Chained with value, chained with time.

TSC White paper

Communication-Resource Exchange Community

Based on Blockchain Nodes

Contents

Abstract

Centralized network's issues including data security, privacy protection, and data ownership have made the network more centralized and more out of control. The rising of the blockchain technology is gradually solving these issues. However, the current blockchain network cannot fulfill the needs for normal commercial process in addition to unable to settle the problems of secure P2P network communication.

Based on the P2P secure communication technology, TSC is aiming to improve the business support and application landing for blockchain P2P network. With the goal of linking values, TSC starts with blockchain basic transactions, and it will provide everyone with secure communication capability based on P2P network technology.

1. Background

1.1. Global Instant Messaging Field

Instant Messaging (refers to IM) is the operation used to immediately send & receive internet messages and other functions. With the development of times and technologies, IM is no longer a simple chatting tool, it has become an integrated information platform which includes services such as communication, information, entertainment, search engine, e-commerce, office collaboration and corporate customer services. With the development of the mobile internet, internet IM is also

becoming mobilized. Currently, important IM providers like Microsoft, AOL, and Yahoo have provided the IM services via smart phones, as users can use their phones to send or receive messages from/to other devices installed with the corresponding application.

Tencent QQ and WeChat are the communication biospheres based on massive users' base as a strong advantage. As the Chinese cyber citizens' No.1 IM chatting tool, Tencent QQ has been existed since February, 1999. Its registered users have exceeded eight hundred million. Currently, its simultaneous online population is about two hundred million per day.

According to Tencent's 2018 first quarter financial report, accounts for both WeChat and QQ are over one billion. These two IM tools bring Tencent substantial profits and reputation.

Facebook is the biggest social network service website in the USA. It was launched on February 4th, 2004, and it also released the Windows version of its chatting App, Facebook Messenger on March 6th, 2012. Its major founder is Mark Zuckerberg. Facebook is the world leading photo-sharing site, and up to November, 2013, there were more than 300,000,000 photos uploaded on this site every day. Up to May, 2012, Facebook had around 2,500,000,000 users.

All these above companies have massive amounts of user groups as they also gain

huge profits from them. But the security and privacy of their considerable user data pool become the big problems to address while it is hard to solve with the traditional technology. We will state the field pain points and their solutions with blockchain technology.

1.2. IM Pain Point：Centralization

1.2.1. Data Security

The internet-based on the centralized server is facing the challenge of data security. The internet has successfully linked almost everyone in the network as it also has risen up concerns related to privacy and data security. Mobile applications are used to processing massive data flows daily, and all the data transmits via a centralized server connected to a center node. It is easy to hack into a center node with this type of centralized system, and it gives criminals access to browse massive internet data, and it also brings the opportunity to hackers to steal or tamper the data. Nowadays, there is hardly any safe solution to use the internet and avoid the risks of privacy divulgence or being hacked.

With the development of computers and network technology, data storage mode has been transferred from centralized to distributed. The distributed storage means to store data on multiple independent storage servers. By using approaches like backing up and redundant coding, distributed storage can improve the system reliability, usability and access efficiency, and it is easy to expand. Therefore, more and more users are

outsourcing large amounts of their data to storage services for distributed storage; as this mode brings convenience and speed to users, it also brings new issues. Whereas distributed storage usually aims to improve reliability as it increases redundant information by coding, using the principle of erasure coding to erasure-code the data and then stores each coded data piece on different remote storage servers. Therefore, users are having greater and greater needs for leak-free personal information and distributed unbreakable secure communication network.

1.2.2. User Privacy Right and Data Ownership

No matter individuals or firms, they all value the information ownership. Some data can be public as others need to be classified, and distinguishing these two types of information is the starting point to protect information privacy. Privacy acts usually separate private data and public data restrictively. Yet in the reality, the boundary between these two types of data is not always clear, and that causes huge difficulties to make legal distinctions. This distinction is to find out the original data owner at least on the initial stage. To determine the ones with data ownership will be the analysis topic, and it will also help you to determine the subjects which may need to contact or analyze, and you can eventually clarify their needs for data privacy.

The current network is easy to be blocked or taken over as the users barely have the ownership of their own data. While involving in internet transactions, the users' information cannot be controlled effectively as the information is requested to be

saved on the server while using large online companies' services. The information has belonged to server's owners by default, yet the owners are actually these large online companies. At the same time, these companies use the data to rapidly improve their services and competitive advantages, and they also try to discover more potential values of these data. Without a question, the value of the data is tremendous. But as the concern of privacy disclosure is everywhere, users are unable to share the value of the data.

1.2.3. The Anxiety of Centralized Communication

The anxiety towards public opinion control caused by centralized communication is getting stronger and stronger. No matter Twitter, Facebook, WeChat or other telecom giants, their analysis and study of users' data is beyond the commercial purpose as it starts to influence public opinions. Nowadays, chat robots on social media are very popular; based on the user's online surfing preferences, the automatic system which controls comm-accounts can strengthen certain public opinion's direction and push these opinions to people who are more likely to accept. These bots can corrupt online public opinions or even manipulate thoughts. Recently, there are research topics about how to control quantifiable robot comm-systems.

In addition to this, the ownership of the user account may also be an issue. One large online company has the regulations that according to related "terms of use", it can take back or close user's account under some circumstances.

Researches show that the data analysis applications from telecom giants can affect the discussion opinions of analyzed groups without a trace.

- Facebook, WhatsApp and Google are banned in China, Mainland. (India Today, 2017)

- During the group chats recently, WhatsApp was discovered that it has set up "back doors". (Greenberg, 2018)

- WeChat was monitoring users' conversation, and it can be synced on various devices. (WeChat, 2018)

- Telegram was actively monitoring all the information, and it was banned by Iran not long ago. (Toronto Star, 2018)

- Facebook and Google have shared users' activities to advertisers. (Facebook, 2018; Google, 2018)

1.3. The Dilemma of Blockchain & Communication

When Bitcoin just appeared, there was no concept called "blockchain". People just referred bitcoin (with all small letters) to the digital currency and Bitcoin (B as capital letter) to its underlying technology which refers to blockchain technology nowadays. In 2015, after the magazine the Economist posted a cover article "The trust machine:

how the technology behind Bitcoin could change the world", the blockchain technology is on a financial technology spree. The globally large financial institutions and banks competitively researched the blockchain technology as billions of dollars have been invested in the blockchain-related firms in just 2016. In September, 2017, China's government (www.gov.cn) posted an article "China's blockchain industry is expected to be at the forefront of the world"; the article acknowledged that all Chinese citizens about blockchain technology, and it openly supported the development of blockchain technology. The blockchain application landing in finance, insurance, retail and notarization fields starts to accelerate.

Blockchain has several characters; its first character is global circulation. As being based on internet, blockchain can be circulated as remote as there is internet. The internet here can refer to World Wide Web or any local area network. Therefore, blockchain is globally circulated. Its second character is its different levels of anonymity. It means that with different levels of authorities, nobody is able to know the amount or the transfer records of your blockchain assets. Its third character is distributed bookkeeping. Your transfer will not be delayed as bookkeeping agency is on holiday; you will not be charged high fees as the bookkeeping agency needs to profit; which is better, you will not suffer a loss if the agency cheated.

The popularity of P2P networks has led to a revolution in business collaboration mode across the world, and all kinds of commercial groups and government agencies have

high hope towards P2P network technology. Unfortunately, the blockchain network these days is still unable to handle normal commercial applications; especially its functions are barely satisfactory. Bitcoin network can only complete 7 transactions per second as Ethereum completes 15 transactions per second. The rising of smart contract brings people high expectations to the application landing of P2P network. But so far, DAPP can only achieve simple functions like gaming and transactions, and the more complicated functions are restricted by the handling capacity and collaborating ability of the network.

The only matured blockchain monetized application digital currency is springing up around the world. But blockchain professionals criticized that the P2P network only provides good support and security during the value transfer, and more P2P commercial applications still remain on the centralized network. The P2P network has to be constantly adjusted by changes within all kinds of supervisions and regulations, and it still hasn't ensured the communication security on the commercial closed loop.

The security of communication environment is exactly the key problem that P2P network is urgent to solve on the commercial closed loop. P2P communication network will settle the current anxiety of centralized communication, and communication applications will break the bottleneck of the P2P network, and it will rapidly promote P2P secure communication and P2P network.

1.4. Blockchain Technology Builds P2P Trusted Network

Since Satoshi Nakamoto implemented Bitcoin network, blockchain have created a distributed trusted network prototype based on consensus algorithm, public owned ledger and P2P network. On this basis, all kinds of public chains have increased the applying range of P2P trusted network, and they also have improved consensus algorithm and the confirmation efficiency of network consensus agreements. The P2P network is also gradually settling the anxiety of centralized network.

The features of P2P network can help effectively reduce the trust cost during the commercial processes. A general commercial action requires participants to ensure the completion of the transaction with self-discipline. But if fraudulent action occurred, the other participant will suffer great losses. With the feature of centralized network, only super huge centralized system can build trust base with certain stability while those smaller systems involved in the commercial applications have to pay for high trust costs.

The appearance of P2P network technology has altered the situation and lowered the trust costs with equally trusting any system in the commercial action. Through P2P network technology applications like blockchain, smart contract and zero-knowledge proof, the business operation costs on P2P network will be reduced gradually, and the society will be promoted to optimize production relations and increase productivity.

2. TSC

2.1. What is TSC?

TSC is a secure instant messaging (refer to IM) platform to form a P2P network commercial closed loop. It overturned the traditional communication on enclosed scopes and truly returned the online communication to P2P secure communication.

The TSC team has been working on to promote the application landing of P2P network in the communication field. At the base of solving the P2P network throughput issue, the team has brought out the secure IM platform based on the P2P network.

In the conventional sense, a communication platform relies on a centralized server to process information and store data transactions between customers. Yet information is no longer stored at one single location due to the P2P network based on blockchain,

and it means cyber-criminals cannot hack into one single server to control the whole system as they cannot steal massive customer data at once. Furthermore, it is extremely difficult for hackers or other cyber-criminals to erase, alter information or move it to other places to interpret the whole system. The tamper-resistant consensus technology, which distributed system uses, creates a transparent and secure framework which can apply to broad application scenarios.

Centralized server   P2P server
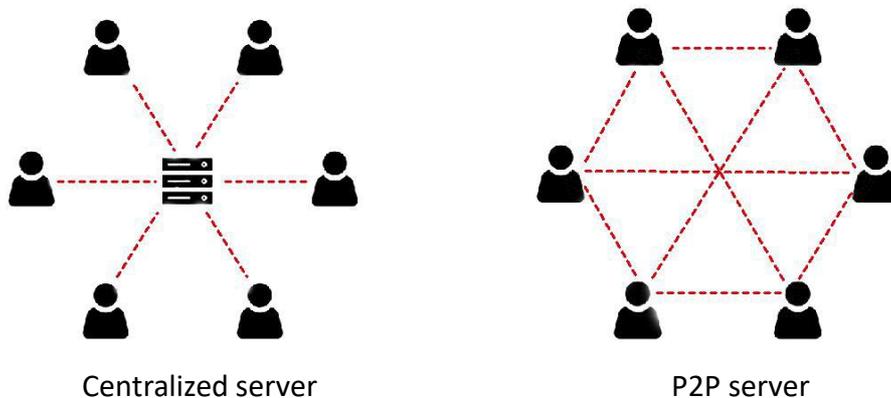
Based on P2P network, TSC IM guarantees both users' privacy and data ownership. Through its unique consensus algorithm and anonymous authorization method with customized username, users can keep the ownership of their personal information, data and communication transactions. One customer can create a community for everyone to participate, or he can start one-on-one conversation with his/her users. All the information will be private and classified. The network will allow users to have seamless P2P communication via messages, calls, videos and file transfers; it also improves users' experience in communication, identity management, unlimited secure communication transactions. With distributed blocks, TSC network can radically remove the security risks in the current internet communication system, and it will

continue to adopt the new security technology.

With the encryption feature of the blockchain technology, this new chat/communication method brings the security level of private communication to the military standard without huge R&D costs. Maybe, it will become the biggest competitive advantage of blockchain IM tool comparing to traditional IM tool.

2.2. TSC IM and TSC Token

TSC-IM is the IM (Instant Messaging) DAPP application based on the P2P network. TSC-IM will establish a P2P communication network to complete the commercial key link in the P2P network as well as help users communicate safely.

TSC IM creates one P2P network wallet address for each user as user's only ID in the communication network. This ID can be used to send messages, smart contracts or digital currencies. TSC IM is running in the secure P2P communication network. This network is based on the secure P2P communication algorithm which function is very efficient.
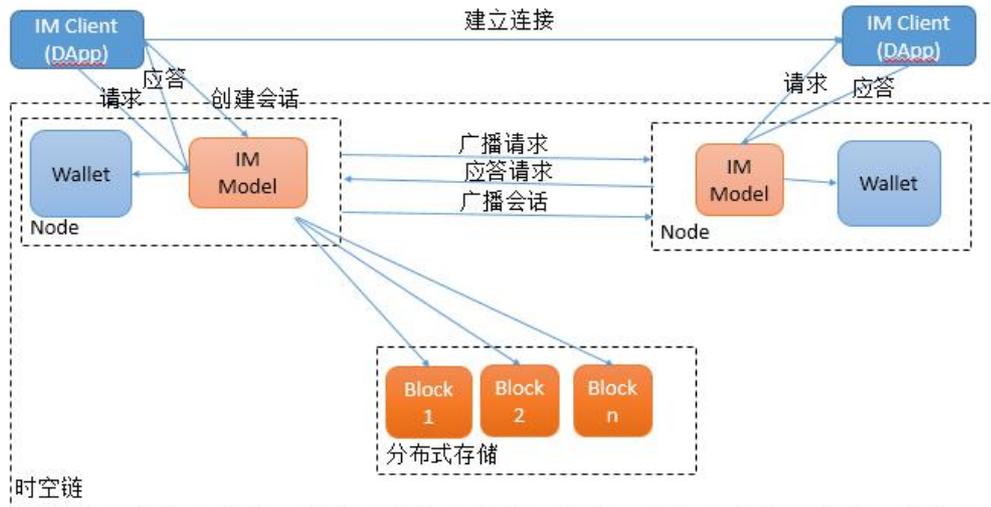
When two users start communicating, the user who starts the communication will generate a connection request via TSC IM, the connection request is synchronized to the receiver through the entire consensus network, and the receiver will generate a response transaction as he receives the request. Both the connection and response request include signatures of both users to ensure their credibility. The requester will start creating encrypted communicating connection as he/she receives response transaction, the consensus network will create a secret key with both signatures for this connection, and the communicating connection will be encrypted with this key. The connection will be successfully created if both users are online and the communication will start. The messages sent by both TSC IM users will be encrypted with session keys, and due to the session, they can create options to determine the storage or destruction of messages.

When IM requester starts the connecting transaction, the connection will not be created if the receiver is not online. The user can choose to send offline messages to

the receiver, and receiver will receive the messages when he/she is online. The offline messages also can be set up as timeout destruction. IM messages will be stored with secure distributed encryption, and only two users in the conversation can view the saved message information. IM can send messages including words, pictures, recording, videos, files, smart contract and other information and they are transmitted based on encrypted channels.

TSC IM is suitable for communication scenarios during commercial activities. For instance, party A and party B can have sufficient communication over cooperation agreements via TSC IM's trusted secure network while guaranteeing the information will not be revealed.

TSC Token is used to support the operation of value transferring on the IM platform and core functions. Besides sending and receiving messages, TSC IM is TSC Token wallet which can store and manage assets. TSC Token is to encourage users to participate the construction of TSC IM P2P network and build a more comprehensive communication application based on P2P network. By introducing TSC Token, TSC IM P2P network can solve the misaligned incentive issues of centralized network. At the same time on the administrative level, it gives certain right to the participants who hold TSC Token as they can have opportunity to voice as well as ability to impact the development of future communication economy network.

One major weakness of traditional communication network is that users have no

impact to the network as they have no right to speak on the platform. They can only use the existing features on the platform. TSC IM and TSC Token's goal is to make such right democratized. By owning TSC Token, Users can make decisions on everything including the development of software features.

The core feature of TSC Token is to enable user to enjoy the high-quality secure P2P communication and complete every part's interaction of commercial applications on P2P network. At the same time, TSC Token also allows key users to select and decide the development direction of the P2P communication network software they are using. TSC Token users recommend decision as any other user can give advises. The holding amount of Token equals to the voting weight of decisions, and user's advises will not affect the weight.

TSC Token lets users make critical decisions of platform software development. Users can also inspire the development of certain features by setting up rewards. TSC Token Foundation will also set up rewards on the communication network platform to reward code contributors on the platform. The foundation and Token holders will collaborate to influence the development direction of the communication platform.

By default, users can send message information with small data in TSC IM, and user's ID will be identified via TSC public key. User's status including on/off line will be transmitted or saved via transactions. TSC Token will be stored on asset chain, and the IM network and the asset chain are independent and interconnected.

2.3. TSC IM and Smart Contract

Besides sending and receiving messages and digital assets, TSC IM can also sign and send smart contracts. Each transaction in the commercial society is actually a contract implementation. TSC IM completes the construction of communication economy network by supporting the release and signing of smart contracts. Two or more parties in TSC IM can create and release smart contracts in the P2P network. Before signing, a smart contract is only stored in the secure distributed network. The participants of the smart contract will adjust the smart contract together by sufficient communication and collaboration, and they will jointly sign the smart contract via TSC IM. After signing, the smart contract will be effective on the TSC Token asset network, yet the key data of the transactions will not be public. Only the participants can review the detailed asset information of the smart contract agreement.

TSC stores smart contracts via asymmetric multiple keys' encryption, and the execution of smart contracts is displayed and not encrypted. The asset transaction part of the smart contract will be strictly encrypted as only contract participants can

review.

With P2P network which is secure and trusted as the base, the signing ability of TSC smart contract can greatly reduce the costs of offline contract signing, and it provides a new direction for commercial communication network.

2.4. TSC Technical Features

2.4.1. POW+POS Hybrid Consensus

TSC adopts POW+POS Hybrid Consensus as the POW miners produce block to build blockchain while POS miners verify the legality of these blocks to protect users' right. According to the number of holding coins and the workload, the fair distribution of voting weights can achieve community autonomy. In the community, developers and enthusiasts can suggest improvements or additions to existing features. The community votes to decide whether to execute or deny the feature, and that is called gathering the wisdom of the group to make decisions and execute.

This consensus can achieve a high-efficient community which is participative, collaborative, cooperative, distributed, decentralized and autonomous. With the hybrid consensus, it can achieve the effective operation of DAO (decentralized autonomous organization) in the broad sense. By adopting a hybrid consensus, the owners of digital currency can directly participate in major project decisions without requiring expensive mining machines.

By adopting the hybrid consensus, TSC has the rigid cost of mining as the guarantee of the currency price through POW. Miners will not sell the digital currency below the cost price. And as the hash rate increases, the rising mining cost will also keep the currency price in a stable and upward state, which restricts the issue of over-concentration of digital currency in the separate POS mechanism.

On the other hand, POS allows small and medium-sized investors to focus on the medium and long-term development of the project. Small and medium-sized investors prefer to keep money in their wallets for POS instead of being ready to trade on the exchange any time. To make the TSC ecosystem healthier, people will pay more attention to the TSC technology and its application in practice instead of only focusing on short-term price fluctuation.

For the security, single POS system is unstable as stakeholders can easily produce corresponding time stamp histories (as it is easy to counterfeit blocks). Therefore, the hybrid consensus avoids POS' counterfeiting issue. At the same time, Since POW must be verified by POS to be effective, POW miners cannot decide and change network rules by themselves as the consensus can effectively fend off 51% attacks in a single POW mode.

2.4.1.1.POS Voting
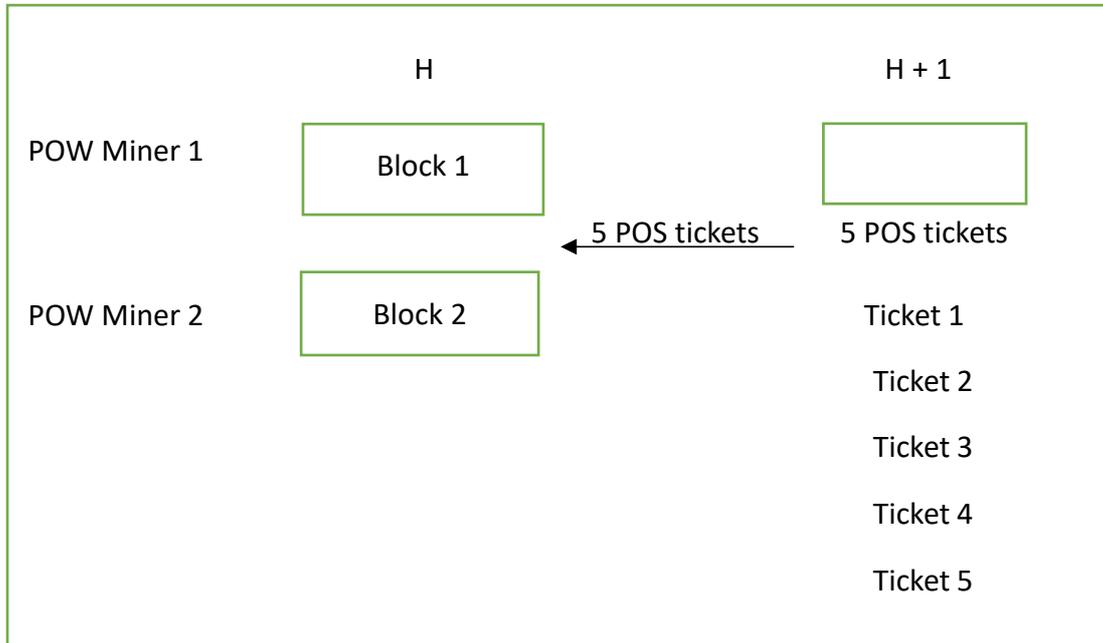
In the mining of Bitcoins, when the block height is H, miner 1 will immediately broadcast to all miners as soon as he calculates the correct hash value first, and other miners will verify whether his hash value is correct. While most miners think his calculation is right, he can get the block's rewards and bookkeeping rights, and miner 2's effort is meaningless. Other miners begin to calculate H+1.

In TSC, different miners can produce blocks at the same block height within a certain period of time. Block 1 and Block 2 will be produced by different miners, and for voting selection, one of these two blocks will be selected randomly by the system from the voting pool with five votes. Even if there is a mining overlord, the prior calculated block may not be adopted. And if POW miners violate everyone's interests, their block rewards will be taken away.

2.4.1.2. Voting Pool

To make voting rights relatively equitable, TSC uses a voting pool mechanism. With voting ticket price adjustment for every 360 blocks (about 12 hours), the total votes in the pool is controlled at 40,960. The votes are randomly selected by the system, and the ticket cost is returned if the voter is successfully participated.

2.4.1.3. Purchasing Tickets

Tickets in the pool need to be purchased by TSC holders, who can directly buy tickets from their wallets. The total purchase cost is ticket price plus ticket fee as the fee pays to POW miners to put new tickets into new blocks.

TSC tokens used to purchase tickets will be locked by the system and they cannot be returned until the voting is completed. The newly purchased tickets need to be packed and recorded in the block by the miners to take effect. The place to store unpacked tickets is called **mempool**. In the mempool, those tickets with higher ticket fee are more likely to be selected by miners (to make money) and enter the ticket pool faster. As each new section can only record up to 20 new tickets, the tickets in the mempool are competitive.

One ticket will become **immature ticket** as soon as it is recorded in the blockchain as one miner completes packing. It is called immature ticket because at this time, this type of tickets is not eligible to be selected in the pool and the ticket fee cannot be

refunded. It cannot become the actual ticket until 256 blocks (takes about 20 hours) enter the pool.

If the mempool has too many tickets, the ticket price and ticket fee will be returned if no miners pack or record these tickets after certain period of time. This action is much like the packaging of Bitcoin transaction that underpaid packets may be eventually returned.

The ticket pool has about 40,960 tickets. The system randomly decides 5 tickets needed to determine every block. The possibility of being selected adopts the Poisson probability distribution function. In simple terms, the probability of one block being selected in 28 days is 50%, probability of being selected in 142 days is 99.5%. if one block hasn't been selected after 142 days, the ticket price will be returned to you while the ticket fee will be collected by miners.

Tickets in the mempool will be selected by the system, and they will participate the voting and earn benefit. But it raises an issue that personal wallet needs to be online all the time during the voting. The ticket price will be returned if there is no action occurred during the voting. For majority of the community members, they are not available to vote all day, but TSC's POS mining pool can vote on their behalf.

2.4.2. Cross-chain Technology

Since 2017, as a large number of blockchain projects have been developed and

promoted, more and more manpower & capital had been invested in these projects. Nowadays, the number of blockchain projects of different sizes and types appears as a blowout. But a series of problems also accrued. For example, when blockchain projects grow, corresponding measures are not matched in time, which results in the failure of communication and connection between most blockchains. In other words, each blockchain project is an "isolated information island", which greatly limits the application space of blockchain. Therefore, effective inter-chain technology is the key to solve these problems as it is able to rescue many blockchain projects out of every "isolated information island" to build communication bridges for them.

Inter-chain technology is a tool to achieve the outward expansion of blockchain, and it largely determines the upper limitation of the development of blockchain projects. The inter-chain technology adopted by TSC is designed mainly based on security, efficiency and difficulty of implementation.

The history of the inter-chain technology: the early inter-chain technology was more focused on asset transformation as Ripple and BTC relay. Nowadays, the existing inter-chain technology is more focused on inter-chain infrastructure such as Polkadot and Cosmos.

The latest FUSION has achieved multi-currencies smart contract, which means that financial transactions of multiple inter-chains are able to occur in the entire market.

A. Notary Schemes

The main representative is the Ripple Interledger protocol, which applies to all accounting systems and aims to achieve a globally unified payments standard.

B. Corda

Corde is a "paralleled blockchain " technical structure. Both parties in the transaction select one notary which is highly feasible to let the notary to test the validity and uniqueness of the data. If the notary proves that the transaction is feasible, then the transaction will be completed as the notary's ledger will be synchronized. The advantage of this action is that transactions can be processed more efficiently with security.

Fabric's new defined concept includes chain, peer, channel and consensus service. Peer can participate in several ledgers as it makes Fabric expansible. There are features like transaction isolation and ledger isolation between Peers.

Channels 1: (P1, P2, P3)

Channels 2:(P1, Pn)

Channels 3:(P2, Pn)
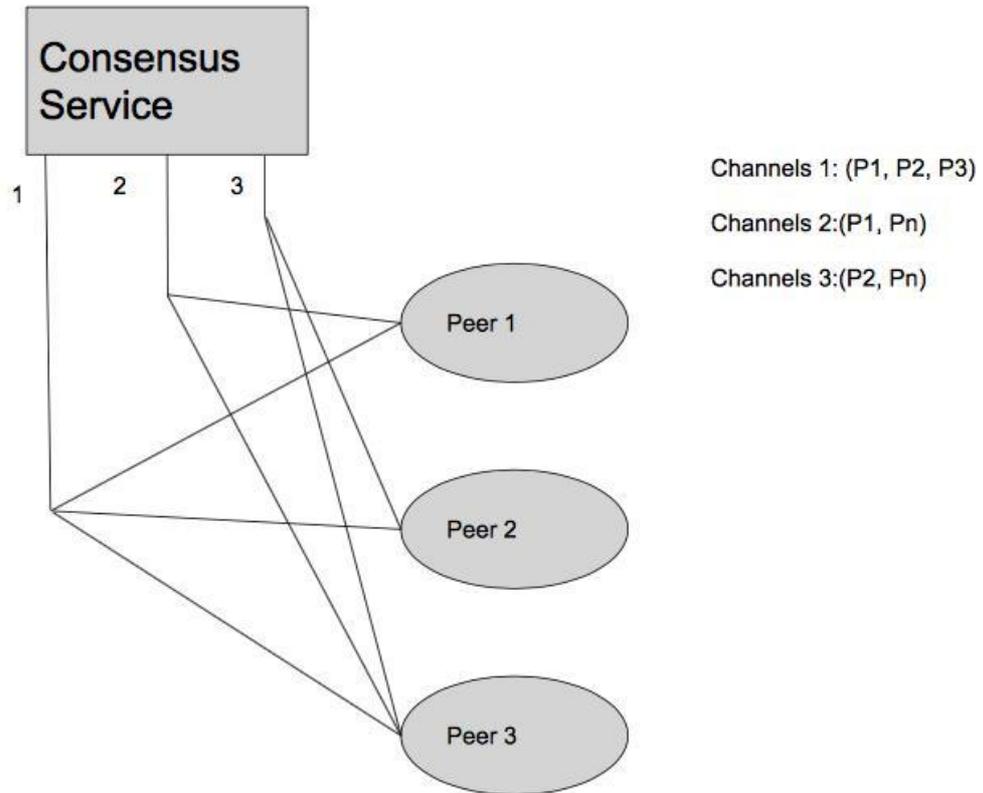
C. Cosmos

Cosmos is the inter-chain open source project of Interchain Foundation. It is focused on solving the transfer of the inter-chain assets. This blockchain network is formed with Zone and Hub:

1) Cosmos Zone is an independent blockchain space.

2) Cosmos Hub is a POS encrypted currency network with multiple assets.

Hub is relay chain as it uses the team of decentralized verifiers to account. One Hub communicate with several Zones as each Hub has billing information for multiple zones associated with it to generate a multiple asset central ledger. The Hub guarantees the total assets in the Hub will remain unchanged during the transfer of

asset.

The Hub guarantees that the total amount of assets in the Hub will remain unchanged during the transfer of assets in different Zones.

Cosmos' processes are the followings:

First, cross-chain communication between Hub and Zone can be achieved by IBC Protocol. We assume Zone 1 wants to have cross-chain transaction with Zone 2.

1) Zone 1 generate transaction information and publish it on the Hub.

2) Hub produces the proof of existing Zone 1's cross-chain information package as it is published on Zone 2.

3) Zone 2 receives the information package and publishes the received certificate information on the Hub.

4) The Hub gives proof that Zone 2 has received the certificate and sends the message to Zone 2.

Advantages of Cosmos shown as the following:

1) Tokens in each Zone are transferred through the Hub where they are connected together. Therefore, all the assets in each Zone will be recorded.

2) If one Zone malfunctioned, it will not influence other effective Zones.

3) New added Zone can be easily added in the Hub Center.

D. Cross-Chain Transactions

Cross-chain technology is a means to realize the outward expansion of blockchain, which largely determines the development of blockchain projects. Nowadays, the most popular cross-chain technologies include: Notary schemes, Side chains/relays, Hash-locking and Distributed private key control.

TSC will use Relay technology similar to future protocol such as Polkadot and Cosmos to support the cross-chain transactions between different encrypted currencies. The cross-chain technology TSC uses is designed based on the security, efficiency and difficulty of its implementation. The core technology of TSC cross-chain protocol is relay chain, and this technology makes TSC not only scalable and extensible as Polkadot, but also compatible with the future blocks as Cosmos. The cross-chain protocol supports the cross-chain transaction between different currencies as it allows users to realize the TSC transactions with Tokens like BTC, ETC, and ZCash. It can break the transaction barriers between different currencies as every "isolated information island" can freely transfer, trade and convert in TSC. TSC relay chain plays a great role in promoting transactions and exchanges between different currencies of blockchain, and provides novel techniques and ideological guidance for emerging blockchain-related companies, and it also has a great innovative

significance to the booming development of the blockchain industry.

Cross-chain protocol design concept:

1) Security: The foot-stone of the cross-chain design, it ensures absolute security while achieving the cross-chain. The historical data produced during cross-chain process is extremely difficult to modify.

2) Performance: efficiency of the cross-chain is also an important consideration. while ensuring the security, cross-chain needs to maximize the throughput and cross - chain validation speed. In another term, cross-chain's total transactions processed per second needs to reach certain amount, and that brings users better transaction experience.

Relays chain is designed using similar to Polkadot relays chain and Cosmos cross-chain protocol, and it is mainly used to record address & amount of the transactions and to verify whether the transaction is legal. One transaction chain has several transaction units. Each cross-chain transaction must be recorded and verified by at least one transit unit. Contracts produced by every foreign currency which connects relay chain must be checked by transfer units of relay chains. Also, the transaction address of a node of each foreign currency must have a mapping address on the relay chain. The amount of each transaction is stored in the transit unit in the relay chain.

The relay chain provides technical & platform support for cross-chain transactions between TSC and foreign currencies, as well as space and opportunities for cross-chain transactions between different foreign currencies.

The transit unit is distributed by verifiers in turns. Its main functions are the following:

1) Verify the legality of all unverified transactions.

2) Collect votes for last transit unit

3) Issue penalty if last transit unit acts maliciously.

Its structure shows as the following:

```
Transfer

{

version:0000...0001，

previous:DC32...1CD1，

height:999，

verify:...，

punishment:...，

direction: output/input，

sourcelink:TSC，

targetlink:ETH，

amount:99ETH，

public_key:12ea...df94，

signature:84ec...edf6，

hash:57da...96c2，

}
```

Version means the version of the relay chain.

Previous means the last transit unit.

Height means the height of current transit unit.

Verify means the verified transactions and votes.

Direction can be output and input.

Sourcelink can be ETH and BTC as input, g TSC as output.

Targetlink can be ETH and BTC as output, TSC as input.

Amount means amount of money which needs to come with unit.

Punishment means to produce evidence and punish evildoers who fail to vote.

public_key，signature means to sign the unit and ensure that the verifier sent the unit.

Hash means to do hash calculation to the whole unit and ensure the transaction unit wont' be modified during the network transmission.

Take the cross-chain transaction of TSC and ETH as an example:
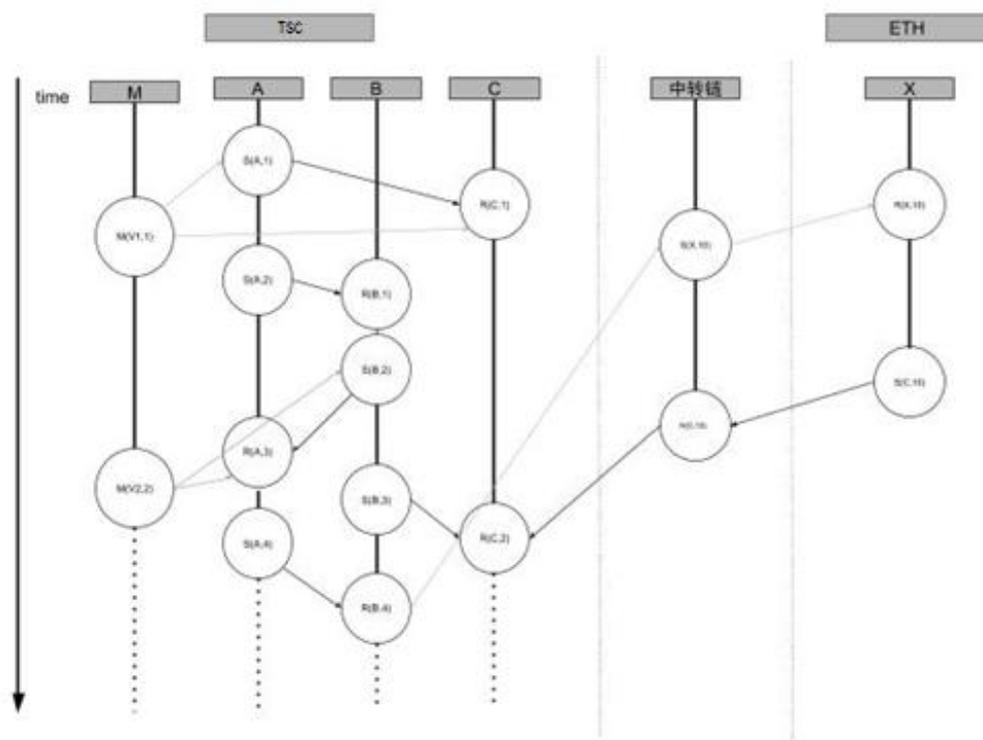
Input transaction:

1） We assume that the account X of Ethereum needs to pay 10 ETH to account C of

TSC. X needs to apply one relay contract on Ethereum as the contract should include

TSC account C address and amount sent with signature from account C;

2） Relay chain automatically detects the contract related to TSC account on Ethereum;

3） One transit unit in relay chain records and check the contract, and the verifier will begin digital verification.

4） If the digital verification has passed, the last node of account C will add the record of this transaction, and 10 ETH will be frozen in the Ethereum so that it can't circulate in Ethereum temporarily ;If not, the contract is voided and the deal fails.

5） Finally, one verifier unit in TSC verifying chain verifies the last node in account C to reach a consensus in the entire network.

Output transaction:

1） We assume that TSC account B need to pay 10 ETH to Ethereum account X. Account B need to send a transaction request with account B signature, and the request includes Ethereum account X address and amount to TSC relay chain.

2） Relay chain receives the request from TSC account B and records it.

3） Certain transit unit in the relay chain records and checks the transaction request, and the verifier will begin digital verification and sign;

4） If the verification is completed, the last node of account B adds one transaction record of deducting 10 ETH, and the relay chain converts the mapping of account X address on Ethereum, it also releases any 10 ETH frozen in the Ethereum;

5） Finally, the contract will send the 10 ETH to the account X in Ethereum.

Cross-chain transaction of TSC is not only limited to one single currency. TSC relays chain can be connected with derivative space such as BTC, ZCash, EOS, etc. In other words, the block space derivated by most existing currencies can be connected to the TSC relays chain. Moreover, any new currency can be easily and quickly connected to the TSC relay chain as long as the TSC contract is signed and the consensus is reached. This allows TSC to to have Infinite expansion on a large scale as well as greatly meets the needs of global transactions. Moreover, most currencies on the market can now be traded directly through the TSC relays chain, for example, BTC and ETH can trade directly on TSC relays chain. In this way, there is no need to establish channels or platforms directly in BTC or ETH, which greatly saves the cost of technology & manpower. TSC relays chain can be considered as a huge cross-chain platform to reach the transactions between different currencies.

To ensure the Immediacy and security of cross-chain transaction on TSC relay chain, TSC atom exchange implementation will be adopted. TSC atom exchange is a new technology which allows TSC Token to have P2P transaction with other types of digital assets without trust. This transaction can be completed in a instant that neither

of parties have the chance to violate the protocol. And when one party of a transaction exits in the middle of the transaction, the digital asset will be returned to both parties after a certain time. The technology is significant for the future of crypto-currencies as this seamless ability to encrypt digital currency swaps across blockchains opens up a new application. The TSC atomic swap opens up transaction barriers between various crypto-currencies to make sure the transaction is correct. If users want to trade between TSC Tokens and other types of crypto-currencies, this technology can let users have complete control over their own assets.

Operating Principle of the TSC Atomic Swap:

For example, M and N are two parties in the digital asset transaction. M has his own account in TSC, and N has his own account on TSC and Ethereum. Now, M and N have settled a deal through phone and internet as they also know each others' account on TSC. According to the deal, M is going to transfer his 100 TSC Tokens on TSC to N's account on TSC, and N will pay M 200 ETC through TSC.

To complete the transaction between TSC tokens and ETC, both parties perform following steps in turns:

● In order to complete the deal atomically, first N customizes a instruction X and have V:= Hash(X) by calculation. Now only N himself knows the instruction X.

● N publishes a transfer transaction on TSC that N conditionally transfers 200ETC

to M. Unlike normal transfer transactions, this transaction comes with a hash-locking condition: only when M shows TSC an instruction which satisfies Hash(X')=V in 4000 seconds, X can then add 100ETC to his account (no essential difference between an account model and a UTXO model). if M is unable to claim ETC overtime, then N can have 100 ETC returned to his account by initiating one withdrawal transaction on TSC. The V in the hash-locking condition and overtime period is public as M can see them.

- Now on TSC, M sees that N initiates one transaction while he doesn't know what is unlock instruction X, he must pay 100 TSC tokens to N to get the instruction X. M then sends a transferring instruction to N on TSC with the same hash-locking with validity of 2000 seconds, and the transfer amount will be automatically returned if N is unable to collect the transfer amount. In principle, the instruction transfer with hash-locking is easy to implement, and its logic is: when N clicks transfer instruction, one dialog box will pop up requesting N to fill an instruction X which satisfies Hash(X')= V. If N puts the right instruction, TSC tokens in the transfer instruction will transfer into the N's account on TSC as TSC will send M a response telling M the transfer has been claimed, and the response shows the instruction X put in by N. If N puts the instruction X wrong, then N cannot collect the transfer amount.

- Now N receives the transfer instruction, and he clicks the instruction in time and

puts in the instruction X only N knows. Because V == Hash(X), so N gets 100

TSC tokens successfully. According to programming logic, TSC sends M a

response to tell him the transfer has been received, and instruction N put is X as

M knows the instruction X.

- As M knows instruction X now, he can use instruction X to claim the 200

  pending ETC on TSC. If M operates in time, he can get 200 ETC on TSC.

- So far, M got 200 ETC as N got 200 TSC tokens. During the transaction,

  Ethereum and TSC don't need to communicate with each other at all while

  remaining the atomic swap of TSC tokens and ETC.

The above actions are the normal processes, but the swap atomicity is still set up

under the exception. For example, in the third step, M didn't send transfer through

TSC , and N didn't put in the instruction X to M as he cannot see the transfer, M

cannot withdraw ETC on TSC as he didn't get the instruction X. It ensures the

atomicity of the transaction.

The mechanism of hash lack is easy to implement on blockchains like Ethereum, and

as for TSC, to achieve the above hash-locking transfer will not be too difficult.

Besides, since both transfers are transfers that specify the other party, the program can

be designed as that a third party will provide instructions to help unlock while the

assets still follow the originally specified circulation method. This design allows users to safely delegate operations to others when their wallets fail or TSC is temporarily inaccessible, therefore the unlock instruction exposed publicly on TSC will not bring security issue, instead, it will bring extra benefits.

2.5. TSC IM Platform Ecosystem

2.5.1. Re-structure IM Ecosystem

Due to the layout of the TSC IM global biosphere, users around the world can play games and socialize by using TSC Token in the biosphere, and the TSC IM guarantees the security and privacy of users' information, which builds a completed ecological closed-loop.

2.5.2. Token Applications in the Ecosystem

TSC IM official digital currency is call TSC, it is the digital encrypted currency based on the P2P network.

TSC applications in the ecosystem:

1. Provides secure communication chatting room;

2. Browser based on IM blockchain (TSChat);

3. Information on-chain feature;

4. Provides developer community.

5. Games

6. Open source code

2.5.2.1. Provides secure communication chatting room (basic feature)

TSC IM can not only store and manage TSC assets but also provide wallet management service to other digital assets including sending receiving digital assets, digital asset red pockets and other features. The storage of chat history is no longer passively default, information can be freely coded on the chain or destroyed.

At the same time, TSC economic communication network also shows the expansion & development ability, and with the reward support of TSC Token, TSC economic communication network provides more comprehensive applying ability. TSC also supports rewards with other digital assets to complete the function improvement of TSC.

TSC IM also provides service of emoji to TSC users. Emoji provides users an interesting visual communication option for them to interact with their friends and

family. It increases the users' participation as emoji brings users efficient and clear expression. It also adds delights of communication as users no longer use letters to communicate via devises' screen.

The emoji Market of TSC IM allows every participant to have chance to create his/her own emoji and transmit value on the TSC network. due to the resource contribution, the battle between copyrights will no longer be a issue needs to be solved.

2.5.2.2. TSChat (refer to 通信宝)

For the convenience of users checking communication status with others, we will develop TSChat. With different needs, Users can obtain information for free or pay some amount of money. TSChat provides users quantity of his/her own messages and token consumption. With others permission, users can review their information by paying certain amount of token. We will set up communication billboard and consumption billboard on the home page. For the users on the billboard, TSC team will reward certain amount of token to these users.

2.5.2.3. Information on-chain feature

Based on blockchain technology, information on-chain is the entry point for TSC to enable individual users to access the blockchain world. Users can use TSC to put information they want (include but not limit to words, pictures, etc.) on the chain in

one click to greatly lower the usage restriction. Normal users only need to take one step to enter the new era of personal value digitization in the blockchain field with low-restriction and strong augment ability. As blockchain has technical features such as distributed data storage, P2P transmission, consensus algorithm, it enables the information on the chain to never be lost. TSC can be considered as the Ethereum in the personal digital value world. We believe that as the TSC ecosystem is completing gradually, more users can use their creativity and imagination to discover the shared applications in the blockchain era. In the future, more value-exchanged applications will be built in the personal scenario, such as socialization, e-commerce, sharing, gaming, digital information and more.

2.5.2.4. Asset Management Service

Asset Management Service is a convenient asset management service for users who hold multiple digital assets. Users can integrate their wallets in the application for managing, and it fix the issue of bank transfer. To seamlessly support the fund transfer on the blockchain, the service plans to support Bitcoin, ETH, Litecoin and more digital assets as users don't need to memorize the receiver's address or special data. Users can transfer funds via use names or QR codes.

2.5.2.5. Developer Community

TSC opens the expansion function API to the developer community, and developers

can develop, submit and complete functions according to the function list of the community. The developed function will reward TSC Token according to the function points. The development of the expansion feature can also adopt reward development mode: TSC users can offer rewards for functions they require, and the developers can receive rewards after they complete the rewarded tasks.

2.5.2.6. Games

With the improvement of the consensus algorithm, TSC can support the development and operation of the non-homogeneous game DApp based on blockchain through flexible and efficient smart contract. TSC provides open access platform to games, so that developers can independently develop all kinds of DApps on the TSC chain. On the same time, TSC also provides the main chain token access to a variety of competitive games, and it brings more flexible game credit management and credit circulation ability to game developers.

2.5.2.7. Open Source Code

After completing the consensus algorithm and successfully launched in the main network, TSC technical committee, managed by the TSC Foundation, will open source the TSC code. All the TSC project codes will be managed and inspected by the TSC Technical Committee, and TSC team also manage to have further schedule for functions upgrade and development work for future technology evolution under the

authorization of the TSC Foundation.

3. Production and Distribution of TSC Token

The total amount of TSC issued token will be 3,000,000,000. In the initial stage, 1,300,000,000 tokens will be produced via POS method, 1,040,000,000 of them will distributed to TSC users; the remaining tokens will be given to the TSC team for the project's software application landing and hardware node development services.

After the TSC project is been launched, in the first 6 months, TSC will use POS method to mine, it produces one block every 2 minutes, each block will reward 148 TSC tokens, which means total 19,447,200 TSC tokens in six months. The remaining 1,680,552,800 TSC tokens will be produced using POS +POW method: it produces one block every 2 minutes, each block will reward 1,600 TSC tokens. Every 2 years, the produced amount will be halved, and its production distribution ratio are 80% rewarded to POW miners and 20% rewarded to POS voters.

We introduced the self-combustion mechanism into the TSC ecosystem, during the mining time of POS + POW, the transaction fee will be directly burned out.

The complete codes will be open source in the github and keep them up to date.

4. TSC's Core Team

TSChain CTO- Dave Archer

As the chief technology officer for TSC, Mr Archer has Graduated from the TAFE SA (Noarlunga campnas) with bachelor's degree in computer science and information technology. Mr. Archer has over 15 years experiences in computer such as DevOps, development, coding and more. Mr Archer has been part of the development services for four large block chain projects.

TSChain CTO-Matt Baker

Mr Baker is a professionals in the field of Internet, communication and information security integration. He is also the inventor for several patents in information and communication field. Mr Baker has over 10 years experiences in software development. Mr Baker has rich experiences in the back-end development, block chain technology and back-end website development. Currently, in the TSC team，he is in charge of the R&D and project landing for hardware products.

TSC Blockchain engineer-John Wills

Mr Willss has full stack development experience of block chain technology. He has been working on the developments of REACT, PHP and JavaScript. Many large applications developed by Mr Baker have been using by millions of blockchain users.

TSC CMO- Ben Horder

As a early investors in digital currencies, Mr Horder has more than 10 years experiences of marketing communication management. He also has rich resources in commercial and media. He has established a good partnership with the industry's leading communication practitioners. He also holds on the social media and community interaction resources for millions of users.

5. TSC Foundation

The TSC Foundation consists of core partners and community representatives with high ideals, technical and marketing capabilities. The Foundation aims to promote community autonomy and the steady development of the platform according to the predetermined plan. It also promotes the formation of community organizations that make democratic decisions, the independent token economy , and the blockchain ecosystem that provides technological basis.

All the participants are the important members in the TSC Foundation as they believe in the equal right for decision making, information sharing and shard value promoting. The TSC Foundation welcomes new TSC investors or TSC holders to be parts of the Foundation.

The TSC Foundation consists of 5 members, and the term is 4 years. The members in the first term are experts in the block chain field and enterprise operations as they were selected by the TSC founder team. After one term, the members in the next term will be selected and elected by TSC Foundation representative (major node operator) based on their holding amount and duration of TSC Token as well as their contribution in the TSC ecosystem.

For the healthy development of TSC ecosystem, TSC Decision Committee established three organizations: the Technical Inspection Committee, TSC Market Operation Committee and Economic Management Committee. All the members will be

appointed by the TSC Decision Committee. Each Committee has its own duty:

- TSC Technical Inspection Committee is in charge of inspecting of the technical structure TSC used, deciding the direction of the technical development and promoting the tech team to implement features outlined in the white paper.

- TSC Market Operation Committee is in charge of the advertisement, market promotion, community communication of the TSC as well as the TSC APP promotion and user maintenance.

- TSC Economic Management Committee is in charge of the lockup and un-luckup management of the TSC token. They also review and release the cost of TSC to the public regularly.

6. Project Planned Timeline

	2018Q1 TSC0.7 Team build up Market research Design product model architecture
2018 Q2 TSC0.8 Design product expansion features Determine product economic model Complete the white paper initial draft	
	2018 Q3 TSC0.9 Release white paper Release TSC Asset
2018 Q34TSC1.0 TSC IM application release	

	2019 Q1 TSC1.1 Release information -on-chain features Release event voting feature
2019 Q2 TSC1.2 Release POW+POS mining	
	2019 Q4 TSC1.3 Support smart contract
2020 Q1 TSC1.4 Release TSChat	
	2020 Q2 TSC1.5 Release cross-chain transaction feature

7. Disclaimer

You acknowledge and agree that there are a number of risks related to your purchase, hold and use of TSC tokens as below.

7.1. Risk of Jurisdiction and Enforcement Action

In many jurisdictions, the legal policies related with TSC and other blockchain technology organizations are unclear or unimplemented. It is impossible to predict how, when or if any regulators will adopt existing or introduce new regulations against the TSC. Such regulatory behaviors can have negative effects on the TSC or TSC ecosystem. The foundation (or its affiliates) of TSC may discontinue its operations in the jurisdiction if the regulatory actions or the changes of laws or regulations make it illegal to operate within such jurisdiction, or make it difficult to conduct business under the necessary regulatory authority.

Based on consultations and discussions with a number of professional legal advisers and ongoing analyses of the development of digital assets and legal architecture, the foundation is wary of the sales of TSC. Therefore, for mass sales, the foundation needs to adjust sales strategies regularly to avoid legal risks as much as possible.

7.2. Risk of Market Competition

There is a possibility that an alternative network technology can build similar

facilities by using the same or similar codes and protocols as the codes of the TSC or TSC ecosystem. The TSC ecosystem may need to compete with these alternative technologies, which will have a negative impact on the TSC or TSC ecosystem.

7.3. Risk of Withdrawal of Team Members

The development of the TSC ecosystem mainly relies on the continuing cooperation of the existing technical teams and expert consultants, who are knowledgeable and experienced in their respective fields. The withdrawal of any member may affect the TSC ecosystem or its development.

7.4. Risk of Development Failure

For various reasons, there is a risk that the TSC ecosystem will not continue to develop as planned, including but not limited to: a decline in the price of some digital asset or virtual currency or TSC, unforeseen technical problems, and a shortage of funds for the platform's operation & development.

7.5. Security Risks

The TSC or TSC ecology also may be interfered tentatively by hackers, other malicious groups or organizations in various ways, including but not limited to: malicious attacks, denial of service attacks, consensus-based attacks, Sybil attacks, money laundering and fraud. In addition, there is another risk that a third party or

foundation member or its branch may, intentionally or unintentionally, introduce a vulnerability that poses a threat to the core infrastructure of the TSC or TSC ecosystem, and that has a negative impact on the TSC or TSC ecosystem.

7.6. Other Risks

In addition to the risks mentioned above, there are other risks (such as the Token Purchase Agreement which is specifically set up) related to your purchase, hold and use of TSC, including those circumstances that the foundation cannot predict. This kind of risk may also evolve into unexpected situations or combinations of the above risks. Before buying the TSC, you should make adequate due diligence on the foundation and its affiliates, and understand the overall framework of the TSC ecosystem and its vision.