The Storecoin Litepaper

$STORE

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About the Storecoin Litepaper

This is the first-ever formal research document providing a high-level overview of why Storecoin exists, the core problems it is attempting to solve, and how Storecoin solves them. In this Litepaper, we propose an architecture that enables deploying real world, data-rich and compute-heavy applications on decentralized cloud, with developer costs comparable to that of centralized cloud deployments. We also discuss why smart-contract based dApp platforms are cost prohibitive for deploying even simple applications and why we need to think different to address crypto's lukewarm adoption so far in solving real world application use cases.

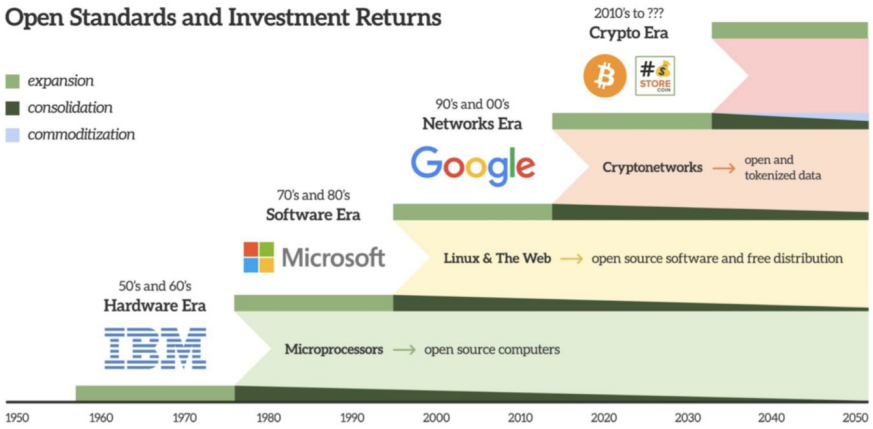
A formal technical whitepaper will be published once the Storecoin settlement mainnet is ready for launch.

Why Storecoin?

> Storecoin aims to revolutionize data computing with a p2p cloud architecture where developer costs are comparable to that of centralized cloud deployments. Storecoin's data computing platform allows data trading while preserving user privacy and data security via context-sensitive encryption and anonymization schemes. Governance of the protocol is democratic ("one entity, one vote") and not plutocratic ("one token, one vote"). $STORE and the layer-2 *datacoins* that it will secure are inevitably mined by peer-to-peer (p2) data centers. Mining *data* is going to be bigger than PoW mining.

Current state of crypto and why smart-contracts, dApps, and *web3* cannot revolutionize data computing -- as they are designed today

"Decentralized" is the next phase of computing but not through data-light, decentralized apps. Truly great apps need lots of data. Therefore, data-rich, decentralized apps will win. This will usher in the era of open computing.



Graphic adapted from: https://ipfs.io/ipfs/QmZL4eT1gxnE168Pmw3KyejW6fUfMNzMgeKMgcWJUfYGRj/Placeholder%20Thesis%20Summary.pdf

If we widen the scope of the "decentralized" argument, we can observe that most dApp platforms today are self referential — solving problems inside crypto, such as derivatives or swaps on tokens, where the underlying tokens don't appear to have much actual use [1]. In addition, the following shortcomings exist in the current generation of dApp platforms.

1. **Closed development environments.** This may come as a surprise, but developers must commit to a platform with their resources to deploy dApps on that platform. This commitment includes deconstructing their app logic into a set of smart-contracts and developing them in languages and tools specific to the platform.
2. **Unpredictable network resource costs.** Developers/dApp users are responsible for renting or reserving network resources such as storage, compute, and bandwidth before dApp transactions are accepted on these platforms. The network resources are traded on respective marketplaces[1] where the price is determined based on the available supply and demand for the resources. This unpredictability makes it harder for developers to determine the cost of running their apps and hence, a predictable revenue model for developer profitability will also be harder.
3. **Inefficient compute and storage architectures.** Current generation of dApp platforms replicated Bitcoin's compute and storage architecture where every node runs a local copy of the blockchain database and every node locally validates transactions and blocks it receives from its peers. This model is akin to running applications in the early days of the personal computing era where the applications are copied onto personal computers using floppy disks and run locally on them. We now know that this model is not scalable, so we need to fast forward a few decades to bring crypto to the state where distributed computing is now.

Data-light vs Data-rich applications

Current generation of dApp platforms are designed for data-light applications. By "data-light", we mean apps that store little to no data on the blockchain and are computationally lightweight. This is evident from how network resources are priced. For example, at the time of this writing, RAM on EOS costs about $0.315/KB, bandwidth costs $0.002/KB/Day, and CPU costs $0.009 USD/ms/Day. If a dApp instance takes 20ms to execute and uses minimum storage and bandwidth, the cost to run that dApp instance would be **$0.315 + $0.002 + (20 x $0.009) = $0.497**, assuming that the data is stored perpetually. Now, what if we want to develop a hypothetical data-rich application and deploy it on EOS? A data-rich application, as the name implies, stores a considerable amount of data on the blockchain and uses considerable CPU and bandwidth resources. Consider the following example.

A data-rich app stores 10MB of data (a PowerPoint presentation, maybe) and takes 2 seconds of execution time per instance. In this case, the cost to run one app instance would be **(10,000 x $0.315) + (10,000 x $0.002) + (2,000 x $0.009) = $3,188!** By web standards, this is a small to a medium sized application and yet, the cost of running such an application on EOS is astronomically expensive.

Other dApp platforms are similar in cost unpredictability, although specific costs vary from one platform to another. We ran a comparison[2] of costs across different protocols using a measure called, "the cost per thousand transactions", or CPT. We measured the costs to senders (developers or end users, depending on the protocol) and miners to send and process 1,000 transactions in respective protocols. Tables 1 and 2 summarize[3] our findings. See [2] for details on this comparison.

[1] EOS — https://www.eosrp.io/, TRON — https://tronstation.io/calculator, ETH2 state rent proposal — https://github.com/ledgerwatch/eth_state/blob/master/State_Rent_2.pdf.
[2] https://research.storecoin.com/cpt.
[3] Storecoin is still under development, so its CPT is estimated based on the simulation and economic model data.

Protocol	Sender (Developer/User) estimated CPT	Total estimated miner revenue per 1,000 transactions	Total estimated miner CPT	Notes
Bitcoin (July 2018 to July 2019)	$1,137	$38,360	$53,823	- Transactions: ~512 bytes. - No other resource renting/purchase necessary. - Predominently settlement transactions.
Cosmos — 100 Validators	$0.827 (EBS) $0.756 (S3)	$1.055	$0.621 (EBS) $0.567 (S3)	
Ripple (July 2018 to July 2019)	$0.651	No Data Available	$0.264	
STORE (settlement) — 92 miners	Zero-Fee	$0.0185	$0.0139	

Table 1 — Sender and miner CPT for settlement transactions

Protocol	Sender (Developer/User) estimated CPT	Total estimated miner revenue per 1,000 transactions	Total estimated miner CPT	Notes
STORE (platform) — 20 miners per cloud market	Users: Zero-Fee Developers: Low end app: $0.00416 (EBS) $0.00357 (S3) High end app: $18.098 (EBS) $4.5316 (S3)	Low end app: $0.00416 (EBS) $0.00357 (S3) High end app: $18.098 (EBS) $4.5316 (S3)	Low-end app: $0.00312 (EBS) $0.00268 (S3) High end app: $13.574 (EBS) $3.3987 (S3)	- Dynamic Transaction sizes. - Renting/purchasing resources like RAM, bandwidth, etc. may be necessary. - Developer/user CPT is a **range** — computed for both a low and a high-end application. - Support smart contracts, dApps, tokenized Apps, etc.
AWS	Users: Zero-Fee Developers: Low end app: $0.000688 (EBS) $0.000344 (S3) High end app: $10.854 (EBS) $2.8047 (S3)	Low end app: $0.000688 (EBS) $0.000344 (S3) High end app: $10.854 (EBS) $2.8047 (S3)	No Data Available	
EOS — 21 block producers	Low end app: $564 High end app: $10,705,440	$5.93	$10.74	
Tron	Low end app: $9,767 High end app: $58,650,713	No Data Available	No Data Available	
Ethereum (July 2018 to July 2019)	$192	$6,129	$5,823	

Table 2 — Sender and miner CPT for dApp, centralized cloud (AWS), and Storecoin platforms

Table 1 compares settlement layer protocols whereas table 2 compares dApp and Storecoin platforms against application deployments on a centralized cloud platform, such as AWS. The purpose of this comparison is to compute **"decentralization premium" — the overhead due to decentralized computing —** for all the protocols, so we can determine if that premium is cost effective to deploy real world, data-rich applications. This analysis was necessary because without it, we would have attempted to design a "better personal computer" rather than "better cloud computer". From table 2, we can conclude that the current generation of dApp platforms are thousands of times more expensive than developing and deploying applications on centralized cloud platforms. Layer-2 and other optimizations on these platforms will make them "better personal computers", but they will still be decades behind the advances made in the distributed computing architectures. With the CPT analysis shown in tables 1 and 2, we can **conclude that architecturally, smart-contract based dApp platforms cannot be the foundations upon which the future web will be built**. We need a different mindset, one that

preserves developer freedom to choose tools and technologies to build decentralized, data-rich applications and affords cost effective deployments.

Data explosion and the need for decentralized data computing

Why is decentralized data computing necessary? What's wrong with the current model of centralized data computing where you trust the corporations that collect data?

Privacy and security

News about data breaches and privacy compromises are everywhere. Even E.U's General Data Protection Regulation (GDPR) is circumvented if a recent complaint[4] from Brave's Chief Policy Officer to Irish Data Protection Commission is to be believed. Cambridge Analytica scandal[5] needs no introduction. Recent data breaches[6] at Capital One, Facebook, Quest Diagnostics, etc. exhibit massive data thefts, which in turn affect privacy and security of a large number of users. This will only get worse because by 2025, it is estimated that the world will emit 175 zettabytes of data[7], 5 times more data than today.

Source: https://www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf

The "***always*** **tracking,** ***always*** **monitoring,** ***always*** **listening, and** ***always*** **watching"** services will **"*always* leak sensitive information and *always* compromise user privacy"**. When centralized data services can circumvent regulations meant to protect user privacy and security, it is obvious that they cannot be *trusted*. So, we need a decentralized data computing platform which addresses the following concerns.

1. **Transparency** – users should know *who* collects data about them, *what* kind of data is collected and the frequency with which the data is collected, *where* their data is stored and *how* it is stored, *who* has access to their data and the frequency with which their data is accessed, shared, or sold.
2. **Privacy protection** – users cannot have it both ways – services must be free, but service providers cannot make money off their data. So, ad-supported economy is here to stay. This means, there is a need for discovering, paying for, and trading data – even sensitive data about users – such that user's privacy is protected and inadvertent data leaks are minimized.

[4] https://marketingland.com/complaint-alleges-that-google-is-circumventing-gdpr-with-rtb-personal-data-sharing-266637
[5] https://en.wikipedia.org/wiki/Facebook%E2%80%93Cambridge_Analytica_data_scandal
[6] https://en.wikipedia.org/wiki/List_of_data_breaches
[7] https://www.seagate.com/files/www-content/our-story/trends/files/idc-seagate-dataage-whitepaper.pdf

3. **Encryption at rest** — data should be encrypted at all times, namely on storage devices, in transit and during computation. Data should never leave data nodes in clear (unencrypted) form. Advanced cryptographic techniques such as homomorphic encryption and secure multiparty computation allow limited forms of computations to be performed in approved and auditable manner on encrypted data. End-to-end encryption defeats data thefts due to unauthorized access to data and data leaks from compute nodes where the data is likely to be in clear form.
4. **Incentive compatibility**[8] — users are rarely compensated for the data they create in the current data economy. An incentive compatible ecosystem where all stakeholders — end users (data producers), developers, infrastructure providers, data buyers, etc. — achieve fair outcomes is desired.

Clearly, centralized data computing platforms have no incentives to address any of the above concerns. Later in this paper, we show economic feasibility of decentralized data computing platform while achieving the above goals.

Bring compute to data

With the ever-increasing data size, traditional architectures where large volumes of data are shuttled between compute and data nodes will be highly inefficient and result in expensive deployments. Smart-contracts, which can be considered as "stored procedures"[9] for blockchains are a suitable alternative, but they suffer from some of the same drawbacks as stored procedures, namely, limited scope for complex logic, runtime validation overheads, versioning, etc. These drawbacks are further amplified by the decentralized execution environment. So, we need a more efficient runtime where complex application logic can be sent to data nodes, which return "safe answers" — any sensitive information is anonymized, any proprietary information is redacted, etc. — after the requested computation is performed. So, Bitcoin inspired architecture where "thousands of personal computers" doing the same job repeatedly will not be able to address massive data processing requirements. We need a "decentralized cloud computer" for efficient data storage and computing.

Uses cases for decentralized data computing

Global data economy is expected to be a **$13 trillion market**[10] **by 2030**. Data-fueled applications of Artificial Intelligence and Machine Learning (AI/ML) are expected to consume data drawn from diverse sources. Most of this data is unstructured and live in their own silos. AI/ML algorithms rely on labeled, structured, discoverable training data, so preparing the data for them is a huge undertaking[11]. Many of today's enterprise and social apps depend on data streams from other apps, with each app employing its own proprietary structuring and labeling scheme to consume external data. A uniform approach to discover and consume data at large scales is necessary to fuel tomorrow's data economy.

Labeling and structuring data also helps with identifying sensitive data such as personally identifiable information or PII. Annotated PII can be automatically encrypted at rest, any computation on it can be forced to be performed on data nodes, and computation results can be anonymized for "safe results". These use cases point towards an ecosystem that promote transparency, privacy, data protection, and incentive compatibility attributes described earlier in this paper. Storecoin's privacy and de-identification spec[12] lays out the foundation for privacy-assured data computing and discusses use cases on sharing data streams across cooperating applications with privacy-preserving schemes.

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[8] https://en.wikipedia.org/wiki/Incentive_compatibility
[9] https://en.wikipedia.org/wiki/Stored_procedure
[10] https://hbr.org/2019/01/which-countries-are-leading-the-data-economy
[11] https://techcrunch.com/2019/08/05/scale-ai-and-its-22-year-old-ceo-lock-down-100-million-to-help- label-silicon-valleys-data/

[12] https://storecoin.com/cloud/privacy-and-deindentification

Overview

The blockchain revolution sits at the intersection of responses to two different but similar phenomena. The first is a shift in the attitude towards money. From Satoshi's "Chancellor on the brink of a second bailout"[13] to the more recent experiments with decentralized finance, there is a clear and urgent desire to see monetary systems removed from the control of super powerful actors, such as the Federal Reserve in the US and the European Central Bank in the EU. The second shift relates to technology platforms. Social media and internet technology companies of web1.0 and web2.0 have become some of the most powerful business institutions the world has ever seen, largely on the back of the immense amount of consumer data that they now control.

In both cases, consumers and citizens are surveying the power centralized institutions have over their lives and asking for alternatives. They want a paradigm with less centralized control and more openness.

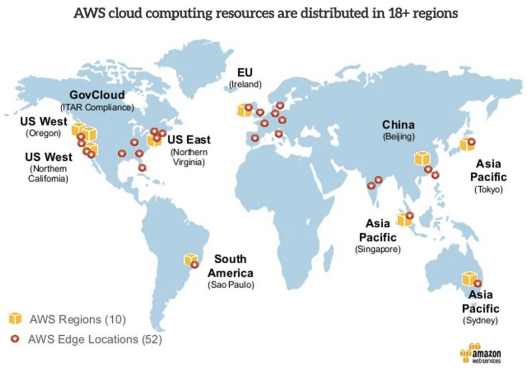
The development of Storecoin is a response to these shifts. The following are some of the salient features of Storecoin.

Open data computing platform

The Storecoin public blockchain is enabling data to be transformed into peer-to-peer (p2p) and tradable money — into data-backed tokens called *datacoins*.

Datacoins are the foundation for a new, open computing platform.

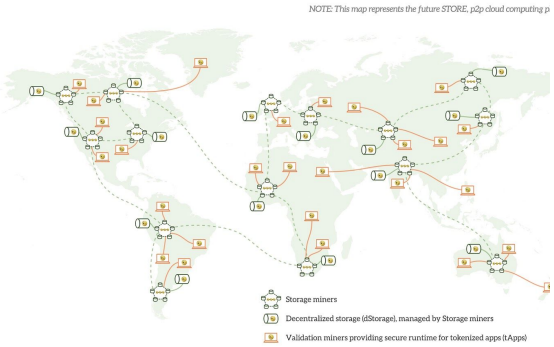
Storecoin is a cryptocurrency protocol that enables both a zero-fee base settlement layer and a p2p cloud computing platform that transforms data into programmable money in the form of datacoins.



The problem

The public cloud — led by Amazon AWS — centralizes data. The internet therefore remains controlled by those who control the data.

[13] https://en.bitcoin.it/wiki/Genesis_block



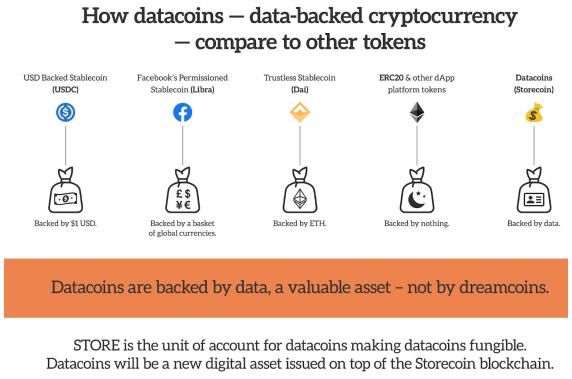
Our solution

A zero-fee payments and p2p cloud computing blockchain for developers to decentralize their app or device's data into the Storecoin tokenized cloud — transforming their data into programmable money (into datacoins).

The miners on Storecoin collectively become a decentralized Amazon Web Services by providing compute, storage, and security for both the zero-fee settlement layer and the datacoins mined on top.

The STORE token secures and incentivizes this datacoin economy.

Why datacoins matter? How do they enable a new, open computing platform?



Datacoins are backed by data, a valuable asset

Once data is tokenized and transformed into datacoins, data becomes open and globally tradable for other apps to purchase and build with. Additionally, massive data monopolies like Google have to pay developers to search their app or device — data is no longer free for them as it is today.

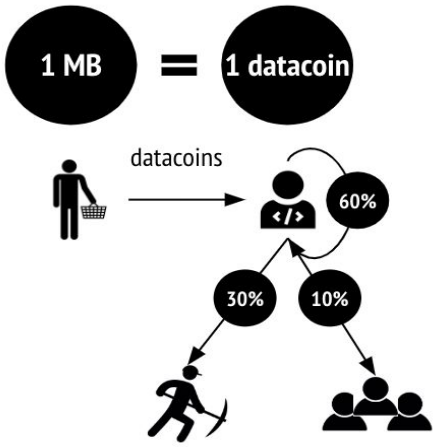
Open and tokenized data becomes a new computing platform, shifting the internet from closed and controlled by the few to being open where any developer can buy, sell, and build with data streams.

Developers can also share datacoin revenue with users, pay them for taking key in-app actions, and more. By default, and enforced through governance, all data is encrypted and anonymized ensuring privacy of PII data for end users.

Datacoins will be a new crypto asset issued on top of the Storecoin public blockchain. Datacoins are bought, sold, and emitted on a 1 MB of data = 1 datacoin schedule.

Storecoin enables application developers to mint tokens via the Storecoin Platform, but rather than utility tokens, payment tokens, work tokens, etc., those tokens are *datacoins*. They are backed by *schema-enforced and validated* data those applications will produce. 1 datacoin is minted for every MB of the application data produced. Storecoin miners — also known as *dWorkers* —who agree to host and secure applications on the Storecoin Platform are paid in datacoins that represent the data. External parties like aggregators and advertisers are then able to pay to access that data, giving the datacoins a natural market as well. Data is anonymized as a matter of course, protecting user privacy. In addition to potentially lowering costs for developers and distributing the hosting responsibilities away from a centralized actor that

can represent a single point of failure, datacoins also enable developers to experiment with new business models — offering their users more transparency or even benefit from their data.



The revenue sharing %s are for illustration only

The datacoin economy

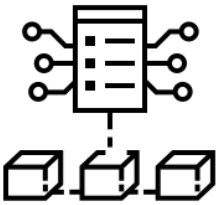
1MB of *schema-enforced and validated* data emits 1 datacoin. Data buyers like external data aggregators and advertisers pay developers in datacoins to access that data. Developers in turn share a pre-negotiated percentage of the datacoin revenue with Storecoin miners who agree to host and secure applications on the platform. Developers may also optionally incentivize their users with a percentage of the datacoin revenue.

Datacoins are denominated in $STORE, which is the *unit of account* for the datacoin economy. This enables buyers who want to purchase data from multiple tokenized apps to pay for the data in a single transaction with $STORE.

Fungibility

Datacoins are fungible similar to ERC20 tokens. One datacoin issued by a tokenized app can be exchanged for another datacoin for the same app. They can be divided into smaller units and then combined later, to produce the same value. The datacoins for different tokenized apps can be exchanged on a decentralized exchange with $STORE as the *unit of account*.

Smart contracts automate the process of datacoin emission, issuance, data trading with datacoins, and the resulting revenue-sharing. Smart contracts also enforce authorization to access the data purchased by data buyers.



Smart contracts for revenue-sharing

Datacoin emission, issuance, data trading with datacoins, and revenue-sharing between the parties — developers, miners, and optionally, the app users — are handled by smart contracts, which automate all of these processes. Smart contracts also enforce authorization to access purchased data.

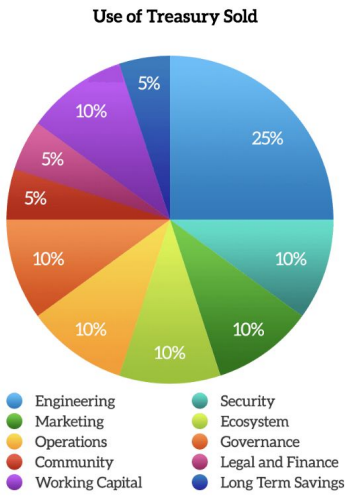
Our zero-fee approach to payments not only opens up new types of economic activities previously unviable because of intermediary fees, but does so on the basis of a sound predictable money supply, not subject to control or inflation by a Federal Reserve-like entity.

Zero-fee transactions (a superior UX)

Transaction fees create poor user experience and unnecessary friction in high volume markets. Contrary to popular belief, they don't help with combating DDoS and spam attacks[2]. Zero-fee transactions are critical for the datacoin economy. Data could be 1/1000th of a penny in value, so any transaction fee based base-layer protocol makes a datacoin economy impossible.

At our base settlement layer, we address one of the most pressing issues facing cryptocurrencies today — bringing together the principles of sound money via credibly low inflation — 2% of the Genesis block token supply — with a truly and permanently zero-fee payments platform. Without perpetual zero-fee payments, huge parts of economic activities enabled exclusively by cryptocurrencies (and currently unavailable in our credit card paradigm) are rendered unviable. Without credibly low inflation and sound money principles, consumer appetite to store wealth in a cryptocurrency diminishes demand.

Storecoin's Treasury is designed from Day One to operate on a long-term, thousand-year+ time horizon[14]. This ensures that Storecoin non-profit has resources it needs to incentivize $STORE adoption, ecosystem growth, miner adoption, sustainable funding to fuel the development of the Storecoin Platform itself, and more.



Long-term treasury schedule

The Executive Director and CTO have 8-year token vesting schedules. The long-term treasury schedule ensures that Storecoin non-profit has resources it needs to incentivize $STORE adoption, ecosystem growth, miner adoption, and more.

The entire ecosystem is managed by a first-of-its-kind governance of checks and balances and separation of powers. Unlike other cryptocurrency governance models that are subjected to plutocracy and captured by large token holders, the Storecoin model balances the needs of miners, developers, users, and the nonprofit stewards of the platform to create a system that is robust and adaptable but impervious to centralization over the long term.

[14] See "$STORE issuance" later in this paper.

"One entity, one vote" based governance model

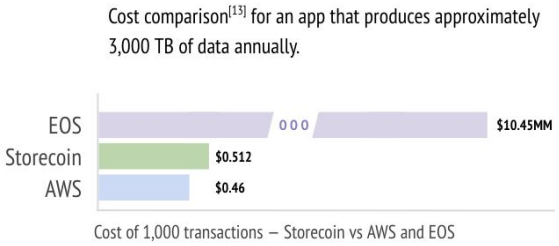
Once ratified by miners, Storecoin's governance of *decentralized federalism* enables the blockchain to reach consensus with finality — without centralization or collusion.

It's built on a democratic value of "one entity, one vote".

A zero-fee, scalable settlement layer comes first

Before the p2p cloud platform launches, Storecoin will launch its scalable, zero-fee settlement layer — the foundation of the public blockchain. As security is proven and governance is ratified by founding miners, the infrastructure for datacoins will be released.

Any cloud platform that courts application developers competes with centralized cloud platforms like AWS, directly or indirectly. So, platforms must be competitive in price and performance to centralized cloud platforms. The decentralization premium arising from the trust-minimized nature of public blockchains cannot cost multiples of times that of traditional cloud platforms without putting mainstream adoption at risk. For example, Ethereum processes approximately 15 transactions per second and EOS charges about $212,000 to rent 1GB of storage, making them unsuitable for deploying any real-world applications.



Tunable decentralization with Cloud Markets

A one-size-fits-all decentralization will not be cost effective. Tokenized apps are hosted on subnetworks of the Storecoin Network called "Storecoin Cloud Markets", which optimize the cost of hosting them, while at the same time, providing any specialized infrastructure support for them. Cloud Markets make the cost of hosting real-world, data rich apps comparable to centralized cloud services.

The rest of this paper dive deep into the following building blocks that make up Storecoin.

1. Zero-fee payments and the settlement layer
2. P2P cloud computing platform
3. Storecoin economic model that enables zero-fee transactions, and
4. Storecoin governance model with checks and balances.

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DISCLAIMER

Nothing herein is intended to be an offer to sell or a solicitation of an offer to buy, Storecoin tokens or rights to receive Storecoin tokens in the future. In the event that Storecoin conducts an offering of Storecoin tokens (or rights to receive Storecoin tokens in the future), Storecoin will do so in compliance with all applicable laws which may include the Securities Act of 1933 and the rules and regulations promulgated thereunder, as well as applicable state and foreign law. Any offering for sale to US Persons in a regulated transaction will be pursuant to a registration statement qualified by the Securities and Exchange Commission, or an applicable exemption from registration requirements.

Project fundamentals

Fig. 1 describes Storecoin fundamentals, including current market cap, circulating supply, details on STORE token, and its inflation and emission schedule.

Current Market Cap	$35.58 MM
Current Circulating Supply	255,950,402
% Pre-Registered to Stake	43.3%
Y2029 Max Circulating Supply	836,282,042
% Total Supply Sold-to-date	14.36%
% Remaining To-be-sold	10%
Earliest Keys To Be Released	Q4 2019

Token Details

Token Type	Native
Name of Token	STORE
Ticker	STORE
Token Usage	STORE begins as a zero-fee payment, staking (work), and governance (once staked) token. Once its p2p cloud platform launches, STORE will also become the utility token for purchasing p2p compute resources from miners and for purchasing data rights from the tokenized data marketplace.

Supply Snapshot

Type	Staking Rewards
Genesis Supply	1 Billion STORE
Ongoing Emission Type	Inflationary
Max Inflation Per Year	20 Million STORE
Inflation Schedule	Will fluctuate to incentivize a maximum of 51% of STORE to be staked
Emission Schedule	Will decrease yearly but the project has committed to a predictable 1,000-year max emission schedule for its Foundation-controlled Treasury

Fig. 1 — STORE token details and the supply snapshot

Fig. 2 illustrates Storecoin's maximum emission and inflation schedule. Visit http://storecoin.com/treasury to learn more about Storecoin's inflation and emission schedules.

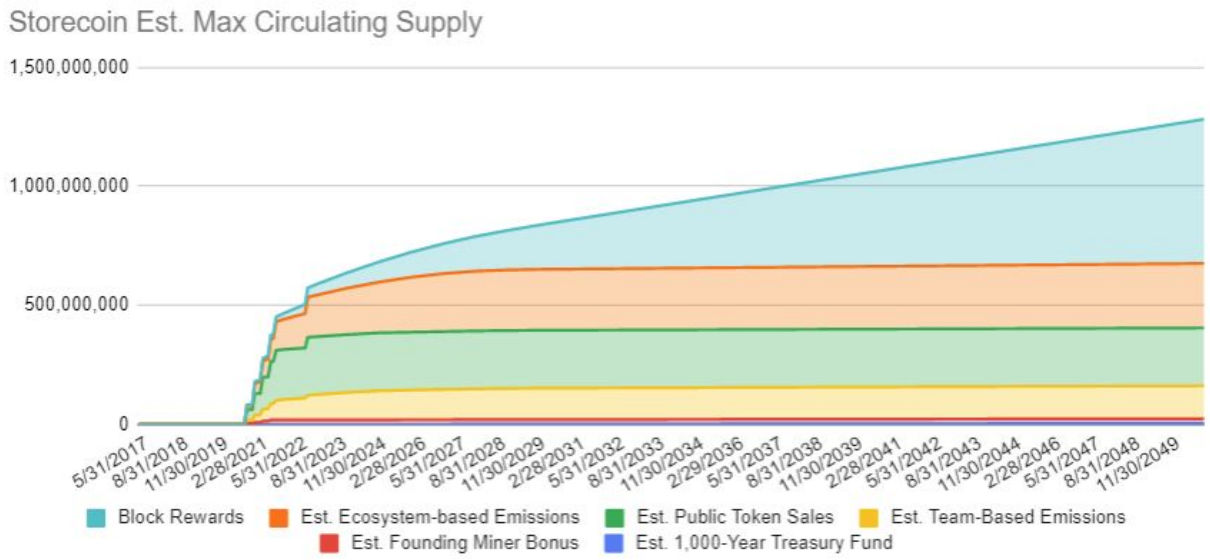


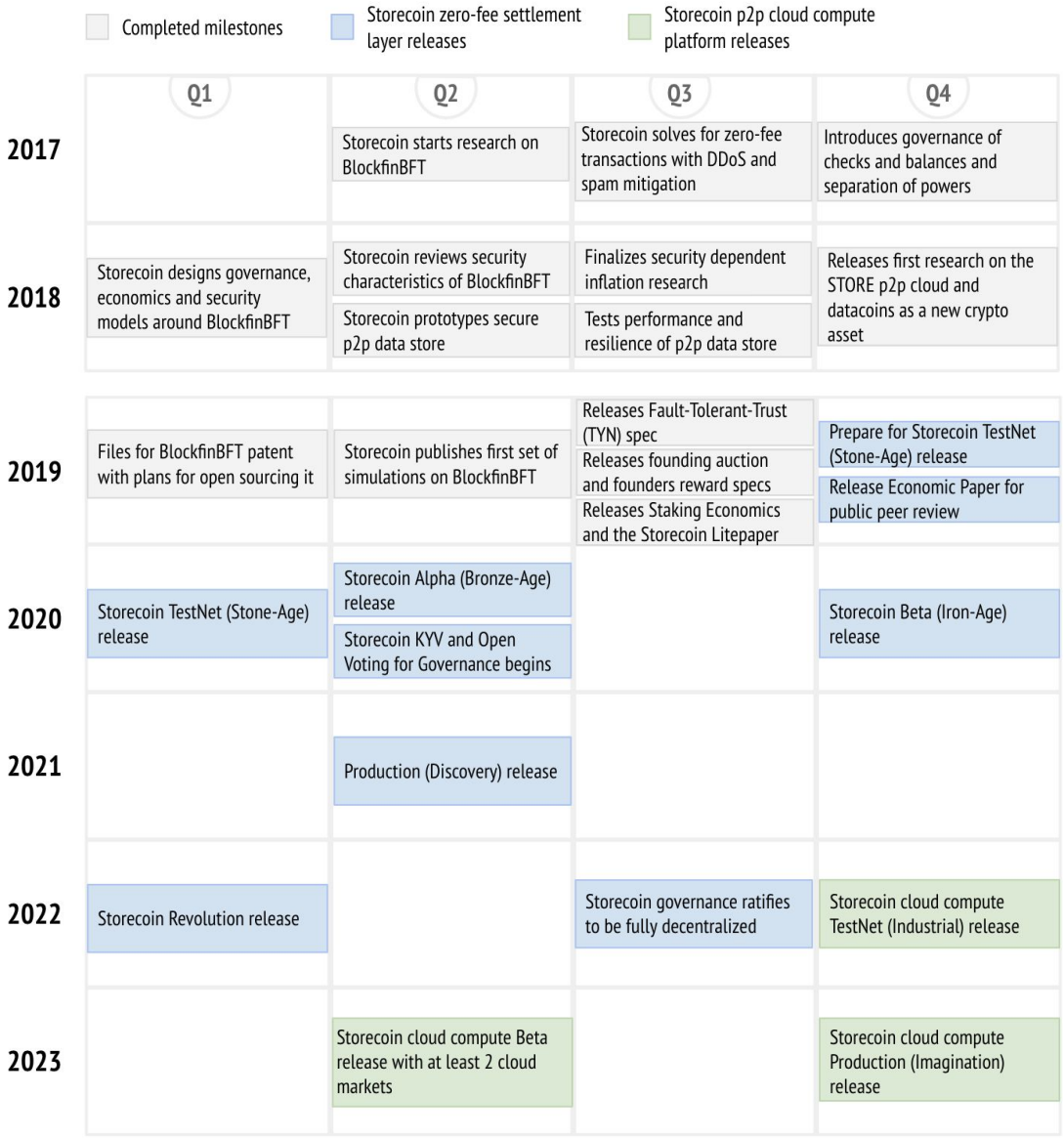
Fig. 2 — Storecoin maximum emission and inflation schedule through year 2050.

To be *part of circulation*, the token must be considered 'vested', ' released' , or 'sold' and "unlocked". There is a 2-year unlocking period starting at launch and applying to tokens sold and vested through team and advisory contracts.

Storecoin roadmap

Initially, we are laser-focused on securing a zero-fee settlement layer. As security with scalability is proven, Storecoin will open up miner participation to anyone in the world. From there, the secure settlement layer can evolve into a p2p cloud platform for the decentralization of data and the creation of new, zero-fee tokenized apps, powered by datacoins. Throughout this evolution, Storecoin's governance moves from informal (but present), to semi-formal with voting, to fully ratified and formal.

The ultimate goal and the completed vision of Storecoin is a truly decentralized, p2p cloud platform that can compete with today's centralized cloud infrastructures. The following roadmap highlights some of the major milestones leading to the release of the Storecoin's p2p cloud computing platform.



1. How Storecoin's scalable and decentralized settlement layer enables zero-fee payments

A high performance layer-1 that makes as few assumptions as possible, is necessary for practical deployments of blockchain based applications. Generally security becomes weaker as you move up the stack such as in layer-2 solutions. We are already seeing this happen in practice. ETH has dozens of layer-2 projects and BTC with Lightning without tangible use cases for either yet. Similarly, the security of the network should be built into layer-1 and it cannot be added in layers 2 and above. Storecoin's base settlement layer implements a leaderless, Byzantine Fault Tolerant consensus algorithm called, BlockfinBFT [5], which ensures network-wide scalability and security independent of the apps running on Storecoin. Fig. 3 describes BlockfinBFT at a high level.

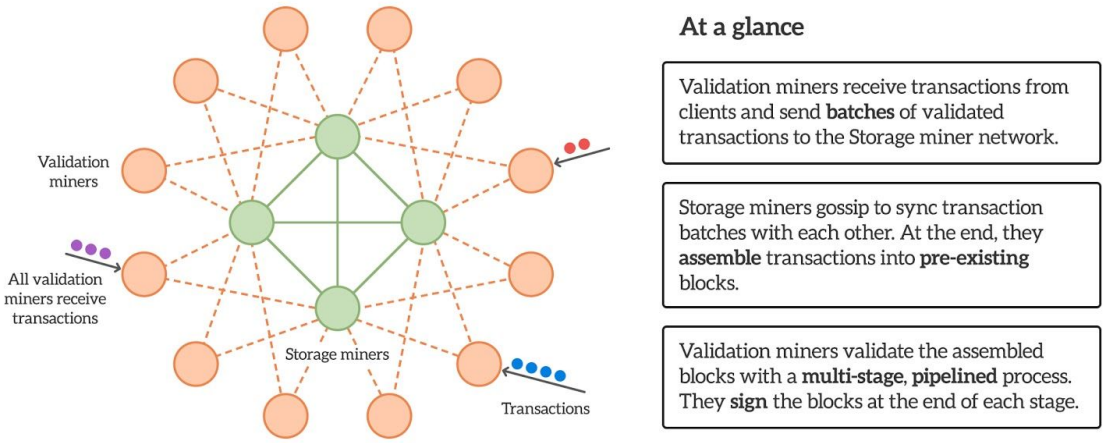


Fig. 3 — Storecoin's BlockfinBFT consensus algorithm at a glance

BlockfinBFT achieves its scaling by separating computing from storage and consensus. A network of compute nodes performs computations such as validating transactions and blocks, running tokenized app instances, and verifying proofs of computation and storage. A second network of storage and consensus nodes provides secure, authenticated storage and runs the consensus algorithm to build the blocks. The two networks are cryptographically linked so as to catch and punish each other's malicious activities. This two-tier network architecture enables *tunable decentralization* — tokenized apps running on the Storecoin Platform can pick the degree of decentralization necessary to satisfy their specific use cases. Computing is handled by a network of Validation miners and Storage and consensus, by a network of Storage miners in the above illustration. This division of labor, illustrated in fig. 4 below, also allows us to use different strategies to scale and optimize each network tier. For example, Validation miners can facilitate moving the "application logic" closer to the data, thus eliminating costly data transfers and the resulting data leaks. This will open up *mobile mining*, where data is processed closer to its source (similar to *edge-computing*)[15], thus vastly improving the overall network efficiency.

[15] https://en.wikipedia.org/wiki/Edge_computing

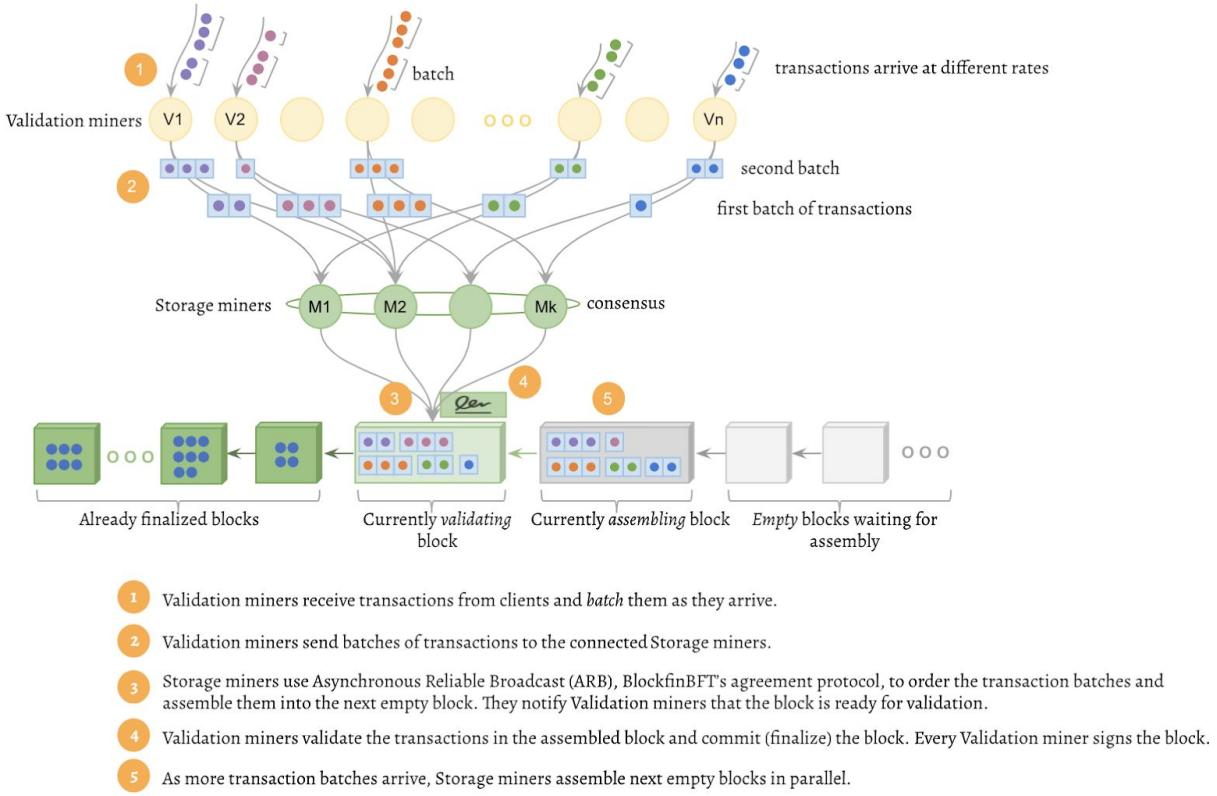


Fig. 4 — Pipelined block assembly and validation steps in the BlockfinBFT consensus algorithm

Storecoin miners are paid with the $STORE issuance from a low annual inflation of the Genesis block token supply in the form of block rewards for securing the settlement transactions. This removes the need for a transaction fee as a form of compensation to miners.

2. Storecoin's decentralized p2p cloud computing platform

Public cloud computing is growing quickly in value. Cloud computing is estimated to be a $411 Billion industry by 2020, growing at 23.3% CAGR [8]. Chamath Palihapitiya, CEO of Social Capital, says [9] :

> AWS is a tax on the internet
>
> Whether you care about mobile apps, consumer apps, IoT, SaaS etc, more companies than not will be using AWS versus building their own infrastructure. For example, 100% of Social Capital companies use AWS and it represents 16% of their total expenses. If you believe that over time the software industry is a multi, deca-trillion dollar industry, then ask yourself how valuable a company would be who taxes the majority of that industry.

Any cloud platform that courts application developers competes with centralized cloud platforms like AWS, directly or indirectly. This includes decentralized platforms using the blockchain technology. So, platforms must be competitive in price and performance to centralized cloud platforms. The *decentralization premium* arising from the trust-minimized nature of public blockchains cannot cost multiples of times that of traditional cloud platforms without risking mainstream adoption. So, decentralized platforms must be nearly as efficient and cost effective as centralized platforms and yet achieve the desired degree of decentralization, so that the trust can be derived without relying on a central authority.

What problems the Storecoin cloud computing platform addresses?

If *data is the new oil*, it can be structured, tokenized, and traded, thus transforming data computing – By 2025, it is estimated that the world will emit 175 zettabytes of data, 5x more data[10] than today. Most of this data is unstructured and lives in its own silos. Tokenizing this data creates incentives for data to be structured, discovered, and traded, thus transforming data computing.

Privacy and data trading don't have to be mutually exclusive – Data breaches are everywhere [11]. More data is collected about users than ever, which makes these data breaches more than just an invasion of privacy. Strong privacy policies and regulations such as the EU's GDPR (General Data Protection Regulation) are not sufficient to guard data privacy and protection. So, there is a need for protecting user data, while at the same time making it tradable without sacrificing user privacy.

Incentivizing developers to decentralize their app data –When developers build their apps on the Storecoin Platform, the app data is structured and tokenized. This facilitates data discovery and trading. Tokenized and discoverable data increases revenue potential because the Storecoin platform makes it easy for data buyers to crawl, query, or search different categories of structured and tokenized data.

Storecoin cloud computing platform — at a glance

Fig. 5 illustrates how Storecoin cloud computing platform works. The platform is built on top of the Storecoin settlement layer, which provides network-wide security for the apps hosted on the platform.

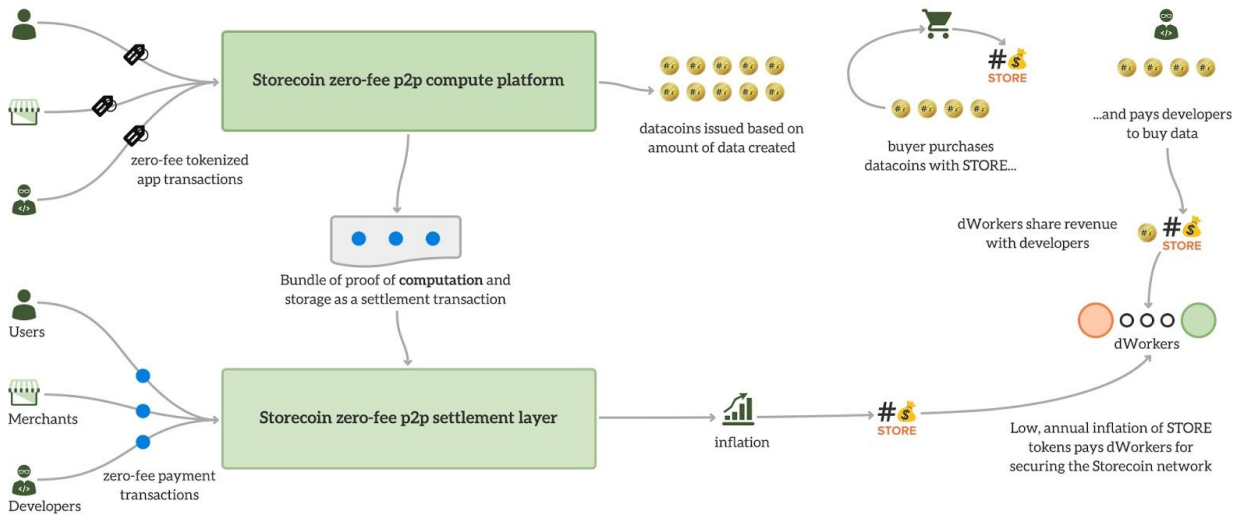


Fig. 5 — How Storecoin platform works

1. The payment transactions originating from the users, merchants, and developers are processed by the Storecoin settlement layer. $STORE issuance from a low annual inflation of the Genesis block token supply pays miners in the form of block rewards for processing the payment transactions.
2. The tokenized app transactions originating from the users, merchants, and developers are processed by the Storecoin platform layer. These transactions produce data.
3. When an app creates data datacoins are mined by the platform, commensurate with the amount of data the app creates.
4. For every MB of app data created, 1 datacoin is minted.
5. Data buyers discover the app data on the platform using the data discovery services offered by it.
6. Data is priced in datacoins, so buyers need to acquire datacoins to purchase data. This access enforcement is done automatically in the platform.
7. Buyers (which likely include today's most data hungry companies such as Google, Amazon, etc.) purchase datacoins on decentralized exchanges by paying for them in $STORE and pay developers in datacoins to purchase data.
8. Developers share an agreed upon percentage of this revenue in both datacoins and $STORE tokens with miners.

Miners earn their revenue in $STORE as block rewards in the settlement layer and in $STORE and datacoins as part of their revenue-sharing agreements with app developers in the platform layer.

Tokenized app transactions produce proofs of computation and storage in the platform layer. These proofs are bundled as a special settlement transaction and sent to the settlement layer for validation by the entire network. This is how apps are secured by the Storecoin network.

Storecoin network and Storecoin cloud markets

Tokenized apps are hosted on subnetworks of the Storecoin Network called "Storecoin Cloud Markets", which optimize the cost of hosting them, while at the same time, providing any specialized infrastructure support for them. A cloud market consists of a subset of miners from the Storecoin network, who cooperate to host one or more tokenized apps. Cloud markets enable *tunable decentralization*. Apps can determine the degree of decentralization they need for their specific use cases and choose the cloud market that meets their decentralization needs. All miners must be part of one or the other cloud market as illustrated in fig. 6 below.

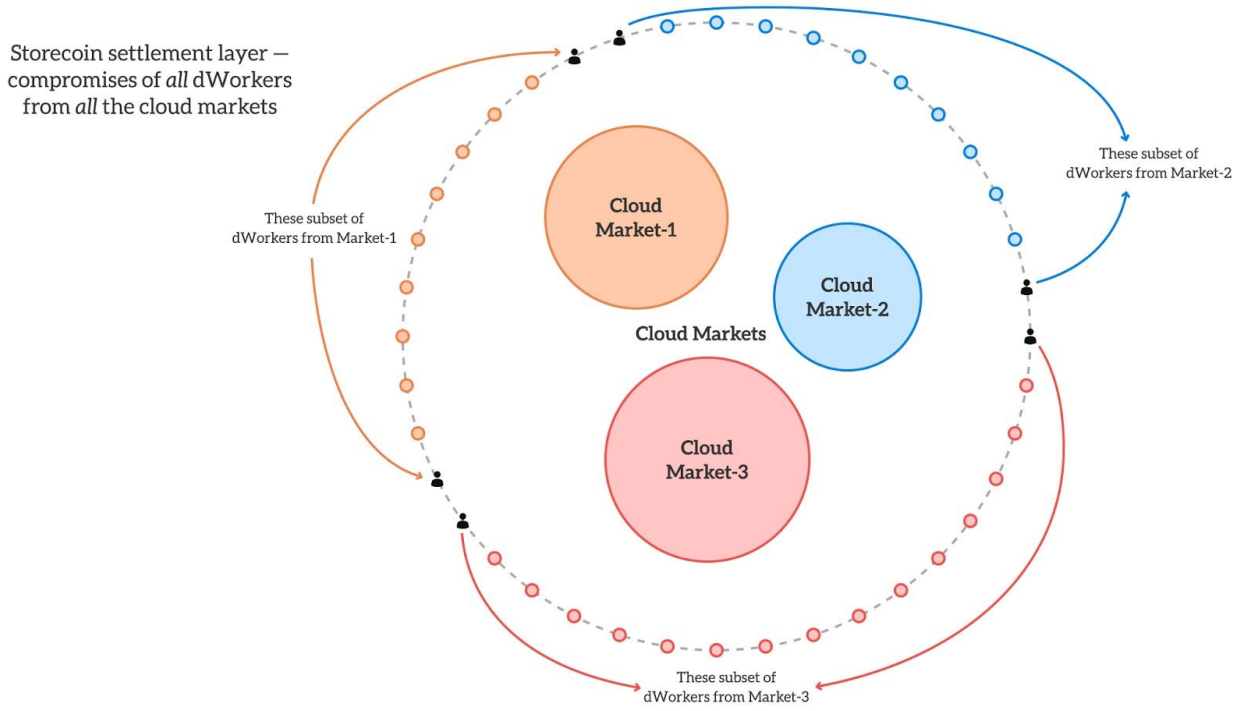


Fig. 6 — Storecoin Platform — the relationship between the Storecoin network and Storecoin cloud markets

Consolidated cost comparison against AWS and EOS

We developed a cost comparison model [13] to compare the cost per 1,000 transactions. Fig. 7 compares the cost of hosting apps on Storecoin vs similar setup on a centralized cloud (AWS) and a decentralized cloud (EOS). In Storecoin setup, a cloud market consisting of 10 Validation miners and 10 Storage miners is assumed. The same network size — the number of applications running on the platform, the amount of annual data stored, the runtime memory requirements, etc. — is assumed for all 3 platforms. The Cloud Market design makes Storecoin's solution comparable in cost to centralized cloud service providers.

				Cost for Developers (Yearly)							
# of Apps	Yearly TB	GB Needed	Resources Used per App per Year	AWS	Cost per 1,000 Txns - AWS	STORE - w/10V and 10MN	Cost per 1,000 Txns - STORE	Multiple of AWS	EOS	Cost per 1,000 Txns - EOS	Multiple of AWS
500	2,920	5.0000	2920.23TB of data storage and 5GB RAM	$144,099	$0.46	$161,325	$0.512	12%	$3,296,940,347,400	$10,454,529	2287972959%
200	7,301	12.5000	7300.56TB of data storage and 12.5GB RAM	$351,202	$0.45	$403,312	$0.512	15%	$8,242,350,868,500	$10,454,529	2346898379%
100	14,601	25.0000	14601.13TB of data storage and 25GB RAM	$696,374	$0.44	$806,625	$0.512	16%	$16,484,701,737,000	$10,454,529	2367220510%
50	29,202	50.0000	29202.26TB of data storage and 50GB RAM	$1,386,717	$0.44	$1,613,249	$0.512	16%	$32,969,403,474,000	$10,454,529	2377514129%

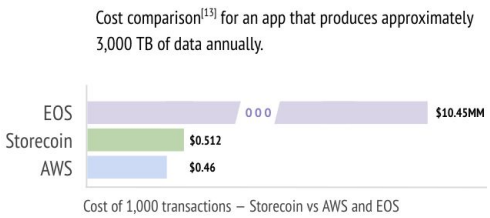


Fig. 7 — Storecoin cloud markets consolidated cost comparison against AWS and EOS

The cloud markets and the Storecoin network work together to secure the transactions originating from the cloud markets. This shared security model is discussed next.

Shared security with decentralized federalism

At Storecoin, we've increasingly come to believe that shared security is a governance issue. Specifically, when a Storecoin cloud market is attacked with DDoS or spam, all miners in the Storecoin blockchain are incentivized to collectively defend against the attack. Governance sets incentives. Fig. 8 illustrates Storecoin's shared security model and compares and contrasts it with a couple of popular blockchain interoperability projects.

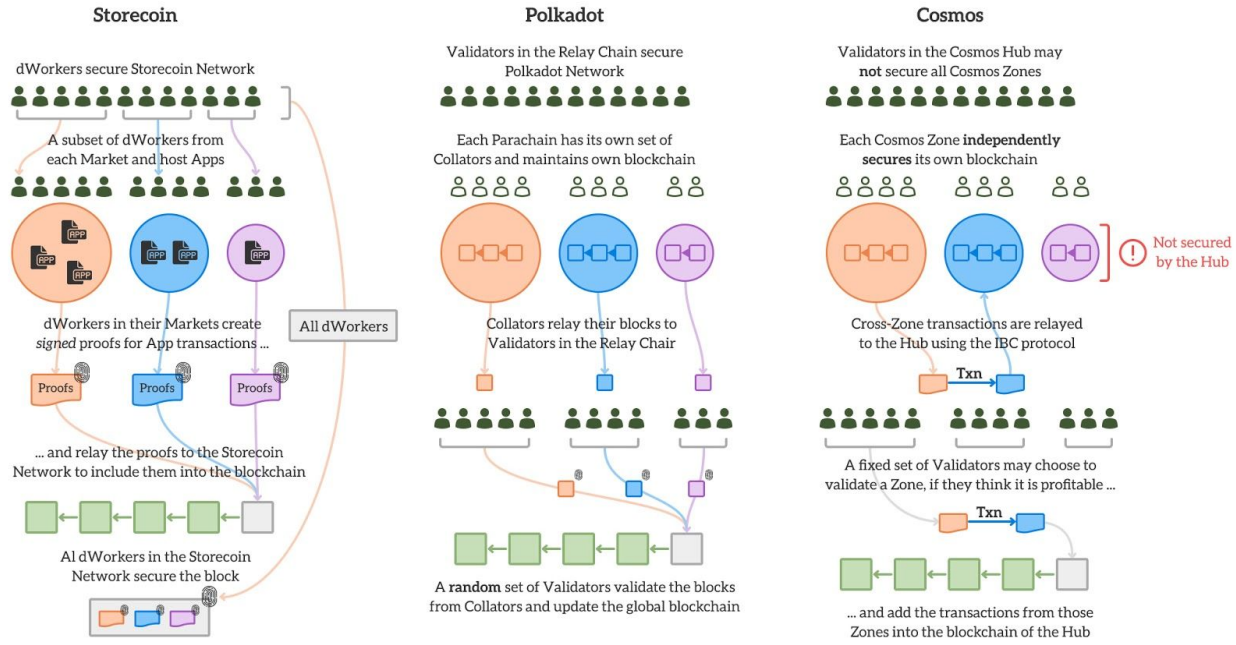


Fig. 8 — Storecoin's shared security model compared to Polkadot and Cosmos networks

Storecoin's shared security model differs from that of Polkadot and Cosmos Networks' in the following ways.

1. Storecoin maintains a single, global blockchain that manages the states of both settlement transactions and apps in different cloud markets. This ensures that all changes to the blockchain are atomic — a series of *indivisible* and *irreducible* operations such that either *all* occur, or *nothing* occurs. Polkadot and Cosmos Networks have two different sets of blockchains, so updating both the chains atomically requires complex coordination between the chains.
2. Storecoin cloud markets are operated by a subset of miners in the Storecoin Network, so their incentives are aligned. In Polkadot and Cosmos Networks, the parachains/zones are operated by different entities than the Validators in the relay chain/hub. So, unless their economic incentives are somehow aligned, the shared security model may not work as designed.
3. All miners in the Storecoin Network validate the app transactions from the cloud markets. This means, every transaction originating from every cloud market is validated by the entire network. A subset of the Validators in the relay chain/hub validate the transactions from the parachains/zones in Polkadot and Cosmos Networks. This is suboptimal.

The shared security model in the context of external or internal attacks are also slightly different between the three networks. Fig. 9 illustrates these differences.

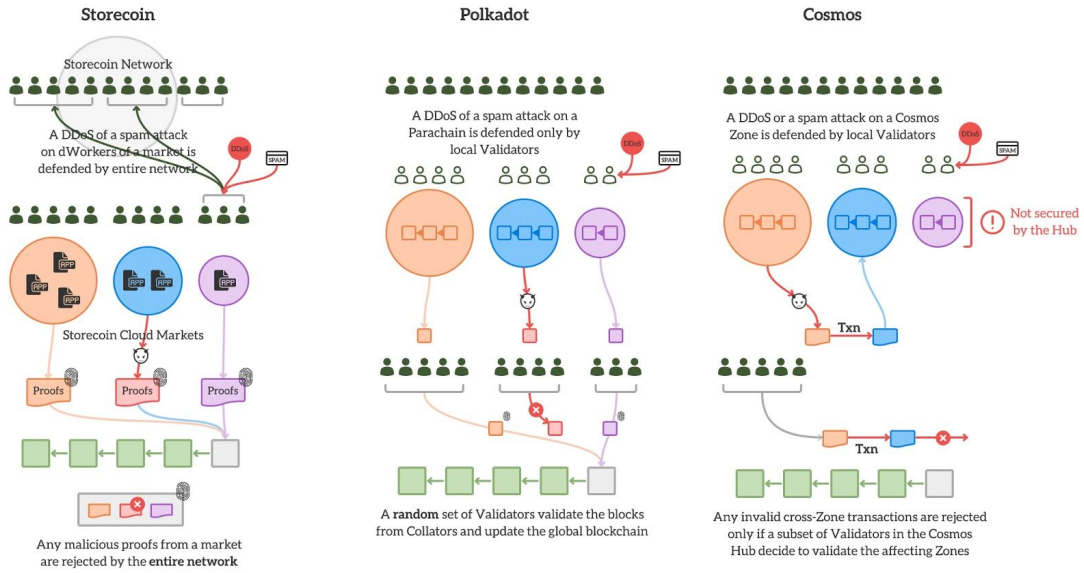


Fig. 9 — Shared security model comparison to defend against external and internal attacks

Specifically, when a Storecoin cloud market is attacked with DDoS or spam traffic, all miners in the Storecoin network may defend the miners of the cloud market, if the attacks persist longer than the what cloud market can defend by itself. With Cosmos and Polkadot networks, zones and parachains are on their own with such attacks.

Shared security with shared incentives

Network-wide security cannot be achieved with technology alone. Economic security plays an equally important role. Storecoin incentivizes miners in the cloud markets and across the entire network as follows.

1. Miners in the cloud markets are compensated in $STORE and datacoins for hosting tokenized apps. Since datacoins are backed by the app data and they are part of the miner compensation, it is in their best interest to secure the data created by the tokenized apps.
2. Miners in the Storecoin Network are incentivized to validate transactions from the cloud markets because they earn block rewards in $STORE for doing so.

So, Storecoin markets and the Storecoin network not only work together to secure transactions, but also share economic incentives, resulting in superior shared security.

Datacoins issued on Storecoin are backed by data

One of the most important differentiators for Storecoin is our approach to thinking about how tokens can become valuable. The crypto ecosystem is home to a number of different token models. Stablecoins, for example, are pegged to a certain value (most commonly $1USD) and are backed in different ways, such as full reserves of USD, a basket of assets, collateralized by other cryptocurrencies, etc. Application tokens on blockchains like Ethereum's ERC20 and similar equivalents on EOS, Tron, and Tezos however, aren't backed by anything. Their value is, at this stage, almost entirely speculative belief on the future potential of the application.

Storecoin believes that the experiment of using tokens to incentivize new types of actions and interactions within applications is just beginning, but the inherent lack of *intrinsic value* is a major deterrent to the experiment's success.

At the same time, we recognize that the primary value created by any digital application is its data. For that reason, we are empowering developers to create datacoins that are backed by the data their applications generate and make that data discoverable and tradable in the Storecoin data marketplace and usable in other applications. Because these datacoins are backed directly by the data of the application, they have an *intrinsic value* which can grow as the value of the data itself increases. Fig. 10 compares Storecoin's datacoins with coins and application tokens from other blockchain projects.

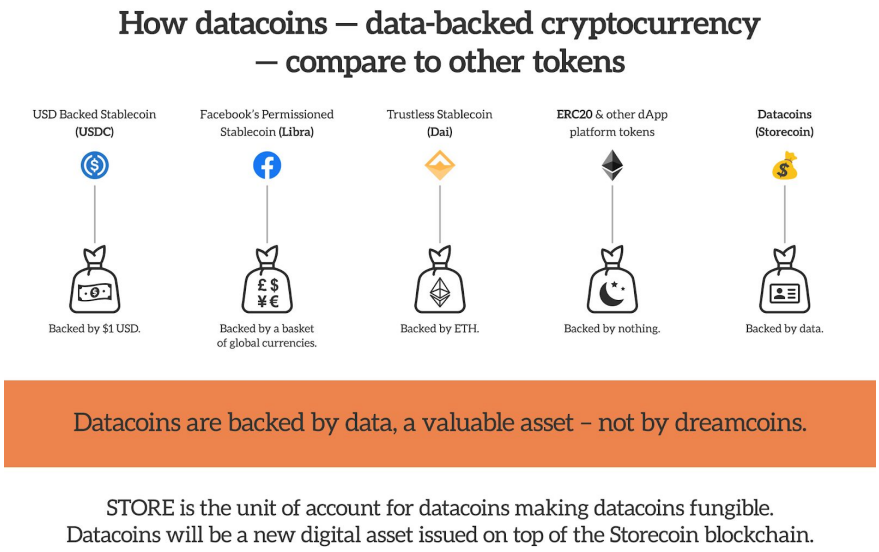


Fig. 10 —Datacoins compared to other types of tokens

Datacoin issuance — 1MB of data = 1 datacoin

Datacoins are the backbone of the Storecoin p2p cloud computing platform. If data is the new oil [12], it is an asset and hence it can be traded in the marketplace. In return for opening up the data on the Storecoin Platform, app developers gain the right to mint datacoins, which are representations of the application data that they have decentralized. But, how do datacoins get issued on the Storecoin Platform?

1MB of data = 1 datacoin

1 datacoin is emitted for every MB of schema-validated data produced in a tokenized app. This ties datacoin issuance to the amount of data produced in the app. While 1 datacoin is issued for every MB of application data created, the price of 1MB of data may not be 1 datacoin. Data pricing depends on various factors such as:

- classification of data — the application may create different classes of data, each of which may be valued differently
- market demand — the demand for certain data may be higher than the others
- data access methods — real time data, which is typically subscribed may be priced differently from static data.

Buyers can search for any type of data on the Storecoin Platform. If the search criteria is matched, the platform returns the metadata relating to the search results, such as the app that created the data, data class, price in datacoins for the data class, sample data, and so on. The buyer can pay for the data either in datacoins or in native $STORE tokens. If the search matches data in multiple apps, it is more likely that the buyer will pay to access them in the native $STORE tokens.

How datacoins work?

Once the data of an app is tokenized on Storecoin, developers around the world can buy access to the open data streams and APIs of the tokenized app. Smart contracts will enable app developers, Storecoin miners, and app users to all get paid for any purchased data.

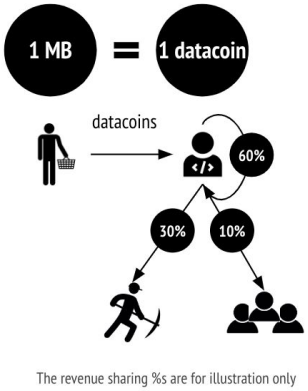


Fig. 11 —Datacoins revenue-sharing between app developers, Storecoin miners, and app users.

Buyers can purchase data streams on an individual API-basis or buy out all data streams produced by the app. Buyers can even pay up front for future data rights giving the developer a valuable revenue stream without selling equity. App developers can sell to multiple buyers or sell on an exclusive basis. Developers are fully in control of their pricing.

Through datacoins, Storecoin is incentivizing every industry and government in the world to make their data open and usable for other developers and governments to build with. With structured data as a common and universal language, the world can communicate and work together more effortlessly. This can transform global commerce and innovation.

Revenue with paid apps

Not all apps may be eligible for zero-fee cloud compute resources for the same reason as not all startups are funded by venture capitalists. However, app developers may still be interested in deploying their apps on the Storecoin Platform for the following reasons:

- Their app data is easily discoverable by potential buyers, thus providing better exposure for their app data.
- If the app data is valuable, miners may approve the app to receive zero-fee cloud compute resources in the future.

In this case, app developers pay miners in the native $STORE token for the cloud compute resources similar to how they pay traditional cloud computing services, such as AWS. The app may issue its own datacoins just like zero-fee apps and it may demand that buyers pay in the native datacoins, but in this case, the developers will not share their revenue with miners.

Privacy and de-identification protocol

In the previous section, we discussed how data created by users of the tokenized apps can be sold to interested buyers. This opens up privacy and data security concerns. So, how can we protect user privacy and ensure that their data is safe and yet be able to share or trade data with third parties without sacrificing user privacy or data security? Storecoin addresses this problem with a privacy and de-identification protocol called *PriDe*, which is built into the Storecoin Platform.

Privacy and de-identification protocol – *PriDe*

The PriDe protocol addresses data privacy using the following constructs.

Data categorization – The data created by the tokenized apps are categorized into various classes of sensitive information. The sensitive information can be personally identifiable information (PII) or any proprietary business information. PriDe module comes with a predefined set of PII categories. App developers can customize or create their own PII or other sensitive information categories. These categories help with identifying and classifying sensitive information and how data must be treated to ensure data privacy.
Encryption – A piece of data with an assigned category is automatically encrypted in the storage medium. This combats hacking or access from insiders with superuser privileges.
De-identification – When the data with an assigned category is accessed, it is automatically de-identified. De-identification is a process, which removes any sensitive information in the application data. Storecoin uses various anonymization and pseudonymization schemes [3] to de-identify sensitive information on-the-fly.

Fig. 12 illustrates how data categorization, encryption, and de-identification works for PII or any sensitive information. If the data is categorized as sensitive, it is automatically encrypted when stored and de-identified when queried and retrieved, so the retrieved data cannot be linked back to the person who created or owned the data.

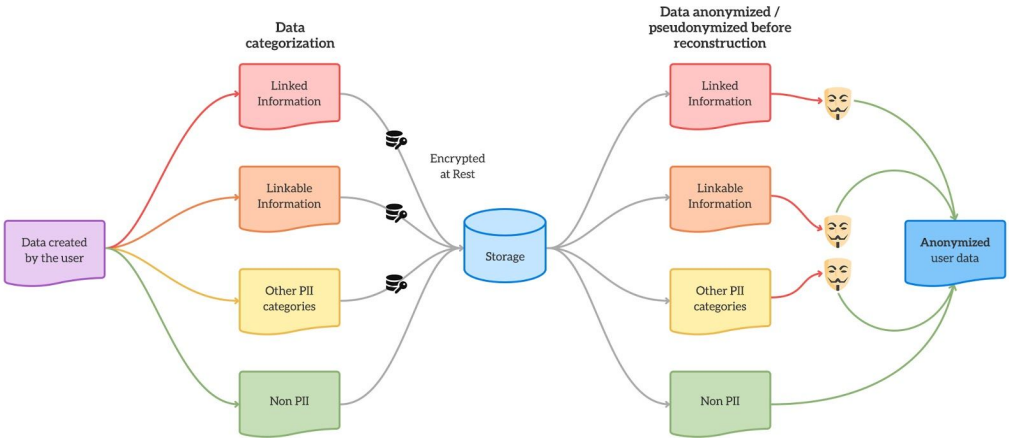


Fig. 12 – Data categorization for sensitive information, encryption, and de-identification in the Storecoin Platform

Compliance with government regulations such as the EU's GDPR

Compliance with government regulations is an integral part of the Storecoin Platform. However, compliance is a *shared responsibility* between the Storecoin Platform miners and app developers. This is inline with the standard practice with most cloud providers. For example, Amazon uses a shared security model [14] where AWS is responsible for securing the underlying infrastructure that supports the cloud and the services provided, while customers and partners, acting either as data controllers or data processors, are responsible for any personal data they put in the cloud. In a similar model, Storecoin miners assume the role of a *data processor* where they are responsible for protecting the global infrastructure that runs all of the platform services. The app developers and partners assume the role of *data controllers.* They maintain the control over data hosted on the Storecoin infrastructure, including the security configuration controls for handling end-user content and personal data. Specifically, they use Storecoin's default encryption and anonymization service for protecting sensitive information of their users. Fig. 13 illustrates one of the shared responsibilities between the platform and the app layers. In this example, the apps identify and categorize sensitive information in the user data, since that logic is app specific. The encryption and anonymization service in the platform ensures that the user data is encrypted upon storage and anonymized context-sensitively when requested and accessed.

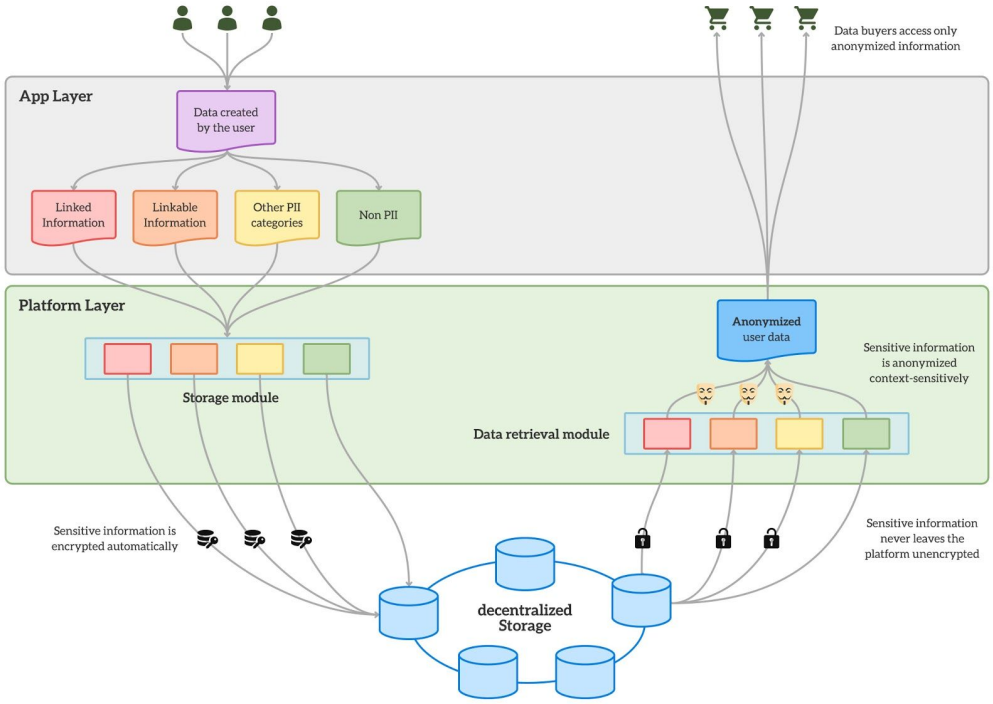
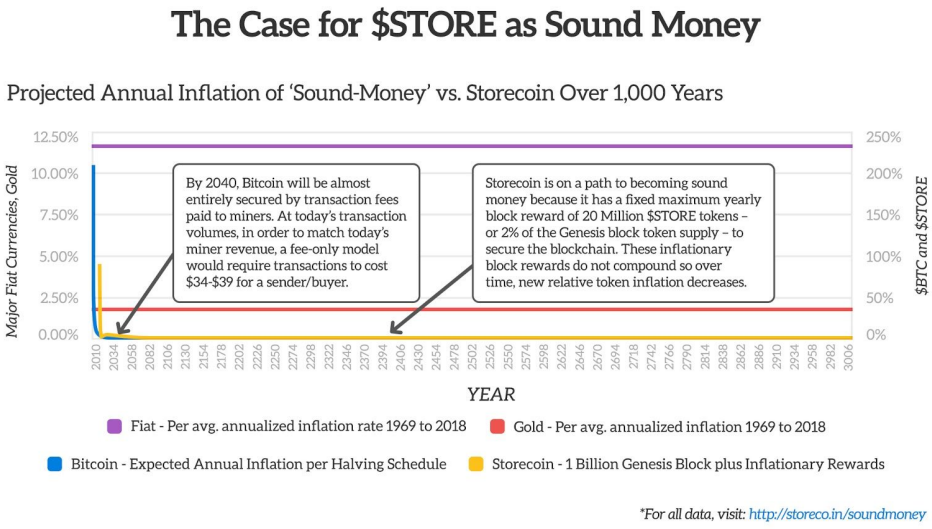


Fig. 13 — Shared responsibility between the Storecoin Platform and the apps in protecting data privacy

3. Storecoin economic model

Storecoin is designed around an economic model that 1) incentivizes the decentralized network of participants to secure the network and participate in key governance, and 2) does so in a way that ensures truly zero-fee payments over the long-term and the creation of sound money through credibly low inflation.

Sound Money with non-compounding inflationary monetary policy



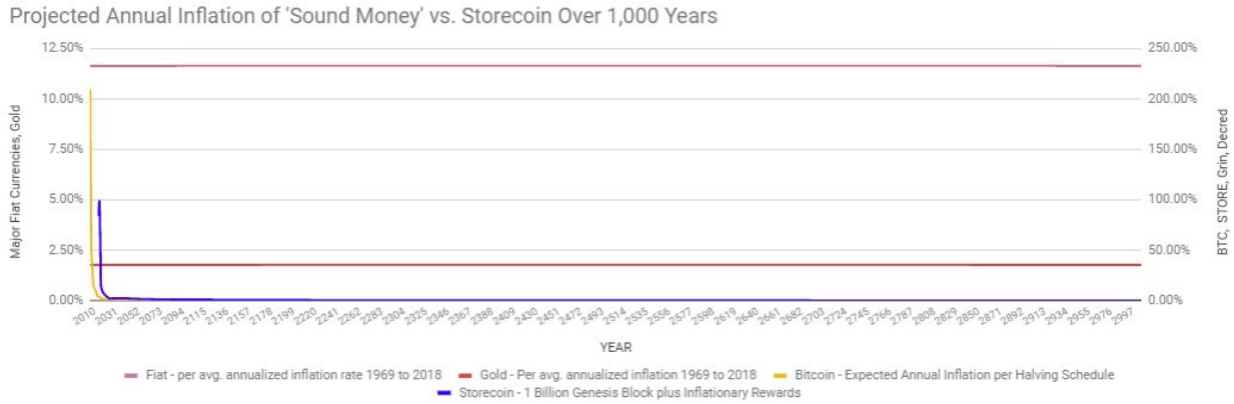


Fig. 14 — Storecoin "sound money" compared to fiat, gold, and Bitcoin

Storecoin's credibly low and non-compounding inflationary monetary policy puts $STORE on a long-range path to one day becoming sound money.

Throughout history, humans have continually upgraded their money. The history of money has shown us that technological progress continually enables new ways of facilitating commerce and trade — through new forms of trusted and secure money. In short, technology enables the adoption of new money.

Alongside $BTC, a zero-fee, programmable cryptocurrency like $STORE could be the next evolution of globally trusted and sound money.

Storecoin is on a path to becoming sound money because it has a fixed maximum yearly block reward of 20 million $STORE tokens — or 2% of the Genesis block token supply — to secure the blockchain. The issuance of block rewards does not compound, so over time, new relative token inflation decreases.

Storecoin's average annual compounding inflation rate over its first 100 years is 2.92%, similar to Bitcoin's 2.59% and significant lower than Grin's 4.72%, EOS 5%, and Cosmos 6.91%.

$STORE issuance

Storecoin's Treasury Schedule is set to operate on a long-term, 1,000+-year time horizon. Both co-founders vest for 8-years. An election in 2021 will elect the first Executive Director. Storecoin has a genesis block consisting of 1,000,000,000 $STORE. Storecoin's Treasury is designed from day one to operate on a long-term, thousand-year+ time horizon. This ensures that Storecoin non-profit has resources it needs to incentivize $STORE adoption, ecosystem growth, miner adoption, and more. The long term treasury plan is as follows.

- **24%** — sold in up to 6 milestone-based token sales.
- **46%** — allocated to the Storecoin non-profit for incentivizing the $STORE ecosystem growth, miner adoption, and more. Emits in the first 100 years.
- **18%** — locked up in long-term emission schedule giving the Storecoin non-profit access to the genesis block Treasury to grow $STORE adoption. Emits over 1,000 years.
- **10%** — founding inflationary block rewards to pay for Storecoin security, governance, distribution, and more. Once the fund ends, upto 20MM new $STORE will be added to the total authorized supply each year.
- **2%** — Founding miner bonus. This is based on a bonus miners get for the initial staking auction. Staking for 1 year is a 10% bonus and staking for 2 years is a 20% bonus (on amount staked).

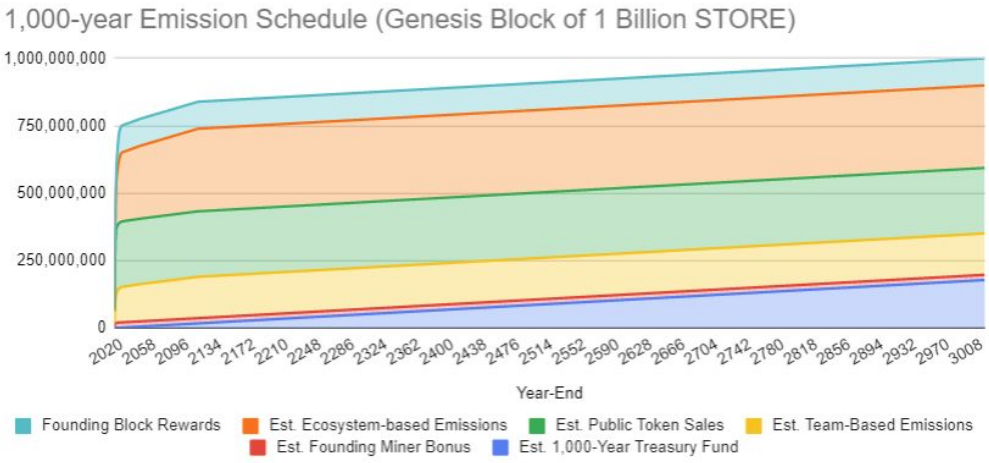


Fig. 15 — Storecoin's 1,000 year emission schedule based on 1B $STORE tokens at genesis

Inflationary rewards

Up to 20,000,000 $STORE will be issued per year for network compensation purposes. The actual amount issued will be dependent on the percentage of the circulating supply that is staked (security spend). As the percentage of the circulating supply staked rises, there will be more inflationary block rewards available.

Security budget

This is the point at which the maximum inflationary block rewards are reached. For example, a security budget of 30% means that if 30% of the circulating supply is staked there will be 20M $STORE issued over the course of 1 year. Storecoin is planning to launch its settlement layer in the following 3 phases.

1. Alpha phase — with a security budget of 30%, with an estimated 92 miners.
2. Beta phase — with a security budget of 40%, with an estimated 138 miners.
3. Production phase — with a security budget of 51%, with an estimated 207 miners. Storecoin governance is fully ratified by this phase.

When Storecoin transitions to p2p cloud platform, the security budget is decided by the governance.

If less than the security budget is staked on the network at any given phase, then there will be less inflationary block rewards. This is defined by an inflation curve that increases the overall average network token yield as the security spend rises. The maximum amount of yearly inflationary block rewards will always be 20M no matter what the security budget is.

Fig. 16 summarizes block rewards and other bonuses paid in the Storecoin Network.

How Block Rewards, Budgets, Governance, and Treasury Work on Storecoin

Up to 20 million STORE tokens — 20% of the genesis block token supply — are allocated annually as block rewards to help secure, govern, and grow the Storecoin public blockchain. Storecoin allocates a security budget, which starts at 30% of the circulating token supply at launch and then grows to 51% before the mainnet launch. Miners stake STORE tokens in an auction and earn block rewards proportional to their stake. If the total stake from all miners is greater than the security budget, their respective stakes are adjusted proportionately to the security budget. Miners earn a single vote in governance irrespective of the size of their stake. Block rewards are categorized into mandatory and discretionary groups. Mandatory rewards are paid automatically as new blocks are finalized, while Judicial Branch of governance custodians and distributes discretionary rewards. This enables Storecoin's short and long-term treasury management to be incentive-compatible and enterprise-grade.

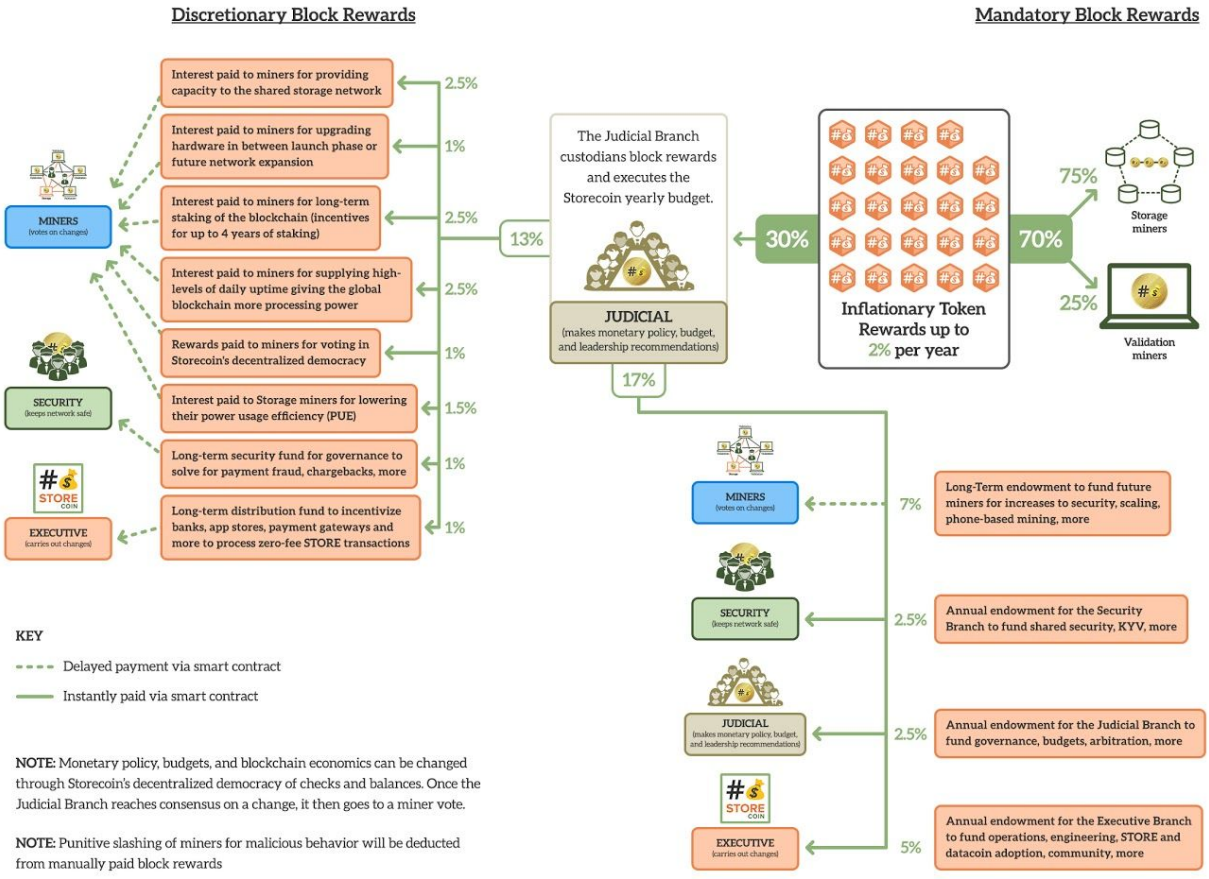


Fig. 16 — A summary of how block rewards are allocated to secure and incentivize the Storecoin blockchain

4. Storecoin governance

Storecoin is organized around a decentralized governance based on checks and balances and the separation of powers. It is designed to coordinate consensus, economics, and security engines, as illustrated below.

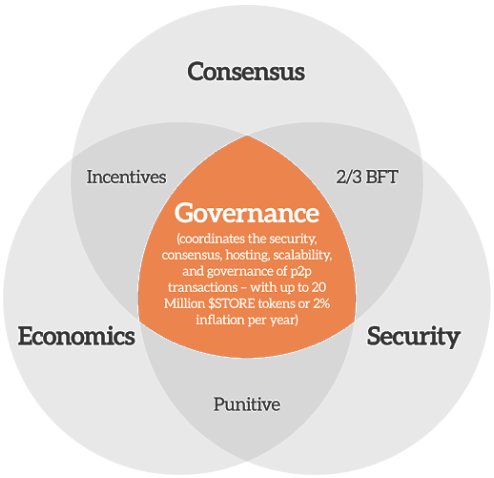


Fig. 17 — Storecoin governance of checks and balances with a separation of powers coordinates the BlockfinBFT consensus algorithm, economics, and security engines

Importantly, it is designed to enable the network to make decisions without having the decision making power able to be captured by any one group or another. miners, developers and the Storecoin nonprofit can all advocate for the decisions they think are best without any one group able to independently shape the direction of the network.

The Problem Of Plutocracy

Storecoin's model of checks and balances is quite different than other blockchain models. Most other blockchains tend to fall into one of two models. The first is the model where there aren't clearly defined governance pathways, so decision making authority in practice falls either to core developers or to the foundation that controls treasury. The second are the newer experiments with on-chain governance. These systems are designed to allow members of the protocol community to take a more active and clear hand in decision making, but are usually organized around holding-based voting allocations, which inevitably crowd small holders out of the process as surely (or in some cases, more officially) than in off-chain governance systems.

One could argue that, in token systems, "plutocracy" simply refers to a system where those with the most skin in the game and the largest incentives to see the network work are charged with making the decisions that create benefit for all. But in practice, we believe that this approach will inevitably lead to network decay. We believe that plutocratic systems are doomed to get more centralized over time. Inevitably, those with the largest stakes will orient the network towards decisions that benefit them — regardless of whether those decisions are good for the network as a whole. This crowds out the space for smaller token holders, who, unable to influence the direction of the network, exit to more favorable protocol ecosystems. The result of this is to further increase centralization around those who have the greatest holdings already. Even if one would make an argument that

this group has an incentive to vote measures that benefit everyone, such that their investment continues to grow, all of a sudden, we're back to trusting a centralized party to do the right thing.

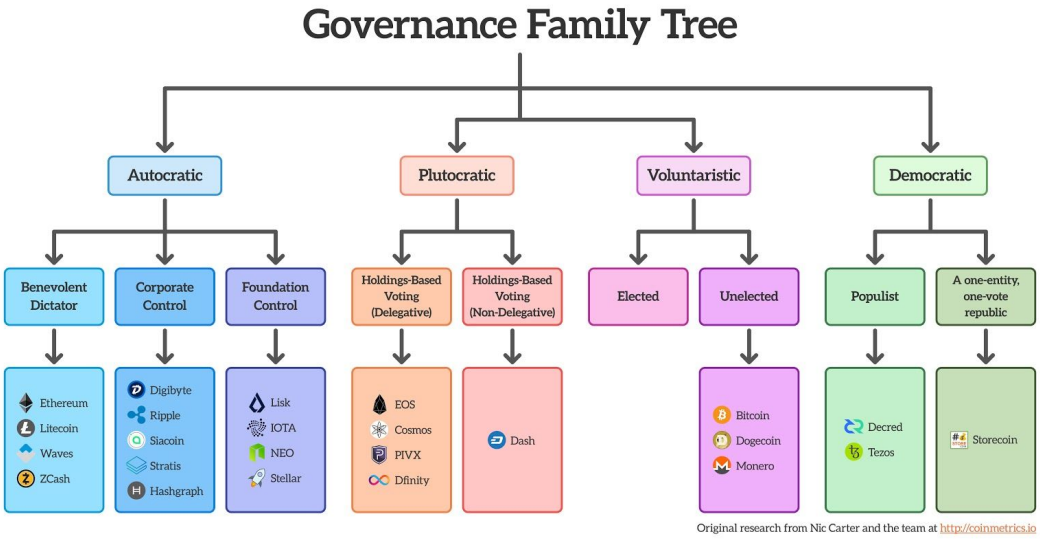


Fig. 18 — The landscape of blockchain governance models

Separation of powers in Storecoin governance

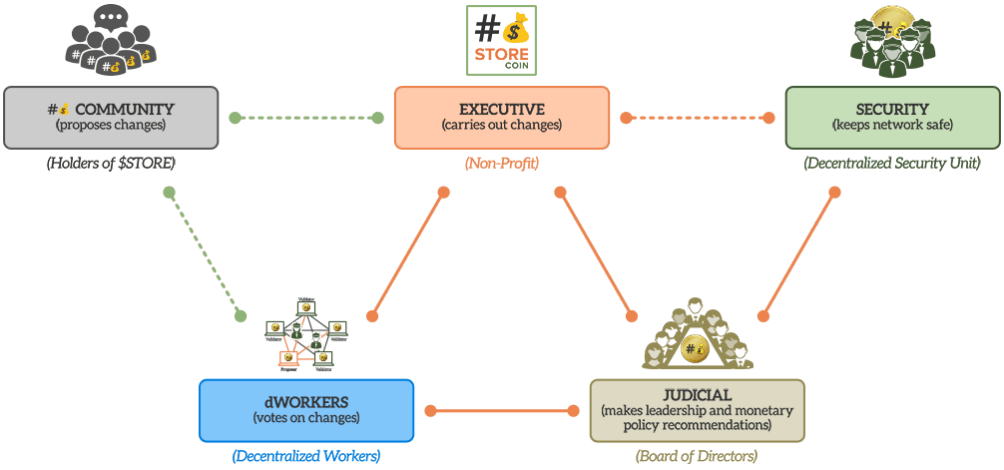


Fig. 19 — Separation of power in Storecoin governance

Just like in the United States government, the purpose of separation of powers in Storecoin is to ensure that no single group within the Storecoin ecosystem has the power to unilaterally advance policies and changes that would benefit their incentives over the incentives of the others.

$STORE holders are empowered to propose feature changes and stake to support other feature change requests.

The dBranch is comprised of miners who secure Storecoin cloud markets and the Storecoin Network. They also have the responsibility to vote on the proposed changes to features, leadership, security and monetary policy, which they do from within independent voting chambers. For a measure to pass, it must pass each of the independent chambers and be ratified by the Executive Branch.

The Executive Branch is the implementation branch consisting of development teams tasked with writing into code the changes passed via the governance process. It is led by an Executive Director (ED) who is appointed by the Judicial Branch and approved by a dBranch vote. ED can also be removed the same way or fired for cause if they fail to implement changes in a predetermined time, set forth in the Storecoin governance bylaws. All other Storecoin nonprofit employees are hired and fired by the ED as they would be in any independent nonprofit.

The Security Branch is charged with securing the network, including ongoing threat awareness and recommending security changes to the Executive Branch, who can advance them for vote by the dBranch. It is led by a Chief Security Officer who is appointed by the Executive Branch and approved by the Judicial Branch.

The Judicial Branch is charged with "big picture" thinking and is responsible for recommending leadership changes and monetary policy changes, which are then voted upon by the dBranch. In the event of a severe threat to the Storecoin Network, the Judicial Branch has the power to recommend putting the network into a *Severe Threat State*, which gives it a 30 day window to directly approve security changes recommended by the Executive and Security Branches.

Entity-based voting promotes democratic decision-making without centralization

An answer to the problem of plutocracy is entity-based voting. If a network could validate that node operators were who they said they were, it would allow them to institute a "one entity, one vote" approach that allows the entire network to participate in decision making without centralizing control around a single group.

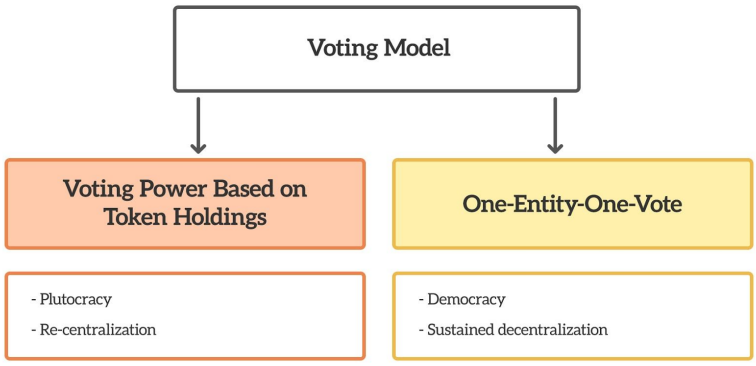


Fig. 20 — Comparison of "one *token*, one vote" and "one *entity*, one vote" models

A "one entity, one vote" approach would in fact allow a network to design a governance such that different groups provide checks and balances against one another and allow consensus with finality through a democratic process.

But at what cost?

Networks haven't taken this approach to date for the fear that instituting any sort of identity process introduces a form of centralization. We believe that there is a key distinction between an identity process to validate that entities are who they say they are and an identity process that allows a central authority to censor or control who participates.

Securing p2p decentralized democracy with Fault Tolerant Trust (TYN)

The fundamental tenet of democracy is “one person, one vote”. The security system of “one person, one vote” is some form of a centrally issued identity. But, can it work for computers voting in any system — centralized or decentralized?

No!

Sybil-resistant[16] **identity doesn’t exist** in the online world because the definition of identity changes from *person* to *entity*. It is very easy for one entity to assume multiple, valid identities. This leads to an imbalance in power, which is harmful, especially in a decentralized democracy. A possible solution to this problem is some form of Know-Your-Customer (KYC) process, but it leads to centralized decision, forcing a decentralized democracy to start its life in a centralized manner. Instead of trying to solve this unsolvable problem, Storecoin proposes a new model for fault tolerant trust called **Trust Your Network (TYN)**. This model borrows heavily from Byzantine Fault Tolerant (BFT) consensus models and achieves fault tolerant trust in a decentralized environment. At Storecoin TYN is used in a variety of use cases, ranging from miner onboarding, to ratifying Storecoin governance, to running on-the-fly micro-voting. TYN facilitates trust among voters around the security of a “one entity, one vote” governance. With TYN, truth is anything that ⅔+ voters agree on. The following diagram illustrates how TYN achieves fault tolerant trust among voters.

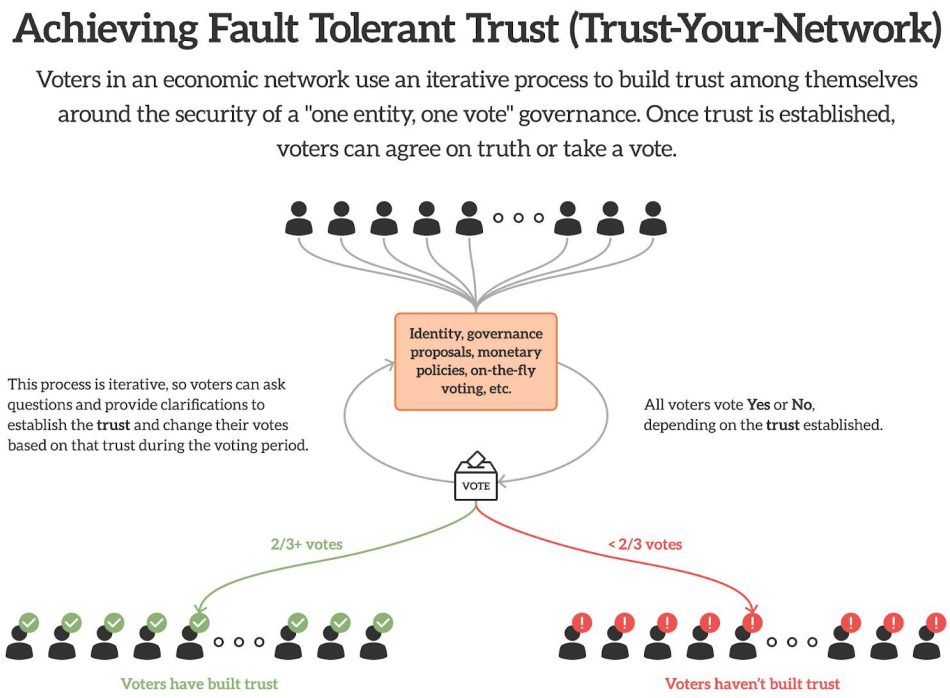


Fig. 21 — Fault tolerant trust with Trust Your Network model

Visit https://research.storecoin.com/tyn for the full specification of Storecoin’s TYN model.

[16] https://en.wikipedia.org/wiki/Sybil_attack

When Whitepaper?

How big can Storecoin be?

How to help the Storecoin public blockchain grow

Here are four ways to get involved with Storecoin today:

1. Join our community and earn a free $STORE tee-shirt by completing our Proof-of-Community at http://storecoin.com/community
2. Join our active governance public peer review at http://storecoin.com/governance
3. Register to secure and stake the Storecoin public blockchain at http://storecoin.com/registertostake
4. Participate in a Milestone Token Offering (MTO) at http://sale.storecoin.com

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