
OneLedger
Tokenomics

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Tokenomics

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Overview

OneLedger's[1] mission is to provide a universal protocol that enables interoperability across various blockchains. We aim to be the first truly interoperable blockchain with a focus on scalability and fault tolerance. We use Tendermint[2] as our consensus engine. Tendermint provides us with a Byzantine Fault Tolerant State Machine that can withstand a failure rate of 33%. Our unique approach allows the network to easily facilitate both public, permissionless, and private, permissioned, blockchains.

This paper aims to discuss our tokenomics and staking methodology in detail for our public blockchain.

Goals

1. Define the utility for OneLedger Token (OLT[3])
2. Provide insights into our mainchain staking methodology
3. Address how delegators[4] are compensated
4. Describe the deceptive behaviors and the penalties associated
5. A sneak peek into our governance model

Excluded from this paper

This paper gives a first person insight into the tokenomics and staking methodology for our mainchain[5]. Sidechain[6] tokenomics and staking for interoperability is a work in progress and we will keep you updated once we decide on the exact mechanics.

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[1] OneLedger Technology Inc. is referred to as OneLedger for all the purposes going forward in this paper
[2] More info about Tendermint can be found here
[3] OLT is the Utility Token for OneLedger
[4] More info on Delegators available in the section of *Network Specifications*
[5] Mainchain is OneLedger network's principal blockchain that facilitates general blockchain transactions
[6] There are a number of sidechains, each pertaining to a specific blockchain that facilitates interoperability with that chain

Future Revisions

The contributions to this paper are iterative and OneLedger will continue taking feedback from subject matter experts and work on improving this paper.

OLT Utility

OLT is primarily a utility token and is used to interact with the platform in a variety of ways:

1. Interoperability
2. Staking
3. Delegation
4. Governance
5. DApps
6. Creation of Custom Tokens
7. Domain Naming Service

Interoperability

1. One of the main areas of focus for OneLedger is Interoperability. OLT will be used as fees for all the interoperable operations across chains.
2. OneLedger's expertise is in connecting businesses to blockchains, keeping their centralized data consistent with the transfer of assets on blockchain. OLT is also utilized for any transaction a private business blockchain makes on the public network. Considering the volume of transactions for businesses, this will be a significant boost to the utility of OLT.

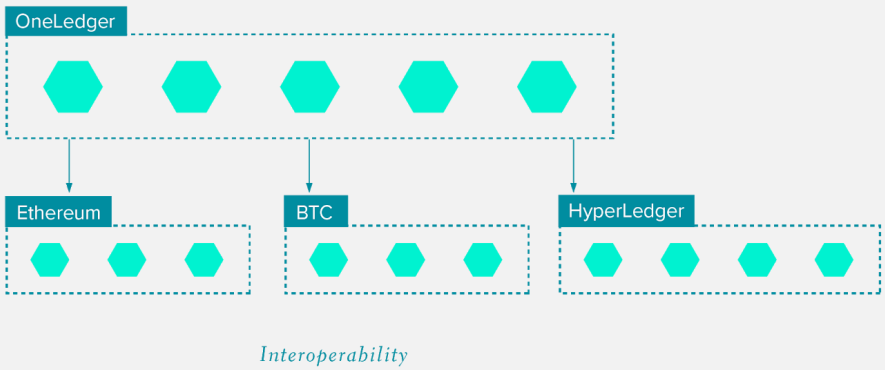

Figure 1: OneLedger protocol interacting with other blockchains

Staking

Validators in the OneLedger network will be required to stake OLT, which provides another utility for the token. The Staking model will be further detailed later in this paper.

Delegation

OLT is further used for delegating stake to Validators in our Delegated Proof of Stake (DPoS) model. There is also a minimum amount of OLT required for delegation. The Delegation model will be further detailed later in this paper.

Governance

Every step in the lifecycle of a proposal in the governance module utilizes OLT. OLT is used for the creation and voting of proposals. The Governance model will be further detailed later in this paper.

DApps

1. Developers can build DApps connecting to the OneLedger platform. These DApps will use OLT to pay network fees. The greater the usage of DApps on the OneLedger Network the higher the demand for OLT.
2. OLVM is our OneLedger Virtual Machine which facilitates writing Smart Contracts in Javascript. OLT is used as fees for deploying and executing smart contracts on the OneLedger Network. JavaScript was strategically chosen as the Smart Contract language for OneLedger as it's one of the most popular languages for front-end development, making it easy for developers to build DApps on the OneLedger Network.

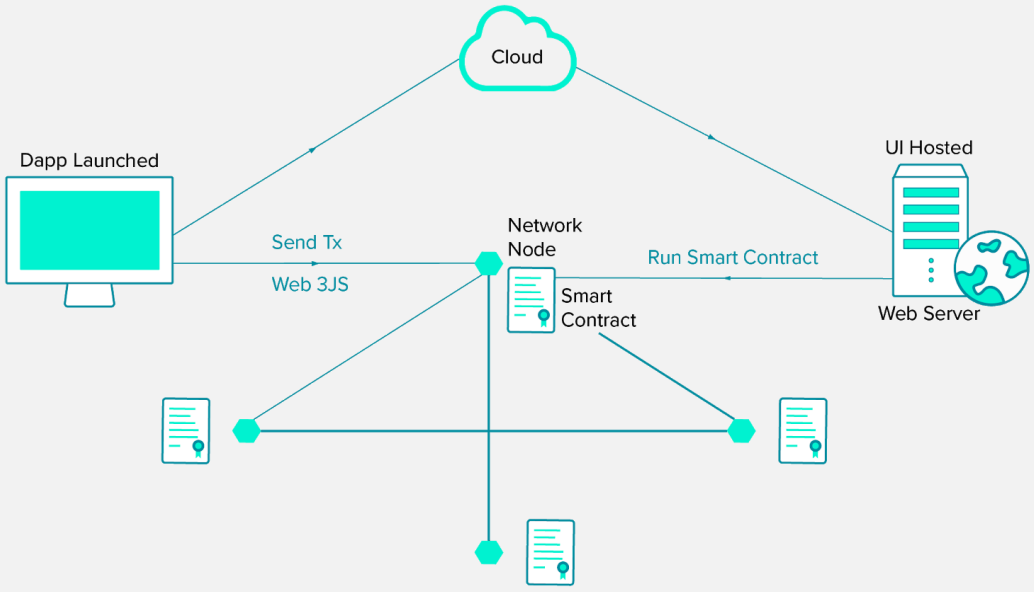

Figure 2: Workflow of the OneLedger Virtual Machine (OLVM)

Creation of Custom Tokens

A future capability of OneLedger is the ability to create Custom Tokens, similar to ERC-20 for Ethereum. Providing this service for businesses is critical when thinking about digitizing assets or for creating a credit system for Loyalty Programs.

Domain Naming Service

The Domain Naming Service (DNS) gives the community an opportunity to move away from complicated addresses. Domain names will be traded by OneLedger in the primary market. OneLedger also creates a secondary market for resellers. Since OneLedger connects multiple blockchains together, the DNS will work as a Universal Blockchain DNS, allowing for domains on any blockchain network. Domain Names will be traded for OLT on the OneLedger platform.

Network Specifications

OneLedger network has three kinds of primary participants.

Full Node

A OneLedger Full Node broadcasts transactions to the network. It also verifies transactions and runs the smart contracts for OLVM[7]. The Full Node also contains a copy of the entire blockchain.

Validator

In addition to all the functionality of a Full Node a Validator also acts as a Block Producer. A Validator writes blocks to the network and follows the Practical Byzantine Fault Tolerant consensus for proof of stake[8]. A Full node has to stake OLT to become a validator. The OLT is then locked and used as a collateral to maintain the security of the network. If a validator is found to misbehave, then their staked OLT is slashed by the network

Delegator

A Delegator delegates OLT and selects Valdiators to stake on their behalf. These Validators represent the stake of the delegator and they get rewarded proportionately when a Validator gets rewarded. Delegators also get penalized proportionately if the corresponding validator is

[7] OLVM is OneLedger Virtual Machine that lets users write smart contracts in Javascript
[8] More info on Proof of Stake https://en.wikipedia.org/wiki/Proof-of-stake

penalized. It is therefore critical for Delegators to do their due diligence when selecting a validator.

Milestones

Testnet[9]

The OneLedger Testnet was launched in December 2018, it included Send Transactions, a JavaScript OLVM and swap functionality that demonstrated an Ethereum to Bitcoin swap on private testnets. In addition, the OneExplorer was released shortly after to visualize the transactions, blocks and accounts on the OneLedger Network. Finally, the OneLedger node was containerized, making it platform agnostic. The node can be deployed in AWS, GCP, Azure, or any other cloud platform.

Token Allocation

Total Supply of OLT is 1 billion. Here is a detailed pie-chart showing the present distribution of our tokens.

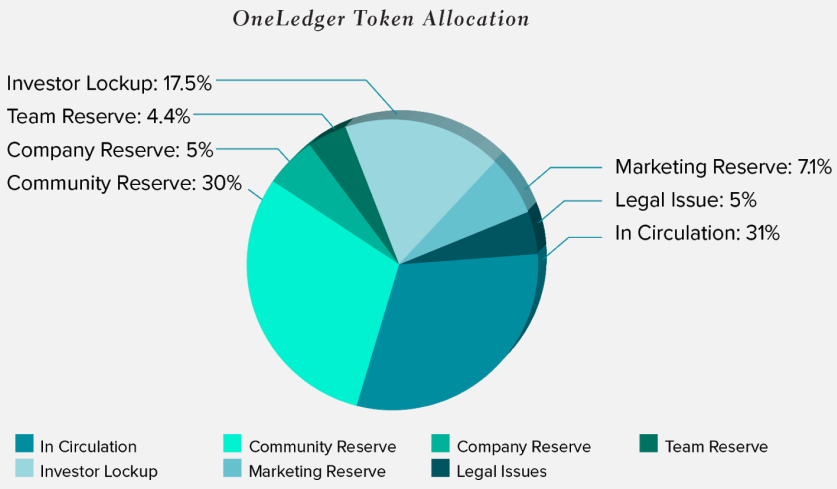

Figure 3: OneLedger Token Allocation

Community Reserve of 30% is distributed as 5% for Bounty programs and 25% for block rewards.

[9] Testnet is a public network created for testing all the features being developed for OneLedger

Validator and Delegator Mechanics

A Validator requires a minimum of 3M OLT to be staked, also referred to as self-delegation. In addition, each Validator is required to identify the following two parameters:

1. Commission Percentage
2. Slashing Percentage of Delegator

Commission

When Validators join the OneLedger Mainchain, they will specify the Commission Percentage they retain for managing their Delegators' stake.

Consider the following example. Suppose a validator's self-delegation is 4 million OLT and there are 10 people delegating 100,000 OLT each to the validator, for a total weight of 5 million OLT. Suppose also that the validator earns 10000 OLT as a block producer. If the validator states its commission percentage as 10%, then the distribution is calculated in the following manner:

Total amount staked: 4 million + (100,000 * 10) = 5 million

Total reward to be shared: 10000

Validator's Commission: 10% of ⅕ * 10000

Validator's reward: ⅘*10000 + Validator's Commission = 8000 + 200 = 8200

Each Delegator's reward: ((⅕ * 10000) - Validator's commission) / 10 = 1800 / 10 = 180

This commission helps delegators choose a validator who can offer them the best return and incentivizes Validators to be conscious of their activities.

Slashing Percentage of Delegator

The Slashing Percentage is another parameter that is configurable for each Validator. This denotes the percentage of slashing that the delegators bear for any misconduct from a Validator.

For example, if some Validator has 4 million in self staked delegation and 1 million delegated to it by 10 delegators equally of 100,000 each, and the Validator chooses 10% as the slashing percentage for the delegators. If the Validator is slashed for a total of 2 million, then the following calculation indicates how much each participant is slashed:

Total amount slashed on Validator: 2 million

Slashing percentage on delegators: 10%

Total self stake from Validator: 4 million

Total amount slashed from Validator: 90% of 2 million = 1.8 million

Total amount slashed from each delegator: (10% of 2 million)/10 = 200,000 / 10 = 20,000

The advantage to this model is that it ensures Validators do not conduct unacceptable behaviour by proportionately distributing the penalties. In return, each Validator behaves more responsibly to maintain the health of the network. Delegators also gain an advantage by choosing a Validator who is more responsible, and whose slashing percentage is minimal.

The minimum percentage that a validator chooses for this metric (slashing percentage) has to be 10%. This incentivizes Delegators to research the validators they are voting to secure the network. OneLedger is not setting a maximum threshold for delegator slashing percentage, as delegators are intrinsically incentivized against high slashing percentages. In the future a maximum threshold can always be voted in through governance if needed.

The OneLedger network ensures that good Validators are always paid handsomely through **commission** and punished accordingly through **slashing**.

Minimum Delegation Amount

Minimum Delegation Amount is the minimum amount a Delegator can delegate to a Validator.

Here is the simple mathematical formula to calculate the Minimum Delegation Amount, at a point of time

Minimum Delegation Amount $\mathbf{D = (T - \gamma) / n (\alpha + \beta)}$

T is the total OLT available in the network for circulation at a point of time

γ is the total OLT burnt till that point of time

n is the total number of validators in the network at that point of time

α is the ratio of total number of validators to total number of delegators in the network

β is the ratio of amount staked by validators to amount staked by delegators in the network

Learnings from this equation

There are a couple of healthy facts in this equation.

1. With **β**, we can control the total percentage of amount staked to amount delegated in the network. This can ensure a healthy equilibrium in the network.
2. With **α**, the ratio of number of validators to delegators is inversely proportional to the minimum delegation amount. When the number of delegators increases, the Minimum Delegation Amount increases with it. An increase in Validators causes a decrease in the Minimum Delegation Amount, which in-turn increases the potential from more delegators to join the network.

Voting Power

Voting Power for a Validator is an important metric that measures the influence a validator has over the network. Voting Power is also a key metric for consensus in a blockchain. In most Proof of Stake networks, Voting Power is simply a factor of the amount staked by the Validator.

OneLedger takes a broader approach by evaluating multiple validator attributes to influence Voting Power.

Currency Staked

The currency staked by the Validator is directly proportional to the Validator's Voting Power. The higher the OLT staked by a Validator, higher its Voting Power. This is a general rule with all the Proof of Stake Networks.

Lock-In Period

A Validator can choose to lock-in their staked OLT for a period of 3, 6, 9 or 12 months. The longer the Validator stakes, the higher the Voting Power. This metric helps the network in two ways.

1. Validators with less stake, can punch in above their weight by locking their stake for a longer period of time.
2. Validators tend to behave more responsibly and avoid misbehavior if their stake is locked, which ensures overall good health of the network.

Validator Seniority

Validator Seniority is measured in terms of the total amount of time a Validator is active and working on the network.

1. Validators tend to earn the trust of the network over a period of time, and OneLedger wants to reward the trustworthiness by making sure their Voting Power increases proportionately to their network age.
2. Minimum amount of time a Validator needs to be in the network to be considered trustworthy is two years.

Number of Infractions[10]

OneLedger disincentives behavior that is malicious. Every infraction that a Validator commits decreases their Voting Power. This metric incentivizes against committing misconduct on the network.

OneLedger promotes a healthy staking mechanism by rewarding good behavior and penalizing misconduct from Validators.

Rewards

Validators of OneLedger mainchain are rewarded in two ways:

1. Block Rewards
2. Fees

Block Rewards

To maintain economic stability OneLedger mainchain's block rewards are distributed proportionally to all the Validators based on their Voting Power[11].

These Block rewards are allocated from the community reserve, which is 30% of the total supply of OLT. The Community Reserve is further divided into 25% for Block rewards and 5% for bounty programs. These Block rewards are distributed over a period of five years, in the following manner:

[10] Infractions are misbehavior or wrong-doings of a Validator
[11] Voting power of a validator is described in the section of "Voting Power"

Year	Percentage of Block Rewards released
Year 1	7
Year 2	7
Year 3	4
Year 4	4
Year 5	3

The Governance[12] model will allow the community to vote on inflation, if needed.

Epoch[13]

Block Rewards are distributed to the validators and delegators one epoch in arrears. Each epoch is of 10000 blocks. If a block is written in the current epoch, the rewards for that block would be distributed at the end of next epoch. If a validator unstakes at any point, it would lose rewards for blocks written in the current epoch.

Fees

All transactions in the OneLedger mainchain have a processing fee. The fees for all the transactions in an epoch are aggregated and stored in an escrow account until the end of next epoch. The fees are disbursed in the following manner:

- 85% of the fees are given back as rewards to Validators
- 5% of the fees are allocated to the block producer
- 5% of the fees are allocated to the bounty programs
- 5% of the fees are burned

[12] Governance provides an opportunity for OLT holders to vote on various proposals
[13] Epoch is the timeframe counted in terms of number of blocks finalized, for the purposes of various network consolidations

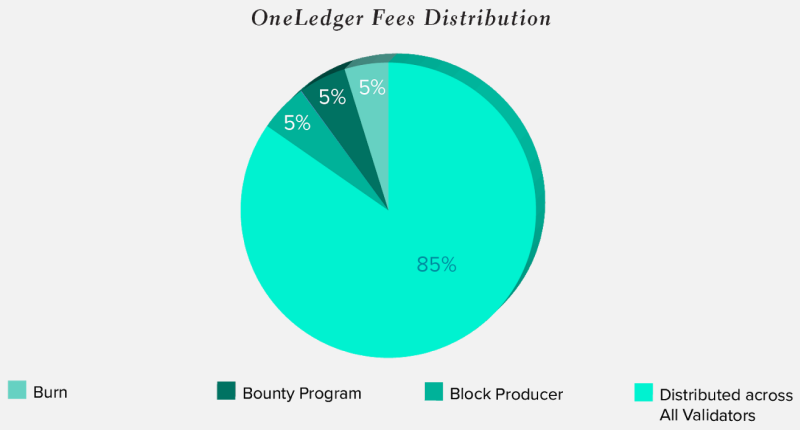

Figure 4: OneLedger Fee Distribution

In the future, these percentages will be configurable through governance proposals.

Slashing

Validators are slashed for any misbehavior in the network. The criteria for slashing and the penalties are as follows:

Byzantine Fault Behavior

Byzantine Fault Behavior is defined as inconsistency in Voting. If a Validator sends a different Votes to different Validators for the same Voting round, it's a Byzantine Fault. Since this is intentional misconduct, the penalty for a Byzantine Fault is 100% slashing of the staked amount and the Validator is removed from the network. The Byzanitine Fault is the most severe of all penalties on the network.

Downtime

For downtime, if a Validator is down for 4000 blocks out of 10000 blocks written, it is slashed 0.1% of its staked amount. At any time, if the staked amount falls below the minimum staking amount, the Validator is removed from the validator list. The remaining staked OLT is locked for 1 month, before being returned.

Slashing Delegators is dependant on the parameter ***Slashing Percentage of Delegator***[14] configured by Validator.

[14] Slashing Percentage of Validator section gives more information on this

Un-Staking

Validators can un-stake any part of their contribution at any time. If the remaining amount staked falls below the minimum staking amount required, you would lose the privilege of being a Validator. The unstaked amount would be locked for a month, before it is returned.

Burning Tokens

OneLedger will use up to 20% of their profits each year to buy back OLT and hold it in escrow. The community will determine what percentage of the profits will be burned and what percentage will be put back into supply, through a governance proposal. The remaining OLT will go into Bounty Programs.

Governance

OneLedger encourages three kinds of governance proposals.

1. Migration Proposal
2. Configuration Update Proposal
3. General Proposal

Migration Proposal

A Migration proposal involves code changes. This could be a software upgrade, fixing issues with the network etc. The network will be down for sometime when such a change is imposed.

Configuration Update Proposal

A Configuration Update Proposal is made to change or update a configuration parameter for the network.

General Proposal

General Proposals are text proposals for collecting any feedback or opinions of the community.

Lifecycle of a Proposal in Governance

Here is a quick look into various stages in the life cycle of a Governance Proposal

1. A proposal has to be funded with at least 10000 OLT to be active.
2. A proposal can become active if it has sufficient funds

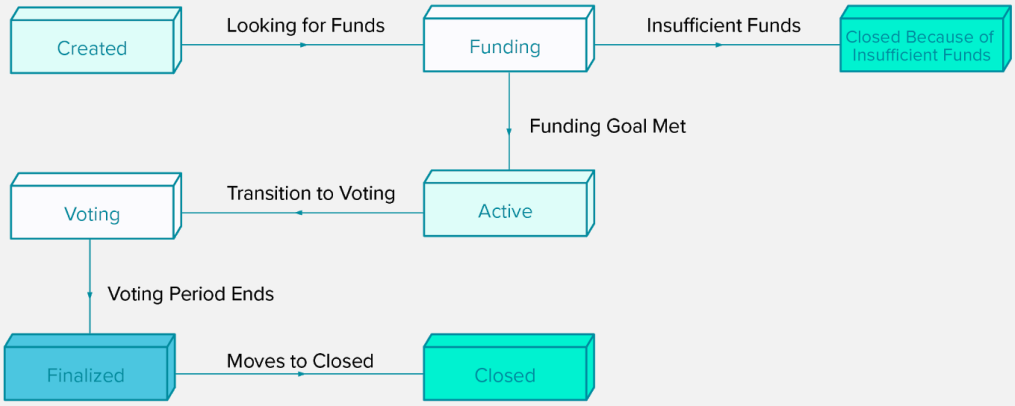

Figure 5: Lifecycle of a Proposal in Governance

3. A proposal can ask for funds for a period of 1 week
4. If the funding goal is not met, it goes into closed state and OLT minus the Tx fees is refunded
5. If the funding goal is met, it goes into Voting stage.
6. Voting happens for a period of 1 month.
7. For a proposal to be valid, 67% of total OLT in circulation is needed to vote
8. For a proposal to pass, it needs 51% of Voting in its favour
9. Delegators can't vote with their delegated stake. Instead, Validators vote on their behalf.
10. Anyone with OLT can vote for a proposal with their unstaked amount
11. OLT earned from funding a proposal goes into an escrow account from which the community can further decide what percentage is allocated to Bounty Programs and what percentage is burned

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