
INT
Make a different world
INT chain Project White Paper
Version 2.0
2018.04

INT: An economy driven solution to improve the device interconnection of Internet of Things

Abstract: INT will build a framework for machines and devices, and create a token, which will be used to facilitate 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. In addition, through zero knowledge proof (specific improvement as necessary), optional masking may be conducted to protect user privacy and improve security.

1 Preface

The Internet of things has developed rapidly in the last a few 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 constraint on the overall IoT development.

It is expected that more than 25 billion nodes will be connected on the internet in year 2020, however, if the interconnection within the whole network is not smooth, the fragmented Internet of Things would not fully realize value of the nodes.

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

1.1 Project objectives

INT is the acronym for *InternetNode 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.

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 the INT a viable solution. 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. Highly distributed IoT field is especially suitable for blockchain applications.

At present, there are several issues with 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 really meet the real-time needs of the 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 range of tens of billions, the additional communication cost also rises exponentially, which will make the IoT solution very expensive.

(4) Security risks

Centralized network has 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 the user's information at will, and after the user realizes the value of their data, he or she may not be willing to just accept the situation. Because the IoT systems have more private information, including health information, vehicle driving information etc., the centralized network cannot be trusted to store that.

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, how to form a unified ecosystem between individual nodes is still a challenge. Later, through the team brainstorming, the team considers an economic way to drive the integration of different systems.

INT is a kind of blockchain application platform and interactive standard which is object-oriented IoT and based on economic driving mode. 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).

So the problem we want to solve is not to provide additional resources, but if the hardware itself is a WIFI, or a temperature collector, when it needs to provide its own value to other services or hardware, the corresponding charging strategy can be proposed. And 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 ecosystem, perhaps we can allow the various devices to open their own functions, so as to gain more revenue through the economic-driven. Because the nature of the standard monopoly is profit, and the tokens themselves can provide profit, and because of the volatility of the price of tokens, it may generate additional economic benefits. Relative income is not less than absolute profit.

So we're going to try a new model that drives the hardware to open itself up by sharing benefits, to get profits decentrally, rather than through a centralized 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 use GAS mechanism, which is similar to ETH. Because devices 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.

Because of the existence of smart contracts, many traditional architectures which cannot be completed in a way that can be taken here, and then implement coordination and interaction, the specific way can be agreed on the chain in the form of a smart contract.

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 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 by the sensor. Moreover, for the current architecture model, even if use the Open ID to implement user desensitization, as long as 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 proof algorithm, by passing the 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 or strategy model and clustering behavior, through zero-knowledge proof algorithm to implement user desensitization.

This allows for the sharing of resources based on intent between devices, and does not require users to share data, which can effectively address user privacy problem.

2.5 Security

Is the device likely to kill like a mechanical bee in a magic mirror (Black Mirror)? This may not necessarily be the case, but it must not be a rarity to drive a automatic car to hit a person into death. The security of the future IoT is the most important, and the INT will try to filter the intent through the innovative BPK algorithm, trying to ensure the user's security.

3 System architecture

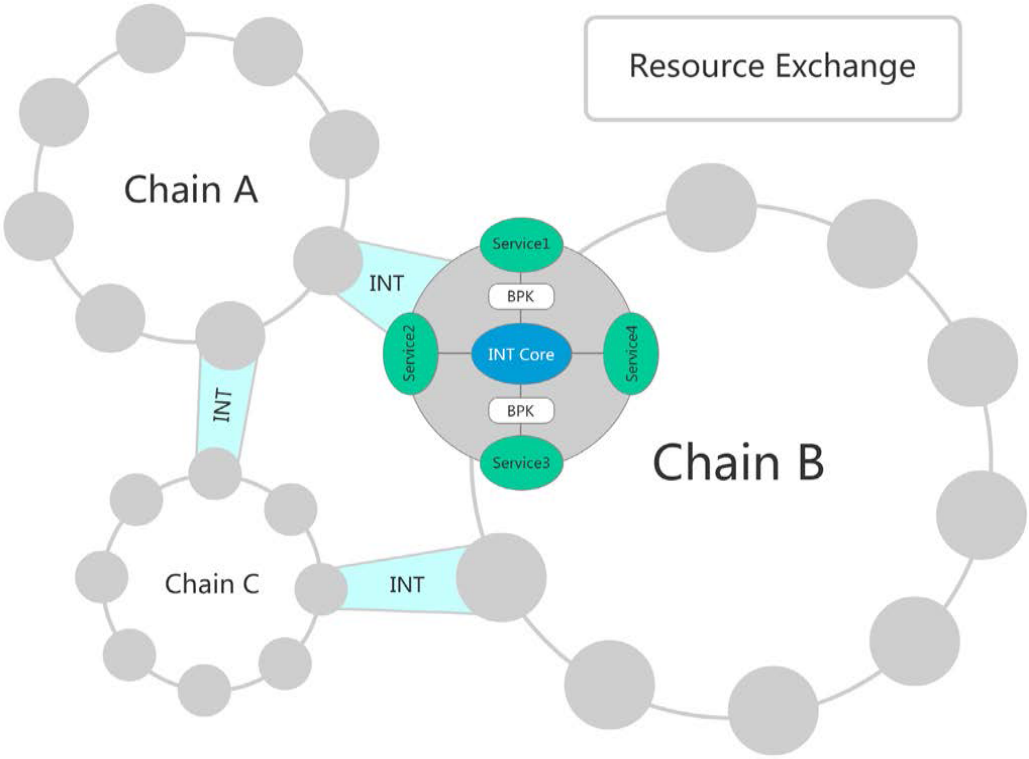

Figure 1 INT system architecture

4 Service

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

5 Trading market

A. Machine automatic matching

Through smart contracts and semi dynamic configuration, for basic services, such as network, power, calculation, self-discovery, implement plug-and-play access.

B. Developer API trading market

For data and services, a trading system is formed in the cloud.

6 INT token

INT token will take a two-tier structure. The first tier is the traditional token structure that participates in exchange transactions and can be understood as an INT share. The second tier uses the first tier token structure, launches a timed auction and float aiming at fiat money, mainly to solve the problem of token volatility, reduce volatility which is easy billing.

7 Machine node

A node may be a traditional PC server node, or a STM32 node that is configured tailoring according to machine performance. IoT is a typical edge fog computing scenario (Fog Computing). In fact, the existing blockchain network is not suitable for IoT. In such a scalable network with high computational power, how to share computational power, in fact, the core is also economic-driven, so we need to define an INT such a solution.

8 Consensus

As we known, in consensus algorithm, traditional DPoS consensus algorithms have started evolving towards the direction of centralization while deviating from blockchain's original intention of decentralization. Therefore, we pragmatically create a new consensus algorithm called Double Chain Consensus Algorithm on the base of deep understanding into the core of DPoS consensus algorithm and on the basis of INT chain's real application scenarios as well as current development status of IoT devices. The basic architecture is shown in the following diagram:

Wherein, the "thearchy chain" made up of the servers provided by device manufacturer, community leader and ecological enterprise is the core of the entire architecture. The "thearchy chain" consists of "thearchy nodes" which have come into being through mass election by the method of community poll. 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 dBFT/DPoS consensus algorithm and coordinate with the work of nodes on the ordinary chains at lower layers. Specific use of whichever consensus algorithm is mainly dependent on the quantity of nodes on the thearchy chain. We are using the dBFT algorithm in the early phase of the project.

Following TXs will be retained in the thearchy chain's blocks: 1. Node grouping TX; 2. Node work reporting TX, and; 3. Identity authenticating TX. Among them, the identity authenticating TX is a key to continuous operation of "thearchy chain". The identification information with signatures of n+1 thearchies will appear on the chain. Through this mechanism, the system can approve new "thearchy nodes" to join in the "thearchy chain" by vote or kick out manufacturers that are no longer involved and thearchy nodes that do not work as normal by vote.

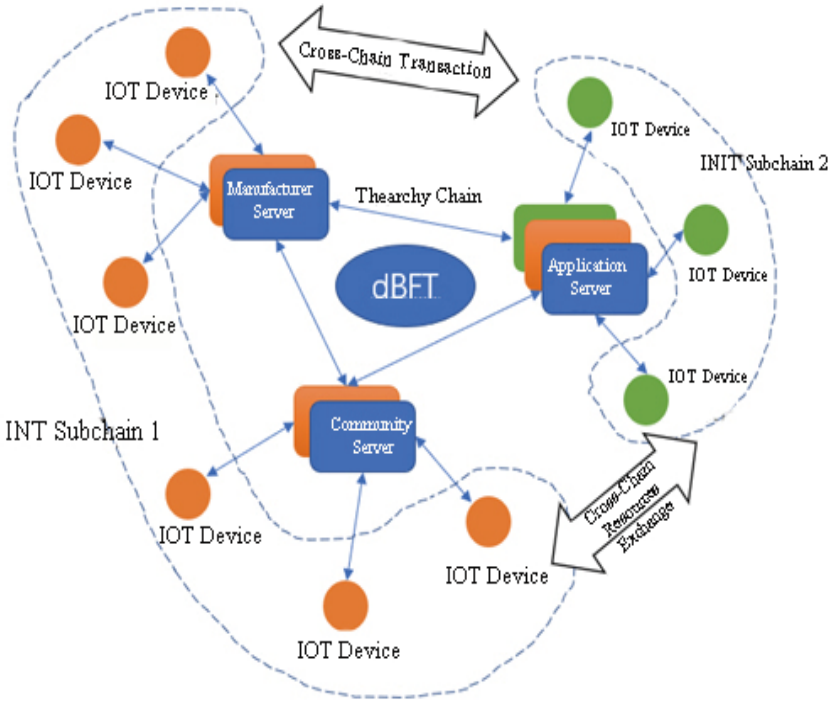

Figure 2: Architecture of Consensus Mechanism Algorithm

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In addition to the "thearchy chain", the entire architecture will consist of ordinary chains which are made up of IoT device nodes of various models produced by numerous different manufacturers, and to which all nodes on the "thearchy chain" will also belong.

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. Determine 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 and then determine 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 the data information reported on other devices is legitimate or not;

4. Report the operation information of ordinary nodes.

By this design, there remain 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 INTchain consensus mechanism is shown as below:

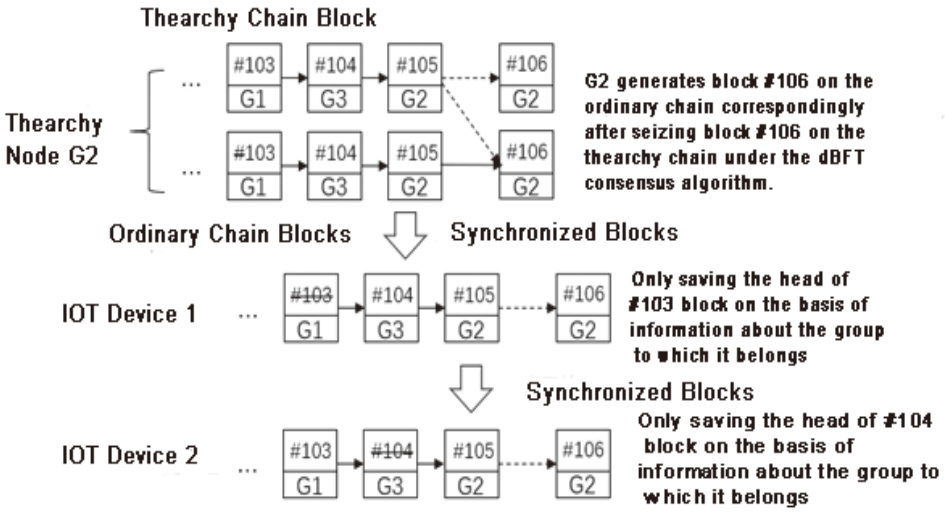

Figure 3: Operational Process of Consensus Mechanism

The operational procedure of the whole process is shown as below:

1. Thearchy nodes generate blocks through dBFT consensus algorithm;

2. The normal nodes running on the server where thearchy nodes are located generate blocks after the thearchy chain generates blocks;

3. 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;

4. 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's confirmation speed and reduce the bandwidth consumption brought about with TX broadcasting of IoT in narrow-band edge network.

5. On the basis of their own grouping information, IOT devices can delete ordinary chain blocks that are alien to their own group;

6. IoT devices deliver the running log to the thear - chy chain through node work report TX in order to obtain salary income;

7. IoT devices send ordinary TX to each other to call functions or send collected data;

8. What is displayed, by default, on the INT browser is the block information about the ordinary chain;

9. 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;

10. On a regular basis, the thearchy chain creates device grouping TX according to the node information of registered IoT devices.

8.2 Calculation Separated from Bookkeeping "Mining Mechanism"

After using the double-chain formulaic algorithm, no IoT device would 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 mechanism to reward IoT devices (nodes) at normal work in order that the entire blockchain network can operate more healthily. From the perspective of implementation, the current scheme being adopted for INT is the wage-paying mechanism "contingent on device's working conditions", but we give an umbrella name to such 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 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 would disclose a salary calculation algorithm, into which the input is the records of working status of all devices within the current period whereas from which the output is the payroll of each device. Plus, INT would publicize the payroll within the publicity period, whereafter the INT foundation would issue INT token 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 mechanism also addresses the issue that economic parameters of traditional blockchains are not easily modified once set. Moreover, the openness and fairness of core mechanism of blockchain are safeguarded through the open algorithm and its input.

8.3 Extending Business Logic Using Smart Contract

INTChain delivers a basic capacity, namely different device manufacturers are allowed to extend the smart contract operating on their own subchain. But considering the hardware capacity of IoT devices, traditional virtual machine-based methods are not employed to extend smart contract. We call such capacity of extending smart contract TX of blockchain as INT Contract.

The principle of INT Contract bears relation to the implementation architecture of INT chain. The implementation architecture of INT chain is shown as below:

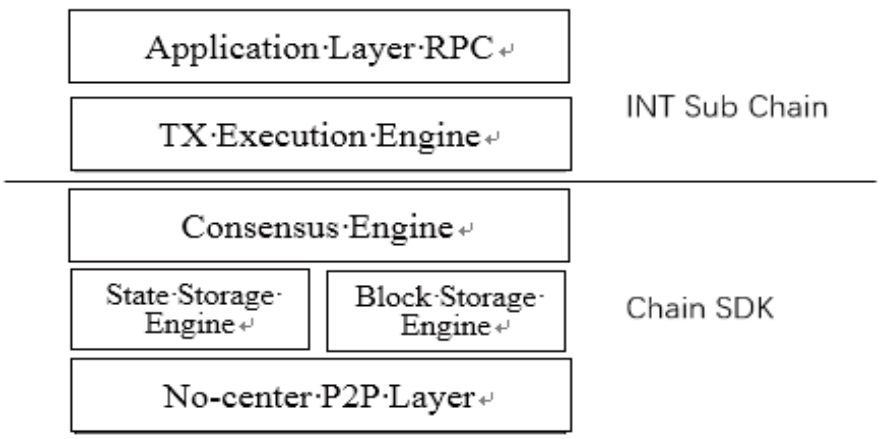

Figure 4: The implementation structure of INT Chain

Each INT subchain is developed based on the same chain SDK. But different subchains are allowed to extend their own INT Contract at the TX execution engine layer. Traditional development language (JavaScript), instead of specialized smart contract VM, is used to extend INT Contract and can run directly on the OS of IoT, featuring high executive performance, low resource consumption and applicability for the real execution environment of IoT devices. Moreover, the learning cost and engineering cost of INT Contract are lowered with effectiveness with the use of regular development languages.

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 form as 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. The smart contract deployed on Ethereum is originally unable to access networks beyond blockchain, even impossible to call the 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 smart contract of blockchain. Oraclize Company promotes the Oracle tool which ensures data are not counterfeited to a certain degree through verification of TSL Notary.

The above description reveals that the core strategy to cope with the puzzle in source-tracing application is to minimize human participation and economic motives for counterfeit throughout the process from collection to processing to transmission-onto-chain of key source data of “matter”.

The shell of INT chain will develop supporting tools similar to Oracle for the smart contract module constituted by Software Fetch and Hardware Fetch to provide reliable executive source data for INT smart contract at 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 chain1.0, 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, the INT Contract feature needs to be exploited to create a contractual account for each participant. For any other blockchain incompatible with INT Contract, it can remain compatible with INT’s cross-chain protocols as long as a simple smart contract feature can be delivered.

(2) Cross-Chain Distributed Transaction Protocol

Cross-chain distributed transaction means multiple steps of an entire transaction whose consistency is secured are implemented on separate blockchains. 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 contract 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 Packaging Methods of Blocks

Different chains may take either form of chains generating blocks at high frequency and low time consumption or highly densified blocks. So, different packaging methods for enclosed blocks are adopted for each parallel chain, and consensus is integrated via the relay chain. The consensus integration part will be billed by main nodes.

8.7 Network Design

IoT is such an extremely special network that there is enormously great discrepancy between the requirements for accuracy of delaying different protocols. So we will adopt the MQTT method in respect of network architecture and accomplish specific implementation and protocol amelioration for MQTT to fulfill the demands for blockchain.

9 Application Scenarios of INT and INT DAPP

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 and real-time, credible automatic data exchange and automatic transaction will be implemented between machines and between human and machine via the distributed IoT DAPPs.

INT will implement data transmission featuring direct interconnection between nodes within IoT. IoT solutions would 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 network of blockchain. Some typical application scenarios of INT are:

（1）Intelligent manufacturing:

Product transport, for instance, in which the 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, intensify 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 change into smart application terminals, and car owners can exploit blockchain to trace IoT devices (e.g. annual inspection of vehicle, automatic car insurance tracing, etc.) Automatic traveling data exchange between vehicles. For instance, the source map indicating traffic congestion transmits data for car owners to keep track of the real-time traffic condition and implement automatic drive in a safer manner, automated navigation of automobiles, roadside service, etc.;

（3）Intelligent finance:

In combination with the impossibility of falsification and authentic right of data implemented for distributed data of blockchain, the authenticity of data about financial agencies is secured, issues such as letter of credit, corporate obligations and bonds, trading platforms, giving quotation, contract fraud and order fraud can be avoided, and traceability in financially safe network is enhanced;

（4）Intelligent equipment:

Sensors are utilized to trace the conditions of bridges, roads and power grids, even to help monitor natural disasters in remote areas, prevent against massive mountain conflagrations, disease and pest damages and other grave catastrophes, 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 board, smart city, military appliances, etc. In intelligent medical treatment, partnership has been achieved with INT'L Medicine, a well-known leading domestic listed enterprise in medical circulation. Having successfully addressed such issues as resource waste in drug packaging, environmental pollution and difficulty in ensuring drug safety during transportation, the INT technology and RSPS carried system can not only provide real-time location information but also ensure safety protection for whole-process traceable drug circulation, channel end-to-end business data and boost the efficiency of drug circulation.

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, different participants can receive the profit at right cost and share it with each other. There exists the bonus of fast development in both domains of blockchain and IoT.

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

In the first step of the solution, we will release the INTchain1.0 by the first quarter of 2018 and, on this base, accomplish code reconstitution and stratification to implement the double chain architecture and create a new version INTchain 2.0 to be released by the second quarter for commercial operation among multi- tudinous cooperative clients.

In the second part, we will build the INT ecosystem, integrate upstream and downstream enterprises and scientific research enterprises in IoT, create open hardware platforms, and apply INT in IoT big data, IoT supply chain, finance, intelligent manufacturing and more industrial domains.

11 INT team

The INT team core members include the first batch of IoT development experts globally, developers with vast experience in communication and large systems, architects for operating systems, and engineers in the financial field. The R&D team has a deep understand - ing and research and development experience in the fields of IoT、 signal transmission,

security system design, blockchain, bottom layer of bitcoin, Ethereum, automated value exchanging, machine learning, the big data technology and so on

11.1 Core Team Members

Xiang Ruofei

Chief Scientist of INTchain. Dr. Xiang holds the degree of post-doctoral research at 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 "863" Projects. He has published multiple papers and applied for several technology patents.

Chen Guanghui

Chief Development Engineer of INT DAPP. Mr. Chen graduated from Fudan University, majored in Computer Software. He worked in EastCOM and Huawei successively. He has rich experience in communication underlying technologies, system 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 in the direction for 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 for the IoT. One of the earliest IoT research and development practitioners in China, entrepreneur of successive 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 instrument based on GPRS, depth of anesthesia tester, early diabetic neuropathy tester and the first WeChat-based IoT device in China - Welomo.

Zhang Bo

Mr. Zhang holds a Mater's Degree from Huazhong University of Science and Technology. He has 12 years of experience in stystem 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 system engineering and highly reliable and secure system 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 deisgn, 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

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.

Roy Li Celebrated network security and IoT expert.

Zhao Yafu Director of Risk Management of Guangdong 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 of-ficial 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

· PHS products, communication platform and 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 INT platform.

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 underlying assets INT token as well as membership dues, donations, etc. paid by members of the alliance blockchain. Some INT will be converted into other forms of equity assets for project operation if necessary.

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 budget shall be submitted to the Autonomous Committee for review; monthly financial budget shall be re-viewed 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 promotion team of the INT project commits makes a commitment to manage crow-funding 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 blockchain industry and enhance transparency of management of encrypted digital assets on blockchain by setting itself as an example to safeguard 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 as of the date of each fiscal year (i.e. December 31 every year).Contents of these reports include but not limited to technology development milestones and 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 cooperations, any change to core team members, lawsuits involved 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, assistant decision-making, and other outside brain staff, 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 post-doctoral 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

The INT Foundation will employ well-known international law firms as an INT project legal advisor to provide comprehensive legal services for the design of the digital asset transaction structure, operational compliance, legal wind control system design, 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, 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.

INT token is neither an ownership nor a control power. Any control over INT token does not represent the control power over INT or its application. INT token does not empower anybody to involve in such control or make any decision on INT and its application.

14 Risk Statemen

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 credential 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 Core Protocols of Ethereum

Before the launch of the main blockchain of INT, INT token is developed based on Ethereum ERC20 Protocol. Therefore, any fault incurred by the core protocol of Ethereum, unpredictable functional failure or incurred attack will possibly cause INT token to stop working or lose functions in an unexpected way. For further information about Ethereum protocols, please visit http://www.ethereum.org

14.3 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 INTcoin 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.

14.4 Risks Associated with Judicial Regulation

The 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 token will be impacted. For example, statutes restricts the use and sale of electronic tokens.

14.5 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 negative influence on INTcoin and INT applications.

14.6 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 the INT itself or buyers for the functions or forms (including participants' behaviors) of INT applications or INTcoin. This can happen because of any analysis with error or any change to underlying design.

14.7 Risk of Hacking or Theft

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

14.8 Loophole Risk or Risk of Vigorous Development of Cryptography

INTcoin 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.

14.9 Risk of Lack of Maintenance or Use

Buying INTcoin shall be considered as support for and investment in the application and development of the IoT rather than speculation. INTcoin 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.

14.10 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 organization or individual.

14.11 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 operation 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 algorithmic mechanism decides f fault nodes can be tolerated to exist without making any difference to the consistency result. Such 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 bookkeeping and verification so as to achieve rapid consensus 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 computer 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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