2018 Citi Financial Innovation Application Competition

Demand analysis report

Title ： Li Jin--A REITs platform for securitization of housing lease assets

Captain： Chu Tianshuo

Tutor： Gao Ming, Sui Cong

School： Dongbei University of Finance and Economics

Contents

1. Purpose of the demand analysis report....3

2. Project introduction....3

3. System requirements....4

3.1 Expected function of the investor port....4

3.2. Expected function of the enterprise port....5

3.3.Expected function of the SPV port....6

3.4 Non-functional requirements....8

4. Prioritization of needs....10

5. System submodule detailed requirement description....11

5.1 object-oriented analysis model -- UML....11

5.2 system structure design and subsystem division....11

5.3 detailed design of system function module....11

5.3.1 Subsystem module design of financing company....12

5.3.2 Subsystem module design of SPV....17

5.3.3 Subsystem module design of investor....24

6. Relational model map....30

1. Purpose of the demand analysis report

The goal of the requirements analysis is to analyze and organize the “requirements” or “needs” proposed by the user for the development software, and to form a document that describes the complete, clear and standardized, and determine which functions the software needs to implement and what to do. In addition, some non-functional requirements of the software (such as software performance, reliability, response time, scalability, etc.), software design constraints, runtime and other software relationships are also the goal of software requirements analysis, we set out The demand report analysis of the “Li Jin--Residential Leasing Asset Securitization REITs Platform” project, which is the software specification. The intended readers of this manual are customers, user documentation writers, project managers, requirements analysts, and testers.

2. Project introduction

Name of the project to be developed: Sheet Metal--Residential Leasing Asset Securitization REITs Platform.

The meaning of the project name: The reason why the platform is named "Li Jin" has its unique meaning. “Li Jin” comes from the years of gold, which means that time will encourage those noble, lasting things or qualities. And "Li" has the meaning of honing, meaning that the platform is honed and growing.

Project creator: Home team

Project Developer: Home Team

User group: There are three ports in the sheet metal, namely the enterprise side, the investor side and the SPV side.

First, the enterprise is oriented to real estate enterprises with financing needs. The platform focuses on asset securitization for long-term rental apartments, and integrates and grades specific portfolios or specific cash flows provided by real

estate companies in a specific way. Asset-backed securities are issued, and investors then subscribe for REITs.

Secondly, the investor side is oriented to investors with investment needs. Li Jin explores the path of REITs with Chinese characteristics under the state's policy of supporting the development of long-rent apartment asset securitization.

Thirdly, the SPV terminal is aimed at the operation manager of the platform. The operation manager can comprehensively master the enterprise risk situation through the SPV terminal, complete the fund classification and issuance, and master the fund dividend situation through this port, so as to better protect the rights and interests of investors in the future.

3. System requirements

The purpose of system requirements is to investigate and study the system, and the developers have a clear and profound understanding of the system's functions and goals, and a series of constraints on the system.

Li Jin platform is composed of two ports (investor terminal, enterprise terminal) and one back end (SPV design supervision terminal).

It provides different platform subsystems for different users.

3.1 Expected function of the investor port

The investor side of li jin platform provides efficient and convenient asset-backed securities trading platform for all kinds of investors to meet their financial demands.

1. Check the information of enterprises in real time

Investors can quickly obtain financial information of all enterprises on the platform, risk status, regional housing price trend and user evaluation of renting. At the same time, the platform will make relevant information of enterprises that have set up REITs funds transparent to ensure fairness, fairness and openness, and protect investors' economic interests.

2. The subscription of the REITs

After completing personal information on the platform, investors can obtain information of REITs fund products and detailed information of related enterprises, which is convenient for investors to purchase REITs fund.

3. Grasp the risk measurement index of the invested enterprise in real time

Platform using the stereo sound risk control system to measure the enterprise's financial risk index, the default risk and environmental analysis index, investors can be on the platform in time to see the three companies risk measurement index, comprehensive understanding of the enterprise the management situation, forecast investment fund, the profit and loss, and adjust their own investment decisions.

3.2. Expected function of the enterprise port

The enterprise port of Li Jin platform designs REITs special plans for qualified real estate enterprises, such as hotels, long rented apartments and squares, to meet the financing needs of enterprises and expand the REITs market in China.

1. Submit financing applications in real time

When an enterprise has financing needs, it can submit its own financing application at the enterprise end of li jin platform at any time, and the background will process in time and notify the financing enterprise with the result of auditing information.

2. Real-time understanding of REITs fund status

When the enterprise gets the notification of access platform, the platform will determine the issuance scale of REITs fund according to the enterprise's future cash flow prediction and value valuation, and feedback the information to the corresponding enterprise in real time.

3. Check the quantitative indicators of business risk

By combining big data analysis technology and various statistical methods, the company analyzed the external environment, internal environment, financial

statements and stock price volatility of listed companies, and then fitted the financial risk index, default risk index and environmental analysis index. Enterprises can check the quantitative index of their business risks from the platform at any time, understand their risks from various aspects in a timely manner, and adjust their business activities.

4. Optimized upgrade and repayment prompt system

On the enterprise end of the platform, the enterprise can check its risk index, expected dividend, remaining term and amount of repayment in real time, and receive overdue warning when the dividend is not paid on time. The enterprise terminal will send a series of possible credit enhancement trigger measures to the enterprise according to its real-time risk index and credit enhancement trigger conditions. Enterprises can adjust their production and operation strategies and capital turnover arrangement accordingly to prevent the occurrence of default conditions caused by insufficient capital liquidity on the dividend distribution day, resulting in the decline of their credit rating.

3.3.Expected function of the SPV port

The SPV terminal of li Jin platform effectively realizes the process of the overall construction of REITs fund, and at the same time ensures that SPV, as an intermediary, understands and grasps the overall information of financing parties and investors, monitors corporate risks in real time, and provides fair and equitable disclosure information.

1. Credit status analysis

According to the relevant financial statements submitted by enterprises, the platform designs the access mode of machine learning and evaluates the indicators of the enterprise's debt paying ability, operation ability, profitability, growth ability and other indicators by online auditing and offline auditing, so as to select the enterprises that meet the standards and guarantee the stable operation of the REITs fund.

2. Reasonable valuation of REITs fund

The SPV terminal embedded the financial model into the background operation, estimated the value of REITs funds of corresponding enterprises, and based on this, conducted market research on investors and determined the issuance scale of REITs funds on the basis of combining the asset rating agencies and the company's intention of financing.

3. Risk monitoring and credit enhancement notification

The back-end SPV terminal has established a three-dimensional and perfect risk control system through the monitoring of enterprise operating conditions and real-time environmental monitoring. Meanwhile, a set of credit trigger mechanism and a series of credit enhancement measures are designed to protect the interests of REITs fund investors. Such as the introduction of priority liquidity support, margin mechanism, the termination and withdrawal arrangement of priority special plan shares, margin payment commitment, etc. The platform will notify the enterprise of credit enhancement and monitor the account according to the corresponding situation.

4. Historical data integration and analysis

By sorting out the historical data of REITs fund or completed REITs fund project, relevant data of fund supply and demand of enterprise end and investor end are obtained to understand the operation status of REITs fund in real time, summarize the problems in each stage and make improvement.

5. Check and release information announcement at any time

The SPV terminal has the information management function, which not only can timely check the previously published announcements, but also can send edited announcements to designated customer groups, including fund opening, dividend repayment and other announcements.

6. Optimize the customer management function to view customer information

at any time

The background management system of li jin platform can check the basic information of investors and financing enterprises at any time and lock the user information to prevent managers from inadvertently operating the database of customer groups.

3.4 Non-functional requirements

(1) Technical requirements:

Hardware equipment:

1) Processor: core frequency 1.73GHz or higher

2) Memory: DDR4 capacity is 8G or higher

3) Hard disk: 256g capacity hard disk or higher

Software configuration:

1) Windows 10

2) Install browsers that support HTML5.0 standards, such as Chrome and Firefox

3) Tomcat 8.0, Eclipse Mars1, jdk1.8.0_91 and later

4) Anaconda 2 and higher

5) My SQL5.7 and higher

6) Office 2010 or 2016 applications

(2) Performance requirements:

1) both data ends use a database at the same time, so the database must be updated in a timely manner, can automatically backup data, allow multiple users to access synchronously, prevent unauthorized access without access permission, and respond quickly to user operations.

2) The application can quickly respond to user requirements; Handle expected user load and have spare capacity; The number of transactions required by the firm to

handle the business; Under expected and unexpected user loads, the application runs stably.

3) The system can clearly distinguish different user permissions; There will be no user conflicts in the system; The system will not error because of changes to the user's permissions.

(3) Availability requirements:

As the project involves three ports: individual investor terminal, enterprise terminal and SPV terminal, the three ports are relatively independent but correlated with each other, and all directly interact with the database. Therefore, the system has relatively high requirements on the database. The database of this project adopts the My SQL5.7 system. The stability, security and efficiency of the database are well guaranteed. The project programmer can easily and quickly establish, modify and view the database information.

(4) Reliability requirements:

No error should occur during normal operation, and the database must be kept intact if an unrecoverable system error is encountered during operation.

Problems encountered during debugging and solutions:

A. when the function page is opened and the program error is prompted: reload the page. If another error occurs, the user can submit the error report manual to the administrator

B. when pages take too long to load or fail to load: make sure the network is open, confirm that IE9.0 and later are installed, or that browsers like Chrome and Firefox support HTML5.0 standards, and reload the page

C. The system prompts that the blank record or record field does not exist: check the corresponding tables and fields of the database, ensure the data exists and is correct, and debug the corresponding programs

(5)Security requirements: able to resist hacker attacks, ensure that user data will not

be lost, and prevent hacker violence registration; Users can log into the system through their account and password only if they have relevant rights. Users of any role can only view information related to themselves and cannot steal or browse other confidential information.

4. Prioritization of needs

Once we have fully understood the requirements of the system and the detailed model of the requirements has been designed, it is critical to determine which system requirements and technical requirements are critical to the system. In the case of limited resources, the analyst needs to evaluate and prioritize the functions proposed by the user, otherwise the requirements of the system will be continuously inflated with the requirements of the user.

In order to curb the expansion of demand and force the project to be completed on time, we will prioritize the following four criteria

Levels:

(1) User experience (users do need it and are supported by data)

(2) Business value (with theoretical and practical basis)

(3) Architecture planning (with strong scalability, the system will not be too complex in the early stage, and it can be flexibly matched in the future)

(4) Priority order (priority order at the business level, priority order at the technical level)

After determining the classification criteria, we can classify the requirements according to the idea of decision system. First of all, for the entire platform, the most important thing is the access control, classification and pricing issuance of the entire asset pool by SPV. Secondly, how can we help enterprises to reduce financing costs and shorten financing time? Next is how to realize the free trading of funds in the secondary market on the investor side, how to enhance the liquidity of funds and

how to reduce the risk of funds; Finally, enterprises submit financing applications, purchase funds in the primary market and the post-loan management of SPV terminal details. Advance and improve the project according to the above priority, so that the service content, performance level and realization efficiency are optimized.

5. System submodule detailed requirement description

5.1 object-oriented analysis model -- UML

UnifiedModelingLanguage (UML, UnifiedModelingLanguage) is a standard modeling language for object-oriented software. UML has become an industry standard for visual modeling language because of its simplicity, uniformity, and its ability to express dynamic and static information in software design. In the development process of software radio system, unified modeling language can be used in the whole design cycle to help designers shorten the design time, reduce the cost of improvement, and optimize the software and hardware segmentation.

5.2 system structure design and subsystem division

Li jin platform adopts the User Story in UML to describe the planning system, that is, a short specification description of a function module of the system from the User perspective. According to the different roles of the system, we divide it into the following four subsystems: enterprise terminal system, investor terminal system, SPV terminal system, and data maintenance terminal system.

5.3 detailed design of system function module

Using object-oriented design method, according to the different roles of the system by the User Story functional division, and use the use case diagram of the function of the system, subsystem, or class behavior modeling, describes the system's overall structure, function and call each other relations between the various modules, with activity diagrams clarify the working process of each module business use cases.

5.3.1 Subsystem module design of financing company

The subsystem of financing company is divided into three modules: application financing module, financing record module and account management module. The following three modules are introduced in detail.

1. Application for financing module

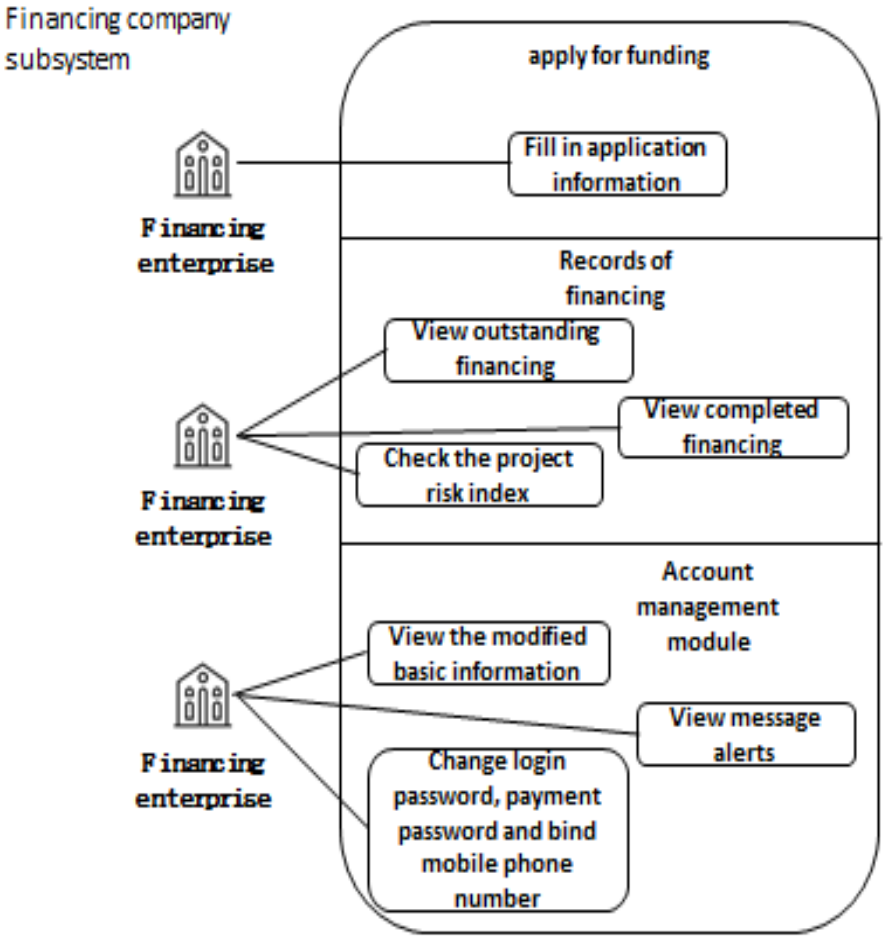
Enterprises in need of financing first need to register company information, legal person information and personal information on the platform, and then log in the platform after successful registration. Fill in the specific information such as the amount of financing and the term of financing in the "I want financing", submit the financial statements for review, and fill in in the remarks that the financing purpose has already been raised needs to be explained. After filling in the application data, it will be automatically sent to the backstage, and the platform will send special personnel for review. If there are any problems, we will get in touch with the financing enterprise in time.

2. Financing record module

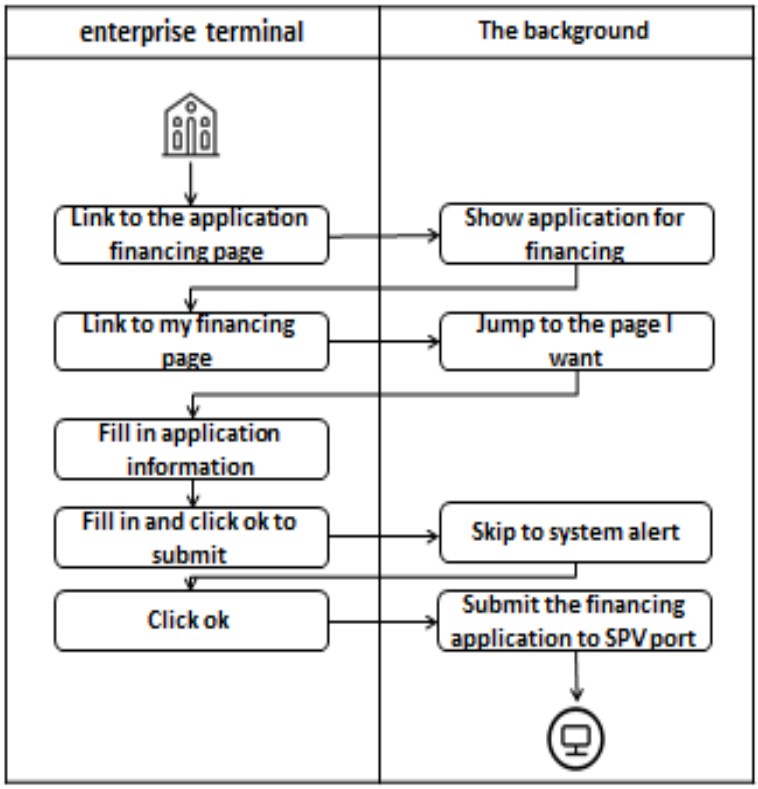
Financing company can check the "financing record" of the enterprise terminal of the gold platform to see the outstanding financing and completed financing. If the application materials submitted by the enterprise are in the audit stage or in the financing process, the enterprise status shall be checked in the unfinished financing; if the enterprise financing is completed or fails, the enterprise status shall be checked in the completed financing. The platform records the basic financing conditions of financing enterprises, including target amount, financing amount, dynamic risk index (including financial risk index, environmental risk index and default risk index) and other information. It is convenient for enterprises to know the risk status of the company in time and adjust the strategic countermeasures in time, which is conducive to the development and safety and stability of financing enterprises.

3. Account management module

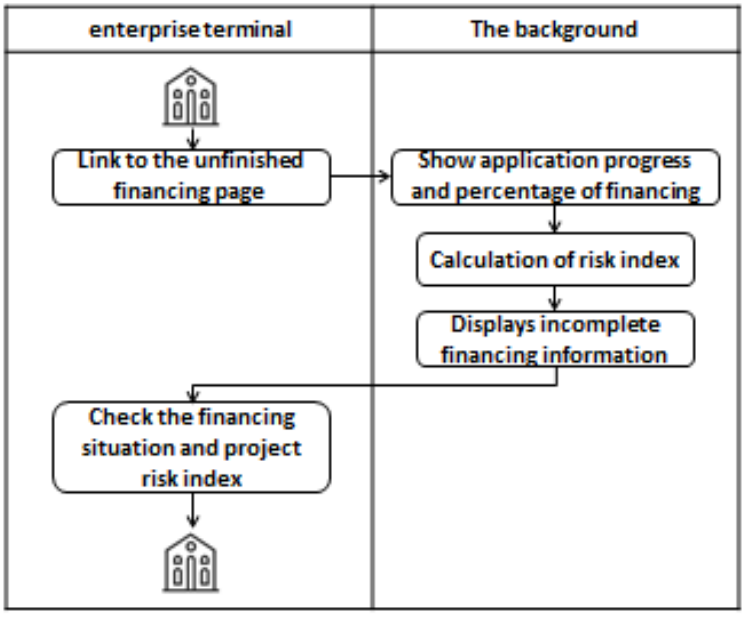
Financing enterprise can check and change the registration information through "account management". If the basic situation of the enterprise changes significantly, it is necessary to change the registration information on the platform in time. In addition, you can also check emails and other information to remind you that when various situations such as dividends and open REITs occur, the enterprise can timely receive emails sent by the background, which makes it more convenient to view the information. The financing enterprise can also change the login password, payment password and binding mobile phone number in "account management", improve the security of the account and solve the problem of password forgetting.



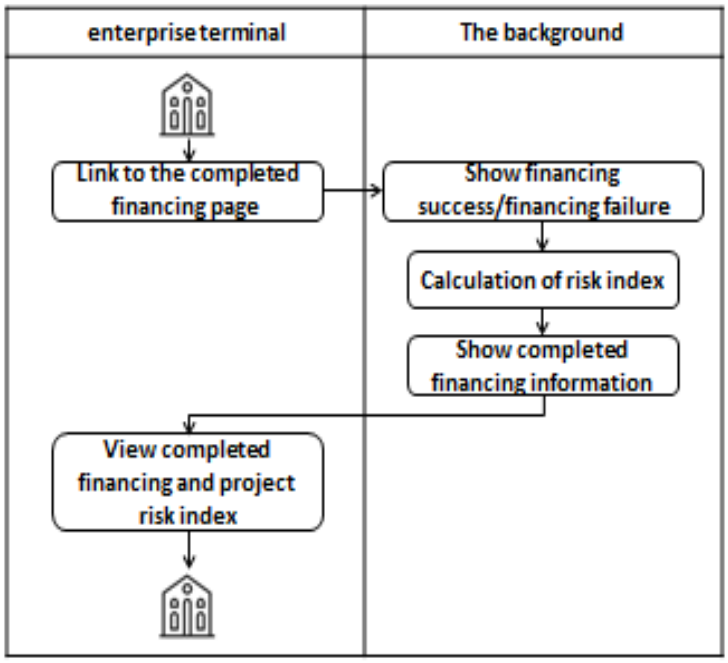
To apply for funding



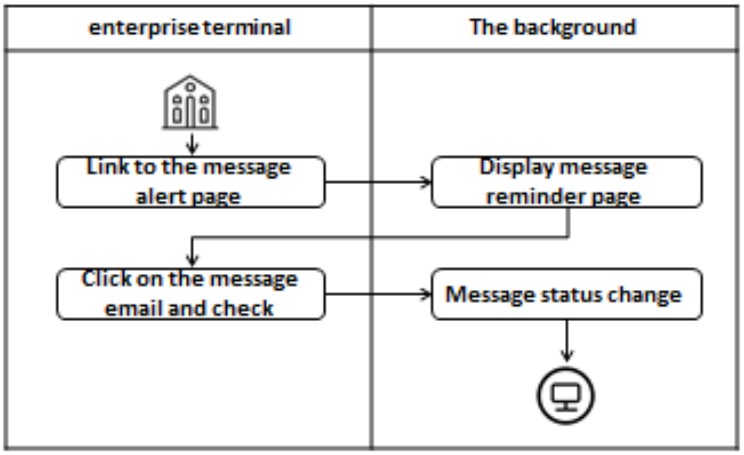
View outstanding financing



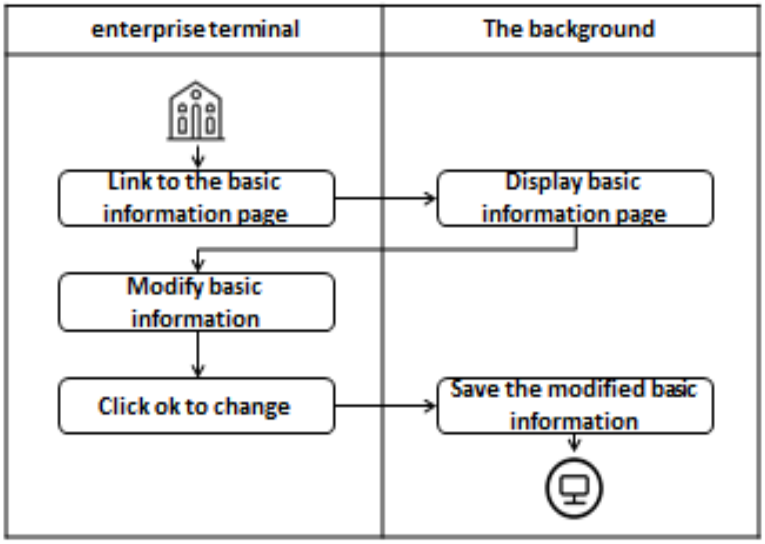
View completed financing



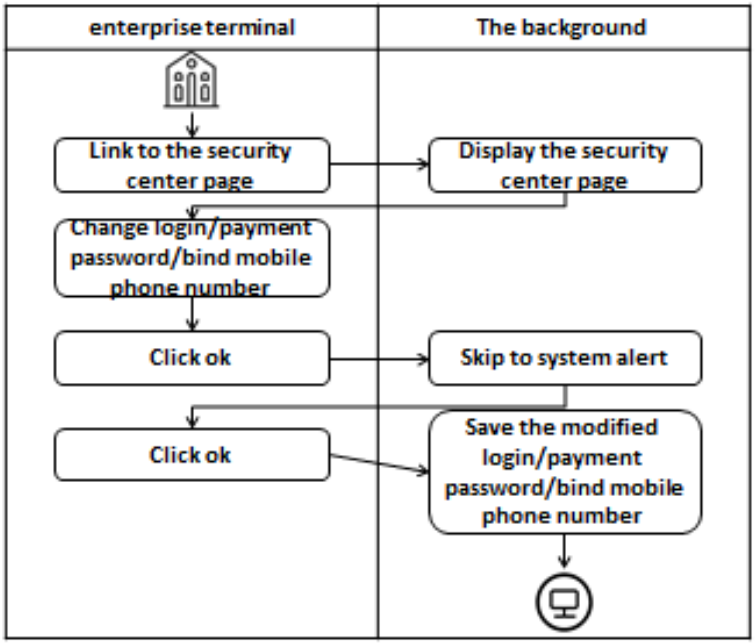
View message tips



View and modify basic information



Change login password, payment password and bind mobile phone number



5.3.2 Subsystem module design of SPV

This part is divided into the following parts: asset audit module, asset management module, information disclosure module and security center module

1. Asset audit module

The back-end administrator can view the basic information registered at the time of enterprise registration on the platform, including the basic information submitted when the enterprise applies for financing, such as financing term, financing time, financing amount, financial statement, etc. In addition, the back-end administrator can also see the basic information of the enterprise that has been audited for easy management.

2. Asset management module

Back-end administrators can see the grading, distribution, openness, and dynamic risk control indices of REITs. The dynamic risk control index includes financial risk index, environmental risk index and default risk index, which facilitates the backstage personnel to timely understand the operating risk status of the financing enterprise.

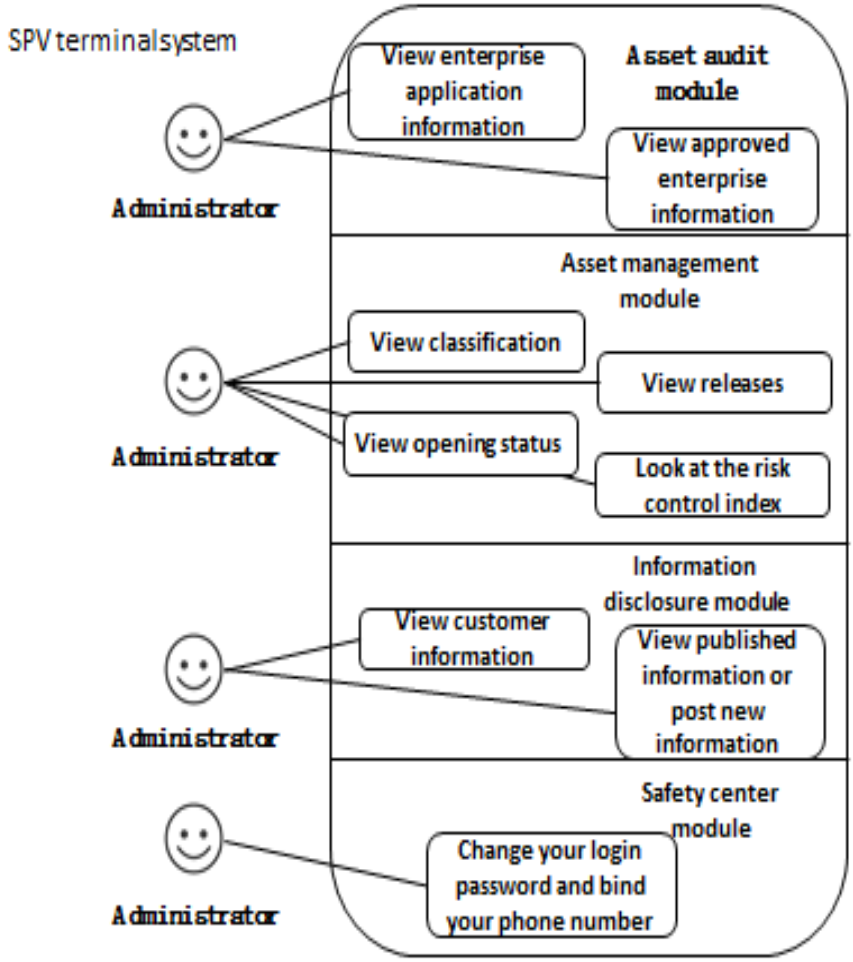
3. Information disclosure module

The information disclosure module is mainly used for backstage management personnel to view the basic information of registered customers, and can view the information published and release new information in the information disclosure module. When new REITs are issued, classified and open, the back-office manager can remind the enterprise and investors through the announcement (in the form of email), which is more convenient and quick.

4. Security center module

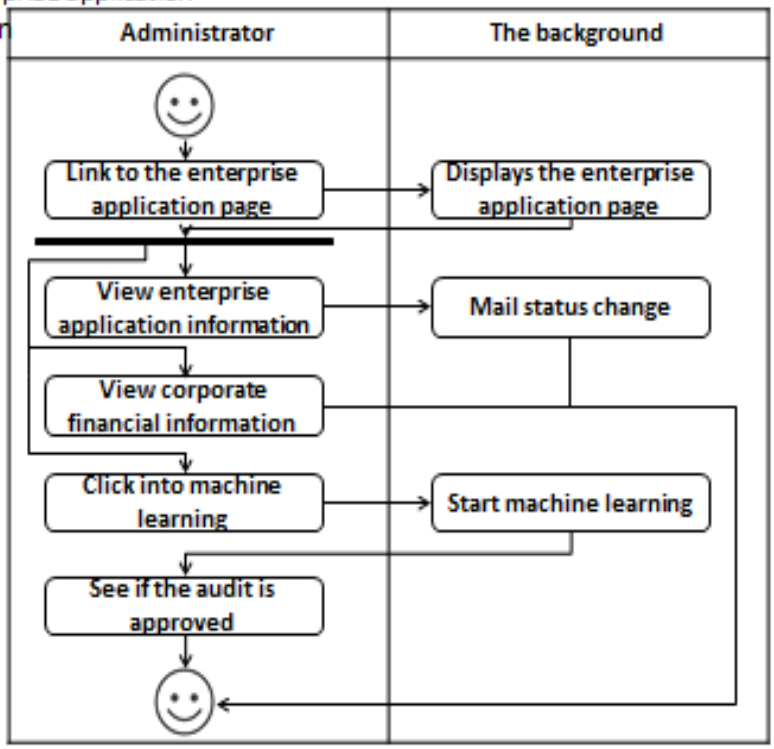
The security center module is mainly used for back-end managers to modify passwords and bind functions of mobile phones. The back-end managers modify the original password by filling in the old password and the newly created password;

When changing the phone number, the contact information left on the platform can be modified through the security center, which is more secure and convenient.

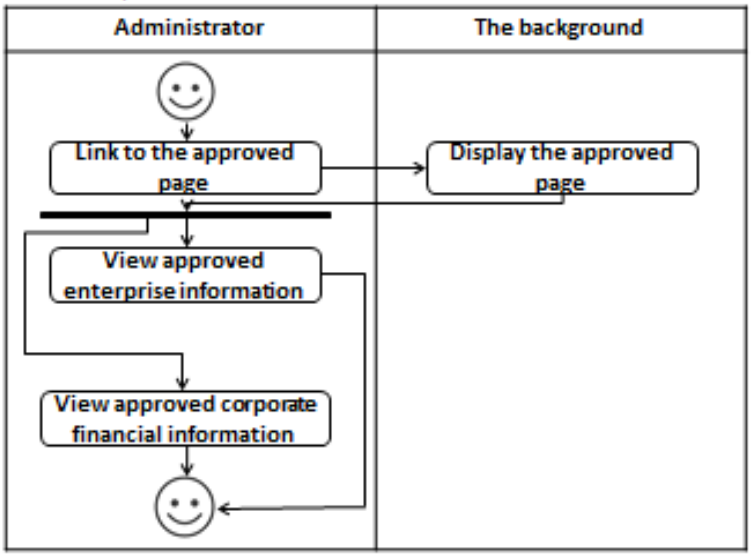


This part is divided into the following parts to introduce the SPV subsystem: login/account cancellation module, view home page module, fund issue module, post-loan management module, market-maker management module and data maintenance module.

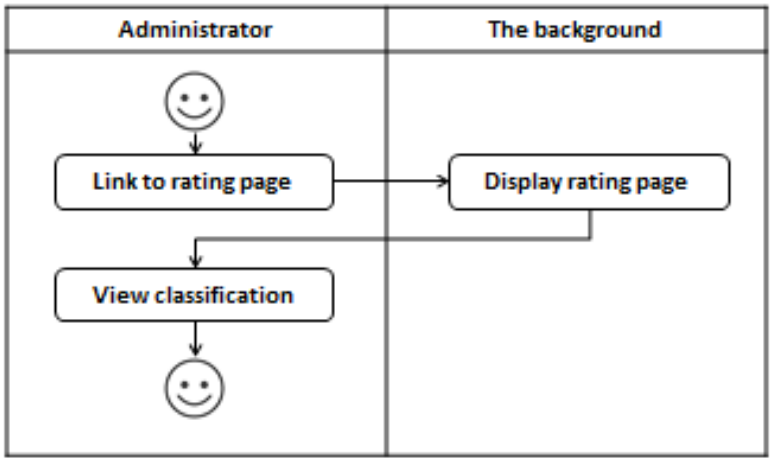
View enterprise application information



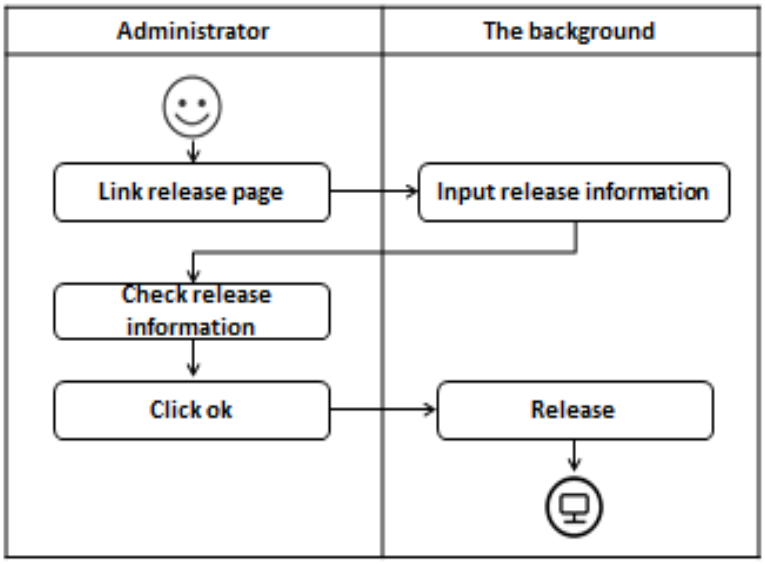
View approved enterprise information



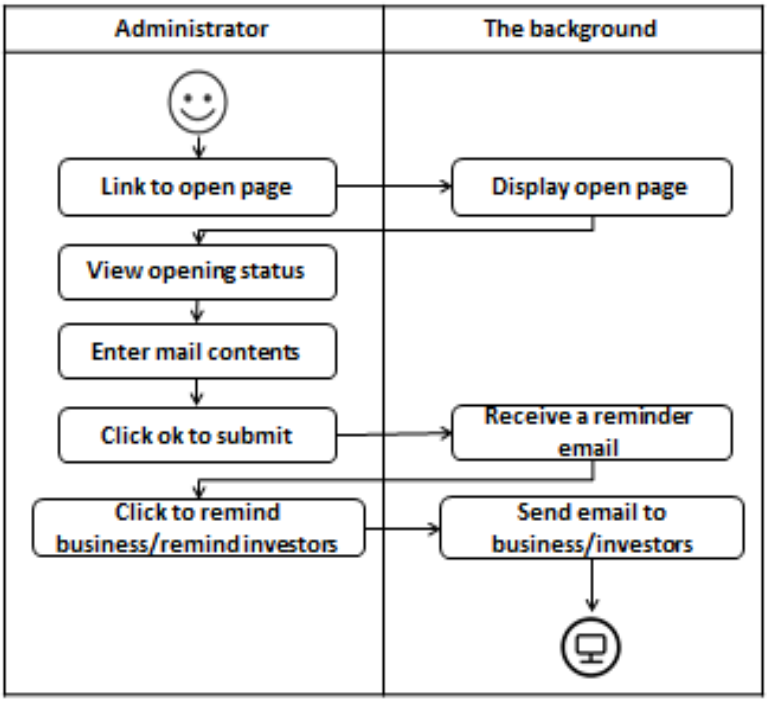
View classification



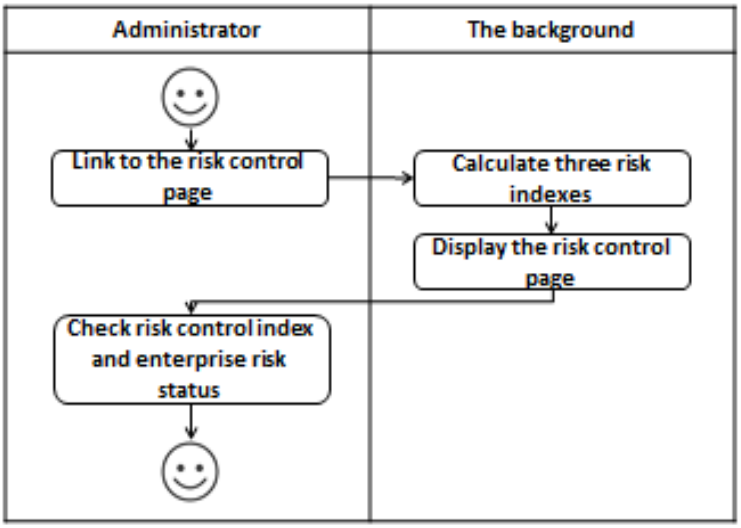
View releases



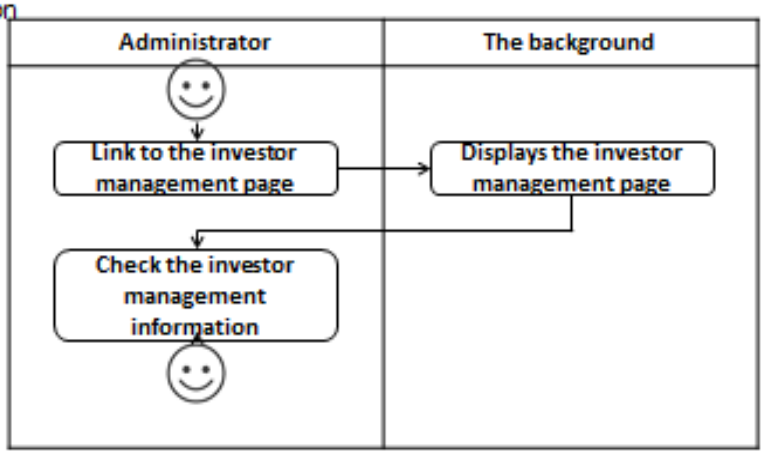
Opening



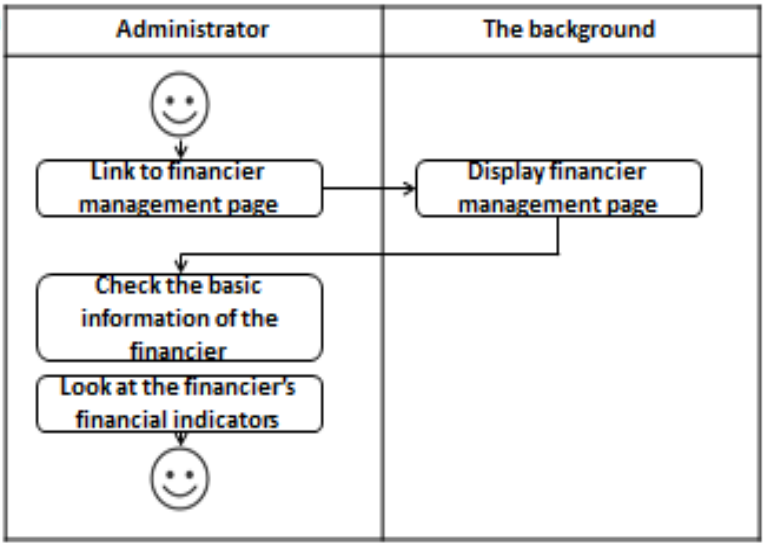
Looking at risk indexes



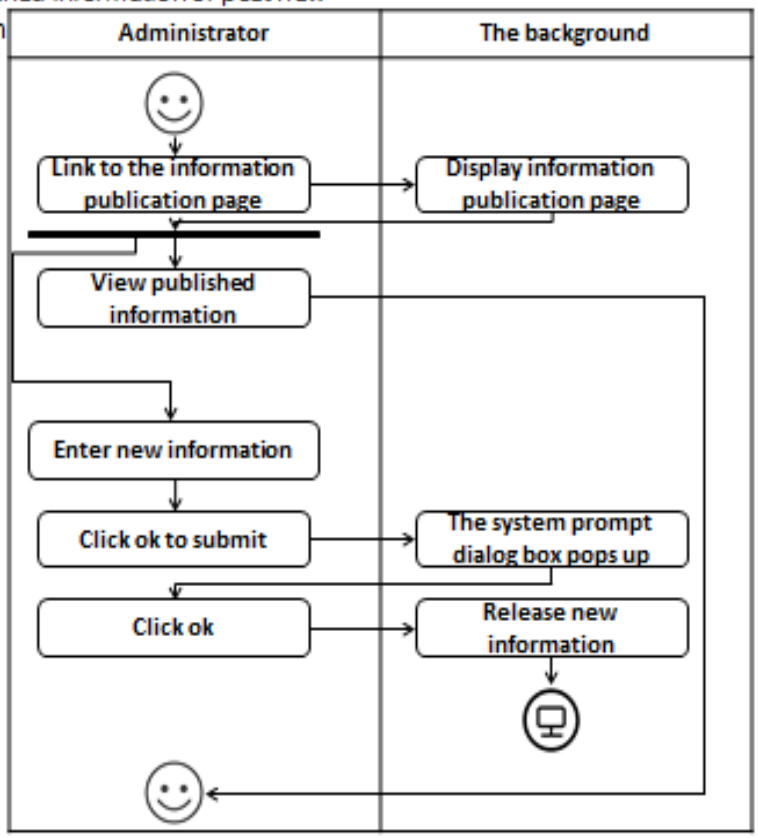
Check the investor management information



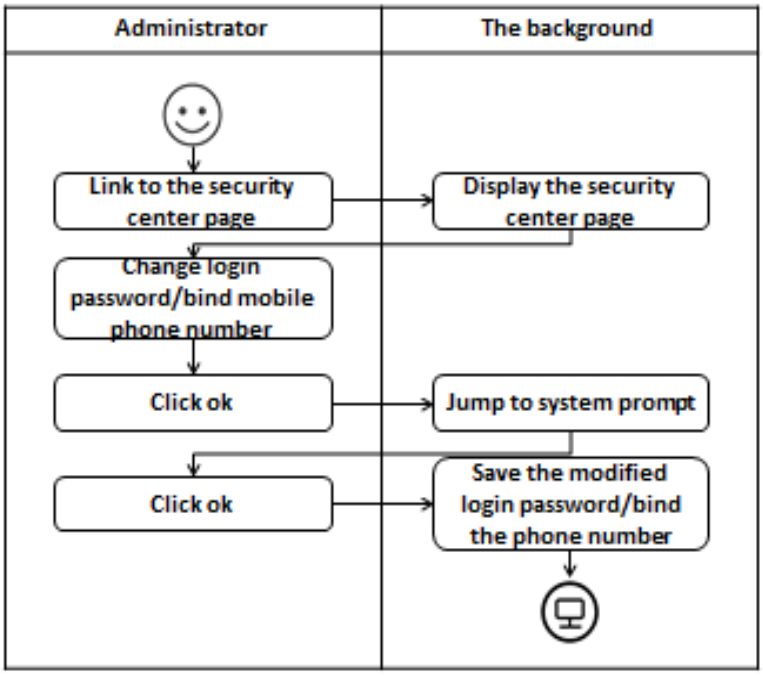
View financier management information



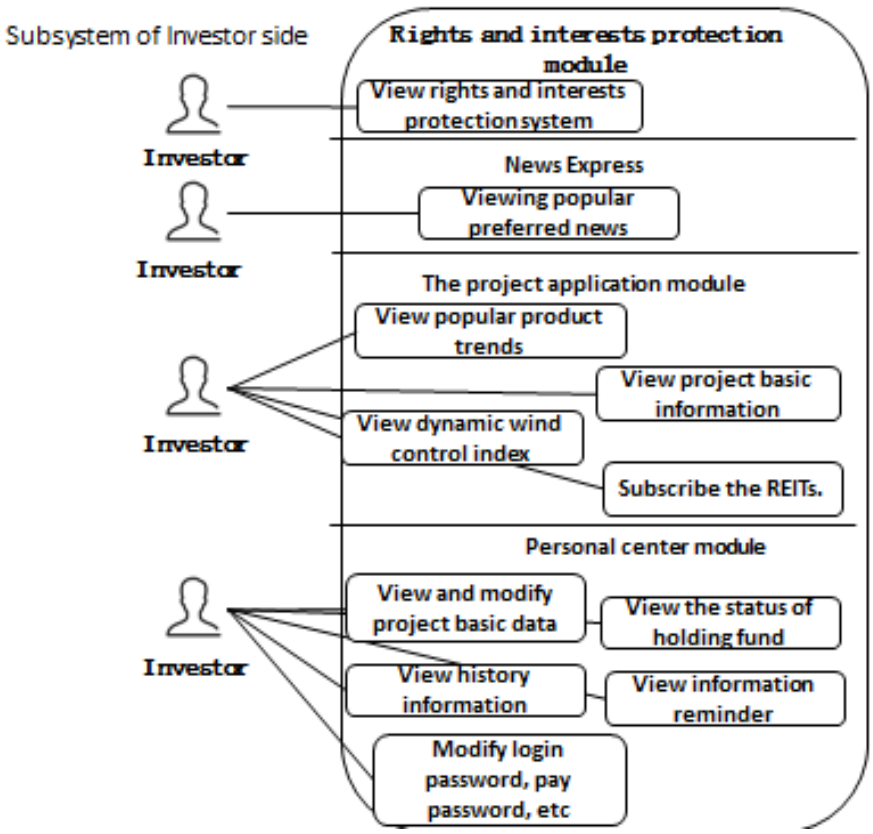
View published information or post new information



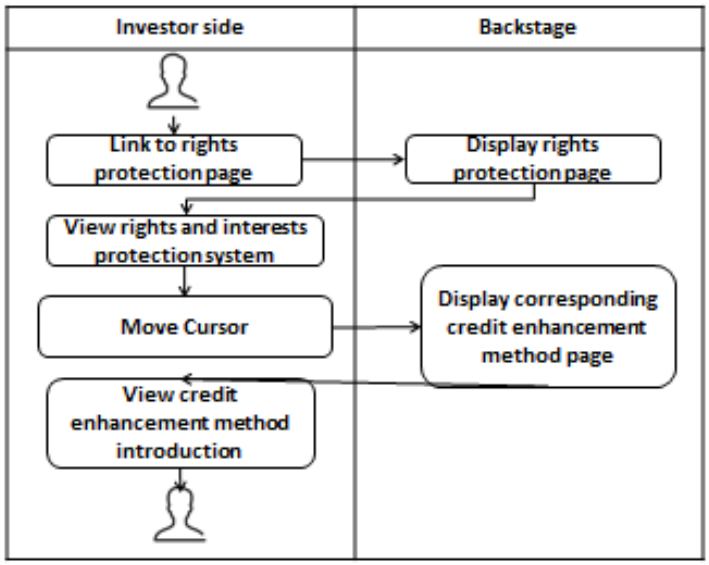
Change login password and bind phone number



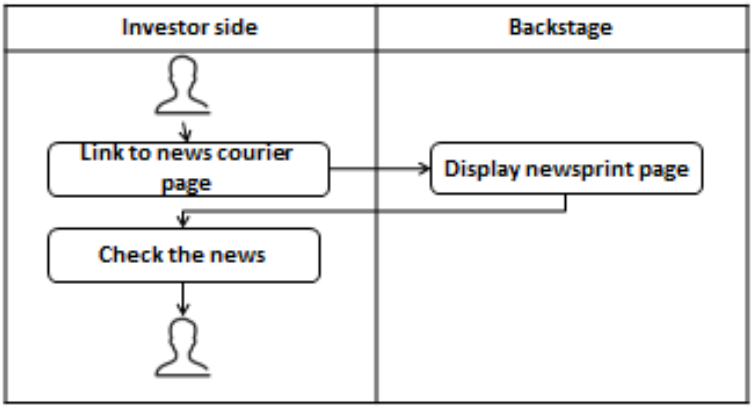
5.3.3 Subsystem module design of investor



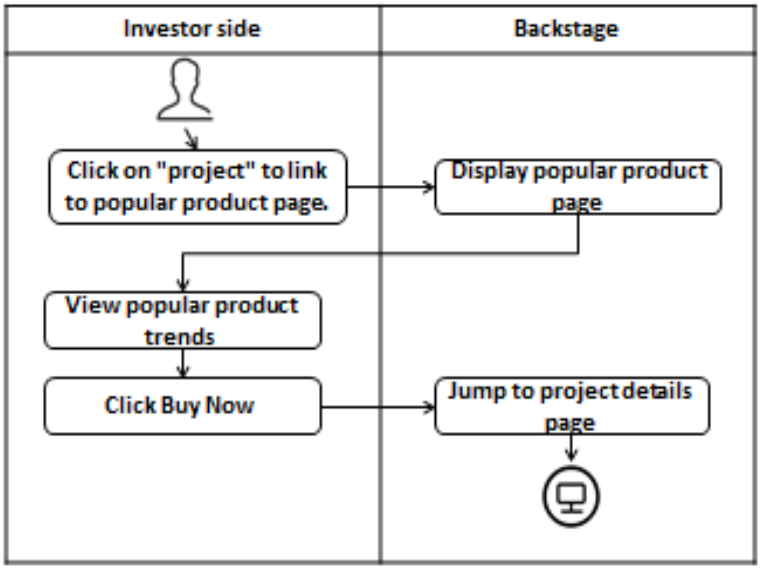
The activity chart of rights and interests protection system



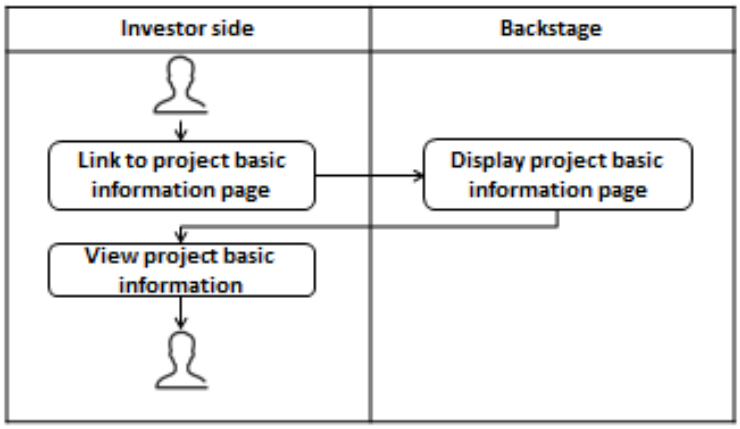
View popular product trends



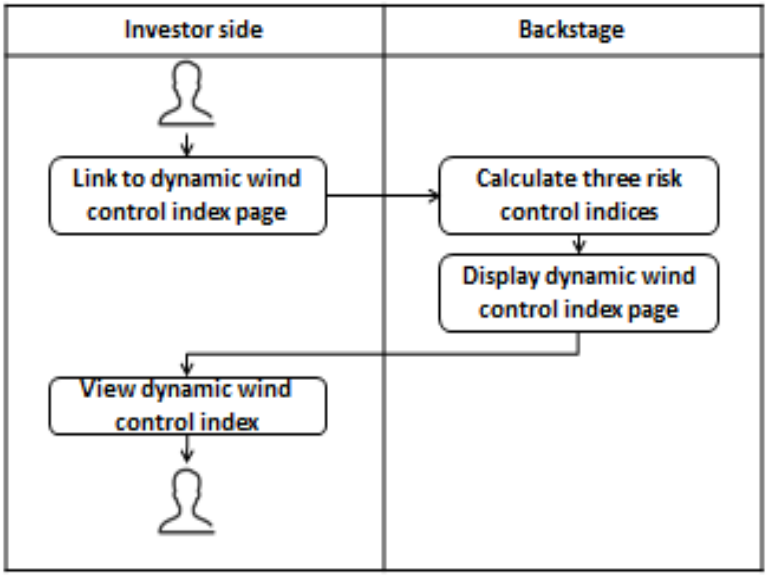
View active product activity diagram



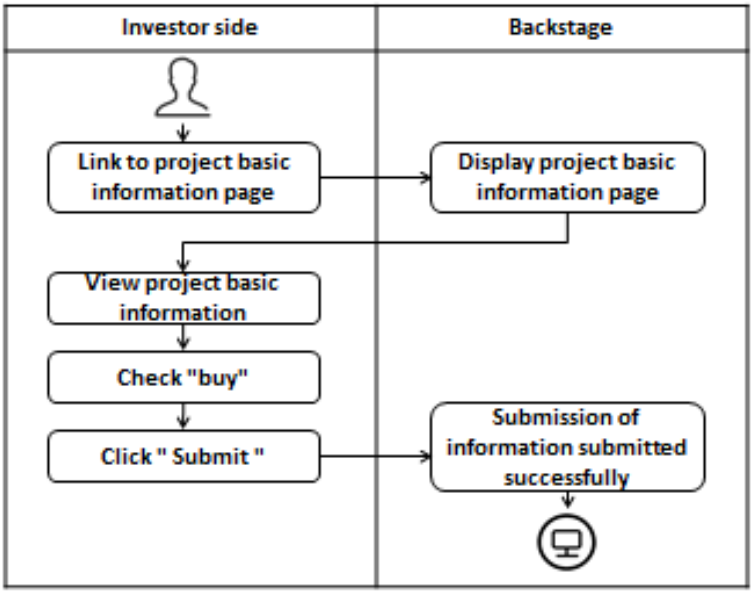
View activity diagram of project basic information



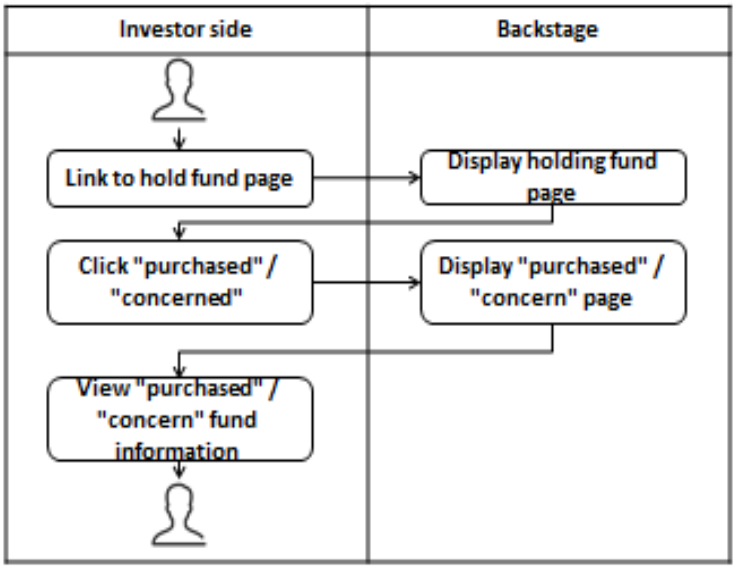
View activity diagram of dynamic wind control index



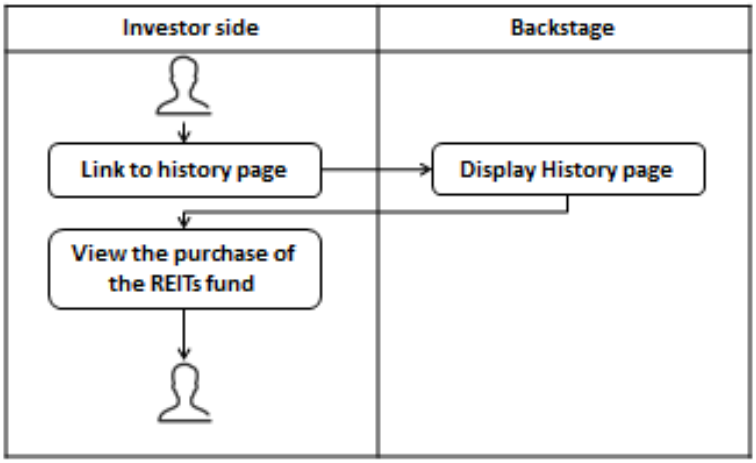
Activity plan for purchase of REITs fund



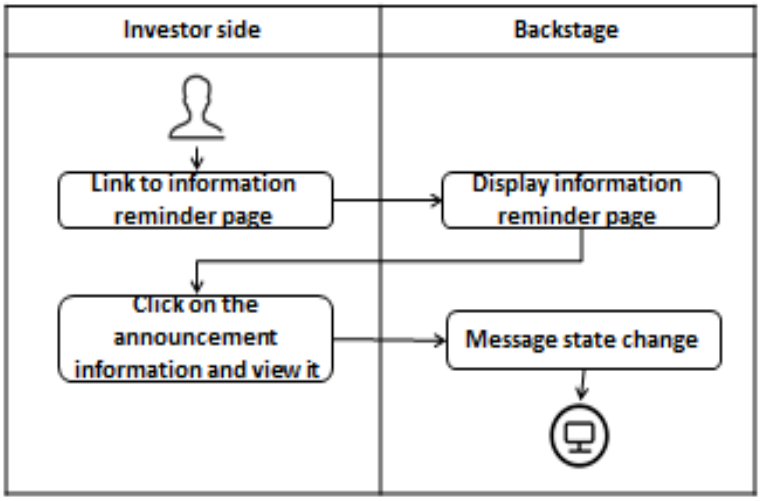
View activity chart of holding fund



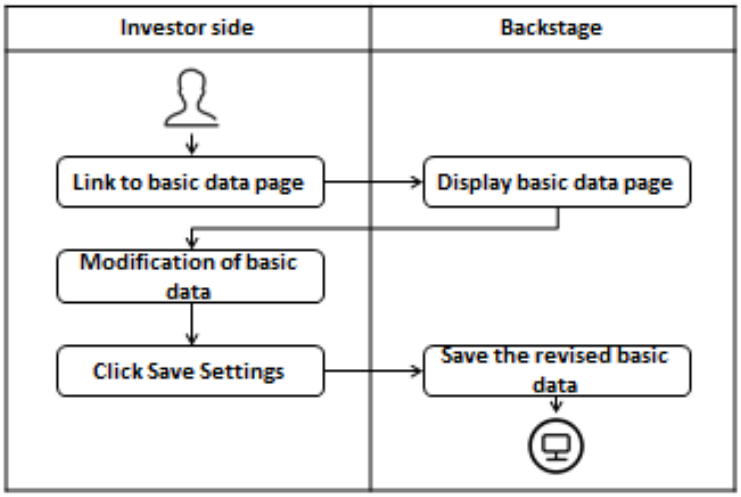
View activity charts of historical records



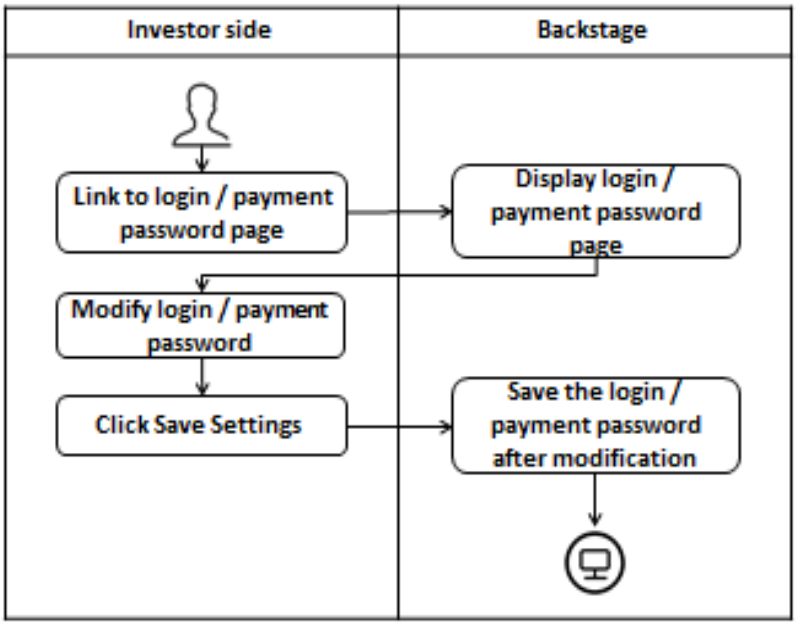
View activity diagram of information reminder



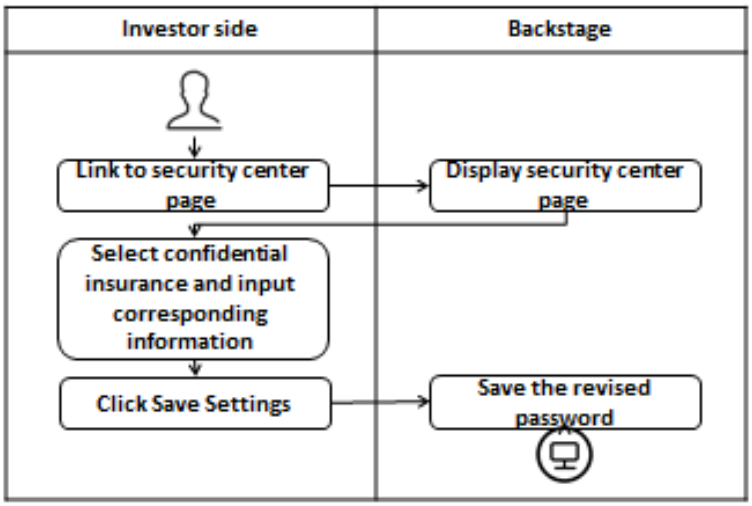
Activity diagram for viewing and modifying basic data



Activity diagram for modifying login password and payment password



Modification of activity diagram for secret insurance



6. Relational model map

In the project development plan, we introduced powerful UML, a standard modeling technique in current object-oriented programming. In previous relational database designs, the standard way to create a database logical model is to use an entity relationship model (ER model). The central idea of the ER model is that an organization's data model can be rationally represented by entities and their relationships. But doing so seems to simplify the message of an organization, and the vocabulary is far from adequate. So for this modeling, the platform adopted a more flexible and robust UML model to replace the ER model, built the business model and mapped it to table usage.