WHITE PAPER

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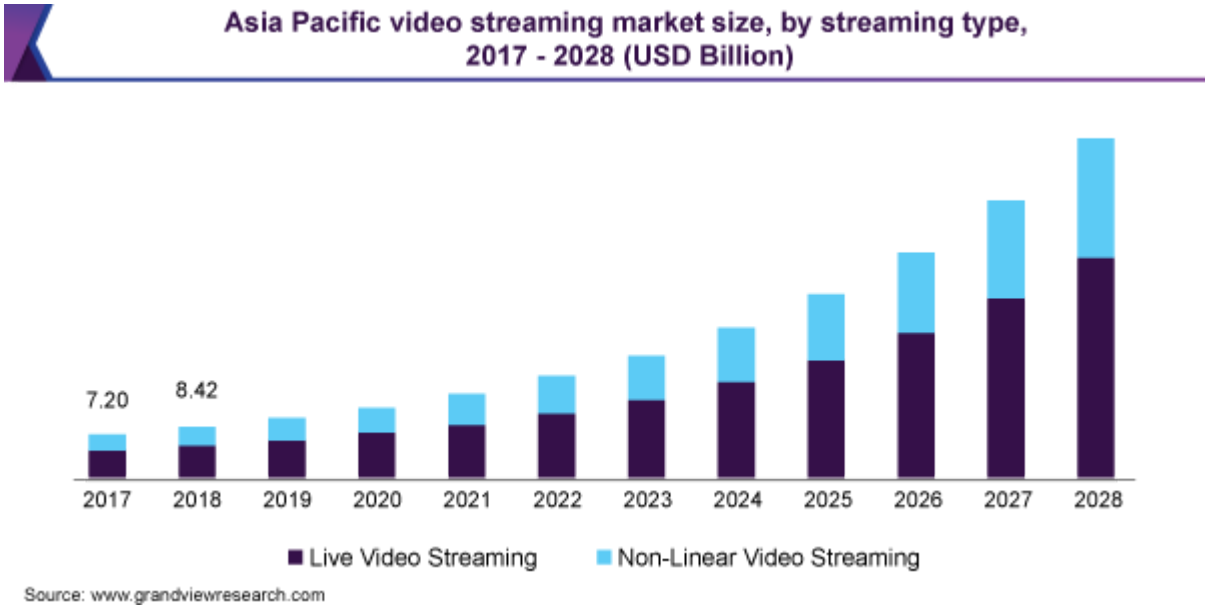
1. ABSTRACT

The global video streaming market size was valued at USD 50.11 billion in 2020. It is expected to expand at a compound annual growth rate (CAGR) of 21.0% from 2021 to 2028. Innovations, such as blockchain technology and artificial intelligence, to improve video quality are expected to boost the market growth. AI is playing an essential role in editing, cinematography, voice-overs, scriptwriting, and several other aspects of video production and upload. Various video streaming solution providers use AI to improve the content quality of videos. In the recent past, the popularity of such platforms over broadcast media such as YouTube and Netflix has increased considerably. Moreover, the rapid adoption of mobile phones owing to the growing popularity of social media platforms and other digital mediums for branding and marketing is anticipated to further fuel the growth.



The growing adoption of cloud-based solutions to increase the reach of video content is influencing the market growth positively. This trend is majorly observed in the countries of North America and Europe. Furthermore, ongoing innovations and technological advancements are expected to meet the growing users' expectations for exceptional video quality, performance, and security. Also, the high adoption of digital media across various industry verticals has led to the population's inclination towards different streaming solutions and services.

Over the last one and a half decades, the streaming industry has evolved in a way that is nothing short of revolutionary. It is not an exaggeration to say that streaming today is posing a serious threat to the long-established cable TV industry - so much so that a fair number of customers have discarded traditional television entirely, in part because online streaming is an attractive replacement. The reasons why are clear. Online streaming platforms are inexpensive or free. They're also convenient because they can be accessed from anywhere, anytime where users have an internet connection. You don't have to be at home to watch TV when you have Netflix or Hulu or video streaming sites like Youtube. However, despite their unprecedented growth, today's mainstream video streaming platforms are not perfect. They suffer from several significant disadvantages from the perspectives of both content producers and viewer's points of view, which mainly are cost inefficiency, latency, disempowered content producers, overhead and startup cost, security and privacy issues.
We introduce Treechain, a modern-age multi-model streaming platform that serves as a one-stop platform for all sorts of content needs. From streaming movies to serials, short clips, talent display to talent acquisition, online learning to online classes and tuition. Treechain is here to help you stream efficiently and cost-effectively. Treechain strives to decentralize live video streaming and help build a complete ecosystem surrounding, focusing on community involvement and decentralized governance.
This white paper specifies the Treechain Network, a decentralised application ecosystem that revolutionises the manner in which information flows. Treechain empowers individuals and businesses to better track, control and monetise their personal content and intellectual property. Treechain does this by using blockchain and the distributed web so that content (movies, music, documents, blogs, posts, and other digital assets) is only hosted and synchronised on devices that are approved by the content owner.

Applications built on Treechain will differ from today's applications where social media and other internet companies host, manage and distribute data on behalf of content owners. Instead, data is separated from the applications that use it, creating a paradigm shift in data custodianship and opening up the way for an internet where people can consume the same content with different applications at the same time.

Not only does Treechain give greater control to content owners but also enables content to become readily available to many more apps, giving greater reach and new and improved revenue streams to individuals and businesses.

Blockchain technology has been hailed to revolutionise many industries, however, blockchain alone is not the entire solution. The cost to store any useful amount of data and the controlled access of data are major barriers to blockchain adoption. This provides uncapped storage capacity, zero storage costs for content, vastly improved speeds for transaction processing, and most importantly, the management of data privacy and confidentiality.
Treechain is made possible through the combination of blockchain and distributed web technologies. Blockchain is used to manage file permissions, guarantee identity, maintain historical records and the secure transfer of value. While “off-chain” distributed storage is used for efficient data storage and transmission of files without not relying on any one entity for hosting content.

Through integration with the Treechain Network application developers can build on and utilize a blockchain platform that centers around speed, efficiency and privacy for distributing content.

This white paper gives a detailed description of our research and planning. It also aims to demonstrate the current status and plans of the Treechain platform, its associated products and solutions, and Tree Token - the native token of the Treechain ecosystem. It strives to inform our readers how to use our team’s expertise to provide decentralized streaming solutions at minimal costs, minimal fees with higher speed, efficiency and higher returns.

2. INDUSTRY OVERVIEW

Video streaming technology has rapidly emerged in the field of information and technology. This technology helps organizations modernize their daily operations such as scheduling meetings, live table conferences, and interacting internally with customers. One of the factors contributing to market growth is the rising demand for live and on-demand video content among consumers. Growing adoption of smartphones to watch movies, TV shows, and live sporting and other events is another factor promoting the market growth. The market is quite competitive with key players as well as emerging video

streaming service providers trying to offer quality content to the end-users with flexible payment models. This offers consumers with several options to choose from the available content libraries. Provision of secured video streaming services with encrypted live and on-demand video streaming becomes a differentiating factor influencing the customers to subscribe to these services. Market giants such as Netflix, Amazon, Hulu, Google, Microsoft, and Adobe are continually developing world-class streaming services and updating their content libraries to attract global customers. The video streaming industry is expected to attain rapid growth with advancements in digital technologies and the emergence of 5G network connectivity services. Furthermore, partnerships and agreements among the telecom network providers and video streaming providers are expected to increase in the coming years to offer an uninterrupted streaming experience to the consumers.

Based on the type of video streaming, the market has been segmented into live video streaming and on-demand video streaming. The videos are delivered to the streaming platform via adaptive streaming or progressive download technique. In adaptive streaming technology, multiple live or on-demand streams are encoded and switched adaptively based on the changing network conditions, i.e., when the network connection is good, the viewer gets a high-quality, high-data-rate stream, whereas, if the connection is weak, the server will send a lower-data-rate video file to ensure continuous connection. On-demand video streaming provides secured content, adaptive playback options, and additional flexibility to the users to stream on any device. It can also be used to publish a live event for video-on-demand playback. Video-on-demand is suitable in situations where live broadcasting is not mandatory, and the content can withstand delays in delivery. However, video-on-demand lacks real-time experience due to which it is not possible to conduct live chats, QandA sections, surveys, or polls.

Live video streaming refers to the real-time broadcasting of video files over the Internet which enables the user to view the content on personal computers, smart televisions, smartphones, laptops, and tablets as soon as the video is played. Even if a video is streamed live in real-time, it is subjected to encoding, transmission, and decoding delays. Software media players such as Apple QuickTime, Adobe Flash Player, and Microsoft Windows Media Player decode the streamed content and present it in a window for viewers. Content such as

sporting events or matches, gaming sessions, videos by individuals, news, concerts, and talk shows can be streamed live. Social media platforms are the major sources of live video content.

In March 2019, Adobe Inc. partnered with Roku channel, one of the largest ad-supported streaming platforms. With this partnership, Adobe's customers can effectively run advertising campaigns on leading TV streaming platforms.

The global video streaming market was valued at USD 39.610 billion in the year 2018, and is expected to reach USD 102.0971 billion by the end of the forecast period growing at ~20.8% CAGR.

Key Players

The key players of the video streaming market include Netflix, Inc., Adobe Inc., Amazon Web Services, Microsoft Corporation, Apple Inc., Google LLC, Cisco Systems Inc, IBM Corporation, Walt Disney Company (Hulu), and Akamai Technologies Inc.

Global Video Streaming**Video Streaming Market Analysis:** and Forecast, from 2017 to 2023

•To provide a detailed analysis of the market structure along with forecast for the next six years of the various segments and sub-segments included in global video streaming market with analysis of its development and demand in the market

•Upcoming technologies, high growth geographies, and countries were identified

•Regional and country-specific demand and forecast for video streaming market were studied

•Key segments covered in the report are type, deployment, platform, component, and model.

•Unit breakdown for all different classification was finalized and the same was referred for forecasting, keeping few assumptions into factor

•For all the regions, forecast demand for all applications was identified and then with historical figure, data collected through primary and annual reports were triangulated to derive the regional market size

•Historical trend is identified to forecast and estimate the future value data

Key Findings

- The global video streaming market is expected to reach USD 102.0971 billion by 2023.
- By type, the on-demand video streaming segment accounts for the largest market share and is expected to grow with approximately ~19.9% CAGR during the forecast period.
- By deployment, cloud sub-segment holds the largest market growing with approximately 21.7% CAGR by the end of the forecast period.
- By platform, the smartphones segment accounted for the largest market value in 2017 and is expected to grow at a CAGR of 23.9% during the forecast period.
- By component, the software solution segment accounted for the largest market share in 2017 and is expected to register a CAGR of 20.1% during the forecast period.
- By model, the subscription video-on-demand segment accounted for the largest market share in 2017 and is expected to register a CAGR of 19.7% during the forecast period.
- Geographically, North America has been projected to have the largest market share in the global video streaming market followed by Europe, while the Asia-Pacific region has been projected to show positive growth in the video streaming market.
- Revenue in the Video Streaming (SVoD) segment is projected to reach US$51,617M in 2020.
- Revenue is expected to show an annual growth rate (CAGR 2020- 2025) of 10.7%, resulting in a projected market volume of US$85,735M by 2025.
- User penetration will be 11.9% in 2020 and is expected to hit 17.2% by 2025.
- The average revenue per user (ARPU) is expected to amount to US$58.52.
- In global comparison, most revenue will be generated in the United States (US$24,079M in 2020).

Revenue in the Video Streaming (SVoD) segment is projected to reach US$51,617M in 2020.

The Video Streaming (SVoD) segment is expected to show a revenue growth of 11.5% in 2021.

Users

In the Video Streaming (SVoD) segment, the number of users is expected to amount to 1,337.1M by 2025.
User penetration in the Video Streaming (SVoD) segment will be at 11.9% in 2020.

Regional and Country Analysis of Video streaming Market Estimation and Forecast

The global video streaming market is expected to grow at a promising rate during the forecast period, 20182023. North America accounts for the largest market share in the global video streaming market. North America has witnessed significant adoption of video streaming in recent years. The presence of key market players such as Netflix Inc., Amazon Web Services, Apple Inc., Hulu, IBM Corporation, and Microsoft Corporation in the US has driven the growth of the video streaming market in the region. Video streaming has seen high adoption in the media and entertainment and education industries in the US, Canada, and Mexico that has promoted the market growth.

Europe accounts for the second-largest market share in the global video streaming market. Adoption of smartphones has overhauled the media and entertainment industry in European countries, driving the market for live and on-demand video streaming in this region. The European countries experience a strong online streaming presence owing to a range of video streaming apps increasing the average time spent by individuals to stream live or on-demand content. Among the European countries, the UK, Germany, France, Italy, and Spain have witnessed rapid growth in OTT subscriptions for streaming videos related to news, sports, fitness, lifestyle, films, and music. Asia-Pacific region accounts for the third-largest market share in the global video streaming market

owing to wide-scale adoption of streaming services in countries such as China, Japan, India, and Australia, among others. There is growth in the number of live streaming and on-demand streaming consumers in this region. Moreover, key market players present in the video streaming market are investing in this region to expand their subscription-based consumers.

Key insights into the global research report:

Comprehensive analysis of global market drivers and restraints
Business profiles of key market players
Competitive analysis of the global market
Demand-supply chain analysis
Some significant sales strategies and methodologies
Global market trending topics and its influence on the global market
Technological advancements and innovative platforms

3. THE DAPP REVOLUTION

Decentralised Applications (DApps) are a new breed of applications that run on peer-to-peer (P2P) networks in contrast to traditional applications that run on centralised servers.

They are made possible as a direct consequence of blockchain and Ethereum smart contract technology. Through a shift toward decentralised business models, DApps will impact almost every industry, unbundling business models that have been dominated by the few and open the way for new and more efficient models.

The primary disruptive features of DApps are:

- The ability to coordinate transactions (via a smart contract) between two or more participants of a system without requiring an intermediary. For example, a user could sell power to a neighbour in order to charge their car without requiring a power company to act as a go-between.
- The ability to incentivise network nodes through a token that can represent a store of value. Users can then be incentivised to individually and collectively perform tasks that would otherwise have been the responsibility of an intermediary.

Ethereum's smart contract capabilities have shown huge promise in revolutionising digital agreements, but the network itself is hindered by an

inability to provide adequate privacy for the content being shared in smart contracts.
This rules out all use-cases where parties are dealing with confidential data (intellectual property, sensitive messages, etc.).

To truly unlock the potential of smart contracts, a network like Treechain is required that provides privacy controls for shared content.
The protocol runs on a modified Ethereum stack while remaining compatible and version synchronised, and makes use of a permissioned IPFS [6] version to to control access to shared protected content.

We expect to see Treechain play an integral role in DApps development through Treechain' combination of on-chain and decentralised off-chain technology to pave the way for future blockchain applications. By leveraging the smart contract functionality of the Ethereum network and the secure content distribution, Treechain brings an unprecedented solution for blockchain privacy and confidentiality.

4. INTRODUCTION TO TREECHAIN

Treechain is an International based platform that strives to revolutionize the modern-age streaming by creating a complete ecosystem surrounding the streaming industry. Treechain aims to create a multi-modal streaming platform that caters to users seeking audio and video clips, songs, studio based movies and serials, talent shows and online learning. The decentralized platform is made up of individual machines each giving up a bit of bandwidth. Similar to the way that Uber uses independent drivers who each chooses when they want to come on and off the driver network.
Treechain allows individuals with computers to put their machines on and get paid for giving unused bandwidth.
Treechain uses blockchain to enable direct participation in the network for consumers, content creators and infrastructure providers. Instead of relying on a centralized service mainly provided by dominant industry players such as Tik Tok, Youtube, Twitch and Netflix, Treechain will allow anyone to become a broadcaster, run a streaming server, give a transcoder, store data, share network

bandwidth or access the available content all in a decentralized manner. Treechain calls them the Tree community.
Treechain features a unique, first-of-its-kind multimodal streaming system whereby content creators and content consumers can get incentivized for their participation within the ecosystem. Treechain uses its native token i.e., TREE, to directly incentivize infrastructure providers or content creators, while consumers only pay for what they are interested in. By utilizing second-layer technologies, Treechain allows automatic processing of micropayments on a per minute or even per second basis, enabling its content producers to get micropayments from users, thus getting rewarded for their efforts. It is important to note that the Treechain network is trustless and secured by design, utilizing encryption schemes that have been proven for many years. It uses blockchain to ensure the credibility of transactional activities within the system. The interaction of streamers and users are direct and transparent as all transactional activities are recorded on a public, immutable blockchain (acting as an open ledger).
Moreover, while centralized services can be censored, controlled, or even shut down by enterprises or governments, Treechain's decentralized architecture and encrypted peer to peer network ensures that it is resilient to centralized manipulation and remains highly censorship-resistant.
The Treechain platform will add a significantly greater level of interactivity between content creators and content viewers while also adding to the transparency, removal of overhead costs, and security mainly because of the usage of cryptography, blockchain, and smart contracts in its architecture.
All users of the platform incur costs (for example, streamers can purchase promotion in the ratings on the main page, users pay for a premium subscription, etc., students pay for premium and localized content in their language of choice, talent hunters get videos they are looking for and recruit employees). However, at the same time, everyone can earn tokens, including the viewers. Treechain also connects influencers and brands for sponsorship and collaborations. Users across these platforms can get access to buy merchandise or tees signed by their favorite players and streamers.

How to access TREE (Token) and participate in Treechain Ecosystem

Treechain aims to design and develop a cutting-edge system of interaction between viewers and streamers with a blockchain-based distribution system powered by consensus and peer-to-peer networks. Unlike the centralized

frameworks, Treechain will allow a reliable trade of content and reward over a blockchain-based worldwide system. Thus, Treechain enables streamers to incentivize their talent, while content viewers also gets a chance to get high quality customized content of their choice (with the added feature of being compensated for the engagement of their video content), without a quick expense to viewers, and without the need to offer and surrender to promoting corporate sponsorships, or partnership deals.

5. OUR VISION

We envision a one-stop platform for all sorts of streaming needs for all kinds of users i.e., video creators, musicians, movie producers, serial creators, online tutors, those looking to publish their talent online.
Treechain delivers unstoppable data to unstoppable applications. It is the real-time data backbone of the global supercomputer. It is a decentralized network for scalable, low-latency, untamperable data delivery and persistence . Anyone – or anything – can publish new data to data streams, and others can subscribe to these streams to power Dapps, smart contracts, microservices, and intelligent data pipelines.
To incentivize user participation in the network, there's a built-in mechanism for data monetization. Valuable data from security exchanges, connected devices, IoT sensors, and social media can be offered to companies, developers, and private citizens. Machines can autonomously sell their data, get paid, and purchase the data they require. A global market for real-time data emerges, with built-in data provenance, encryption, and access control.
Alongside the decentralized data network and marketplace, the full Treechain stack includes a powerful analytics engine and a UI for rapid development of real-time Dapps. Data streams, smart contracts, and decentralized computing resources can be interconnected in a low-code environment using high-level building blocks. Streamr will be the easiest place to create real-time, data-driven, and trustworthy blockchain applications.
A revolution is taking place where centralized cloud services are one by one being superseded by tokenized, decentralized solutions.

6. THE MISSION

Our Mission is to be the leading streaming platform that simplifies the video publishing and content acquisition process. We strive to resolve issues such as centralization of streaming platforms, increased dependency on centralized streaming, recruitment and education platforms, by creating a complete streaming based ecosystem
At the core of any DApp is a smart contract that describes the business rules for processing transactions. A smart contract allows for peer-to-peer transactions between participants where an intermediary would normally be required to facilitate traditional models.

However, a major issue that has limited the usefulness of smart contracts is the lack of privacy and confidentiality when sharing content, including personal information or intellectual property, between participants. Companies and individuals are currently publishing vast amounts of information on blockchain networks that can be read by anyone, anywhere. This provides the opportunity for unknown parties to observe the blockchain, including governments and competitors.

Confidentiality of client information is non-negotiable in many industry sectors. The finance and health sectors are prime examples where confidentiality is essential when dealing with privileged client and patient information respectively. To date, servers and centralised protected databases have been the preferred solution to this problem and many blockchain projects are still opting for this approach in their designs.
A key consideration when designing blockchain applications with centralised servers and databases is the requirement for an intermediary entity to be a custodian of data. As a consequence participants must:

1. Rely on the intermediary to administer and manage the servers and databases in order to provide continuous access for the participant.
2. Trust the intermediary to securely store private data on behalf of the participant.

There is also an issue that over time participants may become locked into using the intermediary and find difficulty in migrating to alternative systems. This clearly creates a position of power where the intermediary can:

- Charge higher fees.
- Update terms and conditions where participants have little choice but to agree to such terms including having information and activity sold to third parties.

An alternative choice to avoid the pitfalls of centralisation is decentralised content distribution with an authorisation mechanism for managing access to information. Treechain is such a network, allowing files of any size to be attached to a smart contract with the relevant permissions for managing access.

7. KEY PRODUCTS

7.1 Treevideo (Decentralized)

Treevideo serves as a video streaming platform that uses blockchain to decentralize the accessibility and ownership of online video sharing and streaming while also as an introduction to a tokenized monetization system so as to minimize and completely eliminate the dependency on advertisements for revenue generation. Treevideo is a streaming platform that not only caters to the needs of the gaming community but also enables streaming for all occasions. It enables users to stream any events e.g. a wedding, a university graduation ceremony, or a local soccer game, you don’t want anyone to miss any single moments.

It utilizes blockchain and cryptography for storing metadata and vital information such as number of views, likes and comments etc., ensuring no room is left for corporate manipulation. Treevideo is designed to better provide sustainable revenue for all content creators and viewers, not just mainstream content producers.

Treevideo has adopted a decentralized blockchain based architecture, whereby it has two foundational parts i.e.

i. A p2p hosting network for data transmission and hosting;

ii. A smart contract based transactional network hosted on blockchain.

Front end of the Treevideo is a user friendly application similar to traditional video streaming websites, ensuring easy early adoption and comprehension for non tech savvy users. The front end is connected to the Tree blockchain network layer which is responsible for recording all metadata such as views recorded on a video, likes, comments, ownership access, and transactional data. For transaction processing, Treevideo uses smart contracts which are responsible for executing transactions such as: micro‑payments, tips, sponsoring agreements, subscription and access control, and donations. Treevideo architecture also ensures immutability and transparency.

7.2 TreeShow (A decentralized platform for short clips and talent hunting / acquisition)

TreeShow is a short clip sharing platform that acts similar to Snapchat or Tiktok but in a decentralized way. While it allows creation and sharing of small video clips with editing and dubbing functionality, it also stands out from the rest by acting as a talent acquisition platform whereby anyone with a talent can create a short clip, publish it and get offers directly from recruiters, which in other words, can be termed as a Combination of Tiktok and LinkedIn.

It will serve as an outlet for the playful way the community connects — professionally as well as socially. Job seekers can make videos on the app almost immediately, while recruiters and decision makers from various industries will have their dedicated accounts and can connect with the respective artist or jobseeker directly via app.

With TreeShow, the vision of the Treechain team is simply to ensure that talent gets rewarded. In this pursuit, TreeShow adopts the concept of tokenized rewards, whereby anyone viewing can reward a content creator simply by liking their content which is conditional to token balance and a micro payment is released upon likes.

The tokens that people exchange on Treechain or TreeShow is to reward each other and show their appreciation which can be used for a variety of in-app uses, such as appreciation, signaling, curation, and personalization. Furthermore, in

case someone wants to cash-out outside the app, they can simply cash them out for credits to use in their favorite real-world stores (partnerships with whom will be made as the project develops and expands further).

7.3 TreeNFT (A NFT platform for short clips and talent hunting / acquisition)

According to a new report at NonFungible.com, more than $2 billion was spent on non-fungible tokens, or NFTs, during the first quarter of 2021 — representing an increase of about 2,100% from Q4 2020. In addition, The NFT mar- ket's big Q1 comes after $93 million worth of NFTs were sold between October and December of last year. There were twice as many NFT buyers as sellers during the first three months of 2021. Therefore, you can see that this NFT market has great potential for content creators. And for NFT lovers and collectors worldwide, you may like to pay attention to NFTs because you know, when you're buying NFT content you own that content. What you have is an authentication — a digital certificate — that makes it extraordinarily scarce or rare .
According to NonFungible.com, there were 73,000 NFT buyers and 33,000 NFT sellers in Q1. This disparity helped drive prices higher. Furthermore, it is a signal of massive interest in newcomers and the desire of current owners to keep their assets, which creates a phenomenon of scarcity in the market.

In addition, according to Forbes, Year-to-date, within less than three months, the combined market cap of major NFT projects has increased by 1,785%.

With modern technology nowadays, anyone can share their creative content online with people around the world. In addition, content creators are also taking advantage of this strength of the internet to share their content globally and make money by selling them. However, the emerging problem is that content shared online is easy to copy, even with registered intellectual rights.

Online social media platforms such as TikTok, Instagram, and Facebook are becoming more popular, and many content creators are generously demonstrating their strengths in these online platforms. They only can make money by selling their content through a centralized platform which charges an expense.

However, online platforms may look good, but they include problems. New technologies always have further issues. When many content creators upload their work to the online space to share and sell, some early viewers can duplicate these works quickly and sell them like their own works, and these things shouldn't happen. This sad reality is occurring all over the world. It's a world where not only famous creators but also promising content creators are being copied. Unless they are worldwide celebrities recognized by many people, it is challenging to protect their digital content by copyright. And in the end, it is complicated to protect their content in the online world.
Most of the major NFT marketplace platforms today focus solely on expensive artworks and luxury collectibles. These artworks may not appeal to everyone, especially teenagers. They are attracted to some interesting content such as memes and short-form content on TikTok or Instagram. When asked in the 2020 GlobalWebIndex survey how TikTok users mainly use TikTok, the majority of respondents answered: "to find funny/entertaining content." So you can see, the demand of users to watch these kinds of content is incredibly high. In addition, according to omnicoreagency.com roughly 50% of TikTok's global audience is under the age of 34, with 26% between 18 and 24.

so TreeNFT platform where users can post any short video , gif ... from their creation to the platform to share , sell and profit .

8. STANDOUT FEATURES

Treechain ensures seamless user-experience, cost-effective content publication and accessibility, redeemable reward points, and wonderful customer support.

Some of the standout features includes:

Localized Content

It is very hard to access localized content, especially in streaming sites such as Netflix and online education sites such as udemy.com or Coursera mainly because it is almost impossible for small scale content creators to publish their content on such platforms. At Treechain, viewers can access regional content according to their geographic, as the Treechain platform will support and enable

content producers regional content, allowing them to publish and stream without having to ask high initial costs.
In our interconnected digital world, where the internet enables the free flow of stories across state lines, borders, and oceans, creative studios have a lot to gain from developing a global content strategy.

The rise of streaming services has forced the entire entertainment industry rulebook to be rewritten, allowing providers like Treechain to simultaneously premiere a new movie or TV series across multiple territories with little more than the click of a button.

Creators should no longer feel restricted by national borders or language barriers, because it has never been easier to distribute content that reaches and resonates with an international audience.

By producing local-language content, telling stories that are both specific and universal, and hiring international voice actors to dub dialogue in different languages, you can ensure your content will soar on a global scale.

Accessibility and ownership
One of the long-standing issues in the online media and OTT industry is the ownership and access to the content. In online streaming platforms, you don't physically own the content like a CD Disc or a Cassette, it leaves a room for lack of transparency. Treechain leverages blockchain technology to tackle the issue of ownership at an infrastructure and protocol level. It encrypts the video, and stores these permanently through the interplanetary file system (IPFS) swarm. And the tracks can be accessed from anywhere with decryption keys through smart contracts.

Reliability
The decentralized blockchain architecture ensures network reliability by leveraging the computing power available to the viewers in the network. The network has a reliable storage layer at its core ensuring that content stored on the network persists till a predefined expiry.

Low Latency

The network intelligently reorganizes data and performs predictive fetching on relays to ensure that content can be retrieved with very low latency.

High throughput
Reputation and incentive structure are defined in Treechain to meet the throughput requirements of bandwidth intensive applications like live HD video streams.

Horizontal Scaling
In Treechain, every new node joining the network increases the transaction processing as well as storage capability of the network in contrast to centralized networks where every node stores and processes every transaction.

Configurable Security
Treechain is privacy-oriented and allows users to preserve their anonymity while using the network at a reasonable performance cost.

Low Storage Overhead
Treechain's architectural design allows it to store the least amount of metadata required to access and ensure the persistence of any file without compromising on performance.

Seamless payments
Make payments in a cryptocurrency of your choice. Whether you prefer Bitcoin , Ethereum or Usdt ...Treechain accepts it all. No more transactional delays, no more hefty processing fees.

Targeted Marketing Enabled by Analytics
Worldwide spendings on digital advertising was $200 billion in 2017 and is expected to reach the $350 billion mark by 2020. Digital advertising is highly advantageous to marketers as they can track the consumer's behavioral data. But, more than 60% of digital video advertisers lack adequate tools that can analyze this data, to measure and effectively improve the digital campaign's performance. With Treechain, we ensure that content producers get access to analytics and thus have marketing investments targeted, helping the advertisers to measure the efficient platforms and add more value to their marketing efforts.

Blockchain-based CDN
Optimization of storage space is very important for any streaming service. Treechain enables a Blockchain-powered Content Delivery Network (CDN) that helps to utilize the collective unused space from the users worldwide by building decentralized applications. The management believes that utilizing a decentralized management system, will help the users exploit this collective unused space, by converting it into peer-to-peer cloud storage and data delivery networks.

Effective monetization and content copyrights
Intellectual Property Rights holds a significant importance for any online content producer, violation of which can be sued, yet often is a hectic process. By leveraging blockchain and Smart Contracts, all user IP Rights are secured by smart contracts and stored on blockchain. The blocks, which are located on a variety of servers around the world, cannot be altered once they are created. Hence, content owners will have complete control of their work, and the transactions are automated whenever the content is accessed by viewers.

Complete Decentralization
Treechain's network uses a peer to peer network scattered across hundreds of thousands of nodes across the world. All content is generated, owned by and published by content producers while accessed by viewers directly from the network. This way, Treechain achieves complete decentralisation, thus it eliminates the role of a middleman or intermediary service provider in the network.

Moreover, as payments or transactions are processed within the network and are powered by blockchain, there is no reliance on a third party financial service provider for executing transactions.

9. PROBLEMS WE SOLVE?

9.1 Distributed Secure Storage

The DSSN is a version of IPFS that has been extended with a security layer to control access to protected content. The DSSN also provides an alternative to

storing data on the blockchain and a significant cost saving to network participants.
IPFS is a peer-to-peer hypermedia protocol with a content addressing scheme for resolving data and has an internal protocol called BitSwap for data distribution. Content-addressing means that each file stored in the DSSN has a unique id in order for the routing mechanism to locate parts of the file on the network. This is similar to how the HTTP protocol employs unique URL addresses to find web pages. The difference is that the unique id is constructed in such a way that the address represents the total content of the file. If any data byte in the file were to change, then the address would also change.
Peer-to-peer file sharing protocols such as IPFS are protocols that share packets of data between nodes in a network. When a node requests data from the network, an address is given to resolve the data, which determines a routing path to nodes that have a copy of all or part of the file. These are open networks without any security mechanisms for preventing data access.

In order to create a security layer for controlling access to protected data, the DSSN integrates with a File Permissions Registry (FPR). The FPR is implemented as smart contracts deployed on the Treechain blockchain and contains a record of authorised accounts that can access the protected content.

9.2 Ever-expanding Bandwidth Demand
With the worldwide Internet, traffic is increasing by an expected 22% every year, the demand for data bandwidth is quickly surpassing the supplier's earnest attempts to supply it. The increase in the measure of content accessible over the internet has led to web penetration getting competitive for organizations, requiring a bigger transmission capacity with top-notch content and increment in average online time. The resulting digital traffic jams threaten to throttle the information - technology revolution.

Treechain addresses the problem of scalability and ever-expanding bandwidth by development of a decentralized video distribution platform whereby it leverages the computing power available at the viewers in the network. Treechain utilizes Tree Network blockchain which would enable countless users

of the internet to share their unused bandwidth capacity of their PCs. This would prompt a boundless system of information exchange. As such, every individual utilizing the network of nodes turns into a Point-Of- Presence. The decentralization of such a system alongside the worldwide incorporation of everyday users will essentially improve the efficiency of content distribution and delivery.

9.3 Lack of availability of localized (geo-specific) content

As described earlier, it is hard to find localized content both in terms of streaming platforms and online education. Treechain resolves this issue by offering support to local studios and content producers using the Treeplay platform while for students it enables a p2p platform whereby users can directly connect with tutors of their region and get assistance in courses they desire.

Centralization and manipulation of few

With a combined market share of about 90% of the online video platform market, YouTube (75%) and Vimeo (15%) leave very little space for the competition. This gives tremendous power to those platforms to dictate the monetization methods, how much the content creator gets and how much the advertiser pays. The concentration of power is even more visible with traditional broadcast networks or with more recent platforms like Netflix, which is accessible to a very limited group of content creators (big studios) and advertisers. Platforms like traditional broadcast TV, Hulu, or Netflix, are practically inaccessible to most content creators. And the fact that Netflix is now transforming into a modern-day studio further limits outsider's options as it now pushes mainly its own productions.

Treechain allows its users to come together to transform the world. Treechain would empower users with more freedom and opportunity, leading to the end of monopolistic manipulation of markets. Consequently, in Treechain, content creators can publish their content for free and it is accessible to everyone in the world.

9.4 Unfair Advertising Revenue Distribution

The market as it is today is especially hard for the smaller creators who are forced to accept prices and conditions imposed on them. This is how YouTube

or other streaming platforms can change monetization conditions overnight or keep about 60% of the advertising revenue generated by a video for example.

The revenue distribution at Treechain is completely transparent and fair as the stakeholder's Proof of Work is stored in the blockchain. All payments are secured by smart contracts which are self-executing contracts that work similar to traditional escrow but are automatic in execution. Moreover, Treechain utilizes the Tree Blockchain network that allows for cryptocurrency-bas**9.5**

9.5 Cost

Streaming is a costly industry yet it can possibly end up less expensive. Treechain should be significantly speedier as the compatibility of these platforms is yet to concoct new innovation to offer better speed and streaming. Last-mile deliveries are related to the uneven stream of content, bringing about terrible client encounters, such as buffering and rough spilling.

Treechain provides a solution to the problems mentioned in the previous section. When users view the videos, they get rewarded with Tree Tokens and the content creator is also compensated out of a pool of tokens that have been generated. Thus, our goal is to move towards a fully decentralized service with a vision to have a system where no centralized middleman is needed. This would eliminate the 30-60% cut which platforms currently take.
ed micropayments for our user's content. The blockchain makes micropayments even a fraction of a penny possible.

9.6 Disempowered content producers

On a platform like Netflix or YouTube, content producers may not retain ownership of the content that streams across the platform. They also lose out on revenue because the platform takes a significant share. In the case of platforms that rely heavily on user-generated content, like YouTube, most content producers make virtually no money.

At Treechain, all ownership rights are reserved with the publisher/ content creator while a fair revenue sharing mechanism is also enforced through the help of blockchain. Smart Contracts based ownership is issued to a user upon publication which ensures that there is no manipulation.

9.7 Privacy

Many people use ‘privacy’ and ‘confidentiality’ interchangeably, yet the two words and ‘anonymity’ mean significantly different things. The differences matter when it comes to data ownership, rights, responsibilities, and protections .

- Anonymity – is ensuring that an individual described is not known and cannot be identified.
- Privacy – is the individual or an entity’s right to keep personal data to themselves and not have their actions recorded or monitored.
- Confidentiality – refers to controlling access to protected information that is shared between parties by consent.

We can see using these definitions that it is possible to have anonymity whilst having no privacy when transmitting data, or to have privacy without an ability to authorise and revoke access to data to multiple parties.
Treechain authorisation protocol gives both privacy and confidentiality. Anonymity can also be achieved using a Ring Signature scheme to hide payments from specific accounts. Plans to develop a custom Ring Signature implementation for Treechain or integration to an existing system is yet to be decided.

If you publish video contents on a streaming platform, your ability to protect your identity is limited. You can publish under a pseudonym, of course, but that doesn’t mean other users can’t trace you. And the company that controls the platform (such as YouTube) knows a lot of identifying information about you because it forces you to create an account, can track your location and so on. The platforms also track viewers in order to serve them ads.

Treechain is privacy-oriented and allows users to preserve their anonymity while using the network at a reasonable performance cost. At Treechain, there is no centralized storage for data. A user's information is used for verification purposes only and is encrypted. Moreover, important information of a user is never made public, and neither is he compelled to share location or other important information.

10. TECHNICAL ARCHITECTURE

Blockchain Overview

The Treechain platform is built on the Treechain protocol which is deployed on the Tree Blockchain Network. The trading logic is formed on the concept of Tree Protocol and it inherits all the infrastructural advantages of decentralization. The technical team aims to implement the Tree blockchain network to enforce rules for entities to interact in tokenizing video streaming via blockchain. Treechain will be a blockchain-powered platform to digitize assets using digital identity, and it applies the smart contract to self-manage digital assets, thereby providing a distributed network of all stakeholders to benefit from this smart economy.

Treechain wants to integrate digital assets, digital identity, and smart contracts into its platform. It also strives to introduce new features, such as cross-chain protocol, quantum-resistant cryptography, a distributed storage protocol, and a secure communication protocol, by leveraging blockchain. The platform's open API enables integration with other platforms and systems in a seamless manner.

Tree Token: Digital Token

The Treechain blockchain platform's UI will allow the user to register, create and share video content like a digital asset or a token. Thus, videos being streamed on the platform will become programmable assets that exist in the form of electronic data. Treechain users will create his/her profile and use it to engage in viewing, sharing, and creation of the digital assets. It helps in the decentralized streaming of videos in a highly secure & reliable environment, which is free from any third-party intervention. The video can leverage the Contract Asset functionality of blockchain to be recorded in the private storage area of the smart contract and require a compatible client to recognize them. It has to match to specific predefined protocols and standards, set by the Treechain community, to achieve compatibility with most clients using it to transact.

Digital Identity

Maintaining digital identity is critical to the operation of Treechain. The Digital identity feature refers to the identity information of individuals, organizations, and other entities that exist in electronic form, making it efficient, error-free, secure and cost-effective, thus avoiding lousy customer experience. Treechain uses a secured mechanism to store, transact and authenticate the digital identity which is efficient and quick, by employing the Public Key Infrastructure (PKI) X.509 digital identity standards.

Consensus Mechanism

Proof of Viewership

Rewarding viewers has proven an effective way to retain users in the live streaming industry. It makes users feel engaged and empowered and on the other hand, provides more reliable data to streamers. We allow publishers and advertisers to allocate a budget to be distributed amongst viewers. As one of the ways to prevent master nodes or relay nodes from faking viewership, we require viewers to solve small cryptographic puzzles.

Though the puzzles are not as resource-heavy as, say, Bitcoin mining, it's enough to deter master nodes from spending resources on solving Proof of Viewership (PoV) puzzles as compared to relaying data.

Proof of Availability

We want our nodes to respond to client requests and deliver the requested content with high probability. To ensure that, we have devised a challenge verifier protocol that penalizes unavailable nodes and awards a trustless challenger.

The protocol proceeds as follows:

- A node (accuser/challenger) registers a claim with the smart contract that a particular node (accused) is unavailable.

The claim transaction contains the following fields:

- Encrypted IP of the accused, using a randomly generated key pair.
- Signature of the accuser to authorize the smart contract. The accuser needs to put some tokens as a stake in the contract, which can be slashed if the claim turns out to be false.
- The IP of the accused is encrypted to ensure that it doesn't learn of the accusation. The decryption key is not shared publicly until later.
- Using the hash of the block in which the Claim transaction is mined, a few transcoder nodes (auditors) are chosen to test the accused node.
- The accuser gossips the Claim transaction hash and the decryption key corresponding to the encryption of the accused's IP in that transaction, encrypting the message using the public key of the auditor nodes.
- The auditor nodes query the accused node for files using onion routing and then submit their judgment to the smart contract.
- To prevent nodes from withholding their judgment and trying to predict the majority opinion, nodes follow a commit-then-reveal protocol; first sending their encrypted judgment and then revealing the value.
- The accused node is identified through a Reveal transaction that contains the IP address of the accused node and can be made by the accuser himself or any node (tester) knowledgeable of the public key used during the encryption in the Claim transaction.

If the majority of the auditors agree with the accusation, the accused node's stake is slashed, and the accuser is awarded else the accuser's stake is slashed.

Auditors

We require accusers to put tokens at stake to prevent DoS attacks on the network. Else, malicious nodes would make frivolous complaints to keep the network busy with unnecessary checks. The master nodes are incentivized to act as auditors by giving them a part of the stake that is forfeited by the node failing the challenge (either the accuser or the accused). Only the nodes in the majority are awarded. The commit- then- reveal protocol in Step 6 ensures that nodes respond honestly instead of trying to follow the majority. Since the auditors have nothing to lose and only gain, they have no reason to not respond to the voting contract. There is a block limit within which the votes have to be submitted. Since votes are revealed before the accused node's IP is, if the votes received are not conclusive to determine an overall majority, a retest is feasible.

The use of onion routing ensures that an accused node does not selectively respond only when he is being tested.

The reputation value is always between 0 and 1. Another critical thing to note here is that the node's reputation is more susceptible to the day Value than the previous reputation. This is to ensure consistent availability and deter nodes from taking a few off days, thus improving the overall performance of the network.

Network & Data Dynamics

Network Dynamics

Treechain is a combination of newly innovated protocols as well as currently well-established ones that power current blockchain platforms. The consensus is established via Proof of Computation. The task results and various players are tracked through the Kademlia Distributed Hash Table (DHT) which is similar to IPFS. NoSQL is the standard for data storage across the network.

All these cogs along with our proprietary off-chain technology run the Treechain.

Treechain Streaming Platform involves interaction between the following stakeholders:

Broadcasters

The first and the foremost entity to initiate the whole workflow is the broadcaster. He can also be named as an originator. These broadcasters have to register on the Treechain platform to initiate the process. Post the successful registration, the broadcaster would be assigned with a unique ID generated by the platform. These ID's are used to track all the activities of the entity that are performed in each regular interval. When a broadcaster requests for a stream, the tracker server of the platform creates a membership certificate from the request with swarm ID (unique identification for a content), a timestamp, external IP and port received from the message signed with trackers private key. The video or the stream contains a sequence of chunks which would be signed with a private key and are delivered to transcoders with the swarm ID (public key).

Treechain Transcoders

Treechain transcoder hubs are in charge of encoding video streams to various bitrates, resolutions and video positions utilizing diverse codecs. They relay streams through transfers. They may alternatively go about as transfers themselves and could transmit the streams to viewers. It's in light of a legitimate concern for ace hubs to go about as Treechain transcoders as well in the event that they have sensible register control. Devices or systems with prescribed high configuration with the combination of specific CPU and GPU computational power can be established as a transcoder on the Treechain platform. Once the transcoders are registered on the network, these devices or systems would be designated with a unique ID. It is a software module that is used to convert the incoming single bitrate streamed chunks from broadcaster to multiple bitrates, formats and resolutions. To inform the network that the transcoder is available, transcoders send a request to the tracker server with these system specifications which should ideally be a highly configured device and tokens at stake along with the network information. Post the submission the platform identifies as the available transcoders and assigns the task to transcode the content. The transcoded content is sent to relay nodes.

Treechain Relay Nodes

Treechain hand-off goes about as an L1 storing layer and comes in the layer between Treechain transcoders and watchers. The pre-interphase to the users are relay nodes. The main functionality of these relay nodes is to support the content delivery with low latency to the users for the best live streaming experience. Users can also act as relay nodes. These relay nodes are distributed across multiple geographical locations which can serve data to the surrounding users. A large number of relay nodes provides our viewers with incredibly low latencies.

Auditors

Auditors are in charge of keeping up the honesty of the system through randomized checks. They are trustless and can take an interest in the framework through a test verifier convention. Tokens must be put on a stake to challenge errors, and prizes are granted on redress check.

Advertisers:

Advertisers utilize Tree Tokens to embed ads in streams and alternative partners gather information with client assent.

Viewers
Viewers are the end-users in Treechain Platform. They are rewarded for viewing with tokens and sharing their bandwidth with other users. The stream comes from Relay nodes with different resolutions, bitrates, and formats. Based on the bandwidth and device, the viewer will watch the stream; these streams that are cached in the browser can be sent to nearby users who request the same resolution and bitrates. The viewer will also get paid for solving the puzzles that are given by the broadcaster. They can use these tokens to reward broadcasters for their creative content, skip advertisements or buy subscriptions for premium content.

11. WHY CHOOSE TREECHAIN?

- Unified Platform: All sorts of streaming services under one platform.
- Decentralized Governance: With deployment on the blockchain and tokenization, the Treechain platform offers a decentralized business model.
- Nominal Transaction Fee: Easy transactions with minimal processing fee.
- Tokenized rewards: Enabling businesses to offer real-valued, exchangeable reward points.
- Security: All transactions in the Treechain ecosystem are secured by smart contracts and cryptography.
- Innovative subscription model: Treechain offers a unique subscription model i.e. Rametron, allowing users to access our products and services directly from the dashboard.
- Multi Functionality: The business model of Treechain has multiple functionalities that include but is not limited to streaming videos, movies, online education etc.
- Token Utility: Tree Token has native utility derived from acceptance of the token in all of the products and services within the ecosystem.
- Unique and futuristic: The products offered by Treechain and its business model are unique and futuristic.
- Team expertise: Treechain team comprises members with decades of experience in their portfolio.

- Agile marketing and go-to market strategy: Treechain adopts an agile marketing strategy.

12. MARKETING STRATEGY

Treechain has adopted a comprehensive marketing strategy, of which brand building strategy serves as the basis for marketing plans. In other words, the main goal is to develop Treechain as a brand that represents quality and value. We will position Treechain in stores that influence our target consumer and validate the brand.

Treechain is introducing an innovative mechanism for its token offering whereby tokens will be distributed among users through the sale of Rametron, starting price of which is USD 25. Treechain is prepared to offer discounts and allowances, sales promotion prices, in order to increase our sales and eliminate subsequent losses. We will offer promotions to the potential customers, in order to raise awareness of the brand and generate profit to maximize the market share. Moreover, to make Tree Token and associated products marketable, we are aiming to take advantage of existing exchange communities where the Treechain IEO would take place. Furthermore, once the fund raising process has been completed, we intend to conduct seminars, use marketing campaigns, forums, blogs and use our social media platforms to further enhance and gain trust of our valued investors as well as entering some key partnership/sponsorship contracts.

Some of the marketing and community building strategies that we follow, both for the fundraising and product promotion, includes:

Expos and Exhibitions
To spread our message loud and clear and in order to entice community participation within the Treechain ecosystem, we will create awareness campaigns all across the world and always participate in expos. We will sponsor mega-events and our professional marketing team will actively participate in these expos ensuring maximum conversion of Treechain and associated products.

Strategic Alliances

We also keep on partnering with key merchandisers around the world from time to time, as it is beneficial for both the parties and helps in enhancing the acceptability of the Tree Token.

Social Media
Through Social channels, we would keep the public audience updated about the latest developments within the Treechain ecosystem. Some of the Social Media platforms that we aim to use include: Telegram, Facebook, Twitter, LinkedIn, YouTube, Instagram.

Celebrity Endorsements
For ensuring maximum outreach to the public, we conduct events and advertisements where Treechain is endorsed by famous celebrities from the music and film industry to ensure greater visibility to the coin and our platform.

Air Dropping and Affiliate Marketing Policy
We also aim to conduct an Air Drop and launch an affiliate marketing policy for expanding our community and ensuring that our messages reach the maximum number of people.

Press Releases and Media Coverage
The Treechain marketing team would release fortnightly press releases, news and media letters. Moreover, we would also strive to cover the Treechain platform products and its fund raising activity in leading media channels, social platforms and cryptocurrency news sites.

Tournaments:
Treechain creates and organizes competitions for the streamers and establishes a path to all the stakeholders to earn more tokens. These tournaments increase the visibility of the platform and can be used for multiple promotions.

Stickers and Virtual Gifts:
These are emoticons for the virtual gifts that fans can send performers. The cost of the awards is debited from prepaid accounts that viewers set up, and

30%-40% of the money goes to the performers. The applause emoticon costs a bit more than 1 cent; a bottle of virtual Chanel No. 5 costs about $3.

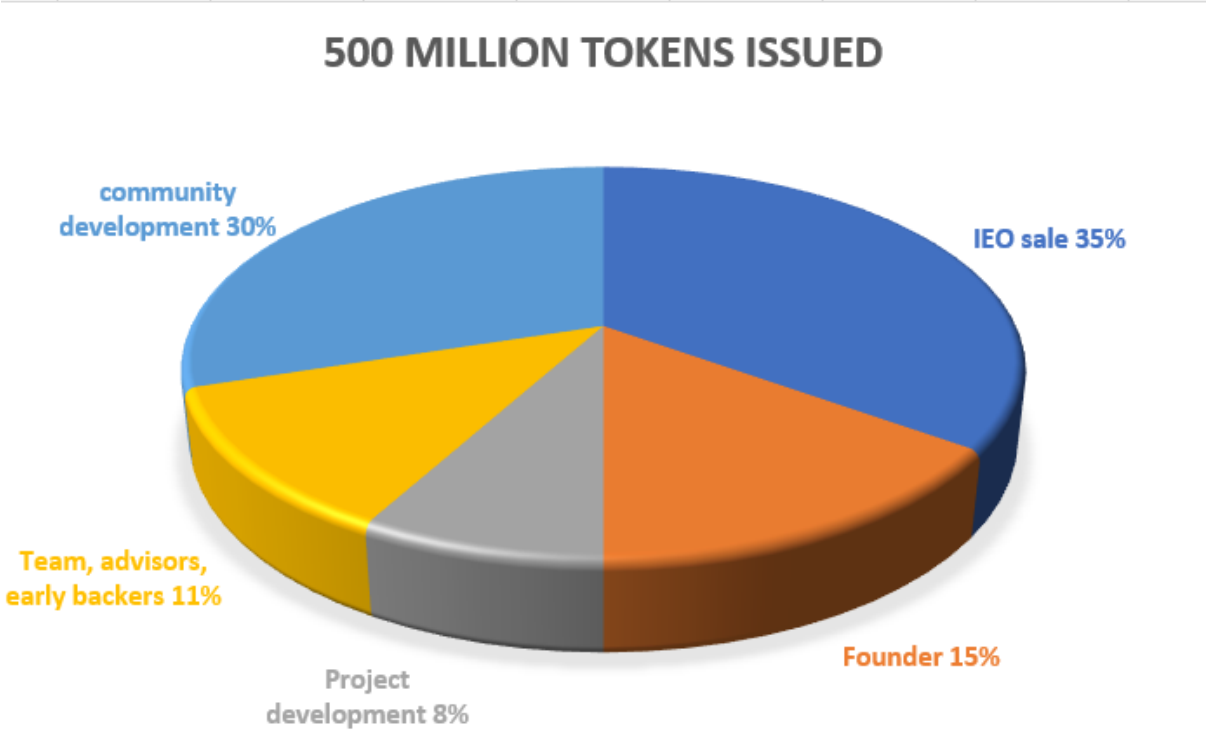
VIP Status
This is a list of the VIP fans for Content Creators/performers who are online. Fans can buy different tiers of VIP status for 'n' number of TOKENS per month. VIP's messages and gifts are displayed in an eye-catching space, so Content Creators/performers are more likely to respond to their messages. VIPs also get priority entry to popular shows that limit the number of viewers.

Virtual Gifts
Virtual gifts are similar to donations in that each gift usually represents a fixed amount of real-world money (i.e. one 'private jet' gift will always cost $10). The difference between this and a donation is the gamification layers of using a virtual currency (which costs money) to purchase virtual gifts, i.e.: $10 USD = 500-star coins = 1 private jet.

Education
- Podcasts
- Chat Bots
- B2B (ex. Bollywood streaming)
- GIF Videos (recording talents and social sharing), karaoke
- Screen sharing like team-viewer

13. TOKEN ALLOCATION

Token Name	Symbol	Platform	Decimals	Total Supply
TREE CHAIN	TREE	TRC-20	18	500,000,000



Of these 500 million tokens :

- 35% will be offered in the pre-sale and IEO.
- Founders: 15% (lock 2 years)
- Company development: 8% (lock 2 years)
- Team, advisors, early backers: 11% (lock 2 years)
- 30% will be retained for community development.

TOKEN UTILITY

The choice for a native token was a heavily considered decision. While a well-designed economic logic can create avenues for new revenue streams and wealth, a poorly designed logic can negatively impact the platform. Our analysis has led us to the conclusion that a native token for the Treechain Platform was the best way forward to achieve our objectives.

Treechain uses the blockchain to build a worldwide Peer-to-Peer network for live-streaming that has smooth transactions, international 24/7 availability and an economic model optimized for live streaming based transactions. Below is a breakdown of the factors considered in reaching this conclusion.

Global Payments available 24/7
Treechain and customers exist globally. A native token is required to make sure that everyone has fair access to the platform. Fiat transaction channels present institutional barriers and overhead. Treechain also becomes vulnerable to external manipulation if we depend on any other currency—be it crypto or fiat.

Scalable Infrastructure
For Treechain to achieve its vision, it needs a scalable infrastructure that can support the expected transaction volume. Current leaders — Bitcoin and Ethereum can't support the volume required. Therefore, it makes sense to implement the native token model with its public chain, optimized for performance.

Lower fees and costs
Treechain will be driven by micro-transactions, whose volume increases, corresponding with rising demand for live streaming services. A tailor- made token solution specific for Treechain is the best way to go forward. Other currencies would have fixed transaction costs or models which are not suitable for Treechain's goals. These reasons present the clear need for a native Tree Token.

14. S.W.O.T. ANALYSIS

STRENGTH

- Multi-modal offering
- Token Utility
- Sound technical architecture
- Regional content offering
- Unique business model
- High throughput
- Horizontal Scaling

WEAKNESS

- Lack of reputation – business is still under development
- Lack of capital – start-up funds from loans and investors

OPPORTUNITIES

- Potential growth – Offering new products and services
- Expanding the business to other market areas
- Regional content In movies and education gives a standout opportunity

THREATS

- Financial support
- Uncertain situation due to Covid 19

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