XEND Finance

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Litepaper

The first DeFi Credit Union on Binance Smart Chain

Version 1.1

Abstract

Xend Finance (XF) is a decentralized Credit Union protocol built to optimize, improve and add value to the core operations of credit unions globally. The Xend Finance protocol is decentralizing savings, lending, borrowing and investment operations of credit unions as well as providing multi-level interest returns to members of these unions. Xend Finance is the first protocol to target this over $2.2 trillion credit union global market.

The Xend Finance network has the Xend Token ($XEND) as its native network token. The $XEND tokens are used to reward users for saving, investing and performing different operations on the network. Xend Finance allows Credit Union operations and individual saving operations on the smart contract. The Xend Finance protocol native blockchain charges credit unions a small gas fee to create a union on the smart contract and a fee per complete save cycle. The fee is paid in $XEND tokens. A percentage of the fee is used to buy back the $XEND tokens to add liquidity to the protocol. The Xend Finance smart contract periodically invests user savings (deposits) on DeFi lending protocols such as Compound, AAVE & Yearn Finance Protocol. The Annual Percentage Yield (APY) generated from these DeFi lending protocols are paid to the users of the Xend Finance protocol as interest. The Xend Finance protocol aggregates these protocols to get the best APY at all times to ensure users get the best APY.

Currently, Xend Finance supports the Ethereum blockchain and the Binance Smart Chain.

Xend Finance gives individuals, groups, cooperatives and credit unions in countries with unstable currencies access to a global trustless and stable-currency savings, lending, investing and borrowing network. Centralized and Fiat savings platforms are always limited by fees and cross-border payment regulations that limit investing in other countries. With Xend Finance, anyone, whether individuals, cooperatives or credit unions, anywhere in the world can save, lend and invest in different DeFi protocols and start earning interests instantly.

Contents

Xend Finance As A Decentralized Finance Application

- Savings, lending and investing are handled by a smart contract that has an algorithm used to reward users with $XEND tokens.
- $XEND tokens have a fixed supply and the reward for savings is reduced as more people save on the Savings platform. $XEND tokens are also bought back from revenue generated through fees and commissions charged by the Xend Finance protocol and this is used to add liquidity to the protocol. This enables users who save, lend and invest in Xend Finance to earn higher rewards. The reward distribution, interest rate determination and revenue generation are all handled by a robust code in the smart contract.
- The custody of users savings is in a trustless smart contract, which provides security.
- Governance is executed by $XEND token holders.
- Users' savings are protected by a decentralized insurance scheme.

Xend Finance Architecture

Credit Union

A group of users or friends can save, lend and invest as a group called Credit Union.

The steps involved in saving as a credit union:

- A user can spawn a group (Credit Union) on Xend Finance by using the web UI which interacts with the smart contract or directly interacting with the smart contract. The group has a unique ID on the smart contract.

- During group spawn, the creator will select predefined rules that govern each group (Credit Union) such as deposit amount and contribution interval. The rules are stored in the smart contract. The creator will also be presented with defaulters' charges and early withdrawal charges. These are charges a user who fails to contribute within a contribution cycle and a user who withdraws before the savings cycle is completed will pay.

- The creator who spawns a group (Credit Union) is required to pay a small gas fee. The group can be named by the creator for the purpose of customization.

- The creator of the group (Credit Union) receives a link which maps to the ID of the group on the smart contract. The creator can share this link with friends for them to join the group (Credit Union).

- When the users in the group begin to contribute, they are rewarded with 0.1$XEND per $1 contributed. The value of $XEND rewarded will decrease to 0.05$XEND per $1 contributed when the contract has received $100,000,000 in savings.

- An early withdrawal charge of 1% is charged if a user decides to withdraw his savings before the savings cycle ends.

i Credit Union savings attracts a higher percentage reward of Tokens than any other savings category.

Esusu

Esusu describes traditional forms of cooperation in African societies whereby groups of individuals contribute to informal savings and credit associations for their mutual benefit. This is a very significant and integral part of cooperatives and credit unions in Africa and other regions of the world.

Consider a union or a group of 12 members who work in the same institution. To start an Esusu, they decide to all contribute 30% of their monthly salaries to one member (beneficiary) per month. Another member (beneficiary) receives the total contribution the next month till all members are paid in 12 months and the cycle can restart. These beneficiaries are able to utilize the funds for personal projects or needs.

Credit Union or Cooperative members have been practising this form of contribution for over a century in small groups of members that belong to the same institution. These groups are usually small to prevent fraud and to prevent members from defaulting. Banks have also attempted to implement this traditional method of contribution by placing a debit order on accounts of members who receive regular salaries to ensure continuous contribution.

Problems faced by Traditional Esusu and Bank Enabled Esusu

- Esusu members are usually a maximum of 12 to ensure a full year cycle and to reduce the number of defaulters.
- Overall contributions generated from Esusu groups are quite small as the number of members are small.
- Bank-enabled Esusu must work with members with regular salaries and members must have their bank accounts with the same bank or mobile wallet.
- Traditional Esusu contributions are at risk of currency devaluation with countries where the currencies are unstable.

Applying DeFi to Esusu (Esusu Version 2.0)

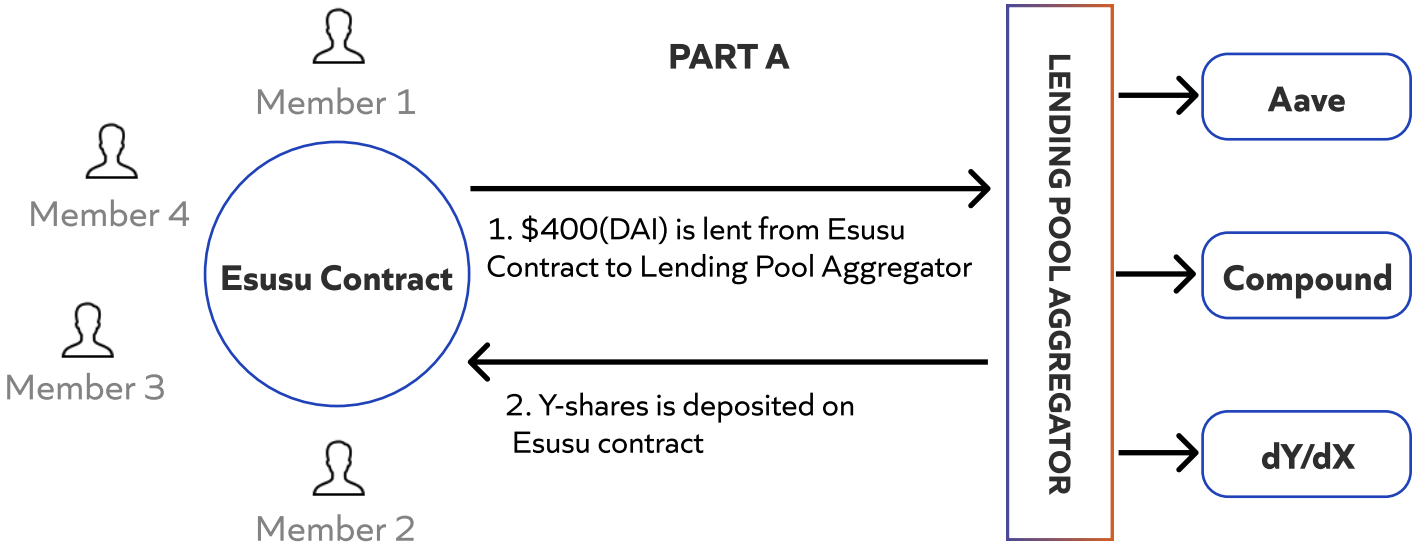
Architecture

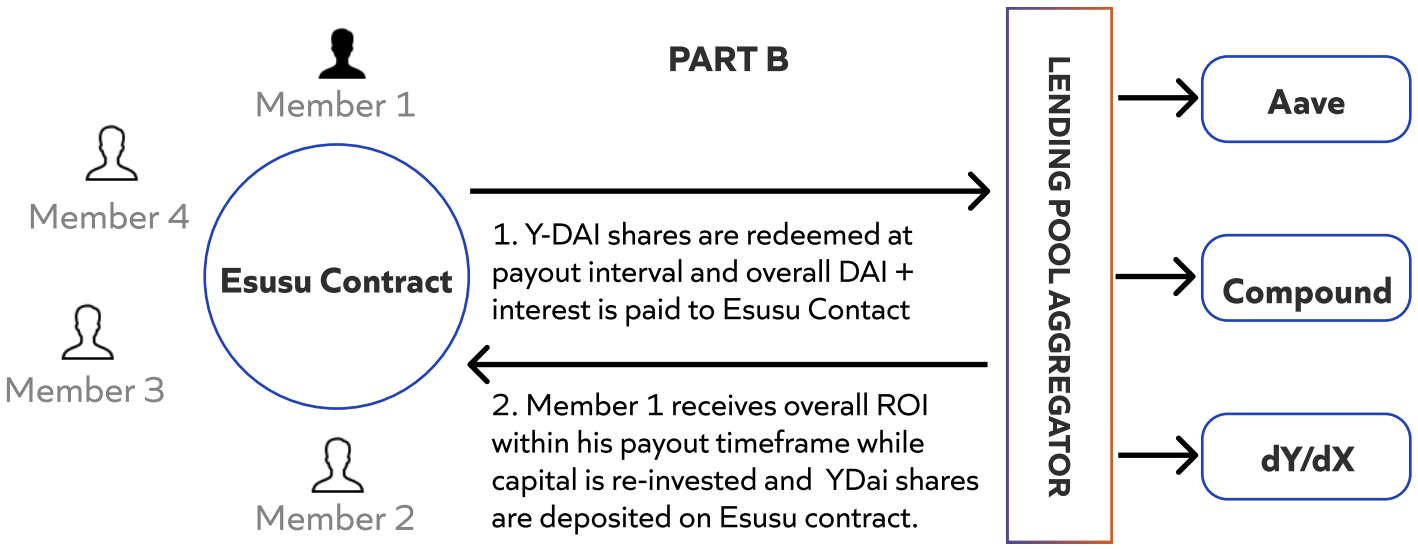
Pending Beneficiary

Beneficiary

Assumed Parameters

Esusu Cycle deposit amount: $100 (DAI)
ROI Payout Interval Per Member: 1 month
Maximum Members in Esusu Cycle: 4





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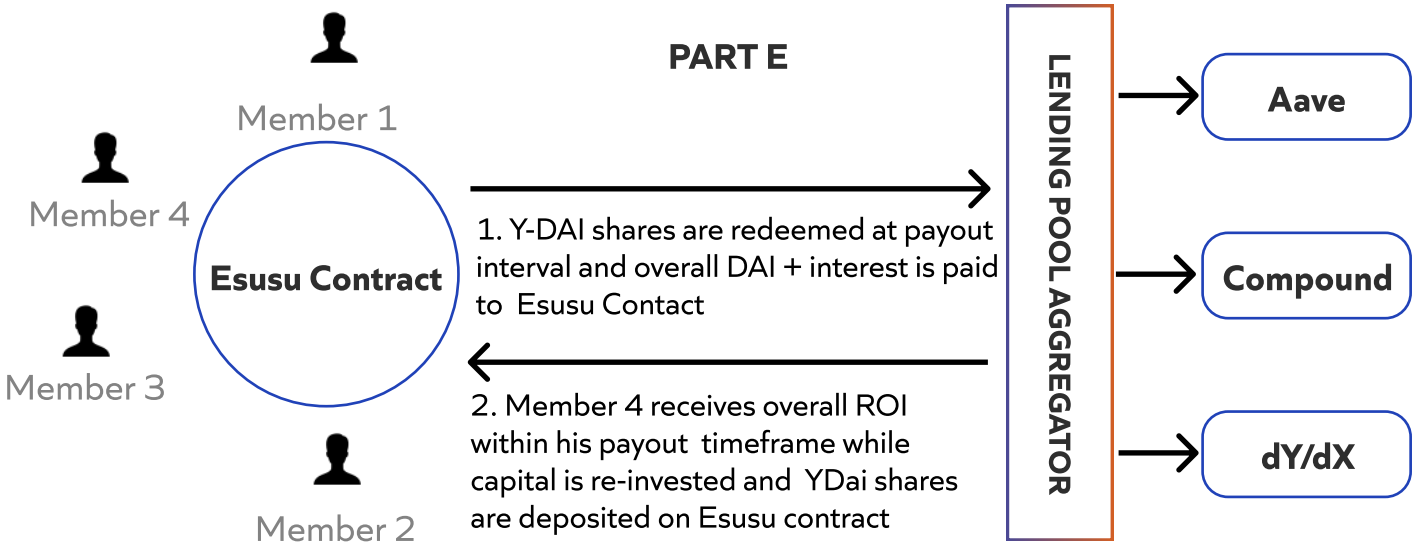
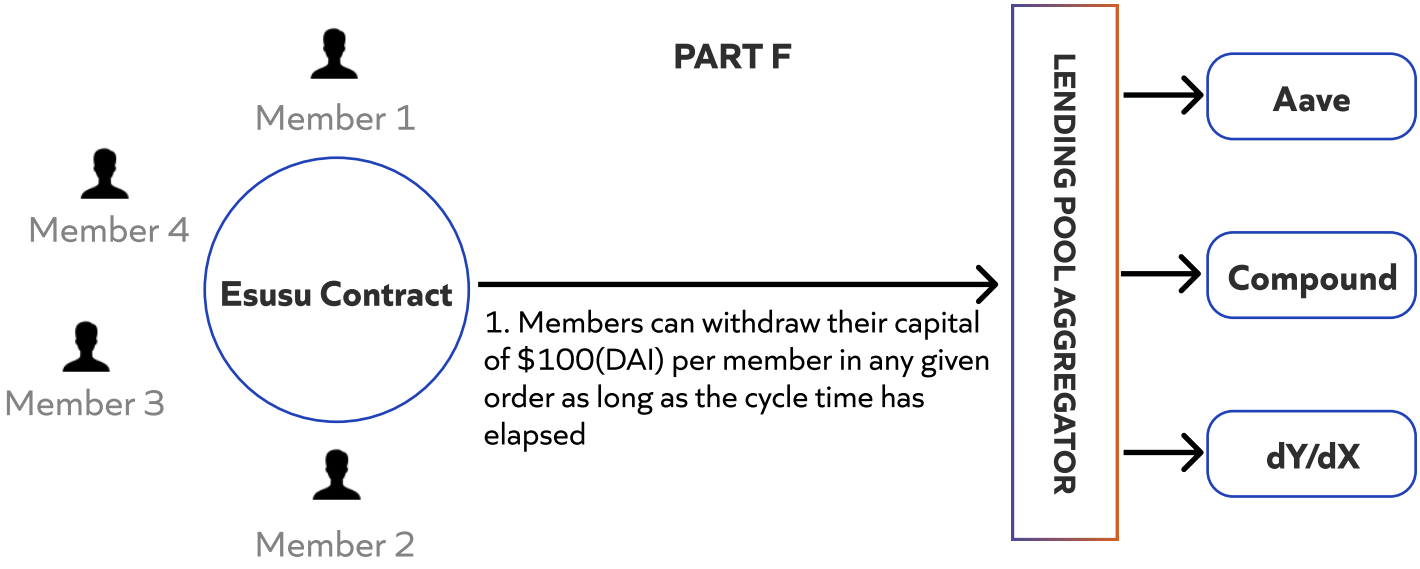

PART E
Member 1
Member 4
Member 3
Member 2
Esusu Contract
1. Y-DAI shares are redeemed at payout interval and overall DAI + interest is paid to Esusu Contact
2. Member 4 receives overall ROI within his payout timeframe while capital is re-invested and YDai shares are deposited on Esusu contract
LENDING POOL AGGREGATOR
Aave
Compound
dY/dX


PART F
Member 1
Member 4
Member 3
Member 2
Esusu Contract
1. Members can withdraw their capital of $100(DAI) per member in any given order as long as the cycle time has elapsed
LENDING POOL AGGREGATOR
Aave
Compound
dY/dX

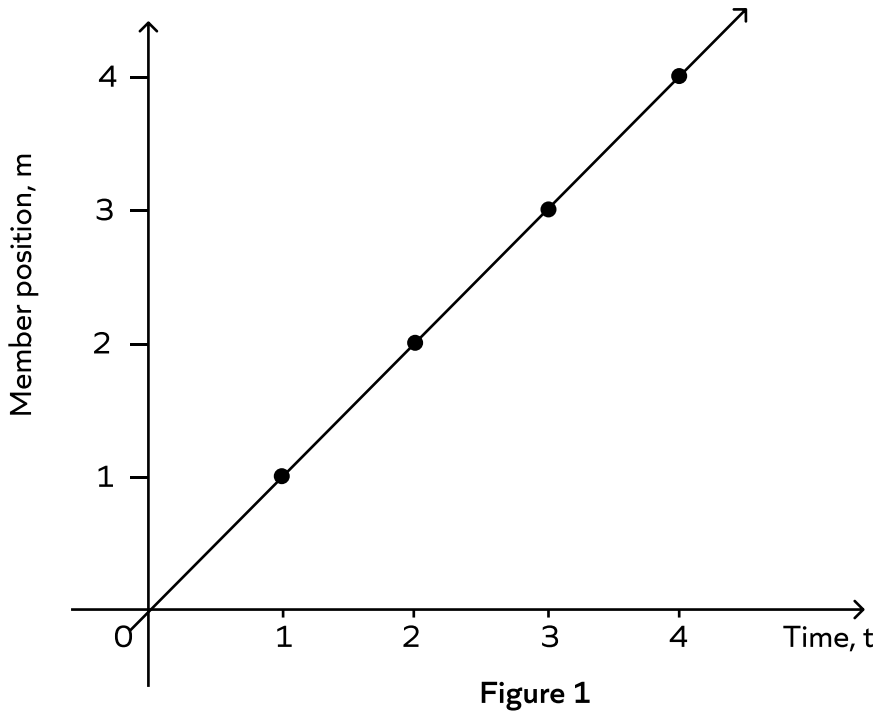


Figure 1

From figure 1 above,
For member at position 1 to withdraw ROI at current Time, Tx, Tx must be greater than T1. Where T1 is the payout time interval for member at position 1. For any member m to withdraw ROI at time Tx, it means that Tx > (m * payout time interval)

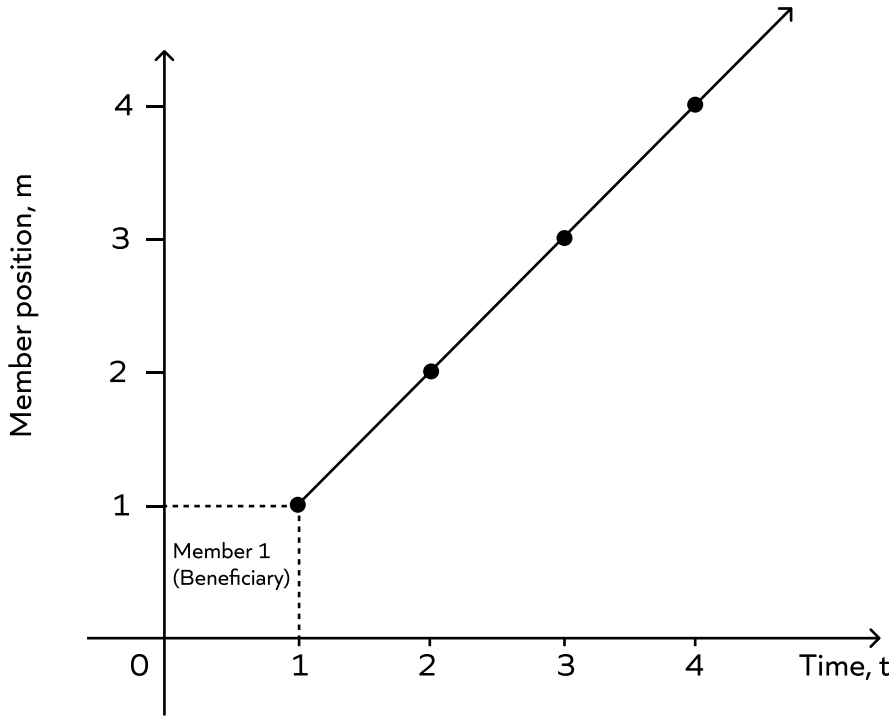


Figure 2

From Figure 2 above,
Let us assume that member one has made a wthdrawal of his ROI at Time Tx which is greater than T1. For member at position 2 to withdraw ROI at current Time, Tx, Tx must be greater than T2.
To calculate the ROI for member 2, we have to take into consideration that member 1 has received his payout. Therefore, ROI for Member 2 = Overall ROI at Time Tx Troi / Ta
Where,
Ta = Tc - Bt;
Bt = number of beneficiaries

Equations and Parameter Definitions For Esusu

Parameter Definitions

Total available time in seconds - **Ta**

Total Beneficiaries at current time - **Bt**

NOTE: Beneficiary is anyone who has withdrawn overall ROI during his payout time interval

Current time in seconds - **Tx**

Total accumulated ROI - **Troi**

Member ROI - **Mroi**

Cycle payout interval in seconds - **T**

Total Members in Cycle - **Tc**

Equations

Bt = number of beneficiaries

Ta = Tc - Bt

Troi - ((balance shares * price per full share) - total deposited - total capital withdrawn)

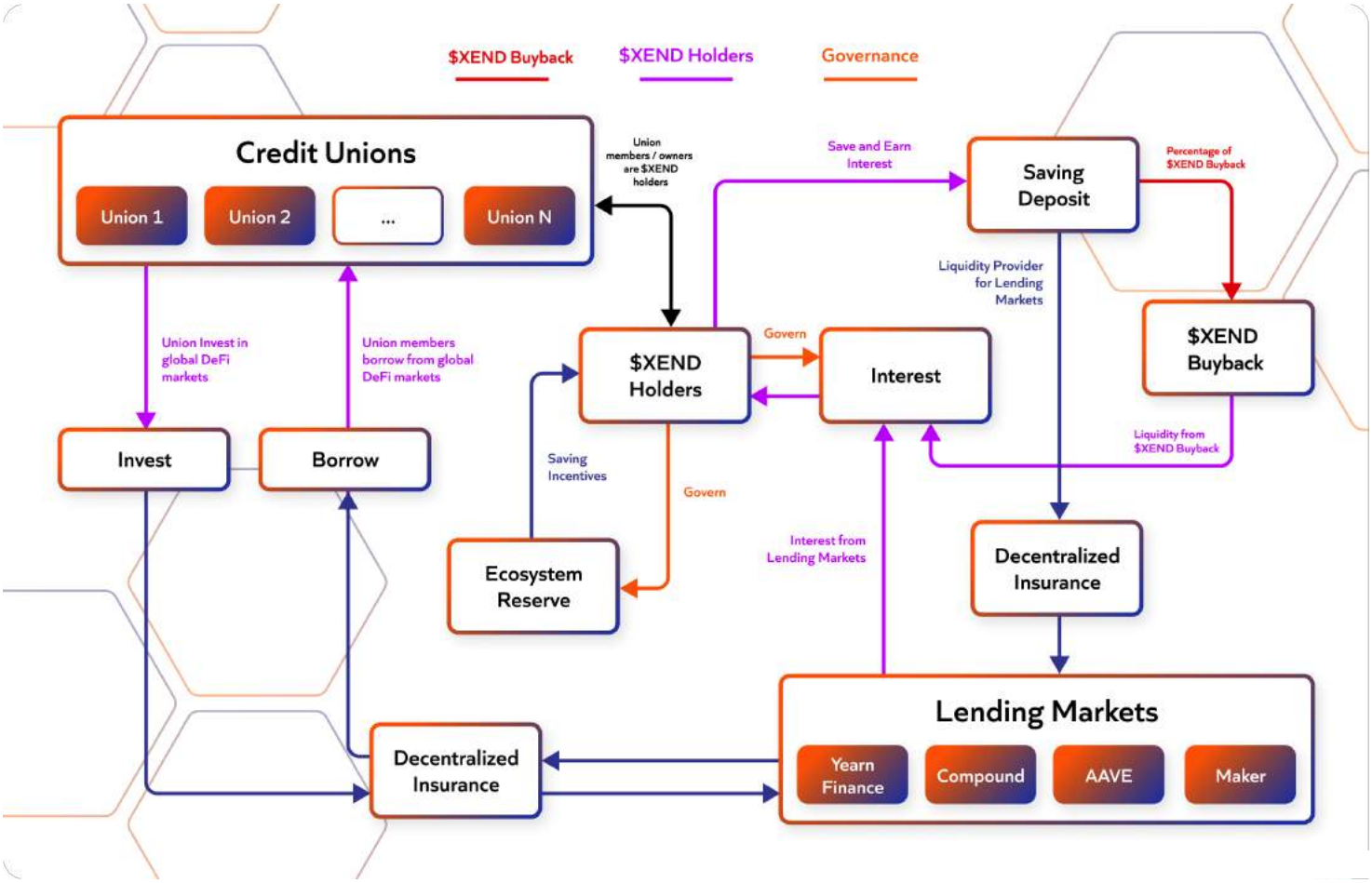
Mroi = Troi / Ta

Individual Savings:

The steps involved in saving as an individual:

- An individual can create an Individual Savings Node (ISN) on the smart contract by using the Web UI or directly interacting with the smart contract.
- The creator will select predefined rules that govern each node such as deposit amount and maturity date. The rules are stored in the smart contract.
- The user who spawns an ISN pays a small gas fee.
- When the individual contributes, he/she is rewarded with 0.07$XEND per $1 contributed. The value of $XEND rewarded will decrease to 0.035$XEND per $1 contributed when the contract has received $100,000,000 in savings.

Token Economy



Xend Token ($XEND) Reward System

The smart contract rewards the users with $XEND for saving by applying an algorithm embedded inside the smart contract.

The smart contract takes **Lock Time** and **Time Level** into consideration. The lock time is the period funds are locked in the smart contract. Lock time was added to the overall reward system to ensure that the users of the Xend Finance protocol use the features of the protocol for a considerable period of time. This ensures that the protocol will only have long term users and this is very important for the overall success of the protocol.
The Time Level determines the percentage of the reward a member will get. We have a total of 4 Time Levels. Each level unlocks 25% of overall reward $XEND tokens.

Example: Current configurations for reward smart contract sets the default lock time to be 1 month at time level 1. This means that if you have funds locked for a period of 1 month, you will earn 25% of the reward calculated with the parameters and formulae below.

Parameters:

Contract creation Time **(T0)**

$XEND - **XT**

Total XT minted (m) - 200,000,000 XT

Total Amount in dollars Contributed **(Y)**

Amount in dollars Contributed by user per cycle **(Yu)**

Category (c) [Group **(Cg)** or Individual **(Ci)**]

Category Reward Factor [Group Reward Factor **(Cgr)** , Individual Reward Factor **(Cir)**, Esusu Reward Factor **(Cer)**]

XT Reward factor (XTf) has unit of XT per $ = Overall XT Reward Threshold per level **(Tr)** / Savings Threshold in USD **(Ts)** per level

```
XT Reward (XTr) = XTf * Yu
Cgr = 1
Cir = 0.7
Cer = 1.5

Threshold Multiplier Factor [Tf] = 2
Xend Token(XT) Depreciation Factor [Df]  = 2 (where time > 0 &
Threshold > T1)
Threshold 1 [T1] = $100,000,000 & 10,000,000 XT
Threshold 2 [T2] = $200,000,000 & 5,000,000 XT
.
.
.
Threshold n [Tn] = ($100,000,000 * n) & (10,000,000 XT / (Df^n-1)


Relationship between Savings Threshold in USD (Ts) and Overall
XT Reward Threshold per level (Tr) - Ts is inversely
proportional to Tr
Ts = k/ Tr, where K is a constant.
```

Algorithm Implementation

```
if(c == Cg)
     if(time > T0)
          Level = GetCurrentThresholdLevel()
          XTf = GetXTf(Level)
          XTr = XTf * Cgr
          return XTr
```

```
if(c == Ci)
     if(time > T0)
          Level = GetCurrentThresholdLevel()
          XTf = GetXTf(Level)
          XTr = XTf * Cir
          return XTf
```

See the rewardconfig.sol smart contract to view implementation.

Xend Finance Multi-Level Interest Mechanism

Xend Finance aggregates and optimizes different DeFi Lending protocols to get the best APY. Interest earned from these DeFi protocols act as the first level of interest.
When users of the Xend Finance protocol use the different Xend Finance saving strategies such as Individual Fixed Savings, ESUSU and Cooperative Savings for a given period of time (from one (1) month and above), they receive $XEND tokens as reward.

Lending Deposited Savings To DeFi Lending Protocols (Compound, Aave, Fulcrum, dYdX, Venus, ForTube, DeFi Dollar, Yearn Finance)

Compound is a decentralized network that allows its users to lend ETH or its derivatives (ERC20 tokens) and earn interest. It also allows its users to borrow ETH or its derivatives (ERC20 tokens) by depositing an asset supported by Compound that is different from the asset the user intends to borrow.

Yearn Finance is a DeFi lending aggregation protocol that optimizes for the highest yields across multiple lending protocols including Compound, AAVE, dYdX etc.
Xend Finance smart contract integrates the DeFi lending Protocols' smart contracts to enable seamless communication between the protocols.

The Xend Finance smart contract periodically lends the deposited savings on its network to the DeFi lending protocols. These DeFi protocols are interest-bearing protocols and Xend Finance protocol routes the interests generated by these protocols to the individuals or groups that have used the savings strategies that enabled them to lend to the DeFi protocols.

Xend Finance Governance Framework

Xend Finance is Decentralized Autonomous Organization (DAO) governed by $XEND holders using three different smart contracts:
Xend Token Smart Contract, Governor Smart Contract and Time Lock Smart Contract

These smart contracts will allow the Xend Finance community to propose features, vote and execute approved proposals.

Proposals include changes like adjusting Group Reward Factor (**Cgr**), Early Withdrawal Charge (**Ewc**), Defaulters Charge(**Dc**) and $XEND Depreciation Factor (**Df**)

Any address with over 500,000 $XEND can propose governance actions which are executable codes. The community can submit their votes during a three-day voting period. After the majority vote is decided for the proposal, it is queued in the Timelock contract and can be implemented in 4 days.

Xend Finance Commission Framework

The commission framework consists of parameters and formulae used by the smart contract to govern the commission deducted from each member's interest during withdrawal from a cycle or a fixed deposit. The fee is transferred to the treasury.

Parameters

```
Fee Rate [Fr]: This is a percentage that is used to multiply the
Member ROI to get protocol fee
Member ROI [Mroi]: This is the ROI a member is withdrawing


Fee = Mroi  * Fr
```

Xend Finance Decentralized Insurance

Xend Finance takes security of the platform and users' assets very seriously. It is no news that DeFi protocols are always constantly targeted by hackers and are also prone to smart contract bugs, key loss and a few other subtle issues. Protection of users' assets is very important and the Xend Finance protocol will be integrating decentralized insurance to ensure that assets are covered.

Decentralized insurance protects users from loss of assets when there are smart contract anomalies or hacks.

In addition, Xend Finance has performed a thorough **security audit** and also has regular vulnerability scans to check the health of the smart contracts and possible loopholes that might arise.

Future Functionality

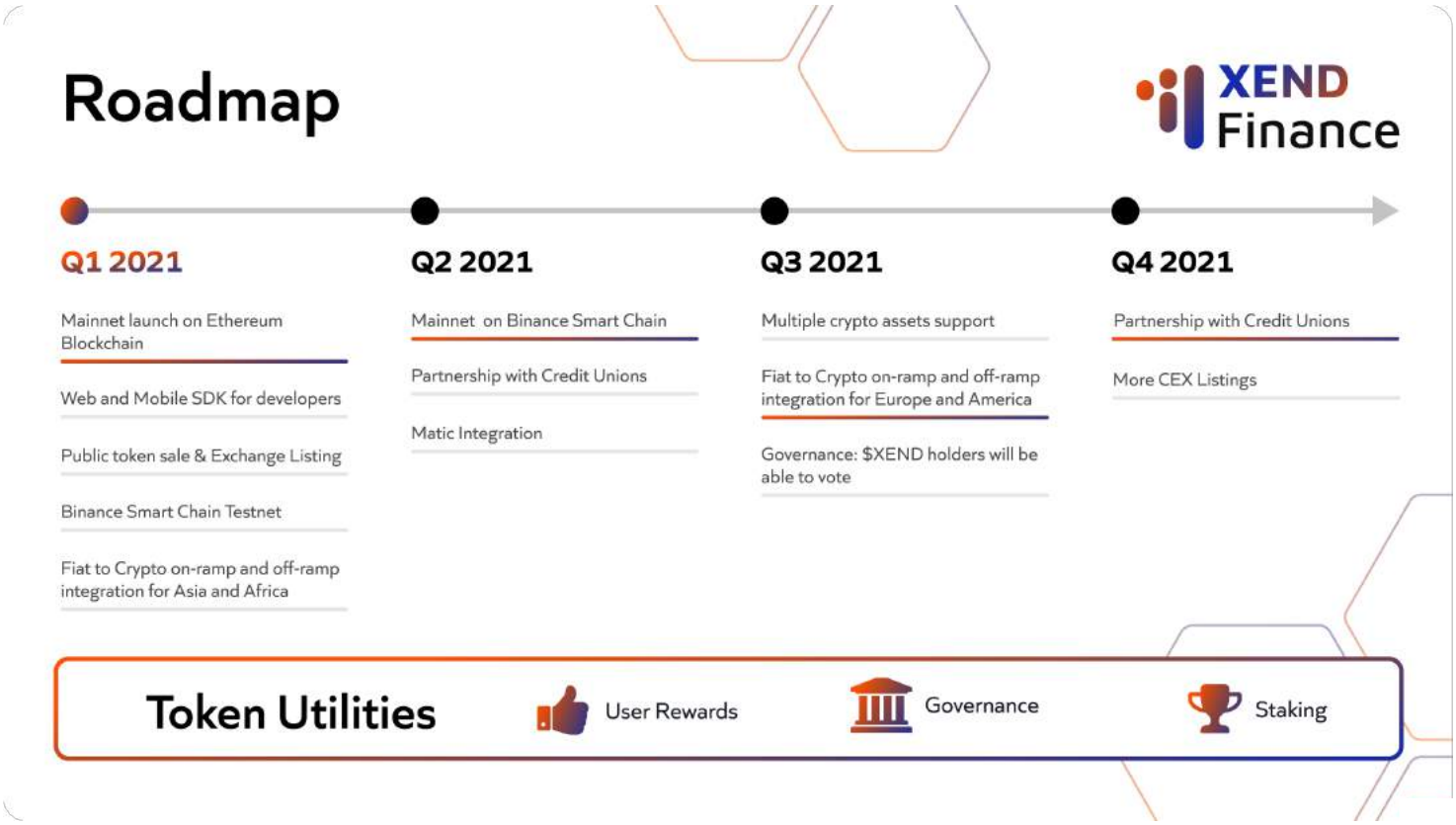
Building web and mobile SDK

We will be building a web and mobile SDK to allow existing wallets and fintech apps to easily allow their users to save on Xend Finance. Our SDK will enable the users to seamlessly save using the fiat currency in their digital wallets or credit/debit cards. Users will also be able to receive their interests on their mobile wallets through the SDK.

Deployment to Binance Smart Chain [Done]

Binance Smart Chain allows cross-blockchain assets and data transfer across multiple blockchains. It supports extremely fast transactions and very low fees.

Xend Finance Product Roadmap



Conclusion

Traditional Credit Unions are location dependent, this means that all members must be in a particular geographical area to be a part of a credit union. They have very low annual percentage yields. Smaller credit unions have access to very little amount of liquidity, hence they give very small loans with high interest rates.

Xend Finance has broken down these barriers by providing a location agnostic protocol that can be accessed from anywhere in the world, providing high annual percentage yields of up to 20%, access to global decentralized financial services such as DeFi savings, DeFi lending and DeFi borrowing and access to decentralized insurance to ensure protection of deposited assets.

Credit Unions and Individuals can now easily store their money , earn interest and borrow in foreign and stable digital currencies. Access to their funds is instant and no 3rd party is required.

Using a decentralized governance process puts the community in charge of operations thereby reducing risks and improving the viability of the project.