



ULTRAIN

Ultrain White Paper

Version 1.1.2

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1. Ultrain Vision

1.1 Core Vision of Ultrain

With the emergence of the information revolution 4.0, this technological revolution is further driving business to expand its borders and streamline its processes. We are witnessing the unfolding of a brand-new business society, where all things are visible, interconnected and exchanged. We call this a “programmable business society”. In this business society, the trading business logic of trillions of business transactions executed each day will migrate from traditional business contracts to smart contracts, which will be automatically executed and implemented by the blockchain through the control and dispatching of an extensive ecosystem consisting of 100-billion-level Internet of Things (IoT) devices. In the smart decision-making process of automatic execution, more and more decentralized artificial intelligence (AI) processes running on the blockchain will take over most of the computational and decision-making tasks, enabling highly efficient and reliable automated execution.



This business approach will be widely used across various fields, such as public utilities, transportation, manufacturing, medical care, agriculture and finance, to significantly reduce the cost of the business operations. The greatest benefits of this society are zero trust costs, automation and intelligence.

This will have significant impacts on the business world as we know it today. First, the organizational form of a company will be looser, more flexible, autonomous and self-disciplined. A group of people can be organized together with common goals and incentive mechanisms which are open, transparent, unanimously agreed and automatically implemented. Therefore, the company's participants can voluntarily and autonomously contribute resources

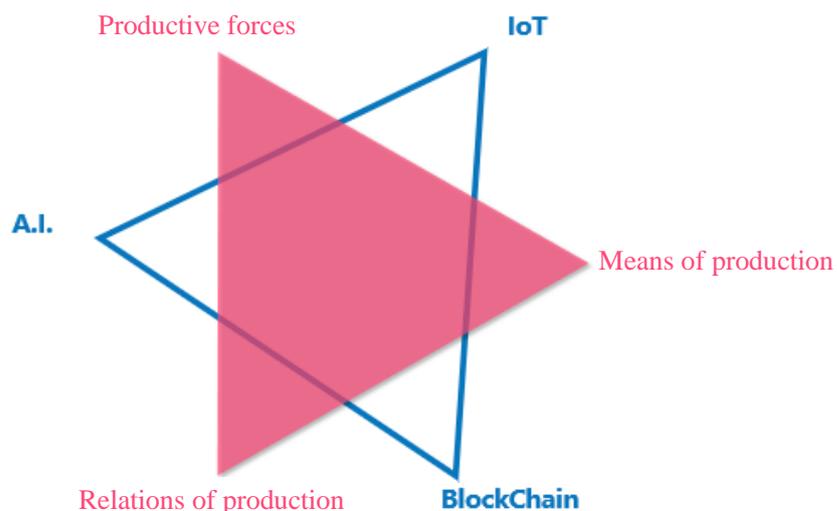
and capabilities to promote the realization of the goals., thereby lowering the company's management costs and operating costs.

Secondly, in this business ecosystem, as the business rules and logic of inter-company transactions can be decided more dynamically and intelligently through AI, a fair and reasonable distribution of business interests can be more transparently achieved using the blockchain technology, thereby slashing the trust costs in business transactions and achieving business transactions without trust costs.

This business ecosystem is composed of many business organizations. Overall, it consists of three parts:

- The technology layer, which comprises infrastructure services integrated based on public blockchain, AI, and IoT
- The horizontal services layer which comprises organizations that provide many decentralized business services, including decentralized banks, decentralized insurance, decentralized loans, etc.;
- The vertical application layer which comprises various decentralized application services that serve many users and can be implemented in various industries, including scientific research and development, manufacturing (such as machinery and textile), logistics, retail, finance, culture and entertainment (education, literature, IP and games), pharmaceutical biochemistry, food, real estate, agriculture, animal husbandry, fishing, services (catering and travel), etc.

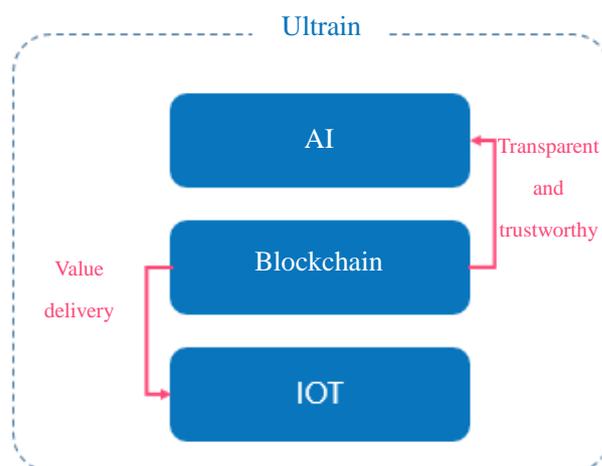
The progress of this business society is achieved through technological advancement. Its core technologies are blockchain, AI and IoT. Blockchain can be considered as the transformation of the relations of production, AI can be considered as the transformation of productive forces, and IoT can be considered as the transformation of the means of production. Through integrated application of the blockchain, AI and IoT technologies, this business ecosystem, compared with traditional business activities, features lower operating costs, higher operating efficiency of business activities and more transparent distribution of business benefits, which can greatly increase social production efficiency, create more value for the real economy and make the society better.



The vision of Ultrain is to advance the realization of a programmable business society.

1.2 Features of IT Infrastructure in a Programmable Society

Just as the industrial society depends on the infrastructure of water, electricity and coal, the information society depends on the infrastructure of the IT technology. The infrastructure of the programmable business society is a complex of blockchain, AI and IoT technologies. As a network for building trust and delivering value, the blockchain technology is the key. At the upper layer, AI needs to run on the blockchain to provide fair and efficient smart decision-making services. For the lower layer, serving as the infrastructure for value delivery, the blockchain integrates and connects IoT devices and networks to provide external services. In general, the blockchain infrastructure should have the following features:



1.2.1 Public P2P Network

The core of the programmable business society is the programmable business consensus, whereas the core of the programmable business consensus is to transform the original business consensus from the traditional contract trust to technological trust and ensure, by using technology, that the business consensus cannot be tampered with, forged or destroyed and is transparent and checkable for all people. From the perspective of IT infrastructure, the entire network needs to be a public, open peer-to-peer (P2P) network with no master-slave distinction and no special nodes. Meanwhile, this network needs to be a low-concentration network to ensure that as many people as possible participate in the network, so as to ensure, to the maximum extent, that the network cannot be controlled by a centralized individual or group and cannot be attacked by evildoers.

1.2.2 Support for Large-Scale Business Applications

The blockchain infrastructure should be able to support large-scale business applications with high performance, high service quality and low cost. However,, the existing public blockchain technologies cannot support large-scale business applications. There are two main problems here:

1. Low system trading performance: Take Bitcoin as an example. The transaction frequency supported network-wide is about 7 transactions/second, and acknowledging one transaction takes 1 hour. We can compare it with the mainstream payment transaction system. The payment peak of Alipay on Double Eleven of 2017 was 265,000 transactions/second. The difference between the two is almost 40,000 times. This system performance obviously cannot support large-scale business applications.
2. Low smart contract performance: The existing smart contracts have the following problems:
 - a. Limitation on the quantity of lines of smart contract code.
 - b. Limitation on the execution time of smart contracts. The current smart contracts basically need to be completed within a consensus, which greatly limits the complexity of smart contracts.
 - c. Execution sequence of smart contracts: The existing smart contracts can only be executed in a serial manner, while in sophisticated business logic, parallel execution of smart contracts is a basic requirement.

The performance problem of the new public blockchain urgently needs to be solved so that the blockchain can become a true IT infrastructure and support large-scale business applications.

1.2.3 Value Computation Enables the Real Economy

In the existing POW-based public blockchain system, in order to maintain the security of the system, a large amount of its computing and electric power is used for hash value calculation,

which consumes a lot of resources and has a very low cost performance. This approach is not sustainable. In the new public blockchain infrastructure, an extremely small amount of computation shall be sufficient to support the operation of the public blockchain system, and the remaining large amount of computing power can be freed, reorganized, and dispatched for purposeful computation to enable the real economy, create social value and support implementation of the decentralized business logic, the very core of the programmable business society, as the IT infrastructure.

1.2.4 User-Friendly Smart Contracts

In the programmable business society, a large number of business contracts and agreements in the traditional business society will fall onto the chain in the form of smart contracts. Therefore, the preparation of smart contracts should be a technique with a low learning threshold, similar to the preparation of PPT and Excel. Anyone can easily read, write and review smart contracts after basic training. However, the existing smart contract syntax is too complex. We need a new smart contract language that can be used to write smart contracts in a manner similar to the formatting rule of the human language, thereby greatly improving the friendliness of smart contracts, significantly reducing the learning costs for ordinary users and allowing more people to use smart contracts to serve different business scenarios and business purposes.

1.2.5 AI Support

The programmable business society is a complex and comprehensive business ecosystem that is based on technology and emphasizes democratic autonomy as its foundation. This ecosystem is faced with numerous complex economic factors that need to be dynamically adjusted at all times to ensure good and efficient operation of the economy. Compared with the traditional economy, for this situation, the planned economy adopts national macroeconomic regulation and control to regulate economic parameters; the market economy uses an invisible hand for dynamic regulation, and the efficiency is low. For the programmable business society, since all data on the operation of the economy are recorded on the chain, a more effective way is to dynamically regulate the relevant economic parameters through AI so as to achieve system optimization.

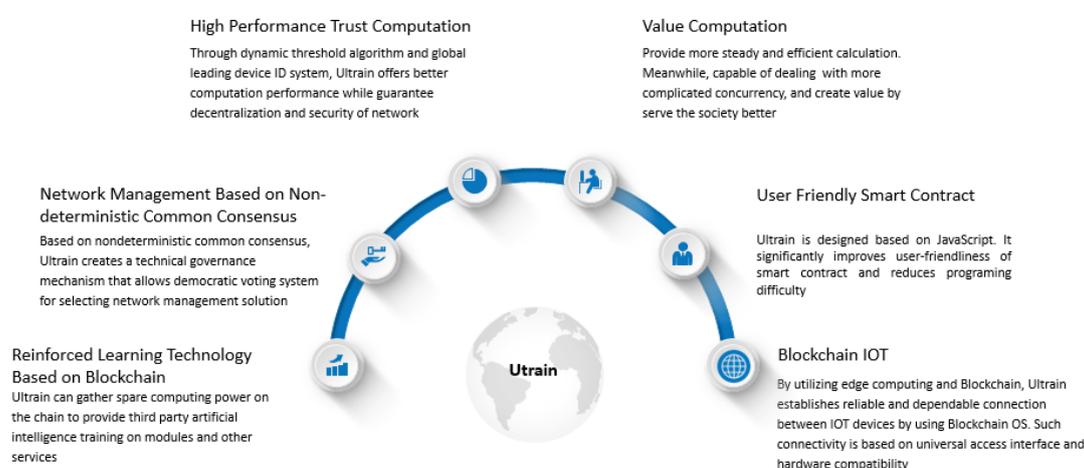
In order to ensure that this regulation is fair, just, reasonable, tamperproof and traceable, the AI matrix group cannot be provided by one or several centralized service providers. The training and operation of the AI matrix group should be completely based on the data on the chain, and the AI matrix group needs to run completely on the chain and constantly implement autonomous reinforcement learning and evolution by integrating the posteriori knowledge of historical data and the priori knowledge of human experience to form an artificial superintelligence.

1.2.6 IoT Device Support

Another core feature of the programmable business society is the support of IoT devices. The business logic of both sides of a transaction will run on smart devices on a large scale to form a machine consensus and automate the transaction based on this consensus for value exchange and transfer. For example, the distributed energy. The traditional IoT technologies, usually accompanied by redundant nodes and hybrid clouds, are unable to implement effective value transfer under ultra-large-scale nodes. The technologies such as the latest IoTA or hashgraph are more capable of securing data transmission between smart devices. However, with no deterministic mathematical proof demonstrating that these technologies can solve the double-spending problem, the value exchange between smart devices cannot be guaranteed. The value exchange must be implemented using the blockchain technology. For the IoT system, the blockchain technology offers something similar to the operating system of a device. The blockchain technology can integrate hundreds of millions of IoT devices into a common software framework, and the smart contract can enable secure, reliable and efficient data transmission and value transfer between smart devices. At the same time, it is also possible to effectively integrate the computing power of a single device into a large computing pool to provide external services.

2. Core Functions of Ultrain

Based on Ultrain, we are committed to providing a computing service called trusted computing. This is a brand-new computing service model that differs from traditional cloud computing. Compared with traditional cloud computing, it is a new computing model based on the blockchain architecture. This computing model includes CPU computing, GPU computing, memory computing, hard disk resources, bandwidth resources, etc., which can all be included within the scope and framework of the entire trusted computing. All the computing has the characteristic of blockchain computing, that is, all data based on trusted computing and operations on these data cannot be tampered with or destroyed and are transparent to all and traceable.



This service is a brand-new blue ocean for businesses that need to establish and use business models at low trust costs. Ultrain provides the following features in order to implement the service capability of trusted computing:

2.1 High-Performance Computing

With breakthrough innovations in cryptography, Ultrain has established a new consensus mechanism which we defined as a random trusted consensus framework. This new consensus mechanism can, under the same level of security performance as the POW, achieve a 1,000-times increase in performance in a fully decentralized network with only 1% of the computing power requirements of the traditional POW network.

This consensus has the following features:

Feature 1: Completely decentralized architecture. A public chain system must have a completely decentralized architecture in order to ensure the security of its network. The network itself needs to be a complete P2P network without any special nodes which is the first priority.

Feature 2: Ultra-large-scale network cluster. Networking of more than 1 million nodes is supported, and the entire network supports horizontal expansion and can maintain linear

growth of performance on the basis of horizontal expansion.

Feature 3: Multi-terminal support. Besides nodes with a large amount of computing power, mobile phones and various smart devices can also connect to our network, providing the corresponding computing power for the entire network.

Feature 4: High-performance computing. For the performance of the blockchain system, we need to consider two values, one is the transaction performance, and the other is the confirmation time. Ultrain is composed of the main chain and side chains. The main chain is intended for guaranteeing the security of the entire system and for secondary confirmation of the calculation result of the side chains. Therefore, the main chain requires high transaction per second (TPS) performance, whereas the confirmation time can be appropriately longer. A side chain is the running environment of a specific DApp. Each DApp can choose to form its own side chain. Since the side chains are the business system of real services, they require a short and quick confirmation time but not high TPS performance. To meet this requirement, the random trusted consensus framework offers two consensus, one of which is applied on the main chain, and the other is applied on the side chains. The performance of the main chain reaches up to 20,000 TPS, and the confirmation time is 15 seconds. The TPS of the side chains ranges from 3000 to 5000, and the confirmation time is 1 second.

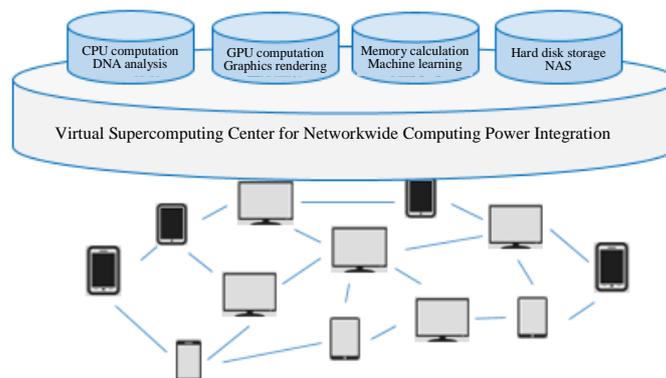
Feature 5: Decentralization design. The centralization issue is actually a very serious problem faced by Bitcoin, Ethereum and others at present. Because Bitcoin mining rigs deployed in a centralized manner for mining can generate excess returns, there are only over 8000 external egress IP addresses available in the entire Bitcoin network (as of November 2017), which is diametrically opposed to the original intention of a completely decentralized network design. In order to avoid the phenomenon of concentration of machines into the mine pool, we have fully considered the decentralization issue in the entire architecture design. Our vision is that a mining infrastructure is view more as an ordinary computer, which can be placed in the houses of countless families. This device could be used as a computer, but when not in use it becomes a node on the network and can perform mining functions to the benefit of the owner.. This is the design goal that Ultrain targets to achieve.

2.2 Trusted Computing Creates Value

One of the objectives of Ultrain is to free up more computing power while ensuring the blockchain security and utilize the freed computing power for computation with actual social benefit to further create value for the real economy. Through innovations in Ultrain cryptography, only 1% of the computing power of the entire network is required to implement mintage when the consensus is reached each round, and the remaining 99% of the computing power can be provided as trusted computing. This computing model includes CPU computing, GPU computing, memory computing, hard disk resources, bandwidth resources, etc., which can all be managed and scheduled using Ultrain to provide services externally.

The users of the computing power are mostly DApp research and development teams on Ultrain. By paying UGas (token for service billing on Ultrain), the DApp research and development teams can enjoy services of the same performance and quality as cloud computing with only 25%–50% of the price. All of the paid service fees will be injected into the entire ecosystem of Ultrain to provide solid value support for the Ultrain economic system. Therefore, the valuation

of the Ultrain economic system solely depends on the actual value it creates for the real economy of society.



2.3 Flexible and Sophisticated Multi-Token System

The prosperity of the public blockchain system depends on the prosperity of the DApps running on it, and an important factor for the prosperity of DApps is whether the token economic system of each DApp is reasonable and healthy. The selection and design of the token economic system need to match and adapt to the business model of the DApp, and the system should be designed to promote and stimulate rapid development of the DApp business model. However, the token issuance of the existing public blockchain is too rigid. For example, for Ethereum, the total amount of currency is set in the smart contract. Once the smart contract is established, all the tokens have been issued. This will have a material impact on the regulation of the future business economic ecosystem of DApps.

In order to solve this problem and better support the token economic system design of DApps, Ultrain adopts the dual-layer token architecture system of UToken and UGas.

UToken is the generic name of the tokens issued by DApps running on Ultrain, which is similar to ERC20 of Ethereum. Each DApp can issue its own tokens based on Ultrain and set its own token monetary system based on its business model, for example, inflationary, deflationary or mildly inflationary. Based on the differences in the monetary system, each DApp can choose different consensus mechanisms, including POW, POS, DPOS, POA and RPOS, or even establish its own consensus mechanism. On the basis of different consensus mechanisms, it can produce exclusive mining rigs for the token to support the mining for token issuance.

UGas is a token that is used to purchase the necessary computing power for running smart contracts on Ultrain. All smart contracts deployed on the main chain and side chains of Ultrain can run only with UGas. Similar to the “Gas” of Ethereum, UGas is a charging and settlement tool for Ultrain.

2.4 Consensus Building Mechanism for Mutual Confirmation

The core of the blockchain technology is the idea of decentralization. Decentralization means that, in a group that is completely equal with no center or authority, a group of people reach a consensus through negotiation to accomplish a goal agreed by everyone. In the blockchain, there is technical consensus and business consensus.

2.4.1 Technical Consensus

In the traditional network architecture, the development of the network is steered by the team that owns the technology. However, due to the decentralization nature of the blockchain, the blockchain network is co-created by many parties, typically the miners which provide the host computers and the research and development team that provides the blockchain software. If the parties disagree on the development direction of the blockchain, the disagreement will often result in the split of the blockchain network. A large network may split into multiple small ones. This has already happened in both Bitcoin and Ethereum.

In the early stages of the blockchain development, many people in the community did indeed hold the idea that the blockchain should not be tampered with. However, a number of vicious incidents in recent years, including the hard fork incident of Bitcoin and the DAO hacking incident of Ethereum, have changed the idea of the community. These incidents have made the community realize that it may not be a good solution if it cannot be changed at all. However, the key is not the change, but whether the change is decided by a central group or by the network community together. Therefore, an important feature of Ultrain is the support for network governance by democratic voting.

2.4.2 Business Consensus

In a decentralized community, it is a complex and difficult task for a group of people to set and accomplish a goal together. In a real community, various frictions will occur during the process of setting and accomplishing a goal because no one can independently propose a perfect solution to all problems. At the same time, waiting for everyone to vote on a decision will be a relatively long process. We call this a non-deterministic consensus issue.

In order to resolve the non-deterministic consensus issue, we try to develop a participatory consensus building mechanism of “mutual confirmation”.

The most representative case of “mutual confirmation” is a negative case: the “mutually confirmed destruction mechanism” of the United States and the Soviet Union during the Cold War. To be specific, both sides confirmed by default that if the other side or itself initiated an attack, itself or the other side would definitely counterattack, resulting in complete destruction of both sides. This “mutual confirmation” mechanism guaranteed the balance and peace between the United States and the Soviet Union. Ultrain hopes to build an effective participatory systematic mechanism so that all participants can effectively build a better future together without requiring the parties to fully reach a consensus. We call this a “mutually

confirmed consensus building mechanism”.

Specifically, a participatory consensus building mechanism requires the guidance of a coordinator to guide participants in thinking and making choices based on the three core principles: basic principle, appropriate process and correct method or tool. In the decision-making process based on these three principles, all related designs or decisions independently made by all participants are open, which allows us to embrace more possibilities instead of limiting the possibility of other people’s decisions in the traditional decision-making process. Everyone’s decisions can be revised and reused by others. Under such a mechanism, even if no complete consensus has been reached in the end, common construction and work can still be achieved.

With the guarantee of blockchain technology, Ultrain hopes to popularize such values and mechanisms within our community, so that the community can work and make decisions efficiently.

2.4.3 Network Governance Based on Democratic Voting

In order to effectively implement technical consensus and business consensus at the technology level, we have designed a network governance mechanism based on democratic voting. We believe that people with more resources in the economic system are more concerned about the health of the system and deserve more voting weight.

Ultrain provides a common negotiation table for all people in the community by means of a reasonable and effective democratic voting method, allowing everyone to vote for a solution that we ultimately need to choose. Such a solution will be automatically deployed and updated on the network in the form of smart contracts.

These network governance solutions include multi-level design and integration of common business goals, dynamic optimization of economic system parameters, dynamic optimization of blockchain network parameters, restart mechanism during hacking attacks, penalty mechanism against malicious behaviors, etc. The different governance solutions are determined by democratic voting each time. The number of votes each person holds is assigned according to the number of UGas that he/she holds, and the voting results are coordinated and automatically executed by the governance AI of Ultrain. In this way, we have not only avoided autocracy, but also fully considered the opinions of all parties.

This hybrid advanced governance system adopted by Ultrain combines the power of the masses of the community with AI and machine learning to make decisions. The system has the special operation privilege of the virtual management system and can execute the submitted solution. At the same time, when facing escalating cyber-attacks, the system has the ability to continuously upgrade and evolve using AI and machine learning algorithms.

In terms of democratic voting, Ultrain has introduced a reward and punishment system. That is, it has established a credit evaluation scheme for each account. The initial credit value of each account is conditional upon the initial number of coins in the account, and the credit value is increased (if the vote is consistent with the voting result) or decreased (if the vote is inconsistent with the voting result) based on the voting behavior and voting results. This not only improves the Matthew effect issue, but also encourages community participants to make considered and responsible choices.

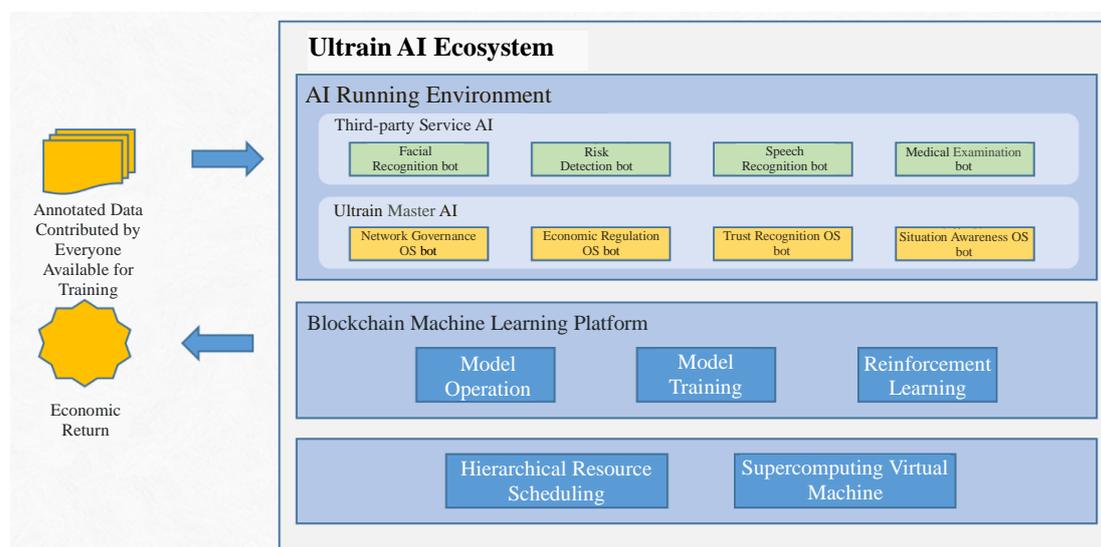
2.5 User-Friendly Smart Contracts

The existing smart contracts have a big problem, that is, the learning curve is too steep, and the threshold for learning is too high. Many smart contracts are actually based on the C++ language. By removing some keywords, we can convert the C++ language into a smart contract language. We believe that in the future programmable business society, the preparation of smart contracts will be a technique similar to preparing PPT or Excel files. Ordinary people should be able to master the skill of writing smart contracts through simple learning. Ultrain hopes to use a quasi-natural language approach to allow more people to master the writing of smart contracts through simple learning and apply it to their own business activities.

Based on this idea, Ultrain has designed a new programming syntax for smart contracts based on the design of the JavaScript language, including providing standard code library support; providing a series of standardized smart contract templates using the template technology; and implementing smart contract formalization and colloquial programming practices using the machine learning technology, thereby lowering the learning curve for ordinary people.

2.6 Artificial Superintelligence on the Chain

2.6.1 Phase 1: Reinforcement Learning Platform on the Chain



Based on idle computing power, Ultrain has built a complete reinforcement learning training and operation platform, which includes not only multiple master AIs indispensable for the operation of Ultrain, but also AIs deployed by third parties that provide various service capabilities. These AIs can be called and used by third parties in need of AIs.

Compared with the traditional AI running on cloud services, the AI (ubot) running on Ultrain has the following features:

- **Trustworthy AI:** The AI model running on Ultrain is obtained by training of the machine learning training platform on the chain based on data on the chain, and it runs on the machine learning running platform on the chain. Therefore, the AI model cannot be tampered with or destroyed and is completely transparent. It can be inspected by users of the entire network, thereby effectively eliminating doubts that AI is uncontrollable. It can be called the trustworthy AI.
- **Socialized data contribution:** With the development of machine learning, it has become a consensus in the industry that more data is better than a better algorithm. However, more and better data is often held in the hands of some Internet giants, and ordinary small- and medium-sized AI startups often have a very difficult time in obtaining a massive amount of high-quality data. This directly limits the further development and application of AI. By using the token incentive mechanism of the blockchain, we can encourage the public to contribute high-quality data over the blockchain platform for economic returns. As such, a data contribution platform can be formed effectively for collecting and accumulating a large amount of high-quality data to solve the data shortage issue of AI companies, thereby laying the data foundation for creating efficient and reliable AI services.
- **Reinforcement learning:** Reinforcement learning refers to an unsupervised online learning technology evolved from theories including animal learning, stochastic approximation and optimal control. During reinforcement learning, the ubot perceives status information in the environment and searches for strategies to select the best action. This causes a change of state and a delayed return value. The ubot updates the evaluation function, completes a learning process, proceeds to the next round of learning and training, and repeats the loop iterations until performance optimization is achieved. The machine learning platform on Ultrain implements continuous evolution and constant optimization of AI deployed on Ultrain by using the reinforcement learning technology combined with more and more high-quality data obtained through socialized data contribution, and it eventually achieves optimal performance by joint effort of the entire network, gaining a unique competitive edge in numerous centralized AI services.

In the first phase of the AI direction, Ultrain hopes to successfully build an economically driven and socially participatory controllable AI service platform.

2.6.2 Phase 2: Artificial Superintelligence Based on Deep Belief Network

2.7 Blockchain-based Value IoT

In the IoT field, Ultrain mainly hopes to achieve trustworthiness and reliability of operations of a single IoT device and between IoT devices as well as reliable payment transactions between different IoT devices by means of the blockchain technology. Meanwhile, it intends to implement firmware-level compatibility and unified external programming interfaces of IoT devices by introducing the blockchain-level operating system.

The traditional module+clouding computing model will be difficult to sustain when massive

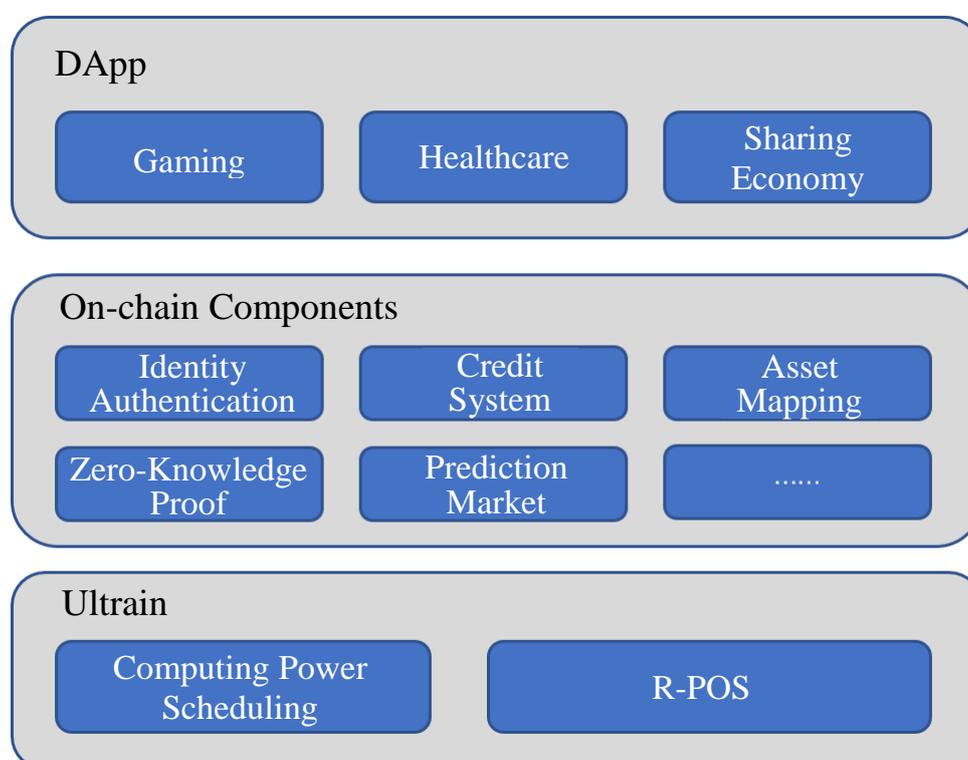
IoT devices are interconnected and interoperable. However, using edge computing to implement self-organization and self-governance of nodes from the perspective of a single computing node will be a feasible computing model. Therefore, there is a need to form a unified abstract programming model beyond the IoT firmware.

An IoT node is usually a very small computing unit. Due to its power consumption requirements, it is usually a computing unit with limited resources. Its memory and storage space are both very small. It is difficult for such a node to participate in the consensus process. The computing power required by the control node of an IoT device will come from edge computing units, possibly gateways or routers. The specific application can be deployed in the form of a smart contract on the chain, and the local network can be managed by using the control unit to implement business interaction.

3. On-Chain Components of Ultrain

To provide comprehensive support and services to DApp developers and allow DApp developers to develop applications more easily and conveniently, Ultrain, on the one hand, offers comprehensive developer tools and development environment support. On the other hand, it provides rich business components and functional components, including identity authentication, credit system, oracle machine and zero-knowledge proof, on the chain, allowing DApp developers to quickly build their own business applications. Most of the on-chain components of Ultrain are developed by technical partners of Ultrain. When using these components to provide services, DApps will directly pay service fees in the form of UGas, and these fees will be paid to on-chain component developers.

Ultrain welcomes more technical partners to build more abundant functional components on the chain to optimize the DApp development ecosystem of Ultrain.



3.1 Identity Authentication Component

In vertical scenarios similar to healthcare and finance, when a user uses a DApp, the user identity needs to be authenticated to allow the user to use the corresponding functions. The data sources required for this identity authentication need to be provided by authorities. This function is a universal requirement, which is rendered by Ultrain as a general functional component.

Ultrain integrates a variety of universal and dedicated identity authentication components according to laws and regulations of different countries to provide identity authentication components of different levels, which have the following features:

- **Multiple identity authentication data sources**
Data sources for Ultrain identity authentication are provided by different identity authentication service providers. The authentication data has a series of distributed trust sources, and different authentication methods are selected in different scenarios. The identity information of all entities exists only in the provider of the specific identity trust source. It will not be retained in Ultrain so as to ensure compliance and privacy in all types of business.
- **Multi-level identity authentication**
Different levels of authentication, such as mobile phone number verification, ID information verification and real person authentication, can be selected to authenticate the identity of a person in Ultrain based on the different requirements of the application scenario.
- **Dedicated identity trust sources**
According to business scenarios or laws and regulations, an entity in Ultrain can use different identity trust sources, such as the eID of specific field or region, CA, government, institution, school, company, community, individual, etc., to meet different trust authentication requirements.

3.2 Credit System Component

In business transactions and activities, the credit system is the foundation of business transactions and is a basic component of many DApps involved in business activities. Ultrain has retained all historical records and information of account transaction activities. Authorized by the user, the credit system service provider can rely on various types of consumption and behavior data of the user on Ultrain, and, in combination with the financial information on Ultrain, can comprehensively process and assess all data by using technologies such as cloud computing and machine learning as well as model algorithms including logistic regression, decision tree and random forest. Then it can objectively present the comprehensive score of the individual credit status from five perspectives, including user credit history, behavioral preferences, performance capability, identity characteristics and personal relationships, and establish a unified credit system model for Ultrain accounts and for DApps. Accordingly, the cost for establishing a credit system for each DApp is lowered.

3.3 Online and Offline ID Mapping Component

This component belongs to the smart lock field and relates to a smart anti-counterfeiting device based on the smart contract and an anti-counterfeiting traceability method based on the blockchain technology.

The goods can be easily replaced or counterfeited during the circulation process. It is difficult to

provide an entire set of systematic solutions to solve the anti-counterfeiting traceability problem by using the traditional methods. The traditional password lock can guarantee that it will not be unlocked illegally, but it has no decentralized trusted network such as the blockchain, and it cannot implement large-scale commercial key storage and distribution. The customer still cannot verify the real source of the goods because it is not traceable. The customer can neither verify whether the obtained key is authentic nor confirm whether the password lock itself is authentic. Criminals can fake a password lock as long as the lock can be unlocked using any keys. The online and offline ID mapping component designed by Ultrain solves the product traceability and anti-counterfeiting problem by using the two core technologies of cryptography technology and smart contract technology.

- The cryptography technology guarantees the security of devices.
- The blockchain technology prevents commodities and owner identity information from being tampered with and ensures continuous traceability of each related operation.
- Smart contracts on the blockchain ensure the trustworthy circulation of smart anti-counterfeiting devices and control information.

3.4 Oracle Prediction Market Component

The prediction market refers to a platform where people make predictions on future events with clear results. People can predict promising results and receive rewards for the predicted results. The incentive allocation depends on the final result of the event in which the parties participated, and it follows a simple but powerful rule: that is, those predicted accurately are rewarded and those predicted wrongly are punished. In order to win as much as possible, people will make predictions as accurate as possible by using various methods, such as information collection and mathematical modeling. According to the statistical law of large numbers, the prediction accuracy is greatly affected by the number of participants. With a sufficient number of participants, the prediction accuracy rate will be significantly improved. An online prediction market that allows a sufficient number of people to participate quickly and easily has great social value and significance. However, a centralized prediction market can hardly gain trust from participants.

With the development of the blockchain technology, the public blockchain has become an impartial and decentralized trust intermediary. Its features including information transparency and tamper-resistance have made the blockchain a perfect running platform for the prediction market. The natural impartiality of the blockchain makes the trust cost of running the prediction market almost zero, and the realization of smart contracts further empowers the blockchain with computing power that allows programmable dynamic calculation. Based on the huge application potential of the prediction market, Ultrain cooperates with service providers to provide the prediction market service component on the chain for direct use by DApps in need.

3.5 Zero-Knowledge Proof Component

The data on the blockchain is transparent and viewable to all people because of the characteristics of the blockchain itself. In some fields in which data privacy needs to be protected, such as the finance field and healthcare field, this characteristic of the blockchain is obviously not applicable. For example, patients clearly do not want their private healthcare data on the chain to be viewed by all. This requires that the on-chain data should be easily accessible and available when needed and that data privacy should be guaranteed. In this case, the zero-knowledge proof technology is required.

The zero-knowledge proof originates from the minimum disclosure proof. Assume that P is the entity that holds certain information and hopes to prove the fact that he holds the information, and V is the entity that proves this fact. If a protocol proves to V that P does have certain information, but V cannot deduce what the information is, we say that P has implemented the minimum disclosure proof. In addition, if V knows no other knowledge except that P can prove a certain fact, we say that P has implemented the zero-knowledge proof, and the corresponding protocol is called the zero-knowledge protocol.

At this stage, the zero-knowledge proof technology is immature, and it mainly has the following problems:

- A. Complex use logic: Each proof logic requires a complex setup process during creation and cannot be flexibly configured and used.
- B. Large number of calculations and low performance: Zero-knowledge proof involves a large number of mathematical calculations in the process of generation and verification. The calculation load is very large, the run time is long, and the performance is low.

Ultrain provides an on-chain component based on zero-knowledge proof for scenarios that require good data privacy protection. The zero-knowledge proof component of Ultrain has the following features:

- Programmable: The zero-knowledge proof module can be customized based on the business logic of users and can be flexibly configured.
- No setup process is required for any asset and any proof logic.
- Highly efficient: By software optimization and chip customization, Ultrain dramatically improves the computing speed of zero-knowledge proofing on both the client side and blockchain node server side.

4. Ultrain Economic Ecology

4.1 Introduction of Token System of the Ultrain Economic Ecology

UGas is a tool for service billing and settlement in Ultrain with an upper limit of 1 billion token. This is still an early stage proposal, details including economical parameters, can all be disclosed after further testing and adjustment is done on the public chain, when it starts to runs online

4.1.1 Generation of UGas

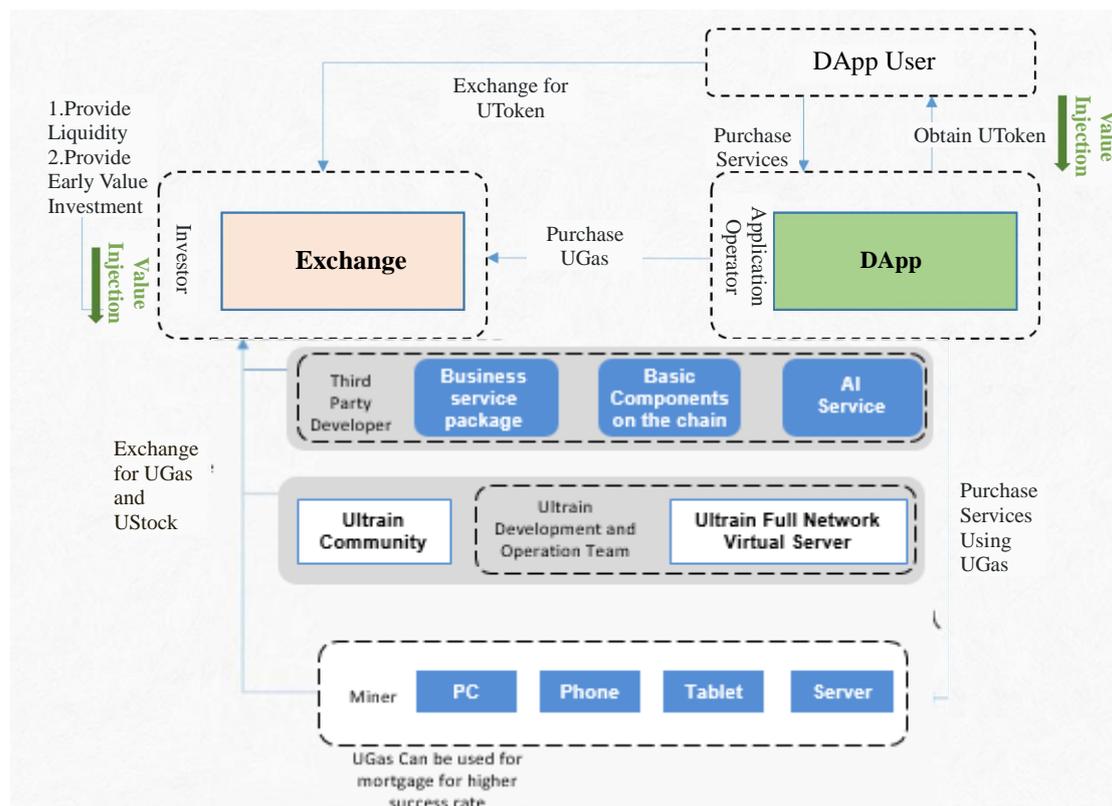
- UGas generated by mining: The generated UGas is evenly distributed among all nodes that participate in the current round of consensus.
- UGas generated by selling computing power: Assuming that the unit price of computing power is 1 UGas, in the first year, each node (mining rig) of which the computing power is used obtains 1 UGas for each unit of used computing power and obtains 0.3 UGas for each unit of unused computing power. Each year, the number of UGas obtained for each unit of used computing power is reduced to 80% of the previous year.
- 20% of the generated UGas is attributed to the Ultrain Foundation for maintenance and construction of the Ultrain ecology. Bonded by smart contract, 5% of UGas will be allocated to the development team; 5% to the Hub leaders; 10% to the active users on DApp . Regarding to the issues of unfair allocation between the Hub leaders and DApp users, a democratic vote is held within the community every time token is being allocated.

4.1.2 Use and Destruction of UGas

- Purchasing computing power using UGas: A DApp running on Ultrain needs to purchase the computing power for running its code using UGas when its smart contract is running. $Cost = Amount \times Price$. Amount indicates the amount of UGas to be consumed for this running, and Price indicates the price of UGas. Ultrain monitors the market price of UGas by using the Oracle machine mechanism and dynamically adjusts the price, ensuring that the operating costs of DApps are maintained at a relatively stable level for a period of time. All UGas used for purchasing computing power will be permanently destroyed.
- Purchasing third-party services using UGas: DApps running on Ultrain can purchase, using UGas, third-party services deployed on Ultrain, such as the authentication service, credit service, and zero-knowledge proof service. 80% of the UGas will be paid to the third-party service provider, and 20% will be permanently destroyed.
- Obtaining tokens: All nodes (mining rigs) participating in mintage and computing must mortgage a certain amount of UGas to participate in the economic system of Ultrain.

4.2 Description of the Ultrain Economic Ecology

We opine that the value growth of the blockchain's economic system is derived from the process of value creation for the real economy, so that the economic system has solid support and can maintain a positive, healthy and sustainable development. At the same time, such an economy is sustainable only if all participants in the economic ecosystem can profit in the ecosystem.



In the entire Ultrain economic ecology, roles of participants include the miner, Ultrain development and operation team, DApp developer, DApp user and exchange investor.

- **Miner:** Miners earn revenue by providing computing power resources of machines. There are two types of mining in Ultrain. One is to provide computing power for mintage on the main chain, and the randomly selected miner node will generate UGas as an economic reward. The other is to sell the computing power of its own machine as the computing power of trusted computing, and the machine randomly selected each round as the machine that sells the computing power will get UGas as an economic return. The probability of random selection is based on the number of UGas mortgaged by the node, machine credits and machine performance. A machine with a higher overall score has a higher probability of being selected, but it is also ensured that a machine with a high overall score will not always be selected, so that fairness is ensured.
- **Ultrain development and operation team:** 5% of the UGas output every year will be allocated to the Ultrain Foundation as rewards, which will be further distributed by the Foundation to the Ultrain development and operation team. This guarantees that the Ultrain development and operation team has a stable and sustainable income. At the same

time, the amount of this income is directly related to the economic volume of the Ultrain network, encouraging the team to endeavor to build a better and stronger economic ecosystem.

- **Ultrain community:** 5% of the UGas output will be allocated to the Hub leader of the most active community based on smart contract, amount allocated to different leaders depends on the result of a democratic vote held by the community.
- **Third-party service component developer:** Third-party teams can develop third-party service components that serve different purposes on Ultrain for DApps to invoke at runtime. DApps need to pay UGas as the charge for use of the third-party services. 80% of the paid UGas will be allocated to the third-party component developer, and 20% will be destroyed.
- **DApp developer:** DApp developers develop their own DApps on Ultrain. To run the smart contract part of DApps, they need to pay UGas to Ultrain as the service fee before they can use the corresponding computing power of Ultrain. DApp developers need to purchase the corresponding UGas from the digital currency exchange. UGas is priced based on the market pricing; 10% of the annual output will be allocated to the most active DApp developer, and amount allocated to different DApp developers depends on the result of a democratic vote held by the community.
- **DApp user:** Users of DApps pay for DApps during use, and part of the payment will be transferred to the Ultrain network as the usage fee of Ultrain smart contracts, injecting actual economic value into the network. As the number of DApps and the number of DApp users increase, the amount of UGas paid by DApps to Ultrain will increase accordingly, and the entire economy will grow and develop rapidly.

5. Token Distribution Plan

5.1 UGas Exchange Plan

Name	UGas
Code	UGS
Total number of tokens	1 billion, and never more
Private exchange price	1 UGS = \$ 0.2 USD
Private exchange quota	0.1 billion UGS
Purposes	See Section 5.4.

Supported currencies for exchange: Bitcoin (BTC) and Ethereum (ETH)

The settlement price is subject to the price on coinmarketcap.com on that day.

5.2 UGas Distribution Plan

Percentage	Distribution Plan	Detailed Content
Private placement	10%	Private equity investors are institutions and experts with great influence both inside and outside the industry. They have abundant industry resources, and they are very helpful and instructive in both technology and business development. They are critical to the implementation of the Ultrain business ecosystem.
Mining	50%	50% of UGS is generated by mining. The Ultrain team promises not to pre-mine.
Consultant & community building	10%	This part of the fund is used for the promotion and construction of the Ultrain community. It is used to promote community recognition and understanding of Ultrain, so that more people can join the Ultrain community to make contributions and advance the realization of a programmable business society.
Foundation/Ecology	15%	The Ultrain Foundation will select industries with blockchain implementation application prospects and competent teams, strategically deploy in these industries, make technology and capital investment in competent teams, and facilitate the early implementation of blockchain business applications on Ultrain.

Core team	15%	The core founding team has made contributions in terms of human resources, resources, material resources and technology during the development of Ultrain. Therefore, UGS is issued as a reward. The ban on 25% of the total number of UGS held by the founding team is lifted every six months starting from the issuance, and the ban is completely lifted in two years.
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5.3 Allocation of Raised Funds of UGas

Use Category	Percentage	Detailed Explanation
Technology development	35%	Mainly the incentives for the initial development team, recruitment of experts and developers, technology patents and intellectual property protection, and other similar activities.
Business and ecosystem development	50%	Business implementation, foreign investment, expansion and training, technical exchange and sharing, publication of periodicals, creation of corporate alliances/industry alliances, etc.
Daily operation	15%	The needs for the routine logistics management of the Foundation, transportation and office, finance and reporting, etc.

5.4 Usage of UGas

UGas is the foundation of the Ultrain economic system. Its main usage is as follows:

- All nodes participating in mintage and computing must mortgage UGas. During selection of a mintage node or a computing power output node, a greater number of UGas held indicates a higher probability of being selected, however the law of diminishing marginal utility applies.
- UGas needs to be paid as the charge for use of the computing power of Ultrain.
- UGas needs to be paid as the charge for use of the third-party service components on Ultrain.

6. Community Building

6.1 Building Proprietary Communities or Collaborative Communities, Exerting Influence

In 2018, Ultrain will implement 15 localized communities (hubs) in San Francisco (Silicon Valley), New York, Boston, Tel Aviv, Munich, Berlin, Paris, London, Seoul, Tokyo, Singapore, Beijing, Shanghai, Hangzhou and Shenzhen and select advisors and leaders with community influence in the local areas for these communities.

With the localization and continuous operation of various localized communities, Ultrain can achieve strategic cooperation with the top IT companies and Internet companies in the United States, Israel, Germany, France, the United Kingdom, South Korea and China, implement highly influential proprietary communities in various regions, and enhance its influence in the blockchain and Internet industry around the globe.

At present, Ultrain has identified the following persons as community consultants and leaders:

A. Germany Hub Advisor: Dr. Stephan Goetz

- Member of the Otto family, one of Germany's largest families
- Founder and Managing Partner of GoetzPartners, a leading boutique investment bank in Europe
- Doctor of Law at University of Regensburg
- Master of Law at Columbia University

B. Munich Hub Leader: Alex Wolfson

- Director of Consumer Management, BMW Group
- Former Director of Strategy of Nokia Emerging Market Services
- MBA at Columbia University
- Bachelor at the Wharton School of the University of Pennsylvania

C. Tel Aviv Hub Advisor: Tomer Bar-Zeev

- Co-founder and CEO of IronSource, one of the largest DSP platforms in the world
- Former Vice President of Business Development at Payoneer, a cross-border financial service provider
- Bachelor of Computer Science at IDC Herzliya, the oldest institution of higher learning in Israel

D. San Francisco Hub Leader: Vincenzo Belpiede

- Co-founder of BitDiem, a compensation payment application based on the blockchain technology
- Co-founder of Stellar Talents, a talent matching platform
- Bachelor of Management, Dual Master's Degree in Entrepreneurship and International Business at Bocconi University, the best business school in Italy

E. New York Hub Leader: Abby Zhang

- Partner of a technology hedge fund

- Co-founder of ABAB Capital and ABAB Education
- MBA at Cornell University
- Bachelor of Finance and Master of Finance at New York University

F. New York Hub Leader: Richard Cai

- Vice President of China Construction Bank New York Branch
- Former Assistant Vice President of Mitsubishi UFJ Financial Group
- Master at Bernard M. Baruch College, CUNY
- Bachelor at Stony Brook University

G. Boston Hub Leader: Stephen Turban

- Big Data Analyst of McKinsey
- Data scientist in Humanyze, an employee behavior analytics company born out of the MIT Media Lab
- Bachelor of Statistics at Harvard University

H. Switzerland Hub Leader: Toni Piech

- Graduated from Princeton University
- Son of former chairman of Volkswagen group - Ferdinand Piëch, his family is the largest shareholders of Volkswagen group, and also the joint owner of the Porsche brand
- Founder and manager of PAE group, including entertainment brand PAE Media, human resources management firm PAE Design Talent and social media platform Hot Pot Design

6.2 Collaborating with Traditional Communities, Enhancing the Influence

The idea of decentralization did not come into being just because the blockchain emerged. With the development of human society, the society will further evolve towards the protection of individual rights, towards the respect of individual privacy, the protection of personal property and the respect of individual rights and interests, and towards civil society. A civil society promotes such elements as equality, autonomy, democracy and people-centeredness. It advocates that a group of people who uphold the same values and ideas strive for the same goal by means of autonomy and self-determination. This goal can be as large as establishing autonomy consensus principles for a community, or as small as achieving a specific implementation objective.

A famous example is the Christmas bird observation program in the United States.

The National Audubon Society (named in honor of John James Audubon 1785–1851, a famous ornithologist, explorer and wildlife artist) is a non-profit non-governmental environmental organization incorporated in 1905. All members participate in conservation activities by donation or as volunteers. This community is committed to protecting birds and the environment in which they live using science, advocacy, education and field protection in the Americas, today and tomorrow. The community now has 23 international, national and state projects, 41 natural research centers and nearly 500 local chapters. It has designated more than 2500 key bird protection areas and is working voluntarily for the common goal of protecting the environment and birds.

The Christmas Bird Count (CBC) activities are conducted around Christmas every year. The CBC data is completely open. Anybody can participate in CBC activities after paying US\$5 (free for people under the age of 18), and can get a copy of The Birds of America. During the

event, at least 10 birdwatchers gather as an observation team, and all teams are distributed in nearly 2,500 observation areas. Each team is responsible for an area with a radius of 24 kilometers, observing and recording the types and numbers of birds in the area. According to official reports, in the 116th (2015–2016) CBC, 76,669 birdwatchers across the Americas voluntarily participated in the event in 2,505 observation areas, and observed and recorded 2,607 species of a total of 58,878,071 birds.

“No other organization does the work Audubon does. It’s very well rounded and well run.”

—Julia A., member of Audubon.

A non-profit, non-government environmental organization has gathered volunteers with the same hobby and goal to complete a task that even the government may not be able to accomplish even if it consumes a lot of manpower, material resources, and financial resources. Each bird-loving volunteer makes his/her own contribution in different ways. They are of different ages, different races, and have different occupations. They stand up and speak in public for birds, donate money online, feed the birds in the garden, go outdoors regularly to observe and record birds, and participate in the annual CBC event. They even promote legislation to protect birds and the environment. Bit by bit, they have accomplished the accumulation that cannot be accomplished by any government department, forming an invisible huge network, a network to protect birds and the environment in which they live. This is the enormous power of spontaneously striving for the same hobby, same goal, and same dream.

There are a variety of non-profit communities around the world that are similar to the National Audubon Society, among which many non-governmental organization (NGO) communities that pursue democratic autonomy or sharing communities with the core idea of knowledge sharing have demands for decentralization. Ultrain hopes to unite these communities and people and provide unique value for these communities through its own features such as the decentralization design and democratic voting mechanism. Meanwhile, the unique user-friendly smart contracts of Ultrain can also benefit the community users with poor IT skills. On the other hand, these community users with democratic ideals will also become a solid user group in the Ultrain ecosystem.

7. Application Scenarios

7.1 Gaming Platform Chain

Based on the Ultrain architecture, a gaming platform side chain can be designed and game coins can be issued. Game developers can develop games on this platform chain, and game operators can operate games by relying on Ultrain. The interested parties on the platform include game developers and operators, game players, Ultrain gaming platform, investors, downstream live streaming platforms, event operators, etc.

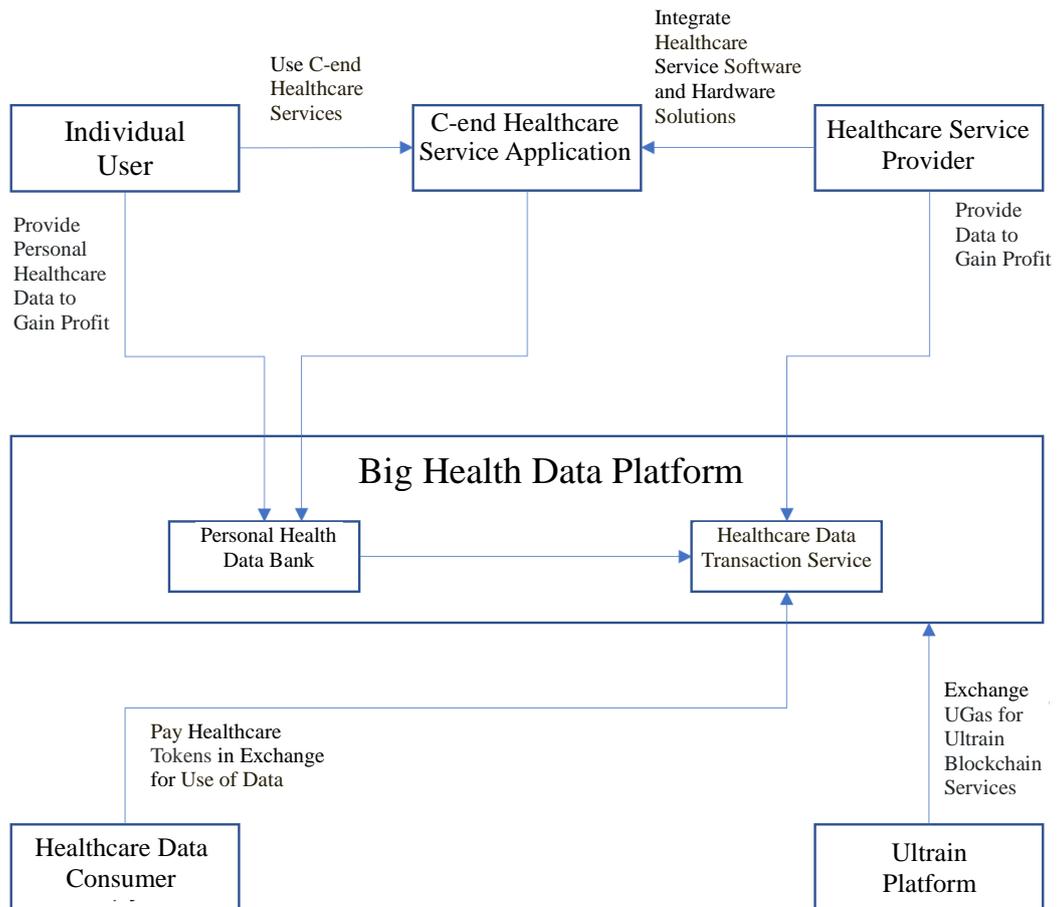
The Ultrain game coins are used as the currency in circulation of the gaming platform side chain. All transactions are automatically settled in the form of blockchain smart contracts. This guarantees the revenue of all parties and reduces transaction costs. Each interested party of the platform can use the game coins for cross-game transactions, and can exchange game coins for Ultrain fiat currency for transactions on the main chain and other side chains.

- The gaming platform is the core portal that gathers game player traffic. It provides the development environment and operation platform for game developers and operators and offers a variety of game options for game players. The gaming platform pays the Ultrain fiat currency to Ultrain in exchange for Ultrain services, including but not limited to the following: solving the data storage problem using the blockchain technology; solving the data replication and desensitization problems using proprietary technologies; solving data privacy issues using the blockchain zero-knowledge proof technology; and a series of data services such as data access, data standardization, data association, etc.
- Investors can gain profits by investing in gaming platforms and game coins.
- Game developers and operators can obtain game coins by selling games and game props. Meanwhile, they can sell game copyrights, data and other information to live streaming platforms, event operators and data analysts.
- Game players use game coins to purchase games, game durations and in-game pay props. Similar to the existing Steam gaming platform, game players can purchase game currency by using Ultrain fiat currency and can obtain game currency by means of in-game prop sales or in-game prizes. They can also gain game currency by signing a contract with a downstream third party in the ecosystem, such as a live streaming platform.
- Game live streaming platforms, event operators and data analysts can pay platforms or game players with game coins in exchange for copyrights and data, which are then cashed through live streaming tipping, event advertisements and other means.

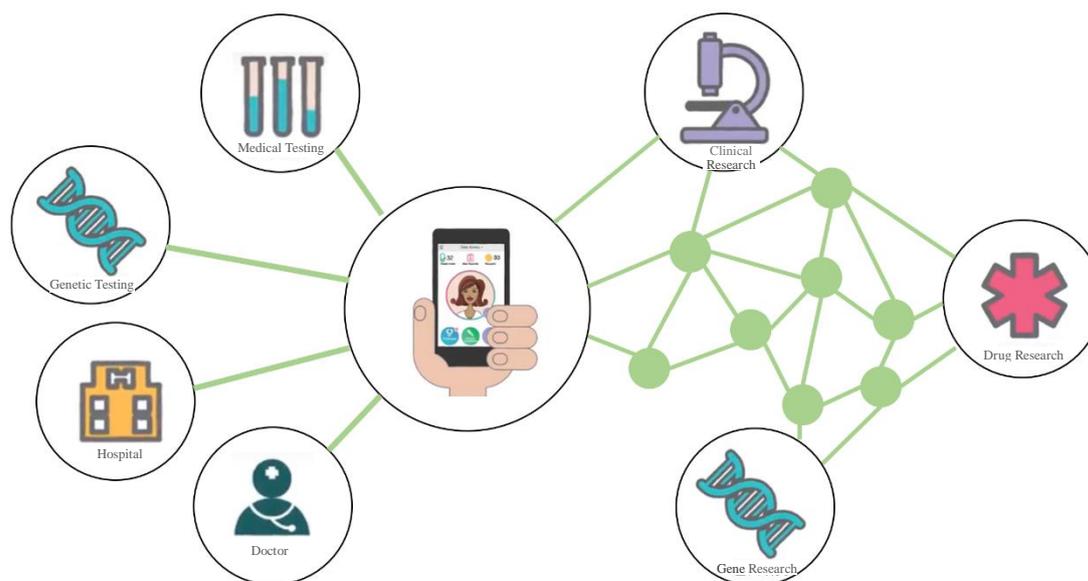
7.2 Healthcare Data Chain

Ultrain is now working with a number of healthcare big data service companies to promote the construction of the healthcare data side chain. The healthcare data chain is mainly intended for solving problems including lack of circulation and transparency of healthcare data in the industry, lack of control by patients over personal healthcare data, and lack of data in relevant

medical research institutions.



The interested parties on the platform include individual users, C-end healthcare service applications, healthcare service providers, healthcare data consumers and Ultrain platform. C-end healthcare service applications can synergize with many healthcare service providers to provide a variety of healthcare services, including basic physical data monitoring service, gene sequencing service, nutrition advices, chronic disease detection service, medical examination (advice) service, outpatient service, clinical service, etc. The applications can also provide a variety of medical-related services for the sub-health population, specific disease patients and family members of patients, and guide the family members and doctors on systematic long-term tracking and analysis of patients’ personal healthcare data.



- The families of patients have a personal health record and an electronic medical record that can be queried at any time on the big health data platform. They can provide authorized health data to the platform in exchange for healthcare tokens. In addition, each time a patient's data is used by a third-party scientific research or business institution, the patient will receive a certain number of corresponding healthcare tokens. The patients can use these healthcare tokens to purchase corresponding healthcare services.
- Healthcare service providers can provide basic physical data monitoring, nutrition advice, chronic disease detection and other services to earn income. They can also take advantage of the features of the blockchain technology to greatly reduce their IT costs, including data storage costs, security costs, privacy protection costs, etc. Meanwhile, they can resolve the healthcare data circulation and reuse issues through data exchanges, and can join the alliance built up by the platform to provide one-stop healthcare solutions for patients together with other service providers.
- Healthcare data consumers, including insurance companies, pharmaceutical companies and healthcare value-added service providers, can pay healthcare tokens to the platform in exchange for authentic and valid data. By utilizing the continuously updating massive and accurate healthcare data, insurance companies can effectively improve their actuarial capabilities; pharmaceutical companies can solve the problem of lack of coherent data in clinical trials of new drugs; and healthcare value-added service providers can offer patients with tailored value-added healthcare services by accessing cross-domain data.
- The big health data platform pays UGas to the Ultrain platform in exchange for Ultrain services, including but not limited to the following: solving the data storage problem using the blockchain technology; solving the data replication and desensitization problems using proprietary technologies; solving data privacy issues using the blockchain zero-knowledge proof technology; and a series of data services such as data access, data standardization, data association, etc.
- The healthcare tokens are used for payment and settlement on the network. At the same time, all transactions are automatically settled in the form of blockchain smart contracts, which can protect the profits of all parties, reduce transaction costs and create a dynamic

value investment market.

7.3 Fan Economy Chain

China's fan economy is now in an era of stratification and diversification. The value of niche content (animation, music, movies, etc.) is gradually being appreciated and accepted by the public. However, the agent system and multi-layer distribution system in the traditional cultural and economic fields are confronted with many difficulties, including value centralization, intermediary exploitation, proliferation of false information and single way of realization, which seriously affect the normal ecological development.

There is little spontaneous communication between the traditional media and communities, and traffic is mostly monopolized by mainstream and vertical media and communities. The lack of communication between channels and monopolization of traffic have seriously affected the flow of value of products in the cultural and economic fields (artists, IP, etc.), and most of the product revenue is harvested by intermediaries and intermediary agencies. The "decentralization" concept of the blockchain technology and the opened up fan behavior data can completely subvert the current situation and patterns of the entire industry.

A fan economy chain can be developed based on Ultrain, comprising the information registration system for public figures (singers, KOLs, etc.), copyright registration and authorization system, data storage system, and information inquiry and payment components. This side chain can issue fan tokens as a circulation tool for the economic system.

- Fans can pay fan tokens to purchase authentic video and audio files or exchange for opportunities to interact with public figures. Performance companies can send performance invitations to artists through this platform without intermediary companies and agencies, saving costs.
- Copyright owners can select copyright purchase requests from all over the world on the platform and collect deposits and follow-up revenues using smart contracts.
- The third parties are data users, such as performance companies, film companies or brands. They can pay fan tokens in exchange for hotness data of various public figures and copyrights as well as fan portraits, and choose suitable artists and IPs for various performances, films and commercial endorsements.
- All copyright owners and public figures (or their studios) can upload information and make "listed transactions" on the platform for free.

7.4 Sharing Economy Chain

A sharing economy side chain can be built up based on the existing architecture of Ultrain. One of the characteristics of the sharing economy is disintermediation. The traditional sharing economy has extended from the removal of intermediaries to the removal of small intermediaries during the development process. Although the costs of intermediaries during the transaction process have been reduced, the situation is still far from the ideal state of the sharing economy. It is merely a realization of platform business for sale of the "right to use".

The underlying architecture of the sharing economy built by Ultrain using the blockchain truly

enables direct peer-to-peer transactions between asset owners and asset users, realizing the reconstruction of the business logic of the sharing economy.

The Ultrain platform can reconstruct the online ride-hailing platforms, short-term rental platforms and other sharing economy models in the current market. Users can directly search all house and vehicle sources on the Ultrain blockchain and filter out and display those that meet their requirements. At the same time, all the transaction records on the chain will be stored in a distributed manner to replace customer ratings. A favorable comment will effectively improve the reputation of the house or vehicle source suppliers and shape their irrevocable blockchain identities. With the resource sharing of IoT devices, bicycles, power banks, homestay services, and the like can also join the sharing economy of Ultrain. Besides sharing, you can also conduct data transactions. For example, you can make real-time data transactions with data demanders by providing your vehicle data, real-time vehicle operation data, and the like.

7.5 Logistics Chain

The Ultrain blockchain ecosystem can meet the four major demands of the express service industry:

- Maintain ownership in high-value markets.
- Effectively record the asset transaction process and record the shared data by using the blockchain ledgers.
- Provide high-quality data for any compliance audit requirements based on the tamper-resistance feature of transactional data.
- Allow all participants in the industry to record and share data by using the blockchain distributed ledgers in the data sharing scenario.

In response to the above four demands, the Ultrain ecological chain can support the following four service scenarios:

- Express value insurance: In the value insurance scenario, when courier companies transport goods, as the asset transactions are transparent, insurance companies can effectively provide value insurance on goods. Merchants offer goods for sale, buyers purchase the value insurance services, and the government conducts industry regulation. Commodity value insurance is a contractual concept. When a customer signs for a parcel properly, a claim settlement of the account is automatically triggered. The contract ends normally and the premium is automatically liquidated. If a parcel has a problem or is missing, the insurance claim process is triggered.
- Charity activities: For example, the “One Cent” Campaign takes one cent from the fees of each charity parcel and donates it to the account of a charity organization. In this scenario, courier companies still undertake the transportation of goods, charity organizations carry out charity activities, and poverty alleviation merchants provide poverty alleviation products for sale. The tamper-resistance and transparency features of transactional data ensure the reliability of charity.
- Industry blacklist sharing: The security and reliability of couriers are a major concern. Currently, offline blacklists are available inside the industry. By using the blockchain

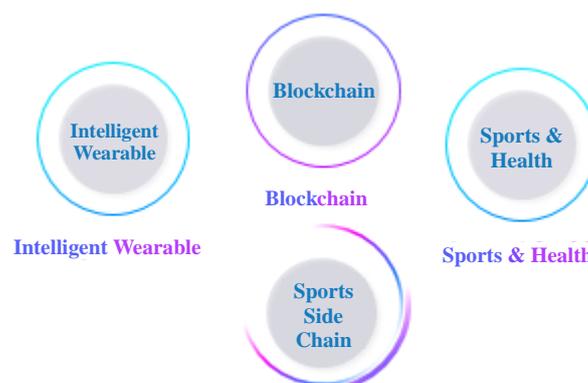
technology, Ultrain allows each company to record the blacklist of practitioners on the blockchain. The data cannot be modified but can be queried by other companies. It allows you to trace information such as which company a person on the blacklist worked for and what the misconduct was.

- Express security regulation: Courier companies are usually equipped with security inspection machines, and the government also wants to know if there are any transportation security risks in each logistics company. The distributed ledgers of Ultrain allows each courier company to record useful information of security incidents on the blockchain when such incidents occur, so that regulatory authorities can monitor the information in real time but cannot tamper with it.

The courier industry is trying the “federalism” system through the blockchain. “Federalism” refers to a composite organization consisting of two or more organizational entities, and members of the organization follow the conformity contract in the system. “Federalism” is different from the traditional franchising model. The biggest difference between franchising and “federalism” lies in the generativity basis. Franchising is about cooperation and co-creation by bringing in external participants; it features exogenous weak links and longitudinal linear control. The intervention of the blockchain transforms the franchising model into federalism, which encourages all partners to enhance their links and cooperation by means of features including effective data sharing, tamper-resistant data and distributed ledgers.

7.6 Sports Chain

Ultrain is working with partners to build a vertical blockchain side chain in the sports industry. By integrating with the side chain, smart wearable hardware devices can effectively monitor the exercise status, daily heart rate, sleep, blood pressure, blood oxygen and other data of users. Meanwhile, DApp developers can assign exercise tasks to users, and users can complete the exercise tasks and burn corresponding calories to get mining opportunities, so as to obtain the encrypted equity assets. This encourages users to love sports and reap the benefits of both wealth and health. The incentive method can guide users to keep away from sub-health status by exercise, and it supports various exercise forms and allows users to simultaneously record multi-dimensional exercise data such as walking, running, cycling, mountain climbing and ice skating.



8. Completion Time Roadmap

Phase	Time	Content
Nova	October 2017 – June 2018	Internal Testnet is online, complete external API framework, and announcement of smart contract development framework – Robin
Supernova	June 2018 – September 2018	Public Testnet is in operation, as well as the enterprise service access network becomes online and ready for use
Black Hole	September 2018 – January 2019	The core structure of Blockchains' operating system is completed. Network management is based on democratic voting system
White Hole	January 2019 – April 2019	Public network becomes fully operational, Sharding technology is ready and in operation; Ultrian also starts to sale mining rigs
Big Bang	April 2019 – April 2020	Ultrian's ecosystem is in operation, AI machine learning platform is deployed and incorporated online; Establishing IOT Edge computing
Singularity	April 2020 –	Consolidate the collaboration between machine learning platform, IOT and deep belief networks

9. Team, Consultants and Investors

9.1 Team

Ultrain has attracted more than 40 experienced technical team members from Alibaba, Ant Financial, Google, Huawei, ZTE and other Internet and IT tycoons; as well as senior executive from world renowned financial institutions such as goetzpartners and CICC.

9.1.1 Management Team

Guo Rui (Ray Guo)

Co-founder & CEO

- As the former Technical Director of Alibaba Security Group, he led the team to establish one of the world's top three risk control data product systems and ensured the security of the platform on Double Eleven every year, helping companies affiliated to the Alibaba group and corporate customers establish a trusted network ecosystem.
- He was the former Technical Director of the IBM Global Consulting Service Department and head of the Innovation Development Center. He served dozens of large state-owned enterprises and private enterprises in various industries, including China Mobile and State Grid, showing an in-depth insight into business pain points and enablement of enterprises by informatization.
- He is committed to uniting global community forces to build a blockchain 3.0 ecosystem that energizes the real economy and promoting the realization of a programmable society.

Li Ning (William Li)

Co-founder & CTO

- He has more than 11 years of experience in the Internet industry and extensive research, development and management experience in high-performance computing, operating system core components, operating system resource scheduling and many other fields.
- As the former technical director of the Alipay Blockchain team, he was responsible for the design, research and development of Alipay's independent blockchain platform. During that time, he led the team to obtain more than 30 patents on blockchain-related technologies.
- As the former core architect of Alibaba Cloud OS, he was responsible for the architecture design and management of cloud application runtime management services, cloud application resource scheduling, CloudEngine cloud, data management services and other modules.
- He is responsible for the research and development work of the Ultrain project.

Liao Zhiyu (Emma Liao)

Co-founder & CSO

- She was the founder and CEO of Pioneer Capital, a leading boutique investment bank in China. With nearly 10 years of experience in investment, investment banking and corporate operation, she is an industry expert in cross-border mergers and acquisitions, overseas cooperation and IoT technology with considerable international and domestic corporate resources.
- She was the Managing Director of Golden Brick Capital TMT, founding CEO of Kunlun Redstar, the first professional ice hockey club in China, founding CEO of goetzpartners China, a top European boutique investment bank, General Manager of Qihoo 360 Intelligent Hardware Investment and International Account Director at New York Private Bank & Trust. She once invested in projects such as NIO, Renrenche.com and 360's privatization.
- She is responsible for strategic planning, financing and investment, BD and PR work of the Ultrain project as well as the establishment and implementation of the Ultrain ecosystem.

Shen Yufeng

Chief Architect

- He studied at Zhejiang University and Alberta University of Canada.
- He has nearly 10 years of experience in the world's top Internet companies and extensive experience in developing hyperscale software and hardware projects (Chrome, ChromeOS, and AliOS). He is an active contributor to top open source communities in the world (Chromium owner&committer; Linux kernel contributor).
- As the former senior technical expert of AliOS, he led many AliOS projects, including construction of the WebApp and developer ecology, OS overall rendering performance, and In-Vehicle Infotainment (IVI) AI, and accumulated rich experience in app ecology and optimization of integrated performance of software and hardware.
- As the former core architect of Google Canada ChromeOS, he was responsible for the Linux kernel driver on ChromeOS and the Touch subsystem at the OS Framework layer, as well as the Touch full stack module of ChromeOS Pixel, the first high-performance touch-screen laptop of Google.
- He was previously a researcher at WATERFRONT INTERNATIONAL, a quantitative financial research firm. He was responsible for the interconnection between the proprietary quantitative trading platform and real-time, high-volume financial market transaction data of data providers.

Wang Husen

Chief Cryptologist

- He studied at Beihang University and Tsinghua University.
- He worked at the University of Leuven in Belgium, a top research university in Europe, and Luxembourg Institute of Science and Technology (LIST).
- As the former blockchain cryptography expert at Ant Financial, he was responsible for the follow-up of cutting-edge technology of blockchain-related cryptography, including zero-knowledge proof, secure multi-party computation, and homomorphic encryption, as well as analysis and follow-up of leading-edge technology on consensus algorithms, such as various PoW algorithms, Algorand, Honey Badger, Thunderella, and other algorithms. He participated in the design of business privacy protection solutions for

multiple large projects.

- He has proposed and participated in 10 blockchain patent inventions.
- During his work in Europe, he was mainly responsible for algorithm improvement and privacy protection application for the fully homomorphic encryption technology, privacy protection solution design for blockchain-based multi-party computation, and security hardware-related algorithm design.

9.1.2 Core Technical Team

A. Fan Liangqin

- Master of Electronic Information, Bachelor of Information Engineering, Zhejiang University
- As the former leader of the IoT Business Division of Alibaba, he led the team to design and develop an intelligent platform to build an ecosystem of smart homes and smart parks, which has now been applied to the smart hotel in Xiong'an New District and Hongshan IoT town in Wuxi.
- He served in Alibaba Cloud OS division for five years, responsible for developing the framework for the cloud OS, which supports the compilation of OS Apps using the JavaScript language. Currently it has been applied to the cloud OS mobile phone system, TMall box system, and YunOS Auto/Wear/Pad.
- He worked at Nanjing Research Institute of ZTE for 4 years, mainly engaged in the development of customized mobile phones for operators, including development of customized mobile phone systems, field testing, and product delivery.

B. Wang Xiao

- Bachelor, Tianjin University
- He worked for Huawei for 10 years, mainly engaged in network requirement analysis, architecture design, and project delivery. He is proficient in various network protocols and network technologies and has rich theoretical and practical experience in network protocols, network architecture, large-scale network project delivery, network performance tuning, etc.

C. Wang Bingying

- He has more than 8 years of experience in the Internet industry. He has conducted in-depth research in high-level language compilation, browser performance and storage, and big data visualization, and has a variety of widely used open source products.
- As the former front-end technical leader of the Ant Financial Big Data Platform team, he was responsible for the R&D and design of multiple data products. He harvested a number of technical patents and promoted the formation and implementation of Ant Financial's full stack engineer culture.
- He is responsible for the design of the top-level development framework for the Ultrain smart contract and the development of NodeJs-related SDKs and APIs.

D. Qin Xiaofen

- Master of Computer Science, Bachelor of Computer Science, Nanjing University of Posts and Telecommunications
- He joined the Alibaba Cloud OS Business Division in 2010 and participated in the R&D

of AliOS. He is a technical expert in the OS field. He transferred to Taobao in 2016 and completed AI implementation on the mobile end from 0 to 1 based on Tensorflow.

9.1.3 Strategy and Community Team

A. Vice President of Strategy: Li Xiaoguang

- Master of Business Administration, Duke University; Bachelor of Management, Renmin University of China
- He has nearly 10 years of experience in investment banking and venture capital in the TMT sector. He participated in projects including private equity financing for an AI chip company, private equity financing for a leading B2B e-commerce platform, acquisition of an Israeli Internet advertising company by a domestic listed company, and private equity financing for a domestic environmental equipment company. He also participated in the IPO of China Shenhua A-share, restructuring and listing of China Southern Power Grid, A+H IPO of Guangzhou Auto, as well as investment in Lacala, UC Web, and Best Logistics.
- He previously worked in Strategic Investment Department of Alibaba, Investment Banking Department of CICC, and Audit Department of PricewaterhouseCoopers.

B. Senior Strategy Manager: Qian Qian

- Master of Industrial Engineering, Bachelor of Mechanical Engineering, Northeastern University, USA
- He has more than three years of experience in investment banking and consulting in the TMT sector. He participated in equity financing for a new energy vehicle company and an AI semantic understanding company. He helped a domestic buyer group in a cross-border acquisition of a billion-dollar advertising distribution platform, assisted a chain hotel in merging its competitor's business in China, helped a European chemical giant assess the feasibility of implementing the LCD industry ecosystem in China, and participated in commercial due diligence of Terminus and other projects. He also assisted a US IT oligopoly in conducting consumer profile analysis of Alibaba Cloud and assisted a listed company in Hong Kong in scanning investment opportunities in independent medical laboratories in mainland China.
- He previously worked at Meritco Services.

C. Strategy Analyst: Wu Feng

- Master of Accounting, Bachelor of Business Administration in Finance and Marketing, Northeastern University, USA
- Worked with a well-known private equity consulting firm in the US, responsible for private equity client's financial calculation and their accounting requests, provide quarterly and annual financial reports for clients. Interned with E&Y and State Street bank in Greater Boston area, and performed different test of controls, consolidation, and substantive procedures.

D. Community Operation: Li Lilin

- She has been engaged in community construction for a long time, focusing on the community economy. She holds the idea of resource crowdfunding, operation crowdsourcing, content crowd-creation, and resource sharing to build an operation

ecosystem for the platform. She operates 10,000 O2O community cultural activities each year, reaching more than 100,000 C-end targets.

E. Community Operation: Ren Yixin

- Bachelor of Financial Management, Zhejiang University City College
- She previously worked as an event planner for an e-commerce company, responsible for communication with suppliers, event planning and event implementation. She also served as an English teacher at an English training institution.

9.2 Investors

9.2.1 Morningside Venture Capital

- Morningside Venture Capital was one of the earliest organizations to engage in early stage venture capital investment in China. Currently, it manages four periods of USD funds and a period of RMB funds, amounting to approximately US\$1.7 billion. The investors come from well-known international sovereign wealth funds, family funds, fund of funds, university foundations, etc.
- Its founding partner Liu Qin has more than 18 years of venture investment experience, focusing on media, entertainment, consumer services, corporate services, AI and Internet finance. He was named Best Venture Capitalist by Forbes, top 10 Chinese Venture Capitalist by Zero2IPO Group and Best Venture Capitalist of the Year by ChinaVenture.
- Morningside Venture Capital has invested in companies such as Sohu, Ctrip, Thunder, YY, OneSmart, Phoenix New Media, Xiaomi, Kuaishou and aihuishou.com.

9.2.2 Hongtai Capital

- Hongtai Capital is a diversified investment holding company with unique advantages in China. It was co-founded by the famous entrepreneur Yu Minhong and the senior investment banker Sheng Xitai in 2014. The core business includes investment management and entrepreneur services, wealth management, consumer credit report and other ecological business. The unique founder combination has made Hongtai Capital well versed in every step of entrepreneurship from startup to IPO. The company has extensive and in-depth influence among Chinese entrepreneurs and listed companies.
- Hongtai Capital focuses on AI/big data, financial technology, consumption upgrade, sports and entertainment, etc., and has invested in projects such as 51 Credit Card, Rage Comics, Edianzu, Dorabot, etc.

9.2.3 Draper Dragon

- Draper Dragon Innovation Fund is one of the core funds of the Draper Venture Network and has long focused on venture capital investment in cutting-edge high technology. At present, it manages multiple RMB and USD funds as well as several special investment funds in the blockchain field. It has participated in the early investment in Telegram, VeChain, Aelf, Ledger and other projects in the blockchain field.

9.2.4 Yang Luyu

- Yang Luyu was the founder and CEO of the musical short video app Musical.ly,

which was acquired by Jinri Toutiao with a valuation of US\$1 billion in 2017. He had previously received hundreds of millions of dollars in financing. The investors included GGV Capital, Qiming Venture Partners, DCM China, GX Capital, Morningside Venture Capital, etc.

- Yang Luyu was the product management director of eBaoTech. As a serial entrepreneur, he once founded ScrumCN, sino-coupon.com and other companies.

10. Business Partners

10.1 Business Partners

10.1.1 Taihe Maitian

Taihe Maitian is a popular music company in China and has top management and executive teams in mainland China. It has more than 20 groups of popular artists, including Sha Baoliang, A Duo and Pu Shu, abundant copyright resources, and powerful media and channel resources. By integration of all powerful resources and continuous innovation in entertainment products and business models, Taihe Maitian has become the leading pop music producer and entertainment marketing expert in China.

10.1.2 UC Express

UC Express is a newly-developed large-scale express logistics company with great development potential. It was formally established on November 1, 2009 and is headquartered in Qingpu District, Shanghai. The company has more than 30,000 employees and over 20,000 transportation and delivery vehicles. Since its establishment, it has built distribution networks covering large- and medium-sized cities in South China, East China, North China, Central China, Southwest China and Northwest China, and established 60 level-1 and level-2 direct distribution centers in provincial capital cities and other large- and medium-sized cities nationwide. With nearly 3,000 business outlets, its business covers major provinces and cities in mainland China as well as Hong Kong, Macao, Taiwan and other places. Based on the development concept of “Rooted in China, Marching Towards the World”, UC Express provides customers with half-day delivery, overnight delivery, third-day delivery and logistics services in large- and medium-sized cities across the country. At the same time, it provides international services, collection on delivery, return proof of delivery, high-value service and other value-added services, and offers professional express import and export services between mainland China and Hong Kong and Macao.

10.1.3 Moving Cloud Tech

Founded in November 2016, Shenzhen Moving Cloud Digital Network Technology Co., Ltd. specializes in the research and development of mobile terminal automation of intelligent devices. By using the industry-leading technologies in combination with blockchain applications, Moving Cloud Tech has not only independently developed the MC Sports DApp, the first application that combines smart wearables, sports health and blockchain equity assets, but has also provided blockchain-based personalized mobile DApp customization services for many companies, striving to become a leader in the blockchain equity assets field.

10.1.4 Shanghai Mixmarvel Technology

Shanghai Mixmarvel Technology Co., Ltd. is a company focusing on the gaming field established by several former core game development experts of Ubisoft China. Since 2016, Mixmarvel has actively explored various possibilities of combining games and the blockchain, and has taken the lead in the implementation of application scenarios. BattleChain, which is co-produced by Mixmarvel and the well-known enterprise Bitbays, covers a variety of hardcore e-sports games. Its game product “HyperDragons”, which is intended to “allow everyone to use the blockchain”, is the first blockchain combat game in the world. It has won praise from players both at home and abroad for its rich gameplay and has been among the top 10 of the same type of games in the world. With the concept that “playing games can also achieve self-value”, “MarvelUniversal”, a game that is intended to “quicken the pace of game developers towards the new runway”, will be launched soon, in a way that will refresh the industry.

10.1.5 H-CRM

Hangzhou H-CRM Technology Co., Ltd is a pioneer in digital management of customer health in China. It provides clinics, nursing homes, rehabilitation centers, health management organizations and doctors with professional smart customer health management systems in mobile environments such as webpages, WeChat official accounts and WeChat enterprise accounts, which provide functions such as outpatient and appointment management, remote services and smart doctor assistant, and help users easily establish electronic health records of customers, thereby enhancing customer compliance and health assessment, reducing operation costs and improving work efficiency.

H-CRM Technology was jointly developed by PUMC doctors, Alibaba IT technology experts and over 400 elite doctors from the 3A hospitals to create highly personalized electronic health records for “everyone in all walks of life”. It introduces the AI expert assistant decision-making system and ensures the security of personal data by using the distributed storage and blockchain technologies.

Currently, H-CRM has established a cooperative relationship with more than 600 institutions,

serving more than 10,000 doctors and over 200,000 patients. Its cooperative partners include Shanghai International Medical Center (SIMC), Shaw International Health Center, Hangzhou Universal Medical Imaging, Taiwan Universal Eye Center, Beijing Longevity Club Nursing Home, Noah Life (Guangzhou) Health Management Co., Ltd., etc. H-CRM was included into the “Hangzhou High-tech Zone 5050 Talent Plan Program” in 2017.

10.2 Third-Party On-Chain Component Partners

10.2.1 Dingxiang Technologies

Dingxiang Technologies is a company that solves enterprise security risk control problems. Committed to becoming a leading service security product provider, it is building top-level panoramic security protection capabilities and continues to empower its customers, which cover a wide range of fields including aviation, electricity, communications, Internet, etc.

10.2.2 Cross-vision World

Specializing in the smart hardware ecosystem chain, Cross-vision World integrates capital, user traffic, sales channels, software development, marketing platforms, hardware modules, supply chains and other resources to provide comprehensive support for smart hardware.

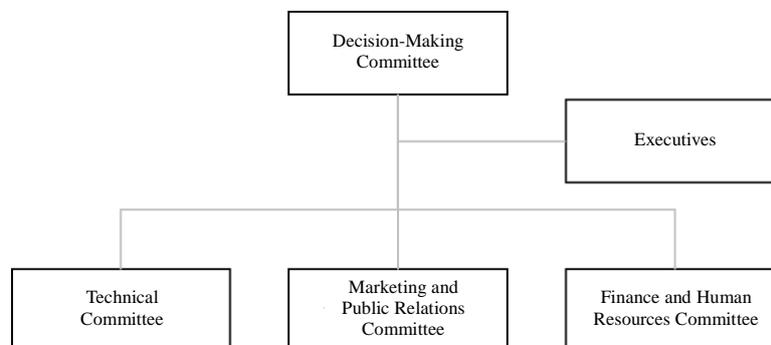
11. Governance Structure

11.1 Foundation Structure

Inside Ultrain, the value of decentralization is strongly advocated. We believe that this new architecture will create a transparent, sharing and coordinated environment in which participants are inspired or can receive rewards and punishments within a reasonable scope. Therefore, Ultrain established the Ultrain Foundation in Singapore.

The Foundation is a non-profit organization aiming at coordinating and promoting sustainable development and transparent management of the Ultrain project. The Foundation is responsible for managing the funds while providing support for Ultrain’s development and operation teams. The “profits” of the Foundation will be retained by the institution and used for other activities. The Foundation members will not be allowed to share the profits. The Foundation was established under the supervision of the Corporate Law in Singapore and the approval of Singapore (Accounting Law). It is operated on its own, independent of government institutions.

In order to ensure that the use of the funds is open, fair and transparent, and to increase the number of Ultrain user bases and attract more institutions, developers and players to join the Ultrain ecosystem while maximizing the development benefits of Ultrain, the Foundation has established a three-tier organization structure as shown in the following diagram:



11.2 Introduction to Internal Organizations of the Foundation

11.2.1 Decision-Making Committee

The Decision-Making Committee is the supreme decision-making body of the Ultrain Foundation. It makes the final decisions. The committee is responsible for preparing strategic and annual plans, managing budgets and voting on important matters related to the Ultrain ecosystem on behalf of the Foundation.

11.2.2 Executives

The Executives are selected by the Decision-Making Committee to manage and report on the daily operation of the Foundation. It is also responsible for coordinating work among subordinate committees and organizing decision-making meetings.

11.2.3 Technical Committee

The Technical Committee is responsible for the overall research and development of the Foundation as well as the design and development of basic technologies and related intellectual property. It is also responsible for actively communicating with community members and players in the ecosystem and organizing scientific research seminars.

11.2.4 Marketing and Public Relations Committee

The Marketing and Public Relations Committee is responsible for community building and public relations management. It is committed to introducing more collaborators to the Ultrain ecosystem by means of marketing campaigns and BD.

11.2.5 Finance and Human Resources Committee

The Finance and Human Resources Committee is responsible for auditing the financial operation of the Foundation, as well as employee recruitment and employee welfare management.

12. Risk Disclosure Statement

The information set out herein is for your information only. The content of this document is for reference only. It is a description about Ultrain's business and development plan and does not offer any proposal or invitation for anyone to buy shares or securities.

The content hereof is not intended to force participation in the ICO. Any conduct associated with this White Paper, including any access to a copy of the White Paper or sharing of the White Paper with others, will not be considered as participating in the ICO.

All supporters and foundations of the Ultrain project must carefully read through this White Paper and the official website to understand the risks of the blockchain technology in the project. Any participant should have reached the legal age, have the mind and ability to make decisions, and understand that the purchase of Ultrain coins from the Foundation cannot be refunded, canceled or compensated.

The regulatory authorities are scrutinizing cryptocurrency-related business and operations around the world. In this regard, the regulatory measures, investigations or actions may affect Ultrain's business and even limit or prevent Ultrain from developing its business in the future. Any person who accepts UGas must understand that the business model, White Paper, or terms and conditions of Ultrain may change or require modification because any applicable law under any jurisdiction will have new regulatory and compliance requirements.

The Ultrain Team will continue to ensure the authenticity and accuracy of the information in this White Paper. The updates include but are not limited to ecosystem mechanisms, tokens and corresponding mechanisms, and distribution of tokens. Some of the content can be adjusted accordingly in the new White Paper. The Team will release the updated White Paper on the official website. The participants must obtain the latest White Paper and adjust their expectations accordingly. Ultrain or the Foundation will assume no liability for any loss resulting from: i) the participants' reliance on the content of the old version of the White Paper; ii) inaccuracy of the information in the White Paper; or iii) any action arising from the White Paper.

As the official token of Ultrain, UGas is an important tool for the efficient operation of the Ultrain ecosystem. UGas has no direct or indirect relationship with Ultrain's capital or income, nor does it grant any governance rights within Ultrain. UGas is not a proof of ownership, nor does it represent any control over Ultrain or any assets or shares of Ultrain or the Ultrain ecosystem. UGas does not represent the right to control over Ultrain's management or decision-making, nor does it grant the buyer the right to control over Ultrain's network and governance.

As a crypto token used in the Ultrain ecosystem, UGas does not fall into any of the following categories: (a) any type of currency; (b) securities; (c) equity in legal entities; (d) stocks, bonds, notes, warrants, certificates, investment contracts or other things with similar rights.

13. Contact Information

Website: <http://ultrain.io>

Telegram: <https://t.me/ultrainchain>

Twitter: <https://twitter.com/UltrainB>

Linkedin: <https://www.linkedin.com/company/ultrain/>

Facebook: <https://www.facebook.com/Ultraincommunity/>

WeChat Official Account: ultrainchain

Email: community@ultrain.com