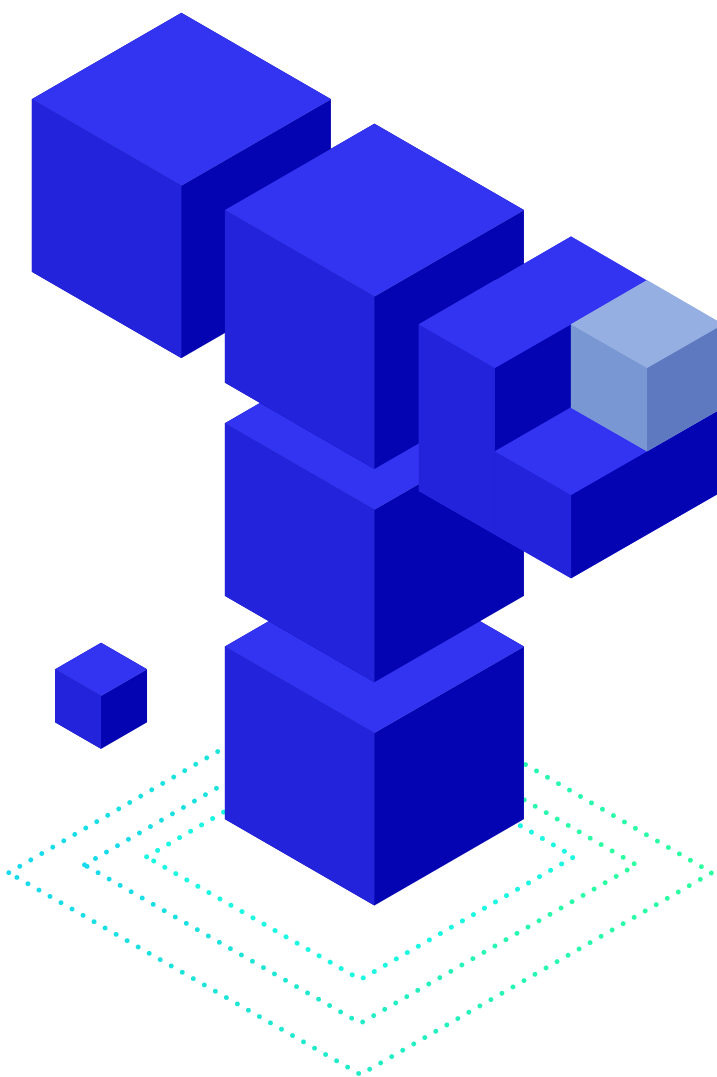




# TTC

A Blockchain Solution for Mass Adoption  
and A Sustainable Token Economy Model



V2.0

# Disclaimer

TTC Foundation (and together with its affiliates, the TTC Group) had in March 2018 created and developed interim ERC-20 Standard-compliant cryptographic tokens (TTC Interim Tokens) associated with initial phase of the TTC Platform blockchain project that was under development by the TTC Group. Certain TTC Interim Tokens had been sold and distributed via various tranches of sale between March and May 2018 (TTC Interim Token Sale). Further details of the TTC protocol and the TTC Interim Token Sale are contained in the TTC protocol Whitepaper accessible at [https://d1u6eqogwsdivn.cloudfront.net/whitepaper\\_v1/TTC\\_Whitepaper\\_EN.pdf](https://d1u6eqogwsdivn.cloudfront.net/whitepaper_v1/TTC_Whitepaper_EN.pdf).

Following the close of the initial phase of TTC Platform and in connection with the launch of the TTC Platform Mainnet, the TTC Group will be undertaking the Launch Token Swap pursuant to which the TTC Interim Tokens will be swappable for TTC Blockchain native cryptographic tokens known as TTC Coins and TST-20 Standard compliant cryptographic tokens known as Acorn Tokens that are associated with TTC Platform. Please refer to this Whitepaper for further details on the Launch Token Swap, as well as the functions of each of the TTC Coins and Acorn Tokens.

The focus of this Whitepaper is on the TTC Mainnet project and the Launch Token Swap. You may have received, been

in possession of or perused this Whitepaper, which contains additional important (related) information about the TTC Mainnet project and the Launch Token Swap, including the TTC Platform, TTC Coins, Acorn Protocol, and the Acorn Tokens (each as defined herein) and their functions. The TTC Group may publish such other documents (collectively with the Whitepaper, the Project Documents) in relation to the TTC Mainnet project and the Launch Token Swap. If so, such Project Documents are intended to be read in conjunction with one another for the purpose of the TTC Mainnet project and the Launch Token Swap. All Project Documents are subject to all disclaimers, restrictions, notices, and legal provisions contained in this Whitepaper.

For the avoidance of doubt, the TTC Group is not, and will not be, offering the TTC Coins and/or the Acorn Tokens for sale to any persons or in any jurisdictions. This Whitepaper, and such other Project Documents that may be published by the TTC Group, is only intended for, made to or directed at, persons who are either existing or future holders of the (a) TTC Interim Tokens, (b) the TTC Coins, and (c) the Acorn Tokens. This Whitepaper is not, is not intended to be, and should not be construed to be, a prospectus or offer document of any sort and is not intended to and should not be construed to constitute an offer of shares or securities of any form, units in a business trust, units in a collective investment scheme or any other form of investment, or a solicitation for any form of investment in any jurisdiction. No regulatory authority has examined or approved of any of the information set out in this Whitepaper. This Whitepaper has not been registered with any regulatory authority in any jurisdiction.

No TTC Coin or Acorn Token should be construed, interpreted, classified or treated as enabling, or according any opportunity to its holders to participate in or receive profits, income, or other payments or returns arising from or in connection with any member of the TTC Group, the TTC Platform, the TTC Coins, the Acorn Protocol, or the Acorn Tokens, or to receive sums paid out of such profits, income, or other payments or returns.

# Abstract

The TTC blockchain platform (TTC Platform) is a complete blockchain solution offering improved performance, scalability and security. It aims to tackle the problems of current blockchain technologies, especially to support large transactions and a variety of possible use cases. Multi-tier Byzantine Fault Tolerant-Delegated Proof of Stake (BFT-DPoS), an optimized consensus mechanism, ensures high transaction speed. A master/slave network combination provides high security and scalability.

The TTC Coin (as defined in this Whitepaper) facilitates asset transactions, the deployment of smart contracts, and purchase of resources in addition to other functions. TTC Connect, a universal wallet, bridges the gap between users and TTC. Users can exchange TTC Coins with other tokens on the TTC Decentralized Exchange (TTC DEX), as well as conduct payments with TTC Pay, an independent payment solution based on the TTC Platform.

The Acorn Token (ACN) is a token based on the TTC Platform which is used with the Acorn Protocol, a decentralized and incentivized social networking protocol. The Acorn Protocol is committed to returning value to individual users through a blockchain-driven, tokenized incentive mechanism. The Acorn Rewards Engine will incentivize users who make contributions on social

Decentralized Applications (DAPPs). All types of social network services are welcome to join the Acorn Alliance, including but not limited to content sharing platforms, online forums, and social commercial services.

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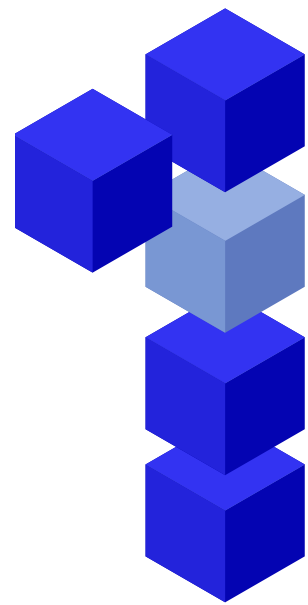
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01

# Background



# Background

In recent years, blockchain technology has gained traction in the internet technology industry. Simply put, a blockchain is a digital ledger that is used to record transactions involving multiple parties. It is decentralized and distributed. Notably, because the record cannot be altered retroactively without the alteration of all subsequent information in collusion with the entire network, blockchain technology is considered to be secure (or “immutable”) by design. This makes blockchains suitable for keeping track of events, medical information, financial transactions, and other types of record keeping.

In technical terms, a blockchain is a distributed computing system that has achieved “decentralized consensus.” This means that there is no central authority that determines how and what information gets added to the ledger. The protocol underlying a blockchain is what allows participants on the network to reach a consensus about how to add new information, even when members cannot trust one another.

This cutting-edge technology has been quickly adopted by the fields of finance and insurance, but for most laypersons, digital assets are mostly regarded to be financial investments, and not a form of currency for practical use in everyday life. This is one of several reasons that has limited the expansion of blockchain technology.

One of the most well-known blockchain-based technologies is the cryptocurrency Bitcoin, which has gradually become more accepted as a payment method in practice. Despite its popularity, Bitcoin use is still not commonplace. This is partially due to Bitcoin's low transaction speed and slow adoption by the public, attributed to a lack of conceptual understanding about cryptocurrencies.

These two hurdles—low transaction speed and latent adoption by the general public—must be addressed in order for the use of blockchains to expand. Unlike Bitcoin, most other digital assets are far from being accepted as a practical payment method and remain the domain of the specialists and technology enthusiasts.

## Low Transaction Speed

At its core, a blockchain network is still a network. Its main function is to record and transfer data from one point to another. Transactions Per Second (TPS) is the term used to describe the transaction rate of a network. Bitcoin has a transaction processing capacity of 10 TPS, while Ethereum is able to handle transaction speeds of up to 15 TPS. In some extreme documented cases, it took several hours for a Bitcoin transaction to be confirmed.

Scaling TPS has been an important area of research for the blockchain industry. Recent developments have led to the invention of new consensus algorithms, with a more efficient decision making system that results in higher TPS. The Delegated Proof of Stake (DPoS) consensus is able to reach up to 1,000 TPS at peak capacity, and has been

adopted by various projects, aiming to create wider adoption of blockchain technology.

Progress in TPS-scaling technology is being made, yet blockchain networks are still extremely slow compared to their centralized competitors.

## Latent Adoption

The concept of a blockchain isn't widely known, and thus its adoption has yet to reach a critical mass that would allow blockchain to enter mainstream use. Despite its successful application in the fields of finance, insurance and healthcare, most of the blockchain developments in the aforementioned fields have yet to reach the general public. At its current stage of development, blockchain is still absent from the everyday lives of most people.

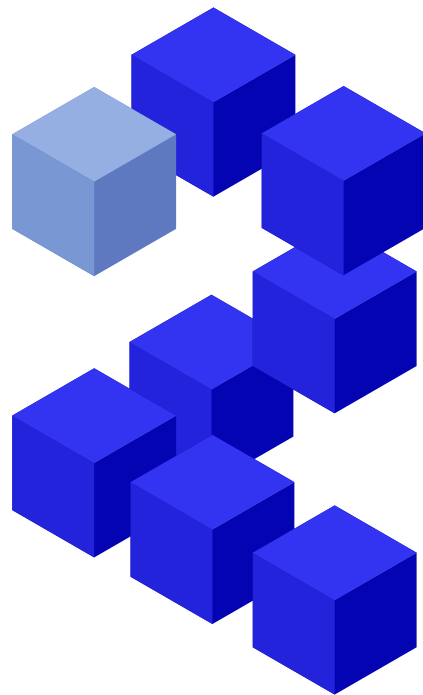
Social networking on the other hand, is a frequent daily activity for most people. Combining social networking with blockchain technology could be the catalyst that allows blockchains to achieve widespread acceptance by the public. Current blockchain solutions have failed to capture the attention of the mainstream, while their infrastructure remains unprepared to support large user bases and transaction requirements. Additionally, most of the platforms associated with these solutions have concepts that are not at all user friendly, which drives blockchain technology further away from the tipping point to widespread adoption.

There's still a long way to go before blockchain technology will permeate the daily life of the common man. Blockchain

technology is still in the early stages of development, but there is a strong demand for a solution that both enables large transactions and fast processing speed, and that the layperson can use with ease.

02

# Infrastructure



# Consensus (Multi-tier BFT-DPoS)

In a decade of development, the consensus algorithm—also known as the core of the blockchain technology—has evolved from a single algorithm Proof of Work (PoW) method to multiple algorithms, such as Proof of Stake (PoS), Delegated Proof of Stake (DPoS), and Byzantine Fault Tolerance (BFT). Each consensus algorithm has pros and cons. A blockchain project ought to adopt the consensus algorithm that is best suited for its intended purpose and ideology. TTC Platform created a new consensus algorithm called the “Multi-tier BFT-DPoS” to support large transaction processing and fast verification.

Multi-tier BFT-DPoS is a consensus algorithm based on the DPoS consensus, where multiple representative producers (Representatives) elected in real time can ensure the stability and efficiency of new blocks under fair premise. Its processing speed of a single chain can reach thousands of transactions per second without multi-chain parallelism or a shared processing mechanism. It also uses the BFT mechanism to increase the speed of confirmation for each transaction. Ideally, the time of confirmation is the same as the generation of a new block, which improves the execution efficiency of the entire blockchain. The multi-tier Representative selection mechanism ensures that all Representatives are provided fair opportunity for block production.

## Consensus Mining

In each round of the mining process, 21 Representatives (out of a total of 50 Representatives) are selected to produce a block or record and synchronize transactions on behalf of all users. The TTC Platform rewards for consensus mining will be generated simultaneously with the production of the block. A Representative can receive rewards attached to a block upon successful production of said block.

There are different consensus periods for TTC consensus mining. Each consensus period contains 10,512,000 blocks. In the same consensus period, the amount of rewards in one block remains the same. The mining rewards in the first consensus period comprises half of all consensus rewards. In the following consensus periods, the amount of rewards is halved from the previous consensus period.

Specifically, 250,000,000 TTC Coins (25%) are reserved for consensus mining. Since one block is produced on the TTC Platform every 3 seconds, there are approximately 11.89 TTC Coins in one block for the first consensus period from 1 to 10,512,000 blocks. From 10,512,001 to 21,024,000 blocks, the amount of TTC Coins in one block is halved, which is approximately 5.95, and so forth.

## Voting Mechanism

Representatives are selected by vote from users who hold TTC Coins. A user's votes can only be designated to a single Representative, where each TTC Coin entitles its holder to



one vote for Representative selection. After ten rounds of mining, the Representatives will be re-selected according to the latest voting results. Also, if a selected Representative does not produce a predetermined number of blocks, that Representative will suffer a reduced probability of producing blocks for a designated amount of time as a penalty.

A vote will become invalid after a week, so users will need to update their votes for Representatives continuously.

Voters can review the performance of the Representatives they have voted for, as measured by a Representative's productivity, blocks produced, and vote rankings.

As voting for Representatives is vital for consensus, voters can also receive a share of the rewards in a produced block. Specifically, 61.8% of the rewards in a block will be distributed to the Representative, and 38.2% will be distributed among users who have voted for that Representative. The more a user votes, the more the user can share in the TTC rewards apportioned for Representative voting.

Voting for a Representative is a method of mining on the TTC Platform. The rewards apportioned for Representative voting can effectively incentivize both Representatives and voters to be involved in the selection process of block producers.

## Multi-tier Representative Selection

There are multiple tiers for which Representative candidates can be selected to produce blocks, with different

probabilities according to the tier they are in. The details are illustrated in Table 1.

Tier	Rank	Probability
1	Top 10	100%
2	11 - 20	60%
3	21 - 30	40%
4	31 - 50	1 selected in each round

**Table 1.** Representative selection probability based on tier and ranking

The multi-tier Representative selection mechanism provides more opportunities to all participating candidates. It also increases the security and efficiency of the blockchain, as more Representatives are eligible to participate in block production.

Voters can choose to vote for Representatives according to their rankings. Lower ranked Representatives will have a smaller total vote count, so a voter will receive a larger portion of the voting rewards. If all holders vote logically, the system will quickly reach a status of Pareto Efficiency. According to Table 2, the Pareto Efficiency is set to:  $1/N_1 = 0.6/N_2 = 0.4/N_3 = 0.05/N_4$ . In this case, the Voting Rewards per vote will be the same no matter the Representative a user votes for.

Tier	Representative Amount	Probability of Producing Blocks	Vote Count	Voting Rewards per Vote
1	10	100%	N1	$1/N1$
2	10	60%	N2	$0.6/N2$
3	10	40%	N3	$0.4/N3$
4	20	5%	N4	$0.05/N4$

**Table 2.** The voting rewards per vote for Representatives in different tiers

Under a balanced voting system, when a Representative fails to produce blocks, the voters receive fewer voting rewards. As a result, voters will be incentivized to vote for a better Representative according to Representative productivity levels, rather than the Representative vote rankings.

As block production is a continuous process, Representatives who fail to maintain a certain level of productivity will fall behind in the ranks while those who excel will rise above. In this system, personal profits are positively correlated with the betterment of the TTC Platform because rewards are provided based on the efficiency of the entire blockchain. In other words, irrational behaviors such as block producers colluding with one other and ignoring poor productivity is discouraged since it comes with a high opportunity cost.

## Consensus Evolution

A decentralized consensus needs to evolve in order to effectively serve different scenarios in the future. In the TTC Platform, Representatives may initiate a proposal to optimize the consensus mechanism with regards to rewards distribution proportions, block production time, and more. Proposals will be publicly voted on by users. During a voting period, Representatives can share their positions on the proposal. All TTC Coin holders can participate by voting for Representatives according to their positions via the TTC Connect universal wallet. After the end of a voting period, all Representatives will cast their votes on the proposal. Each Representative's voting power is different; the number of votes a Representative received from constituents determines the number of votes that Representative uses. For a proposal to pass, it requires two thirds of the votes. When a proposal is accepted, the execution of that proposal will occur online via Proof of Autonomy (PoA) consensus without any code changes. In this way, ordinary users can participate in the governance of the consensus mechanism by voting for a Representative they trust.

The TTC Platform provides the means to achieve democratic consensus in a simple and effective way. The electoral voting mechanism increases participation, efficiency, and the validity of voting compared to a direct voting mechanism. This system ensures that the ultimate power to decide significant consensus reform lies with TTC Coin holders.

For the avoidance of doubt, while the TTC Coins entitle its holders to cast votes per the consensus mechanism as

described herein, TTC Coin holders have no right or control, through the aforementioned voting process or otherwise, over any entity part of TTC Group, or any of its assets, which shall remain under the full and absolute control of the TTC Group. TTC Coin holders have no connection, purely on the basis of the TTC Coins, with the TTC Group.

# Master/Slave Network

There is one master network and multiple slave networks on the TTC Platform. The master network primarily deals with asset transactions with a relatively high security demand. Slave networks mainly record the data with a relatively high speed. The separation of master and slave networks increases the performance, security, and decentralization of the TTC Platform significantly.

A gas mechanism is introduced to protect the TTC Platform from abnormal attacks. A gas fee is necessary for each asset transaction on the master network. The more gas fee a user pays, the faster the transaction is processed. The gas fee will become a part of consensus mining rewards for Representatives and voters. For slave networks, a gas fee is purchased in advance by the DAPP developer who would like to use the resource. As a result, DAPP users can enjoy the service on slave network without paying a gas fee.

The master network and slave networks run in parallel. A selected Representative will produce blocks on both the master network and slave networks in one time period. Representatives are obligated to keep productivity high on all networks, which is important to the operation of the TTC Platform. Representatives that fail to produce blocks on either networks will be penalized. Specific rules are as follows:

1. A Representative only receives full consensus rewards upon the successful production of all blocks on master and slave networks.
2. A Representative receives no consensus rewards if the Representative fails to successfully produce the block on the master network.
3. When a Representative produces the block on the master network but is unable to produce blocks on a slave network, consensus rewards are attenuated. The attenuation imposed will be proportional to the amount of blocks that were not produced, and the attenuation coefficient falls into logarithmic distribution.

It's obvious that even one missed block causes relatively large losses according to the attenuation coefficient. Additionally, Representatives will have a reduced probability of producing blocks for a designated amount of time as a penalty. Furthermore, low productivity can influence voters' trust, leading to fewer votes in the future. This arrangement ensures it is always the best strategy for Representatives to keep a high productivity on all networks.

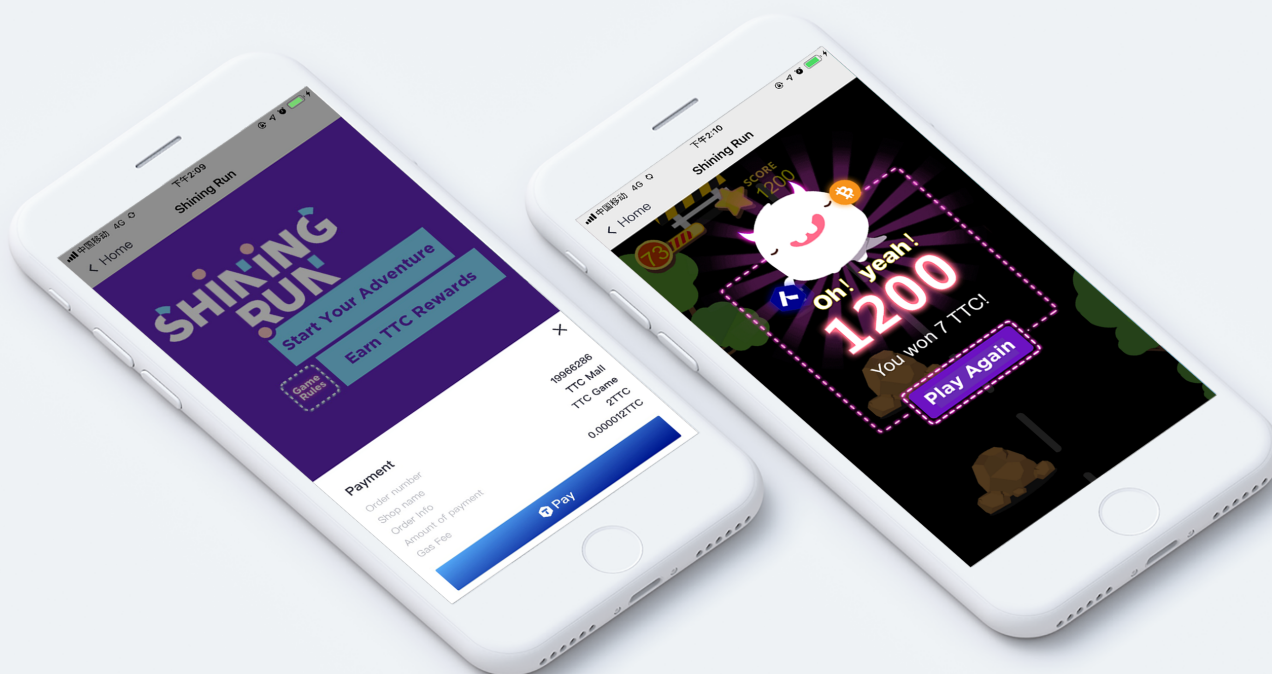
# Payment Solution

TTC Pay is an independent payment solution for conveniently transferring TTC Coins. Anyone can provide TTC Pay as a payment method simply by integrating the TTC Pay Software Development Kit (SDK).

TTC Pay provides an in-depth integration with merchant services. Related information such as product details can be transferred during the payment. TTC Coin payment can be conducted by simply scanning a Quick Response (QR) code, providing a smooth and seamless user experience.

Developers can also accept TTC Coins as a payment method in DAPPs, which helps build the value chain and attract more users.





**Fig 1.** A demonstration of a DAPP integrating TTC Pay

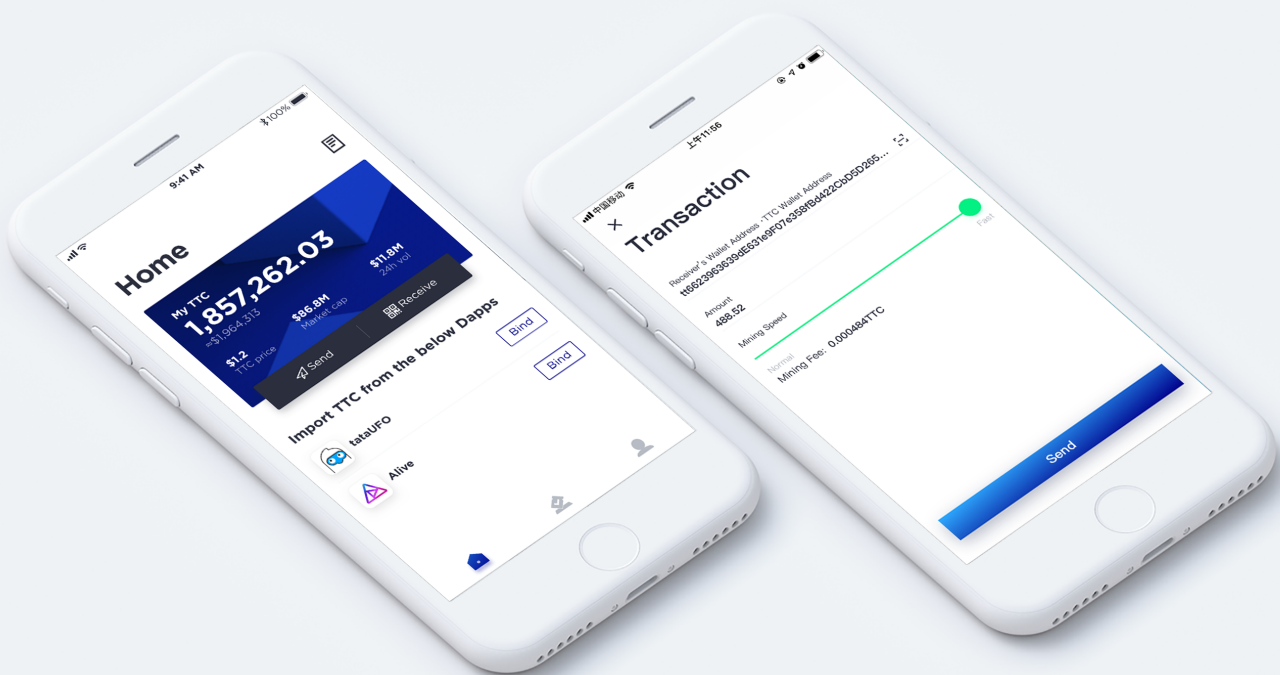
TTC Pay increases the potential uses of TTC Coins significantly. As more and more users accept TTC Coins as a payment method, the TTC ecosystem (TTC Ecosystem) expands. The result is a more dynamic ecosystem that benefits both DAPP developers and end users alike.

## TTC Connect

Users store and manage their assets in TTC Connect. With a Single Sign-On (SSO) function, users can connect different services in the TTC Ecosystem. TTC Connect bridges the

gap between users and the TTC Platform. The main functions of TTC Connect are as follows.

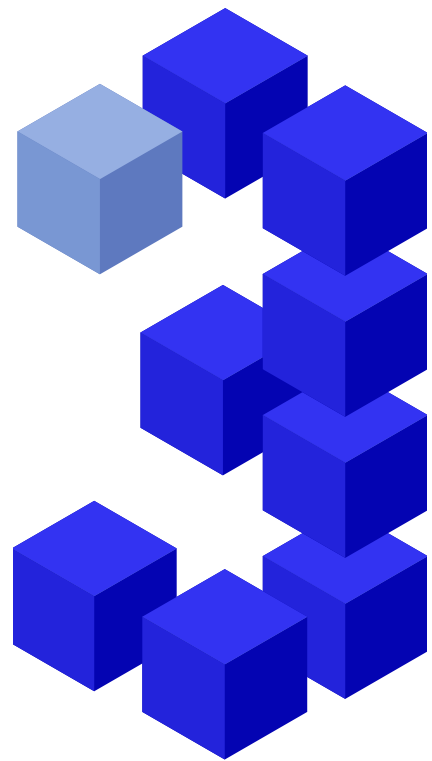
- Synchronizing rewards among multiple DAPPs.
- Transferring assets with other users or exchanges.
- Taking part in the governance of consensus by voting for Representatives.
- Conducting payments with TTC Coins.



**Fig 2.** A demonstration of TTC Connect

03

# Token Economy



# Token Economy

The universal token of the TTC Platform, TTC Coin (Symbol: TTC), serves as the universal currency in the TTC Ecosystem and can be used to fulfill a number of different functions, such as transfer of assets, deployment of smart contracts, and purchase of gas for the slave network. Tokens on the TTC Platform lay the foundation for the various services on the TTC Platform, further expanding the TTC Ecosystem with each new service and user that participates.

# TTC Coin Allocation

A total supply of 1,000,000,000 ERC-20 compliant TTC Interim Tokens had initially been issued for sale, ecosystem building, operation of the TTC Foundation, consensus mining, additional incentives for team members, additional incentives for legacy users, and bounty programs.

The TTC Interim Tokens that were initially issued were ERC-20 Standard-compliant cryptographic tokens. In connection with the launch of the TTC Platform Mainnet, these initial ERC-20 Standard-compliant TTC Interim Tokens will be swappable (Launch Token Swap) for TTC Standard-compliant TTC Coins on the basis of:

- (a) one ERC-20 Standard-compliant TTC Interim Token; for
- (b) one TTC Standard-compliant TTC and ten TTC Standard-compliant Acorn Tokens (further details of the Acorn Tokens are set out in this Whitepaper).

Further details including timing of the Launch Token Swap will be announced in due course.

The allocation of TTC Coins (being TTC Interim Tokens pre-Launch Token Swap) is as follows:

- 25% of the total pool of TTC Interim Tokens had been distributed via a TTC Interim Token sale, each of

which will be swappable for one TTC Coin and ten Acorn Tokens in connection with the Launch Token Swap

- 20% of the total pool of TTC Coins (being TTC Interim Tokens pre-Launch Token Swap) for use in ecosystem building
- 20% of the total pool of TTC Coins (being TTC Interim Tokens pre-Launch Token Swap) for use by the TTC Foundation, which supports the development of a healthy and accessible environment
- 25% of the total pool of TTC Coins (being TTC Interim Tokens pre-Launch Token Swap) for use in the consensus mining framework, to be distributed to Representatives and voters
- 8% of the total pool of TTC Coins (being TTC Interim Tokens pre- Launch Token Swap) is reserved for team members and advisors
- 2% of the total pool of TTC Coins (being TTC Interim Tokens pre- Launch Token Swap) is reserved for legacy users and for use in bounty programs



**Fig 3.** The allocation of TTC Coins (being TTC Interim Tokens pre- Launch Token Swap)

# Tokens on TTC Platform

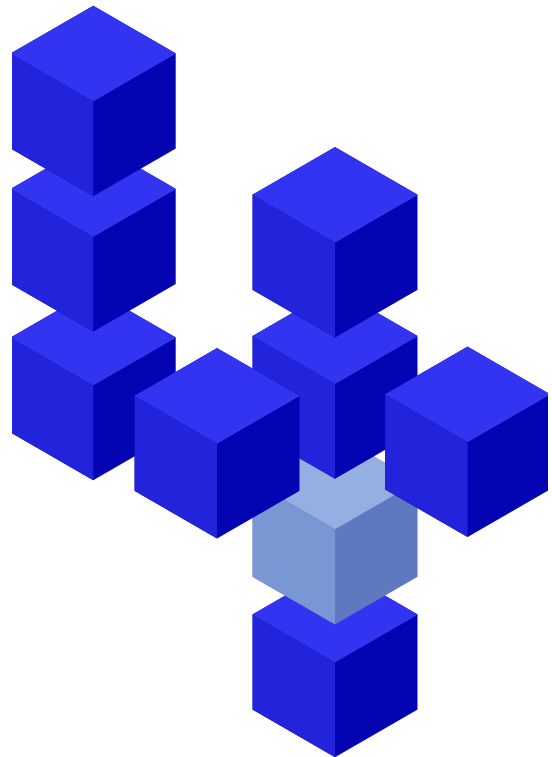
Incentives for decentralized services in the blockchain world commonly take the form of token awards. Especially at an early stage, tokens can boost a service's growth engine, resulting in the growth of the service's user base, user activity, user retention, and advertising revenue.

Any entity will be able to issue tokens based on the TTC Platform which adhere to the TTC Standard Token (TST-20), a technical standard for smart contracts to implement tokens on the TTC Platform, according to their business requirements. Such entity may decide the amount, price and distribution rules for the token. Tokens which are based on the TTC Platform and adhere to the TST-20 standard may be traded with TTC Coins on the TTC DEX in the TTC Connect application.



04

# TTC Foundation



# TTC Foundation

The TTC Foundation<sup>1</sup> is an independent and non-profit governance institution. Its mission is to ensure the TTC Ecosystem operates reliably and transparently. The main objective of the TTC Foundation is the open governance of its resources and partners in the ecosystem, which entails, amongst other, the following:

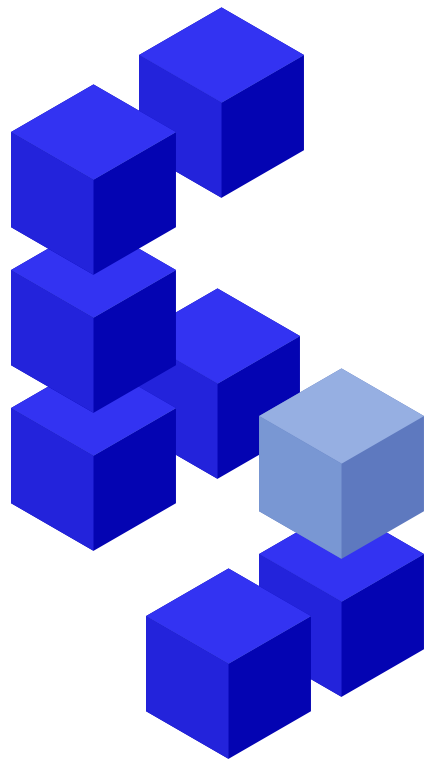
- Establishing a global ecosystem by inviting more DAPPs, and increasing the TTC Platform user base along with user value
- Supporting the TTC Ecosystem by funding new projects, providing airdrop subsidies to DAPPs for early user acquisition, and ensuring the fast and stable growth of the entire TTC Ecosystem
- Establishing a set of fair and transparent governance processes, assisting developers in the prevention and containment of system abuse in order to maintain a healthy environment
- Supporting the sustainable development and optimization of the TTC Platform to deal with various issues that might arise as more members join the ecosystem

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<sup>1</sup> **TTC Foundation** is a company incorporated in the Republic of Singapore as a company limited by shares known as TTCFoundation Pte. Ltd. (Singapore Company Registration Number 201808413G).

05

# Acorn Protocol



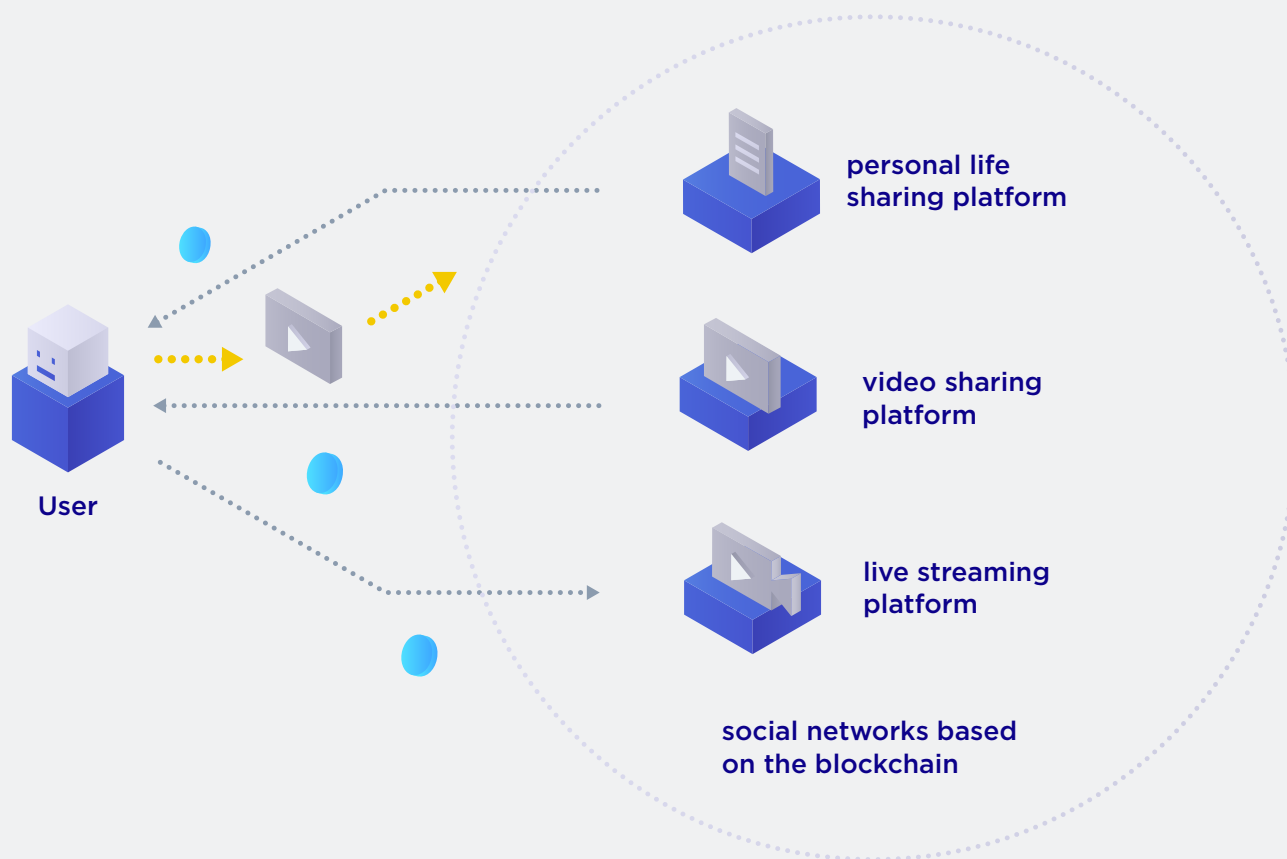
# Acorn Protocol

The Acorn Protocol is a social networking protocol based on the TTC Platform. It incentivizes users who make meaningful contributions to their networks via the Acorn Token, a token based on the TTC Platform and which adheres to the TST-20 standard. The Acorn Token is distributed to users who proactively participate in DAPPs that are members of the Acorn Alliance, an organization composed of different types of social networking services. The Acorn Token also serves as the digital asset of exchange for Acorn Alliance DAPPs and for advertising across the Acorn Alliance.

# Decentralized Social Networks

Social networking services are among the most frequently used services in everyday life, meaning social networks represent huge potential inroads for blockchain technology to become widely accepted by the public. In social networks, each user functions as a node. As the frequency and the probability at which user interactions increases, the density of nodes increases. This underlying pattern makes social networks highly compatible with blockchains.

For an average user, using a decentralized social network isn't much different in practice than using a centralized one. A typical post cycle might look something like this to the average user: you wake up in the morning to find your two cats are playing with each other. You take out your cell phone, take a video of your cats, and upload the footage to a personal life sharing platform that pushes the footage to a video sharing platform that you only recently registered for. Suddenly, your video is picked up by the platform users. They upvote your post, comment on it, even share it on other platforms. All of these interactions increases the value of your post. Your post then becomes one of the most popular posts of the day. However, unlike most social networks, you are rewarded for your contribution (a popular post) with tokens. In this case, you use the tokens to purchase a virtual gift to send to a streamer you like on a live streaming platform also on the network.



**Fig 4.** A demonstration of the value chain for blockchain-based social networks

This is just one possible way participating on a decentralized social network could impact its users. In social networks built on blockchain, users who have created high-quality content stand to be rewarded. Additionally, as with traditional social networks, users can choose to watch advertisements or participate in activities requested by advertisers, but unlike centralized social networks, the advertising revenue will be directly distributed to the users. This is yet another way users benefit from a blockchain-based social network. Blockchain technology provides an opportunity to integrate a variety of products and services

across a wide network. For the user this means a significantly more valuable network, and for the developer this means exponential community growth.

# Acorn Rewards Engine

The Acorn Token (ACN) serves as the native token for the Acorn Protocol. The total amount of Acorn Tokens is 10,000,000,000. The allocation of use of ACN is the same as the allocation of use of TTC Coins as set out in *03 Token Economy*, with 25% of Acorn Tokens to be distributed in connection with the Launch Token Swap (referred to in the section entitled *TTC Allocation* of this Whitepaper) to holders of ERC-20 Standard-compliant TTC Interim Tokens.

As a protocol for social networks, the Acorn Protocol distributes Acorn Token rewards to DAPP users and developers who make contributions to the ecosystem. A total of 2,500,000,000 ACN is reserved for an Acorn Rewards Engine, half of which are distributed in the first year of inception. In each subsequent year, half of the remaining Acorn Tokens will be distributed every year. Distribution amounts change on a yearly basis. Put another way, the daily distributed ACN will be the same amount each day for ACN distributed in the same year.

On a daily basis, a predetermined amount of Acorn Token rewards will be distributed among all DAPPs in the Acorn Alliance according to the contributions they make to the ecosystem. The rewards distributed to a specific DAPP will be distributed between the developer and users based on a set ratio. For the protection of all DAPPs in the Acorn



Alliance, Acorn Token rewards for DAPP developers are subject to predetermined period of lock-up.

The Acorn Protocol distributes most rewards to DAPP users who make contributions. This is considered a mining activity, one that encourages users to stay active and continuously make contributions in DAPPs. Compared with the traditional mining system, computing power is not as essential a resource as it used to be. Instead, meaningful contribution is emphasized, and those who truly contribute to a DAPP are recognized and rewarded.

More details about the Acorn Rewards Engine can be found in *06 Acorn Rewards Engine*.

# Use Cases

As the native and currency token for the Acorn Protocol, the Acorn Token plays an important role in providing a better user experience. Third party developers can receive Acorn Tokens for their service from DAPP users. The services they provide become channels of Acorn Token flow in the ecosystem. Acorn Tokens can be used in the following ways:

## Emoticons

Emoticons make chatting more interesting. Third party designers can provide emoticons to users and accept payment of Acorn Tokens in return.

## Chat bots

Third party chat bots can offer various services such as on-demand weather reports, real-time exchange rates, and other premium services users can pay for with Acorn Token.

## Private gifting

Users can send virtual gifts to others with acquired Acorn Token.

## Discount coupons

Users can use Acorn Tokens to purchase discount coupons for online and offline stores.

Additional scenarios might include bounty payments, interactive game earnings, special item purchases, and so forth. There are numerous possible ways to provide a richer user experience with Acorn Tokens.

# Acorn Ad Network

The Acorn Ad Network is a network that allows advertisers to promote their products and brands within the Acorn Protocol ecosystem. The general outline and concept of the Acorn Ad Network are similar to traditional online ad networks. Advertisers use Acorn Tokens to bid for advertisement slots on the Acorn Ad Network, and the winning bidder uses the slot to promote content to millions of users. Advertisements are configurable as individual display ads, promotional campaigns, customer surveys, and so forth.

Acorn Tokens used for advertisements are distributed directly to the users that view and interact with the advertisements. The DAPP developer and TTC Foundation will take a fractional transaction fee to cover the maintenance cost of implementing the Acorn Ad Network.

# Acorn Alliance

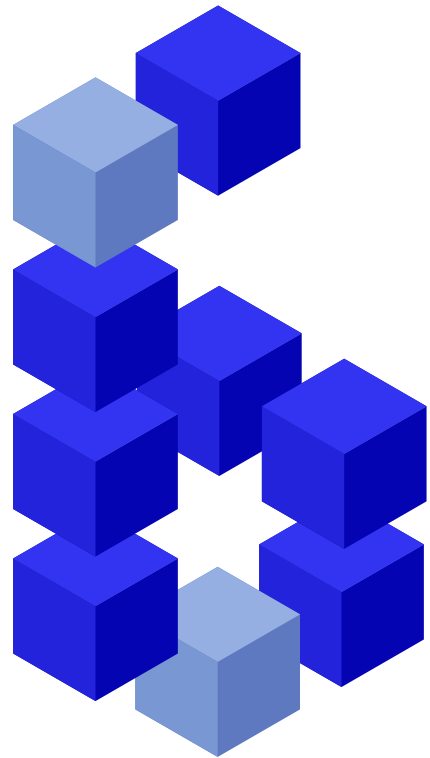
The Acorn Alliance is a membership-based association of social networks using the Acorn Protocol. All types of social networking services are welcome to join the Acorn Alliance, including but not limited to content sharing platforms, online forums, and social commercial services.

The Acorn Alliance is organized and governed by the TTC Foundation. A DAPP must submit to a series of assessments conducted by TTC Foundation before a DAPP can become a member of the Acorn Alliance. Acorn Alliance member benefits depend on a DAPPs needs.

For example, the TTC Foundation is able to invest in an Acorn Alliance DAPP, or acquire the service to further its development and operation. Allied DAPPs in the ecosystem will be eligible for a series of subsidies from TTC Foundation, including the Acorn Rewards Engine, airdrop subsidies, and access to the Acorn Ad Network.

06

# Acorn Rewards Engine



# Acorn Rewards Engine

Acorn Token rewards originate from the Acorn Token rewards pool and are distributed among DAPPs. All DAPP rewards are calculated via the Acorn Rewards Engine, based on the information recorded on the TTC Platform. The calculated rewards for each DAPP will be sent to the accounts of DAPP users and developers.

Variables and Terms	Explanation
Daily ACN Rewards Pool ( $E_{trp}$ )	Daily ACN rewards distributed from the ACN Rewards Pool
Daily DAPP Rewards Pool ( $E_{dapp}$ )	Number of ACN allotted to a single DAPP from the daily ACN rewards pool ( $E_{trp}$ )
Daily Developer Rewards ( $R_{dev}$ )	Number of ACN distributed to a DAPP developer from the daily DAPP Rewards ( $R_{dapp}$ )
Daily DAPP User Rewards Pool ( $E_{user}$ )	Number of ACN distributed to users of a DAPP. $E_{user} = E_{dapp} - R_{dev}$
Daily Reputation Rewards Pool ( $E_{rep}$ )	$E_{user} \times W_{rep}$
Total Daily Content Rewards Pool ( $E_{cv-total}$ )	Total number of ACN allotted for the Content Rewards ( $R_{cv}$ ) $E_{cv-total} = E_{user} \times W_{cv}$

Single Daily Content Rewards Pool ( $E_{cv}$ )	<p>Total number of ACN allotted for users involved with the Content Rewards (<math>R_{cv}</math>) of a single content.</p> $E_{cv} = (V_{cv} / \text{Sum of } V_{cv}) \times E_{cv\text{-total}}$
Reputation Rewards ( $R_{rep}$ )	Number of ACN each user receives based on their Reputation Value ( $V_{rep}$ )
Content Rewards ( $R_{cv}$ )	Number of ACN each user receives based on the Content Value created by the user ( $V_{cv}$ )

**Table 3.** Main Rewards and Rewards Pools of Acorn Rewards Engine Distribution System

First, the daily DAPP rewards pool ( $E_{dapp}$ ) is calculated. The Acorn Rewards Engine divides the pool into the daily developer rewards ( $R_{dev}$ ) and the daily DAPP user rewards pool ( $E_{user}$ ). Finally, based on the daily DAPP user rewards pool, daily user rewards ( $R_{user}$ ) is calculated as a sum of reputation rewards and content rewards.

As a decentralized ecosystem, all the data related to these factors are recorded on the TTC Platform openly and transparently. Monthly variables are based on a 30-day time frame, and annual variables are based on a 365-day time frame.



# Daily DAPP Rewards Pool ( $E_{dapp}$ ) for each DAPP

The total amount of ACN each DAPP will receive is calculated based on the overall contribution it made to the Ecosystem.

Table 4 (below) introduces several terms and variables required to calculate the daily DAPP rewards pool ( $E_{dapp}$ ) for each DAPP in the ecosystem.

Variables and Terms	Explanation
Contribution Factor Value ( $V_{cf}$ )	Value of how much a DAPP contributed to TTC Ecosystem as calculated by TTC Foundation.
User Nationality Score ( $S_n$ )	Value of a user acquired in a specific nation. Refer to Table 10 in the Appendix.
User Acquisition Score ( $S_{ua}$ )	Degree of difficulty at which a DAPP acquires new users. Refer to Table 11 in the Appendix.
User Value ( $V_{user}$ )	Value of a user in a DAPP, calculated by multiplying the user nationality score and user acquisition score.  $V_{user} = S_n \times S_{ua}$
Monthly New User Value ( $V_{mnu}$ )	Sum of $V_{user}$ of monthly new users of a DAPP
Monthly Active User Value ( $V_{mau}$ )	Sum of $V_{user}$ of monthly active users of a DAPP

**Table 4.** Variables required to calculate the Daily DAPP Rewards Pool ( $E_{dapp}$ )

The amount a DAPP has contributed is calculated using the above factors and compared to all DAPPs across the network. Table 5 shows the ratios used to compare for four key factors.

Terms	Type	Explanation
MNU Rate ( $r_{mnu}$ )	Description	Ratio of a DAPP's monthly new users to the sum of all the DAPPs' monthly new users
	Equation	$r_{mnu} = V_{mnu} / \text{Sum of } V_{mnu}$
	Ratio	20%
MAU Rate ( $r_{mau}$ )	Description	Ratio of a DAPP's monthly active users to the sum of all the DAPPs' monthly active users
	Equation	$r_{mau} = V_{mau} / \text{Sum of } V_{mau}$
	Ratio	20%
MR Rate ( $r_{mr}$ )	Description	Ratio of a DAPP's monthly Acorn AD Network revenue to the total Acorn AD Network monthly revenue <sup>2</sup> .
	Equation	$r_{mr} = \frac{\text{A DAPP's monthly revenue from TTC AD Network}}{\text{A total monthly revenue of TTC AD Network}}$
	Ratio	50%
CF Rate ( $r_{cf}$ )	Description	Ratio of a DAPP's contribution factor value to the sum of all the DAPPs' contribution factor values
	Equation	$r_{cf} = V_{cf} / \text{Sum of } V_{cf}$
	Ratio	10%

**Table 5.** Evaluation Items for Daily DAPP Rewards Pool ( $E_{dapp}$ )

$$E_{dapp} = E_{trp} \times \{(r_{mnu} \times 0.2) + (r_{mau} \times 0.2) + (r_{mr} \times 0.5) + (r_{cf} \times 0.1)\}^2$$

<sup>2</sup> For DAPPs that do not host advertisements from Acorn AD Networks, this value is 0.

# Daily Developer Rewards ( $R_{dev}$ )

The daily developer rewards ( $R_{dev}$ ) are Acorn Token rewards for DAPP developers for their contributions.

Table below contains all the key variables and terms required to calculate the daily developer rewards. DAPP Developers can preset the developer rewards weight, which will be recorded in the Acorn Rewards Engine.

Variables and Terms	Explanation
Developer Rewards Weight ( $w_{dev}$ )	% value preset by a DAPP developer determining how much of daily DAPP rewards pool ( $E_{dapp}$ ) is distributed to the developer

**Table 6.** Variables required to calculate the Daily Developer Rewards ( $R_{dev}$ )

$$R_{dev} = E_{dapp} \times w_{dev}$$

# Daily User Rewards ( $R_{user}$ )

Daily user rewards are distributed to all users of a DAPP who have contributed on the previous day. For each user, a daily user rewards will be calculated as a sum of Content Rewards and Reputation Rewards.

$$R_{user} = R_{rep} + R_{cv}$$

DAPP developers can decide the proportion of the two kinds of rewards according to the needs of their platforms. The simple rule of thumb for the daily user rewards is that the more contributions you have made, the more rewards you will get.

The developers can also set the ratios for both reputation rewards pool and content rewards pool, which are used to determine the size of each pool.

## Reputation Rewards ( $R_{rep}$ )

A user's reputation ( $V_{rep}$ ) is a quantified value of the user's long-term contribution. A user's reputation can reflect the total contribution a user has made to the platform, and it is an effective way to combat and prevent abuse.

DAPP developers can decide the criteria and weight used to calculate Reputation rewards ( $R_{rep}$ ). Table 7 below shows

the basic default criteria and equation of how a user's Reputation ( $V_{rep}$ ) is calculated.

Variables and Terms	Explanation
Reputation Rewards Pool Ratio ( $w_{rep}$ ) <sup>3</sup>	Ratio determining the size of the reputation rewards pool
Retention Score ( $S_r$ )	Retention Score ( $S_r$ )
Content Score ( $S_c$ )	Content value of the content posted by a user
Follower Score ( $S_f$ )	Social value of a user
Police Score ( $S_p$ )	How much a user contributes to the health of the DAPP environment. (e.g. report and audit)
Retention Weight ( $w_r$ )	Weight determining how much Retention Score is used to calculate the Reputation ( $V_{rep}$ .)
Content Weight ( $w_c$ )	Weight determining how much Content Score is used to calculate the Reputation ( $V_{rep}$ .)
Follower Weight ( $w_f$ )	Weight determining how much Follower Score is used to calculate the Reputation ( $V_{rep}$ .)
Police Weight ( $w_p$ )	Weight determining how much Police Score is used to calculate the Reputation ( $V_{rep}$ .)

**Table 7.** Default scores and weights for Reputation Rewards

$$E_{rep} = E_{user} \times w_{rep}.$$

$$V_{rep} = (S_r \times w_r) + (S_c \times w_c) + (S_f \times w_f) + (S_p \times w_p)$$

$$R_{rep} = (V_{rep} / \text{Sum of } V_{rep}) \times E_{rep}^3$$

<sup>3</sup> Typically, reputation rewards comprises less than 50% of the rewards pool. The proportions are adjustable.

## Content Rewards ( $R_{cv}$ )

Content rewards ( $R_{cv}$ ) are rewards distributed to both creators and curators of content from a single daily content rewards pool ( $E_{cv}$ ).

Variables and Terms	Explanation
Content Rewards Pool Ratio ( $w_{cv}$ )	Ratio determining the size of Content Rewards Pool.

**Table 8.** Variables required to calculate the single daily content rewards pool ( $E_{cv}$ )

$$E_{cv-total} = E_{user} \times w_{cv}$$

$$E_{cv} = (V_{cv} / \text{Sum of } V_{cv}) \times E_{cv-total}$$

Content rewards ( $R_{cv}$ ) are closely linked to content value ( $V_{cv}$ ). Content value ( $V_{cv}$ ) is the value of a piece of content as calculated by the Acorn Rewards Engine using the number of curators interacting with the content and the reputation of those curators.

As all social networks have unique actions and aims, DAPP developers can decide which actions to count and how to weigh each action. Table 9 below shows the default settings as an example.

Variables and Terms	Explanation
Action #1: Like	Action "Like" will influence the Content Value ( $V_{cv}$ )
Action #2: Comment	Action "Comment" will influence the Content Value ( $V_{cv}$ )
Action #3: Share	Action "Share" will influence the Content Value ( $V_{cv}$ )
Action #1 Weight ( $w_{a1}$ )	Weight determining how much Action #1 is used to calculate the Content Value ( $V_{cv}$ )
Action #2 Weight ( $w_{a2}$ )	Weight determining how much Action #2 is used to calculate the Content Value ( $V_{cv}$ )
Action #3 Weight ( $w_{a3}$ )	Weight determining how much Action #3 is used to calculate the Content Value ( $V_{cv}$ )

**Table 9.** Default actions and weight for Content Rewards ( $V_{cv}$ )

$$V_{cv} = Y_{like} * \sum f(\text{reputation of liker}) + Y_{comment} * \sum f(\text{reputation of commenter}) + Y_{share} * \sum f(\text{reputation of sharer})$$

DAPP developers can adjust the proportion parameters between content creators and curators.<sup>4</sup> Simply, curators are users who interacted with a piece of content (e.g., liking, commenting, presenting gifts, etc.).

DAPP developers can adjust the parameters of the Acorn Rewards Engine, including the proportion between content

<sup>4</sup> Typically, the content creator would a larger share since they contribute most. The proportions are adjustable.

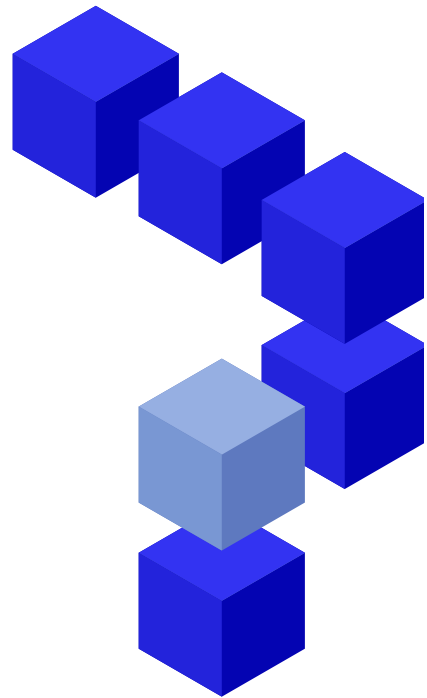
creators and curators, or the proportions for different ways of curation, different distribution patterns of curation, and so forth.

For reward-specific interactions, the distribution pattern typically decreases over time, since interaction with high-quality content is less significant when it has already been recognized by a critical mass of users.



07

# Summary



# Summary

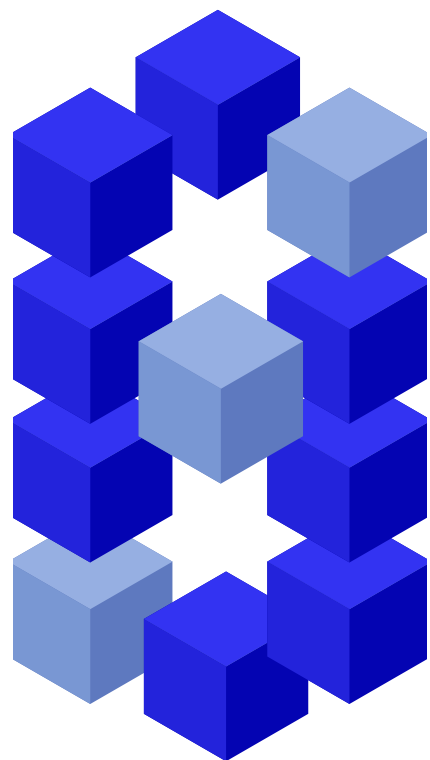
The TTC Platform is a blockchain solution committed to achieving mass adoption. With an optimized consensus and a separation of master and slave networks, the TTC Platform is capable of reaching a higher TPS, laying a solid foundation for its services.

The Acorn Protocol is a decentralized and token-incentivized social networking protocol based on the TTC Platform. It aims to provide token incentives to users who have made contributions to the Acorn Protocol ecosystem. It can be seen as a new way of mining. The Acorn Protocol de-emphasizes computing power as a less relevant resource, and instead emphasizes social contributions as a key resource. The users that truly contribute to the platforms are clearly recognized and fairly incentivized, resulting in increased user activity, higher user retention, and larger advertising revenue.

The TTC Platform addresses the problems of current blockchain solutions and can support large transactions and a variety of possible use cases. In doing so, the TTC Platform provides a decentralized solution at a high level of performance, security, and scalability. The TTC Platform is committed to changing traditional, centralized social networking services with the Acorn Protocol and Acorn Tokens, while TTC Pay offers a user-friendly experience by providing a seamless method for users to make payments.

Altogether, the TTC Platform is a comprehensive blockchain solution able to realize the full potential of blockchain technology and bring the benefits of this technology to the general public.

# Appendix



# Appendix

Nation & Region	D
North America	3
Europe	2
China	2
South Korea	2
Japan	2
Oceania	2
Other Asian Countries	1
South America	1
Africa	1
Others	1

**Table 10.** Value table for User Nationality Score ( $S_n$ )

Product Type	U
Social Networking Service	10
Social Media	1
Video Community	3
Customization	0.5—100

**Table 11.** Value table for User Acquisition Score ( $S_{ua}$ )