

Crypto Lending and Hedge Fund Platform (Liquifi)

Peer-to-peer (P2P) lending online collateral-free lending system.

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Abstract— Obtaining loans from traditional financial institutions can be a challenging and time-consuming process that often requires significant collateral. For cryptocurrency holders, liquidating their holdings can be even more difficult due to taxes, transaction fees, and potential losses in invested capital. To address these challenges, we have developed Liquifi, a decentralized peer-to-peer lending platform that utilizes Ethereum's smart contract technology to facilitate secure and cost-effective borrowing and lending. Lenders on Liquifi can deposit and lend cryptocurrencies to borrowers, who may choose to invest the loaned funds in hedging strategies to maximize their returns. Our platform provides a comprehensive suite of borrowing and lending options tailored to the needs of various users, ranging from experienced cryptocurrency traders to novice investors.

Keywords— Ethereum, Collateral, Liquidate, Lending

I. INTRODUCTION

Blockchain technology facilitates the fair distribution of resources among network members by acting as a distributed ledger. This research paper aims to assess the limitations of a lending platform and suggest ways to optimize its functionality. Collateralized loans provide a flexible borrowing option, while peer-to-peer (P2P) lending is an online, collateral-free system that serves both individuals and businesses. P2P lending has experienced remarkable growth, posing a competitive threat to traditional financial institutions [1]. This digital form of microfinancing, collectives, or cooperatives has gained significant traction.

II. LITREATURE SURVEY

A. Background

Peer-to-peer (P2P) lending is a lending system where individuals or businesses directly exchange loans without involving traditional financial intermediaries. This system has been made possible by the use of digital devices and the internet, which have eliminated the need for third parties. Decentralized P2P lending offers unsecured personal loans with flexible interest rates and repayment terms since they do not require collateral [2]. These loans usually have lower interest rates than the national average but come with shorter repayment periods. By spreading their risk across multiple borrowers, lenders can earn a slightly higher average return in decentralized P2P lending.

B. Basic Terminologies

DeFi: Decentralized finance is a financial system driven by technology that eliminates the need for intermediaries and centralized institutions. It utilizes stablecoins, software, and hardware to support the development of applications, and its infrastructure and regulation are constantly evolving.

ETH: Ethereum is a blockchain platform that employs a peer-to-peer network to execute and verify smart contracts, which allows parties to transact without a central authority.

Collateral: Collateral refers to valuable assets that borrowers offer as security for a loan. For instance, a property secures a mortgage, while businesses may pledge equipment or real estate for financing.

Lending: Lending involves permitting individuals or organizations to borrow money with an agreement to pay it back later, while borrowing entails acquiring funds from a lender and repaying them with interest at a later date.

Stablecoins: Stablecoins are a type of cryptocurrency that maintains a relatively stable value by being linked to a commodity or currency or governed by an algorithm that regulates its supply.

C. Existing Systems

1) Aave

The Aave protocol is a system of decentralized finance (DeFi) that allows individuals to lend and borrow cryptocurrencies and real-world assets (RWAs) without the involvement of intermediaries. It operates through a decentralized autonomous organization (DAO) model in which governance and operations are managed by those who hold tokens [6]. The AAVE token is utilized for platform governance, paying fees, and as collateral for borrowing. Lenders earn interest on deposited assets [20], and borrowers pay interest on borrowed assets. Although initially built on the Ethereum blockchain, Aave has expanded to support other chains. Aave is a decentralized finance (DeFi) protocol that enables lending and borrowing of cryptocurrencies and real-world assets (RWAs) in a peer-to-peer fashion, without requiring intermediaries. Lenders can earn interest, while borrowers pay interest. Aave was initially developed on the Ethereum blockchain [16] and ERC20 tokens, but has since expanded to other blockchain networks like Avalanche, Fantom, and Harmony [7]. The protocol is managed by a decentralized autonomous organization (DAO) composed of AAVE token holders who vote on its operations and governance.

2) 1INCH

1inch is an exchange aggregator within the decentralized finance (DeFi) space that allows users to find the lowest cryptocurrency prices by scanning decentralized exchanges. The platform is powered by its governance token, 1INCH, which is used for token staking to facilitate liquidity mining and to support the decentralized "instant governance" model. 1inch is a platform that aggregates decentralized exchanges to locate the most affordable cryptocurrency prices for

traders, and is powered by its governance and utility token, IINCH. The token supports the platform's decentralized "instant governance" model and enables liquidity mining through staking [9].

3) Uniswap

Uniswap is a decentralized exchange (DEX) protocol that operates on the Ethereum blockchain, allowing users to trade cryptocurrencies and other assets without intermediaries. It uses an automated market maker (AMM) system instead of a traditional order book, which allows users to contribute to liquidity pools and earn fees on trades. Uniswap is powered by its governance token, UNI, which is used for platform governance and fee payments. The protocol is community-governed and owned, with UNI token holders having the ability to propose and vote on changes to the protocol [19].

4) Compound

Compound is a decentralized finance (DeFi) protocol that allows users to lend and borrow cryptocurrencies [17] on the Ethereum blockchain. It uses a system of algorithmic interest rates to adjust the interest rate of assets based on supply and demand. The protocol is managed by a community of token holders who govern the platform through a decentralized autonomous organization (DAO) model. The platform's native token, COMP, is used for voting on proposals and for earning interest on deposits. Users can earn interest by supplying assets to the protocol, and borrowers can take out loans by collateralizing their crypto assets.

5) MakerDAO

MakerDAO is a decentralized finance (DeFi) system that allows users to create and trade stablecoins, which are cryptocurrencies designed to maintain [10] a stable value against an underlying asset. The system is based on the Ethereum blockchain and uses smart contracts [21] to automatically execute transactions without the need for intermediaries. MakerDAO's stablecoin, called Dai, is collateralized by other cryptocurrencies, which are held in a collateralized debt position (CDP). Users can borrow Dai by locking their cryptocurrency into a CDP and pay interest on their borrowed funds. The system is governed by the Maker (MKR) token holders who have a say in system upgrades and parameter adjustments.

III. SYSTEM ARCHITECTURE

A. Proposed System Architecture

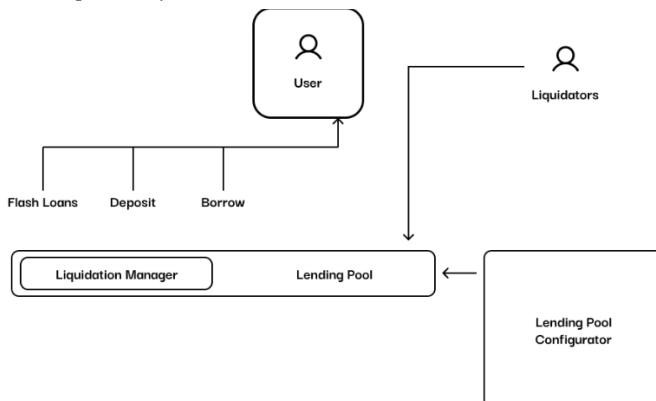


Fig 3.1 System Architecture

1) LendingPoolCore:

The Aave protocol has recently undergone updates that have resulted in a fundamental change to the way funds are stored. Previously, all funds were stored in the LendingPoolCore contract, but now each specific aToken contains its own funds. This modification has brought about a number of benefits, including better segregation between assets and improved implementation of yield farming aware aTokens.

The segregation of assets in individual aTokens allows for more precise management of yields and reduces the risks associated with yield farming. Essentially, each aToken is associated with a specific asset, and the funds are locked within that asset's corresponding aToken contract. This means that each aToken can be used in yield farming strategies, where liquidity providers can stake their tokens to earn additional tokens as rewards.

Overall, this change has made the Aave protocol more attractive to investors looking for decentralized finance solutions. By storing funds within specific aTokens, the protocol can offer greater flexibility and more targeted yield farming strategies. It is seen as a significant improvement that could help position Aave as a leading player in the rapidly growing DeFi space.

2) Code complexity and optimization:

a) Library replacement:

The recent updates to the Aave protocol involved the removal of the LendingPoolCore and LendingPoolDataProvider components and their replacement with libraries. This update brings several benefits to the Aave protocol. The main advantage is the significant reduction in gas footprint for all actions within the protocol by 15 to 20%. This translates to lower transaction costs for users, making it more accessible and affordable for people to use the Aave protocol. The updated libraries also optimize the code complexity and verbosity, making it easier for developers to work with the codebase. This enhances the overall efficiency of the protocol, enabling developers to deploy new features quickly and with greater ease [3]. The new implementation is also more resilient, reducing the likelihood of errors or bugs that could potentially cause issues. All these improvements make Aave more attractive to both users and developers, positioning it as a leading decentralized finance solution in the market.

b) Removed redeem() requirement:

In decentralized finance (DeFi), lending and borrowing are crucial activities that enable users to earn interest on their assets or borrow funds for various purposes without the need for intermediaries. A key component of DeFi lending protocols is the use of aTokens and debt tokens to represent assets and liabilities respectively.

Previously, in order for users to redeem their aTokens and withdraw their underlying assets, they had to manually call the redeem() function on each individual aToken they held. This process could be time-consuming and tedious, particularly for users with multiple aTokens.

However, with the introduction of the LendingPool mechanism, all actions related to lending and borrowing now happen through a single smart contract. This means that users can now deposit and withdraw funds, as well as borrow

and repay debts, with just one transaction, greatly simplifying the user experience [4].

In addition, the use of debt tokens allows the lending protocol to track users' outstanding debts, which can be useful for calculating interest rates and enforcing borrowing limits. Debt tokens represent the amount of borrowed funds, and their value increases as the borrower accumulates interest and principal payments.

Overall, the LendingPool mechanism and the use of debt tokens streamline the lending and borrowing process in DeFi, making it more efficient and accessible for users [5].

B. Methodology

1. The protocol's hub is the LendingPoolCore contract, which manages the fundamental logic, stores the status of each reserve and all deposited assets (cumulation of the indexes, calculation of the interest rates)
2. As compared to LendingPoolCore, the LendingPoolDataProvider contract runs at a higher degree of abstraction and provides the LendingPool with crucial data. Its functions include figuring out the ETH equivalent of a user's balances, including their borrowing limit and health factor, as well as their collateral and liquidity balances. Moreover, it gathers information from the LendingPoolCore to produce thorough data for the LendingPool, such as the average loan to value and average liquidation ratio [10].
3. Both the LendingPool and LendingPoolCore may be configured with the help of the LendingPoolConfigurator contract. Initiating reserves, setting reserves, permitting or disabling borrowing on a specific reserve, and allowing or disabling the use of a certain reserve as collateral are some of the actions that fall under this category. Moreover, the LendingPoolConfigurator contract will be incorporated into Liquifi Protocol governance, highlighting its significance in determining how the protocol will operate as a whole.
4. The information required to change a reserve's interest rates is included in the InterestRateStrategy contract, which also carries out interest rate changes. A specific InterestRateStrategy contract is allocated to each reserve. These activities are performed in the DefaultReserveInterestRateStrategy basic strategy contract.

IV. SYSTEM ANALYSIS

A. Use case flow:

Smart Contracts: Users are able to interact with the reserve using LendingPool's implementation of these activities. All actions take place in the following order:

- Deposit: The simplest operation, the deposit one lacks a specific state check.
- Borrow: The borrow action exchanges a locked-in collateral for a defined quantity of the underlying asset that is transferred to the user.

- Repay: The user has the option to refund all or portion of the borrowed money, as well as the origination charge and any accumulated interest.
- Liquidation Call: A liquidation call agreement enables any third party to buy a portion of a collateral at a reduced cost. A maximum of 50% of the loan may be liquidated in the event of a liquidation event, which will reinstate the health factor.
- Flash Loans: Users who return more liquidity than they borrowed through the flash loan action will be able to borrow from the reserves in a single transaction.

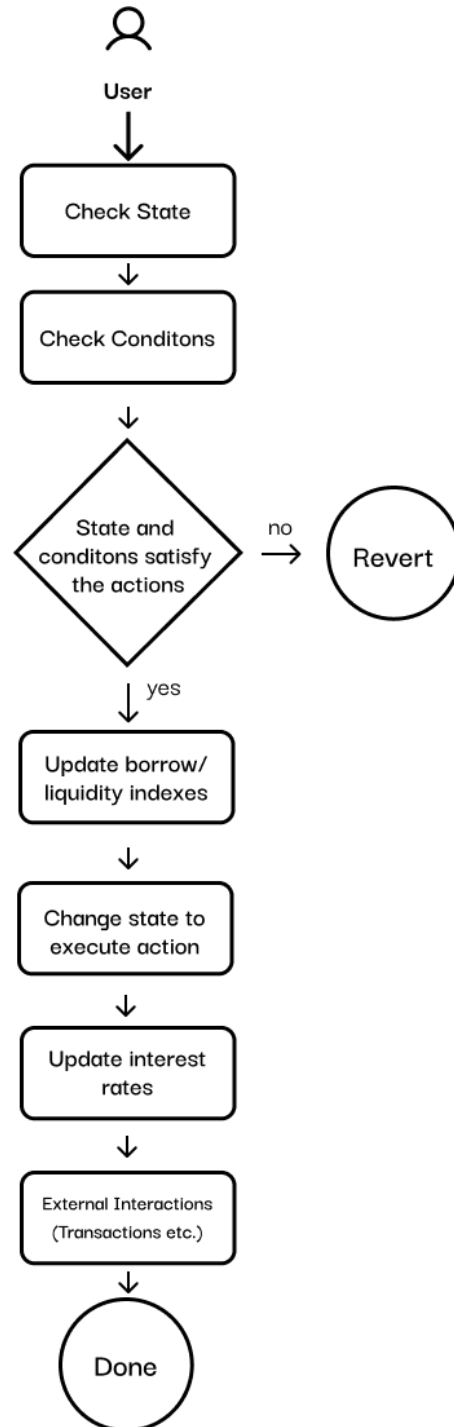


Fig 4.1 LendingPool Contract

V. SYSTEM DESIGN

The project design portion of a report contains a thorough explanation of the proposed project, a management strategy, and techniques for quantifying the project. It also contains the essential documents and materials for validating the proposed project's specifications [13].

Liquifi is a pool-based lending strategy that is based on a pool contract where lenders deposit their crypto-assets and borrowers provide collateral in exchange for short-term loans. This strategy allows lenders to easily provide liquidity while borrowers can access funds quickly. Additionally, this strategy offers several advantages over traditional lending structures, such as quicker access to loan funds, flexible terms, and tailored loan characteristics that are based on the current pool state. Loans are automatically matched based on the pooled money, the amounts borrowed, and the required collateral, so they do not need to be matched individually. This results in a much more efficient process and reduces the amount of time and energy needed to approve loans. Pooled liquidity is an innovative and efficient strategy that can revolutionize the lending process. It can be used by both lenders and borrowers for a variety of different purposes and provides a secure and reliable way to access funding.

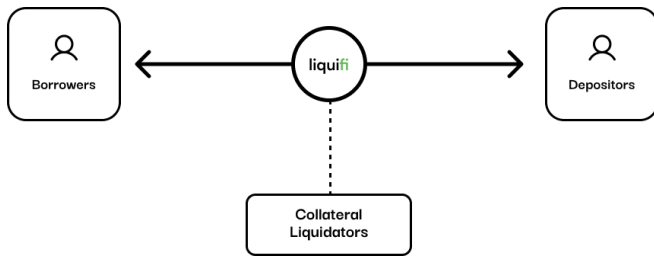


Fig 5.1 Activity Diagram

VI. RESULTS

Our team has successfully created a decentralised lending platform, Liquifi, that runs on the Ethereum blockchain. This platform provides customers with a plethora of innovative features, such as collateralized loans, flash loans, and the possibility to earn interest on their deposited assets. Our technology is poised to redefine the way people and institutions participate in DeFi by bringing a new level of simplicity and security to the DeFi ecosystem.

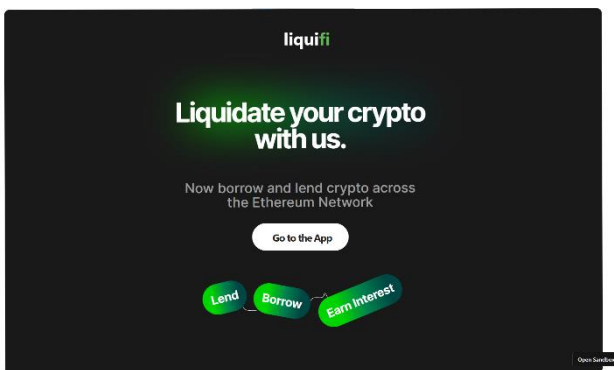


Fig 6.1 Landing Page

We did extensive testing using both human and automated techniques to assure the appropriate operation and security of our platform. We ran a number of scenarios, including loan repayments, flash loan transactions, and asset deposit and withdrawal. The majority of the app's performance was stable and efficient, according to our tests. We did, however, run across a few small challenges, such as optimizing petrol fees and transaction times. In addition, we discovered certain possible security flaws that we resolved with a series of app upgrades and enhancements.

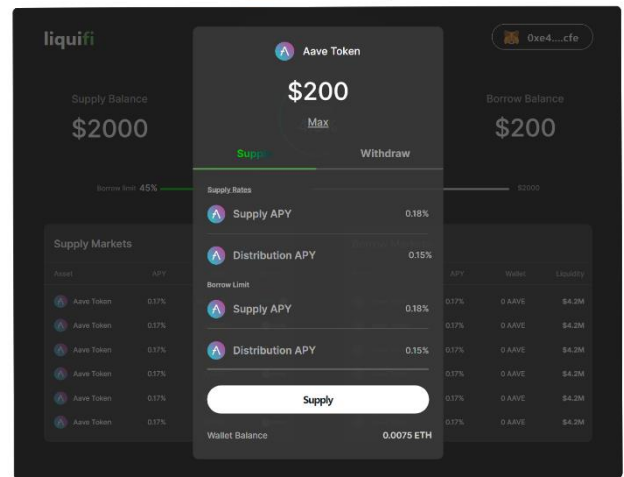


Fig 6.2 App User Interface

Notwithstanding these obstacles, we are certain that our Liquifi app offers consumers a highly intuitive interface for enjoying the benefits of DeFi while also providing abundant chances for personalization and creativity. Our software is user-friendly, and we believe it will contribute to improved accessibility and security in the realm of decentralised banking.

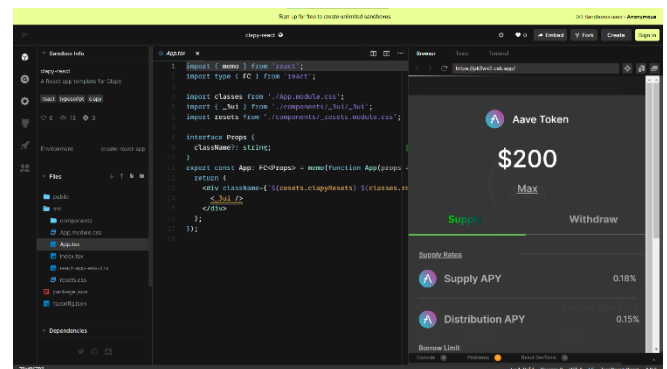


Fig 6.3 User Interface Source

To summarise, our team's creation and testing of the Liquifi app is a key success in the progress of DeFi technology. We believe that our software will be a beneficial tool for both individual and institutional investors wishing to join in the DeFi ecosystem. Our invention will contribute to the advancement of DeFi capabilities and give new options for individuals and organisations to engage in decentralised finance in a safe and secure manner.

VII. CONCLUSION

The Liquifi Protocol is a cutting-edge lending pool concept that provides high liquidity, is backed by collateral, and is represented by aTokens. Its interest rates and Loan-To-Value are token-specific, and it has a high Loan-To-Value ratio. With two major features—Stable Rates to aid borrowers in financial planning and Flash Loans for borrowing without collateral in a single transaction—this protocol outperforms the present options in Decentralized Finance. Users will be able to build their own lending pools using the Pool Factory and set their own criteria and guidelines, making it simpler for them to swiftly and securely access money. On-chain governance will be in place to ensure that the protocol is compliant with all regulations and laws, with the lend token representing the Protocol level and aTokens representing the Pool level. Additionally, the Pool Factory can be used to create pools with a variety of interest rates and Loan-To-Value ratios, allowing lenders and borrowers to tailor the loans to their particular needs. This protocol can revolutionize the way that Decentralized Finance works and provide a secure, reliable, and efficient way to access funds.

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