

WHITEPAPER OF IBAX PUBLIC NETWORK

The World-leading Decentralized Blockchain Network

ISSUED BY IBAX FOUNDATION

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1. PREFACE	5
1.1 WHAT IS IBAX NETWORK	5
1.2 CORE CONCEPTS	6
1.3 VISION	7
2. IBAX ECOSYSTEMS GOVERNANCE	8
2.1 CONSENSUS MECHANISM	8
2.2 GOVERNANCE MODEL	9
2.3 ECOSYSTEM GOVERNANCE	9
2.3.1 IBAX FOUNDATION	9
2.3.2 ECOSYSTEM PARTNERS	11
3. A FAIRER, TRANSPARENT, FRAUD-PROOF, AND SUSTAINABLE ECONOMIC MODEL	12
3.1 EXECUTIVE SUMMARY	12
3.2 FEE MODELS	14
3.3 SYSTEM DEVELOPMENT STAGES	16
3.4 IBXCOIN OVERVIEW	16
3.5 SYSTEM COMPONENTS	21
3.5.1 HONOR NODES	21
3.5.2 GUARDIAN NODES	22
3.5.3 MINT NODES	22
3.5.4 NETWORK SUBSIDY	23
3.6 IBAXCOIN HOLDER TYPES	23
3.6.1 THE IBAX FOUNDATION GRANT	23
3.6.2 THE STABLECOIN RESERVE	25
4. OVERALL ARCHITECTURE	26
4.1 IBAX PUBLIC NETWORK	26
4.1.1 PLATFORM ARCHITECTURE	26
4.1.1.1 Honor Node	27
4.1.1.2 Guardian Node	29
4.1.1.3 Mint Node	29
4.1.1.4 Sub Node	30

4.1.1.5 CLB (Cross Ledgers Base)	30
4.1.1.6 Database	31
4.1.1.7 Smart contracts	31
4.1.2 Service architecture	32
4.1.2.1 ecoLib	32
4.1.2.2 ecoGroups	33
4.2 THE DEVELOPMENT PLATFORM	34
4.2.1 WEAVER OVERVIEW	34
4.2.2 MAIN FUNCTIONS OF WEAVER	34
4.2.3 INTERFACES AND STRUCTURE OF WEAVER	34
5. TECHNICAL FEATURES AND ADVANTAGES	38
5.1 TECHNICAL FEATURES	38
5.1.1 EXCLUSIVE APPLICATION PROGRAMMING LANGUAGE	38
5.1.2 A SELF-GOVERNED DECENTRALIZED, FAIR, AND TRANSPARENT DAO	38
5.1.3 SMART TRANSACTION PROCESSING MECHANISM	39
5.1.4 MULTI-LEVEL PERMISSION MANAGEMENT	39
5.1.5 ISOLATED VERIFICATION	40
5.1.6 SUPPORT FOR MULTIPLE ENCRYPTION ALGORITHMS	40
5.1.7 ZERO-KNOWLEDGE PROOF	41
5.1.8 PRIVATE TRANSACTIONS	41
5.1.9 MULTISIG	41
5.1.10 TRANSACTION SHARDING	42
5.2 DATA INTERACTION MODES	42
5.2.1 INTERNAL INTERACTION WITHIN AN ECOLIB	42
5.2.2 INTERNAL INTERACTION WITHIN DIFFERENT ECOLIBS	43
5.2.3 OFF- / CROSS-CHAIN INTERACTION	43
5.3 DATA PROTECTION AND COMPLIANCE	43
5.3.1 ON-CHAIN STORAGE OF PERSONAL INFORMATION	44
5.3.2 INTERNATIONAL PRIVATE DATA PROTECTION AND COMPLIANCE	44
6. IBAX APPLICATION FIELDS & PROSPECTS	45

6.1 DECENTRALIZED COMPANY (COMMUNITY) OPERATION	45
6.2 FINANCE	46
6.2.1 THE BANKING SYSTEM	46
6.2.2 BLOCKCHAIN FINANCING	46
6.3 INTEGRATION OF BLOCKCHAIN AND THE IOT	47
6.4 MEDICAL SERVICES	48
6.5 BLOCKCHAIN ENVIRONMENT PROTECTION	49
7. BUILDING THE FUTURE TOGETHER	51

1. PREFACE

We pursue equality and freedom, but the world is full of deceit and lies. The advent of the blockchain technology is like a ray of sunlight passing through the haze to the ground! Facing the light, we unite into a torrent of will and shout to the world: decentralize, we can self-govern through voting; be open and transparent, hypocrisy and lies are about to end.

1.1 WHAT IS IBAX NETWORK

IBAX Network is an integrated blockchain infrastructure with extreme compatibility that adopts microservices. Having researched the basic blockchain features that unite Bitcoin, Ethereum, Grin, and other cryptocurrencies, IBAX commits to decentralized organization. IBAX recognizes the foundation of value and sustainable development possibilities. These root not only in consensus but also in the patience and costs of all participants.

Based on the above, to design a self-governance network that integrates all the ecosystem participants, we use a nested consensus mechanism and a low-consumption mining model to decentralize hash power and return data ownership and monetization benefits to the ecosystem co-builders. All eligible co-builders can enjoy rights and interests such as governance, allocated hash power, storage, etc., without affecting the compatibility and efficient operation of the ecosystem.

IBAX Network is a practical enterprise-level service product based on a blockchain network and launched after years of experience in core fields like distributed parallel computing, PaaS, BaaS, data management, and secure encryption.

Facing the changing market conditions, it is normal to have various demands to accommodate. The dilemma of traditional blockchain structures has been affecting their commercialization. Centralization is the core foundation for the operation of social and commercial ecosystems, while decentralization and transparency are beyond the operational and social demands. It is time to break away from the obsession with decentralization and jointly improve data verification and structure, virtual currency economy, smart contract structure, and trusted computing models. This is the consensus the industry players have been increasingly willing to reach. Only this will allow for a consensus with the real world (traditional commercial organizations, governments, developers, node operators, community followers, etc.) and a true increase of the blockchain technology power.

The technology layer is naturally isolated, just like the Internet at the very beginning. First, it needs to break all potential technical barriers and customer habits and reduce or eliminate the inconvenience resulting from isolation. Only then, it is possible to establish a standardized scalable scenario and integrate it into distributed commercial applications, allowing quick access to traditional commercial applications. If the default smart contract

of the ecosystem cannot meet your own needs, you may code a new one using the programming interface integrating smart contracts and consensus mechanisms and release it in the IBAX ecosystem. This creates a cyclic incremental open-source model for the commercial ecosystem.

The core platform and comprehensive services of IBAX Network support rapid construction of an ecosystem that meets your needs. IBAX supports multiple independent ecosystems and brand-new personalized modes of interaction with multiple data types to meet the demand for high-speed and secure data services. The systems it builds adopt the super model with a dozen features, including distributed databases, hierarchical management, distributed encrypted storage, cross-chain internal-external data interactions, sharding processing, post-quantum lattice-based cryptography, and homomorphic encryption.

When the technical roadmap and commercial application scenarios of IBAX reach the stage of mutual promotion, its blockchain network will become an extension of the real world, a metaverse world where everyone is a participant. Here, privacy of participants is self-governed; no one can intrude, no matter what use case or application it is!

IBAX adopts the concept of digital twins. The metaverse life and real life will integrate with each other profoundly. In the metaverse world, we still can learn, get paid for our work, shop, entertain, and exchange emotions.

IBAX not only has an exciting technical roadmap and development plan. The IBAX team has been ahead of most blockchain networks in terms of engineering practice. A strong development team and veteran advisors from various industries are the foundation for IBAX's rapid and steady growth. IBAX's commercial plans are imaginative and its team and ecosystem partners develop technologies following the principle "commercial feasibility first", ensuring the moves are bold and commercial implementation is complete.

IBAX is more than expectations!

1.2 CORE CONCEPTS

- **A great reduction of blockchain application cost**
- **An independently build physical ecosystem**
- **Quick deployment of distributed servers, development and application environments**
- **A diversified DApp Store and BaaS functionality**
- **Actual service response in seconds**
- **Cross-chain and cross-system data interaction**

- **A new infrastructure network integrating public, alliance, and private chains**
- **A customizable consensus mechanism**
- **Separation of front end and back end to meet various encryption needs**
- **Zero access and usage threshold**

1.3 VISION

Our vision is to create an open underlying blockchain infrastructure that is secure, fair, simple, efficient, intolerant to fraud, and strongly compatible!

As you can see by the IBAX network semantics, IBAX is an underlying trust transmission protocol. It establishes a trusted channel for all parties of a business ecosystem and makes collaboration easy and efficient. It can quickly transmit valuable resources and enable unlimited possibilities for connections between points, lines, and planes. More importantly, IBAX guarantees that no fraud is technically feasible.

It is impossible to have only one blockchain to meet the needs of all service architectures in the world. Therefore, IBAX is a huge blockchain ecosystem network that embraces various heterogeneous chains, breaks the chain structure barriers, and communicates using interaction in multiple data types and compatible cross-chain collaboration.

In IBAX's distributed blockchain network, each ecosystem point (an enterprise, community, or individual side chain or ecosystem partner) receives rewards as per its value contribution. These value-adding growth points are interconnected and can create a powerful cluster that transmits on a high-speed channel composed of blocks, thus forming an integrated ecosystem.

2. IBAX ECOSYSTEMS GOVERNANCE

2.1 CONSENSUS MECHANISM

Consensus is the cornerstone of mutual trust in a collaborative society. We follow the traffic rules, stop at the red light, and move at the green light, which is essentially a consensus ensuring our personal safety. In the economy, the U.S. dollar is the major settlement currency in international trade. This is another consensus ensuring commodity trading and economic development.

Does consensus exist naturally, or is it created? When there was no traffic consensus established, traffic accidents were common as we could not read the mind of others and could only guess or predict by actions or eye contact. In the past, people would trade freely with gold and silver but not with US dollars (we will not dive into the evolution of currencies, but this is a reference to consensus we are discussing). We are willing to use US dollars instead of gold and silver for many reasons, but consensus is the most important one that cannot be neglected. Our consensus is mutual recognition of the dollar's value.

You can see that consensus does not exist naturally. It is developed in the process of mutual recognition.

In the blockchain world, mainstream consensus mechanisms include Proof of Authority (PoA), Proof of Contribution (PoC), Proof of Stake (PoS), and Proof of Work (PoW). There are many others, too.

If you analyze it deeply, each consensus mechanism suits a specific scenario and specific rules. There is no universal consensus applicable to all environments, just as the traffic consensus is not interoperable with the economic consensus.

Considering commercial application scenarios and real-world environments, IBAX Network has built a new consensus mechanism, DPoA (Decentralized Proof of Authority).

On the IBAX platform, you can design your own consensus mechanism or integrate any group of consensus mechanisms in one to meet your requirements for any ecosystem (ecoLib). For example, you may use any of the mainstream consensus mechanisms, such as PoA, PoS, PoC, and PoW, or integrate them as one.

IBAX is, and perhaps should be (we say it modestly), the world's first platform that supports coexistence of multiple consensus economies in a blockchain network

environment. For the first time, various types of consensus economies are equal and coexist at the basic level of the system!

2.2 GOVERNANCE MODEL

Decentralization has always been our firm belief. It refers not only to IBAX's infrastructure network environment. Instead, we will let decentralization take root in each ecoLib created in IBAX Network and use technical solutions to achieve a high degree of self-governance in each of them. For the purpose of highly distributed self-governance, we have made many changes in the overall architecture and technical implementation. However, in practice, we cannot avoid the centralized management concept. In order to find a balance between centralization and decentralization, in addition to the DPoA consensus mechanism, we have also formulated certain reward and incentive programs.

To enrich the ecosystem environment for IBAX, the Foundation will give certain rewards to partners and developers who build ecoLibs in IBAX Network and develop and release DApps (the specific reward plan will be announced on the official website of IBAX).

The Foundation managed by the Board members is responsible for the continuous operation of IBAX Network. Initially, the Foundation consists of 21 members. These are companies providing technical support for IBAX, well-known founders of global companies, multilateral organizations, non-profit organizations, well-known academic institutions, and some guardian node partners (designated representatives from qualified verification nodes). Then, according to the operating environment and influence of IBAX Network, it will consider whether to increase the number of Honor Nodes and introduce changes according to voting results. The Foundation will jointly make decisions on network and reserve governance, technical R&D and design, market construction and management, and public relations.

The world is wonderful because of diversity. IBAX's decentralized consensus mechanism is highly compatible, therefore, at the early stage, the Foundation will initiate ecosystem cooperation activities. The launch of a comprehensive ecosystem reward plan will bring innovation and vitality to IBAX Network.

2.3 ECOSYSTEM GOVERNANCE

2.3.1 IBAX FOUNDATION

IBAX Foundation is a group of cryptography and blockchain experts, software engineers, and outstanding businesspersons and managers who focus on the development, deployment, and maintenance of IBAX Network. Foundation members are devoted to promotion of the continuous operation, breakthroughs, and innovations on IBAX Network. We hope to implement next-generation decentralized algorithms through cryptographic software protocols with technologies such as zero-knowledge proof and homomorphic encryption. From the Foundation's constitution, you can see that we consider both technical and commercial applications and the members complement one another.

To upgrade the current technology of IBAX Network comprehensively, the Foundation will continuously research, develop, deploy, fund, and maintain IBAX-related technological innovations. For better support of ecosystem partners and developers, IBAX Network provides a powerful visual development and deployment tool that we call Weaver (<https://weaver.ibax.io/>).

The Foundation adheres to the principles of fairness and has clear Articles of Governance. It is responsible for execution of specific matters as well as major strategic issues in technology and operations. Board members generally are representatives recommended by sub-committees of the Foundation. The term of a sub-committee is one year.

In order to promote the continuous development of IBAX blockchain, the Board of Directors will elect heads of functional committees to supervise various operating departments. The committees shall consider interests of all parties of IBAX Network.

The initial purpose and functions include but are not limited to:

- Review and revision of the Foundation's Articles of Association and governance principles;
- Making, review, and adjustment of major strategic decisions;
- Changing and upgrading of the core technology of IBAX Network;
- Formulation, review, and adjustment of the nomination and election process for the Chairman, Board members, and heads of functional committees of the Foundation;
- Review, approval, and supervision of the Foundation's annual budget, financial status (including all the ecosystem holdings), use of proceeds, and major transactions;
- Initiation and organization of network-wide voting on major issues of IBAX Network, such as fundamental adjustments to the consensus mechanism or technical parameters;
- Decisions on emergencies and other matters to be voted by the entire network according to the Development Committee;

Stakeholder members and employees of the committees shall not receive additional cash compensation for serving the committees. Subject to approval, members of the Board of Directors or the Foundation can get a certain percentage of pre-defined coins or ecoLib

tokens as rewards. In order to ensure the fairness and transparency of incentives, the Foundation will mine IBXC, the basic coin of IBAX Network, together with miners.

2.3.2 ECOSYSTEM PARTNERS

Ecosystem partners include but are not limited to:

- Government agencies, companies, individuals, developers, and all entities that provide products or services for all ecoLibs or a single ecoLib based on the IBAX ecosystem development and operation;
 - Entities that participate in governance of the chain structure, node packaging, verification, broadcasting, and node operation and maintenance and get involved in ensuring the security of the entire network. We will open supporting infrastructure services for selected nodes;
1. They directly participate in the governance network of the entire blockchain by mining and holding coins, maintain network security, and have the right to participate in the decisive development of certain ecoLibs. Forms of participation: nomination, community governance voting, contract auctions, revision proposals, etc.;
 2. Ecosystem community partners have the right to vote, represent, and make suggestions on the applied ecosystem construction, communication etc. through self-competition.

3. A FAIRER, TRANSPARENT, FRAUD-PROOF, AND SUSTAINABLE ECONOMIC MODEL

One of the core issues posed in economic research is the reasonable allocation of scarce resources, which is also true in a public blockchain network. Bandwidth, storage, and hash power are scarce resources on a public blockchain. However, after thorough considerations about the contradiction between self-governance and commercialization, IBAX developers believe that, theoretically, a public blockchain network should have no participation threshold, or this threshold should be minimal to let all network participants consider only their own interests. Such actions may harm the IBAX value system in the short term, but for commercial scenarios, it may turn out to be a good market regulation mechanism.

IBAX Network is socially oriented. It is a fair market platform for value flow and circulation. In theory, any ecosystem facility can become a valuable resource. At the same time, as an integrated blockchain system, it can include hardware systems, consider actual service needs and sustainable socio-economic models, provide a gateway for decentralized data flow transactions and storage services, and ensure the authenticity and reliability of data stream transactions and the integrity and recoverability of stored data at the technical layer.

To avoid fraud and other malicious events frequent in the blockchain world, IBAX Network links the economic theory and scenario requirements and adopts the most advanced cryptography technologies in its technical implementation. These include homomorphic encryption, asset lock-up, smart contracts with zero-knowledge proof, a cross-chain mechanism with unreadable secret key pair (smart contract encryption), and multi-chain segregation. This way, ecoLib and ecoGroup projects on IBAX Network are fairer, more transparent, fraud-proof, and sustainable to the greatest extent.

The native cryptocurrency of IBAX Network serves as the transaction medium in all ecoLibs. It is the basic accounting unit for measuring the value of all ecosystem services, e.g. fees for ecosystem infrastructure construction, application development and on-chain release, and calling smart contracts, etc. You can see the list of fees in IBAX Network Explorer.

All previous publications shall be deemed to have been withdrawn and replaced by this document.

3.1 EXECUTIVE SUMMARY

IBXC is the coin and basic settlement unit of IBAX Network. It has two main functions in IBAX Public Network:

1. IBXC can be used to pay service fees on the network, including creation of ecoLibs, import of smart contracts and database tables, gas fee for on-chain transactions, etc.;
2. The settlement unit. IBXC can protect the network from attacks.

The exclusive, powerful, and concise set of smart contracts that can execute various complex designs drive IBAX Network. When calling a smart contract, a fee in IBXC is incurred. IBAX coins are designed as a mechanism for users to pay for network usage. They reflect the number of network participants and the actual ecosystem status.

IBAX Network has created a new consensus mechanism that combines distribution, weak centralization, and a certification authority. We call it DPoA (Decentralized Proof of Authority). To ensure continuity for the entire IBAX Network, the consensus covers not only IBAX Public Network, but also ecoLibs created by each user and user group. This creates a truly self-governed, decentralized, fair, transparent, and fraud-proof Decentralized Autonomous Organization (DAO).

DPoA has a prevention mechanism against network attacks and allows creation of Mint Nodes that guard the network and mint new IBXC coins. IBAXCoin holders can stake a part of their IBXC liquidity balance in Mint Nodes for Mint & Stake Emission Rewards. Minting and staking serve to increase the cost and difficulty of attacks and increase the total value of IBXC coins proportionally. With this mechanism, the probability and harm of any attack are infinitely close to zero.

To pay coin holders who choose to mint and stake and thus ensure the network security, the network design includes new coin emission at a constant rate. The network pays these new coins to accounts that protect the network and meet the payment conditions via on-chain programming. The reward conditions include a Valid Address to receive the coins, Mint Power, Stake Amount, and Stake Period. Rewards are directly proportional to the above conditions controlled by users.

IBAX Network created an innovative metaverse that reflects the real society. It connects nodes beyond the real world, overcomes the limits of reality, and will create a better future for the humanity.

In order to support the sustainable development of the metaverse and ensure that NFTs are minted in a safe environment protected from attacks, we adopt block rewards in tokens. All metaverse participants who pledged a stake have an equal and fair right to compete for block rewards.

In the metaverse, the ecosystem structure of the real and the imaginary can be realized. Along with the growth of the IBAX metaverse and the addition of ecosystem partners, more partners will build their unique user ecosystems and economic models. Then, NFTs initially created in the metaverse will entitle not only to metaverse rewards, but also to various rewards of the greater unified ecosystem with different economic models. In order

to create more types of value behavior in the metaverse, IBAX will offer more surprising rewards to ecological creators and metaverse participants!

Data of metaverse applications is stored on-chain in the form of blocks. Mint Nodes provide data storage services and serve as metaverse data traffic carriers to ensure the decentralized storage and distributed sourcing of data. Although NFTs and Mint Nodes have a similar incentive nature, their functions and value are essentially different. Refer to 4.1.1.3 Mint Node for details.

In addition to minted coins and metaverse rewards, IBAX Foundation also plans to issue 0.25% of the total supply in the source code of the first network release to be used for initial chain operation and ecosystem development. The remaining IBXC coins are partially locked in a smart contact and will be released through open competition. The relevant data will be traceable on the blockchain.

3.2 FEE MODELS

* Background

You can say that the current blockchain space has only one major fee model: the one who calls a smart contract pays the gas fee. It is neither user-friendly nor suitable for the basic consumption logic in the real world. Ecosystem end users pay extra costs for this setting and it increases the threshold for new users (especially if used together with conventional payment methods like PayPal). It is the reason why blockchain projects have a small user base in the real world. IBAX Public Network creates several different network fee models (for gas fees), allowing ecoLib creators/developers to focus on their services, lowering the threshold for users, and allowing for quick access to the real-world market for developers.

* Contract Caller Fee Model

Any user calling any contracts within the ecoLib shall pay the incurred transaction fees itself.

This is the above “the one who calls a smart contract pays the gas fee” model. It is a popular payment method on blockchain. Undoubtedly, it has universal value in decentralized scenarios, so it also works for IBAX Network.

* Contract Binder Fee Model

When any user calls some contract within the ecoLib, the wallet of the contract binder pays the incurred transaction fees.

In this model, a wallet to pay all fees (gas fee) incurred by the application is designated by the application creator. All users of the application need to neither pay extra gas fees nor hold IBAX's coin IBXC. It brings great convenience to application users, lowers the threshold, and enables the rapid promotion of the application.

Note: applications will not run if the IBXC balance of the binding account is not enough to pay the contract calling costs.

* EcoLib Creator Fee Model

When any user calls any contract within an ecoLib, the wallet of the ecoLib creator pays the incurred transaction fees.

We encourage users to create their own ecoLibs on IBAX Network. Every user can create one. The same features are available for common users and creators, including an account on IBAX Network, which is a wallet address. When you create an ecoLib on IBAX Network, you are the creator and have the corresponding rights.

In this model, the ecoLib creator/developer has the same role as the binder in the Binder Fee Model.

* EcoLib Wallet Fee Model

When any user calls any contract within an ecoLib, the designated ecoLib wallet pays the incurred transaction fees.

Imagine this scenario: In a community-oriented ecoLib, multiple community developers develop applications. Quick promotion of applications of this ecoLib and a decreased user threshold need a model similar to the Contract Binder Fee Model. However, in this model, the wallet is deemed multi-signature as its address uses a regular pair of public and private keys. It means that if the assets in it are lost or stolen due to human errors, this ecoLib will collapse.

To avoid this, IBAX Network created the Exclusive Ecosystem Wallet. When transfers from other wallet addresses happen to it, IBAX locks the received assets to pay application gas fees.

With the Exclusive Ecosystem Wallet, fraud and other malicious events become impossible. It ensures the normal operation of ecoLib and protects users' rights and interests.

The DeFi and NFT application environments created using the Exclusive Ecosystem Wallet prevent exit scams and property theft, allowing users to focus on liquidity improvement and trading of scarce assets.

3.3 SYSTEM DEVELOPMENT STAGES

DPoA, the innovative consensus mechanism of IBAX Foundation, is the blueprint for the overall development of IBAX Network. It explains our plans to build an integrated distributed blockchain public ledger that is oriented at microservices, scalable, truly decentralized, fair, and self-governed, ensures cross-chain asset security, and thus supports and connects thousands of organizations and hundreds of millions of global users.

Please note that IBAX Public Network is developed and implemented in iterative stages and the first version does not enable all of its functions. Network releases start with BPN- α (Basic Public Network- α). This version is not just a Minimum Viable Product (MVP), but a mature and complete practical public network that has passed security tests and carries most of its planned functions. Undoubtedly, with updates enabled by our powerful technical team in cooperation with community developers in new iterations, IBAX's roadmap will be implemented as planned.

3.4 IBXCOIN OVERVIEW

This section covers some security precautions regarding the use of IBXC coins, DPoA, Mint Nodes, and key details on how to implement and maintain network security and public control.

* Transaction Fees

Transaction fees for all blockchain network operations that need to change the state of the ledger, such as transactions, creation of ecoLibs and tokens, creation and import of smart contracts and database tables, on-chain messaging, creation of minting pool nodes, etc. must be settled in IBXC.

For the above blockchain network transactions, different amounts of transaction fees will be paid to the verifier by transaction type. This establishes a strong and positive direct relationship between the improvement of coin liquidity and the frequency of network usage.

To facilitate public participation and incentives in IBAX Network, our economic model includes a diversity of participation methods with the following transaction fee types:

① Gas fee

Gas fees are a necessary integrated operation mode of blockchain that ensures network security. It commonly used to compensate fees incurred on public blockchains.

The processing performance and network usage efficiency of IBAX are complex but efficient. In order to meet these operational characteristics, we divide gas fees into four components by economic consumption:

$$TP \times ElementRate \times FuelRate + BlockSizeCost$$

TP – TP is the unit of gas to be burned for each operation and calculation in a virtual machine (VM);

FuleRate – FuelRate is used to convert gas units to qIBXC. FuelRate = 1,000,000;

ElementRate – ElementRate is only applicable to fees of special smart contracts. ElementRate = 1,000,000. The fee of special smart contracts is calculated as a resource fee;

BlockSizeCost – BlockSizeCost is the fee charged according to and only applicable to the block size. It is 15,000,000,000,000 qIBXC for every 1,048,576 bytes;

See the calculation formulas below:

Excluding the *ElementRate* and *BlockSizeCost*

$$1 \text{ IBXC} = 1,000,000,000,000 \text{ qIBXC} = 1 \text{ (TP)} \times 1,000,000 \text{ (ElementRate)} \times 1,000,000 \text{ (FuelRate)}$$

Including the *ElementRate* and excluding *BlockSizeCost*

$$1 \text{ IBXC} = 1,000,000,000,000 \text{ qIBXC} = 1 \text{ (TP)} \times 1,000,000 \text{ (ElementRate)} \times 1,000,000 \text{ (FuelRate)}$$

Excluding the *ElementRate* and only including *BlockSizeCost*

$$1 \text{ IBXC} = 1,000,000,000,000 \text{ qIBXC} = 1 \text{ (TP)} \times 1,000,000 \text{ (FuelRate)} + BlockSizeCost$$

Including the *ElementRate* and *BlockSizeCost*

$$1 \text{ IBXC} = 1,000,000,000,000 \text{ qIBXC} = 1 \text{ (TP)} \times 1,000,000 \text{ (ElementRate)} \times 1,000,000 \text{ (FuelRate)} + BlockSizeCost$$

② Resource fee

In the above formulas, the resource fee is the fee of a special smart contract. The architecture and functional design of IBAX Public Network are feasible and highly reliable to make the network powerful enough to undertake all existing Internet service capabilities. It comes with a variety of available resources and usage methods:

RESOURCE FEE CATEGORIES			
Type	Contract Nam	Estimated Cost, IBXC	Beneficiary
New Contract	@1NewContract	1	Honor Node
New Datasheet	@1NewTable	1	Honor Node
New Datafield	@1NewColumn	1	Honor Node
New ecoLib	@1NewEcosystem	100	Honor Node
New Menu	@1NewMenu	1	Honor Node
New Page	@1NewPage	1	Honor Node
New Code Block	@1NewBlock	1	Honor Node
New View	@1NewView	1	Honor Node
New Application	@1NewApplication	1	Honor Node
New View	@1NewView	1	Honor Node
ecoToken Emission	@1NewToken	5000	Honor Node
ecoAsset Emission	@1NewAsset	1000	Honor Node

* Verification Fee

All blockchain network operations that need to change the ledger status, such as transactions, creation of tokens, messaging, creation of conditions and statuses, must be submitted along with the IBAX transaction fees.

After verifying the requested network operations, transaction fees are burned, which establishes a direct relationship between the frequency of coin burning and the frequency of network usage.

* Staking

Staking is the process where users are able to lock their IBAX coins to participate in consensus and obtain network coins in cooperation with Mint Nodes. When a user activates a Mint Node in the IBAX Ecosystem Wallet, it can lock and stake coins. Coin staking is a behavior and not a physical object such as a node. The locked coins will be used to participate in coin minting and will complete the internal incentive cycle of IBAX Network. Staking serves for the network security and stability and is the operating core IBAX Public Network.

* Minting

Coin minting is an incentive behavior of IBAX Public Network. Mint Nodes running globally exist independently as distributed servers and provide decentralized services (e.g. network services, social tools) for various ecoLibs. Mint Nodes are one of the core parts of IBAX Public Network.

The minting process of Mint Nodes is impossible without coin staking by users. This model is designed to improve the liquidity of the system coin IBXC and to encourage users to run Mint Nodes and provide services for all ecoLibs and ecoGroups of IBAX Network.

* IBAXCoin Information

To ensure the vigorous operation of IBAX Public Network, the “Unlock Schedule” section of *IBAX Funding Prospectus* details 5 key fund allocation directions for IBXC coins.

Total Supply: 2,100,000,000 IBXC

Block time: block/4s

Total block generation rewards: 1,233,750,000 IBXC

Metaverse block reward: 25 IBXC/block

Minting reward for nodes: 25 IBXC/block

Genesis block: 0.25% of the total IBXC (as guaranteed by IBAX network programming and smart contracts, it will drive and ensure the operation, fundraising, network testing, and initial ecosystem cooperation of IBAX Public Network)

Metaverse halving cycle: Every 21,000 NFTs minted in the metaverse

Block generation halving cycle: 2 years (can be voted by the entire network according to consensus of the main network)

Metaverse reward rules: one wallet address is randomly rewarded according to the stake amount and the number of energy points (the unique attribute of NFTs within the metaverse)

Minting rules for nodes: according to the stake amount, a wallet address will be rewarded according to the total hash power of the Mint Node

The calculation parameters of the basic total hash power of a Mint Node include storage space size, staking time, stake amount, CPU, RAM, bandwidth, etc.

* Coin Distribution

In order to ensure long-term commitment, coin holding, liquidity improvement as well as other behavior of the key stakeholders, the 2.1 billion IBXC coins issued at the network launch will be subject to the automatic unlock schedule. When implemented, the schedule will be automatically carried out by IBAX Network through programming and smart contracts to ensure there is no human intervention.

Ecosystem genesis: 0.25%

Mining: 58.75%

Private placement: 3%

Foundation: 15%

Ecosystem partners: 8%

Team: 15%

The impact of these sales/distribution events on the control of the total public interests can be found in the subsequent economic model documentation and the IBAX Funding Prospectus.

As the Foundation coins unlock linearly after 6 months, if the public ownership drops below 67% of the unlocked coins at any stage, the Foundation will sell coins in its coin pool until the public ownership reaches 67% or above. To ensure that the launch of BPN-a makes the public stake ratio reach 25%, the Foundation still needs to sell a certain percentage of the total supply, which is expected to be performed in the market after this white paper is released.

The Foundation also desires to donate some coins to ecoLibs, developers, and communities to support their participation in the early development of the IBAX Public Network ecosystem. We will disclose the impact of the Foundation's Network Emission and Network Subsidy in further releases of charts of the total unlocked coins of the Foundation and IBAX that participate in public staking.

IBAX Foundation will issue 0.25% of the total IBXC coin liquidity. It can be staked from the first day of BPN-a launch. This is of great significance for network security because staking is only available for unlocked IBXC. We call it the “secure introduction period”. Except for IBXC coin consumption for creation of distributed database tables, creation of smart contract fields, and import of smart contracts, the remaining IBXC coins will be used for staking when the development of Mint Nodes is completed.

* The Economic Value of Coin

IBAX Network is committed to building a secure and efficient blockchain framework that is user-friendly for service applications. To achieve this, IBAX has thoroughly investigated the most popular usage patterns, underlying technologies, and platforms in the market

since 2015. Our goal is to provide cloud users with a simple and smooth experience and minimize the conversion costs so that integrated applications on IBAX Network can be used in user solutions.

The nested consensus and creative DPoA were invented in the absence of a trusted execution environment. Look at Bitcoin. It requires every miner, even an attacker, to solve an extremely difficult task (calculate a hash) before becoming the next consensus leader. However, with the help of IBAX's effective nested Proof of Work (PoW) consensus, every miner can perform general-purpose tasks. Besides, these miners form a large network of independent serverless computing units and IBAX can build decentralized cloud computing services based on it.

Serverless architectures are a popular design for cloud terminals. By using it, developers can focus on the core logic of service requirements without worrying about server management and operation. According to Amazon Cloud Services (AWS), "A serverless architecture is a way to build and run applications and services without having to manage infrastructure. Your application still runs on servers, but all the server management is done by AWS." On IBAX, we use the three-layer distributed cloud computing design and organize and operate these layers as a system.

The blockchain infrastructure is the underlying layer of IBAX's distributed cloud computing design. It provides general blockchain functions other than mining, such as RPC request servicing, block maintenance, or transactions. All DApps built on IBAX blockchain are directly related to this layer. Due to the inefficiency of Ethereum, we also use multiple blockchains and the Cross Ledgers Base (CLB) structure to improve the throughput of smart contracts and interact across systems.

3.5 SYSTEM COMPONENTS

In this section, we will introduce key system components of IBAX Public Network and explain how they interact.

3.5.1 HONOR NODES

Honor nodes are responsible for block packaging of the entire IBAX Network and receive packaging rewards. They are the most important part of IBAX Public Network. We use a reputation mechanism that can effectively reduce the impact of node failure and this is where the title "Honor Node" comes from.

Honor Nodes judge and filter the results of one or more processing nodes. They must be business merchants or service organizations with professional computing capabilities that use supercomputers or other cost-effective computing resources, e.g. globally distributed hash power. Basically, the same data processing task is sent to multiple data processing nodes to facilitate the voting by Honor Nodes and determine satisfactory outputs.

Although this will result in data or calculation redundancy, it ensures the high degree of accuracy of the final results.

Any Mint Node with the total hash power of the required scale and a satisfying total stake amount is likely to become an Honor Node. Other requirements to a Mint Node are hash power and the total stake amount. To operate an Honor Node, there are also requirements to index conditions of server hardware. IBAX Network integrates a monitoring system that can monitor the hardware operating environment of Honor Nodes in real time. When all the above conditions are met, you can call for a vote to become a Candidate Honor Node, and then an Honor Node once you receive 70% of votes.

Although anyone can become an Honor Node and directly participate in the consensus governance, the first version of IBAX Public Network (BPN-q) initially enforces the maximum of 101 Honor Nodes. We plan to expand this limit greatly in the subsequent sharded versions of the network. Of course, all the decisions will be made according to the community consensus.

3.5.2 GUARDIAN NODES

Guardian Nodes are the witnesses of ecosystem data and the storage of ecosystem content. They will actively request ecosystem data synchronization in IBAX Network.

A Guardian Node is a candidate Honor Node. When it meets the hardware and staking conditions, it can become an Honor Node through voting.

3.5.3 MINT NODES

A Mint Node mints new coins in IBAX Network and obtains network rewards. It should be noted that minting must be accompanied by staking.

Besides generation of new IBXC coins, Mint Nodes can greatly improve the liquidity of IBXC and create a better economic environment for IBAX Network through staking. Operation of Mint Nodes also increases the cost and difficulty of attacks and the total value of IBXC coins proportionally. With this mechanism, the probability and harm of any attack are infinitely close to zero and IBAX Network security is improved greatly.

As Mint Nodes guard the network and mint new IBXC coins, coin holders can stake a part of their liquid IBXC balance in Mint Nodes for Mint & Stake Emission Rewards. Minting and staking serve to increase the cost and difficulty of attacks and increase the total value of IBXC coins proportionally.

$$\text{Fee Earnings as Percentage of Stake for Staking Node (x)} = \frac{\text{Total Period Earnings}}{\text{Staking Node(x) Stakes}}$$

Note:

Staking Node (x) Stake = (stake amount × amount conversion rate) + (staking time × duration conversion rate) + (miner hash power × capacity conversion rate)

Total Period Earnings = Sum(Staking Node (x) Stakes)

3.5.4 NETWORK SUBSIDY

IBAX Network Subsidy refers to the additional 0.25% IBXC coins to be used for the initial work at the IBAX Network launch.

3.6 IBAXCOIN HOLDER TYPES

In this section, we introduce seven key coin holder types, their relationships, and the number of IBXC coins granted to each of them.

Private Holders (private placement), IBAX Foundation, Eco-partners, IBAX team, and Mint Nodes are the five initial key coin holders predefined in IBAX Public Network.

Mint Nodes are users who run minting nodes and stake coins, i.e. perform coin minting through mining.

A Private Holder is a specific company, team, or individual with significant influence in the industry who receives a certain amount of IBXC issued by the Foundation at an internal price (participates in a private placement).

An Eco-partner is any institution, organization, or individual that develops and operates ecoLibs, provides products or services for the entire ecosystem or a single ecoLib based on IBAX Public Network, and participates in security protection of IBAX Network.

To learn more about the Foundation, please see releases on our official website.

3.6.1 THE IBAX FOUNDATION GRANT

IBAX Foundation will promote IBAX Public Network and assist in managing the IBAX community and ecosystem. IBAX Foundation manages three types of coin grants: Network Security, Network Subsidy, and the Foundation Grant. Refer to their purpose below:

Grant	Purpose
Network Security	The first IBXC coins staked to protect IBAX Public Network.
Network Subsidy	Additional coins paid to all nodes meeting the minimum performance criteria.
Foundation	Coins to support the long-term technical and ecosystem development of the Foundation.

For coin raising and utilization plans, please refer to [Coin Distribution](#).

Before launching BPN-a, the Foundation can use a part of coins granted to it for purchases and distributions. All coins purchased or earned during this period will be added to the Public Total and granted proportionally according to the daily unlock schedule of all other public coins within the period of 1 year.

Suppose the Foundation sold 25 million coins after releasing this white paper but before the launch of BPN-a. The number of IBAX coins under the Foundation Grant will be 275 million and the Public Total will increase by 25 million.

The Foundation Staking and Network Subsidy programs are described above in detail. The Foundation coins are allocated to IBAX Foundation with a clear purpose to advance its goals. After the network launch, these goals will be followed through community participation and network governance.

To make the network succeed, companies, developers, and consumers must all accept the rules with dedication and work hard, evangelize, and balance interests carefully.

Although this list is by no means complete, below is a summary of contributions that IBAX Foundation will be authorized to offer to the network and community:

1. Technology Development

- Core network protocol development
- Open-source support
- Crisis management

2. IBAX Community Development

- Developer conferences
- Developer meetups
- Hackathons

3. Marketing

- PR / announcements / events
- Stakeholder relations

- Mint Nodes relations
- Public Education

3.6.2 THE STABLECOIN RESERVE

Distributed stablecoins such as MakerDAO are usually deemed strategically significant for a prosperous public network ecosystem. They provide a mechanism to convert system coins into stable fiat currencies and vice versa. Using a leverage mechanism, they create a large number of lock-ups for other applications to use or build the useful storage of stable distributed value on it.

The Foundation will not prevent any developer from developing its own versions of distributed stablecoins to be staked on IBAX, although we know that such an attitude of ours may be discouraging.

To guide such important projects, the Stable Coin Reserve is established. It stores one hundred million IBXC locked indefinitely and completely removed from the circulating supply.

In the coming 10 years, the Foundation has different plans to test stablecoins, which may or may not require the use of the Stablecoin Reserve. If the Stablecoin Reserve is not required, it will remain locked and will be burned after 10 years.

The following are the most likely plans for the unused Stable Coin Reserve:

- IBAX stablecoin proves to have no need of use;
- IBAX stablecoin does not require the Stablecoin Reserve;
- Our testing proves to be unsuccessful;
- impossible due to regulatory reasons.

4. OVERALL ARCHITECTURE

4.1 IBAX PUBLIC NETWORK

4.1.1 PLATFORM ARCHITECTURE

We define IBAX Network as an infrastructure for all applications of traditional centralized systems and traditional blockchain systems. The Layer 2 scheme adopted by IBAX Network abandons Bitcoin's UTXO model and adopts the Account model that allows handling complex service logic and getting extensive support. Therefore, IBAX Network is an underlying blockchain framework built with the innovative spirit and aiming to provide commercial value:

- ① **Honor Node:** Responsible for the data distribution, packaging and verification.
- ② **Guardian Node:** Responsible for full data synchronization.
- ③ **Mint Node:** Responsible for distributed storage and i-File storage, can work as distributed application servers.
- ④ **Sub Node:** Only synchronize relevant data with their own physical ecoLib, are built using the side chain concept.

- ⑤ **CLB:** The virtual CLB nodes outside IBAX Network operating as IBAX Network Oracles. CLB can be used to complete on-chain data interaction with systems of the same data structure as IBAX. It can also be used as a port for off-chain data requests and on- and off-chain data interactions witnessed by the consensus mechanism. P2P transmission of encrypted data, and thereby private data interaction, is possible between CLBs of different ecoLibs. This great functionality meets the mandatory compliance requirements on network security in different countries. IBAX Operating System Platform can truly complete connection with the off-chain environment. Cross-chain application is no longer a problem, too.
- ⑥ **Smart contracts:** The importance of smart contracts for blockchain is self-evident. Our R&D team has designed a brand new contract language called Needle. It has outstanding preprocessing and contract execution efficiency, supports nesting of multiple contracts, and handles complex contract logic freely.
- ⑦ **Database:** We use secure and efficient data storage and a relational database with an object-oriented design. Our R&D team has been constantly working on inclusion of a time-series database into IBAX Network. After we succeed, the theoretical handling capacity for complex services will be up to 1,000,000 TPS.

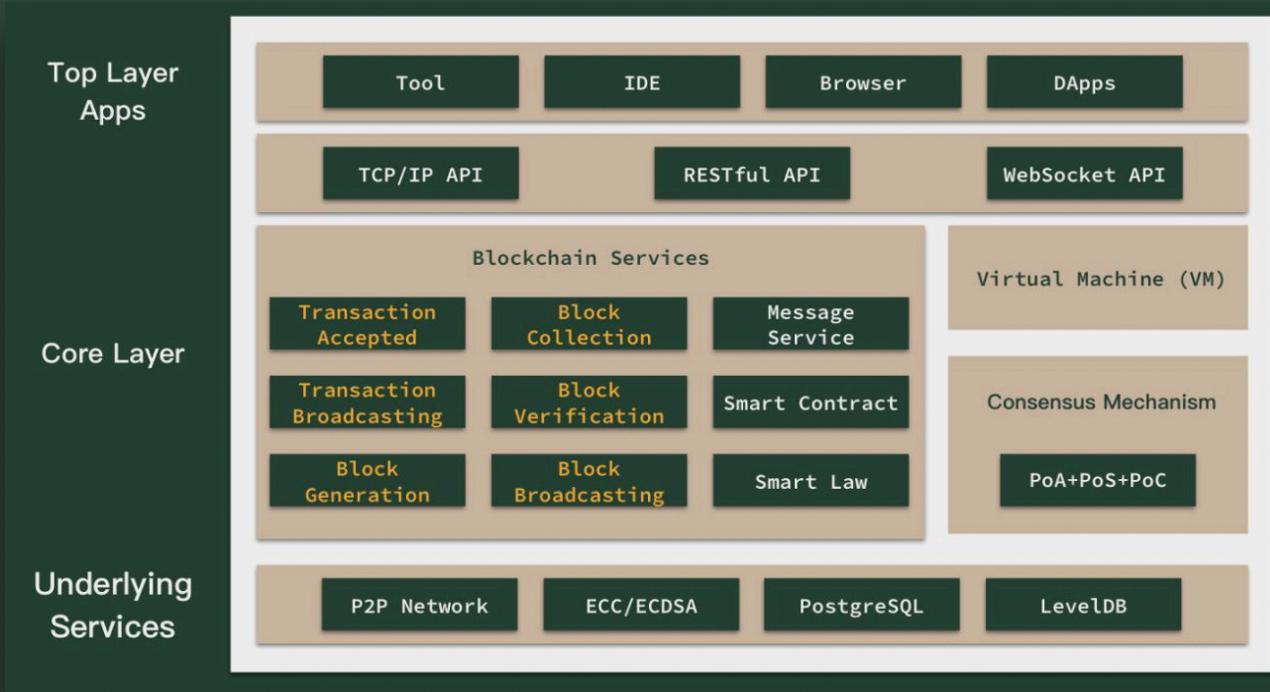
The above-mentioned functions together forge the IBAX Operating System Platform. Our engineers have poured enormous amounts of energy in each of its configurations. We treat IBAX Network as a beloved child. We need to make it fully functional and adapt to the social environment, but cannot go over the top with the care. Imagine our growth process. As long as we have a good growth environment (basic components) and excellent learning ability (scalability), we can become greater.

When designing IBAX Network, our Chief Engineer prevailed over all dissenting views and removed many important but not essential functions because we do not want a “giant baby”. As long as we have the basic components of an operating system platform plus the built-in architecture scalability, we can make IBAX powerful and outstanding.

4.1.1.1 HONOR NODE

An Honor Node is one of the key components of IBAX Public Network. It executes and validates transactions, collects transaction information from other nodes, adds transactions to the queue, and verifies the correctness and validity of new blocks using the confirmation mechanism. Generally, it has two states: packaging and non-packaging.

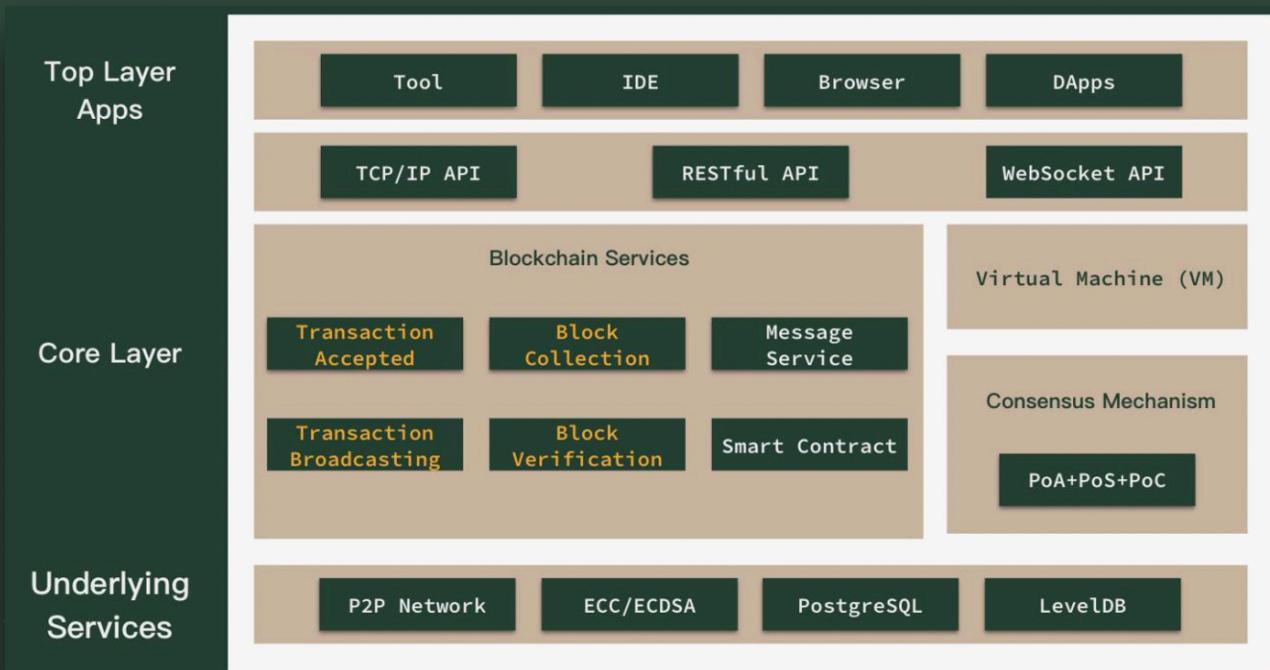
An Honor Node in the packaging state delivers the highest performance. It obtains transaction requests to be executed from the transaction queue and verifies the signature validity and correctness of transactions, e.g. transfer amount, permission for transaction operations, and accurate execution of transactions. All transactional operations, correct or wrong (wrong transactions will be rolled back), will be written into the block. Wrong



transactions will incur a punitive gas fee. Executed transactions are notified to other Honor Nodes along with the block through broadcasting.

An Honor Node in the non-packaging state is mainly responsible for block verification to ensure in-block transactions generated by a packaging node are executed correctly. In case of an anomaly, it will trigger the exception handling mechanism and IBAX Network will roll back and re-verify the block.

In order to ensure transaction execution efficiency, Honor Nodes collect transaction information constantly.



4.1.1.2 GUARDIAN NODE

A Guardian Node stores data, witnesses services, and can obtain block information actively. Guardian Nodes are critical data guardians in IBAX Network. Even if all the data on Honor Nodes is lost (though it could never happen), as long as the data is available on one Guardian Node, IBAX Network can quickly return to normal operation.

Therefore, a Guardian Node is also a candidate Honor Node. When the conditions are met (see [3.5.1 Honor Nodes](#)), it can become an Honor Node.

4.1.1.3 MINT NODE

A Mint Node (Mint Node) is a node that operates in a computer system to provide data storage and peer-to-peer (P2P) communication for the IBAX network.

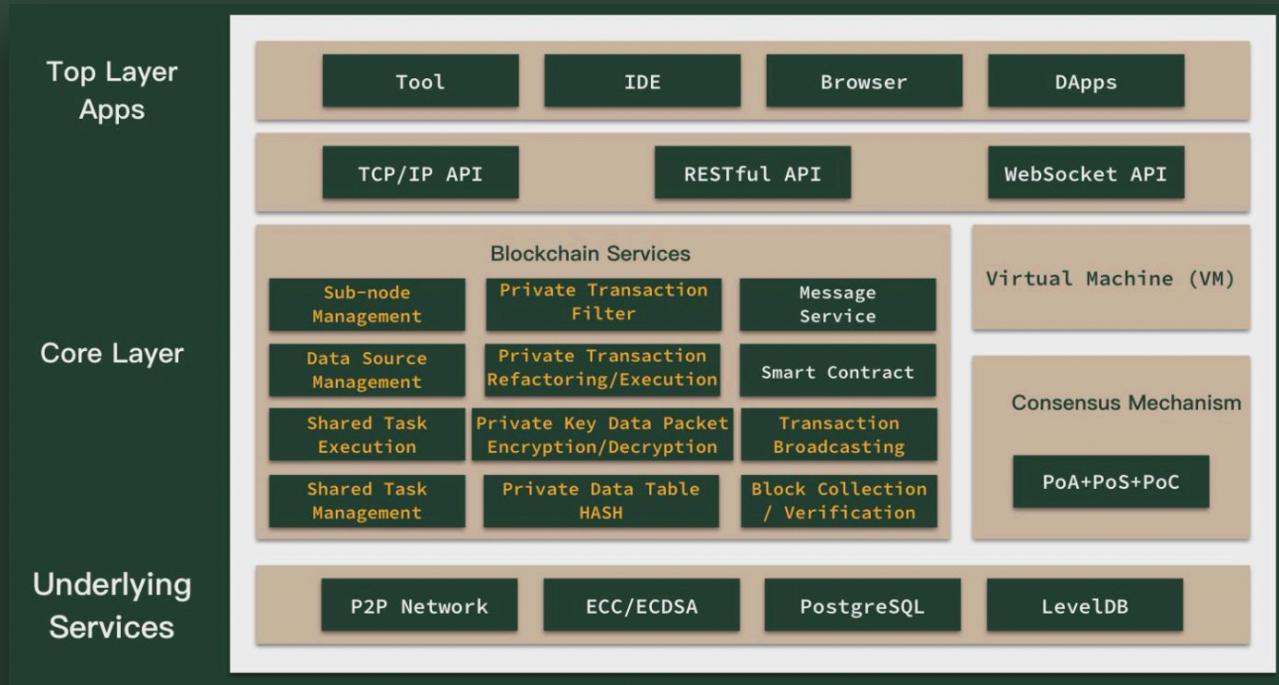
In order to meet the requirements of data storage and traffic transmission on the IBAX network, the Mint Node needs to have good hardware equipment and stable network services. Therefore, the important factors that are considered for mint nodes are: CPU, RAM, HDD. The IBAX network completes a comprehensive score through the performance of the hardware devices of the mint nodes and obtains the corresponding computing power according to the score, which we call 'minting computing power'.

Factors affecting the minting computing power are also related to the network services provided by the mint nodes. Eco-applications (ECOlib) running in the IBAX network obtain stored data on the chain from neighbouring mint nodes via a peer-to-peer transfer protocol (P2P), giving the mint node additional computing power based on the amount of traffic used, which we refer to as 'traffic computing power'. The mint node has the ability to maintain the stability of the IBAX network, improve the decentralized distributed storage characteristics of IBAX, and also provide network services for eco-applications, so the IBAX network gives the mint node a corresponding 'minting' reward.

The mint node not only generates new IBXC tokens, but also 'stakes' IBXC tokens during the 'minting' process to greatly enhance the liquidity of IBXC tokens and create a better economic environment for the IBAX network. At the same time, the operation of the mint node increases the cost of attacking the network in proportion to the total value of the IBXC tokens. By the design of the IBAX mechanism, the likelihood of an attack is infinitely close to zero, which greatly enhances the security of the IBAX network.

Mint Nodes, which secure the network and can mint new IBXC tokens, give token holders the option to stake a portion of their IBXC liquidity balance to a Mint Node to generate new IBXC token proceeds (Mint & Stake Emission Rewards). The purpose of Mint and Stake is to increase the cost of attacking the network in proportion to the total value of the IBXC tokens.

4.1.1.4 SUB NODE



Sub Nodes are the original concept pioneered in blockchain by IBAX Network. A Sub Node only keeps data related to transactions of its own ecoLib (application), whereas Honor Nodes, Guardian Nodes, and Mint Nodes retain the full data. It can also interact with private data to ensure the privacy, security, and flexibility of transactions.

In some traditional applications, there may be cases where only the service data of itself is stored. However, in many blockchain projects, it is impossible for the creator not to keep the data of other ecoLib (application).

A Sub Node can only retain transaction data of its own ecosystem (application) and it can also execute the logic of its own independent ecoLib (application) in isolation from other node networks. Therefore, we also call a Sub Node a Side Chain.

4.1.1.5 CLB (CROSS LEDGERS BASE)

CLB is a node independent of IBAX Network that functions as an oracle. Our Architect says, “I simply love this feature. It opens the door to the world for IBAX Network.”

Running as an independent node, CLB does not affect the performance of the Master Node. You can deploy CLB nodes and configure their performance flexibly according to your service needs. In a complete CLB application, there are independent smart contracts, operation interfaces, and database tables. Its operation interface may be an app coded in Weaver or a front-end interface implemented directly through API.

CLB is designed to meet cross-chain needs. With the native data reading function and the asset lock and conversion features of smart contracts, external assets can become assets in IBAX ecoLibs. In the course of use, to our surprise, we found out that CLB could do much more than this. CLB can not only obtain data from external systems through contracts but also process and format the data used by IBAX Network. For example, weather data, external authentication results, and even Bloomberg or Wikipedia data can be accessed for use on blockchain.

We have also considered the possible change in the behavior of CLB smart contract trigger elements due to artificial reasons. Therefore, IBAX engineers integrated the on-chain smart contracts with those in CLBs and realized Validated Binding. When a smart contract in CLB does not match a smart contract for on-chain verification, the CLB will no longer execute operations, which ensures and improves the users' trust in ecoLibs running on CLB.

CLB-based applications give us plenty of room for imagination. The numerous data applications and data acquisition methods enabled by CLB are even more exciting than just realization of the cross-chain application itself.

4.1.1.6 DATABASE

The underlying data storage layer of IBAX Network is a PGSQl database completely open to the public. Based on the permission design of the IBAX Operating System Platform, users do not need to worry about data security. With an object-oriented design philosophy, IBAX Network pre-compiles data through a relational PGSQl database and improves the data processing efficiency.

You may be interested in the following if you are a technical specialist, or just skip it if you are not.

- ① All tables without a number prefix in their name belong to permission tables of IBAX Network Basic;
- ② All tables with a number prefix in their name belong to permission tables of ecoLibs.

4.1.1.7 SMART CONTRACTS

Smart contracts are essential to IBAX Network. Similar to other blockchains, the advantage of using smart contracts in the on-chain processing logic and transactions is obvious. IBAX's smart contracts are designed with unique innovation and differentiation.

In order to improve the execution efficiency of virtual machines for such contracts, we have designed a new smart contract language Needle.

Needle supports multi-layer contract nesting, a mechanism that enables running of multiple contracts in one contract and retrieval of parameter values from the contracts. Its implementation is similar to Golang, allowing developers to write contracts in an object-oriented way.

In special service scenarios such as delayed contracts triggered by satisfactory block height or logic, such contracts can make the service judgments more accurate and improve the service execution capabilities under unknown circumstances.

IBAX contracts are omnipotent and can meet almost all your needs. Therefore, we implemented a strict classification of contract security and access control. Developers grant smart contract permissions by adding a role with authorized permission to call smart contracts, and only members within this role group have the permission to use the contract.

You also need to know that contracts have open permissions by default. Therefore, you need to grant contract permissions when implementing permissioned contracts.

4.1.2 SERVICE ARCHITECTURE

4.1.2.1 ECOLIB

It is quite easy for users, even common users, to create an ecoLib of their own on the IBAX Network System Platform. We have integrated and developed an application where ecoLib creation takes just one click.

When creating an ecoLib, you can configure the ecosystem parameters and rules, and set the administrator account and charging model. Most importantly, to apply the DPoA consensus within ecoLibs better, creators can set it up by writing or importing their own contracts.

We support quick emission of ecoLib tokens by importing contract templates.

Due to the differences in consensus and management permissions, ecoLibs fall into decentralized and centralized ones. They have no specific advantage or disadvantage by

type. You should choose the appropriate one against your service needs. What to do if it is OK for now but not for the future? You can change ecoLib parameters, even the consensus mechanism, token, and governance method, on the IBAX Network System Platform. You can leave it all to the self-governance mechanism maintained by the ecoLib administrator or members (depending on the ecoLib type).

On the IBAX Network System Platform, an ecoLib has complete data control permissions and permissions to design and access independent database tables and fields. In the data control permission design, we support triggering when a field satisfies a logical expression. This feature allows for imagination space in special services like monitoring, logic satisfaction, and triggering by time and specific conditions.

In an ecoLib, you can write your own contracts without any restrictions. For details on smart contracts, see [4.1.1.7 Smart Contracts](#).

There may be multiple DApps in an ecoLib, and each of them can have independent parameters. An ecoLib is like a platform where you can implement anything you want.

In order to better support ecosystem developers, we provide the editing, management, and development tool Weaver. It will reduce the ecosystem development, maintenance, and management costs greatly. See [4.2.1 Weaver Overview](#) for details.

4.1.2.2 ECOGROUPS

Multiple ecoLibs form an ecoGroup.

The chain connectivity we are going to achieve falls into on-chain and off-chain. Outside the IBAX Network System Platform, we have CLB to support the communication with external data. Inside the IBAX Network System Platform, we have ecoGroups for authorization and data exchange between ecoLibs.

In traditional Internet applications, the cost of acquiring users and traffic is incredibly high. In IBAX Network, these costs will be minimized. ecoGroups solve issues such as user connectivity and traffic interoperability.

IBAX Network is like a pool of users and each ecoLib is a smaller pool. ecoGroups formed via ecoLib authorization are like lakes (ecosystems) that are interconnected by rivers (authorization). They will finally become a network and form a rich community.

The advent of ecoGroups enabled the division of technical R&D and network traffic efforts, solved operational problems of the R&D team, and brought about abundant interesting applications to users.

4.2 THE DEVELOPMENT PLATFORM

4.2.1 WEAVER OVERVIEW

IBAX Network offers a polished development tool Weaver to develop DApps for ecoLibs (side chains).

IBAX Network has created its own languages, Needle for logic processing and contract coding and Logicor for page and layout design. Both use Weaver client where users can develop and package products for customers.

Weaver client has ecosystem management, node management, and other related functions.

It also has some BaaS features. You can download, import, and manage “physical ecoLibs” (side chains) created by users through relevant applications available in IBAX DApp Store.

Of course, Weaver can also manage the built-in basic ecosystem applications (Basic DApps) of IBAX Network.

4.2.2 MAIN FUNCTIONS OF WEAVER

- Provides user pages;
- Provides an IDE for application development;
- Stores public keys of user accounts and performs authorization;
- Requests API data from a database of application pages and displays application pages to users;
- Sends transactions to servers through REST API.

In order to facilitate automatic transaction creation by users, when application developers execute a contract from IDE, Weaver will convert operations into transactions.

4.2.3 INTERFACES AND STRUCTURE OF WEAVER

After selecting a node to be connected, users can start a node locally for connection or just connect to a test network node or an IBAX Public Network node.

The screenshot shows the 'Networks' section of the IBAX application. At the top, there's a back button labeled '< Back', the title 'Networks', and a status indicator 'IBAX •'. Below the title is a table with four columns: 'ID', 'Name', 'Nodes', and 'Actions'. There are two rows in the table:

ID	Name	Nodes	Actions
1	Default Network	1	Connect
1	(Current) IBAX	3	Connect Remove

Below the table is a button with a plus sign and the text 'Add network'. A tooltip below it says 'Specify connection details and connect to another network not listed there'. At the bottom of the screen, there's a footer with the text 'IBAX © 2020 <https://ibax.io>'.

Like on conventional blockchains, you can import or create an account:

The screenshot shows the 'Account actions' section of the IBAX application. At the top, there's a back button labeled '< Back', the title 'Account actions', and a status indicator 'IBAX •'. The page is divided into two main sections:

- I have a key**: This section features a folder icon with a dot. It contains text explaining that if the user already has a backup of their private key, they can import it. A blue link 'Import existing key' is provided at the end.
- I don't have a key**: This section features a lock icon. It contains text explaining that if the user is new to the system or wants to create a new account, they can generate a new private key and protect it with a password. A blue link 'Generate new key' is provided at the end.

Import of system contracts, basic contracts, and ecosystem contracts:

ecoLib (side chain) creation:

Existing ecoLibs (side chains):

The screenshot shows the IBAX Platform Ecosystem Developer Dashboard. The top navigation bar includes links for Home, Admin, Developer (which is selected), and Editor. On the right, there are icons for search, refresh, and user profile, along with the text "0868-0683-7257-7959-5922" and "PLATFORM ECOSYSTEM". The main content area is titled "Dashboard: System" and has tabs for 1:System, 2:Conditions, and 3:Basic. The 1:System tab is active, displaying a table titled "Contracts" with two columns of contract names. The first column contains: AddAssignMember, AddFoundationMember, AdminCondition, AppendMenu, AppendPage, AppInstall, AssignRolesInstall, BindWallet, blockchain_url, BlockMember, block_reward, BufferFileUpload, BufferManager, CallDelayedContract. The second column contains: max_fuel_tx, max_indexes, max_tx_block, max_tx_block_per_user, max_tx_size, MembershipAdd, MembershipDecide, MembershipRequest, MetricsUpdate, NewApplication, NewAppParam, NewBadBlock, NewBlock, NewColumn, price_exec_substr, price_exec_sys_fuel, price_exec_sys_param_int, price_exec_sys_param_string, price_exec_table_conditions, price_exec_unbind_wallet, price_exec_update_lang, price_exec_validate_condition, price_tx_data, price_tx_size_wallet, PrivateRoundCondition, ProfileEdit, PublicRoundCondition, ResearchTeamCondition. Each row in the table has edit and delete icons.

You can view smart contracts, database tables, pages, and application parameters of each DApp in the Dashboard. In a self-built ecoLib, you can add and edit the above accordingly. The edit log is stored on IBAX Network.

WEAVER is far more powerful than what you see, come explore more features!

5. TECHNICAL FEATURES AND ADVANTAGES

5.1 TECHNICAL FEATURES

5.1.1 EXCLUSIVE APPLICATION PROGRAMMING LANGUAGE

The underlying language of smart contracts is written using a native Turing-complete scripting language and compiled into bytecode. This language includes a set of keywords, functions, operators, and constructs. It can be used to implement data processing algorithms and database operations. The contracts coded with this language can be nested into and called by other contracts.

We named this smart contract language **Needle**.

Principle: A smart contract is the basic element of an application. The process of contract execution on a page by users is usually a single operation, while execution results include records of new and modified database entries. All data operations of an application form a contract system. Contracts interact with one another through the database or functions defined in contracts.

To declare a smart contract, you can use keywords followed by contract names. The contract contents must be enclosed in braces. The contract structure includes three main parts:

- ① *Data* is the part that declares the input data variables, including the variable name and type;
- ② *Conditions* are the requirements for data correctness verification;
- ③ *Action* is the operation with data.

5.1.2 A SELF-GOVERNED DECENTRALIZED, FAIR, AND TRANSPARENT DAO

IBAX aims to provide a truly self-governed, decentralized, fair, and transparent DAO for the market. While ensuring decentralization of the organization, we fully hand over the management duties and responsibilities to the public.

The voting, publicity, implementation, and all other aspects of the organization will be jointly managed and voted by the participants. For any decision, the smart contract within the DAO will be automatically executed as per the organization's consensus reached through voting based on the program settings. After voting, no one can interfere with the execution of the contract. This process is irreversible.

DAO allows for better self-governance for community members. As long as voting rules and valid conditions are set, the DAO will always operate in accordance with everyone's common agreement.

It is quite simple and easy to build a DAO in IBAX Network. Every ecoLib is a DAO.

5.1.3 SMART TRANSACTION PROCESSING MECHANISM

Unlike the operation singularity problem where contracts can execute only one operation at a time in other blockchain systems, IBAX Network supports a multi-layer contract nesting mechanism. It allows multiple contracts to form a smart transaction that can handle complex service logic, including several multi-directional service contracts and multiple service interface functions. A smart transaction is equivalent to a set of operational rules in a system.

The communication and processing of smart transactions have overturned the rigid service communication mode of blockchain systems. With it, realization of huge and complex service logic and requirements in IBAX Network has become clear and simple.

5.1.4 MULTI-LEVEL PERMISSION MANAGEMENT

For ecoLibs in IBAX Network, different roles and permissions for administrators, visitors, users, etc. can be set according to the service needs. Different levels of management permissions can also be established according to the service environments to meet various commercial demands. The same technical core carries different role permissions, which is sufficient to accommodate to the complex and changing service scenarios in the market.

IBAX Network has a clear concept of roles and users. By assigning certain permissions to a role group and adding users into it, the same permissions will be assigned for all users in a role group.

A role group can also have an administrator who has the right to add or delete users in it.

You do not need to worry about the existence of centralized management of roles and permissions. The voting mechanism corrects this situation perfectly.

5.1.5 ISOLATED VERIFICATION

Isolated verification first appeared in Bitcoin transfers. Its idea is to perform and confirm transfers without touching the Bitcoin network. Later, it became widely applied in various payment-oriented blockchain projects.

Is the biggest usage case of isolated verification just offline payments?

We have repeatedly emphasized that IBAX is a blockchain operating system developed against real-world scenarios. Isolated verification is a very important function. It acts in the ubiquitous LAN environment that is not always connected to the Internet, such as e-government or enterprise internal production management environments.

IBAX's authorized Honor Nodes that verify and package data are hosted in big data centers in various locations. Honor Nodes also have additional functions such as disaster recovery and tamper-proofing. In a production environment that is not always connected to the Internet or requires a special VPN, its Sub Node can use IBAX's built-in database to store data temporarily and ensure normal production. When the Sub Node connects to the Internet, it will automatically synchronize the production data to the Honor Node.

The production environment is sovereign. The prerequisite is that the end user trusts the Sub Node (e.g. a government affairs office). Because the internal data is stored in the database, the Honor Node does not need to perform instant packaging and verification. Hence, its concurrent transaction processing speed is not restricted by the network speed. This setup can be applied to a system with a huge volume of data interactions.

5.1.6 SUPPORT FOR MULTIPLE ENCRYPTION ALGORITHMS

In data transmission, the node data processing layer has another encryption method based on a mathematical algorithm.

You may change the encryption algorithm of blockchain. It can be compatible with and adapted to non-elliptic curve algorithms applied in many countries. We provide a variety of configurable encryption algorithms and support encryption algorithm expansion on demand.

5.1.7 ZERO-KNOWLEDGE PROOF

In IBAX Network, there is a mechanism where an authenticator can convince a verifier that a certain assertion is correct without providing any substantial information. A zero-knowledge proof is essentially an agreement involving two or more parties, i.e. a series of steps that two or more parties need to take to complete a task. The authenticator affirms and convinces the verifier that it knows or possesses a certain message. However, any information about the authenticated message cannot be disclosed to the verifier in the process of authentication.

We have designed two implementation methods: zero-knowledge proof for transactions and zero-knowledge proof for smart contracts. Unlike IBAX, all modern blockchain networks driven by smart contracts only have the zero-knowledge proof for smart contracts to ensure data security.

5.1.8 PRIVATE TRANSACTIONS

One of the key features of blockchain is openness. Anyone can retrieve the data of all blocks from the chain. Although blockchain projects, including Bitcoin, use anonymous transactions, it is still possible to identify both transacting parties by analyzing the data address and relevant IPs. In some transactions, people do not need or want to let others know the details, especially the object of transaction.

In private transactions, it is technically impossible to get the information of both parties.

IBAX Network provides a Private Data Pool where each account has a private address. All private transactions are sent to the Private Data Pool and the recipient obtains the private data or assets asynchronously.

5.1.9 MULTISIG

Multisig (multisignature) means multiple users simultaneously sign a digital asset. Simply speaking, there is more than one person with the right to sign and initiate payments in one account.

If an address can only be signed and paid with a single private key, it can be described as 1/1, while the multi-signature is m/n. There are n private keys permitted to sign account operations and a transaction can be paid when there are m address signatures. Therefore, m must be equal to or less than n.

IBAX Network allows not only creation of multisig wallet addresses, but also management of one wallet private key by multiple people. Since IBAX Network can handle complex service logic, it can create asset storage for various signatures administered by roles,

realize asset lock-up in the network, and enable asset management by different accounts. According to the actual service needs, you can set the percentage of users who can transfer assets and realize fund co-management truly consistent with banking systems.

5.1.10 TRANSACTION SHARDING

IBAX Network performs node and transaction sharding. The originally congested and lengthy transaction packaging queue is divided into multiple shorter queues through organized break-up and reconcentration of transactions and nodes. With different consensus and processing algorithms and multisig verification mechanism, the packaging efficiency has been successfully improved by orders of magnitude. Moreover, the number of shards increases along with the number of nodes. In case the transaction number increases, IBAX's sharding mechanism brings a completely different effect. The more the number of nodes, the higher the number of transactions and shards, and the greater the transaction throughput. This brings proportional performance improvement on the main chain along with the increase of transactions and nodes.

5.2 DATA INTERACTION MODES

IBAX Public Network provides users with 7 data interaction modes to implement their own service logic. They cover all service scenarios and can meet all kinds of service needs.

5.2.1 INTERNAL INTERACTION WITHIN AN ECOLIB

Full data interaction on the main chain: multiple Sub Nodes can be set up within an ecoLib. Sub Node data is fully synchronized. It is similar to a DApp on Ethereum but with full DApp data synchronization. Data interaction happens through the main chain. It is commonly used for important data interactions between different systems in enterprises or organizations, especially in financial, depository, and risk control scenarios.

Partial data interaction on the main chain: multiple Sub Nodes can be set up within an ecoLib. Selected Sub Node data is synchronized. Data interaction happens through the main chain. All data tracks are completely controlled and traceable. Irrelevant ecoLib data can be filtered out.

Full hash verification on the main chain: all Sub Nodes in an ecoLib obtain interaction notifications via block data packets from the main chain and then target Sub Nodes connect for off-chain interaction. All request tracks are completely controlled and the process is traceable. Irrelevant ecoLib data can be filtered out. It is commonly used for

important data interactions between different systems in enterprises or organizations, especially in ERP, approval, and monitoring scenarios.

Partial hash verification on the main chain: multiple Sub Nodes in an ecoLib obtain selective interaction notifications via block data packets from the main chain and interact off-chain. All request tracks are completely controlled and the process is traceable. Irrelevant ecoLib data can be filtered out.

5.2.2 INTERNAL INTERACTION WITHIN DIFFERENT ECOLIBS

Full hash verification on the main chain: Sub Nodes of multiple ecoLibs obtain interaction notifications via block data packets from the main chain and then target Sub Nodes connect for off-chain interaction. All data tracks are completely controlled, the process is traceable and the connection is trusted. Irrelevant ecoLib data can be filtered out. It is commonly used for important data interactions between systems of different enterprises or organizations, especially in supply chain, industrial, and transportation scenarios.

Partial hash verification on the main chain: multiple Sub Nodes of multiple ecoLibs obtain selective interaction notifications via block data packets from the main chain and interact off-chain. All data tracks are completely controlled, the process is traceable and the connection is trusted. Irrelevant ecoLib data can be filtered out.

CLB interaction: multiple Sub Nodes of multiple ecoLibs directly interact via CLB nodes. Interactions are private and the interaction process is absolutely secure and extremely efficient.

5.2.3 OFF- / CROSS-CHAIN INTERACTION

Cross-chain interaction: IBAX's interaction methods are not limited to interaction between different nodes of the on-chain network. CLB can also be used for interaction of on-chain nodes with off-chain systems or other blockchain systems. With CLB's innovative contract verification mechanism, when an external system needs to call an on-chain contract for on-chain operations, IBAX Public Network will verify whether the contract hash is correct during and after the execution to determine whether the off-chain and on-chain interactive handshake is trustworthy and secure. This method can ensure there is no contract tampering risk during the interaction.

5.3 DATA PROTECTION AND COMPLIANCE

5.3.1 ON-CHAIN STORAGE OF PERSONAL INFORMATION

According to the data protection policy of IBAX Public Network, users are strictly prohibited from storing personal information of natural persons without encryption and need to use encryption and anonymization technologies to protect personal information. IBAX provides the corresponding anonymous and encrypted BaaS that will be installed and applied in a new physical ecoLib (side chain) once a user creates it. Users can also join the physical ecoLib (side chain) that provides such a service. However, it should be noted that users need to check whether the encryption and anonymous services are enabled in the smart contract code parameters of the ecoLib.

5.3.2 INTERNATIONAL PRIVATE DATA PROTECTION AND COMPLIANCE

According to the General Data Protection Regulation of the EU, Information Security Technology — Personal Information Security Specification and Cybersecurity Law of China, Act on the Protection of Personal Information of Japan, and relevant laws and regulations of other countries, there are strict constraints on the collection, use, processing, and transmission of personal data of natural persons. To prevent users (including the creators of ecoLibs / side chains) from violating the laws and regulations, IBAX provides a comprehensive solution:

IBAX offers users a feature to create a CLB. This is a virtual ecosystem with full functions of a standard physical ecoLib (side chain) but its data runs outside the IBAX main chain. It serves as an oracle and is responsible for the interaction with on-chain and off-chain data.

Users may choose to transmit encrypted / unencrypted CLB data on blockchain or record the transaction summaries on blockchain and transmit the data through an offline P2P encrypted channel to comply with regulations of various countries on personal data privacy protection.

6. IBAX APPLICATION FIELDS & PROSPECTS

6.1 DECENTRALIZED COMPANY (COMMUNITY) OPERATION

The rapid development of the Internet is like a surge of entrepreneurial activities sweeping the world. It took only 20 years to change our understanding of the world completely and it continues to reform and affect our lives in 4-year cycles. The secret of its success is the rapid technological development and breakthrough innovation in hardware technologies. What we want to discuss is, why are Internet companies growing so fast and their development speed easily surpasses many established century-old companies?

Well-known Internet companies such as Facebook, Twitter, and Google have adopted a flat management concept and provide equity incentives to talents and personnel with outstanding contributions. With KPI assessment, employees stay creative and change for the better. The purpose of such talent management plans is to bring out the value of employees and tie personal interests to corporate interests.

The future management of our company (community) will be completely decentralized. Its members will self-govern, giving the full play to the individual creativity of each employee and rewarding employees through community coin incentives.

In its ecoLibs, IBAX supports establishment of organizational structures for member management.

The important Articles of Association and Management System of the company (community) are stored on-chain where the records cannot be modified.

IBAX ecosystem realizes collaborative work where Mint Nodes can perform distributed storage of files.

Voting will be more convenient and faster and smart contracts will execute the results without human intervention.

IBAX members are distributed globally. We are a strict organization with a rigid management system and regulations. Unlike traditional companies, we don't need to gather in the same premise to work. We adhere to the IBAX decentralized management concept where everyone is independent, thinking is open and bold, and creativity is stronger.

We believe a decentralized company (community) like this will set off the next technology boom.

6.2 FINANCE

6.2.1 THE BANKING SYSTEM

For banking systems, data security comes first. With the asymmetric elliptic-curve cryptography and hash encryption of blockchain, bank data transmission is secure and reliable. The data results are stored in IBAX Network through hash mapping, making the change logs clearly visible.

The bank settlement system has clear requirements for data concurrency. IBAX Network currently supports data concurrency at 3,000 TPS, which fully meets the large data settlement requirements of banks. We work on a breakthrough to achieve 10,000+ TPS.

6.2.2 BLOCKCHAIN FINANCING

Many people consider blockchain a financial technology. In our opinion, blockchain only serves the finance but has no financial attributes.

Finance is the internal driving force of social development. Capital activities directly affect the economic development cycles. In New York, we meet many creative and dreaming young people who give up the idea of starting a business due to financial problems. In Greece, we see the people who are not willing to see the recession of their state.

Why are the rich getting richer and the poor getting poorer? Without diving into philosophical ethics, from the economics perspective, it is nothing more than a trial and error story for the rich, while there are no mistake chances for the poor. Is there a way to change this situation and combine fundamentals and creativity to provide opportunities for the creative poorer?

Create a decentralized lending ecosystem platform using IBAX Network. A third-party appraisal agency will give risk assessment results based on the borrower's asset situation, determine the loan interest rates, and give risk warnings based on the result of risk assessment. Create a matchmaking lending and trading platform where lenders can choose a loan according to their own loan abilities and risk acceptance. The behavior records of both borrowers and lenders are stored on blockchain and can never be changed, which protects the legitimate rights and interests of both parties.

- ① A third-party financial evaluation agency creates a DeFi lending platform;

- ② The corresponding financing ecosystem is created on IBAX Network;
- ③ Financing applications meeting the service needs of capital borrowers are created;
- ④ A decentralized lending and trading platform is created;
- ⑤ The evaluation process and lending behavior are stored on-chain to protect the legitimate rights and interests of both parties.

This financing model solves not only the financing problem of the poor but also the asset appreciation problem of the rich, bringing new vitality to economic growth.

6.3 INTEGRATION OF BLOCKCHAIN AND THE IOT

As one of the core development areas of the communications industry, the Internet of Things (IoT) is gradually evolving towards a concentrated domain-focused ecosystem. The introduction of various emerging technologies has become an important means of IoT ecosystem cultivation for the communications industry. The organic integration of blockchain, the IoT, and 5G is already an indispensable and important part of it. According to the IoT characteristics, the IBAX team proposed the following views:

- ① Improvement of the edge computing capabilities of the network

Most of the current IoT environments are still built on a centralized distributed network architecture and edge nodes are still restricted by the capabilities of centralized core nodes. Communication networks develop toward flattening. There is a trend to enhance network access and service capabilities by improving edge computing capabilities. The communication network flattening and blockchain decentralization naturally complement each other.

With the decentralization and DPoA consensus mechanism of IBAX Network, the capabilities of core IoT nodes can be decentralized and allocated to each edge node. The core node only controls the critical content or serves as a backup node, while each edge node serves the equipment within the region it covers. With more flexible collaboration models and related consensus mechanisms, an edge node can complete the authentication, accounting control, and other functions undertaken by the original core nodes to ensure the secure, reliable, and stable operation of the network. At the same time, the decentralization of computing and management capabilities can also enhance the scalability of the IoT network and support its evolution and upgrading.

- ② Improvement of IoT identity authentication capabilities

A digital identity is a unique digital code that condenses the real identity information of users or IoT devices (with their content). It is a digital tag that can be queried, identified,

and authenticated. As representative identities, digital identities play an important role in the IoT environment.

Together with the digital coin application of IBAX Network, encryption technology and security algorithms can be used to protect digital identities, thereby building a more secure and convenient digital identity authentication system in the IoT environment. The same applies to blockchain-backed digital identities. A digital identity needs to be authenticated and endorsed by a certification authority (a government, enterprise, etc.) before moving on-chain. After moving on-chain, the IBAX Network-based digital identity authentication system will guarantee the authenticity of digital identity data and provide a credible authentication service. Each IoT device has its own blockchain address. Address rules can be added during registration to protect digital identities of separate devices.

③ Improvement of IoT device security

Out of cost and management considerations, a large number of IoT devices, such as home cameras, smart lights, and street light monitors, lack effective security mechanisms. These IoT devices can be easily hijacked. Hijacked IoT devices are often controlled by malicious software and carry out DDoS attacks on specific network services. In order to solve such problems, it is necessary to discover the hijacked IoT devices, prohibit their connection to the communications network, and cut off their network connections before they access target servers. Communications operators can upgrade IoT gateways and connect them to blockchain to jointly monitor, identify, and process network activities of IoT devices and thus ensure and improve network security.

④ Improvement of O&M capabilities of the communications networks

For communications operators, the operation and maintenance (O&M) of traditional communication equipment faces many problems. For example, routine maintenance and inspection of equipment consume a lot of labor and time. O&M data may also face problems such as forgery and distrust. Based on the IoT and blockchain, these problems can be alleviated or solved. IBAX Network can realize data reliability and credibility and ensure the authenticity of O&M data. Integration of the IoT technology for information interconnection between communications equipment and sensing devices can greatly improve O&M efficiency. For instance, automatic sensing technology can realize automatic data collection and extend traditional equipment O&M to automatic inspection. Temperature and humidity sensors or cameras can be additionally installed at the equipment site to obtain various O&M and environment data locally in real time. Additionally, detectors may be used to periodically dial the equipment and detect its operating status. The IoT and blockchain improve the daily O&M and inspection efficiency of communications equipment and ensure the data authenticity and credibility.

6.4 MEDICAL SERVICES

The integration of blockchain and medical care, especially in processing of electronic medical data, is one of the important research directions of the current blockchain applications. Effective sharing of medical data can improve the overall level of medical care and reduce the cost of medical treatment of patients. Medical data sharing is a sensitive topic, a pain point, and a key issue in the development of medical applications. It mainly stems from the needs of patients for privacy protection of sensitive personal information.

Blockchain provides potential solutions to solve the medical data sharing problem. The medical records of patients in different medical institutions can be uploaded to the Internet and various data providers can authorize platform users to access such data through allowed channels. This can not only reduce operating costs but also solve the trust issue.

A typical medical application using blockchain is chronic disease management. Medical regulatory agencies, medical institutions, third-party service providers, and patients themselves can share sensitive information in a protected ecosystem, coordinate the implementation of an integrated chronic disease intervention mechanism, and promote effective disease control.

Imagine if a patient suffering from a long-term chronic disease can enjoy continuous treatment at top medical institutions no matter where he or she locates globally because the credible and tamper-proof medical history is recorded on IBAX Network.

Breakthroughs in medical services would directly and positively affect the well-being of all humans and improve our living standards. Please look forward to it with us. IBAX Foundation will promote this great project as soon as possible. A better life is coming.

6.5 BLOCKCHAIN ENVIRONMENT PROTECTION

The environment protection industry usually uses the IoT to establish automated systems to monitor key pollution sources and environment quality online. However, there is a trust problem in environment monitoring devices and data. In the absence of supervision, enterprises may directly change the status of such devices and tamper with relevant data. Environment protection data sharing and opening are other issues.

The integration of blockchain and the IoT can solve the problems of end monitoring, low data validity, and the lack of monitoring methods in the environment supervision process. The application of blockchain can ensure that the identity of each environment monitoring device is trustworthy and the data is tamper-proof. This can not only ensure the privacy of enterprises and institutions but also enable open sharing of the necessary environment data. The IoT + blockchain can realize unified access of devices from different manufacturers with different protocols and models, establish a trustworthy space for transactions with data resources on environment protection, and help the implementation of environment protection policies.

Typical environment protection applications using blockchain include:

Environment data management: Pollution data may be tampered with during transmission from the environment monitoring devices to the network. Blockchain can permanently record each monitoring activity. The encryption technologies used to prevent tampering can improve data reliability and strengthen the supervision of pollution-related enterprises. The application of blockchain can also realize digital tracking of the entire pollutant discharge process and eliminate the effect of human factors on the accuracy of pollutant discharge data.

“One Source and One File”: Environment protection agencies use blockchain to build a basic information database of pollutant companies, centrally manage all the data and polluting equipment of the registered pollutant companies, establish a corresponding file for each pollution source, and put the files on-chain to prevent forgery and tampering. At the same time, blockchain is used to strengthen the account verification mechanism and prevent account data theft.

Environment taxation: The IoT + blockchain can provide a feasible technical solution to collect environment taxes. Blockchain provides consensus and joint maintenance of data across the entire network. Combined with the IoT, it can collect pollutant discharge data from polluters more accurately.

7. BUILDING THE FUTURE TOGETHER

With an open and sharing mind, we welcome brilliant ideas from around the world. We hope to improve IBAX with the help of a team with common values and build a rich eco-community together with innovative companies.

We know that the blockchain technology is still in development. We will take care of the rapid growth of IBAX and continuously improve the capabilities of our team.

As a fundamental operating platform, IBAX has plenty of imagination space for developers and partners. IBAX has a solid technical foundation that allows us to solve the problems we face.

We are working on addition of the following functions in our next releases:

- ① Homomorphic encryption;
- ② Post-quantum cryptography;
- ③ Hot-swappable consensus algorithms;
- ④ DeFi;
- ⑤ Non-fungible tokens (NFT);

The future must be bright because the future means hope, uncertain but creative.

Let's Build the Future Together!