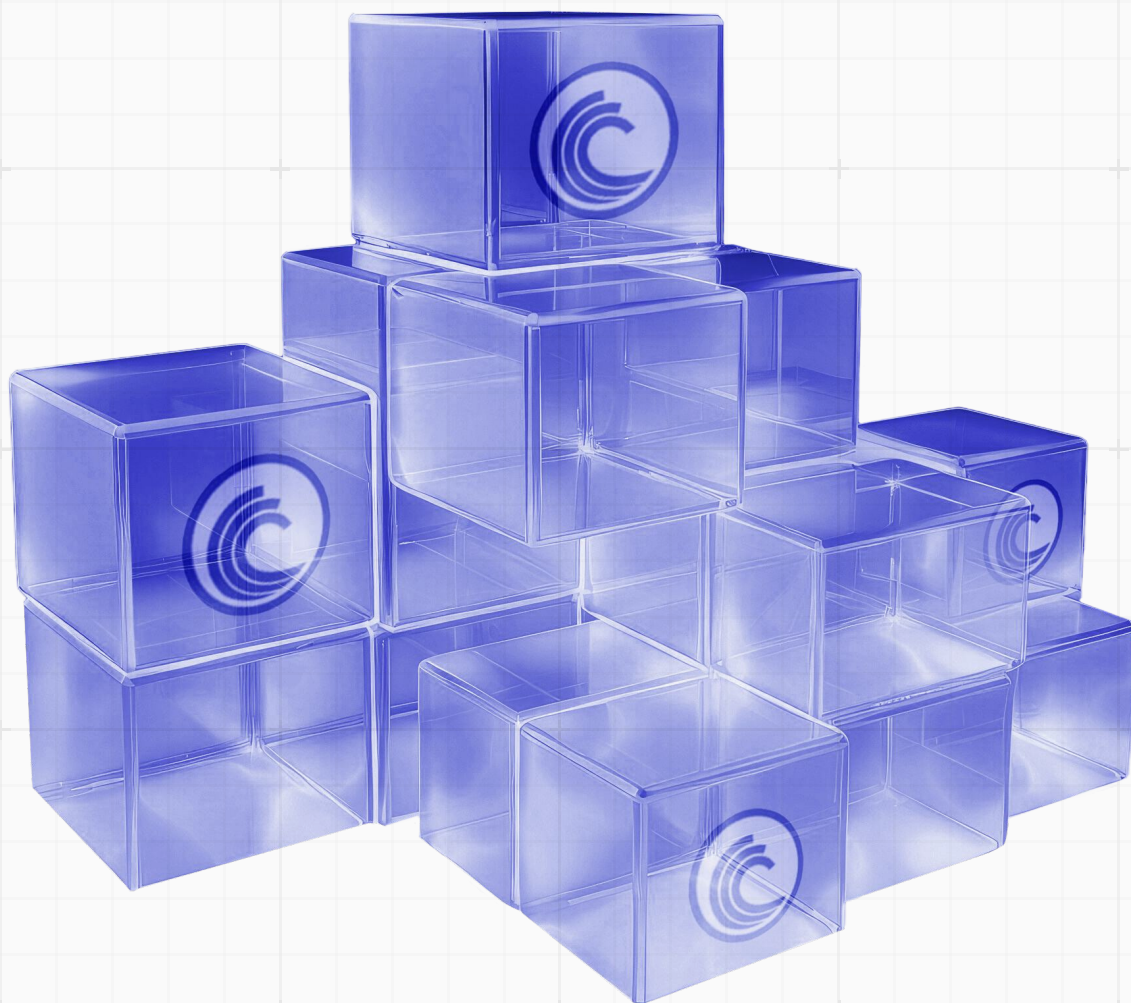




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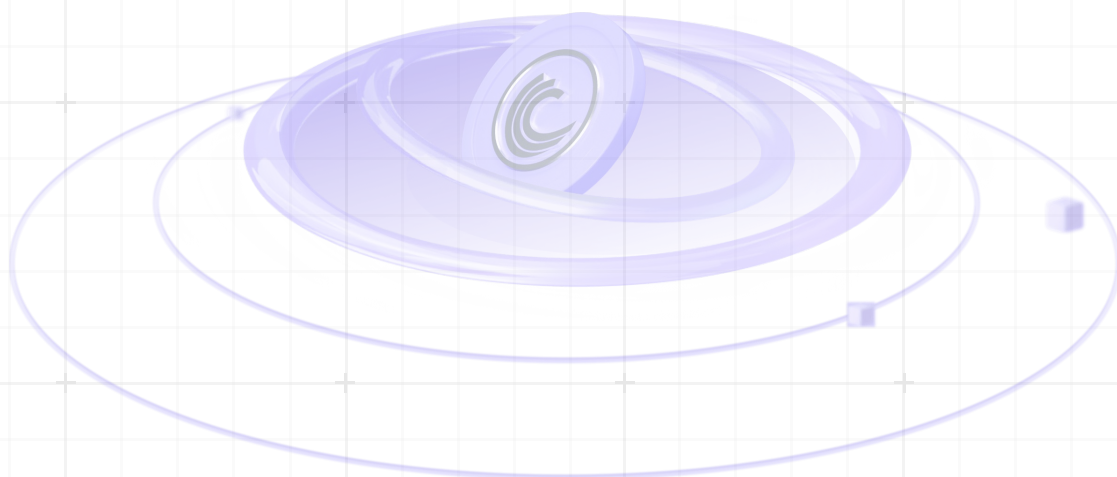
BITTORRENT CHAIN'S BRIDGING BREAKTHROUGHS IN H1 2024: UNLOCKING TRON'S POTENTIAL



Cointelegraph Research Report

Content

I. Introduction: History and the Bittorrent ecosystem	3
BitTorrent protocol	3
BTFS	5
II. Technical Overview	8
Bridge architecture	10
Relayer services	11
III. Tokenomics	12
BTT supply and distribution	12
Protocol incentives	13
IV. Product updates and key milestones	15
DeFi Integrations	15
BTCFi	16
VI. Conclusion	17
Disclaimer	18



I. Introduction: History and the Bittorrent ecosystem

The BitTorrent project is much older than the crypto space itself, having released its first piece of software back in 2001. It started and is still well known for the BitTorrent P2P file sharing protocol but has broadened its scope since its associated company was acquired by Tron in 2018.

Apart from maintaining various BitTorrent client applications, it is now working on the development of the [BitTorrent Filesystem](#) (BTFS), a fork of IPFS, and the [BitTorrent Chain](#) (BTTC), a multichain proof-of-stake interoperability layer between Tron and EVM-based chains.

BitTorrent protocol

In the early days of the internet, bandwidth was more limited than nowadays, which presented a challenge for simple client-server approaches to sharing files, such as FTP and HTTP. To circumvent the bandwidth bottleneck on single machines, the BitTorrent protocol made every downloader simultaneously an uploader or 'seeder.' It also introduced the idea of distributing files in hashed pieces (and later on as hash trees) instead of monolithically.

All of the aforementioned projects make use of the BitTorrent token (BTT), a TRC-20 token on the Tron blockchain. Users can spend BTT to speed up their torrent downloads or be rewarded for seeding when using the BitTorrent Speed client.

BTT is also used to pay for the use and reward the provision of storage on the BTFS. This makes BTT essentially a DePIN token according to recent Web3 terminology. Lastly, BTT is also the asset that needs to be staked to become a validator on BTTC.

This introduces redundancy and makes the download process resilient against unstable connections, as different file chunks can be downloaded through separate TCP connections and from various peers. [Some sources claimed](#) that one-third of all internet traffic in the early 2000s was from BitTorrent traffic.



Initially, torrenting still relied on central servers called trackers to discover peers from whom to download files. In later iterations, this element, too, became decentralized and peer discovery through a distributed hashtable routing (DHT) algorithm called Mainline DHT was introduced to most clients.

The BitTorrent protocol thus had the properties that we now view as desirable for Web3 applications, namely decentralization and censorship resistance. However, in recent years, as networking speeds have increased and streaming subscription services have become popular, BitTorrent usage has declined significantly.

The BitTorrent protocol in its original form has another inherent weakness, which it shares with first generation decentralized file sharing projects such as Freenet, GNUnet, Perfect dark or Zeronet. There are no economic incentives to store files in the long run or provide bandwidth to the network once a file download has been completed.

The system is purely based on altruism and, in many cases, succumbs to the tragedy of the commons. Most torrent files are in poor health after some time as people download the file but then stop seeding.

Modern blockchain architectures can provide a solution to this problem by overlaying an economic incentive system on file sharing networks without compromising decentralization. They can systematically reward those who upload and store for the long term while demanding small compensation from those who download.

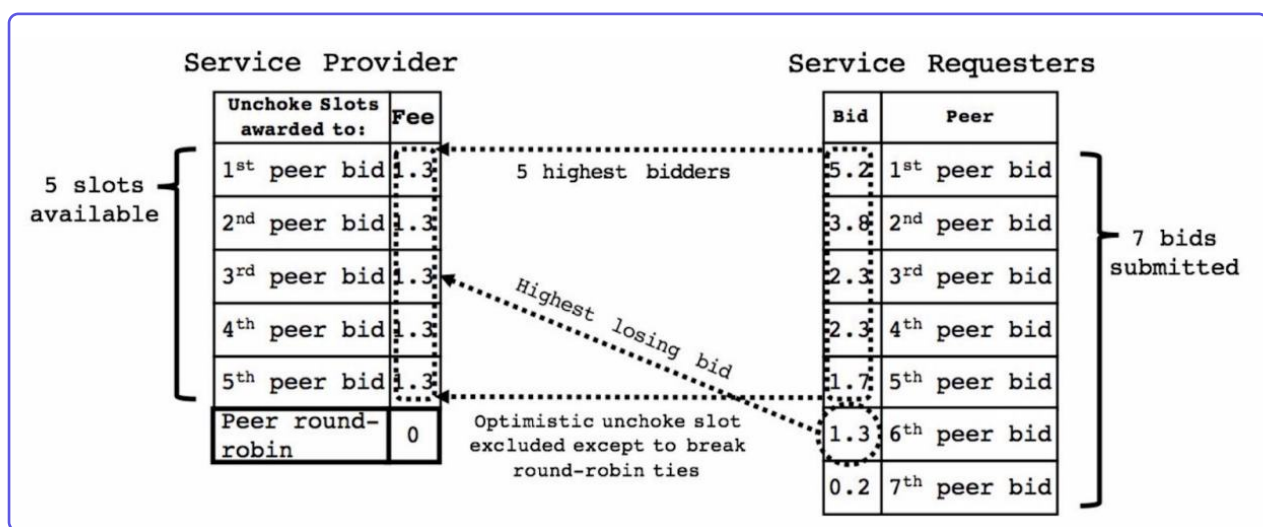
In the case of the BitTorrent protocol, the TRC-10 token BTT on the Tron blockchain was used for this purpose (now upgraded to a TRC-20 token) in an optional feature called BitTorrent Speed. With this feature, everyone can still download the torrent, but increased speeds are available if BTT tokens are used.



Seeding is, in turn, rewarded by receiving BTT tokens. Based on the available BTT balance and the size of the remaining download, the torrent client submits a bid to a Vickrey-Clarke-Groves style auction. More resources are then provided to the downloader through a change to the choking algorithm of the protocol, which determines which peers to exchange data with (Figure 1).

Normally, peers and seeders will choke or unchoke peers based on how much data they have received or sent to the peer in the previous round to optimize the throughput of the torrent swarm. However, with BitTorrent speed, choke slots are allocated through the auctioning system.

Figure 1: Choke Slot Auctioning System of Bittorrent Speed



Source: [Bittorrent \(BTT\) White paper](#)

BTFS

The BitTorrent Filesystem (BTFS) is a fork of Protocol Labs' IPFS, which also allows users to share files in a distributed way. Unlike the BitTorrent protocol, the BTFS adds a unified content address space, making it more akin to a potential replacement for the World Wide Web.

Files are addressed not by means of a domain name system but through the hash of their contents, making the resulting content addresses permanent, even if the underlying file disappears from the network.



To route data, [the BTFS uses two distributed hashtables \(DHTs\)](#), one to map a data identifier to peer IDs that store the respective piece of information and one to map peer IDs to the addresses under which the peer can be reached. For those who do not run their own BTFS node but want to browse the decentralized web of BTFS DApps, an [HTTP gateway is available](#) under the domain btfs.io.

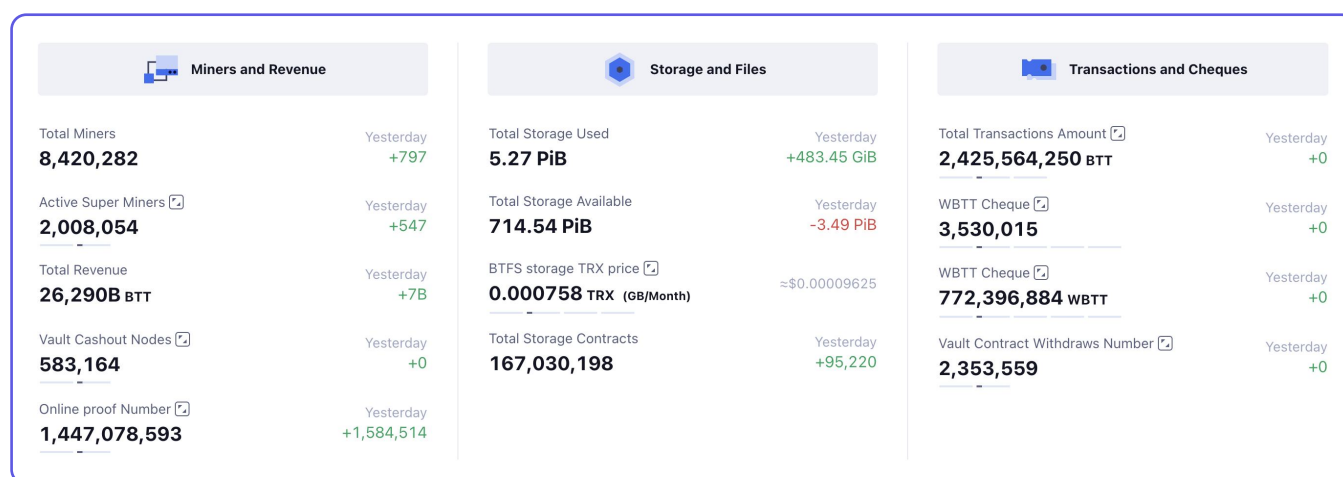
Unlike the IPFS, the BTFS also offers a native integration for symmetric encryption and file removal, which makes it easier for node-runners to individually remove illicit content from their cache.

Like BitTorrent Speed, the BTFS uses the BTT token for its underlying reward infrastructure. In the case of the BTFS, however, long-term storage rather than the short-term provision of bandwidth is rewarded.

By default, every node shares cached files with the network after downloading them. However, as a user browses more of the BTFS, old files will gradually drop out of the cache. To remedy this, users can use their BTT balance to store files with so-called storage miners for predetermined periods.

At the time of writing, the BTFS features more than 8M storage miners and has stored more than 6 Pebibytes worth of data, [according to BTFS scan](#). The total cumulative protocol revenue, i.e., the fees paid from storage renters to miners, currently stands at 26.29 B BTT or \$20.033. Furthermore, around 8 B BTT or \$6,096 worth of gas was consumed by storage contracts (Figure 2) at the time of writing.

Figure 2: BTFS Core Network Statistics

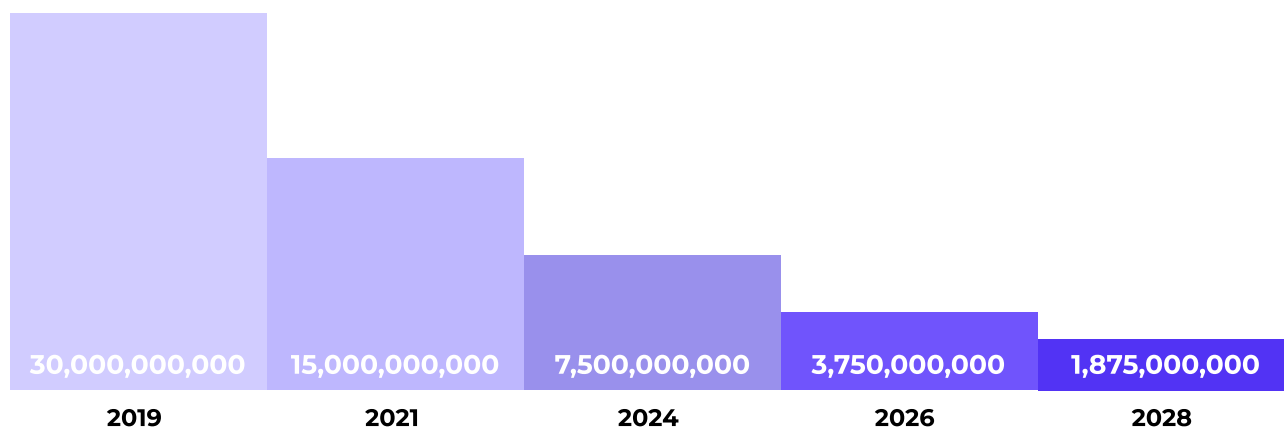


Source: [Bittorrent \(BTT\) White paper](#)



In addition to the raw protocol revenues, storage miners [also receive BTT airdrops as an incentive](#). The rate of these airdrops [was recently halved](#) from 15 B BTT to 7.5 B BTT daily and is due for another halving in 2026 (Figure 3). Despite the halving, these airdrop incentives still make up more than half of the total revenue of miners.

Figure 3: BTFS Storage Reward Halving Schedule, BTT



Source: [BTFS Scan](#)



II. Technical Overview

Bridging assets across different chains has remained one of the hardest engineering for blockchain developers and one of the biggest roadblocks to mainstream adoption and user-friendliness. To this date, bridges are among the most attractive hacking targets and are the cause of a [large proportion of funds stolen in the ecosystem](#).

At the same time, they are essential for a smooth user experience and seamless onboarding. When relying on centralized exchanges, limited liquidity and trading fees can create significant friction for something as simple as transferring USDT from Tron to Ethereum. Given that the same asset is involved on both ends, it will seem unacceptable to most users [that 0.5-2% are lost](#) when transferring large sums from one chain to another.

The BitTorrent Chain (BTTC) is intended as a scalable, high-throughput and low-fee interoperability layer between Tron and EVM-based chains. It consists of a network of EVM-compatible PoS side-chains that are derived from [Cosmos' Tendermint software stack](#).

Validators stake BTTC on Tron and face slashing conditions in case of misbehavior or prolonged downtime. Final validation on BTTC is separated from consensus and execution. While the former is taken care of by [Tendermint-derived so-called delivery nodes](#), the main BTTC execution client [is a fork of Go-Ethereum](#). According to information provided by the project website, [BTTC PoS](#) achieves a transaction throughput of roughly 7000 TPS, with a block time of 3s and average gas fees below \$0.01. Gas fees are paid in BTT.



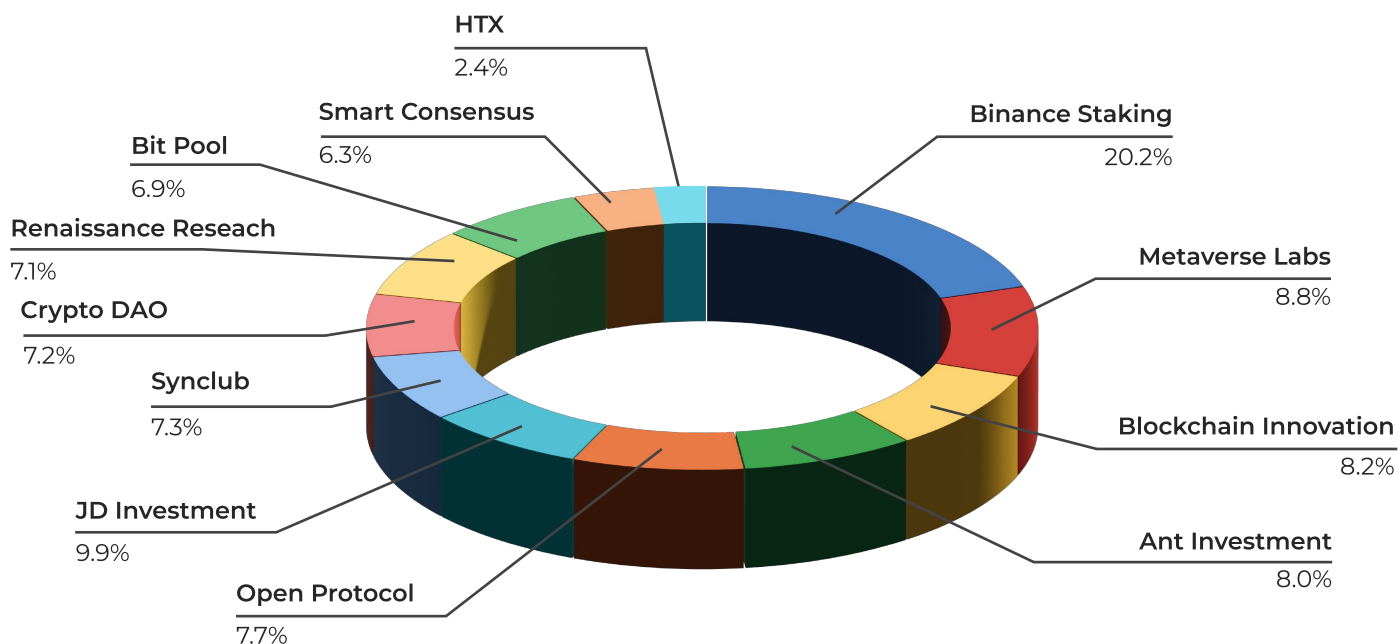
There are currently 11 validators on the network to which users can deploy their TRC-20 BTT tokens for staking. Currently, all nodes offer the same APY of 17.65% and have been active in signing nearly all of the network's blocks and checkpoints.

Currently, 39.9 T BTT tokens are staked by over 6200 stakers. Binance staking hosts the largest validator with 8 T BTT or 20.2% of the total stake, followed by Metaverse Labs with 8.8% of the total stake (Figure 4).

Figure 4: BTTC Validators by Share of the Total Stake

Total Stake: 41,190b

Online Validators 12/12



Source: [Delivery Scan](#)



Bridge architecture

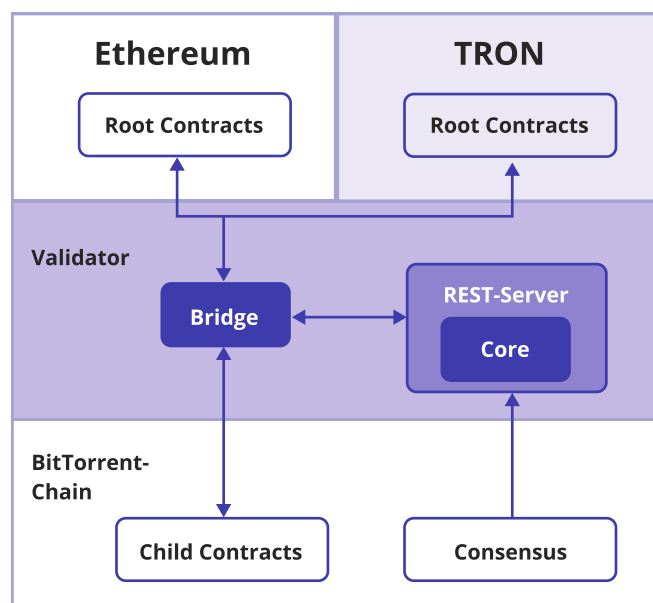
BTTC offers bridging functionality to Tron, Ethereum and BSC through a classic lock-and-mint model. Root contracts are deployed to allow assets to be locked (and later released) on the chain they were originally issued. The corresponding child contracts sit on the BTTC chain (Figure 5).

All pairs for which such token mappings have been created are visible on [Delivery Scan](#). At the time of writing, mappings for 75 tokens across all supported chains have been created. When a deposit to the root contract is initiated, a [ChildChainManagerProxy](#) contract on BTTC will call the deposit method of the contract of the associated wrapped token by emitting a deposit event.

When the token on BTTC is to be redeemed for the underlying asset on the other hand, the withdrawal method is called.

This cross-chain communication is handled through the delivery nodes that are also the validators of the BTTC. Merkel tree roots of aggregated BTTC blocks are periodically posted on the root chains as so-called checkpoints. Currently, [a checkpoint is signed](#) every 30 minutes. This provides an additional layer of transaction finality on the respective root chains and is also necessary for releasing locked assets when the withdrawal method is called.

Figure 5: Top-Level Schematic of BTTC Bridge Architecture



Source: [BTTC White paper](#)



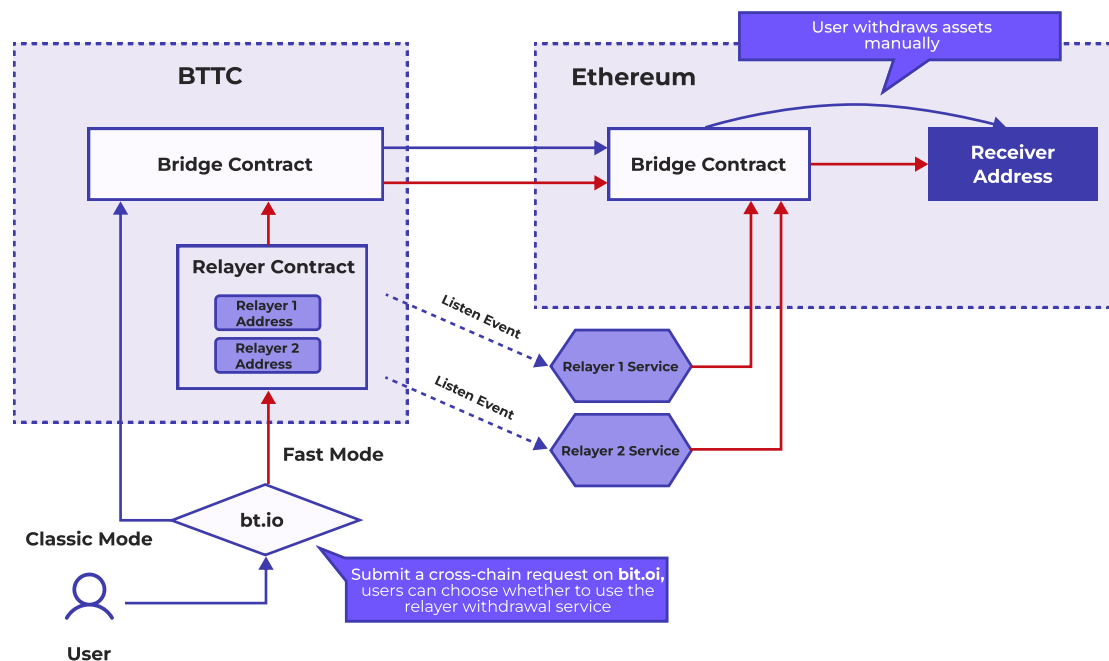
Relayer services

15-30 minutes because the user has to wait for the next checkpoint to be submitted. Calling the withdraw function on the root contract also incurs a gas fee, so users have to create an account on the respective withdrawal chain and pre-load it to pay the gas fee before the withdrawal. To avoid this, there is the possibility of withdrawing through a so-called relayer.

Relayers are independent providers that take over the withdrawal process on the base chain in exchange for a fee and thus allow users to withdraw in so-called fast mode (Figure 6).

The relayer will listen to the cross-chain event, which includes the user's receiving address, and subsequently pay the gas fee for the withdrawal call through an external account. In fast mode, users can also elect to convert a small portion of their withdrawn asset to the native asset of the target chain in order to pay gas fees for subsequent transfers.

Figure 6: Top-Level Schematic of BTTC Bridge Architecture



Source: [Bittorrent Chain Documentation](#)



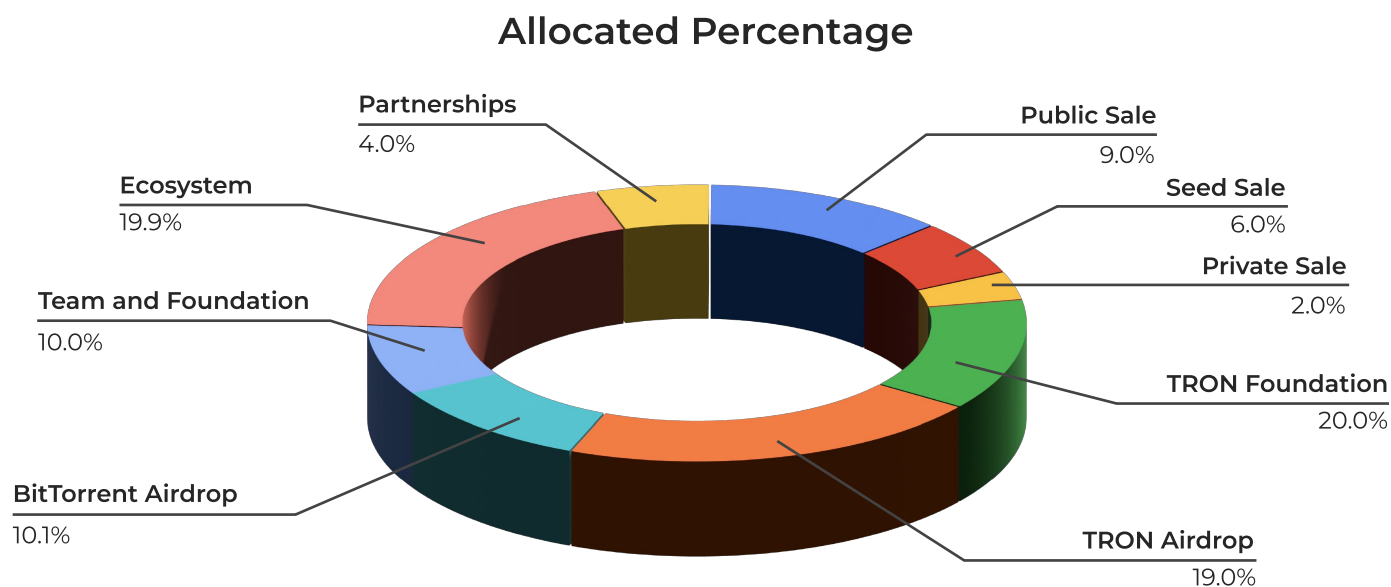
III. Tokenomics

BTT supply and distribution

The supply of the BTT token is fixed at 990 T. Before a [redenomination](#) that occurred in 2022, this figure was 990 B, but this change was not dilutive and did not change the token's market capitalization. 2% of the total supply was emitted in a private sale in late 2018. Another 6% were sold in a public token sale on Binance launchpad in 2019, which raised \$7.2M.

After this, the BitTorrent team launched one of the [largest airdrops in history to that date](#) by allocating roughly 0.11 BTT (or 110 BTT under the new denomination) per TRX held in every airdrop-eligible wallet. This consumed 10% of the total supply of BTT. Large allocations were given to the team and BitTorrent Foundation (19%), the TRON Foundation (20%) and BitTorrent Ecosystem projects (19.9%). Another 4% were reserved for partnerships (Figure 7).

Figure 7: BTT Token Distribution

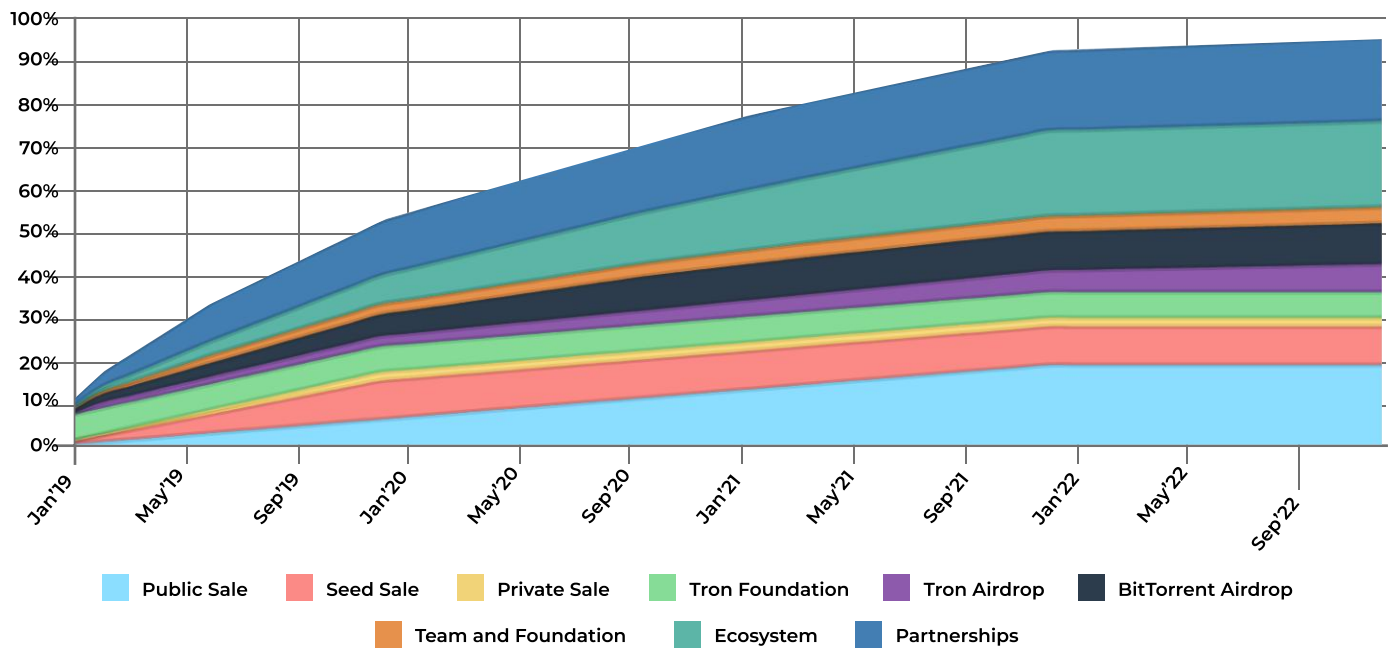


Source: [Binance Research](#)



Most of these funds, however, are vested under a fairly drawn-out schedule to avoid excessive short term sell-pressure. Airdrops on Tron will continue until 2025, and BitTorrent Ecosystem tokens and Partnership tokens will continue to unlock until 2028 (Figure 8).

Figure 8: BTT Supply Vesting Schedule



Source: [Binance Research](#)

Protocol incentives are released as part of this distribution and thus continually increase the liquid circulating supply of BTT. However, the total supply cap of 990 T BTT remains unaffected by them.

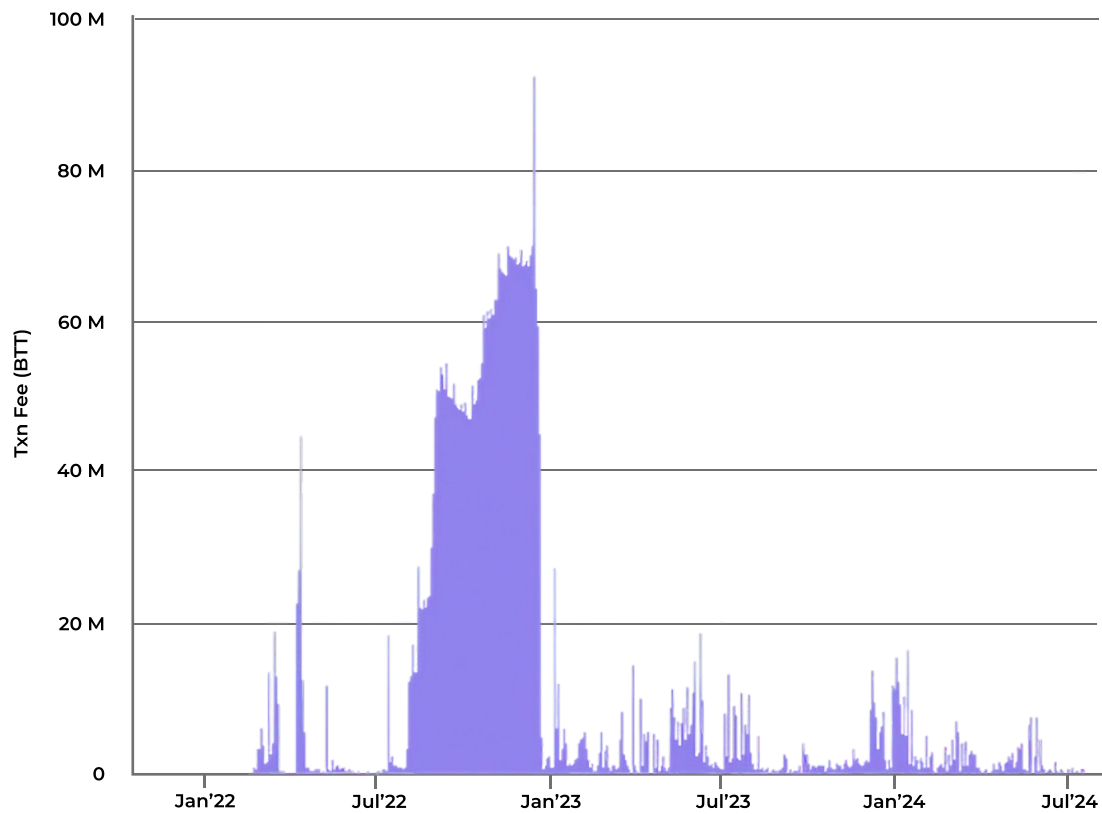
Protocol incentives

Currently, staking and validation activity on the BTTC are rewarded with 7,041,208,483,000 BTT annually or \$5.25M at current prices. This represents 0.7% of the total BTTC supply. 90% of this amount goes to stakers in proportion to their share of the total amount of BTT staked on the network. Currently, 39.9T BTT or 4% of the total supply, is staked. The remaining 10% goes exclusively to the validators themselves, who submit checkpoints to BTTC's root layer.



Thus, incentives are largely responsible for the 17.65% APY currently available on staking. Transaction fee revenue on BTTC is insignificant in comparison and has been ranging well below 10 M BTT or \$9 USD for the last few months (Figure 9).

Figure 9: BTCC Daily Transaction Fees Since Launch



Source: [BTTC Scan](#)

Together with the rewards for BTFS storage miners, which currently sit at 2.74 B BTT annually, annual network incentives thus currently amount to 0.99% of the total BTT supply. As BTFS mining is concerned, the situation looks more sustainable with 7 B BTT in daily organic protocol revenues and 7.5 B BTT in daily incentives at the time of writing.

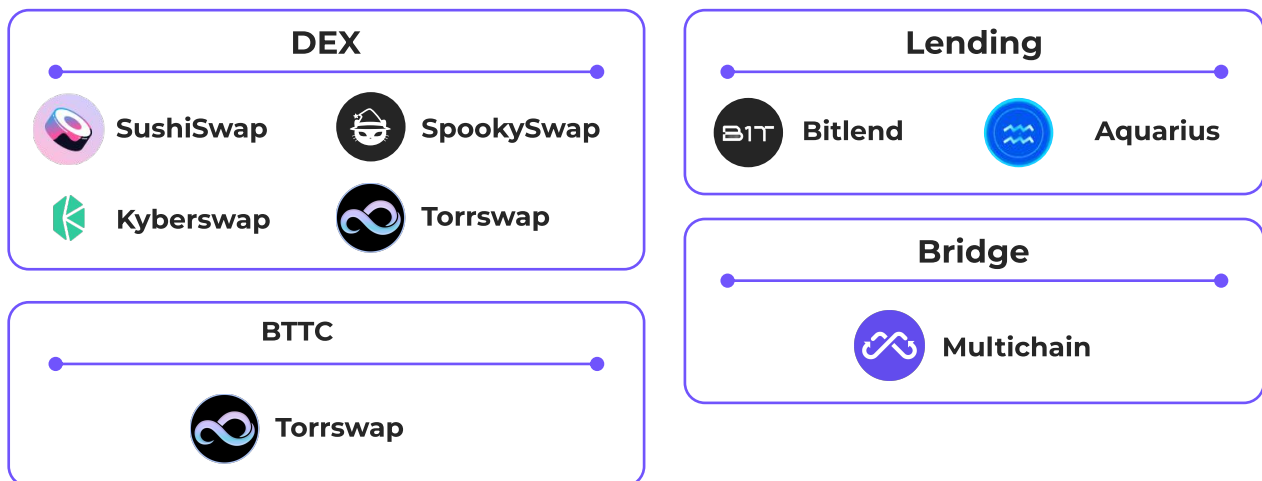


IV. Product updates and key milestones

DeFi Integrations

Apart from the native bridging, staking and swap features, BTTC [is currently integrated with the following DApps](#):

Figure 9: BTCC Daily Transaction Fees Since Launch



Apart [from technical updates](#), a key objective for BTTC will be to attract more liquidity to these DApps and thus induce demand for DeFi activity on the chain that goes beyond the bridging of tokens.

Because the BTTC execution client is a fork of Geth with no changes to EVM opcodes, the [deployment of existing DApps from Ethereum is straightforward](#). As such, more DeFi integrations can be expected in the near future.



BTCfi

BTTC is likely to play a key role in Tron's upcoming plans for a deeper integration with the Bitcoin ecosystem. [Justin Sun announced a roadmap](#) for this in February 2024. While most of the ideas appear to be in the concept stage, BTTC's bridging features will likely play a key role in their implementation.

Stage α : Bridging Bitcoin-based assets to Tron and vice versa

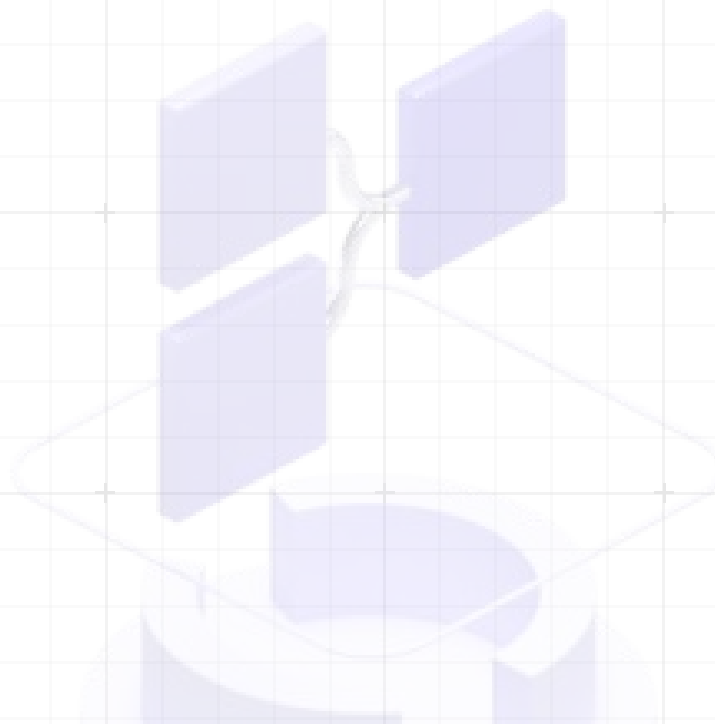
While wrapped versions of BTC are already available on the Tron / BTTC ecosystem, this step of the roadmap foresees that assets such as USDT, TRX, BTT, JST, SUN, NFT, WIN, and USDC be brought to the Bitcoin blockchain.

Stage β : Ecosystem Partnerships with Bitcoin L2 projects

In the second phase of the roadmap, Tron will enter partnerships with key Bitcoin L2 projects to give Tron users access to the restaking features of the emerging Bitcoin ecosystem.

Stage γ : L2 Solution that integrates Tron, BTTC and the Bitcoin network

Lastly, Sun envisages the creation of a L2 solution that seamlessly integrates Tron, BTTC and Bitcoin in a manner that maintains the security of final settlement on Bitcoin's PoW, while leveraging the speed and low fees of BTTC's PoS system.



V. Conclusion

The BitTorrent Chain (BTTC) presents a promising solution to the challenge of bridging assets across different chains, a critical hurdle in the path to mainstream blockchain adoption. By offering a scalable, high-throughput, and low-fee interoperability layer between Tron and EVM-based chains, BTTC aims to reduce the friction and costs associated with asset transfers.

The BTTC network, with its 11 active validators and over 6200 stakers, has so far been performant and reliable. Its bridging functionality, supported by a lock-and-mint model, currently extends to Tron, Ethereum, and BSC. The introduction of relay services further enhances user experience by facilitating faster withdrawals.

The BTT token, with its fixed supply, distribution and vesting schedule, underpins the BTTC ecosystem. The protocol incentives, primarily directed toward staking and validation activities, contribute to a healthy APY for stakers. To sustain these incentives over the long term, fostering more organic demand for transactions on BTTC will be beneficial.

BTTC's integration with various DeFi platforms and its potential role in Tron's upcoming plans for deeper Bitcoin ecosystem integration highlights its strategic significance. As BTTC continues to evolve and expand its offerings, it is poised to play a pivotal role in the broader blockchain ecosystem.



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