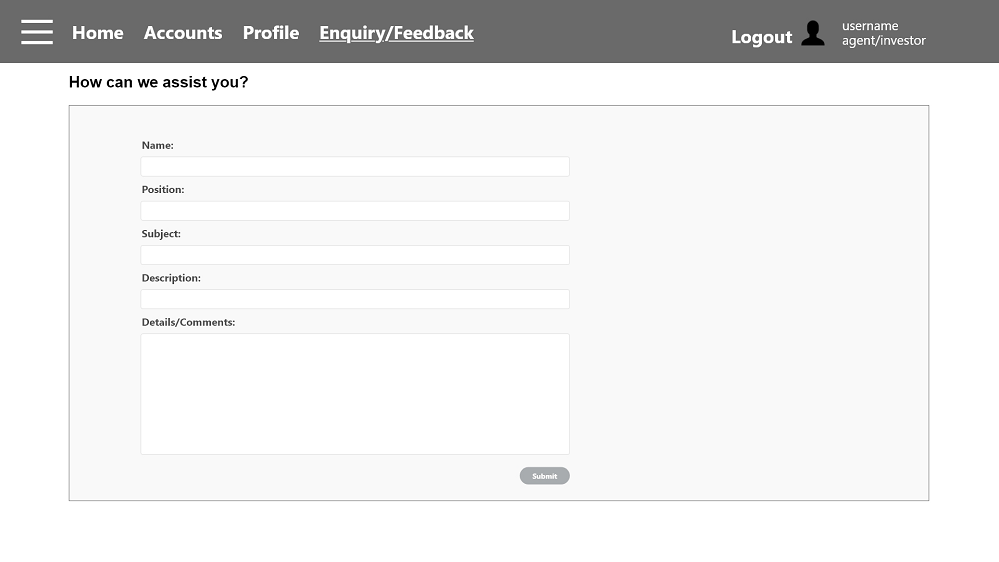
### 5.9 Investors Section (As Agent)



### 5.10 Resources Section in Profile Page



### 5.11 Enquiry and Feedback



## 6.0 Agency Portal Site Map

The following diagram below is an example of Agency Portal site map.

