Lambda

Economic Whitepaper

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The age of chivalry is gone - that of sophisters, economists, and calculators has succeeded.

- Edmund Burke

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Any successful blockchain project can be attributed to decentralized application of leading technologies and ecological economic models of corresponding technology application scenarios. The blockchain system is essentially a distributed system based on peer-to-peer networks, and a computer network system. In the computer world, the infrastructure at the bottom of any system includes computing, network, and storage. And storage serves as a cornerstone of the development, innovation and application of any computer technology.

In terms of economics, any cryptocurrency project can be viewed as an economic system, the foundation and propulsion system of which are driven by the design of economic models. Today, for many excellent projects, a number of attempts and innovations have been made in consensus protocols and scalability, but there are relatively few innovations in economic model design.
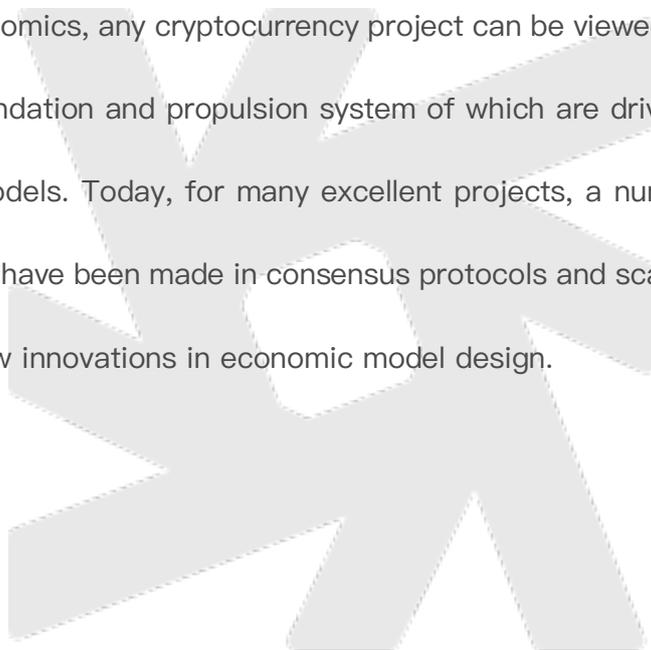
Lambda

A New Generation of Value Public Blockchain Based on Distributed Storage Technology

Lambda is committed to providing storage infrastructures for a new generation of the Internet. Through P2P network and innovative Proof–of–Spacetime (PoST), it provides a decentralized storage network with security, reliability and unlimited scalability. On the consensus network of Lambda Chain, decentralized data storage, data storage transaction and safe, fast and reliable operation of data security verification are available, providing storage capabilities with unlimited scalability for the value Internet.

A good economic ecology requires high circulation of tokens as well as the system stability through staking and deflation.

In most application–scenario–oriented blockchain projects, there is often a dilemma in which the token application scenario is simplex, resulting in low token circulation. Meanwhile, excessively high circulation will lead to a decline in the commercial stability of the system.

Storage is a cornerstone for development and innovation of computer technology. In the future, Lambda's public blockchain, based on distributed storage technology, will gradually derive technological innovations based on decentralized storage network, such as distributed network and computing, and commercial

applications. In the process of ecological development, the design of project models should provide stability and meet multi–purpose usage scenarios of the whole ecosystem.

Design Principle

The two core ideas of economics are: goods and resources are scarce and the society must use resources effectively. The business development history of humankind of nearly one thousand years is the result of continuous development of productivity and innovation of resource allocation. Its internal driver and result are the improvement of economic efficiency. Blockchain makes it possible for us to improve economic efficiency in a brand–new way.

In the information era, data and data storage are the foundation of everything. Accordingly, Lambda's decentralized storage network requires an economic model meeting the needs of multiple application scenarios, such as storage supply, storage transaction, economic incentives, project launch and issuance of tokens. For this purpose, Lambda main network economic white paper is released based on the proposal, survey and practice of Lambda Foundation, R&D team, Lambda community, validator and miners.

I. Economic Model Design of Lambda's Public Storage Blockchain

1. Four Important Roles and Functions

The operation of Lambda's main network requires the participation of multiple roles and maintenance & operation, including validators, storage miners, storage market makers and partner nodes.

- Validator: responsible for the maintenance and construction of the consensus network, and some also for the management of miners.

- Proposer: selected by validators based on staking capacity according to weight; responsible for the packaging of block data and the initiation of consensus

- Storage miner: responsible for the maintenance and construction of storage system, participating in storage market transactions

- Storage market maker: providing services for storage miners in terms of storage mining

- Partner node: a non–technical node which merely undertakes ecological construction, without participation in consensus network.

On top of that, there are multiple economic roles such as storage users in Lambda's main network ecology.

2. Double-token Economic Model

Lambda features double-token economic model. In Lambda's decentralized storage network, there are two tokens: LAMB and TBB.

 Lambda

LAMB is the original circulation token in Lambda storage network. It is mainly used to issue block rewards and settle transaction fees for circulation and payment, and ecological application cost.

 TBB

TBB is the storage space asset of Lambda storage network. It is mainly used for staking and anchoring of storage asset equities.

Lambda double-token economic model has the following features

1. Incentive System with Parallel Operation of Storage Mining and Staking Mining

Lambda mainly has three ecological roles: validator, storage miner and storage asset market maker. Among them, the validator operates the consensus network, the storage miner provides storage space and the storage asset market maker provides storage miners with storage resource circulation. LAMB, with constant block generation of consensus network, is jointly distributed by the staking miner, the storage miners who provide storage space, and the validators who operate consensus network. Staking income incentive ensures the stability of TBB staking and corresponding storage space. For storage mining, a mechanism, in which storage miners compete to get storage user data to allocate income, is adopted to motivate the contribution within the ecology.

2. High Reliability, without Impact on Circulation of Ecological Tokens

Staking is an effective economic means that ensures good operation of data security and consensus network in the blockchain system.

As a circulation token, LAMB is required to meet various settlement and payment needs within the ecology. For example, storage demanders need to purchase storage space; the diversification and high efficiency of application scenarios require high circulation of LAMB. TBB is used for the staking guarantee system, thereby ensuring LAMB circulation safely.

3. Commercial Stability

"Storage resource on chains are the entity storage assets" is a major feature of Lambda's decentralized storage network. In the business world, both efficiency and stability are necessary for good development of ecology. Decentralized transaction transfer enables LAMB to greatly reduce transaction costs in trading. With diversified storage application scenarios, the circulated currencies with limited quantity, under the market rules, will stay in a high-speed circulation state. As a low-circulation equity token, TBB ensures a good stability of the storage assets and value. It also allows Lambda's economic system to have a greater possibility of business application.

II. Block Reward — Economic Incentive Mechanism

Lambda Chain is the consensus network of Lambda's main network. The consensus network is operated by validators, and the block reward of the consensus network is the main component of the economic incentive system of Lambda's main network. Block rewards generate LAMB.

After successively accessing commercial applications, LAMB, paid by the storage demander for storage space, is also an important part of the economic incentive system.

Block rewards of Lambda's main network are mainly obtained by staking mining and storage mining.

1. TBB Staking

For the sake of economic stability, both staking mining and storage mining need TBB staking. In Lambda ecology, the staking of 1TBB equals to staking mining rights of 1TB and storage mining equities of 1TB.

2. Staking Mining

Staking is mainly used to operate the consensus network and ensure security. All participants in Lambda system need to stake TBB. And all staking will result in block rewards as the economic incentive basis for operating consensus network.
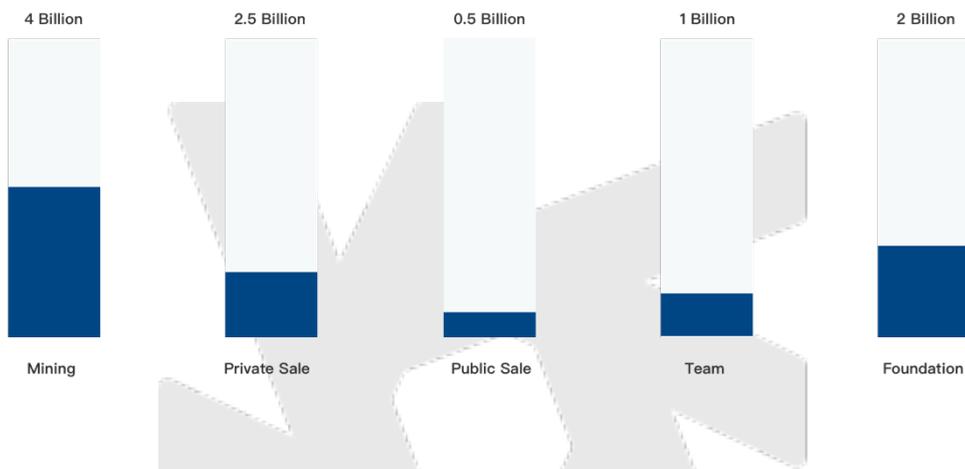
3. Storage Mining

Storage mining is obtained through competition after the storage miner provides available storage space. It is a competitive part of Lambda's economic ecology.

III. Distribution Model for Tokens
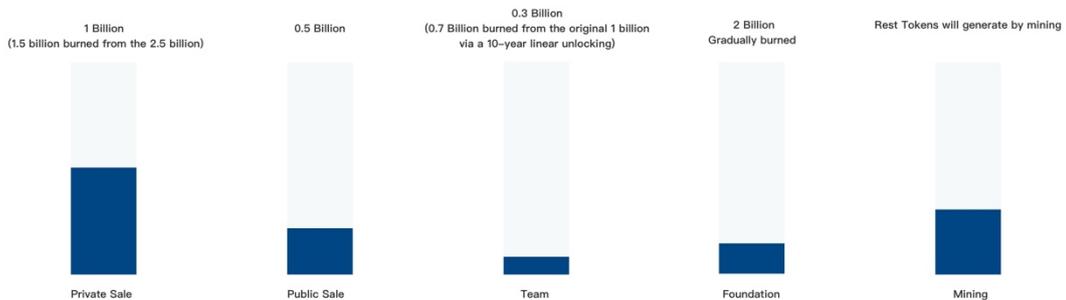
LAMB allocation model

Original token allocation model:

Total quantity: 10 billion LAMB;

4 Billion	2.5 Billion	0.5 Billion	1 Billion	2 Billion
Mining	Private Sale	Public Sale	Team	Foundation

The token allocation model for the main network is adjusted as:

A total quantity of about 10 billion LAMB;

1 Billion (1.5 billion burned from the 2.5 billion)	0.5 Billion	0.3 Billion (0.7 Billion burned from the original 1 billion via a 10-year linear unlocking)	2 Billion Gradually burned	Rest Tokens will generate by mining
Private Sale	Public Sale	Team	Foundation	Mining

TBB allocation model for mainnet:

At present, the total number of TBB is about 600,000, generated by LAMB staking, early miner incentive and private equity exchange. This part of TBB, however, cannot be reversely exchanged for LAMB.

In terms of additional issuance logic, 3,000 LAMB in the main network can be exchanged for one TBB which can be reversely exchanged for LAMB.

IV. Decentralized Data Trading Market, Storage Market Maker and Storage Mining

1. Data Trading Market: Market Value Drives Productivity

In the business behavior of storage application, there is an industrial chain: "storage suppliers to application to users". In Lambda's economic system, data trading market is a crucial player.

2. Storage Mining: Commercial Competitive Ecology Storing Valid Data

Technically, Lambda's decentralized storage is based on Lambda's consensus network. The storage miner shall submit Proof of Data Possession of the storage data to the validator where such mine is located, and the validator will package the Proof of Data Possession and generate blocks.

The commercial implementation of decentralized storage requires miners to store valid data instead of invalid random data: storage miners stake some LAMB in

advance as an order compensation which will be returned linearly to the seller as the order duration decreases; the storage miners shall accept storage orders from the storage demander in the data trading market, and the system will check through orders. After that, the storage miners will be rewarded for storage mining and paid by users.

3. Storage Asset Market Maker: Providing Commercial Services for Storage Miners

Decentralization does not mean disintermediation. Especially in such scenarios as enterprise-level resource allocation, the matching between individual storage miners and storage demand users in the trading market is distinctly of low efficiency and high cost. The storage asset market maker provides higher efficiency: market maker intensively stores the storage resources of the supplier on a large scale and trades them to the storage demander (application); the existence of such market maker will greatly improve the resource integration capability of the economic system, further improving the efficiency of the industrial chain.

Currently, Lambda's storage asset market maker mainly involves enterprise-level application, user-oriented application value-added service provider and sales agent. The storage asset market maker needs staking and be responsible for creating data trading market in different scenarios to provide efficient commercial services for miners.

In the Lambda ecology featuring dual tokens, LAMB is used for circulation, payment settlement and payment of trading commission; TBB is mainly used for staking, anchoring and tokenization of storage assets, ensuring their liquidity while providing stable economic support for the business requirements of storage.

With the support of staked TBB in the whole network, validators operate consensus network and the Provable Data Possession submitted by storage miners. Market makers provide efficient data trading market orders for storage miners as well as more economical commercial services.

V. Lambda's Economic Model Parameters

1. Composition of Block Reward

- Total block rewards of Lambda's main network are composed of two parts: block reward + commissions (in transfer transaction, storage trading and space transfer transaction).

- For example, if the block rewards are 40 LAMB and trading fees are 2.5 LAMB, then total rewards of the block are 42.5 LAMB.

- The total block rewards will be obtained by ecological participants (validators, storage miners, partner nodes and their voters, and communities).

2. Allocation Model of Block Rewards

- Income of staking mining: 50% of total block rewards, which are capital income and obtained after completion of space staking.

- Income of storage mining: 43% of total block rewards. Rewards of storage mining are the most important part of miners' income. Storage miners access the mining machine to store data and submit PDP certificate to the validator. After verification and successful packaging, the rewards will be obtained.

- Packaging income: 5% of total block rewards at most. Such an income is dynamic (1%–5%), which is obtained after successful block generation and

packaging of blocks and collection of sufficient consensus votes by the validator. The income is determined by the number of effective consensus votes collected by the block.

- Community income: 2% of the total block rewards. The community income will be used for community construction and the community will decide how to use it.

VI. Income Models of Different Roles

1. Income Model of Validators (for validators and partner nodes)

- Income ratio of validators: commission proportion of both validators and partner nodes can be customized.

- Income of validators: 25% of the total block rewards of the miners will be obtained as the income.

- Income of partner nodes: 25% of the voter income will be obtained as the income

2. Income Type of Other Roles

- Validators: **commission of validators (storage income + staking mining income + packaging income)**

- Storage miner: **storage mining income + staking mining income +packaging income + income from user payment.**

- Storage asset market makers: income sharing of storage orders.

- Partner nodes: income commission of staking mining.

- Partner voters: income of staking mining.

- Community income

3. Logic for Ledger Implementation

- Rewards for staking mining: 50% of the rewards will be allocated to all stakers and their validators (including validators and partner nodes). The validator and partner node will get commission according to the commission proportion, and the remaining rewards will be allocated according to the proportion of assets of stakers and voters.

- Rewards of storage mining: 43% of the rewards will be allocated to PDP submitters as well as the validators to which they belong. PDP challenge orders are determined by the chain, with the number of N in each block.

- Each validated PDP will get 1/N from 43% of the rewards. The validators get the commission based on the commission proportion, and the remaining commission goes to the miners submitting the PDP.

- As for the orders with PDP failing to pass the validation, its 1/N rewards will directly go to community.

- Block packaging reward: block generation nodes will obtain (1%–5%) rewards according to pre-commit proportion; the validators of the block packager will get commission according to the commission proportion; the

remaining rewards will be distributed according to the miner's asset proportion under the validators.

- Community income: 2% of the block rewards will be paid to the community as a tax and the community will decide its use.

VII. Mechanisms for Access, Withdrawal and Penalty (for validators and storage miners)

1. Mechanism for Access and Withdrawal

Lambda's main network validators, partner nodes and storage miners can access Lambda consensus network by staking of TBB.

2. Mechanism for access

- The validator needs to stake 666.66 TBB to obtain its qualification, so as to access the consensus network and provide stable consensus network services for miners and users.

- By staking TBB, the storage miner accesses the consensus network of the validator and provides PDP certification for the validator, so as to offer storage space to users to participate in storage mining.

3. Mechanism for withdrawal

- The staking TBB will be frozen for 21 days before withdrawal, during which no income will be generated. Once the freezing period ends, the TBB can be withdrawn once

- When the storage miner withdraws, it is necessary to ensure that there is no valid user data in the space.

4. Mechanism for Penalty of Validators in Main Network

The consensus network of Lambda's main network is operated by stable validators in the network, so the stability of validators is the fundamental guarantee for the stable operation of Lambda's main network to ensure the storage security of storage miners and user data. To promote the stability, security and sound development of ecology of Lambda's main network, the validator should follow the penalty mechanism of Lambda's main network node after becoming the validator who operates the consensus network.

5. Conditions for Penalty

- The validators will be subject to penalty in the following conditions. The consensus network will deduct the TBB staked and the validator will be removed from the validator group.

- Countersign of blocks

- Fewer than 500 blocks from the recent 10000 blocks are signed for Mechanism for penalty

- A certain amount of TBB space of the slashed nodes will be destroyed. Since the validator needs to stake at least 666.66 TBB to be involved in the consensus network, when the staking quantity is lower than such amount, the validator will not be able to participate in the consensus network.

- The validator needs to convert a portion of the LAMB from the income into TBB for re–staking, so as to have a chance to re–participate in the consensus network.

VIII. Cautions for Staking and Mining at Main Network

1. Income from TBB Staking

- The TBB in miners' balance will not generate income.

- When staking TBB, miners must join any node mine pool in Lambda's main network that has been involved in the consensus network to obtain the staking income.

- While getting staking income, miners can access the appropriate amount of storage space according to the staked capacity to obtain users' storage orders through which storage mining income and storage income paid by users will be obtained.

- The obtaining of TBB can be realized through the purchase of TBBs from the balance of other miners by transaction or LAMB staking at the main network. 1 TBB can be obtained by staking of 3,000 LAMB.

- The TBBs obtained by LAMB staking at the main network can be withdrawn freely. The corresponding LAMBs can be obtained 21 days after the application for lifting staking, and the corresponding TBBs will be burnt after the lifting of staking is done. No staking income will be generated during the 21–day lifting of staking.

2. Income from voting using LAMB

- The LAMB in circulation does not generate income.

- LAMB holder can vote and stake the LAMB in its balance by voting for the partner node, which will generate staking income.

- The voted and staked LAMB can be withdrawn freely. After the application for revocation of voting, the staked TBB will enter a freezing period of 21 days, during which there is no staking income. After that, corresponding LAMB can be redeemed.

- LAMB holder can also stake LAMB to obtain TBB to participate in mining and generate income.

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Please stay tuned of Lambda's official information

Official website

http://lambdastorage.com/

Mainnet Explorer

https://explorer.lambdastorage.com

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