RiVERSE

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Introduction of RiVERSE

RiVERSE is a revolutionary software company based in Singapore, that is adamant in bringing Web 3.0 technology to individuals and businesses and integrate it into their everyday lives. The purpose of RiVERSE established RiCHAIN in providing a blockchain service is to output these core technical advantages in a three-dimensional manner, and carry out cooperation and integration with blockchain technology. Through RiCHAIN's blockchain service, users can apply the most advanced cloud technology and blockchain technology to their own advantages

RiCaaS (RiCHAIN as a Service)

RiCaaS is a blockchain service that can create and provide commercial value for users. RiCaaS helps various industrial application to integrate blockchain technology and promote the transformation and upgrading of self-owned industries to create all new products, and business models for its users. In order to prove that blockchain possesses empowering industry wide businesses capabilities.

In business aspects, it can bring new opportunities for business innovation. RiCaaS adopts the method of an alliance chain, deep farming technology services, and by defining a unified standard specification, any enterprise can easily build blockchain services on the RiCaaS platform, and provide more development space for their business partners in various fields.

Overview of RiCaaS

RiCaaS, by partnering with Tencent Cloud, a company who has many years of accumulative experience in cloud storage, distributed computing, high-throughput network communication, big data, artificial intelligence, data security provides financial security-level blockchain infrastructure services for the enterprise market. We provide safe, reliable and flexible solutions for the industry through services on the blockchain cloud. The RiCaaS not only meets the financial-level security compliance requirements, but also possesses the complete capabilities of Tencent Cloud. It can quickly build its own IT infrastructure and blockchain services on an elastic and open cloud platform. Apart from supporting the Hyperledger Fabric, the RiCaaS will also support BCOS, TrustSQL, Corda, EEA and other underlying technologies of different blockchains, and open up the surrounding technology ecosystem to provide users with a complete set of blockchain development, from testing to rapid deployment, to flexible and controllable enterprise-level solutions.

Structure and Component of RiCaaS
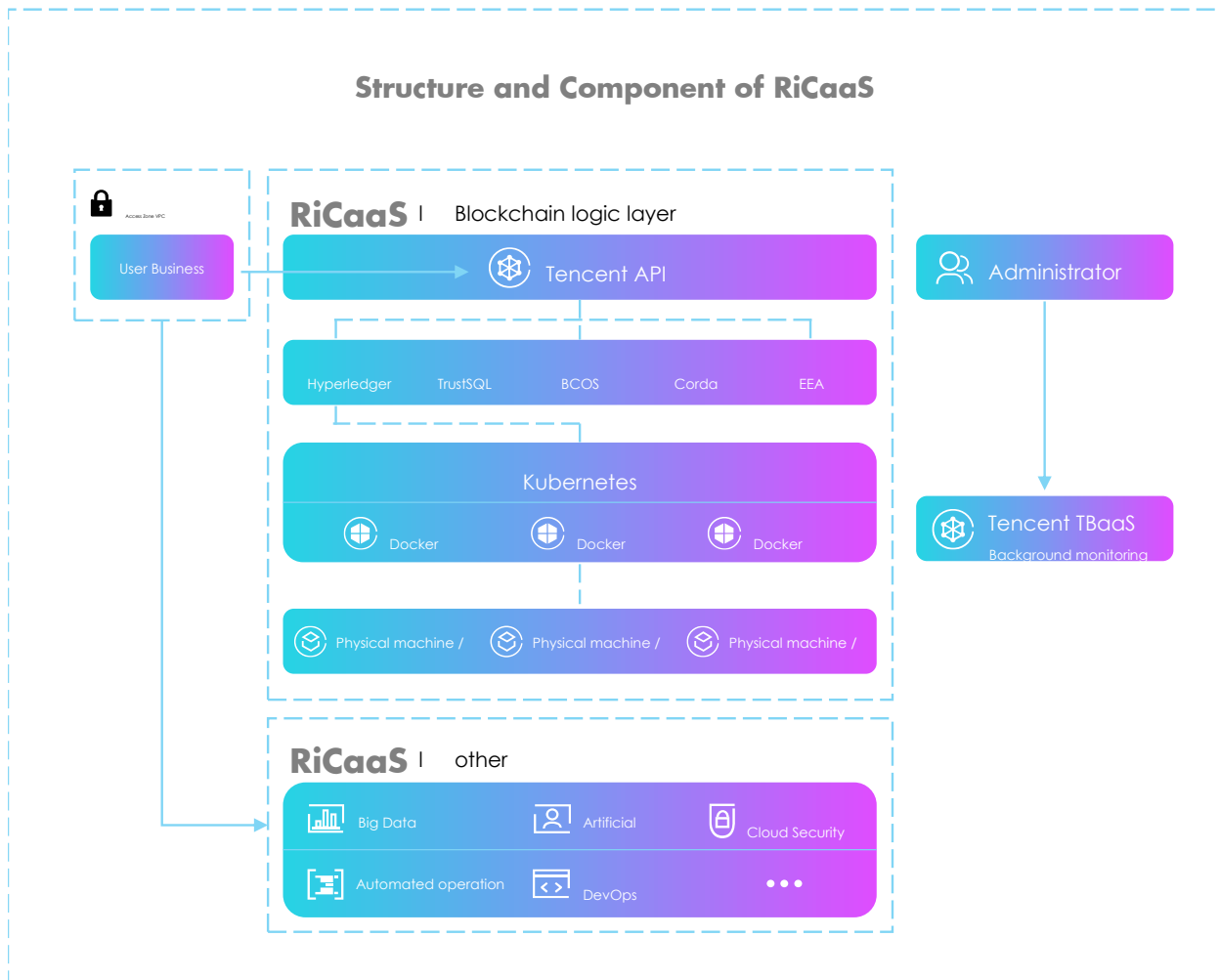
Why RiCaaS Choose Tencent Cloud

Design Principles of Tencent Cloud

1)   Openness

•   Linux Foundation Gold Member, Hyperledger Member, Gold Chain Alliance Member, Trusted Blockchain Member

•   Open-source code to the Linux community, provide code to partners and regulators for code security review

•   Code is compatible with community standards, data migration is standardized, and migration costs are controllable
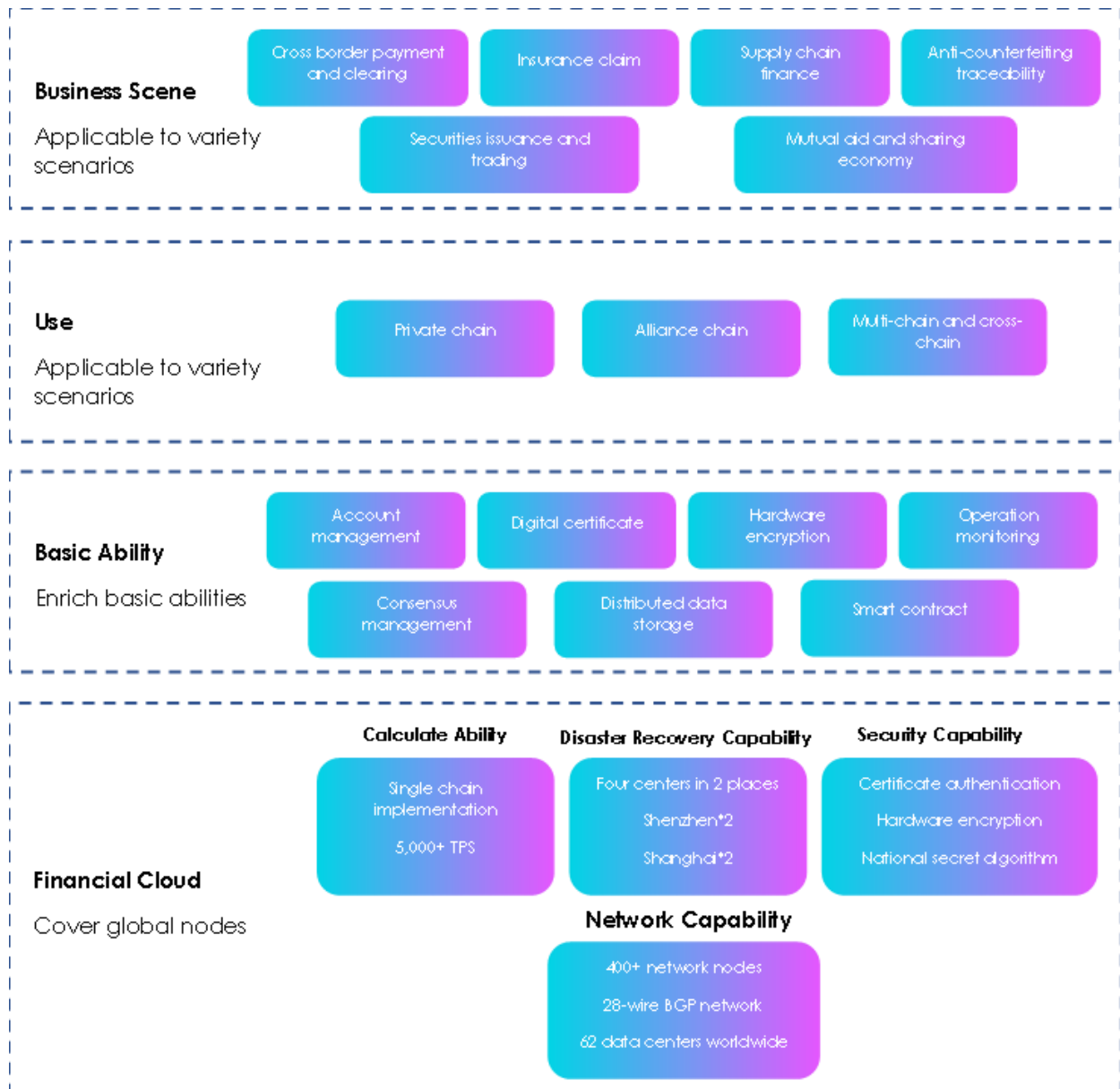
2)   High availability

•   RiCaaS is built on the mature Tencent cloud platform, and the entire platform follows the design criteria of grade 4 high availability

3) Extreme performance

- Based on the open-source version, the platform engine is optimized, and a single chain achieves 5,000+TPS, meeting the high throughput and high concurrent performance requirements of the production system
- Provide multi-chain, hardware encryption, high-performance SSD and other solutions suitable for commercial applications, and linearly improve RiCaaS processing performance
- Multi-role node members dynamically join/exit the RiCaaS

4) Automated deployment

- To meet the personalized needs of users, by providing a one-stop rapid delivery of customized RiCaaS
- Actively upgrade the underlying blockchain platform and update patches

5) Intelligent monitoring

- 24/7 monitoring of Kubernetes clusters
- Provide three-dimensional RiCaaS platform data monitoring, intelligent data analysis, real-time fault alarm and personalized data report configuration, real-time and accurate control of business and RiCaaS platform health status

6) Cost-effective

- It can be elastically scaled according to user needs
- Save operation and maintenance costs
- Save monitoring development cost
- Annual or monthly billing model to reduce customer upfront investment costs

7) Global interconnection

- With 42 data centers, reaching the world, helping customers to deploy across regions on Tencent Cloud
- Industry-leading multi-line BGP, covering domestic and foreign mainstream operators
- Tbps+ Internet bandwidth resources
- Tbps-level intranet interconnection, cross-domain disaster recovery between multiple computer rooms
- Open ended attitude, with the ability to access the business cloud of friends and businessmen
- All-round network security basic capabilities, including DDoS protection, intrusion detection, vulnerability scanning, host protection, etc.

## Service Capability of RiCaaS by taking advantages of Tencent Cloud

RiCaaS is an enterprise-level blockchain open platform, which can be quickly deployed and accessed with one-click. It has a centralized trust mechanism, support private chain, alliance chain or multi-chain, with privatized deployment and rich operation and maintenance management among other characteristic and capabilities. RiCaaS can be widely used in finance, medical care, retail, e-commerce, games, Internet of Things, logistics supply chain, public welfare and other industries. It can reshape the business model and enhance the influence of customers in the industry.

Business Scene

Applicable to variety scenarios

- Cross border payment and clearing
- Insurance claim
- Supply chain finance
- Anti-counterfeiting traceability
- Securities issuance and trading
- Mutual aid and sharing economy

Use

Applicable to variety scenarios

- Private chain
- Alliance chain
- Multi-chain and cross-chain

Basic Ability

Enrich basic abilities

- Account management
- Digital certificate
- Hardware encryption
- Operation monitoring
- Consensus management
- Distributed data storage
- Smart contract

Financial Cloud

Cover global nodes

Calculate Ability
- Single chain implementation
- 5,000+ TPS

Disaster Recovery Capability
- Four centers in 2 places
- Shenzhen*2
- Shanghai*2

Security Capability
- Certificate authentication
- Hardware encryption
- National secret algorithm

Network Capability
- 400+ network nodes
- 28-wire BGP network
- 62 data centers worldwide

Technical Architecture of RiCaaS

The technical features of RiCaaS are:

Hardware accelerated encryption/decryption;

Containerized resource management, supporting multiple chains;

DevOps operation and maintenance monitoring;

Redundant backup of storage system data, safe and reliable;

Standardization of data migration;

Incremental recovery technology speeds up user data recovery;

Redundant physical link design, multi-link high reliability path, no single point of failure;
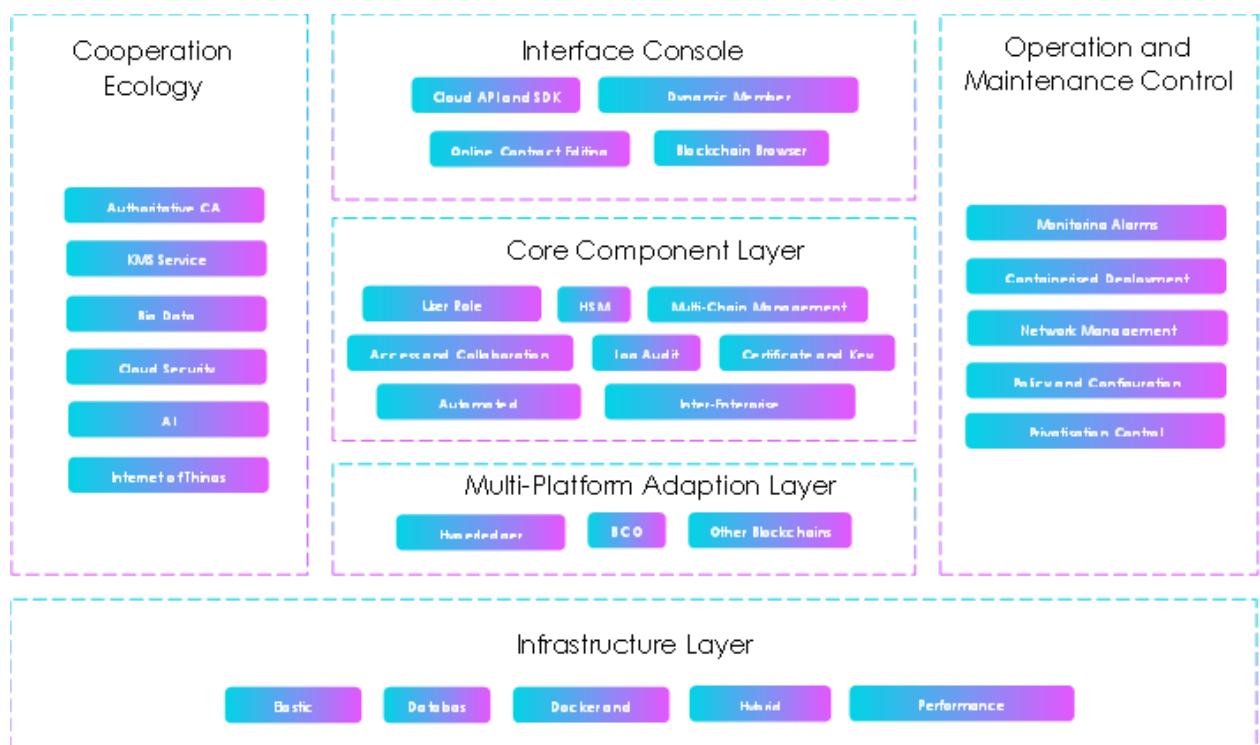
The overall technical architecture of blockchain of RiCaaS

RiCaaS Product Features

Cloud Services

The blockchain services provided to customers on RiCaaS follow the principle of one alliance, one system, different alliance chains (different customers users), which are not only strictly logically isolated, but also independent of each other in terms of physical resources (machine hardware, network, storage…). It fully complies with financial security regulatory requirements.

Only in the same consortium chain system can resources and information be shared. The consortium chain has a safe and reliable access mechanism to avoid leakage of sensitive information.

The RiCaaS cloud service is built in accordance with the standard blockchain underlying protocol, and can be compatible with friends and business cloud platforms with consistent network protocols. In a converged environment, users can build a true cross-cloud platform alliance chain according to business needs, decoupling the strength of users and the underlying technology platform's strong dependency, improve the credibility of the blockchain platform itself.
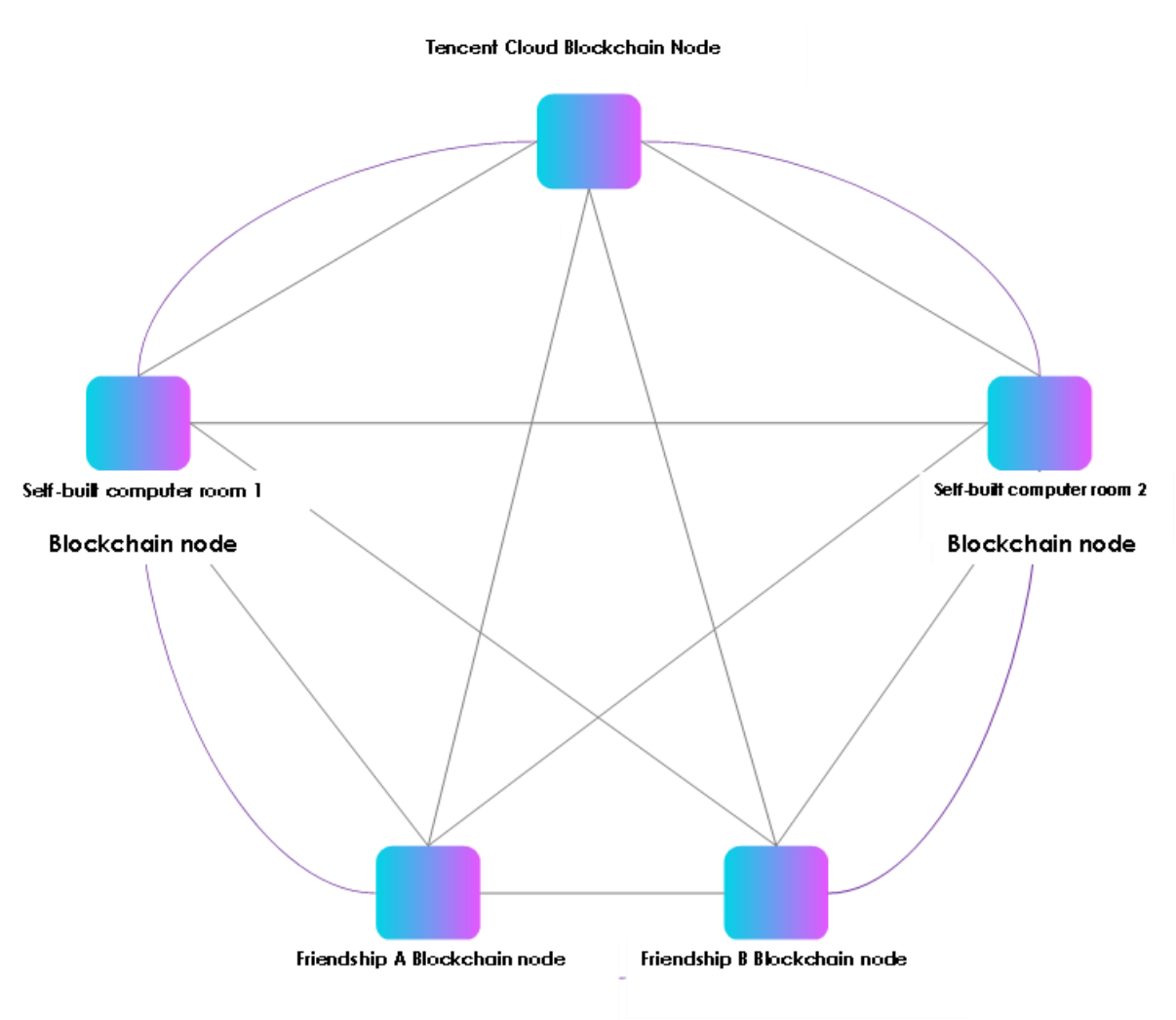
Private Cloud Services

In industries such as finance, telecommunications, government, energy, education, and transportation, users' core business needs to be autonomous and controllable. To better meet this demand, RiCaaS supports TCE privatization deployment. TCE is Tencent Cloud's enterprise-level private cloud solution. After the Ministry of Trusted Cloud's Certification, SLA reached 99.95% service availability and 99.999% data reliability, reaching the highest standard in the financial industry. The RiCaaS proprietary cloud deployment method is built on a stable TCE platform, and users can independently control the entire Tencent Cloud platform.

The entire private cloud is built on the micro-service governance architecture, and the industry's excellent reputation Kubernetes is introduced for large-scale clusters and distributed applications. It fully reflects the concept of DevOps continuous integration and continuous delivery. RiCaaS provides two levels of elasticity, cluster and service. It can monitor the CPU, memory, bandwidth and other indicators of the container to perform automatic scaling services according to the business operation. Elastic scaling of resources can be achieved according to the deployment of containers. RiCaaS private cloud platform also supports efficient deployment, modified business code is rapidly built, tested, and packaged and integrated, and the integrated code is quickly deployed to the pre-release and online environment and the current version in a grayscale way.

Privacy Protection

Tencent Cloud platform adopts digital certificate-based identity management, multi-chain isolation, information encryption, smart contract control and other means to protect private information.

Based on PKI-based identity management: The RiCaaS platform adopts a two-factor authentication mechanism. First, the account verification is completed through the official account of Tencent Cloud. After entering the permission management system of the blockchain, the users must register through the blockchain user management center to obtain relevant certificates. In response to the identity certificate, only client nodes signed with this security certificate can initiate transaction requests or proposals.

Multi-chain isolation: Different logical blockchains can be established between nodes of different organizations, and through information isolation, offer different privacy protection of account books by organizations and different nodes. Account books are located at the nodes of each organization

Information encryption: Before saving the data on the blockchain, the data can be encrypted by a secure method, and hide the sensitive and private data. In addition, sensitive data or files can also be stored by hashing their data fingerprint to store on the blockchain, the original data or files are kept in a more secure way.

Smart contract control: Limit roles and users who access data through smart contracts and access control policies. The contract method provides more flexible access control, which can be for nodes, organizations, roles, and users to develop different strategies.

Multi-chain support

A logical blockchain is a private blockchain system that integrates specific organizations and specific nodes and can be established between different organizations. Different logical blockchains implement data isolation between chains, and smart contracts can be deployed on different logical blockchains.

In the RiCaaS system, users are supported to establish multiple different logical blockchains in the same blockchain system, that is, multi-chain. Each chain in the Multichain is a logical structure including accounting nodes, consensus nodes, smart contracts and books, which connect participants with data (including smart contracts). It realizes the basic requirements for data security control with different access rights of users in different roles.

Multi-chain structure, without needing to increase the cost of hardware equipment, the hot chain can be split into several parallel chains, so that the number of data can be written in parallel to improve parallel performance.

Information isolation is carried out in a multi-chain way, which fully conforms to the fact that users establish different logical blockchains according to business scenarios and participants. At the same time, it also avoids communication storms, and nodes only communicate on their own logical blockchain, which improves efficiency.
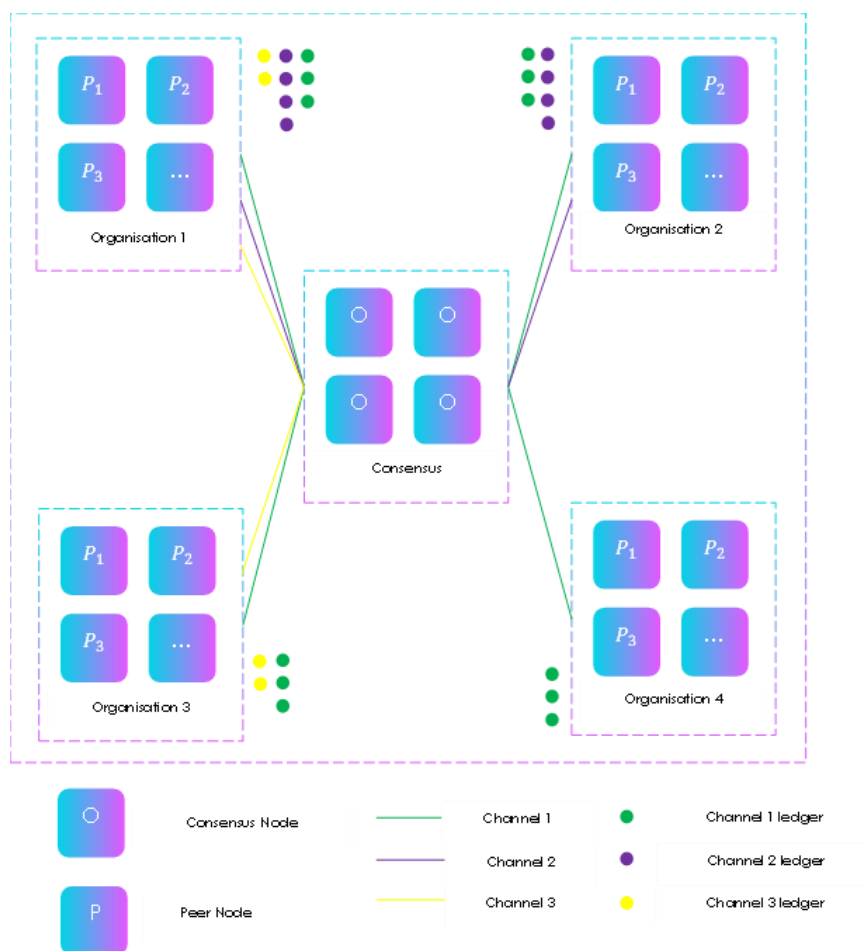
Contract Management

Since smart contract development is the main function of blockchain applications, all blockchain business capabilities revolve around smart contracts to realize smart contracts, automatic triggering, security isolation, business definition, digital agreements and other functions. Therefore, smart contracts are an important part of blockchain application development as customers need to spend a lot of energy to write and debug smart contracts. In order to solve this difficulty, the RiCaaS platform provides a complete integrated development and debugging environment for smart contracts, which greatly shortens the user development cycle and reduces development pressure, in order to assist software development in a more convenient way.

Different from other platforms, RiCaaS platform can not only perform lexical analysis and grammar check on smart contracts, but also provide smart contract security check service to check compliance and security to prevent the recurrence of security incidents similar to Ethereum DAO to occur.

The following figure shows an example of the life cycle of a smart contract on the Tencent Cloud blockchain platform:
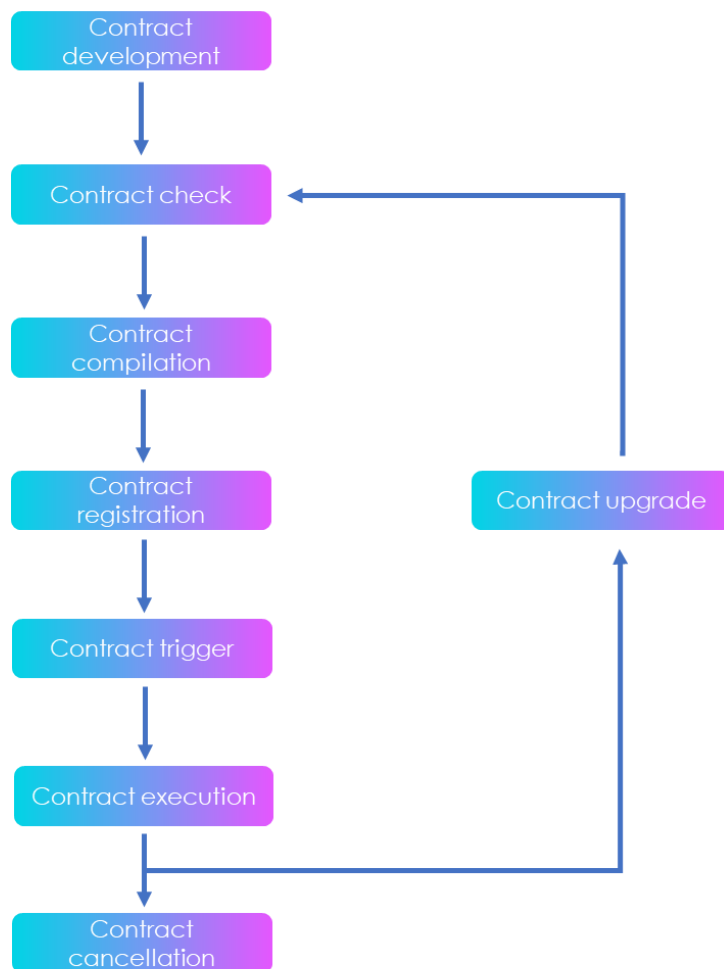
Smart contract service

Consensus Mechanism

The consensus mechanism determines the implementation and applicable scenarios of blockchain data consistency. In addition to supporting Hyperledger's native consensus mechanism, user-defined consensus plug-ins and endorsement plug-ins will also be supported in the future to facilitate users according to their own business needs for flexible selection and switching.

Open Mechanism

RiCaaS is an open service platform. While supporting Hyperledger Fabric, we also support the blockchain underlying platforms of excellent partners such as BCOS and TrustSQL, and will support R3 Corda, Enterprise Ethereum and other technologies in the future and actively pay attention to the development of blockchain cutting-edge technology.

On-demand storage

Storage expansion is a problem that the current blockchain will inevitably face. The current full ledger data volume of Bitcoin and Ethereum is already very large. It is huge and is not suitable for fast access processing by today's mainstream Internet mobile devices. The price for delivering trust and value for blockchain is that it consumes much more computing and storage resources than traditional solutions. How to prevent storage problems from becoming a hidden concern for enterprises to go online is an important topic that RiVERSE is focusing on. An excellent storage solution should not only guarantee read and write performance and high availability of data but should also strike an appropriate balance between centralized storage and independent maintenance of a complete ledger by each node to help enterprises save storage costs. Cloud storage will have unlimited advantages in scalability, pay-as-you-go, reliability, availability, security, etc.

Blockchain has different storage system requirements in different scenarios. RiCaaS provides a variety of storage layer solutions to suit the needs of users and meet different needs. Taking Hyperledger Fabric as an example, the storage is divided into three parts, ledger data, state data and historical data. Ledger data supports the use of traditional block storage solutions, such as CBS cloud hard drives with better performance or lower cost and easier operation and maintenance CFS, and supports backup and fast copy requirements such as snapshot images, which is convenient for new nodes to quickly synchronize ledgers after joining the blockchain; In addition to using native GoLevel DB and CouchDB for historical data and state data, Tencent Cloud's MongoDB method can be used in the future.

In addition, the blockchain itself is undoubtedly a huge data source. At present, Tencent Cloud has already supported big data solutions and no seam docking to meet customers' big data needs on the blockchain.

Enterprise Interconnection

Cloud enterprise customers usually have several VPCs of their own, and the VPCs are naturally isolated. Tencent Cloud blockchain uses VPC to deploy and provide services, deploy the blockchain in an independent VPC, not occupy the user's VPC quota, and support the blockchain. The VPC can quickly connect with the VPCs of other users, and is not limited by factors such as overlapping network addresses and cumbersome routing configuration. It allows users to directly access their own organizations and nodes through their own VPC, so that customers do not need to worry about customer network interconnection and subsequent expansion.
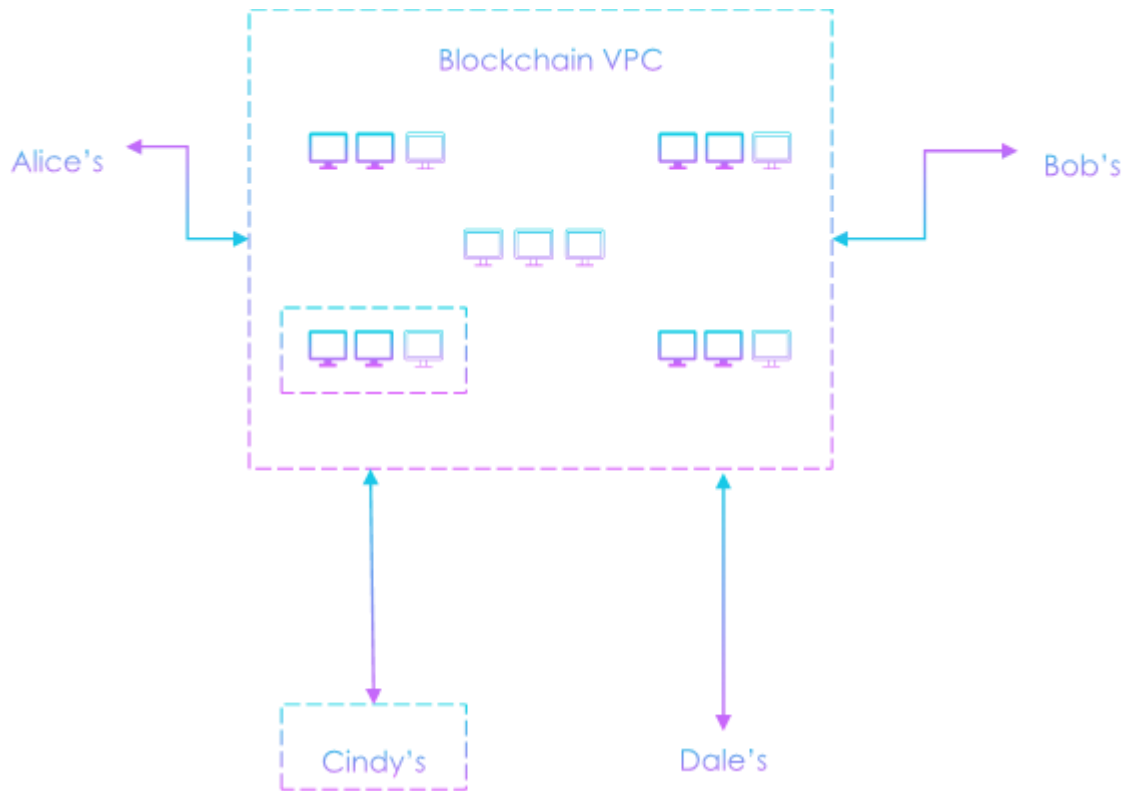
Schematic diagram of blockchain VPC interconnection

In addition, as an open platform, RiCaaS fully protects users' existing IT infrastructure investments, and can support users to reuse the infrastructure in existing VPCs and user-owned IDCs as part of the blockchain.

Network Management

RiCaaS taking the advantages of Tencent Cloud infrastructure to provide a high-speed, low-latency blockchain network, which provides high-reliability communication without blocking and overloading, while also letting the communication protection meets financial-level security level standards.

The network of Tencent Cloud blockchain follows the access mechanism of the alliance chain, and adopts the method of multi-organization alliance, regional autonomy, multi-chain isolation, etc. The technology realizes the flexible expansion of the network and the adaptive management mode.

- Permissioned network: Members of RiCaaS must first undergo strict identity verification before they can join a certain blockchain network, the participants must be approved by the organizer to access after the application is initiated, which realizes the access mechanism of the alliance chain.
- Regional autonomy: The blockchain network realizes the division of regions and the autonomous management of different organizations through the division of different organizations. The group communication within the organization does not need to be broadcast on the whole network, and the communication between organizations is carried out through their respective anchor nodes, which not only reduces the need for the amount of communication required, and the privacy of the information is guaranteed

Policy and Rights Management

The alliance chain is only open to members. This access mechanism, as well as the read and write permissions on the blockchain, and the permissions to participate in bookkeeping, need to follow the union rules. The collection of these mechanisms and rules constitutes the management of policies and permissions.

Authority and policy management are part of the consensus mechanism, and authority control is based on the consensus reached under different strategies. Policy Management is at the heart of the definition of authority. The formulation of the strategy includes channel strategy and consensus strategy. RiCaaS provides graphical and more friendly permissions and strategies to help customers better achieve consensus customization for different users and different business logic.

For enterprise-level management and monitoring needs, the alliance chain conducts user permissions, roles, and various consensus strategies and access strategies for comprehensive enhancements. RiCaaS provides users with a complete management mechanism. Through this flexible rights policy management, they can control the access rights of different users.

Account Management

In the Tencent Cloud blockchain, an organization's account is divided into root accounts and sub-accounts. The root account is the administrator of the organization and the organization. The owner of the resource; the sub-account can have the permission to create the resource. By default, it does not have the permission of the created resource. The permission of the sub-account can be controlled granularity to a single API interface. Multiple sub-accounts with the same function can be formed into groups, and permissions can be managed through groups.


Account Management
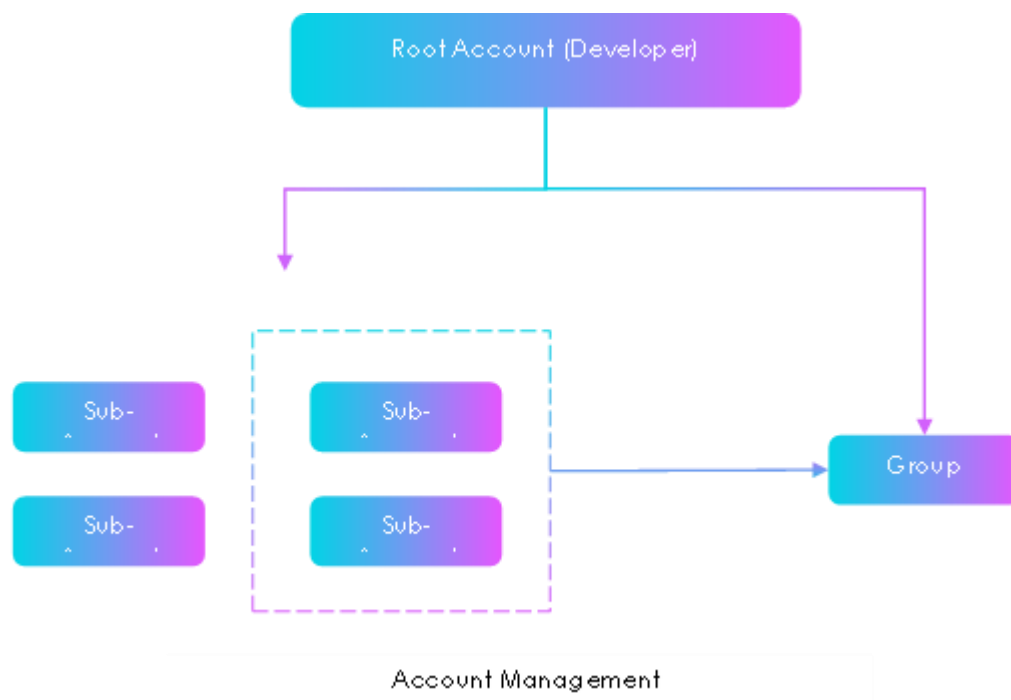
The login system and sensitive operations of Tencent Cloud blockchain support two-layer security protection. In addition to the username and password, an additional layer of MFA is added. MFA devices can be installed on mobile devices such as smartphones.

The account of Tencent Cloud blockchain can be registered through email, or it can be associated with third-party accounts such as QQ and WeChat

Overview of RiCaaS Application Scenarios and Solutions

RiCaaS focuses on using blockchain technology in different business scenarios to help customers understand the blockchain from a business perspective and introduce blockchain solutions for specific business scenarios. This can help lower threshold to help users more efficiently, easily and quickly build blockchain services. We free users from tedious and repetitive development tasks, allowing users to devote more energy to the advanced architecture design of services and business systems on the blockchain. The following is the schematic diagram of service architecture solution RiCaaS provides to solve user problems

Blockchain business architecture diagram
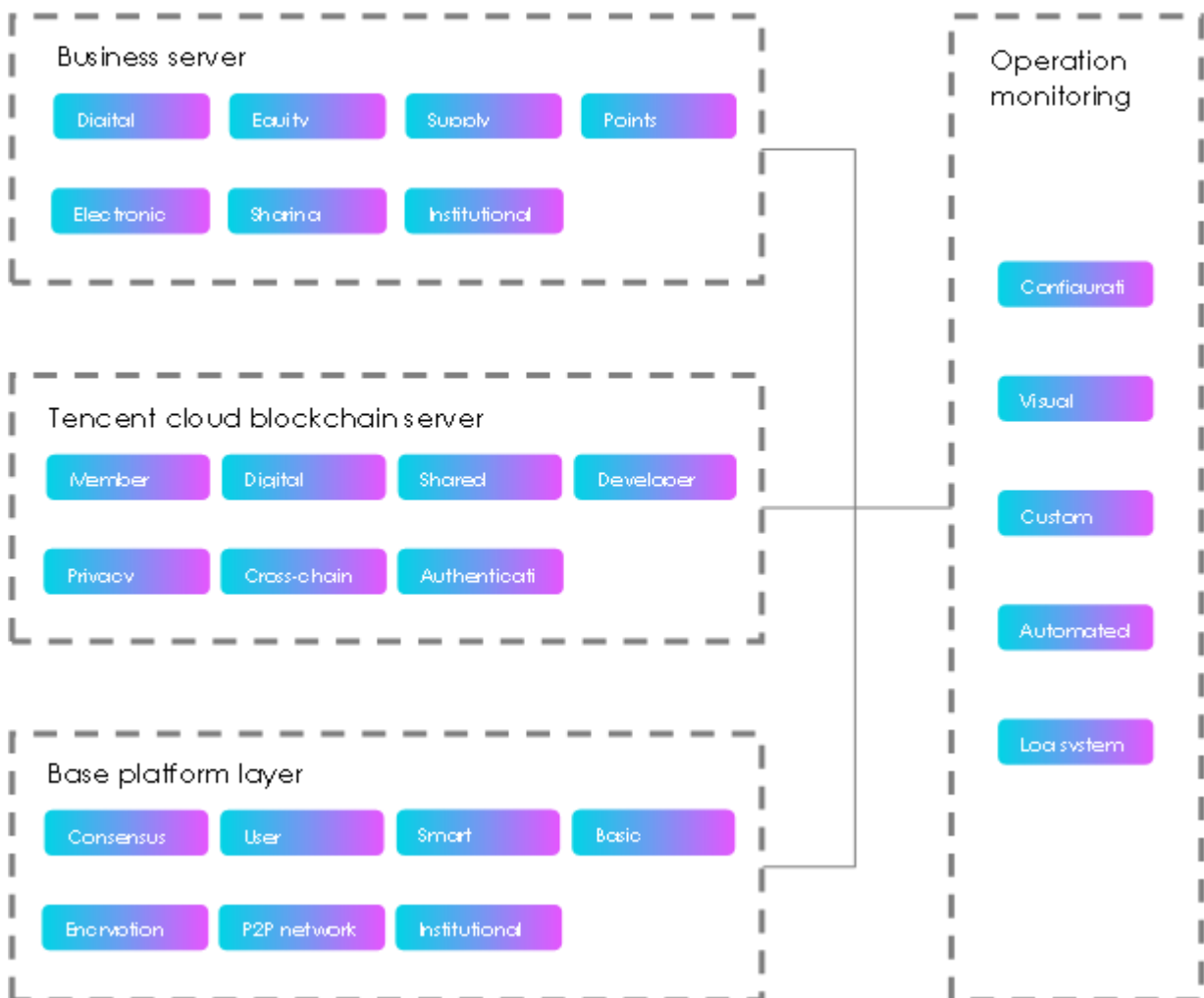
Shared ledger

Business Application

1) Fast underwriting/insurance direct claim

2) Inter-bank clearing and settlement

3) Cross-border remittance

4) Audit

Solving Industry Concerns

1) There are many insurance claims documents, and the process takes a long time

2) Inter-bank clearing, and settlement is slow

3) Cross-border remittance takes a long time and costs high

4) The traditional audit process has high complexity and limited quality and efficiency

Case Study 1: Insurance Claims

Traditional insurance from product design to agent system sales model is a top-down sales management model with complicated intermediate links. In addition, it is slow to respond to the rhythm of the market and cannot adapt to today's rapidly changing social situation. Challenges facing the insurance business mainly focus on the following points:

- It is difficult to develop new insurance business needs in time
- The insurance and medical systems are not connected, and the application, acceptance, review and payment cycle of claims is long, and there are cases of fraudulent insurance
- The life cycle process of insurance (from insurance participation to claims settlement, and finally to claims payment) is not transparent, and the insured lacks trust in the insurance company
- The entire insurance business process is completely dependent on human operations, lacking automatic triggering and intelligent control, so not only does the response speed become slow, it is also difficult to prevent human operation errors, omissions, and even malicious tampering
- It is difficult to query information, and it is difficult for users to query their own insurance status anytime, anywhere
- Difficulty in reinsurance business due to lack of effective supervisory mechanisms: tamper-proof, anti-fraud, traceability
- It is difficult for traditional insurance business to achieve both information disclosure and privacy protection
- The IT infrastructure construction cycle of the entire insurance business is long, and the cost is high, which restricts the introduction of high-tech (big data analysis, analysis, artificial intelligence...) in traditional insurance, and hinder the transformation of traditional insurance to the Internet

Blockchain combined with easy-to-use insurance scenarios will revolutionize the existing insurance system. Taking medical insurance as an example, the introduction of blockchain not only save the digital information certificate on the block, and more importantly, it can also:

- Achieve information sharing, under the premise of ensuring privacy, it can open up all links in the insurance process and solve the problem of incorrect information

- Solve the problem of weighing, make the process in insurance, upstream and downstream institutions to achieve transparency in operation and information

- Realize the circulation of value, through information sharing, provide a certain reward mechanism for the information provider, and guide the medical system information

- Get through the links of medical care-insurance-supervision, etc., to realize the electronification of medical care and insurance business in the true sense

- Realize the insurance business is carried in the blockchain network through smart contracts, and complete the high-level goals of automatic underwriting and intelligent claims settlement mark. After the entire insurance business is on the chain, the distributed management of business capabilities and data storage can be realized, avoiding centralization.

A series of problems brought by the data center, can greatly reduce the development and operation and maintenance costs
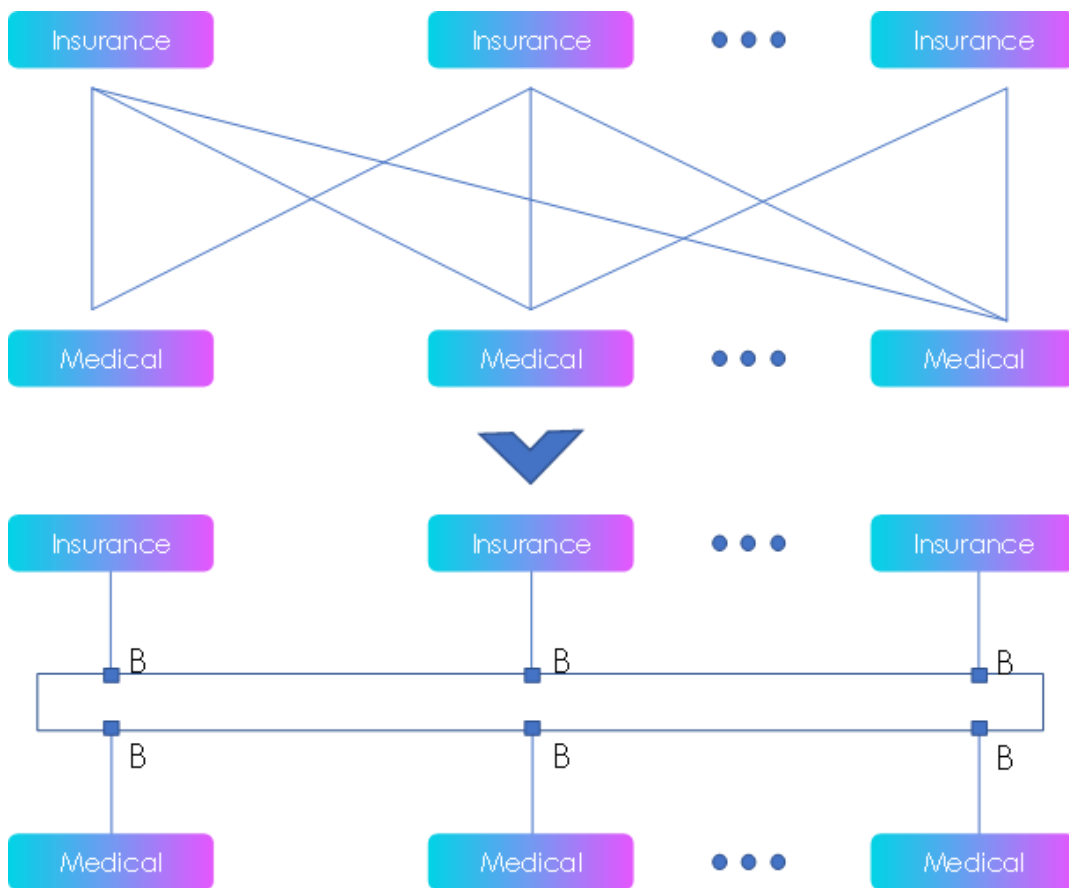

Changes after introduction of blockchain

Before the introduction of the blockchain system, the communication mode of information was fragmented, decentralized, irregular, non-universal, and lacking standardization. Each link needs to be opened up by each institution in the past, and the electronic information of each institution is a private agreement, lacking unified norms, and making it difficult to form a unified consensus, which is also the biggest obstacle to the standardization of medical information. By introducing blocks, the chain realizes the sharing of information and forms a unified

information exchange and communication standard, without the need for each institution and each organization to get in touch and get through.

Due to the closed nature of medical institutions and the lack of profit-driven endeavors, it is difficult to share medical information with institutions outside the system structure. After the introduction of the blockchain system, by establishing a system of information and value exchange, it will maximize the attraction of medical institutions to their own information that is
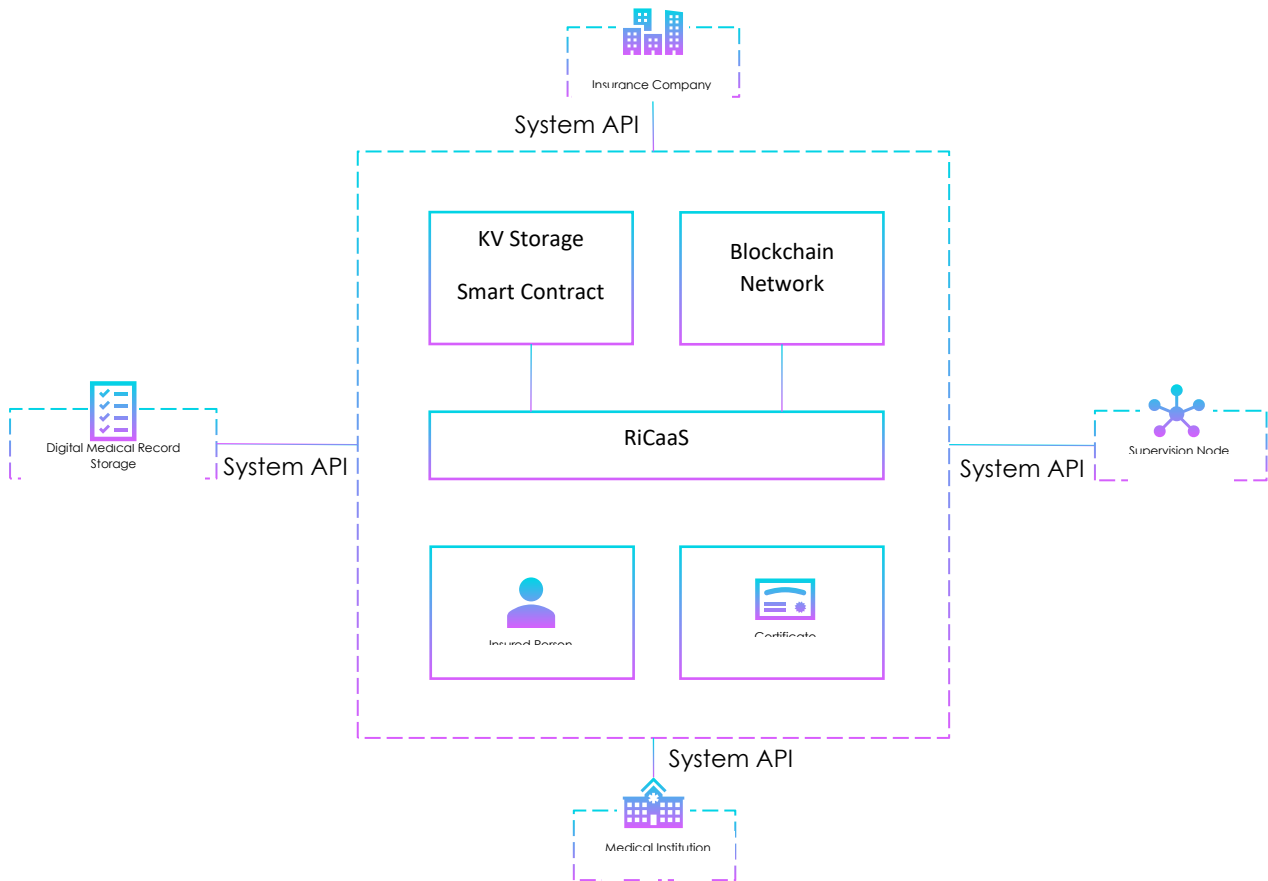
open to insurance agencies

Automatic underwriting is achieved through smart contracts, and the process of smart claims settlement is as follows:

1. After the insured sees a doctor in the hospital, he submits a claim application and submits the relevant information to the system at the same time.

2. After submitting the application, the smart contract is automatically triggered, and the system calls the medical institution interface to check the insured's claim information

3. After the review is passed, the compensation smart contract is triggered, and the insurance company automatically transfers the compensation money

Among them, the certificate center is added to the system as the core node. Various roles in the system and the electronic certificates used by various nodes are centrally controlled and issued by the certification center organization, making the issuance and verification of certificates more financially compliant, and making electronic certificates truly legal.

At the same time, blockchain technology makes the business capability of reinsurance possible. Reinsurance is insurance based on the original insurance, fundamentally speaking. It's a "re-contract" process. Blockchain will give birth to the era of "Reinsurance 2.0", whose important feature is "new risk dispersion" Consensus mechanisms, timestamps, and smart contracts will play an important role, giving reinsurance and even insurance innovation a boost for brand new inspirations and paths.

Finally, we will use blockchain technology to build a display platform to share capital information, policy information, member information, etc. to the blockchain. In addition to the ability to store evidence, another very important aspect is governance capacity. RiCaaS can invite third-party media and members to jointly participate in the supervision of the platform. Our platform is open, decentralized and self-operated in its business model. This means that insurers can operate and manage these items on their own. After these projects are listed on the chain, by introducing these participants, third-party media, and even some members who are willing to participate, they can verify the authenticity of the data on the chain.

Case Study 2: Cross Border Remittance
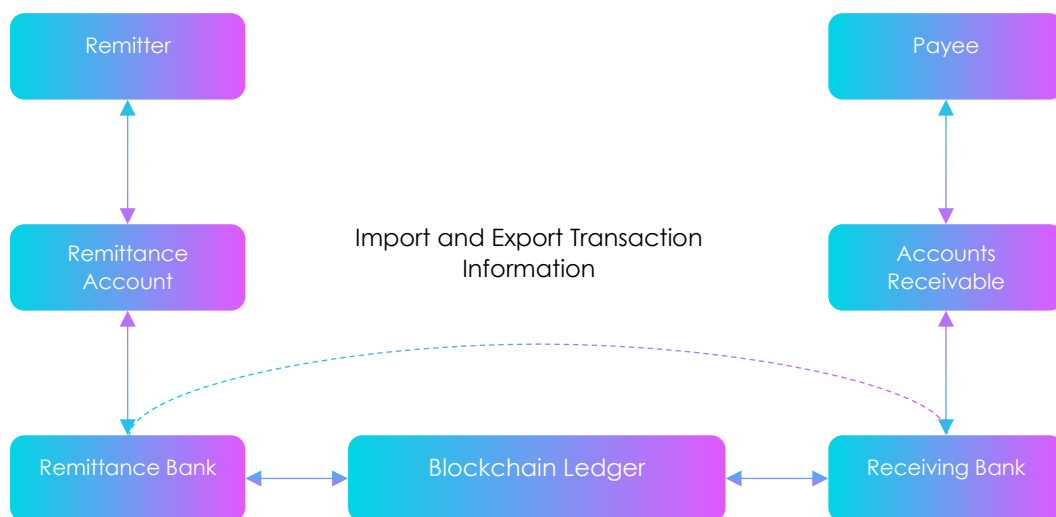
Schematic diagram of cross boarder remittance

In the process of traditional cross-border remittance and inter-bank clearing and settlement, the issue is that the process needs to go through the opening bank, the central bank, the overseas bank, the agency, management banks clearing banks and so on. Each institution has its own accounting system, so the speed is slow, and the efficiency is low. The shared ledger and smart contract features of RiCaaS help users solve the problem of slow inter-bank clearing and settlement, long cross-border remittance time, high fees, high usage, numerous bank documents, and long processing time. The complete smart contract integrated development and debugging loop provided by RiCaaS is different from other platforms, RiCaaS provides smart contract inspection services to check compliance and security to prevent similar recurrence of the Ethereum DAO security incident.
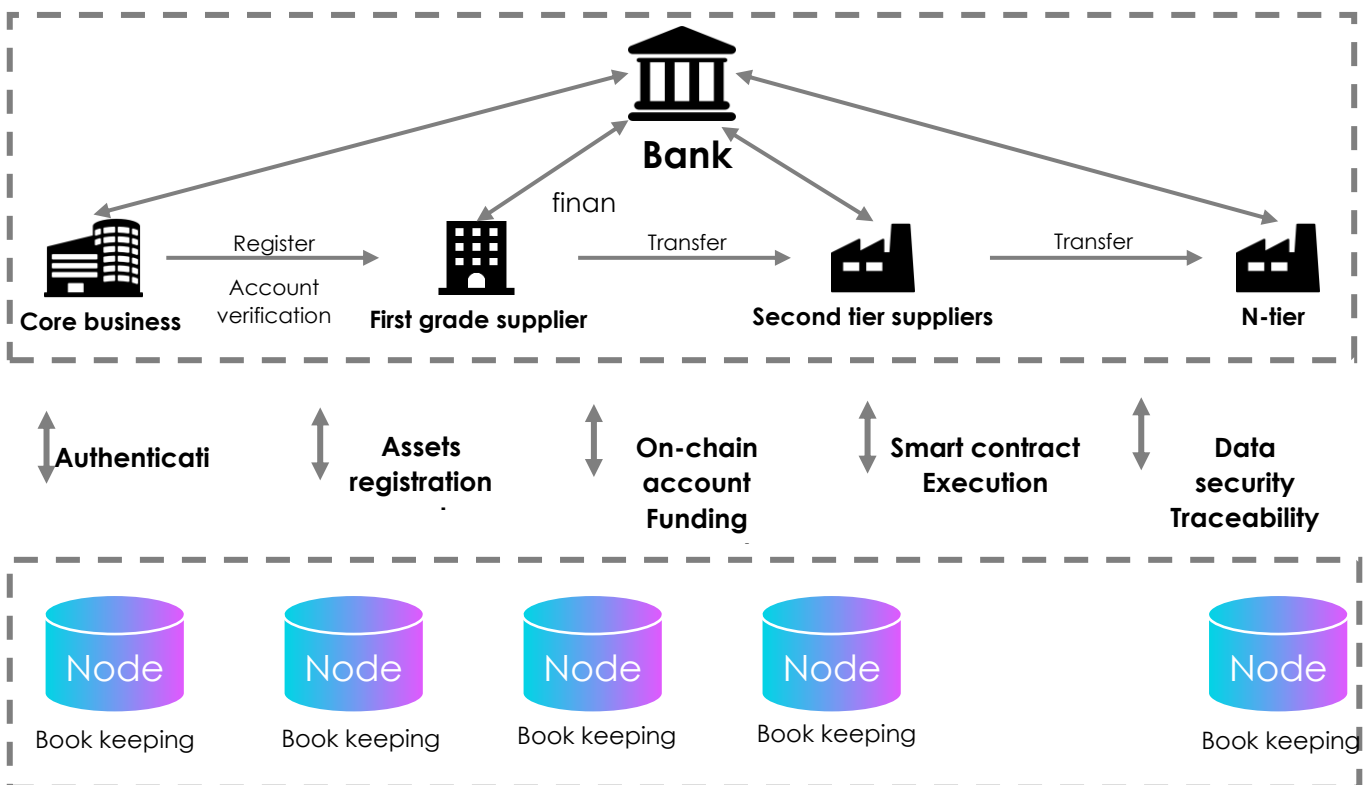
Notarization and Records

Business Application

1) Electronic contract

2) Electronic bills

3) Evidence preservation

4) Supply Chain Finance/Supply Chain Management

Solving Industry Concerns

1) The issuance of certificates is slow, the process is long, and the bills are forged

2) High cost of rights protection

Case Study: Supply Chain Finance

Schematic diagram of supply chain

In simple terms, supply chain finance means that banks focus on core enterprises, manage the capital flow and logistics of upstream and downstream small and medium-sized enterprises, and the uncontrollable risk of the enterprise is transformed into the controllable risk of the whole supply chain enterprise. Its core purpose is to reduce capital costs and improve business efficiency. In traditional banking and corporate financial services, based on risk management considerations, banks are only willing to have accounts receivable obligations to core companies. The upstream suppliers (first-tier suppliers) of the business provide factoring business (accounts receivable financing) or their direct downstream distributors (first-tier

distributors). For prepayment financing or inventory financing, the bank uses the credit of the core enterprise and the order as an endorsement usually only lends to the core enterprise and tier suppliers, trust cannot be split into multi-tier delivery, suppliers in the downstream of the supply chain facing financing difficulties.

At the same time, the non-uniform ERP system used by various institutions/enterprises cannot share accounting and other data, resulting in information islands, making reconciliation and settlement extremely cumbersome. The shared ledger technology in the RiCaaS solves the core problems of supply chain finance, allowing the stakeholders involved in the whole process of supply chain finance to share the same node of the shared ledger. All participants on the chain can read/write links from the transaction data. The supply chain financial information and value carried by the shared ledger can be freely forked and merged for circulation and value transfer.

RiCaaS can truly realize open, consistent, authentic verification and its transaction data cannot be tampered with, allowing banks to better handle management of risks and substantial reduction of bank operating costs. The development and application of blockchain technology will become the key for banks to promote supply chain financial business. It is considered the best solution as banks will no longer be limited to collateral financing, and gradually turn to factoring that saves time, does not need to control goods and has low operating costs services to serve more small and medium-sized long-tail user groups.

The anti-tampering feature of the blockchain of RiCaaS can ensure the execution of smart contracts and provide a platform for smart contracts to run. In real business scenarios, RiCaaS can effectively help customers solve the problems of notarization, information recording and supply chain industry. The problem is that the business process is long, the documents are numerous, and the information is falsified and easily tampered with.
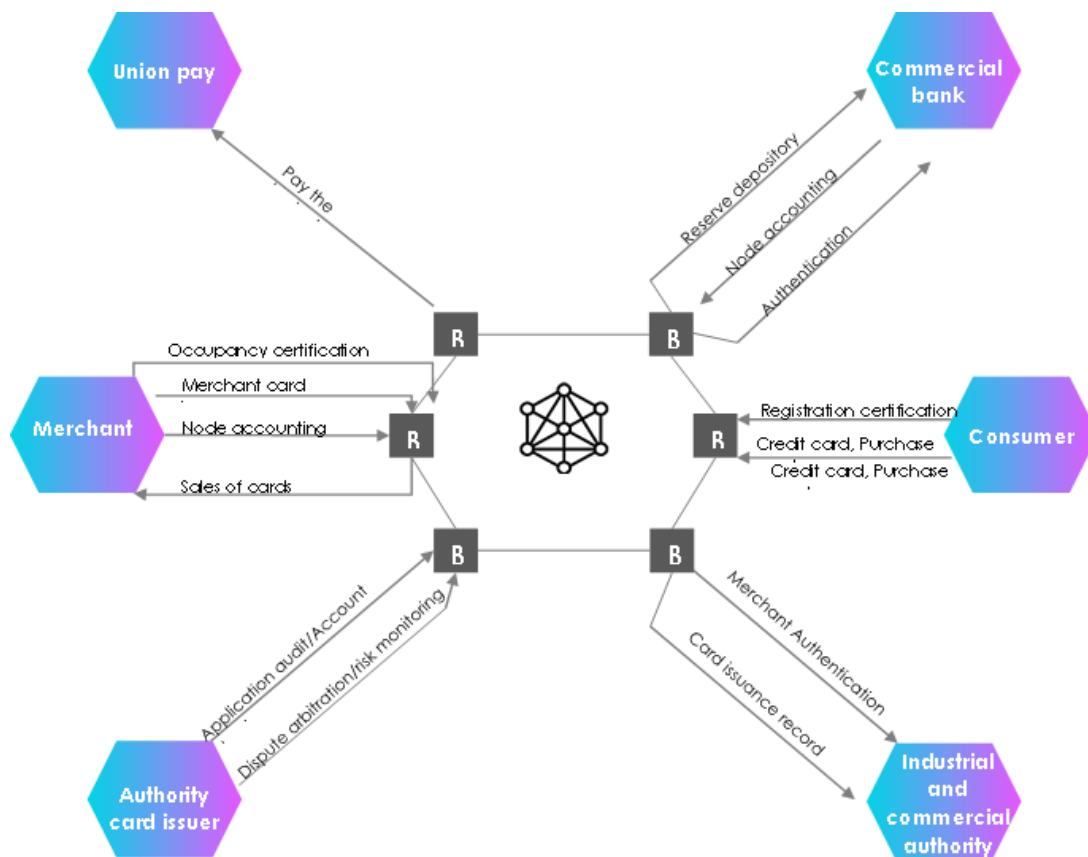
Digital Assets
Business Application

1) Big data transactions

2) Sharing economy

3) Points circulation and exchange

Solving Industry Concerns

1) Sharing economy

2) Digital asset trading

3) Points circulation and exchange

Case Study: Prepaid Cards

In the field of bank prepaid card consumption, the number of complaints in 2017 was about 50,000, with an average annual growth rate of about 35.7%. Many of them faces issues where the card issuer just shut down the store and ran away with money; as the card issuer's terms state that once sold, will not be returned; and the service shrinkage leads to the situation before and after the card application where the degree is completely different, and the discount is difficult to cash. Tencent Cloud Blockchain can help banks to pre-empt the single-purpose premise that is out of the regulatory line of sight. Payment is included in the scope of supervision, which improves the accuracy of macro-currency supervision and reduces the possibility of illegal fundraising. At the same time, helping merchants can guarantee that the prepaid payment is kept in the merchant's account, the efficiency of fund transfer in the card can be improved, and the merchants using prepaid payment can be expanded to a certain extent, increasing the source of customers. The credit reporting system of the blockchain platform helps consumers identify the credit of merchants and reduces the occurrence of merchant owner clauses. The emergence of adverse phenomena will increase the cost of sudden disappearance for merchants, and reduce the risk of customer loss through a reasonable compensation mechanism. Various transaction data through Blockchain technology can ensure that data cannot be tampered with and traceable, and it also helps consumers in the process of dispute resolution, providing a solution for disputes.

RiCaaS provides value circulation capabilities, enabling the blockchain to play the role of asset confirmation in the issuance and circulation of digital assets rights, transaction confirmation, bookkeeping, reconciliation and liquidation; and the tamper-proof capability of blockchain technology will effectively prevent data tampering, and avoid the risk of internal cheating.
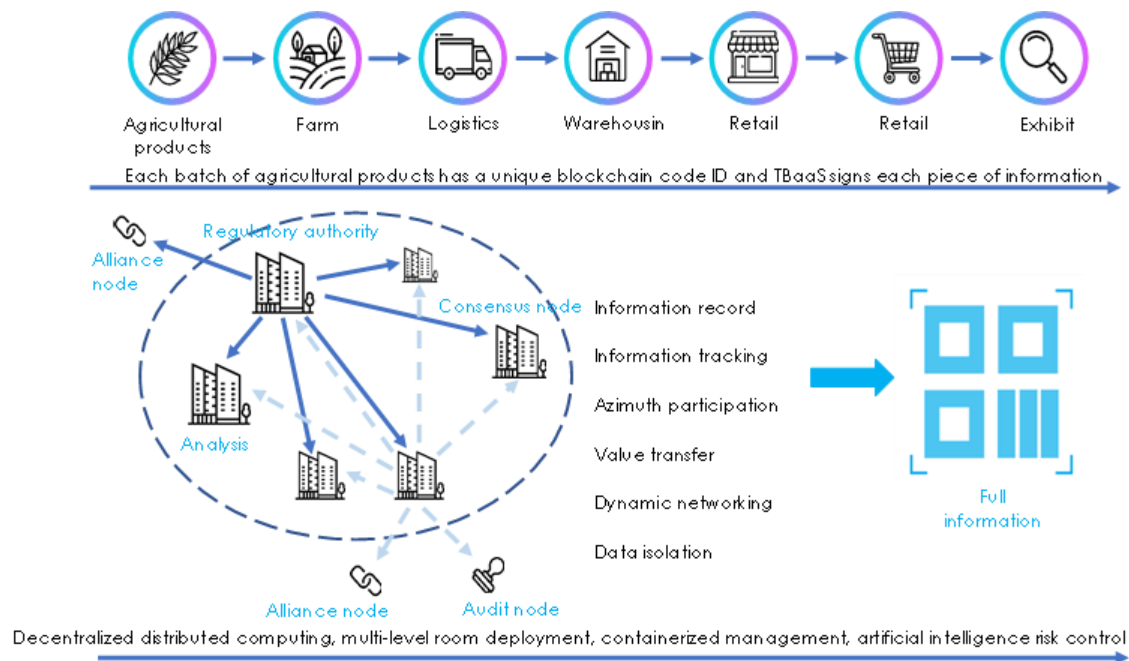
Anti-counterfeiting traceability

Business Application

1) Traceability of medical drugs

2) Tobacco traceability

3) Food traceability

4) Prescription circulation

Solving Industry Concerns

1) Commodity forgery

2) Commodities are difficult to trace

Case Study 1: Traceability of agricultural products

A farm provides traceability verification of livestock based on the alliance chain provided by the RiCaaS platform, so that the general public can eat assured meat, and at the same time increase the brand reputation and product sales of meat products. The RiCaaS blockchain system connects to the offline farming process of the farm database of the traceability platform and records the whole process of livestock breeding. By wearing RFID electronic ear tags on livestock as identification carriers, each livestock is given a unique identity that contains a unique label identification code, and the basic information of livestock, such as livestock birth records, feed usage records, immunization records, quarantine records and veterinary drug use records. The livestock slaughtering link is entered in the database to record the slaughtering location, slaughtering person in charge, time stamp, etc. The two-dimensional code anti-counterfeiting label RFID that records the meat information is pasted on the packaging surface of the

packaged meat products. At the same time, the identification data of the two-dimensional anti-counterfeiting label RFID generates a unique data fingerprint and collects it on the RiCaaS blockchain. This data fingerprint is entered into the factory processing database for subsequent inspection of information index values such as livestock breeding, slaughtering and processing. After scanning the QR code on the package, it will proceed to add related information such as warehouse, transport vehicle, meat product packaging pictures, etc. to the object. At the same time, data fingerprints are regenerated for this information, and the unstructured data of pictures also generate data fingerprints. It is then stored in public cloud storage for later query access, and newly generated data fingerprints are entered into the RiCaaS blockchain at the same time. This method is followed by warehousing and retail links are reused, while the timestamps and corresponding detailed data are recorded in each link. RiCaaS blockchain records livestock transactions while the corresponding data fingerprints and the unique QR code on the packaging are generated through the entire supply chain link. When end users buy meat products, the traceability of the historical data of the entire meat product is displayed in the final consumption link according to the QR Code.

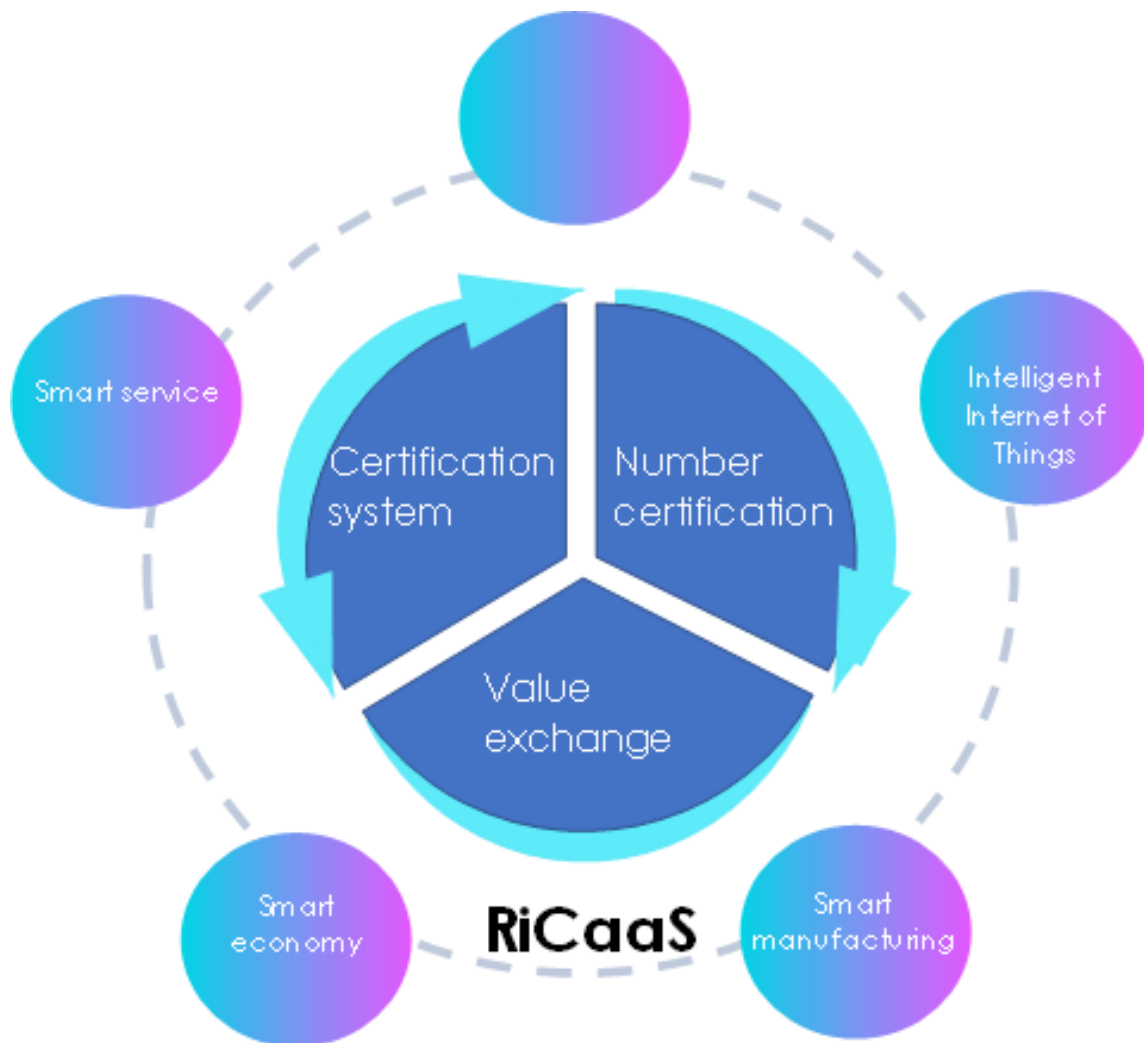Internet of Things

Business Application

1) Smart Home

2) Logistics supply chain

3) Smart Manufacturing

Solving Industry Concerns

1) The cost of IoT centralized architecture is high

2) Information is easy to be tampered with, and privacy protection is weak

3) It is difficult for manufacturing enterprises to dynamically adjust procurement and production according to market conditions

Case Study: Smart Manufacturing

The emergence of blockchain technology, its peer-to-peer networking mode, distributed storage, secure digital authentication method, natural and meeting the demands of the Internet not only fills the shortcomings of the Internet of Things in practical applications, but also makes the Internet of Things' large-scale deployment and safe operation possible. Aiming at solving the issues in the industry, RiCaaS platform helps the combination of IoT and blockchain technology, not only by reducing the operational costs of IoT but also enable smart devices to be managed in a more secure and reliable manner and achieve advanced IoT goals. The target, that is, the settlement of payment and fees, forms a network of value circulation


Blockchain improve IOT in every aspect

The application of the Internet of Things in enterprises, combined with the blockchain platform, the innovation of the original business model has formed the transformation of the Internet of Things + Blockchain. With the help of the Internet of Things + blockchain, enterprises have realized the rapid interconnection and intercommunication of information, and realized the barrier-free exchange of value, to introduce innovation technology into business processes, and then combine big data, AI, cloud computing, etc. on this basis, so as to realize the transformation of traditional manufacturing enterprises to digital transformation of service companies.

With the changes of the times, traditional heavy-asset manufacturing enterprises are faced with many difficulties, such as rising costs, declining profitability, insufficient capabilities are plaguing the transition to modern and more competitive companies. In response to this problem, the RiCaaS provides a full range of services, combined with AI, big data, cloud computing, etc. on the cloud, to help companies transform themselves.

Structure and Component of RiCaaS
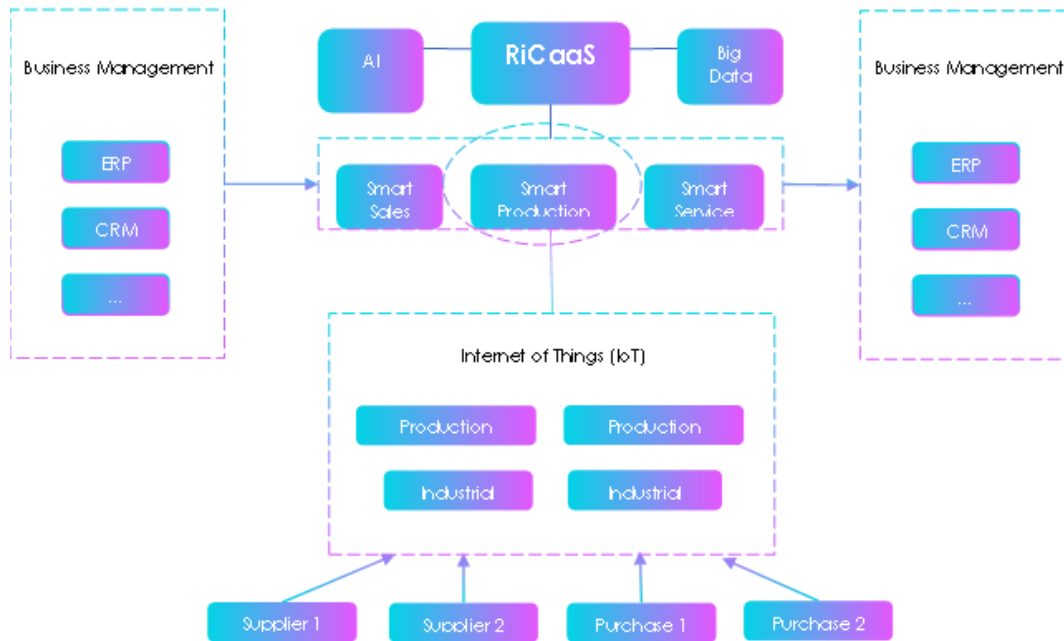
RiCaaS participates in the smart manufacturing process

Through the introduction of the blockchain platform, the upstream and downstream of enterprise procurement, production and sales are connected. Production raw materials or parts of core enterprises needs to come from many suppliers. Through the structure of RiCaaS, the unified coordination of the production and supply time of each supplier can be realized. It can trace and track the supply of parts, reduce the delivery time, and track the quality of the supply more reliably; the production of core enterprises allows buyers to produce purchase orders on demand, dynamically adjust them according to market conditions, and minimize inventory and blind production; In the internal production process of the enterprise, the introduction of the blockchain platform realizes the intelligent manufacturing of the enterprise. With the help of the data generated by the Internet of Things, enterprises can not only dynamically adjust production according to the upstream and downstream information at any time, but also upload the production data in real time to the chain for intelligent marketing.

Through the information on the Internet of Things, the core enterprises can perceive the status of the user's products, whether they need to replace parts or new equipment, to prepare, notify customers in advance and realize independent production, reducing the waiting time of customers for stocking. More importantly, turning manufacturing companies into service companies provides guarantee, and core enterprises can establish a market-oriented strategy based on the RiCaaS combined with the AI, big data analysis and other engines on Tencent Cloud to provide a dynamic perception of the field, analysis of user behavior, consulting services, commodity services and decision-making services for the market and users, and realizing manufacturing shift as a service.
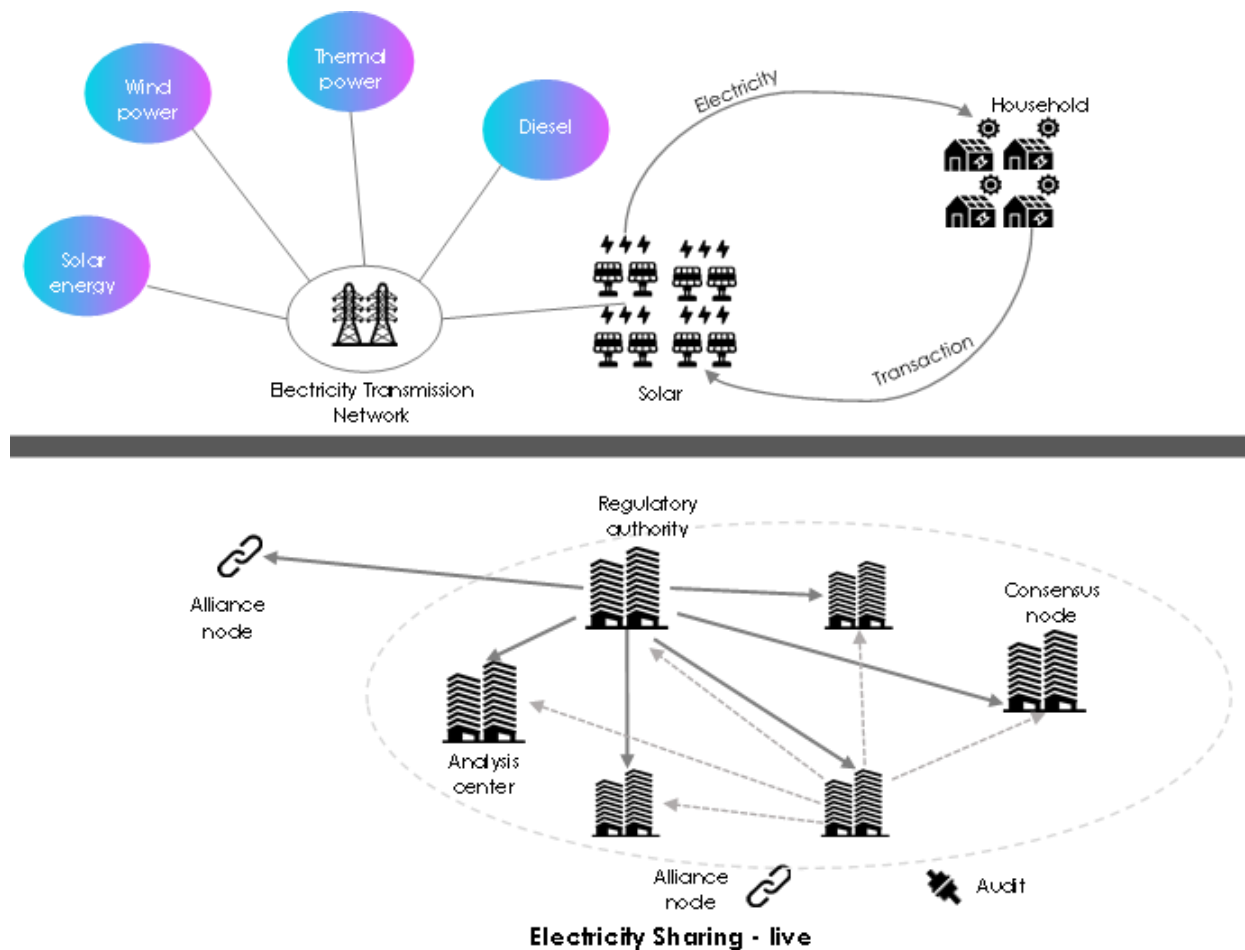
Sharing economy

Business Application

1) Power sharing

2) Charging pile sharing

3) Home sharing

Solving Industry Concerns

1) Idle resources are wasted

2) Lack of transaction negotiation mechanism

Case Study: Smart Grid

Electricity Sharing - live

A community, located in a coastal plain city with abundant daily resources, is an ideal source of solar power, but the local weather changes and fluctuations are large and difficult to predict. When the weather is fine, far more power is produced than the household uses, due to the lack of effective electricity in the household, it will result in a waste of clean power energy; On the other hand, due to historical reasons, the energy and power market has always been dominated based on regional monopolies and remote transmission infrastructure. Due to the lack of stable and predictable production of solar clean energy, the overall capacity has not reached the minimum power trading threshold, and it has been unable to be included in the local centralized power trading market. Consumers have started to seek an effective distributed trading platform and a negotiation mechanism for decentralized energy trading, through self-generated energy or storage-based solutions. The energy arbitrage of the scheme to directly participate in the energy purchase decision can ultimately create a more decentralized, low transaction cost grid trading platform. The RiCaaS blockchain platform provides the shared ledger of this grid trading platform by building smart grid infrastructure throughout the community. With the help of smart meters installed in residents' homes, the two-way multi-rate metering function and the two-way data communication of various data transmission modes information function, electricity consumers can automatically respond according to their energy needs. Every fixed time period, the shared electricity market will negotiate and publish a price, and the proxy machines of power producers and consumers can directly query the negotiated price. Due to the distributed power, the resource does not require investment in transmission and distribution facilities, and usually the price has a more attractive discount compared to the mains, making it easier to reach sales deals. When a power transaction is reached, the transaction is registered in the RiCaaS blockchain ledger, and the power transmission dispatcher is notified offline to transfer the power of the grid by force transferring power from supply nodes to demand consuming nodes.

In the future, more abundant power sources will be introduced, such as wind power generation, surplus diesel generator power stored in smart buildings and traditional thermal power, water conservancy power generation, etc., and finally build a more economical and environmentally friendly decentralized shared power market, so that consumers can ultimately have more choices.

Future Outlook

RiCaaS has always insisted on building an open ecosystem and hopes to work with partners to create a blockchain ecosystem. RiCaaS actively cooperates with the formulation of blockchain industry standards, cooperate with industry-leading manufacturers, and expand to the bottom layer of various blockchains platform support, so as to better adapt to different user scenarios; to strengthen cooperation with various regulatory agencies, disclose internal control, create a compliant and transparent service platform. RiCaaS actively introduces surrounding ecological partners to provide blockchain communication in various industries to use customized solutions to provide a solid foundation for the rapid development of customers' blockchain business. In the future, we will focus on moving the development of blockchain in the following aspects:

Multiple platform support - allowing customers to focus more on their own business

Since the blockchain technology is still in a period of rapid development, many basic blockchain technologies have emerged. Thus, when choosing which technical solution to use, we insist on being user- and application-oriented, based on the performance and functionality of users' actual application scenarios. As a starting point, select the specific underlying technology platform, configure system parameters, and let the blockchain technology and application perfectly match to play their due role.

In many scenarios that require the use of blockchain, compliance and security are unavoidable topics for enterprise users. The integration of blockchain in addition to system functional requirements such as monitorability and manageability, compliance and security also need to comply with industry's special regulations such as access mechanism. Through our support for various blockchain underlying platforms, we enable it to meet various customers and various applications for the needs of the scene.

RiCaaS platform will provide a variety of blockchain solutions in the future, in addition to currently supporting the Linux Foundation's

Hyperledger Fabric will also support R3 Corda, Enterprise Ethereum (EEA) and other technologies. These heterogeneous blockchain platforms are encapsulated to shield the differences at the bottom layer, and the upper layer provides users with the same capabilities. corporate or financial institutions will pay more attention to how to apply blockchain technology to their business to improve business efficiency or service quality, instead of focusing on the underlying areas. The development and design of blockchain technology has greatly solved the problem of long application landing cycles

Tencent cloud blockchain
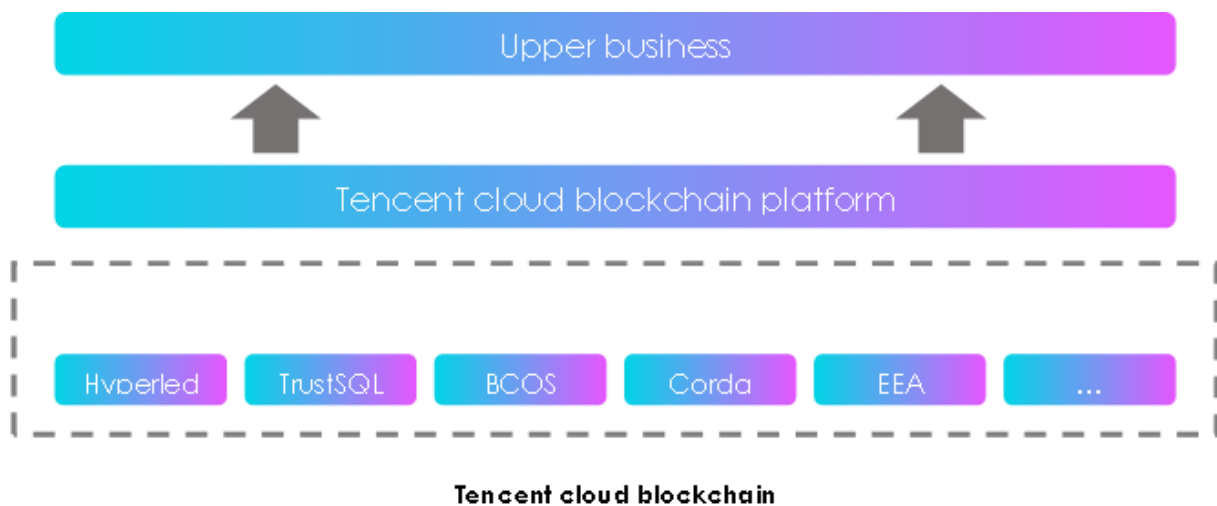
Off-chain trust - a bridge to the real world

Off-chain trust is a major problem that hinders smart contracts from entering the real world. At present, the implementation of smart contracts depends on the basic situation of input limited to the inside of the chain, how to expand the conditions on which the execution of smart contracts depends on cross-chain and outside the chain is the current focus of many industry peers. As an open platform, RiCaaS will actively embrace other excellent blockchain systems in the industry, and is committed to becoming a regional cross-chain information hub in the blockchain world to help customers make full use of the platform hub advantages, reduce customer cross-chain costs and quickly achieve mutual trust.