

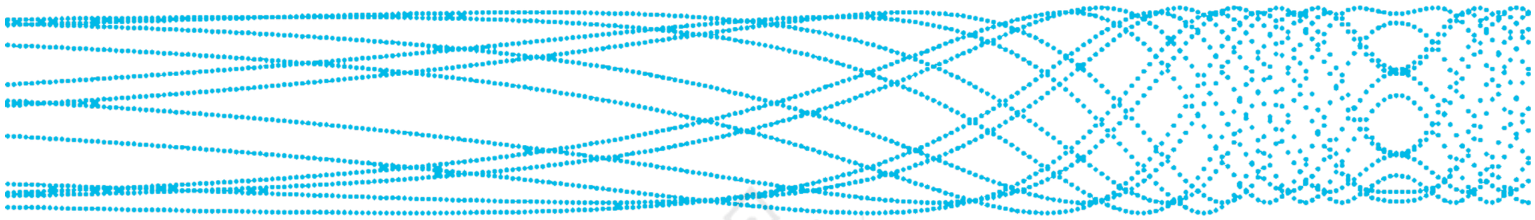
Zipper

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Cross-Chain Message & Transaction Switching Network



Zipper is a decentralized value switching network that enables point to point Message Communication, Transaction Switching and Transaction Settlement across multiple blockchain networks among different financial institutions. Zipper enables and empowers rich and comprehensive blockchain-based services for global financial institutions.

The rapid development of blockchain technology has demonstrated the ongoing megatrend of a future New Finance based on blockchain solutions. However, it is also apparent that financial institutions currently take a cautious attitude when implementing blockchain technologies mainly due to concerns of safety, regulations, lack of technical standards, etc. As a result, current blockchain infrastructure, including Private Blockchains and Consortium Blockchains developed by individual financial institutions, form disconnected and isolated silos or islands. Given the rigid demand of regulatory compliance in network-based communication among global financial institutions, cross chain Message and Transaction Switching are becoming the ultimate solutions.

In light of this, we are developing financial grade Public Blockchain called Zipper, which is a decentralized network that enables cross-chain Message communication and Transaction Switching.Zipper is promised on meeting the fundamental requirement for the financial industry, Zipper' s format follows the general norm and standard of message for global financial industry, thus enabling a seamless migration of existing financial services onto Zipper. Zipper introduces nodes for account identity KYC validation and nodes for regulatory measures in order to meet the international financial compliance requirement. Zipper combines existing technologies with the latest crypto-technologies, such as zero-knowledge proof, to solve privacy protection problems for financial grade applications.

To achieve an optimal balance between payment efficiency and privacy security, Zipper employs a data separation and credit granting verification mechanism. For a specific transaction on Zipper, blockchain clearance files and transaction payment data on distributed ledgers are separated. When the decentralized verifier for credit granting is calculating, only the encrypted use case for mathematical verification is visible; when the financial institution executes payment based on clearance files, details of the payment data are not required. The transaction is transmitted among the transaction participants of

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multiple institutions and the actual payment data is encrypted and shared among the transaction participants only.

Zipper adopts contract-based inter-network Finance Electronic Authorization (FEA) to design and support highly complicated financial services under diverse commercial scenarios. FEA focuses on cross-chain and cross-gateway payment path design and clearance & settlement logic design, in the form of Smart Contract. The combination of business rules of the decentralized ledgers with the contract-based inter-network FEA for Zipper is configurable, in order to meet the various functional and non-functional requirement for inter-operable consensus groups.

The development team behind Zipper started researching on the index management of related accounts that are cross-blockchain and cross-gateway for financial institutions in 2013, and was granted with multiple invention patents in Canada, Singapore, China and other countries. Zipper pioneered the inter-network Transaction Switching and Message communication from traditional bank accounts to non-bank accounts of digital assets.

In consideration of the international financial regulations and the internal network safety requirements of financial institutions, Zipper has specifically designed front-end systems for implementing blockchain businesses with banks' existing internal networks, so as to deliver fast system integration and turnkey project.

Zipper strives for an inter-connected financial world!

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Background

Since the arrival of Bitcoin[1-4],blockchain [5-6] has thrived rapidly from anonymity into the mainstream in a strong upward trend. By now, blockchain has already become one of the core technologies for the financial industry [7] .Since safety, efficiency and low cost in clearance and settlement are the everlasting pursuit of global financial transactions, blockchain-based decentralized payment clearance and settlement will become the ultimate solutions in the future[8-9].

The booming of blockchain has promoted digitization of assets [10] ,and brought high liquidity that is cost-effective, global in nature and 24-hours open. Blockchain-based financial innovation makes transfer of digital assets through internet a reality [11] . At the same time, various individually developed blockchains have created increasing number of isolated islands of digital assets. Cross-blockchain transfer of digital assets have become the bottleneck for the entire blockchain industry [12] . A standard that better fits the cross -chain transactions of blockchain tokens is critical for the development of blockchain financial innovation [13].

Traditional banks have made numerous attempts to transform their traditional businesses via blockchain technologies. Unfortunately, up to now there have been little practical progress [14]. The main reason is that traditional banks are too conservative on innovation of its core system architecture. Under heavy regulation, the banking industry is concerned more about stability and defense against risks [15]. This is the result of both the society' requirement on banks and the banks' obligations, which is to provide safety and liquidity of assets for commercial entities and consumers at large scale and serves as the last fortress of trust mechanism in the market economy. In this situation, in order to safeguard their ledgers vigilantly [16] , banking systems are protected behind multiple firewalls and even tiny changes of the system require complicated processes, making any innovation or reformation particularly hard or even impossible [17] . In accordance with the original intention when designing ledgers, traditional banks are heavily inclined towards security and less inclined towards innovation or flexibility [18]

Ripple [19]is an earlier blockchain-based open payment network that attempts to provide new solutions on global financial settlement for banks, payment service providers, enterprises and digital currency exchanges [20] . However, due to inherent flaws that are difficult to overcome, Ripple fails to form any deep partnership or ignite any ripple effect with mainstream financial systems. For instance, Ripple is non-compatible with laws for financial regulation [21-23] thus cannot be integrated with official financial entities in many countries and regions. Ripple also does not support clearance and settlement thus cannot be integrated with ledgers of financial institutions [24] . Ripple' s Message system is non-compatible with current banking formats or standards, making system migration difficult. Ripple' s privacy protection mechanism is faulty and business information are insecure [25]

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In consideration of the issues above, we developed Zipper, a financial grade blockchain network that is both secure and flexible. The core of Zipper is its cross-chain protocols, which provide certified Public Blockchains, Private Blockchains and Consortium Blockchains with data and Transaction Switching services. Compliant with global financial regulation, security requirements and ISO international financial standards[26-27], Zipper is developing infrastructure-grade public blockchain network protocols based on blockchain technologies. Zipper creates effective connections between ledgers of financial institutions and distributed ledgers of blockchains; enables cross-chain switching of transaction and information among banks; supports regulation and privacy protection requirements; meets the high efficiency requirements for transaction processing; and supports collaboration on complex financial businesses among institutions.

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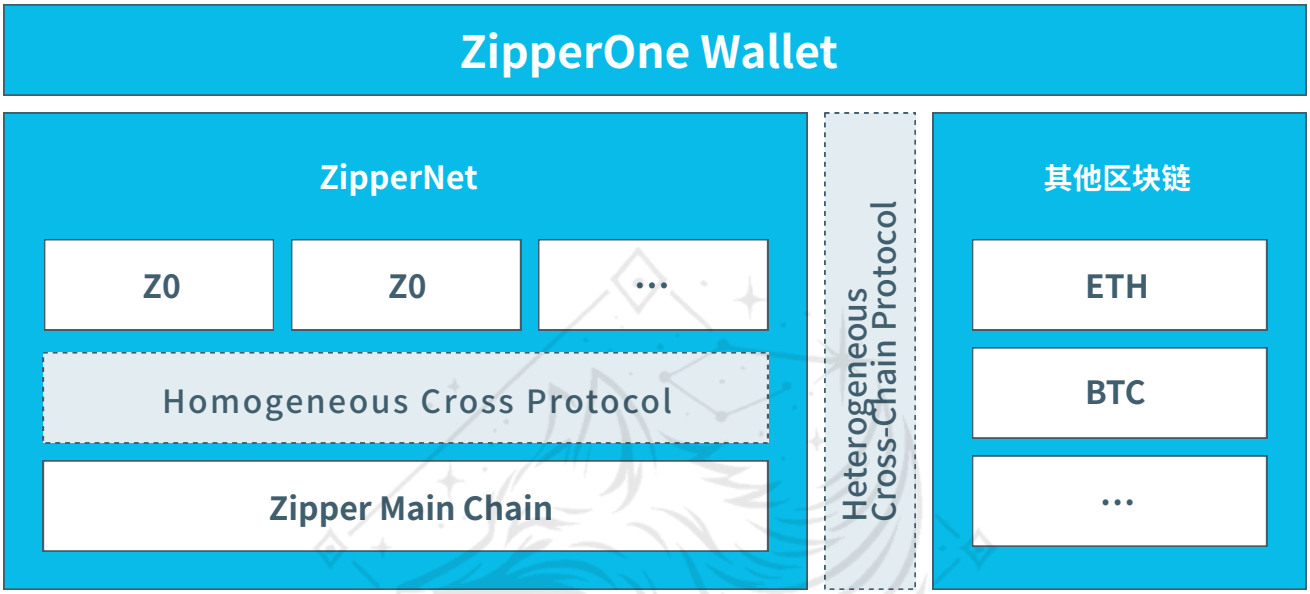
Zipper Architecture



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1. Zipper Architecture



ZipperNet

ZipperNet is a multi-chain financial grade blockchain network that contains multiple Z0 blockchains, as well as ZipperOne wallet nodes and all the zipper ecology participants.

Zipper users can quickly complete cross-chain transactions between different Z0 blockchains within ZipperNet through symmetric chain interoperation protocol, or intercommunicate with other Public Blockchains through asymmetric chain interoperation protocol.

Z0

Z0 is blockchain unit of ZipperNet, each Z0 has a relatively independent ledger and consensus algorithm and can process independently internal transactions. Zipper community members can establish Z0 network and build various applications in a decentralized way. Meanwhile, Z0 blockchain can access to ZipperNet to transfer value with other Z0 networks and even other Public Blockchains.

Enterprises can also deploy Z0 as Private Blockchains or Consortium Blockchains to meet their internal business needs.

Zipper Main-Chain

Zipper main-chain refers specifically to the main blockchain in ZipperNet, which is also based on Z0 and differs from other Z0 blockchains. Zipper main-chain hosts Zipper Token (or ZIP). ZIP is the basic currency on Zipper main-chain, it can be the value measure of transactions, and the collateral for Token issued on ZipperNet or cross-chain transaction. At the same time, Zipper main-chain supports all Z0 blockchains and cross-chain protocols between ZipperNet and other Public Blockchains.

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ZipperOne Wallet

ZipperOne wallet is an innovative blockchain wallet which provides users a unified address to manage all digital assets. ZipperOne is not only a wallet, but a full-featured blockchain terminal. Based on ZipperNet's asymmetric chain interoperation protocol, ZipperOne will support point to point asset transactions between different blockchains in the future.

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Zipper Characters



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2. Zipper Characters

Zipper is the world's pioneer financial grade public blockchain that provides certified Public Blockchains, Private Blockchains and Consortium Blockchains with data and Transaction Switching services. The goal of Zipper is to become the largest cross-chain value transfer network in the world. Zipper is able to provide Message and cross-chain Transaction Switching services at high efficiency and low cost. Zipper has specifically designed front-end systems for implementing blockchain businesses with banks' existing internal networks and gateways, lowering integration cost with financial institutions. Zipper is compatible with the ISO20022 standard (an ISO standard for electronic data interchange between financial institutions) and the KYC/AML requirements of financial institutions globally.

2.1. Consensus Algorithms

Zipper employs a laterally extendable multi-chain structure, which not only solves the functional bottleneck of traditional single-chains and achieves concurrency significantly better than traditional blockchains, but also supports connection with other heterogeneous blockchains.

Consensus algorithm is at the core for blockchain technologies. The consensus algorithms behind Zipper consist of three key protocols, namely Self Organizing Strategy (SOA), Symmetric Chain Interoperation Protocol (SCIP), and Asymmetric Chain Interoperation Protocol (ACIP).

SOA: a protocol that sets the standard for participants of Zipper network to self-organize into multiple subsidiary chains. Through SOA, all participants can self-organize into sub-chains of appropriate scale and each sub-chain maintains a sub-ledger with Byzantine fault-tolerant consensus algorithm that can tolerate a certain number of faulty nodes or malicious nodes.

SCIP: a protocol that sets the standard for multiple homogeneous sub-chains and ledgers on Zipper to access data and execute transactions cross-chains. SCIP includes definition and collaboration logics of inter-chain transactions. Sub-chains achieve cross-chain access and transactions through SCIP, leading to high concurrency and strong scalability of Zipper.

ACIP: a protocol that sets the standard for integrating external or foreign blockchains with Zipper. ACIP includes standard data structure and processing logics of scripts or contracts. Through the same data structure and processing logics, Zipper achieves cross-chain data compatibility with heterogeneous blockchains.

2.2. Design for Payment Clearance and Settlement Security

Zipper adopts a data separation and credit granting verification mechanism. To process a transaction on Zipper, blockchain clearance files and transaction payment data on distributed ledgers are separated. When the decentralized verifier for credit granting is calculating, only the encrypted

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use case for mathematical verification is visible; when the financial institution executes payment based on clearance files, details of the payment data are not required. The transaction is transmitted among the transaction participants of multiple institutions and the actual payment data is encrypted and shared among the transaction participants only.

2.3. Cross-Chain Gateway (CCG)

Cross-Chain Gateway (CCG) is responsible to communicate and integrate with all the external blockchains. Externally, CCG is compatible with various Private Blockchain protocols, Consortium Blockchain protocols as well as trustworthy Public Blockchains. Internally, CCG blocks the heterogeneous structural differences among all the different Private Blockchains and Consortium Blockchains. Security-wise, CCG prevents direct access of internal systems from external systems. Structure-wise, internal systems only need to integrate with CCG to use any blockchain technologies.

Zipper CCG creates a complete cross-chain gateway structure for global financial institutions to launch blockchain-based financial services. As an analogy, CCG serves as the routing protocols among the blockchains of different financial institutions, and provides communication and data switching across different blockchains. CCG establishes communication and interaction protocols among different blockchains, therefore heterogeneous blockchains from different institutions can connect with each other through CCG just like different devices inter-communicate on the internet.

In the Zipper network, different blockchains analyze and transmit communication requests in accordance with the CCG protocols, maintaining the topological structure of a blockchain system in a dynamic way.

2.4. ZConnector

ZConnector maintains the connection between financial institutions and the Zipper Network and keeps its own position as well as neighborhood relationships in the blockchains. ZConnector simultaneously communicates with multiple participants in the Zipper Network via P2P Message switching, including Transaction Messages, Query Messages and Consensus Messages. Transactions from financial institutions are submitted to Zipper via ZConnector and then written into the ledgers after consensus is reached with related participants.

2.5. Communication Security

Zipper supports decentralized authentication mechanisms. Nodes in the Zipper Network are able to identify IDs in a decentralized manner. Nodes communicate by adopting secure TLS connection for data transmission. Zipper supports multiple open-source and commercial encryption algorithms and meets the cryptologic standards in various regions, hence ensuring communications are not attacked or tapped by any intermediaries.

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2.6. KYC (Know Your Customer) & AML (Anti-Money Laundering)

Zipper Network and protocols are compatible with financial compliance regulations among the collaborative institutions. When a user creates a ledger, the KYC obligation of the collaborating institution does not change and it should comply with AML laws and financial regulations of different regions. Banks shall use Zipper on the condition that the regulatory requirements are unchanged.

2.7. Contract-Based Finance Electronic Authorization (FEA)

Financial institutions have diverse applications and business scenarios. When providing comprehensive financial solutions to financial institutions, the required standard for payment pathways and clearance logics among multiple transaction participants is high. Solutions for financial institutions not only need to address the trust problems among multiple transaction participants, but also need to provide payment, bookkeeping, message, clearance, commission settlement and other services that are compatible with each individual participant' s own requirement and business logics.

The contract-based FEA adopted by Zipper is customizable contract that is in digital format and combines transaction process pathways and clearance processes together. FEA serves as both bookkeeping results and clearance evidence for multiple transaction participants after consensus is reached. FEA defines the agreement for all transaction participants to execute their consensus commitment. The rights and obligations on FEA are executed by Zipper Network.

2.8. Auditability and Privacy Rights

For traditional Public Blockchains, balance and entire transaction history of each address are transparent to all network. This is not compatible with practical requirements of most financial applications. By adopting the latest crypto-technologies such as zero-knowledge proof, Zipper can fully meet users' privacy protection requirements while complying with regulations and being auditable.

2.9. Framework to Support Businesses

Zipper supports Distributed Ledger Technology (DLT), Smart Contract (SC) and Finance Electronic Authorization (FEA), all of which jointly equips Zipper Network with the fundamental abilities to provide business services for financial institutions. On this infrastructure, financial institutions can easily migrate their traditional services onto blockchain networks in a flexible way.

2.10. Automatic Clearing Chain (ACC)

Zipper ACC is similar to the automatic clearing center of the Automatic Clearing House (ACH) in the United States. Developed based on DLT and contract-based FEA, Zipper ACC defines the business types and information format of any clearing events, which conforms to entry format of the clearing houses and provides distributed ledger file to the accessed institutions.

ACC processes transactions and bookkeeping on blockchains, sends clearing instructions and ledger file formats via Zipper gateways to contract-based FEA, and appoints financial clearing house for clearance. If the subject assets are purely digital assets, clearance of the digital assets

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can be executed directly on the blockchains. For different clearance and settlement requirements, FEA allows developers to design their own solutions based on their individual business logics.

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Technical Architecture



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3. Technical Architecture

3.1. ZipperNet Architecture Features

ZipperNet adopts multi-chain architecture. At present, Mainstream blockchains are single consensus and single ledger structures, which greatly limit ledgers' size and performance. ZipperNet is composed of Zipper main-chain and multiple Z0 blockchains to build high performance blockchain based on SCIP.

3.2. Z0/Zipper Architecture Design

Nodes

Z0 was composed of accounting nodes, data nodes, and light nodes. Accounting nodes hold all the data, verify all the sub-ledger data and realize consensus; data nodes synchronize ledger data from accounting nodes and validate it, and they can also choose to process sub-ledgers that they cares about; light nodes can only process certain accounts' data, create and receive transactions.

Ledger Structure

Z0 can be configured single ledger or multi-ledger structure, multi-ledger accounting nodes can use cluster technology to concurrently process and verify different sub-ledgers, and simultaneously merge all sub-ledgers of each block to ensure the high performance of Z0.

Assets

Z0 natively supports multiple assets (Token), and ensures the independence of assets and contracts. It allows any accounts to create asset types and issue its own digital assets that are determined by market. Custom assets can be applied in different contracts to ensure the liquidity of assets.

Take Zipper main-chain, for instance, it not only provides ZIP and smart contract, but also supports user to issue other Token in Zipper main-chain based on blockchain instead of smart contract, the issued Token supports ordinary transaction as well as trade through smart contract.

Consensus

Z0 consensus algorithm is pluggable, and can use different consensus algorithms (including DPOS/BFT, etc.) according to requirements, and to be configured as different patterns such as high throughput/ low latency to adapt to different scenarios.

Smart Contract Engine

Z0 smart contract engine will implement GAS mechanism based on EVM engine to ensure the consistency of contract execution, meanwhile realize economic penalties for spamming traders to ensure rational use for resources.

Cross-Chain

Z0 blockchain can naturally identify Zipper main-chain data, and its ledgers can be anchored on Zipper main-chain. Different Z0 blockchains can read Zipper main-chain data to identify other Z0 blockchains or other Public Blockchains data for completing cross-chain transactions. Z0 can realize cross-chain atomic exchange of different assets or lockup of assets and cross-chain transfer on Z0.

3.3. ZipperOne Architecture Design

ZipperOne Wallet not only provides users with a unified digital asset address service based on Zipper cross-chain

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protocols, but provides cross-chain transactions, assets issuance, smart contracts, and third party payment interfaces along with the development of Zipper.

Unified Digital Asset Address

After user initializes the wallet, ZipperOne wallet will generate a unified asset address that will bind the user's digital assets address (the binding relationship follows Zipper' s technical specifications), and this binding relationship will be submitted to ZipperNet in a decentralized way after it has been signed. Products that support Zipper' s technical specifications can also verify and query user' s asset addresses in a decentralized way.

ZipperOne uses Z0 blockchain to bind unified address and other addresses to realize the decentralization of bind relationship.

Cross-Chain Transaction

Only supported by user terminals, cross-chain transaction may be widely promoted and used. Supporting Zipper' s functions for symmetric chain and asymmetric chain, ZipperOne makes users directly conduct atomic exchanges and assets switching in a decentralized way on different blockchains.

Assets Issuance

ZipperOne wallet can issue and manage assets on ZipperNet through API.

Smart Contract Support

ZipperOne wallet can issue and use contract on ZipperNet through API, and meanwhile allow third party to develop embedded plugin of smart contract and extend application scope of wallet.

Third Party Service Support

With the development of blockchain in the future, multiple applications will use blockchain to pay or trade, ZipperOne wallet can use local services to provide interface for third party payment application, and expand blockchain application domain.

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Applications of Zipper



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4. Applications of Zipper

With the purpose to achieve global financial interconnectivity, Zipper can serve in rich and diverse financial applications, playing major roles in fundamental cross-chain Message and Transaction Switching services, application-level inter-bank cross-border, switching and payment, corporate remit transactions, consumer micropayment, supply chain financing, trade financing, acceptance drafts, etc.

By using Zipper, financial institutions can enjoy the following advantages

Lower cost for international clearance and settlement.

New tools based on blockchain technologies will reform the global commercial value chain, driving down cost and increasing values.

Additional value from liquidity management.

By adopting Zipper, financial institutions can offer their clients with more asset services, increasing values derived from liquidity management.

Improved efficiency on transaction processing.

Zipper significantly cuts down the cost of traditional bookkeeping and account reconciliation, increasing efficiency and achieving better user experiences for transactions.

Intelligent finance.

Cross-chain contract-based FEA (Finance Electronic Authorization) provides banks with more blockchain-based smart solutions, improving banks' abilities to solve diverse demands from their clients on transaction processing, clearance and settlement.

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Zipper Development Path



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5. Zipper Development Path

Z0/Zipper

Date	Event
2018Q2	Realize multiple assets function
2018Q3	Realize contract function and consensus algorithm
2018Q4	Realize asymmetric chain algorithm and support the use within the company
2019Q1	Synchronous online

ZipperOne

Date	Event
2018Q2	Open test and support the function of unified address
2018Q3	Support the broader assets Provide the blockchain browser of lots of assets
2018Q4	Provide the decentralized trading interface
2019Q1	Support Zipper main-chain Provide third party service interface

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Zipper Token Distribution Plan And Incentive Plan

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6. Zipper Token Distribution Plan And Incentive Plan

ZIP is the basic currency on Zipper main-chain, it can be the value measure of transactions, and the collateral for Token issued on ZipperNet or cross-chain transaction. The total number of ZIP is set to 100 billion.

Election Mechanism for Accounting Nodes

ZIP adopts an improved DPOS consensus algorithm. Accounting nodes complete the election by a decentralized way. If accounting nodes are successfully elected and complete bookkeeping, accounting nodes and users who elect these nodes will receive a certain number of ZIP awards.

Awards for bookkeeping

ZIP main-chain bookkeeping awards include two parts, fee awards, and new issuance awards. Fee awards are generated by transaction fee, and its computation way is related to the fee strategy when accounting nodes are running for election. New issuance awards are generally reduced every year to ensure the total circulation of ZIP are as expected.

Various Ways for Issuance Assets

Users issue assets in ZipperNet by mortgaging ZIP. Conventional cross-chain transactions involve multiple interactions within multiple blockchains, and its cycle is very long. In ZipperNet's symmetric cross-chain transactions, the asset which is cross-chain switched can be mortgaged by ZIP, if sender defaults during switching process, he will lose all mortgaged ZIP, and these mechanisms facilitates rapid confirmation of cross-chain transactions.

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Team



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7.Team

Zipper community consists of Zipper participants and is initiated by Zipper community developers. Since its establishment, Zipper that government for participants, by participants and of participants, aims to establish multi-chain financial grade blockchain network for user, which is ZipperNet-based and tokenizes user assets. For all participants in the world, Zipper system is committed to building an ecology which can one-stop store digital assets, second-level same chain or cross chain transactions, and high speed digital assets swithcing.

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