

# Trading 4.0: A Money Lending Platform

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## ABSTRACT

Online Money lending platform also referred as peer-to-peer lending platform (P2P) describes the process of lending and borrowing money between private individuals mostly via an online web-based platform without a direct arbitration of financial institutions such as banks or other financial agencies. In 2005 the first money lending platform called Zopa was created in the United Kingdom, several other types of money lending platforms have since followed. What caused peer-to-peer lending to become popular today is that it can now be carried out via the internet. The objective of this project is to develop a cloud-based money lending platform with both the direct auction and reverse auction mechanism and to implement blockchain technology to secure transactions between lenders and borrowers.

## KEYWORDS

P2P lending, Cloud, Blockchain

## I INTRODUCTION

Peer-to-peer lending platforms can be defined as the process of lending and borrowing money between private individuals via an online platform without a direct interference of financial institutions such as banks. Banks or other financial agencies like credit bureaus can still act as depositary institutions to provide the online lending platform with accounts where the money is deposited or they can be used to confirm the financial information that have been provided by the user of the platform [2]. Peer-to-peer lending is not different from what has already been happening in communities around the world, systems like the Stokvel, Tontines and Cooperative Societies have been created by citizens and managed by citizens to cover the need for savings and loans to cover some of the basic needs of citizens. Peer-to-peer lending communities can be traced back to the 1640s when the so called Friendly Societies was created in Britain [2]. As in modern peer-to-peer lending, the members of Friendly Societies were mostly working-class and they were characterised by mutual and financial support [3]. Thus it can be said that the concepts of societies and mutual benefit have resisted over the years and tend to define the re-emergence of the peer-to-peer lending phenomenon that we are experiencing today. While the banking system can be very restrictive and require to meet strict conditions before being granted a loan, peer-to-peer lending platforms make it easier for most people around the world to access loans with the possibility of getting better terms than in the formal banking system. The objective of this project is to

develop a cloud-based money lending platforms and to implement blockchain technology to secure transactions between lenders and borrowers.

## II LITERATURE REVIEW

The emerging growth of online communities has led to a new way of loan demand in the financial industry called Peer to peer lending which has moved the concept of personal loan into the web where it's not required financial institutions such as banks to mediate between lenders and borrowers. Websites like <https://www.prosper.com> offer an online platform where private borrowers and lenders can initiate a loan process between USD 2,000 and 40,000 [4]. These platforms generally force the borrower to specify the motivation behind their loan request and to provide details of their financial situation, such as income or credit history, lenders then can select the loan request that meet their requirement with the appropriate interest rate according to the information provided by the borrowers [3]. For borrowers, the online Peer-to-Peer lending platform can be seen as a way to be granted a loan with better terms without the mediation of a formal financial institution like a Bank. On the lenders' side, the platform can be seen like as a way to invest money. The platform then make revenues by collecting service fees from realised transactions. Peer to peer lending model raised awareness for the first time in 2006 with the introduction of the first online peer-to-peer platform called Zopa in the United Kingdom [3]. Several other types of money lending platforms were developed afterwards [1]. Online peer-to-peer platforms can be divided fundamentally into two types: non-commercial and commercial [6]. In commercial platforms the lenders make profits from the interest rate of the loans they provide, and the platform make profits by collecting service fees from realised transactions. In non-commercial or charity-based platforms, the main concept is not to make profits but to provide support and help people to accomplish their project without being constrained financially. Online peer-to-peer platforms can also vary according to the way the interest rate of the borrower is fixed. Platforms such as [prosper.com](https://www.prosper.com) use an auction mechanism where the borrowers can publish their request by setting a maximum interest rate that they wish to pay, the request is published on the platform for a limited period of time when lenders will be able to place their bids by specifying the minimum interest rate they wish to take and the amount of money they wish to provide [7]. Other platforms such as the German [smava.de](https://www.smava.de) set the interest rate based on some financial and demographic characteristics of the borrower [8]. Borrowers and lenders are the key participants in all lending platform activities and

many studies have focused on these two participants to discuss the determinants that are necessary for the success of a lending activity [9]. While the lender is looking to invest money and gain the best return on investment as possible by selecting the loan request that suit their requirement by reviewing the information provided by the borrower, the borrower is looking for liquidity and he's willing to hide some information that can prevent him from getting funding for his request. To facilitate the lending process, some papers address the need for bank mediation or other credit bureaus, this participation involves the confirmation of the borrower's financial records [7]. Some platforms require their borrowers to supply financial records that have been checked by external organisations (banks or other credit bureaus) to enable lenders to make a decision based on accurate information. Other platforms can request their borrowers to provide demographic information such as race, location, gender, etc, or social information such as family members, photos, hobbies, which cannot be validated. These determinants play a major role in the decision of a lending process and the successful financing of a loan. Michael Klafft in his study from records collected from the Prosper.com site reveals that the credit rating of the borrower has the largest effect on the loan's interest rate, whereas information like a borrower's depth-to-income ratio, house ownership or verified bank account has a lower impact [10].

### **III REQUIREMENTS**

This section details step by step, all the behavior of the application starting with the actions that the user must be able to perform as well as the behavior of the application to satisfy the actions of the user.

#### **i. About the Project.**

The objective of this project is to implement a cloud-based trading platform that enables the lending and borrowing of money among users by using an auction mechanism (both direct and reverse auction). The lenders should be able to register in the platform and publish a lending offer and the borrower should be able to register and publish a borrowing request. The platform act like the intermediary between the Lender and borrower and should be able to efficiently match offers of lenders and request of borrowers and provide the best deal for both party by implementing the appropriate matching algorithm. The platform must potentially implement blockchain technology on the transactions for security and traceability.

#### **ii. User Requirements.**

The user requirements specifies the actions that the user must be able to perform to ensure that the system is working correctly. The system must cover the following operations:

- Both borrowers and Lenders must be able to register in the platform
- Borrowers must be able to publish loan requests on the platform by specifying the amount of money and the maximum interest rate they are willing to pay
- Lenders also must be able to publish lending offers on the platform by specifying the amount of money and the minimum interest rate they are willing to accept

- As per the auction mechanism, borrowers must be able to view all the active lending offers and the conditions related to them so that they can place their bids on a particular offer by specifying the amount of money they are willing to borrow and the maximum interest rate they can pay.
- As per the reverse auction mechanism, the loan request and the corresponding conditions must be displayed on the platform so that lenders can decide where to place their bids by specifying the amount of money and the minimum interest rate they are willing to offer
- After the matching of demands and offers, all the users involved in the transaction must be able to view the details and validate the transaction in order for it to be initiated.

#### **iii. Functional Requirements.**

In the functional requirements, I will specify what the system is supposed to do to satisfy the actions performed by the user. Some algorithm method will be used to define the function of the lending platform. The system must be able to perform the following task:

- Upon registration, the system must be able to assess the borrower and assign a credit score based on the information provided by the borrower
- Display all active loan requests and lending offers for a limited period of time when borrowers and lenders can place their bids
- The system should implement some algorithm techniques to be able to automatically seal the bids in order to select the best offers among multiple bids by matching offers to demands in both direct and reverse auction mechanism
- After the matching of offers and demands, the platform must send notifications to all the users involved in the transaction for validation
- The platform must potentially implement blockchain technology on the transactions for security and traceability. The technology will be augmented by different other mechanisms building upon cryptography to secure users' transactions.

#### **iv. Use Case Diagram.**

This diagram defines the interaction between the external users and the system to perform a specified task (see figure -1)

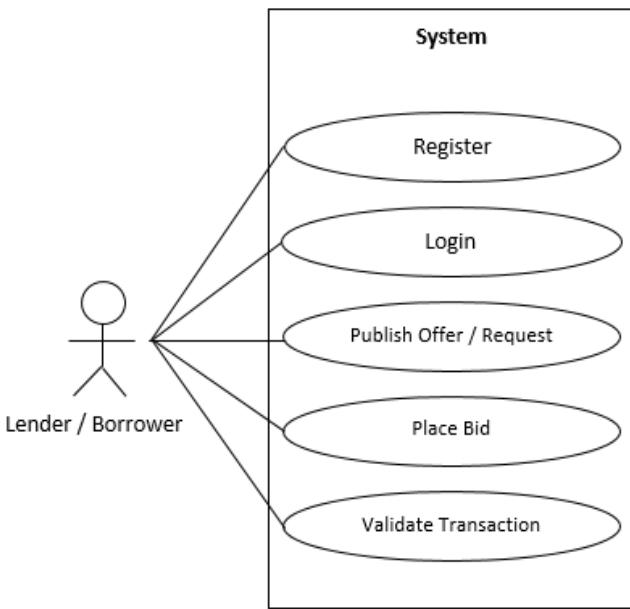


Figure 1 Use case diagram

## v. Activity Diagrams.

Provide a picture of high-level or end-to-end business processes (figure -2)

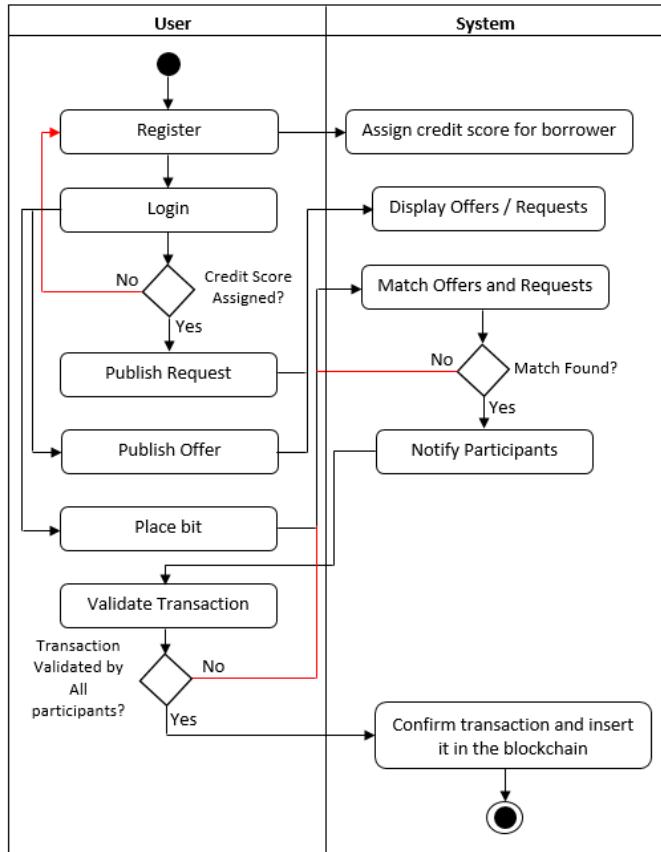


Figure 2 Activity Diagram

## IV NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements focus on the conditions that determine the quality of a system in the way it performs its operations rather than particular behaviours. They are sometimes referred to as qualities of a system. The non-functional requirements of the money lending platform are listed below:

### i. Usability.

The platform must provide services that are easy to use. The user must have the facility to register in the platform and publish lending offer or loan request in an easy way. The platform must also be able to support multiple users at a given time

### ii. User Friendly.

The platform must provide the user with user-interface that is well designed and attractive, including instructions like a prompt out message box to help the user perform the desired action successfully.

### iii. Security and Privacy.

Security is a very big concern in every system and for the user. The system cannot reveal sensitive details about the participants to others. The system must ensure the safety of every transaction.

### iv. Maintainability.

It should be easy to make changes to the platform either by adding new functionalities or updating existing functionalities without breaking the entire system.

## V ARCHITECTURE

The architecture includes the software architecture and big-data architecture

### i. Software Architecture.

The software architecture (see figure -3) is a layered architecture with 3 layers: layer -1 (lower layer) which includes the end user's device. It also includes the application needed on the user's computing device for the cloud-based system to operate and also a user interface to allow the user to interact with the cloud platform. These applications may include mobile applications, web browsers, windows form applications, etc. The second layer (middle layer) is the transactions layer, responsible for performing the behind-the-scenes operations to realise the transaction between borrowers and lenders. The third layer (top layer) being the block-chain layer where transactions are recorded and linked using cryptography.

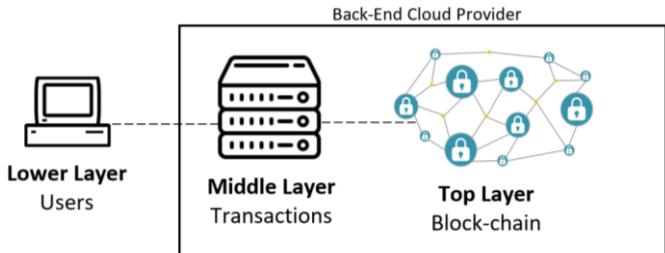


Figure 3. Software Architecture

## ii. Big-Data Architecture.

The data is acquired from a traditional database and persisted in a scalable and flexible data stores from which the data can be processed by batch or some advanced analytics can be performed on the data using some machine learning models which is beyond the scope of this project. The resulted data can then be stored for later auditing or can be audited directly to the user (figure -4).

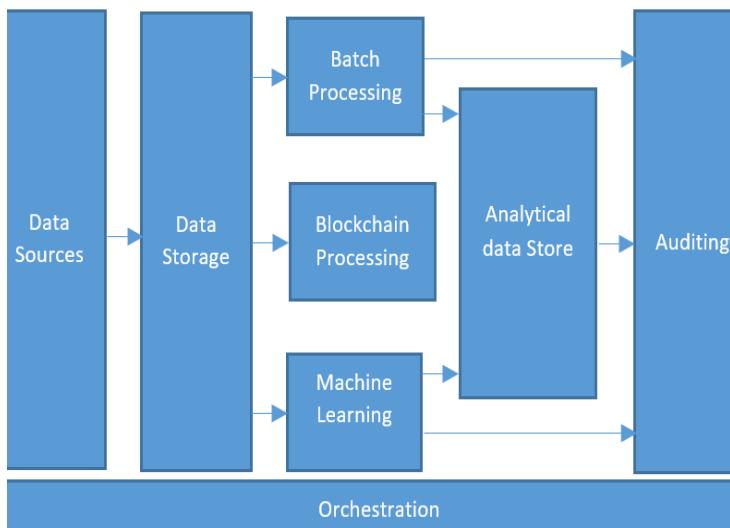


Figure 4. Big-data Architecture

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## VI SUMMARY

The platform offers valuable benefits to borrowers and lenders, users can visit the platform, search for an opportunity to borrow or invest money anytime without having to go to a physical institution or credit agencies. Borrowers and lenders who have access to the internet can easily operate on the platform and comfortably initiate a transaction. This project will provide users with the facilities to make secured transactions using blockchain and ease of access to every operation provided by the platform.