

TRON

Whitepaper

Contents in this version V1.8 are subject to change at any time as required for the project progress



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Preface | Heal the Internet

Tim Berners-Lee, inventor of the World Wide Web (WWW) and recipient of the 2016 Turing Award, issued a statement in 2017, indicating that the Internet is deviating from its original intention.

Yes, there has been something wrong with the Internet for years.

At the time when Tim Berners-Lee invented the Internet, the Internet was a fully decentralized platform, in which anyone could create content, webpages, websites, and freely interact with others. However, the Internet has developed from a simple academically-researched sharing network into a stunner that governs business, communication, entertainment, and information.

The Internet's power structure is also changing.

Undoubtedly, the Internet belongs to large corporations, rather than the public, that define the rules of the Internet. These corporations include Amazon, Facebook, Google, Apple, as well as Alibaba and Tencent in China.

Internet traffic, data, and content are becoming concentrated because of corporate giants like Facebook, Messenger, Instagram and Snapchat, while China focuses on Apps, including Wechat, Toutiao.com, Taobao and QQ.

These giants own and benefit from the numerous data created by billions of users throughout the world, and maintain the power to create what users read, gain, and desire.

Giants, other than users themselves, own the ability to control data. The data no longer belongs to its creator. Due to the inappropriateness of an attempt to retake data initiatives and the difficulty in building websites and Apps, we have to adopt the rules of WeChat and Facebook and the distribution mechanisms of Weibo and Twitter, thus



losing our own features. Although an App can be self-made, Apple can easily withdraw it from its platform.

However, it is never easy to destroy a person, a thing or a cause.

The Internet is no longer fully decentralized, and it has even become more centralized than the old forces which have been overturned by it, including newspapers, magazines, and records, because newspapers may be collected, but micro blogs are not backed up.

TRON is an attempt to heal the Internet.

We believe users should have ownership of and control over the data they create, rather than have to cede that ownership and control to the platform; users must freely own all digital information.

We believe users must have the final power to make a decision on whether to read and access content, and information must be distributed on a free and volunteer basis, at the user's choice.

We believe users must be entitled to the incentives of digital assets - using data on a free basis, which will no longer be bound by any platform, and be protected by a decentralized Internet.

All of these are facilitated by the decentralized protocol called TRON.

TRON is an action against the centralized Internet, and while this endeavor will be difficult, we believe the fight is worthwhile.

Because a truly decentralized Internet is a laudable goal.

1. What is TRON?

TRON protocol is the blockchain's entertainment system of free content, in which TRX, TRON's coin, is circulated. Its native economic system enables an unprecedented one-on-one interaction between providers of digital entertainment content and ordinary users. Therefore, content providers will no longer need to pay high channel fees to centralized platforms like Google Play and Apple's AppA Store. Also, providers of content



such as texts, pictures, videos, and broadcasts, will break the curse that popularity and hits cannot create cash.

With the strengths of social network and value network, TRON is committed to ecological prosperity. In relation to any community and free market economy, an incentive system that fairly and reasonably reflects the contributions made by participants is fundamental. TRON will attempt to accurately and transparently measure and motivate relevant participants and contributors using digital assets for the first time, thus enabling this content ecosystem.

2. Value of TRON

In designing TRON, the following core values are:

1. Data creators (users) will have the fundamental ownership of data, and the Internet should be decentralized. This was proposed by Tim Berners-Lee at the time when the Internet was born.
2. Those who make a contribution to the TRON ecosystem will be entitled to proportional profits for their work, according to rules. A value network that can digitally capitalize on anything in social and media networks has the greatest potential.
3. All forms of contribution should be of equal quantitative value. Substantially, the time invested by participants, excellent content, and attention are as valuable as furnished capital.
4. The fundamental objective of TRON is to provide services for the public. As an ecosystem operated by a non-profit foundation, TRON is designed to serve the masses throughout the world who enjoy content entertainment, rather than gaining profits.
5. Content should derive from people rather than capitals, and content should be used to reward people rather than to control people. Cultural and creative industries should be driven by the pursuit of the quality of art and content by content creators, artists and scriptwriters, rather than the capitalists who do not



consume the contents.

3. Infrastructures Provided by TRON

TRON seeks to provide relevant participants with the following infrastructures:

1. A High-quality content platform
2. Social network that provides a link among all people
3. Digital currency as a bridge
4. Payment network; and
5. Autonomous ecosystem

4. Characteristics of TRON

As a decentralized content protocol, TRON subscribes to the following four basic characteristics compared, in contrast to the centralized Internet:

1. Data liberation: on a free and uncontrolled basis, the contents including characters, pictures, audio and video may be uploaded, stored and spread.
2. Content-enabling: digital assets are obtained through provision and distribution of content, thus economically stimulating the content ecosystem.
3. Personal ICO: an individual may freely distribute digital assets in the form of ICO, while others may enjoy the benefits and services brought due to the continuous development of contributors' data by purchasing digital assets.
4. Infrastructure: distributed digital assets will be equipped with a complete set of decentralized infrastructures, including distributed exchange, autonomous gaming, forecast, and game system.

5. How to Achieve Economic Stimulation of Content Development Through TRON?



Fundamentally, the TRON design requires the monetization of the content economy. The TRON mechanism is based on economic stimulation of content development and monetization of the content in an encrypted manner. Economic stimulation achieved through cryptology may greatly contribute to the growth of a content platform, and it is believed that cryptocurrency could unprecedentedly stimulate the content development ecosystem.

TRON will propose a set of improved mechanism to evaluate an individual's ecological contribution. Most existing platforms adhere to the principle of one-user one-vote, which easily cause repeated voting and the request for control of junks and attacks. Existing content platforms have been controlled by profit demands and centralized mechanisms, and the content we read is that which the centralized platform wishes us to read, rather than what we wish to read. Due to the unfair algorithm of information flow, Weibo, Toutiao.com, WeChat, and Facebook are gradually becoming controlled tools. Advertising platforms are the first profit-gaining mode, among which Phoenix Nest, advertiser's recommendation algorithm of Toutiao.com, advertising system of WeChat, promotion program of Weibo, and advertisement channel of Taobao are typical profit-gaining modes and unable to enable the content which attracts traffic.

However, with TRON, the economic stimulation system is expected to become a circulatory system in a decentralized manner, enabling users to have a platform to enjoy their favorite content without conflicting with profit demands. TRON's autonomous system will also unprecedentedly enable ecosystem members, thus forming an autonomous ecosystem rather than the current flat-user mechanism.

TRON only allows the users who involve themselves in the periodic unfreezing of TRX to cast a vote on the platform's ecological management and decision-making. The TRON Platform is currently operating. We believe that under this model, over time, community members will be encouraged to hold TRX for the long term, which will maximize the TRON Platform's long-term value.



6. Realization Path of TRON

While the initial TRON platform is currently up and running, it is expected to take 8-10 years to implement the entire TRON system, a large program involving six steps. Specifically, the realization path is as follows:

1. Exodus, Data Liberation

A mechanism of upload, storage, and distribution which is based on peer-to-peer and distributed content.

In the Exodus phase, on the basis of the distributed storage technology represented by IPFS, TRON will provide users with a completely free and reliable platform for data publication, storage and dissemination.

2. Odyssey, Content Empowerment

Economic incentives, empowerment, content ecology and blockchain technology will create a fully competitive economic mechanism with fair returns for content creation, distribution and dissemination. Therefore, individuals can be encouraged and contents can be empowered, thus constantly expanding the boundary of the system.

In the centralized Internet system and in the vast majority of cases, content producers earn cash through advertising models. But the efficiency of obtaining cash has been extremely low because the user experience is seriously dampened by the annoyingly strong advertising push mode. Other content has also confronted trouble. Despite cash being gained through tipping and gifting for other content, content producers' profits are deducted by 30%-90% due to a lack of a paying system. What's worse, because they are hindered by the randomness of the tipping model, most content providers cannot break even.

Content creators are in urgent need of a content protocol with a self-paying system. Access to content can be measured by payment, and the payment and purchase are based on the transparent records of a blockchain.



TRON protocol is the blockchain's entertainment system of free content, in which TRX, TRON's coin, is circulated. Its native economic system enables an unprecedented one-on-one interaction between providers of digital entertainment content and ordinary users. Therefore, content providers will no longer need to pay high channel fees to centralized platforms like Google Play and Apple's AppA Store. Also, providers of content such as texts, pictures, videos, and broadcasts, will break the curse that popularity and hits cannot create cash. The tipping model focuses on the popularity, and popularity increases as the tipping increases. The distributed clearing and storage mode will also enable developers and content providers full freedom of creation, without being restricted by centralized managers.

In the TRON system, content producers can have direct access to TRX, the TRON coin paid by fan users for premium content. They can also obtain influence and power by creating high-quality contents, thus directly gaining TRX rewards given by the system.

An example of a value score of user operation that heavily weights content distribution:

Calculation formula of V_C^t

$$V_C^t = \sum_{i=1}^5 \sum_{j=1}^{c_i^t} w_i p_j x_j^t$$

$$p_j = trx_j / \left(d_1 + \frac{ca_j}{1 + e^{d_2 - ca_j}} \right)$$

C = content

w_i = weights of operations such as hit (1), like (2), comment (3), tipping (4), and forward (5)

p_j = user's energy value during the jth operation. User's energy value will constantly decrease when the user frequently operates specific interactions over a certain period; the value will slowly increase when the user stops the operation, thus limiting the click farming.



x_j^t = user's credit score during the jth operation. The score is calculated dynamically on the basis of the user's credit among the community as a whole. A user's credit score will be downgraded if he or she is repeatedly reported against or receives complaints.

trx_j = user's available TRX balance during the Jth operation. User's current available TRX balance is obtained by his or her current TRX balance deducting the amount locked by the system. The larger the available TRX balance is, the higher the value score of the user's interactive operation. The purpose is to prevent malicious users from registering multiple blank accounts for click farming.

$d_1 d_2$ = Threshold value of operation

ca_j = the total number of user's various operations during the jth operation

c_i^t = at the moment of t, times of the ith operation

For creators of live-show-like instant contents, the block chain technology can also display the anchor's popularity in a transparent and fair manner and obtain real-time and rapid income through intelligent contract. The technology can avoid problems triggered by the centralized platforms, such as the black box operation, account delay and block for no reason. The problems damage the interests of the anchor and the audience.

An example of an anchor's sharecropping of the intelligent contract on the live platform:

```
pragma solidity ^0.4.11;
```

```
contract 波场 ( TRON ) AnchorPay {
```

```
    address platform;    // 平台地址
```



```

function 波场 ( TRON ) AnchorPay() {

    platform = msg.sender;

}

function deposit(address anchor) public payable{

    uint for_anchor = msg.value * 9 / 10;           // 主播拿 90%

    uint for_platform = msg.value - for_anchor;

    anchor.transfer(for_anchor);

    platform.transfer(for_platform);

}

function withdraw() public{

    assert(msg.sender == platform);

    msg.sender.transfer(this.balance);

}

function() payable{

}

```

With TRON's structure of bottom blockchain, TRON can issue their own tokens freely, and thus is equipped with a native economic system. Through TRON's official token, TRX, users can easily achieve value distribution, payment, and settlement of content. The system can also motivate users to produce content with clearer



copyrights and high quality, which enables the content output system's fine self-operation.

3. Apollo, Free Movement of Value—Decentralized Token Trading Exclusively for Individuals

To reach the goal that each content producer in the TRON system can issue their own tokens, the system must have a complete solution for de-centralized tradings, thus realizing the values.

The platform will face the following challenges:

1. As time passes, the number of tokens issued on the platform will significantly increase, making it difficult for traders to screen. Traders may become easily confused or even cheated.
2. Despite the very small amount paid by individual supporters, the total number of supporters is huge, who have high requirements for the safety of platform funds. However, the system will prevent phenomena like hacker attacks and absconding with funds on the platform.
3. Because the logic of distribution of interests varies from that of tokens, the platform needs to promptly complete reminders and have quick delivery.
4. Transaction history needs to be open and transparent, so that participants can understand the whole process and have sufficient information, thus reducing transaction risks.

The current centralized exchange cannot respond to these challenges, especially in regard to the rapid trading of mass-type tokens and risk management of platform funds; therefore, decentralized trading platforms are needed to complete deals. Not all funds are handled by centralized trading platforms, but instead, they are always stored in traders' accounts, perfectly solving for third-party custodian risk - problems like funds being stolen or money being absconded; on the other hand, through the peer-to-peer content-addressable protocol that is decentralized and distributed, traders can easily and accurately find mass and exclusive tokens without confusion.

Through the establishment of the decentralized trading platform, the system's value, property rights, and risks can be freely traded and exchanged, thus increasing the economic vitality of the entire system in geometric multiples.

4. Star Trek, Traffic Monetizing—Gaming of De-centralization and Market Forecast

The size of the global gaming market in 2014 exceeded \$450 billion. Traffic on the TRON network will make it possible to build an online gaming platform for de-centralization. Developers can freely build online gaming platforms through TRON, providing fully autonomous games and predicting market functions.

5. Eternity, Traffic Conversion—Decentralized Game

In 2016, the global video game market was to \$ 9.66 billion, of which the scale of the phone game market was \$ 4.61 billion, accounting for 42%. TRON provides the possibility for establishing an on-line game platform. Developers can freely set up game platforms through TRON, achieve crowd funding for game development, and common investors can contribute to game content creation..

7. Technical System of TRON

1. File Storage Protocol

TRON's bottom layer consists of a group of multi-layer protocol stacks with various implementation models for each layer and is integrated in modules. Corresponding interface standards are defined between layers, including the following five levels:

- name layer: a self-certified PKI namespace
- MerkleDAG layer: data structure format
- Exchange layer: block transmission and copy
- Routing layer: locating peer nodes and objects
- Network layer: establishing connection among peer nodes



- Node and identification

- 1) “TRON node” is the program that can locate, release and copy MerleDAG. TRON network adopts node identification based on PKI (Public Key Infrastructure); the node is shown as NodeId, which is the Ciphertext Hash of Public Key. Node will store its public and private keys (private key will be protected by password). Users can freely establish and initiate a “new” node in every boot, which will deprive the network the profit achieved from former node running. The system has an incentive mechanism to make users maintain the same node.

```
type NodeId Multihash

type Multihash []byte

// self-describing cryptographic hash digest

type PublicKey []byte

type PrivateKey []byte

// self-describing keys

Type Node struct {

    NodeId NodeID

    PubKey PublicKey

    PriKey PrivateKey

}
```

The generation mechanism of NodeId is as follows:

```
difficulty = <integer parameter>

n = Node{ }

do {
```



```

n.PubKey, n.PrivKey = PKI.genKeyPair()
n.NodeId = hash(n.PubKey)
p = count_preceding_zero_bits(hash(n.NodeId))
} while (p < difficulty)

```

When the connection is established, the nodes will exchange public keys among each other and, check if the hash of node public key is equal to the NodeId hash(other.PublicKey) equals other.NodeId of peer node, if not, the connection will be terminated.

2) Multihash and updatable hash

All hashes in TRON will be encoded with multihash, which is a self-describing hash format. The hash function should be used in accordance with specific security requirements. The encryption system is updatable, which means the system can switch to a stronger hash algorithm when a current hash function cannot meet more strict security requirements. But there is indeed a price to be paid, the object needs to be rehashed and the connection needs to be rebuilt. This way of not defining the length of a hash digest in advance allows for the tool used today can to work normally even if it is switched to a longer hash function tomorrow.

The hash digest value is stored in multihash format, including a short header, specified hash function and byte length of digest, For instance:

```
<function code><digest length><digest bytes>
```

The current TRON node must support the following hash algorithm: sha2-256, sha2-512 and sha3.

3) Network layer

Provide point-to-point reliable and unreliable transmission between two TRON nodes, and process:

- NAT traversal—punching, port mapping and relaying

- Support various transport protocols—TCP, SCTP, UTP...
 - Support encryption and digital signature
 - Multiplexing—multiplex connection, stream and protocol...
- 4) The routing layer: locating peer nodes and data

Routing layer serves for two purposes:

- Node-routing—searching for other nodes
- Content routing—searching for data released to TRON.

Routing layer defines an interface, and all implementations meet or realize the interface can be linked to TRON, for instance: DHTs, mdns, snr, dns. The corresponding interface definition is as follows:

```

FindPeer(node NodeId)
// gets a particular peer's network address

SetValue(key []bytes, value []bytes)
// stores a small metadata value in DHT

GetValue(key []bytes)
// retrieves small metadata value from DHT

ProvideValue(key Multihash)
// announces this node can serve a large value

FindValuePeers(key Multihash, min int)
// gets a number of peers serving a large value
}

```

5) Block swap: transmitting content-addressable data

TRON's block swap layer is responsible for data transmission coordination. Once the nodes are aware of each other and establish connection, content-addressable blocks can be transmitted through swap agreement. Note that the term "swap" in this context does not refer to a swap in the sense of a financial market transaction as defined in the US Commodity Exchange Act. It is a technical term of art dealing with the TRON platform code's distribution of content. The block swap layer is the interface definition, and all implementations meet or realize the

interface can achieve seamless access, for instance:

- BitSwap: current implementation, which is the generalization implementation of BitTorrent, supports the swap of any DAG;
- HTTP: simple HTTP implementations can be used between HTTP clients and servers.

BitSwap is a block transmission agreement similar to BitTorrent—where nodes represent the expected block set with `want_list`, and represent the data block set they can provide with `have_list`. Unlike BitTorrent, block swapped by BitSwap is not limited to a single torrent. BitSwap serves as a persistent market, nodes exchange blocks through BitSwap market, the node can obtain their favored block sets, and these block sets may be completely unrelated files from the file system. Sometimes, in exchange, a node may have no blocks needed by other nodes, and it will help find blocks it needs – these get the needed block from each other, and such incentives can help the cache and distribution of rare blocks.

BitSwap credit

The agreement must urge the nodes to be the seed because they might not have the blocks needed by other nodes. Therefore, BitSwap nodes will actively deliver blocks to other peer nodes, and the agreement must prevent the existence of greedy nodes that load little and never share their blocks. A simple system similar to credits can solve these problems.

(1) An node track its number of bytes exchanged with other nodes.

(2) Nodes transmit blocks to indebted nodes in form of probability, the higher the debt of indebted node is, the lower probability of block transmission will be.

It should be noticed that if the node decides not to transmit a block to the opposite end, then it cannot transmit a block to the ignored correspondent

node within the following ignore_cooldown time. This prevents the submitter from escaping from repeatedly sending blocks.

BitSwap strategy

The node's strategy to send blocks directly influences the performance of block swapping. It should meet the following objectives:

- (1) Maximize the node and the overall transaction performance;
- (2) Prevent greedy nodes from taking advantage of or reducing the swapping performance;
- (3) Efficient and exclusive to other strategies;
- (4) Be friendly to the credit node.

A practical strategy selection is Sigmoid function, the defined debt ratio r is:

$$r = \frac{\text{bytes_sent}}{\text{bytes_recv} + 1}$$

At a given r , the probability of sending to indebted node will be calculated as:

$$P(\text{send} | r) = 1 - \frac{1}{1 + \exp(6 - 3r)}$$

The sending probability drops dramatically with the rising of debt ratio. Debt ratio is the measurement of credit, which is friendly to previous nodes that have swapped many blocks and unfriendly to unknown or untrusted nodes.

BitSwap accounts

The BitSwap node will keep accounts of block swaps, which helps node track history and avoid being cheated. When connection is established, the



BitSwap nodes will exchange account information. If the information is not matched exactly, the accounts will be deleted and reinitialized, and all profits and debts will be lost. This method seems to have a loophole for malicious nodes to delete debts by way of intentionally “losing” accounts, but that is impossible because nodes cannot accumulate enough debts. Furthermore, it will lose all the previously-accumulated debt, and other nodes will consider it abnormal behavior and refuse to swap.

```
type Ledger struct {
    owner      NodeId
    partner    NodeId
    bytes_sent int
    bytes_recv int
    timestamp  Timestamp
}
```

The account information history will not influence the normal operation, and only recent account items are useful. The node can also choose store or not to store historical information.

2. Self-operation of Storage Network

TRON is a centerless storage network, which turns the storage from cloud model to market model based on algorithms and rules. The market is based on blockchain and trade in virtual currency: the miner earns TRX by providing storage for clients; on the contrary, the clients spends TRX to hire miner to store and dispatch data. Similar to Bitcoin, offered by miners, which provides a useful client-side service (unlike Bitcoin, the miners’ work is only useful for blockchain consensus) and is a strong incentive to drive miners to contribute as much storage space as possible to client-side rent. The agreement will integrate these resources into a self-healing storage network for external use, and the network will realize its robustness by copying and dispersing stored content and automatically detect and repair replication errors. The client side can choose different replication parameters to protect data according to different threat degrees and levels. The storage network also provides other security guarantees for clients such as end-to-end encryption of content, and the storage provider cannot obtain the decryption key.



1) Proof-of-Replication (PoRep) algorithm

The server (prover, P) convinces the user (verifier, V) that its data D is replicated and stored in multiple physical storage locations.

Seal operation

Seal operations include: (1) getting the public key of verifier's stored data through asking verifier to prove the pseudorandom and force the data copies to be correctly stored in independent physical storage; and (2) force the time required by copying the process to be longer than the expected time required by responding to a Challenge.

PoRep algorithm flow

Create a copy: create a copy in Setup algorithm through the Seal operation and provide the proof of successful execution.

```
[ Setup
  • INPUTS:
    - prover key pair  $(pk_P, sk_P)$ 
    - prover SEAL key  $pk_{SEAL}$ 
    - data  $\mathcal{D}$ 
  • OUTPUTS: replica  $\mathcal{R}$ , Merkle root  $rt$  of  $\mathcal{R}$ , proof  $\pi_{SEAL}$ 
```

Storage verification: The Prove algorithm produces storage verification for the replica. The prover receives a random challenge c and determines one leaf R_c of Merkle Tree R (root is rt), the prover produces the proof of R_c and the Merkle path to rt .

```
[ Prove
  • INPUTS:
    - prover Proof-of-Storage key  $pk_{POS}$ 
    - replica  $\mathcal{R}$ 
    - random challenge  $c$ 
  • OUTPUTS: a proof  $\pi_{POS}$ 
```

Verification proof: Verify algorithm checks the validity of the storage verification based on the data copy of the Merkle tree root and the hash of the original data.



The verification is publicly verifiable: any distributed system node interested in this data can check the validity of the storage verification.

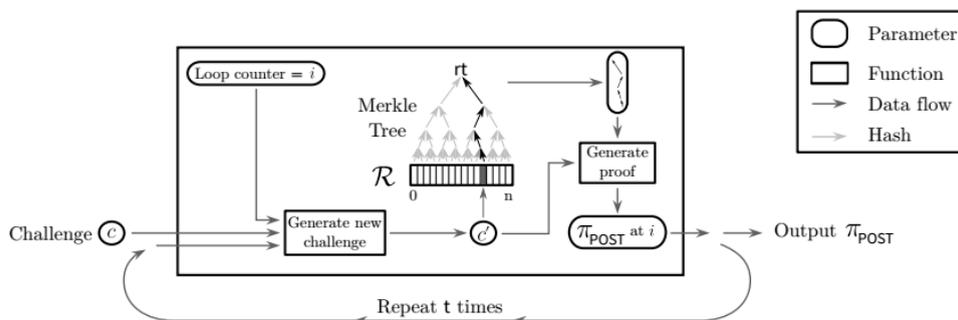
- Verify**
- **INPUTS:**
 - prover public key, pk_P
 - verifier SEAL and POS keys vk_{SEAL}, vk_{POS}
 - hash of data $\mathcal{D}, h_{\mathcal{D}}$
 - Merkle root of replica \mathcal{R}, rt
 - random challenge, c
 - tuple of proofs, (π_{SEAL}, π_{POS})
 - **OUTPUTS:** bit b , equals 1 if proofs are valid

1) PoSt algorithm flow

The Setup of PoSt is similar to Verify algorithm and PoRep. The Prove algorithm produces Proof-of-Spacetime for data copy.

- Prove**
- **INPUTS:**
 - prover PoSt key pk_{POST}
 - replica \mathcal{R}
 - random challenge c
 - time parameter t
 - **OUTPUTS:** a proof π_{POST}

The prover receives random challenge from verifier and orderly generates Proofs-of-Replication, then uses one proof output as the next output until t times of loop iteration, as is shown in the following picture:



PoSt. Prove mechanism displays an iterative proof that is effectively stored for a period of time.

3. Network Implementation of TRON Contents

Through the use of many existing mature technologies, wave field (TRON), as a new content platform, provides security, scalability, and privacy, and simultaneously allows the participants to actively contribute to the processing capacity of their machine to build a user registration network. It also gives positive contributors the privilege to send advertisements to the whole network to incentivize (of course this group text messaging will be limited in number).

1) The user registers P2P network

Centerless, but secure user registration, is implemented through the blockchain mechanism, and the same mechanism has been applied in Bitcoin without the need for central authorization, which avoids double spend difficulties. The blockchain ensures no duplicate registration, and the newly-registered users must obtain the confirmation of multiple blocks before taking effect, i.e. notarization. Each block is defined as:

$$Block_i = [i, H(Block_{i-1}), Nonce_i, SpamMsg_i, [UserReg_j, UserReg_{j+1}, \dots]]$$

$H(Block_i)$ provides proof-of-Work to prove that the user received satisfying Nonce value in $Nonce_i$ space through violent solving; meanwhile occasional hash collision is avoided through verification. The difficulty of solving is determined by the difficulty value, and the number of blocks generated per hour is automatically set by the system, which is similar to the Bitcoin network.

$$UserReg_j = [Username_j, PUBK_j, Nonce_j]$$

New user j must broadcast $UserReg_j$ when registering online, and after receiving the broadcast message, other nodes must prove the proof-of-Work of $H(UserReg_j)$, which will prevent denial of service attacks by false registration. This workload is much smaller than the workload of the blockchain; typically, a few minutes of computation can solve the problem.

The blockchain provides a mapping from the user name $Username_j$ to the user public key $PUBK_j$, a dictionary that can be publicly queried.

The node must verify the uniqueness of $Username_j$ before adding $Username_j$ to the new block, but there is an exception: if the newly-registered key is signed by the previously known public and private keys, then it may be replaced. In addition, the ID_j uniqueness and the proof-of-Work of $UserReg_j$ should be also proved when receiving the new block.

$Username_j$ also has the maximum size and the allowable character limit to protect the ID space from the hash attacks.

$SpamMsg_j$ is a broadcast message (called "Promoted" message) that sends the Promoted message as a reward to nodes that actively participate in block generation.

2) Routable DHT overlay network

The second network is a P2P overlay network similar to Kademia, which is mainly used for resource storage and searching content, and also for direct delivery of notifications between users.

Using the user's ID as the network node ID seems like a good choice, but this leads to the exposure of the user's identity and location, breaking the system's privacy. Therefore, hashing the IP address and the node's port number to identify the node and taking it as the node's name in the DHT network can also avoid the sybil attack:

$$ID_{node_j} = H([IP_j, port])$$

The package delivered from ID_{src} to ID_{dst} in DHT network is defined as follows:

$$Packet = [ID_{dst}, ID_{src}, SIG_j(payload), ID_j]$$

The payload is signed through user ID_j , the ID_j may be different from other users of ID_{src} during package retransmission/refresh.



These functions constitute the third layer function of the concept model of the DHT overlay network. The above layer is the "application layer", which provides the data storage primitive to PUT and GET, PUT is defined as follows:

$$payload_{PUT} = [target, value, time, seq] \text{ where} \\ target = [owner, resource, restype] \text{ and } ID_{dst} = H(target)$$

Before accepting the storage request, the destination node needs to do the following rule checking:

- $ID_{dst} = H(target)$: ensure the correct calculation of the destination address;
- ID_{dst} is the neighbor of ID_{node} that actually receives the request;
- $ID_j = H(owner)$: verify when restype is "single";
- seq is larger than stored old value seq_{old} , which is also verified when restype is "single".
- time is a valid time (i.e. not a future time value).

Restype defines resource types. There are two possible values, "single" and "multi." Single represents resources that can only key owners can update; multi represents responses from different users (i.e., replies to a post). For a single type, the node stores only a single value, and for the multi type, the new PUT request appends the value to the list. Both types of storage can set the expiration time, and the corresponding storage will be deleted from the system after the setting time, so that the expired data will be automatically cleared. Primitive data retrieval GET can also operate on two types of storage resources, other non-storage resources related to the dynamic content also can achieve similar access operations, so as to share the same API interface.

3) User contents

The k-th message of user j is defined as:



$$UserPost_{jk} = \overline{SIG}_j([Username_j, k, type, MSG_k, REPLY_k])$$

MSG_k is content, k is a monotone increasing number, possible values of type include: the new posts, replies, retransmission (RT), direct messages (DM), $REPLY_k$ is an optional domain, which provides reference of the original message in response /retransmission and is defined as:

$$REPLY_k = [Username_{j'}, k']$$

representing the original message is the k' -th message of the user j' .

The contents are simultaneously shared in two overlay networks: (1) stored in DHT as a short-term storage value; and (2) archived like files in BitTorrent network. When the new content is created, the client-side must send a PUT request to the following addresses:

$$ID_{UserPost_{jk}} = H([Username_j, \text{"post"} + k, \text{"single"}]) \text{ and} \\ ID_{swarm_{-j}} = H([Username_j, \text{"swarm"}, \text{"single"}]).$$

$ID_{UserPost_{jk}}$ is the destination storage node's address in the second DHT network, providing the retrieval capability of any content.

$ID_{swarm_{-j}}$ is the gateway address of torrent swarm group related to the content of the user $Username_j$ in the third network, and this torrent contains all the content of a given user j , which provides quick distribution and sharing of content based BitTorrent protocol and is independent of the second DHT network. The neighbor node of $ID_{swarm_{-j}}$ needs to join the swarm cluster of user j to help the storage and distribution of content, provide data reliability and better data distribution performance; similarly, the neighbor node of $ID_{UserPost_{jk}}$ also needs to store the same values stored by $ID_{UserPost_{jk}}$.

The swarm group mechanism solves the problem of fast and efficient notifications and distribution of new content, so that the user's followers don't have to always poll the DHT network address to determine whether new content is generated.

Direct message (DM)



Users posting content can also be delivered by direct message, but only if the message receiver is a follower of user k.

$$UserPost(j \rightarrow l)_k = SIG_j (["", k, "dm", [PUBK_l(DM_k), H(DM_k)]])$$

Except the for the content difference(now is $[PUBK_l(DM_k), H(DM_k)]$), there is no difference from regular posts. DM will only be received by user l who has successfully decrypted. Although other followers can also receive the message, they cannot decrypt the message, nor can they perceive who is the final receiver. Encryption is based on the ECIS elliptic curve encryption algorithm.

User content torrent/tracker rule

- In hashing space, the online neighbor nodes within a certain distance from ID_{swarm_j} need to join the corresponding Swarm;
- When ID_{swarm_j} 's neighbor receives new content from the DHT network, it must work as a gateway for BitTorrent network to incorporate content into a file-like archive structure;
- BitTorrent tracker is read-only multi-value list storage. Its hash address is calculated as:

$$ID_{tracker_j} = H ([Username_j, "tracker", "multi"])$$

- The follower of user j should join in the corresponding swarm to receive real-time content update, so as to obtain the address of the initial Peer through the primitive GET query of $ID_{tracker_j}$;
- $ID_{tracker_j}$ is different from other storage values because it is read-only, which prevents the tracker attack and contains the swarm members' privacy. The list of IP addresses is obtained through the swarm protocol, which requires the online neighbor node of $ID_{tracker_j}$ to join the swarm.
- Swarm members can only know each other through IP address, and BitTorrent does not provide any information about the user name.

- There is no need for the hash of all user contents, because the contents (including DM) have been signed to verify the integrity of the content;
- The added value k when generating new content is broadcasted directly through flooding in the Swarm;
- Members of the Swarm will exchange the content lists, where members can choose to save or request only the most recent content;
- The seed node is the node selected to archive the content;
- A content publishers (user j) can choose not to be member of the swarm group (to protect privacy and hide IP address);
- If the publisher chooses to be a swarm member, it does not have to follow the ID_{swarm_j} gateway mechanism, which will expose its own IP address;
- Even if the publisher becomes a swarm member, it may not have to act as a seed node;
- The new block generation rate will impact the user's posting speed, and if a new block is generated every 10 minutes, on average, 288 contents blocks can be released daily.

4) User mention mechanism

If the new content refers to user j , the client-side also has to send a notification to ID_j , including the entire message content, to be routed through the DHT network.

The mention mechanism is the only function in the system that needs to be addressed by user ID_j instead of ID_{node_j} , which may expose users' privacy information. An alternative implementation mechanism is as follows:

$$ID_{\text{mention}_j} = H([Username_j, \text{"mention"}])$$

The user name is hidden hash and a new address for receiving and accumulating all mention is calculated, ID_{mention_j} neighbor nodes will also



participate in the storage of mention, providing maximum reliability and storage performance. A bad thing about this approach is that the user needs to poll this address periodically to determine if any new mention is received.

The mention mechanism requires the collaboration of the client-side, and if it does not send notification messages to the network, the user will not perceive that he has been mentioned.

5) Explicit message request

User I can request a specific explicit message from user j without joining Swarm group through directly retrieving the corresponding contents from $ID_{UserPost_jk}$ address of the second DHT network, it supports functions of "message upstream".

6) Message downstream

A downstream trace of the message (such as a reply/RT query for a specific content query) is relatively difficult to resolve, and a possible solution is to send a notification to a storage address of a multi-valued list

$$ID_{replies_jk} = H([Username_j, \text{"replies"} + k, \text{"multi"}])$$

The stored value is the copy of all responses, which also requires the client sides to work together.

7) Hash tag

Like the mention mechanism, the hash tag detects in the context of the new message, and the copy of the message is sent to a specific multi-value list storage address:

$$ID_{hashtag_t} = H([hashtag_t, \text{"hashtag"}, \text{"multi"}])$$

This is similar to a message downstream mechanism, but the difference is: the hash tag creates a new Swarm group; and $ID_{hashtag_t}$ neighbors must also join this virtual Swarm. It is called virtual because the Swarm group does not share

any file content and is only used to realize the broadcast function for users who want to monitor the hash tag.

8) Content search

A search for any content that appears can be realized by extending the implementation of the hash tag to build a similar mechanism for the content that appears. In order to reduce overhead and network transmission, corresponding restrictions must be attached, such as restricting content size and excluding prepositions. In addition, it can significantly reduce the storage overhead and the system implementation complexity if the unified storage of content containing the same content is stored in a temporary multi-valued list address. The address calculation is as follows:

$$ID_{word_w} = H([word_w, \text{"word"}, \text{"multi"}])$$

TRON content provides the following security, extensibility and privacy features:

- The architecture itself provides elastic extensions, and no single company, government or organization can close it;
- The distributed user registration mechanism is as secure as Bitcoin transactions, providing non-centralized content authentication;
- Users are more eager to register early so they can select their favorite user name,.
- The common user naming method and discarding the long encryption hash allow users to have a better use experience.
- Public key substitution mechanism allows users to change their key pair when security is threatened;
- The main functions of other blogging systems are included, such as user name search, message tracing, mention, encrypted message, hash tag and content search.

- The ability to send notifications to and request resources from specific user via DHT routing, whether the user is online or not;
- The architecture provides incentives for participating nodes to have the privilege of sending broadcast messages;
- Users' public content and hashtags can be accessed through read-only web interface, which does not break the security of the system;
- Resource-constrained client sides can be optimized, for example, by not storing all blockchains but only the hash values of the blocks. In order to search for a particular user, they can inquire network which block contains the user's registration, and the client-side only have to download the desired block without reducing security and verify data integrity through some branches of the Merkle Tree.

8. TRX—Official Token of TRON

TRON's official currency is TRONIX. TRON will own the following categories of assets extended from TRONIX:

(1) TRONIX

TRONIX is the basic unit of accounts in TRON's blockchain. The value of all other tokens is derived from the value of TRON. Those who wish to enter or exit TRON must buy or sell TRONIX. TRONIX's total distribution is 100 billion.

(2) TRON Power (TP)

TP is locked TRON. Users can acquire TP by locking their TRONIX. TP, in

nature, is TRONIX with voting rights, which means TP holders have more privileges in the ecosystem.

In the world of cryptocurrency, we see speculators constantly seeking fast-appreciating currencies for investment. TRON tries to build an ecology under the full control of TRON holders who are optimistic about TRON on a long-term basis, and we hope TRON could be controlled by those whose values are consistent with TRON's over the long term.

As time passes, we'll give TP holders more TPs as a reward, and the reward will be dynamically allocated. This means that those who hold and lock TP for the long term will be rewarded.

TRON POWER's balance cannot be transferred nor sold, which means TRON POWER is not tradable.

Long-term investment in TRON's direction is critical for the ecosystem to make long-term plan and not give up the pursuit of its ideal for short-term interests. Meanwhile, stakeholders enjoy the sustainable growth. Long-term holders can be the benchmark in the ecosystem and better lead the ecology's development.

(3) TRON 20 TOKEN

Content owner ICO: Content owners (IPs, individuals, and groups) can freely issue their digital assets, using TRON 20 standards, while others can buy these digital assets and enjoy the benefits and services brought by the constant growth of data contributions.

Tokenization is a way of defining value in blockchain and is used to benchmark financial or digital assets. On TRON, we suggest all tokens use the same standards, TRON 20, which will make it easier for the token exchanges and DAPP support



On the basis of TRON's blockchain, the community will also support some development of DAPP, the decentralized exchange, market forecasts, random digital sources, and other ecological projects.

9. Transaction Confirmation and Community Governance

The blockchain transaction confirmation mechanism is critical to the system's self-upgrading. When the protocol layer changes, the ecosystem will decide to follow the longest chain. Existing voting mechanisms are inefficient and sometimes fail to make most nodes vote, leading to stagnant decision-making.

TRON is the first to propose a mixed-voting mechanism and set a two-tier voting system,

1. Poll
2. Follow vote

TRON's nodes communicate with each other, but they can confirm the transaction at different times. Blockchain requires the uniformity of sequences, which means every transaction's time sequence must be uniform. To ensure the uniformity of every broadcast round, TRON's voting system needs to take three steps:

1. Preliminary Preparation

When a user sends an application for transaction, the host node will send a message to all verification nodes and wait for a reply.

2. Preparation

A verification node will check this message. If consensus is reached with a two thirds affirmative votes or more, the host node will broadcast that the transaction enters the next stage.

The verification node will have three response options

- 1) The node approves the transaction
- 2) The node rejects the transaction
- 3) The node doesn't reply within the required time
- 4) Nodes that do not respond often will be eliminated

3. Confirmation

A verification node officially promises that information is correct. Then, if a consensus is reached with a two-thirds affirmative vote or more, the transaction will be completed, and the blockchain will link with co-chain and broadcast it to all nodes in the network.

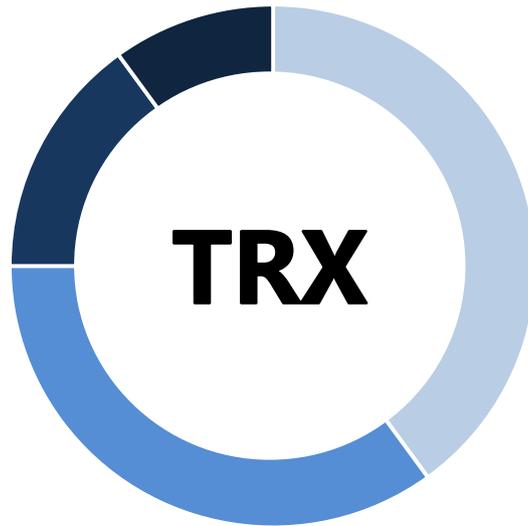
10. TRON ICO PLAN

1. Time: September 9, 2017, Beijing Time

2. Allocation:

Total amount of TRX is 100 billion and will be allocated as follows:

- Public offering: 40%
- TRON Foundation and the ecosystem: 35%
- Private offering: 15%
- Pay initial supporter-Peiwo Huanle (Beijing) Technology Co., Ltd.: 10%



■ ICO ■ Foundation&Ecosystem ■ Private Placement ■ Peiwo

11. TRON Schedule

1. Exodus, free data - point-to-point distributive content updating, storing and distribution mechanism, August 2017 to December 2018
2. Odyssey, content empowerment - economic incentive-empowered ecosystem, January 2019 to June 2020
3. Great Voyage, personal ICO, July 2020 to July 2021
4. Apollo, free flow of value-decentralized individual exclusive token transaction, August 2021 to March 2023
5. Start Trek, cash in the flow - decentralized game and market forecast, April 2023 to September 2025
6. Eternity, transformation of the flow – decentralized game, April 2023 to September 2025

12. Compliance

- Operator

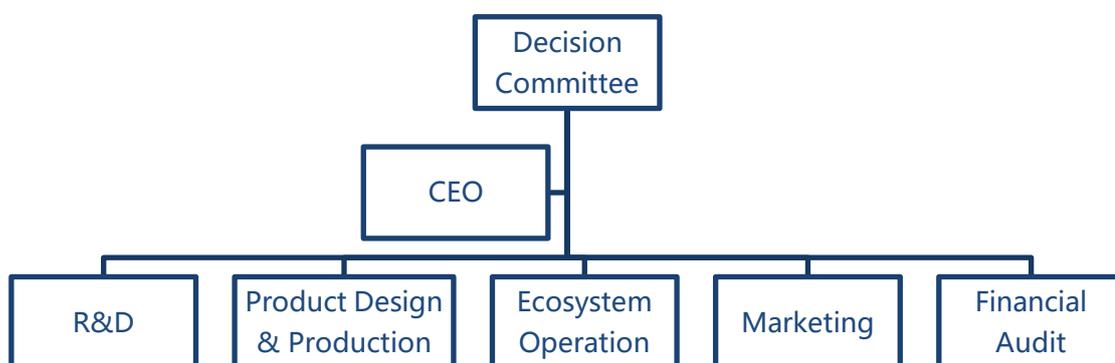
As followers of Tim Berners-Lee, the TRON team firmly believes that the Internet belongs to all humankind since the day the protocol was born, instead of a profitable tool for a fraction of people. Therefore, TRON established Tron Foundation in Singapore, with the primary task to operate the TRON network publicly, fairly, transparently, and not for profit, and offer support to TRON's development team.

Tron Foundation's establishment was approved by Singapore's Accounting and Corporate Regulatory Authority (ACRA) and is supervised by Singapore's corporate law. This Foundation is independently managed and run by a fiduciary board or management committee and is independent of the government.

The Foundation does not have any commercial interests to support or participate in public interest or private interest activities. The "profit" earned by the Foundation is deemed surplus and will be kept as outlays for other activities instead of being distributed among its members.

2. Governance structure and voting

The Foundation has set up a three-tier organization structure to ensure the reasonable use of funds and resources to promote openness, justice, and transparency; to constantly advance the rapid growth of TRON protocol; to extend the application scenarios of TRON protocol; and to attract more institutions, companies, and organizations to enter the open-source TRON ecosystem:



- Decision Committee

Decision Committee is the supreme decision-making body of the TRON Foundation and assumes the final decision. There is no seniority among the Committee members. The Committee is responsible for reviewing and approving the Foundation’s major affairs, such as strategic planning, annual plan and budgeting, and vote on major issues in the TRON protocol ecosystem on behalf of the Foundation.

- CEO

The CEO is elected by the Decision Committee and is responsible for the Commission. The CEO will comprehensively organize and implement the decisions and regulations of the Decision Commission and is responsible for TRON’s daily operation, reaching all targets assigned by the Commission, and reporting their implementation to the Commission/Committee on a regular basis. Moreover, the CEO has the right to establish functional departments when necessary and organize and employ managers. The CEO is responsible for the business of five

departments, including R&D, product design and production, ecosystem operation, marketing and financial audit, forming a CEO-centered organizational, and management system.

- R&D Department

The R&D Department is responsible for the development and audit of underlying technology and is the Foundation's basic department. To ensure that team members exchange information and act in concert, R&D should exchange information with other departments (particularly the product design and production department) and timely adjust and communicate project details and decide the direction of future research.

- Department of Product Design and Production

The Department of Product Design and Production is responsible for enriching and perfecting product frameworks, provided by the technical department, making specific sustainable development strategies, including conducting market research and planning product functions, and TRON's UI design and graphic design, and other works. The Department staff needs to follow trends, hotspots, community feedback, and proactively communicate with token holders and hold activities like occasional technical seminars.

- Ecosystem Operation Department

Based on what technical and product departments provide, the Ecosystem Operation Department is responsible for "the external and the internal." The Department will extend the depth of work, actively develop partners, and closely link TRON with end-users and partners, thus building an open, distributive, and privacy-protection global entertainment ecosystem. The Department will also build an ecosystem within the user community with

benign interaction, free flow of information, and information symmetry.

- **Marketing Department**

The Marketing Department is responsible for marketing TRON's core and derivative products and services. Its duties include, but are not limited to, contacting and cooperating with media, advertising, designing user interaction, and other tasks. The Department works closely with Ecosystem Operation Department to formulate a publicity program, based on the requirements of partners and end-users.

- **Finance Department**

The Finance Department is responsible for the company's financial affairs, including funds management, financial accounting, and cost control. Because digital assets feature high risks, this Department is also in charge of risk management and control and will coordinate with other Departments to analyze and evaluate projects' operational and financial risks. Because of the particularity of digital assets and tokens, it is difficult for existing institutions to supervise them in an effective way; therefore, the Decision Committee will engage professional auditors to ensure open and transparent use of TRX.

13. Team Profile

Founder and Chief Executive Officer | Justin Sun

He studied for a bachelor's degree at Peking University and went on to study for a master's degree at the University of Pennsylvania, a member of the American Ivy League group of schools. He is the founder of Peiwo APP – China's largest audio content community. He joined Ripple in its early days, where he served as chief representative for Ripple's Greater China Region. He was one of the 2015 *Forbes* "30

under 30” in China and one of the 2017 *Forbes* “30 under 30” in Asia. He also won the title of Global Shaper at the 2014 Davos Forum (World Economic Forum). He was the only post-90 student of first period of Hupan University founded by Jack Ma. The market value of Ripple has exceeded \$10 billion, the number of the Peiwo APP registered users is more than 10 million, and the number of monthly active users has exceeded 1 million.

Chief Technology Officer | Lucien Chen

Lucien Chen has served in many first-tier Internet companies, such as Netease(NASDAQ:NTES) youdao, Tencent(00700.HK), Qihoo 360(NASDAQ:QIHU) and SM search (Alibaba P8 +). With capabilities of developing with million-level system architecture, he has rich experience in big data, advertising algorithms, DMP system, BT system, CTR platform and high concurrent system framework design. He also has many practical experience in team management, strategic planning and business integration. Apart from that, Lucien Chen not only has a deep understanding in cryptography, but also support and invest Bitcoin at the early stage.

Technical Supervisor | Keelson Yang

He graduated from the Computer Department of Tsinghua University with a bachelor's degree. With more than 15 years of work experience at front and rear ends, he has worked at UFIDA—a leading provider of enterprise management software, corporate internet services, and corporate financial services in the Asia-Pacific region, and then at the China Roads Information Technology (Beijing) Co., Ltd.—China's leading provider of express highway monitoring system solutions. Yang Kaishan has great accomplishments in front and rear ends of the system. He has paid close attention to technological developments in blockchain since 2013..

Senior Rear-End Engineer | Dongdong Huo

He obtained a bachelor’s degree in computer science and is a senior rear-end engineer.



He once served as technical director of rear-end technology of InstNews, one of the largest news information applications in Latin America, and of VnNews, a leading news information application in Southeast Asia. He has rich experience in platform security and high concurrent treatment. He has paid close attention to technology development in blockchain since 2015.

Product Supervisor | Deuce Yu

He successively worked on two leading platforms of China's SNS social interaction – Kaixin and RenRen. He served as product manager at the Department of Social Interaction and Games, and is responsible for R&D and promotion of the then very popular social games at the webpage terminal like “vegetal” and own games at Kaixin's mobile terminal. He then worked with RenRen, serving as operation principal of games open platform, responsible for access and combined operation of games from the open platform as well as for R&D and promotion of games at the customized mobile terminal. Since 2015, he has paid close attention to blockchain, comprehensively balancing the docking procedure of the TRON protocol entertainment platform with the protocol and its manifestations.

Market Supervisor | Tim Guan

He graduated from Peking University and is a serial entrepreneur. His project once obtained investment from Matrix Partners China, and he once served as principal of the information strategic system of Global China Group. Since 2016, he has paid close attention to blockchain. He has a unique understanding about markets and brands and is an expert in creating high-dissemination brands. He once organized an association of nearly 200,000 members tied by common values of Chinese youth.

Operation Supervisor | Charles Zhang

He is a professional practical operator of associations. He once served as co-founder and COO of Elegance Space, secretary-general of Chicago branch of Elegance Space,



expert of Zaihong and editorial board member of Association Commerce. He is a founder and operator of an association of 0.1 million high-end women, whose field has covered a dozen aspects like female, training, studying abroad, fund, investment and Internet. He has been invited to give lectures more than one hundred times by Peking University, VBill, Zhongjian Huatong and Internet operating agencies. Since 2016, he has paid close attention to blockchain.

14. Risk

- **Systematic risks:** They refer to possible changes caused by common factors of overall importance, which will impact the success of all blockchain companies in the same way. A policy risk: at present, the government has not formulated an explicit policy about blockchain projects and ICO financing, so participants may suffer from losses caused by future policies. . At the same time, systematic risks also include a series of force majeure factors, which include, but are not limited to, natural disasters, large-scale breakdowns of global computer networks, and political unrest.
- **Supervision absence risk:** Digital asset transactions, including TRX, have extremely high uncertainty. Due to lack of forceful supervision in digital asset transactions, electronic tokens are subject to sharp rises and falls.
- **Risks after supervisory regulations are formed:** It cannot be denied that in the near future, supervisory regulations will be formed to restrain the fields of blockchain and electronic tokens. If supervisory and regulatory bodies perform a standard management over these fields, the electronic tokens purchased during the ICO period may be affected. The impacts include, but are not limited to, price and stability fluctuations and restraints.
- **Inter-team risks:** At present, there are numerous teams and projects in the blockchain technology field, so the competition is very fierce. There is

strong market competition, so whether the TRON project can stand out among many excellent projects and be widely recognized will not only depend on the capacity and vision/planning of its own team, but it will also be determined by numerous competitors in the market. There is a likelihood of competition.

- Risks within the team: TRON has gathered a talented team full of vitality and strength and attracted senior practitioners and experienced technical developers in the blockchain field. Because we play a leading role in the Chinese ICO field, team stability and cohesion is of vital importance to TRON's overall development. In the future, there is a possibility that TRON will be negatively impacted by resignations of core personnel or conflicts within the team.
- Risks about project coordination and marketing: The TRON founding team will spare no efforts to realize the development goal proposed in the white paper and expand the growth space of the project. At present, TRON has a relatively mature commercial model analysis. However, due to unpredictable factors occurring in the overall development trend of the industry, existing commercial models and coordinating thought are not well compatible with market demands, thus considerably decreasing the profits. At the same time, this white paper may be revised with updated project details. If the ICO participants fail to obtain details after project updates in time or if the public fails to fully understand the project due to information asymmetry, the subsequent development of the project will be impacted.
- Risks about project technologies: First, this project is based on a cryptographic algorithm. The rapid development of cryptology will inevitably lead to risks of system cracks. Second, cryptology's core businesses are supported by technologies like blockchain, distributed ledger,

decentralization, and. The TRON team cannot fully guarantee technological fulfillment. Third, loopholes may be found during project upgrading, which can be remedied through a patches release. However, the degree of being impacted by loopholes cannot be determined.

- Risks about hacker attacks and crimes: In regard to safety, one individual is very small, but the overall number of people is great. This has placed a high priority upon the project's security assurance. Because they have characteristics like anonymity and immutability, tokens may be used by criminals and/or hackers for criminal activity.
- Other risks unknown at present: With continuous development of blockchain technology and the overall industry, TRON may face some risks that cannot be predicted at present. Participants should fully understand the team background, know about the overall framework, and the project's concept before making a decision. They should manage their expectations and participate in token distribution reasonably.

15. Disclaimer

- This document serves only the purpose of conveying information. The contents of this document are for reference only and do not intend to create any suggestions or invitations to solicit interest in or purchase stock or securities .
- The contents of this document shall not be interpreted as forced participation in an ICO. Any behavior associated with this white paper, including any requests for obtaining a copy of this white paper or sharing this white paper with others, will not be deemed as participation in an ICO.
- Participation in an ICO means that the participant has reached the age required by law, has full mental capacity, and the contract signed with

TRON is authentic and valid. All ICO participants should sign the contract voluntarily and must have a high threshold about TRON before signing the contract.

- The TRON team will continue to perform reasonable tests to guarantee authenticity and accuracy of the information in this white paper. During the development process, the platform may be updated. The updates include, but are not limited to, platform mechanisms, electronic tokens and their mechanisms, and distribution of electronic tokens. Some document contents may be adjusted accordingly in the new white paper with the project's development. The team will make public the changes to the white paper through an announcement or by posting the updated white paper on its website. The participant must get the latest white paper and adjust their expectations accordingly. TRON will not assume any losses by the participant caused by: (i) the participant relying on the contents of the white paper; (ii) information inaccuracy in the white paper; or (iii) any behaviors caused by the white paper.
- As the official token of TRON, TRX is an important tool for the TRON platform to perform efficiently. However, TRX is not a security, and owning TRX does not mean that its owner has been afforded with the proprietary right, controlling right, and/or policy-making right regarding the TRON platform. As an encrypted token used in TRON, TRX does not belong to any of the following categories: (a) currency of any type; (b) securities; (c) stock rights of a legal entity; (d) stocks, bonds, bills, warrants, certificates, investment contract, or other instruments affording similar rights.
- Whether TRX will appreciate or not is determined by the market and the demands after application fulfillment. In some cases, TRX may have no value at all. The team will make no commitments about its appreciation and will assume no responsibilities for consequences caused by an increase or

decrease in its value.

- To the maximum extent allowed by law, the team shall assume no responsibilities for any damages and/or risks arising from token distribution participation, which include, but are not limited to, direct or indirect personal damages, loss of commercial profits, loss of commercial information, and any other economic damages.
- The TRON platform will observe supervisory regulations in favor of healthy development of the ICO industry and the industry's self-discipline statements. Participation means that the participant will completely accept and observe these practices. The information disclosed by the participant to complete these inspections must be complete and accurate.
- The TRON platform has explicitly conveyed possible risks to participants. Participation in token distribution earns that the participant has confirmed his/her understanding and recognition of each clause and instruction in the detailed rules, accepts the potential risks about this platform, and will assume consequences by himself/herself.

16. Versions

Date	Version No.	Content
2017/06/03	V1.0	Initial outline
2017/07/08	V1.1	Filling of background contents
2017/07/25	V1.3	Version of global entertainment

		protocol
2017/08/04	V1.4	Initial version of entertainment system of free contents
2017/08/11	V1.5	Second version of entertainment system of free contents
2017/08/18	V1.6	Initial version of contents entertainment protocol
2017/08/22	V1.7	Second version of contents entertainment protocol

17. Contact

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E-mail : service@tronlab.com