PowerVerse — — Web3.0 Decentralized Computing Cloud Platform White Paper

—. The creation of PowerVerse

With the rapid development of the digital age, cloud computing and artificial intelligence technologies have become the core force driving innovation and change in various industries. Cloud service providers are booming around the world, providing enterprises and individuals with a variety of computing resources and service models. At the same time, as a key infrastructure for the development of artificial intelligence, the demand for AI computing power has shown explosive growth. However, the current cloud service and AI computing power market has also exposed a series of pain points in the process of development, which provides opportunities for the emergence and development of decentralized computing power cloud platforms.

1. Current status of AI computing industry

1. Demand growth drivers

The rapid development and widespread application of artificial intelligence technology are the main factors driving the growth of demand for AI computing power. With the continuous evolution and breakthroughs of deep learning algorithms, the complexity and scale of AI models are growing exponentially, and the requirements for computing power are getting higher and higher. For example, OpenAI's GPT-4 model has more than 1.8 trillion parameters, and the computing power required for its training is astronomical. At the same time, the application scenarios of AI in various industries are constantly expanding, such as smart driving, smart security, smart manufacturing, smart medical care, etc. These applications require strong AI computing power support to achieve real-time data processing and decision analysis.

2. Computing power supply and distribution

At present, AI computing power is mainly provided by professional computing chip manufacturers, data center operators and cloud service providers. NVIDIA is the world's leading AI computing chip manufacturer, and its GPU products dominate the fields of AI training and reasoning; other chip manufacturers such as AMD are also continuously increasing their efforts in the research and development and market promotion of AI chips. In terms of data centers, major global technology giants and professional data center operators have invested heavily in building ultra-large-scale data centers to meet the growing demand for AI computing power.

In terms of computing power distribution, the United States occupies a leading position in the global AI computing power field, with many top technology companies, research institutions and data centers, and its AI computing power resources are the most abundant. China has also vigorously developed AI computing power in recent years, and through policy support, industrial investment and technological innovation, it has gradually narrowed the gap with the United States. In some regions and fields, competitive AI computing power clusters have been formed, such as Beijing's "Zhiyuan" artificial intelligence computing center and Shanghai's "Haisuan" computing power platform.

3. Technology Trends

In order to meet the growing demand for AI computing power, computing chip technology continues to innovate and evolve. In addition to the continuous optimization and upgrading of the traditional GPU architecture, new computing architectures such as TPU (tensor processing unit) and FPGA (field programmable gate array) are also gradually being widely used. These dedicated chips have higher performance and efficiency in specific AI computing tasks. At the same time, the development of quantum computing technology has also brought new hope for breakthroughs in AI computing power. Although the application of quantum computing in the field of AI is still in the exploratory stage, it is expected to provide more powerful computing power for solving complex AI problems in the future.

2. Current status of cloud service provider industry

1. Market size and growth trends

According to data from market research firm Gartner, the global cloud service market has maintained a high growth momentum in the past few years. In 2023, the global cloud service market will reach US\$586.4 billion, a year-on-year increase of 19.4%. It is

expected that the global cloud computing market will exceed US\$1 trillion in 2027. This growth is mainly due to the acceleration of enterprise digital transformation. More and more enterprises are migrating their businesses to the cloud to reduce IT costs and improve operational efficiency and flexibility.

In the domestic market, the cloud service market also shows a strong growth momentum. According to data released by the China Academy of Information and Communications Technology, in 2023, the scale of my country's cloud computing market will reach 616.5 billion yuan, a year-on-year increase of 35.5%, and it will still maintain a high level of vitality. The cloud technology innovation and enterprise strategy adjustment brought by AI native are driving a new round of growth in my country's cloud computing. It is expected that in 2027, my country's cloud computing market will exceed 2.1 trillion yuan. Among them, Alibaba Cloud, Tencent Cloud, Huawei Cloud and other leading cloud service providers occupy a large market share, but the market competition is still fierce, and many small and medium-sized cloud service providers are also emerging, trying to get a share of this vast market.

2. Service model and application areas

Currently, cloud service providers mainly provide three service models: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). IaaS provides users with basic computing, storage and network resources, on which users can deploy and manage their own operating systems and applications; PaaS, based on IaaS, provides more advanced development platforms and tools to help users quickly develop, test and deploy applications; SaaS provides software applications to users in the form of services, and users do not need to install software locally, but can use various applications through a browser.

Cloud services are widely used in various industries. In the Internet industry, cloud services support the storage and processing of massive data, as well as the stable operation of various online applications. Financial institutions use cloud services to achieve rapid business innovation and digital transformation, and improve risk management and customer service levels. Manufacturing companies use cloud services to optimize production processes and improve supply chain management efficiency. The medical industry uses cloud services to share medical data and provide telemedicine services. The education field uses cloud services to support the construction and operation of online education platforms, providing students with more convenient learning resources and environment.

3. Competitive Landscape

The global cloud service market presents a relatively concentrated competition pattern, with international giants such as Amazon AWS, Microsoft Azure and Google Cloud occupying the leading position. In the Chinese market, leading enterprises such as Alibaba Cloud, Tencent Cloud, Huawei Cloud and Baidu Cloud also occupy most of the market share with their strong technical strength, brand influence and market resources. However, with the continuous development of the market and the increasing maturity of technology, some emerging cloud service providers are also gradually emerging through differentiated competition strategies, such as focusing on specific industries or fields and providing more cost-effective services.

3. Industry Pain Points

1. Data privacy and security issues

In the cloud service model, user data is stored on cloud servers, which puts the data at risk of being leaked, tampered with, and abused. In recent years, cloud data leaks have occurred frequently, causing huge losses and trust crises to users. For AI computing power, data security issues are more prominent because the training data of AI models often contains a large amount of sensitive information, such as personal privacy, commercial secrets, and national security data. Once this data is leaked, it will have an immeasurable impact on individuals, companies, and countries.

2. High cost

Enterprises need to pay high fees to use cloud services and AI computing power, which has become a major bottleneck for the development of some small and mediumsized enterprises and start-ups. Cloud service providers usually adopt a pay-as-you-go billing model. As the business volume of enterprises grows and the demand for computing power increases, the cost will also rise accordingly. In addition, the training cost of AI models is also very high, including the purchase of hardware equipment, energy consumption, and the salary of professionals, which makes many enterprises reluctant to invest in AI applications.

3. Uneven distribution of computing resources and low utilization

On the one hand, leading enterprises and large scientific research institutions are often able to monopolize a large amount of high-quality computing resources, while small and medium-sized enterprises and individual developers face the problem of computing power shortage and find it difficult to obtain sufficient computing power to carry out their own AI projects. On the other hand, the utilization rate of existing computing resources is generally low, and many data centers and cloud servers are idle or underloaded most of the time, resulting in a huge waste of resources. This phenomenon of uneven distribution and low utilization of computing resources has seriously restricted the popularization and development of AI technology.

4. Technology Monopoly and Vendor Lock-in

At present, there is a certain degree of technological monopoly in the cloud service and AI computing power markets, with a few large companies holding core technologies and key resources, such as Nvidia's dominant position in the field of AI computing chips. This often limits users' choices of cloud service providers and computing power suppliers, making them prone to vendor lock-in. Once users choose a particular supplier, it is difficult to switch to other suppliers' services due to issues such as technical compatibility and data migration costs, thus losing flexibility and bargaining power in market competition.

4. Advantages of decentralized computing cloud platform

1. Enhanced data privacy and security

The decentralized computing cloud platform uses blockchain technology to store data in multiple nodes instead of storing it in a single server. This distributed storage method makes data more secure. Even if a node is attacked or data is leaked, the data of other nodes can still remain intact and secure. At the same time, blockchain encryption technology can ensure the confidentiality and integrity of data during transmission and storage. Users have greater control over their own data. Only authorized users can access and use the data, which effectively solves the data privacy and security issues in cloud services and AI computing power.

2. Reduce costs

The decentralized computing cloud platform integrates idle computing resources to form a huge distributed computing network. Users can directly rent computing power from this network without relying on traditional cloud service providers. This model greatly reduces the cost of the intermediate links, making the computing power price more affordable. In addition, since the operating cost of the decentralized platform is relatively low, there is no construction and maintenance cost of large data centers, as well as high marketing and management costs, so it can provide users with more cost-effective computing services, especially suitable for small and medium-sized enterprises and individual developers.

3. Optimize computing resource allocation and improve utilization

On the decentralized computing cloud platform, any device with idle computing resources can participate in the computing network, whether it is a personal computer, server or mobile device. Through smart contracts and distributed algorithms, the platform can reasonably allocate computing tasks to each node, achieve the optimal configuration of computing resources, and avoid waste and idle computing resources. At the same time, this distributed computing network can dynamically adjust the computing supply according to user needs, improve the utilization rate and response speed of computing resources, enable more users to obtain the required computing support, and promote the widespread application and development of AI technology.

4. Breaking technology monopoly and avoiding vendor lock-in

The openness and interoperability of the decentralized computing cloud platform allow users to freely choose different computing nodes and technical solutions, and no longer be subject to the technical monopoly of a few large suppliers. Users can choose the most suitable computing resources and services from multiple suppliers according to their needs and budgets, without worrying about being locked into a specific supplier platform. This competitive mechanism will prompt each node provider to continuously improve their technical level and service quality, and promote the innovation and development of the entire computing cloud platform ecosystem.

—.PowerVerse Ecosystem - Two-pronged Ecosystem Iteration

PowerVerse is an evolving ecosystem with advanced technology architecture, rich functional modules and broad application prospects, which brings huge value and opportunities to users, developers, enterprises and the entire society. Whether in terms of technological innovation, market potential or social impact, the PowerVerse ecosystem has significant advantages and appeal, and is expected to play an important role in the future digital era, becoming a benchmark ecosystem leading the development of the industry, and bringing rich returns and unlimited possibilities to investors and participants.



- 1. Basic support system
 - PowerVerse Chain: A blockchain system with PoS consensus and support for EVM, which can easily deploy and run DApps, provides a friendly development environment for developers, greatly reduces the development threshold and cost, and promotes the rapid development of ecological applications.
 - PowerVerse Infra: Provides excellent performance at the virtualization level, achieves efficient use and flexible allocation of resources, and provides strong support for various upper-layer applications and services.
 - Decentralized storage based on IPFS: Freed from the limitations of traditional centralized storage, data is stored in a decentralized manner on multiple nodes, which improves data security and reliability while reducing the risk of data loss and ensuring the integrity and availability of user data.
 - Decentralized CDN: It can accelerate content distribution, improve user access speed and experience, and enable users to quickly obtain the information and services they need no matter where they are. It is of great significance to improve the user stickiness and attractiveness of the ecosystem.
 - Geographic location-aware edge computing framework: Based on the user's geographic location, computing tasks are assigned to the edge node closest to the user for processing, which greatly reduces data transmission delays, improves real-time performance and response speed, and is especially suitable

for delay-sensitive application scenarios such as real-time video streaming and online games.

- Distributed task management based on multi-graph topology: Through advanced distributed task management technology, tasks can be efficiently coordinated and allocated, various resources in the ecosystem can be fully utilized, the operating efficiency and throughput of the entire system can be improved, and various tasks can be executed and completed in an orderly manner.
- 2. Decentralized AI and cloud computing platform
 - Model reasoning and training: It provides powerful computing power for the development of artificial intelligence, supports reasoning and training tasks of various complex models, enables developers to easily build and optimize AI applications in the ecosystem, and promotes the widespread application of AI technology in various fields, from intelligent customer service to precision medicine, from intelligent security to financial risk prediction, etc., creating huge value for enterprises and society.
 - Privacy computing based on homomorphic encryption and federated learning: As data privacy protection becomes increasingly important, this privacy computing technology ensures the security and privacy of data during the computing process, enabling enterprises and institutions to conduct collaborative data analysis and model training without leaking sensitive data, breaking down data silos, promoting data circulation and value mining, and providing new possibilities for data-driven innovation.
 - DePIN architecture PaaS platform: provides developers with a one-stop development and deployment platform, reduces development costs and technical barriers, accelerates application development and launch speed, attracts more developers to join the ecosystem, enriches the application ecology, and also provides enterprises with more flexible and efficient digital solutions, enhancing the competitiveness of enterprises.
 - Data Space: As a data aggregation and management center, it provides a safe and reliable environment for data storage, analysis and sharing, facilitating enterprises and developers to effectively manage and utilize data, explore the potential value of data, and provide strong support for decision-making.
- 3. Decentralized Markets and Governance
 - PowerVerse DAO organization: Through the form of decentralized autonomous organization, community members can participate in the governance and decision-making of the ecosystem, give full play to the wisdom and strength of the community, realize the self-development and self-improvement of the ecosystem, ensure that the development direction of the ecosystem is in line with the interests and vision of community members, and improve the participation and sense of belonging of community members.
 - Computing power resource trading market: It realizes the optimal allocation of computing power resources, allowing users with computing power needs to quickly find suitable computing power suppliers, and computing power suppliers can also monetize idle computing power resources, thereby improving resource utilization efficiency, promoting the development of the computing power industry, and providing strong computing power support for the operation of the entire ecosystem.
 - Model and Data Market: It promotes the circulation and transaction of models and data, accelerates the sharing of knowledge and technology, and stimulates innovation. Enterprises and developers can purchase the models and data they need in the market, quickly improve their business capabilities and innovation capabilities, and promote technological progress and application innovation in the entire ecosystem.
 - DApp Market: It brings together a variety of decentralized applications, meeting the diverse needs of users in different fields, from finance, social networking to entertainment, education, etc., providing users with a more free, secure and convenient application experience, while also providing developers with a broad

market space and business opportunities, forming a mutually beneficial and winwin application ecosystem.

- Agent market: With the development of artificial intelligence technology, Al Agent has shown great potential in automated task execution and intelligent decision-making. The existence of this market provides a platform for the development and application of Al Agent, promotes the in-depth application of Al technology in actual business scenarios, and improves production efficiency and intelligence level.
- 4. DeCloud Ecosystem
 - SDK: Provides developers with a wealth of development tools and interfaces to facilitate their integration of PowerVerse ecosystem functions into their own applications, expands the application scenarios and influence of the ecosystem, and promotes the interconnection and interoperability of the ecosystem with other platforms and applications.
 - Web3.0: As an important part of the new generation of the Internet, the PowerVerse ecosystem actively embraces the Web3.0 concept, enabling users to independently control their data and return value, providing users with a more fair, transparent and free Internet experience, while also bringing new business models and development opportunities to enterprises and developers.
 - Metaverse: With its powerful underlying technology and rich application ecology, the PowerVerse ecosystem provides a solid foundation for the construction of the metaverse, supports the creation, interaction and economic activities of the virtual world, and brings an immersive experience to users. It is expected to open up a broad market space in the metaverse field and become an important promoter of the development of the metaverse.
 - SaaS service: By providing various software as a service, it meets the information needs of enterprises in different business scenarios, reduces the software procurement and operation and maintenance costs of enterprises, improves the operational efficiency and management level of enterprises, and provides strong support for the digital transformation of enterprises.
 - Industry scenarios: The application scenarios of the PowerVerse ecosystem cover many industries, including but not limited to e-sports hotels, Internet cafes, games, enterprise collaboration and office, cultural creativity, finance, medical care, education, logistics, manufacturing, etc. By providing customized solutions for these industries, it helps companies solve practical business problems, improve the overall digital level and competitiveness of the industry, and achieve industrial upgrading and innovative development.

Ξ . PowerVerse Chain——Building a Trusted Foundation

PowerVerse Chain is a distributed ledger platform that uses blockchain technology to build a decentralized network environment. In this network, multiple nodes jointly participate in the verification, storage and transmission of data, ensuring that the data cannot be tampered with and has high reliability. By supporting EVM smart contracts, PowerVerse Chain can realize the automated execution of complex business logic, providing a strong foundation for the development of decentralized applications.

5. Overall architecture



- 1) Base Layer
 - P2P network: The PowerVerse Chain network consists of multiple nodes. The connection between nodes is realized through the P2P network architecture to realize functions such as node discovery and data synchronization, ensuring the rapid dissemination of information and high availability of the network.
 - Database: stores all the data of the blockchain, including transaction data, smart contract code, account status, etc. It uses the optimized Merkle tree data structure to organize data, which can quickly verify the integrity and consistency of the data.
 - Cryptography algorithm: implements functions such as private key and public key, data signature, and hash calculation to protect data privacy and blockchain security.
 - Sharding optimization: Parallel processing for transaction verification to increase block generation speed.
- 2) Core Layer
 - Distributed ledger: including transactions, blocks, block verification tools, receipts, status data, and transaction pool related information.
 - Consensus mechanism: The key to achieving decentralized consistency adopts the PoS consensus mechanism that combines the VRF algorithm and the BFT algorithm.
 - Smart Contract: Based on the smart contract function built on EVM, developers can use familiar programming languages (such as Solidity) to write smart contract code.
- 3) Application Layer
 - API interface: Provides http and tcp related interface RPC framework services.
 - DApp: Developers can use PowerVerse Chain's smart contract functions and network infrastructure to develop decentralized applications with various functions, such as DeFi, DID, etc.

2. Blocks and Transactions



A block is a data structure that records transactions and status results that occurred over a period of time. It is a consensus on the current state of the ledger. The block is mainly composed of two parts: the block header and the block body. The block header contains the parent block hash value (PrevHash), timestamp (Timestamp), transaction tree root hash value (TxRoot), etc. The block body mainly contains transaction counts and transaction details. Each transaction is permanently recorded in the block and can be queried by anyone. Transactions are recorded through the data structure of the Merkle tree, in which each transaction contains a digital signature, so that each transaction can be guaranteed to be unforgeable and tamper-proof. All transaction processes will generate a unique TxRoot record in the block through the hash process of the Merkle tree. When verifying the validity of the block, the user only needs to calculate the root value according to the hash method of the Merkle tree and compare it with the TxRoot value in the block to verify its authenticity.

A transaction includes fields such as sender (From), receiver (To), transaction index (Nonce), quantity (Value), and handling fee settings (Gas, GasPrice). The generation process of a transaction is as follows:

- The user constructs and broadcasts a transaction;
- The miner node receives the transaction, and after passing the basic verification such as balance validity and double-spending prevention, the transaction is added to the transaction pool TxPool and waits for the transaction to be synchronized or packaged into a block;
- Miner nodes package several transactions in the transaction pool into proposal blocks according to the transaction selection algorithm. After the proposal blocks are packaged, transaction execution and consensus are carried out;
- Transaction execution: every transaction in the proposal block will be handed over to EVM for execution;
- Block consensus, consensus messages will be distributed through the P2P network, and block proposals will be determined based on the consensus mechanism;
- Block import: When the proposal block is packaged and consensus is successful, the block will be placed on disk. During the placement process, the status data will be updated on the one hand, and the chain fork situation will be handled on the other hand.

3. Consensus Mechanism

1. Election Proposers and Committees

In each round of consensus, PowerVerse Chain will determine whether the node can participate in the original consensus process based on the random number generated by the VRF algorithm at each node. VRF (Verifiable Random Functions) is a verifiable random number generation function. It mainly includes two types of functions, one is the generation function and the other is the verification function.

 $\begin{array}{ll} Generate \\ functions \end{array} & \begin{array}{l} R = VRF_Hash(sk,M) \\ P = VRF_Proof(sk,M) \\ \end{array} \\ \end{array} \\ \end{array} \\ \begin{array}{l} Validation \\ functions \end{array} & \begin{array}{l} R = VRF_P2H(P) \\ VRF_Verify(pk,M,P) \\ \end{array} \\ \end{array} \\ \begin{array}{l} sk: \ Private \\ pk: \ Public \ / \ Exposed \ by \ default \\ M: \ Enter \ the \ data \\ R: \ VRF \ hash \\ P: \ VRF \ Proof \end{array}$

In the application process, the prover first generates a pair of public and private keys, and then uses the generation function to generate a hash value R and a hash value proof P respectively, and the verifier uses the verification function to verify R and P respectively. Therefore, the VRF function has the following characteristics:

- Randomness: For different input values, the output value is random and evenly distributed within the value range;
- Determinism: For the same input value, the output value it obtains must be the same;
- Verifiability: Non-interactive zero-knowledge proof can be used to verify the authenticity of the random number output, indicating the legitimacy of the random number;
- Efficiency: Off-chain computing improves the efficiency of the process.
- In PowerVerse Chain, we use VFR to conduct lottery for Proposer and Validator
- elections. The lottery process must meet the following requirements:
 There is no God character manipulating the entire lottery;
 - Each participant draws his own lot independently, and no one else can know the result of the draw before he actively announces his own draw result;
 - After a participant publishes his/her lottery result, other participants in the system can verify the result without revealing his/her private key.
 - Before a round of drawing begins, no participant can pre-calculate their own drawing results;
 - The draw is fair and equitable to all participants;
 - Prevent witch attacks.

In order to meet the above requirements, PowerVerse Chain designs the election process function as follows:

• The hash length (hashlen) of the output value is fixed, so converting the output hash to a number gives the range of the hash:

$$\left[0,2^{hashlen}-1
ight]$$

 The amount of tokens staked by a node should be positively correlated with the probability of being selected:

$$W = \sum\limits_{i} w_i \ p = rac{w_i}{W} \ w_i: ext{ node } i ext{ The value of the stake after stake} \ W: ext{ Total Equity Value}$$

The probability of node w being selected conforms to the binomial distribution: $P(k, w, w) = C^{k} x^{k} (1 - w)^{w-k}$

$$egin{aligned} B(k;w,p) &= C_w^k p^k (1-p)^{w-1} \ &\sum_{k=0}^w B(k;w,p) = 1 \end{aligned}$$

The binomial distribution is used as the probability distribution function to prevent Sybil attacks, because

$$B(k_1+k_2;w_1+w_2,p)=B(k_1;w_1,p)+B(k_2;w_2,p)$$

Therefore, from a probabilistic point of view, it is impossible to increase the possibility of being selected by splitting the token.

• Split the space [0, 1) into continuous intervals:

$$egin{split} & \left[\sum_{k=0}^{j}B(k;w,p),\sum_{k=0}^{j+1}B(k;w,p)
ight)\ & j\in\{1{\dots}w\} \end{split}$$

• If the ratio of the hash value to the maximum hash value falls in the interval j>0, it indicates that the node is selected.

The overall algorithm for the election draw is as follows:

$$\begin{array}{l} \text{Sortimon}(sk, seed, \tau, role, w, w) :\\ \langle hash, \pi \rangle \leftarrow \text{VRF}_{sk}(seed \| role) \\ p \leftarrow \frac{\tau}{W} \\ j \leftarrow 0 \\ while \frac{hash}{2^{hasshlen}} \notin \left[\sum_{k=0}^{j} B(k; w, p), \sum_{k=0}^{j+1} B(k; w, p) \right) do \\ j + + \\ return \langle hash, \pi, j \rangle \\ \hline \\ & \begin{array}{c} csk : & \text{The user's private key} \\ seed : & \text{Seed information used in elections} \\ role : & \text{Identity information for the current election} \\ \tau : & \text{Select Threshold} \\ w : & \text{Node weights} \end{array}$$

W : The total weight of the whole network

The verification algorithm is as follows:

 $egin{aligned} VerifySort(pk,hash,\pi,seed, au,role,w,W):\ if VerifyVRF_{pk}(hash,\pi,seed\|role) ext{ then return0};\ p\leftarrowrac{ au}{W}\ j\leftarrow0\ while rac{ hetash}{2 hetashlen}
otin E\left[\sum_{k=0}^{j}B(k;w,p),\sum_{k=0}^{j+1}B(k;w,p)
ight]do\ j++\ return j \end{aligned}$

2. Submit block proposals and select blocks

After the proposer is elected, he will broadcast his own package proposal to the entire network. Due to the different environments of each node, the package proposals generated are also different, so the committee needs to select the proposal. The proposal block selection is divided into two stages:

1) Each committee validator selects a block proposal with the highest priority from the received proposals and broadcasts it. If it times out or all received proposals are illegal, an empty block is broadcasted.



2) After the validator synchronizes the proposal block broadcast of other validators, it decides whether to agree to the new proposal or maintain the original proposal. Before the timeout expires, the validator will continue to repeat the above process until there is a proposal that is agreed by more than 2/3 of the validators. If a consensus plan of more than 2/3 is not reached after the timeout, an empty block will be output.



4. PowerVerse Coin

PowerVerse Coin is the underlying native digital asset of PowerVerse Chain, with a total of 1,400,000,000 issued. It is highly secure, transparent and tamper-proof. It relies on a decentralized blockchain network, and nodes around the world jointly maintain the fairness of its operation and transactions. The main functions of PowerVerse Coin in the entire ecosystem include:

 Staking: Staking is one of the core functions of PowerVerse Coin in the PowerVerse Chain ecosystem. Holders can lock their PowerVerse Coins in the network and participate in the maintenance of the blockchain's consensus mechanism. Staking helps to enhance the security and stability of the entire network, because the interests of the pledgers are closely linked to the healthy operation of the network, and they will actively maintain the normal order of the network; on the other hand, the pledgers can receive corresponding rewards. This reward mechanism encourages more users to participate in staking, thus forming a virtuous circle and continuously improving the overall staking rate and security of the network. For investors, staking PowerVerse Coin provides a relatively stable and attractive way to obtain income. In an environment where the cryptocurrency market is volatile, staking income can serve as an important supplement to asset appreciation.

- Ecological circulation and payment: PowerVerse Coin acts as a medium for value circulation in the entire PowerVerse Chain ecosystem. It connects various participants in the ecosystem, including developers, users, merchants, service providers, etc., and promotes the efficient exchange and flow of resources and value. In the process of developing ecological applications, developers can obtain PowerVerse Coin as financial support and rewards for project development, which motivates them to continue to innovate and optimize applications; when using ecological applications, users can use PowerVerse Coin to pay service fees or obtain value-added services within the application; merchants can expand sales channels and customer groups by accepting PowerVerse Coin payments. This wide range of ecological circulation gives PowerVerse Coin an intrinsic value support. Its value does not only depend on market speculation, but is also closely related to the prosperity of the ecosystem. As the PowerVerse Chain ecosystem continues to grow and develop, the circulation demand for PowerVerse Coin will continue to increase, thereby driving the steady increase in its value and bringing long-term investment return expectations to investors.
- DAO organizational governance function: DAO (decentralized autonomous organization) is an innovative governance model in the blockchain field, and PowerVerse Coin plays an indispensable role in it. In PowerVerse Chain's DAO organization PowerVerse DAO, PowerVerse Coin is an important carrier of voting rights. Holders can participate in the major decision-making process of the project based on the number of tokens they hold, such as protocol upgrades, ecological development plans, and fund allocation. This governance model fully embodies the spirit of decentralization, allowing each token holder to become a participant and decision maker in the ecosystem, and jointly promote the project to develop in a direction that is more in line with the interests of the community. For investors, by participating in DAO governance, they can not only gain an in-depth understanding of the project's operations and development strategies, but also use their voting rights to influence project decisions, protect their investment interests, and contribute to the long-term value growth of the project. This openness and community-driven nature can also encourage users to participate in discussions and decision-making, enhance users' sense of belonging and loyalty to the project, and further expand the project's influence and user base.

四.PowerVerseInfra——DePINThe beginning

As one of the cores of the ecosystem, PowerVerse Infra is a virtualization software platform. Based on the concept of software definition, it realizes the virtualization integration of various types of chip computing power. Whether it is a common CPU, or a GPU and AI computing power chip that shines in the fields of graphics processing and artificial intelligence, or even a quantum chip that represents the future computing trend, PowerVerse Infra can bring them under its command and conduct unified virtualization management. In this way, it enables individuals or organizations with idle computing power resources to transform them into shareable and tradable digital assets, while providing convenient, efficient and diversified ways to obtain computing power for users who have an urgent need for computing power.

5. Core Design

PowerVerse Infra consists of five components: control component, network component, computing component, storage component, and interface component. Their core functions are:

 Control component: The core of the PowerVerse Infra architecture, which includes various service components, such as core virtualization services, network virtualization services, image services, etc. The control component is responsible for receiving user requests, managing resource allocation, monitoring system operation, etc.

- Computing component: a computing resource provider responsible for running virtual machine instances and processing computing tasks. The control component sends requests to the computing component through the API, and the computing component performs corresponding operations after receiving the request.
- Storage component: responsible for storing data and images. PowerVerse Infra supports multiple storage backends, such as block storage services, object storage services, etc. The storage component receives user storage requests through the API and stores the data in the corresponding storage backend;
- Network component: manages network resources, such as virtual networks, subnets, and routing. It is responsible for implementing functions such as communication between virtual machines, network isolation, and network security.
- Interface service: provides a set of RESTful APIs for communication and interaction between control components and other service components.



Among the five components, we will focus on the functions and collaborative relationships of the nine service modules:

- Core virtualization: manages the entire life cycle of virtual machine instances for users, is responsible for operations such as creation, suspension, adjustment, and destruction of virtual machines, provides virtual services based on user needs, and configures CPU, GPU, memory, and other information;
- Network virtualization: Provide network virtualization technology, provide network connections for other services, and provide interfaces for users;
- Image service: virtual machine image retrieval system, supports multiple virtual machine image formats, can create and upload images, delete images, edit basic image information, etc.;
- Block storage: provides stable data block storage services for virtual machine operation;
- Object storage: Object storage is implemented in a massively scalable system with built-in redundancy and high fault tolerance mechanisms, allowing files to be stored or retrieved, and can provide persistent storage for volumes in Image Service and Block Storage Service;
- Monitoring service: Provides statistical data support for billing, monitoring and other services;
- Permission service: Provides identity authentication, service rules and service tokens based on the DID service provided by PowerVerse Chain, and manages Domains, Projects, Users, Groups and Roles;
- Orchestration service: Provides collaborative deployment mode defined by

templates to realize the automated deployment of DeCloud infrastructure software operating environment;

Management: Web management pages for various services.



We will provide two virtualization methods: type 1 and type 2, which differ in many aspects such as architecture and performance.

- Type 1 virtual machine
 - At the architectural level, type 1 virtual machines run directly on the hardware of the host computer without the need for a host operating system, so traditional cloud vendors call them "bare metal virtual machines." This allows them to interact more closely with the hardware and utilize hardware resources more efficiently. For example, when processing large-scale data operations or high-load enterprise-level applications, type 1 virtual machines can fully utilize the performance potential of the hardware and reduce performance loss caused by middle-layer software.
 - In terms of performance, type 1 virtual machines usually have lower latency and higher throughput because they are directly connected to the hardware. They can more accurately control the allocation and scheduling of hardware resources, for example, achieving more optimized processing in network communication and storage I/O.



- Type 2 virtual machine
 - At the architectural level, type 2 virtual machines run on top of the host operating system, relying on the host operating system to manage hardware resources and provide an operating environment for the virtual machines. This architecture is relatively flexible and facilitates the rapid deployment and use of virtual machines on ordinary desktop operating systems. It is suitable for individual developers or small application scenarios that do not have demanding resource requirements.
 - In terms of performance, the type 2 virtual machine may be subject to certain limitations due to the existence of the host operating system. When processing high-intensity tasks, performance bottlenecks may occur due to resource competition in the host operating system.



2. Collaboration with PowerVerse Chain

3. Virtual machine permission service based on decentralized identity (DID)

PowerVerse Infra creates a unique DID for each user and virtual machine through PowerVerse Chain. This DID not only contains the user's basic identity information, but also links all historical behaviors and credit data of the user in the process of computing resource transactions and virtual machine use. When a user tries to create, access or operate a virtual machine, PowerVerse Infra will verify the user's DID identity information through PowerVerse Chain. This authentication method does not rely on a centralized identity authentication agency, but is based on the distributed consensus mechanism of blockchain, ensuring the fairness, security and immutability of identity authentication.

In the sharing and leasing scenarios of virtual machines, DID-based authentication is particularly important. For example, when a user wants to rent computing resources provided by another user, the DID information of both parties will be interactively verified on the PowerVerse Chain. The lessee can view the lessor's credit record, computing resource configuration, and usage history to assess the risk and reliability of the lease; the lessor can also verify the legality of the lessee's identity and payment ability to ensure the security of the transaction. This decentralized authentication method not only improves the security of the system and avoids the security vulnerabilities and trust crises that may exist in traditional centralized authentication methods, but also makes the entire computing power trading ecosystem more fair and transparent, providing users with a trustworthy trading environment.

4. Smart contract driven computing resource transaction aggregator

We will use PowerVerse CHain's smart contracts to build an automated trading aggregator for computing power resources - PowerVerse Market. In the process of computing power resource transactions, buyers and sellers do not need to go through tedious manual negotiations and third-party intermediaries. They only need to reach a transaction intention on PowerVerse Market and submit relevant information to the smart contract. Smart contracts will automatically execute the transaction process according to pre-set rules and conditions, including the leasing of computing power resources, the settlement of funds, and the storage of transaction records. The entire transaction process is efficient, transparent and cannot be tampered with, which greatly reduces transaction costs and risks, and improves transaction efficiency and market liquidity.

3. PowerVerse Infra Features

Wide chip compatibility: Supporting most chip types on the market is one of the significant advantages of PowerVerse Infra. In today's diverse computing device environment, different application scenarios have different requirements for computing power. Some focus on the general computing power of the CPU, while others rely on the graphics processing or parallel computing capabilities of the GPU. With the development of artificial intelligence and quantum computing technologies, AI computing chips and quantum chips are gradually emerging. PowerVerse Infra's multi-chip computing power virtualization function enables it to meet a variety of complex computing needs. Whether it is a data center, cloud computing service provider, or various research institutions, they can make full use of idle computing resources on this platform to maximize resource utilization and value creation.

- Support for quantum computing: Although quantum computing technology is still in the exploration and development stage, PowerVerse Infra has begun to prepare technology for the virtualization application of quantum chips. We have worked with multiple quantum computing research teams to preliminarily design the abstraction and allocation mechanism of quantum bit resources, and build an abstract model and virtualization interface for quantum chip computing power. Through these interfaces, users can write and run simple quantum algorithm simulation programs in a virtual machine environment, and use the superposition and entanglement properties of quantum bits to perform computational experiments. Although the actual application of quantum chips is still subject to many restrictions, we believe that this is a sufficiently forward-looking layout.
 - High security and trust guarantee: Through collaboration with PowerVerse Chain, PowerVerse Infra has built a highly secure and trusted computing power trading ecosystem. The decentralized identity management system effectively prevents identity forgery and fraud, ensuring the true identity and legitimacy of both parties to the transaction. The smart contract-driven transaction mechanism eliminates the interference of human factors in the transaction process, ensuring the fairness and transparency of the transaction. In addition, the distributed ledger technology of the blockchain enables all transaction records to be permanently stored and cannot be tampered with, providing a reliable chain of evidence for the resolution of transaction disputes, further enhancing users' trust in the platform. This high level of security and trust guarantee mechanism has won PowerVerse Infra a competitive advantage in the computing power trading market and attracted more users to participate in computing power sharing and trading.

Efficient resource utilization and dynamic scheduling: PowerVerse Infra's virtualization core engine has powerful dynamic resource scheduling capabilities, which can automatically adjust the allocation of computing resources according to the real-time load of the virtual machine. In a complex computing environment with multiple users and multiple tasks, this dynamic scheduling mechanism can ensure that each virtual machine can obtain appropriate computing resources, avoiding resource waste and local overload. Through this efficient resource utilization and dynamic scheduling strategy, PowerVerse Infra significantly improves the overall utilization efficiency of computing resources, reduces computing costs, and provides users with more economical and efficient computing services.

五.PowerVerseMarketStep 1: Aggregation of computing

resources

Based on the smart contracts and payment system of PowerVerse Chain and the VM management capabilities of PowerVerse Infra, we have built PowerVerse Market, a decentralized platform that automates and standardizes the transaction of computing power resources. The platform connects computing power providers and computing power demanders, allowing both parties to directly trade and collaborate on computing power resources without trusting a third party. Through the distributed ledger and encryption technology of blockchain, the fairness, immutability and data security of transactions are ensured. The platform mainly consists of computing power resource management, computing power demand order management, transaction execution and monitoring, data statistical analysis, user evaluation and other functions.

- Computing power resource management: Computing power suppliers can easily
 publish detailed information about their computing power resources on the
 platform, including but not limited to CPU computing power, GPU computing
 power, storage resources, etc., and set corresponding parameters such as price
 and available time range. Computing power resource information can be
 updated at any time, such as adjusting prices, suspending or resuming
 computing power supply, etc., to adapt to market changes and their own
 operational needs.
- Computing power demand order management: The computing power demander

can submit a computing power demand order according to their business needs, specifying the type, quantity, usage time, budget and other conditions of the required computing power. The platform will automatically find suitable matches in the published computing power resources and recommend them to the demander. The computing power supplier can also actively match the demand according to the demand order.

- Transaction execution and monitoring: Once both parties confirm the order, the transaction execution contract will automatically start the computing power supply and fee settlement process. The computing power provider provides computing power services as agreed, and the demander can monitor the computing power usage and task execution progress in real time. During the transaction process, if any abnormal situation occurs, such as insufficient computing power, network failure, etc., the platform will promptly notify both parties and handle it.
- Data statistics and analysis: The platform collects and stores a large amount of computing power transaction data, including transaction history, computing power resource distribution, market price trends and other information. Through data analysis tools, it provides users with data statistics reports and market analysis insights to help users better understand market dynamics and formulate reasonable trading strategies. Computing power suppliers can adjust their computing power supply strategies according to market demand to improve resource utilization and revenue; computing power demanders can choose computing power resources with higher cost-effectiveness based on data analysis results.
- User evaluation and reputation system: After the transaction is completed, the two parties can evaluate each other, including computing power quality, service attitude, transaction execution efficiency, etc. These evaluation information will be recorded in the platform's reputation system to provide reference for other users. The reputation system will affect the user's trading rights and priority on the platform. Users with good reputation will get more trading opportunities and preferential policies, while users with poor reputation may be subject to certain restrictions, thereby motivating users to abide by trading rules and improve transaction quality.

4. Role

In PowerVerse Market, there are four roles, namely computing power suppliers, computing power demanders, administrators and arbitrators. They will work together to build a well-developed market ecosystem.

- Computing power suppliers: After virtualizing and standardizing their own computing power resources through PowerVerse Infra, computing power providers can register and publish these resources on the PowerVerse Market platform. Merchants can not only obtain rental remuneration, but also enjoy regular token dividends.
- Computing power demanders: Computing power demanders can rent ideal computing power resources through contracts to build their own applications or perform tasks such as mining and model training. If they have not found an ideal target for the time being, they can also publish a computing power demand order and wait for matching.
- Administrator: For users who engage in dishonest behavior, the administrator has the power to freeze, blacklist, and perform other operations to maintain market order.
- Arbitration Committee: For controversial transactions, the Arbitration Committee can determine the party at fault and the compensation plan and submit it to the administrator for execution; it can also submit a proposal to the DAO organization, which will vote on it.

2. Computing resources release

Computing power suppliers can use PowerVerse Infra to publish computing power resources to PowerVerse Market. The overall process is as follows:

- Computing resource virtualization: The computing resource provider correctly installs and configures PowerVerse Infra on the local device. PowerVerse Infra will conduct in-depth mining of idle computing resources in the device, such as underutilized CPU cores, GPU graphics processing units, memory and storage space, etc. PowerVerse Infra abstracts and isolates physical hardware resources to create an independent virtual machine environment.
- 2) Computing resource registration: After completing virtualization, computing resource providers need to register these virtual resources on the PowerVerse Market platform. The registration information includes detailed technical parameters of virtualized resources, such as CPU model, number of cores, main frequency, GPU model, video memory capacity, number of CUDA cores, memory capacity, frequency, storage space type, capacity, read and write speed, etc. The platform will strictly verify and review this information to ensure the authenticity and accuracy of resource information.
- 3) Computing power resource scoring: The PowerVerse Market platform has an intelligent and complex scoring system that is specifically used to evaluate and quantify the value of listed computing power resources. For each technical performance parameter in the previous step, we will give a weight value, and the sum of the product of each parameter and the weight is the score value of the computing power resource.
- 4) Asset certificate issuance: After completing the above steps, the platform will generate an NFT (Non-FungibleToken) as an asset certificate for each virtual computing resource, providing a solid trust foundation for subsequent resource transactions. The information contained in NFT includes: owner, meta information, performance score, technical parameters, renter, usage status, etc.

PowerVerse InfraVMs
id
owner
metadata
rentalinfo
{
status
priceperday
period
lessee
}
performpoints
performpara
{
сри
{
model
clockspeed
cores
}
gpu
{}
memory
{}
aisk
{}
3

- 5) Computing power resources are listed: Finally, the computing power resources will be officially listed in the resource list of the PowerVerse Market platform. At this time, other users or demanders on the platform will be able to view the detailed information of the computing power resources in the resource directory. The computing power resources after listing will be in an idle state, and demanders can filter and match suitable computing power resources on the platform according to their own computing needs for trading.
- 3. Computing resource transactions
- 5. Lease Transactions



- The supplier publishes and lists computing resources;
- The demander selects the ideal computing resources, sets the rental time and pays the corresponding amount of PowerVerse Coin;
- The platform changes the NFT leasing status corresponding to the computing power resources to rented and temporarily freezes the rent paid by the tenant;
- The demander starts using computing resources, and the platform monitors the service status of computing resources;
- After the lease expires, the platform will pay the rent to the supplier and charge a certain fee, and the NFT lease status will be changed to rentable;
- Both the supply and demand parties evaluate the order, which is collected by the platform.

2. Computing power demand list

There are two modes of computing power demand orders. One is a rental demand initiated by the demander. The process is similar to that described in the previous section and will not be repeated here. The other is that the demander initiates the task and the supplier undertakes it and executes it. The process is as follows:



- The demand direction platform publishes the task demand form, including task requirements, computing power requirements, price, completion time, acceptance method and other information;
- The platform temporarily freezes the remuneration paid by the demander;
- The supplier selects the tasks that can be undertaken and provides the computing resources used in task execution to the platform;
- The platform changes the NFT leasing status corresponding to the computing power resources to rented;
- The supplier performs the task, and the platform monitors the computing resources used during this period;
- After completing the task, the supplier submits the results, and the demander conducts acceptance;
- After the acceptance is completed, the platform unfreezes the remuneration and pays it to the supplier and charges a certain fee, and the NFT leasing status is changed to available for rent;
- Both the supply and demand parties evaluate the order, which is collected by the platform.

4. PowerVerse Market Features

- Decentralization: PowerVerse Market removes the centralized intermediary in traditional computing power transactions and enables direct connection between the two parties. This not only reduces transaction costs, but also improves the transparency and fairness of transactions. All transaction data and rules are stored on the blockchain and jointly verified and maintained by nodes across the network, avoiding the risk of single point failure and data tampering, and ensuring the security and reliability of transactions.
- Security: Encrypt user identity information, transaction data, computing resource information, etc. to ensure data privacy and security. Smart contracts undergo strict code audits and security tests before execution to prevent contract loopholes from being maliciously exploited. At the same time, the tamper-proof nature of blockchain

also ensures the certainty and reliability of contract execution. Once a transaction is initiated, it cannot be manually intervened or tampered with.

Scalability: The technical architecture design of PowerVerse Market takes into account future business development and user growth needs, and has good scalability. It can easily cope with the growing scale of computing power transactions by optimizing the supporting platform and upgrading smart contracts. The platform supports access to various types of computing power resources and can easily integrate new technologies and functional modules to adapt to the ever-changing market needs and technological development trends.

六.DeCloud——Web3.0Computing Cloud Ecosystem

PowerVerse aims to build an open, efficient, secure and highly scalable decentralized computing cloud platform - DeCloud, which integrates the Web3 capabilities of PowerVerse Chain, the powerful virtualization functions of PowerVerse Infra, and the marketization of computing resources of PowerVerse Market to achieve optimal resource allocation and meet the diverse needs of different users for computing power. Whether it is enterprise-level large-scale computing tasks or innovative projects of individual developers, DeCloud will provide strong support. DeCloud is showing its unique value and potential, and is expected to reshape the allocation and utilization model of computing resources, bringing unprecedented opportunities and innovative solutions to many fields. We will create rich scenario value for PowerVerse at multiple levels.

5. Smarter DePIN facilities

- Decentralized storage based on IPFS: In terms of data storage, DeCloud introduced IPFS technology to implement a decentralized storage solution. For AI model training data and DApp data, they are stored in multiple nodes in a decentralized manner, greatly improving the security and reliability of the data. Compared with traditional centralized storage, IPFS can effectively prevent single point failures and data leakage risks, ensure data integrity and availability, and provide a reliable storage foundation for data-intensive applications. It meets the strict requirements of enterprises and developers for data security, while also reducing data storage costs and improving storage efficiency.
- Edge computing based on geolocation awareness: With the popularity of the Internet of Things and mobile devices, the demand for edge computing is growing.
 DeCloud's PowerVerse Infra has geolocation awareness capabilities and can assign computing tasks to edge nodes closer to data sources or users for processing. This not only reduces data transmission delays and improves response speed, but also meets application scenarios with high real-time requirements, such as smart transportation and industrial automation. By processing and analyzing data at the edge, it can also reduce the pressure on core network bandwidth, optimize overall network performance, and provide users with a smoother and more efficient service experience.
- Apply multi-graph topology routing network for task management: DeCloud uses an advanced multi-graph topology routing network for task management and scheduling. This innovative network architecture can dynamically select the optimal computing path and resource allocation scheme according to the characteristics of the task and the availability of resources, achieving efficient execution of tasks and rational use of resources. Whether it is a large-scale parallel computing task or a complex distributed application, the multi-graph topology routing network can effectively coordinate the collaboration between various nodes to ensure the smooth completion of the task, improve the computing performance and stability of the entire platform, and provide users with reliable computing power support.

2. Safer and more efficient AI support

Privacy computing based on homomorphic encryption and federated learning: In the field of AI, data privacy protection is crucial. DeCloud uses homomorphic encryption and federated learning technologies to separate inference training from model data, ensuring the security and privacy of data throughout the AI processing process.

Homomorphic encryption allows calculations on ciphertext without decrypting the data, thereby protecting the privacy of the data. Federated learning further strengthens data protection by collaborating on model training between multiple data sources without directly sharing the original data. This enables enterprises and institutions to fully utilize DeCloud's computing resources for training and optimization of AI models without leaking sensitive data, promoting the widespread application of AI technology in various industries, especially in fields such as medicine and finance that have extremely high requirements for data privacy. GPU parallel training support: AI model training has huge demands on computing resources, especially the parallel computing capabilities of GPUs. The DeCloud platform provides powerful GPU parallel training support, which can meet the highperformance computing needs of large-scale AI model training. Through optimized GPU scheduling algorithms and resource management mechanisms, users can efficiently utilize the platform's GPU resources, accelerate the model training process, shorten training time, and improve model accuracy and performance. This provides AI researchers and developers with an efficient and convenient experimental and development environment, which helps promote the rapid development and innovation of AI technology and accelerate the intelligent transformation process of various industries.

3. Richer PowerVerse Market elements

AI Dataset and Model Market: The expansion of PowerVerse Market further enriches the platform's ecology. In the AI Dataset and Model Market, users can easily obtain a variety of high-guality data sets and pre-trained models, and can also sell or share their own data and models. This promotes the circulation and reuse of AI resources, lowers the threshold and cost of AI development, and accelerates the speed of AI innovation. Whether it is a startup or a large enterprise, they can find AI resources suitable for them in this market, quickly start and optimize their own AI projects, and promote the popularization and application of AI technology in various fields. Agent and DApp Market: The Agent and DApp Market provides a platform for developers to display and trade their works. Developers can publish their own intelligent Agents and DApps to the market for users to use and purchase. This not only provides developers with commercial monetization opportunities, but also enriches the platform's application ecology and meets the diverse needs of users. Users can choose a variety of powerful and innovative Agents and DApps in the market to meet personalized business needs, further expanding DeCloud's application scenarios and market scope, and promoting the prosperity and development of the platform.

4. Building a more comprehensive ecosystem

- SDK support: In order to facilitate developers to access the DeCloud platform, the platform provides a rich set of software development kits (SDKs). These SDKs cover a variety of programming languages and development frameworks, allowing developers to easily integrate DeCloud's computing resources into their own applications. Whether developing new DApps or upgrading the computing power of existing applications, the SDK provides convenient development interfaces and tools, which reduces the difficulty of development, improves development efficiency, and attracts more developers to join the DeCloud ecosystem, injecting new vitality into the platform's continued development.
- Build a decentralized CDN to support DApp: Content delivery network (CDN) is critical to the performance and user experience of DApp. DeCloud has built a decentralized CDN to distribute DApp content to users quickly and reliably through nodes distributed around the world. This decentralized CDN not only improves the transmission speed of content and reduces latency, but also enhances the antiattack and stability of DApp. Compared with traditional centralized CDN, DeCloud's decentralized CDN is more secure and efficient, and can provide strong support for the development of DApp, promote the prosperity of the DApp ecosystem, and attract more users to use and participate in the development and application of DApp.

- Data Space: DeCloud is committed to building a diversified ecosystem. In terms of data space, the platform provides users with secure and efficient data management and sharing solutions, meeting the needs of enterprises and individuals for decentralized data assetization.
- Metaverse, etc.: In the field of metaverse, DeCloud's computing power support will provide a strong foundation for the construction and operation of the virtual world, including the rendering of virtual scenes, real-time response of user interactions, etc., bringing users a more immersive experience. The creation of these ecosystems further expands the application scenarios and commercial value of DeCloud, making it a leader in the future wave of digitalization.

七.PowerVerse DAOAutonomous Organization

PowerVerse DAO is a decentralized autonomous organization (DAO) built on PowerVerse Chain. It was born out of a deep insight into the development of PowerVerse Chain blockchain technology and a precise grasp of the huge potential of the decentralized ecosystem PowerVerse Market and DeCloud. It aims to create a fair, transparent, efficient and vibrant ecological environment through the joint efforts and wisdom of community members, laying a solid foundation for the prosperity of PowerVerse and its related projects.

5. PowerVerse DAO general workflow

- 1) Project Proposal and Initiation
 - Proposals submitted by community members: Any community member can propose a project proposal for the development of PowerVerse DAO based on their own ideas and creativity, including but not limited to technical improvements, marketing activities, new business cooperation opportunities, etc. The proposal should elaborate on the background, goals, implementation plan, expected benefits, and required resources and budget of the project.
 - Proposal review and screening: After a proposal is submitted, it will be reviewed and screened by a dedicated proposal review committee. The members of the review committee are elected by community members. They will evaluate and score the proposals based on the feasibility, innovation, value contribution to the organization, and whether they are in line with the development strategy of PowerVerse DAO, and screen out proposals with high potential and feasibility to enter the next voting stage.
- 2) Community voting decision
 - Voting starts: Proposals that have passed the review will start the voting process within the community, and community members can use the tokens they hold to vote on the proposals within the voting period. During the voting period, community members can fully understand the details of the proposals and vote based on their own judgment and interests.
 - Voting result statistics and execution: After the voting is over, the system will automatically count the voting results. If the proposal receives more than a certain percentage of votes in favor, it will be passed and enter the implementation stage. A dedicated project execution team is responsible for organizing and coordinating resources from all parties in accordance with the implementation plan in the proposal, promoting the implementation of the project, and regularly reporting the progress of the project to community members.
- 3) Project implementation and supervision
 - Project execution team formation: For projects that pass the vote, community
 members will voluntarily form a project execution team, or select personnel with
 relevant professional skills and experience through open recruitment to join the
 execution team. The execution team will be responsible for the specific
 implementation of the project, including task allocation, progress tracking,
 quality control, etc., to ensure that the project can be smoothly promoted
 according to the predetermined plan and goals.
 - Project supervision and evaluation: During the implementation of the project, community members can monitor and evaluate the progress of the project in

real time through public information on the blockchain. At the same time, a special project supervision team is established to regularly inspect and audit the implementation of the project to ensure that the implementation of the project meets the requirements and standards in the proposal, and promptly discover and resolve problems and risks that arise during the implementation of the project. If the project deviates significantly during implementation or fails to achieve the expected goals, the supervision team has the right to make rectification suggestions or suspend the implementation of the project, and restart the voting process to decide the subsequent direction of the project.

- 4) Results sharing and feedback
 - Project outcome evaluation and acceptance: When the project completes its intended goals and tasks, the project supervision team will organize an evaluation and acceptance of the project outcomes. After acceptance, the project is officially completed, and the project outcomes will be announced and shared with community members, including the economic benefits generated by the project, technological innovations, and contributions to the ecosystem.
 - Experience summary and feedback: The project execution team and community members will summarize and reflect on the lessons learned during the project implementation process, and feedback the relevant information to the community to provide reference and reference for future project proposals and decisions. At the same time, based on the project results and feedback from community members, the development strategy and operation mechanism of PowerVerse DAO will be optimized and adjusted to continuously improve the overall operational efficiency and development level of the organization.

2. PowerVerse DAO Features

- 1) Decentralized Governance
 - Decentralization of decision-making power: PowerVerse DAO abandons the traditional centralized management model and delegates decision-making power to community members. By adopting a blockchain-based voting mechanism, community members can directly participate in major decisions of the organization, such as project development direction, fund use, rule making, etc., ensuring the fairness and democracy of decision-making, and fully reflecting the will and interests of community members.
 - Transparency and traceability: All decision-making processes and transaction records are recorded on the blockchain, achieving complete transparency and traceability. Community members can query and monitor the organization's operations at any time, understand the flow and use of funds, and the process of making and executing various decisions, which enhances the trust and confidence of community members in the organization.
- 2) Community Driven Development
 - Extensive community participation: PowerVerse DAO encourages community members to actively participate in various activities of the organization, whether it is technology research and development, marketing promotion or operation management. By establishing a variety of community incentive mechanisms such as token rewards, honorary recognition, and governance rights enhancement, more talents and resources are attracted to join the community, forming a vibrant and creative community ecosystem to jointly promote the ecological development of PowerVerse.
 - Diverse community members: Community members come from different backgrounds and professional fields, including blockchain technology experts, computing industry practitioners, investors, marketers, legal experts, etc. This diverse membership structure brings rich knowledge and experience to the organization, helps to think and solve problems from different perspectives, promotes the innovative development of the organization, and provides allround support and services for the ecological construction of PowerVers.
- 3) Innovative economic model
 - Token economic system: PowerVerse DAO uses PowerVerse Coin as an

important tool for community governance and economic incentives. Token holders can obtain corresponding rewards by participating in community governance. This token economic system closely binds the interests of community members with the development of the organization, forming a virtuous cycle incentive mechanism, promoting the active participation of community members and the sustainable development of the organization.

 Value capture and distribution: As the PowerVers ecosystem continues to develop and grow, the value of PowerVerse DAO tokens will also increase. Through a reasonable value capture mechanism, the value generated by the ecosystem is distributed to token holders, allowing them to share the dividends brought by the development of the organization, further enhancing the attractiveness and market recognition of the tokens, and providing a solid economic foundation for the development of the organization.

八.Economic Model

3. PowerVerse Coin Distribution

The total number of PowerVerse Coins issued is 1,400,000,000, and the distribution model is as follows:



- The block reward accounts for 30%, totaling 420,000,000 tokens. Mining will start 30 days after listing on the CEX exchange, and the block reward will be halved every 5 years;
- Investors raised funds in four rounds, accounting for 35% in total, totaling 490,000,000 tokens:
 - Seed round, angel round, and A round each account for 10%, with 140,000,000 tokens allocated. They will be unlocked in 10 months starting 60 days after listing on the CEX exchange, with 10% unlocked each time;
 - The pre-sale/public sale round accounts for 5%, with 70,000,000 tokens allocated, 40% of which are unlocked, and the remaining will be unlocked over 6 months starting from May 31st, with 10% unlocked each month;
- Community airdrop accounts for 2%, totaling 28,000,000 tokens. Community members can receive 500 HBC airdrops after sending 2 USDT to the designated address and registering relevant information.
- The team holds 15% of the total 210,000,000 tokens. 5% will be unlocked after 60 days of listing on the CEX exchange, and the rest will be locked for 3 years and then released in 10 months.
- Compliance consultants account for 3%, totaling 42,000,000 tokens. Their main job is to assist projects in adapting to the laws and regulations of multiple countries. They will be unlocked over 4 years 30 days after listing on the exchange.

- Operation consultants account for 5%, with a total of 70,000,000 tokens. Their main job is to assist in listing on top exchanges and operations, preaching, and giving lectures. After 30 days of listing on a CEX exchange, the tokens will be unlocked in 4 years;
- The foundation holds 10%, totaling 140,000,000 tokens, which will be unlocked over 4 years 60 days after listing on the CEX exchange.

2. PowerVerse Market Monthly Dividend

At the end of each month, the Foundation will distribute dividends to each user who lists computing resources on the PowerVerse Market. This dividend mechanism is based on the principles of fairness, transparency and sustainability, and aims to distribute profits reasonably based on the user's contribution to the platform. Dividends come from two aspects:

- Block reward sharing: 3% of each block reward will be allocated to the foundation. The foundation will calculate the total amount allocated this month and include it in the monthly dividend;
- Donations from other members or organizations.
- The dividend distribution process is divided into the following steps:
- Calculate the total dividend amount for this round of dividends;
- Take a snapshot of the devices listed on PowerVerse Market;
- Calculate the total performance score of each user's online active devices in the snapshot (see Section 5.2). If the user has violated the rules in the previous month, the score is 0;
- The above scores are added up to get the total performance score of the entire network equipment;
- Calculate each user's monthly dividend:

• Pay dividends.

We hope that this mechanism can enhance its attractiveness to users, provide users with additional income in addition to equipment rental income, improve overall profit levels, enhance user stickiness and loyalty, and encourage users to pay more attention to equipment performance maintenance and upgrades to improve equipment performance scores and obtain more dividends, forming a virtuous circle that will help improve the overall quality of equipment on the platform and rental competitiveness.

In addition, this mechanism can also enhance the value of the platform, improve the platform's activity, attract more users to actively participate in the platform's business through the dividend mechanism, increase the number of devices on the shelves and the frequency of transactions, and create a more active platform ecological environment; further strengthen the platform's competitiveness, attract more high-quality equipment resources and user traffic, consolidate and enhance the platform's market position and brand influence; stabilize the user group, establish long-term and stable user relationships, reduce user churn rate, and lay a solid user foundation for the sustainable development of the platform.

九.PowerVerse Chain Technology Roadmap

2025Q1:

- Realize simple computing resource sharing and transaction functions
- Started the development of PowerVerse Chain and PowerVerse Infra

2025Q2:

- Completed PowerVerse Chain development
- Completed the development of PowerVerse Market computing power resource trading
- Start verification of other elements of PowerVerse Market

2025Q3:

- Design and development of PowerVerse DAO
- Completed PowerVerse Infra 1.0 development

• Start developing other supporting services

2025Q4:

- · Complete the overall development of basic support services
- Started the development of DePIN PaaS
- Started development of AI reasoning and training services

2026Q1:

- Completed the development of DePIN PaaS
- · Completed the development of AI reasoning and training services
- · Started the development of privacy computing services
- Start developing various markets

2026Q2:

- Complete the development of privacy computing services
- Complete the development of various markets
- Selection and design of decentralized SaaS services

2026Q3:

- Complete the development of privacy computing services
- · Complete the development of various markets
- Start building the Web3.0 system
- · Selection and design of decentralized SaaS services

2026Q4:

- Initial completion of the Web3.0 ecosystem construction
- Launch more than 10 demonstration decentralized SaaS services
- Selection and setting of industry scenario docking
- Metaverse Ecosystem Design and Development

+.About the Team

1. Harvey

Harvey graduated from the University of Birmingham in the UK, focusing on the application and research of blockchain and cryptocurrency. Since his student days, he has conducted in-depth research on the underlying technology and economic mechanisms of mainstream public chains such as Bitcoin and Ethereum, and on this basis, he has continuously expanded his practical understanding of cutting-edge fields such as decentralized finance (DeFi), stablecoins, and NFTs. Over the years, Harvey has been deeply involved in various blockchain summits and cryptocurrency industry conferences, and has served as a guest speaker or roundtable discussion guest many times, providing highly forward-looking insights for the blockchain community and professional investors.

On the technical level, Harvey is familiar with a variety of mainstream smart contract platforms, consensus algorithms and distributed network architectures, and has provided technical consulting and project planning for many blockchain startups. He also has unique experience in digital asset trading and risk management, and is good at analyzing market trends and formulating flexible and diverse investment strategies. In addition to keeping up with international regulatory policy trends, he also actively participates in community governance and has a deep understanding of blockchain compliance and industry self-discipline.

Today, Harvey is committed to promoting the integration of cryptocurrency and traditional industries. He not only implements solutions and innovations in the fields of financial technology, supply chain, digital identity management, etc., but also popularizes blockchain knowledge to more people through training and speeches. He firmly believes that cryptocurrency will lead a new wave of digital economy and is willing to work with industry partners to continue to explore and build a more open, diverse and sustainable future.

02.Solomon

Solomon graduated from the University of Manchester in the UK and has a solid

foundation in blockchain technology and a global vision. During his university years, he conducted in-depth research on distributed ledger technology, cryptographic algorithms, and smart contract principles, and accumulated a solid theoretical foundation in the academic field. After graduation, Solomon served as a blockchain technology consultant in many startups and well-known companies, leading or participating in a number of blockchain implementation projects, covering a variety of fields such as financial technology, supply chain, decentralized finance (DeFi), and enterprise-level solutions.

With his extensive attention and thinking on the blockchain ecosystem, Solomon has been invited to attend international blockchain summits, technical seminars and industry forums as a guest speaker or roundtable discussion guest, sharing his insights and practical experience in cross-chain interoperability, NFT and Web3 application scenarios. He is good at combining cutting-edge technology with real business needs, helping companies develop effective implementation plans from business models, technology selection to risk management, and creating significant value for customers.

In addition to actively promoting the application of blockchain technology in the industry, Solomon also always maintains a keen insight into industry trends. He pays attention to emerging business models and policy trends, and is committed to accelerating the integration of blockchain technology and the real economy. He firmly believes that blockchain is not only an underlying technology, but also a new business cornerstone that is expected to completely transform production relations and reshape value distribution. Through continuous and in-depth research and practice, Solomon is committed to providing professional, forward-looking and sustainable blockchain solutions to global companies and institutions, bringing broader growth and transformation opportunities to the digital economy era.

03.Jane

Jane graduated from the University of Victoria in Canada and is an expert in blockchain technology and cryptocurrency operations with many years of experience. She focuses on promoting the growth and application of blockchain technology, especially in the construction of decentralized ecosystems, crypto asset management, and the operation and expansion of blockchain platforms, and has excellent practical ability and industry insight.

With a deep understanding of blockchain technology and business applications, Jane has played a core role in multiple high-impact projects, responsible for driving community growth, establishing strategic partnerships, and sustainable development of the ecosystem. She is good at translating complex technical concepts into actual business value, helping projects stand out in the highly competitive cryptocurrency market.

Core advantages:

Blockchain ecosystem construction: Good at creating a sustainable development model for the blockchain platform, driving user growth and enhancing network effects.

Cryptocurrency Market Strategy: Develop and execute innovative market strategies to ensure that the project gains broad market acceptance.

Decentralized community management: Successfully manage and expand decentralized communities to promote user participation and community self-governance.

Strategic resource integration: We have established in-depth cooperation with global blockchain institutions, media and investors to help the project grow rapidly. Jane is committed to exploring the unlimited potential of blockchain technology in the digitalization of the global economy, and actively promotes sustainable development in this field with technology-driven innovation as the core concept. She believes that

blockchain technology will bring profound changes to the future digital economy, and she will also contribute her professional strength to this goal.