IPSE: A Search Engine Based on IPFS

IPSE TEAM

Oct 1, 2019

Abstract

IPFS content is mapped to specific hash address,IPSE maps hash addresses to semantic tags that humans understand. Users only need to retrieve tags to find content. Users share content resources, add tags to complete mining process, and obtain Token reward. SuperNodes can scale storage index data horizontally and provide stable search services. Copyright and paid content storage based on IPFS network, while reducing storage and bandwidth costs, can directly distribute to all users through IPSE, which builds a strong and robust distributed ecosystem.

Glossary

IPFS:InterPla netary File System
DAG:Directed Acyclic Graph
DSN:Decentralized Storage Network
DApp:Decentralized Applications
HTTP:HyperText Transfer Protocol
DHT:Distributed hash Table
PoS:Proof of Stake
PoW:Proof of Work
BFT:Byzantine Fault Tolerant
DPoS:Delegated Proof of Stake
UTXO:Unspent Transaction Outputs

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1. Overview of Data Industry

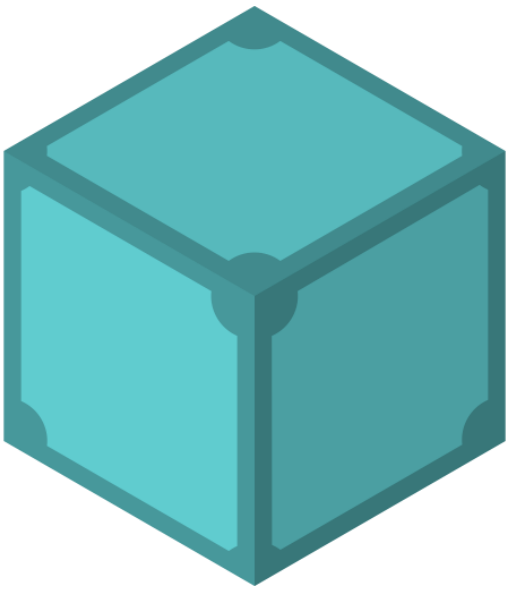
1.1 Data Introduction

As a fast, efficient and low-cost storage deployment method, cloud storage has been regarded as the mainstream storage mode for the massive growth of data in digital economy era, and gradually recognized and accepted by humans. The number of registered users of cloud storage in 2017 has reached 1.3 billion, and the cloud storage market has also shown a rapid growth trend.

The scale of the billion-dollar market has also been sought after by major manufacturers, and the competition in the cloud storage market is unprecedentedly fierce. However, since 2016, cloud storage networks including Sina Microdisk, 115 Network Disk and 360 Cloud Disk have been shut down, which is due to the fact that on the one hand, operating costs remain high, and cloud storage products are difficult to obtain profit. On the other hand, the user has low storage threshold and imperfect auditing mechanism. A large number of illegal content such as vulgarity, pornography and violence are spread by means of network disk. The cloud platforms are not willing to carry the crime of spreading bad content and shut down the cloud storage business. This has prompted the cloud storage market share to gradually gather in the Internet giants such as Alibaba and Baidu, and the industry has formed a monopoly. After the storage service is monopolized, including price, service content, data security and privacy, etc., the storage space is set by the storage service provider. The user's choice space is compressed. Some excellent and worthwhile content is also implicated and cannot be shared. This violates to some extent of the original intention of cloud storage also gives the opportunity for the development of distributed encryption storage.

1.2 Introduction To IPFS

IPFS (InterPlanetary File System) is a global, peer-to-peer distributed hypermedia file system with the goal of connecting all computing devices with the new protocol. IPFS aims to replace the domain-based address with a content-based address, that is, the content that the user is looking for is not domain but the content address itself, and does not need to verify the identity of the sender, but only needs to verify the hash of the content. This will make the page fast, safe, free and robust.



IPFS

The existing internet is a centralized network using the HTTP protocol, which will greatly depend on the central node in terms of access, storage, security and privacy, while IPFS can help the WWW(World Wide Web) to decentralize, from web page addressing, access efficiency, Data storage, privacy protection to data transactions, they all will change. Once decentralized through IPFS, internet access will undoubtedly be faster and will save more bandwidth resources; in addition, the role of network security, data network "over-redundancy" and privacy policy will be more and more Significantly, it can be said that IPFS has upgraded the Web to the next level, which will make a better internet and lead a a new and promising future.

IPFS has the quality of being an internet subsystem, and can be complete or even replace HTTP through reasonable configuration. IPFS can also solve the security problem that plagues the HTTP for a long time: content addressing and content signing technology can protect IPFS-based websites and eliminate the possibility of DDoS attacks. IPFS can also archive important public record content to avoid the loss of the site's termination of operations. The core improvement of IPFS is decentralized content distribution, which allows people to access content under decentralized internet services (even offline), so that websites and web applications can be freed from the source server. The pattern of the currency network is distributed like Bitcoin. This is something that HTTP can't do, and it's a great benefit for places with poor network conditions (such as developing regions) and suburban areas.

The combined advantages of IPFS networks bring the following 4 significant features:

- I. Permanently decentralized store and share files
- II. Saves various types of hypermedia data through P2P network.
- III. Versioning, traceable file modification history, Git version control technology, Merkle DAG.
- IV. Content is addressable, and the file is identified by generating a unique hash value.

1.3 Introduction to Filecoin

Filecoin is an incentive layer of IPFS. It is a combination of IPFS and blockchain technology. Filecoin supports Smart Contracts. Its consensus mechanism is Proof of Storage, which includes Proof of Replication and Proof of Spacetime. People can provide storage and broadband resources for customers to get Filecoin. Instead, customers can use Filecoin to get free storage or distribute data.

Filecoin's working mechanisms includes the following sections:

- Ⅰ.Form a decentralized storage network (DSN).
- Ⅱ Proof-of-Replication(PoReps) that allows verification that any copy of the data is stored in physically separate memory.
- Ⅲ Proof-of-Spacetime(PoST) , giving sequential replication and storage as a useful working consensus for incentive metrics.
- Ⅳ.Form a verifiable market, build a storage market and a search market, and manage how to write and read data from Filecoin respectively.
- Ⅴ.Connect to other systems and manage how to use them.

1.4 Pain Points of IPFS and Filecoin

Although IPFS has a promising future, we have found some shortcomings such as all data stored in the IPFS network is a series of hash address. The hash string is long and not easy to remember, and a character change means the hash address changes. The biggest technical challenge of the Filecoin project is the Proof of Replication. After an in-depth analysis of Filecoin's storage and retrieval markets, we found that if we want to make a big advantage over the peers in the storage market, it is likely to be a cheating attack, and this cheating attack will quickly accelerate the network.The unfairness will also let Filecoin's development team, Protocol Labs, notice this attack and will soon fix and defend against it. So we think about another direction, that is: search the market. if more search services are provided, and more data can be provided to users, so that more search gains can be obtained, which is good for the entire DSN network. Therefore, we have made a search service for the IPSE focusing on the search market.

2. The Search Engine Based on IPFS

2.1 Traditional Search Engine Disadvantages

Traditional search engines have brought convenience to our lives, but with the development and strength of search engines, the drawbacks are obvious and affect our lives.

2.1.1 Sin Stems From Monopoly

On this earth, a company controls 77% of all search traffic, affecting trillions of dollars in spending, shaping global perceptions and effectively acting as the main gatekeeper of the internet, such a closed, profit-driven search engine. Is it the most perfect? Can we trust Google's "Do not be evil", Can we believe in the monopolist in the remaining search

market and their ethical standards may not be much better than Google's monopoly.

We can easily observe the impact of these monopolies on our lives.

- Data Capture: Traditional search engines are able to make more personalized and accurate content pushes, which stem from the capture of personal data, and individuals do not receive substantial benefits.

- Online Advertising: The online advertising market of $55 billion does not have many spoilers. Ordinary users feel that online advertising is awful, and companies have to surrender to giants such as Google and Facebook to pay huge sums of money for product promotion to attract audiences.

- False Traffic: Although companies pay huge amounts of money for promotion, traditional search engines do not guarantee that traffic is real, and based on real experience in DSP, 50% of advertising traffic may be generated by robots.

- Missing Bottom Line: If a company is driven by interest without a bottom line, then some recurring bad events will be the norm. For example, "Death of Wei Zexi", Wei was a 21-year old Chinese college student who died from a promoted result of Baidu. Baidu shares fell almost 14 percent in the days following reports of his death.

2.1.2 Decline Stems From Its Past Success

In terms of the success of traditional search engines, we do not have to understand the needs of the community for information retrieval, or understand the underlying technology of the inverted index. It can be determined that it is built on the centralized internet, and all the dividends brought by the centralized network after being used by traditional search engines, its decline will also come to an end. Centralized networks bring high efficiency, but data does not automatically participate in index building. Instead, a huge spider crawler system is needed to capture data, which is essentially owned by all users, and traditional search engines will steal the data. It has played a huge value and has not shared the benefits with data owners, all users. The most deadly point is that this way of thinking has become the corporate culture of these traditional search engine vendors. They will never think that it is necessary to share their interests with users. When the blockchain technology rises, they cannot make a search engine with a profitable Token mechanism comes out.

2.2 New Generation of Search Engines Can Solve Problems

The new generation of search engines are decentralized. The first step is to clarify the ownership of data and solve the problem of unethical data. Then there will be a real weighty spoiler in the online advertising market and bring new forms of online advertising. Finally, the clear Token economic model creates a powerful community of interests.

2.2.1 Data Ownership and Privacy Protection

With the European Union's “General Data Protection Regulation (GDPR) ”, countries around the world are gradually forcing technology companies to make changes to protect consumer privacy. In the past, the long-term common practice is that consumers have no choice but to give their data for free in exchange for free services. Like various search engine manufacturers, they can obtain user data and provide free services while carrying private goods. A new generation of search engines must be able to do this at least, consumers' shared data can clarify their ownership, and users can be compensated for sharing data. Ideally, a decentralized data storage underlying system is a must, so users don't have to worry about storing data on any internet giant, and users can set their own privacy preferences.

2.2.2 Incentive Sharing and Free Search

There are many ways to be a distributed search engine, and we choose the free search service model. In order to make the search service more accurate and rich in content, we use incentive sharing, sharing data mainly in two categories, one is ordinary material data, and the other is user's own preference data. Of course, the preference data can be stored in encryption.

The above two points are the core of the entire search engine, and online precision advertising is still a direction worth exploring. Due to the user's sharing of their own preference data, the advertiser can accurately locate the customer group and give a reasonable compensation price. The user does not disclose private data to anyone other than the advertiser on the exact match. Advertisers don't have to worry about fake traffic, and they only pay for matching users.

The underlying technology that can support the above models and practices can only be a distributed storage solution. IPFS-based storage can bring free storage and bandwidth costs, and provides underlying technical support for an online advertising system without intermediaries.

2.2.3 Search-based Decentralized Advertising Market

Centralized Search and centralized advertising market, no matter how many drawbacks, at least one efficiency advantage

is guaranteed. IPSE team will absorb some advantages, we set a coordinator role in the entire decentralized advertising market, the user's precise information is matched with the needs of advertisers, released through Smart Contracts, and traded under an open and transparent mechanism, so that advertisers and users can benefit. A system that does not have a middleman to make a difference can make all participants a community of interests. Compared with the traditional search engine platform, the middlemen earn the most benefit benefits, and the advertisers and ordinary users are in a losing position. The new generation of decentralized search engine platform builds the advertisers and ordinary users into one interest. The community of interests, thus achieving a win-win situation.

2.3 Building a Next Generation Internet Traffic Portal Based on Search

If the underlying protocol of the next generation of internet will change, with the advent of the 5G era, the drawbacks of centralized storage will become more and more apparent, data throughput will usher in an order of magnitude improvement, and for the single-node data, there is no orderly increase in disk read and write speeds, and centralized data storage will be difficult to meet the data throughput needs, and distributed data storage will be able to solve this problem perfectly. As the underlying internet protocols transition from HTTP to IPFS networks, new traffic entry disputes will reappear.

2.3.1 Search Is Just a Traffic Entry

The search service is currently able to be perfectly integrated with the IPFS protocol, and is also an urgent need for applications at the IPFS protocol layer, but we are not just creating a search engine, but let this search engine be as a traffic portal and make more expansion applications and underlying innovations. Storage of data on IPFS will gradually become mainstream, and data will naturally be rich, while long tail data will only be found by search engines, and most of the popular data will be displayed to Consumers through video portals, news portals, etc.

2.3.2 Business Storage Market and Copyright Protection

When TikTok needs to delete more long tail cold data to reduce costs, it means that its centralized storage solution will face increasing cost pressure. The search system we built will have a huge amount of storage space behind it, and it is a free storage space. If you sell these storage space to the Business side, it will be a huge business opportunity. The storage mining machine behind the search system can provide free storage, but can not only guarantee the permanent storage of data, but also the free access to the service, does not require expensive bandwidth costs, such features are suitable for long tail cold data like TikTok.

The efficient distribution of copyright data is also a huge business opportunity. Through the Token system, there is a search traffic portal as a guarantee. Copyright content can obtain copyright protection on the platform, and the copyright content of the Business side can reach the user terminal efficiently.

2.3.3 Content Creating and Sharing for Consumer

Consumers can easily obtain copyrighted content through the Token in their hands. The Token economy system built by EOS's payment system is as simple and convenient as leaving a like. Content sharing is as simple as sending a message. Sharing your content means you can receive Token reward. This system benefits from the powerful third-generation blockchain underlying technology. More details will be described in later chapters.

3. The IPSE Design Attitude

3.1 The Starting Point of IPSE

The starting point of IPSE (InterPlanetary Search Engine) is to solve real-world problems and learn from other excellent Public blockchain technology to create a vertical blockchain ecology that focuses on storing indexing services and computing (Smart Contracts). Looking at the entire blockchain ecology, IPSE needs to find its own position with the consideration of decentralization dimension and Mundellian Trilemma theory.

DApp can carry millions of users according to the rapid development of the blockchain throughout the four years. Unfortunately, it did not happen. There is a big difference between blockchain entrepreneurs and the traditional Internet industry. Many of the blockchain entrepreneurs are based on the ideas in the iterative white paper, while traditional Internet entrepreneurs are based on iterative products. We can simply understand that blockchain entrepreneurship is the design and implementation of a set of trading rules, focusing on design, as to the realization of the results, from the currency price can reflect the real situation. Internet entrepreneurship is about creating and iterating a product and service, focusing on iteration. The Internet is an information network, and the blockchain is a value network with a network effect. But to play the network effect, that is, Metcalfe's law has to play a role, it needs a difficult climbing up in the early stage. So why is DAPP so difficult to climb up?

The development dilemma of DAPP is the result of the current blockchain infrastructure is not perfect enough. DAPP's trust sources come in three directions. The first one is verification, such as a smart contract that cannot be modified. Anyone can verify it without having to choose to trust any third party. The second is that the trusted entity of off chain

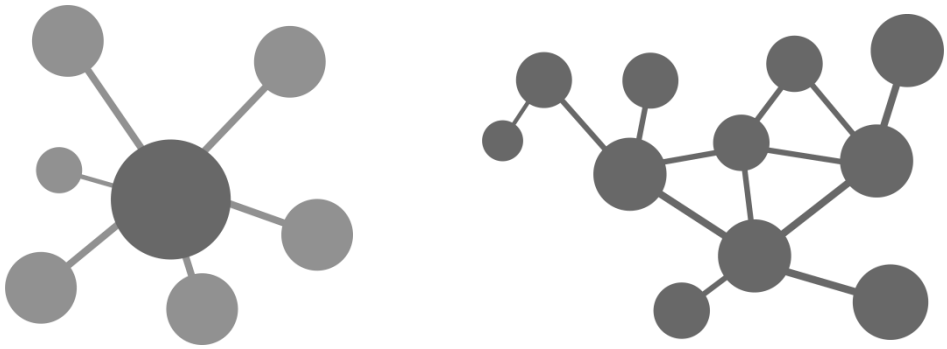
will trust the endorsement on the blockchain, which can be simply understood as a consensus network. The third one is decentralized governance on the blockchain. In the past years of DAPP development, the distributed management on the blockchain is obviously absent, and the verifiability conflicts with the smart contract iteration, resulting in many smart contracts can not be engineered to achieve huge landing applications. This is the reason many Dapps are gaming and gambling.

A basic truth is that good projects are not developed, more evolved, from the perspective of Darwin's Theory of Evolution, the survival of the fittest. The existing DAPP has no evolutionary ability, there is no way to adapt to the current market for a new block of students with high learning costs. After thinking about the causes of these dilemmas, IPSE will not hesitate to choose a cross-chain approach. If IPSE is just a small consensus network, it can be integrated into a larger consensus network by means of cross-chaining, catching up with the ride and reducing user learning and management costs. With the cross-chain technology, IPSE will build a application-specific blockchain on Polkadot, changing the development of DAPP to the development of landing application-specific blockchain.

3.1.1 Three Types of Decentralization

One core of the blockchain is decentralization. When you discuss decentralization, there are actually three different dimensions of decentralization:

- Structure Decentralized: The system consists of multiple nodes that can tolerate simultaneous collapse of multiple nodes.
- Politic Decentralized: No individual or organization controls the entire system.
- Logic Decentralized: The interface and data structure of the system display and maintenance looks more like an amorphous group of objects. Users can divide the system into two parts that can continue to operate as separate units.



(Decentralized vs. Distributed)

Looking at some things from these three dimensions,we can draw some typical cases.

◆Traditional enterprise is Politic Centralized(The CEO can control the entire company),and Structure Centralized(may have multiple branches, but there is always a headquarters as the center)and Logic Centralized(and can not really be divided into two).

◆The customary law system is Politic Decentralized(many customary courts have great discretion),but Structure Centralized(many customary courts do not have absolute centers),and Logic Centralized(different customary laws are Community management).

◆The language system is Politic Decentralized(no organization can control a language),Structure Decentralized(there are no absolute centers in many language versions),and Logic Decentralized(such as the English system, half of the words are removed, or can Used alone).

◆The BitTorrent system is Politic Centralized(can be controlled by a corporate organization),but Structure Decentralized(multiple nodes are joined) and Logic Decentralized.

◆blockchain(including first and second generation)is Politic Decentralized(no one or institution can control the blockchain),and Structure Decentralized(no infrastructure center failure point),but Logic Centralized(There is a recognized state in which the entire system behaves like a computer).

3.1.2 Impossible Triangle of Blockchain

In the traditional monetary theory, there is the "Mundellian Trilemma" theory, that is, a country's monetary policy cannot simultaneously achieve monetary policy, exchange rate and capital mobility. It can only meet two goals at the same time, and give up another goal. Deep thinking about the essence, as the value in the traditional financial system,

the flow is its nature, exchange is an extension of this nature,and the independent monetary policy can not be abandoned by each subject using this value,and finally the floating exchange rate just reflects the value Equilibrium.This balance is lost at all times,and it is also formed all the time.Similarly, blockchain has Impossible Trinity problem,The trilemma claims that blockchain systems can only at most have two of the following three properties:

- Decentralization:defined as the system being able to run in a scenario where each participant only has access to O(c) resources, ie. a regular laptop or small VPS.
- Scalability:defined as being able to process O(n) > O(c) transactions.
- Security :defined as being secure against attackers with up to O(n) resources.

In terms of blockchain system value,flow becomes its nature,security and stability are connotations,and scalability is the pursuit of most users to maintain values,and finally part of the Decentralization is the choice of the last resort,in fact,this decentralization is also the equilibrium of value,which means that there is no eternal decentralization,and there is no long-term complete centralization.The entire blockchain system is always breaking and constructing one where a decentralized equilibrium that can carry value.

Let's analyze several existing solutions about decentralization.

- Bitcoin is a combination of security and decentralization but it lacks of scalability.And decentralization is increasingly being questioned by mining centralization,no matter what people trying to improve scalability.
- BitcoinCash,the hard fork for the limited carrying capacity of Bitcoin,makes the operation threshold of node mining improved,which means that some nodes can no longer mine,thus sacrificing partial decentralization and optimizing scalability.It has improved the data throughput of the blockchain,but in general it still has scalability problem.
- Ethereum,with no doubt,the fragmentation will disperse the overall computing power,thus creating a hidden danger of security under the premise of pursuing scalability and guaranteeing decentralization,sacrificing security will also be widely questioned.
- The DPoS consensus mechanism goes to the extreme in the pursuit of scalability while ensuring security,but can not achieve decentralization.which will be widely questioned.
- P2P streaming media playback,this application scenario can allow data to drop frames,which means that data error is allowed sometimes.Such a network can pursue scalability and decentralization,but security is not guaranteed.

3.1.3 The Position of IPSE

Thinking about the evolution of the world,in the 21st century,the causal mindset in the Newtonian world system has already been broken.Deeply thinking about the essence of complete decentralization,each node maintains the same amount of information.Dr.Claude Elwood Shannon connects the world's uncertainty and information in book *Shannon information theory*.Complete decentralization is equivalent to the entire blockchain network.Eliminate uncertainty completely and maintain a low-entropy network system at the cost of high external energy input.The evolution process of the whole universe is a process of entropy increase.If the earth is regarded as a system,in order to maintain its long-term low entropy state,the sun needs to input energy continuously,but the energy obtained by each node inside the earth(such as the mainland),the amount of information maintained by each node is not equal.If you think deeply about the mechanism behind this,there is no doubt that the process of evolution is not designed by humans,and many uncertainties are explaining one thing:complex system.A completely decentralized Bitcoin network is not a complex system,and there is no order gap in all the nodes.Such a system makes us have to think of mechanical thinking.

From the speculative thinking and logical reasoning of ancient Greece,through the invention and improvement of Euclidean,Ptolemy,Descartes to Newton,the mechanical thinking constructed by causal logic was once the commanding height of human thinking,and also gave birth to the 20th century.Science building.The core of mechanical thinking can be summarized in three sentences.First,the changes in the world are certain.Second,the laws can be recognized and clearly described by simple formulas or languages.Third,the rules are universally applicable and can guide the practice in the unknown.In short,mechanical thinking emphasizes certainty(predictability)and causality.

If there is a standard to be discussed in this debate about decentralization,then I will admire the Gilders Law.The most successful business model with the lowest price resource.It will be consumed as much as possible to save the most expensive resources.Corresponding to the decentralized thinking of the blockchain,the resource will have a price,which means that the node as a resource for saving data will also have a price,and the price will naturally have a high or low level,meaning that the saved data is not completely consistent,at least The value is not consistent,the lowest price resource will be consumed as much as possible,that is,the node with low storage data value will be sacrificed to the greatest extent.Maintain a low-entropy system by following Gilder's law while the overall input energy is constant.

The above discussion is only the theoretical starting point of the IPSE on decentralization.Specific to the technical level,we will use DPoS to construct the IPSE main ,which is the settlement layer of the blockchain system,and then there will be application-specific blockchain technology to save data of different values,and select nodes according to the value of the saved data.The number of such IPSE will be compromised in terms of decentralization,which achieves structural decentralization and political decentralization,maintaining logical centralization.

The above discussion is only the theoretical starting point of IPSE on decentralization. Specific to the technical details, we will use DPoS to build the main chain of IPSE, which is the transaction layer of the blockchain system, and then there will be application-specific blockchain technology to save data of different values, and select the number of nodes according to the value. In this way, IPSE will be compromised in decentralization, which achieves structural decentralization and political decentralization, maintaining logical centralization. But if you don't just look at the main chain, but go deep inside the blockchain system, you will find that there will be many attempts to decentralize the subnetwork, and maintain the low entropy state of the entire system with limited resource consumption.

3.1.4 Two Genres

There are basically two major genres in the blockchain game,one is the company model,and the other is the community model.The so-called company model,such as Tencent to be a BaaS platform,believes that people in the currency circle do not know much about BaaS.This is the problem of influence.The company model is to make blockchain,the basic investment is relatively large,and the preparation will be compared and adequate, it also needs more technical accumulation and more patent applications.If you want to build your own barriers in the open source chain,the result is:tt is very difficult to do.The community model is a completely different scene.The investment is relatively small.Basically,it is open source.The problems and progress are shared,though there are many participants and great influence.

From the analysis of the above two genres,if the blockchain is key to Web3.0 and represents the future,then questions are: Is it the operation mode of the enterprise optimali right choice?Is it necessary to apply for a patent?If the essence of the enterprise is to quickly find a consensus person in a dispersed group to do something,is the consensus on the blockchain stronger and faster?If the patent application is to realize the value realization by using the centralization authority to confirm the technical advantage,then the blockchain can realize the value realization by using the centralization consensus confirmation method.Is the patent application still necessary?

From the analysis of many existing blockchain projects,we can see that blockchain technology is used in traceability and deposit,distributed accounting,and expected value management.If you think deeply,the essence of the blockchain is to change the way individuals or legal persons get income.

3.1.5 Value Creation and Management

In modern society,in addition to capital,the source of power for individuals or legal persons to obtain income can be roughly divided into the following five aspects:

1. The community environment,such as which kind of currency is used,is an important measure of the quality of a community.A good country,its currency would not be bad,a bad country,its currency would not good.In the eyes of the ultimate believers of Bitcoin,there are only two things worthwhile in the future,one is to encryptocurrency and the other is land.
2. Labor,using both hands and skills to earn income,participating in the global divisionof labor or community division of labor,is the invisible hand described by Adam Smith in The Wealth of Nations,and also belongs to the category of God.
3. Nowadays,many mental workers are working in a division of labor and can gradually log into the intelligent contract ecology of the blockchain.
4. Machine intelligence is the ability of an individual or a legal person to manipulate many machines to work for themselves: storage,computing,network transmission,algorithms and programming,etc.
5. In the above aspects,we need to consider the cost of trust.From top to bottom,the required cost of trust is decremented in turn.

There is no doubt that the way IPSE creates value is a combination of decentralized capital,extremely high machine IQ and extremely low cost of trust.The IPSE will encourage users to invest in building their own nodes,POST will be mined while the IPSE's focus on data storage and computing,and provide support for the traditional Internet and Web 3.0,giving full play to the node's machines.IQ,The IPSE itself can quickly form the consensus of participants and reduce the cost of trust between participants.

3.1.6 Thinking About the Nature of Company

Coase's thinking on the nature of the enterprise is very worthy of praise.Coase pointed out that the essence of the enterprise is a mechanism for resource allocation.The enterprise and the market are two resource allocation methods that can replace each other.If the popular language is used,the production links of goods and services will reduce transaction costs within the enterprise.

blockchain technology originates from Bitcoin.Its ideological origin comes from Friedrich von Hayek's *Denationalisation of Money*.Its core idea is to change the theory of super-sovereign currency.With the development of the blockchain,if the essence of the above is to change the way individuals or legal persons obtain income,it can also prove Coase's transaction

cost theory:when more and more links transaction costs tend to zero,The boundaries of the company disappeared,and everyone is no longer an employee,but a free man.

The IPSE team's thinking about the company is very deep,and will use the model of community operations to develop the IPSE.

3.2 Layered Design of IPSE

3.2.1 Grading and Stratification

When discussing the layered design of the blockchain,it is separate from the hierarchical design.Bitcoin's lightning network is more like a hierarchical design.The Lightning Network accumulates small payments and then walks along the lightning network.The fast payment channel is divided into the main chain.The same reason is the offchain wallet.As the first level,the main chain does not need to pay attention to the state change of the second level.However,the second level lightning network or offchain wallet needs to monitor the first level main chain.Lightning networks or offchain wallets need to ensure that payers in their fast payment channels do not go to the main chain for broadcast fraud.In the hierarchical design architecture,an exception occurs in the second level,and does not affect the first-level main chain.The affected ones are only the fast-channel itself,but if the first-level main chain has an abnormal situation,the second-level lightning The network will definitely have big problems.

There are several basic principles for the hierarchical design of blockchains.First,the layers must be decoupled.The internal design of the next level can be changed.The levels do not affect each other.The last level can communicate through the interface.Starting from the above basic principle,if the design application-specific blockchain realizes some functional layers,the application-specific blockchain can be designed as a completely independent blockchain,which is completely different from the main chain.The main chain is responsible for UTXO transfer and account book update maintenance.The application-specific blockchain uses a specific two-way binding transaction to act as an interface to communicate with the main chain,and then use application-specific blockchain to implement specific functions,such as Smart Contracts.

3.2.2 Five-tier Architecture

From the perspective of blockchain architecture design,the blockchain can be easily divided into three levels:protocol layer,extension layer and application layer.The protocol layer can be subdivided into a storage layer and a network layer.

（1）Protocol Layer

The protocol layer is the bottom. It is basically a complete blockchain product. It is similar to a computer operating system. It maintains network nodes.It only exposes API calls. It usually provides a simple wallet client to call these APIs. If a layered design concept is adopted, this protocol layer is only responsible for the settlement of the main chain asset (main chain Token), specifically the UTXO transfer and the update and maintenance of the ledger, excluding the application-specific blockchain function, so that the function of the docked client will also It is very restrained and only creates addresses, verifies signatures, transfers payments and checks balances.

This protocol layer is the basis of all other blockchain functions.It builds the network environment,builds the main channel of the transaction,formulates the node mining reward rules,and designs and implements the wallet address.
Development of protocol layers,including network programming(P2P),a distributed consensus algorithm,encryption and signature data storage.Firstly,about distributed consensus algorithm we can learn from PoW,PoS and DPoS.Secondly and cryptographic signature technology and database storage can also adopt the existing mature solutions.Finally,as for the implementation and development of the peer-to-peer network,it will be a difficult point of protocol layer development, we will use IPFS's Libp2p solution.

The entire protocol layer includes the storage layer and the network layer. The technical selection of data storage is considered from two dimensions, one is performance and the other is ease of use. The performance of the whole system depends on the I/O performance of the network and data storage. The I/O optimization space of the network is not large, but the I/O of the local data storage can be optimized. We will use Google's LevelDB as the underlying database. The read and write performance of the database can meet the requirements.

（2）Extension Layer

If the underlying protocol layer is similar to a computer's operating system,then the extension layer is equivalent to the computer driver,in order to make the blockchain product more practical.The extension layer of the IPSE is mainly in two directions,one is virtual machine and Smart Contracts,and the other is application-specific blockchain technology.When developing the extension layer,in addition to interacting with the protocol layer during transactions,try not to mix with the development of the protocol layer.Spreading layer closer to the application layer with the above,if the center of thinking to understand,like the server B/S architecture(Server).Decoupling design has obvious advantages,which can make the data of the main chain smaller,the network more independent,and ensure that the expansion layer development is not constrained.

The Smart Contracts needs to run on a separate virtual machine,but the virtual machine is not in the protocol layer.The reason is with the layered design concept,the virtual machine cannot be run on the main chain of the protocol layer,but it needs to be developed in the extension layer.The user runs the application-specific blockchain of the Smart Contracts.Of course,the user can also issue the business chain that meets his business needs and then run the Smart Contracts on it.The application-specific blockchain of the extension layer needs to be bound to the main chain of the transaction layer by using slots.

（3）Application Layer

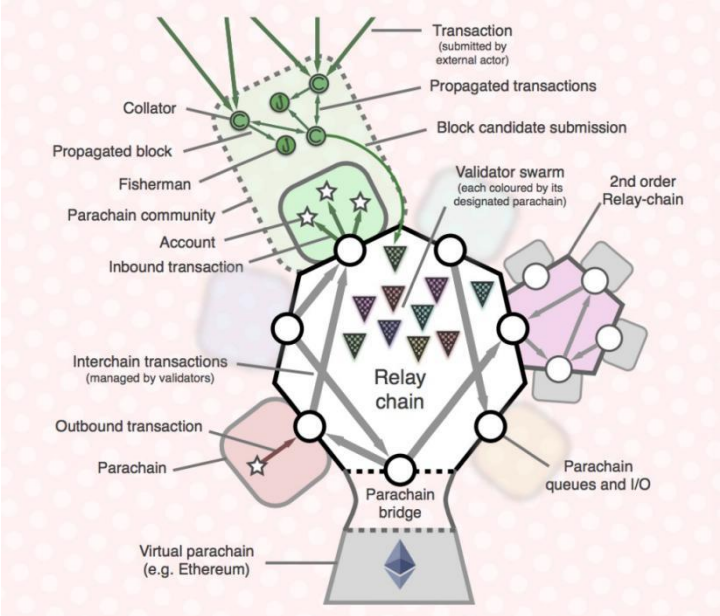
If the protocol layer is similar to the computer's operating system,and the extension layer is similar to the computer driver,then the application layer is like various software programs in the computer.It is a product that can be directly used by ordinary users.It can be understood as browsing in the B/S architecture.device(Browser).The application layer's applications mainly are wallet services,but this is the most basic and simple service.There is still a lot of room for each user to wait for mining development.

3.3 Application-specific Blockchain Technology of IPSE

When the Web3.0 technology stack was proposed, the development of the application-specific blockchain had a clear direction. The past development of a public chain + DAPP combination encountered obvious challenges. Any public chain for the current blockchain encryption economy physically becomes a kind of segmentation. For a segmentation of network effects, such a development path is obviously constrained.

3.3.1 Background of Application-specific Blockchain

The development of DAPP encountered the problems, the cost of use is huge,and the benefits can not offset the required learning costs. Each DAPP is architected on a corresponding blockchain. For the user, one of the first blockchains must be selected. We have never seen a situation where someone uses an app and first needs to choose an internet. Because for us, there is only one Internet, and the underlying operating system shields all network differences.



For the development of Web 3.0 in blockchain era, the most important thing is to get such an operating system first, and shield the differences of various chains in front of users. Users don't care what chain DAPP runs on. You don't need to care about your tokens in some cases. This is the background of the application-specific blockchain.

In fact, the application-specific blockchain is relative to the Web3.0 ecosystem. The promising project, Polkadot, is a cross-chain technology solution that needs to be opened up by all the blockchains. The Substrate framework created by the team can be used as such a blockchain operating system. The interaction in the application-specific blockchain is not universal. As long as the Polkadot ecosystem is connected, all operations of the application-specific blockchain should be universal to the user. Even if the user holds Bitcoin, it can be completed in the application-specific blockchain. Speaking of application-specific blockchain In the Web 3.0 ecosystem, not only can the chain constructed using Substrate be seamlessly interoperable, but also the existing blockchains can be connected by means of a bridge, such as Bitcoin, Ethereum and EOS. From the perspective of network effects, such connections will bring network-fighting traffic to the new application-specific blockchain. The cost of bringing users into the learning blockchain is greatly reduced, ushered in a new wave of blockchain technology dividends.

The main functions of the application-specific blockchain:

1. Interoperable transaction layer. As can be seen from the architecture diagram of Polkadot, the parachain can

achieve interoperability through the verification nodes in the relay chain, which includes basic operations such as transaction.
2. The basic user data of the application-specific blockchain (user account, permissions, token ledger).
3. The application bearer of the application-specific blockchain (smart contract, virtual machine, running platform).

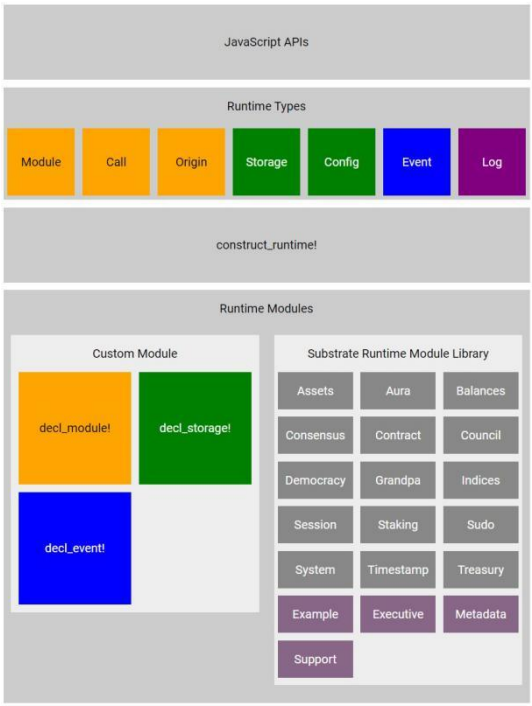
3.3.2 Substrate and Access Slot

The Substrate framework modularizes the many functions of the blockchain. It is only a matter of choice for developers. It also maintains a large number of customizable functions and modules, such as the underlying communication module, account system, and consensus mechanism,and they are customizable.

The underlying operating system framework of a blockchain must meet at least the following five requirements:

1. Functional modularity
2. Data and asset interoperability
3. Transaction scalability
4. Decentralized governance and iterative upgrades
5. On-demand security

IPSE will use Substrate to build its own application-specific blockchain. The above five basic needs, Polkadot plus Substrate can just be satisfied. Specifically, functional modularity is the biggest highlight of Substrate. As long as Substrate is used to develop the blockchain, you can see the benefits of the loosely coupled module. Here is the Substrate's partitioning of modules.



The interoperability of data and assets requires the help of Polkadot. As can be seen from the architecture diagram of Polkadot, as long as the slot of the Polkadot is accessed, the certifier node of the relay chain can verify the data and assets, so as to open up with the parachain of other access slots, of course The connection between the role of the bridge and the existing main blockchain can be used. Such a connection scheme can also be extended by the second layer of the relay chain.

Transactions also need to be scalable for an application. When a parachain is not enough to support a transaction in an application-specific blockchain, it can also be extended through new parachains. So in the ecology of Polkadot, combined with the rapid development of Substrate, it can easily meet the expanding needs. Of course, when a relay chain can not meet the demand, you can also use the multi-layer relay method to expand the number of parachains.

Substrate's framework is naturally friendly to governance. Nowadays, the biggest problem of blockchain is that it does not solve the problem of a source of credit. It is often said that the blockchain naturally creates trust, which is partly true. If, like Ethereum, the contract cannot be changed once it is released, it is indeed verifiable. As long as it can be verified to create trust, no one needs to believe that the person who issued the contract can go through the verification, but the problem is that the contract cannot be iteratively upgraded. The land-based blockchain products are absolutely iteratively evolved. Iterative upgrades should be pursued. As the application chain service of IPSE, it is necessary to pursue the characteristics of iterative upgrade. However, this requires solving the problem of trust. The project team cannot be upgraded at will. Everyone can only trust the project team unconditionally. There is absolutely no way out. How to upgrade, we need to introduce a governance structure: Let the onchain governance associate with offchain

governance, so that the application-specific blockchain is iteratively adapted to the market development needs.

The security of on-demand allocation is something that every developer needs to consider. The cost of pursuing absolute security is high. For a application-specific blockchain, the pursuit of relative security is sufficient. The security of the Polkadot ecosystem can be provided through its own consensus mechanism or through the consensus mechanism of other blockchains. The access slot does not need to maintain the verification node itself, so that you can focus on your own applications and functions.

3.3.3 The IPSE Design to Application-specific Blockchain

After the emergence of Bitcoin,it provided sufficient distributed nodes and power barriers,but its congestion and high latency caused it to fail to achieve commercial landing,while Ethereum had the function of Smart Contracts,but it also had too congestion.The root cause is that the entire problem set is not considered from the perspective of stratification at the beginning of the blockchain design.

(1) Application data and transaction data do not need to be stacked on a blockchain. The IPSE puts most of the application data on the application-specific blockchain.

(2) A variety of application data does not need to be mixed and coexisted in a blockchain. All Smart Contracts are on a virtual machine in the main chain,and the same security is obtained,but the cost is reasonable.The IPSE will have multiple application-specific blockchains for efficient separation of multiple application data.

(3) The node size of the application-specific blockchain is matched with its implementation business.The importance of the data is matched with the data chain security of the blockchain application-specific blockchain.The IPSE will not be completely decentralized,but pay attention to reasonable match.

(4) All application operations do not require an equal commission. If there is only one main chain like Ethereum, then its price estimate for all operations in smart contracts is homogeneous, and its price lacks hierarchical planning. IPSE will design different gas charges in different virtual machines, and the smart contract calculates the price layered design.

(5) All trading operations do not require equal mining costs. Different transactions have different values. It is a fact that IPSE will use application-specific blockchain technology to put most of the transaction storage in the application-specific blockchain, while mining uses the main chain to jointly mine. Which means the powerful consensus mechanism is used on main chain, the application-specific blockchain rides smoothly. For example, there are hundreds of nodes on the main chain to achieve a strong consensus, and only 10 nodes in the application-specific blockchain are responsible for storing application-specific blockchain data. And the data volume stored by 10 nodes is the 99% of network. Anyway, verifying transactions and other behaviors on the mining node are very fast, just when the block being created, the data is pushed to the application-specific blockchain for preservation, and the 10 nodes of application-specific blockchain do not need to mine, they are completely compliant with 10,000 nodes on the main chain.

(6) Whether the unified computing virtual machine on the main chain is unnecessary.For different Smart Contracts,the difference in importance is self-evident,and the importance of the data that needs to be saved is the same.If a main chain is implemented vertically,there will be serious performance expansion problems like Ethereum,that excessive amount of synchronization can also cause security problems.The IPSE application-specific blockchain can be responsible for these two parts.The calculation of virtual machine splitting solves the problem of insufficient performance of the main chain,and the data storage split solves the scalability problem of data management.

3.4 IPSE's Unique Thinking on Storage and Computing

In addition to providing the simplest wallet service at the application layer,the IPSE offers four main services:storage retrieval services,computing services,DApp and Chain Publish services.

3.4.1 Storage Retrieval Service

There are already many public-chain projects focusing on distributed storage.The more successful solutions are IPFS+Filecoin.The IPSE will be based on the IPFS network and provides search services.Users can search through a cluster of search servers,find the data,and then view it through the IPFS browser.Of course,the current browser is also compatible with some resources on the IPFS network.

3.4.2 Computing Service

The computing service mentioned here is neither the hash calculation of Bitcoin mining nor the calculation in Smart Contracts,but the computing service in the field of big data and artificial intelligence,so it is necessary to add GPU graphics card to the node,and IPSE The chain's mining machine provider is also preparing for a graphics card

upgrade.When many nodes have the GPU graphics cards,which enables distributed nodes to have powerful computing power,and with distributed localized data stored in nodes,IPSE will easily provide big data computing and artificial intelligence computing services.The computing services provided by this layer will be standardized,the computing tasks need to be quantified,and fair pricing and prevention of cheating.And forms a unified,abstract computing task order network wehre each node performs order matching,and the nodes are connected.After the order is completed,the calculation task is completed.At the same time,it is necessary to prove that the calculation is completed.other nodes also need to help verify.Then package such an order in the application-specific blockchain.

3.4.3 Application-specific Blockchain

In the Substrate framework, the application-specific blockchain is a public chain that fully supports smart contracts, and the smart contract development is a more general WASM model. Mastering Rust language and development skills is a rare help for the rapid development of the application-specific blockchain. Most of the functionality will be embedded in the application-specific blockchain through a smart contract.

3.4.4 Smart Contract

IPSE positioning is a search ecosystem. The application-specific blockchain is also a public-chain infrastructure. It can fully support smart contracts and token publish services. Any application that needs to access search services and decentralized storage services can build smart contracts on it. It will support your own functions and even build and release your own token.

4. IPSE Storage Retrieval Scheme Technology

The IPSE has its own solution to the underlying storage technology.It involves whether the data is decentralized,whether the data should be broken up,whether the data should be backed up,and how the data is copied?The IPSE will give you directions and answers.

4.1 Combination of Software and Hardware

When a decentralized application is needed, it is always necessary to deploy some miner nodes in places where the physical distance is relatively scattered, and the IPSE team has already deployed at the hardware level such as the mining base and mining center. When the team developed an ecological application-specific blockchain that based on IPFS and Filecoin, we can quickly deploy and test it in the first place.

The combination of hardware and software is not just a convenience from the engineering level, but a very high-dimensional thinking. When the Internet first developed, the hardware is actually an industry with high returns, but the software industry needs to go through several risks. Fluctuation period. The development of the application of the blockchain, if there is hardware first and sustained strong cash flow guarantee, the application development will be guaranteed by the funds, the development team will not be affected by the fluctuation of the cryptocurrency price.

Finally, the strategy of combining hardware and software is a long-term strategy. IPSE will be completely open, and any hardware vendor can deploy mining machines to IPSE network for mining. At the same time, the hardware products designed by the team will be adapted to IPSE network for the first time. The IPSE development team will not be centralized, and we accept the excellent code provided by the community.

4.2 Index Server Rights Management

4.2.1 Prevent Malicious Input of Data

The search server of the IPSE needs to prevent malicious input of two types of data.One is to add tags to the same content hash multiple times,and the other is to make small changes to the content to obtain different hashes to add duplicate tags..These two situations are ineffective for the retrieval service,and will cause pressure on the entire retrieval server.Of course,it is relatively easy to prevent the previous situation.The entire retrieval server adds tag mining behavior to the same hash address.The response is real-time,and it is easy to monitor this cheating and penalize it.For the latter kind of cheating,a review mechanism is needed.As long as the anti-cheating mechanism is added,it can effectively prevent such cheating attacks.

In addition to these two basic malicious inputs,there are some attackers who dislike the entire system and the network.This kind of attack will adopt real-time monitoring.As long as a malicious input of a large amount of garbage data is initiated in a short time,the system Will respond to this attack and will soon reject the data input.

4.2.2 Illegal Data Processing

The IPSE adopts a combination of decentralization and centralization,and will also make full use of the advantages of both.Decentralized mining behavior will provide rich content resources and more dimensions of content;semi-centralized SuperNodes solution can also meet index cluster services and bring community benefits to project

promotion.A centralized arbitration mechanism will prevent content from moving in a hopeless direction.The handling of non-compliance data will be inevitable,and a centralized solution will be the most efficient.The judge decides which is illegal or not and there is no need to give a definition in this judgment,and there is no need for everyone to dispute..The same is true of the IPSE.Centralized arbitration will save the cumbersome voting mechanism and quickly and efficiently maintain the entire service as a relatively usable state.

For data that violates the rules and data reported by the user,the IPSE will conduct centralized arbitration.If it is judged to be a violation of data,its index data will be deleted directly from the index server.Due to the untrackability of the data source,it is impossible to delete the data source.As long as the hash address is filtered,the scope of its impact will be limited.

4.2.3 SuperNodes Permissions

The SuperNode can sort the search content provided on its own index server. If the search request accesses its own search server, it is understandable to access its own sorting algorithm. Of course, there is a competitive relationship between all the SuperNodes. If the ordering of a SuperNode is not good enough, there will be a better SuperNode to make a better sorting algorithm. Of course, this is the right of the SuperNode, but it can also directly cooperate with the project team to form a super unified external service system, and at the same time, it will not need to bear the responsibility of technology development, but also share the corresponding benefits.

4.3 Data Changes and Cheating Submissions

In the IPFS network,any changes to the original data will generate a new hash address, which can be re-tagged.Of course,there is a basic judgment in it,whether it is a reasonable content change or a malicious cheating attack? As long as the review mechanism and a large number of mining early warning mechanisms are added in a short period of time,it is better to prevent such cheating attacks.

5. IPSE Optimizes IPFS Protocol

The IPSE will build a search layer based on IPFS,and the IPFS incentive layer is Filecoin.Users can provide a large amount of storage space and then put it in Filecoin's DSN market.As long as there is a storage demander who is willing to purchase storage space,the order can be comfirmed and Completed.Filecoin's mining profit will be huge.The success of Filecoin will stabilize the entire IPFS network and the number of nodes will grow geometrically.

5.1 Filecoin's Block and Storage Price

Filecoin's block generate will be a huge profit,the data storage will become safe after Proof-of-Replication being enhanced,the whole Filecoin Token system will be recognized by society and the capital market,many miners will gradually involved in mining set lower storage prices to compete for limited storage needs.Of course,this limited storage requirement is only the beginning.If the storage price drops to a level that cannot be refused by a large resource,the market will change dramatically.There is also a non-negligible developer community that is most active in embracing the IPFS ecosystem,and they will no doubt prefer a cheaper and more secure IPFS network for data storage.There is even a situation where some aggressive mining behavior will directly set the storage price to be free for the storage order.

5.2 Filecoin Mining Pool

Filecoin's white paper discusses two mining methods and the DSN market very clearly and elegantly.Can storage markets and storage mining be able to easily design Bitcoin-like mining pool?It is difficult to build a mining pool in Filecoin's storage market.Each storage miner node has a unique identity PeerlD.It can't pretend and replace other nodes to get orders from the DSN market.And the matching transaction will not be attacked,Even if the miner node gains the mining advantage through some mining pools.this advantage will likely be identified as an attack.The mining behavior that does not pay for it will probably be an attack and cheating,and Filecoin The team will soon smooth out this advantage by upgrading the mining software.

Filecoin also has another way of mining,which is to search the market and retrieve mining of get Token.If you see the essence,the data is saved in order to be retrieved,and a large amount of data should be widely used.How to increase the

access to search orders by gaining more access traffic? such a mining pool will no longer be an attack for Filecoin,but a positive mining behavior.The IPSE builds a search layer based on IPFS,which provides users with free retrieval services.At the same time,it also helps SuperNodess to get the opportunity to build their search mining pools.

5.3 IPSE Traffic Flow and Retrieval Mining

The traffic of the IPSE will be in the hands of the SuperNodess.How to guide the traffic will be a place where the SuperNodes can play a huge role.Undoubtedly,the easiest attempt is to build a mining pool and connect it with the mining machines,allowing these mines to obtain higher retrieval and mining revenue.Of course,if the SuperNodes can form a larger pool,the number of miners that are connected will be even larger,and the content coverage of the content will be more extensive,so that the guidance of traffic will be more efficient.

5.4 IPSE SuperNodes and Mining Service

The SuperNodes of the IPSE is a deep participant,the technical solution is provided by the project side,and the execution level requires the SuperNodes to participate hard.Only the community with the same interests can make some applications that can be applied.We can't really see the possibility of the blockchain landing if we just focus on the hash calculation competition.SuperNodess can build their own mining pool services,which can have huge advantages in the mining hardware sales.If you observe the development of the entire Internet,the sales profit of hardware to promote the development of the whole industry is a process,and we will go through such a process again.It is only whether we can increase the profitability and sales advantage of hardware through technical means and consensus networks.

5.5 Future Role of IPSE and Filecoin

With in-depth research of Filecoin's basic protocol, we can will find such an embarrassing point, data is saved to the IPFS network, if the data storage user chooses to use Filecoin's DSN market, then you need to pay Filecoin(FIL) to get storage space, so the data is safely saved, but the data retrieval also needs to pay Filecoin, the popular data will be retrieved by countless people, and these people also need to pay Token to get resources? Obviously this is a relatively embarrassing point, the data is accessible to users through P2P network, and if the data allows a centralized node to pay and then distribute, it is no different from traditional HTTP. After thinking deeply about these points, IPSE's positioning can just solve this embarrassing point. The data owner can save one or two copies to IPFS for data security, and use Filecoin for security protection, but the data access will not pass Filecoin. The search market, but directly through the IPSE to allow a large number of users to access free, and the data is also free to save, so that not only can get IPSE Token POST rewards, but also can solve the storage cost and bandwidth costs, and because Filecoin guarantees the data Security, loss of data on IPSE does not affect the integrity and security of the data.Very little data will be secured by Filecoin, but most of the data will be distributed and reached through IPSE.

6. IPSE Incentive Mechanism and Token Allocation

The IPSE does provide a powerful search service layer,with the service provided by the search server bound.The search service layer requires a large number of data sources.IPFS creates the next generation data storage network.There will be a huge amount of data sources,since the data is an unsearchable hash address,only the uploader can tag the hash address and upload it to the search server to be searched by all users.

6.1 Mining Logic of IPSE

The semantic annotation of content is a difficult point.It requires very high latitude thinking and calculation.Artificial intelligence technology will gradually replace human beings to semantically tag content.However,in this excessive stage,human intelligence needs to be involved,and some semantic tags are added to the content.The IPSE will calculate a reasonable computational value for a hash address and semantic tag,which is calculated based on the type and size of the content.

6.1.1 Mortgage Mechanism

The annotation semantic tag is open,so the decentralized mining method is consistent with the blockchain project such as Bitcoin,but the consensus layer is not simply a hash computing competition,it needs to maintain an orderly semantic annotation.In the behavioral market,in order to prevent the attacker from maliciously mining,the IPSE will introduce a mechanism for mortgage Tokens.Once the attack behavior is discovered by others,the review mechanism will play a role,and the arbitration mechanism will soon conduct fair arbitration,once it is sentenced to the attack behavior,the mortgage Token will be fined.

6.1.2 Timely Mining

As a technical collection of the third-generation public chain,IPSE will support a wide range of mining operations and be able to respond to mining requests in a timely manner and make reasonable settlements based on computing power.Users only need to carefully tag the content and will immediately obtain mining revenue.The calculation of

specific mining revenues can be based on the total calculation power over a period of time and the calculation power of a single mining operation.The economic model of the IPSE will show how much minerals are produced at a specific time,and then obtain specific mining gains based on the total power of the mining behavior.The total power is a process of dynamic evaluation.Just as Bitcoin adjusts the difficulty of mining according to the calculation power for a period of time,the IPSE will adjust the profit of mining based on the calculation power of the past period of time.

6.1.3 Review Mechanism

When the user searches for the data hash and finds that it is not matched with the semantic tag,or the hash address is invalid.Of course,it may be that the storage party has shut down the storage node,or the data has been deleted by the storage node,no matter what.This will be a violation of the content service promise of the semantic tag.The user can comment on this violation of the service commitment,and if such a review accumulates a sufficient amount,it will automatically enter the arbitration process.Of course,users can't comment for no reason.Users who participate in the review need to have an account with IPSE,and they need to sign their own comments.At the same time,if the number of comments is enough,it will automatically enter the arbitration process.As long as it is not a random attack,it will receive rewards from the community.

6.1.4 Arbitration Mechanism

The arbitration mechanism is at the level of public trust governance.In this regard,the team has in-depth thinking.If a fully decentralized search service can be implemented technically,can such a product be used on a large scale?A completely decentralized network will be completely free,just as human beings are completely free from the Eden.If such a network still has mass storage and complete search services,such a network will be difficult to be large-scale use,because it is impossible to shield some unsuitable resource content,the evil of human nature will be infinitely amplified through the network.IPSE team knows that IPSE search layer is huge and will use this ability more cautiously.We will adopt a combination of centralization and decentralization,and adopt a centralized solution in the design of the arbitration mechanism.Users can trust the IPSE team,because the consistency of interests is the best guarantee,of course,a semi-central plan solution is also in our consideration,but see the low voter turnout rate on the EOS ecosystem-like public chain project,Let us give up such a semi-centralized solution.

6.2 Anti-cheating Mechanism of IPSE

The IPSE will adopt the DPoS solution at the consensus level.This is a set of mature programs,so there will be no chance of cheating at the consensus level.The IPSE will not have a mechanism to block the reward,we will use the Smart Contracts to distribute user Token solutions.And it would be a huge challenge.The IPSE will work to prevent cheating and try to ensure ecological equity.First,each account of the IPSE needs to purchase memory resources and mortgage network and CPU.In short,it takes a price to get the account of the IPSE.The IPSE will set up a blacklist mechanism.if the user is arbitrated.After joining the blacklist,its mining behavior is no longer valid during the blacklist period.The penalty for adding a mining account to the blacklist is relatively minor.The mortgage mechanism described above will punish the Tokens mortgaged by the user.The penalty will be severe.The mortgage mechanism is like Filecoin,the cost of cheating for users increases.

6.3 Economic Model of IPSE

A good economic model will be conducive to the expansion of the ecology and the promotion of the community. The IPSE will allow pre-mining 30% of the Tokens that will be released gradually within 3 years. The remaining 70% of the Tokens will be released by mining for miners, and will be vested in half every 2 years.

Since the IPSE adopts the consensus mechanism of DPoS, there will be some SuperNodes stakeholders who will be responsible for the stability and security of the entire blockchain network. On the one hand, it will also provide search services. This search service cluster will be The SuperNodess are composed, of course, they will also get a good return.

As a SuperNodes, mining hardware sales will also be a source of great benefits. The project side will provide a Smart Contracts template to the SuperNodes. This contract will enable a SuperNodes and miner to establish a binding relationship. Both sides can bring certain benefits, such as the SuperNodes needs someone to bring traffic, and the ordinary miners can also gain by developing mining allies, which can be achieved through Smart Contracts.

6.4 Incentive Allocation Mechanism

6.4.1 Token Introduction

IPSE Token name is POST. The total amount of POST is 10 billion.

6.4.2 Token Allocation Scheme

POST is mainly divided into several parts:

1. Early contributors and angel investors

POST will be given to those for supporting the project.

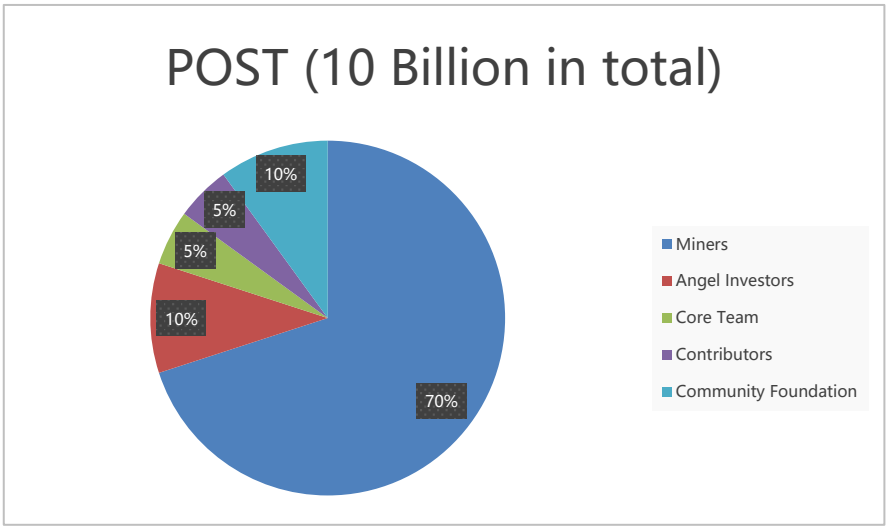
2. Community incentives
   The IPSE will be motivated by multiple communities, and a portion of Token will be given to IPSE Foundation to support the entire community.
3. Core team
   Maintain long-term development.
4. All miners
   They will get the majority of the POST by mining.

The founding team of IPSE is a very diverse team, not only the elite from the internet, but also the core blockchain technology development talents, using innovative technology,building a strong economic ecology with multi-incentive, multi-dimensional development, guaranteeing the entire project.Which ensures a long-term sustainable development.

6.4.3 Token Allocation

IPSE's Token, POST, is halving every two years. And 30% of Tokens will be pre-mined, and 70% of Tokens are directly mined by miners. And 5% of Tokens for Core Team will be locked with 3 years. The vesting schedule for each participating group is as follows:

- Angel Investors: 3 years, linear vesting.
- Core Team: 3 years, linear vesting.
- Contributors: 3 years, linear vesting.
- Community Foundation: linear vesting.
- Miners: Halving every two years.



7. Commercialization Prospects of the IPSE

7.1 Traffic Entry for the Next Generation internet

If we carefully observe the development of things, when the information on the Internet is just beginning to grow, people learn from the Linnai classification system, classify the content of the Internet, and then make various portals to satisfy people's information demand. Immediately after the emergence of search engine services, people can retrieve data according to their own needs, and then developed the Internet advertising industry.

When the previous generation of Internet giants mastered the search for this traffic portal, when 77% of the global search market was controlled by a company, when the $55 billion Internet advertising industry had no new challengers, Google’ s market capitalization could Easily break through one trillion dollars, and the traffic portal of the next generation Internet will change. Of course, the trend of fragmentation will be inevitable. The IPSE deeply understands these two big trends, the infrastructure of the Internet will eventually be changed. There is no doubt that the IPSE is based on IPFS, which is betting that it will win the next-generation Internet infrastructure, while the IPSE will adopt an open attitude to build a community autonomy and sharing model with the CIS economy,fragmented traffic portals can converge as much as possible, but value is no longer monopolistic.

7.1.1 Form New Barriers

If you simply think from the perspective of doing search, IPSE can't build a competitive barrier in a short time, because it can't be compared with traditional search engine vendors in semantic analysis, big data analysis, artificial intelligence and natural language processing, etc. But blockchain technology brings changes, traditional engine vendors embrace blockchain technology can never be used to reshape their main business, Google's search engine can not introduce the blockchain incentive mechanism in a short time, In this time IPSE has the opportunity. All of the above are just considering the issue of competition barriers from a commercial perspective. Of course, the technical perspective is also an important judgment direction.

The resources on the IPFS network are a black box mechanism and cannot be crawled by the spiders of the search engine vendors. If users upload their own resources to the IPFS network, as long as the hash addresses of the resources are not shared, other people on the network cannot know the resources. Wherever it is stored, search engine spiders can't crawl resources. IPSE will use incentive mechanism, and let users share resources, a large number of active sharing exists.users share their resources uploaded to IPFS are able to get Token rewards, so that the resources on IPFS can be the first time Indexed to provide a search service layer for free to ordinary users.

The index data on the IPSE will not be open to traditional search engine vendors. If they infringe on the index data on the IPSE, we will not hesitate to use legal weapons to punish such theft. Of course, the IPFS network is not yet influential. Traditional search engine vendors will not list the IPSE as their main competitor, because the IPSE cannot compete at the level of search intelligence, but these are just a process. As long as we have the next generation Internet traffic portal, the IPSE will win the next traffic entry dispute.

7.1.2 Open Business Model

The traditional search engine constructs a weight value for each web page, sorts the web pages according to the weight value of the web page, and a search engine manufacturer introduces a bidding ranking mechanism to maximize the advertising benefits. Regardless of the way in which pages are sorted, it is a compromise product that allows users to search for the best content on the one hand and maximizes business value on the other, and this compromise is never easy to make.

The IPSE is fortunate to adopt a completely different strategy. The basic approach is to make the premium content cost less to promote, and the inferior content resources will require higher promotion costs. This is a positive cycle. The content provider will focus on content improvement rather than promotion. The IPSE will use Smart Contracts to intelligently settle the payment of promotion fees. The promotion cost will take into account factors such as the matching degree and popularity of resource seeds. Based on Smart Contracts to push better content to users, all parties involved can't cheat, users will no longer be the target of harvesting, advertisers can't simply deceive users, and will not pay heavy promotion costs. and IPSE makes it more diverse to get income, because anyone can participate in the promotion, rather than a cumbersome registration process for platforms like Google that need to open the account and bank credit card. On IPSE, anyone want to promote content, they can just use the POST Token to place an order with the Smart Contracts, and the system will respond to this demand.

7.2 Mining that Anyone Can Involve In

The IPSE is built on IPFS. The ecology of IPFS needs to share the spirit. Anyone can upload resources to the IPFS network, or share storage space and network resources to gain revenue. Filecoin is an incentive layer built on IPFS. It solves the problem of how data is stored. The IPSE is a search layer built on IPFS, which solves the problem of how resources are found.

7.2.1 Contributing Resources

When a resource is uploaded to the IPFS network, the actual content is not shared,the process is completed when the seed of the resource is shared. Of course, the scope of the seed is limited. If the hash seed is posted after tagging and then entering the index server, it can be easily searched by anyone, then the resource is truly shared. The IPSE is very supportive of this sharing behavior, not only technically fully supporting this tiny sharing behavior, but the entire pass-through economy will encourage this behavior, so the Token of the IPSE will be used to motivate this multi-dimensional resource sharing. The contribution of ordinary users' resource sharing to the search service layer of IPSE is obvious. If only large video vendors upload resources, the dimension and richness of resources are inferior to the traditional Internet, if ordinary users are more willing By sharing content on IPFS and gaining higher incentive revenues, IPFS networks will gain an advantage over traditional Internet.

7.2.2 Contributing Storage Space and Networking

IPFS is to completely revolutionize the underlying protocol of TCP/IP. Currently, the popular browsers are based on http/https, but IPFS browsers will be completely different for the purpose of more stable operation, the IPFS network needs more nodes to join in. These nodes can join in and use their own storage space and network resources to obtain mining revenue. The IPSE plan will develop a client that allows users to freely allocate storage space and network resources of their PCs and mobile devices to join the IPFS network as a node, and this client is also a blockchain wallet that can be used. Which is very convenient to dig the Token of the IPSE in the wallet. When the IPFS incentive layer, Filecoin,goes online, it will also be compatible with Filecoin's wallet, and users can easily get Filecoin and POST Tokens.

It is possible that ordinary users take out a part of the storage space to mine, which is not dominant in the entire mining ecology. However, because ordinary users share idle resources and their content is more advantageous in terms of dimension and richness, The search for mining revenue will be higher, and the management experience of the owner will be added, and the resources will be updated and maintained.

Of course, if users are not only satisfied with contributing their own idle resources to mine, they can join the professional storage mining industry. The threshold of this storage mining industry is low enough. As long as you buy a mining machine and prepare for broadband, you can participate in mining. You can even find a reliable host to manage your mining machine in a centralized manner.

7.2.3 Professional Mining Machine Node

In fact, the IPSE officially recommends the matching mining machine products, and its mining machine products are compatible with the mining logic of the IPSE. At the same time, its mining machine products are the best in the same industry, and the technical team is reliable. The hardware quality can be guaranteed. The basic logic of the mining of the IPSE is very clear.

Users do not need to update and maintain content resources when purchasing mining machines. Mining machine manufacturers will have background updates and distribute content resources.

- Users can manage the mining machine in a cluster, and the proceeds will go directly to the digital coin wallet.
- The mining machine uploads the data to the IPFS network and locally saves a copy of the data in case the data is deleted by the unstable test node.
- The rake mining machine can realize double digging after Filecoin mainnet goes online, while digging Filecoin and POST.
- The limited space of the mining machine realizes the maximum benefit. How to optimize the double excavation of FIL and POST, the mining machine manufacturer will optimize the quantity and heat of the content, and optimize the storage strategy to ensure the maximum return after deducting the cost.

7.3 Construction of the Traffic Matrix

The IPSE is not a complete decentralized solution. A lot of data about the search service layer uses the most efficient centralized solution. A deeper understanding, the IPSE team will build some new traffic portals on the road of commercial exploration based on the understanding of the data.

7.3.1 Peer-to-peer Streaming Service

IPFS network support for video resources is very friendly. Sufficient stable nodes will provide very high download speeds. It is a great advantage for video transmission and sharing. Decentralized p2p transmission features and centralized video portals. There is an essential difference, and there will be an absolute advantage at the cost level. Of course, the existing video portal can completely transfer its own content resources to the IPFS network. Currently, there is an IPFS-like video portal similar to Youtube called DTude, but its The fatal flaw is that it can't motivate users to upload high-quality video content. Causes its content to remain in a low quality state for a long time. When a traditional video portal uploads resources to an IPFS network, it can only search in existing content circles. The IPSE will use the economic model to motivate users to upload high-quality content, and will also be associated with traditional video portals. Website to cooperate.

Google has invested in Youtube and has made the world's largest video platform. Google not only gets the best bandwidth resources from operators, but also supports traffic. The same is true for the logic of the IPSE to be a IPFS video platform. It will be more advantageous in terms of storage and network costs, because it is P2P propagation, there is basically no bandwidth cost, and resources are stored by users and customers, so there is no storage cost. The new video platform will use a very reasonable pass-through model to coordinate the distribution of interests among all parties, and these are places where POST can deliver value.

7.3.2 News Service

The traditional media is facing difficulties, and the traditional Internet information portal is also accelerating. If you want to ask why, no matter how you answer it, you can always see a reason: Centralization is not friendly to the dissemination of information, no matter it is Information Centralization or Capital Centralization. An information portal can only feed a group of people, and this group of people's thinking in turn shapes the style of an information portal, which ultimately leads to the loss of the possibility of the entire information platform. And a thing with vitality is always in a dynamic balance. The IPSE will adopt a decentralized solution to decentralize the production of information. At the same time, it can also match the user and use the artificial intelligence recommendation system. Users can use the IPSE to obtain some high-quality content. You can also get an ad-free information reading experience, and even get direct access to the advertiser's promotional expenses.

7.3.3 App Store

The main content category of the IPSE is the resource package. The distribution platform of the existing resource package is closed, which ensures security and also creates a monopoly of distribution. The IPSE will provide a Free distribution platform for resource bundles, and any manufacturer can provide calibration hash values of resource bundles for security check. Users can download the resource package of IPSE Security Certification. Through such a fast search, there is no need to go to each official website for downloading, and the download speed will have a huge advantage.
The resource promotion within the app store will also be the same as the advertising industry. The Smart Contracts solution also requires the Token POST of the IPSE.

8. IPSE Trident Plan

8.1 Copyright and Token Related Resources

8.1.1 Copyright Protection and Content Distribution

Copyright protection is a very complicated issue. It is not a simple matter of copyrighting a copyrighted resource. However, if the IPSE project develops to this stage, anyone can easily share resources and copyright disputes will be needed. Directly facing the problem, of course, the use of containment is not the idea of IPSE. For example, adopting a one-size-fits-all approach, without any resource sharing, there will be no copyright disputes. And these copyright disputes caused by users are by no means solved by the blockchain technology itself. IPSE will adopt the opposite idea of containment, so that anyone can declare the copyright of resources in the first time, and adopt asymmetric encryption. The way to protect its copyright.

At the engineering implementation level, there will be two options. The first one is to choose to trust IPSE. After uploading the copyright resources to the IPFS network, upload the hash address to IPSE and mark its corresponding copyright information. You can set the price and decide who can access it. So that IPSE will protect the user's copyright from copyright infringement. At the same time, other people's payment for copyright can be settled to the copyright party through the Smart Contracts, and the IPSE platform will Get a reasonable intermediate platform revenue. Another way is to choose not to trust anyone. After uploading the copyright resources to the IPFS network, encrypt the hash address with your local private key and IPSE's public public key, and upload the encrypted hash address to IPSE's Smart Contracts, save to the blockchain, and then only after paying the copyrighted content, the Smart Contracts can give the credit of the decrypted copyrighted content to the payer. The entire process does not expose copyrighted content to unpaid people.

Both methods are feasible, but the first one needs to choose to trust IPSE, which will also achieve higher efficiency, while the second method does not need to trust IPSE, but its efficiency will be lower.

Copyright protection can be achieved by IPSE on this asymmetric encryption, but its impact will be huge. The biggest impact is the distribution of content. For example, the distribution of a song needs to go through various brokers to earn the difference. The singer will face all kinds of piracy. On IPSE, copyright is protected, and copyright revenue is also protected. The key is to make content distribution very simple. The content of the singer can be distributed in one second. And copyright confirmation, and then quickly reach users through IPSE's vertical content platform, copyright content can achieve a win-win situation.

8.1.2 Conflict Between Token Related Resources and VIP Modes

In addition to copyrighted resources, there are still many resources that do not have copyright, but they can be sold at a price without infringing on the copyrights of others. These large and widely distributed resources can become a currency resource on IPSE. The advantages of purchasing cryptocurrency resources on IPSE are as follows:

1. Payment is very simple and convenient.
2. You can pay for different resources with different prices.
3. The price is very low.
4. Token is very easy to get, don't worry about the Token you need to pay.

Nowadays, the VIP mode is everywhere and affecting our lives. That is because the cost of distinguishing all users is high. It is better to directly engage a VIP to harvest a part of users, and the rest of users can take a ride. While IPSE uses different strategies, IPSE distinguishes the cost of all users because the Token economic model of the blockchain drops rapidly. For example, a song and an album, the content is different from the lesser dimensions; listening to one month and permanent listening, the content acquisition time dimension is different; users who have purchased 100 songs and users who have never purchased, users loyalty is different. Inconsistencies in all of these dimensions can be calculated in Smart Contracts and a fair price is calculated. Of course, the use of asymmetric encryption technology to protect the currency and copyright resources, can not let users take a free ride, unless the copyright and resource parties are willing to.

8.2 Open Plan of Search Sorting API

8.2.1 Comparison of Traditional Search Engines and IPSE

The traditional search server saves the searchable resource index into the centralized server cluster. But don't forget the core essence of it. These data are basically not owned by the company behind the search engine, but they are crawled by spiders. Based on this logic, search engines can easily track information about individuals and organizations and then match search needs. But good stories always have the bottom half. These search engines can personalize addresses for users and use it for ad tracking. All users are called harvesting objects, and the real purpose behind these is not to tell users easily. The traditional search engine can easily cooperate with governments in the censorship to go astray because of the support of a strong operating company. If the interests of traditional search engine companies are inconsistent with the public interest, and the anti-monopoly law can not break its monopoly position, an inevitable evil may become a basic reality for a long time.

IPSE(InterPlanetary Search Engine)is secure and does not track user behavior and history for the benefit of the user, and the data uses a decentralized preservation scheme, and the search data will be distributed and stored in the decentralized search cluster server. This means that IPSE will not have a plan for advertising tracking. Of course, it is necessary to pay for the construction of a commercially viable architecture. IPSE uses incentives to obtain some data shared by users. Based on the same logic, the user can transfer part of the personal data to the IPSE while getting the Token incentive. IPSE will ensure the absolute security and personal privacy protection of users' personal data through blockchain technology.

8.2.2 Combination of Search Sorting and Smart Contracts

Smart Contracts can be priced for any promotion over a certain period of time, and this pricing falls within a reasonable range. The searched content can be sorted very intelligently, and the intelligence of this sorting work requires the support of artificial intelligence technology. Technology is never a problem, and the data needed to train artificial intelligence models is key. The user needs to transfer the right to use some data to IPSE in order to make the search service smart. IPSE will undoubtedly quickly practice this great idea: users can transfer part of the data usage rights to IPSE, not only to get the incentive to get Token, but also to make IPSE more intelligent to provide services to users themselves, and advertisers do not have to take a lot of cost to do the promotion plan, because the pricing model of the Smart Contracts is not the high-priced person to get the traffic.The price system is open, the high-quality, user-approved promotion will be low-priced.But,inferior, and disgusting to the user promotion price will be high.

8.3 Pixel Matrix Plan

8.3.1 Locally Save Data and 5G Opportunities

IPSE are thinking those question: What kind of form will the future data storage become with the arrival of the 5G era? What kind of form will the calculation of data in the future become? IPSE is currently pushing data to the IPFS network, the data will be distributed, and the data can be persisted locally distributed stored. The storage party is only responsible for distribute storage,not for the data itself.

With the advent of the 5G era, there are two fundamental changes. One is that the efficiency of data transmission will increase by an order of magnitude, and the other is that the delay of data packets will be reduced by orders of magnitude. The changes brought about on the IPFS network will be very obvious, that is, the demand for data will increase by more than an order of magnitude. Users who previously watched 1080p video will watch 2K, 4K or even 8K video. Now the physical medium of data storage still has no essential change, that is, the ability of data to read and write I/O will not be increased by orders of magnitude. The data upload between single point or limited nodes and unlimited data download will be contradictory. The IPFS solution will be perfect, with unlimited data upload nodes and unlimited data download nodes being transmitted via P2P network. Accessing data on IPFS also has the problem of packet delay, but what is even more unbearable is the search time of the node. As the stable nodes on the IPFS network grow, the search for nodes on the IPFS will become faster and faster.

8.3.2 Edge Calculation and Scenario Application

The edge computing that IPSE is to implement will have scenarios at the application level. Such as picture recognition and space mapping construction. The data is stored locally, but IPSE will adopt the upgraded localization strategy. The data local storage will not be sharding. Of course, this stored data is used for calculation. The IPSE storage node will support the upgrade of the graphics card and access the powerful computing framework, which will become very flexible and powerful in the calculation of the edge of each scene. For example, in a museum, you need to provide a robot navigation map service, a new robot to the blockchain to request map services, if the local map service is available, you can automatically reach a deal with Smart Contracts, the local node can provide stable the map service to the robot. IPSE's edge computing is designed for scene applications to achieve application landing.

9. IPSE Team

9.1 IPSE Team Members

Core Devs

Silver Xie

Founder and CEO of IPSE.

He is an entrepreneur in the field of big data and artificial intelligence, a member of Huawei Distributed Cloud Data Center and Global Distributed Storage Development Group, he is also a cross-disciplinary expert in blockchain technology. He Started in blockchain application development in 2016, has participated in Ethereum contract development, and he has been focusing on IPFS and Filecoin since January 2018. Currently he uses Rust and Substrate to develop blockchain, providing innovative ideas and solutions for IPSE.

Zhiming Lee

Chief Architect of IPSE.

Architect of Baidu Artificial Intelligence Driving Group; Expert engineer of Tencent MIG; Senior engineer of Microsoft software development engineering department, with more than 8 years of R&D experience in artificial intelligence and software engineering. He is a PHD. in Computer Science, National University of Singapore.

Zhe Wang

Chief Technology Officer of IPSE.

University of California, Los Angeles, PHD of Computer Science and Engineering. Former Microsoft software development engineer. Former Google senior engineering manager, led a team to apply machine learning for web search.

Larry Liu

Chief Data Scientist of IPSE.

Early contributors to Hadoop ecosystem at Yahoo. He invented AutoML. Has more than 15 years of experience in technology to drive innovations in distributed system. big data and AI for large IT companies and 500 fortune companies.

Early Contributor

Ender Xu

Early Contributor of IPSE.

Managing partner of GSR Digital Funds. Funding chairman of Global Blockchain Investment Association (GBIA). Chairman of Hong Kong Blockchain Association (HKBA).

Khalfan Al Mazrouei

Early Contributor of IPSE.

Former royal secretary of the United Arab emirates.

Bob Qin

Early Contributor of IPSE.

Chairman of North America blockchain Foundation. Lead DB2 researcher of IBM Toronto research center. Big Data Senior expert. Founder of Nuclear Chain (NUChain).

Kim Keun Koung

Early Contributor of IPSE.

Chairman of WTIA GROUP.
Senior Consultant of AI Hermas Global, Chairman of AI Hermas Korean.

Engineering Team

	**ANDY HUANG** **Chief blockchain Technical Engineer of IPSE.** Former Huawei technical engineer, has many years of technical experience, He is one of the veterans of the Internet and blockchain industry. A Leader in the technical elite group.		**TOM TANG** **Chief Back-End Technical Engineer of IPSE.** Former Huawei technical engineer. Has many years of Back-end development experience. Once led the team to develop the underlying public blockchain. He is the key in the technical elite group.
	**JAMES CAI** **Chief Front-End Technical Engineer of IPSE.** An outstanding Front-end developer with rich UI /UX development experience. He is also good at mobile app and wallet development. He is talented and has the ability to lead the team on site.		**LUI DENT** **Operations Manager of IPSE.** Has unique insights in brand design, brand promotion and content operations. Committed to brand building and construction. Great experience with independent projects.

10. Project Development Roadmap

10.1 Project Development History

- 2018.5-2018.10 Research on market, software and hardware Algorithms.
- 2018.10-2018.11 Theoretical verification, technical white paper released.
- 2018.11-2018.12 Product design, development associated with public blockchain and index server cluster construction.
- 2019.01-2019.02 The official website and search website went online and started trial operation.

10.2 Project Development Plan

- 2019.02-2019.04 The project officially launched and started internal test for mining.
- 2019.04-2019.05 Development on web plug-in access and blockchain browser.
- 2019.05-2019.07 Development on wallet support.
- 2019.07-2019.12 Index server upgrade.
- 2020.01-2020.06 IPSE2.0 development, exploring the underlying harddisk-based consensus mechanism innovation.
- 2020.06-2020.12 Exploration and development on IPSE 2.0 business application layer, including storage business and search business commercialization.

11. Risk Warning

11.1 Regulatory Oversight Risk

The regulation of POST is still at a very preliminary stage of development, and the applicable legal and regulatory framework may change after the date of this paper. This change can be very rapid and anticipate the nature of such regulatory changes. POST does not express in any way the regulatory status of POST Passes will not be affected by any regulatory changes that occur at any point prior to, during, and after this release. POST and its affiliates are currently not regulated or supervised by any regulatory body and are not subject to the standard laws of the *Securities and Futures Act*, the *Financial Advisers Act* and other relevant regulatory requirements.

11.2 Other Risks

The tax characteristics of POST passes are unclear, so the taxation faced by POST is uncertain. POST makes no representations about any tax consequences arising from the purchase or possession of a POST Pass. The POST Pass is a blockchain-based asset that does not account for the loss of the POST and is not responsible for third party factors. Third party factors include, but are not limited to：third party wallets, trading platforms, misconduct and fraud.etc.

12. Disclaimer

Disclaimer: The information outlined in this white paper may be missing, but it does not mean that this white paper is

not reliable, and the final resolution belongs to POST. POST Tokens are not securities, bonds, commodities or any other type of financial instrument. It is not registered under the guarantee laws of any country, including the securities laws of any jurisdiction in which the potential holder of the Token is located. In no event shall any warranty be given to anyone in any form, including the accuracy of any statement, commitment or other factual statement, or the integrity of any part of the information in this white paper. This white paper does not constitute investment, legal, tax, regulatory, financial, accounting or other advice. Prior to obtaining a POST Pass, potential purchasers should consult their legal, investment, tax, accounting, and other advisors to determine the potential benefits of such transactions and bear other consequences. Upon receipt of the POST Token, it is stated that the POST Token holder has read and accepted the terms of this White Paper.

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