BITSCREENER
Financial Data and Content Ecosystem Powered by Blockchain

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https://bitscreener.com

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Abstract

BitScreener is a finance-focused unified platform of cryptocurrency and stock tracker powered by blockchain. It integrates data of separated spaces of stock and cryptocurrency into a single platform, allowing traders and investors to track their investments across the domains seamlessly. At the same time, writers and researchers can contribute new content to the system for rewards. BitScreener leverages the blockchain incentivization mechanism for user engagement and content quality. The visualization tools (charts, table, news, etc.) of the data subsystem support writers to create new content easily within the platform. Once published, the newly generated content is transparently evaluated by the community for rewards. The two subsystems data and decentralized content of the system are weaved together, making BitScreener a unique ecosystem evolving overtime. BitScreener aims at tracking 2000+ cryptos, 100,000+ stocks and thousands of other equities around the globe in real-time for its community.

1 Introduction and Problem Statements

Finance is considered as the most important sector to the functioning of the world economy. Distributing accurate information in real-time to investors, traders or financial professionals plays key role in making right decisions, which might affect the future of organizations. The current financial content providers have several shortcomings in providing quality content to their communities. Benefits and interests of the service providers are the designers' goals, putting aside their users'. Consumers may be loaded with biased information based solely on the providers' view or interests (e.g., finance, politics, etc.) There is no transparent and auditable way for the consumers to reflect their views about the information, which might mislead the community. We summarize some of the key issues in the existing financial data and content systems.

- **One-sided, biased, and low-quality information.** The media delivers information to primarily accommodate the perspectives of the owners, editors or authors, with limited approval from users or without getting reviews from the viewers. According to the 2016 Gallup News poll on trust in the media, only 32% of Americans said they trust the media, declining from 40% in 2015 [1]. The report also said that the key factor of the deterioration in trust was biased and fake news. As an example, Fox News - an American basic cable and satellite television channel, has been the subject of several controversies and allegations on biased news coverage [2]. In finance, the biased news is typically

disseminated as "pump-and-dump" schemes for the unethical gains. In 2017, the U.S. Securities and Exchange Commission (SEC) conducted a wide-reaching investigation into illegal stock promotions. The promoters were alleged to have published bullish articles on some stocks for payment from the companies they covered between 2011 and 2014. Several of the articles cited by the SEC were published on SeekingAlpha [3] that allows viewers to examine (i.e., to vote) any posted information by voting mechanism to verify the quality of the news. The examination process, however, is still limited since the incentives are not strong enough. The viewers conduct the examination, generally for free, that leads to our next shortcoming of the prevailing systems.

- **Unfair share distribution.** It is well-known that social platforms retain the revenue to their shareholders without sharing with their users. Popular financial forums such as BitcoinTalk or TradingView[1] mimic the Facebook and Twitter business models for generating revenue. There is no difference in benefit sharing - they get most of their income by selling advertisement or monetize their user information [4, 5]. For instance, BitcoinTalk - the largest cryptocurrency online forum, has more than 30 million posts on millions of topics created voluntarily by nearly 2 million free members worldwide [6]. BitcoinTalk gets their income by selling banner ads to crypto-related startups. Although several websites such as SeekingAlpha try to resolve that problem by sharing a small portion of the income to the contributors, the fairness is still an issue; only a few highly-ranked users earn the share in an undisclosed ratio. As social media is becoming the bigger part of everyone's daily activities, the paradigm of the traditional profit-sharing needs to be changed. Contributors and readers should be treated fairly based on their content contributions which are justified by communities. The system should be for the people, not a single centralized provider.

- **Stagnant financial information.** Despite significant changes, most of the existing financial data systems have not matched with the readers' needs. Users have very poor experience in controlling over the content or reflecting their views. For example, Finviz[2] and CoinMarketCap only provide stock charts or crypto quotations with very limited interaction between the systems and users or among users. Users are hardly giving feedback on the information on those websites. In different systems such as StockTwit, interactions and communications are the main focuses but detailed data is missing. It is extremely difficult for a trader to make a trading decision without referring to other platforms for gathering information. As a result, users may miss their opportunities due to time delay, high cost, and data inconsistency. It will be much better and more effective if users can get all the real time data and able to interact with other peers within a single platform. Users can quickly make a right trading decision if they can acquire the financial data via charts, tables, or news from a data vendor and control their own content by looking at high quality news which are upvoted by their peers(i.e., approval). The process is transparent where no one is able to control the content and its quality. Unifying the two above discussed components of financial data and user-generated content (interactions) is a natural design to serve its community.

- **Disconnected financial world: crypto vs. stock.** The recent cryptocurrency craze has attracted many traders and investors - most of them are trading stock, forex or other types of equities. Robinhood - a free stock trading gateway, drew more than a million users after cryptocurrencies are tradable on their platform (Robinhood app). By enabling trading cryptos, Robinhood integrates the two domains of stocks and cryptocurrencies

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[1]https://tradingview.com
[2]https://finviz.com

into a single gateway that serves both stock and crypto enthusiasts. Similarly, famous equity exchanges CME (Chicago Mercantile Exchange) and CBOE (Chicago Board Options Exchange) offered future trading of Bitcoin in late 2017 to meet the needs of their investors. From a data processing standpoint, the is no difference between in exhibiting cryptocurrencies and other equities. Each crypto or stock is presented by its quotation, charts, news, and analysis. Thus, their data should be unified into a single platform to benefit both user groups.

Many other crowdsourced content systems such as TradingView, StockTwits[3] tried to address the problems. However, those systems have not resolved the issues. BitScreener's financial ecosystem is a blockchain-based approach designed to tackle these challenges. It blends the fundamental financial data into the community-generated content. It marries the crypto domain with the traditional equity world. It improves the quality of information by recommendation algorithms. And, more importantly, it guarantees the profit-sharing by putting the benefits of the BitScreener community as the highest priority, where both content creators and viewers are rewarded for their contributions. The community-generated content is distributed utilizing social interaction and the corresponding rewards are publicly transparent and auditable using the undeniable smart contract on the Ethereum network.

2 Blockchain and Smart Contract

A blockchain is a decentralized, distributed and open digital bookkeeper that is used to immutably log transactions on the computer machines across its network. The blockchain bookkeeper, also called blockchain database or ledger, stores the transaction records that will not be altered without changing all subsequent blocks of the network [7]. The key significance of blockchain is that it allows the participants across the global computer network to verify and audit transactions immediately and inexpensively. In other words, the blockchain database is maintained, controlled, and verified autonomously by a peer-to-peer network of tamper-proofing servers worldwide. The blockchain data is immutable so it is perfect for recording a digital asset. The blockchain allows each unit of digital value to be transferred only once, completely avoiding the problem of double spending. This opens up a new computer protocol called a value-exchange protocol which is faster, safer and less expensive compared with traditional systems.

Blockchain with smart-contract capability is considered as a blockchain version 2.0 [8]. While the blockchain technology (blockchain version 1.0) that empowers Bitcoin transactions only allows to record the digital-asset transactions, the blockchain 2.0 allows to deploy immutable code that works as a tamper-resistant contract between two or more parties. For example, Ethereum network runs on a network of computer nodes worldwide to ensure that data and small program code, called smart contracts, are executed on all network participants' machines without a central party. Ethereum takes one steps further from the Bitcoin network by creating an unstoppable censorship-resistant self-sustaining decentralized digital agreement written in computer code by computer across the globe. What Bitcoin does is storing distributed data, Ethereum does is storing distributed data plus running computer piece of code. The small computer codes being run are called smart contracts, and the contracts are run by participants on their machines using a sort of operating system called a "Ethereum Virtual Machine" [9]. The Ethereum network is the second largest blockchain network in terms of processed transaction numbers, just after the Bitcoin blockchain network.

Blockchain-based smart contracts are digital agreements that can be partially or fully executed or enforced without human coordinators. The immutable code of the blockchain database
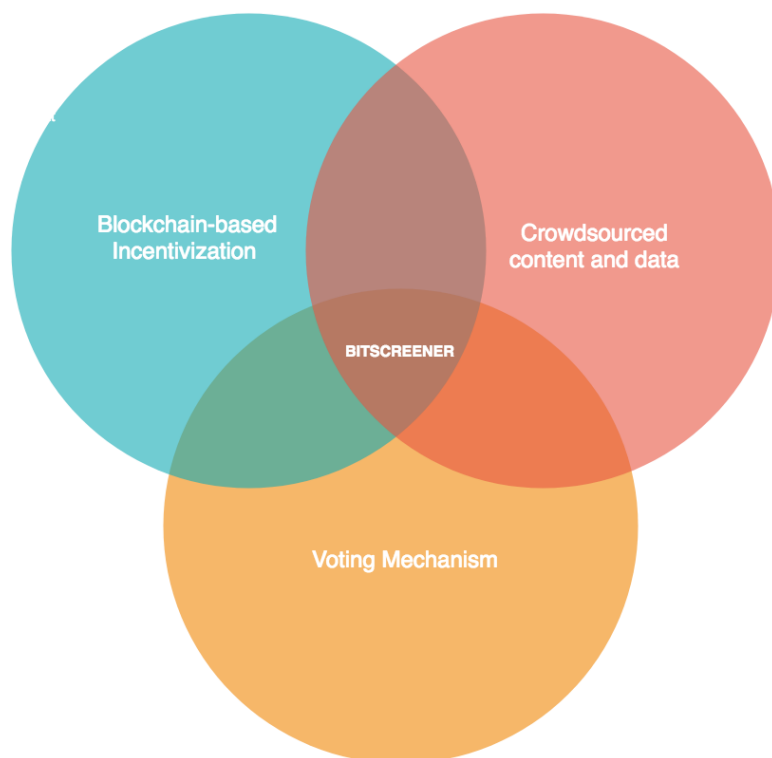

Figure 1: BitScreener Ecosystem is a fusion of several technologies: it has the crowdsourced financial data and content component, the voting mechanism and the incentivization using blockchain-based tokens.

decrease moral hazards and optimize the use of digital contracts in general. Ethereum implementations of the smart contract could enable the coding of contracts that will execute when specified conditions are met. A blockchain smart contract would be enabled by extensible programming instructions that define and execute an agreement. For instance, Ethereum Solidity is an open-source blockchain project that was built specifically to realize this possibility by implementing a Turing-complete programming language capability to implement such contracts [9].

A critical question is whether we can employ smart contract and blockchain-based tokens to empower the financial content delivery and unify the worlds of cryptocurrency and the stock market. Our BitScreener Ecosystem is a solution just for that.

3   BitScreener Solution

BitScreener is an innovative financial ecosystem using blockchain-based incentivisation in order to solve the problems of (1) unfair profit sharing, (2) biased information, (3) fragmented financial data system and community content system, and (4) fragmented stock and crypto domains as mentioned above in the financial data and content delivery. BitScreener integrates several advancements of the existing content delivery and crowdsourcing systems for finance field with a focus on economic incentives. Such fusion is implied in Fig. 1.

The Bitscreener ecosystem is a community-generated financial content system that utilizes blockchain-based rewards, in order to improve the **fairness among various parties**. The system will evaluate certain user's social actions, such as writing a well-researched article, editing a post, or upvoting/downvoting a piece of information. Upon evaluation, these actions are later translated into points (BSP) depending on how their actions benefit to the community. The points will then be converted into an Ethereum-based BitScreener tokens (BITX) that can

Table 1: Comparison among different financial data and crowdsourced content platforms

Platforms	Rewarding	Cryptos & Stocks	Crowdsourced	Multi-Exchanges
CoinMarketCap				✓
Yahoo Finance			✓	
SeekingAlpha			✓	
MarketWatch				✓
Steemit	✓		✓	
Investopedia		✓		
TradingView		✓	✓	✓
BitScreener	✓	✓	✓	✓

be held in Ethereum Wallets such as MyEtherWallet or MetaMask. In addition, the points or tokens can be used to unlock advanced features in the platform that would usually be purchased with fiat money.

Different from other existing systems, BitScreener, is designed to **accommodate both crypto and stock data in a single platform**. It works similar to CoinMarketCap for crypto and Finviz for Stocks. BitScreener, from a financial data processing and content delivering context, removes the boundaries between stocks and cryptocurrencies. This will allow traders to do their due diligence for their trading decision on a single platform. The success of the crypto domain can be translated to the success of the stock domain. It is also worthwhile to note that some of those functionalities have already been implemented in our iOS App *(Crypto Tracker by BitScreener[4])* and Web (https://bitscreener.com).

The information on BitScreener is **high-quality, multi-sided, and un-biased based on the wisdom of the crowd**. Adopting the voting mechanism from Wikipedia and StackOverflow, any information can be scrutinized by the community. Because each action is reflected in the amount of BSP of the viewers, the action will have to be authentic. Furthermore, the information posted is not final - it will always be improved by any other viewers or editors with higher qualifications. This design ensures the consistency in the quality of the information submitted. The methodology of "content quality increment" by the crowd is popular among famous content portals including Wikipedia and StackOverflow. In addition, because users have their profile posted and voted, any action of "pump-and-dump" is much more difficult than that of the prevailing social media.

BitScreener is unique compared to other platforms. In particular, it is vastly different from the platform Steemit. BitScreener addresses the specific problem of the financial world while Steemit is a multipurpose blog. Additionally, BitScreener is also distinct from other platforms such as CoinMarketCap, Yahoo Finance, SeekingAlpha, Investopedia, and TradingView as it has a community forum with rewards based on performance-driven points and blockchain-based tokens. And it merges the primitive financial data system with content created by users as well as **integrated equity markets within the new crypto market - all in one ecosystem**. Table 1 compares BitScreener with some common platforms.

4   System Architecture

From the technical standpoint, BitScreener can be divided into two subsystems. The first one - the financial data subsystem works by extracting trading data from financial exchanges (i.e., from cryptocurrencies, equity exchanges, or media outlets); then processing and preparing the data. It provides information for end users through visualized charts, tables, text, or notifica-

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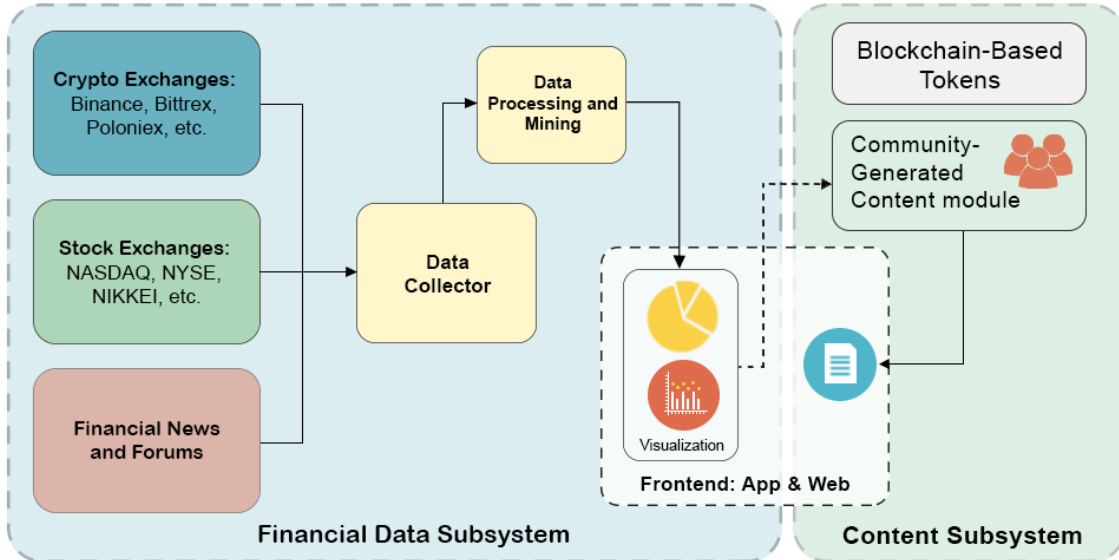[4]https://itunes.apple.com/app/apple-store/id1240849311?mt=8

Figure 2: BitScreener Ecosystem with two subsystems: (1) Financial data subsystem that includes three modules: data collector, data processing and mining module, and visualization and (2) Content subsystem.

tions on frontend sides (the BitScreener App or Web). The second part of the architecture is the blockchain-based community-generated content subsystem where writers or professionals can create content in exchange for a reward. The data subsystem provides free and paid services, and users have the options to purchase these services using the BitScreener Token BITX. The content subsystem, on the other hand - enables users to earn rewards in form of BITX via socialized activities such as creating, reviewing or editing information. The two subsystems work cooperatively with each other, in a way that improves both subsystems. The users rely on the charts, news, and the informed data subsystem to create knowledgeable articles, while the data subsystem processes the crowdsourced data to filter the significant information. Next, we will describe each subsystem in detail.

4.1 Financial Data Subsystem

The financial data subsystem includes the data collector, the data processor, and the informing unit. The data collector extracts the trading data which is normally the open price, close price, high price, low price and volume of the traded equity and the quality is normally defined by the delivery frequency, latency, format, reliability. For cryptocurrencies, the data collector can get data directly via open APIs of the cryptocurrency exchanges such as Binance, Bittrex, or Poloniex. For stock exchanges, the data can be bought via the financial data vendors such as Bloomberg, Interactive Data Corporation, or MorningStar [10]. Those vendors commercialize the data of almost all equities around the world - from those listed on New York Stock Exchange (NYSE), Shanghai Stock Exchange (SSE), to ones listed on Vietnam Stock Exchanges (HOSE). In addition, the finance-focused news or discussions on the variety of media outlets and social networks such as Google News, Twitter, and Reddit will be harvested by the data collector. For example, our current BitScreener data collector extracts the number of Twitter followers to each cryptocurrency Twitter page. This number is meaningful in the sense that it indicates the number of potential adopters.

Charting visualization literally is the most important aspect to inform traders and investors on the price movements of a financial instrument. BitScreener's current charting tool, avail-
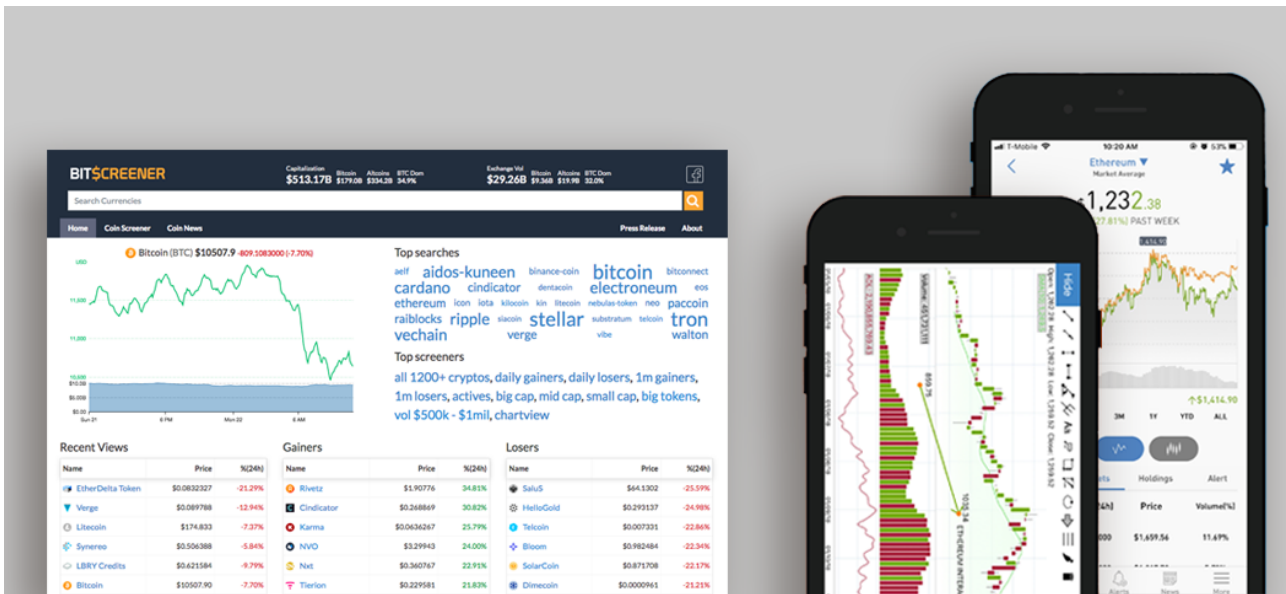
Figure 3: Screenshots of current BitScreener App and Web. The App and Web have served over 1.2 million traders and investors worldwide near 70,000 Daily Active Users (DAU).

able on both the App and Web version, empowers people to access and analyze the data of both cryptos and stocks in the same manner. It summarizes large volumes of information into graphs, tables, and maps that can be easily comprehended and referenced. This helps traders when making quick decisions and enables them to utilize and draw various technical indicators or technical overlays such as SMA, Bollinger Bands, RSI, etc. BitScreener uses the latest visualization tools so that users can perform their technical analysis right on the website efficiently. BitScreener is also a financial news compiler and discussion aggregator.

Alert or notification features of any financial application play a decisive role in informing the trader on the movement of the financial instrument. Traders typically want to be the first to get updates on any events associated with their investment vehicle, so that they be prepared with their investments ahead of others. For this reason, notification is a prioritized feature on our platform. The current BitScreener App allows users to get price alerts, volume alerts, and market cap alerts, right on their mobile devices. To make this possible, the backend server with the data collector is carefully configured so that the alert can be triggered by the specified price or volume movement of cryptos directly from exchanges. For example, users can set a price alert for LTC/EUR on the exchange GDAX and be confident they will be notified in real-time from the exchange. Similarly, users are also able to set a volume change alert for a coin with information from nearly 100 crypto exchanges. Once our full product is completed, users will also be able to set a notification for almost all cryptos and equities across major markets worldwide. It is very accomplishable because the format of data and charts for stocks and cryptos are almost the same.

The informing unit of BitScreener includes the Screening Tool, which is an outstanding feature of the BitScreener App and Web. This tool offers hundreds of filtering criteria that helps traders efficiently scan cryptos or stocks of their interests - rather than surfing through the massive number of the investment instruments. The ability to "screen" or filter through the thousands of cryptocurrencies based on specified criteria is a powerful feature that is unique to only BitScreener. The adjustable parameters include price, volume (24hr.), market capitalization, exchange, performance, order, type, and age. The newest version of BitScreener just added several important filtering criteria such as algorithms, 52w average volume, circulating supply and maximum supply. Being able to quickly sort and find the coins that exactly meet
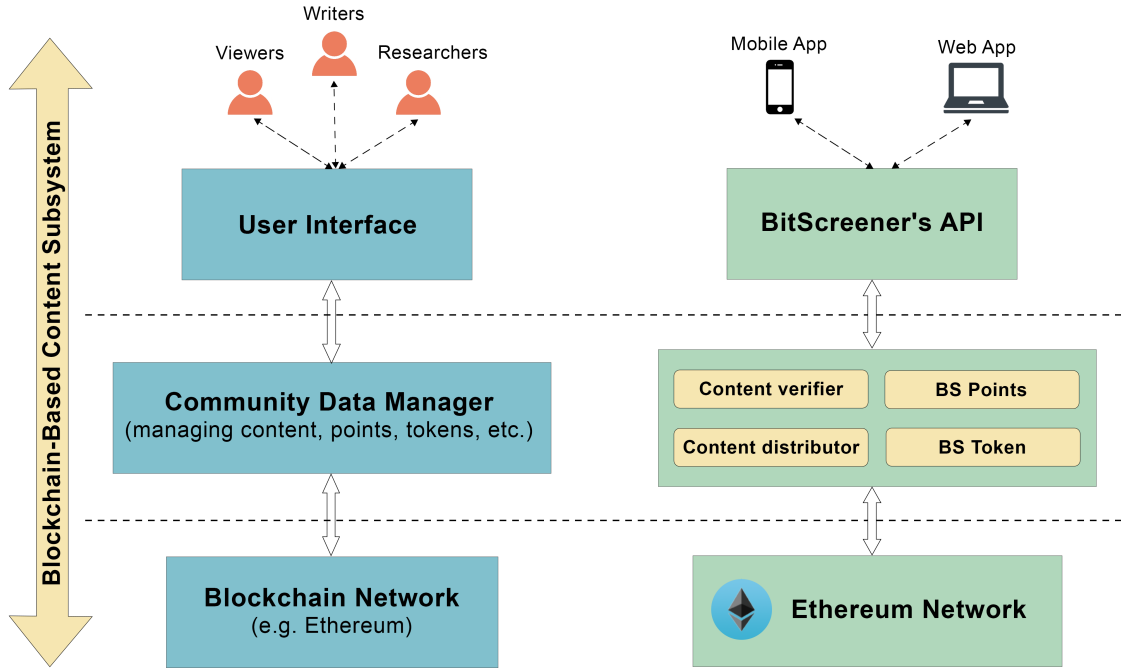
Figure 4: Layer-based community-generated content subsystem

the specified criteria is a critical advantage for both traders and investors. The platform now also includes some pre-set screeners that enables users to conveniently browse some cryptos such as gainers, losers, or newly-added cryptos. There are also miscellaneous information features such as market heatmap, latest financial news, but the details of those features are out the the scope of this white paper.

What we have implemented: Our existing BitScreener App and Web have completed the most important functionalities of the data subsystems for the cryptocurrency domain. The data from famous exchanges include Binance, Bittrex, Poloniex, or GDAX are fed in real-time to our system. The data are processed and displayed to crypto users via the chart, tables, news compilers and notifications. Fig. 3 displays a screenshot of our available BitScreener App and Web. Currently, the App and Web have served over 1.2 million traders and investors worldwide near 70,000 Daily Active Users (DAU).

4.2 Blockchain-based Content Subsystem

While the financial data subsystem provides price, chart visualization, notification to users, the content subsystem is an interface for BitScreener members to communicate and exchange knowledge with each other. More innovative than other social networks, the content subsystem is powered by blockchain networks. Fig. 2 expresses the overview of the subsystem that composes of a blockchain part, the content part, and the end user part. This subsystem can be translated into a layered architecture as illustrated in Fig. 4 with three main layers: (1) User Interfaces, (2) BitScreener Data Manager, and (3) Blockchain-based network.

User Interfaces: This layer includes interfaces (e.g., web, apps, etc.) via which individuals can interact with BitScreener such as reading, voting or creating new content. We build a closed ecosystem where a user can utilize several functionalities of BitScreener such as analyzing tools, graphical tools, etc. to create and post the content. The process of creating high-quality content is just simple as posting a status on Facebook.

Community Data Manager: This is the heart and soul of the subsystem. It includes several novel algorithms and implementations such as Content Verifier, BSP, Content Distributor,

and BITX, etc.

- **Content Verifier**: This module plays as a system's guard to verify the originality of the created content. It links with the internal content database of BitScreener as well as external databases on the Internet (e.g., Google Search, Bing, etc.) to verify the source of the newly generated content. For example, if a user copies the content from somewhere on the Internet and posts it in BitScreener, our Content Verifier should be able to detect and mark it as invalid for point and token rewards. If we identify the original source, all BSP and BITX will be awarded to the original creator. We also emphasize that Content Verifier is only the first guarding shield of verifying the quality of published content. The second shield is the reviewers. As we indicate in our use case below, a set of good credentials of reviewers is selected for reviewing the content as well. Thus, we are very confident that the published content in BitScreener platform is good quality that benefits the community. Finally, the readers will vote up the published content to assess its content over its lifetime.

- **BitScreener Point (BSP)**: Once the newly created content is verified and accepted by reviewers, it is fed to our BSP unit for calculating the points which later will be converted to BITX. On the other hand, the rejected article is also awarded some points, which is less compared with the accepted article, to appreciate the effort of the writer. We also emphasize that the published content will be paid additional points (or BITX) based on the number of upvotes by readers over its lifetime. Our system calculates the points based on the consensus feedback (i.e., upvotes) of users who consume the content. All the information of the process is stored in the blockchain which is publicly available to the community.

- **BitScreener Token (BITX)**: Once the user accumulates enough points, the system will convert the points to BITX. BITX can be used as a payment method to buy advanced features of the ecosystem. This mechanism is implemented by a smart contract which is automatically executed when the certain conditions are satisfied. The conditions are sufficient amounts of points and sufficient matured times. Participants need to store their points for a period of time before being able to convert to the tokens. Our idea is to encourage the community to make more of their contribution to the long-term growth of the ecosystem.

- **Content Distribution**: A critical component of the BitScreener platform is the content distribution component. This component automatically feeds the newly accepted content to target consumers based on their interests. This component consists of machine learning algorithms which learn users history content usage and subscriptions for matching with the newly created content. This approach plays an important role in promoting the content over its lifetime by feeding it to targeted readers. As a result, writers who contribute good content will be awarded over the lifetime of the content as long as the community consumes and values the content.

Blockchain Network: The lowest layer of the content subsystem is blockchain network (e.g., Ethereum) that executes the smart contracts of transferring the BITX from the BITX pool to the contributors or between users. Those smart contracts are public for the sake of the transparency. As said earlier, the Ethereum blockchain network is a decentralized network consisting of a large number of machines which are miners. Once the transactions performed on the Ethereum network, they are immutable. It is important to highlight that each user on BitScreener does not involve in the mining process of Ethereum blockchain network. The "mining" process of BITX are different and will be explained in more details in the next sections.
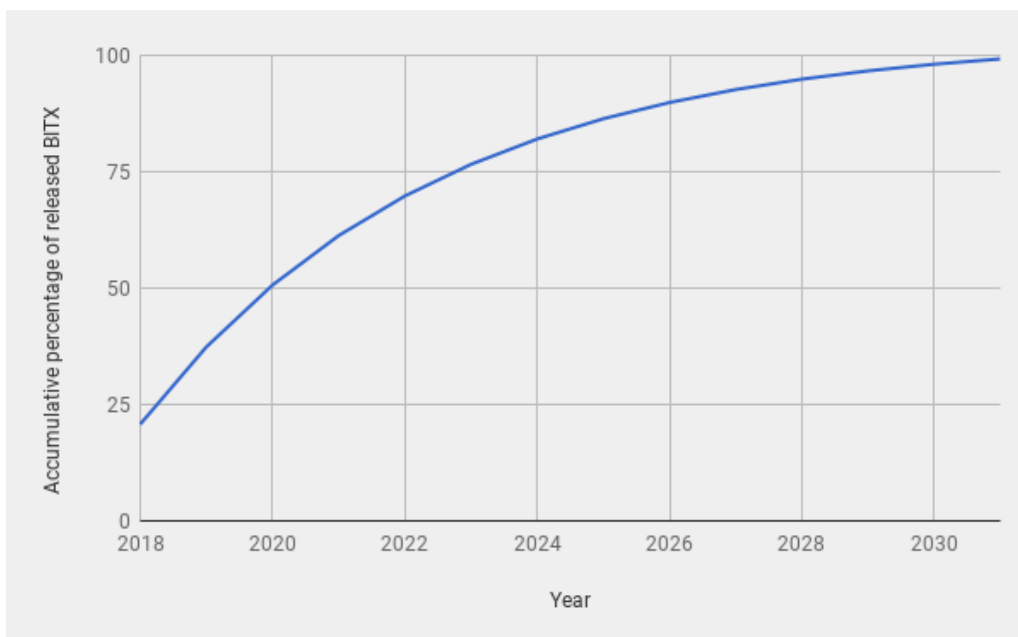
Figure 5: Accumulative percentage of BITX "mined" by content contributors from the reserved pool (90,000,000 BITX) after each year.

5 BitScreener Token Economy

The breakthrough of BitScreener is the blockchain-based incentivization via token BITX. BITX is a vehicle for transferring value between content contributors and content consumers. The financial writers or researchers who deliver the value will be awarded BITX and the readers or traders who consume value, to some degree, may need to spend the tokens. These economic incentives help the ecosystem sustain and grow. By using the blockchain tokens, this mechanism of incentives is far more advantageous than that based on other means of payment such as fiat money or traditional gift card. BITX will be transacted faster, cheaper, and more accurate on the blockchain, regardless of the amount and the geographical locations. The transactions of BITX are transparently public to all related parties. This section presents the details on how, for token holders, to buy premium features on BitScreener using tokens and how, for contributors, to earn rewarding tokens from delivering high-quality content to the community. The "mining" process from the reserved token pool and the conversion between BSP and BITX will be examined.

5.1 "Mine" BITX by Contributing Content

BitScreener's economic incentives are inspired by Bitcoin mining mechanism. Bitcoin mining is the activity by which transactions are validated and appended to blocks in the chain, i.e., the blockchain [11]. The mining allows un-explored bitcoins remained to be released and to be circulated. It is the process of competition in which computers try to be the first to solve a difficult cryptographic puzzle (Proof-of-Work). The first one getting the answer claims the new Bitcoin. The amount of new Bitcoin released with each mined block is called the mining reward. The mining reward is halved every 210,000 blocks or approximately every 4 years. The mining reward began at 50 Bitcoin in 2009, is now 12.5 in 2018. And this will continue to 6.25, 3.125, 1.5625, and so on. This diminishing block reward will result in a total release of Bitcoin that approaches 21 million. The mining process of Bitcoin is predicted to last until 2140 [12].

BitScreener leverages the well-known mining process in Bitcoin to incentivize the contrib-

utors - the "miners". The "miners" of BitScreener need to share their knowledge to make the content of the BitScreener Ecosystem improved. They may create knowledgeable research articles, edit, or vote an article. This is, somehow, similar to the bitcoin mining in which contributors share the computation resource of their machines. To this end, the mining process of BitScreener can be termed as "Proof-of-Knowledge". The amount of the contributions will be mathematically computed through the evaluation by other peers. The evaluation is then translated to BSP which will be converted to an appropriate amount of BITX. This amount will be released from the reserved pool and will be circulated on the blockchain. The reserved tokens account for 20.0% of the total supply that is equivalent to $90,000,000$ BITX. It will take some time to unlock all those remaining BITX. We set this period to be 15 years.

We need to find a proper token distribution agenda so that it promotes the viability of the ecosystem over time. We propose a schedule for the distribution as followings: Assume that during the first year, N tokens will be distributed to the contributors; during the following years, the number of released BITX will reduce to 20% compared to the preceding year. Thus $0.8 \times N$ in the second year, $0.8 \times 0.8 \times N$ in the third year, $0.8 \times 0.8 \times 0.8 \times N$ in the fourth year, and so on, will be released to the contributors. The distribution rate diminishes year after year so that all $90,000,000$ BITX will be unlocked during the "mining" period of 15 years. The amount in the first year N can be calculated via following equation

$$N + 0.8 \times N + 0.8^2 \times N + ... + 0.8^{13} \times N + 0.8^{14} \times N = 90,000,000. \tag{1}$$

Solving this equation gives us $N \approx 18,672,200$ BITX. Fig. 6 shows the accumulative percentage of tokens released after each year. After 15 years, all $90,000,000$ BITX reserved tokens will be released to the contributors. Apparently, the first year will deliver the largest mount and the last year will release the smallest amount. An interesting question is how the contributor get rewarded after this phase. BitScreener adopts the same Bitcoin's policy. It is the revenue obtained from selling features on the platforms which will be used to reward to the contributors.

5.2   Spend BITX to Buy Premium Services

Like any other types of utility tokens that is popular in gaming portals, BITX can be used to purchase advanced features in BitScreener Ecosystem. For example, instead of using fiat money to unlock the real-time price movement notification (alert) on our iOS app, users may use BITX to subscribe to those features. As the ecosystem grows, more advanced features will be added. A financial professional, for instance, can produce a high-quality research report of a financial instrument and sell it to interested traders or a trader may exchange with viewers a finance-focused tutorial for BITX. In other words, users spend BITX to buy knowledge from other contributors. To this end, BitScreener is a marketplace for knowledge on finance where buyers and sellers exchange their ideas through underlined BITX.

The system with blockchain-based tokens for exchanging the services, as discussed in the previous subsection, has more advantages over the common ones using fiat money. **If using the fiat money-based scheme, a service provider may have to use the third parties for the transactions that obviously incur more fee.** For instance, to allow users to purchase features on the mobile app, BitScreener, as an app publisher, needs to integrate the In-App Purchase module made by Apple and Google. Apple and Google, who host the BitScreener mobile App, will charge 30% of every transaction. Similarly, if we implement an In-App Purchase feature on the BitScreener Web, we need to implement a third party Point-of-Sale system in which the payment is normally made by credit card. There will be an amount of 3%-5% subtracted from the payment associated with those transactions. BITX tokens, instead, working on the public blockchain, can completely remove that costly fee. The transaction fee on blockchain is normally smaller and can be neglect when compared with those
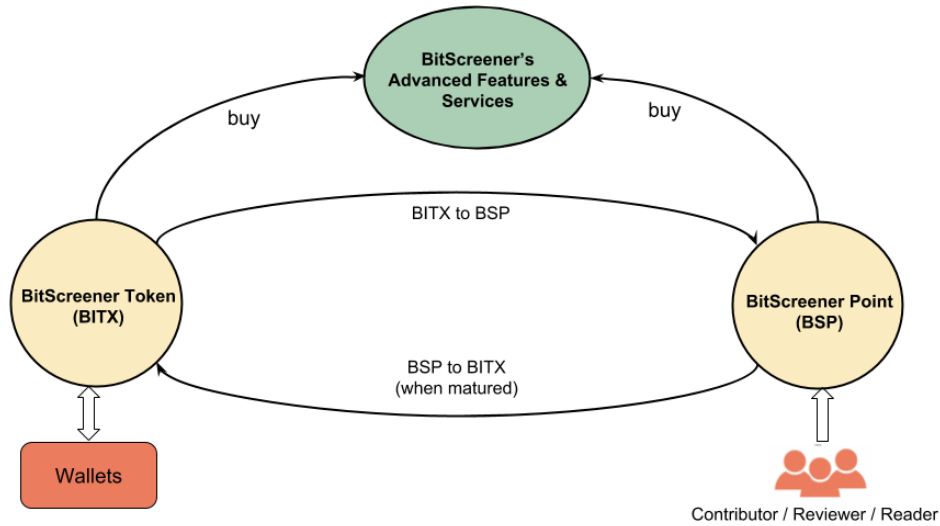
Figure 6: BSP and BITX Conversion Flow

of using the third party ones. Those supposed fees should be counted toward the reward paid to the contributors rather than to the intermediate agencies.

5.3   BSP and BITX Conversion

BSP is a linking bridge between the contributors with decentralized consensus tokens BITX. Such connection is expressed in Fig. 6. For each amount of contributed value, BitScreener will map to BSP according to a fixed rate. That amount can be measured by, for example, the number of votes or the number of views. For this reason, BSP is similar to the number of upvotes that ranks users in many other crowdsourced content systems such as StackOverflow or Quora. For example, we can set a conversion of fixed rate such as 1:1, meaning that one vote is equal to one BSP. The code to execute the rate will be public on blockchain for transparency.

Besides exchanging to BITX, BSP can also be used to buy advanced services of BitScreener, similarly to the tokens. For example, price alert features on mobile can be unlocked using an appropriate amount of the points. This shortcut eliminates the redundant steps of converting to BITX in order to access to advanced services, which can save extra transaction fees and time.

It is important to note that the BSP, once generated, are not immediately converted to BITX. The points will be available for conversion to BITX after the matured period and in a ratio which depends on the supply and demand for BITX on the Bitscreener platforms. There are three main reasons that we want to hold BSP for a while in the system.

- Having more points implies the seniority level of users. They have more incentivization to contribute good content, i.e., they are more responsible users.

- We want users to invest in long-term in the Bitscreener Ecosystem that will benefit the whole community.

- That helps to regulate and ensure the fairness of the conversion ratio between BSP and BITX.

As described in Fig. 6, BSP and BITX create a circulation and are interchangeable. BitScreener users can save or retrieve their tokens from Ethereum-compatible wallets. The users with BITX may use them to power up their BSP to become more powerful users. The

users can also use any of the BITX or BSP to purchase their advanced in-app features or services of the BitScreener Ecosystem. This closed loop makes a great difference between our BitScreener Ecosystem and other existing systems. We will discuss some particular user cases of generating BSP in the next section.

6   A Use Case of BSP

BSP is a measurement of user contributions. BSP is computed, based on the value generated by users. This computation is a common problem that is already solved in many crowdsourced systems, from community-based content forums such as Wikipedia, StackOverflow to commercial marketplaces such as Netflix or Amazon where users vote for a movie or a selling product. In this section, the details and a use case of content creation and its BSP distribution will be discussed.

- **Content Contribution**: BitScreener operates based on the interactions of its community. A user contributes new content and the community reads and gives feedback (e.g., comment or upvote), both of them will be rewarded for their contributions. When a user upvotes or comments on a writer's content, it initiates discussions, facilitates knowledge-sharing within the community which is one of the main objectives of the BitScreener platforms.

- **How Rewards Are Divided**: When a new post gets accepted for publication, the author will earn BSP for their one time publication (which then can be converted to BITX). After that, if the content is good and receives positive evaluation from the community (i.e., upvoted by readers), additional BSP will be rewarded to the contributor. In this process, both author (writer of the content) and readers who vote for the content are rewarded. As both the contributor and the consumer get paid, BitScreener will divide rewards, according to an appropriate ratio, between the contributors and the voters. For example, 70% of a post's reward can go to the contributor and 30% of the reward goes to voters.

- **Transaction Fee**: BitScreener Ecosystem is a feeless system which motivates its community to continuously contribute the content to the system. Despite of feeless, only good quality content which is upvoted by community can earn rewards over its lifetime. In other words, users eventually see only good content which benefits its community.

There are many ways the community can promote their content using BitScreener platform. Particularly, our platform is designed with built-in tools to support creating high quality content within the system. Following are a few typical ways users can contribute to the system and earn BITX in return.

- **Creating New Content**: A use case is described in Fig. 7. In this use case, a writer or researcher can create a new content by using the BitScreener built-in editor. The editor consists of BitScrener tools such as charts, data analyzing functionalities, etc. External sources (e.g., news, social network feeds, etc.) can also be searched and linked directly to the editor to support the writer. Upon completion, the article can be posted directly on the BitScreener platform for review. The system will run Content Verifier to detect any plagiarism before releasing it to reviewers. The system will select early bidders who have good credentials of the related topic. Consensus voting will be used to determine if the article will be published or not. If the article is rejected, notification will be sent to the writer along with a submission payment for the effort. On the other hand, if the
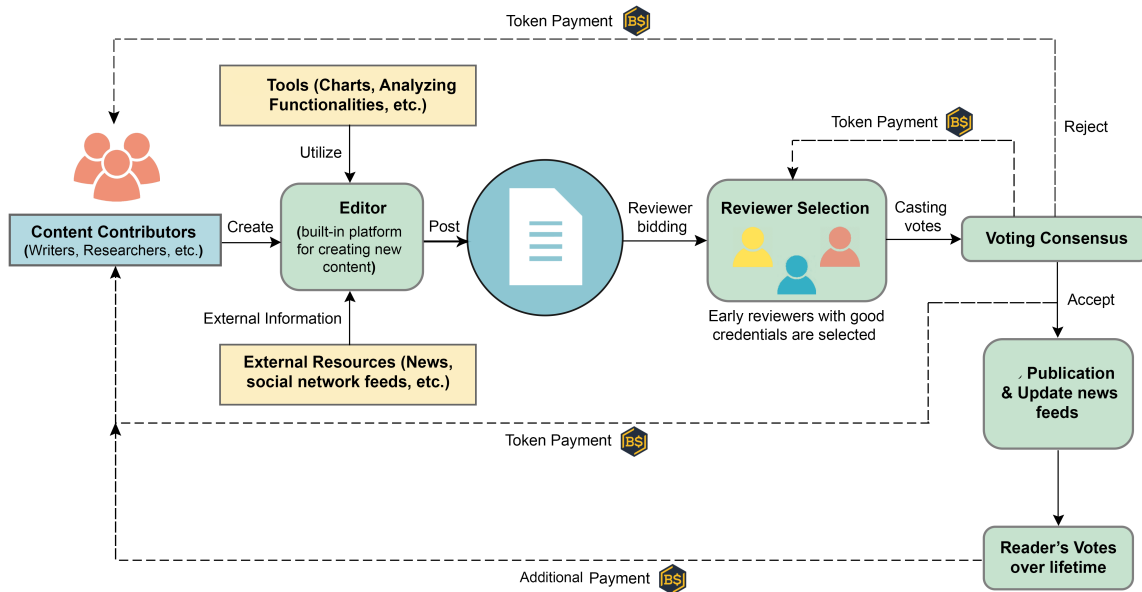
Figure 7: Flow Chart of Creating New Content in BitScreener Ecosystem.

article is accepted for publication, a publication payment will be awarded to the writer. At the same time, the system also issues BITX tokens to the selected reviewers. The newly accepted content is then pushed to the corresponding news feeds of the Content Distributor on the platform. A key difference between the BitScreener compared with some other common systems is that the writer will be awarded additional tokens based on the upvotes by readers over its lifetime. This principle is to encourage users to contribute high-quality content that benefits its community.

- **Curating/Editing/Modifying Content**: The users can also earn rewards by curating, editing, or modifying the existing content. In this case, only users that have more reputation, which is measured by the amount of BSP held, can modify or improve the existing content on the platform. This process is also applied to the case of content curation where a curator assembles information relevant to a particular topic or area of interest. The reward earned by newly generated content will be equally divided to both the editor/curator and the original author. The implemented model in BitScreener platform is an adoption of the well-known model of StackOverflow and Wikipedia. The modification, once accepted by another higher reputation viewers, will result in a reward of BSP to the one who did it. This is a key for BitScreener to keep the content improved over time.

7   BitScreener's Market Overview

The beginnings of stock markets date back to the late 17th century when traders in London exchanged shares of companies that wanted to raise money for exploration and trading in the new markets around the world. These trading activities took place in Jonathan's Coffee House near the Royal Exchange (itself a place for merchants to trade) in London [13]. In the early 18th century, brokers set up a more formal stock exchange that set the foundation for the modern London Stock Exchange. Participants were required to enroll the exchange and the first codified rulebook was introduced later. New York Stock Exchange was established in 1792 when 24 stockbrokers signed the Buttonwood Agreement on Wall Street in New York City [14].
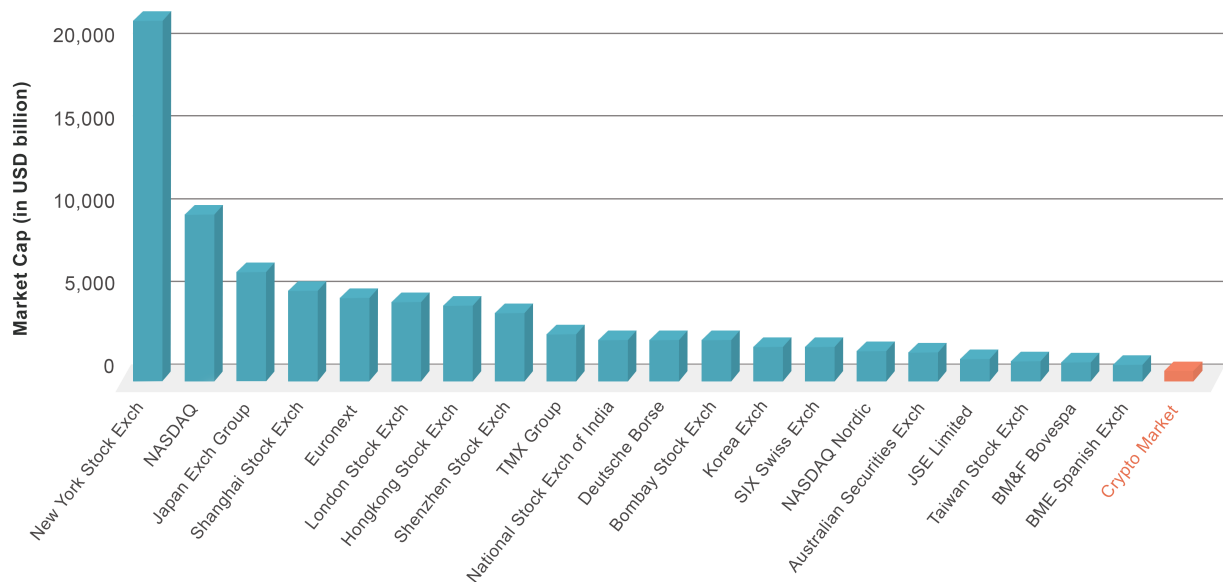
Figure 8: Crypto market cap in comparison with other equity market caps.

London emerged as the major exchange for Europe, but many companies that were able to list internationally still listed in New York Stock Exchange. Since then, many other countries including Germany, France, the Netherlands, Switzerland, South Africa, Hong Kong, Japan, Australia and Canada developed their own stock exchanges.

Through many years of development, the stock markets become the biggest medium for exchanging the equity of an organization and an essential indicator of the global economy. Companies can raise fund through selling their security via Initial Public Offering. Shareholders of publicly listed companies can swap their shares for other assets via stock exchanges. Evidently, the market capitalization reflects the size of the economy. As of mid-2017, the size of the world stock market was about $76.3 trillion. By country, the largest market was the United States (about 34%), followed by Japan (about 6%) and the United Kingdom (about 6%). There are more than 60 stock exchanges around the world. 16 of which have a market capitalization of $1 trillion or more that accounts for 87% of global market capitalization.

Since its launch in 2009 by an unidentified group of developers, Bitcoin has become an online financial vehicle for digital asset store and transmission. Bitcoin has served billions of transactions between hundreds of million accounts. As of March 2018, the daily transaction volume was approximately 5 billion at market exchange rates - and the total market value of all Bitcoin in circulation was $135.5 billion. In addition to Bitcoin, there are more than 2000 other cryptos, normally called "altcoins" that add up to 300 billion market cap and more than $10 billion of exchange volume. The figure, however, is far less than those of stock exchanges. For example, NASDAQ alone has the market cap of $9.585 trillion with over 10,000 listing companies and the trading volume of nearly $1 trillion a day. Fig. 8 illustrates this comparison.

The financial data industry manifests the economic growth as it serves to provide financial market data and related services to financial institutions, traders and investors. According to the 2017 Burton-Taylor report, the Market Data industry including market data, analysis and news exited 2017 at $27 billion, 3.45% increase in global spend for financial information in 2016 [13]. In 2017, Bloomberg and Thomson Reuters market share was at 33.40% and 24.24% respectively. S&P Global Market Intelligence accounts for 21.85%, Platts 11.14%, S&P Global Market Intelligence (10.91%), Moody's Analytics (10.19%) and FactSet (8.72%). As the global economy expands together with the revolution of Information Technology, more and more
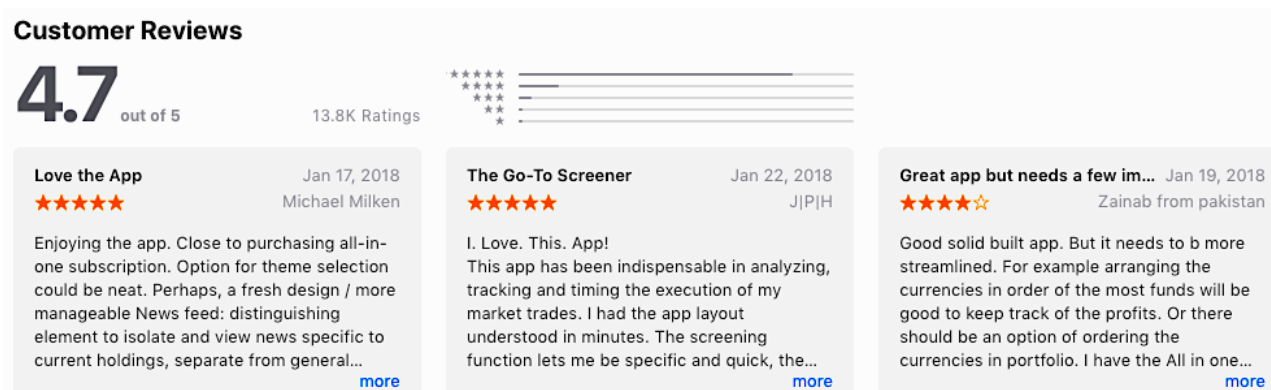
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Figure 9: Screenshots of user reviews to iOS BitSceener App on the US territories: there are more than 45 thousand reviews worldwide.

amount of financial data is produced each day. This phenomenon leads to the fast-growing industry of financial data and content delivery.

Merging the stock market data with new cryptocurrency market data becomes critical to serve diversified traders and investors regardless of their languages and locations. From a data and content delivery perspective, stocks are similar to the cryptocurrencies. For the investors and traders, each trading decision also based on technical charts, news, and analysis. Consequently, those two domains can be essentially built on a single platform. BitScreener, at the first stage, is built to be the first crypto market tracker with blockchain-based incentivization. The second stage will be a global equity market tracker with crowdsourced analysis that is scalable to list a growing number of both cryptos and stocks worldwide.

8   Running Products and Development Roadmap

The concept of crypto market data tracker was formed by the team from several countries including Vietnam, Singapore, the United States, and the Netherlands. In Q1, 2017, we launched the beta version of BitScreener iOS App called Crypto Tracker by BitScreener. With more advanced features that are unique such as filtering and technical charting features, the App quickly attracted more than 1000 Daily Active Users (DAU) during the first month. In Q4, 2017, we added real-time trading crypto pairs to enable live price quotations and charts directly from exchanges. For example, users can track and draw chart for LTC vs EUR from exchange GDAX. During the time of writing (March 2018), the App achieved the milestone of 50,000 DAU. Totally, BitScreener App and Web have served over 1.2 million traders and investors. Importantly, there have been more than 45,000 positive reviews from users worldwide, that are publicly viewable on the Apple App Store (Fig. 9). The US App Store alone has 13,200 reviews with the average rate of 4.7 out of 5.0. BitScreener App constantly stays in the top 500 most downloaded financial apps in many countries including United Kingdom, Australia, Singapore, Canada, and Vietnam.

With the objective of building an ecosystem that is accessible on any device, the team has been developing both App and Web versions. Since it was launched on July 14, the platform has served millions of traders and investors. Fig. 3 shows the screenshots of the iOS App and Web as released during February 2018. The team is expecting to deploy the Android App in Q2, 2018.

BitScreener's team proposes a long-term plan to realize our objectives. The development roadmap and the achievements of BitScreener are summarized in Table 2. Specifically, we will complete the financial data subsystem devoted to cryptocurrency as well as implement the first

Table 2: Achievements and Future Development Roadmap

TIMELINE	MILESTONES
Q1-2017	Team formation & Conceptualization
Q2-2017	iOS App launched, 1000 daily active users (DAU)
Q3-2017	Web version launched, iOS App 5000 DAU
Q4-2017	iOS App 20,000 DAU
Q1-2018	Real-time price & chart; in top 100 financial apps in 30 countries
Q2-2018	Release the Android Version; Synchronize Portfolio on App and Web
Q3-2018	Deploy the BITX payment module
Q4-2018	Develop the BITX reward module
Q1-2019	Integrate stock-tracking into BitScreener Ecosystem
Q2-2019	Launch Singapore and Vietnam stock market tracker
Q3-2019	Deploy distributed & crowdsourcing trading algorithms
Q4-2019	Launch the global stock market trackers: 30-50 countries

version of community-generated content platform with the blockchain-based point component, i.e., BSP, in Q3, 2018. Selected users will be able to contribute the value in exchange for BITX rewards by creating crypto-related articles, editing them or translating them into different languages, etc. In 2019, we will deliver the full-fledged version of data subsystem and content subsystem for both cryptos and equity market. By expanding the services in the equity market worldwide, BitScreener will be a financial gateway and a financial blockchain-based content pioneer to meet the investment needs of various traders and investors.

9 Token Supply and Allocation

The maximum supply of BITX is 450 million, which is fixed in the Ethereum smart contract. This supply has been carefully scheduled for distribution over time as well as allocated to different parties as shown in Fig. 10:

- **Crowdsale:** We will reserve 31% of the tokens for crowdsale. This crowdsale will take place from May 19 to July 4. There are three phases: Thank-You BitScreener, Private Sale and Public Main Sale. Citizens of the United States, Singapore, and OFAC countries are prohibited from the sale.

- **Future Content Contributors (i.e., "miners"):** 20% will be reserved for the miners-It will take 15 years to "mine" those tokens. The schedule of releasing tokens over 15 years was discussed in Section 5.1

- **Advisors and Bounty Programs**: We will assign 4% of the tokens to advisors and bounty activities.

- **Reserved for Future Operations:** We will reserve 30% for the future operations. Those tokens will be locked for two to four years in a multisig wallet.

- **Reserved for Team:** We reserve 15% for the team's members. Those tokens will be locked for one to four year in a multisig wallet.
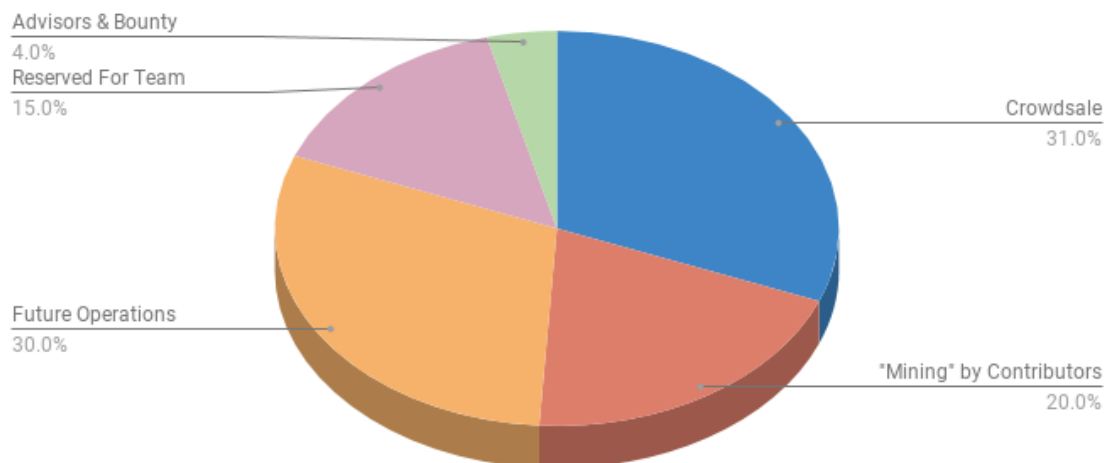
Figure 10: Token Distribution

10 Legal and Compliance

BitScreener Token BITX issuance is administered by BitScreener, Pte Ltd. in Singapore with Registration Number 201810672H. We are following the best practice in relation to the Token Sale including whitelisting and KYC/AML via reputable legal and compliance firms: Collyer-Law[5] and Cynoptis Solutions[6]. There are potential risks of possessing and using BITX, which have been outlined in the Terms of Sale. Buyers are advised to read the documents carefully before making any purchase.

11 Team

The BitScreener's team has been enjoying working together for nearly a year. We are dedicated and united to make significant progresses and deliver the milestones. Despite living across different continents with various backgrounds, the members are committed to the innovations and ultimate goals of BitScreener.

- **David Nguyen:** graduated with a Ph.D. in Computer Engineering from Oregon State University - USA. He has published 12 scientific IEEE/ACM conference proceedings and journals in data mining and computer networking. His publications have been well recognized in the research community with more than 600 citations (based on Google Scholar). He is the Winner of Jack Neubauer Award from IEEE TVT transactions.

- **Hai Pham:** graduated with a BE in Computer Engineering from the Nanyang University of Technology in Singapore with First Class Honour. Hai Pham was the recipient of Singapore Government's ASEAN Scholarship for the talented students. Since graduation, he has founded several successful startups both in Singapore and in Vietnam.

- **Ha Le:** graduated with MBA from Vietnam University of Commerce. He was working in the finance field during the boom time of Vietnam Stock Market in 2005-2009 when

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[5]https://www.collyerlaw.com/
[6]https://www.cynopsis-solutions.com/

the Vietnam stock market index - VNIndex increased from 300 to more than 1,000. He has brought his extraordinary experience in the stock market to the crypto world that is now reflected on BitScreener products.

- **Phong Le:** graduated with Ph.D. from Université de Pau et des Pays de l'Adour in France. His expertise lies in Cryptography, Cyber Security, as well as new Blockchain technology. He also has extensive skills in cryptographic algorithms (e.g. AES, DES, MAC, TLS, SHA, RSA, ECC, ...) and cryptanalysis/side channel analysis. He has worked as a computer scientist with various organizations including National University of Singapore and Institute for Infocomm Research in Singapore.

- **Anh Nguyen:** graduated with MS in Computer Engineering from University of Denver, USA. He is now a data scientist and has published several IEEE/ACM scientific publications on data mining. He enjoys working with data and its visualization, especially, realizing BitScreener products on mobile devices.

- **Quang Hoang:** pursuing Software Engineering at FPT University - Vietnam. He received the award for the best student at FPT University in 2015 (only one award each year). Quang possesses great skills in backend-system programming that guarantees million of real-time queries of crypto price quotations and charts every day to run smoothly.

- **Huy Tran:** pursuing Software Engineering at FPT University - Vietnam. He received an award of ACM International Collegiate Programming Contest for Asia region - the contest for best software programmers around the world, in 2017. He is now working full-time as a Solidity programmer and blockchain developer for BitScreener.

- **Anh Tuan Le:** graduated with BS Computer Software Engineering from FPT University - Vietnam. He received an award of ACM International Collegiate Programming Contest for Asia region in 2016. He is now working full-time for BitScreener. He is responsible for developing and maintaining the iOS BitScreener app to be in the top 5 crypto tracker apps on the Apple App Store.

- **Hanh Nguyen:** pursuing a BS degree at Vietnam National University in Vietnam. She is leading the data and content team at BitScreener

- **Thu Nguyen:** pursuing a BS degree at Vietnam National University in Vietnam. She is working as a data and business analyst at BitScreener

12 Conclusion

Cryptocurrency is a fast-growing financial area. Coupled with equity markets, cryptocurrency creates a new and fascinating space and opportunities for financial data processing and content delivering businesses. BitScreener, as a pioneer in crypto data processing, envisages to consolidate the global financial data delivery and crowdsourced content and fuse the cryptocurrency market tracker and the equity market tracker. It leverages incentivization of blockchain-based tokens to present a new earning paradigm to financial content creators, reviewers, and readers in ways that have not existed within the current platforms. Within BitScreener Ecosystem, individuals earn real online rewards that are fairly associated with their contributions. More than the existing financial data platforms and forums, the content and data in BitScreener Ecosystem are high quality based on examination and evaluation by responsible users. The goal is to economically align a large group of content contributors to work together to build an outstanding ecosystem of financial data and content. To be part of our project, please visit us at https://bitscreener.com.

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