



# **Six Domain Chain Technical Whitepaper**

Draft for open community review and subject to change.

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objects in the physical world and digital asset resources, to create a new infrastructure of all things in general, thereby promoting efficiency and bringing benefits to various industries.

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## **Abstract**

Since the birth of Bitcoin, blockchain and cryptocurrencies have been flourishing vigorously. However, most current blockchain projects are still on the basic level of token issuance and exchange of virtual information - there are very few digital assets which have real value to be widely used to establish a practical business ecosystem. In other words, especially there lacks an effective symbiotic mechanism between the physical world and digital world. Future development of the blockchain ecosystem inevitably requires mutually beneficial situations of symbiosis between the physical and digital economy.

IoT (Internet of Things) will be a major connection of both the physical world and also the digital world. On one hand, IoT can establish an efficient coordination mechanism between users and objects in the physical world, thus promoting efficiency and bringing benefits to various industries, in addition to a new “Wisdom Revolution”. On the other hand, with a potential size of tens of billion possibilities and a high concurrency for transactions; IoT has the potential to create huge, high-value and steady streams of digital asset resources for blockchain. Meanwhile, this connection need of both physical and digital worlds will promote the establishment of a value system of digital assets and network credit, in order to achieve multilateral prosperity of both digital and physical ecosystems. The



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combination of IoT and blockchain will create a new infrastructure of all things in general.

SixDomainChain Platform is the world's first decentralised public blockchain ecosystem for data exchange that integrates international standards of IoT Six-Domain Model and reference architecture standards for distributed blockchain (**SDChain Platform**), which would operate on its own native blockchain (**SDChain**).

The design of SDChain gives full consideration to IoT characteristics and requirements of business ecosystem construction. In specific fields like issuance of digital assets, management of users' credits and identities, P2P communication, encryption algorithm, consensus algorithm, smart contracts, cross-chain smart contract model, market consensus incentives, decentralised DApp (Distributed Applications) and fast access to new businesses, SDChain optimises current blockchain infrastructure in depth. By seamlessly implementing the underlying SDChain blockchain infrastructure and IoT Application ecosystem, the SDChain Platform will create a business ecosystem with benign, rapid and sustainable development, enabling SDChain Platform to have a coexistence of tokens, blockchain and industrial IoT. A reliable blockchain ecosystem based on IoT digital assets will be established, and an efficient way to realise the circulation and value transformation of reliable digital assets will be formed as well. In this manner, SDChain will become a global benchmark for the integration

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of IoT and blockchain ecosystem.

Core Business of SDChain includes:

- 1) Regarding application requirements of a specific industry, and based on IoT Six-Domain Model reference architecture, SDChain will enable the establishment of business ecosystem and DApps thereon for agricultural IoT, industrial IoT, energy IoT and applicable verticals. It will also provide issuance of digital assets for different DApps, as well as services of credit identity registration and management, data storage, verification and inquiry on blockchain, smart contract setup, trigger and automatic account division for various IoT users and equipment subjects on SDChain. SDChain will ensure the consistency, authenticity and non-manipulation of the data and establish ACM (Asymmetric Credit Mechanism) between people and objects to guarantee the safety, efficiency and value of data assets interconnection.
- 2) SDA (Six Domain Assets) is the native digital asset token to be used on the SDChain Platform. SDA will be issued based on a predetermined quota. SDA is intended to be utilised solely on the SDChain Platform (when fully completed and deployed), as a unit of exchange for consumption of services and payment for transactions on the SDChain Platform, as well as the incentive which will encourage participants to establish consensus for

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digital assets on SDChain, thereby contributing and maintaining the ecosystem on the SDChain Platform.

SDA does not in any way represent any shareholding, participation, right, title, or interest in the Foundation, its affiliates, or any other company, enterprise or undertaking, nor will SDA entitle token holders to any promise of fees, revenue, profits or investment returns, and are not intended to constitute securities in Singapore or any relevant jurisdiction. SDA may only be utilised on the SDChain Platform, and ownership of SDA carries no rights, express or implied, other than the right to use SDA as a means to enable usage of and interaction with the SDChain Platform.

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(c) is not intended to be a representation of money (including electronic money), security, commodity, bond, debt instrument or any other kind of financial instrument or investment;

(d) is not a loan to the Foundation or any of its affiliates, is not intended to represent a debt owed by the Foundation or any of its affiliates, and there is no expectation of profit; and

(e) does not provide you with any ownership or other interest in the Foundation or any of its affiliates.

The contributions in the token sale will be held by the Foundation (or its affiliate) after the token sale, and contributors will have no economic or legal right over or beneficial interest in these contributions or the assets of that entity after the token sale.

To the extent a secondary market or exchange for trading SDA does develop, it would be run and operated wholly independently of the Foundation, the sale of SDA and the SDChain Platform. The Foundation will not create such secondary markets nor will it act as an exchange for SDA.

3) Based on many encrypted blockchain digital assets resources on the SDChain Platform, it is convenient to establish multilateral

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cooperation with new business ecosystems, find potential venues for co-operation, incubate innovative applications, and drive the coordinated development of IoT technology, artificial intelligence innovations, IoT financial service innovations, services of supply chain traceability, and other market service innovations with high efficiency.

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## **1. Background and Significance of this Project**

### **1.1 Issues and Solutions for IoT Development**

IoT is the information technology for the new generation, and its value and significance has been widely recognised by the society. Currently, the IoT industry has completed the initial phase of development, with the groundwork for large-scale applications rapidly laid, with the development of the entire industry at a critical point. However, due to the complexity of IOT and its difficulty of integrating with other industries, there remain challenges for implementing IoT, as well as various security and privacy issues. Currently, the IoT industry mainly focuses on infrastructure construction and localised innovations, the great potential and value of integration with various industries has not been explored in depth.

Specifically: First, IoT involves chips, modules, equipment, network, platforms, applications, data and other parts of the chain, in addition to complex technical fields. Market channels have not been opened yet, therefore the transfer of value is very slow. Second, current systems for interactions and cooperation among all types of users, objects, conception control equipment, service platforms, regulation platforms, third-party resources platforms, credit and value systems are not mature; this increases the difficulty of IoT integration with various industries. Third, most centralised IoT platforms for manufacturers and

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services providers collect and analyze users' data and control users' devices without permission or authorisation from these users; such situation poses a great threat to users' own privacy and security.

In addition, due to the complexity of integration of IoT with traditional industries, where the lack of market operation coupled with closed business modes, the development of IoT is relatively slow. To solve this issue, the first thing to do is to create a system framework capable of integrating traditional industry with IoT. More importantly, there is a need to ensure the legal identity of IoT devices as well as the validity, authenticity, consistency, tamper-resistance of data, which will determine whether IoT can be applied as a key part in areas such as agricultural production, supply chain traceability services, finance and insurance innovations.

The breakthrough solution for this issue would be a complete integration of IoT system and a blockchain distributed ecosystem. On one hand, based on the guidance provided by the "Six-Domain Model" IoT framework standard (ISO/IEC 30141 DIS, GB/T33474-2016), it is planned that an IoT operation service system would be set up on the SDChain Platform, thus ensuring the effectiveness, and sustainability of the system (as it shows in Figure 1). On the other hand, blockchain technology is used as an underlying operation platform of this decentralised ecosystem, which enables the construction of IoT credit system and value system (as it shows in Figure 2).



Figure 1. Agricultural IoT Framework based on Six-Domain Model (Example)

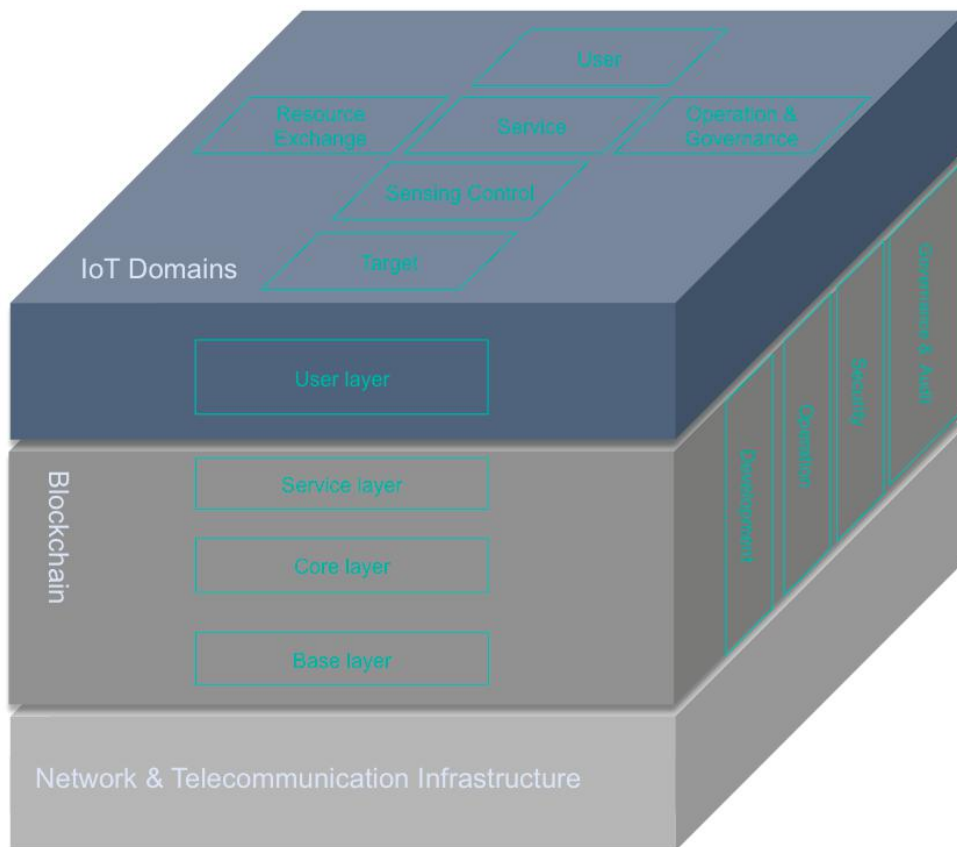


Figure 2. The Framework of IoT and blockchain integration

IoT “Six-Domain Model” reference architecture systematically sorts out correlational factors of complex IoT applications, makes analysis



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from different angles, and sets up major rules regarding different business functions. Specifically, it sets up rules for six main areas as follows: IoT User Domain (definition of user and demand), Target Domain (ensuring the correlation with “objects”), Sensing Control Domain (setting up schemes for sensing and control, namely correlation between different “objects”), Service Domain (processing original and semi-original data for corresponding users), Operation and Governance Domain (managing security, reliability, stability and precision from both technical level and system level), and Resources Exchange Domain (establishing a closed loop IoT business model by achieving sharing and exchange between single IoT application system and external system of information and resources from the market). Furthermore, these domains will be connected to one another by the business logic of this network, therefore forming an individual IoT industrial ecosystem. A single industrial IoT ecosystem can then form a new collaborative system with other industries by their respective domains of resources exchanged.

## **1.2 Application Analysis of Blockchain and IoT Combination**

By applying blockchain technology to the device’s identity permission management, smart contract mechanism, data security, privacy protection and data resources transaction mechanisms, there have been many breakthroughs so far. This will support integration with

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other users of IoT, as well as various financial and insurance resources available on the network. By doing so, it will reshape online and offline open value system and credit system, which may further expand the space of IoT add-on services and industry in general. IoT will play important roles in fields of agriculture, industry, medicine, health, environment protection, transportation, security, finance, insurance, object traceability, supply chain, smart city, and others. As a result, a big transition from general information on the Internet to value information on IoT may be achieved.

Experiments into the application of blockchain technology to IoT have started around 2015. Currently some domestic and international corporations and research institutions have looked into this field, and have applied blockchain technology into many sub-fields of IoT.

For example, the Bluemix project (October 2016) has incorporated blockchain services based on IoT with a blockchain solution for truck tracking. There is also the Blocklet project, which connects all electronic devices on the blockchain to build an IoT system, which adopts blockchain technology to ensure that the accuracy of agricultural data from smart farms is not tampered with. In September 2016, Wanxiang Holdings released a plan to invest 200 billion RMB in “Wanxiang Innovation Hub”, which includes blockchain, IoT, artificial intelligence, microelectronics, and other latest technologies to implement a new decentralised energy trading and management system.

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Yet another example is AgriLedger, which provides free or low-cost smart phones for individual farmers and agricultural corporations, and each smart phone contains an agricultural production management blockchain application. This application first records all relevant information onto the blockchain, and then helps individual farmers to enjoy economies of scale from joint production and sales. Also, this application makes the crop supply chain more transparent, and reduces corruption, theft and other negative incidents.

Due to the complexity of cross-boundary and cross-industry issues, most of current projects which focus on the integration of blockchain and IoT are still in the early stages of their individual private chain or consortium chain. There are some public chain IoT projects, which are still at the preliminary stages of token issuance or simple application business support. On the other hand, IoT applications in different industries have common references for design, and also resource sharing and collaboration needs. Therefore, considering characteristics of the IoT ecosystem, it is necessary to establish a public blockchain infrastructure, which is able to provide comprehensive support services.

Taking the agricultural industry as an example, currently, there are significant challenges facing both agricultural development and food quality. On one hand, agricultural resources are widely dispersed but isolated, farming facilities and services are quite weak, it is not easy to direct technological and financial resources to agriculture industry,

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while income for most farmers are low. **As a result, there is an urgent need to increase the quality and efficiency of the current agriculture industry.** On the other hand, current food safety still remains an issue. The supply chain is too long and the credit system is weak, thus it is difficult for consumers to effectively identify and find safe and high-quality food. **Therefore, there is also an urgent need to improve the current food quality assurance practice.**

Current centralised and localised solutions are not able to control and track all steps of the journey of agricultural products from the farmland to the dining table, and to realise a complete upgrade of existing food quality assurance practice, because the current ecosystem (i.e. information service platform, e-commerce agricultural equipment, product merchants, logistics and fintech resources) is still disperse. **The core issue lies in the failure to create substantial economies of scale for agriculture and the difficulty in establishing cooperative credit system for agricultural supply chain.** The solution to this issue will come through various levels. On one hand, IoT may be applied to agricultural production and circulation, in order to improve traditional operational efficiency, raise the level of food quality, unleash agriculture potential and create economies of scale. On the other hand, blockchain technology and its decentralised model will link agricultural digital assets from IoT, to establish a complete credit cooperation system, and solve current pain points of agricultural transition and

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agricultural consumption upgrade. By doing so, this can bring more income for farmers and guarantee food security and quality for consumers. Meanwhile, IoT will create a good amount of digital assets resources for blockchain. Its future potential of economic value and social values are huge as well; the combination of both IoT and blockchain will bring in a smart revolution in agricultural industry as a result.

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## **2. SDChain’s Design Objectives and Applications**

### **2.1 Concepts of Design and Construction Objectives**

IoT “Six-Domain Model” international standard framework provides an important reference point for IoT applications in different industries and establishment of a closed business loop; it will be conducive to the development of IoT industry, especially for optimisation of division of labor and application ecosystem of the industry. However, on the construction of a credit and value system, this framework still requires integration and support from the decentralised blockchain technology.

SDChain is designed to address the various requirements and business needs from different companies and users with the IoT Six-Domain Model, such as IoT business users, IoT device users, IoT service platform users, IoT operation, regulatory platform users, third-party business cooperation users, property owner users and others. It will optimise in depth for current blockchain technology, specifically in sub-fields of digital assets issuance, credit of user identity management, P2P communication, encryption algorithm, consensus algorithm, smart contracts, cross-chain smart contract models, market consensus incentives, decentralised DApps and fast access to new business, to ensure the benign, fast and sustainable development of SDChain ecosystem. By doing so, it will promote the coexistence of

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token, blockchain and IoT technologies, achieve efficient circulation and transition of digital assets credit, therefore SDChain will become a universal benchmark to promote the real social development through the combination of IoT and Blockchain.

## **2.2 Business Model and Application Scenarios**

Core business of SDChain includes:

- 1) According to application requirements of the particular industry and IoT Six-Domain Model for referential framework, DApps will be established by operators from each industry, such as agricultural IoT, industrial IoT, energy IoT. SDChain will provide digital assets issuance for each DApp, and also provide different users with digital credit identity registration and management on SDChain, allowing recording of data onto blockchain, authorisation and search for data, smart contract set-up and trigger, automatic split as well as other services. It will ensure the consistency, authenticity and tamper-resistance of data, and establish the asymmetric credit mechanism between people and objects (ACM), to guarantee the safe and effective interconnection of data assets.
- 2) Issuance of SDA by distribution schedule – SDA will be used as the unit of exchange for facilitating digital assets transactions and payment for services / transactions on the SDChain Platform, as

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well as the incentive which would be consumed to encourage participants to establish ledger consensus for digital assets on SDChain, thereby contributing and maintaining the ecosystem on the SDChain Platform. SDA may also be used by the Foundation for purposes of application ecosystem incubation, community construction, business cooperation and promotion of SDChain Platform. The continued development of the SDChain Platform, blockchain industry and IoT, will generate value for the entire industry at the same time.

- 3) Based on large encrypted blockchain data resources on blockchain, the SDChain Platform is intended to create a mutually beneficial ecosystem to tap potential values, incubate innovative applications and drive IoT technology to grow efficiently with artificial intelligence innovations, IoT financial service innovations, supply chain traceable service innovations and market service innovations.

### **2.3 DApp Practical Applications: Agricultural IoT**

The SDChain Platform, when completed, will focus on one of the primary needs of society – namely upgrading the food consumption chain, by developing the first agricultural IoT system based on SDChain – agricultural IoT DApp. The SDChain Platform will use look towards applying IoT to the fishing business as a market entry point,



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because it is relatively mature and has a high level of data openness. By establishing system models and integrating with primary plantations (such as those for grain, oil, fruit, vegetables, tea leaves), livestock (such as chicken, pig, cattle, sheep) and other agricultural IoT applications, the SDChain Platform will promote agricultural production and circulation as well as continuous improvement in digital credit system of consumption. Thus, on one hand, the SDChain Platform will provide IoT and financing resources for agricultural producers and supply chain, with an increase of agricultural benefits as a result. On the other hand, the SDChain Platform will increase the add-on value of agricultural brand to ensure that consumers can have a safe, healthy and efficient supply of food. The SDChain Platform is designed to gradually establish a prosperous, collaborative modern agriculture blockchain ecosystem, which can be a model mechanism for other IoT application or DApp within the SDChain Platform (Such as textile IoT, energy IoT, healthcare IoT, smart home, smart parking, smart fire prevention, smart environment protections and so on). The SDChain Platform will establish the important foundation for the widespread adoption of a decentralised ecosystem of value.

Looking to the agricultural industry as an example, its application scenarios mainly includes IoT supervision of agricultural service operation, agricultural e-commerce transaction services, agricultural e-commerce transaction and brand services, agricultural, fintech and

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insurance services. Meanwhile, the SDChain Platform will further support development in agricultural innovation research and development (such as seed coverage, forage, fertilizer, pharmacy, biology, equipment), agricultural devices research and development, issuance of digital assets, market analysis of agricultural products, price index of agricultural materials and products, credit scores, crowd-funding transactions of agricultural resource use, equipment rental, logistics resource sharing, agriculture tourism services, agricultural travel live stream, social events, rankings, brand advertisement, training, agricultural innovation space and other development of innovation applications.

- Agricultural IoT operational supervision services: Data gathered from agricultural IoT equipment will be synchronised onto blockchain, and provide identity authentication for both devices and users, data verification, data upload to blockchain, data inquiry and smart contract services. By doing so, the SDChain Platform will constantly create new agricultural data assets.
- Agricultural supply chain traceability and e-commerce transaction services: Data regarding agricultural material transactions will be uploaded completely on blockchain, to guarantee quality and utility of the traceability services; meanwhile, smart contract set-up, smart contract trigger and automatic accounting services will also be provided.

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- Agricultural products traceable e-commerce transaction and brand services: Data of agricultural transitions will be recorded on the blockchain for the whole process, making quality and transaction identity traceable at all times; meanwhile, smart contract set-up, smart contract trigger and automatic accounting services will also be provided.
  - Agricultural IoT finance and insurance services: the SDChain Platform will support provision of technology credit loans and technology insurance to finance, insurance, third-party technology service platforms, farmers, supply chain by smart contract services. This will simplify current valuation and business procedures.
  - Issuance of new agricultural digital assets: By providing new agricultural digital assets issuance platforms through the SDChain Platform, the whole digital token ecosystem will be enriched and SDChain will become a bedrock blockchain operation platform for agriculture.
  - Agricultural research services: Through the gathering of big data information by the SDChain Platform, it can provide blockchain data inquiry services for seed, forage, fertilizer, pharmacy, biology and facilities.
  - Agricultural IoT and system research and development services: Based on framework standards of SDChain and IoT Six-Domain Model, the SDChain Platform will support agricultural IoT

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standard construction, which includes research and development of international IoT and blockchain standard at levels of device, platform, system, data and services.

- Market analysis of agricultural products: Based on distributed market resources connected to the SDChain Platform, it can support big data market analysis of agricultural products, as well as blockchain data inquiry services.
- Price index for agricultural materials and products: Based on agricultural material and products data linked to the SDChain Platform, a price index for agriculture may be set up to provide data inquiry services for enterprises on the agricultural chain, farmers, commodity transactions, consumer organisations and individuals. It can be used to support business innovations as well.
- Agricultural credit score: Based on the analysis of various types of business in the network on the SDchain Platform, a credit score may be assigned for different types of users on blockchain, which can further activate potential digital asset resources.
- Crowd-funding of the right of use for agricultural resources: The right of use can be uploaded on blockchain and then can be crowd-funded for plantation, farms, fishing pools and other agricultural resources. The SDChain Platform would allow participants to set up smart contracts for industrial co-operation, in addition to various other services.

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- Agricultural device rental: By promoting expensive or important agricultural devices and other digital assets on SDChain, financing and rental services through the usage of SDA can be realised as a result.
  - Logistics resources sharing: Based on service requests from agricultural products logistics information linked via the SDChain Platform, the sharing and allocation of logistics resources can be maximised. It can significantly optimise logistic resources sharing and allocation. As a result, it will be more efficient to undertake business, transportation and use SDA for settlement.
  - Agriculture tourism services: Based on the SDChain Platform, and consumer resources, evaluation, inquiry payment and other agriculture tourism services can be provided as well.
  - Agricultural live stream: Due to the linking via the SDChain Platform of agricultural products and resources from agricultural tourism bases, objective and live stream can be promoted, in addition to relevant video-on-demand, with settlement to be made in SDA.
  - Social network: Based on participant interests and subject matter notified to and linked via the SDChain Platform, various social events may be organised to promote multi-culture development, such as meet-ups, meetings, exhibition, and these may all use SDA as participatory notes.

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- Ranking: based on different types of data accumulated by SDChain, various rankings based on agricultural material, agricultural products, technology, consumption can be established, thus promoting the benign development of the ecosystem.
  - Brand advertisement: Based on large-scale consumer and user groups linked via the SDChain Platform, targeted advertisement may be introduced to users of the SDChain Platform, in addition to creating collaborative value of agricultural products brand, with SDA to be used as payment by advertisers.
  - Training: Based on expert resources and data resources linked via the SDChain Platform, various types of training and experience sharing sessions can be held, with training providers receiving SDA as an incentive for participating.
  - Agricultural Innovation Space: Based on extensive resources linked via the SDChain Platform, it can provide relevant services for agricultural innovation space in different regions, and different types of resources can be obtained or opened through various channels on the SDChain Platform.
  - Innovation application development: Based on resources linked via the SDChain Platform, SDChain users can rapidly disseminate their development requirements. Also, SDChain can provide development resources for developers and allow these developers to monetize their applications.

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Agricultural IoT Dapp on the SDChain Platform is one of the agricultural IoT sub-applications under the Six-Domain IoT framework. It establishes a distributed blockchain ecosystem to deal with credit digital assets during the agricultural production process, including: registration, storage, authorisation, transaction and services of these digital assets. Through the construction and operation of collaborative systems on the SDChain Platform, more innovations from agriculture, forestry, animal husbandry and fishery will continuously emerge, thus promoting agricultural production, circulation and improvement of digital credit system in consumption fields. On one hand, it will bring resources and power of IoT and financial services for agricultural producers and supply chain, thereby increasing agricultural profits. On the other hand, by increasing the add-on values for brands of agricultural products, consumers will have better opportunities to access safe and high-quality food supply. Meanwhile, billions of potential terminals of agricultural IoT with highly concurrent transactions will create huge amount of digital assets on SDChain, providing the most powerful support for the continuous growth and development of the SDChain Platform ecosystem.

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### 3. SDChain's Architecture and Technical Solutions

Based on IoT Six-Domain Model system, SDChain is designed to be able to efficiently categorise its users, which mainly include individuals, enterprises, government agencies, property owners, IoT operation providers, IoT devices, and various operators on the industrial chain, such as: equipment providers, online e-commerce businesses, financial institutions, logistics companies. According to characteristics of its users and the users' blockchain businesses, SDChain will modularize its infrastructure, in order to provide multi-dimensional and multi-role protection, data privacy, confidentiality, distributed data storage, credible data access and transactions by SDChain's strong underlying security.

To learn more about the composition of this blockchain system, it is necessary to look at the function view of SDChain's reference framework. This function view describes typical functional components of SDChain system through the hierarchical structure by "four horizontal and four vertical levels", as it shows in Figure 3. This figure includes *user layer*, *service layer*, *core layer*, and *base layer* with additional cross-layer functionalities.



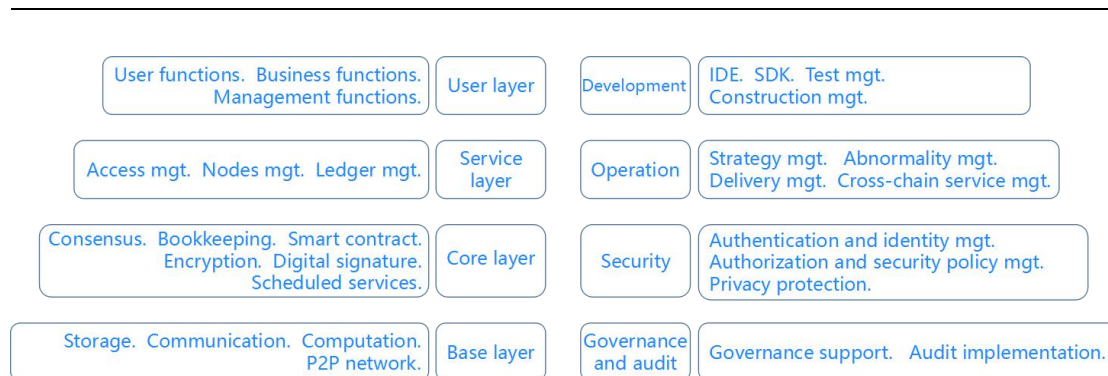


Figure 3 Functional Components of Blockchain Reference Framework

The *user layer* is designed to address users' needs for portal entrance. Through this portal entrance, execution and client related management functions could be activated, in addition to maintenance and use of blockchain services. Users may also use blockchain services to transfer the output to provide support for cross-layer blockchain services.

The *service layer* provides unified access and node management services.

The *core layer* is core functional layer of the blockchain system, which includes the consensus mechanism, time-sequence services, privacy protection, encryption, summary and digital signatures and many other modules. Further, according to different application scenarios, users may add automatic executable smart contract modules by default logic.

The *base layer* provides necessary operation environment and components for the blockchain system, such as data storage, operation container, communication network and others.

Meanwhile, in response to the needs of blockchain research and

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development, this function view also includes a “development, operation, security, auditing” four cross-layer system. Functional components in the four cross-layer system interact with abovementioned three layers of components and provide support for the entire system in general.

The following is a brief description of core functions of the *base layer* of SDChain:

### **3.1 P2P Communication**

P2P communication is the core of blockchain. It has all the characteristic of decentralisation, scalability, privacy and high performance. The efficiency of P2P network communication is very important to the overall performance of blockchain, especially the speed of the whole blockchain network. Designed specifically for IoT devices and users connected on the SDChain Platform, SDChain will optimise in depth for areas of communication maintenance, address confirmation, communication mechanism and storage plans. By specifying associated physical configuration and size of clients and consensus nodes, SDChain will adopt sharding mechanism and high-speed Internet connection, to decrease the burden of consensus communication, calculation and storage, therefore further improve transactional performance of the blockchain, and so to achieve maximum performance of IoT devices. This also guarantees IoT

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devices registration, digitalisation and authorisation in the future.

### **3.2 Encryption Algorithm**

Encryption is a key part of blockchain, in particular, the hash function and asymmetric encryption algorithm.

- 1) Hash function: Currently, there are many algorithms for hash function such as SHA and MD5, as well as series and parallel use of the algorithm. Since most commercial applications focus more on performance, SDChain will adopt SHA256 as its basic algorithm.
- 2) Asymmetric encryption algorithm: This includes RSA, DSA, elliptic curve algorithm and others. Blockchain mainly adopts elliptic curve algorithm like ECDSA and SCHNORR. Since SCHNORR has a faster signature verification speed compared to ECDSA, its signature has a smaller size and is supportive of native multiple signature. SCHNORR is in accordance with the small volume size of IoT; therefore SDChain would be adopting its own version of SDSCHNORR based on SCHNORR.

Meanwhile, the modular design of SDChain allows interchangeability of multiple algorithms. Because there are various forms and different types of use case scenarios, security requirements are not always consistent. Therefore, SDChain supports algorithms such

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as Chinese National Standard encryption algorithms (SM2 elliptic curve public key cryptographic algorithm, SM3 cryptographic hash algorithm, SM4 block cipher algorithm) and others based on demand. As a result, SDChain abstracts the underlying encryption algorithm and alternative channels of different algorithms to meet various algorithm and security requirements of different IoT applications. The name of wallet and address can be interchangeable.

### **3.3 Consensus Algorithm**

The consensus mechanism is a set of mechanism designed to ensure the accuracy and consistency of information stored in the distributed ledger, which is mainly determined by business and performance requirements. IoT is a comprehensive and complex heterogeneous system, which covers multiple industries and a wide range of transactions. Because there are many types of communication protocols, IoT has high safety and performance requirements for the underlying blockchain. With the abovementioned characteristics in mind, SDChain innovatively proposes SDFT algorithm, which integrates high consistency RAFT and high concurrency PBFT algorithms, thus solving security, high performance and trust issues at the same time. It is planned that SDFT will have the following features:

- 1) Select one or a number of master nodes (Master node) from the full network authentication nodes (Validate node) with

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SD-RAFT to balance the computing load that is accessed by the client. The master node is responsible for the collection of the new transaction accounting request and the generation of the transaction list in the whole network within a fixed period (10 seconds).

- 2) Each verification node will broadcast the transaction record that sent from the client to the entire network. The major node will collect transactions that will be put into new blocks by sequence and store them into transaction list and then broadcast this list to the entire network.
- 3) When each node receives the transaction list, it will execute these transactions by sequence. When all transactions are executed, each node will broadcast to the entire network based on the calculation of hash summaries of new blocks.
- 4) If a node receives  $3f$  ( $f$  is the number for tolerable SDC nodes) summaries from other nodes to request to equalise with itself, a commit message will be broadcasted to the entire network.
- 5) If a node receives  $3f+1$  commit messages, it can submit new block and its transactions to local blockchain and its status database.

Please find below a performance comparison of SDChain with other blockchain platforms:

Blockchain Platform	Consensus Algorithm	Transaction Confirmation Time
Bitcoin	POW	60 min
Ethereum	POS	17 sec
SDChain	SDFT	3~5 sec

### 3.4 Smart Contract

Each IoT device connected to the Internet has a global identity on blockchain, and this will be the only identifiable global identity, which can be used for credit identification. The credit status of each IoT device is visible to other devices on the SDChain Platform. The corresponding key is used to sign data which records transactions sent from this address, and it is only visible to the device owner. Additionally, the SDChain Platform will set up a wallet for that device, which aims to improve the security of IoT devices by preventing attacks. Each time an IoT device records a data transaction, the action will result in the generation (and/or consumption) of gas. Each smart contract is similar to a common wallet, which has a unique public key address. The difference is that the private key of the smart contract is discarded when smart contract is created; therefore no one can send digital assets towards smart contract except by way of the consensus mechanism. In response to monitoring demands for IoT, namely IoT device holders can set up smart contract, path of data storage and amount of charge to the

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account beforehand, and then broadcast to the entire network and stored as digital records. When an emergency happens, blockchain regulations will activate, the smart contract on the SDChain Platform will require enforceability, promptness and automatic trigger. The triggering conditions are also recorded as data on the blockchain and is subject to the related protection. This type of data is accurate, safe and reliable, and cannot be tampered with.

### **3.5 Decentralised DApp**

The existing incubation of development projects is relatively centralised with inefficiency, opacity and unfriendliness, which affects developer's creativity and activities. Comparatively, under the incentive of DIP protocol, the SDChain Platform will promote the decentralisation of community ecosystem incubation through a positive feedback mechanism. With the development of the ecosystem on the SDChain Platform, there will be more and more information accessible on blockchain. The key result is to provide this information in a simple and effective way, which is conducive for further processing. It is expected that there will be more phenomenal DApps to emerge in the future. As it shows in Figure 4.

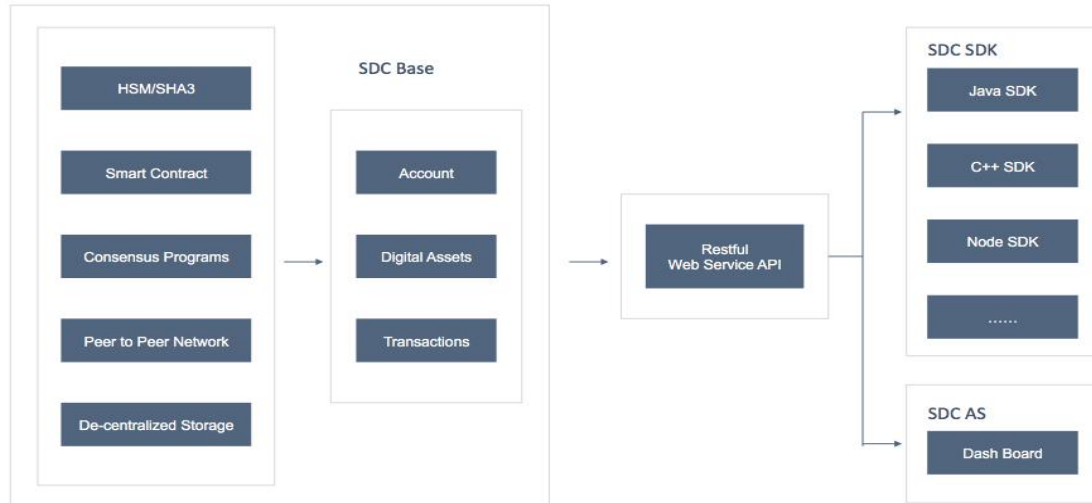


Figure 4. The Framework for SDChain Developers

Enterprise and individual developers can each create an account for IoT devices, obtain asset digitalisation, get information about block height, create and request trading information on the chain and receive real-time notifications on SDChain. Currently by SDK, SDChain can realise the value of access, information privacy protection, value transmission, BaaS services on voucher, in order to create value for accessible data, and make accessible data flow, transformation trustworthy. SDChain has made in-depth analysis in Internet applications, IoT applications and financial applications. Meanwhile, SDChain has established a number of SDK in accordance to different languages, such as C++ SDK for IoT, Java and Node SDK for Internet. Doing so will satisfy different application platform access requirements for the entire ecosystem.



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### **3.6 Issuance of IoT digital assets**

There are four basic elements of an SDChain smart contract: {code, status, [code], balance}. The code is generated by users; the status contains all current internal information of the smart contract; the balance is the cryptocurrency in balance of the smart contract, which also stores a history of transactions. According to user's requirements for issuance of new digital assets from different IoT application platforms, token distribution can be realised by a smart contract on the SDChain Platform, which is also supportive of distribution of other cryptocurrencies by SDA as the underlying asset.

### **3.7 Cross Chain Smart Contract Model**

SDChain has real value for both lightweight participants (such as IoT devices) and computation-intensive participants (such as IoT platforms). There always exists a huge imbalance between these two types of participants. Since the development of blockchain is still in an early age, current blockchain technology has various issues such as problems with upgrades, cross-chain compatibility with different blockchains, and splits in user groups. In order to solve the abovementioned issues, SDChain will introduce the solution of layered consensus stack technology, namely SDCC (SD Cross-Chain). SDCC is

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incubated from SDChain, which is a smart contract module on blockchain, and it can provide following content features:

- 1) Layered configuration structure: functional modules can be replaced from multiple dimensions.
- 2) In response to the situation that Bitcoin cannot issue digital assets by itself and the objective shortcomings of Ethereum's smart contract focus, SDCC provides support for various types of transactions, smart contracts and distribution of self-defined digital assets.
- 3) A variety of data storage forms can be replaced, which supports MySQL, PostgreSQL, Oracle and other relational databases, as well as RocksDB, Redis and other non-relational databases.
- 4) The consensus node can be configured to support multiple consensus protocols, besides SAFT in the system, SDChain is supportive of PoW, PoS and other consensus protocols used by other IoT blockchain.
- 5) SDCC supports pluggable authentication schemes and injection user protocols, which can deploy existing consensus nodes to integrate new blockchain more easily.
- 6) For participants with small processing capacity, they can still participate in node verification.
- 7) Using SDCC's internal split-flow scheme to improve communication and storage performance of IoT devices connected: As it shows in Figure 5.

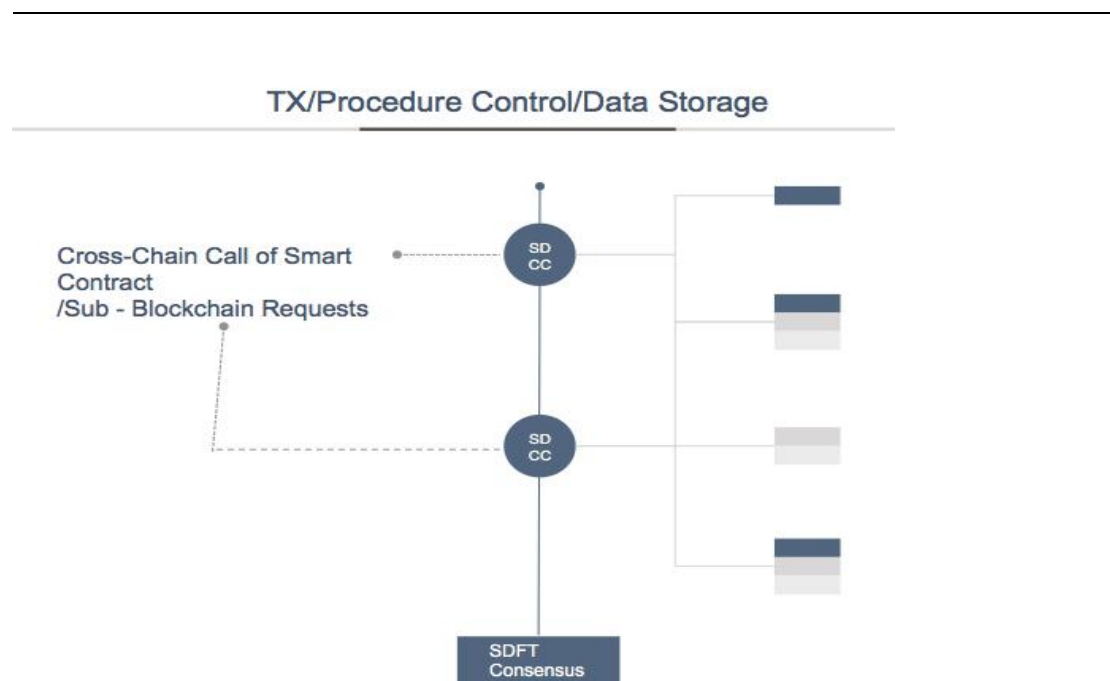


Figure 5. Cross Chain Work Model

## 4. Ecosystem Roadmap & Community Management Architecture

### 4.1 SDChain's Ecosystem Roadmap

SDChain will combine international strengths to build a universal community ecosystem. The management of its ecosystem will be led by SDChain Foundation in addition to international community management agencies. SDChain will make full use of blockchain and IoT innovations, in addition to promoting to IoT enterprises and users.

Meanwhile, SDChain will continuously explore the innovation business within six domains, and establish a global ecosystem of blockchain and IoT under the supervision of community and relevant

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regulatory agencies. As an open platform, SDChain upholds principles of openness, inclusiveness, mutual cooperation and benefits, and will establish ecosystem-wide cooperation throughout the industry.

#### **4.2 SDChain's Ecosystem Business Model**

The development of the SDChain ecosystem depends on two parts. On one hand, based on SDChain, the whole industry supply chain and users can generate value through various innovative services. On the other hand, a large number of high-value digital assets on SDChain will support large volumes of high-frequency digital assets transactions, thus promoting the increasing added value of the ecosystem on the entire SDChain Platform, and drive SDA to expand to even more transaction processes. Further, projects built on SDChain's public chain capabilities would have high levels of scalability – the relevant business teams may utilise SDChain to develop their own DApps, distribute relevant tokens and enhance the ecosystem on the SDChain Platform. By connecting businesses to resources, the SDChain Platform will grow more robust and diverse.

#### **4.3 SDChain's Community Management Architecture**

The SDChain community will be guided by the Foundation, which is based in Singapore. The Foundation's views on the technical

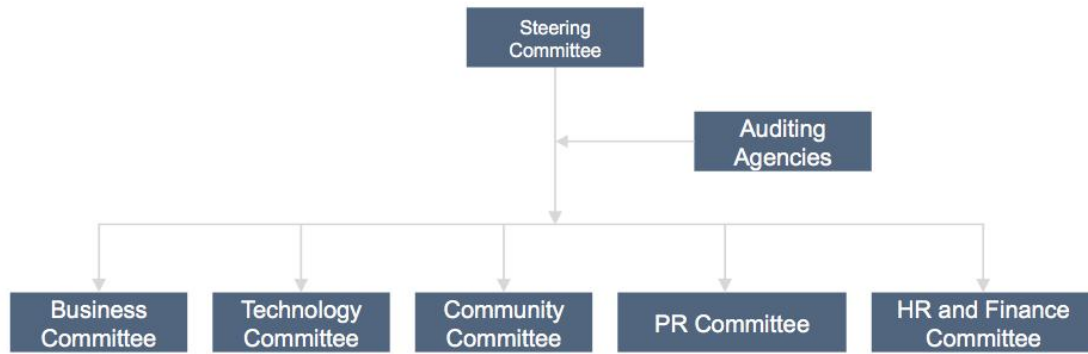
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development, business promotion and community operation of the SD Chain Platform will be influential, but ultimately it will not have control over the actions of the SDChain community, which is spontaneously formed and is open, decentralized and admission-free to join, comprising various users, participants, developers, supporters, SDA holders worldwide, who are not connected with the Foundation in any manner. In order to ensure the efficient development of the SDChain Platform and ecosystem thereon based on the principles of openness and transparency, there will be various Committees set up by the Foundation:

Board of Directors – It is the highest decision-making body of the Foundation and will manage various executive agencies (Committees). It has the right to decide, use, freeze, and reward SDA, and conduct punitive measures on behalf of the Foundation, as well as other activities. The Board of Directors will be selected by the members of the Foundation.

The term of each director in the Board of Directors is 2 years, and new members will be selected upon expiry of the term.

Under the Board of Directors, there are 6 Committees:



Steering Committee – Its function is to advise the Board of Directors on the overall direction and development of the project to develop SDChain and the SDChain Platform, the promotion of the ecosystem, community operation, and on all major board decisions.

Business Committee – It will be in charge of business promotion, business development and ecosystem construction of the SDChain Platform. Its members are generally chosen from representatives from the industry.

Technology Committee – It will be in charge of technical development of SDChain and the SDChain Platform, open source code management, Github open source code maintenance, and updated evaluation of technology in community. Its members are generally selected from an international blockchain expert pool.

Community Committee – It will be in charge of global community operations and management, community events planning, resources integration, and community rewards distribution. Its members are mainly selected from active community members.

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Public Relations Committee – It will be in charge of project progress updates, public relations issues, external publicity and other issues relating to the development of the SDChain Platform. Its members are generally selected from an international pool of marketing executives and representatives of public relations companies.

Human Resources and Finance Committee – It will be in charge of payments and allowances to the staff of the Foundation, normal financial expenditure for the development of the SDChain Platform, volunteer recruitment and other types of work.

Heads of each Committee – the Board of Directors will appoint heads of Committees, and such persons shall be responsible for the operation management in their committees, in addition to work and coordination among other Committees. The head of each Committee needs to report to the Board of Directors on a regular basis.

**Steering Committee:**

The Steering Committee members will be selected from well-known blockchain and IoT industry experts. A brief introduction of the growing list of members, is as follows:

1. Dr. Jie Shen, Co-Chairman

Dr. Jie Shen obtained Ph.D from Chinese Academy of Sciences after receiving bachelor degree from Zhejiang University, and was a visiting scholar at University of California at San Diego (UCSD). He is

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an authoritative international experts on IoT, with 15 Years of IoT experience and 3 Years of blockchain research experience, and had participated in developing the worlds' first international Internet of Things Reference Architecture (IoT RA) ISO / IEC 30141 on behalf of Chinese Leaders. He is also the proposer and chief editor of the "Six-Domain Model" of IoT, sponsor of Joint Laboratory for Six-Domain Blockchain, founder of Qingyu Tang, and part-time professor of Fudan University. Since 2011, he has been the general team leader of the National IoT Basic Standard Working Team and promoted development of dozens of basic standards and application standards for Internet of Things jointly with the Ministry of Public Security, Ministry of Agriculture, Ministry of Transport, Ministry of Environmental Protection, State Forestry Administration, National Health and Family Planning Commission and China National Textile and Apparel Council. He was once the vice president of Wuxi Internet of Things Industry Research Institute, vice director of National Research Center for Sensor Network Engineering Technology of Ministry of Science and Technology, and vice chairman of the CCSA TC10. He has presided over 10+ state-level scientific research projects related to IoT and 10+ international and national standards, and was awarded the first prize of Shanghai Science and Technology Advances, the second prize of China Standard Innovation and the Advanced Individual of the National Information Security Standardization Technical Committee.



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## 2. David Pan, Co-Chairman

David joined the Foundation with 20 years of industry experience serving North American and Asian technology and investment companies in IoT, semiconductor, software, electronics manufacturing and telecom sectors. Prior to joining the Foundation, David served as the Director of IoT Asia Marketing at Arm, growing and supporting Arm's IoT developer ecosystem and partnerships in Asia. Prior to Arm, David served as the President of Ayaris 9 with sell-side mandates in IoT, clean tech and e-commerce sectors, as well as managing buy-side venture capital specialised in pre-IPO projects. David graduated from Harvard with a Masters in Finance, Golden Gate with Masters in Enterprise Systems, and UC Berkeley with BA in Architecture.

## 3. Richard Zhou, Co-Chairman

Richard is currently the President of Green Panda Marketing Inc. in Toronto, Canada, Advisor to multiple Fortune 500 companies and Nasdaq-listed companies, and Advisor to China Canada Angel Alliance. Formerly, Richard served as an Independent Board Director of Internet of Things Inc. (TSX.v-ITT), Assistant Director of Ontario Ministry of Tourism, Culture and Sports, Canada, Co-Chair of TIFF China Internet Film and Television Development Forum, President of Canada

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Evergreen Association, and Founding Director of Chinese Cabinet of Toronto Sick Kids Foundation, one of the largest charity organisations in Canada. Richard has 20 years of industry experience in information technology, Internet, IoT, energy, serving at EMC, Siemens, and Apotex.

### **Core Team Members:**

#### **1、 David Pan**

David joined the Foundation with 20 years of industry experience serving North American and Asian technology and investment companies in IoT, semiconductor, software, electronics manufacturing and telecom sectors. Prior to joining the Foundation, David served as the Director of IoT Asia Marketing at Arm, growing and supporting Arm's IoT developer ecosystem and partnerships in Asia. Prior to Arm, David served as the President of Ayaris 9 with sell-side mandates in IoT, clean tech and e-commerce sectors, as well as managing buy-side venture capital specialised in pre-IPO projects. David graduated from Harvard with a Masters in Finance, Golden Gate with Masters in Enterprise Systems, and UC Berkeley with BA in Architecture.

#### **2、 Faud A. Khan**

Apart from his leadership role at the Foundation, Faud is the Chair

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of Canada International Organisation for Standardisation (ISO / IEC SC27), Convenor of IOT Special Working Group, International Convener of ISO / IEC SC41, CEO and Security Analyst of TwelveDot Labs, delivering network security solutions to customers worldwide. He has over 21 years experience in cybersecurity industry.

### 3、 Dr. Yue Gao

Apart from his leadership role at SDChain, Yue Gao is a Reader in Antennas and Signal Processing, and Director of Whitespace Machine Communication (WMC) Lab in the School of Electronic Engineering and Computer Science at Queen Mary University of London (QMUL). He worked as Research Assistant, Lecturer (Assistant Professor) and Senior Lecturer (Associate Professor) at QMUL after his PhD degrees from QMUL in 2007. He is currently leading a team developing theoretical research into practice in the interdisciplinary area among smart antennas, signal processing, spectrum sharing and internet of things (IoT) applications. He has published over 120 peer-reviewed journal and conference papers, 2 patents, and 2 book chapters. He is a co-recipient of the EU Horizon Prize Award on Collaborative Spectrum Sharing in 2016, and Research Performance Award from Faculty of Science and Engineering at QMUL in 2017. He is an Editor for the IEEE Transactions on Vehicular Technology, IEEE Wireless Communication Letter and

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China Communications. He is serving as Cognitive Radio Symposium Co-Chair of the IEEE GLOBECOM 2017. He has served as the Signal Processing for Communications Symposium Co-Chair for IEEE ICC 2016, Publicity Co-Chair for IEEE GLOBECOM 2016, and General Chair of the IEEE WoWMoM and iWEM 2017. He is a Senior Member of IEEE, a Secretary of the IEEE Technical Committee on Cognitive Networks, and an IEEE Vehicular Technology Society Distinguished Lecturer.

#### 4、 Wenbo Xu

Wenbo holds Master of Software Engineering from Fudan University, with 8 years of experience in C++ server-side software development and architecture design and 4 years of experience in R&D team management. Wenbo was responsible for the development of Shanghai Telecom "Game Frontier" platform, precision location-based services (PC LBS), Internet users portrait and data mining, centralised batch stamp inspection for Bank of Suzhou and electronic stamp inspection for other banks. Recently, he has led the blockchain module package development on Arm mbed OS. Wenbo has valuable blockchain IoT project development and implementation experience, and rich software security system development capabilities.

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## **The Foundation's Advisory Board**

### 1、 Dr. Lirong Zheng

Lirong is a professor of Royal Institute of Technology, Sweden, Dean of School of Information Science and Technology, Fudan University, Executive Vice President of New Rural Development Institute, Fudan University and Distinguished Professor of China's National "Thousand Talents Program".

### 2、 Eduard Molla

Eduard is Economic Counselor of Albania in China.

### 3、 Qiang Yin

Qiang holds EMBA from Donghua University, Vice President of Circulation Branch of China National Textile And Apparel Council, Deputy Director of IoT standard working group for textile industry, and GM of CNTEX.

### 4、 Xuming He

Xuming is the Chairman of the Organising Committee of World Internet of Things Convention, Chairman of World Chinese Business Alliance Federation, President of World Chinese Entrepreneurs Alliance Group, Executive Chairman of Chinese Entrepreneurs Alliance,

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Chairman of Warner Fund (Beijing), Chairman of World Chinese Business Alliance Investment Fund Management Company, and formerly served as Executive Officer of Chinese Chamber of Commerce in China, CEO of Warner Investment Group (US), Executive Officer of Promotion Association of Chinese Chamber of Commerce, and Executive Secretary General of Chinese Business Alliance Federation.

#### 5、 Bingxian Liang

Bingxian is the Chairman of Taiwan Internet of Things Association, Chairman of Flowring, Dean of the Cross-Strait Intelligence Service Industry Institute of Nanjing University of Posts and Telecommunications, Vice Chairman of IOTCC, China Electronics Chamber of Commerce, MIIT, Executive Chairman of Alliance of Sensing China, Executive Director of Jiangsu Innovation Center for Internet of Things Technology and Application Synergy, Vice Chairman of Zhejiang Technology Innovation Association for Automotive Industry, Vice Chairman of Wuxi Cross-Strait Technology and Financial Services Center, Member of Technical Expert Committee of Cloud Computing and IoT Association in Taiwan (CIAT), and Member of Cloud Computing and IoT Committee of Taiwan Electrical and Electronic Manufacturers Association.

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#### **4.4 Foundation auditing**

In order to achieve open and transparent governance, the Foundation's Finance and HR Committee will hire professional auditor(s) and published its auditing results.

### **5. Roadmap**

#### **May 2017**

Development of SDChain Platform Planning Kickoff.

#### **Exploration: May 2017 - October 2018**

The Beta Version of SDChain is launched during this time, inviting selective community members to participate in internal testing groups to test, modify and optimise the SDChain Platform.

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- *December 2017 – June 2018*

Application Layer Development: iOS and Android client, account creation and SDA transfer.

Service Layer Development: Account creation, storage release, SDA, SDChain Node Incentives.

Core Layer Development: Call functions of SDChain Node Small Contract, client connection.

Infrastructure Development: Index and caching, storage.

- *July 2018 – October 2018*

Application Layer Development: Community presentation, IoT-OS access.

Service Layer Development: Community Creation, Community motivation.

Core Layer Development: SDChain Node security verification.

Infrastructure Development: Storage optimisation, task scheduling, service flow.

### **Expansion: October 2018 - December 2018**

Release of the SDChain Platform online, fully open to users and officially start operation.

2018.10 – 2018.12

Application Layer Development: Browser plug-in, setting of value



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flows.

Service Layer Development: Community integration, setting of value flows, credit valuation.

Core Layer Development: SDChain Node External Service Connection.

Infrastructure Layer Development: Storage optimisation, schedule transfer optimisation.

### **Evolution: December 2018 - May 2019**

Connect partners on the SDChain Platform and expand the scope of partners to form the ecosystem with account namespace, account binding, tripartite-link SDK, public API, identity authentication. Help partners get connected and continue to expand.

## **6. Risk Warning**

There are various risks associated with the purchase of SDA. Potential purchasers should carefully evaluate these risks based on their own risk tolerance.

### **1. Risks associated with markets for SDA**

There is no prior market for SDA and the SDA token sale may not result in an active or liquid market for SDA. SDA is designed to be used solely within the ecosystem on the SDChain Platform, hence there may

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be illiquidity risk with respect to the SDA you hold. SDA is not a currency issued by any central bank or national, supra-national or quasi-national organisation, nor is it backed by any hard assets or other credit nor is it a "commodity" in the usual and traditional sense of that word. We are not responsible for, nor do we pursue, the circulation and trading of SDA on any market. Trading of SDA will merely depend on the consensus on its value between the relevant market participants. No one is obliged to purchase any SDA from any holder of SDA, including the purchasers, nor does anyone guarantee the liquidity or market price of SDA to any extent at any time. Furthermore, SDA may not be resold to purchasers where the purchase of SDA may be in violation of applicable laws. Accordingly, we cannot ensure that there will be any demand or market for SDA, or that the price you pay for SDA is indicative of any market valuation or market price for SDA.

Even if secondary trading of SDA is facilitated by third party exchanges, such exchanges may be relatively new and subject to little or no regulatory oversight, making them more susceptible to fraud or manipulation. Furthermore, to the extent that third parties do ascribe an external exchange value to SDA (e.g., as denominated in a digital or fiat currency), such value may be extremely volatile, decline below the price which you have paid for SDA, and/or diminish to zero.

## 2. Regulatory Risks

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The blockchain industry is still at its early stage of development, not only China but also the rest of the world do not have relevant legal documents regarding pre-ICO requirements, transaction requirement, information disclosure requirement, lock-up requirements. Also, it is not clear how current policies will be implemented, which may negatively impact SDA and the SDChain Platform. Since blockchain technology has become the major target of regulation in most countries, if regulatory agencies intervene or influence the blockchain industry in general, SDA and applications on the SDChain Platform may be affected as a result. Such intervention may include, without limitation, legal restriction on the use and sales of token, restrictions on applications on the SDChain Platform and the usage of SDA.

### 3. Competition Risks

With the development of information technology and mobile internet, digital assets represented by “Bitcoin” have emerged, and various kinds of decentralised applications have continued to emerge, competition in this industry has become increasingly fierce. However, with the proliferation and expansion of other application platforms, the community will face continuously operational pressure and certain market competition risks.

### 4. Risks of Loss of Staff

The Foundation has gathered a team of experienced technical and consultant experts with respective professional advantages and rich

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experience, which include professionals engaged in blockchain industry for a long term, in addition to experienced internet product development and operation core team members. The stability of core team and advisory resources is important for the continued development of SDChain and the SDChain Platform. The loss of core staff or advisory board consultant may affect the stability of the platform or adversely affect future development.

#### 5. Risks due to lack of funds

If the price of the tokens contributed for development is greatly decreased, or development time is much longer than expected, or any other relevant reasons, it is likely to lead to a shortage of funds, resulting in certain development goals being unrealised.

#### 6. Risks of losing private keys

After investors transfer SDA to their own digital wallet addresses, the only way to keep the contents of operation address is the relevant encrypted key purchasers have (namely the private key or wallet password). The user is responsible for protecting relevant keys and use them to sign transactions which can prove asset ownership. Users should understand and accept that if the private key or wallet password is lost or stolen, then acquired SDA associated with the user account (address) or password will not be restored and will be permanently lost. The best way to store a login credential is to separate the key into one or several local security stores, preferably not on a public computer.

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## 7. Risks of being hacked or stolen

Some hackers, or certain organisation, countries may attempt to interrupt the operation of SDA and the SDChain Platform, which include but not limited to denial of service attack, Sybil attack, gaming attack, malware attacks or consistency attack.

## 8. Risks of uninsured loss

Unlike bank accounts or accounts of other financial institutions, there is usually no insurance for data stored on SDChain or in the ecosystem on the SDChain Platform. In any event of loss, there will not have any public or individual organisations to cover the loss.

## 9. Risks associated with core protocols

Currently SDChain and the SDChain Platform is developed based on the Ethereum protocol. If there is a fault or similar incident with the Ethereum protocol, unexpected functional problems or attacks are likely to cause interruptions to the usage of SDA or the SDChain Platform, or certain reduced functionalities.

## 10. Systematic Risks

The risk of a fatal flaw in an open source software or a massive failure of global network infrastructure will cause risks as well. Although some of these risks are greatly reduced over time, such as repairing of loopholes and breakthrough of calculation bottleneck. However, some other parts are still unpredictable, such as political factors or natural disasters causing global Internet interruptions.

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#### 11. Risks of vulnerability or acceleration development of cryptography

The accelerated development of cryptography or the development of technology like quantum computing, will bring risks of decoding SDChain, which may lead to the loss of SDA.

#### 12. Risks of lack of attention towards application

The SDChain Platform may have risks of not being used by a large number of individuals or organisation, which means the public has little interest to develop DApps on the SDChain Platform, which might adversely affect SDA and the SDChain Platform.

#### 13. The risks of not being recognised or lack of users

SDA should not be treated as an investment. Where it is not recognised by the market or not widely used, its value may be very small. Possibly, for any reason, including but not limited to commercial relations or failures in marketing strategy, the SDChain Platform and all subsequent marketing sales might be unsuccessful. If it happens, there will be no such platform or little follow-ups. This will be very detrimental to this project.

#### 14. Default risks of Applications

The SDChain Platform may not be able to provide services due to various reasons, such as during large-scale node downtime, which may result in loss of SDA for users.

#### 15. Risks of applications or product not reaching its own or

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purchaser's expectations

The SDChain Platform is still in the developmental stage, hence there may be large changes to the final design before the official version is released, therefore, a purchaser of SDA may find that it does not meet previous expectation of SDChain Application or SDA's functionalities or forms. Any wrong analysis or a change in design might lead to such situation.

#### 16. Other unexpected risks

Digital tokens (such as SDA) based on cryptography are a brand new and untested technology, besides risks mentioned in this whitepaper, there might be other risks the founding team has not anticipated or not mentioned. Additionally, some other risks might arise suddenly, or in a combination of the abovementioned risks.