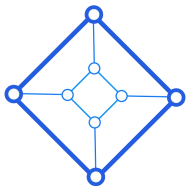


Ladder Network Whitepaper

Contents

1.Abstract

The Internet industry has experienced Web1.0 and Web2.0 era during the past several decades, and is now rapidly moving into the Web 3.0 era with blockchain, cloud computing, artificial intelligence, and big data as the core, which are driving the change of business form, organizational form and governance relationship. With the development of 5G technology and the coming of connectivity era, many industries including finance, supply chain, games, storage, traceability and content are accelerating the Block-chain Economic Reform (hereinafter referred to as the “Chain Reform”, and a new round of technological revolution and industrial transformation have swept the world.

However, there are still many problems to be solved in the course of Web3.0 and the evolution of block-networks:

• The lack of centralization, inadequate sharing, transaction congestion, and expensive transaction costs.

• The lack of interoperability and poor communication between different chains. Value communication between different projects is inadequate, and the island problem still exists.

• Existing cross-chain technology mainly focuses on asset transfer, lacking a well-defined cross-chain infrastructure, which will do harm to heterogeneous architecture integration.

• The “Chain Reform” is difficult to conduct with complex deployment. The existing blockchain architecture cannot meet the needs of diverse and complex application scenarios in the future 5G era.

In order to solve these problems, the Ladder Network comes into being. Ladder Network is committed to becoming a cornerstone and a world leader of connectivity in the blockchain industry of the Web 3.0 era. We ensure the validity of transaction

verification by introducing the witness mechanism of threshold signature. We pioneered the cross-chain investment model, promoted the smooth flow of cross-chain assets, and introduced the predictor to open up the barriers between the chain and the real world.

Ladder Network has built a distributed, decentralized, safest and largest POS cross-chain network with up to thousands of verification nodes and candidate verification nodes of more than 10,000, which are our key advantages to develop major projects, such as data sharing, security and privacy protection, decentralized exchanges and Web 3.0 e-commerce. Through strategic cooperation with ABMatrix, it is expected to directly attract tens of millions of IoT user traffic in the next three years.

Ladder Network can be used as the first-layer protocol of blockchain industry, interfacing with thousands of second-tier blockchain protocols and building a value network covering multiple areas of enterprise collaboration through cross-chain technology. Ladder Network focuses on the markets of “Million Enterprises’ Chain Reform” and “Million-Chain Interoperability”. The BAAS blockchain service platform, after being established, will support the Initial Coin Offering(ICO) in fields of finance, supply chain, games and decentralized storage, help to realize “Chain Reform” and meet the needs of high-throughput, low-latency, high-concurrency, low-power application scenarios in the 5G era so as to reshape the credit cornerstone and business form of the industry.

2.Industry Background

The essence of blockchain lies in a decentralized ledger with distributed data storage, consensus mechanism, encryption algorithm, and point-to-point transmission. Since January 3, 2009, when Satoshi Nakamoto dug out the first block, Bitcoin has always been operating in a uninterrupted way. With 10 years of

safe operation, Bitcoin proved to the world the feasibility of blockchain technology. In the past 10 years, numerous blockchain concepts have emerged all over the world, such as Ethereum, ICO, stable coin, decentralized exchange, IEO, and super-node economy, which are subverting people's imagination.

2.1 Development Path of Blockchain

Hereby we put forward the following two pre-judgments in terms of the future development of blockchain industry:

Firstly, the world is witnessing the best time of the development of blockchain industry, with urgent needs of all industries to implement the "Chain Reform". In the future, more BAAS blockchain service platforms will be born.

Driven by capital and technological assistance, more and more companies and entrepreneurs have got involved in blockchain industry, and the number of blockchain projects has grown rapidly. On October 10, 2018, IBM announced the official commercialization of IBM Food Trust. In February 2019, Morgan Bank issued JPM, a stable currency of bank system, which is equally anchored with US dollar. In March 2019, Bloomberg reported that Facebook, with 2 billion users, is strategically shifting its focus to blockchain industry, and will use WhatsApp to launch a stable currency, targeting the remittance market.

Blockchain technology is driving a new round of change of business model and is becoming an important support for building a credible social system. There are two ways for different industries to get involved. One is to develop independently and train internal blockchain talents to complete the Chain Reform. The other one is to use existing blockchain platform services. Considering cost and efficiency, the latter one will be the main way for most companies to complete the "Chain Reform". In the future, many professional blockchain services, namely BAAS product services, will be born, which will be a huge industry, market and technology demand.

Secondly, we believe that blockchain belongs to all people and the blockchain project should be a distributed one. In the future, there won't be any global

unified or area unified blockchain frameworks, instead, the future will be a world with numerous blockchains developing independently.

The diversified development and the coexistence of more than 10,000 chains will inevitably bring about problems such as heterogeneity, interoperability and inefficiency of reuse. Therefore, the intermediate platform connecting different chains therefore emerge to boost the development of agreement, technology and architecture between different chains, which is also known as "cross-chain technology".

Cross-chain technology is like the middleware of computer systems. The Internet boosted the birth of distributed systems and network applications, and that's when middleware is developed. The existence of different systems and applications provided solid ground for the development of famous middleware, such as IBM CICS.

So we believe that in the process of the million-chain coexistence and the "Chain Reform", the cooperation and interoperability between different chains will become more common, and the cross-chain technology will rise and prosper at a faster speed.

2.2 Weakness of the Industry

Each chain has its own logical structure, block structure, consensus mechanism, mining model, business model, economic model and governance structure. The first thing to consider in a million-chain world is the interoperability between different chains. In addition, due to the diversification of application scenarios, the integration of new business and existing systems should be taken into consideration, which is a great challenge.

In terms of cross-chain asset trading, considering that the decentralization technology is not mature at the moment, although current market-centralized exchange have realized asset transfer and asset swaps, it is a relatively weak cross-chain scheme. The disadvantage of centralized system is that users need to transfer assets to a three-party as intermediary. which may lead to users losing their ownership of assets, and meanwhile bring security risks. Exchanges that have

collected large amounts of user funds will easily become the targets of hackers. The exchange prevented hackers by technical means, but it also affected normal capital transactions and withdrawals. At the same time, transactions in exchanges are, generally speaking, unfair, and this common phenomenon has urged people to find better cross-chain solutions.

Speaking of cross-chain information cooperation, the network consensus mechanism differs from blockchain to blockchain, causing problems like information non-synchronization. For example, Bitcoin produces one block in every ten minutes, and EOS 1.5 seconds. So hackers will have opportunities to take advantage of it during the middle nine more minutes. What's more, the complexity of blockchain protocol and varied blockchain economic systems of different blockchain are also the main reason for the difficulty in communication between different blockchain networks.

In terms of the deployment of chains, problems also exist: the complexity of business logic leads to difficulties in "Chain Reform"; the real world cannot connected one by one with assets on the chain, resulting in the distortion of the data; the traceability system of supply chain cannot completely solve the problem authenticity verification; the time span of Chain Reform is too long; the technical difficulty is hard to cope with……

2.3 The Existing Cross-chain Technology

There are three general types of decentralized cross-chain technologies: Notary schemes, Sidechains/relays, and Hash-locking.

Notarization technology: Interledger protocol launched by Ripple Lab is a typical notary technology, which aims at connecting different ledgers and achieves synergy between them. Interledger can be adopted in all kinds of ledger systems and is able to accommodate the differences between them. The goal of Interledger is to create a globally uniform payment standard and a unified network financial transport protocol. It's disadvantage is that the degree of decentralization is low, and it is controlled by

some particular institutions.

Sidechains/relays: The blockchain system can read the status of the chain, which means that, it can support SPV (Simple Payment Verification) and verify the information of Header and Merkle tree on the block. Its essential feature is that the structure and consensus characteristics of the chain are highly emphasized. Generally speaking, the main chain does not know the existence of the side chain, but the side chain needs to know the existence of the main chain; the double chain does not know the existence of the relays, but the relays need to know the double chain.

Hash-Locking: The Lightning Network provides a scalable bitcoin micro-payment network that greatly enhances transaction processing capabilities outside the Bitcoin network. If both parties of the transaction have a payment channel on the blockchain in advance, they can realize two-way fast-recognition and micro-payments for many times in a short time. If there is no point-to-point payment channel between the two parties, as long as there is a payment path that connects them and the path is formed by multiple payment channels, the Lightning Network can use this path to achieve reliable transfer of funds between the two parties.

Notary schemes, Sidechains/relays or Hash-locking are theoretical framework techniques for achieving cross-chain operability. At present, products like Cosmos and Polkadot can realize cross-chain technology. In terms of cross-chain technology, the Ladder Network, similar with Cosmos and Polkadot, is a typical relays. The Ladder Network is developed based on Substrate framework, which is similar to Polkadot.

3.Solutions

3.1 Project Vision

Ladder Network is committed to building the world's most distributed, secure and largest POS cross-chain network, building a trusted cross-chain platform in the parallel world of blockchains, connecting every island of chain to realize free circulation, asset interoperability and value interoperability.

Through the operability and configurable module design, the Ladder Network provides ICO function, helping enterprises to complete Chain Reform and add to business value, and finally provides the projects of “Million Enterprises’ Chain Reform” and “Million-Chain Interoperability” with the safest, most reliable, and pluggable blockchain infrastructure services, and contribute to the global revolution of blockchain industry.

3.2 Goals of Design

In order to achieve the vision mentioned above, the technical requirements of Ladder Network mainly come from two aspects, namely, cross-chain technology and blockchain services. Its goals of design are as follows:

· Realize interopera

Interopera is the most basic requirement for cross-chain technology. The reason for the poor interoperability is that the underlying protocols of each project are not uniform, and the heterogeneity leads to isolation between chains. The Ladder Network will provide standard communication mechanisms, network protocols, asset communication, and service semantics to facilitate the interoperability of different chains.

· Hiding heterogeneity of system

Based on the layered system of TCP/IP protocol, a logical layering is established on the Ladder Network, which can rank the modules that have same processing function. Communication between different layers is achieved through service language. Communication cannot be achieved directly across different levels. Thereby we can resolve heterogeneity, address differences like consensus algorithms, governance architecture, and block structure.

· Trusted isolation

We will define the trusted computing module of the smallest security facility in the chain, establish a security perimeter, and divide the trusted and untrusted boundaries, clearly unifying the security interface. By using reference monitors, we will ensure security to the greatest extent, and make sure that the access can be confirmed, verified, secured and trusted.

· Common Condensation and Reuse

Many basic functions and structures between blockchain services in the same field are very similar. Developing a system from zero every time is definitely not a good method, and will do great harm to the quality and efficiency. Therefore, the Ladder Network should be divided into different modules according to different application scenarios, and build a highly reusable blockchain service platform to achieve user-oriented blockchain service, parameterized service management, and configurable functional support.

3.3 Ecological synergy

The Ladder Network is developed based on the Substrate framework protocol. At present, Substrate is also adopted in Polkadot project. Substrate is a framework that is similar to Express or other web applications, which are primarily used to build frameworks for distributed or decentralized systems, such as cryptocurrency projects or message bus systems. The Ladder Network uses Substrate for the purpose of firstly, enabling the project to inherit the functionality, security and scalability advantages of Substrate, and secondly, focusing the team's efforts mainly on the development of cross-chain platforms and blockchain business services. Just as most web applications that don't need to reimplement their own HTTP protocol, with Substrate, there is no need to step through the network and consensus code when creating a new chain.

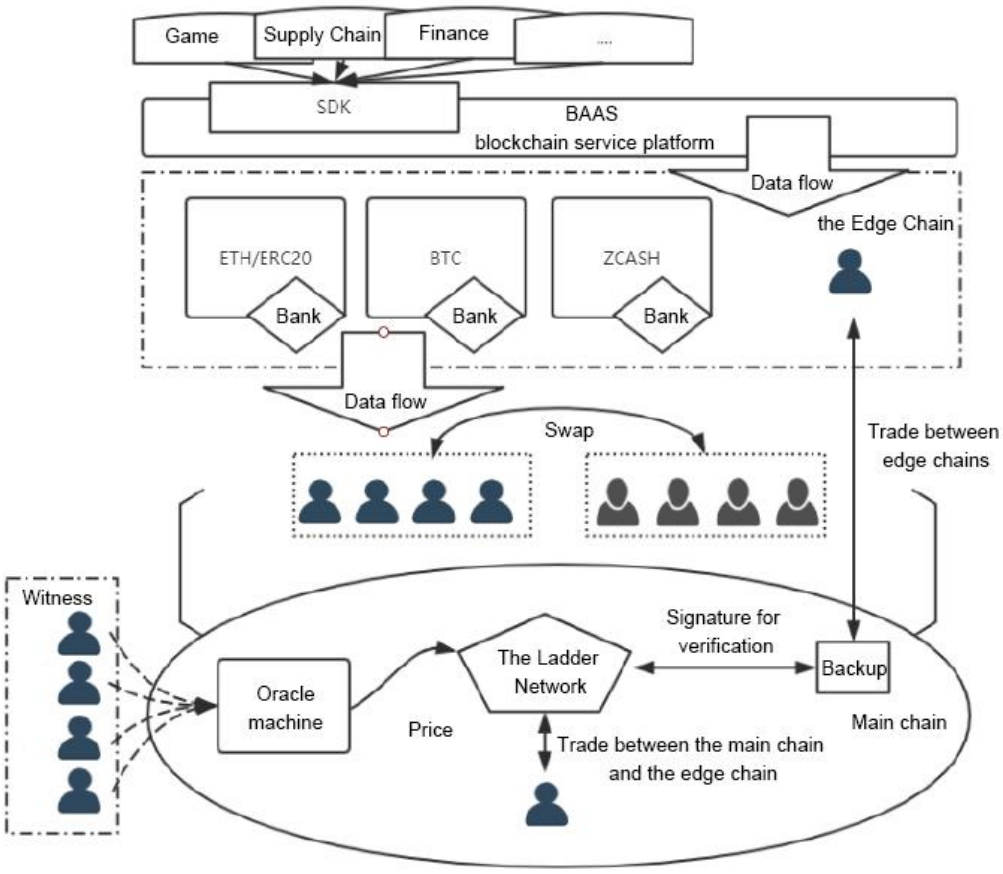
The Ladder Network uses Substrate, which combines three technologies: La_WebAssembly, La_Libp2p and La_GRANDPA consensus protocols. By quickly building a new blockchain library, the key framework of blockchain client can be

synchronized to any chain of Substrate-based technology development. By using Substrate, the Ladder Network will directly inherit the following advantages:

- Implementing blockchain consensus algorithms, final determinism, and block voting logic.
- Having P2P network library with functions of node discovery, data synchronization and replication.
- Smart contracts and other projects based on Substrate development and be run based on WebAssembly mechanism, which is efficient, deterministic and sandboxed.
- Ability to seamlessly run a node in the browser that can communicate with any desktop or cloud node.
- Cross-platform database/file storage.
- Seamless client updates. Quick and secure deployment of local code without problems like hard forks and other consensus issues.

3.4 Technical Architecture

The Ladder Network provides infrastructures for inter-chain asset transfer. It is a distributed system that interconnects different blockchain networks through cross-chain protocols, complete record of cross-chain transactions, and intra-chain transaction detail maintenance.



Picture 1: Architecture Diagram

The edge chain refers to chains that carry the Ladder Network protocol, such as Ethereum, Bitcoin, EOS, traceability chain and so on. **The main chain** is the core chain of Ladder Network, which can operate independently or as a bridge chain

The main chain of Ladder Network provides a registration module, and the name is registered on it. Through Rule-Audit, one can be officially added to the Ladder Network to become a legal edge chain, sharing the cross-chain service provided by Ladder Network.

Each edge chain has a 64-bit address space. In order to prevent developers and users from identifying complicated and difficult addresses, the Ladder Network provides Chain Name Service (CNS), being responsible for bidirectional mapping of the address space and the project name. For example, the name of BTC edge chain in

the network is Ladder_BTC.

Blockchain systems are relatively independent from each other. Information flows within a single blockchain system are trusted, but the flows between chains need to be verified by bridging interrupts. So messages in the edge chain are stored and verified through the main chain, and then, is forwarded to the target edge chain by the main chain to ensure the reliable circulation of information between chains.

A simple process of running cross-chain: In edge chain A, users initiate a transfer operation to the B chain. User A obtains the project name of B chain through CNS, and then queries whether there is a conflict by using Request-Resposey method. If there is no conflict, it can be proved that the user obtains the transfer certificate from the edge chain and submits the transfer information to the main chain. The main chain will check the information and send it to edge chain B. Then, an cross-chain information operation is completed.

In the future, the Ladder Network will also launch BAAS module to provide one-click coin-transfer function for enterprises and entrepreneurs. BAAS module provides parameterized and configured blockchain services, and develops financial SDKs, Chain SDK, game SDK, storage SDK and other component interfaces according to different business areas. Enterprises will be able to access BAAS with zero programming, share the main chain service, and provide a business ecosystem for the “Chain Reform” and “Coin Reform” of enterprises.

3.4.1 Consensus

The Ladder Network uses the POS-based BABE+Grandpa consensus algorithm. In terms of choices of the blocker, BABE+Grandpa randomly selects blockers based on VRF algorithm, which can guarantees fairness.

There are three types of nodes on Ladder Network: authoritative nodes, oracle machine proof nodes, and ordinary verification nodes. Authoritative node mortgages a large amount of margin. Bigger margin brings greater equity of the block. If no block is dug, the deposit will be deducted. The oracle machine proof node is one that

collateralizes a certain margin. A set of nodes is selected by a random algorithm. They acquire data from the edge chain and then send it to the main chain with sign on it to obtain the exchange rate. If a fake transaction is sent or the transaction is not sent, the Ladder Network will deduct the deposit and reduce the number of cross-chain transaction certification nodes. Only by controlling enough rights can it become a normal verification node, which verifies the behavior of the first two types of nodes and sends false behaviors.

3.4.2 Cross-chain Atomic Trading

To ensure the atomicity of the transaction, we designed the following protocol:

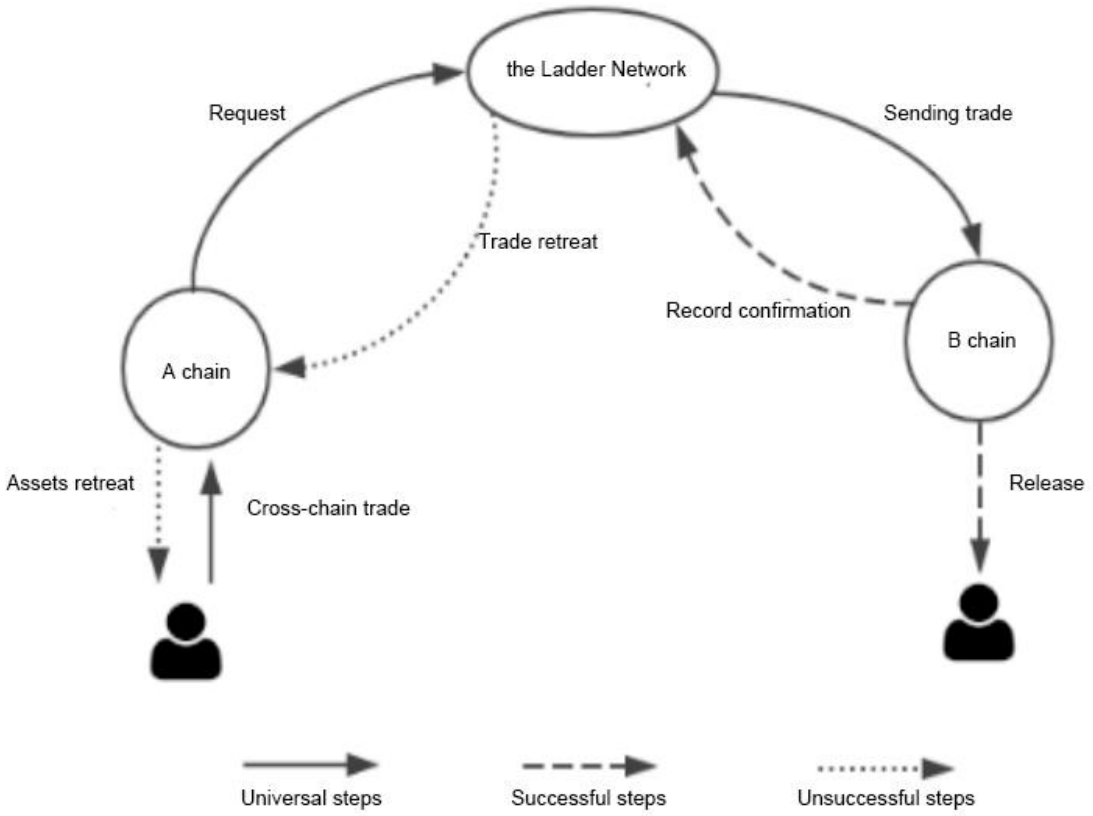


Figure 2: Atomic Trading Agreement

The user initiates a cross-chain transaction on edge chain A. The main chain will automatically monitor and record the transaction (Because the multi-sign checker

method is adopted. The transaction records may be redundant. Solutions will be introduced latter on). The main chain verifies the events on A chain and forwards them to the edge chain B. Because the release on B chain requires sufficient funds, there are two situations: when the funds are sufficient to meet the release standard, the transaction is successful and will be recorded on the main chain; if the funds are insufficient, the transaction will fail, and the main chain will return the transaction assets back to the user, that is, to initiate a transaction retreat.

User's assets are locked on the edge chain for a period of time throughout the whole transaction process. If the transaction fails, the asset will be returned on the edge chain; if the transaction is successful, the assets will be put into the fund pool, which will be used to release transactions initiated from other chains.

Trading volume per second（TPS）

TPS = Sb / St / tb

"Sb" is the size of the block. The size of main chain block is 4M.

"St" indicates the volume of the transaction, usually trading at 250 bytes.

"tb" indicates the block time, which is usually 3 seconds.

Transaction delay

In order to ensure the security of transactions, all transactions need to be recorded on the Ladder Network, and "Ta" referrs to the block time. The block time of edge chains are T1 and T2 respectively.

At least four transactions are needed to complete a successful cross-chain transaction. One transaction on each of the two edge chains, and two transactions on the main chain, referring to transaction request and transaction confirmation. Based on the transaction process, we can give the following formula:

$$L = Ta * 2 + T1 * D + T2 * D$$

Failure of processing

When cross-chain mortgage verification fails on Ladder Network, or fails to be released on B-chain, the assets of A chain will be backtracked to achieve atomic operations, so as to avoid the loss of A-chain assets.

If the multi-signing verification on Ladder Network fails, the Ladder Network will directly record the failure of verification. If the verification node fails to receive the reply of the successful asset mortgage verification, the transaction will be recorded as “deleted” and the asset will be returned to A chain.

Storage structure of multi-sign verification:

Transaction <=> [Signature, send or not send]

Transaction <=> Verification passed or not passed

When the number of signatures reaches to a certain amount, the mortgage request will be confirmed, and the cross-chain mortgage transaction, which is recorded by Ladder Network when it accepts the verification node, will be stored. An unsuccessful transaction will be deleted directly. At the same time, parameters will be modified to prevent repeated transaction caused by network delay.

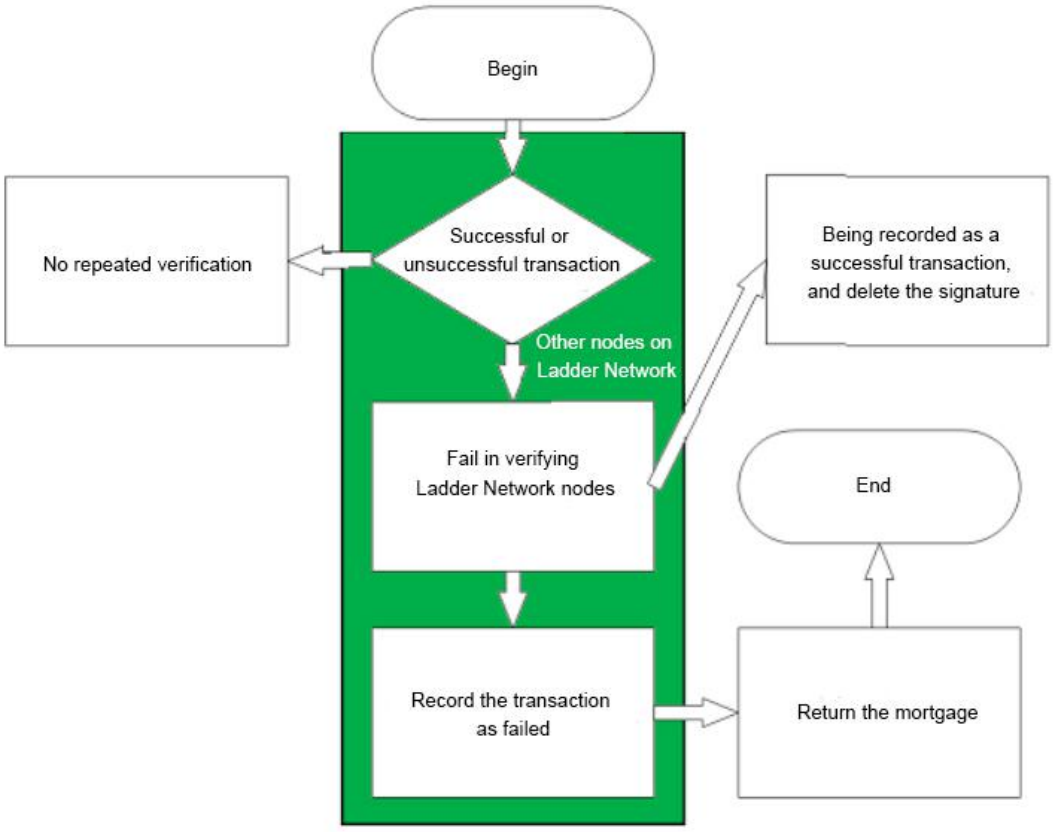


Figure 3: Process of asset return when both atomic operations fail to be verified

3.4.3 Bank Module

Cross-chain is usually completed through asset mapping, such as centralized exchange, where users need three steps to convert assets. Our goal is to simplify the process of asset transfer, where only one operation, covering target chain and the address of the account, is needed.

Considering the impact of total assets on real-time conversion, we introduce a bank module to address the problem of liquidity. In the edge chain, the bank module manages the user's investment assets through contracts and can earn revenue on the main chain after a certain period of time.

Users on chain can take out assets at any time, and we won’t lock any transactions. Investors can operate on edge chains, providing investment in assets and liquidity to the across-chain, and as a return, investor can benefit from the main chain.

The investment operation is just like deposits in banks, so we call it Bank Module. Multiple chains and nodes are involved in this operation, taking Ethereum as an example, its main process and distribution diagram are as follows:

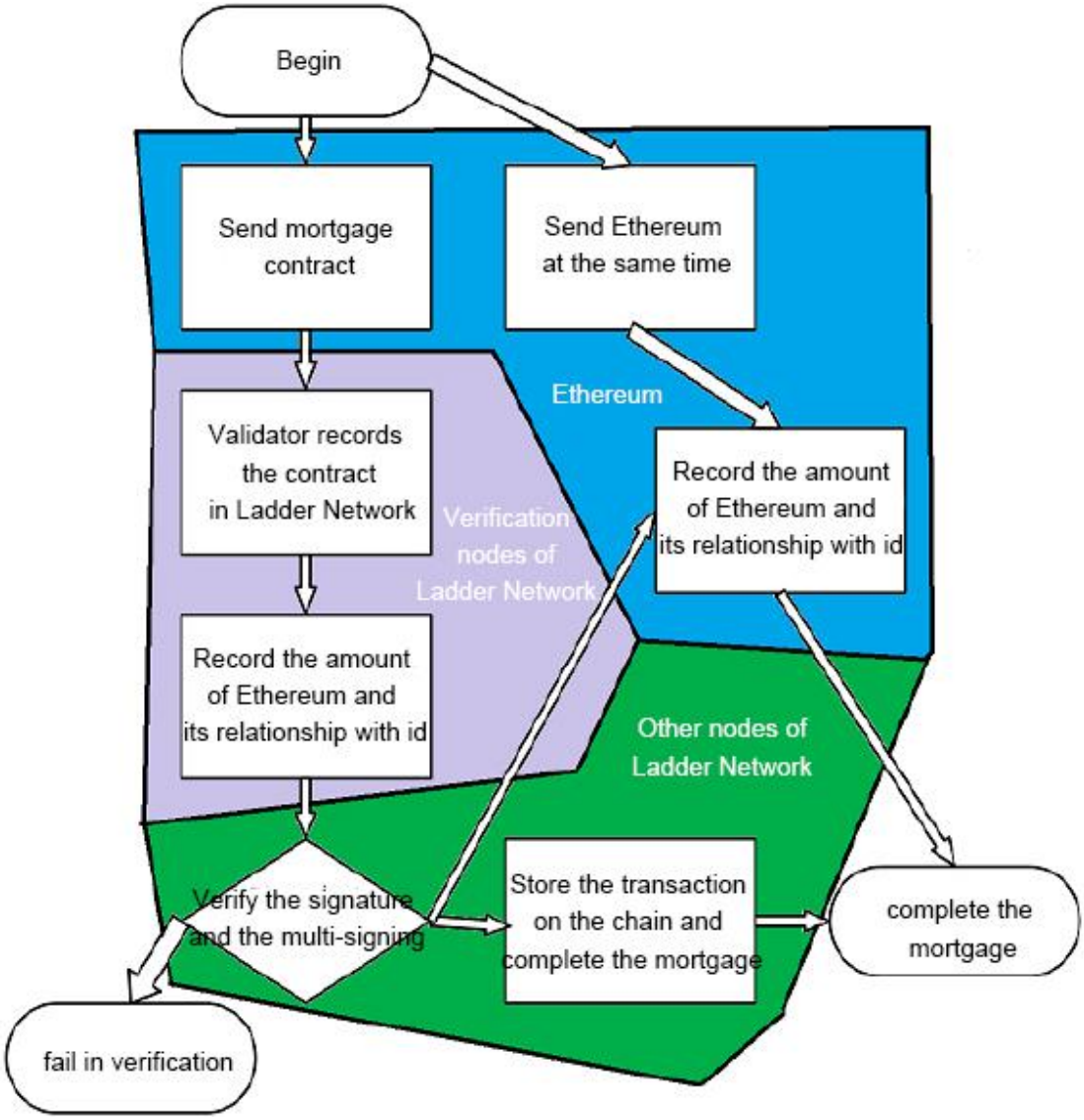


Figure 4: Operational Node Division and Process of Ladder Network

The bank module system can be decomposed into five parts. Takes Ethereum as an example, the operation generates a mortgage transaction T. After relevant verification nodes record this information, the signature can be finished and forwarded to the chain for verification.

Step 1: Intended mortgagor send a transaction, each verification node record the transactions containing the chain account and the mortgage amount

Txn n=1,2,3,4,5,……

Step 2: Verify node captures and sign each transaction

Tsn = sign(Txn) n=1,2,3,4,5,……

Step 3: Pack up the transaction and upload the data to Ladder Network

∑Tx(Tsn，data) n=1,2,3,4,5,……

Step 4: Each node on ladder network participates in verifying the validity of the signature and the data (determine whether the data is uploaded separately by the unconfirmed verification node through multi-signing). The verification process is guaranteed by modules that have signature.

Check（∑Txn） n=1,2,3,4,5,……

Step 5: The data will be saved on the chain after being verified. And the mortgage process is therefore completed

Prase_update(T,data)

3.4.4 Exchange Rate Module

In order to achieve rapid exchange of different assets, asset pricing should be taken into consideration. As the blockchain is a deterministic and closed system environment, at present, only the on-chain asset can be obtained. The blockchain is separated from the real world, and the real world data outside the chain cannot be obtained.

To solve this problem, we deploy an oracle machine contract on the chain. The exchange rate module periodically forwards the asset price to oracle machine contract, which will obtain external data through the off-chain API interface. The technical process is that external data is sent to the chain predictor contract, which will transmit

the data to the exchange rate module.

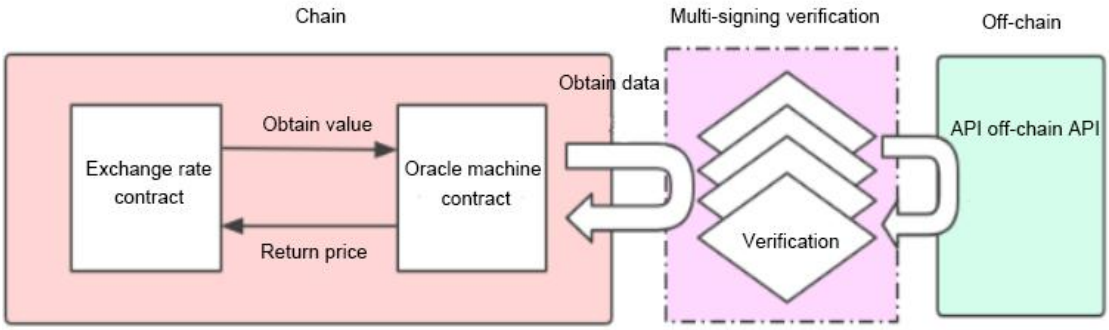


Figure 5: Exchange Rate Module

The verification node of the Exchange Rate Module obtains real-time exchange rates of the external encrypted asset through multi-signing, and the information is processed by the encrypted signature and cannot be changed. Through real-time exchange rate, chain A and chain B can complete the cross-chain asset conversion, which is similar to a centralized exchange. The process is as follows:

Step 1: Judge whether the current account is the associated account id of the oracle node.

Is_validator(id)

Step 2: If yes, call the external API to get the real-time cryptocurrency exchange rate.

Tx = http_get(url)

Step 3: Send the exchange rate signature to the multi-sign verification module.

Txsn = ∑Sign(Txn) n = 1,2,3,4,5,……

Step 4: If the multi-signing is verified as valid, the exchange rate can be recorded.

Check_save(Txsn) n = 1,2,3,4,5,……

3.4.5 Risk Control Module

In the cross-chain protocol mentioned above, one problem should be considered carefully, that is the transaction retreat caused by insufficient liquidity. If the system is liquid, and there are enough investors and users, theoretically speaking, there is no trade retreat. But our system consider all possible situations, including initial and extreme conditions, such as very little financial support in the early stage, and poor user experience. On the other hand, the deposit and redemption operations by investors on edge chain will affect liquidity, so a risk control module is introduced to deal with this problem.

The role of AI risk control module:

- Ensure sufficient funds on edge chain through interest rates
- Ensure the success of cross-chain transactions and reduce useless operations.
- Ensure the liquidity of the system.

The impact of AI risk control module:

- Control changes of interest rate in the Bank Module.
- Control floating costs of cross-chain transactions.
- Control the price stability of the edge chain assets.

By monitoring the transactions on the main chain and the balance of funds on the edge chain, we can predict whether a transaction can be successfully completed in the future, so as to reduce trade retreat and system pressure.

The formula of maximum cross-chain transaction amount Vmax is as follows:

The average of capital inflow:

$Vi = \sum(Vt / St) / n / L, \quad n = 1,2,3,4,5,\ldots\ldots n < 100$

The average of capital outflow:

$Vo = \sum(Vt / St) / n / L, \quad n = 1,2,3,4,5,\ldots\ldots\ n < 100$

$Vmax = R - Vi + Vo$

T : Single transaction

L : Transaction delay time; unit: second

Vt : Value sent by T transaction

St : The time span since T transaction is sent; unit: second

R : The balance on the current edge chain

3.4.6 Plasma Arbitration Protocol

Plasma was originally designed to reduce the burden on the main chain by combining different chains to realize Ethereum expansion. Plasma provides a basic guarantee for returning assets, that is, you can always return your assets and funds back to the main chain.

Regarding how to ensure the return of assets, Plasma introduces a fraud certification mechanism, namely, users submit evidence of asset freeze to the main chain, and anyone can submit a “cheat certificate” to challenge the return of assets. But asset return is inherently a risky practice. One of the problems is that if users of sub-chains submit asset return requests to the main chain at the same time, but the main chain doesn’t have enough capacity to handle the transaction, a possible result will be the loss of funds.

We put the game of users on high-performance ladder network, and then introduce the board mechanism to ensure the notarization of arbitration, so as to avoid the loss of funds caused by performance problems on the main chain.

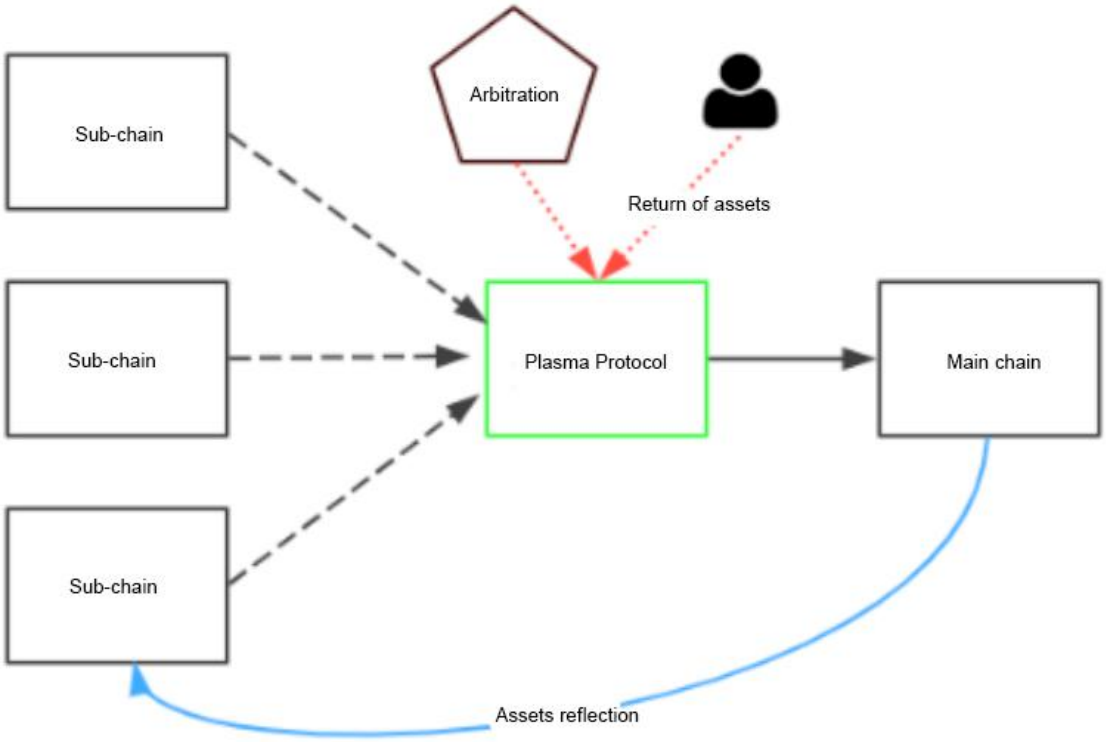


Figure 6: Ladder Network Plasma structure

The process is as follows:

Step 1: Supplier register and open the mapping channel on Ladder Network.

Step 2: Users map the assets on the main chain and Ladder Network record the operation.

Step 3: Assets on sub-chain is released by Ladder Network.

Step 4: Users apply for a fund return on the sub-chain, the application will be arbitrated by Ladder Network.

Step 5: The ladder network releases assets on the main chain.

4.Security Guarantee

4.1 Threshold Signature Protocol Based on VRF Algorithm

The disadvantages of the single-witness pattern are the lack of security and the low degree of decentralization. Therefore, we use Threshold Signature Protocol based on

VRF Algorithm to compensate for the defects. We will randomly select a new signature group based on VRF algorithm and reset it on each edge chain. That is to say, the multi-signature on the main chains are updated synchronously. In this way, secure synchronization can be guaranteed.

4.2 Dynamic Multi-signing

The total collateral of all verification nodes must exceed the total circulation of the ladder network Ladder Network by x%. If no one can control these part of circulation, the number of signatures required by the on-chain multi-signing verification will be decided in accordance with the value of x%.

5.Fields of Applicati

With the advantages of cross-chain network and more than 10,000 candidate verification nodes, the Ladder Network is developing some major projects, including data sharing, security and privacy protection, decentralized exchanges and Web 3.0 e-commerce. When the BAAS blockchain service platform is established, Ladder Network will provide SDK components in various fields, including finance, supply chain, games, and decentralized storage platforms, to meet the needs of high-throughput, low-latency, high-concurrency and low-power complex application scenarios in the 5G era.

5.1 Data Sharing, Security and Privacy Protection

Data sharing, security and privacy protection are important application areas of blockchain technology, and data-featured projects usually belong to this field. In this regard, Ladder Network has a well-designed solution. On the one hand, including the cross-chain verification nodes into an all-in-one machine by integrating available resources can reduce the cost of deploying Ladder Network verification node, and meanwhile it can make the nodes highly dispersed and stable. The node-sharing

model has obtained the invention patent of the State Intellectual Property Office. On the other hand, through the combination with edge computing technology, the security and privacy of enterprises' data can be better protected, and the sharing and exchange of data values will be realized, so that the quantifiable value flow can be traced and verified and settled clearly.

At present, the Ladder Network and ABMatrix have reached a strategic cooperation agreement, and the two parties are cooperating to help enterprises build a multi-party data value network based on IoT technology and blockchain technology. Through close cooperation, the Ladder Network will be involved in fields like data sharing, security and privacy protection in an extensive way. Strategic cooperation with ABMatrix is expected to bring tens of millions of user volume in the Internet of Things in the next three years.

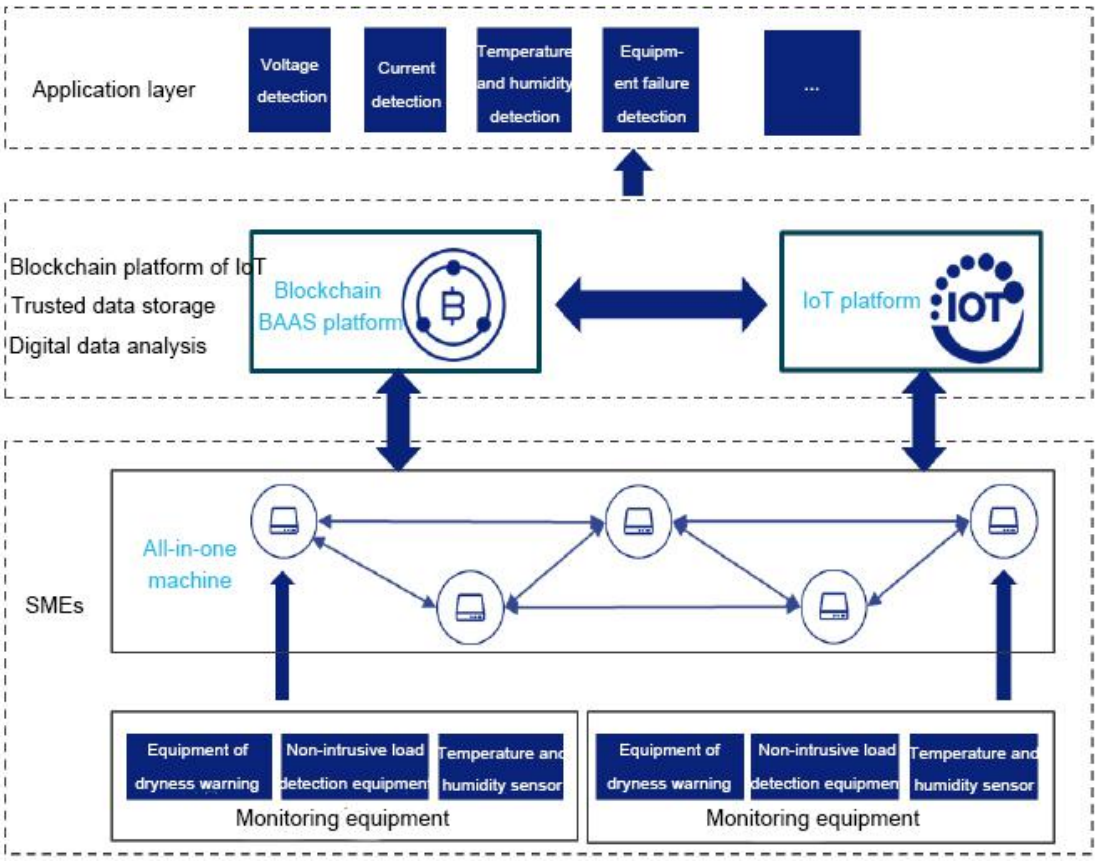


Figure 7: Case of Industrial Internet Architecture of Ladder Network

Founded by technology developers and computer researchers from Zhejiang University, ABMatrix is an industrial Internet platform specializing in

cutting-edge technologies, industrial upgrading, covering industrial equipment, edge computing, the Internet of Things, blockchain, big data and cloud computing. It provides internationally renowned companies with comprehensive solutions including fault diagnosis, fault analysis and prediction, reliability analysis, optimization of production line and capacity improvement, covering more than 100 industrial enterprises.

5.2 Decentralized Exchange

Decentralization is the future trend of exchanges. Both Binance and Huobi have been deployed projects in this field. In the future, the public chain with project resources will be able to realize decentralized transaction, which is actually a typical cross-chain application.

The Ladder Network transforms the inter-chain assets in a decentralized manner. Any chain can establish asset interoperability with other chains as long as it is connected with the Ladder Network, at the mean time, enjoy privacy protection, which will soon be available in the Ladder Network wallet.

Once the main network is online, the Ladder Network's decentralized transaction agreement will be officially put into use, provide technical supports for centralized exchanges, where LAD can be used as a platform currency. Due to the gas burning and deflation, the more the exchange uses Ladder Network platform, the stronger the support will be for LAD value.

5.3 WEB3.0 E-commerce

In the traditional retail era, “centralized e-commerce” is the main way for merchants to connect to the Internet. So all businesses from merchants are concentrated on one platform, which is therefore the only shopping entry for consumers. However, in the new retail era where user traffic is highly valued, retailers are gradually realizing the

importance of their own traffic. Having an independent e-commerce platform and "decentralized e-commerce" has become a new appeal of merchants.

The Ladder Network can meet this demand. In the Ladder Network, user browses the e-commerce DAPP, selects a certain item and places an order. The e-commerce DAPP requests the user's identity information through cross-chain network. The payment request, after being verified, is initiated to the payment chain, and the payment is therefore completed. After that, the order will be synchronized to the logistics chain, which will obtain the order information, and then pick up the items stored in warehouse and delivers them to the users. All the off-chain information is synchronized to the logistics chain through the Internet of Things (as shown in Figure 7).

After being remade by Ladder Network, all information of the e-commerce platform users, including request, payment, logistics and capital flow, are transferred in a trusted network, and the users' privacy and data are controlled by themselves, so the monopoly, fraud, and other issues of centralized e-commerce can be avoided.

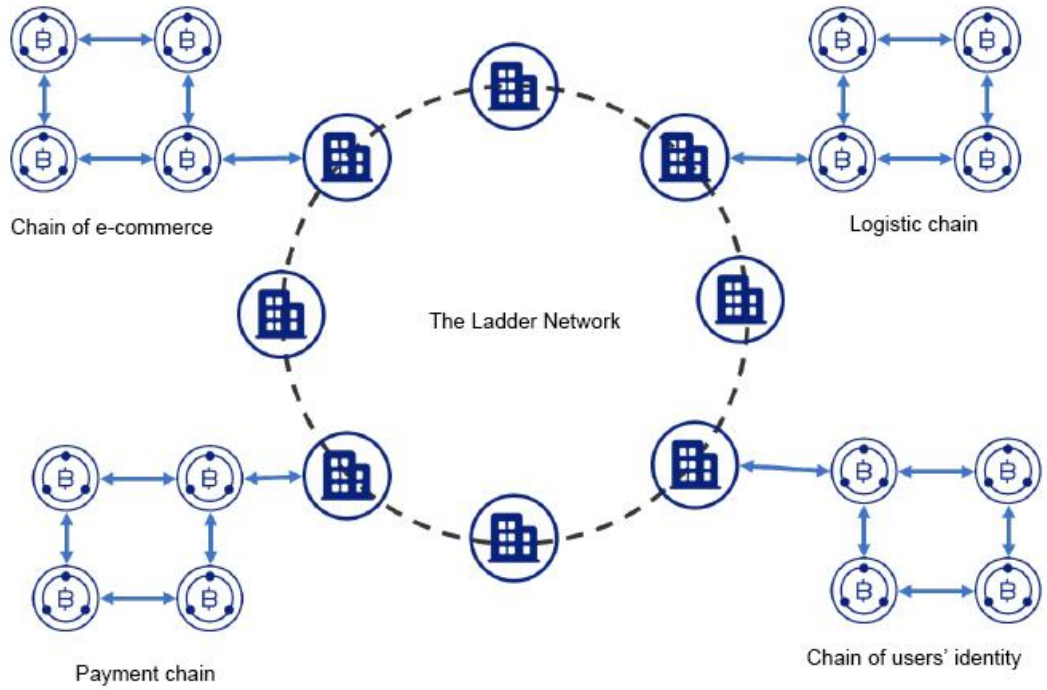


Figure 8: Ladder Network e-commerce case

6.Token Model

The token of Ladder Network is LAD with a total volume of one billion. The volume of issuance of mining pool is reduced by 50% for every two years. The user can enter Ladder Network's various assets through the cross-chain system, which will automatically convert the LAD market value according to the daily average price, and distribute the issued Ladder Network according to the total market value of the held assets.

Exchange of Token: 15%

Include early participant of Token exchange and the incentive plan launched in exchange.

Development team: 10%

After LAD is online, 2% is unlocked each year for operation, maintenance expenditure and sustainable development.

Foundation: 10%

In the early stage, 2% is used for early strategic layout and high cooperation, and then every 2% is unlocked each year.

Ecological construction: 15%

In the early stage, 3% was used for early ecological construction and resource introduction, and then every 3% is unlocked each year.

Reservation of mining pool: 50%

The volume of issuance of mining pool is reduced by 50% for every two years. Nodes and mining machines that are connected to the network are used for incentives and ecological circulation.

The Ladder Network obtained by user-mining can be used to:

- pay for miners.
- become a node through mortgage.
- vote for election nodes.
- function as an intermediate currency for redeeming certain niche assets.

• connect locked tokens with BAAS platform.

The increase of edge chains, user transactions, and the increase of projects that are connected with BAAS platform will consume LAD. So the value of LAD will increase when the total amount of LAD is constant.

7.Roadmap

1. In July 2018, the Ladder Network project was initiated.
2. In September 2018, the Ladder Network proposed multiple technical routes, and the white paper 1.0 was released.
3. In December 2018, the technical route of Ladder Network was optimized, and the direction of ecological construction was established.
4. In May 2019, launch the test network, and realize the cross-chain interconnection of Ethereum and ABOS chain.
5. In September 2019, link to some mainstream main network such as BTC, ETH, and EOS; open the Ladder Network in a full scale, and launch the cross-chain ecological navigation plan.
6. In December 2019, launch the main network of Ladder Network; activate the BPOS mining mechanism, and start the node campaign.
7. In March 2020, build the BAAS platform, which will provide a large number of basic SDK modules.
8. In June 2020, connect the supply chain module and game module with BAAS, share the Ladder Network cross-chain service.
9. In July 2020, fully launch the cross-chain ecological navigation plan.
10. In September 2020, launch the Ladder Network de-centralized exchange 1.0 and realize the free flow of cross-chain assets and information. LAD will become the Token of platform circulation.
11. In December 2020, realize the decentralized autonomy of community nodes.

8.Governance Body

8.1 Establishment of the Foundation

Aiming at building the world's most dispersed, secure and largest POS cross-chain network, Ladder Network will set up a foundation that is committed to the development, construction and operation of Ladder Network. It will promote the decentralization of the project, strengthen transparent management, promote the safe and harmonious development of the eco-society, and contribute to the development of blockchain industry.

The Foundation's decision-making committee consists of eight members, including five on behalf of the team and three on behalf of the early investors. After the expiration, 10 representatives will be selected through community voting. The members of the early committee will select 8 core members of the decision-making committee according to the contribution of the community members. New members need to be approved by all the members of Strategic Decision Committee before they can be elected.

In terms of the use of funds, the Foundation will invite international auditing agencies for formal financial audits, and will regularly publish audit results to inform investors, eco-participants and users about the progress of various jobs and funds.

8.2 Committee Functions

- **Executive committee**

Set up long-term and short-term plans; formulate rules and regulations; establish

management systems; set up project plan and strategic directions; assist in expanding media relations; manage daily operations; and promote the smooth and effective function of the Foundation.

- **Operational Management Committee**

Be responsible for the positioning of projects based on the development goals of the foundation; formulate development strategies; meet user's need; formulate operational modes and directions.

- **Compensation and Personnel Committee**

Formulate and revise the salary scheme; allocate institutional settings and post settings; be responsible for the recruitment of talents.

- **Audit and Compliance Committee**

Be responsible for project monitoring and evaluation, including operational audit, financial audit, code audit and Token application audit; ensure project compliance and expenditure specifications, and improve the efficiency of capital flow.

9.Disclaimers and Risk Warning

LAD Token does not constitute any security in any jurisdiction. This white paper does not constitute any type of prospectus or offer document, nor does it constitute an agreement for securities or investment securities in any jurisdiction. This white paper does not constitute any advice regarding a sale proposal or any advice from a partner/supplier of LAD Token ("the partners") to purchase any LAD Token, nor should it be part of or all facts presented form the basis of any contract or investment decision or rely on any contract or investment decision. No one is allowed to sign any

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To the fullest extent permitted by applicable laws, regulations and rules, LAD and/or the partners shall not be liable for any indirect, special, incidental, or consequential damages (including but not limited to the loss of profits and data) caused by any kind of infringement, contract, which arise from or is related to your approval or reliance on this white paper or any part thereof.

- **Risk and uncertainty**

Potential purchasers of LAD Token (as described in this white paper) should carefully consider and evaluate all risks and uncertainties associated with LAD, the partners and their respective businesses and operations. All information regarding LAD Token and the risks and uncertainties related to the ICO of LAD Token are listed in this white paper and in the Terms and Conditions before the purchase of LAD Token. If any risks and uncertainties develop into actual risky events, the business operation, financial condition and prospects of LAD and/or the partners may be materially and adversely affected. In this case, you may lose all or part of the value of LAD Token.

– Cautionary Declaration Regarding Forward-looking Statements

All statements contained in this white paper, such as statements made in press releases or in any publicly accessible places, statements made by LAD and/or the partners or their executive team, representative or employees, should not be regarded as a statement of historical fact.

All statements regarding the financial condition, business strategy, plans, industry prospects of LAD and/or the partners should be considered as forward-looking statements. These forward-looking statements, including statements regarding the revenue and profitability of LAD and/or the partners, prospects, future plans, other expected industry trends and other matters discussed in this white paper, are not historical facts, but only predictions.

These forward-looking statements contain known and unknown risks, uncertainties and other factors that may lead to discrepancies between actual results and expected results, achievements, performance or prospects of the LAD and/or the partners. These factors include:

(1) Changes in political, social, economic market conditions and changes in stock or cryptocurrency. Changes in regulatory environment of the countries in which LAD and/or the partners conduct their respective businesses and operations;

(2) Risks caused by LAD's and/or the partners' failure to implement their business strategies and future plans;

(3) Changes in expected strategies and expected internal growth of LADs and/or the partners;

(4) Changes in feasibility and cost of payment to LAD and/or the partners in connection with their business and operations;

(5) Changes in usability and remuneration of employees required by LAD and/or the partners to conduct their businesses and operations;

(6) Changes in customer preferences of LAD and/or the partners;

(7) Changes in the competitive conditions of LAD's and/or the partners' operation and the competitiveness of LAD and/or the partners under such conditions;

(8) Changes in future funding needs of LAD and/or the partners, and the availability of financing and funds to meet those needs;

(9) Wars or terrorist acts;

(10) Catastrophic events and natural disasters affecting the business and/or operations of LAD and/or the partners;

(11) Other factors beyond the control of LAD and/or the partners;

(12) Risks and uncertainties associated with LAD and/or the partners and their business and operations, such as LAD Token and the sale of LAD Token.

All forward-looking statements made or vested by LAD and/or the partners or representatives of LAD and/or the partners are limited by such factors. Given the risks and uncertainties caused by the discrepancies between actual results and expected results of LAD and/or the partners, which are expressed or implied by the forward-looking statements in this White Paper, these statements should not be over-relied on. These forward-looking statements is and only valid since the date of this white paper. LAD, the partners or any other person does not represent, warrant and/or promise any expected results or performance of LAD and/or the partner. The results and performance will be discussed in the forward-looking statement.

The actual results, performance or achievements of LAD and/or the partners may differ greatly from those anticipated in these forward-looking statements.

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