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|  | **MINISTRY OF EDUCATION AND TRAINING** |

**FPT UNIVERSITY**

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| Capstone Project Document | |
| **Peer-to-Peer Lending System** | |
| **Group 10 - IS** | |
| **Group members** | Nguyễn Trung Dũng – SE62576 (Leader)  Huỳnh Văn Lộc – SE62291  Lê Ngô Minh – SE62705  Ngô Hoàng Đông – SE6 |
| **Supervisor** | Nguyễn Huy Hùng |
| **Ext. Supervisor** | N/A |
| **Project Code** | PPLS |

– **Ho Chi Minh City, 13 May, 2019** –

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# Introduction

## Project Information

* Project name:  **Peer-to-peer Lending System**
* Project Code: **PPLS**
* Product Type: **Website Application**
* Start Date: **May 13rd, 2019**
* End Date: **--**

## Introduction

These days, borrowing money is no longer strange. Borrowing money to invest in a project or to buy something like washing machine, phone, etc … that can be seen every day around our lives. However, borrowing money from banks still exists many cumbersome procedures that make borrowers encounter many difficulties in borrowing money. Moreover, whether transactions can be changed, or even deleted to protect an individual may cause someone to be guilty.

In this document, we introduce a solution to make loan transactions transparent, a web application called Peer-to-peer Lending System. This Peer-to-peer Lending System helps people borrow money directly by making an agreement with the lender, from which all transactions will be stored on the Blockchain and viewed by anyone in the system.

## Current Situation

As mentioned in the introduction, borrowing money causes many difficulties for borrowers because many procedures need to be authenticated by the authorities. This makes many people in urgent need to earn illegal money such as interest loans.

Also, trust between people and people is still deficient to be able to lend directly between two people. That's why creating trust among people is a necessity.

## Problem Definition

Below are the disadvantages of the current situation:

* Currently, if you want to borrow money from the bank, you need a lot of documents, as well as many complicated procedures. Not to mention whether you are approved for a loan after going through a customer appraisal step.
* The current interest rate is quite high. For unsecured loans VPBank from 15.91-21% / year, TPBank from 8.28 - 17% / year, ACB up to 22% / year. As for mortgage loans, about 5-12%/year.
* The amount can be borrowed from the bank is not too much. The maximum limit of banks falls between 300 million VND and 1 billion VND.

## Proposed Solution

We will build a website using blockchain to reduce the time of borrowing money from banks and increase the borrowing limit to higher than the current banks. Features will be implemented in the system:

### **5.1 Feature functions**

* Create requirements to borrow money from people who need to borrow money.
* Create and set the necessary milestones in borrowing as well as the most appropriate payments created by borrowers and lenders.

### Store transactions using blockchain.

### Use online payment gateways for transferring loans as well as paying such as Paypal, Ethereum, Momo, ...

### **5.2** **Advantages and disadvantages**

The advantages and disadvantages of the proposed solution:

* **Advantages**:
* Optimize time to do loan procedures.
* The loan limit is not dependent on banks so the limit may be much higher.
* **Disadvantages**:
* There are still risks when lending.

## Functional Requirements

Function requirements of the system are listed below:

**6.1 Admin:**

* Admin can approve, activate, or deactivate the account.
* Amin can view list users.

**6.2 Authorized User:**

* User can create a borrowing request.
* User can detect a borrowing request.
* User can view detail of a request.
* User can accept request after view detail.
* User can make a deal with the chosen request.
* User can view all transactions.

**6.3 Guest:**

* User can sign up a new account.
* User can log in into the system.
* User can view all transactions.

## Role & Responsibility

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **Full Name** | **Role** | **Position** | **Contact** |
| 1 | Nguyễn Huy Hùng | Project Manager | Supervisor | hungnh@fpt.edu.vn |
| 2 | Nguyễn Trung Dũng | Developer | Leader | dungntse62576@fpt.edu.vn |
| 3 | Huỳnh Văn Lộc | Developer | Member | lochvse62291@fpt.edu.vn |
| 4 | Lê Ngô Minh | Developer | Member | minhlnse62705@fpt.edu.vn |
| 5 | Hoàng Nhật Đông | Developer | Member | donghnse62357@fpt.edu.vn |

# Software Project Management Plan

## Problem Definition

* 1. **Name of this Capstone Project**
* Official name: Peer-to-Peer Lending System Based on Blockchain Technology
* Vietnamese name: Ứng Dụng Vay Tiền Giữa Các Cá Nhân Trên Nền Tảng BlockChain
* Abbreviation: PPLS
  1. **Problem Abstract**
* This project is a concern for individuals who have a surplus of money and want to invest in profits, but they need transparency in transactions. We call it Peer-to-peer Lending System (PPLS). PPLS will provide users with an interactive and easy-to-use interface for making transactions.
* Individuals use the website as a reputable trading channel because every recorded transaction is saved to the Blockchain. And Blockchain is a network where all transparency is exposed, so people can only view and cannot edit any transaction after it has been done.
* The Peer-to-peer Lending System can ensure transparency in all transactions between users, thereby reducing concerns about fraud in transactions.
* Finally, PPLS will perform the transactional data control between the database and Blockchain, thereby creating more credibility for customers that the transaction history has not been changed.
  1. **Project Overview**
     1. **Current Situation**

Below are the problems encountered in this project:

• Limit time and human resource: Team has only 4 member and time for all project is about 13 weeks for writing a document, implementing the products and testing.

• Framework study: team members have a problem when applying the play framework into project. The team needs an amount of time to get familiar new techniques.

• New technique: Some team members are new to the techniques used in the project. The team needs an amount of time to get familiar with those techniques.

• Lack of UI (user interface), UX (user experience) design skill: Our team members all study IS major, and no one has studied UI, UX design. Therefore, that some UI may misunderstand or hard to use with normal users.

* + 1. **The Proposed System**

Building a web application that allows individuals lending money to others. Proof of leading will be stored in a blockchain-based system to secure lending transaction. Admin can manage user and accept users though their identity information. Individuals can create and process transaction anytime. Besides, they can process to payback money in full amount or breaking the payment in different amount.

Task will be assigned vertically to team members, so that if one member quits, the team will not lack of resources.

* + 1. **Boundaries of the System**

The system can:

* Allow Admin to manage user accounts .
* Allow Admin to accept User’s document for increasing limit loans.
* Allow Individuals to conduct borrowing request.
* Allow Individuals to view and accept by other individuals.
* Allow Individuals payback in full amount; or breaking the payment in different amounts.

The system cannot:

* Current system just support Paypal for payment.
  + 1. **Future Plans**
* The system is currently being developed on the web platform:
  + We will develop our system on Android and iOS platform
* The current system uses some user information to identify the user:
  + We will add more other user identification information to reduce risks when users join the system and increase user loan limits.
* The current system has not been able to evaluate highly reputable users
  + We will design the user review feature after each transaction. From there, users may consider lending large amounts of money.
    1. **Development environment**
       1. **Hardware requirements**

**For server**

|  |  |  |
| --- | --- | --- |
| **Hardware** | **Minimum Requirement** | **Recommended** |
| **Internet Connection** | Cable, Wi-Fi (4 Mbps) | Cable, Wi-Fi (8 Mbps) |
| **Operation System** | Ubuntu 18.04 | Ubuntu 18.04 |
| **Computer Processor** | Intel® Xeon ® 1.4GHz | Intel® Xeon ® Quad Core (12M Cache, 2.50 GHz) |
| **Computer memory** | 4GB RAM | 12 GB RAM or more |
| **Storage space** | 5GB | 15GB or more |

Table 1 - Hardware Requirements for Server

**For PC**

|  |  |  |
| --- | --- | --- |
| **PC** | **Minimum Requirements** | **Recommended** |
| **Internet Connection** | Cable, Wi-Fi (4 Mbps) | Cable, Wi-Fi (8 Mbps) |
| **Operating System** | Window 7 | Window 10. |
| **Computer Processor** | Intel® Core i3 1.4GHz | Intel® Core i5 2.50GHz |
| **Computer Memory** | 2GB RAM | 4GB RAM or more |
| **Web Browser** | Firefox (v52 or higher), Chromes (v42 or higher) | Chrome latest stable version |

Table 2 - Hardware requirement for PC

* + - 1. **Software requirement**

|  |  |  |
| --- | --- | --- |
| **Software** | **Name / Version** | **Description** |
| **Operation System** | Windows Server 2014 | Operating system and platform for development |
| **Environment** | Java EE 8.0, Node v10, npm v6 | Specification for developing web application |
| **Modeling tool** | StarUML, Software Ideas Modeler | Used to design diagram |
| **IDE** | Intellij IDEA 2018.1.5, Visual Studio Code 1.35.1, A5M2 2.12.1 (SQL) | Programming tools |
| **DBMS** | MYSQL 8.0 | Used to create & manage the database for system |
| **Source control** | Git on IDE (Github) | Used for source control |
| **Web browser** | Chrome 69 or above | Testing browser |

Table 3 - Software Requirement

## Project Organization

* 1. **Software Process Model**



Figure 1 - Scrum Framework

* 1. **Roles and responsibilities**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Full name** | **Role in Group** | **Responsibilities** |
| **1** | Nguyễn Huy Hùng | Product Owner | * Specify user requirement * Control the development process * Give out technique and business analysis support |
| **2** | Nguyễn Trung Dũng | Scrum Master | * Managing process * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing * Arrange Meeting * Risk Management |
| **3** | Huỳnh Văn Lộc | Scrum team member | * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing |
| **4** | Lê Ngô Minh | Scrum team member | * Designing database * Clarifying requirements * Prepare documents * GUI Design * Create test plan * Coding * Testing |

Table 4 - Roles and responsibilities

* 1. **Tools and Techniques**

|  |  |
| --- | --- |
| Tool/Technique | Name |
| Front-end | HTML, CSS, JavaScript, jQuery, React Semantic UI |
| Back-end | JavaEE, SpringBoot framework, JPA, Hibernate, Python, Flask framework |
| IDE | NetBeans 8.2, IntelliJ IDEA 17.2 |
| DBMS | MySQL |
| Source Control | Github |
| Modelling tool | StarUML, Software Idea Modelers |

Table 5 - Tools and techniques

## Project Management Plan

* + 1. **Product Backlog**

Product Backlog could be found here.

* + 1. **Sprint Backlog**

Sprint Backlog can be found [here](https://docs.google.com/spreadsheets/d/1DvHD5Bwmk1IL5XokeVP7r67h5yaPtwHpret4qHMtcmw/edit?usp=sharing)

* + 1. **Deliverables**

|  |  |  |
| --- | --- | --- |
| **No** | **Deliverable** | **Note** |
| 1 | Introduction, Entity Relationship Diagram, Use Case Overview, Mock UI | Sprint 1 |
| 2 | Study Spring Boot Framework, React JS, BigchainDB, Design User Interface for Web Application | Sprint 2 |
| … |  |  |
|  |  |  |

Table 6 - Deliverables

* + 1. **All Meeting Minutes**

All sprint meeting minutes could be found here.

## Coding Convention

**Summary**:

* **Naming Convention**:
* Variable names should be short yet meaningful. The choice of a variable name should be designed to indicate to the casual observer the intent of its use.
* Methods should be verbs, in mixed case with the first letter lowercase, with the first letter of each internal word capitalized.
* **Indentation**:
* One declaration per line is recommended since it encourages commenting.
* In absolutely no case should variables and functions be declared on the same line.
* Do not put different types on the same line.
* **Declarations Convention:**
  + One declaration per line is recommended since it encourages commenting.
  + Using Java Code Convention from:

<http://www.oracle.com/technetwork/java/codeconvtoc-136057.html>