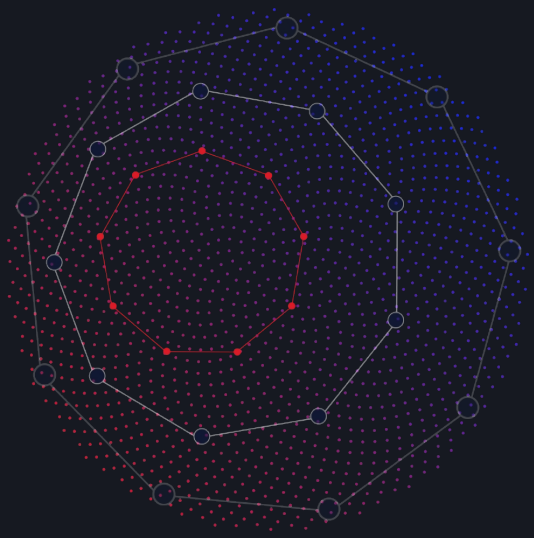
INT Whitepaper 3.0

Build a wide ecology of IoT chain with intelligence



2021.05

INT 4.0: An intelligent ecosystem focused on improving the interconnectivity of IoT devices

Abstract: INT will build a framework, based on which a cellular network is made of machines, and create a token, which will be used to coordinate the resource exchange between nodes and heterogeneous links (different nodes may create independent internal links). For example, a node may make a request and pay corresponding tokens to request other nodes (or links) to provide power, network, data, service and other possible resources. The ecosystem will facilitate a credible, secure, and open system through the economic model of cryptography and tokens. In addition, user data can be handled to protect user privacy through zero-knowledge proof (specific improvements are required). At the same time, the INT public chain is based on smart contracts and will become a platform for various Dapps including Defi, NFT, etc.

1 Preface

The Internet of things has developed rapidly in recent years, however, concerns have been raised for the standards of communication and data exchanges among manufacturers, the interests of manufacturers, user privacy, as well as fragmented model constraints on overall IoT development. According to the "The mobile economy 2020" report released by GSMA, the total number of global IoT connections reached 12 billion by 2019, and it is expected to reach 24.6 billion by 2025, with a compound annual growth rate of 13%. In 2019, the global Internet of Things revenue was 343 billion U.S. dollars, and it is expected to grow to 1.1 trillion U.S. dollars by 2025, with a compound annual growth rate of 21.4%. However, if interconnectivity within the whole network is not smooth, the fragmented Internet of Things will not fully realize the value of the nodes.

Without defining a common set of protocol standards, seeking support from individual manufacturers is inefficient and costly. Through decentralized and economically driven methods, INT creates a new way to make standards for device interconnection.

In recent years, with the rapid development of blockchain technology, various applications have

been making breakthroughs, especially in the fields of traceability, evidence storage, DeFi and NFT, which have all achieved explosive growth. INT is not only an underlying IoT protocol, but also a public chain. In this regard, it will become a platform for carrying out various types of Dapp development and operations across many industries. Through the development and operation of more types of Dapp applications, INT can promote the healthy circulation of INT Token, reverse the economic driving force in the IoT protocol and improve the security of the system.

1.1 Project objectives

INT is the acronym for Internet Node Token. INT attempts to build a scheme that allows data and resources to flow freely within the network and to ensure user privacy in untrusted and decentralized machine federations.

INT is trying to establish a plan to allow data and resources to circulate freely and ensure the privacy of users in a non-trusted decentralized system.

INT is a public chain, which will have obvious advantages in terms of speed, performance, security and decentralization. It will be a platform to have various Dapps, such as Defi and NFTs.

This paper is not a complete and detailed specification, just a preview of the development intent of the whole design, which attempts to propose solutions, and through experiments and projects, community support as well as confirmatory development, to make INT a viable solution for the current challenges facing IoT. Through experimental evidence, prototypes and data, as well as responses to community suggestions and comments, the content of this paper will be revised gradually in the future.

1.2 Background introduction

Blockchain technology has proved its value in finance and other fields, but we believe its best usage is in the field of IoT. The highly distributed field of IoT is especially suitable for blockchain applications.

At present, there are several issues with the current development of IoT：

(1) Lack of standard

The IoT vendors are very diversified, each holding their own data silos, so the information flow within the systems is everything but smooth, while cross-vendor access and liquidation is hard to implement.

(2) Inefficiency

Under the current IoT ecosystem, all the devices are connected through central cloud server authentication. The connection between the devices is handled through the central servers, thus the efficiency cannot effectively meet the real-time needs of IoT.

(3) Cost

The infrastructure and maintenance cost of centralized systems, large servers, cloud service and network devices is very high. While the number of IoT devices increases to a range of tens of billions, the additional communication cost also rises exponentially, which makes IoT solutions very expensive.

(4) Security risks

Centralized networks have very high security requirements for central servers, and the security vulnerabilities of IoT nodes will affect the whole network.

(5) Privacy protection

Existing centralized networks can collect user information at will, and after users realize the value of their data, he or she may not be willing to just accept such a situation. Because IoT systems increasingly contain more private information, such as health information and vehicle driving information, centralized networks might not be a trustworthy custodian that will always act in the best interests of users.

2 Project overview

The INT project stems from the Apache Mynewt community practice.

The team initially tried to define hardware through software to reduce the complexity of hardware development.

However, even if we define the abstraction layer of the system, the challenge remains regarding how to form a unified ecosystem between individual nodes. Later, through team brainstorming, the team

converged on an economic way to drive the integration of different systems.

INT is a blockchain application platform and interaction standard oriented to the Internet of Things that is based on an economy-driven approach. The parallel chain structure is used to form a distributed network between devices, and a consensus algorithm is adopted to guarantee the legal trustworthiness of the transaction between devices. At the same time, different kinds of devices can be connected to different parallel chains to avoid the explosive growth of the total ledger. The existence of INT can greatly reduce the development difficulty of the application of the blockchain of IoT. It can relay different IoT, form edge computing networks, effectively circulate resources, and accelerate the progress of IoT popularization. INT is designed as a scalable heterogeneous chain, providing a relay chain platform on which a large number of verifiable, globally consistent and consensus data structures can be built. In other words, on the basis of ensuring overall security and cross-chain trust, INT is committed to making the IoT blockchain into a networking infrastructure like TCP/IP, which imperceptibly affects people's lives.

In order to achieve these objectives, we must do the following:

2.1 Software defined resources

There is a fundamental difference between hardware development and software development. Because of cost and design constraints, the hardware resources are generally scarce, so when we want to add additional costs and provide additional resources in the hardware, it is relatively hard (for example, to provide additional computing power and extra external power supply).

The problem we want to solve is not to provide additional resources, but if the hardware itself is a WIFI router, or a temperature collector, when it needs to provide its own value to other services or hardware, a corresponding charging strategy can be proposed. Furthermore, the resources we are involved in, according to different devices, are abstracted from the real world, mapping existing entities (whether hardware or data) to provide consistent invocation in the form of services.

There is no way to add additional functionality to existing devices, but in a relatively hardware-based ecosystem, we may be able to allow the various devices to open their own functions, so as to gain more revenue through the ecosystem. Because the nature of the standard monopoly is profit, and the tokens themselves can provide profit, and because of the inherent volatility of the price of tokens, it may generate additional economic benefits to end users. Relative income is not less than absolute profit.

In this regard, we will implement a new model that uses hardware to distribute benefits in a transparent and decentralised way, rather than sharing the benefits through a centralised monopoly.

2.2 Monetization of resources

In our definition, we need a steady measurement, and we do not use INT in the settlement of the IoT, but instead use a GAS mechanism similar to ETH. Because device resource settlement needs a relatively stable measurement, the resources will be settled in the following ways:

Price tag type: pay according to the marked price.

Metering type: Pay according to the timeline, or other dimensions of subsection.

Competitive bidding type: Bid on all devices that need to invoke the resources.

CPP (Cost Per Purchase): Pay based on the end use of the resource.

With the help of smart contracts, many settlement methods can be solidified in code on a decentralised network in order to solve the trust problem and improve transaction efficiency.

2.3 Resource transaction configuration

Related nodes shall purchase resources in a semi-automatic manner through a custom policy.

2.4 Privacy protection principle

There is also a particularly important problem in the current state of IoT: User privacy. The user privacy protection of IoT is extremely fragile. It is easy to predict user behavior because of the large amount of data collected. Moreover, for the current

architecture model, even if we use Open ID to implement user desensitization, as long as we analyze multiple dimensions, it is easy to reverse deduce the identity of the user. To solve this problem, we try to adopt our innovative Behavior Private Key (BPK) algorithm model based on zero-knowledge proofs, by passing user intent (intent) to other hardware, without the need to pass the user symbol, which not only can effectively protect the user's privacy, but also can resolve concerns about the loss of users.

Our innovative BKP algorithm model uses unsupervised learning and clustering behavior, through zero-knowledge proofs, to implement user privacy. This allows for the sharing of resources between devices based on intent, and does not require users to share data, which can effectively address the current privacy issues in IoT.

2.5 Security

The future security of IoT is the most important consideration going forward. To this end, INT will attempt to filter user intent through its innovative BPK algorithm in order to achieve a greater level of overall user security.

2.6 Ecosystem

INT is not only an underlying IoT interactivity protocol dedicated to the implementation of IoT applications, but also a public chain for the entire blockchain ecosystem. INT will also encourage the development of various Dapps to enhance the circulation value of INT and expand its ecosystem.

3 System architecture

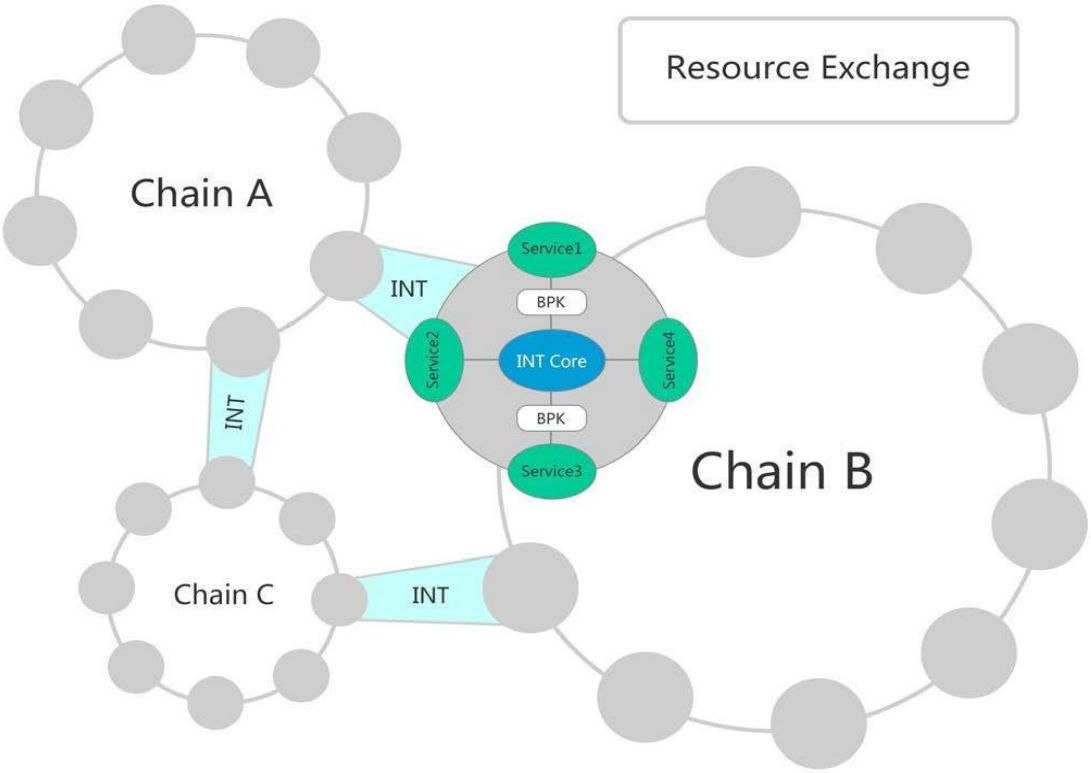


Figure1: INT system architecture

4 Service

Each machine node can shelve corresponding SKU based on their own wishes, which is to be suitable for different bidding, sales, distribution strategies, authority strategies, and forming self-discovery of metadata. This layer is a definition of software services and an abstraction of hardware services.

5 Trading market

Through smart contracts and semi-dynamic configurations for basic services such as network, power, calculation, self-discovery, and the implementation of plug-and-play access, developers can utilize an API based trading market to build a trading system for data and services in the cloud.

6 INT token

INT token is the medium to govern the entire ecosystem. As investors and stakeholders, token holders can pledge their tokens to vote on various issues in community governance and project development. At the same time, the INT token is the gas fee for system transactions. Half of the gas fee for each transaction will be burned, thus creating a deflationary mechanism. In addition, the settlement of resources for devices requires a relatively stable measurement, so instead of using INT directly for settlement within the IoT ecosystem, we will issue a stable currency similar to Ethereum's DAI that is based on the INT mainnet for settlement. This stable currency will have a floating price aimed at fiat currency and can be obtained by over-staking INT.

7 Machine node

A node may be a traditional PC server node, or a STM32 node that is custom configured according to machine performance. IoT is a typical edge fog computing scenario (Fog Computing). In fact, existing blockchain networks are not suitable for IoT. In such a scalable network with high computational power, the challenge is in determining how to share computational power. The essence of the issue is economically-driven, so we need to define an INT based solution.

8 Consensus

As we know, in consensus algorithms, traditional DPoS consensus algorithms have started evolving in the direction of centralization while deviating from blockchain’s original intention of decentralization. Therefore, we have created a new consensus algorithm called Double Chain Consensus Algorithm that is based on a deep understanding of the core essence of DPoS consensus algorithms, INT chain’s real application scenarios, and the current development status of IoT devices. The basic architecture is shown in the following diagram:

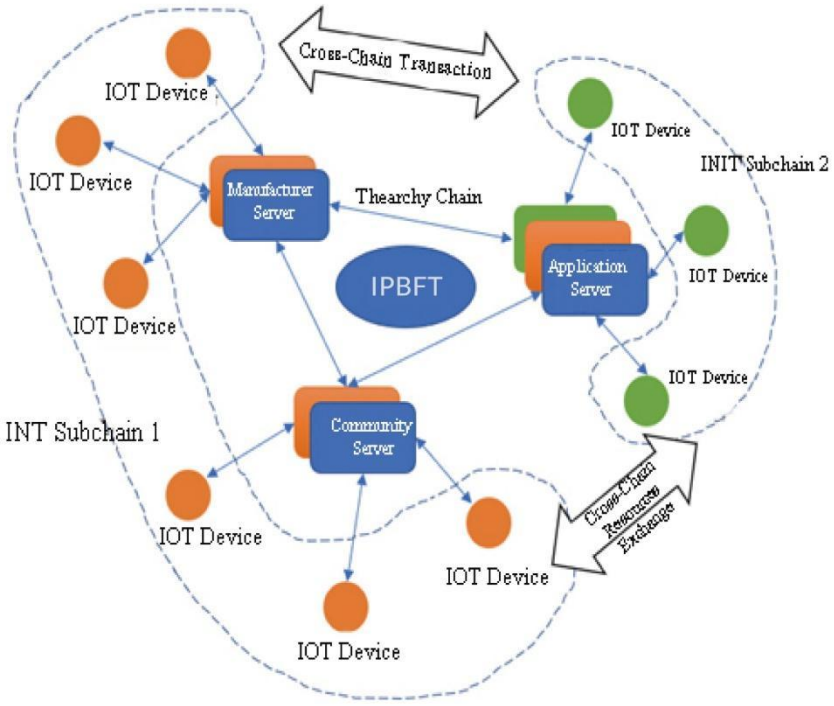


Figure 2: Architecture of Consensus Mechanism Algorithm

The "thearchy chain" is made up of the servers provided by device manufacturers, community leaders, and ecological enterprises. It is the core of the entire architecture and consists of "thearchy nodes", which have come into being through election by the method of community polling. Eventually 2n+1 thearchy nodes are produced, and their address information is written into the thearchy chain's genesis block.

The primary function of "thearchy chain" is to perform block-generation operation using the IPBFT consensus algorithm and to coordinate with the work of nodes on the ordinary chains at lower layers.

The following TXs will be retained in the thearchy chain's blocks: 1. on-chain governance, contract transactions, INT transfer TX; 2. node grouping TX; 3. node work report TX. On-chain governance TX is the key to the continuous operation of the thearchy chain, INT holders can vote or withdraw their votes at any time, and thearchy nodes can also register and withdraw. In every block cycle, the system will re-elect a node according to the number of votes it has received, and the node with the highest number of votes will be elected as the thearchy node, while nodes that are not working properly will be kicked out.

The nodes on ordinary chains will continually read the information on the “thearchy chain” during operation in order to work with high efficiency.

The information mainly includes:

(1) Determining on which node the next block will be generated, according to the “thearchy chain” block generation information (Blocks on ordinary chains are also generated from thearchy nodes);

(2) On the basis of reading the “thearchy chain” information, determine the group to which the current nodes belong, the block data that will need to be saved, as well as complete the data fragmentation;

(3) Read the legal manufacturers information of “thearchy chain” and decide if the data information reported on other devices is legitimate or not;

(4) Report the operation information of ordinary nodes. By this design, there remains only the IoT data collecting TX and the scalable smart contract operating TX among the main TXs of ordinary chains, while the consensus algorithm logic and device/data legitimacy judgment logic are both transferred up to the thearchy chain, thereby boosting the stability and celerity of block generation by ordinary chains while implementing data fragmentation of ordinary chains and reducing the performance storage capacity requirements for IoT devices becoming blockchain nodes.

8.1 Consensus Mechanism Process

The operational process of the INT consensus mechanism is shown as below:

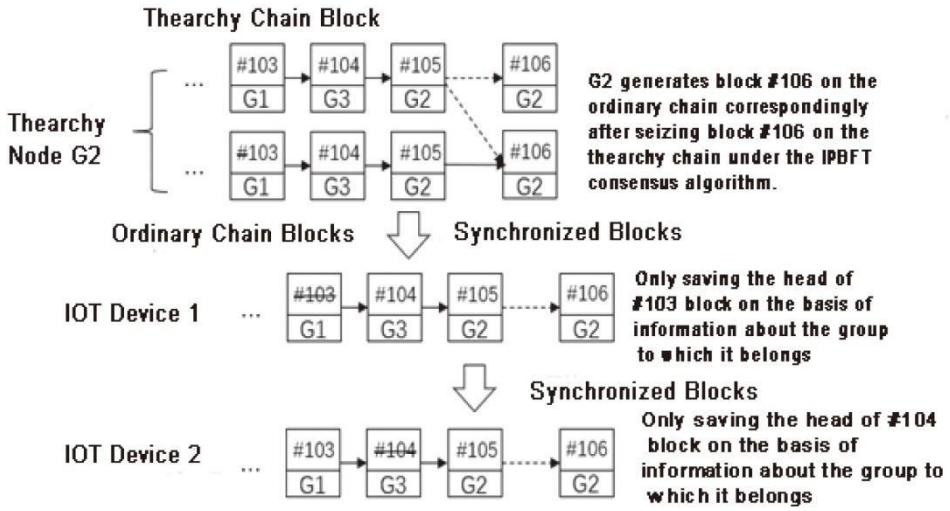


Figure 3: Operational Process of Consensus Mechanism

The operational procedure of the whole process is outlined below:

The system selects the block producer for each round through the VRF, and then the block producer will first propose the block and broadcast it to other thearchy nodes. Consensus among the thearchy nodes will be conducted through the IPBFT consensus algorithm, which requires more than 2/3 of the total votes to agree before the block generates properly.

The thearchy nodes will be re-elected based on the number of votes they have obtained, and nodes with the top 25 votes will be the new round of block producers.

If a node does not participate in consensus for a long time, the system will kick the node out for a period of time and the node must be unbanned manually before it can return to normal.

Each normal block will receive a block reward, which consists of a fixed block reward and half of the gas fee, the other half of the gas fee will be directly burned. The thearchy node can set a commission ratio and each block reward will be proportionally distributed to the node that produced the block and the INT holders who voted for the node.

Every INT holder can participate in or propose to vote on the main affairs and development of INT.

After the voting is over, each proposal will be led by the INT Foundation and will be jointly promoted and completed in collaboration with the community.

1) The normal nodes running on the server where thearchy nodes are located will generate blocks after the thearchy chain generates blocks;
2) The ordinary nodes running on IoT devices read the grouping information on the thearchy chain to determine the group to which they belong; IoT devices that access the network for the first time are also required to register nodes on the thearchy chain;
3) On the basis of their own grouping information, ordinary nodes on IoT devices select a thearchy node to maintain connection for updating blocks and delivering TX; Such design can boost TX confirmation speed and reduce the bandwidth consumption brought about with TX broadcasting of IoT in narrow-band edge networks.
4) On the basis of their own grouping information, IOT devices can delete ordinary chain blocks that are alien to their own group;
5) IoT devices deliver the running log to the thearchy chain through node work report TX in order to obtain salary income;
6) IoT devices send ordinary TX to each other to call functions or send collected data;
7) The default display of the INT browser is the block information of the Thearchy Chain;
8) The INT wallet can submit the ordinary chain TX to any of the IoT device nodes or to any ordinary chain node running on thearchy nodes. Standard TX reproduced similarly by such means also supports anonymous submission by using broadcast;

8.2 Calculation Separated from Bookkeeping "Mining Mechanism"

After using the double-chain formulaic algorithm, no IoT device will have the chance to generate blocks, so there is no way to earn rewards by generating blocks. Although, from the perspective of INT's economic model design, IoT devices can earn incomes by providing functions and reporting key data. We design a set of incentive mechanisms to reward IoT devices (nodes) at normal work so that the entire blockchain network can operate more efficiently. From the perspective of

implementation, the current scheme being adopted by INT is the wage-paying mechanism “contingent on device’s working conditions”, but we give an umbrella name to such a mechanism as “calculation separated from bookkeeping mechanism” in order to make a distinction between it and traditional incentives which are based on rewards for block generation.

The content of the operational core of this mechanism is shown as below:

(1) On a regular basis, IoT devices pack their own working status into "node work report TX” to submit to the thearchy chain. The working status includes "Device Startup", "Device Shutdown", "Device has completed xxx work", and other information and extension is supported.

(2) Within a time period, working status of all devices in the entire INT network encompassed on the thearchy chain is recorded;

(3) INT will disclose a salary calculation algorithm, whereby the inputs are the records of the working status of all devices within the current period, and the outputs are the payroll of each device. In addition to this, INT will publicize the payroll within the publication period, whereafter the INT foundation will issue INT tokens on the basis of this payroll. In addition to the calculation of payroll, this salary calculation algorithm can also be iteratively optimized during each period, thereby identifying any data fraud;

This set of mechanisms also addresses the issue that economic parameters of traditional blockchains are not easily modified once set. Moreover, the openness and fairness of the core mechanism of the blockchain are safeguarded through the open algorithm and its input.

8.3 Smart Contract

As a core part of blockchain technology, smart contracts are the foundation for various decentralized applications. In the INT system, smart contracts are an important technical support mechanism for coordinating the work of different IOT devices.

At present, the Ethereum community's Dapps have grown stronger, and most developers are already accustomed to smart contract development based on the EVM virtual machine. Therefore, in order to

better attract developers, the INT Contract has completed the compatibility of smart contracts with EVM, and can support smart contracts written by solidity, while initially completing the compatibility of WASM, which can support smart contracts written in multiple languages (C++, C#, Java, Python, JavaScript).

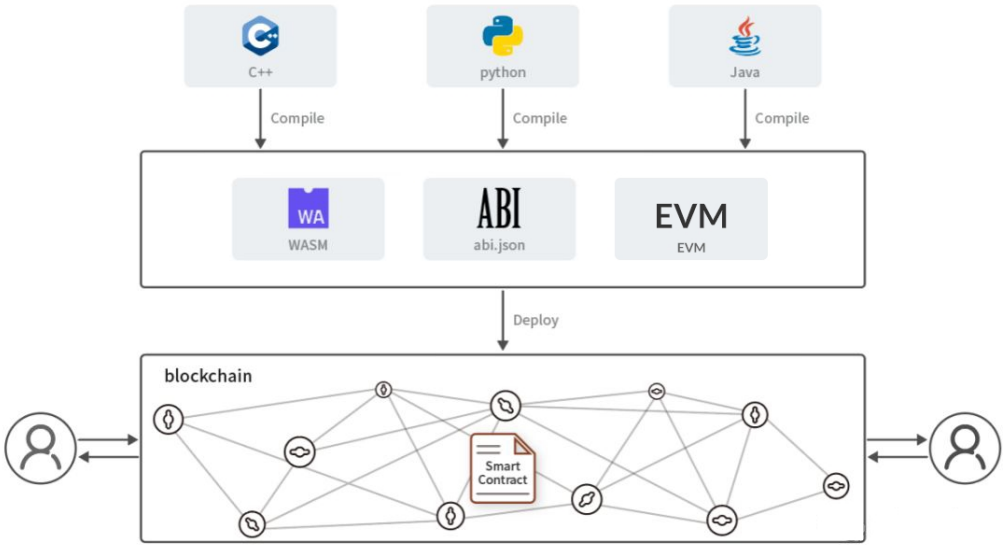


Figure 4: The implementation structure of INT Chain

8.4 Countermeasures against Puzzles on Source Tracing along the Public Chain

Logically, it is impossible for matters in the physical world to be chained, so a numeric ID is required to be fabricated for each “matter”, in such a form as a number or QR code. But the correspondence between such ID and the “matter” hinges on human factors, which allows for considerable subjectivity and scope for counterfeit. The reliability of tracing the source along blockchain remains deficient.

Take Ethereum as an example: A smart contract deployed on Ethereum is originally unable to access networks beyond its blockchain, and it is even impossible to call a Restful API directly in similar ways applications are developed. Hence, data sources in the physical world remain significantly inaccessible to blockchain. This requires an

automated tool that can provide reliable data sources for blockchain smart contracts. An oracle service called Provable promotes an oracle tool which ensures that data is not counterfeited to a certain degree through verification of TSL Notary.

The above description reveals that the core strategy to cope with the challenge of source-tracing is to minimize human participation and economic incentives for counterfeiting throughout the process from collection to processing to transmission-on-chain of the key source data of “matter”.

The shell of INT chain will develop supporting tools similar to that of Provable for the smart contract module constituted by Software Fetch and Hardware Fetch to provide reliable executive source data for INT smart contracts at both the software and hardware levels respectively.

8.5 Cross-Chain Interoperability Protocol

The cross-chain interoperability protocol of the INT relay-chain will fall into two parts: "cross-chain asset exchange protocol" and "cross-chain distributed transaction protocol".

(1) Cross-Chain Asset Exchange Protocol

Extended over the double-chain atomic asset exchange protocol of INT Chain 1.0, this allows multiple participants to exchange assets on different blockchains and guarantees complete success or failure of all steps throughout the trading process. To implement this function, one need only implement the functionality of the INT smart contract. For other blockchains, if they are not compatible with INT smart contracts, they can be implemented through the INT asset cross-chain bridge.

(2) Cross-Chain Distributed Transaction Protocol

Cross-chain distributed transaction is where multiple steps of an entire transaction are implemented across separate blockchains while securing its consistency. This is an extension to cross-chain asset exchange, whereby the behavior of asset exchange is extended into an arbitrary behavior. In layman's terms, INT’s relay chain makes cross-chain smart contracts possible. A single smart contract can execute different parts across multiple different blockchains, which are

either completely executed or return to the status prior to execution.

8.6 Network Design

Different IoT data transmission protocols have very different requirements for delay accuracy.

Therefore, INT will adopt the MQTT method in respect of network architecture and accomplish specific implementation and protocol amelioration for MQTT to fulfill the demands of blockchain.

In addition, for data transmission between the thearchy nodes, we have adopted an improved BDT-P2P scheme. The advantages of this protocol are as follows:

(1) The protocol design fully supports UDP NAT penetration, the non-centralized SuperNode design, supports multiple operators and IPv6, and has a better P2P connection success rate.

(2) DHT structure based on stable topology analysis for better efficiency and redundancy of broadcasted messages.

(3) BDT's built-in congestion control kernel applies the congestion algorithm using the latest academic theories, which has much better transmission performance than TCP.

9 Application Scenarios of INT and INT DAPPs

With the growth of IoT devices at geometrical progression, as well as the improvement in the level of intelligence of machines, there will be an increasing number of automatically running IoT DAPPs to be installed on smart devices. Furthermore, real-time automatic data exchange and automatic transactions will be implemented between machines and between humans and machines via distributed IoT DAPPs.

INT will implement data transmission featuring direct interconnection between nodes within IoT. IoT solutions will not require importing large-sized data centers for data synchronization, management and control. All operations, including the sending of data collection instructions and software update, can be transmitted via the blockchain network. Some typical application scenarios of INT are:

(1) Intelligent manufacturing

Product transport, for instance, in which products can be traced, secured and delivered on schedule even though cargoes are transferred through multiple material flows; for instance, the data about production, inventory management, sales volume of products and inventory are all recorded in order to be shared between the business and production departments, incentivize punctual production and boost efficiency of operation. Equipment and systems in manufacturing are becoming increasingly intelligent, thereby stepping progressively into a completely virtualized world;

(2) Intelligent automobile

The automatically running DAPPs in IoT enable vehicles to become smart application terminals. Car owners can use the blockchain to trace IoT devices (e.g. annual inspection of vehicles and automatic car insurance tracing). For example, a source map indicating traffic congestion transmits data for car owners to keep track of the real-time traffic condition and implement automatic driving in a safer manner, automated navigation of automobiles, roadside service, etc.;

(3) Intelligent equipment

Sensors are utilized to trace the conditions of bridges, roads, power grids, and even to help monitor natural disasters in remote areas. They can also prevent large mountain conflagrations, disease, pest related damages, implement smart urban management, prognosticate urban greening and pollution conditions, and perform maintenance to share high-efficiency urbanized management.

Different IoTs are relayed to circulate resources with efficiency while significantly lowering the access threshold on IoT, shortening the cycle of development and reducing risks in application development. It will be extensively applied in respect of intelligent power grid, intelligent logistics, smart home, smart advertising, smart transportation, etc.

(4) Intelligent finance

In combination with the impossibility of falsification and authentic right of data implemented for distributed blockchain data, the authenticity of data about financial agencies is secured. Issues such as letter of credit, corporate obligations and bonds, trading platforms, providing

price quotes, contract fraud prevention, and traceability, are enhanced; Decentralized finance is gradually prospering on the basis of public chains and smart contracts. The decentralized trading protocol based on automatic market maker algorithms and exchange pools—DEX's smart contract code has been very mature, which is easy to implement, simple and efficient. Protocols and derivatives written through smart contracts, such as farm economy, lending economy, and other decentralized financial products, serve to enrich the product ecology of the public chain and attract more financial users to join it;

(5) Smart insurance

With the growth and development of decentralized finance, the simple Defi protocol is actually very fragile and subject to multiple risks. In addition to considering security at the beginning of the design, as well as technical iteration and auditing, insurance is another major positive means of solving problems and preventing risks. Smart contracts can be used to implement decentralized insurance products. Insurance contracts under the smart contract system are digitized and stored in the blockchain ledger, which cannot be tampered with; It can also automate the insurance claims process, providing near instantaneous processing, verification and payment services, guarantee the trustworthiness of the product, and provide a smooth insurance claims service;

(6) NFT

NFT is the abbreviation of Non-Fungible Tokens. NFT provides a way to mark the ownership of native digital assets, which can exist outside of centralized services or centralized libraries. The ownership of the NFT does not prevent others from inspecting it or reading it. The NFT does not capture the information and hide it, it just captures the information and discovers the relationship and value of the information with all other information on the chain. As a unique digital asset, from digital art, games, collectibles, digital art markets to physical assets (various documents, bonds) can be chained, validated and circulated on the blockchain.

10 Roadmap

INT aims to address the issue of value transfer in fragmented and dispersed IoT markets. It will be a brand new architectural platform at the bottom layer of IoT blockchain featuring decentralization, openness, open source and high efficiency. In the ecosystem, participants can profit and share profits with each other. There exists a large potential for gain with respect to accelerated developments in both domains of blockchain and IoT.

As a transparent and open system, INT will promote the development of IoT, without appealing to unified standards, to drive the interconnection of different standards by economic means and to form an effective decentralized market.

The technical roadmap is as follows:

(1) The Chaos:

(A) In August 2017, the first version of the white paper was released, and the INT project was formally approved.

(B) Q1 2018: INT 1.0 was released, and the basic modules of the underlying network communication and consensus were completed.

(C) Q2 2018: INT 2.0 was released, the dual-chain architecture was completed, and hardware manufacturers began to connect.

(D) Q3 2018: completed the hierarchical reconstruction of the main network code and introduced smart contracts.

(E) Q4 2018: Completed the development of multiple mainnet applications and launched the testnet.

(F) Q1 2019: INT 3.0 was released, started the thearchy node plan and mainnet mapping.

(2) The deities:

(A) Q2 2019: SmartWallet was released.

(B) Q3 2019: Completed the online governance plan and improved the economic model.

(C) Q4 2019: Released a variety of wallet applications.

(3) The Olympus:

(A) Q1 and Q2 2020: Completed the infrastructure of INT 4.0, initially realized consensus and smart contracts, launched the testnet Titans and the testnet browser and web wallet.

(B) Q3 2020: Continued to improve the consensus of INT 4.0, initially completed the privacy function, and started the global public testing.

(C) Q4 2020: Upgraded the INT 4.0 smart contract, modified the account standard, fully compatible with EVM, and launched the cross-chain asset exchange bridge.

(D) Q1 and Q2 2021: Reconstruct the INT 4.0 consensus communication, improve the economic model, and start multiple instances of public testing.

(e) Q3 and Q4 2021: INT 4.0 will be launched, along with various Dapps.

(f) Q1 and Q2 2022: Layer2 solution implemented based on INT 4.0, greatly improving the extensibility of INT Chain and providing a foundation for richer applications.

(g) Q3 and Q4 2022: Implement a high performance, secure and privacy-protected IoT interactivity protocol based on layer2.

11 INT team

The INT team core members include the first batch of IoT development experts, with vast experience in communication and large systems, architects of operating systems, and engineers in the financial field. The R&D team has a deep understanding and R&D experience in the fields of IoT , signal transmission, security system design, blockchain, bottom layer of bitcoin, Ethereum, automated value exchanging, machine learning, and big data technology.

11.1 Core Team Members

Chen Guanghui

Chief Development Engineer of INT DAPP. Mr. Chen graduated from Fudan University with a major in Computer Software. He worked in EastCOM and Huawei successively. He has rich experience in communication technologies, systems architecture, R&D project management, software development, mobile Internet and other

fields. From 1993 to 2005, he worked as R&D engineer in the CDMA Switch Development Department, Head of the Testing Department and Vice General Manager in EastCOM. He joined Huawei in 2005 and served as Head of the Enterprise Communications MKT Department and Head of the Railway Signal Architecture Design Department. In 2012, he started his own business involved in the mobile phone taxi service market.

Wang Hongwei

Master from Sichuan University, 10 years of experience in technology research in IoT; early platform architect for Huochebang; a leader for the first industrial routing AR531 device in Huawei; inventor of the High-speed Railway Signal 3oo3 Combined Default - Security System and Smart Packaging.

Michael Zhang

MBA from National University of Singapore. Bachelor from Fudan University. Mr. Zhang has over 20 years of experience in IT management and operation in Asia. He is a leading expert in cross-border trade and supply chain management.

Yin Xiangyu

Head of INT China. A diehard fan of IoT. One of the earliest IoT research and development practitioners in China, entrepreneur of multiple Internet startups and Apache Mynewt code contributor. Mr. Yin has participated in the research and development, application and promotion of wearable remote single-soldier life test instruments based on GPRS, depth of anesthesia tester, early diabetic neuropathy tester and the first WeChat-based IoT device in China - Welomo.

Liu Zhicong

Founder of Bucky Cloud, Former Chief Engineer of Thunder.Technical VP, the local leading talent in Shenzhen; won the second prize of National Science and Technology Progress Award in 2015 with the project of “Key Supporting Technology for Large-scale Network Streaming Media Service”; during the work in Thunder, he led the development of Thunderbolt interface engine and a new generation of P2P framework of Thunder, helping promote the evolution and upgrading of many core technology architectures of Thunder.

Zhang Bo

Mr. Zhang holds a Master's Degree from Huazhong University of Science and Technology. He has 12 years of experience in systems architecture; a leader

for DDOS protective devices in H3C; head of the High-speed Railway Signal double 2-vote-2 Security Mechanism in Huawei; architect for the first industrial routing software in Huawei and metro system ATP & ATO system.

Zhang Hangjun

Graduated from Hangzhou Dianzi University, 11 years of experience in hardware development; in charge of R&D of 10+ EMC testing devices; head of the first industrial routing hardware in Huawei, in charge of R&D of vehicle-mounted, CBI and rail-side signal system hardware of high-speed railway, metro system and tramcars.

Xu Chun

Master from China Jiliang University. Worked successively in Huawei and CETC, an expert in software systems engineering and highly reliable and secure systems design. When he worked in Huawei, Mr. Xu was in charge of design and development of high-speed railway signal systems and the RBC system; when he worked in the IoT Research Institute of the CETC, he was in charge of the project of Smart Zhili in Huzhou and other projects and he was the technology chief in charge of top-layer planning, network design, applications, deployment and development of hardware terminals, etc.

Chen Yuqi

School of Mathematics of Sun Yat-sen University, former development engineer of the distributed system of SouFun.com and contributor Google Brillo code.

11.2 Advisors to the Team

Xiang Ruofei Technical Advisor of INT. Dr. Xiang holds a degree in post-doctoral research at the Chinese Academy of Sciences (CAS). He is a young expert in the Next Generation (5G) Wireless Communication and IoT technology, and he now majors in the applications of “Blockchain - IoT " technological convergence. He took charge of one of the “863” Projects, has published multiple papers, and applied for several technology patents.

Kong Huawei Head of Shanghai Sub-institute of the Institute of Computing Technology, Chinese Academy of Sciences and Chief Scientist of Venture Capital Investment of Zhangjiang Hi-Tech.

Tan Lei Blockchain and big data mining expert, promoter of North America Blockchain Association

(NABA), 13 years of service in Microsoft Headquarters, Master from Duke University, author of books like Blockchain 2.0.

Ramble Chairman of North America Blockchain Association (NABA), Chief Architect for Guiyang Blockchain Financial Regulation Sandbox, Chairman of Guiyang Blockchain Finance Incubator, Founder of GooCoin and SWFT.

Zhao Yafu Director of Risk Management of Guang- dong Zhuo Tai Ci Capital Ltd.

Liu Jinhua CPA, CTA, Co-partner of Shandong Shixin Certified Public Accounts Firm, accounting and tax consultant for several listed companies, former official of Shandong Provincial State Taxation Bureau.

Mo Lei Partner of Guangdong ETR Law Firm.

11.3 INT Angel Investment Team

Wang Dou Founding partner of Silicon Valley Geek Capital and Link Capital

Liang Junzhang Co-founder of Kinzon Capital.

Li Jiaxuan Co-founder of Future Fund.

Huang Zhiyi Co-founder of Sino-US Venture Capital.

Luo Wen Chairman of Iwali Technology.

Zhou You Director of Hangzhou Shunwang Technology Co Ltd, Chairman of Fuyun Technology.

Lin Shirong Founder of Enhou Investment.

Zheng Zhiping Founder of aizhan.com.

Lin Xirong Co-founder of ITB CAPITAL.

11.4 Team achievement

·China's first generation remote single soldier life status detection wearable clothing based on GPRS

·China's first depth of anesthesia tester concept products and the alliance blockchain.

·PHS products, communication platform and necessary communication protocol system

·The first CDMA switch in China

·HUAWEI's first industrial routing hardware, AR531

·High speed rail signal 3oo3 combination fault and safety system

·H3C 100 G class DDOS protective device

·HUAWEI high speed rail signal Double 2-vote-2 2security system

·Chinese subway ATP & ATO system

·Interbank settlement blockchain application system

·In 2016, the test of a vehicle connecting blockchain application “Automatic Traffic Interchange System” based on ETH was successful.

12 INT Foundation

INT Foundation is a non-profit organization which is established for supporting IoT application projects based on the INT blockchain.

12.1 The Governance of INT Fund Committee

INT Fund Alliance Committee adopts the alliance rotating chairmanship, in which a chairperson-in-office will be elected by voting every other year and hold his/her office for only one tenure. The Committee has several management centers, including Blockchain Technology Development Center, Blockchain Commercialization Center, Financial Management Center, Risk Control and Management Center and General Affairs Management Center, which give guidance for work in their respective business departments.

12.2 Capital Source and Management

The capital used for maintaining the operation of the INT project mainly originates from batch-based venture investment into INT tokens as well as membership dues and donations. Some INT will be converted into other forms of assets for project operations as needed.

12.3 Financial management explanation

Financial management of the INT Foundation follows the principle of comprehensive management, frugality and practical results orientation. INT Foundation assets management is included in the all-round budget management and financial operating budgets are made based on actual operational conditions. Annual financial operating budgets shall be submitted to the Autonomous Committee for review; monthly financial budgets shall be reviewed by the Execution Committee. The Financial Management Center is responsible for preparation and execution of reports and make disclosure on a quarterly basis. INT Foundation will engage third-party auditing to

supervise financial operation of the project, audit capital and prepare auditor's reports which will be announced in annual information disclosure. Financial statement disclosure channel: https://intchain.io/

12.4 Progress Disclosure

The promotional team of the INT project makes a commitment to manage crowdfunding encrypted digital assets in the principle of dedication, integrity and prudence and diligence. In order to protect investors' interests, strengthen management and efficient use of INT and promote healthy development of the INT project, the information disclosure system is adopted for the INT project. INT hopes to standardize digital asset management, improve self-discipline in the block- chain industry and enhance transparency of management of encrypted digital assets on blockchains by setting itself as an example to safeguard the long-term development of the blockchain industry.

INT will disclose a quarterly report within two months as of completion of each quarter and prepare and disclose an annual report within three months of the date of each fiscal year (i.e. December 31 every year). Contents of these reports include but are not limited to technology development milestones, progress of the INT project, application development milestones and progress, digital asset management, duty performance of the team, financial conditions, etc.

INT will disclose important temporary information of the INT project in a real-time manner on an irregular basis, including but not limited to major partnerships, any change to core team members, lawsuits involving INT, etc. INT will disclose information and financial statements on its official website https://intchain.io/.

12.5 Advisory committee

INT will invite domestic and foreign experts engaged in the field of blockchain industry for many years, notables with rich experience in work performance, legal entertainment culture and other professionals, and people familiar with government policy to form a third-party expert advisory committee, and to provide consultants, assist decision-making, and assist in other ways, including:

(1) Demonstrate and guide the team's work plan and major projects, assist the project development planning and design;

(2) Undertake projects of government research and industry commission to carry out industry research;

(3) Organize the research on the hotspot issues of IoT and blockchain, and provide consulting services for the team;

(4) Strengthen the exchange of information, regularly hold industry forums, guest discussions, academic exchanges, etc.

INT Expert Advisory Committee includes the following experts: Kong Huawei, Director of Shanghai Institute of Computing, China Academy of Sciences (CAS); Xiang Ruofei, CAS postdoctoral expert in blockchain; Zheng Zhiping, Founder of aizhan.com and expert in network marketing; Zhao Yapu, risk control supervisor of Guangdong Zhuotai Investment Management Co., Ltd.

12.6 INT Legal Counsel

INT Foundation will engage an international law firm to act as legal advisor for the INT project, providing comprehensive legal services in the design of digital asset transaction structure, operational compliance, legal risk mitigation, and overseas legal advice for the INT project.

13 Disclaimer

This document is meant only for conveying information and does not constitute an opinion on the trading of INT token. Any such proposal shall be carried out under a trustworthy provision and with the permission of the applicable securities law and other relevant laws, and the above information or analysis shall not constitute investment decisions or specific recommendations.

This document does not constitute any investment suggestion, investment proposal or abetted investment in relation to any form of securities. This document shall neither constitute nor be construed as any behavior of providing any buying and selling or any behavior of inviting to buy and sell any form of securities, and it shall not be a contract or commitment in any form.

INT has made it clear that users with relevant intentions have had explicit knowledge about the risks of INT platforms and that investors, once involved in any investment, are deemed as having known about and accepted the risks of this project and being ready to undertake every corresponding result or consequence for their investment.

INT token is a digitally encrypted currency used on INT platforms. When this paragraph is being compiled, the INT token remains unable to purchase relevant goods or services. We cannot guarantee that the INT currency is bound to appreciate, instead it may also depreciate under certain conditions.

14 Risk Statement

14.1 Risk of Loss of INT token due to Loss of Certificate

Each buyer will have a corresponding INT account after allocation of the INT token. The only way to access this INT account is a related login credential chosen by each buyer. The loss of such credentials will result in loss of INT token. The best way to store a login credential securely is to securely store it in one or more places rather than any public place or a place where a stranger will show up.

14.2 Risks Associated with Buyer's Credential

Any third-party that acquires a buyer’s login credential or private key is likely to control his/her INT tokens directly. To minimize this risk, buyers are expected to protect their electronic devices to prevent admittance of any unverified access request and any access to contents in such devices.

14.3 Risks Associated with Judicial Regulation

Blockchain technology has become a main target of regulation in major countries and regions. If a competent authority for regulation exerts influence, INT applications or INT tokens will be impacted. For example, a new statute restricting the use and sale of electronic tokens.

14.4 Risk of Lack of Attention to INT Applications

It is possible that INT applications are not used by a large number of individuals or organizations. This means that the public is not interested enough to develop and grow these related distributed applications. This phenomenon of lack of interest may have a negative influence on INT tokens and INT applications.

14.5 Risk of INT Related Applications or Products Failing to Meet the Expectations of INT Itself or Buyers

INT applications are still in development and they may be changed significantly before the release of official versions. It is possible to fail any expectation or imagination of INT itself or buyers for the functions or forms (including participants' behaviors) of INT applications or INT tokens. This can happen because of any analysis with error or any change to underlying design.

14.6 Risk of Hacking or Theft

It is possible that any hacker or organization or country or region tries to interrupt INT applications or INT tokens functions in any way, including service attacks, Sybil attacks, guerrilla attacks, vicious software attacks or consistency attacks, etc.

14.7 Loophole Risk or Risk of Vigorous Development of Cryptography

INT tokens might be lost due to development of cryptography by leaps and bounds or development of other related sciences and technologies, like development of quantum computers, or decoding risks brought to encrypted tokens and INT platform.

14.8 Risk of Lack of Maintenance or Use

Buying INT tokens shall be considered as support for, and investment in, the application and development of the IoT rather than speculation. INT tokens may have considerable market value in a certain period of time and enable early investors to make promising earnings. However, if the INT platform is not well maintained or used sufficiently,

such appreciation is not of much practical significance.

14.9 Risk of Loss due to Lack of Insurance

Unlike bank accounts or accounts with other financial institutions, storage in an INT account or Ethereum network is normally uninsured. Any loss under any circumstances is not underwritten by any open organi- zation or individual.

14.10 Other Unpredictable Risks

Cryptographic token is an emerging technology. Besides the risks elaborated herein, there are also some risks which are unpredictable by the blockchain industry itself and the INT team. For further information, please visit INT's official website: https://Intchain.io

Definitions

[1]Bitcoin: Bitcoin is a virtual currency and it is not issued by relying on a certain currency organization; but rather, it is generated through a huge amount of computing according to a certain law. Bitcoin uses the distributed database constituted by many nodes in the entire P2P network to confirm and record all trading behaviors and guarantees security of all parts of the currency circulation process by leveraging cryptographic design.

[2]IoT: Internet of Things, i.e. network links between things.

[3]Apache Mynewt: an open-source community project promoted by the Apache Software Foundation (ASF).

[4]Mynewt: a real-time operating system focusing on IoT applications, including low power consumption bluetooth (BLE50) wireless transfer protocol stack NimBLE; latest stable version 100-b1.

[5]DAPP: Decentralized Application.

[6]DAC: Decentralized Autonomous Corporation.

[7]Distributed Ledger.

[8]Fog Computing: in this model, data, (data) processing and applications concentrate in devices at the edge of the network rather than almost all of them storing in the cloud. It is an extended concept of Cloud Computing.

[9]Hash: a classic technology in cryptography. An input with a random length is turned into an output composed of letters and numbers with fixed length through hash algorithm.

[10]Hash/s (H/S for short): a computing performance parameter, i.e. the number of hashes processed per second. 100MH/S means it is able to process 100 million hashes every second.

[11]Merkle Tree: it is a double-fork tree, composed of a set of leaf nodes, a set of middle nodes and a root node.

[12]PBFT: Practical Byzantine Fault Tolerance, which is also known as the Practical Byzantine Fault Tolerance algorithm consensus mechanism. It is a consistency algorithm for message delivery, wherein consistency is achieved through three stages to determine the final generation of blocks. In the case that there are 3f+1 nodes, such an algorithmic mechanism decides f fault nodes can be tolerated to exist without making any difference to the consistency result. Such a mechanism can be independent from the existence of tokens. Consensus nodes can be constituted by the participatory and supervisory parties. The shared delay for 2 to 5 seconds can basically fulfill commercial requirements.

[13]ZKP: zero knowledge proof, a concept put forward by S.Goldwasser, S. Micali and C. Rackoff in the 1980s, It means that a prover enables a verifier to believe that a certain conclusion is correct without providing any useful information to the verifier.

[14]PoA: Proof of Activity.

[15]POW: Proof of Work.

[16]POS: Proof of Stake. It is a consensus mechanism upgraded from the PoW. It controls the duration of mining based on how many tokens a node owns and how long it holds a token; it can effectively shorten mining time, but it does not avoid the issue of waste of computing resources of miners.

[17]DPOS: Delegated Proof of Stake. For its principle, a token selects a certain number of nodes through voting and completes verification and bookkeeping for them. This consensus mechanism can significantly reduce the number of nodes which participate in book- keeping and verification so as to achieve rapid consen- sus verification. However,

it also relies on the existence of the token and this limits some applications which do not need the existence of the token.

[18]ERC20: the ERC20 Token is a common exchange standard for ETH wallet, allowing developers of wallets, exchange and other smart contracts to know the way a new mark operates based on this standard in advance. In this way, they can design their own applications to take care of these tokens without waiting for any update to a new token system.

[19]ERC223: the ERC20 Token is unable to send tokens to a contract which is incompatible with them. This is the reason for why there is a risk of loss of some capital. The ERC223 Token will introduce a new function to the existing ERC20 standard to prevent any unexpected transfer.

[20]Raspberry Pi: Rpi for short. It is a mini comput- er of credit card size designed for learning computer programming education and its system is based on Linux.

[21]Arduion: a convenient, flexible and easy-to-use open-source prototype platform. It includes hardware (various models of Arduino boards) and software (Arduino IDE). It is developed by an European development team in the winter of 2005.

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