

DefiCliqu Whitepaper

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Introduction

The banking system is currently one of the most scrutinized sectors in any country. Due to the amount of regulation and political interest associated with this sector, innovation is slow, with occasional bouts of stagnation, a situation familiar with any over-regulated situation. Because of this, it is increasingly tempting for innovators to target this field, aiming at current institutions, with extensive opportunities for substantial invasion and digitalization. The recent success of fintech proves how necessary technological development is in the field, with more room to grow.

Lending is a crucial component of any traditional financial institution, but at the same time, it is a tricky component to access because of the legal and political aspects associated with it. However, it is a central place in the financial industry that has led to several technological efforts entering this space. Peer-to-peer lending and, more importantly, DeFi (an acronym for Decentralized Finance) are leading the way and making a change into the field, challenging traditional lending mechanisms. Recent market turmoil, such as the Great Recession

and the 2020 Pandemic, has brought to the forefront the need for new financing options, putting further into the spotlight the traditional institution inadequacy of keeping up with development and consumer demand. Defi is one of the answers to this problem, proposing extended use of blockchain technology to create faster, safer, and more transparent systems to rival the existing ones.

Deficliq's mission is to democratize the lending market opening further possibilities in this untapped space, with the firm belief that everyone has the right to finance their endeavors in a safe, secure, and transparent environment. As such, we are the first company to provide both collateralized and uncollateralized loans that, too in both p2p and traditional ways, with more features like DAO (off-chain governance), staking, interoperability in one place as a Polkadot Substrate Project, thus becoming a leading competitor in the fintech space.

We will debate in this paper the current conditions of the field, the impact of DeFi, and the innovation brought forward by Deficliq.

The traditional economic lending mechanisms

What is lending? What are the loans?

A fundamental characteristic of any traditional capitalist economy is the uneven distribution of resources, and capital, which can be considered the de facto state since the dawn of human society. Wherever there was a surplus, the deficit was never too far away. This uneven distribution is the fundamental basis behind lending - Also known by its more contemporary term "financing" lending occurs when someone allows another person to borrow something from him. A loan is a particular type of credit vehicle for a particular case of lending where the lent object is granted by the lender (or creditor) to a borrower (also known as debtor) in exchange for the future repayment of the value or principal amount. In most cases and especially in the context of lending as a business model practiced by financial institutions such as banks, the lender also adds interest and finance charges to the principal value that the borrower must repay on top of the initial balance. Every new institutional loan has three main defining characteristics:

1. The interest rate
2. The security component
3. The term

The interest rate is the lender's charge for the use of their money. Taken together with various charges, some experts choose to name it "cost of crediting." Fixed rates represent an unchanging percentage applicable to the remaining debt. Variable rates are floating rates (in the sense that they go up or down), depending on a standard market rate, which is usually the rate on which credit institutions such as banks can themselves borrow money from other commercial banks or the national bank.

The security component of a loan indicates whether the debtor is using an asset to guarantee the loan's repayment to the creditor. Such a security component is also called collateral. Based on the presence or lack of collateral, loans are divided into secured loans and unsecured loans, a key distinction with complex risk and economic implications, which will be further explored in dedicated sections of the present paper.

The term is the time interval in which the borrower has to repay (with monthly installments being the standard approach). The term vastly depends on the type of loan, and it can range from under a year for commercial credit to over 30 years for mortgages. Typically, the longer the term, the higher the interest rate. The term is not compulsory - the debt can be extinguished before the end of the term; however, early repayment charges are applicable in some cases, also depending on the jurisdiction. Loans can be categorized by a few key characteristics:

- The nature of the borrower. Personal (or consumer) loans and business loans can have many overlapping areas but are traditionally treated differently by the banks and other credit companies because the creditworthiness of the borrower and specific risks are computed in vastly different ways. Depending on applicable legislation, there are also different legal protections for personal borrowers as opposed to business borrowers.
- The nature of the term - loans can either have a fixed term, in which case they are called fixed-rate or fixed-payment loans, or can be revolving - credit lines that can be spent, repaid, and spent again.
- The nature of the loan or the reason for the loan can also be used to label typologies. As such, we can observe: Investment loans, Personal needs loans, Working capital loans, Credit card financing, Commercial and industrial loans¹, Mortgages, Vendor financing (commercial credit from suppliers), Disaster relief loans
- The form which the loan takes. Debt can be structured in many ways, and loans may also take the form of bonds and certificates of deposit (CDs), which all serve specific purposes, such as financing the capital needs of a company, such as in the case of corporate bonds, or even the financial needs of a city or country, such as in the case of municipal or government bond.

During the credit approval process, the lender assumes the risk that the borrower will fail to repay the debt (a situation called the default risk) and factors this in the cost of crediting. In the case of large sums, this issue is considered insufficient, and collateralization appears (the use of a valuable asset to secure the loan). This measure is defined legally as a lien (legal right on an asset to satisfy a debt) and has the effect of lowering interest rates.

Secured versus unsecured loans

Driving a significant distinction in regards to the risk that the lender assumes when approving a loan to a borrower, secured and unsecured loans present vastly different behaviors and challenges. Secured (or collateralized loans) pose a far lower risk for the lending institution. Thus lower interest rates can be achieved.

¹ <https://www.thebalancesmb.com/what-is-a-commercial-and-industrial-loan-4163422>

However, **they create other kinds of challenges, such as the need for a correct appraisal, dealing with the liquidation of assets in the case of defaults, etc.**

Collateralized Business and Personal Loans

For most business loans, collaterals are standard practice. And that is true not only for companies borrowing from banks but also in the case where the lender is the collective of debt holders, as in the case of bonds. Companies often attach collateral to bonds when they issue them. The bonds can be secured with a variety of assets such as equipment and property. If the company defaults and fails to repay the debt, regardless of the type of creditors it has, the pledged asset will be liquidated first in the interest of the creditors. This assurance lowers the risk of crediting the company. In the case of bonds, this means that the cost of financing the company is lower since it can pay lower interest rates to its creditors.

For personal loans, a popular form of collateralization is pledging the asset that is acquired using the credit itself. As such, for mortgages, the debtor pledges the acquired real estate itself, the car is the collateral for the car loan, etc. As the general rule that the collateral has to meet or exceed the value of the principal still applies, such loans usually require an advance.

Uncollateralized loans

Uncollateralized loans, also known as unsecured loans, are not based on a collateral asset pledged by the borrower, but on a system of risk management and creditworthiness. Thus, they have higher interest rates than secured loans, and the rates themselves can vary widely between loan types and based on the specific credit history of each potential debtor.

There are, however, specific methods to reduce the risk for the lender:

- Excellent credit ratings are also seen as a "proof" of financial well-behavior, and thus, people exhibiting such a scoring are many times excluded from having to present collateral for instruments that usually require it, earning so-called "signature loans." Creating and maintaining a 360 degrees view on the creditworthiness of an individual is in itself a tricky endeavor, which involves many institutions and creates costs.
- They are bringing a co-signing debtor that jointly assumed the debt, being obliged to repay the loan if the primary borrower fails to do so. For obvious reasons, lenders prefer co-signers with a higher credit rating than the borrower.

Present and future in lending - the market trends

No matter how old and established, any industry can be disrupted by new models arising and being empowered through technology. Lending is not an exception. Here are the main technological trends that promise to change the lending industry in the next few years:

1. **Machine learning and Big Data will be applied to credit scoring and loan monitoring.** The ability to deduce your borrower's behavior based on surprisingly subtle clues is a gamechanger for lenders. In this endeavor, the ability to extract relevant information from a mountain of information is what makes data scientists and data forensics so sought-after.

2. **Nonbanks will continue to expand into all forms of lending.** The fintech apps revolution is merely at the beginning. Driven by technology, companies of various sizes, from startups to tech giants, are moving into services that were previously the sole domain of banks or continuously tried to develop alternative models.
3. **Banks are shifting their focus - adding new services, quitting traditional ones.** In many ways, banks as institutions and their core services are unchanged since the Industrial Age, even if the services they offer have adapted to the needs of digital society. However, change is slowly creeping in the portfolio of services they offer.

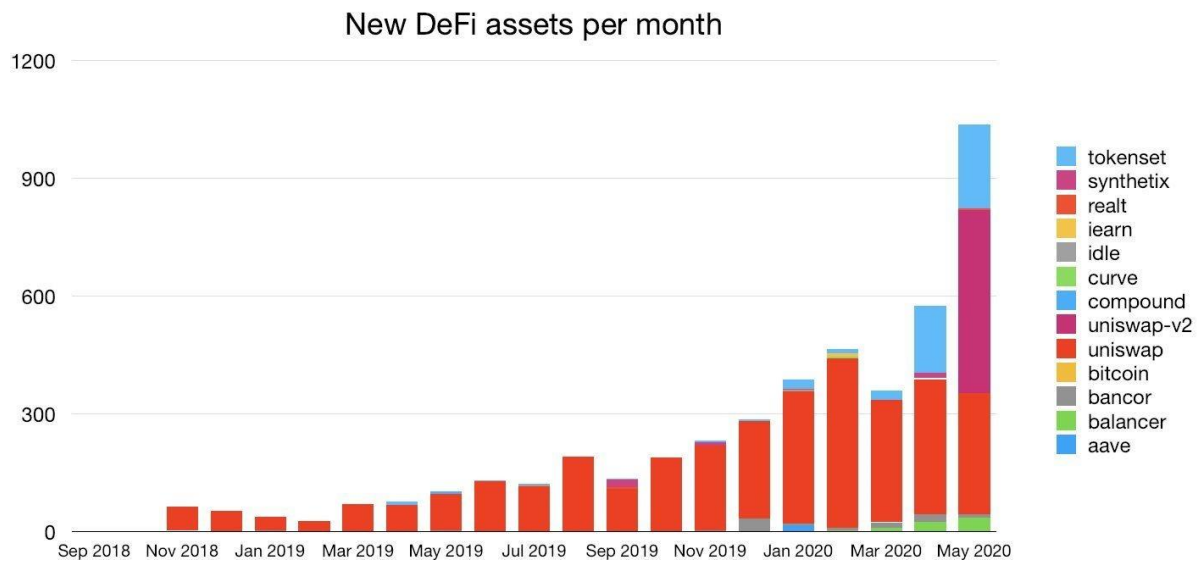
Nevertheless, perhaps no other trend is going to reshape the face of lending as the fourth and perhaps most important trend for the upcoming years:

4. **Peer to peer lending.** Although many technological innovations shaped the lending industry through the centuries, the centralized nature of lenders would maintain as a constant. Alternatively, such was the case until the internet provided a functional alternative. What became known as "peer to peer lending" was first experimented in 2006 when Prosper allowed borrowers to skip the banks and get loans from online lenders, paving the ground to the focal point of this paper, decentralized finance.

Decentralized finance

Decentralized finance represents the adoption of traditional banking service on a deconstructed technological infrastructure - in most cases using blockchains (or distributed ledger technology, DLT). Decentralized finance (also known as Open Finance or DeFi) shares the underlying vision of decentralization that started with Satoshi Nakamoto, the inventor of Bitcoin - creating open, socially inclusive versions of the financial services provided traditionally by banks. This includes savings and checking accounts, loans, asset trading, insurance, and much more.

Currently, within the crypto space, DeFi is seen as the most important and fastest-growing application for the ² blockchain technologies behind it, with DeFi tokens consistently outperforming both Bitcoin and other types of altcoins or utility tokens, as well as traditional counterparts offering similar services. Even more, the continuous interest and potential in the field are attracting exponentially growing numbers of users and funds as it can be seen in Fig. 1.



To be able to develop complex ecosystems like those promised by DeFi, the first steps were the development of reliable distributed networks (blockchain 1.0), the development of smart contracts (blockchain 2.0), and last but not least, ever-stronger, more common, and user-friendlier programming languages to allow the programmer communities to flourish. Only at this stage, we can talk about delivering robust yet straightforward applications on the blockchain, creating real value for the non-tech-savvy end-user, applications known as Decentralized Apps (dApp, for short) running mostly on Ethereum blockchain. Most DeFi dApps processes take place in a manner that works based on automatic code execution on a dispersed infrastructure, with no central authority, no corporation, and no agency (in terms of agency theory) that drives the business functions

² <https://cointelegraph.com/news/3-reasons-why-defi-tokens-are-outperforming-bitcoin-price>

of these applications. All value is created by and for the community, without the need for intermediaries, cutting costs, unwanted hassle, and red-tape classically associated with traditional financial companies offering similar services and products.

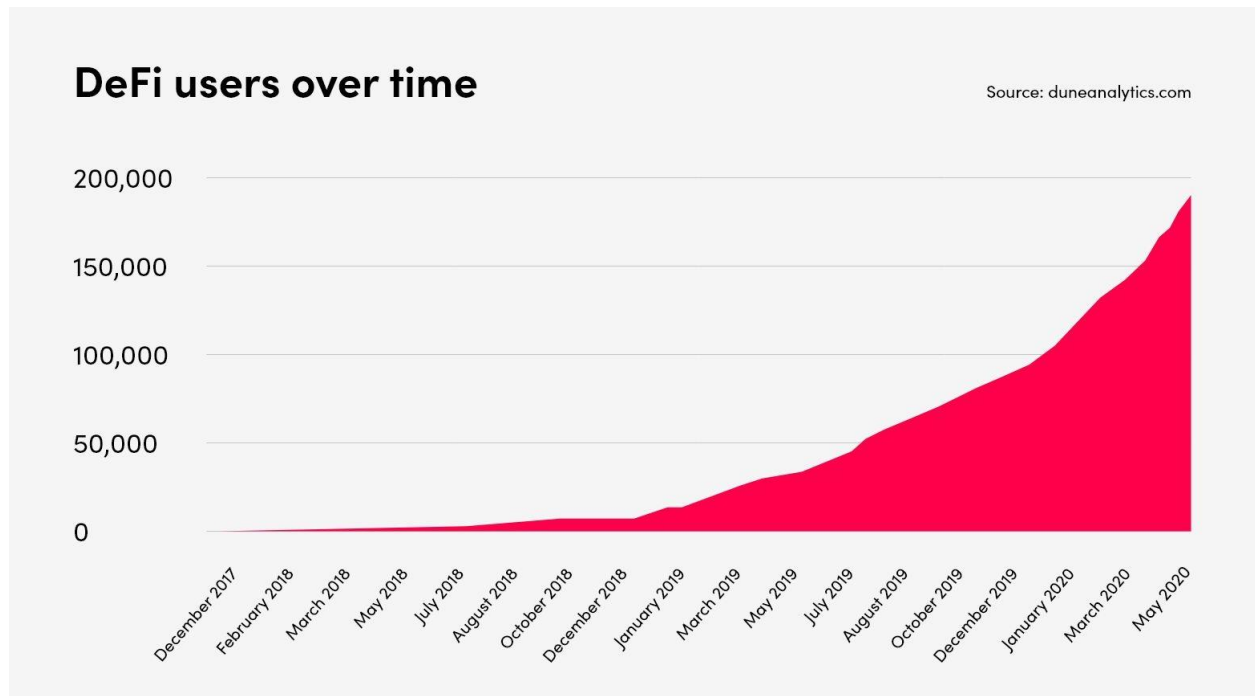


Figure 2 DeFi User growth over time. Source: Dune Analytics

The sudden growth of interest towards DeFi dApps in the past few months (6 out of top 10 Ethereum dApps in terms of daily volumes are DeFi dApps, with Aave Protocol and MakerDAO leading the top from the first and second place) created all-time high costs on the Ethereum infrastructure, testing the limits of the infrastructure and increasing the pressure towards Ethereum 2.0, a much-awaited updated which promises to solve the scalability issues of the network.

Peer to peer lending and borrowing

The leading service driving the DeFi phenomenon is and will remain for the foreseeable future the peer-to-peer lending and borrowing services ("p2p lending"). In 2019, the global p2p lending market size was valued at \$67.93 billion and it is projected to reach \$558.91 billion by 2027 (growing at a CAGR of 29.7% from 2020 to 2027).

Broadly defined, p2p lending involves an individual with excess capital offering loans (usually using cryptocurrencies) to other individuals, without the involvement of a bank or other financial institution. For the lender, the logic of p2p lending is to obtain a more significant return on their savings than bank savings accounts or certificates of deposit. For the borrower, the most attractive advantage is again a better interest rate than from a traditional bank but also the almost non-existent red tape and overall ease of obtaining the loan, compared to traditional banking solutions.

It is noteworthy to mention that even if the phenomenon is currently experiencing booming growth in the context of blockchain-based DeFi, p2p lending is neither exclusive to the blockchain nor a result of the advances in blockchain technology and just like it was stated before, it precedes it.

P2P lending started with online organizations, such as Prosper, Lending Club, Peerform, Upstart, and StreetShares, platforms that used to connect lenders with borrowers, set the rates and terms, and enable the transactions, all in exchange for fees, usually taken from both sides of the transaction. However, given the opportunity to bypass such intermediaries while preserving all the advantages of the p2p mechanism, such centralized p2p lending platforms are quickly falling into obsolescence.

Specific mechanisms

The biggest and most obvious challenge of decentralized p2p lending is finding ways to protect the lenders against borrowers abusing the system and running away with the funds. For this challenge, there are two main methods used:

1. Credit can be provided with the condition that the loan is repaid atomically, meaning that the borrower receives the funds, uses, and repays them, all within the same blockchain transaction. If the borrower fails to repay the principal of the loan, plus the interest at the end of the execution cycle, the transaction is invalidated, and the loan itself reverted. The resulting lending product is called a flash³ loan and has exciting applications to arbitrage and other short-lived profit-generating opportunities (in some ways similar to margin trading).
2. Loans can be fully secured with collateral. By collateral in the DeFi context, we mean digital assets, which can be locked in a smart contract and released once the debt is repaid. There are three types of collateralized loan platforms, each with specific mechanics:
3. Collateralized debt positions. In this case, the loan itself is generated by the platform as newly minted tokens that are being backed by collateral presented by the borrower and locked within smart contracts. The number of tokens generated is based on a mix of the target price of the tokens, which are being generated, the value of the crypto assets used as collateral, and the target collateralization ratio. The advantages of such a loan include:
 - a. overcoming a temporary liquidity squeeze on the collateralized coin;
 - b. Acquiring additional crypto assets for a leveraged exposure

There is a large variety of lending protocols. Some of the most popular ones are Compound (Leshner and Hayes, 2019), dYdX (Juliano, 2017), and bZx.

³ Wolff, 2018; Boado, 2020

Comparative analysis between traditional finance and DeFi: Advantages, Challenges, and Regulation

When comparing DeFi lending solutions to the traditional lending markets (or even to the centralized p2p lending market), a correct analysis has to take into account both the benefits that the new system proposes to lenders and borrowers as well as the challenges that the nascent financial ecosystem is facing.

The benefits of decentralized p2p lending

Faster, easier processes

A significant advantage of present-day DeFi apps is their user-friendliness compared to first-generation blockchain applications and even compared to the most popular fintech apps. The DeFi solution means instant transaction settlement, whereas traditional lending could take days from the beginning of the process to being able to use the funds

Banking for the unbanked

In 2020, 59% of the world's population are active internet users, which creates a unique opportunity for large communities that have no active banking solution in their proximity but do have a mobile internet connection and a smartphone. Shockingly, this category falls around 40% of the global population. **Permissionless**

Unlike the traditional, ossified financial system, that requires potential users (not to mention the startups in the field) to pass through long gauntlets of regulatory verification before they have access to the services, in the DeFi space, anyone can develop a DeFi application.

Lower costs, higher rewards

Not just one side but both sides stand to use from eliminating traditional intermediaries from the borrowing-lending process - the lender reaps better returns, the borrower experiences lower interest rates. The primary economic motivation behind this reality is that brick and mortar intermediaries, besides their profit margin, incurred costs with personnel, physical building/infrastructure, utilities, etc.

What you see is what you get

Transparency is another crucial advantage of DeFi p2p lending platforms. Most DeFi apps function over public blockchains, and that means that all transactions are public. Privacy is protected by pseudo-anonymity, which provides enough protection for privacy-sensitive users, but enough traceability by teams of experts to detect fraudulent activity if needed.

All major DeFi applications are open source, which means that the code is public, and anyone can audit and validate its functionality, security, and capabilities.

Interoperability

Another pillar of the DeFi community is interoperability. Creating modular components that can link with various pieces of the ecosystem stems from the mentality of open-source programmers that have to face the daily reality of developing code that has to work together with programs and protocols developed by other people, in a decentralized manner.

Self-custody and data control

Although some experts may argue that this feature can be seen as a vulnerability, many users would prefer storing their digital assets themselves using Web3 wallets like MetaMask (together with a mix of cold storage hardware devices for extra safety) while also keeping their data untouched by financial institutions.

The challenges of decentralized p2p lending

DeFi is a nascent ecosystem and, as such, is prone to several challenges, which will be listed here:

Security challenges

Doing everything online and in an automatized fashion that creates efficiency by eliminating human intermediaries also creates cybersecurity exposure - where there is not anyone to validate or verify transactions, only the code can stop attackers. Moreover, such attacks can be devastating. For example, hackers have stolen more than [\\$27 million](#) from DeFi projects over the past few months. In June, DeFi liquidity provider Balancer Pool [experienced a sophisticated hack](#) that tricked the protocol into releasing around \$500,000 worth of tokens. In another incident, \$25 million worth of Bitcoin and Ethereum was stolen from dForce's lending protocol, Lendf.Me, [via a re-entrancy attack](#).

Scalability and slower transactions

Inherently, all dApps that run over a blockchain are limited by the throughput of the network, expressed simplistically in transactions per second. While Visa claims it can process over 24,000 transactions per second,⁴ Ethereum is lumbering around 15-25 tps . To onboard millions of people or even billions, and thus fulfill the vision of banking the unbanked, any DeFi must be hosted on a network that can process millions of transactions per second, which is the exact vision for Ethereum 2.0, teased by its creator, Vitalik Buterin⁵. However, we are not there yet, and estimates for Ethereum 2.0 place it in 2022 at the earliest.

Lack of credit scoring

Traditionally, risk in the lending market, especially when dealing with uncollateralized loans, was mitigated by credit scoring services. The initial absence of such services in the DeFi space is slowly being fixed, with companies such as Teller, that combines an algorithmic credit risk protocol with legacy classical scoring services.

⁴<https://amberdata.io/dashboards/transactions>

⁵<https://bravenewcoin.com/insights/vitalik-ethereum-en-route-to-a-million-transactions-per-second>

Market trends

Ever-growing interconnection within the ecosystem

Open source projects are in line with the zeitgeist of the blockchain movement. This characteristic leads not only to "cross-pollination" of developers being involved across projects, protocols, and even across infrastructure blockchains, but with projects becoming interlinked and users using multiple DeFi services in conjunction to create customizable financial services, custom-tailored for each user's needs.

"The unbanked" will become a stand-alone financial ecosystem

Previously considered the fringe of the traditional financial system, the 1.7 billion adults without access to a banking account will become a desirable market for many companies offering services and products catered to their specific needs and ways of payment, such as mobile crypto wallets.

The regulation will catch up

The counterculture vibe associated with DeFi will slowly dissipate as decentralized solutions will become mainstream, and large institutional players enter the field. This will also attract the interest of regulators and will drive forward the effort of integrating the decentralized ecosystem with the traditional markets.

The return of the DAO

Decentralized Autonomous Organizations have fallen off the public's attention following the infamous hack of the original DAO in 2016. However, development work made by many groups such as DAOStack, Aragon, Colony and regulatory evolutions such as the Bill recognizing BBLLCs (Blockchain-based Limited Liability Companies) in Vermont, USA, will pave the way to spawn a new generation of DAOs, more capable and less vulnerable than ever before.

Decentralized Credit Scoring

Creating a decentralized scoring system aims to tackle the need to lower risk for uncollateralized p2p loans. Companies such as Teller and others will certainly try to fill this need in the market, but we expect to see other innovative ways to create trust within a DeFi community.

Decentralized stablecoins will soar

Fiat-backed stablecoins are already a rising star as traders use them to hedge and store value on-chain. But most of them are backed and minted by centralized entities and this can be seen as a point of failure, censorship or simply against the values of decentralization. On the contrary, stablecoins such as DAI are different. Combining the openness and censorship resistance of "traditional crypto" and the stability of fiat currencies, DAI and other similar stablecoins have gained traction in many parts of the world as a means to store value, combat hyperinflation, or even for online trade. We expect this trend to continue and to see other major decentralized stable coins flourishing.

Deficliq

Addressable Market characteristics

There is clear value to be unlocked in the DeFi space, and we are here to contribute and grow this ecosystem and to offer services to a wide variety of underserved users. During 2020 the market has seen tremendous transformation and had to pull through the global pandemic, which is here to stay for a while. Below we dissect some of the events and analyze the addressable market for DeFi; therefore, the market for our products.

As of early 2019, we have seen a steady increase in the amount of ETH locked in DeFi, with the majority being attributed to Maker and Compound. Maker's position as an early pivotal player has assured their dominance with respect to ETH locked (nearly 100% of ETH locked until mid-2019, but still the majority to this day). Maker enabled a new wave of ETH Locked financial protocols that depend on a decentralized stablecoin: SAI

In the traditional finance landscape, the financial institutions look towards offering a variety of services in order to serve the individuals better. Unlike them, DeFi companies, despite the technological advantage, do not focus on offering a diversified set of services to the user. The current market landscape is shaped around companies that limit to a single service, and they do not focus on offering a single stop shop type of solution for the financial needs of the individual.

Why DefiCliqu?

Although focusing on a comprehensive service offering seems the right approach for technologists and some investors, **we aim to offer services that provide the best value to our target customer**. Democratizing the lending market is our mission long-term, and we believe everyone has the right to finance their endeavors and passions.

We are the first company on the market to offer both collateralized and uncollateralized loans, meaning that we offer to our investors the possibility to diversify and distribute their risks over multiple tiers. Lenders can choose the amount of risk they want to assume by engaging in the platform while ensuring borrowers are not discriminated against when applying for a loan solely based on the lack of collaterals.

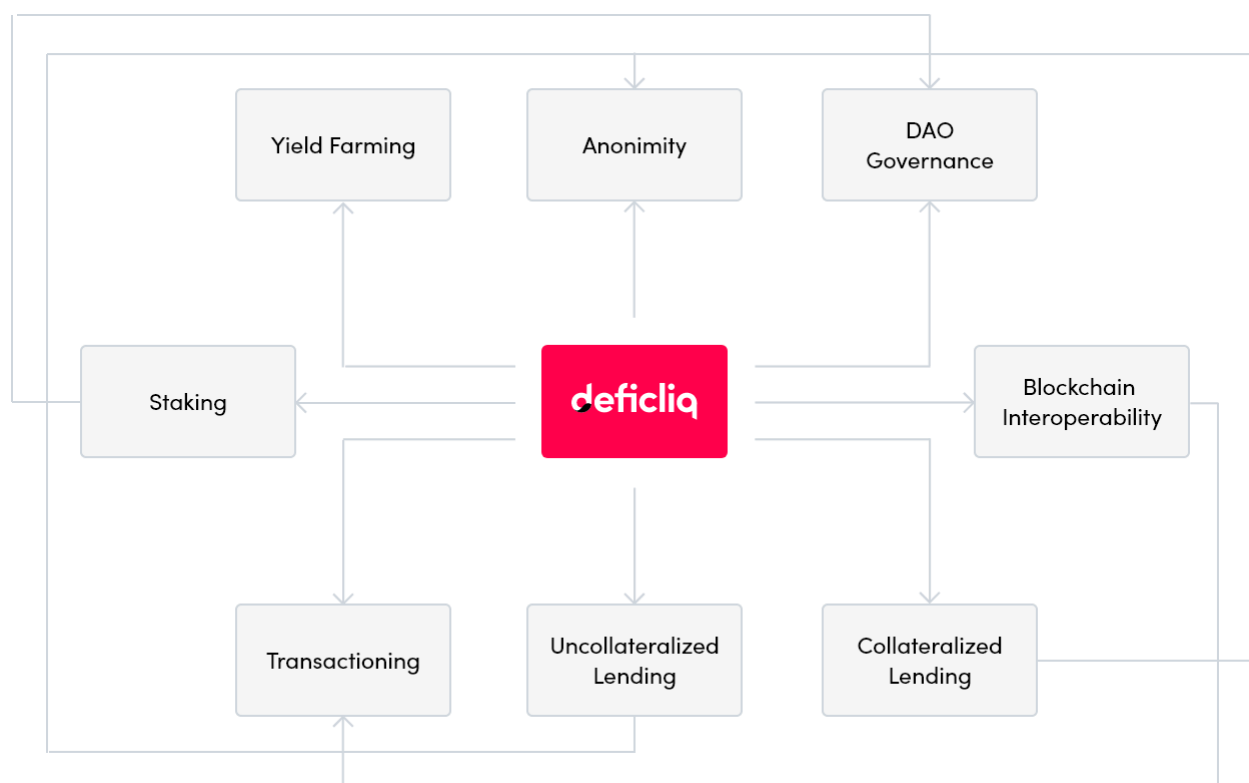


Figure 4 The services and features offered by DefiCliqu

The DefiCliqu DAO

The DefiCliqu governance will be ensured using a Distributed Autonomous Organization model. This ensures that all token holders can take part in the decision-making process directly. We use Polkadot's Proof of Stake consensus algorithm, which is a hybrid consensus model that separates block production from the final determination of the block.

All users can use CLIQ for node voting elections. The voting weight will be proportional to the amount of CLIQ tokens' balance from each voter's wallet. The more tokens are staked, the higher the vote weight is counted. The vote weight is computed as a percentage of the total token circulating supply, excepting the tokens held by the company (team tokens, advisor tokens).

The voting process will exclude the team members' wallets, advisor wallets, platform reserve wallets, and all other company connected addresses.

Off-Chain Voting Model

Defi protocols are normally administered by their governance token, with holders given the right to determine the protocol's issues and policies via an on-chain voting system. However, due to the rising gas price, many token holders hesitate to vote and express their opinion. The effect is that the on-chain voting system suffers from the potential risk of high costs associated with the community's low desire for voting.

Given the high costs of on-chain voting, we designed an off-chain voting mechanism for our community. Democratization is finally possible. The process has three significant steps: the creation of a policy, the voting process, and the voting result.

Every token holder can propose a policy as part of DAO, but the proposal must contain the parameters in order to be voted. The policy will then be submitted either as a pull request on Github or in the form of a Markdown file, on the dedicated Policies Repository. After the PR is submitted, the Deficliq team will assess if the policy is complete (a.k.a. All parameters are submitted) and will launch the voting (a.k.a. Will approve the Pull Request).

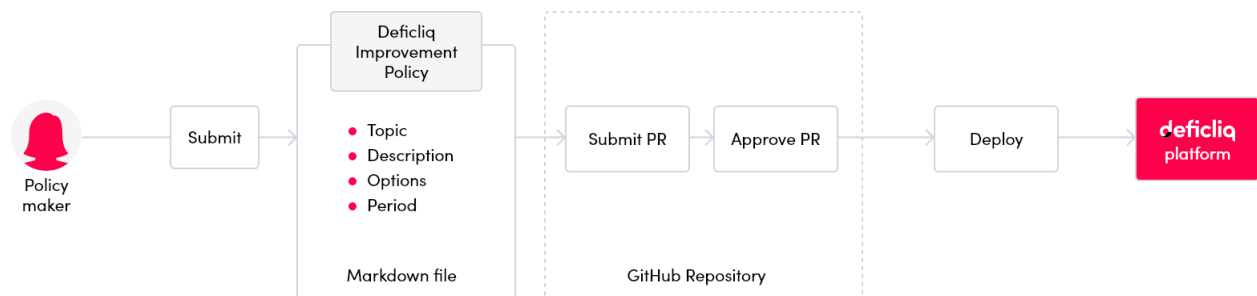


Figure 5 Deficliq policy creation process

Any token holder will be able to take part in the voting, with the policies being open to them to read. Voting will be submitted through a vote transaction, signed with the token holder's private key. This means that we can easily verify whether the vote transaction is signed by the wallet owner or not by checking the public key of the wallet. The vote will contain policy number, vote option, policy content hash, timestamp (the moment when the transaction is signed).

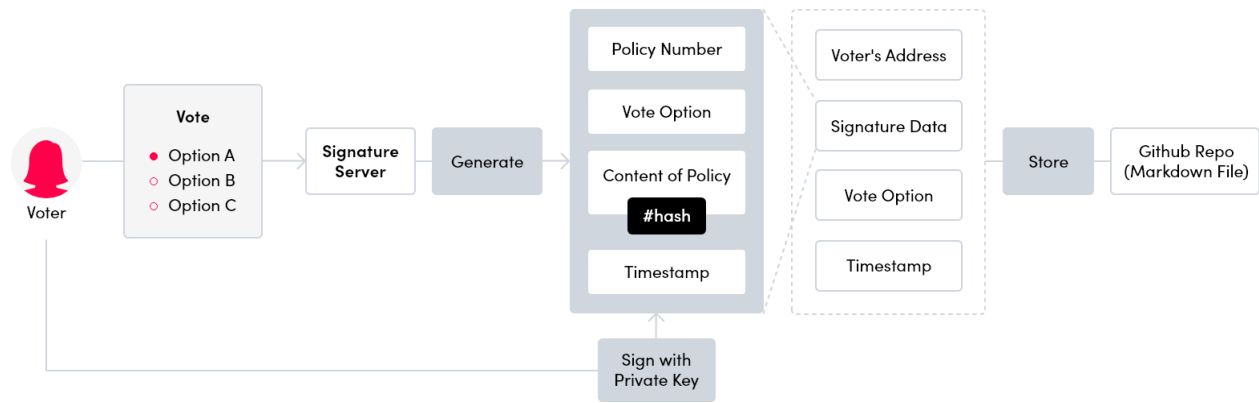


Figure 6 The Deficliq voting process

The voting count will be displayed live through on the Deficliq Platform. This is done through a counter which is connected to the GitHub repository. Each vote will be counted in after balance data from the addresses is collected. After the voting process is over, the voting system turns off and the Counter will display the final results.

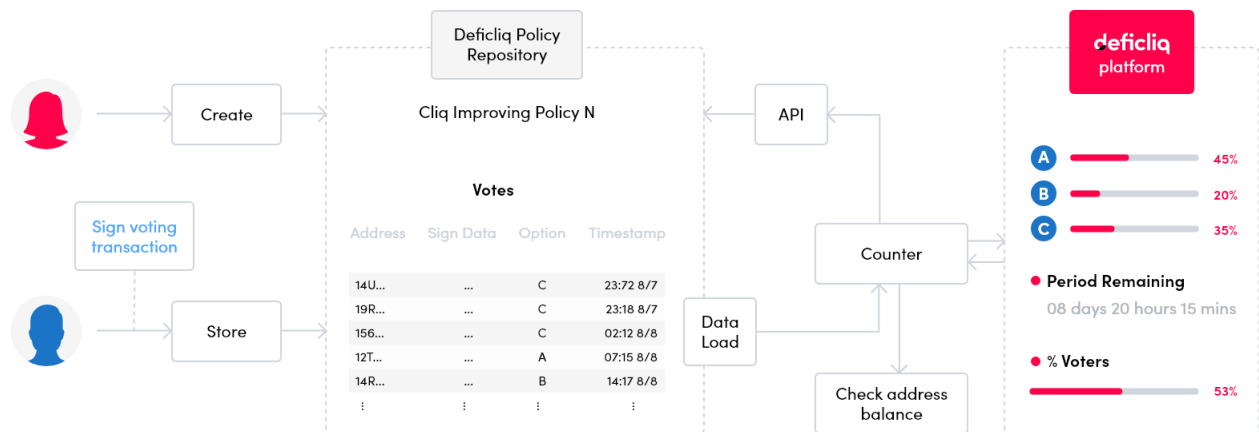


Figure 7 The Deficliq end-to-end policy approval through the DAO

We are aware of the possible issues that may occur during the voting, so we are taking steps to mitigate them: double voting count, stress loading the system, and balance changes. If a token holder votes and then they change their mind or they have realized that they mistakenly chose the wrong option, they will not have multiple votes counted in. We will only count the last vote in order to protect the system from malevolent actors. We will have a rest period after each vote from a specific address. The rest time will be 10 minutes before another vote can be sent from the same address. The system takes into account the balance of each wallet after the voting period has ended. Therefore, if a balance changes, so will the vote weight.

Anonymity

We believe in the real power of decentralization and independence from traditional societal mechanisms. This is what DeFi is all about: Democratising finance to the people.

As a true peer to peer technology, we will remain a crypto business without exhaustive KYC processes in place, thus avoiding hindering users from lending and borrowing and unlocking the full power of a DeFi platform.

Collateralized Loans

The main advantages of our solution for collateralized loans is the flexibility offered to both lenders and borrowers, offering users the possibility to choose the best fit for lending and borrowing for their needs.

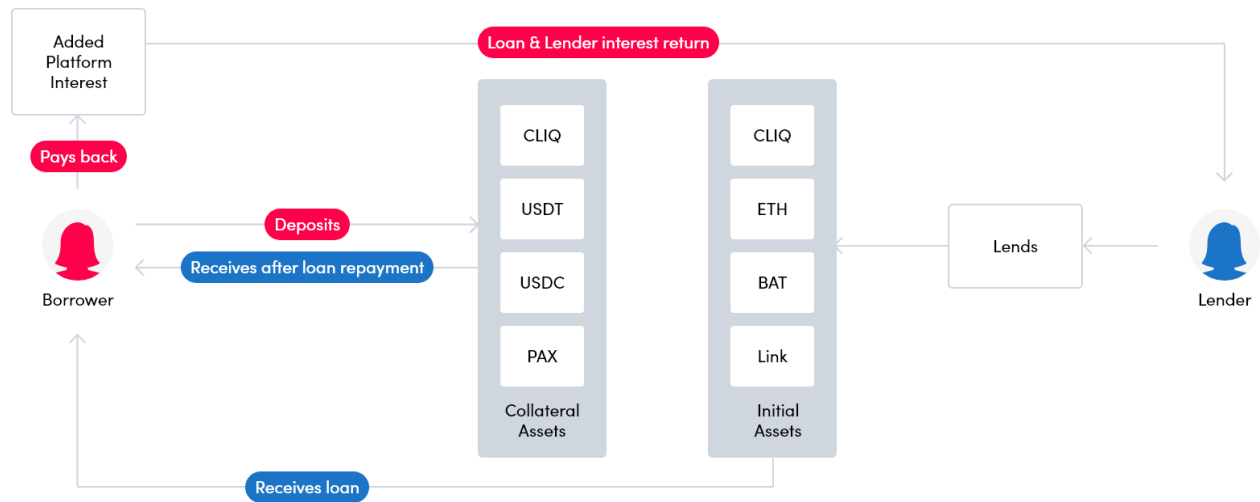


Figure 8 P2P lending process on Deficliq

Any lender will be able to set the amount the plan to lend, the interest rate, and adjunct the risk (Set a collateral percentage of the total loan). They will then place a loan offer for the borrowers to choose from. Borrowers will be able to either choose a lending offer or place their borrow request on Deficliq. If they place their request stating how much they plan to borrow, their collateral, and their preferred interest rate, then the lenders will be able to pick them for a loan.

There are two main options for the users to make use of Deficliq: an automated mode (with the Deficliq engine doing the heavy lifting and managing the loans at a mathematically determined interest rate) and a more advanced model (giving users access to the more advanced P2P features).

Borrowers will have the option to create a custom loan request by specifying the given parameters and will also be able to browse the loans available and filter based on APR, collateral, etc. After a loan or borrow offer is accepted, a smart contract is generated to handle all of the conditions related to the loan.

If the value of the collateral drops below a certain percentage of the loan value, then the loan will be immediately liquidated, with the borrower incurring a penalty. The margin of the platform will be generated by the difference between the borrowing and lending rates, with the margin being incorporated into the offer upon execution. The collateral that borrowers deposit on the platform will be either USDT, DAI, or CLIQ to ensure further protection for the lenders.

$$interest = i \times \frac{interest\ rate\ of\ platform\ margin}{100} \times loan\ principal$$

Our matching system will be able to sync the offers and the requests automatically. The users will be able to get a personalized loan based on their collateral and the credit score that our platform will internally compute.

One loan will be taken at a time, thus protecting the lenders from situations where a collateral amount may be used for multiple loans.

Uncollateralized loans

Collateral reduces the cost of borrowing because it incentivizes the borrower, but it also increases the cost of borrowing because the collateral may be worth more to the borrower than to the lender and because transferring control imposes costs. However, **there is research linking societal instability to the widespread use of collateralized lending**. Should the borrower post much collateral, the lender might be

8 tempted to

finance a project even if he knows the project has a negative NPV, with the lender gaining from such a loan because he obtains the collateral whenever the loan goes bad. However, **society as a whole (in particular, the borrower) loses because of the deadweight cost associated with collateral and because resources are spent on projects with a negative NPV**. In their working paper, Philip Bond, David Musto, and Bilge Yilmaz use the term predatory lending to refer to a situation in which a lender knowingly makes a loan

9 that is

harmful to the borrower.

$$NPV = \sum_{t=1}^n \frac{R_t}{(1R+i)^t}$$

R_t = Net cash inflow – outflows during a single period, i = Discount rate, t = No. of time periods

Collateral is still an under-researched topic in economics, but the number of studies tackling the issue has grown significantly in recent times. The focus of these studies has been the impact of collateral on a societal level, the benefits and issues it creates. On the one hand, collateral protects lenders should the borrower default and induce a sense of responsibility in the borrower. This results in borrowers with positive NPV obtaining credit more quickly. But on the other hand, **the valuation of the collateral can differ between parties, and there can be incentives to engage in predatory lending**.

Because DeFi loans are secured loans (the majority at least), over-collateralization starts to become an issue - obliging the borrower to hold assets greater in value than the loan. This constraint results in a severe diminish of business on the platform due to this ceiling on market adoption.

Building on the collateralized loan services, **we are going to offer an additional uncollateralized loan service and it will enable a multitude of users to enroll and make use of financial services through our platform**. Unlike DeFi's staple overcollateralized loans, we do not require any capital to get started, lowering the barrier to entry and making them a handy tool for everyone. **We see uncollateralized loans as an entry point for individuals to make life-changing decisions and benefit from a set of advantages that traditional finance does not grant them.**

Credit scoring

Creditworthiness is defined as the degree of financial trustworthiness demonstrated by a borrower. It is usually expressed in a credit report, which can be an overarching document showcasing the borrower's ability and willingness to meet his/her financial obligations in the case of potential debt financing.

⁸ Net Present Value

⁹"Using Collateral to Secure Loans - Studylib." <https://studylib.net/doc/8398446/using-collateral-to-secure-loans>. Accessed 31 Aug. 2020.

Mathematical models will be used for credit scoring, with the model focusing on estimating the probability of default (triggering a credit event, i.e., failure to pay, etc.) The higher the score, the lower the probability of debt.

There are a number of common credit factors in credit scoring models, and different types of loans may involve different credit factors specific to the loan characteristics. For example, the credit factors for an uncollateralized loan will include payment history, age on our platform, and token holder address; the credit factors for a collateralized loan will include collateral and loan size.

Accurate and predictive credit scoring models help us maximize the risk-adjusted return to inform the lenders better. Techniques used to create and validate credit scoring models include, but are not limited to:

- Logistic regression and linear regression
- Machine learning and predictive analytics
- Binning algorithm (i.e., monotone, equal frequency, and equal width)
- Cumulative Accuracy Profile (CAP)
- Receiver Operating Characteristic (ROC)
- Kolmogorov-Smirnov (K-S) statistic

Yield farming

New ways of facilitating finance have accompanied the rise of DeFi. Centralized exchanges like Binance and Coinbase enable trading through an order book and all orders set by traders are put into the order book and matched based on a trader's desired price and the size of the trade.

As DeFi Dad puts it: *"In its simplest form, yield farming means to put idle assets to work. Often, it involves receiving rewards by providing liquidity, because many of the protocols rewarding liquidity providers are trying to bootstrap liquidity to kickstart their DeFi application. Yield farmers are people who look for and maximize those opportunities. They measure yield as the amount of interest or rewards 'grown' on top of underlying crypto assets like DAI, USDC, and USDT when put to use in DeFi platforms."* Another term floating about is "liquidity mining."

Automated market makers (usually referred to as AMMs), being able to pool liquidity from various users and execute based on a given equation. This allows anyone to be a liquidity provider on these DEXes with no capital restriction. Adding liquidity to DeFis AMMs gives DEXs the ability to increase the number of customers it can serve. It can also attract crypto investors who trade at high volumes. Currently, DEXs are inadequate for larger trades, and as a result, liquidity providers are a critical service.

Deficliq will provide yield farming features to liquidity providers on our platform. Deficliq will reward yield farmers Cliq tokens for providing liquidity to AMMs as well as for providing liquidity to our lending platforms. The Annual Percentage Yield (APY) will differ based on the amount of liquidity provided and the period and will be offered to the client in CLIQ tokens periodically.

Interoperability

By letting specialized chains exchange messages with other specialized chains, we are able to recover the network effects that would usually hinder specialized chains. Some of the assets that are of value to the platform will inevitably not live in the state of the same blockchain.

Polkadot uses the relay chain to enable arbitrary message passing between blockchains in its ecosystem. The relay chain is generic enough to allow adjacent chains—we call them parachains—to have their own application logic. You have the freedom to write your parachain in any language (Rust, C/C++, C#, Go, etc). You merely need to implement a specific function interface that Polkadot can call into, handling the messages passed to the chain.¹⁰

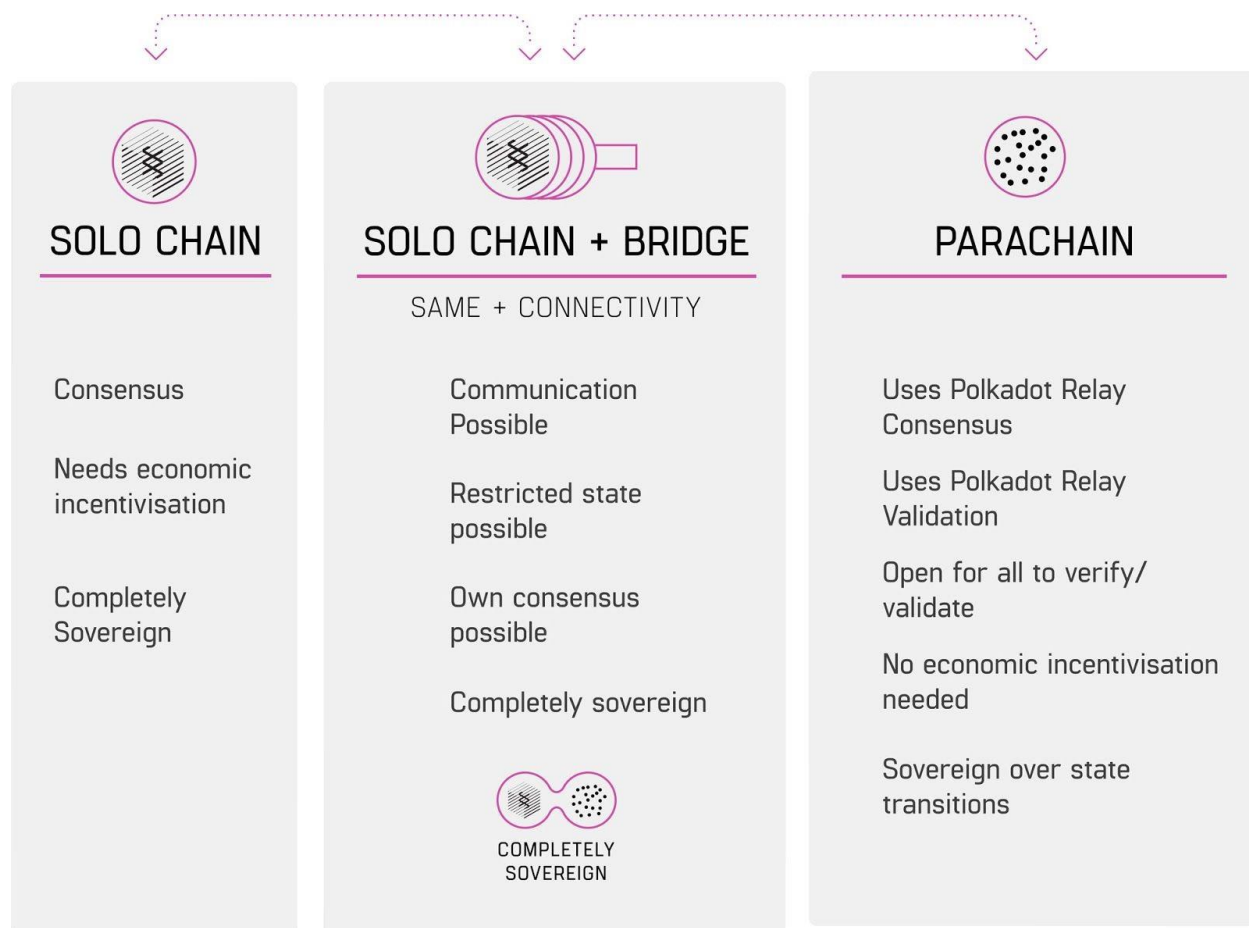


Figure 9 Polkadot Substrate types of projects. Source: <https://www.parity.io/a-brief-summary-of-everything-substrate-polkadot/>

Polkadot allows the connections to a range of blockchains, from general to app-specific, to create a platform that enables more advanced applications. Some examples of such advanced applications that harness cross-chain arbitrary message passing:

¹⁰ "A brief summary of everything Substrate and Polkadot | Parity" 14 Mar. 2019, <https://www.parity.io/a-brief-summary-of-everything-substrate-polkadot/>. Accessed 2 Sep. 2020.

- Oracle service that puts real-world data on-chain
- Identity management system to link user identity in multiple apps
- Decentralized exchange order books and escrow
- IoT network that receives messages from other networks or controllers
- Cross-chain smart contract calls
- Message passing between private and public chains



Figure 10 Transactions handling on Polkadot. Source: <https://www.parity.io/a-brief-summary-of-everything-substrate-polkadot/>

Deficliq as a polkadot substrate project will provide cross-chain communication which will help the user to interact with other defi protocols on other networks. It will ensure higher scalability and minimum transaction costs across its network, while users can also leverage liquidity available on other dex either as a liquidator to sell their collateral obtained by the borrower.

Staking

Token staking gives currency holders an incentive to be part of the network. It gives them the ability to earn more tokens(as a dividend) for their holdings. This is quite similar to how someone would receive interest for holding money in a bank account.

Decentralized infrastructure relies on community participation. Staking is the most effective mechanism for participation facilitation. Token holders can stake some or all of their CLIQ tokens to receive benefits. Staking provides many economic incentives to the project and also facilitates great community and involvement. How projects benefit:

- Community engagement and influence
- Governance and voting can be provided by community
- Securing infrastructure by community participation
- Marketing is done through community

How community benefits:

- Rewards and incentivization schemes
- Continuous awareness about the project
- Ability to shape and guide the project

On a very practical level, staking just means keeping funds in a suitable wallet. This enables essentially anyone to perform various network functions in return for staking rewards.¹¹ On Deficliq, the token maturity can be chosen by the staker when they stake their tokens on the platform. The reward can go up to 90% APY based on the amount staked and the duration of the staking.

The ability to stake CLIQ tokens will be to get preference based on the following:

- Number of tokens staked
- Age of staking

The details of the above will be elicited on a future iteration of the roadmap and white paper.

Token Burn

DeFiCliq will apply a small % basis points in fees for each of the transactions, across all transactions passing through the network. This fee will be split into the following:

- Burn (e.g. 0.05%). A % of token fees will be burnt, thus resulting in reduced supply.
- Stake (e.g. 0.10%). A % of tokens fees will be accumulated, calculated, and distributed to community members who have staked.

Technology

Deficliq will be built using the Substrate open-source platform. Substrate allows us to easily build and deploy our protocol and blockchain network on Polkadot.

Polkadot is a heterogeneous multi-chain protocol. This means that the shards connected to the relay chain are not all the same but allow for different nodes to run different application logic, making each chain its own platform. If all the shards in a sharded system can have different tasks, they enable a landscape of very specialized

shards (that is, blockchains).¹²

Substrate comes with the ability to conduct forkless runtime upgrades. Once blockchains become interdependent, a fork has a tremendously larger impact than in the case of a siloed network splitting into two individual siloed networks.

Using Substrate we will include the following functionalities:

¹¹ "What Is Staking? | Binance Academy." <https://academy.binance.com/blockchain/what-is-staking>. Accessed 31 Aug. 2020.

¹² "A brief summary of everything Substrate and Polkadot | Parity" 14 Mar. 2019, <https://www.parity.io/a-brief-summary-of-everything-substrate-polkadot/>. Accessed 2 Sep. 2020.

1. PoS blockchain
2. PoS consensus
3. P2P networking layer
4. Runtime logic: staking, accounts

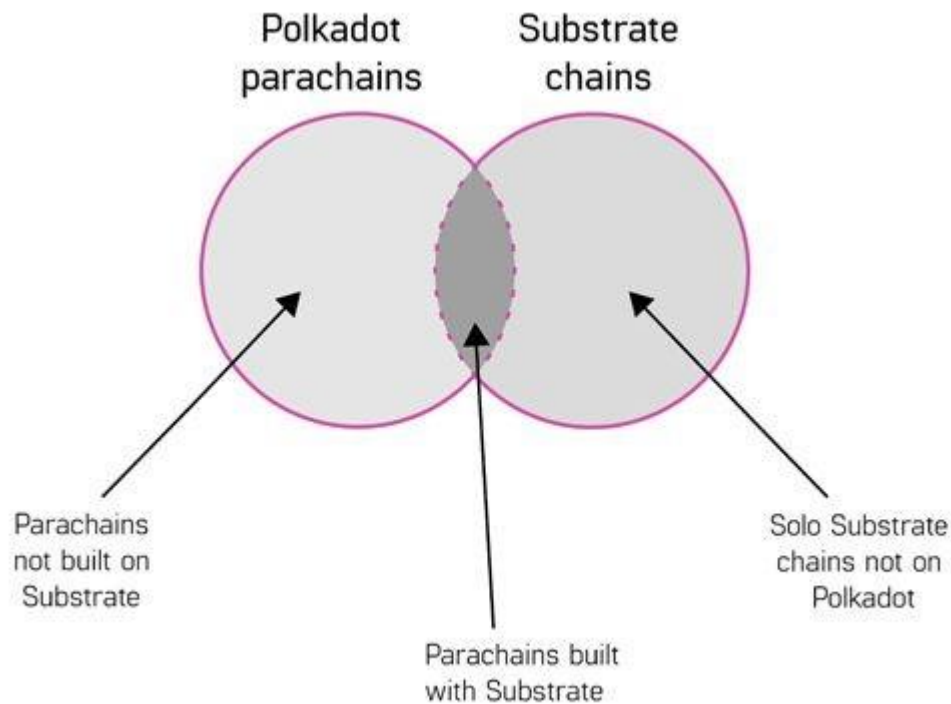


Figure 11 Polkadot and Substrate chains Source: <https://www.parity.io/a-brief-summary-of-everything-substrate-polkadot/>

Clq Token Utility

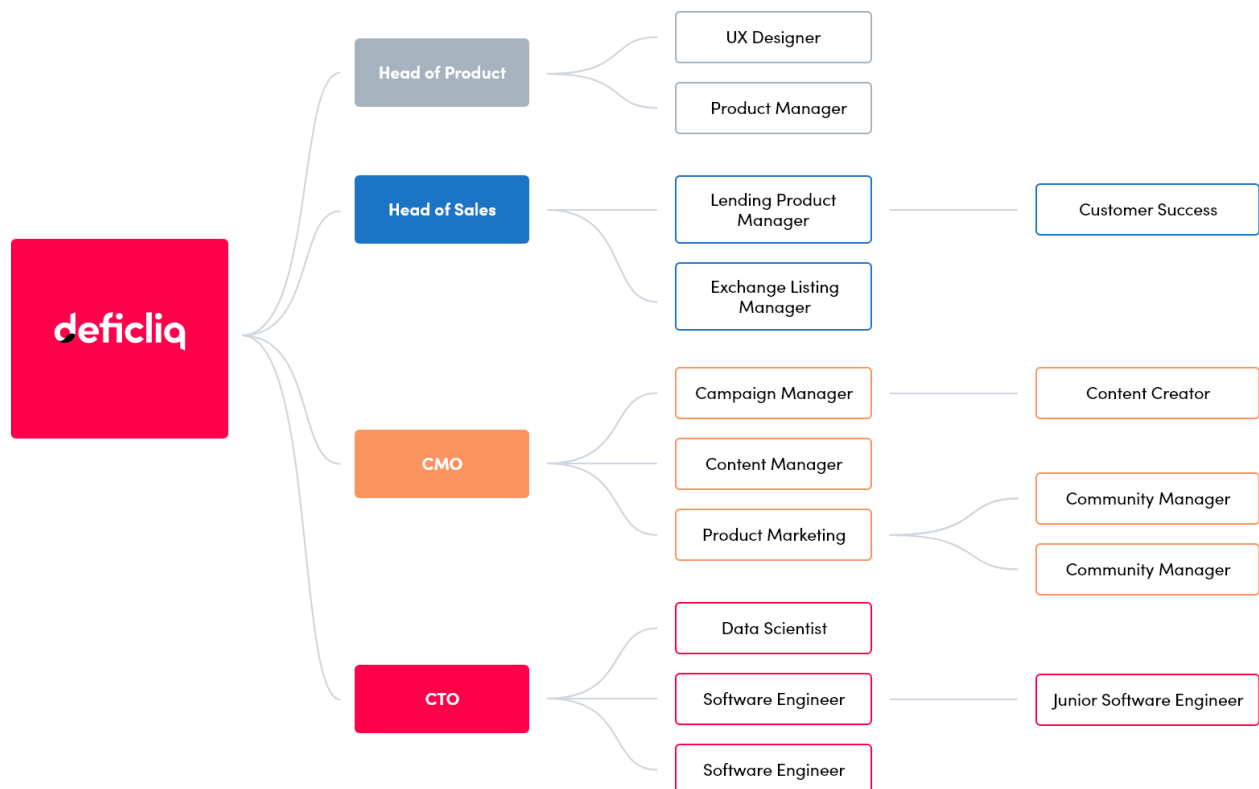
The CLIQ token can be utilized in several ways. Basic uses would be as collateral for borrowing or as an asset for lending. It can also be used as a staking reward, a reward to yield farmers, or as a gas fee for all transactions on the platform. There are also advanced uses such as governance (possessing the CLIQ token gives holders a certain amount of rights in the ecosystem) or for earning (a percentage of fees collected will be paid out to token holders with stakes in a non-custodial contract).

The CLIQ tokens create an internal economic system within the confines of the project itself. The tokens can help the buyers and sellers trade value within the ecosystem. This creation and maintenance of individual, internal economies are one of the essential tasks of the tokens.

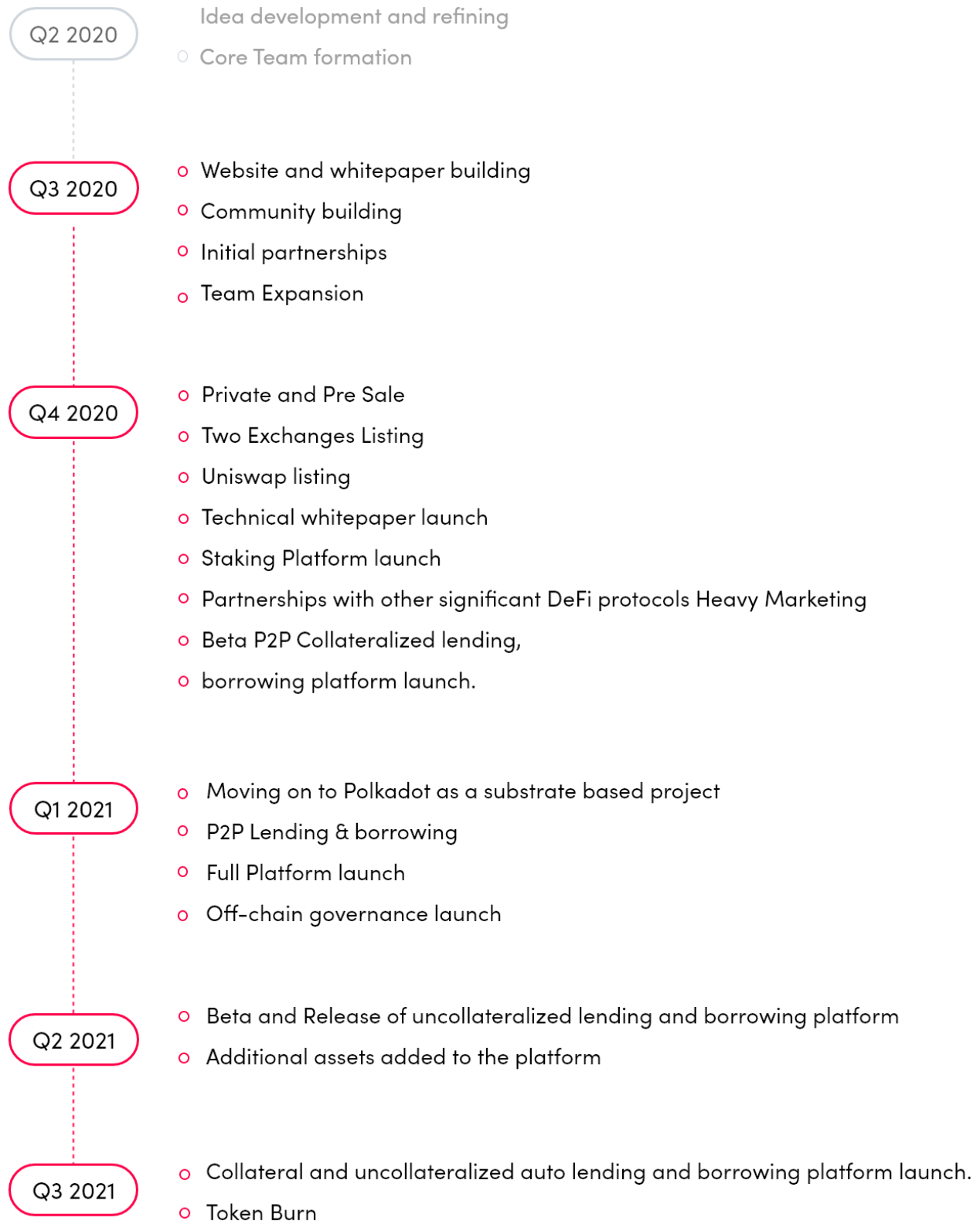


Figure 12 CLIQ token utility

Team Structure



Roadmap



Team



Shantanu Kumar, CEO & Founder [LinkedIn](#)

Experienced tech entrepreneur with an investment portfolio focused on innovative crypto projects. Shantanu has previously grown multiple businesses in the tech and lending area. He is now focusing on increasing access to financial products and opportunities for people from all backgrounds.



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Roy is a savvy UX Researcher with a Ph.D. from Rennes School of business. He has over 10 years of research experience. His focus is consumer behavior and his abilities to match the right audience with the right tools are indisputable.



Khizer Arshad, CTO [LinkedIn](#)

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Afzal Raza, Senior Blockchain Developer [LinkedIn](#)

Experienced Blockchain Developer with a demonstrated history of working in the computer software industry. Skilled in Nodejs, Laravel, Databases, Android Development, and AWS.



Salah ud Din, Project Manager [LinkedIn](#)

Software Quality Assurance Professional with a keen eye for details and a passion for bringing about quality improvements via root cause analysis. His experience in Quality Assurance makes him the best fit as a Project Manager for our platform.



Fazeel Ahmed Blockchain Developer [LinkedIn](#)

Experienced Blockchain Developer with a demonstrated history of working in the computer software industry. Skilled in C++, Nodejs, Smart contracts, Blockchain, Servers Management, and Team Building. Strong engineering professional, solution-oriented, innovative, dedicated with industrial experience.



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Technology strategy expert, with a proven track record in Software Product Management, Product Strategy, and Business Development. I have been working both in corporate and startup environments in Strategy, Operations, and Business Analysis.



Charlie Shrem [LinkedIn](#)

He is a bitcoin advocate. In 2011 he co-founded the now-defunct startup company BitInstant, and is a founding member of the Bitcoin Foundation, formerly serving as vice chairman. He joined Jaxx as its director of business and community development. Later that year, he founded cryptocurrency advisory CryptoIQ.