



# Whitepaper

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# Introduction

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*You can't build a great building on a weak foundation. You must have a solid foundation if you're going to have a strong superstructure.*

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This whitepaper introduces Alendium, a trailblazing pooled lending protocol built on the Alephium blockchain. By harnessing the power of decentralization by way of Alephium, Alendium offers a platform where users can lend and borrow assets with unparalleled trustlessness, reliability, and openness. As the pioneer of lending protocols on Alephium, we must and will exemplify a commitment to sustainable and reliable financial operation and build a robust foundation and framework for future lending-based projects on Alephium to stand upon.

## How Alendium?

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*The future of lending is one that enables everybody to play a role. Until that happens, we live in a world of tyrants and anarchs.*

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Alendium harnesses the decentralized nature of blockchain technology to facilitate a direct interaction with the protocol – with no intermediaries – by way of its smart contracts. This interaction is made possible via a dedicated user interface offering a user-friendly gateway into the protocol while simultaneously maintaining its permissionless characteristics.

### Lending

To lend funds, users deposit native tokens into a designated smart contract called a *pool*. This contract acts as an asset reservoir and is used to supply borrowers with the necessary funds while accruing interest for their lenders. Interest rates are dynamically calculated by way of an algorithm which reflects the pool's *utilization rate* – a measure of the supply and demand ratio.

### Borrowing

Borrowing on Alendium is akin to taking out a loan from a collectively owned pool of funds, supplied by one or many lenders. Each loan has an associated interest accrual that must be repaid along with the borrowed assets. To borrow assets, a user must deposit a *collateral* asset that exceeds the *liquidation threshold* of the assets they wish to borrow. It is imperative that the borrower repay the loan before their *collateralization ratio* falls below its *liquidation threshold*. If this threshold is breached, a *liquidator* can initiate a liquidation of the borrower's collateral, safeguarding the systems lenders.

## Health Factor & Liquidation Threshold

The health factor is a numerical indicator of the safety margin between a borrower's collateral and the assets they borrowed. It is calculated based on their underlying values, calculated in ALPH, and a *liquidation threshold*. The collateral value of an asset is determined by estimating the value it can be sold for on a DEX. Likewise, the loan value of an asset is determined by estimating the value it can be sold for on a DEX.

$$CR = \left( \frac{\text{Collateral (in ALPH)}}{\text{Loan (in ALPH)} + \text{Interest (in ALPH)}} \right)$$
$$HF = \frac{CR}{\text{Liquidation Threshold}}$$

The liquidation threshold acts as a time and value buffer to safeguard lenders and borrower's assets alike. If a *collateral ratio* falls below the *liquidity threshold*, a liquidation can be initiated by any actor.

## Liquidation

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*Life is a balance between holding and letting go.*

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Liquidations are the industry standard way of maintaining lending pool health. When a loan's health factor falls below 1, or a loan's collateralization ratio falls below the liquidation threshold, a liquidation can be initiated. The liquidator must repay the loan and the interest on behalf of the borrower and will receive the loan value in collateral tokens along with a commission fee incentive for their service - paid out of the collateral overhead. The interest is deposited into the lending pool as an incentive to the lenders. Remaining collateral is claimable by the borrower. This process maintains pool security and stability by ensuring that pools are overcollateralized.

## Fees

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*The key to a functional system is perfecting the financial incentives of both parties – balancing what cannot be balanced.*

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There are currently two proposed fees. One which incentivizes the liquidator and one which incentivizes the lender. Both fees are derived from the borrower.

The liquidator fee is an incentive used to maintain collateralization security and is paid out to the user who repays the debt on behalf of the borrower – we have called this user the liquidator. They are permitted to take a fee off the top of the collateral (*this operates under the assumption that the Liquidation Threshold is greater than 1*).

The lenders fee is an incentive used to promote lenders to keep assets in the lending pool and readily available to borrow. This is derived from the interest accrued on a loan. It is paid back into the pool and split amongst the lenders at their ratio of pool ownership.

Both fees are variable and subject to governance votes.

## Safety and Transparency

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*Honesty and transparency make you vulnerable.*

*Be honest and transparent anyway.*

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### Safety

#### 1. Price Oracles

A liquidation can only be as reliable as the price oracle from which it is executed. Given the nature of Alephium at this current time, Ayin is the only true DEX in production. Thus, this is a single point of failure as we will rely on their contracts data exclusively for our V1 release. Naturally, since we are using their **on-chain data** it is not a high threat given their reliability. Nonetheless, we must acknowledge it. Once other exchanges are created, we can decentralize our price feeds.

#### 2. Audits

A smart contract must be thoroughly audited by a trusted third party to ensure asset safety. As such, we will be reaching out to a community elected, trusted third party to audit our contracts prior to launch.

### Transparency

We believe in Alephium and, as previously stated, are committed to creating a platform that users can use as a foundation to leap from. As such, we will be open sourcing our codebase after launch to provide resources for the community to use within their own projects and help Alephium grow.

## Governance

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*Vote wisely, even if that means not voting at all.*

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Governance is crucial for the success of Alendium as it is responsible for balancing the incentive mechanisms of the protocol. There will be a two-stage approach to governance.

1. **Off-Chain**

Proposals and voting commence off-chain and must gather a voting threshold to be considered for a *protocol changing proposal vote*.

2. **On-Chain**

Once a proposal has passed the off-chain vote. It is brought on-chain and must meet a 51% positive vote threshold and a minimum asset voting turnout threshold to be implemented.

Voting power is linear with the total amount of Alendium Token you own. A snapshot time is announced and then taken to determine a given wallet's voting power. Each vote will have a set amount of time to complete. If it is unable to meet the turnout threshold at that time, it is considered void.

## Token

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*Life's greatest rewards are reserved for those who demonstrate a never-ending commitment to act until they achieve.*

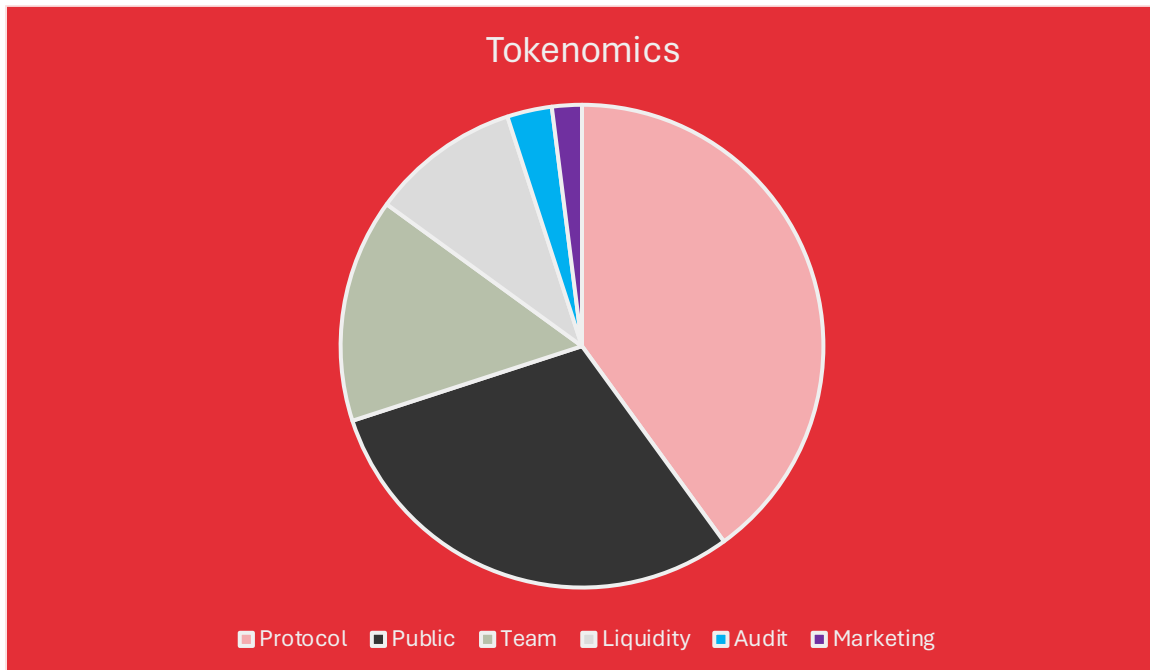
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The Alendium Token serves as the utility token of the platform. It provides holders with the following benefits:

1. Alendium token holders are given the exclusive ability to vote on governance proposals and influence the future of the platform's development along with its protocol parameters. Token holders are responsible for maintaining decentralization and a fair marketplace for lending.
2. The Alendium token can be used as collateral when borrowing assets. This gives users access to increased liquidity options and grants them a larger array of instruments to borrow and lend as they desire.
3. The Alendium token is used as an incentivization method for both borrowers and lenders. Users of the protocol are rewarded with the token. This reward is dynamic and decreases over time as the protocol reward allocation depletes. This reward is a parameter that the governance protocol is responsible for balancing. It is additionally responsible for ensuring the protocol token lies in the hands of its users.

Additional utility can be initiated from the governance protocol and enacted by token holders via their exclusive voting rights.

## Distribution



Total	1,000,000
Protocol	40%
Public Sale	30%
Team	15%
Liquidity	10%
Audit	3%
Marketing	2%

All categories are unlocked at time of token launch except for the Teams allocation and the Protocol allocation. The protocol allocation is paid out over time to the lenders and borrowers as an incentive for using the protocol. The team allocation has a 3-month cliff before commencing a 9-month linear vesting period; there is an unlock on the first day of each month in the 9-month period and is valued at 1/9 of the team's total allocation.

## Additional Notes

This is the first iteration of our whitepaper. We acknowledge that we may have forgotten something. As such, we will make changes to this formal document overtime to improve the accuracy of it and include all aspects of the protocol.