



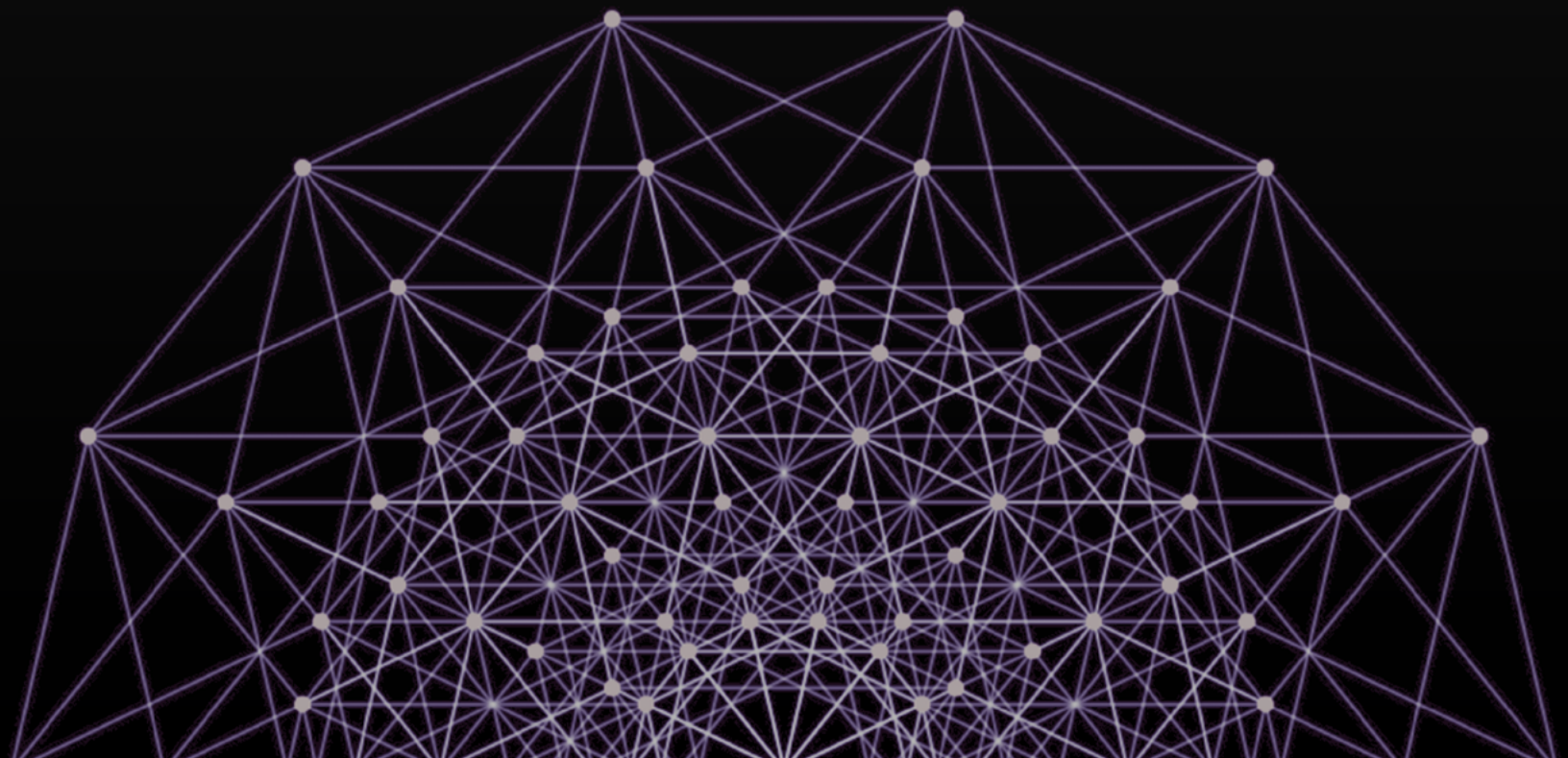
DECENTRALIZED SOCIAL NEWS PLATFORM

White Paper v1.3
March 2018

Ankit Bhatia

Robert Giometti

Aurélien Nicolas



CONTENTS

Glossary	5
ERC20	5
Sapien Platform	5
Sapien Network / Ecosystem	5
Branch	5
SPN	5
Staked SPN	5
Unstaked SPN	5
Overview	6
SPN Token Sale	6
SPN Utility	6
Introduction	9
What is Sapien?	10
Core Values	10
Key Features	10
Live Beta	10
Objectives	11
Establish a Proof of Value Consensus Protocol	11
Launch the first Democratized Autonomous Platform	11
Build a Robust Marketplace and Incentivize User Contributions	11
Power Future Applications on the Sapien Network	11
Why Contribute?	12
Product Roadmap	13
User Stories	15
Creators	15
Curators	15
Freelancers	16
Developers	16
Media Companies	16
Market Opportunity	17
Social Media	17
E-Commerce	17
Privacy	18
Media	19

Business Model	20
Marketplace	20
Buyers & Sellers	20
Sapien	20
Ad Platform	20
Users	21
Advertisers	21
Sapien	21
Extend to other Websites	21
Token Sale	22
Presale	22
Allocation of Presale Funds	22
Token Sale Phase #1	22
Minimum Goal	23
How to Contribute	23
Allocation of Funds (2018 - 2022)	24
Distribution of Tokens	25
Incentivizing the Network Effect	26
SPN Token	27
Proposed Utilities	27
Utility I: Staked SPN to Power the Sapien Platform	27
Utility II: Reputation Network built-in the SPN token	27
Utility III: Democratized Autonomous Platform (DAP) Proposals	27
Utility IV: Content Payouts and User-to-user Tips	27
Utility V: Standardized Token for Integrated Marketplace	28
Utility VI: Ad Platform Revenue Sharing	28
Use Cases	29
Use Case I: Fake News	29
Use Case II: Unified Media Portal	30
Use Case III: Tokenizing Virtual Goods	31
Platform Features	33
How to Register	33
How to Qualify for Platform Payouts	33
Reputation	33
Backfeed Protocol	33
Voting Mechanisms	34
Rewards for Posting, Commenting, and Voting Rewards	35
Posting & Commenting Payouts	35
Voting Payouts	36
SPN Payout Management	36
How We Handle Voting Manipulation	36
Democratized Autonomous Platform (DAP) Implementation	37
Proposal System	37
Branch Autonomy	37
Tribunals	37

Token Mechanics	38
Staking SPN	38
Staked SPN Capacity Bonus	38
Unstaking SPN	38
SPN Consensus Mechanism	39
Leadership	40
Core	40
Advisors	41
Competitive Analysis	43
I. Steemit	43
a) Choice of Blockchain	43
b) Distribution of Power	43
c) Barriers To Entry	43
II. Synereo	44
a) Technological	44
b) Token Utility	44
c) Philosophical	44
Risk Analysis	45
Quantum Computing Attacks	45
Public-Key Cryptography	45
Elliptic Curve Cryptography	45
Elliptic Curve Discrete Logarithm	45
Bots	45
Sybil Attacks	45
Inflation	46
Technical Considerations for a Dapp	47
Data	47
Beta Release	47
SPN Integration	48
Search	48
Storage	48
Decentralized Release	48
Blockchain	48
Off-chain	48
IPFS & Swarm	50
References	52

GLOSSARY

ERC20

A common list of rules for all Ethereum tokens to follow, allowing developers of all types to accurately predict how a token will function within the larger Ethereum ecosystem.

Sapien Platform

The Sapien Platform is a decentralized social news platform built with Meteor.js, the recommended framework for Ethereum Dapps (Decentralized Applications).

Sapien Network / Ecosystem

The Sapien Network is powered by the SPN token and includes the Sapien Platform, the decentralized marketplace, integrated third party applications, digital content creators, and media publications.

Branch

Branches are the communities within Sapien. A branch can be either private or public, and focuses on a specific topic or theme. Users have reputations associated with each branch that they participate in, affecting their influence within the branch.

SPN

SPN is a cryptocurrency used in Sapien to reward users for their contributions. SPN can be freely exchanged between users within Sapien or held in any ERC20-compliant wallet. SPN can be used for social actions (posting, comments, voting, etc.), purchasing physical or virtual goods on the Sapien marketplace, and to purchase premium content. SPN will be awarded to quality content creators within Sapien, and will track a user's reputation as their contributions are evaluated.

Staked SPN

In order to be rewarded for contributions on Sapien, a user must have staked SPN. Unstaked SPN can be staked by locking it into a separate smart contract for a fixed duration of one year. Upon completion of the staking contract the SPN will be returned to its unstaked form. Users can choose to stake SPN tokens again to increase their capacity for doing social actions, user-to-user tips, and participating in platform and community proposals. Staked SPN is used within the Sapien ecosystem and will not be listed on exchanges.

Unstaked SPN

Unstaked SPN is not in the Sapien ecosystem. For example, this can be SPN tokens in a personal wallet. A user can manage their portfolio of staked and unstaked tokens within their digital wallet.



OVERVIEW

- **Vision:** Sapien is a democratized, tokenized, reputation-based social news platform capable of rewarding millions of digital content creators without any centralized intermediaries. Sapien will be powered by our utility token, SPN, and built to provide a smooth user experience that will bring the benefits of the Blockchain to the masses.
- **Token sale:** Users can acquire SPN tokens to use on the Sapien platform immediately.
- **Official Website:** <https://www.sapien.network>
- **SPN Decimals:** 18
- **Initial Token Supply:** 500,000,000
- **Growth Rate:** All new tokens will be minted through Sapien and distributed to value creators at a controlled inflation rate.

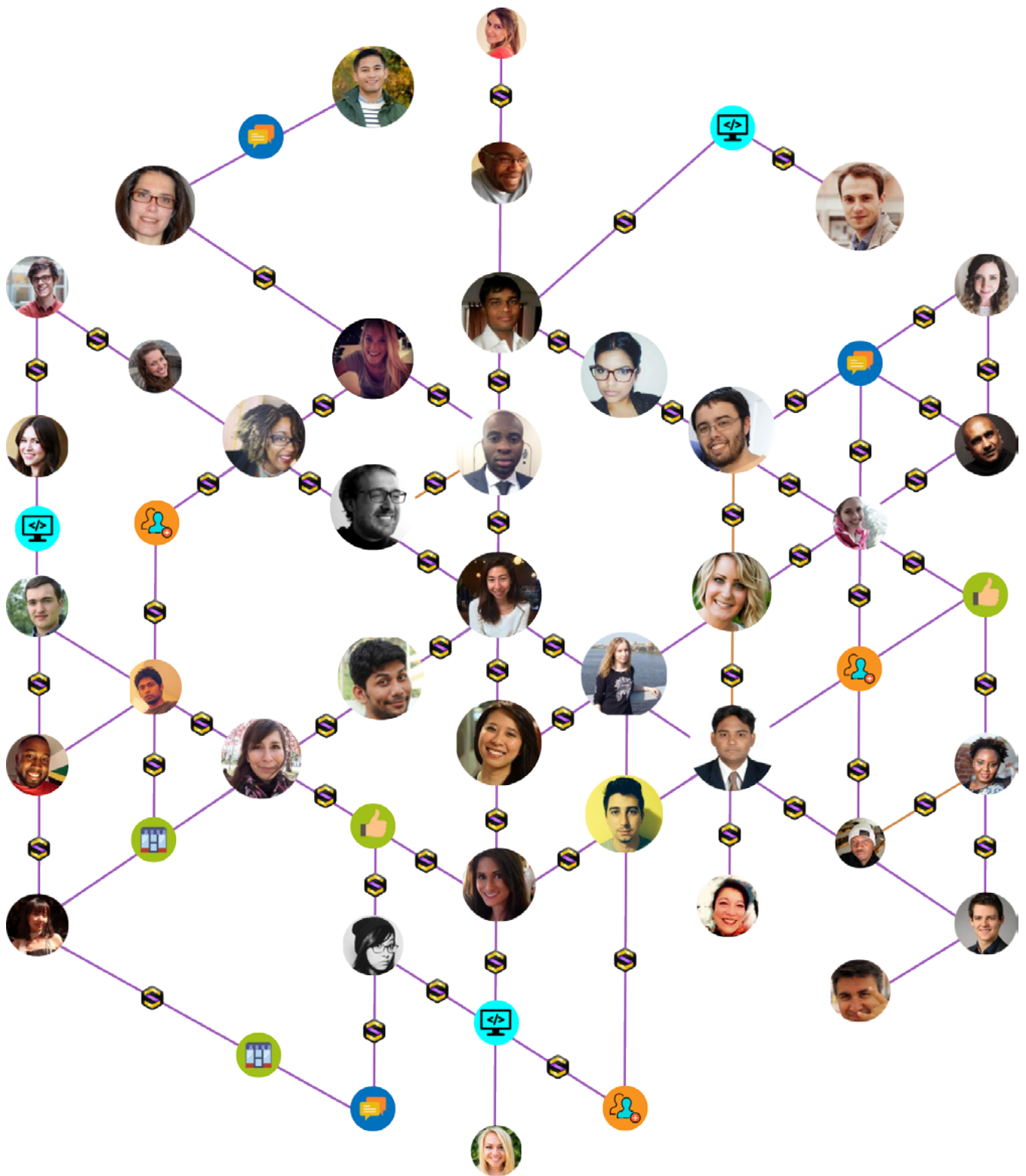
SPN Token Sale

- **Token Allocation:**
 - 20% reserved for team and advisors (100M)
 - » 6-month cliff with a 24-month vesting schedule
 - 45% sold during Pre-sale and Token Sale Phase #1 (225M)
 - Up to 5% distributed as Bounties (25M)
 - 30% in Sapien reserve for future Token Sales and Airdrops (150M)
- **SPN Distribution:** Smart Contract will distribute tokens after Token Sale Phase #1 is complete.
- **Token Sale completion:** 250,000,000 SPN tokens are distributed or April 3rd, 2018, whichever comes first.
- **Unsold SPN:** SPNs not sold in the Token Sale will be transferred to the Sapien reserve.

SPN Utility

1. Tokens will exist in staked and unstaked forms. Staked tokens will provide users with platform functionality. Unstaked tokens will be listed on exchanges.
2. The token will keep track of a reputation within each community the user is part of, accumulating a score that reflects their expertise and reduces the spread of fake news.
3. Power a Democratized Autonomous Platform (DAP), enabling users to participate in organizational decisions and shape product roadmap with a proposal system.
4. Allow holders to purchase physical and virtual goods, content, and services in a decentralized marketplace.
5. Reward digital content creators who generate quantifiable value, determined with the consensus of the community.
6. Share ad revenue with users who opt-in to see advertisements. By staking more tokens, users can earn a larger portion of the revenue they generate for Sapien.

This page was intentionally left blank



INTRODUCTION

A multitude of theories behind human intelligence suggest how fundamental social networks have been to the evolution of our species, Homo Sapiens.¹ Whereas thousands of years ago the primary objective of interaction was survival, we now interact for numerous reasons, ranging from business to pleasure. Companies like Reddit and Facebook have enabled us to continue this ancient practice of socializing, while simultaneously driving open-source innovations like React.js and GraphQL. Another example of the earliest social activity is payments. Bitcoin is the first successful implementation of a borderless, cryptographical store of value enabling us to discreetly send funds to another person. Yet it was Satoshi Nakamoto's brilliant idea behind the coin, the Blockchain, that has opened the floodgates of innovation. Immutable, hashed data is stored in blocks that are chained together to create a distributed database, secured with cryptography. This new technology has begun to disrupt everything from healthcare to banking to consumer apps. It is quite likely that we are witnessing the early stages of Web 3.0. Our team believes it is now feasible to combine the innate human desire for social networks with the immense power of the Blockchain to give each individual unprecedented control over their online social experience. We intend to build a democratized social platform that truly serves its users, fueled by a flexible cryptocurrency, SPN, built on the Ethereum Blockchain.

1 https://en.wikipedia.org/wiki/Evolution_of_human_intelligence#Social_brain_hypothesis



WHAT IS SAPIEN?

Sapien is a highly customizable, democratized social news platform capable of rewarding millions of content creators and curators without any centralized intermediaries. Sapien is powered by an ERC20 compliant cryptocurrency called SPN. The Sapien network will rapidly evolve to include a marketplace, various integrations, and third-party applications.

Core Values

1. **Democracy** - Users should have the final say over their communities and should be incentivized to contribute.
2. **Privacy** - Targeted advertising is profitable but inherently flawed because it exploits user data and infringes on user privacy.
3. **Free Speech** - A fundamental principle that should be protected online with disruptive tools.
4. **Customizability** - Each user should be able to tailor a social experience to their liking.

Key Features



Public/Private Browsing

Seamlessly switch between public and private modes to experience Sapien with your real identity or anonymously.



Subscriptions

Subscribe to branches to stay up to date with the latest posts from your friends and people around the world.



Friends, Groups, and Posts

Add friends, create groups, share posts, write comments, and expand your horizons.



Feature-rich Chat

Join text and voice channels with our powerful chat interface, which provides a more dynamic and engaging user experience.



Encryption

Protect your online privacy. Sapien protects your personal data and offers encrypted chat conversations.



Highly Customizable

Every individual is unique. Have control over every feature and tailor your own social experience.
...and much more

Live Beta

You can join the beta waitlist with this link: <https://www.sapien.network>.

OBJECTIVES

Establish a Proof of Value Consensus Protocol

At its core, SPN derives its value from the ability to collaboratively distinguish high-quality content throughout the Sapien Network. The proof of value mechanism will promote quality contributions and reward users accordingly. As the contributions of users are evaluated throughout the network they will accumulate a score that reflects their reputation. This will allow a user's domain-specific expertise to be reflected within their communities. Within Sapien, reputation will mitigate trolling and reduce the spread of fake news. The reputation system is inherent to the SPN token and thus not restricted to the Sapien platform.

Launch the first Democratized Autonomous Platform

To create a truly autonomous social platform, users must have real power over the direction of the platform. Thus, one of the capabilities of the SPN token will be to give users a voice through our innovative proposal system. This will allow users to participate in organizational decisions, feature developments, and marketplace rewards. SPN stakeholders will be in a unique position to suggest and prioritize milestones on our project roadmap. With the first autonomous social platform, we can cultivate a passionate and engaged community that has the ability to change its values over time. In addition, SPN will enable users to vote on proposals within a branch, facilitating democratic decisions at a community level. Ultimately, this will enable branches to self-moderate, without the need for authoritative moderators that are the norm on similar platforms.

Build a Robust Marketplace and Incentivize User Contributions

Content creators should be rewarded fairly for their time and the original content they add to a platform. Users will be able to tip one another for posts or comments and even receive payouts in SPN from Sapien for posts that have created quantifiable value. By enabling users to pay each other in this manner we believe we will foster an environment that supports quality content and liberates content creators from dependence on ad revenue. A decentralized marketplace is planned in the roadmap to enable SPN holders to purchase exclusive premium content, services, physical merchandise and virtual goods, including themes, integrations, and features.

Power Future Applications on the Sapien Network

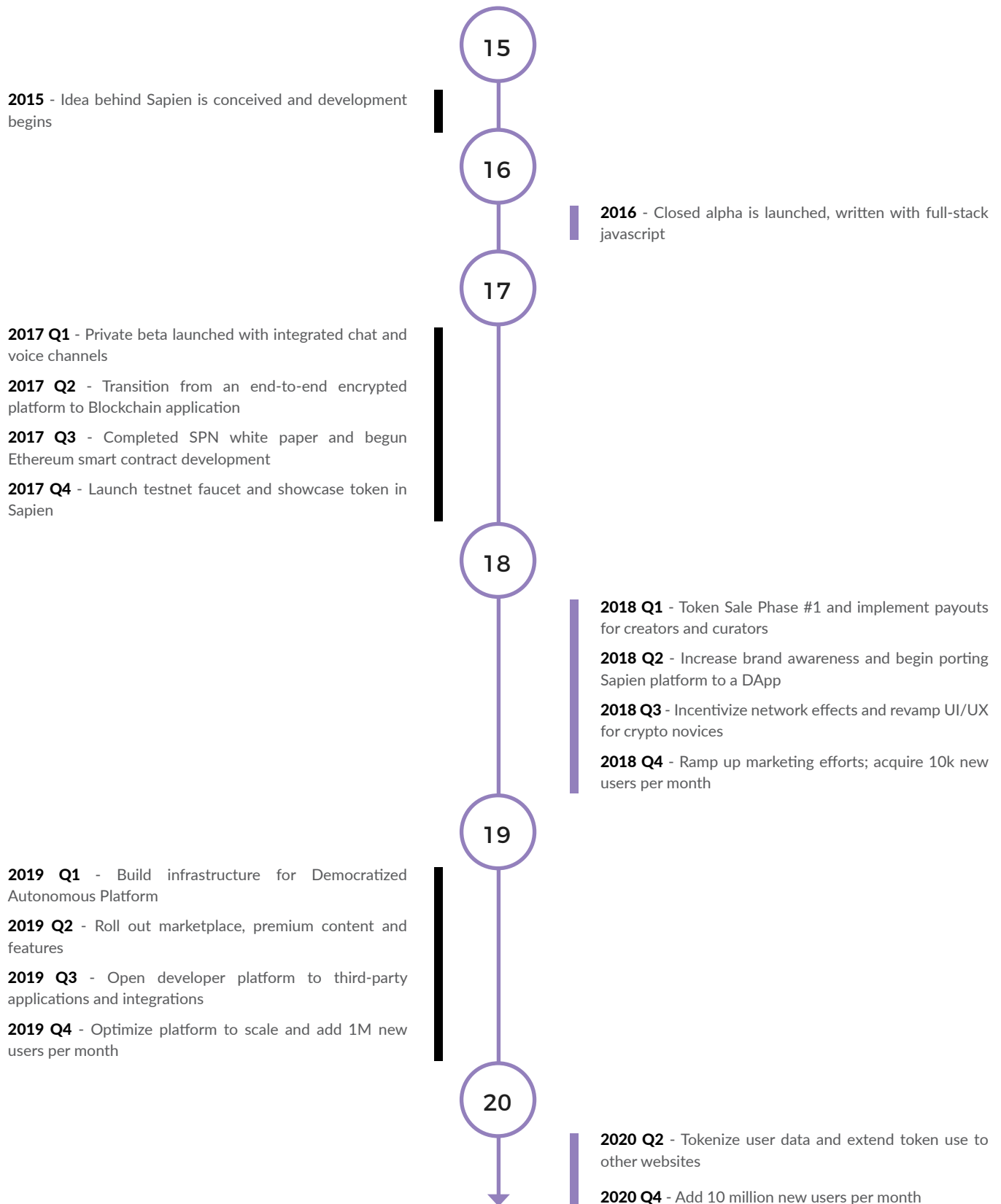
As Blockchain applications become the new standard, Sapien will build out a development platform powered by SPN to offer users a wide variety of app integrations and permit external apps to leverage our user base. We intend SPN to function as a unified currency for all in app purchases on integrated apps. New applications will be able to integrate with SPN easily through the Sapien API allowing users to exchange and make purchases with SPN. The unified market created by SPN will tether virtual items purchased inside integrated applications to the real world value of SPN creating a new dimension of interactions between users on applications integrated with SPN. Lastly, our goal is to establish a global reputation network on all SPN integrated platforms to fight fake news everywhere.

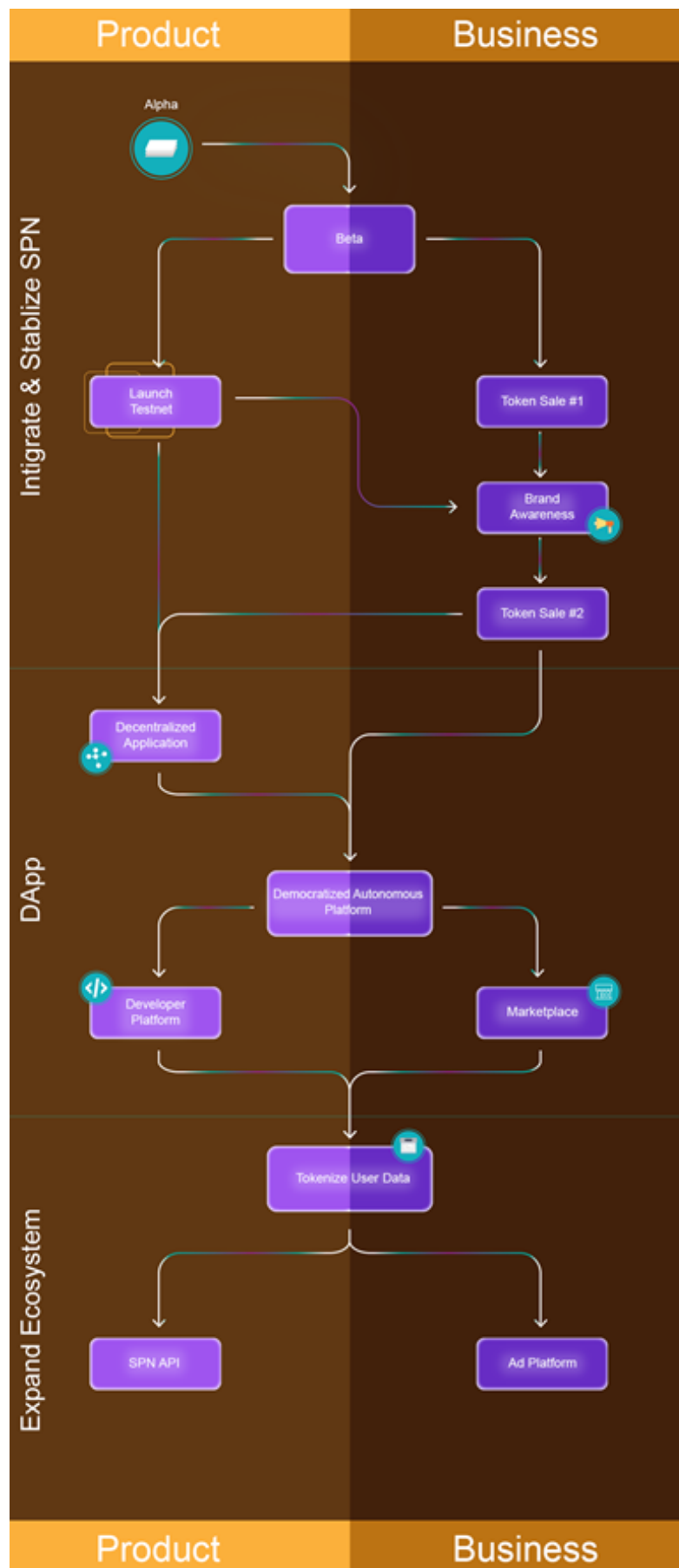
WHY CONTRIBUTE?

Once implemented, we believe that SPN will be one of the most versatile tokens in the online space. Not only will the SPN token be immensely useful within the Sapient ecosystem, SPN will also facilitate creating and transferring value within and beyond the platform. Fake news will be greatly mitigated with secure identities on the Blockchain and an extensive reputation system. SPN will be the backbone of every social action and transaction that happens, embedding its growth potential in the expansion and adoption of the platform instead of any arbitrary fluctuations in the crypto market. Content creators will truly have a viable means of earning rewards without being exploited by centralized entities. Users will finally have a real voice in collaborating and shaping the community they want to be part of. By leveraging the latest Blockchain technologies, we can work together to build a platform that is immune to censorship, guards our free speech, respects our privacy, and persists content throughout humanity's existence. Now is the time.

Be on the right side of history.

PRODUCT ROADMAP





USER STORIES

There are several users that would comprise Sapien's vibrant ecosystem:

1. **Creators:** Users who submit original digital content (posts, comments, videos, memes, podcasts, etc.) to the Sapien platform. Their quality contributions are compensated with SPN tokens that increase their reputation on the platform.
2. **Curators:** These are trusted guides for different branches on Sapien. Curators discover and share high-quality content within their branch and network. For these users, we have designed voting rewards in SPN tokens that recognize their efforts.
3. **Freelancers:** Individuals who would like to provide services to Sapien users in exchange for SPN tokens. Tasks will be completed on the marketplace with zero transaction fees.
4. **Developers:** Decentralized app developers who want to contribute to the platform or ecosystem. As the platform grows, our team will open up a developer platform that will allow engineers to build third-party applications, integrations, and features for Sapien.
5. **Media Companies:** Media Publications can partner with Sapien to set up independent publishing, individual prices for content, create a sustainable business model, and build reputation with our users.

Creators

Name: **Alice**

Background: Alice is a prolific content creator who just graduated from college. She loves writing articles on technology and current events. She also recently launched a podcast on SoundCloud to document her growth as an author and a human.

Problem: As much as she enjoys creating digital content on the Internet, Alice is disappointed that she has made \$0 from her articles, posts, and podcast. She would love to create content for a community of like-minded people that can reward her for her consistent and passionate work. She also wants to set up an easy way for power-users to subscribe to her premium content.

Solution: Alice finds out about Sapien. She posts her articles, podcast, and videos in the technology branch, receiving great feedback from the community. Her efforts are rewarded with SPN tokens, some of which she uses to launch her own branch on Sapien for premium content. She eventually gets hundreds of thousands of followers that are subscribed and paying her weekly in SPN tokens for her content. Alice is excited that she can finally pursue her dreams!

Curators

Name: **Waylan**

Background: Waylan is often found in the "new" section of Reddit and 9gag. He spends some of his time curating content on these platforms, giving an upvote if he believes a post should go to the front page or a downvote if he thinks the content is irrelevant or a repost.

Problem: Users like Waylan are absolutely essential to platforms that depend on users to evaluate the content generated by other creators in an online community. Unfortunately, Waylan is not currently rewarded for his time and effort despite thousands of curators like him underpinning user-generated platforms.

Solution: Waylan joins Sapien. As a curator on the platform, Waylan uses his staked SPN to give quality contributions



upvotes. Depending on how early he votes, Waylan now can earn rewards in the form of SPN tokens if the community also finds the post valuable. At the end of the rewards window, Waylan will receive all of his originally staked SPN back and any newly staked SPN, proportional to the amount he originally staked and how early he voted.

Freelancers

Name: **Rahul**

Background: Rahul, a passionate full-stack JavaScript developer based in India, enjoys building web applications for clients all over the world. He enjoys the flexibility of working on his own schedule and setting his own prices.

Problem: To list his services, Rahul uses Fiverr and Upwork, two popular freelancing websites. However, as a result of being centralized, both companies take as much as 20% commission on every job that Rahul performs. Rahul is frustrated by these excessive fees, and rightfully so.

Solution: Rahul learns about Sapien's decentralized marketplace, where in addition to listings for physical goods and virtual commerce, he can also list his services with zero transaction fees. Payments are handled efficiently by the SPN token. He is also happy to notice that as he completes projects successfully, his reputation increases as a vendor. Sapien's global reputation system lets other websites integrate the SPN token and view Rahul's stellar reputation.

Developers

Name: **Nzingha**

Background: Nzingha has been active in the cryptocurrency space since the early days of Ethereum. She's an experienced developer and a strong believer in Blockchain technologies. She routinely contributes to open source projects and is active on social media.

Problem: Nzingha enjoys using current platforms, however, she understands the promise of Web 3.0 to return the power to the people. She has many experimental ideas that she wants to try out but unfortunately, can't contribute directly to any existing centralized websites and open source projects do not reward her time.

Solution: Nzingha learns about the developer platform for the decentralized social news platform, Sapien. The platform enables her to build on top of the platform and sell her creations in an open marketplace. All transactions on the marketplace are powered by SPN tokens. Nzingha can now contribute to the Sapien platform with themes, integrations, and features, while also opening up a sustainable revenue source for her.

Media Companies

Name: **Carlos**

Background: Carlos is the chief Editor of a media publication called Now!. Now! is a publication focused on delivering high-quality, impact driven articles and papers about society. Carlos is an ambitious leader, who wants to rapidly grow the Now! digital user base.

Problem: Now! is finding it difficult to distinguish itself from the plethora of other publications in the market. Carlos realizes how hard it is to compete with prolific giants like NY Times and BuzzFeed. He knows that he must build the Now! brand and modernize his business to reach more users.

Solution: Carlos finds an untapped audience for his publication on the Sapien platform, where users can pay with SPN to subscribe to Now! Content. His team can set individual prices or subscriptions for articles, powered by the SPN cryptocurrency. Using the Unified Media Portal, Sapien users can organize their content in one place from Now! and other publications. Carlos is very excited to be at the frontier of media on the Blockchain and build a trusted brand on Sapien.

MARKET OPPORTUNITY

Social Media

There are currently over 2.3 billion social media users and by 2020 there will be more than 3 billion. Humans are an inherently social species; thus, some form of social media will continue to play an important role moving forward.

E-Commerce

According to Statista, the number of people buying goods or services online will increase from 1.46 billion in 2015 to more than 2 billion in 2020. Technologies like Blockchain, IoT, and cloud computing are radically changing how consumers will transact in the future.

**Number of social media users worldwide
From 2017 to 2021 (source: Statista)**

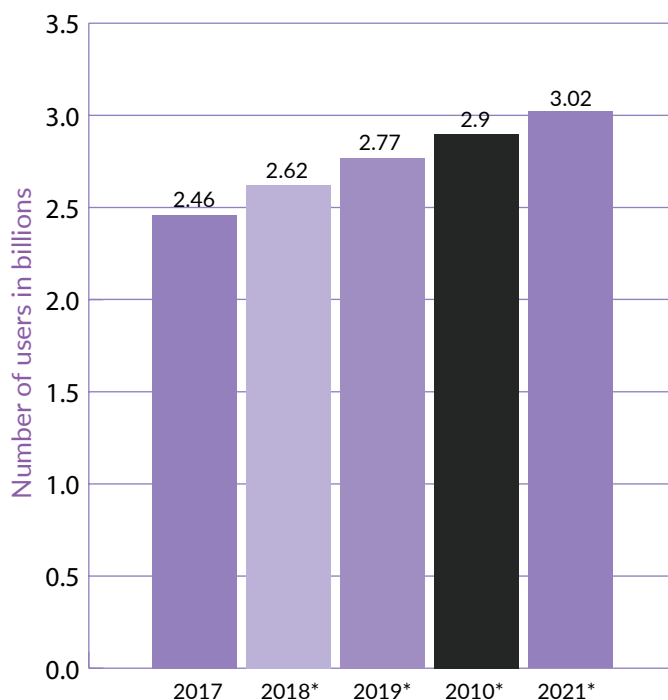


Figure 1.1

**Number of Digital Buyers worldwide
From 2017 to 2021 (source: Statista)**

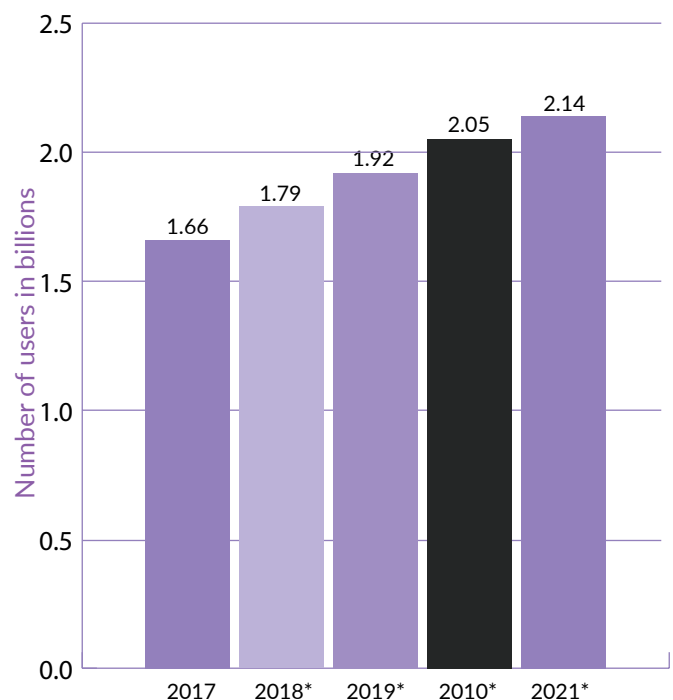


Figure 1.2

Privacy

As shown by Figure 2.1 and 2.2, trends indicate a rising privacy concern and a rising distrust of disclosing personal info on social media. These attitudes show internet users are increasingly concerned with privacy, yet simply have no option but to continue using services that hoard and profit of their data.

Social Disclosure Behaviors
(source: Semantic Scholar)

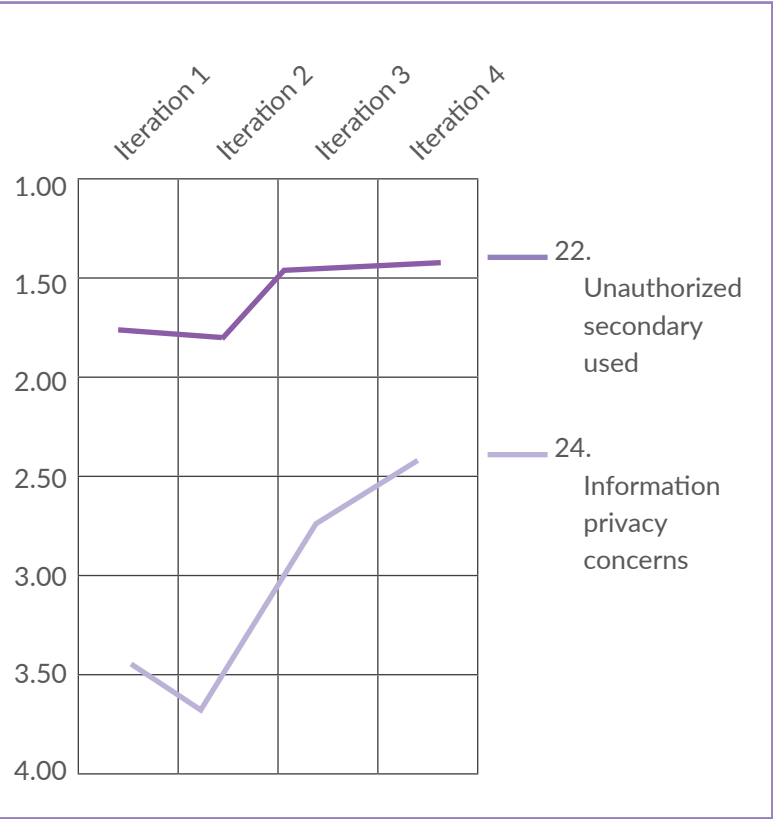


Figure 2.1

Longitudinal Study Hypothesis Results
(source: Semantic Scholar)

Number	Hypothesis	Findings
H1	Social Media Privacy concern are positively correlated to time.	Supported
H2	Distrust of Social Networking Sites is positively correlated to time.	Supported
H3	Risk perception for privacy disclosure is positively correlated to time.	Supported
H4	Privacy disclosure to Social Networking Sites is negatively correlated to time.	Supported

Figure 2.2

Media

Figures 3.1 and 3.2 below clearly indicate a move towards more digital spending and this clearly impacts media publishers. Sapien offers these creators an opportunity to have a digital transformation of their businesses by offering consumers additional revenue streams to monetize and reduce losses.

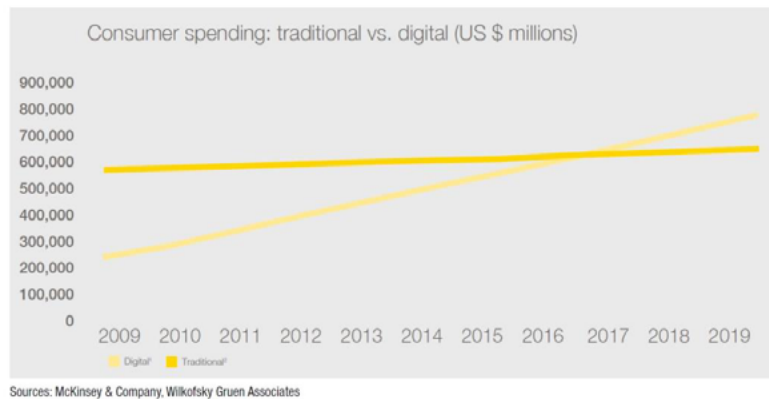


Figure 3.1

Total global spending by category¹ (US \$ millions)

Category	2009	2010	2011	2012	2013	2014p	2009–2014p CAGR	2015	2016	2017	2018	2019	2014–2019 CAGR
Digital Advertising	60,336	70,756	81,544	94,065	109,686	127,345	16.1	146,617	168,538	190,822	211,955	231,442	12.7
Broadband	234,137	267,784	313,039	355,947	393,274	429,280	12.9	463,826	500,510	539,361	581,203	624,613	7.8
TV Advertising	136,792	152,824	159,985	168,749	173,314	183,501	6.1	189,445	202,511	208,960	223,099	233,876	5.0
In-Home Video Entertainment	257,841	270,985	283,287	297,662	310,783	323,408	4.6	331,922	347,781	358,950	370,244	381,648	3.4
Audio Entertainment	92,551	91,294	92,470	93,681	96,559	95,636	0.7	96,984	98,772	100,667	102,767	104,648	1.8
Cinema	30,147	31,692	32,245	34,719	35,972	37,133	4.3	39,359	41,614	43,799	45,834	48,334	5.4
Out-of-Home	24,817	27,044	27,816	29,150	30,627	31,747	5.0	33,220	34,824	36,468	38,337	40,334	4.9
Consumer Magazine Publishing	65,573	65,010	65,376	63,635	61,167	59,061	-2.1	57,640	56,546	55,710	55,080	54,610	-1.6
Newspaper Publishing	153,392	154,521	153,900	150,311	145,688	142,430	-1.5	140,647	139,917	140,023	140,766	141,968	-0.1
Consumer Books	69,687	70,034	69,504	69,944	70,750	72,357	0.8	72,976	74,020	74,794	75,425	75,968	1.0
Educational Publishing	38,619	39,608	40,135	39,347	39,955	40,980	1.2	41,624	42,138	42,629	43,241	43,929	1.4
Video Games	55,190	57,791	60,822	66,444	73,973	84,534	8.9	94,117	103,454	111,634	118,738	124,542	8.1
Total	1,208,470	1,286,526	1,364,933	1,446,077	1,521,420	1,603,951	5.8	1,681,314	1,779,536	1,868,556	1,966,897	2,061,479	5.1

¹At average 2014 exchange rates.

Note: Television, audio, newspaper, and consumer magazine digital advertising as well as video games advertising are included in their respective segments and also in the digital advertising segment, but only once in the overall total.

Sources: McKinsey & Company, Wilkofsky Gruen Associates

Figure 3.2

BUSINESS MODEL

The primary focus after the SPN token sale will be to securely and accurately implement the proposed utility of SPN. At the same time, the success of the Sapien platform is essential to the longevity of the SPN token. Thus, it is necessary to create a sustainable business model that aligns the values of SPN token holders, platform users, and company shareholders.

Marketplace

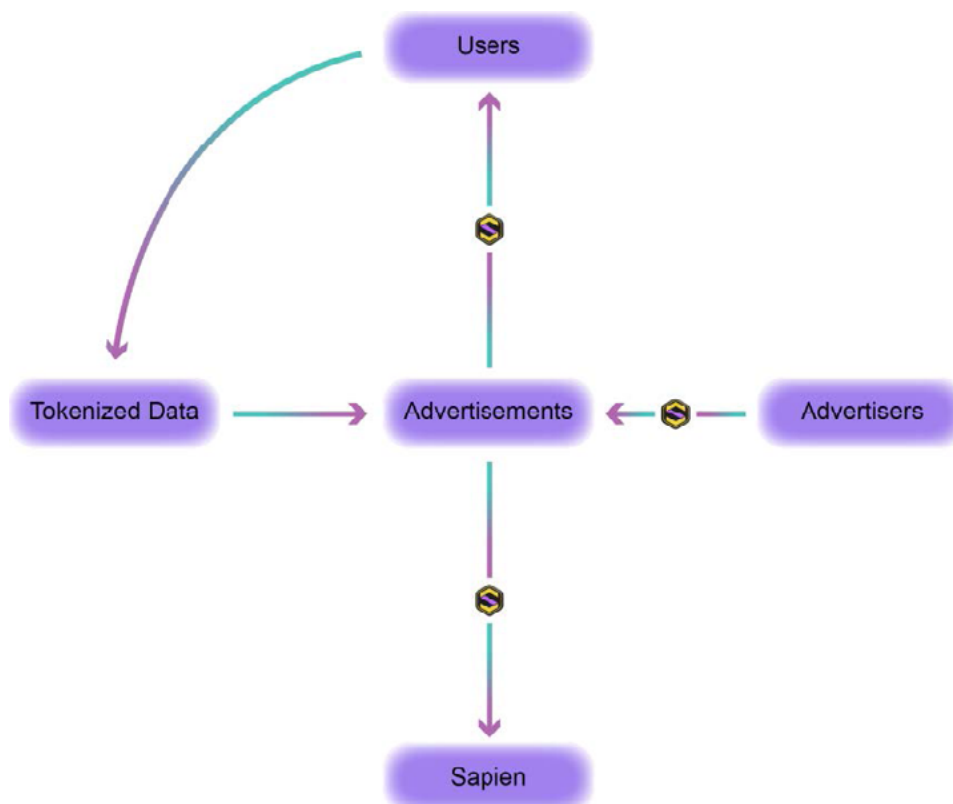
Buyers & Sellers

Users will be able to purchase and sell physical and virtual goods, services and premium content on the Sapien marketplace using SPN tokens. Reputation scores will be integrated into the marketplace, enabling users to be confident that the vendor they are purchasing from is reliable.

Sapien

Sapien will charge a 1% transaction fee to buyers and sellers on the Sapien marketplace unless they have a certain threshold of staked SPN. The minimum threshold will initially be set at the equivalent of \$20 worth of staked SPN. If a buyer or seller have staked at least \$20, then they will pay no transaction fees from their behalf. If either party has less than the minimum threshold staked, they will be charged a 1% transaction fee.

Ad Platform



The rising concern for privacy has been disregarded by most mainstream social platforms. As a result, a collective feeling of helplessness has emerged among users regarding the exploitation of their personal data to use popular services. Users should be in absolute control of their data and how other companies use it. Therefore, prior to any third-party integrations with Sapien, we will attempt to standardize and liquidize any data that we have amassed from our users. SPN tokens will be assigned to various elements of user data for activity, interests, subscriptions, likes, dislikes, etc. Users will have complete autonomy in determining what data is released and be able to reap the rewards for the consensual disclosure of information when third-party apps ask for permissions.

Users

User privacy is a critical part of our philosophy, and as such we will allow users to have complete control over their relationship with advertisements on Sapien. By default, users will see no advertisements and no personal user data will be collected without a user's knowledge. If a user so desires, they can opt-in for Sapien to collect and assign SPN token value to their data. Then, users can choose to share their information with advertisers in exchange for SPN tokens. The more staked SPN a user has, the more SPN tokens they will receive for enabling advertisements.

Advertisers

Ads will be purchasable on Sapien with SPN tokens and will be served to users who have enabled them. Advertisers will receive a substantial discount for purchasing ads with SPN tokens. Advertisers will be able to place ads on public branches that align with their target audience. The advertising experience will be similar to existing social platforms, except a majority of ad revenue will be given to users.

Sapien

The majority of revenue earned from ad purchases will be distributed to users who have enabled ads. Users will receive at least 50 percent of the revenue from ad purchases. The ratio of revenue distributed is dynamic and will be adjusted to keep the platform afloat. All ad transactions will be publicly viewable on etherscan.io. This way, Sapien can assure transparency and our users will retain full control over their experience on the platform.

Extend to other Websites

At its core, the SPN token will always have intrinsic value governed by market supply and demand. To promote the widespread adoption of SPN, we can integrate the token as purely a tipping or payment mechanism in Reddit, Slack, Twitch, etc., thereby increasing token liquidity. An open-source tipping system could be built by developers in each community to tailor SPN to each service and expose more people to the Ethereum Blockchain.



TOKEN SALE

Presale

- **Token Exchange Base Rate:** Phase #1 rate +20% (final exchange rate will be fixed closer to presale)
- **Currencies Accepted:** ETH
- **Tiered Investment Structure:**
 - >\$250k: +25%
 - >\$100k: +15%
 - >\$50k: +7%
 - >\$10k: +3%
 - <\$10k: no bonuses
- **SPN Distribution:** Smart Contract will distribute tokens after Token Sale Phase #1 is complete.
- **Minimum Presale Goal:** No minimum

Allocation of Presale Funds

Presale funds will be used to cover legal costs, fund the marketing campaign, and pay for the development of SPN.

Token Sale Phase #1

- **Total Hard Cap (in USD):** 30,000 ETH
- **Currencies Accepted:**
 - ETH: Natively supported.
- **Token Exchange Base Rate:** 1 ETH = 6000 SPN
- **Bonus Structure:**
 - March 20 - March 21: +15%
 - March 22 - March 23: +12%
 - March 24 - March 25: +9%
 - March 26 - March 27: +6%
 - March 28 - March 29: +3%
 - March 30 - April 3: no bonuses
- **Issuance Rate:** All new tokens will be distributed to value creators within Sapien
- **Minimum Goal:** 50,000,000 SPN

Minimum Goal

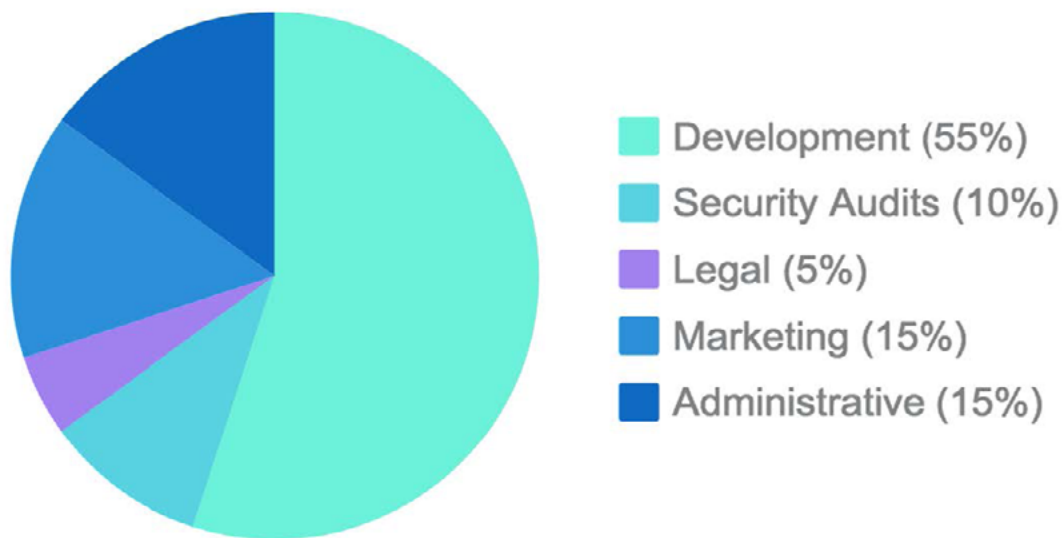
Our minimum goal has been set strategically to ensure that the Sapien core team can quickly, securely, and completely

deliver on our promises for the SPN token and the Sapien platform. If our goal is not met, all contributors will be refunded through our smart contract, minus any funds that were liquidated for marketing and other expenses.

How to Contribute

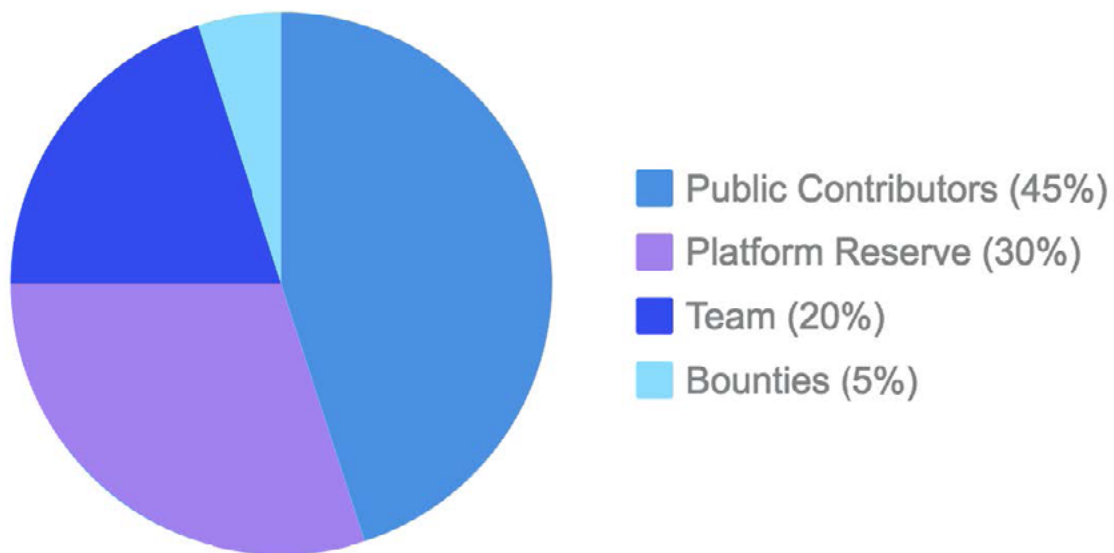
- Contribution address will be released closer to the presale.
- Send ETH from your personal Ethereum Wallet using MyEtherWallet, Metamask, Parity, Mist or Ledger Nano S
- Your **CONTRIBUTION** address **MUST** be an ERC20-compliant wallet.
- **Do not** send funds before the crowdsale begins, or your transaction will be rejected
- Smart Contract will distribute tokens immediately after ETH is received in the crowdsale.
- **Guide:** <https://youtu.be/h-7EyHjDUul>

Allocation of Funds (2018 - 2022)



- **Administrative:** To ensure day-to-day operations run smoothly as the project grows.
- **R&D:** Development for SPN, including core team and community developers. Funds will be liquidated as our company milestones are met.
- **Marketing:** We will encourage organic community growth and launch an incentivized referral program. Thus, we have a smaller marketing budget than other similarly situated companies. Traditional media channels and Sapien will be used to reach our user base.
- **Legal:** Compliance with the SEC and other regulatory entities will be a top priority for our token. Our budget is allocated to cover existing and any new regulatory laws applicable to SPN.
- **Security Audits:** A separate budget has been allocated for continually auditing any new smart contracts our team develops, both for the SPN token and the Sapien platform.

Distribution of Tokens



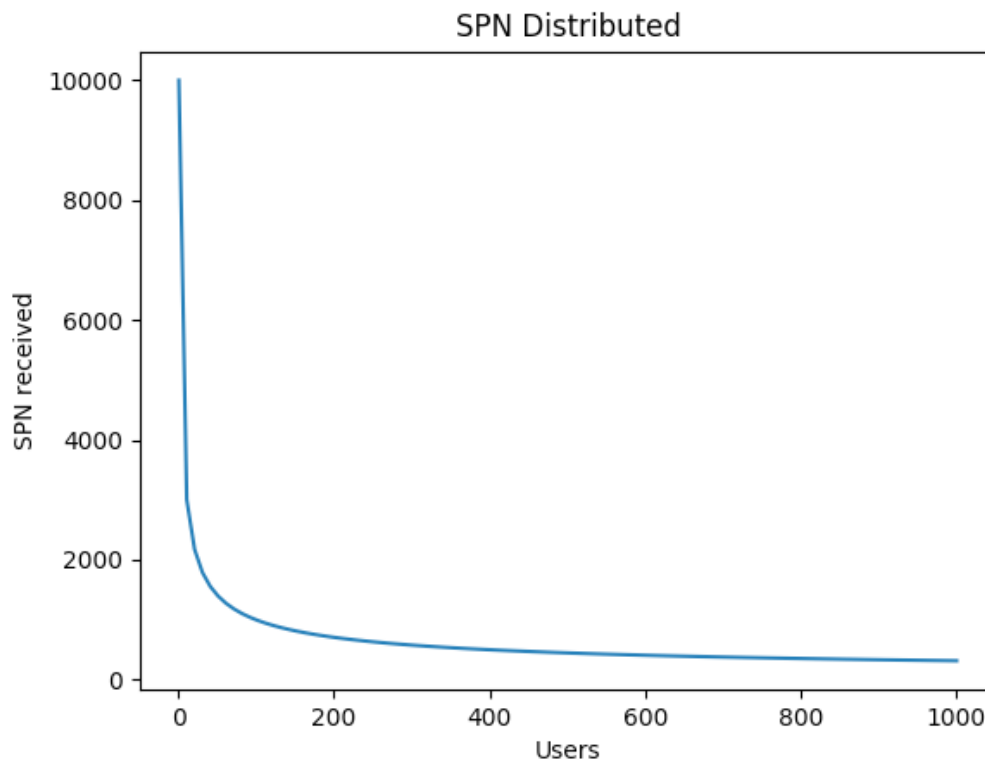
- **45%** of SPN created during our token sale will be reserved for contributors who send ETH to the smart contract address.
- **20%** of SPN will be locked in a smart contract for the founders and team, subject to a 6-month cliff and 24 month vesting period.
- **30%** will go to the Sapien reserve which will be distributed in our Token Sale Phase #2 to augment platform growth, distributed via Sapien, or burned to control inflation.
- Up to **5%** will be reserved for our bounty program, contingent on the total number of participants in the campaign. Participation details will be released in a separate document.

Incentivizing the Network Effect

Metcalfe's law² states that the value of a network is proportional to the square of the number of connected users of the system, n^2 . The value of a social network clearly increases as more interactive users join. This law also reveals the difficulty facing a nascent social network, as its utility is lower when there are fewer users on the platform. In order to overcome this problem, we will include several incentives for new users. The earlier a user signs up, the more SPN they will receive. We will also create a referral program that will let a user send invitations to join the platform. Users will receive $10/m^2$ SPN for the m -th user that they have referred. Any SPN tokens distributed in this manner will be provided by tokens allocated in the Sapien reserve.

The n -th user to sign up will receive $p * 10000/\sqrt{n}$ SPN tokens from the Sapien reserve, where p is the percentage of the hard cap raised, staked automatically for a period of 12 months and without the option of immediately unstaking. If the hard cap is reached, the first 10,000 users will receive 1,985,446 SPN tokens; the 10,000th user who registers will receive 100 staked SPN tokens; the first 1,000,000 users will receive 19,985,401 tokens; and the 1,000,000th user who registers will receive 10 staked SPN tokens.

For context, with the current SPN phase #1 base rate and Ether price (\$450 = 1 ETH), this corresponds to a user acquisition cost of \$22.50 for the 10,000th user and \$2.25 for the millionth user. If the market cap of SPN significantly changes, this equation will be adjusted to prevent currency dilution. This is shown below in the case that the hard-cap is reached.



2 https://en.wikipedia.org/wiki/Metcalfe's_law

SPN TOKEN

Proposed Utilities

Utility I: Staked SPN to Power the Sapien Platform

In order to encourage stability of the SPN token, the longevity of its platform, and the curation of good content, Sapien will allow tokens to be staked to access social features on the platform. SPN tokens can be staked for a period of 1 year. Staked tokens can be used to upvote content, vote on proposals, submit new proposals, tip, and access premium branches, and much more. On the other hand, unstaked tokens are liquid: unstaked SPN will be easily transferrable out of Sapien and tradable on exchanges.

Staked SPN tokens do not necessarily get consumed in platform transactions. Rather, consider them “locked up” for platform actions. For example, the platform will at first require 10 staked SPN to make a new post on the platform. Initially, exactly 10 SPN will be returned to the user at the end of the voting period for the post. When SPN payouts are integrated, it would then be possible for the user to receive back more than 10 staked SPN. However, if the user posts illegal content or violates community guidelines, it would be possible to penalize the malicious user by freezing their staked SPN.

Utility II: Reputation Network built-in the SPN token

Contributions made by users, publishers, and businesses on the Sapien platform will be inherently stored in the SPN token with a reputation score. All users will start out with a reputation score of one. Then, depending on the value the user adds to the platform, this score can be positively or negatively impacted. When quality contributions are evaluated positively, a user’s reputation within a community will increase; low-quality posts and comments will lower a user’s reputation. Reputed users will be delegated more “power” on the platform, allowing them to have a greater say in what qualifies as valuable contributions within their respective communities.

Utility III: Democratized Autonomous Platform (DAP) Proposals

SPN token holders will be able to create and vote on proposals for Sapien. Proposals can theoretically consist of anything, ranging from organizational decisions to feature requests to marketplace reward modifications. Proposals will be at the core of the DAP, enabling users to self-organize and self-moderate their communities. This elevates the autonomy of a community, empowering users to actively build the community that they want to be a part of. Bad actors will be flagged for inappropriate behavior within a branch, creating a tribunal. A tribunal will enable the community to collaborate and decide if a user should be penalized and to what extent. Reputation will be tightly tied to community organization and execution of the DAP.

Utility IV: Content Payouts and User-to-user Tips

To further encourage and cultivate quality content on Sapien, the SPN token will be the backbone of payouts and user-to-user tipping. Payouts for content creation are the primary mechanism for rewarding users and promoting the creation of quality content. User-to-user transactions will create an altruistic environment in which a user can selectively reward authors and original content creators for posts, comments, podcasts, videos, memes, etc. The elimination of transaction costs and the utility of a token (a tangible reward unlike Reddit gold) should sufficiently incentivize users to post original content, growing both the Sapien platform and the SPN token value.



Users will not be required to have substantial knowledge of cryptography or how tokens operate. Sapien will offer various settings that can be customized to fit the skill-level of users. The interface for single-time payments will be displayed in dollars, while the SPN token will be used in the background. Advanced users will have the option to manage their own private key for their SPN address. Users will also be able to set up recurring payments for premium subscriptions. Our intention is to open the benefits of SPN to everyone, regardless of their qualifications or crypto expertise.

Utility V: Standardized Token for Integrated Marketplace

The aforementioned DAP proposal system will be used to propel much of the development of the marketplace. After opening up the platform to developers, the interface will benefit from the collective imaginative power of our community.

The Sapien marketplace will be the ultimate portal to manage SPN and accelerate market liquidity. Within Sapien, users will be able to transfer tokens, view the marketplace, and manage their portfolio.

Transfer Tokens: A simple interface to transfer and exchange SPN tokens.

Manage Portfolio: Allows users to view their staked and unstaked SPN token distribution.

Marketplace: To complete the ecosystem, a community-driven marketplace will serve as the primary interface for users to create and access exclusive rewards, themes, and components, both within Sapien and through third-party businesses.

Our team priorities for the marketplace:

1. Design and develop the initial rewards with input from our user base.
2. Actively reach out to businesses to negotiate discounts for SPN holders on products ranging from ride-sharing, to merchandise, to pizza, etc.
3. Launch a secure community platform for contributors to develop new features, themes, and integrations for Sapien users.

Utility VI: Ad Platform Revenue Sharing

User privacy is a critical part of our philosophy, and as such we will allow users to have complete control over their relationship with advertisements on Sapien. By default, users will see no advertisements and no personal user data will be collected without a user's knowledge.

If a user decides to see ads, all revenue generated will be shared between the user and Sapien, with the user receiving no less than 50% of this revenue in the form of SPN tokens. Users will be able to increase the percentage of ad revenue they receive by staking SPN on Sapien.

By default, user data will not be collected on Sapien. Users will be able to choose what data, if any, they want to share with advertisers. Users will receive a greater percentage of ad revenue for sharing their data with advertisers. The percentage of ad revenue received by a user will be based on a tiered system, with users receiving a greater percentage if they have more SPN tokens staked.

Percentile of SPN staked on platform	Percentage of ad revenue received
0	50
10	53
20	56
30	59
40	62
50	65
60	68
70	71
80	74
90	77
95	80
99	90

Sapien will also facilitate user-to-user advertising. Community (groups or branches) owners will have the option to display advertisements on their groups and will receive a share of ad revenue for doing so. The choice of whether or not to display advertisements is entirely up to the community owner and they will have complete control over which ads are displayed on their group page. Sapien will receive a small share of ad revenue generated in groups while the majority of this revenue will be split between the community owner and the users. The distribution of revenue between owners and users will also follow the above tiered structure. The portion of ad revenue a owner receives will increase as they stake more SPN.

Advertisers will be able to purchase ads on Sapien with either fiat or SPN tokens and reach users who have shared relevant information or to public branches that align with their target audience. Advertisers will also receive a substantial discount for purchasing ads with SPN tokens.

Use Cases

Use Case I: Fake News

Problem: According to study done by Stanford University, there were over 30,000,000 fake items shared in the 2016 campaign.¹ In this era of fake news and alternative facts, it is not surprising that news subscriptions have been on the rise. The Washington Post recorded a year-to-year growth of 145% while The New York Times has seen a tenfold increase in subscriptions. People have an evident need to access quality content without worrying about the authenticity of the publisher and journalists involved. This trend makes it necessary to shift revenue generation from the manipulative “eyeball” business model to a more sustainable one that uses simple subscriptions. Transparency is essential in this industry, as it can directly influence the masses and motivate certain behaviors.

1 <https://web.stanford.edu/~gentzkow/research/fakenews.pdf>



The problem of fake news is compounded when technologies such as artificial intelligence become smarter and begin to learn what makes humans tick. Already, machine learning has enabled us to replicate the voices of individuals and combine them with video to give a convincing illusion that the person really did say the fake statements. Online entities, funded by large corporations, will continue spending millions in the booming attention economy, resulting in a constant bidding war for consumer attention. Inevitably, we will need to be quite discerning in how we consume content on the web as truth becomes blurrier. This is precisely where we can leverage Blockchain technology to help us identify and distinguish valuable content while directly rewarding the creators.

Solution: Sapien will leverage the Blockchain for a three-pronged attack against fake news:

- 1. Identity on the Blockchain:** Sapien will enable storage of identities on the Blockchain for the purpose of identification. All marketplace sellers will be required to verify their identity prior to selling content. Media publishers and well-known users will also be able to verify their identity on the blockchain. With identities on the Blockchain, it will be harder for trolls to deceive users into believing that they are someone they are not.
- 2. Reputation in Communities:** Reputation will be fundamental to combating fake news and trolls on the platform. Lower reputation users will have significantly less power on the platform. Reputation is specific to a given branch and so helps identify a user's expertise across a wide range of subjects. Moreover, reputation will be a valuable asset in the marketplace to exchange goods and services. A reputed vendor or content creator has earned their SPN through consistent contributions, great customer service, or validation from other reputed individuals. This enables the creation of a reputation network that will consciously help our users distinguish the sources of their information, making them less vulnerable to fake news or incessant trolling. Since this utility is inherent to the SPN token, it is easily extensible to other applications and businesses outside the Sapien ecosystem.
- 3. Something-at-stake Design:** By allowing users to stake SPN tokens, we are able to align the interests of the Sapien platform and users. Users have a vested interest in creating quality content on the platform, or risk losing their staked SPN. With this "something-at-stake" design, trolls are discouraged from malicious behavior. Valuable contributions will fuel the growth of the platform, increase the value of the SPN token, and compensate users for their merits in the form of SPN rewards.
- 4. Machine Learning:** Machine learning is a powerful tool that can be used to combat the spread of misinformation. We will use cutting-edge machine learning models to perform stance detection in order to determine whether headline claims are supported by evidence, specifically other articles posted on the Sapien platform and on the Internet. Using these tools we will be able to produce a probability that a headline claim is false. This probability can be displayed to users to help inform their judgment and to encourage them to further scrutinize the sources of an article.

Undoubtedly, there will be users who attempt to manipulate the system for personal gain. In addition to freezing all funds and banning any users attempting to "game" the system, users will be able to flag fake or stolen content. The Sapien team will have a minimum involvement in determining what material is protected by free speech. While illegal or stolen content will immediately result in a ban from Sapien, punishments for reposting or posting questionable material will ultimately rest in the hands of the Sapien community.

Use Case II: Unified Media Portal

Problem: As advertisements masquerading as insightful articles have become rampant, traditional, quality journalism has struggled to survive. Many news sites have turned to paywalls, where users must pay to access articles. With so many diverse feeds of information at their disposal, the modern internet user may find it hard to justify paying a subscription to access a single source of news. SPN provides a unified solution, allowing users to access a wide range of quality content.

Solution: Our unified media portal will consolidate a diverse feed of content in one place for our users. Users can subscribe to quality content from media publications. Thanks to the Blockchain, users can pay publications directly using our cryptocurrency with 0 transaction fees. Links on the platform will drive organic traffic back to the company's website.

1. **Premium Content:** The creator of a branch can set a reasonable price, either to access a single piece of content or monthly subscriptions. A Sapien user can subscribe to a creator's premium branch with the expectation that they will receive consistent quality content. With SPN, we are enabling direct transactions between users and content creators who believe their effort to create quality original content comes at an additional cost. Moreover, it would also be very simple for a multitude of services to emerge that cater to different interests. For example, services similar to Netflix could easily exist on the Sapien platform with à la carte show selection. Premium content will only be available to users who have staked at least \$20 worth of SPN in total over a period of 1 year. For users found guilty of leaking content, 100% of their SPN will be frozen, Sapien account will be banned, and IP address permanently blacklisted.
2. **Subscription Service:** The Sapien platform will be in a position to address the subscription service problem within the crypto community. As of now, there is not a platform that allows creators to sell their content to the community with subscriptions. Monthly and yearly fees are a huge part of the community but to pay in cryptocurrency requires the creator to manually handle each and every transaction. Through the Sapien platform, creators can set up recurring payment plans for their members who can pay this fee using the SPN token. The subscription fee will be automatically charge to the consumer and be paid for via SPN in their Sapien wallet. This allows creators to solely focus on making premium content for their members.
3. **Media Publications:** Traditional media publishers like NY times have long struggled in being able to monetize their content using micropayments, primarily as a result of transaction fees with traditional modes of payment. Mobile applications have attempted to aggregate content from multiple publishers—often to the detriment of the publisher's digital revenue streams.

The Sapien platform will offer publishers the opportunity to introduce micropayments via cryptocurrency, enabling consumers to access premium content at a very granular level. This will enable publishers to get away from the blanket paywall model that has failed with consumers. However, a micropayment model, especially one where the SPN wallet would be integrated into a browser (e.g. Chrome plugin), would make shopping for content seamless.

Augmenting crypto-micropayments can be a mobile application, which could aggregate all of the consumer's purchases within one app. But in order for the publisher to not cannibalize their existing advertising revenues, users would be redirected to the publisher site to complete the reading experience. This would provide users with an enhanced user experience, while preserving current revenue streams and potentially accretive revenues through micropayment sales. The mobile app would serve not only as a viewport into content, but double as a Sapien Media Wallet. Over time, additional features, interesting to publishers and consumers alike, such as fake news filter and community authoring could be introduced.

Use Case III: Tokenizing Virtual Goods

Problem: Although virtual goods clearly have real value, as shown by the huge annual sum spent on things such as in-app purchases and cosmetic enhancements in video games, the true value of these virtual items has remained nebulous. A marketplace where such virtual items can be exchanged for tokens more firmly cements the exchange value of these commodities.

The rapid expansion of the digital economy has created a burgeoning supply of virtual goods. Most of these virtual goods are present in isolated markets, and are therefore unable to be exchanged with other such goods. Virtual goods now represent a multi-billion dollar industry annually, despite the severe limitations in this sector due to the seemingly unexchangeable nature of these goods. By creating a single market for virtual goods, we hope to dramatically increase the volume of transactions in this space, simultaneously providing value to both consumers and content creators. We believe that such a marketplace need not be restricted to common virtual goods such as those present in video games. In the modern world, information is truly the most valuable commodity and thus any quality content has a place on our marketplace, whether it be an article, video, or virtual item.

Solution: We will create a marketplace in which virtual goods can be exchanged along with physical goods, services, and premium content. In addition to creating a marketplace for users to purchase virtual goods, we hope to create a platform allowing users to create and sell their own virtual items such as cosmetic enhancements or entirely new features on the Sapien platform. We believe that the extensible and decentralized nature of Blockchain applications will not only allow the community to influence the direction of the platform by voicing their opinions but will also allow users to contribute to the development of the application by creating self-contained features. In order to allow content creators to place their content on the Sapien platform, we will create an API, establishing all of the necessary infrastructure to allow content creators to sell their content. Content creators will be able to establish all relevant parameters, such as the price that they are willing to sell their content for, or whether they are willing to accept other offers for their content.

PLATFORM FEATURES

How to Register

To combat manipulation, we require the following to open a new account:

- Full name
- Private username
- Email
- Password
- Verified phone number
- Google Recaptcha

After getting verified, each user will have an initial amount of SPN token deposited to their Sapien digital wallet. The quantity of SPN tokens will depend on how early the user registers.

How to Qualify for Platform Payouts

SOCIAL ACTION	MINIMUM STAKED SPN PER ACTION	MAXIMUM STAKED SPN PER ACTION
Voting	1	10
Posting	10	100
Commenting	5	50

These are the initial staked SPN token ranges required to receive rewards from the Sapien platform. As the platform grows, the requirements will be adjusted in the best interest of the platform and users.

Reputation

In order to provide a more accurate representation of the value of a contribution in the Sapien network, user votes will be weighted in proportion to the user's perceived value within a community. This is captured by their reputation score in that community, which changes as a their contributions are voted on. Reputation is branch specific and as a user contributes on Sapien they will accumulate various reputation scores that reflect their expertise across a broad range of subjects.

Backfeed Protocol

Sapien's reputation system expands upon the Backfeed Protocol.³ As our partner, DaoStack will enable the infrastructure for collaborative creation and distribution of value. The protocol provides the framework to create a Proof of Value mechanism in the Sapien Network. This protocol enables reputation to flow within a decentralized network, reflecting the value that a user provides to a community. Reputation scores are linked to the users who have earned them and cannot be transferred between users. Reputation scores are affected by two distinct mechanisms. Reputation can be earned through contributions or the evaluation of another user's contributions. Within Sapien,

3 <https://backfeed.cc/>

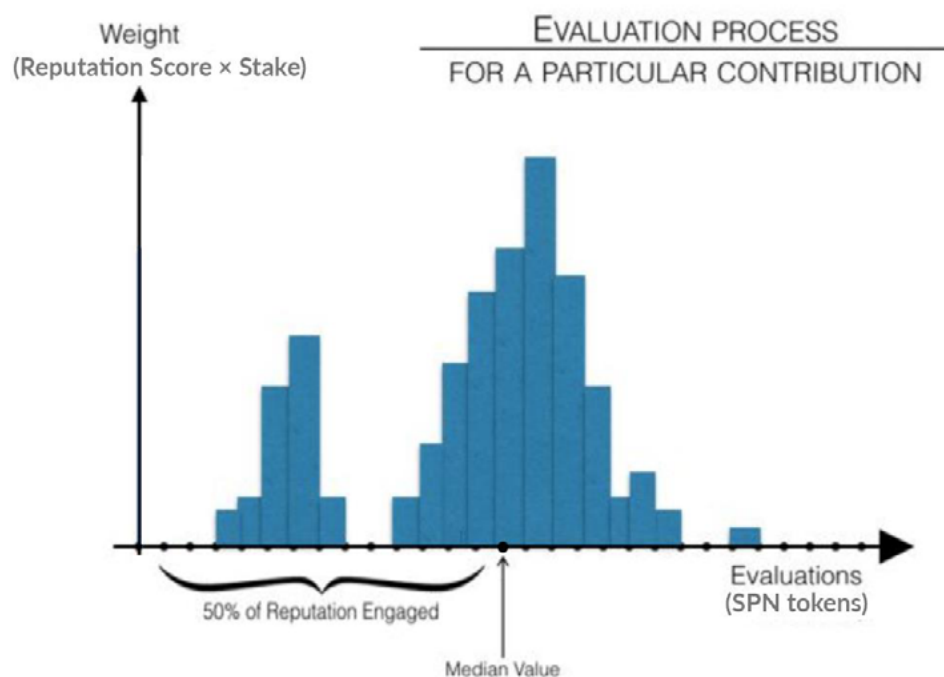
a contribution can be a post, comment, DAP⁴ proposal, or marketplace transaction. Contributions are evaluated by community voting, which requires SPN to be staked. A user must stake a portion of their reputation in order to make an evaluation, which can be recouped when the contribution is evaluated positively by other users, but may be lost. Reputation facilitates the distribution of value throughout the constituent communities of Sapien according to their respective values. A user's reputation is bounded between 100 and -100, so no user will have disproportionate influence within a community, enabling Sapien to maintain a democratic user ecosystem. Any user with less than equal to 0 reputation will have no weight in evaluating the contributions of other users.

Voting Mechanisms

Posts can be voted on by staking a variable amount of SPN, up to a fixed limit. In the case that 0 SPN is staked, a vote will count towards visibility but not toward the payout pool or reputation. SPN can only be staked for voting for the duration of the reward window, which is set at one week. After the completion of the reward window, all payouts generated by the post will be distributed to users. After the reward window has passed, posts and comments can still be voted on and votes will count toward visibility but no longer contribute to the payout pool or reputation. The amount of staked SPN that can be used for posting, commenting, and voting is limited by a user's capacity, which is determined by their total amount of staked SPN. Only staked votes will influence reputation.

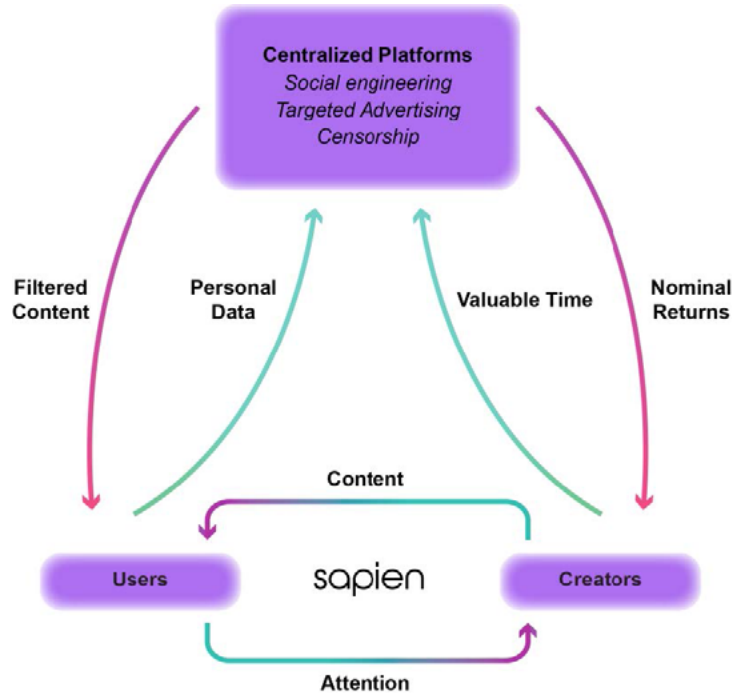
Ex. 1: I stake 1 SPN (by pressing the upvote button) on a new post, which is locked for the duration of the voting window. After the reward window has closed, if the post did well, I receive more than 1 SPN back and can use that 1 SPN to vote on something else. If I have maximum voting power, I can stake up to 10 SPN on the post by pressing another button. If I vote with max voting power (currently limited to a maximum of 10 SPN), my vote counts for more in terms of visibility and I will receive a proportionally greater reward if the post does well when the voting window closes.

Posts can be affected positively (upvote) or negatively (downvote). In order to be more resilient to collusive voting, the reputation change and payout are proportional to the median rather than the mean of the reputation scores of users who have voted on a post, weighted by stake. In order to stake a larger amount of SPN when voting, a user must stake a larger amount of reputation as well. The evaluation procedure for a single contribution is shown below.



The reputation score will be embedded into the SPN token. Thus, reputation can be extended outside of the Sapien ecosystem to any application utilizing SPN. Reputation serves a critical role in establishing the proof of value protocol, promoting quality content and reducing the spread of fake news and trolling.

Rewards for Posting, Commenting, and Voting Rewards



We believe that users should be rewarded for creating quality content. In order to achieve this, we will award the majority of newly minted SPN to users who post, comment, and vote on the Sapien platform. In order to receive rewards for creating a post, comment, or vote, a user must first stake SPN on the platform. To create a post, comment, or vote without earning rewards, no staked SPN is required; in this case, all SPN generated will go towards the platform reserve.

All newly minted SPN will be distributed to users making contributions on the Sapien platform and validators who verify transactions on the Blockchain.

Posting & Commenting Payouts

Post and comment payouts will occur at a fixed interval, with the creator of a post or comment receiving SPN tokens proportional to the median of the reputation of users who have voted weighted by SPN staked. Posts and comments can receive a minimum payout of zero. This is shown by the formula below:

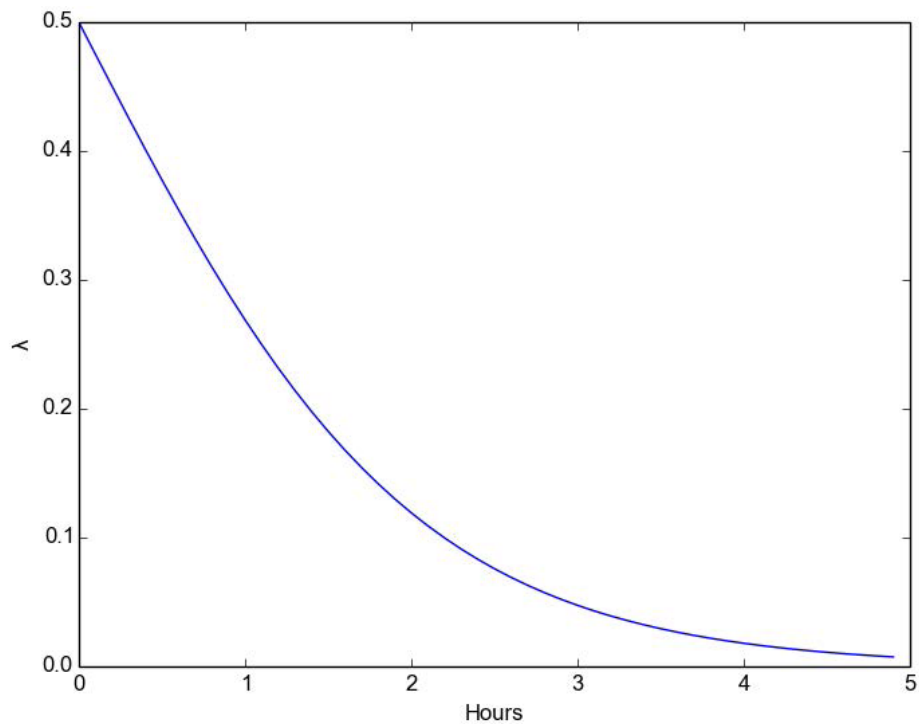
$$\max\{0, \alpha \cdot n \cdot \text{median}\{R_x \cdot S_x \mid x \in X\}\}$$

Where R_x is the reputation of user x , S_x is the SPN staked on the post or comment by user x , n is the number of users who have voted on the post, X is the set of users who have voted on the post, and α is an inflation factor that will be adjusted to ensure that the SPN dollar value of payouts are proportional only to n and the above median.

Voting Payouts

In order to incentivize the creation of quality content, SPN tokens will be distributed to both the creator of a post, and the users who upvoted the post. Ninety percent of the SPN tokens generated by a post will be rewarded to the content creator and the remaining 10 percent will be distributed among the users who upvoted the post. In order to receive a reward for voting, a user must stake SPN tokens. Users will need to withdraw their rewards manually.

As it is more difficult to identify a quality post when it has fewer upvotes, the SPN rewarded from voting will be proportional to the time at which the post is voted on. This will encourage users to browse new content and help create a more dynamic feed for all users. The decay factor λ , is defined as follows: $\lambda(t) = (1 + e^t)^{-1}$



SPN Payout Management

Advanced users: Rewards generated from voting, posting, commenting will be added to your digital wallet balance. Staking duration must be specified, with a minimum period of one year.

Novice: Automatically managed rewards with all earned SPN staked for one year.

For both advanced users and novice users, the original SPN invested in voting, posting, or commenting remains on the same staked schedule as before. Users will be able to toggle their user experience on the platform at any point.

How We Handle Voting Manipulation

To prevent manipulation by malicious users, only a certain fixed amount of SPN will be usable at any one time to stake on posts for voting. Posts will have a window during which they may be voted on and, after this window expires, all SPN tokens staked during voting will be released and restakeable.

The inclusion of negative-voting will make voting manipulation more difficult, since highly reputable users or a large collection of users can cancel out the votes of a colluding group. In addition, attempted vote manipulation will be

transparent to the community, because posts that gain a large number of votes quickly will be the most visible on the platform.

Posts that have been flagged by a significant portion of the community will have their staked SPN temporarily frozen until the community decides whether collusion has taken place. If the user is found guilty of manipulation, the original staked SPN will be transferred to the platform reserve. Repeated attempts at manipulation will result in freezing all of a user's SPN tokens.

Democratized Autonomous Platform (DAP) Implementation

Proposal System

SPN token holders will be able to participate in DAP voting to help influence the company roadmap and organization. It is important to note that SPN tokens do not correspond to equity in the company. Our goal is to simply create the infrastructure to support a democratic platform that can eventually move towards full autonomy. Our threat model will employ the following three strategies to ensure equal opportunity for DAP voters:

Mandatory Staking: Only SPN tokens that are staked for at least six months will count towards DAP voting. When staked through the smart contract, tokens cannot be transferred. A token holder who wishes to sell SPN tokens must un stake them from smart contract in order to do so. A token holder will not be able to vote on DAP proposals until they stake their SPN.

Vesting: Voters will initially not be able to vote using their entire SPN token supply. They will be able to vote on their first proposal with 10% of the SPN tokens they have staked, and this percentage will increase every time they vote on a proposal. If they do not vote on 10 consecutive proposals, their percentage of stakeable SPN tokens for DAP voting will be penalized by 5%.

Variable Stake Limits: Proposal creators will be able to select what percentage of staked SPN voters will be able to vote with. The higher the percentage, the more powerful the proposal and higher it becomes on the core team's priority list. Lower percentage limits will increase each vote's significance. Thus, each proposal creator should carefully weigh execution speed and voter voice, depending on the nature of the proposal.

Branch Autonomy

The reputation system will ultimately enable democratic management of branches without a centralized authority. Users will be able to make proposals within a branch and evaluate the proposals of other users. The Backfeed protocol will ultimately enable branches to self-moderate and enact proposals democratically to determine the future direction of a branch.

Tribunals

Users will be able to flag other users for inappropriate behavior within a branch, creating a tribunal. During this process, a random subset of users of a branch will be selected as validators, and will need to vote to determine whether the flagged user has acted inappropriately. The selected users will be notified and the next time they open the Sapient platform, they will be asked to participate in the tribunal. Once consensus is reached, votes will be weighted by reputation to ensure that trolls are adequately punished for acting against the values of a community.

TOKEN MECHANICS

Staking SPN

To stake SPN tokens, users can transfer tokens to a special smart contract with the help of ERC223. This contract will manage the staked SPN so that users can interact with the Sapien platform (post, comment, etc). Users will have multiple options to unstake their SPN, described in the section titled “Unstaking SPN.” As a result, users can easily transfer their tokens back to their wallets with ERC223, creating more liquidity for the SPN token.

Staked SPN Capacity Bonus

If users have SPN tokens in their portfolio that have been staked for more than 6 months, these tokens will receive a 15% Sapien platform capacity bonus. This capacity bonus will give 1 SPN token, that has been staked for a period greater than 6 months, the platform power of 1.15 SPN tokens.

Unstaking SPN

Users can also choose to liquidate their staked SPN to unstaked SPN at any time with 0% fees after one year. This will prevent large fluctuations of SPN price in the crypto markets and offer users a simple way to cash out without fees or destabilizing the Sapien platform. As the Sapien platform and SPN token stability increases, the conversion fees can be reduced to convert staked SPN to unstaked SPN more quickly. Platform users are encouraged to stake their SPN tokens. The default staking period is one year.

Advanced users: For precise control over their SPN, advanced users can see a live dashboard of all their SPN and a mapping from their holdings to different staked schedules.

Novice: Users will get notification when their staked SPN can be unstaked. It is at the user’s discretion if they want to continue staking their tokens or withdraw their earnings.

Users can unstake their SPN token immediately for a small withdrawal fee that depends on the remaining time left on the staking schedule. Earlier withdrawals will be more heavily penalized than late withdrawals. Withdrawals will be penalized by 0.526% per day, adjusted continuously if executed before six months, and 0.1096% per day, adjusted continuously between 6 months and 12 months. Below are the fees incurred for early withdrawal:

Percentage of SPN Converted after Time Elapsed on Staking Schedule

<1 month: 0%	7 months: 83.33%
2 months: 16%	8 months: 86.66%
3 months: 32%	9 months: 90%
4 months: 48%	10 months: 93.33%
5 months: 64%	11 months: 96.66%
6 months: 80%	12 months: 100%

SPN Consensus Mechanism

The Ethereum Foundation is planning to move to a proof-of-stake model in 2018 that would require validators to stake their Ether in order to verify transactions on the Blockchain. Therefore, it makes sense to form the SPN consensus mechanism using Proof of Stake. Our specific implementation will depend on a variety of factors, including the specifics of the complementary technologies that we plan to integrate. Plasma's proposed off-chain merkelized commitments would require us to implement a tokenized PoS that relies on the robustness of the underlying root chain and incentivizes SPN holders to operate in the economic interest of all token holders. This implementation would require SPN to bind to Plasma smart contracts to enforce protocol. Instead of mining rewards, validators participating in PoS will be rewarded transaction fees that will be proportional to the SPN the user has staked. The Plasma white paper also expounds on exit strategies for block withholding attacks or Byzantine behavior that would enable users to migrate to another chain or even root Ethereum chain with their tokens. If an attacker attempts to submit an invalid block, any other participant within the block can submit a fraud proof on a parent Blockchain, rolling back the invalid block and penalizing the attacker's staked SPN. Similar to Ethereum's Casper protocol, users on the platform would be required to have a substantial amount of SPN staked to become validators on Sapien. The exact Sapien PoS algorithm will be at the full discretion of the core developers with the intent of maximizing efficiency, security, and decentralization.

LEADERSHIP

SPN is an ambitious vision. It will be developed by experienced engineers and guided by knowledgeable advisors who are eager to make a social cryptocurrency a reality.

Core



Ankit Bhatia, Co-founder & CEO

Studied electrical engineering and computer science at UC Berkeley. Designed, developed, and pioneered the Sapien platform during his junior year. Full stack JavaScript engineer who enjoys bringing great ideas to life. Crypto enthusiast and investor since 2013. YCombinator SUS'17 graduate.

LinkedIn: <https://www.linkedin.com/in/ankitxbhatia>



Robert Giometti, Co-founder & CPO

Studied Mathematics and Electrical Engineering & Computer Science at UC Berkeley. Spearheaded and developed many of the features, algorithms, and innovations in Sapien. Theorist who understands how modern technologies will transform future societies. YCombinator SUS'17 graduate.

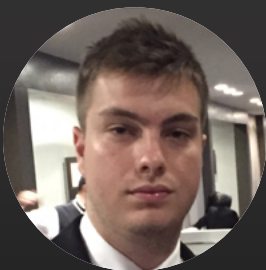
LinkedIn: <https://www.linkedin.com/in/robert-giometti-78bb889b>



Aurelien Nicolas, CTO

Product security expert, with experience in web, distributed systems, and crypto. White hat hacker. CTO of an AI-for-enterprise startup. Researching applications of cryptography and computation integrity.

LinkedIn: <https://www.linkedin.com/in/aureliennicolas/>



Matias Dorta, Marketing Strategy

Studied political science and marketing at American University and Florida International University. Previously Director of Marketing @ Bardot, The Loft at Space, More or Less, and PromotionalPartySticks.com. Founder of ICO Informer and Crypto swag.

AngelList: <https://angel.co/matias-dorta>



Christopher Lee, Marketing Manager

Currently working as Director of Marketing for a growing IT company. Specialist in digital lead generation. Passionate about marketing strategy and new marketing technologies and platforms. Crypto enthusiast and investor since 2015 and believes the surface of Blockchain technology has barely been scratched.

LinkedIn: <https://www.linkedin.com/in/1smartchris/>



Stefan Ionescu, Solidity Dev

Currently working as a CTO for a startup focused on NLP. Building machine learning models for self-driving cars in games and now focusing on applying the blockchain in the insurance world. Enthusiast of studying neurobiology and applied psychology alongside multiple programming languages.

LinkedIn: <https://www.linkedin.com/in/stefan-codrin-ionescu-205521121>



Andy Boot, Head of Operations, Europe

Co-founded a Blockchain start-up in 2014, Cointemporary—the first Bitcoin gallery. Studied Communication Design and Fine Arts. Blockchain enthusiast with a UX/UI Design background, particularly interested in user experience for the Blockchain sphere.

LinkedIn: <https://angel.co/abab>



Oliver Dinsmore, Content Strategy

Digital marketer, writer, and content creator with over 15 years of experience spreading the e-love. Created 6000 pieces of content and worked with over 20 global brands to provide creative solutions in marketing and advertising. Founder of the naturalhigh.club

LinkedIn: <https://www.linkedin.com/in/oliver-dinsmore-37027811/>

Advisors



Dr. Michaela Ulieru, Blockchain Expert

Professor Mihaela Ulieru, PhD is an expert in distributed intelligent systems working with many governments and organizations towards a healthier, safer, more sustainable and innovation-driven world. She founded two research labs leading several global large-scale projects in collaboration with international businesses such as Rockwell Automation, Daimler-Chrysler, SAP, Fanuc, BHP Billiton, Thales, NORTEL as well as government, academia and nonprofit leaders. She was appointed to numerous boards among which the Science Councils of Singapore, Canada and European Commission and recently to the Global Agenda Council of the World Economic Forum where she championed Blockchain as one of the Top 10 technologies of 2016. She advises several startups at the nexus of Blockchain and Artificial Intelligence, among which: LifeLink.com, MyBit.io, and SocialCash.io.

LinkedIn: <https://www.linkedin.com/in/mihaelaulieru>



Christian Ferri, Blockchain Expert

Christian Ferri has been in the crypto space since its early days in 2010 and built a solid network of early adopter, influencers, experts, and visionaries over the years. He founded BlockOne Ventures in 2014, one of the first blockchain agencies to work on crypto related projects. Today the agency has helped companies like Bancor, Token Card and many others to successfully raise funds through ICOs. In addition, BlockOne Ventures delivers corporate training on Blockchain to Fortune 500, organizes a crypto event series in collaboration with Draper and is managing a crypto fund for selected high-net-worth investors.

LinkedIn: <https://www.linkedin.com/in/ironsferri>



Adnan Javed, Legal & Blockchain Advisor

Adnan is a qualified Lawyer and Engineer. He has worked in the IT/Telecommunications space with international businesses such as Ericsson and Nokia for the past 10 years. Three years ago he discovered Bitcoin, which led him to explore Blockchain applications and use cases. He has worked on numerous Blockchain projects, including large scale bespoke Blockchain projects across internet of things, finance and payments sectors. He is an advisor to multiple Blockchain startups including ZenCash and ETHLend. He has a keen interest in how Blockchain technology will advance in shaping all industry sectors from an adoption, regulatory and policy perspective.

LinkedIn: <https://www.linkedin.com/in/adnan-javed>



Gregory Berkin, Business Strategy

Gregory Berkin is the Managing Director of Concours Ventures, a Silicon Valley boutique angel group focused on next generation geospatial, virtual, augmented and mixed reality (VR/AR/MR) applications for mobile devices. Greg is serial entrepreneur who founded several successful startups in Silicon Valley and New York. He has been an Apple software developer for over 30 years having founded one of the first educational software development and publishing firms for the Apple Macintosh Computer in 1984. With a computer science degree from Potsdam and an MBA from Duke University, Greg mentors, consults and advises over a dozen Silicon Valley start-ups in early-stage growth, strategy, investment, IP, and development in all areas of high technology.

LinkedIn: <https://www.linkedin.com/in/gregberkin>



Latif Nathani, Business & Marketing

Latif was most recently the CEO of eBay India. He grew the business from under \$200M GMV in 2013 to nearly \$500M GMV in 2016 and 5M+ customers. He exited with the sale of eBay India to Flipkart. Previously Latif co-founded eMemories.com (one of the first online picture sharing services) and 2 enterprise businesses at Microsoft (Systems Center and Speech Server). He also led global product marketing at Symantec and named/launched Norton 360. Latif has 26 years of technology industry experience, including 15 years at Microsoft.

LinkedIn: <https://www.linkedin.com/in/latifn>



Raghu Bala, Media Expert

CEO, NetObjex Inc based in Southern California. Formerly with Yahoo, Infospace, Primedia, Source Interlink Media, PwC, and with 3 successful startup exits. Wharton MBA in Finance, MS in Computer Science from RPI, published author and major conferences including IoT Congress, Google IO, and more. Mr. Bala has significant domain expertise in the media industry having led digital operations for over 100 brands including MotorTrend, HotRod, Import Tuner, Automobile, and Slam. His responsibilities included managing digital assets across multiple mediums including web, mobile, video/YouTube channels, and social media. The portfolio of digital assets managed had a total visitor profile with monthly statistics of over 16M unique visitors and 100M pageviews. Mr. Bala also has deep expertise in search engine advertising and audience conversion from his stints at Infospace and Yahoo. Current focus areas: Decentralized computing, Distributed ledgers, IoT, Cryptocurrencies.

LinkedIn: <https://www.linkedin.com/in/raghubala>

COMPETITIVE ANALYSIS

I. Steemit

Steemit is another social news platform that rewards content curators and creators for posting, commenting, and voting. While Sapien and Steemit both share a common goal of rewarding users' time via a decentralized Blockchain, the two differ significantly in philosophy and implementation.

a) Choice of Blockchain

Steemit is built on an independent Blockchain called Steem, which has been laden with controversies from the start. Steem developers unfairly “stealth” mined a large majority of Steem early on in the site's development while giving the impression of equal opportunity.⁵ Sapien opts for Ethereum because of its strong community, remarkable technology, maturity, and transparency. And with the second biggest coin market cap and a more organic developer ecosystem, Ethereum has excited many with its potential to surpass Bitcoin. For these reasons, SPN will be built as an ERC20 token on the Ethereum network. We have not just decided to throw the Blockchain haphazardly onto the platform—it is an absolutely essential innovation that has enabled Sapien to have an immutable ledger capable of executing smart contracts and generating token payouts for our users.

b) Distribution of Power

Secondly, Steemit has tremendous disparity in the distribution of platform power. Only individuals who have been around since Steemit's inception (also known as “whales”) have the ability to earn any substantial awards and, as such, possess a disproportionate amount of Steem power, enabling these users to selectively pick which posts become “winners” and “losers.” It is publically viewable that the top 247 accounts, most of which are held by developers and friends, hold 87.5% of the Steem power on Steemit.⁶ For a site with more than 150,000 registered users, we believe that this level of inequality is not feasible nor sustainable in the long run. Sapien intends to learn from the innovations and shortcomings of Steemit to create a democratized social news platform. Steemit's idea behind decaying and regenerative voting power was notable, as was its implementation of Zipf's Law to fairly reward long-tail posts. To mitigate any possible disparity within Sapien, the largest SPN holder will have the exact same voting power as a newly registered user. To minimize manipulation, voting power will instead be acquired as a function of how much reputation a user has earned through quality contributions on the platform.

c) Barriers To Entry

Lastly, Steemit faces significant obstacles to appealing to a broader market. Crypto economics are already challenging for the non-technical consumer. Steem further complicates this with three different Steem tokens: Steem Dollars, Steem Power, and Steem. Not only is it surprisingly difficult to understand the use cases of each, but the entire endeavor seems to discourage crypto novices from joining Steemit. The average user should not be required to have knowledge of crypto mechanics or how to optimize their token portfolio to maximize rewards. Our goal with Sapien will be to continually develop two parallel user experiences: one for the novice and one for the advanced user. For the novice, Sapien will automatically manage wallets, addresses, and two-factor authentication with a usability similar to that of Coinbase. Advanced users will have direct and full access to their wallet, along with various other metrics and customizations. By differentiating these two target users, the Sapien platform and the SPN token will be in the best position for adoption by the most number of people.

5 <https://bitcointalk.org/index.php?topic=1427230.0>

6 Distribution of Steem power can be found here: <https://steemd.com/distribution>



II. Synereo

a) Technological

6. Synereo's older AMP token is not an ERC20-complaint token and its total supply is fixed. This prevents the token from taking advantage of the Ethereum Blockchain base security, the fantastic community, and continual developments like Plasma and Raiden.
7. Synereo intends to store too much information on the blockchain. This inherently limits its usability. Our multimedia storage options include IPFS, Swarm, and FileCoin—all of which will scale nicely and improve performance drastically.
8. WildSpark is an extension, whereas Sapien is an entire ecosystem. Our long-term vision includes opening up a developer portal to leverage the ingenuity of the open-source community where third-party applications can build and monetize on our platform while prioritizing user privacy.

b) Token Utility

The biggest difference between the two is in token utility is how integral SPN will be for Sapien's decentralized marketplace. Our marketplace will be powered by our token and offer users premium integrations, features, and content that can't be found anywhere else. The token will let creators set their prices and consumers enjoy a variety of community-sourced physical and virtual items. The Sapien Network will also let users share ad revenue in SPN tokens with users.

c) Philosophical

SPN tokens will be minted proportionally to the value created on Sapien, distributing the rewards among creators and curators. AMPs fixed supply makes people hesitant to give up something that is considered scarce. Essentially, Synereo's offering, Wildspark, is just a crypto-tipping extension that permanently asks its users whether it's worth "AMPing" something. We hope to eliminate this cognitive overhead with a sustainable secondary distribution model for SPN tokens that scales with the number of users and value generated.

RISK ANALYSIS

Quantum Computing Attacks

Public-Key Cryptography

Ethereum, and consequently all ERC20 tokens, use a system involving pairs of public and private keys. In order to maintain security, only the owner of tokens at a given address should know the associated private key. If anyone else is able to determine the private key associated with an address, they will be able to transfer all of the tokens at that address. For this reason, it is of the utmost importance that the private key remain hidden.

Elliptic Curve Cryptography

Elliptic curve cryptography is an approach to public-key cryptography based on the algebraic structure of elliptic curves over finite fields. Elliptic key cryptography requires smaller keys compared to other public-key methods such as RSA. Ethereum uses the Elliptic Curve Digital Signature Algorithm (ECDSA) to secure transactions.

Elliptic Curve Discrete Logarithm

Shor's Algorithm, invented by Peter Shor in 1994, is a quantum algorithm that solves the integer factorization problem, finding the prime factorization of an integer N in polynomial time. Shor's Algorithm can be extended to solve the discrete logarithm problem (DLP) in polynomial time. Solving the elliptic curve discrete logarithm problem (ECDLP), which is a specific case of the discrete logarithm problem, would allow one to determine the private key from a public key, thus putting the security of all addresses at risk. The security of elliptic curve cryptography is based upon the intractability of the ECDLP on a classical computer. Recent work by Zalka, Proos and Kaye has led toward quantum algorithms to solve the ECDLP.⁷ Ethereum's Metropolis update permits users to define their own security model. Toward this end we will ensure that all SPN addresses use Lamport signatures, which are currently believed to be quantum resistant.

Bots

Due to the incentivized nature of the Sapien platform, we believe that we are a potential target for botting. In order to reduce the risk of such manipulation, we will employ several precautionary measures. Users will be required to pass a captcha in order to create their account and post or comment after long periods of inactivity. In addition, users must verify either a phone number or an email address associated with their account. Accounts suspected of using bots for a malicious purpose will have their SPN tokens seized and deleted promptly.

Sybil Attacks

All peer-to-peer networks are susceptible to the problem of adversaries working counter to honest participants. For cryptocurrencies, one of the goals of the participants in the network is to reach a consensus via a majority vote. This means that any adversary with the resources to allocate many IP addresses could influence the consensus of the entire network. One of Bitcoin's key innovations was the use of Proof-of-Work (PoW) as a way of "determining representation in majority decision making" through computation. PoW requires nodes to solve a cryptographic problem, which is CPU-intensive to calculate, but easy for other participants to verify. As a consequence, an attacker, wishing to alter the history of the Blockchain is required to solve the PoW for their block and every subsequent block that came after. As long as the number of honest nodes is greater than the number of adversary nodes, it is

⁷ <https://arxiv.org/abs/quant-ph/0301141>



probabilistically infeasible for this event to occur.

Sapien will eventually migrate to a mechanism similar to the proposed Casper protocol, which is a deposit + penalty PoS. In this scheme, validators will be punished for contradicting themselves.

Inflation

Excess minting of SPN within the Sapien ecosystem will result in unfair dilutions for SPN holders. As opposed to traditional companies, one clear advantage of Sapien will be the ability to directly share economic growth with its users. All new SPN that will be minted aims to distribute the value generated back to the content creators. To prevent the devaluing of SPN, we will focus on maintaining a steady inflation rate that will closely mirror that of Ether's. The first year will have a projected inflation rate of 5%, as each new user joining the platform will be given some initial SPN to use the platform. Users who register early on will be given more SPN tokens than those that register later. Ethereum has plans to reduce Ether issuance before migrating to a Proof-of-Stake with the Serenity milestone. SPN will follow a similar trajectory, closely emulating the inflation rate of the Blockchain it is based on.

Sapien will be well-equipped to handle fluctuations in the digital currency value. Mechanisms to increase SPN inflation rate include increasing utilized SPN interest rates and increasing digital content payouts. Conversely, SPN can be reduced by decreasing payouts and lowering interest rates. Even more precise control can be established by burning excess SPN tokens in reserves or storing excess SPN tokens in reward pools to be distributed in a user reward pool annually. All actions will be performed transparently with the intention of stabilizing, maintaining, and scaling a highly valuable token.

TECHNICAL CONSIDERATIONS FOR A DAPP



To ensure that the integration of SPN works seamlessly for all its users, the Sapien Platform will initially be a hybrid centralized-decentralized web application. While the social platform will be centralized, all SPN transactions (previously outlined in the token utility section) will be decentralized and handled by the Ethereum Blockchain. As Sapien and the SPN token approach stability, our team will begin decentralizing more components of the social platform, as illustrated by our roadmap. To combat censorship and guarantee the web immortality of content, Sapien will first transition to Swarm or IPFS (Interplanetary File System) system to store posts, comments, and media without a central authority. Currently, the application is not decentralized to allow our team to better understand how the token will work within the ecosystem and carefully moderate any attempts to manipulate the payout system. Additionally, Vitalik Buterin has promised several improvements to Ethereum, most of which are required to scale to millions of users. The Ethereum Blockchain needs to increase transaction speeds and lower prices to even entertain the thought of a decentralized social news platform at the same scale as Reddit. As technological improvements are made, the core development team will move the Sapien platform over to a complete DApp.

Data

Due to nature of the Blockchain, any data stored on it is both public and expensive. Therefore, it is logical for us to minimize the amount of data stored on the Blockchain. Data security, redundancy, and performance will always be a priority for us. To eventually support a platform that is fully decentralized, censor-resistant, and immutable we will plan to use off-Blockchain storage like Filecoin or Swarm.

Beta Release

The current implementation of Sapien is built with an open source, full-stack Javascript framework called Meteor.js.⁸ The framework is fast, cross-platform, and is equipped with many features right out of the box. Moreover, Meteor is the most common framework used to build DApps. With strong community support and frequent optimizations, Meteor was the perfect framework to build Sapien quickly and securely. For our chat solution, we are using a forked version of Rocket.Chat, another open-source chat solution built with Meteor. Rocket.chat is highly configurable and comes standard with channels, groups, video, audio support, and much more.⁹ Although Rocket.Chat is perfect for a centralized platform, a decentralized release of Sapien will require a separate chat DApp built with the Whisper communication protocol.

8 <https://www.meteor.com>

9 <https://rocket.chat>

SPN Integration

Prior to the completion of the SPN token sale, the Sapien beta platform will have an integration of SPN on the Ethereum mainnet. The Sapien platform will allow users to post, comment, and vote, powered by the SPN token. Thus, immediately after the completion of the token sale, the SPN token utility can be explored by our contributors.

Search

Search is currently handled by AWS's ElasticSearch Service.¹⁰ Elasticsearch is a secure, fast, and scalable solution for indexing documents with high availability. Our team will stay up to date with any new developments for search solutions that work with the Ethereum Blockchain. One such solution is a node package called Elastic Ethereum.¹¹

Storage

AWS S3 buckets are used to store multimedia data for posts, comments, and users. AWS S3 is an affordable and scalable solution for data. Although it will suffice for Sapien, the data will be migrated over as soon as an alternative, scalable solution is offered.

Decentralized Release

As the Ethereum ecosystem matures, new and powerful technologies will emerge. Currently, we have outlined several technologies that can help us create a fully decentralized social platform.

Blockchain

Metropolis

Metropolis provides usability improvements, such as letting recipients pay gas fees instead of senders, anonymous transactions, and improvements to smart contracts. This is a major step in the development of Ethereum. By adding the ability to select who pays for gas fees, Sapien will be able to more fairly implement premium content and tipping. Anonymous transactions also bolster the privacy of the platform and will be used for transactions that require more privacy.

Sharding

Ethereum has invented a novel way to scale Ethereum's Blockchain through sharding. Sharding simplifies the way the Blockchain is validated by enabling addresses to form groups that internally approve transactions and communicate with other shards. As a result, Ethereum can scale more efficiently because not all nodes need to execute every transaction. To reduce protocol complexity, developers do not need to do additional work to implement sharding.

Off-chain

Whisper¹²

Whisper is a communication protocol that enables DApps to communicate with each other. It is ideal for chat applications in the Ethereum ecosystem that require secure communications between two entities. By default, all of Sapien users' communications will go through Whisper, and all extended functionality not immediately supported by Whisper will be handled through centralized servers.

¹⁰ <https://aws.amazon.com/elasticsearch-service>

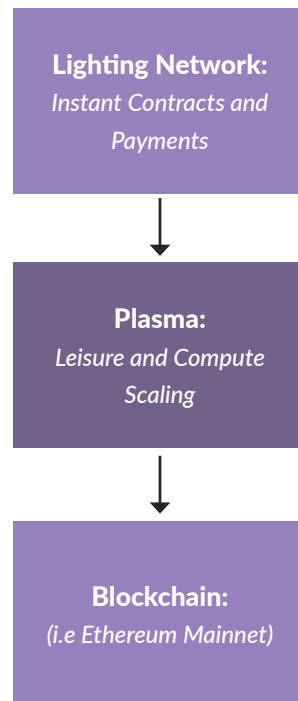
¹¹ <https://github.com/nexusdev/elastic-ethereum>

¹² <https://github.com/ethereum/wiki/wiki/Whisper>



Raiden¹³

Raiden increases the scalability and performance of Ethereum-based applications. Raiden enables off-Blockchain transactions that avoid the Blockchain consensus bottleneck by creating a deterministic graph layer for nodes to communicate even if they are not directly connected. State channels could be essential to Sapien, as it permits faster microtransactions and lower fees for all actions on the platform. The performance of SPN will scale linearly with the number of users on the network, providing Sapien with the foundation to scale to millions of users.

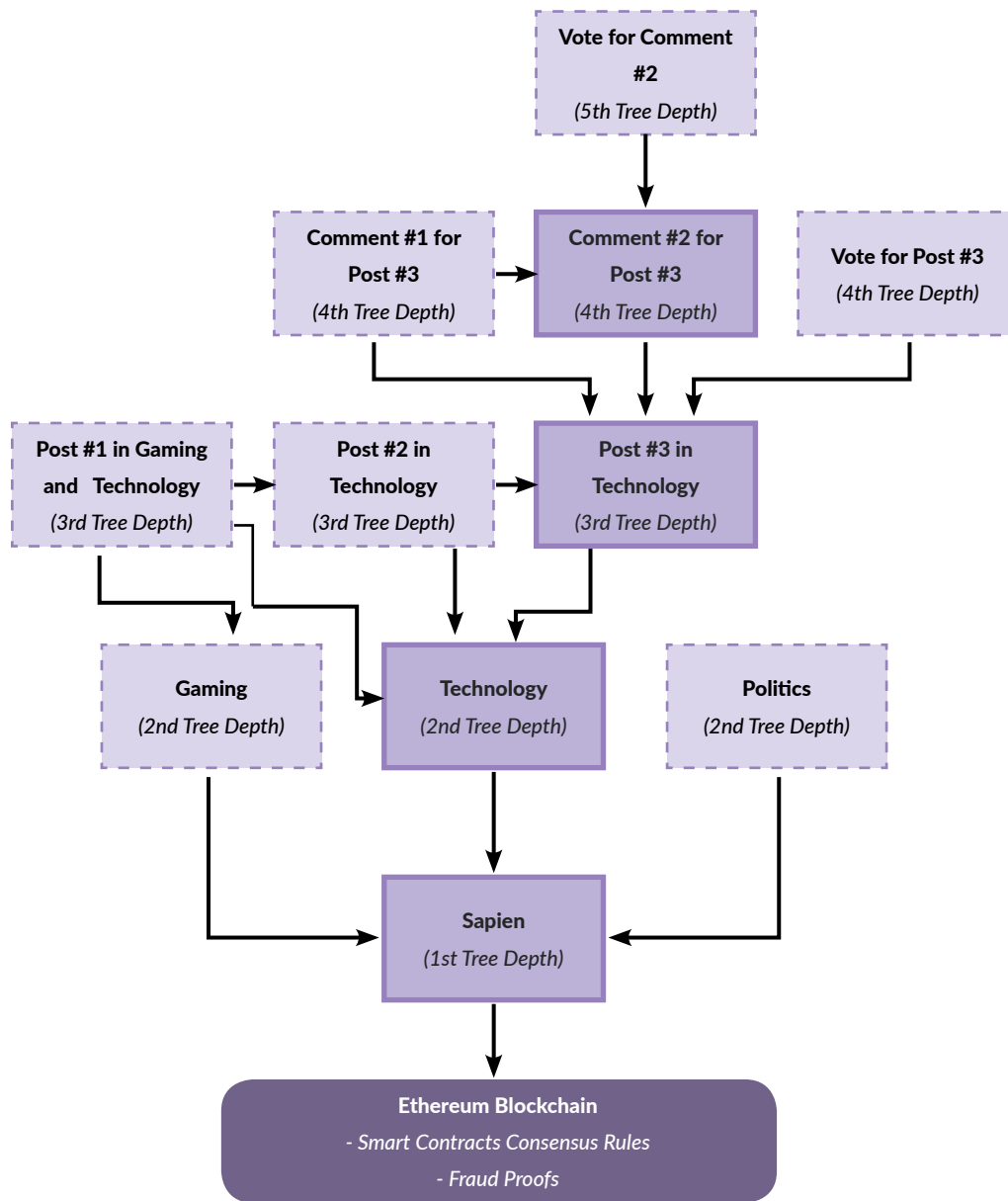


Plasma¹⁴

“Plasma is a proposed framework for incentivized and enforced execution of smart contracts which is scalable to a significant amount of state updates per second (potentially billions) enabling the Blockchain to be able to represent a significant amount of decentralized financial applications worldwide.” Plasma offers additional improvements that unburden transactions from Ethereum’s Blockchain, which makes it possible to decentralize a social platform. If our core team decides Plasma is the best approach, then a tokenized Proof-of-Stake will be chosen as the consensus mechanism described in detail in the Plasma white paper. The following diagram illustrates a Sapien implementation with Plasma:

13 <https://raiden.network>

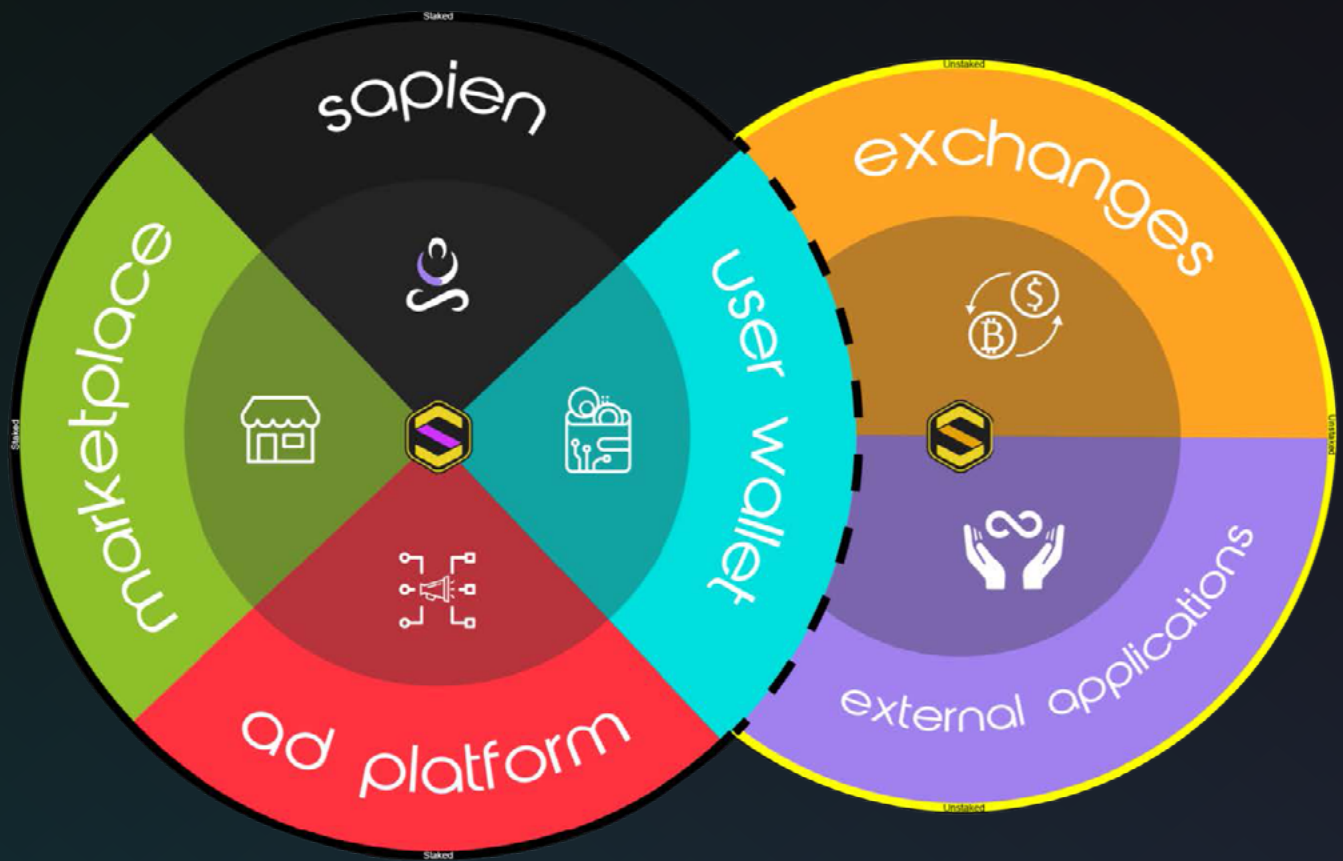
14 Reddit Clone built on the Blockchain. <http://plasma.io/plasma.pdf>



IPFS & Swarm¹⁵

Sapien will transfer all multimedia (images, videos, attachments) from AWS S3 to decentralized databases. Currently, the two most popular decentralized storage solutions include IPFS and Swarm. Both are content delivery protocols that work with a network of cooperating nodes that store data in encrypted chunks. They also share the following properties: censorship-resistance, permanent content, redundant storage, and efficient scalability. While IPFS has already been released and begun building a large community, Swarm is still in the early stages of its developers testnet. IPFS can potentially work with any Blockchain, whereas Swarm is part of the Ethereum ecosystem. As a part of the Ethereum p2p network layer, Swarm adds monetary incentivization and the benefits of smart contracts. Filecoin adds incentivization to IPFS, but it relies on its own altcoin and can only implement positive incentives. Similar to Plasma and other off-chain solutions, Swarm will handle all major disputes in the root Ethereum Blockchain, which will ensure that all content on Sapien is protected. Sapien will ultimately use one of these solutions for our decentralized release. Rather than committing to one storage solution, our development team will continually monitor the progress of both of these protocols and any new innovations. Eventually, we will utilize the most secure, robust, scalable, and performative solution.

15 IPFS vs. Swarm: <https://github.com/ethersphere/go-ethereum/wiki/IPFS-&-SWARM>



REFERENCES

Ethereum. Ethereum. <https://ethereum.org>.

Satoshi Nakamoto. Bitcoin: A Peer-to-peer Electronic Cash System. <https://bitcoin.org/bitcoin.pdf>, Oct 2008.

Joseph Poon and Tadge Dryja. Lightning Network.
<https://lightning.network/lightning-network-paper.pdf>, Mar 2015.

Joseph Poon. Vitalik Buterin. Plasma White Paper. <http://plasma.io/plasma.pdf>

Vitalik Buterin. Ethereum Sharding FAQ. <https://github.com/ethereum/wiki/wiki/Sharding-FAQ>

Raiden Network. <https://raiden.network>

Steem White Paper. <https://steem.io/SteemWhitePaper.pdf>

BlockGeeks. Smart Contracts: The Blockchain Technology That Will Replace Lawyers
<https://blockgeeks.com/guides/smart-contracts>

Meteor Web Framework. <https://www.meteor.com>

RocketChat Platform. <https://rocket.chat>

Coindesk. Metropolis: Ethereum's Next Big Upgrade.
<https://www.coindesk.com/metropolis-today-shifting-plans-ethereums-next-big-upgrade>

Github, Ethereum/Whisper. <https://github.com/ethereum/wiki/wiki/Whisper>

IPFS. <https://ipfs.io>

Proos, John, and Christof Zalka. "Shor's Discrete Logarithm Quantum Algorithm for Elliptic Curves."
<https://arxiv.org/abs/quant-ph/0301141>

IPFS & Swarm. <https://github.com/ethersphere/go-ethereum/wiki/IPFS-&-SWARM>

Statista. "Number of Social Media Users."
<https://www.statista.com/statistics/251666/number-of-digital-buyers-worldwide>

Boyd, Andrew W. "A Longitudinal Study of Social Media Privacy Behavior." (2011)
<https://www.semanticscholar.org/paper/A-Longitudinal-Study-of-Social-Media-Privacy-Behav-Boyd/95285bbb96187f3252a4afd3b6df07060c29c4bd?tab=abstract>

Business Live. "Putting the world's money into perspective."
<https://www.businesslive.co.za/fm/fm-fox/numbers/2017-07-06-infographic-puts-the-worlds-money-into-perspective>