SPACEBOOK: A standardized infrastructure for the next generation of distributed network.

Spacebook Foundation
https://spacebook.net

Spacebook is a large-scale distributed infrastructure network. Spacebook provides computing power, bandwidth, and storage computing resources, while using Proof-of-Traffic based on the proof of unit time throughput to reward infrastructure contributors. The distributed and intelligent features of the Spacebook network enable developers of Public Chain and DApp (Decentralized Application) to release software without complicated network deployment; developers can focus more on product implementation while at the same time effectively reducing development costs. Spacebook aims to create a distributed network ecosystem in which all parties including infrastructure providers, middleware providers as well as DApp developers will achieve common development, share common values and promote co-governance. Spacebook provides efficient, reliable and low-cost infrastructure for the implementation and prosperity of blockchain applications.

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Chapter 1: Status and Problems

1. Thinking from Bitcoin, Smart Contracts of Ethereum and Blockchain Technology

In 2008, Satoshi Nakamoto detailed a completely peer-to-peer technology in his paper "Bitcoin: A Peer-to-Peer Electronic Cash System": an electronic cash system that enables online payments to be initiated directly by one party and paid to the other without going through any third party. Bitcoin pioneered the decentralized digital currency and became the first fully decentralized cryptocurrency that can be traded without the need for intermediaries. Today, the total market cap of Bitcoin has exceeded $110 billion. The digital cryptocurrency system, represented by bitcoin, is commonly referred to as blockchain Technology Version 1.0.

Next, between 2013 and 2014, Vitalik Buterin proposed the concept of Ethereum. Ethereum is an open source, public blockchain platform with smart contract. Ethereum provides an internal Turing-complete scripting language that allows users to build and process peer-to-peer smart contracts or transaction types using their proprietary digital cryptocurrency, the Ethereum (ETH). Today, the total market cap of Ethereum has exceeded $47 billion. The combination of digital cryptocurrency represented by Ethereum and smart contracts is commonly referred to as Blockchain Technology 2.0.

Both Bitcoin and Ethereum are based on blockchain technology (also known as Distributed Ledger Technology(DLT)). Blockchain technology is a self-referential data structure used to store a large amount of transaction information. Each record is linked from the back to the front and it is transparent, unable to tamper and easy to trace. The blockchain technology itself achieves a consistent consensus on all nodes of the system by sacrificing efficiency of execution to a certain extent. This process does not require any centralized nodes to provide services or credit endorsements. In other words, it greatly reduces the cost of establishing credit between all nodes in the system. This peer-to-peer credit verification, once applied in a real business environment, will greatly eliminate the cost of trust between the various nodes in the value chain, so that the transaction information can be automatically transmitted and carried out without the verification of the third party node.

Since the beginning of the human society started to enter the commodity economy stage, all commercial activities are inseparable from the effective flow of three types of value, namely information flow, logistics and cash flow. Effectively improving efficiency or reducing costs in the liquidity of any type of value can create a huge incremental trading market for the commodity economy. The birth of advanced means of transport, such as ships, trains and planes, has greatly improved the efficiency of logistics, reduced logistics costs, and created possibilities for the circulation of goods in the global market. The invention of telegraph, telephone, fax machine and Internet has greatly improved the efficiency of information flow transmission, reduced the cost of information flow transmission, and enabled commodity information to reach a wider range of consumers, satisfying or even generating transaction demand. The emergence of banknotes, checks, credit cards, and electronic payment methods has greatly increased the efficiency of cash flow, and the cost has been greatly reduced. The capital turnover rate of all parties has been greatly accelerated, so that it can meet the demand for larger transactions with less capital.

The essence of blockchain technology is to combine information flow and cash flow into one, and at the same time, it can complete peer-to-peer direct transaction confirmation without providing credit endorsement or intermediary service through any third party. This allows transactions between all participants in the value chain (namely, participants in all trading activities) to be automated based on smart contracts developed between them in any business area, and the execution process is transparent, unable to tamper and easy to trace. This greatly eliminates the cost of trust between transaction participants, and simplifies the multiple, multi-layer, and asynchronous transaction processes within the value chain into a one-time, automated transaction process in which all participants participate. Such a transaction will counteract all participants in the value chain, facilitating them to establish a consensus mechanism from the perspective of maximizing the value of the overall value chain, thereby greatly changing the production relations between the participants (from the original model of mutual distrust or even antagonism, infringement of interests to the establishment of collective consensus, interest transfer and sharing) to further liberate the productivity of all parties in the overall ecosystem.

At present, there are various application ideas and scene designs of blockchain technology. But all attempts to realize these ideas and scenarios into applications are faced with many common problems. First, completely-decentralized system cannot coexist with security and high efficiency (“Impossible Triangle Paradox”, quoted from the People’s Bank of China Chen Yixi’s paper “The Impossible Triangle of Blockchain Technology”). This problem exists not only in the blockchain world, but also in human production and economic activities. More than two thousand years ago, when humans used their surplus items to seek the equivalent exchange of different kinds of surplus items of other people, the market came into being. Since then, human society has never been completely “decentralized”. Therefore, the design of the consensus mechanism and network topology of the Spacebook network must be compromised and balanced among the three. Secondly, except for a very small number of enterprises, the application development of blockchain has encountered the problems of lack of infrastructure and middleware plus bottlenecks in throughput, making the possibility of designing complex smart contracts almost non-existent. This hinders the possibility of using blockchain technology to solve various real-world scenarios. Thirdly, the blockchain as a new technology lacks regulatory laws and benign institutional design. Thus, with the outstanding financial properties of the blockchain technology itself, the cost of fraud for blockchain practitioners becomes very low, which leads to various financial scams and the rampancy of mean cryptocurrency projects, thereby deepens the public's negative impression of blockchain technology, making the popularity and progression of blockchain harder to achieve.

2. Problems of Peer-to-peer Network and the Challenges that Faced by Public Chain and DApp Developers

In a pure P2P(peer-to-peer) network, how to solve the access reliability of network nodes and effectively cope with the sudden increase of large-scale network traffic while taking into account efficiency and cost has always been a difficult problem to solve. Introducing a professional peer (SP) in a P2P network to provide sufficient redundant network resources can effectively solve the overall reliability and efficiency problems. Historically, Chinese Internet companies such as Xunlei, QvodPlayer and Tencent have built ultra-large-scale P2SP (Peer to Server and to Peer) networks to solve application scenarios such as file downloading, content distribution and data synchronization under large-scale usage, normally with a scale of 100million Daily Active User (DAU) or above. This is also the most extensive and reliable use case for P2SP networks worldwide.

At present, the development of the blockchain public chain and DApp (Decentralized Application) encounter the following problems when implementing: 1. Lack of blockchain-friendly distributed infrastructure. Many public chain developers use existing public cloud computing platforms to deploy node resources and implement code. However, current centralized public cloud computing platforms cannot complete the functions of automation node and code deployment, developers need to manually deploy code on one node before another, causing huge cost and time waste. 2, the underdevelopment of infrastructure construction can easily lead to throughput bottlenecks, therefore unable to handle large-scale concurrent network traffic. The popular Fomo3D game directly led to the congestion of the entire Ethereum network. It often takes ten minutes or more to complete a transaction in the game. This situation that one application leads to the congestion of the entire network is the biggest obstacle to the development and prosperity of DApps. 3. Fully distributed networks often have bottlenecks such as unreliable nodes, which leads to a large amount of additional work proof calculations in order to complete a transaction, which consumes considerable computing power, traffic, and storage resources. The entire blockchain world needs more reliable, efficient and low-cost, scalable infrastructure.

Chapter 2: Ideas and Objectives of Phase One of Spacebook's Network

1. Overview of Idea in Network Phase Ⅰ Design

Spacebook's Network Phase I is designed to provide a standardized, intelligent, and scalable large-scale distributed infrastructure network for the blockchain world. Globally, Spacebook's initial goal is to build millions of professional peers and tens of millions of common peers, before applying PaaS service for the blockchain world usage. Through implementing the main network communication logic through P2SP network technology that has been verified by large-scale concurrent network applications, Spacebook creates a very large-scale distributed computing network; Spacebook connects all network nodes through a consensus mechanism, and provides distributed computing, file storage, and network communication standardized components for developers to use. Spacebook also aims provides a range of network middleware including PaaS service, wallets, virtual machines, and smart contract deployments to help developers implement and deploy business application logic more swiftly. Spacebook uses Token to motivate infrastructure contributors, middleware developers and DApp developers to build a distributed network ecosystem of shared development, shared value and effective governance. Spacebook provides an efficient, reliable and cost-effective infrastructure for the development and prosperity of blockchain technology.

In order to practice and achieve the above objectives, Spacebook will take the lead in setting up a global large-scale gross computing infrastructure network, standardizing the information flow between peers and mapping it into the number of Tokens. Spacebook will also be responsible for the initial establishment of a Token economic model of supply and demand. Based on this token economic model, Spacebook develops an ecology network for all infrastructure contributors, hardware developers, application developers, middleware developers and users to share value, interact benignly and grow healthily. In the future, with the support of trusted computing technology, Spacebook is expected to standardize the measurement of computing resources and traffic of networks, further highlights the value of computing resources in the whole Spacebook network.

Spacebook hopes to unite all the consensus forces, starting from the underlying infrastructure and R&D(research and development), reshaping the value of the blockchain world, breaking the barriers to information flow, eradicating the crypto currency scams from the source, and letting the objective value of the blockchain world attribute to constructors, developers that truly make contributions. Eliminates trust barriers and unreasonable allocation mechanism among Internet-centered business organizations, traffic brokers, independent application developers and users, further stimulates the initiative and enthusiasm of the participants in the blockchain world, and builds a blockchain network industry that shares long-term interests, positive value and sustainable development. Spacebook hopes to develop more than 10 million wallet users in the 12/24-month cycle after the main-net online. The final consensus number expected be more than 1 billion, covering all Internet users in major countries.

2. Overview of Network Phase I Design

Spacebook's Network Phase I is designed to construct a complete network topology system using the idea of partial decentralization while also addressing security and efficiency issues (Hybrid). Instead of designing blockchain networks and consensus mechanisms based on individual events or transaction characteristics, the team tries to superimpose blockchain networks and consensus mechanisms with mature computing network architectures; makes the process of information flow standard and abstract during the computing process, simplifies the design of the consensus mechanism; restricts the any possible cheating and abusive behavior in the network jointly by feasible technical means and an effective Token economic model. The target is to ensure the integrity and fairness of the consensus mechanism to the greatest extent possible while meeting mass computing requirements of the applications efficiently.

3. The Main Technologies Involved in Network Phase I Design

—— Large-scale grid computing technology for high concurrency and complex application computing;
——Distributed storage technology for massive data;
——Distributed network technology for blockchain computing;
——Encryption security (including hardware encryption) technology;
—— Proof-of-Traffic (PoT) consensus mechanism and smart contract based on actual throughput;
——Blockchain distributed ledger technology based on Gosig algorithm;
——Trustworthy computing technology;
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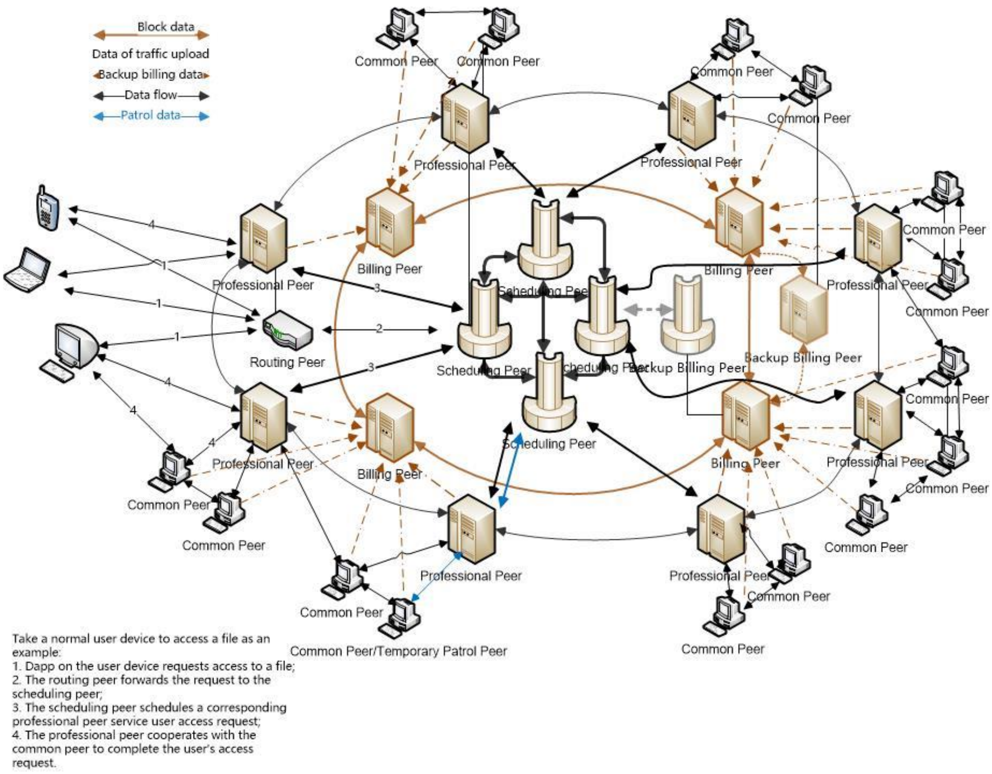
4. Network Design Topology in Network Phase Ⅰ



Spacebook's Network Phase I is actually a hybrid model of a distributed computing network and a blockchain network. The distributed computing network completes various computing and storage task logics based on a centralized intelligent scheduling network, while a decentralized blockchain network completes the PoT consensus mechanism based on actual throughput. Smart contract issues various types of Token incentives and completes decentralized chain transactions. The goal of the Spacebook Phase I network is to provide blockchain application developers with an efficient, secure, blockchain-friendly computing platform with QoS. Regardless of what public chain that application developers rely on, Spacebook can be chosen as a low-cost, reliable, secure and efficient file, data storage and transport infrastructure. With the high-performance of professional peers and scheduling peers deployed around the world, Spacebook could automatically and efficiently deploy, distribute and access requests of popular files.

5. Definition and Effect of Each Role in Network Phase I

i. Professional Peers

Spacebook Professional Peers are the underlying supporting nodes for the entire computing network. Physically, a professional peer is a general-purpose computing server deployed in a professional IDC with enough computing power, bandwidth, and storage resources. In addition to standalone support capabilities such as network communication, encryption, file system and database, professional peers connecting-together will also serve as general-purpose gross computing platform, providing a variety of application-oriented functional call interfaces and virtual machine services. Network throughput data of the professional peers will be recorded by the billing peers periodically, and the corresponding tokens are issued as an incentive.
The professional peers in the Spacebook network are mainly built and provided by third parties. After the Spacebook main-net launch, any third-party computing resources that meet the prepositional requirements can be added to the Spacebook network.

ii. Common Peers

Any Spacebook common peer is an auxiliary support facility for the entire grid computing network. Physically, a common peer is a personal computing device that has a certain amount of computing power, bandwidth, and storage resources connected to the Spacebook network. Common peers mainly provide backup storage and patrol statistics of the Spacebook network, and occasionally contribute certain amount of computing power and bandwidth resources especially during the peak period of network traffic. Network throughput data of the common peers will also be recorded by the billing peers periodically, and the corresponding tokens are issued as an incentive. After the Spacebook main-net launch, any personal computing device that meets the prepositional requirements can join the Spacebook network.

iii. Billing Peers

The number of billing peers is a minority within the Spacebook network, and physically a billing peer is a dedicated server with enough computing power. The purpose of the billing peer is to verify, compare, and sort the throughput data reported by the professional peers and the common peers, before packaging the completed throughput data into a blockchain according to the block generation logic and the egress period, ultimately submitting for consensus algorithm verification. As the verification process completes, blockchain data is formed and stored in the node. Billing peer will also receive tokens dedicated to reward them through smart contract during the working period. The computing resources of the billing peers are only used for ledgering, as billing peers do not provide computing power, bandwidth, and storage resources for any other computing tasks.
Spacebook network will open the billing peer election campaign before main-net launch. No more than 21 nodes will be elected as default billing peers, whilst other running nodes will be appointed as backup billing peers.

iv. Scheduling Peers

Scheduling peers of the Spacebook network is physically supercomputer clusters, which are mainly responsible for: statistically counting schedulable computing power, bandwidth, and storage resources of the whole network; analyzing computing task requirements; and intelligently allocating the computing power, bandwidth, and storage of corresponding professional peers or common peers to meet the corresponding requirements. Taking storing files into the Spacebook network as an example. Upon receiving the storage task, any given scheduling peer broadcasts the storage task in the cluster of the scheduling peers. Then, scheduling peers who receive the task during the broadcast selects its correspondent qualified professional peers and attend the scheduling election. The scheduling peer performing the broadcast collects the election response of each scheduling peer within a limited time and determines the primary professional peer(s) and the backup peer(s) that would perform the storage task according to the scheduling rules. Factors affecting the scheduling rules including: total storage space of the professional peer, available storage space on the professional peer, online duration of the professional peer, number of common peers connected to the professional peer, number of redundant common peers connected to the professional peer and total available storage space of those common peers, the physical location of the professional peer and a random integer factor. Scheduling peers do not participate in ledgering, nor do them provide computing power, bandwidth, and storage resources to any third-party computing tasks, nor do them store program codes, files, or access logs of any third-party computing tasks. Scheduling peers are initially funded and maintained by the Spacebook team. The scheduling algorithms will be gradually open sourced after Spacebook main-net launch.

v. Patrol Peers

A patrol peer is a peer that automatically chosen to execute temporary patrol role. Any professional peer or common peer connected to the Spacebook network may become a patrol peer at any time. Spacebook scheduling peers may include a patrol task randomly among any scheduled computing tasks. A patrol task is a computing task involving at least one of the following features: sorting algorithm, ellipse encryption/decryption algorithm, file compression, floating point operation and large-file I/O. The professional peer or common peer performing these tasks does not aware whether any task being executed is a patrol task or not, nor will it be notified in advance. When the patrol task is completed, the scheduling peer will verify the results returned and decide whether to issue patrol token rewards to the corresponding patrol peer.

vi. Routing Peers

Routing peers are mainly responsible for the access of the mass end users of the Spacebook network. They manage traffic-load balancing, network security, and cyber-attacks through a routing cluster, preventing the scheduling peers from being directly exposed to open Internet environment. Routing peers are also initially funded and maintained by Spacebook team.

Chapter 3: Consensus Mechanism and Economic System of Spacebook’s Network Phase I

1. Proof-of-Traffic Consensus Mechanism and Block generation Logic

The consensus mechanism is the core technology of the blockchain. Popular consensus mechanisms nowadays are PoW, PoS and BFT. Taking the energy and computational waste of PoW and PoS, as well as poor TPS into consideration, Spacebook would prefer to save the resource for third-party computation tasks. Together with the fact that professional peers of Spacebook's Network Phase I are mostly regarded as trusted peers, Spacebook's selected the BFT-derived Gosig algorithm for billing peer’s secret election and block generation based on throughput data on billing peers.

For the details of Gosig algorithm, please refer to the corresponding paper of Professor Wei Xu and the research team of Tsinghua University published in February 2018(Gosig: Scalable Byzantine Consensus on Adversarial Wide Area Network for Blockchains). The core design idea is that under the premise of limited node amount and relatively high credibility in a Blockchain network, a methodology of set-of-random-numbers calculation can be used to secretly elect the billing peer among all peers, before generating block based on the data recorded on the billing peer.

Unlike PoW and PoS, Spacebook uses a Proof-of-Traffic approach to record the network throughput of different peers in the entire computing network, motivates infrastructure providers with Token accordingly, thus ensure and promote efficient operation of computing and network resources supply and demand models.

The block generation process of Spacebook's Network Phase I is explained as follows, taking a ledgering period of 5 minutes as an example:

Step 1: each common peer and professional peer (hereinafter collectively referred to as the node or nodes in this section) records its network throughput data in the current ledgering period, performs adjacent binary tree comparison; sorts by numerical value in a descending order.

Step 2: nodes with the lower throughput ranks rolls their throughput data into the next ledgering cycle for accumulation; and nodes with the highest throughput ranks reported their throughput data to the billing peers, although, before reporting their collective data, certain traffic-related third-party nodes will compare the upstream and downstream throughput data with the throughput data of the nodes reporting to the billing peers. Throughput data with correct third-party comparison results will subsequently be recorded by the billing peers. Any incorrect data found in comparison results will be held and may be exposed to a second or even multiple comparisons. Node with multiple comparison failures may trigger patrol tasks, in the worst case may lose its place in the network.

Step 3: billing peers perform distributed sorting of all throughput data reported by nodes in a descending order, selects the throughput data within the highest group of nodes. The throughput data of the remaining nodes is rolled into the next ledgering cycle to be accumulated;

Step 4: secretly elect the billing peer according to the Gosig algorithm, and the elected billing peer packs the data before generating the block.

Step 5: the highest group of nodes receives token reward based on the block data generated by the billing peer. In any given ledgering cycle, the number of tokens that a node would obtain is calculated as follows:

N(a)=N(total)*T(a)/T(total)

Where
N(a) is the number of tokens awarded to node(a) in this ledgering cycle;
N(total) is the total number of tokens awards to all nodes in this ledgering cycle, with prior consensus by smart contract;
T(a) is the throughput data of node(a) in this ledgering cycle; and
T(total) is the total amount of throughput data of the highest group of nodes recorded by billing peers.

For an example, assuming a total of 1 million token are issued to the top 100 nodes winning the throughput data sorting game in a ledgering cycle, whilst the throughput of the (a) node in this cycle is 80 GB, and the total throughput of these top 100 nodes sums up to 1000GB, then the reward of that (a) node would be 80GB/1000GB*1 million=80,000 tokens). After obtaining their respective token incentives, the winning nodes clear its throughput data record and roll back into the next ledgering cycle.

2. Token Usage, Distribution, Economic Model

i. Token Usage, Distribution, Economic Model

Spacebook Token (SPB) is a universal digital certificate in the Spacebook network. Its primary purpose is for the applications (DApp) to pay for their nominal computing resource usage and traffic transmission (bandwidth consumption) behaviors in the entire Spacebook network. Additionally, it can also be used as a general means of payment for direct digital asset transactions between Spacebook community consensus users.

Totally 10 billion SPB will be generated and initially issued as follows(preliminary plan):

—— 4.5 billion (45% of the total) SPB would form a mining pool, distributed to all infrastructure contributors including professional peers, common peers, billing peers, and patrol peers, in a yearly decay model of no more than 10 years. The initial allocation mechanism is as follows:
1．64-99% of which are distributed to the professional peers and the common peers according to the consensus mechanism stated above, motivating actual throughput completed;
2. 1% of which are distributed to the billing peers as a reward of block generating;
3. 0-35% of which are distributed to the scheduling peers as a reward for completing the scheduling task.

——2 billion (20% of the total) SPB will be allocated for deposit usage of related parties and necessary market intervention. This part of token will be initially managed by the Spacebook Foundation in accordance with the following rules: 1) To provide discounted token sales for professional peers and DApp developers with limited usage as deposit ONLY, with a lock-up period for 12 months; 2) To provide liquidity to the open market to ensure sufficient token circulating so that all parties could acquire and use for different purposes, without any lock-up limitation. Funds obtained from the sale of this part of token will be entrusted to the Foundation and used for investment in the Spacebook's basic network and other purposes within the scope of the Foundation's authority.

—— 1.5 billion (15% of the total) SPB play as a reserved use for ecological development. This part will be managed by the Foundation according to the following rules: 1) 5% will be used for construction and operation expenditures of the global community of Spacebook ecology, including the operation and maintenance costs of not less than 51% of the scheduling peers in the Spacebook network; 2) 5% for setting up a DApp ecology investment fund, investing in DApp development and operation teams and enterprises who use Spacebook as their infrastructure; 3) 5% for rewarding Spacebook community opinion leaders, technology contributors (providing algorithms, executable middleware components, network security services, community and other services) , according to rules uniformly proposed and decided by the Foundation and the Governance Committee. These parts of token are expected to be unlocked and used in batches within 5 years after the project is launched.

—— 1.5 billion (15% of the total) SPB are designated for long-term commitment and services incentives for the Spacebook team. This part of Token will be unlocked linearly in 6 years.

—— 500 million (5% of the total) SPB are obtained by the cornerstone investors of Spacebook project. This part of token will be unlocked linearly after 6 months since the main-net launching.

The above allocation scheme and token issuance process set to be locked by smart contracts.

ii. Economic Model

As the scale of any given Internet economy is mainly judged based on the volume of information transmitted as an objective means, Spacebook believes that there is a connection possibility between the scale of Internet economy and its financial valuation method. That is, after the flow of information in the computing infrastructure is quantified transparently and measured traceably by blockchain technology, any unit information flow can be reflected directly by a certain token amount.

Linking infrastructure builders, application providers, and end users with such a consensus mechanism will ultimately allow any application running on the Spacebook computing infrastructure network to be objectively valued, before its value shared among all consensuses.

In other words, the Spacebook network links all information flows among its nodes to crypto assets. This will open up the following possibilities:

——As an cryptocurrency, SPB has real grid computing network resources as the basis for valuation; at the same time, its real flow will objectively reflect the flow of data assets in the entire network;
——All infrastructure contributors receive incentives equally and share the ecological evaluation improvement of the overall network;
——The entire web ecosystem and DApp are valued based on real and open traffic data;
——Establish an open and equal traffic trading market to eliminate price discrimination under closed ecosystem and information asymmetry scenarios.

After the Spacebook mainnet's launching, the main demand side of the SPB token will be DApp developers, and the main supply side will be infrastructure providers (miners), including the professional peers and the common peers. That is to say, the main usage scenarios of SPB token are the lock-up of network computing and storage resources and consumption of bandwidth resource.

iii. Pricing Mechanism (first draft)

From the day of the Spacebook's main-net launching, Spacebook will set a nominal price for all DApps' references. The nominal price includes:
—— Lock-up a certain amount of grid computing (including computing power, bandwidth, and storage) resources for the Token price required for DApp to use at its deposal;
——Throughput consumption of per period, charged at a quantitative price.

The calculation formula for the nominal price in a certain period can refer to the following algorithm:

Assume that P1 is the nominal price of the cycle, P is the nominal price of the previous cycle; S is the total amount of idle computing power of the entire network in the previous cycle and the total amount of bandwidth, calculated in accordance with the nominal price of the previous cycle; S1 is the total amount of new available computing power and bandwidth, calculated in accordance with the nominal price of the previous cycle in this period; D is the total amount of actual token consumption of computing power and bandwidth of the DApp of the whole network in the previous cycle; D1 is the net increase of computing power and bandwidth of the DApp expected from Governance Committee, priced in token quoted at the nominal price of the previous cycle; A is the price-weighted average of the main competitor's equivalent computing power and bandwidth converted according to the average transaction price of the SPB market in the previous cycle; a is the arithmetic average of nominal price over the past several periods, the reference calculation formula for the nominal price for the current cycle is :

$$P1=(S+S1)/(D+D1)*a/A$$

With the maturity of the community governance mechanism, the Spacebook Governance Committee will periodically adjust the nominal price depending on the supply and demand of computing resources across the Spacebook network. After the nominal price adjustment, if the nominal price of unit usage of computing resource drops, the number of tokens that the DApp developer locked-up will automatically decline; if the nominal price rises, the DApp developer may need to reimburse his deposit. If the DApp developer decides to withdraw his DApp and no longer uses the computing resources, then his locked token will be released. After Spacebook launches its main-net, Spacebook Governance Committee will work with third-party application developers to explore the possibility of determining the nominal price floating trading mechanism in a collective auction.

Taking any certain DApp as an example:

If a DApp developer determines to launch a Dapp using Spacebook as its infrastrucure, he/she must lock-up certain computing resources first, assuming:
——1 instance: with single core CPU, 100M bandwidth, 500GB hard disk, with the nominal price as 100 SPB;

——After that, the DApp goes online. In any given month, its data traffic is 1T and the corresponding nominal price is 10SPB; then

The developer needs to lock-up 100SPB in his deposit account and pay 10SPB this month.

If the nominal price of the second month (1 instance, single core CPU, 100M bandwidth, 500GB hard disk) is reduced to 90 SPB; the amount of locked SPB in the developer's deposit account is automatically reduced to 90SPB as the remaining 10SPB unlocked, which can use to pay for data traffic for the current month by DApp Developers.

For DApp developers, Spacebook's grid computing business charges are theoretically lower than traditional vendors. This is because: 1. the cost of locking up computing resources is collected in the form of a token deposit rather than a fixed fee. In the long run, this is a considerable cost savings; 2. Token revenue incentives new infrastructure suppliers joining the Spacebook network.3. Most importantly, infrastructure providers and DApp developers share the increase of value of token after the expansion of the Spacebook network.

The Spacebook may apply a processing fee of 0.5% of the total data traffic revenue in the SPB as the income, supporting the cost of the Spacebook scheduling peers, routing peers and the team labor cost. The remainder is rolled into the mining pool.

iv. Other Usage Scenarios for Token

Deposit:
Professional peers, common peers, and DApp developers must set up SPB accounts for the normal circulation of Spacebook tokens. There is a special type of sub-account in the SPB account called the deposit account. For any professional peer, common peer or DApp developer, a certain amount of SPBs must be deposited in the deposit account to formally access the Spacebook network for SPB clearing (The amount of deposit is differed according to different types of roles)

Professional peer deposits can be purchased directly from the 20% of the pool managed by the Spacebook Foundation, or through open market or over-the-counter transactions. The deposit of professional peer is an economical means to ensure that the professional peer continues to be stable online for a long time, provides sufficient computing resources, and prevents cheating. The professional peer's deposit is unlocked proportionally over time.

The deposit for common peer can be purchased through open market or over-the-counter transactions. Default deposit of common peer is generated as follows: after common peer accesses the Spacebook network, providing online storage and computing resources (mining) and receiving SPB rewards, the SPB quantity equivalent to the minimum deposit requirement is automatically locked in the deposit account. The rest of the SPB can be used to conduct transactions, transfer and other activities. The deposit for the common peers is unlocked proportionally over time.

DApp Developer's Deposit: DApp developer who may want to use Spacebook as an infrastructure must first deposit sufficient amount of SPB in their deposit account to lock-up the corresponding computing resources. At the same time, if the Governance Committee verifies that DApp has conducted violations such as infringing the legitimate rights of the end user, leaking user's personal or confidential information, it will also make advance fine and payback the user through DApp's deposit account. Deposits of DApp developers can also be purchased directly from the 20% deposit pool, or through open market or over-the-counter transactions. There is also the possibility that DApp developers may use their SPB deposit account to conduct ICO facing all users of the Spacebook, since on one hand DApp is trying to provide and create value to users, and, on the other hand, SPB token that DApp developer raises in this manner can be used to pay for network fee only, which eliminates the possibility of misappropriation of DApp developers.

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Elections of Billing peers and others:

SPB also represents voting rights during the election of billing peers and other community affairs in Spacebook network. SPB needs to be locked correspondingly to the number of votes during the voting process.

DApp's pay services

Spacebook encourages DApp developers to conduct pay services for users and use SPB as a billing method. At the early stages of the development of Spacebook, DApp will enjoy free processing charge for any pay services enrolled.

v. Token Flow Diagram

The flow diagram of the Spacebook Token can be found at https://spacebook.net/en

3. Mining Behavior and Income Analysis

Professional peers and common peers join the Spacebook network to provide available computing resources and obtain tokens allocated by the Spacebook mining pool. This behavior can be regarded as mining behavior. The miners' income is affected by several factors, including the allocation ratio of the Spacebook mining pool, the release rate; the hardware system (mine machine) configuration requirements; the total number of professional peers and common peers; the development of DApp and user brought to the Spacebook Token's overall demand; the cost, quantity and unlocking speed of the deposit; the actual usage and usage efficiency of the computing resources of a certain peer; the price of Token on the open market, etc.

4. Miners' Hardware Configuration and Solutions

Spacebook will work with major chip, storage and hardware vendors to address hardware solutions for professional peers and common peers, and provide recommended system configurations in stages. The capabilities of mining machine, as preferred by Spacebook, need to meet the general standards of computation requirements such as trusted computing environments, sorting algorithms, elliptical encryption algorithms, compression algorithms, floating-point operations, and large file reading and writing.

Spacebook will also work with major hardware partners to consider a recommended solution of hardware wallets for users.

5. DApp Use Cases

The distributed nature of the Spacebook network can be used to handle large-scale, high-concurrency scenarios of file download, content distribution, network communication, and distributed crypto exchanges.

In the Spacebook network, the implementation principle of a simple network file downloading or streaming is shown as the following coding:

```
//////This is a simple file download and streaming case ///////
#include <stdio.h>
#include<string>
#include<vector>

using namespace std;

struct STFileInfo
{
	string strFileAddr;			// File path
	string strHashIndex;		// File hash index
	int	nLength;			// File length in bytes
	int	nSubFileNum;		// Number of file slices

};


//file query interface
bool queryFileHashIndex(string &strFileAddr,	vector<string> &result);


//file information query
bool queryFileInfoFromHashIndex(string hashIndex, STFileInfo &stInfo);


// download file
// parameters:
//hashIndex	File hash index
//nFileStart	starting position of file content, to download the entire file, fill in -1
//nFileEnd	end of file content, to download to the end of /the file, fill in -1

//strTaskId	identification ID of the current download task assignment
//nMaxLength	the maximum length of the returned download cache

bool startDownloadFile(string hashIndex, int nFileStart, int nFileEnd,	string
&strTaskId, int nMaxLength);


// Get the contents of the file
// nFileStart	the starting position in the file of the data currently received

//buffer		Data content
//length		Data length

void receiveFile(int &nFileStart, char *buffer,	int &length);
```

// Stop downloading files

```
void stopDownloadFile(string &strTaskId);
```

DApp does not need to worry about the storage path, connectivity and security issues of specific files within the Spacebook network. Files can be accessed within the Spacebook network by simply providing its hash index.

The second use case is a simple VPN channel:

```
////// this is a simple VPN channel//////
// VPN channel mode
//create a data forwarding channel
//only supporting the sock proxy protocol locally
//strAddr sock5 Resource listening address
//nPort      Listening port
bool createDataChannel(string &strAddr, int &nPort);


// close the data channel resources
void destroyDataChanhel(void);
```

Chapter 4: Community and Governance Mechanisms

1. Consensus Community (first draft)

Spacebook welcomes everyone to join the consensus, be it an infrastructure povider, a code contributor, an ecosystem contributor, or a governor. The Spacebook consensus community is initially managed by the Foundation, subsequently by the Governance Committee after its election.

Based on the consensus of “free flow of information, building a healthy ecology, advocating community autonomy, and building a better future”, Spacebook advocates the following behaviors:

——Share code resources and publish valuable applications;

——Promote the Spacebook consensus and convince consensus participants to join the community;

——Equally publish opinions, express constructive views, and actively participate in community governance;

——Actively embrace regulation to ensure business compliance;

However, the Spacebook community discourages the following behaviors:

—— Discrimination, personal attacks and other subjective malicious acts against other members of the community;

—— Spread malicious code and hacking programs to steal other people's intellectual property and personal privacy information;

—— Investment fraud or inducement of trading;

—— Violation of laws and regulations, administrative orders, and violations of human conscience and customs.

—— Modify code, parameters, network communication protocols, or other cheating behaviors that intentionally transmit erroneous data.

2. Consensus Community Building Plan

The construction of the network and the consensus community is initially planned as follows:

I. Consensus build-up and initial infrastructure construction period(test-net launch);

Spacebook will publish the official website, whitepapers, team profiles, consensus mechanisms, online discussion communities, and phased path planning, and invite a small number of infrastructure contributors to set up a test-net infrastructure network based on consensus mechanisms. The Spacebook development team will put the following issues into test in the test-net:

——Blockchain consensus algorithm and corresponding incentive mechanism;

——Security defense mechanisms and anti-cheating mechanisms;

——Reasonableness and throughput speed of network topology;

——Various DApp use case simulation tests;

——Compatibility of hardware solutions that may be applicable in the future;

——Other types of testing;

Spacebook expects the testnet to be launched in October 2018.

2. Consensus and infrastructure development period (mining begins);

In this phase, the main items of the Spacebook include:

——The release of the mining machine program- mining begins;

——Mining machine related hardware configuration plan and sales network construction;

——The deployment of global professional peers and the election of billing peers;

——Spacebooks’s Global partners Signing;

——Launch of Spacebook Token in the major exchanges;
—— The provision of basic grid computing services, the development of middleware for PaaS and testing & release of DApps;
—— Promote the Spacebook network and its ecology globally, and hold a developer conference to attract outstanding developers to join the Spacebook network to provide DApp and various open source middleware;
—— Discuss effective governance models with consensus makers;
Spacebook expects the mining network to be launched no later than June 2019;

3. Consensus and maturity of infrastructure construction;
In this phase, the main items of the Spacebook include:
——Continue to build professional peers globally; develop Spacebook into a mainstream service network for large-scale blockchain grid computing infrastructure;
—— Continuous incubation and support for excellent DApp ;
—— Election of the Spacebook Governance Committee and development of a draft governance;
—— A road map for the development of the public chain decided by the community and the developer;
—— Gradually open source scheduling algorithms, optimized by the community and developers;
—— Negotiate the formation of next-generation hardware solutions with major hardware vendors;

3. Governance Committee(Preliminary plan):

Within six months of the official launch of the main-net (minning), Spacebook community will work out the rules for the election of the governance committee and elect the governance committee accordingly, followed by elections every 12 months. The Spacebook Governance Committee consists of no more than 9 members. The election of the 9 members is produced by 42 candidates through the community public voting election mechanism. Each of the 21 main billing peers have the right to nominate one candidate; the Spacebook Foundation has the right to nominate 6 candidates; the top 10 third-party DApp developers have the right to nominate one candidate respectively; the remaining five candidates are pre-elected by the Spacebook community. Any Token holder can sign up for the pre-election in the Spacebook community and those who receive 10,000 votes' support (1 SPB for 1 vote) can enter the pre-election voting list. The pre-election is elected from the voting list by public voting, and the five people with the highest number of votes become candidates. 42 candidate members are elected through the community public voting (1 SPB for 1 vote), and the 9 members with the most votes become members of the governance committee. During the election, the SPB corresponding to the number of votes will be locked and released after the election is completed.
Responsibility of the Governance Committee:
——Adjust the nominal price of the Spacebook network charges according to the actual operation of the Spacebook network.
——Reward or punish any node or Token holder according to the network situation automatically reported by the SP node, and decide the specific reward and punishment measures (must be approved by more than half of the members);
——Any member of the committee has the right to request the committee to vote on the general governance of the community; the proposal must be approved by more than half of the members;
——Any member of the committee has the right to request the committee to vote on proposals for major corporate governance issues, including the upgrade of the mainnet, the change of the voting mechanism of the governance committee, and the decision-making method of the billing peers. The proposal must be approved by more than 2/3 members (7 votes).

4. Global Partners

Spacebook will seek regional partners around the world, and partners will perform the following duties in their respective regions:

——Ensure local legitimacy of the Spacebook related business;
——Spacebook consensus community, promoting Spacebook services;
——Production, distribution, sales and after-sales service of mining machines;
——Local exchange of Spacebook Token;
——Local sales of Spacebook distributed computing services;
——Encourage and support local DApp developers;

Regional partners must be at least builders of professional peers.Regional partners are given priority under the same condition in the election process of the main billing peers.

5. Development Stages and Corresponding Valuation Models

In the initial stage, before the Token's main supply and demand scenario (grid computing service business) fully developed, the overall valuation model of the Spacebook network is mainly determined by the Token market price, that is, the supply and demand relationship. At this time, the Token demand mainly comes from the deposit of professional peers and DApps newly added to the Spacebook network;

In the advanced stage, when the distributed computing service business develops to a certain scale, the overall valuation model of the Spacebook network mainly targets the major cloud computing service providers in the world, namely the fixed assets plus cloud computing service business scale and growth rate plus replacement cost;

In the final stage, when the scale of the grid computing service business and the number of DApps based on the Spacebook network and the revenue scale are quite complete, the overall valuation of the Spacebook network should be based on the sum-up valuation of all DApps.

6. Regulatory Friendliness

To ensure the long-term benefits of all infrastructure builders, DApp developers, and end users, Spacebook is responsible for working with the community of consensus to ensure the legitimacy and compliance of network assets, data assets, and applications across countries. Spacebook will establish a global compliance team and work with global partners to achieve this goal, and to develop punishments and counter-measures for behaviors like violation of the Spacebook ecosystem, stealing intellectual property, malicious cheating, malicious cyber-attacks and other violations of the laws and administrative orders of the country, even violations against the conscience of human race through the governance committee.

Chapter 5: Team

1. Team Members

Ayrton Zhu

Founder and CEO

——Worked at Tencent, QvodPlayer, Xunlei

——Involved in the design of Tencent Q Coin issuance system in the early years, presided over the construction of Tencent Q currency online and offline sales network system;

——Head of QQ Music and Tencent Video business, presided over the design of QQ music and Tencent Video products, and built a large-scale P2SP network of Tencent, which led the cooperation with content providers and business model design of QQ music and Tencent Video;

——Became the CEO of QvodPlayer Company. During his term, the QvodPlayer system quickly evolves into the world's largest P2SP network;

Linyi Feng

Founder and Chief Architect

——One of the very early founders of Tencent QQ; the chief development engineer of QQ client software;

——Founder of the world's first iOS synchronization management assistant - iTools.

Yong Jiang

Co-founder

——Founder of Zhengyue Capital

——Controls a number of mixed industry funds;

——Controlled and participated in a number of Chinese A-share listed companies;

Gangwu Xu

Core technical consultant

—— Tencent's first employee and chief architect;

——One of the very early founders of Tencent QQ, master programmer of OiServer architect and software;

——The founder of Dawu Venture Capital

Yu Deng

Core technical expert

——Founder of first Chinese Linux system - Bluepoint;

——Founder of Togic Software

——Established Tongcard Network, which was acquired by Tencent as WeChat micro-life team;

Brian Cai

Core technical expert

——Technical experts of Sxit;
——Years of experience in Internet companies as CTO;

Mario Wang

Core product specialist

——Early product manager of Tencent Mobile Monternet Business;

——Lead the design of Tencent 3G portal, mobile QQ pet, video and other mobile products;

Bin Zhu

CEO of North American R&D Center

——Team leader of Telecom BOSS system, enterprise CMS, CRM, ERP

——Team leader of data processing department in Mindgeek(Billion-level data processing capability)

2. Advisors

To be Announced Soon