



ELIX

An Incentivized Lending Platform

Abstract

Due to its trustless nature, blockchain technology will come to dominate many interconnected systems as its rate of adoption grows. When cryptocurrencies first became available to the public, initial methods of mining blocks used tremendous amounts of hashing power. However, Elixir proposes and implements a new mining system based on proof of time and batch creation with genesis transfers.

Elixir will also be the base token of a lending platform capable of analyzing financial transactions between borrowers and lenders, and rewarding them for successful loan payoffs. In the pages below, the mining system which Elixir is built on will be explained in full detail, as well as the initial market that Elixir intends to pursue to introduce cryptocurrencies to the mainstream and provide real world use-cases of this new blockchain technology.

Introduction and Purpose

Ethereum smart contracts are revolutionizing the way information is distributed across the world. The Ethereum blockchain can include these contracts, allowing new tokens and services to be created for all manner of applications. The financial industry is incredibly large and centralized, and has often been regarded as an unfriendly and profiteering market that does not have the best interest of its clients in mind. With the creation and mass adoption of blockchain technology, it is now possible to move towards a decentralized and more trustworthy system.

Elixir aims to revolutionize the way lenders and borrowers make and receive loans with one another. In a traditional model, a borrower will request an amount of money from a lender, usually a bank or a credit union, and pay it back through installments over a specified amount of time with interest in addition to the principal sum. This results in a lender being rewarded via interest, while the borrower has received a suitable loan they have paid back in time. However, the borrower is left unrewarded for completing their part of the deal. The Elixir lending platform intends to reward both lender *and* borrower for completing a loan successfully and uses rewards to incentivize each borrowing participant to pay back their loans in their agreed installments and on time. Additionally, the lending service will eliminate the need to pay for brokers, allowing the lender and borrower to receive the best deal between one another. To help financial applications of cryptocurrencies become mainstream (in a way other than simply functioning as a currency, such as Bitcoin), the initial lending service will be provided in the form of a mobile application. This application will serve as a kind of social payment network between friends and family. In addition, this initial lending service will include zero collateral and interest, providing a purely incentivized reward system for borrowers and lenders to partake. In the long term, this lending service will expand to a global scale, allowing anonymous participants to create loans and borrow from others in a decentralized manner. This system will

track the credibility of a borrower to show how trustworthy they are, and give the lender an idea of any potential risk a loan being made to a borrower would have.

Elixir aims to simplify the process of requesting a loan. To receive a loan from a bank or credit union, one must apply through the bank's lending department and identify how much is being borrowed, for what reason, the length of time, and what interest rate. All of these factors are then taken into account and a decision is made based on the worthiness of the borrower's credit score, which is also calculated in a way that favors people who have simply had a credit profile for a longer amount of time. One of Elix's goals is to develop a new credibility/reputation system to tied to a user's wallet address, without requiring participants to divulge information that will be kept on a central server. This creditability system will be used in the global lending service, and will be implemented after the friend and family lending application. Requesting a loan on the global lending platform will be as simple as providing the amount of Elixir a borrower wants, the time they need to pay it back, the number of installments that will be made, and the collateral that will be put up to ensure the repayment of a loan.

Genesis Pair Mining

Elixir can be mined by transferring any amount of Elixor (the base layer of ELIX) from a parent to child genesis address. Elixor was distributed to genesis address holders, who provided a parent and child Ethereum address that were be locked into the Elixir smart contract. There are three types of addresses that exist in EXOR, the base layer of ELIX: parent addresses, child addresses, and normal Ethereum addresses. Each parent address has an associated child address. Each child address begins with one unit of currency. Every other type of address begins with zero balance. When the owner of a parent-child pair wishes to generate currency, they move a nonzero amount of currency into the parent from its child. The first ten transactions from a child to its parent trigger the generation of currency in the child. To elaborate, each owner of a parent-child pair can only create ten batches of tokens. The longer the owner waits to create batches, the more tokens they will receive. Specifically, the tokens per batch created is a linear function that allows 25% of maximum token generation when the system goes online, and 100% after 10 years. The maximum number of tokens per batch is 5000 tokens. Therefore, the theoretical maximum number of tokens per parent-child pair is 50000. The increased batch return over time is meant to incentivize long term interest in the token. Only the aforementioned interaction between parent-child pairs produces batches. All other interactions occur as expected. The number of tokens given per batch mined can be represented by:

$$\begin{cases} 375t + 1250 & t < 10 \\ 5000 & t \geq 10 \end{cases}$$

where t is the time since the contract deployment, represented in years. To help better understand the benefits of waiting to mine a batch between a genesis address, a list of several possible scenarios are shown below:

Scenario 1

You deploy all batches when the contract goes online. For each batch, you get the minimum batch reward: 1250 EXOR. In total, you get 12500 EXOR. This is summarized in the following table:

Batch Number	Year Created	Reward (Tokens)	Total Tokens Created
1	0	1250	1250
2	0	1250	2500
3	0	1250	3750
4	0	1250	5000
5	0	1250	6250
6	0	1250	7500
7	0	1250	8750
8	0	1250	10,000
9	0	1250	11,250
10	0	1250	12,500

Scenario 2

You deploy all batches 10 years after the contract goes online. For each batch, you get the maximum batch reward: 5000 tokens. In total, you get 50000 EXOR. This is illustrated in the following table:

Batch Number	Year Created	Reward (Tokens)	Total Tokens Created
1	10	5000	5000
2	10	5000	10,000
3	10	5000	15,000

4	10	5000	20,000
5	10	5000	25,000
6	10	5000	30,000
7	10	5000	35,000
8	10	5000	40,000
9	10	5000	45,000
10	10	5000	50,000

Scenario 3

You deploy 4 batches when the contract goes online, 2 batches after waiting 5 years after the contract goes online, and the remaining 4 batches 10 years after the contract goes online. In total, you get 31300 EXOR. This is shown in the following table:

Batch Number	Year Created	Reward (Tokens)	Total Tokens Created
1	0	1250	1250
2	0	1250	2500
3	0	1250	3750
4	0	1250	5000
5	5	3125	8125
6	5	3125	11,250
7	10	5000	16,250
8	10	5000	21,250
9	10	5000	26,250
10	10	5000	31,250

Scenario 4

You create 1 batch every year starting 1 year after the contract goes online, and continue until you have created 10 batches. In total, you get 33125 EXOR. This is summarized in the following table:

Batch Number	Year Created	Reward (Tokens)	Total Tokens Created
1	1	1625	1625
2	2	2000	3625
3	3	2375	6000
4	4	2750	8750
5	5	3125	11,875
6	6	3500	15,375
7	7	3875	19,250
8	8	4250	23,500
9	9	4625	28,125
10	10	5000	33,125

Because Elixir relies on a proof of time mining system, the total supply of the Elixir token cannot be determined at this moment, but a range value can be calculated by finding the minimum total supply count and the maximum total supply count. It is assumed here that all batches will be created, which probably will not be the case. The minimum total supply count can be calculated by taking the total number of genesis address pairs (4,113) and multiplying by the minimum batch size of every batch (12,500). The resulting minimum total supply would therefore be 51,412,500. In contrast, the maximum total supply count with the maximum batch size of every batch (50,000) would result in a total of 205,650,000. However, at the time of revising this whitepaper, the current maximum total supply size is 139,356,672 and the minimum total supply size is 52,727,808. It should be noted that because of this mining model, the total supply count will follow a pattern of convergence; the sooner genesis pair address holders mine their batches, the lower the maximum total supply will be. However, the longer they hold, the higher the minimum total supply will rise. Early creation of batches will cause low inflation in the long term. As of the time of this whitepaper revision, 42.5% of batches have been mined. Eventually, these values will converge and ELIX will reach a final total supply count. We estimate that this value will most likely be around 60-70 million tokens.

Lending Service

Consider a borrower and a lender. The borrower takes some amount of currency, uses it for a purpose, and returns it at a later time. Virtual currency can be sent quickly by a lender, and a borrower can receive that currency almost instantly. This document proposes a system in which both the borrower and lender are rewarded when the borrower returns a loan. The act of repaying the loan will be analogous to a trigger from child to parent, except in this system both the child and parent will earn currency. Miners who do not need loans for temporary spending can issue loans to themselves by moving tokens between 2 pairs of addresses. Through the process of issuing and repaying loans, currency will be generated.

Simple Mining: A miner owns address A and address B. The miner would like to pair the addresses to mine more tokens. The miner initially has 1500 tokens and plans to mine for a month. The miner would like address A to charge Address B zero percent interest over the loan period, since he can maximize loan reward by minimizing interest. The miner lets the smart contract know he would like to form a borrower-lender pair. Interaction with the contract specifies the loan period, loan amount, and interest rate. The miner moves the tokens to A by the loan repayment time, and then holds the tokens in A for as long as he waited to pay back the loan. Both addresses are rewarded. The reward for each address is proportional to the loan amount and time the miner waited to move the loan amount back to A.

Clever Mining: Once a miner has created a loan, there is something clever he can do. He can issue himself a loan for half the repayment time of the previous loan, thereby reaping some extra reward before the holding period of the first loan. Indeed, though this behavior may seem unfair at first, the miner will never more than double his rewards for a given time period. In fact, this loan halving procedure is how this new currency is expected to be mined. Real borrowers, who need to spend currency sent to them will likely participate less in this process. Mathematically, if the longest loan is required to be paid back within x blocks and x is even, a clever miner in an idealized case with zero gas costs could receive the following total reward after waiting $2x$ blocks, where r is the reward for the longest loan:

$$2 \sum_{n=0}^{\log_2 x} r / (2^n)$$

This sum converges to $4r$ as x increases. Idealized miners who choose an odd number of blocks for the largest loan will get slightly less a reward per block r/x due to the necessity to make the number of blocks in the second loan even.

In this idealized example, the miner was able to insert two transactions in a specific order into the same Ethereum block. In reality, miners will probably leave a break between the end of the last holding period and the next loan repayment deadline to ensure they can pay off their next

loan in time. Automated systems will likely make this mining process more precise. The hashing power of these automated systems, however, will not be of interest. These automated systems will only perform a few transfers in rapid succession between the end of the last holding period and the next payment time.

A borrower who does not participate in this halving procedure but borrows a loan of equal magnitude for equal time will receive a reward of r . This makes sense that miners who use halving and have to pay extra gas costs will be rewarded more. The actual number of loans the miner chooses to create within a time frame will be limited by the price of gas. If either the loan time period is too short or the loan amount too small, the gas cost for executing the loan will be more than the reward.

Mobile Application

As mentioned previously, the mobile application will be the first demonstration of the lending service's capabilities to reward users for repaying loans between family and friends. The mobile space is a largely untapped market for cryptocurrencies. Although many wallets and trading services have been adapted to provide mobile interfaces, financial services using cryptocurrency (like lending and borrowing) have not been added to mainstream stores like Apple and Google stores. This lack of products is likely due to these factors:

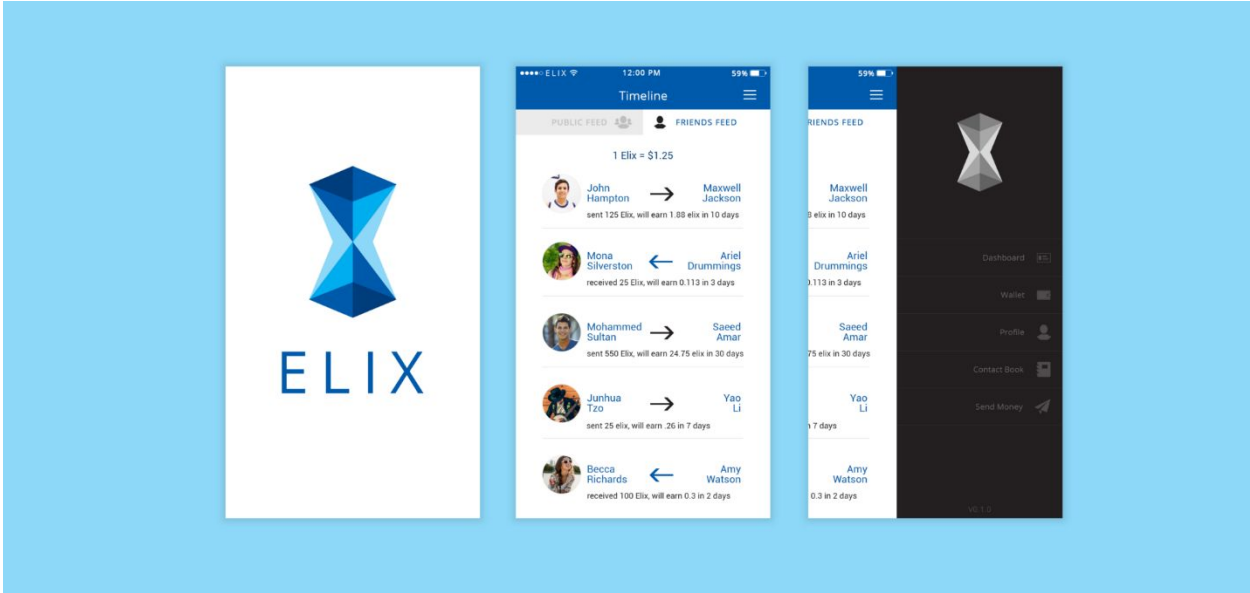
1. The technology behind cryptocurrencies is new and has not developed to a large extent. This includes cryptocurrencies themselves and the technology required to integrate them into businesses seamlessly.
2. Most people aren't aware of the wider applications of cryptocurrencies.

For our first product, we will be creating a mobile lending and borrowing platform with the following key advantages over current services like PayPal and Venmo:

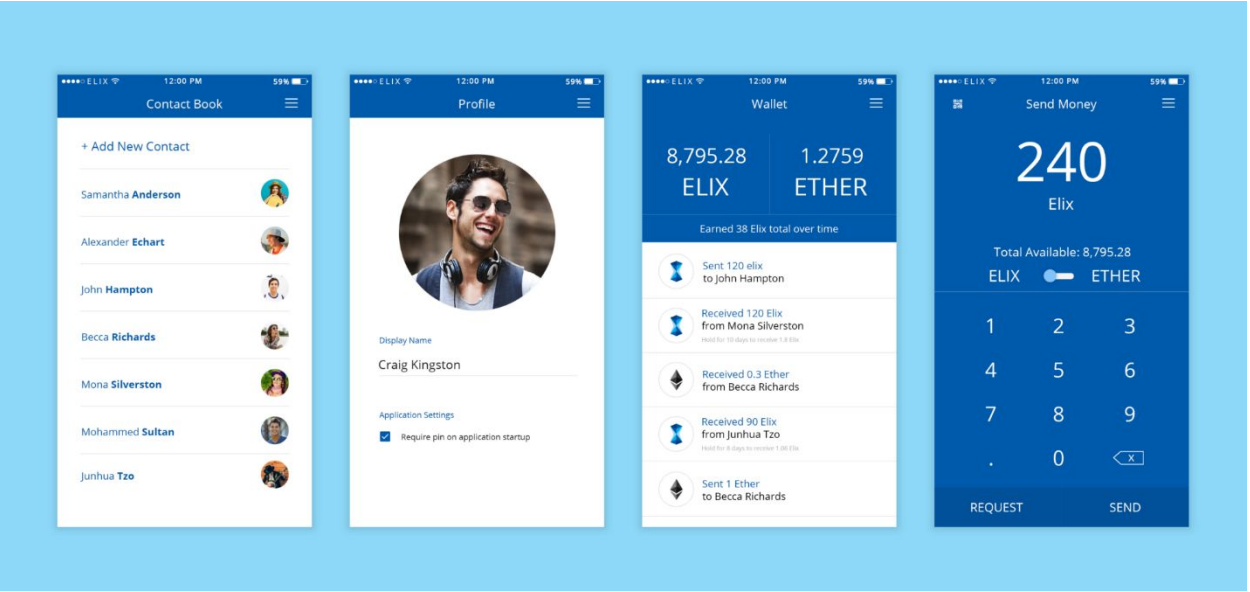
1. Token-backed reputations that double as earnings
2. Lower transaction costs
3. Higher Security
4. Greater Privacy
5. Reduction of fraud

Imagine you need to borrow money from a close friend to finish paying off your rent for the month. You might pull out your phone, open a popular app like Venmo, and request your friend send you the money you need. Next week when your paycheck comes in, you'll pay them back — possibly the same way. After doing this for a while, you hear about the ELIX app. Using ELIX, you can borrow money from your friend, pay them back later, and both of you receive a reward for you repaying your friend. Better yet, that reward isn't in the form of useless "points" or "stars" — instead, you receive tokens which you can trade for cash. You might need to

borrow money frequently. That's ok — many people in the world do. But given the choice between an app like Venmo and ELIX, which would you choose?



After you borrow your ELIX, you can sell them for USD, withdraw that USD, and use the money for whatever you need. When you have the money to pay your friend back, you can buy ELIX and square up. Finally, after a holding period, you and your friend can go out to dinner using the tokens backing your now improved reputation. Through the ELIX app, we plan to use cryptocurrency to re-imagine borrowing for people around the world.



There are also additional considerations to integrate purchasing/selling into the mobile application. This includes using payment APIs like Stripe linked to a company ELIX wallet, which would streamline the transition to and from fiat.

This app is the first service and beginning step in our journey to decentralize lending using incentive driven payments.

Security

Security has increasingly become an issue in the financial sector. Just recently, a security breach in the company Equifax affected the personal data of an estimated 145.5 million American customers. Having sensitive financial data on a central server, especially data used to authenticate financial transactions, is not ideal. Another primary issue with credit cards is the linking of personal data like social security numbers and names to financial history. Ethereum provides a way around this by using addresses to make transactions. This also increases user privacy. Fraud is also easier to combat with decentralized systems, since there is no centralized authority required to execute transactions.

Credit System

One of the long-term goals of ELIX is to build a credit score system backed by tokens. A credit score can be represented by a tally of token rewards. In a general sense, rewards are generated when users behave in a positive manner, such as successfully paying off loans in the number of installments specified over a period of time. Other factors can include the number of trades a wallet address has made, and the amount of money it had already traded. These factors would all be read and analyzed through a smart contract, and would not require any information to be saved on a database other than the blockchain. In our mobile app, token rewards will be awarded when a borrower returns loans. The mechanism behind these rewards could be the beginning of a much more complicated credit system executed by automated contracts.

Business Model

The mobile application space has a variety of options for generating revenue. Many mobile platforms rely on paid features to generate revenue. This includes apps in gaming, lifestyle, and many other categories. These profit models extend into the financial sector as well. Some companies require payments for each use of a service. For example, from the PayPal website

There is a fee to send money as a personal payment using a debit card or credit card. The fee in the U.S. is 2.9% plus \$0.30 USD of the amount you send. For example, if you send \$100.00 USD by credit card, the fee would be \$3.20 USD (\$2.90 + \$0.30).

Since we want to make the ELIX mobile app simple and cheap to use, we do not plan to collect money for user transactions. There is no reason a payment of 100,000 USD should forfeit the

customer of over 2,900 dollars. In our view, sending a payment should cost at maximum tens of cents.

One variable in our model scales directly with both the size and involvement of the user base. As more users join the app, and more miners buy up tokens to mine, this demand will be reflected in increased net rewards. To sustain continuous development of the product, the company can allocate a percentage of these rewards for company use. In this way, the business continuously generates capital. Receiving this capital depends upon delivering a great user experience and onboarding more users.

There are a variety of other features often incorporated into apps that could be introduced as well. Many apps have paid features and limitations on freemium models. However, because our freemium model generates revenue, we can focus on the above business model first. This model will be simple to implement and requires the addition of only several lines of code. We do not need teams of engineers to build memberships or paid upgrades; rather, we can focus on our product and base our revenue stream only on its quality.

Fees

The only transactional costs between borrowers and lenders will be gas costs. Our goal is to engineer the reward function in such a way that these costs are more than offset.



ELIX ROADMAP



Elixir Smart Contracts Published

Q3 2017

- Listed on multiple exchanges
- Mobile lending platform announced



Social Network Features Integration

Q1 2018

- Ability to add messages and replies when lending and borrowing
- "Like" functionality implementation
- View reward progress on transaction between users



Elix Mobile App Public Release

Late Q2 2018

- Public release to the iOS App store
- Public release to the Google Play store
- Continuous integration of feedback
- Explore further feature additions



Begin Development of Collateral and Reputation-based Lending Platform

Q4 2018

- Development of platform to automatically link borrowers and lenders across the world
- Integration of a reputation-based system to establish credibility between potential lenders and borrowers
- Integrate Elix into other application services and businesses
- Further research into application extensions and modifications

Elix Mobile App Alpha Test

Q1 2018

- In-house testing of functional prototype
- Prototype linked to Ethereum blockchain with block scans transmitting information to mobile device through sockets



Elix Mobile App Beta Test

Q2 2018

- Private closed beta
- Open beta launch to public
- Integration of feedback and improvements



Elix Web App Public Release

Q3 2018

- Web application release for desktop interface
- Easy linking between desktop and mobile apps

