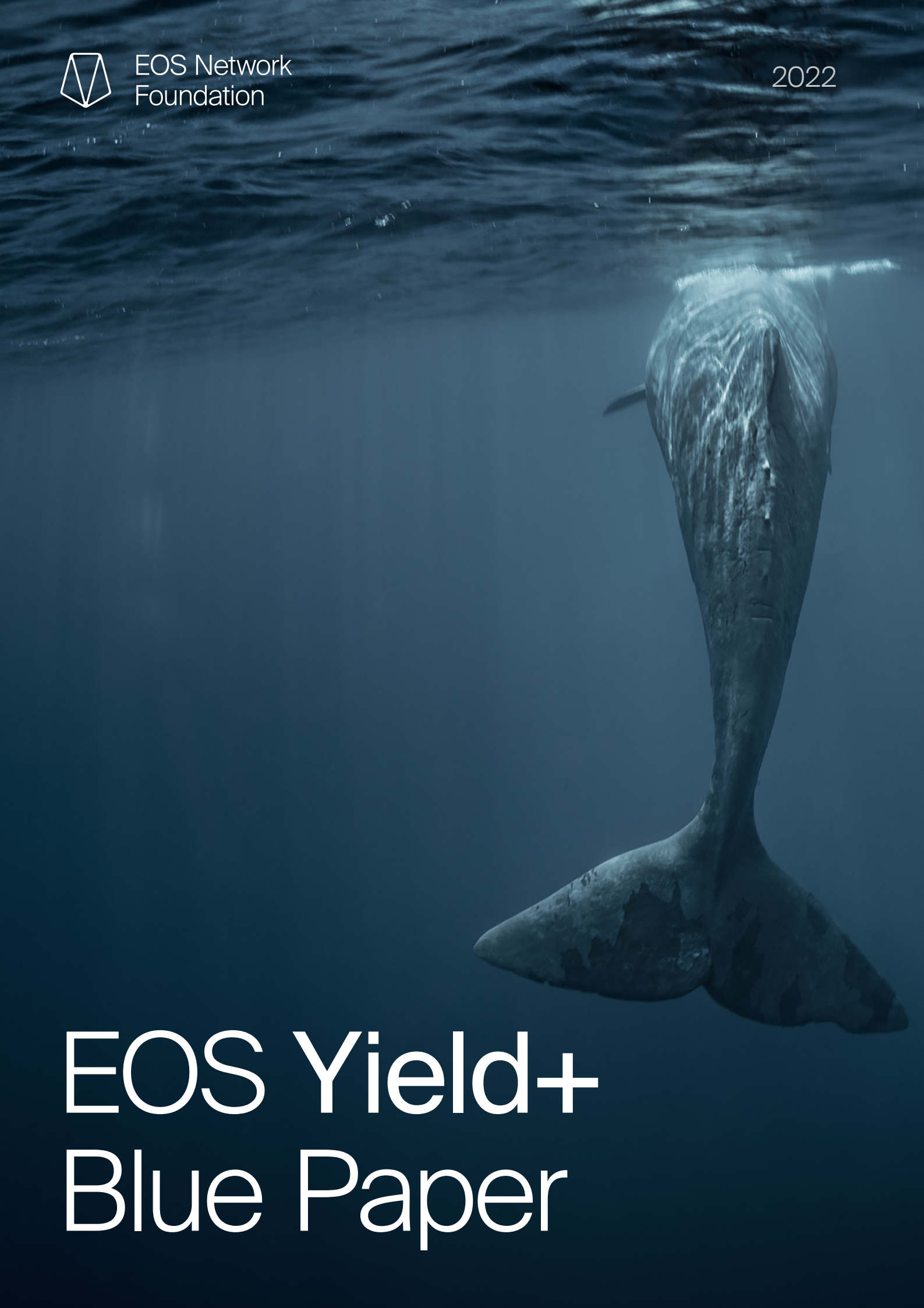
EOS Network Foundation

2022



EOS Yield+ Blue Paper

Table of Contents

I. Introduction

A. Overview

Yield+ is an EOSIO working group and community initiative that was started to help develop the EOS DeFi ecosystem, grow the amount of total value locked in EOS DeFi, and increase opportunities for users to earn yield off of their EOSIO assets.

DeFi, or decentralized finance, has quickly proven itself to be one of the killer apps of blockchains and smart contract platforms. DeFi competes with legacy finance by offering users more control, ownership, and earning potential.

Today, a number of smart contract platforms have robust DeFi ecosystems that compete for users across the crypto space. The Yield+ Working Group was formed to make EOS a more competitive and attractive platform for DeFi applications, builders, and users.

Our goal is to create a system of economic incentives that brings more liquidity and opportunity for on-chain yield to the EOS Network. To do this, we have designed a Liquidity Rewards Program for EOS that we have outlined and analyzed in this paper.

B. Abstract

DeFi is currently fractured across many different blockchains. Chains like Ethereum and Solana lead the way, while others like BSV, Avalanche, and Fantom are growing rapidly. Unfortunately, EOS is not currently participating meaningfully in this market - it lags behind other comparable chains in terms of overall DeFi activity.

Other chains, notably Fantom, have introduced Liquidity Rewards Programs that have greatly increased the amount of developer and user activity within their DeFi offerings. These programs create frameworks for measuring the total amount of DeFi activity across various decentralized applications (dApps) and services and then provide token rewards to those that generate the most activity.

This paper presents an overview of comparable programs on other chains and proposes a custom Liquidity Rewards Program for the EOS Network. Our goal is to adapt and improve upon existing programs to benefit the EOS DeFi ecosystem as a whole, bring more activity on-chain, and increase earning opportunities for users.

C. Team

The Yield+ working group consists of a number of individuals from various companies and teams throughout the EOSIO ecosystem including: EOS Nation, Greymass, 0rigin, Defibox. Joe Louis, Pizza DeFi, and EOS Asia held advisory roles and contributed significantly to the research, writing, and work that went into this paper.

D. Summary

We strongly believe that DeFi is one of the most powerful existing use cases for smart contract platforms, and that driving this activity onto the EOS Network should be a priority for the community.

In this paper, we will attempt to show with objective data the success of similar programs on other blockchains. Then, we propose a design for a custom Liquidity Rewards Program for the EOS Network, as well as a plan to build and maintain that program.

II. DeFi Ecosystem Overview

A. Introduction

Yield+ seeks to establish an incentive mechanism for rewarding developers of DeFi projects and individual participants in the EOS ecosystem. Through this mechanism, we intend to grow the value locked within the ecosystem and promote rapid development on the EOS Network. DeFi is an indispensable piece of blockchain infrastructure and is a prerequisite to the success of any given chain. In this section, we provide an overview of the broader DeFi landscape and some of the incentive programs it has to offer.

B. Key Terms

DeFi: Decentralized finance, used to refer to financial primitives built on smart contracts that are open and permissionless.

TVL: Total value locked refers to the total amount of value held in the DeFi smart contracts on any given blockchain.

Smart Contract: Self-executing contracts, built on a blockchain, that run when predetermined conditions are met.

Oracle: An oracle is a bridge that takes a given piece of information or data and establishes it as a value on-chain that can be used by smart contracts.

Liquidity: A measure of the availability of liquid assets in a given market.

Volume: A measure of the total value of assets exchanged in a given time period.

C. What is DeFi?

Decentralized Finance (DeFi) offers public access to a variety of old and new financial instruments such as virtual currencies, monetary contracts, derivatives, options, borrowing, lending, and many more - all using smart contracts on a blockchain. It does not rely on traditional financial intermediaries such as banks, brokerages, insurance companies, or centralized exchanges; rather, it disintermediates these legacy services.

DeFi protocols are a set of rules or standards enforced by smart contracts on publicly accessible blockchains that govern various activities. Such protocols are built by developers to allow users to access products and services directly through smart contracts, either peer to peer or peer to contract.

Instead of using traditional financial intermediaries, DeFi uses decentralized applications, referred to as dApps. dApps offer financial services which are run autonomously by smart contracts on a DeFi protocol. Smart contracts are computer programs running on smart contract-capable blockchains that perform automatic functions when predetermined conditions have been met.

D. What is TVL?

TVL refers to Total Value Locked and is composed of assets that are deposited on DeFi platforms as collateral. As outlined by Benedict George in this January 2022 Coindesk[1] knowledge-base piece, TVL has been used as a metric to gauge interest in different cryptocurrencies.

According to DefiLlama,[2] on March 12, 2022, the cumulative TVL across DeFi platforms was $198.27 billion. Ethereum accounts for more than half of this figure at 54.56%. On the same date, EOS accounted for $247.11 million in TVL, ranking 25th among all cryptocurrencies that use DeFi.

The Coindesk[1] piece further explains that TVL is calculated by adding the total amount of cryptocurrency that is deposited for staking, lending, and liquidity pools; each of which are common functions of consensus mechanisms on Proof of Stake and Delegated Proof of Stake blockchains with DeFi offerings.

Staking[3] is when a person, known as a "staker" (or validator), locks a certain amount of a cryptocurrency for a specific period of time to contribute toward network security via its native consensus mechanism. In exchange for this, stakers commonly receive rewards from the network for their active involvement.

People who hold cryptocurrency assets may further generate passive income through DeFi by lending.[4] Crypto investors can deposit their funds to lend and receive interest payments. The dApps that are used to lend typically offer higher interest rates than traditional financial institutions.

Cryptopedia defines a liquidity pool[5] as cryptocurrency assets that are pooled via crowdsourcing into a smart contract to increase liquidity on a decentralized exchange. Liquidity refers to the ease in which a cryptocurrency token can be exchanged for another token. Liquidity pools incentivize users to provide liquidity for a share of trading fees, which aims to solve the problem of illiquid markets. Because liquidity pools are managed by smart contracts, buyers and sellers do not need to match their desired assets through a human intermediary; the smart contracts manage the transactions.

The sum of the financial value of the cryptocurrencies and tokens that are involved in staking, lending and liquidity pools under DeFi determines TVL.

E. Benefits of DeFi

In a world that is increasingly dominated by financial intermediaries, DeFi provides an open, transparent, and credibly neutral alternative.

DeFi allows any two parties to engage in a secure and direct financial transaction without involving an intermediary or central authority. Traditionally, entire subsets of the human population have been excluded from the financial system because of their location. DeFi allows anyone with an internet connection to participate in a global financial system that is decentralized, permissionless, and neutral.

In addition, DeFi can substantially lower the costs of transactions as users may receive better interest rates than those at traditional financial institutions with large overhead and profit goals.

F. Risks of DeFi

Some companies and organizations have identified risks with DeFi. Major risks, as outlined by Jesus Rodriguez in this February 2022 Coindesk article,[6] may include the following:

Intrinsic Protocol Risks

Intrinsic Protocol Risks are flaws within a DeFi protocol's design, created by human error. These risks can emerge even when the protocol is working as expected and can include bugs in coding, contract limitations, resource shortages, or high fees for transactions.

Exogenous Protocol Risks

Exogenous Protocol Risks occur when DeFi transactions expose a DeFi protocol to factors that may alter its behavior. For example, a third party integration (such as an oracle[7] which provides external data to inform a blockchain when to dispense money) may be manipulated. Or, an attacker may take advantage of a bug within a dApp's smart contract and exploit the contract for financial gain.

Governance Risks (Centralization/Decentralized Ownership)

Governance Risks for DeFi involve the spectrum of decentralization and centralization. As stated in this Bis Quarterly Review,[8] in the Bis Quarterly Review, although DeFi is by default decentralized, certain features of DeFi, such as requiring consensus on certain decisions, may lead to a concentration of power. Centralization is a risk for DeFi as a small number of parties could have a large influence on decisions.

Underlying Blockchain Risk (Operators / Miners / Block producers)

Underlying Blockchain Risk involves the type of blockchain that a DeFi protocol is operating on. Each blockchain has its own consensus mechanisms and there are limitations for which services are available on it. This feature may lead to vulnerabilities for a DeFi protocol on that blockchain. For example, some contend that by requiring proof-of-stake (a more efficient alternative to the proof-of-work consensus mechanism), a few people with large stakes in a specific blockchain could collude and make decisions that benefit their small cohort at the expense of other stakeholders.

Market Risk

Like any type of investment, DeFi transactions are subject to various market risks. The value of cryptocurrencies can fluctuate wildly, and this volatility may lead to losses. If the market performance is poor relative to their position, a user could see a decline in assets if they choose to exit the pool. Impermanent loss is a financial loss that occurs if you withdraw your cryptocurrency from a liquidity pool at a lower rate than the amount it was when you initially invested.

Regulation Risk (AML)

Because DeFi applications theoretically do not involve third party intermediaries such as banks, brokerages, or lenders, they are not subject to the same enforcement as those intermediaries are. As legislators become more aware of DeFi, they may implement anti-money laundering (AML) laws and regulations that could affect DeFi transactions, even for those that are compliant with the law. See Regulatory Background in the Treasury section for more.

Suitability (to retail / target audience)

Given that DeFi transactions are complex in nature, some transactions are not suitable for all retail consumers. As outlined by Sanjib Saha in this January 2022 opinion piece,[9] it can be difficult to navigate the different services, staking, and lending opportunities under each DeFi protocol - presenting risks to target audiences as they attempt to safely access certain features of DeFi. Many dApp developers are continuously seeking to evolve and provide solutions to these risks.

G. Types of Attacks in DeFi

DeFi transactions may be subject to various forms of attacks including rug pulls, phishing, flash loan attacks, and front running. This section briefly describes those types of attacks.

DeFi Rug Pulls

A DeFi Rug Pull[10] occurs when a crypto developer performs a heist on investors and takes away their money. Shaurya Malwa notes in her December 2021 article,[11] in 2021, rug pulls accounted for 37% of scam revenue in crypto, representing $2.8 billion in losses.

Phishing Attacks

Phishing attacks[12] occur when a hacker sends a message intended to entice recipients to give away legitimate information such as a password or private key. With that information, the hacker could access funds.

Flash Loan Attacks

Flash Loan Attacks[13] are when someone takes out an uncollateralized loan (known as a flash loan) from a protocol and manipulates the market to act in their favor. This is the most common type of DeFi attack. One method of a flash loan attack is a sandwich attack, where a hacker will place two orders for a currency ahead of and behind an original transaction to manipulate the price of that asset for their advantage.

Front Running

Front Running on Decentralized Exchanges[14] (DEX) refers to when miners receive a preview of future transactions, providing them opportunities to manipulate the market. When a trade is broadcast to the blockchain, it must be verified by miners who decide which transactions to include in the following block. The frequency of incoming transactions often outweighs the capacity of the subsequent block, so transactions that are not mined right away sit in a mem-pool for pending transactions. The blockchain mempool information is transparent, therefore frontrunners can enter their trades first to profit before the transactions in the mempools are completed.

III. External Liquidity Incentives

Many public chains such as Fantom and Polygon have opened liquidity mining, which not only attracts many individual developers, but also well-known projects such as AAVE and Uniswap. The on-chain data shows that the number of new addresses, active addresses, TVL and market capitalization have increased significantly. Fantom previously ranked among the top 5 cryptocurrencies and continues to be one of the most popular public blockchains.

A. Fantom Liquidity Mining Incentives

31/08/2021 Version 1: Fantom Incentive Framework[15]

Tier	TVL requirement	Rewards/year	Rewards/ month	Ratio	TVL Yield	Minimum TVL Standard Deviation Value
1	$5M-$50M	1M FTM($800K)	$67K	1:6.25	16%~1.6%	
2	$50M-$100M	1.8M FTM($1.4M)	$117k	1:35.7	2.8%~1.4%	10x
3	$100M-$200M	5M FTM($4M)	$333k	1:25	4%~2%	2x
4	$200M+	12M FTM($9.6M)	$800k	1:20.8	≤4.8%	2x

Date	Token Price	Marketcap	TVL
31/08/2021	$0.80	$2.01B	$691.96M
Liquidity Reward Ratio	**Rewards in $USD**	**Rewards Relative to Marketcap**	**RewardsRelative to TVL**
1:20	~$296M	14.8%	42.78%

16/11/2021 Updated to Version 2: Fantom Incentive Framework[16]

Tier	TVL Requirement	Rewards/Year	Rewards/mo	Ratio	TVL Yield	Minimum TVL Standard Deviation Value
1	$20M	500K FTM ($1M)	$83K	1:20	5%~2.5%	
2	$40M	900K FTM ($2M)	$166K	1:20	5%~2%	2x
3	$100M	2.5MM FTM ($5M)	$416K	1:20	5%~1.9%	2.5x
4	$260M	6MM FTM ($13M)	$1M	1:20	≤5%	2.6x

B. Fantom Project Eligibility

Version 2: Fantom Incentive Framework is presented below.16

To determine if a project qualifies for a Fantom reward tier

Step 1 – Calculate the dollar value of the reward

Reward dollar value = (Current $ price of FTM * FTM Reward for tier)

At the time of writing, FTM is $2.25. Taking the 500,000 FTM tier as an example, the reward dollar value is: ($2.25 * 500,000FTM) = $1,125,000.

Step 2 – Calculate minimum required TVL

To calculate the minimum required TVL, multiply the reward dollar value by 20. In other words, the reward dollar value represents 5% of the required total TVL.

In this case, to qualify for the 500,000 FTM reward tier, project TVL (time-weighted) must be at least: ($1.125M * 20) = $22,500,000.

Projects must perform this calculation before applying.

Acceptance and Reward Details

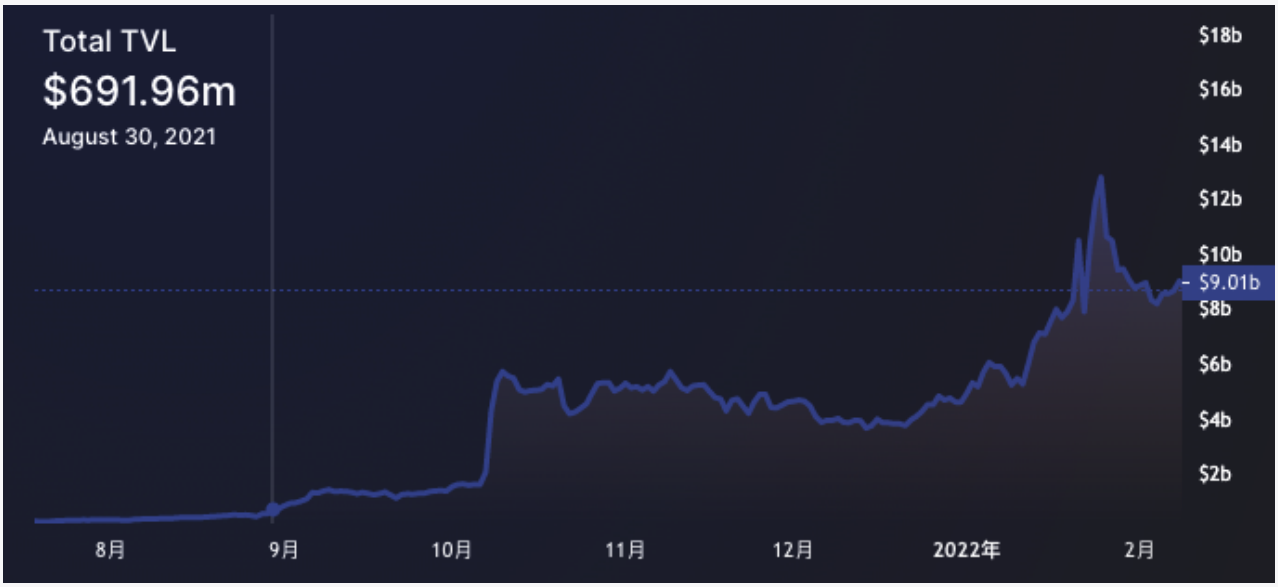
Marked from the date the protocol achieves the requirements, a two-month cliff ensues.

Rewards are vested monthly over 12 months. The project administrator tracks protocol TVL on an ongoing basis. If the protocol TVL falls below the minimum threshold during the vesting-period, vesting is paused until minimum TVL is regained.

If the TVL of a protocol that applied for a lower reward rises above the required average TVL of a higher tier – for example, from the minimum TVL for the 500K FTM reward tier to qualifying TVL for the 900K FTM reward tier – that project will receive higher rewards over the remaining vesting period. For TVLs that dip from one tier to a lower tier, the inverse will apply. The purpose of this incentive program is to support the Fantom ecosystem. If it is reported that FTM rewards are misused in a way that is negative to the ecosystem, the Fantom Foundation reserves the right to halt rewards to the protocols in question.

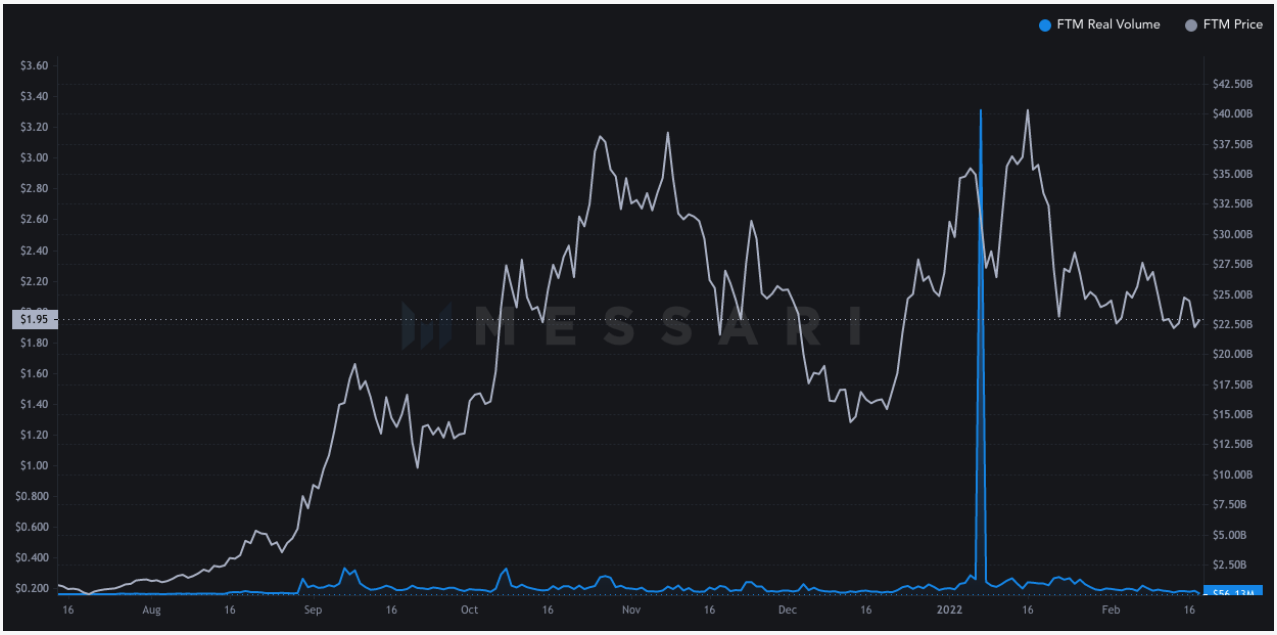
C. Fantom Liquidity Mining Data Analysis

Fantom TVL[17]



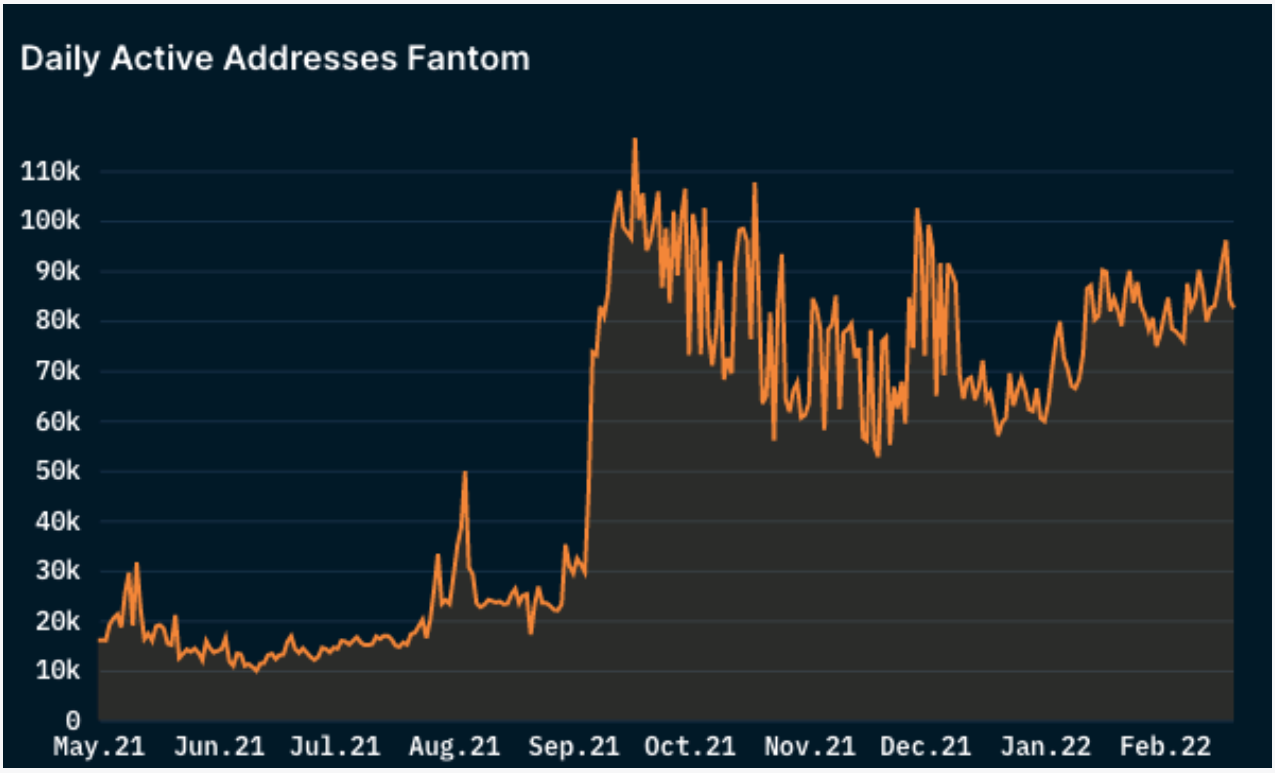
Date	Token Price	Total TVL
27/08/2021	$0.47	505.5M
Period maximum	$3.25 (+591%)	12.8B (+2432%)
16/02/2022	$2.08 (+342%)	8.54B (+1589%)

Real Volume[18]



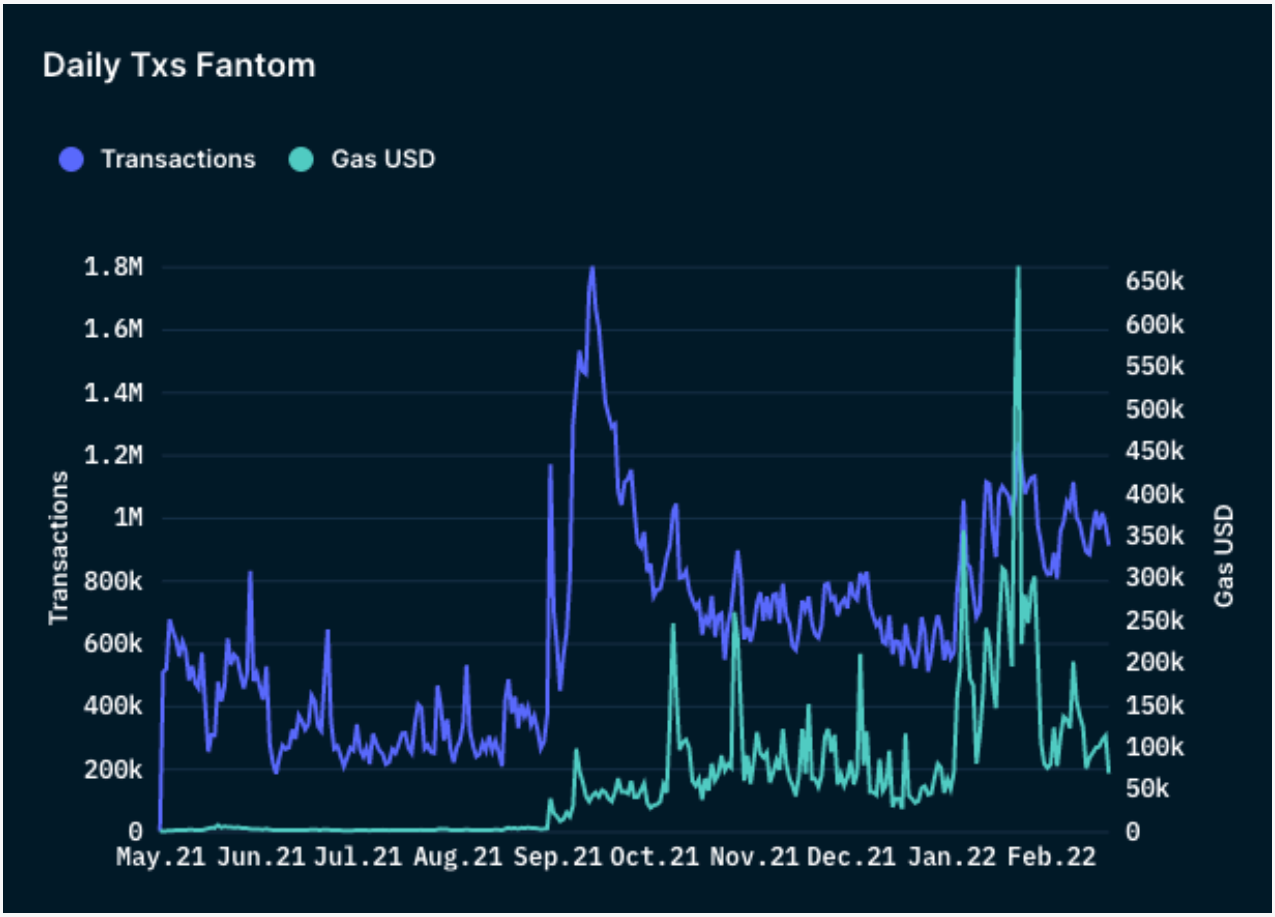
Date	Real Volume
26/08/2021	$123M
Period maximum	$40.31B (+32672%)
16/02/2022	$221M (+79.7%)

Daily Active Addresses[19]



Date	Active Addresses
27/08/2021	22115
Period maximum	116583 (+427%)
16/02/2022	91936 (+316%)

Daily Transactions[19]

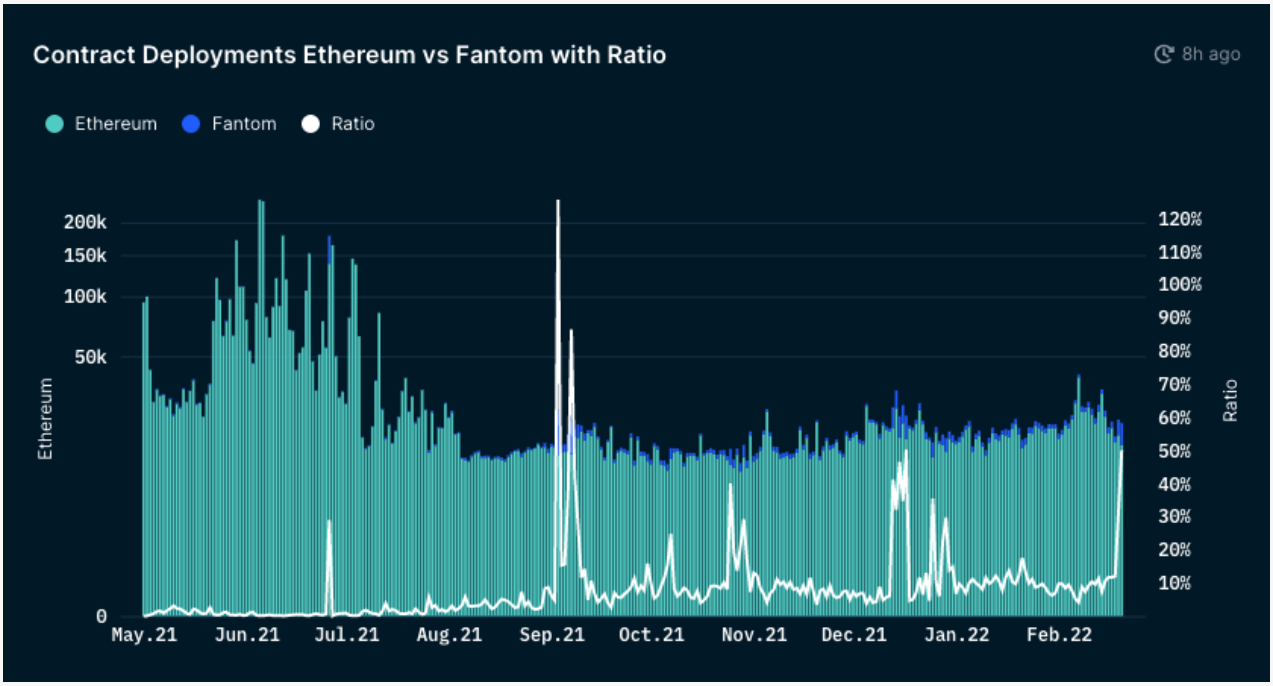


Date	Transactions	Gas USD
27/08/2021	263358	2399
Period maximum	1800288 (+584%)	668418(+27762%)
16/02/2022	961231 (+265%)	99786 (+4060%)

Contract Deployment Activity[20]

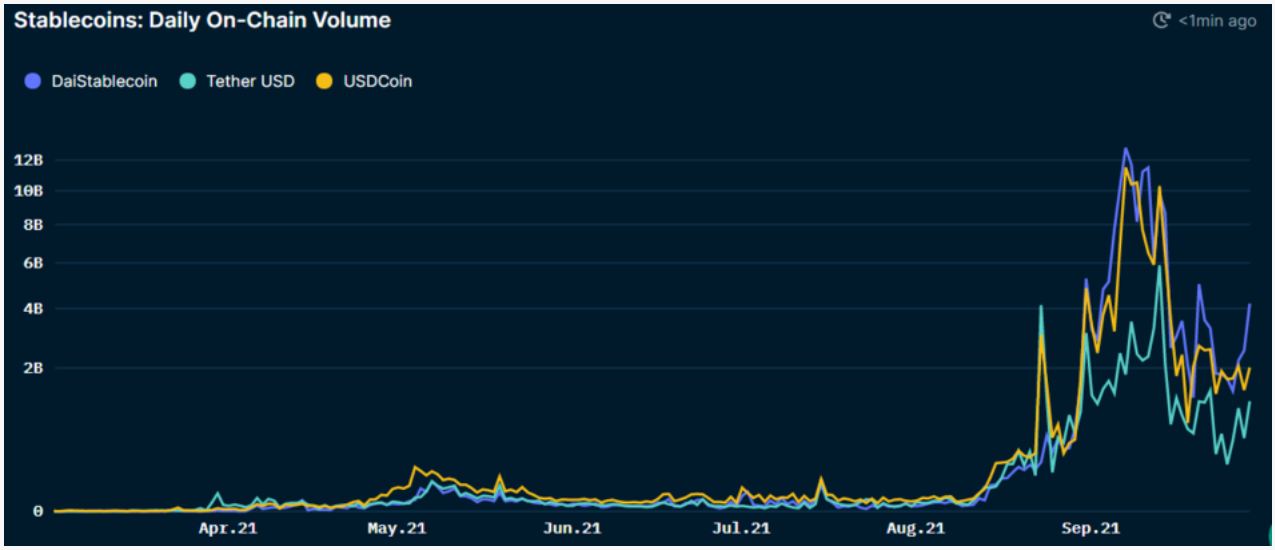
The number of contracts deployed on a blockchain is a good indication as to the development health of a blockchain. Depicted in the graph below, Fantom saw spikes in the number of contracts being deployed in early September 2021 after announcing their liquidity incentive program, topping out at around 12,800 contracts deployed each day. Note that Fantom's contract deployment activity was higher than that of Ethereum during this period.

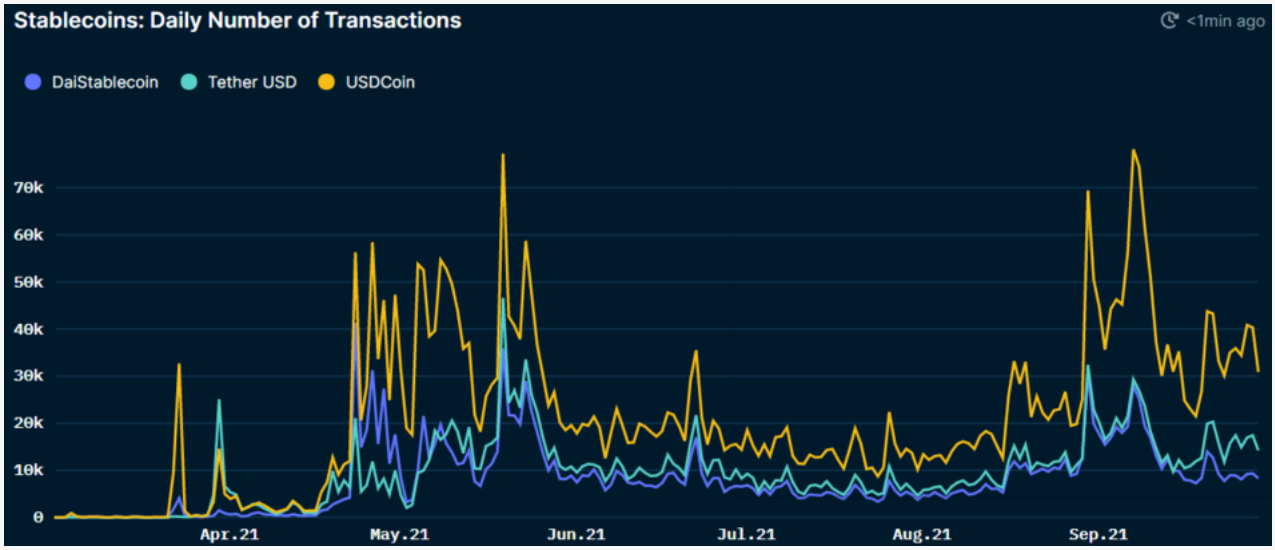
To calculate the contract deployment ratio (CDR), take the amount of contracts deployed on Fantom and divide them by the number of contracts deployed on Ethereum for a given timeframe. The result reveals that the contract deployments ratio has been increasing with notable spikes throughout time. At the time the number of contract deployments overtook that of Ethereum, CDR was 1.26; meaning that for 1 Ethereum contract being deployed, Fantom was experiencing 1.26 contracts being deployed. The key observation to be made through the data is that, cumulatively, CDR has been following an uptrend relative to Ethereum, hovering near 0.1.



Date	Fantom	Ratio
27/08/2021	239	2.1%
Period maximum	12765 (+5241%)	125.7%
16/02/2022	1813 (+659%)	11.7%

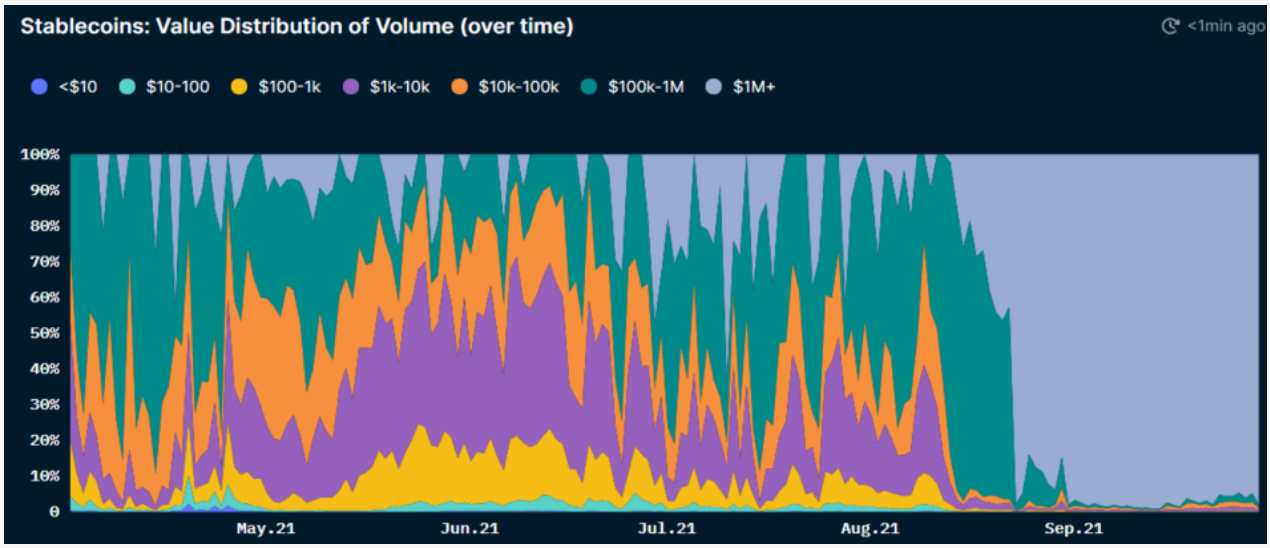
Stablecoins on Fantom[21]





Stablecoin activity on Fantom reveals a gradual increase in adoption. September was a banner period, appearing to correlate with their liquidity incentive program being announced.

Stablecoin volume increasing is a positive indicator, suggesting thriving and viable liquidity availability on-chain. Liquidity such as this provides participants the flexibility to employ more complex DeFi strategies frequently utilized on Ethereum, though more efficiently.



In the above graph, we observe a large shift in the volume and value of stablecoin transactions on Fantom starting in the middle of September. The amount of transactions carrying greater than $100,000 USD spiked at this time - notably the same timeframe as the incentive program announcement. Perhaps more interesting is that the number of transactions with a value of at least $1,000,000 USD began to routinely consume greater than 90% of trading volume on Fantom. This seemingly suggests large accounts, either new or relatively dormant previously, began to participate due to the launch of the incentive program.

D. Polygon Liquidity Mining Incentives

Polygon Incentive framework[22]

Tier	TVL Requirement	Rewards	Rewards/mo	Ratio
1	+$100M	588K MATIC ($1M)	$200K	1:100
2	$50M - $100M	294K MATIC ($500K)	$83.3K	1:100
3	$15M - $50M	147K MATIC ($250K)	$41.6K	1:60
4	$5M - $15M	58.8K MATIC ($100K)	$16.6K	1:50

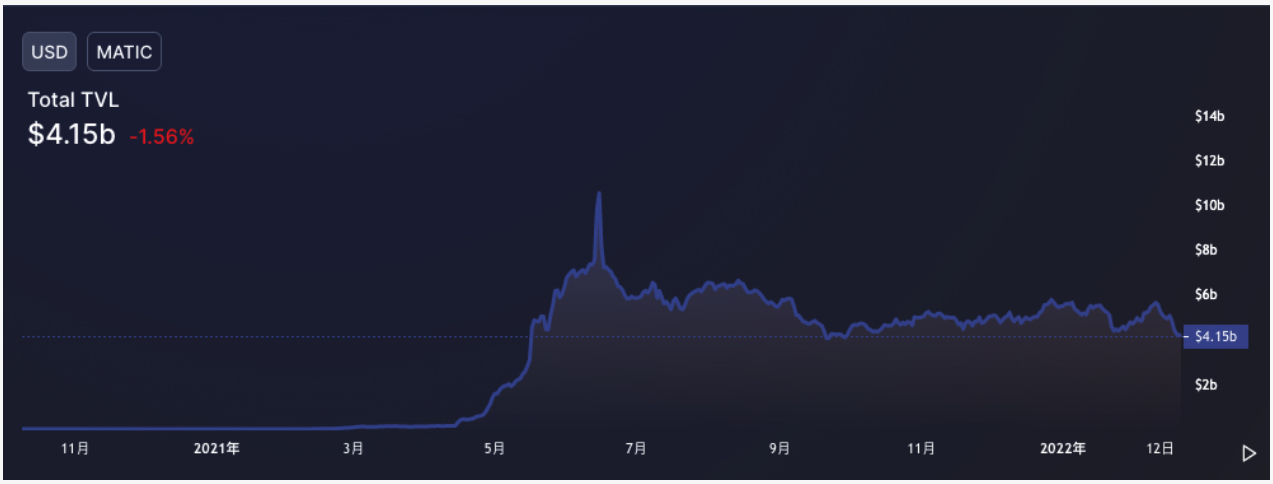
Date	Token Price	Marketcap	TVL
01/04/2021	$0.363	$1.8B	$116M
Liquidity Reward Ratio	**Rewards in $USD**	**Rewards Relative to Marketcap**	**Rewards Relative to TVL**
1:20~1:50	$85M+$15M	-	-

Polygon Incentive Framework is presented below.[22]

Important things to note:

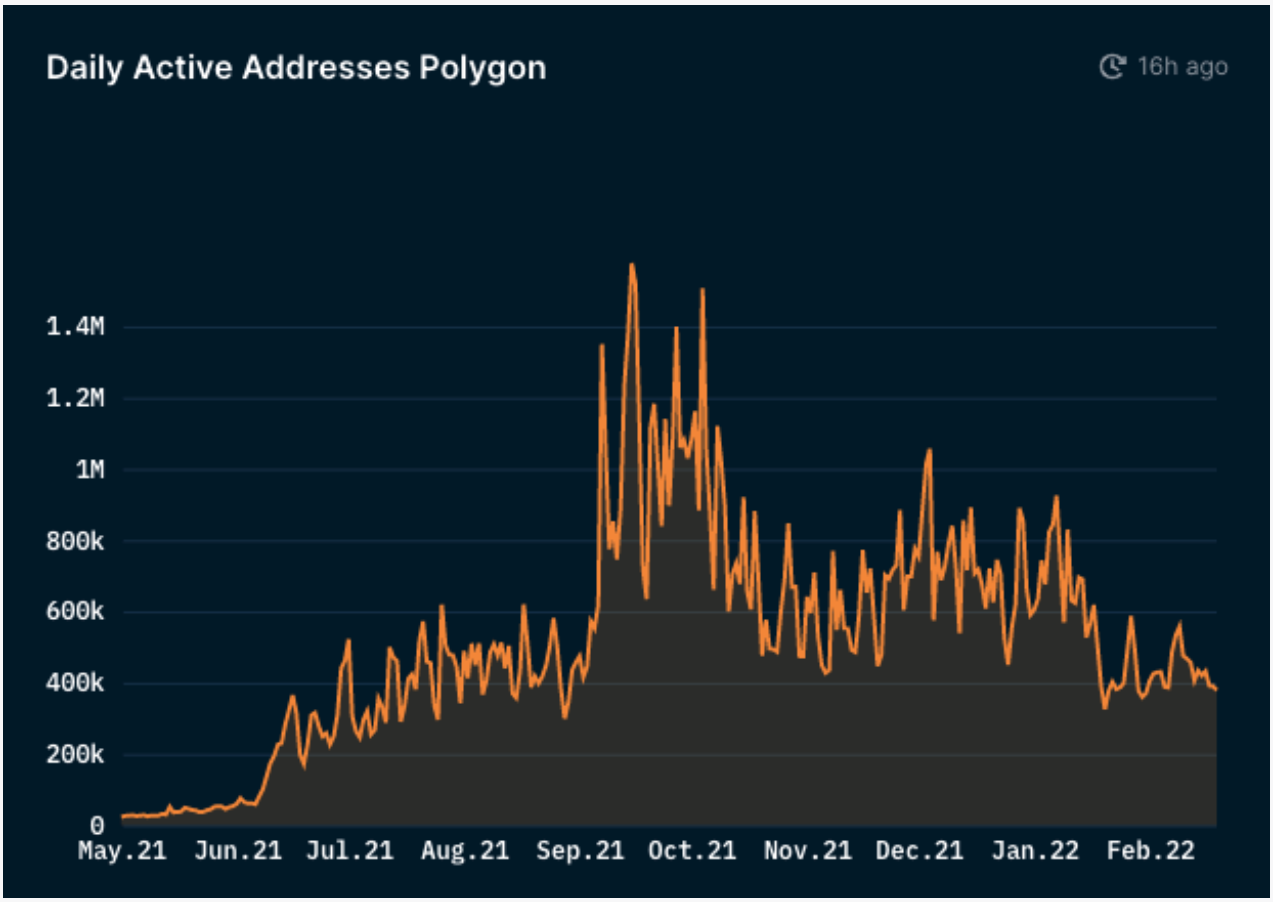
- Only protocol teams that have never received incentives from Polygon can apply.
- TVL must stay above the specified TWAP for a period of 1 month to get the rewards.
- All dApps that qualify can apply if the teams can provide a publicly-verifiable address (preferably a multi-sig) and a DeFiLlama link to track TVL.
- The Polygon grants team must approve the application before qualified teams can get the rewards.
- Snapshots are taken daily and weekly of DeFiLlama and the eligibility list will be updated on a weekly basis.
- If at any point, the TVL goes below the given tier requirement, the team gets rewards of the lower tier.
- If the one-month TWAP falls below $5M, rewards will be paused until the TVL returns.
- Similarly, a protocol would qualify for higher rewards if TVL increases.

E. Polygon Liquidity Mining Data Analysis[23]



Date	Token Price	Total TVL
01/04/2021	$0.36	116M
Period maximum	$2.92 (+711%)	10.53B (+8977%)
16/02/2022	$1.836 (+410%)	5.06B (+4262%)

Daily Active Addresses Polygon[24]



Date	Active Addresses
01/05/2021	23043
Period maximum	1577604 (+6746%)
16/02/2022	432500 (+1777%)

F. Aave Liquidity Incentive

Approximately $85M was apportioned to Aave's own incentive program[25] by the Polygon network - in similar fashion as Fantom and Polygon incentive programs. The goal being to prime the pump for liquidity pools. Total Value Locked through Aave, on Polygon, increased 100x to nearly $5B USD, remaining there at least until the target date for content in this paper.

IV. Incentive Rewards Program

A. Introduction

In the past few months, a number of blockchains have started offering liquidity mining reward programs, incentivizing innovative developers, project parties and individuals to promote the development of their respective ecosystems. Based on various empirical studies, the EOS blockchain is approaching the launch of its own liquidity mining initiative, promoting the creation of institutional-grade, decentralized financial products, and supporting a variety of innovative DeFi applications designed to enrich the EOS ecosystem.

B. Yield+ Framework

The Yield+ Framework will identify how decentralized applications can apply to the Yield+ program and how the review process shall proceed. Once the application is approved by the Yield+ review committee, the dApp's TVL will begin to be recorded by the Time Weighted Average Price (TWAP) Oracle. Once a dApp reaches enough TVL data points for a particular Yield+ tier, the dApp can begin to start claiming their daily rewards.

Application Steps

Step 1 – Apply to Yield+

Protocols can apply to Yield+ by first providing the "Application Submission Checklist."

Step 2 – Calculate the sum TVL value denominated in EOS

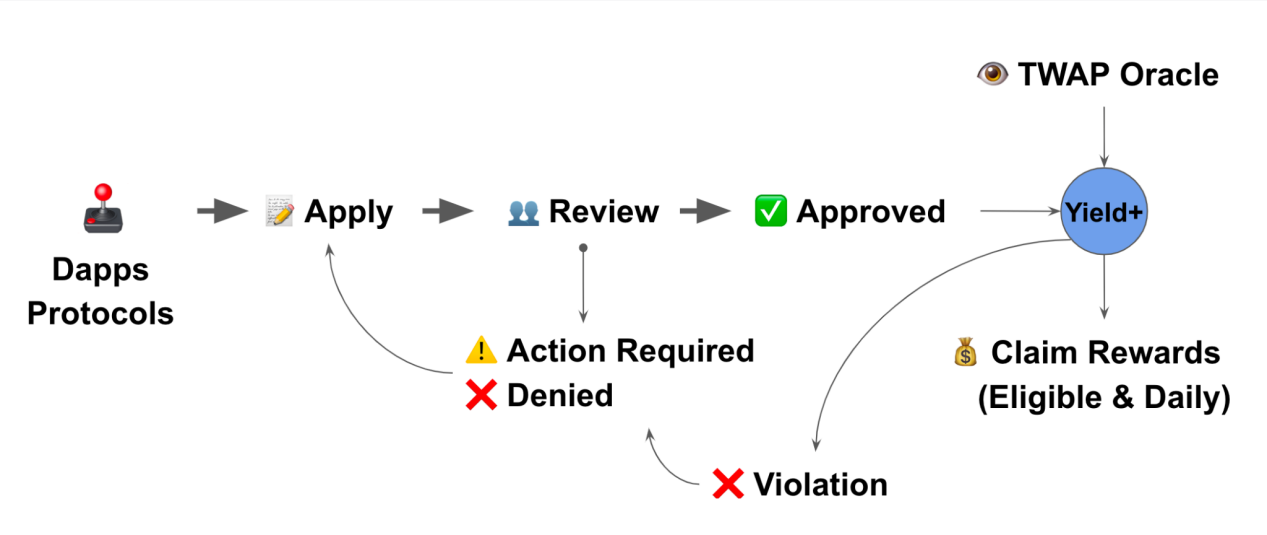
Time-weighted oracles will calculate the True TVL of a protocol denominated in EOS.

Step 3 – Join Yield+ if TVL meets the minimum threshold

Once a protocol's time-weighted TVL has met the minimum threshold, the application can then apply to join the program and be eligible to claim their daily reward.

Step 4 – Calculate estimated daily reward

Every 24 hours, protocols will be able to claim their Yield+ rewards.



Application Process

Decentralized applications will be able to apply through the official Yield+ application portal by submitting their dApp's details on-chain. The following details must be included:

Application Submission Checklist

- Project logo
- Project website
- Project description
- Project whitepaper
- Team introduction video
- DeFi protocol type[26] (Dexes/Lending/Yield/etc.)
- Recover+ project ID (required)
- Security Audits of smart contracts
- External DeFi analytics ID's (ex: DappRadar, DefiLlama)
- Token details ID's (ex: CoinMarketCap, CoinGecko)

Review Process

Once a dApp has submitted their application, one of the Yield+ researchers will review all of the provided details to confirm accuracy. A recommendation will be suggested by the research team identifying whether the applicant should be approved, denied, or if there is missing information which will place the application in a “action required” state. The Yield+ review committee will review the recommendation to determine eligibility for the Yield+ program.

Cause for Denial or Violation

Applications can be denied if they do not meet the minimum application requirements or are in- violation of the terms of the Yield+ program.

C. Yield+ Stages

The Yield+ incentive program is divided into three stages with various assets supported and different quarterly rewards amounts.

	📣 Launch (Stage 1)	❤️ Support (Stage 2)	🚀 Accelerate (Stage 3)
Quarterly Rewards			
625K EOS	✓	✓	
2.5M EOS			✓
Supported TVL Assets			
EOS/USDT	✓	✓	✓
EOS EVM		✓	✓
Cross Chain		✓	✓
Stable Tokens		✓	✓

D. TVL Tiers

These TVL tiers represent the approximate minimum daily reward allocation based on minimum TVL thresholds. The earliest “Launch” stage has an approximation of 625K EOS being distributed per quarter and the later “Accelerate” stage has a quarterly distribution of 2.5M EOS.

Minimum Rewards

Once a protocol has reached the minimum TVL requirement, the yearly reward allocation will be 5% of its True TVL (denominated in EOS). The daily claim reward can be calculated by dividing that value by 365 days.

Calculate TVL

To calculate the TVL of a protocol, all supported assets must first normalize their price into EOS and calculate the total sum of all assets. This will be defined as the True TVL and denominated- in EOS value.

TVL EOS value = (USDT amount / $USD price of EOS) + EOS amount

Example: A protocol has 400,000 USDT and 350,000 EOS, EOS price is $2.50, the EOS denomination would equal 510,000 EOS (400,000 USDT / $2.50 + 350,000 EOS).

Minimum TVL

Minimum TVL is the required threshold for DeFi protocols to be able to join a selected tier, the base currency denomination being EOS.

Maximum TVL

The Yield+ system will enforce a maximum TVL allocation per protocol, which will limit the maximum daily reward one protocol can claim.

📣 **Launch** (625K EOS per Q)				
	Tier 1	**Tier 2**	**Tier 3**	**Tier 4**
Min. Rewards claim/24h	27.4 EOS	102.5 EOS	205 EOS	410 EOS
Min. TVL EOS @ $2.50	200K EOS ($500K)	750K EOS ($1.875M)	1.50M EOS ($3.75M)	3M EOS ($7.5M)
Max. TVL EOS @ $2.50	N/A	N/A	N/A	6M EOS ($15M)

🚀 **Accelerate** (2.5M EOS per Q)				
	Tier 2	**Tier 3**	**Tier 4**	**Tier 5**
Min. Rewards claim/24h	102.5 EOS	205 EOS	410 EOS	820 EOS
Min. TVL EOS @ $5.00	750K EOS ($3.75M)	1.50M EOS ($7.5M)	3M EOS ($15M)	6M EOS ($30M)
Max. TVL EOS @ $5.00	N/A	N/A	N/A	12M EOS ($60M)

E. Supported Assets

In the first “Launch” stage, only the assets of $EOS and Tether’s $USDT are included in the TVL calculation. In the next stage, the team will evaluate other tokens such as large marketcap, bridged native assets (ex: Ethereum, Bitcoin with pTokens network), overcollateralized, native EOS, algorithmic stablecoins (ex: USN with Defibox), and other native tokens supported in the upcoming EOS EVM.

The dimensions of token evaluation include: token project operational time, token authority, volatility within the token cycle, number of holders, team members, and etc.

F. Claiming Rewards

Once a participating protocol has joined a TVL tier, they will be able to claim their daily reward allocation based on their TVL tier.

The protocol's average TVL must continue to meet the minimum TVL threshold to continue to be eligible to claim.

Daily Rewards = TVL (EOS) * 5% / 365 days

V. Data Modeling and Risk Analysis

A. Introduction

The purpose of the Yield+ working group is to determine a rational process for the incentivisation of Total Value Locked (TVL) on the EOS blockchain. By examining the relationship between TVL and economic growth on comparable blockchains, we have derived a dynamic inflation mechanism that incentivizes TVL accordingly, providing accretive economic benefits to the network and the EOS token.

Analysis of data from L1 chains revealed a set of interesting features. We observed that there were three distinct phases that are outlined in detail below. These relate to four significant factors that can be measured as a chain's ecosystem matures:

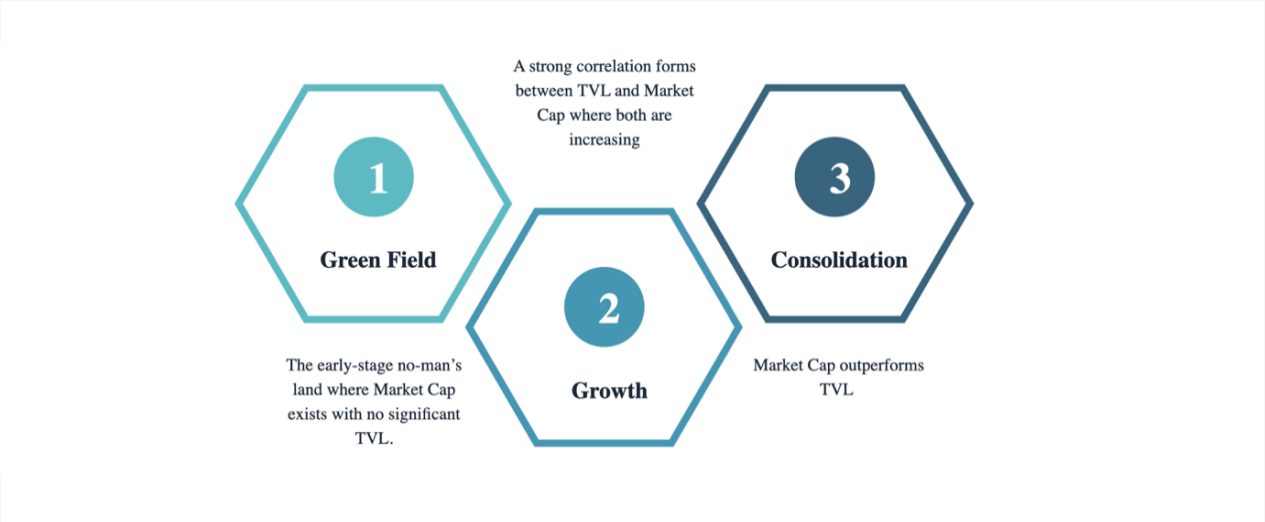
1. Market Capitalization (Market Cap)
2. The ratio of Market Cap to TVL
3. Absolute TVL
4. Quality of TVL

We can see that Market Cap begins to respond once absolute TVL reaches $2 billion. Thereafter, the rising Market Cap held a steady ratio with TVL on-chain ranging between 0.20 and 0.60; there was an obvious relationship that developed with both rising Market Caps and TVL. The best performing chains tended to be at the lower end of this bracket, and this seems to be driven by the quality of TVL. Whilst the data is scarce after this phase, in Ethereum, we can see that the relationship breaks once a certain capacity has been reached whereby the Market Cap continues to rise. We suggest that this is a resultant catalytic effect of TVL on-chain stimulating other areas of the ecosystem.

Our work produced three functions to describe the optimal values for the first three metrics. TVL quality is described mathematically by the number of dApps locking value and entropy of the spread of TVL across them. As a result, the functions produce an incentive weighting for each dApp on the chain.

Further analysis determined that the appropriate maximum cost to the chain should be 1% of the token capital per annum.

B. Three Observable Phases



The analysis shows that the evolution of economic growth through market capitalisation operates across three phases.

Phase 1: The early-stage no-man's land where Market Cap exists with no significant TVL.

Phase 2: A strong correlation forms between TVL and Market Cap where both are increasing.

Phase 3: Market Cap outperforms TVL.

We can rationalize this intuitively. Phase 1 represents marketing and community gathering. DeFi deployment in Phase 2 drives TVL and Market Cap symbiotically; and as a result, the catalytic economic benefits of liquidity on-chain are felt in Phase 3.

We can consider EOS in Phase 1, with comparable blockchains in Phase 2 and Ethereum alone in Phase 3.

C. Results of the Analysis

We observe that:

- The change from Phase 1 to Phase 2 occurs at around $2 billion absolute value of TVL.
- The stability relationship within Phase 2 for TVL / Market Cap starts at around 0.2 and stabilizes from 0.4.
- The change from Phase 2 to Phase 3 occurs at around $10 billion TVL.
- The diversification of TVL contributed positively to economic growth.

D. Our Approach

The algorithm comprises three functions to determine the proportion of maximum allocation of inflation for any given period.

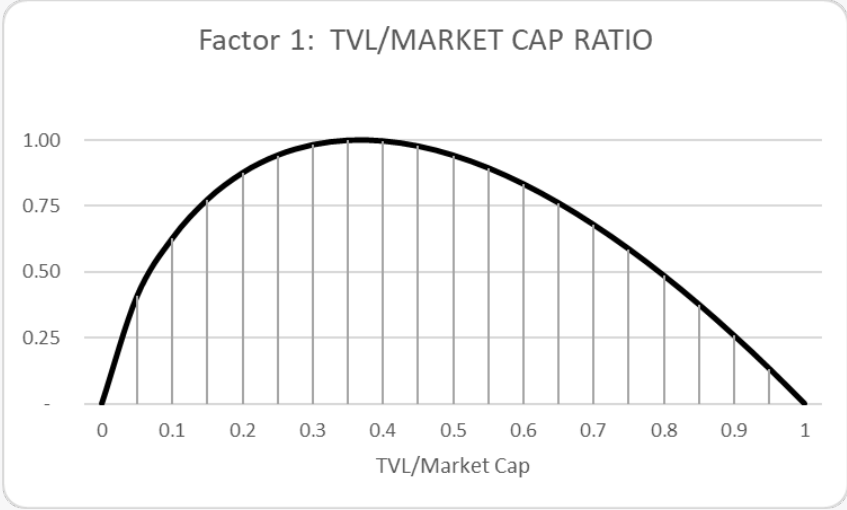
(1) The TVL / Market Cap Ratio (R)

Where,

$$R = \frac{TVL}{(Market\ Capitalisation)}$$

$$f(R) = R\ e\ ln\ \ 1/R$$

f(R) is restricted to (0,1], e is Euler's number, the natural base is used for logarithms, and in the following graph we note that as R tends to zero, so f(R) tends to zero.

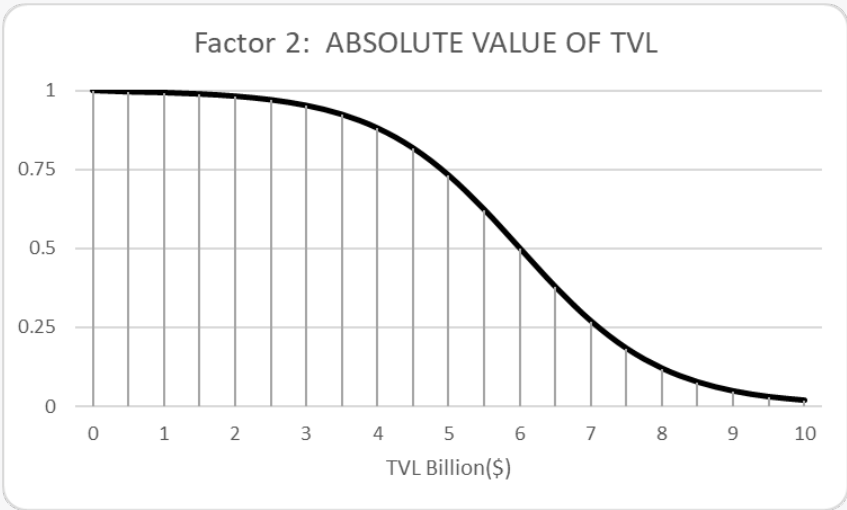


(2) Absolute Value of TVL in $Bn (T)

Where,

$$D=1/2\ (T-6)$$

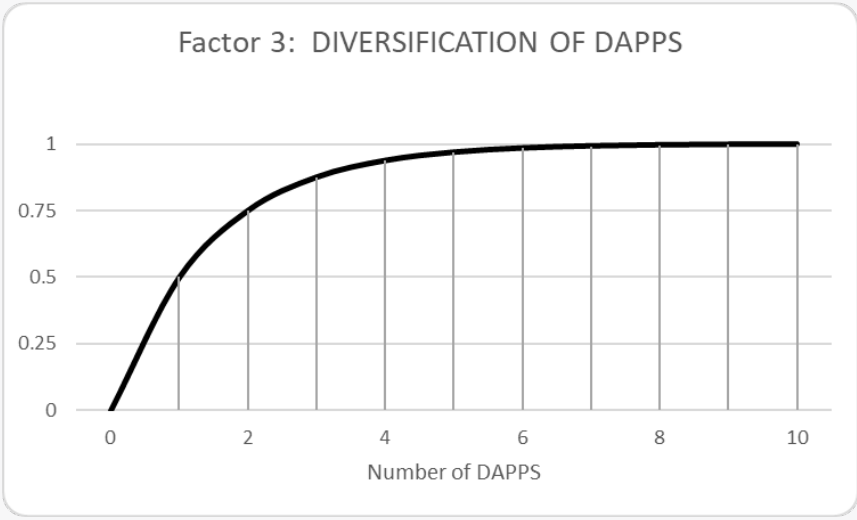
$$g(D)=1/2(1-\tanh\ D)$$



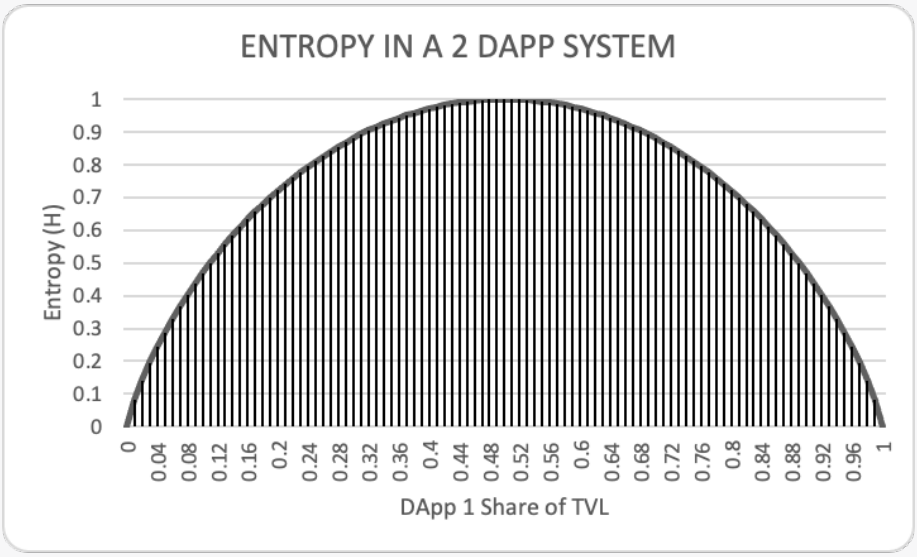
(3) Diversification of dApps Providing TVL

$$S=1-1/n^2$$

Where n is the number of dApps locking value on-chain.

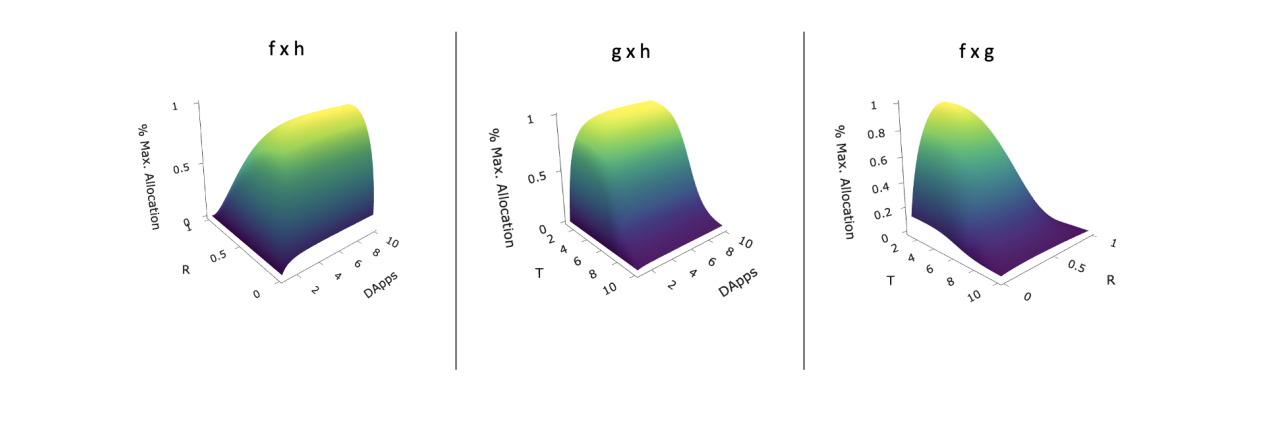


$$H_n(p) = -\sum_{(i=0)}^{n} \frac{p_i \ln(p_i)}{\ln(n)}$$



$$h(x)=S \cdot H_n$$

The final allocation for any given period is the maximum inflation allocation multiplied by the product of the three functions. Visualizations of how this allocation varies when these functions are combined are provided below (where H is held at 1):



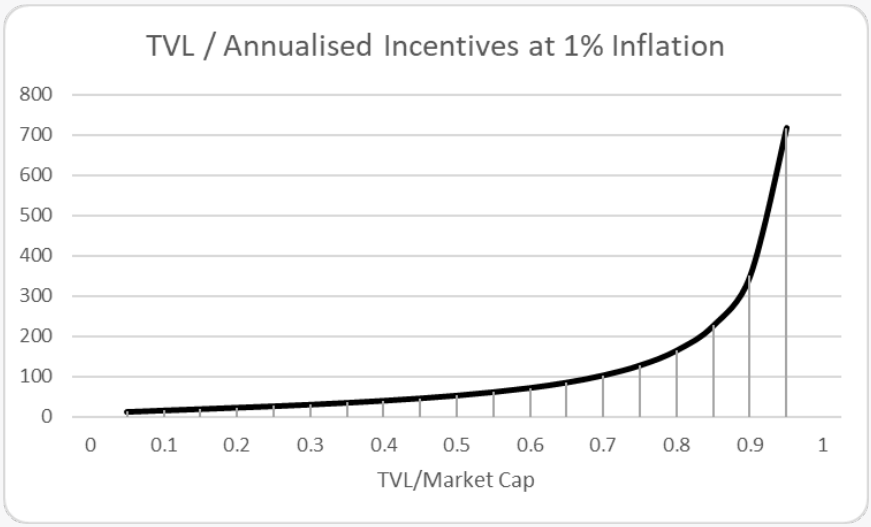
Distribution of Incentives

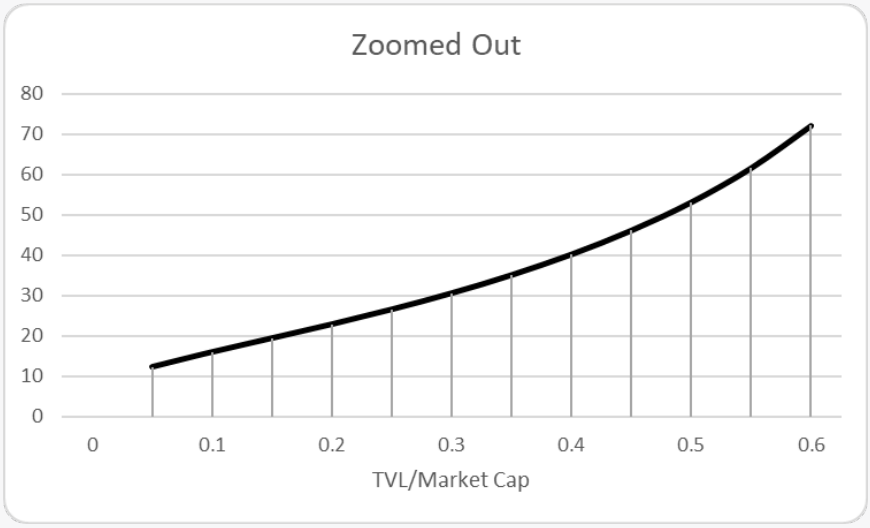
Theoretical allocations can be determined by the contribution to TVL from each dApp. However, it is expected that the network will provide a qualitative overlay based on these quantitative foundations.

Maximum Inflation Allocation

The incentives allocated per chain in the data set show an average of 20x TVL to an annualized incentive. For example, a TVL of $100 million requires up to $5 million of annualized incentives.

Since we want to stimulate Phase 2 at the minimum point, our target R is 0.20 and this would correspond to an annualized incentive of approximately 1% of the network issued via an inflation mechanism. Whilst the exact number would be slightly more, optically the “rounding down” approach is preferable.

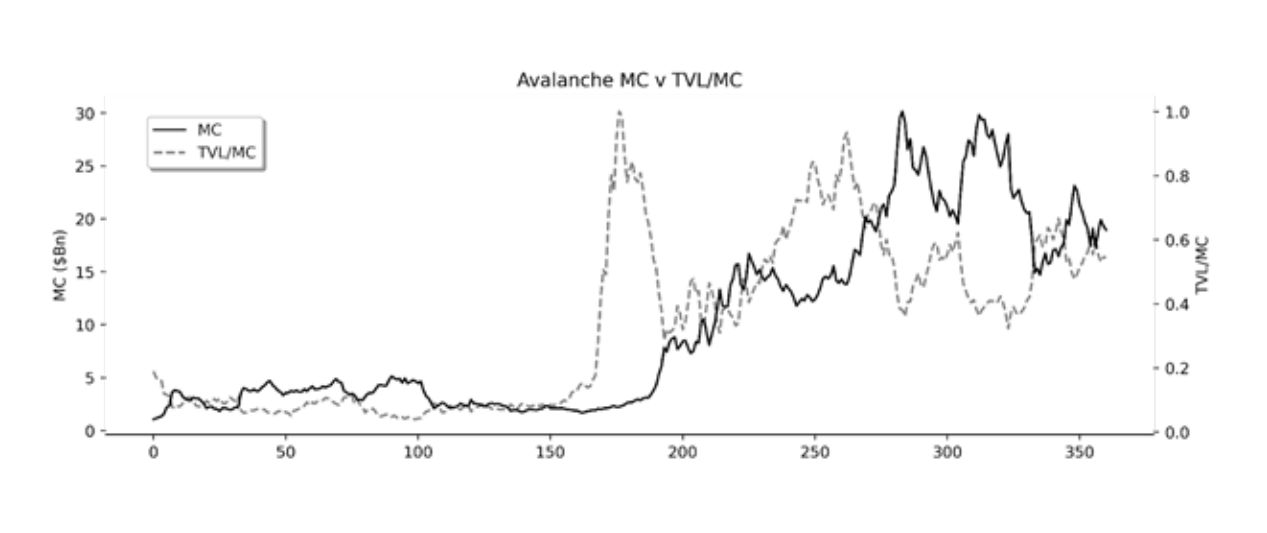


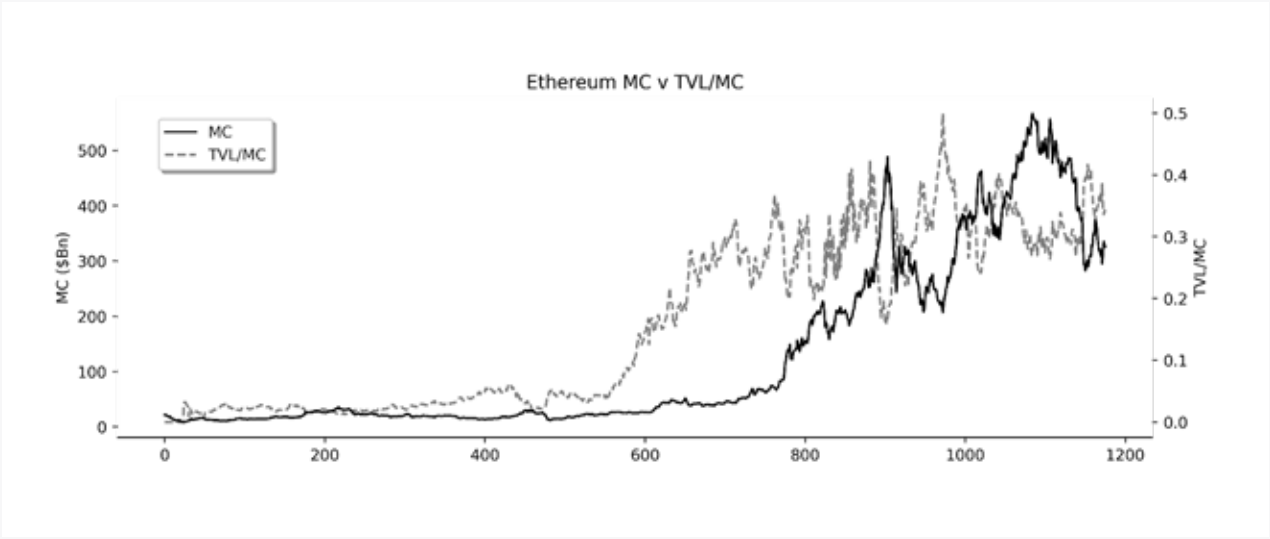


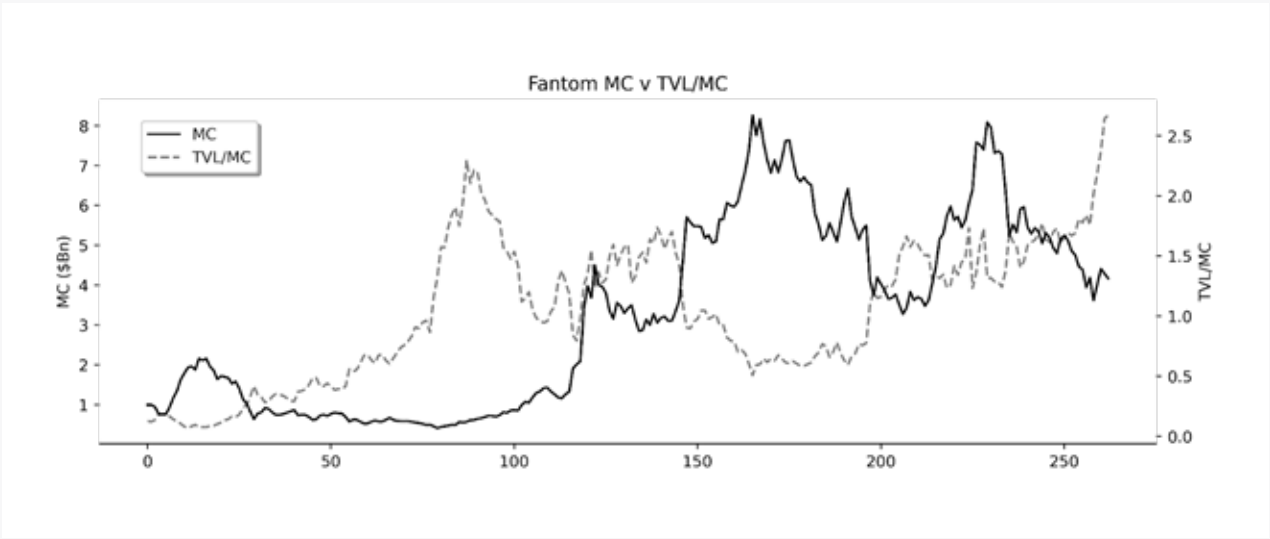
In context, a 1% cost to the network to generate greater than 5x capital value seems proportionate on a risk-adjusted basis.

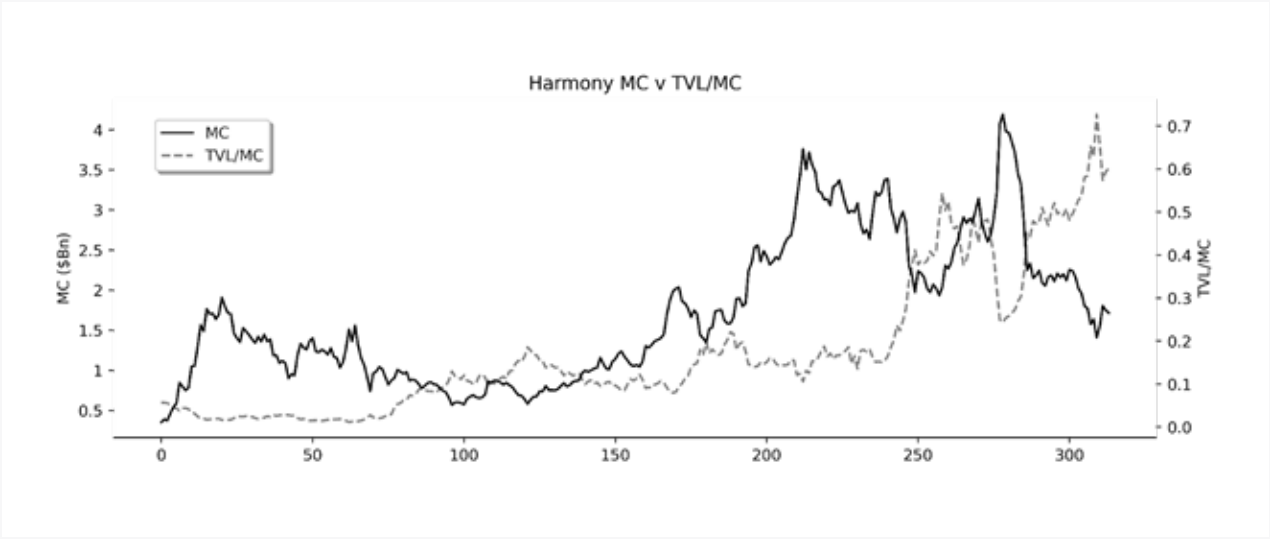
Appendix

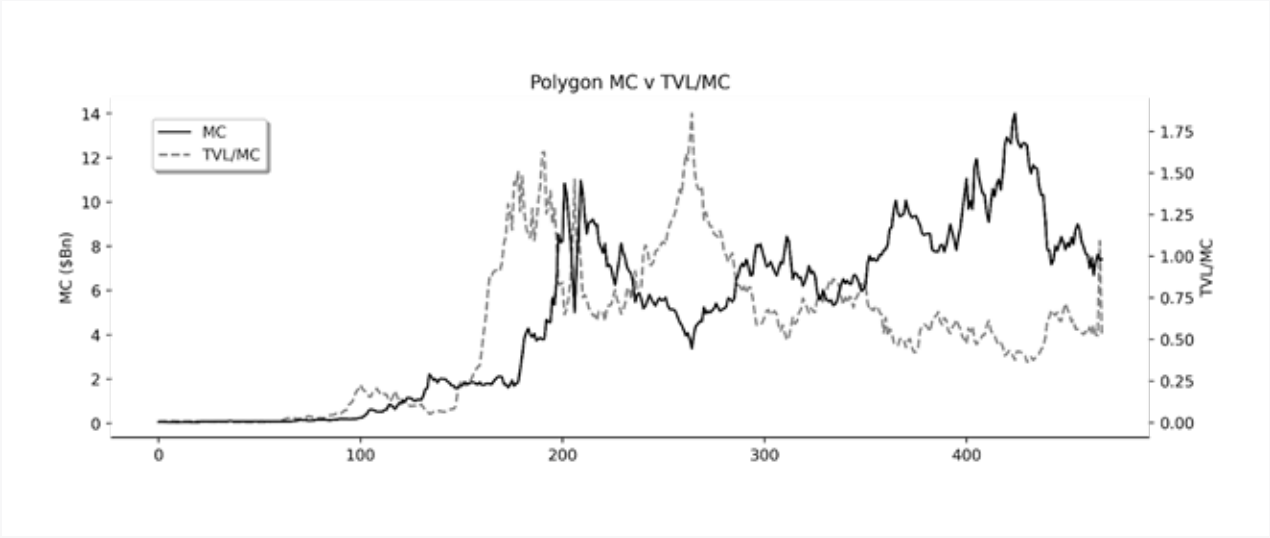
TVL data for 24 layer 1 blockchains was investigated. The majority fell into the Phase 1 category. 7 chains have demonstrated a stable transition into Phase 2, namely: Avalanche, Terra, Tron, Solana, Harmony, Polygon, and Ethereum. Presented below are the comparisons between R and Market Cap for those 7 chains.

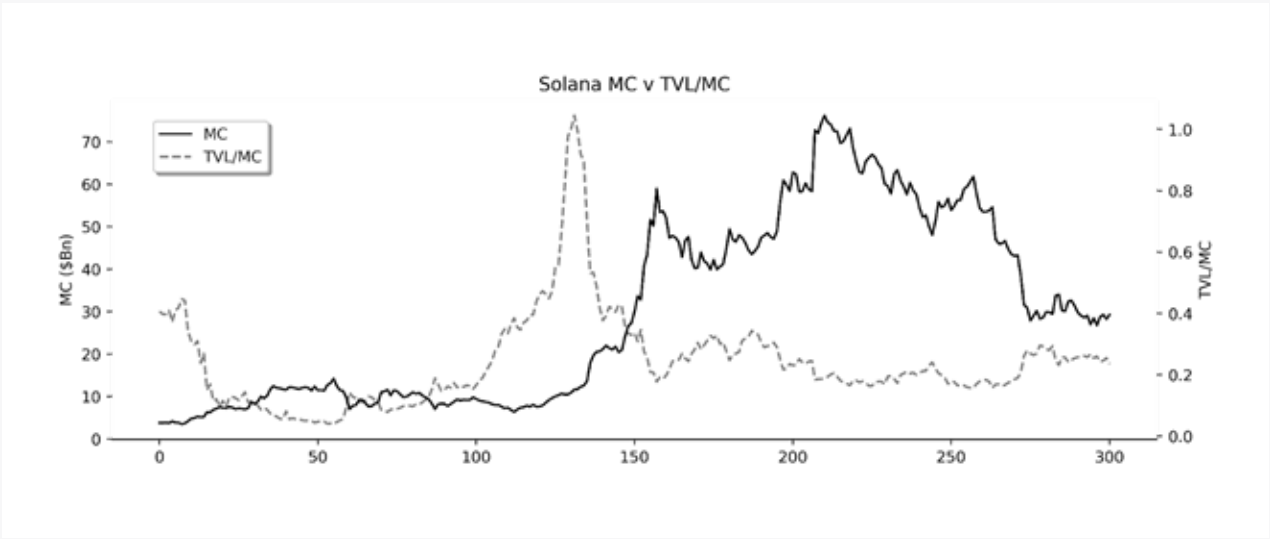


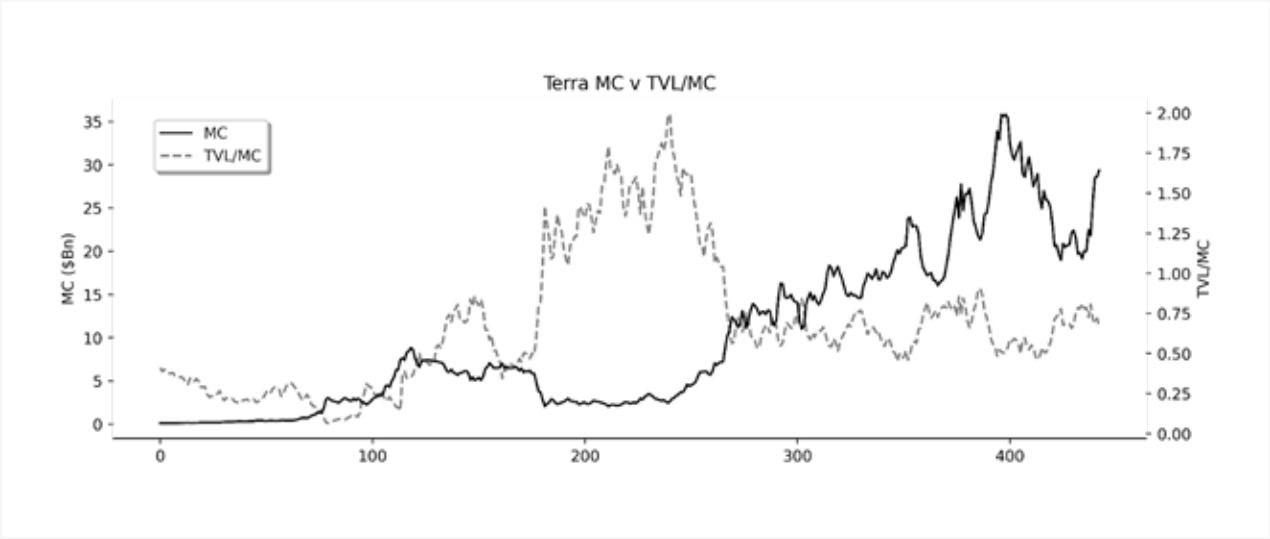

Ethereum MC v TVL/MC
MC
TVL/MC
MC ($Bn)
TVL/MC
0
100
200
300
400
500
0.0
0.1
0.2
0.3
0.4
0.5
0
200
400
600
800
1000
1200

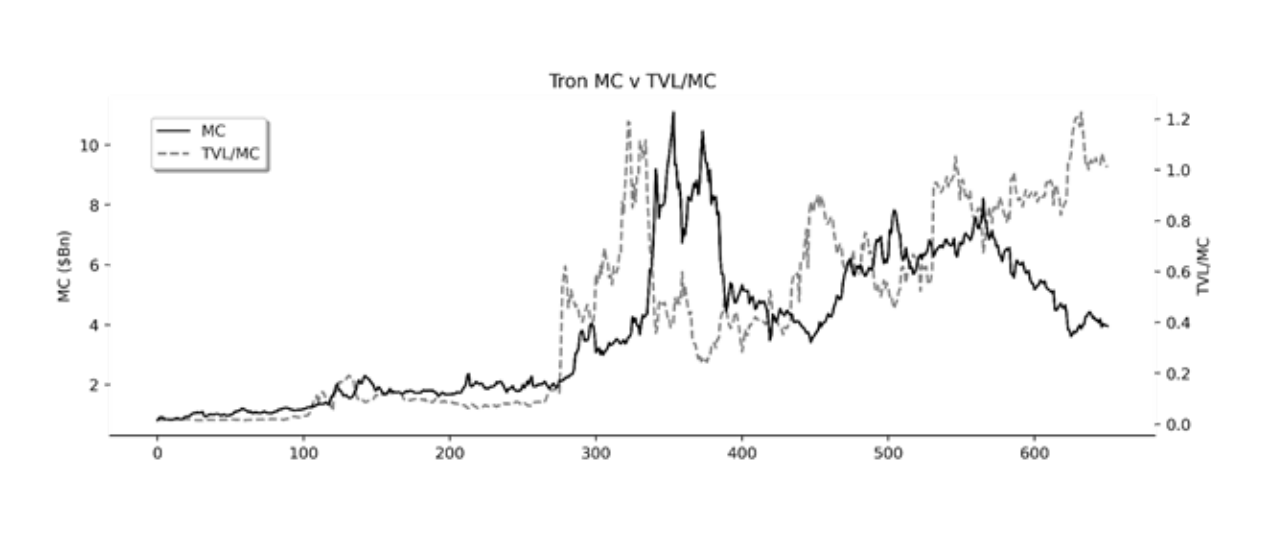

Fantom MC v TVL/MC
MC
TVL/MC
MC ($Bn)
TVL/MC
1
2
3
4
5
6
7
8
0.0
0.5
1.0
1.5
2.0
2.5
0
50
100
150
200
250


Harmony MC v TVL/MC
MC
TVL/MC
MC ($Bn)
TVL/MC
0.5
1
1.5
2
2.5
3
3.5
4
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0
50
100
150
200
250
300


Polygon MC v TVL/MC
MC
TVL/MC
MC ($Bn)
TVL/MC
0
2
4
6
8
10
12
14
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
0
100
200
300
400


Solana MC v TVL/MC
MC
TVL/MC
MC ($Bn)
TVL/MC
0
10
20
30
40
50
60
70
0.0
0.2
0.4
0.6
0.8
1.0
0
50
100
150
200
250
300


Terra MC v TVL/MC
MC
TVL/MC
MC ($Bn)
TVL/MC
0
5
10
15
20
25
30
35
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
2.00
0
100
200
300
400

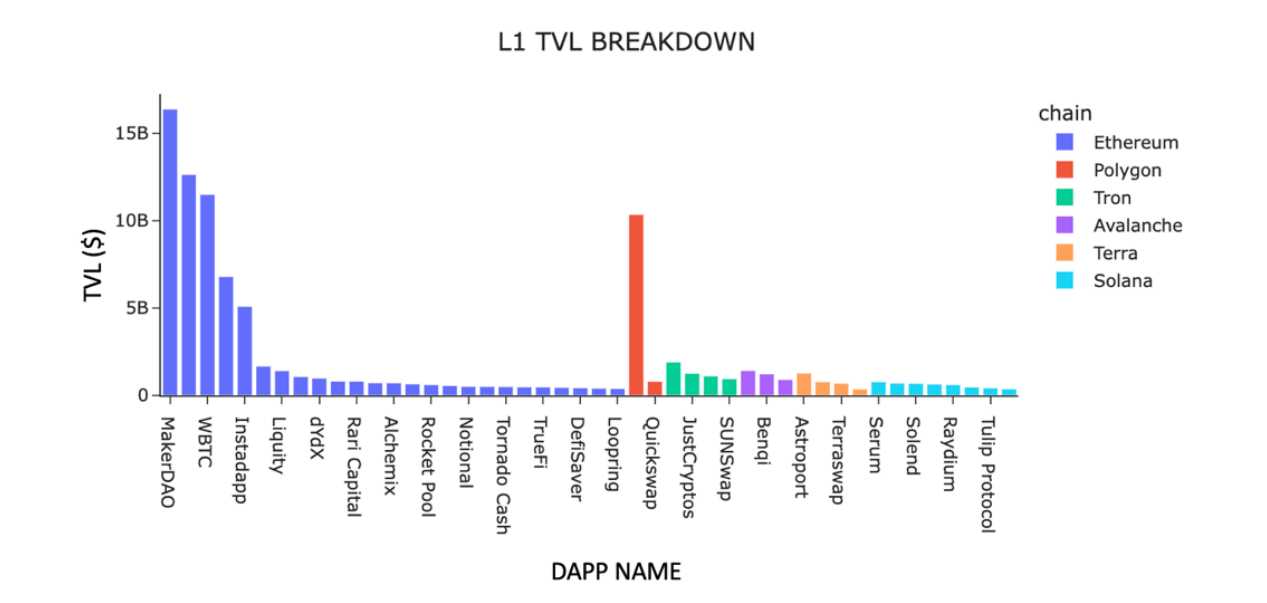


There is a clear demonstration that the transition from Phase 1 to Phase 2 is accompanied by healthy growth, with TVL growing along with trading price often leading the way. This action can be encouraged through the strong initial incentives to grow TVL when R is low provided by f(R). However, this benefit of TVL growth can taper off, as demonstrated by recent developments in TRON and HARMONY.

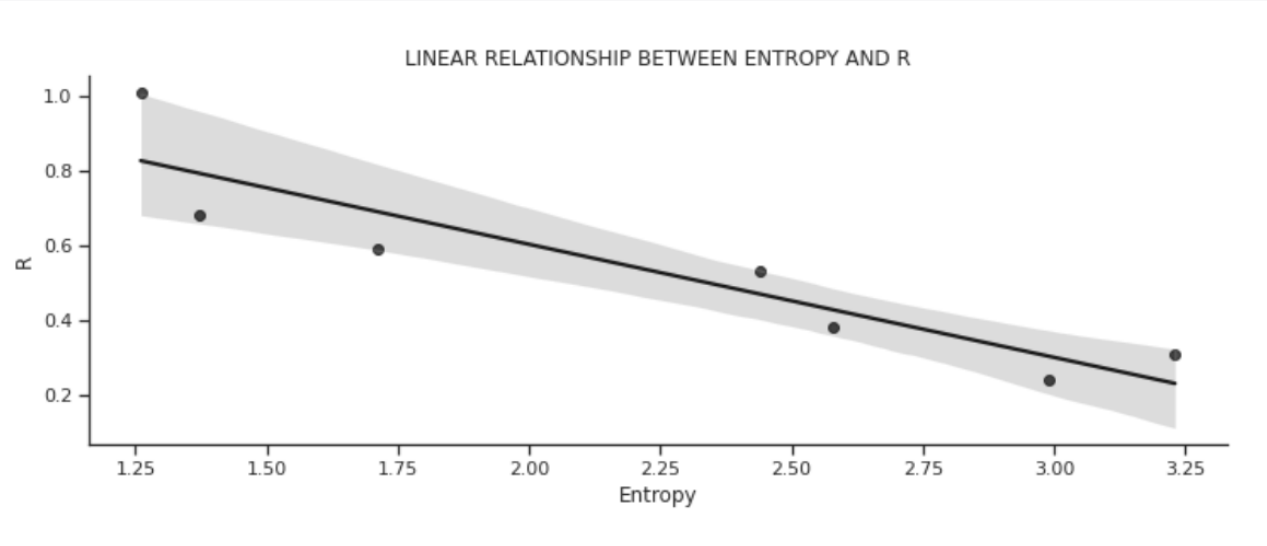
What should be encouraged as a chain matures through Phase 2 is no longer pure TVL growth, but preferably sustainable growth that allows the Market Cap to outperform TVL; i.e., not just the absolute TVL, but the quality of TVL.

However, first consider when the transition into Phase 2 begins to stall; i.e., TVL no longer simply drives growth. A straightforward analysis shows this in the absolute range of $1-3 billion. g(D) takes this waning direct influence into account.

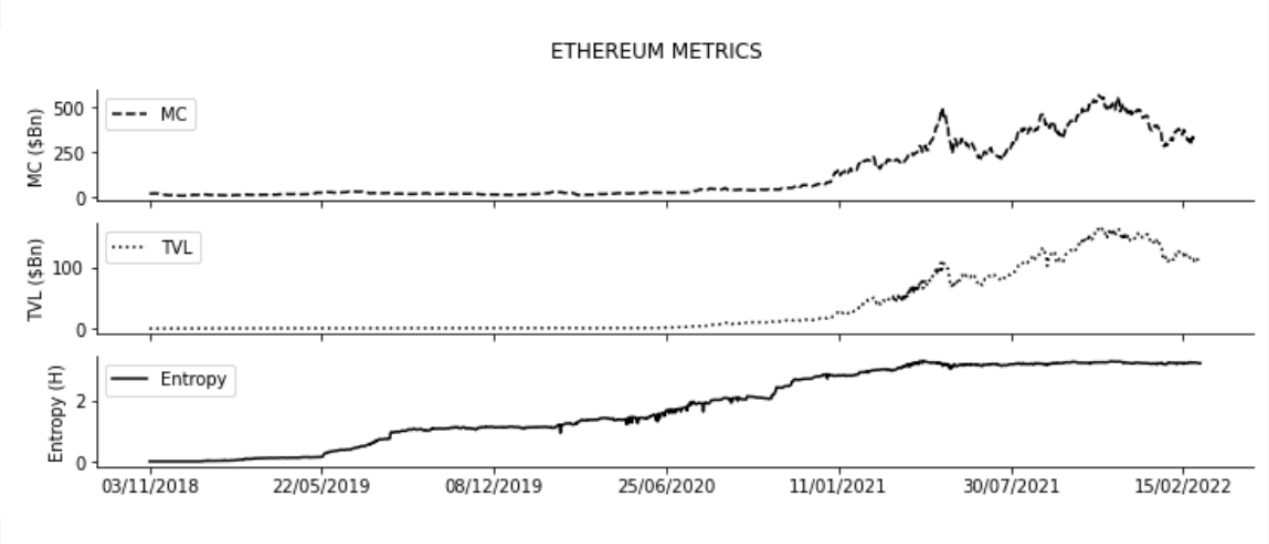
It is clear in the previous figure that Solana (at least in the past) and Ethereum have experienced the most promising growth. They also have the lowest R, so we should look at the quality of their TVL.



Solana and Ethereum have the broadest sources of TVL on-chain. This idea can be formalized as the diversity of TVL. The relationship between the diversity of TVL and the TVL/MC ratio can be extracted as linear:



The above figure suggests at this stage, the diversity of dApps locking value on-chain is an independent driver of the Market Cap that should be incentivised. We therefore formally define diversity as Entropy: H. The incentive needs to be normalized to 1 whilst maintaining a dependence on the absolute number of dApps; therefore, the incentive factor is a modification of the Entropy, normalized by the dApps on chain, with a diminishing return as more dApps join.

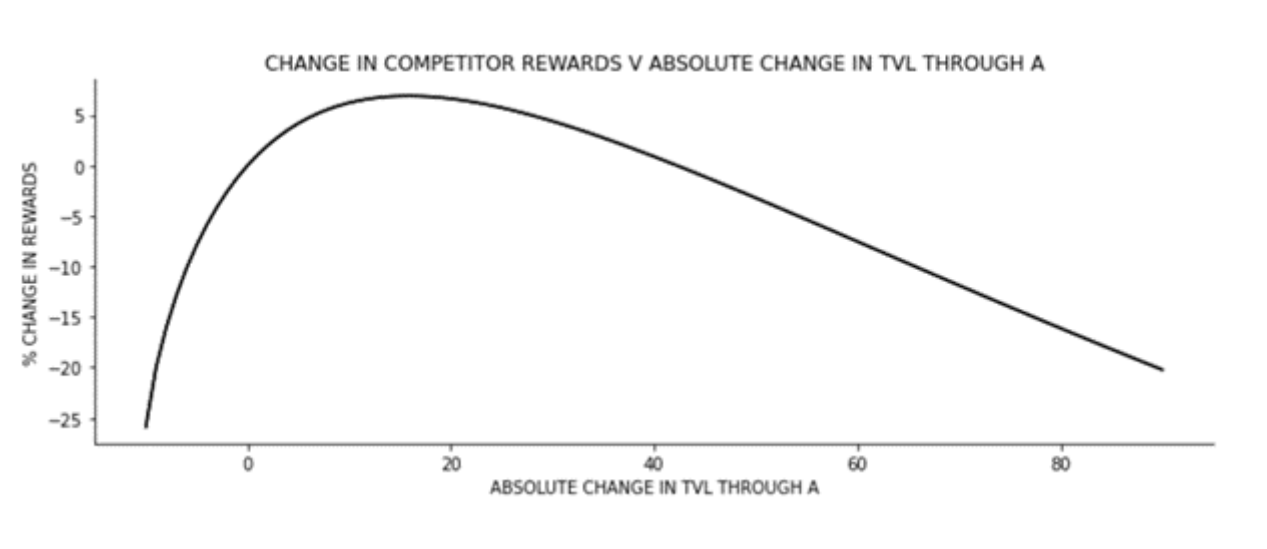


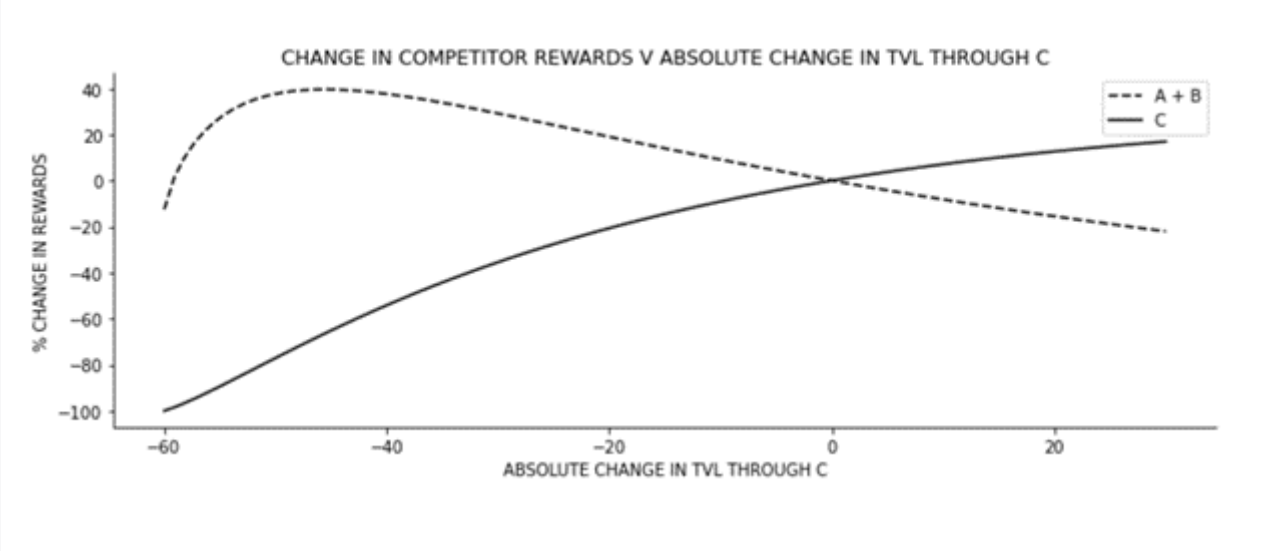
The above example of Ethereum shows that stabilization into the [0.2,0.3] range for R depends on growth of diversity up to a certain level. S is designed to meet this.

A summary of an investigation into the viability of the dynamic incentive is also provided:

A scenario where 3 dApps (A, B, and C) are locking value on-chain is considered. They are locking value in the ratio 10:30:60.

The plots below demonstrate the percentage change in the inflation reward for the other two chains as the TVL through A and C varies respectively.





Consider the first curve; it demonstrates the correct incentives are present. As the TVL through A increases to the range of B and C, there is a positive benefit to all parties, but as A overtakes B and C, this becomes harmful to them as the imbalance of TVL reduces the system entropy. This should encourage B and C to also lock more value into the protocol.

The second plot demonstrates the same dynamic, but also shows the change in benefit to C as it locks in more value. Any initial value locked provides rewards at an increasing rate, encouraging significant commitment. Then, however, C experiences diminishing returns on its TVL.

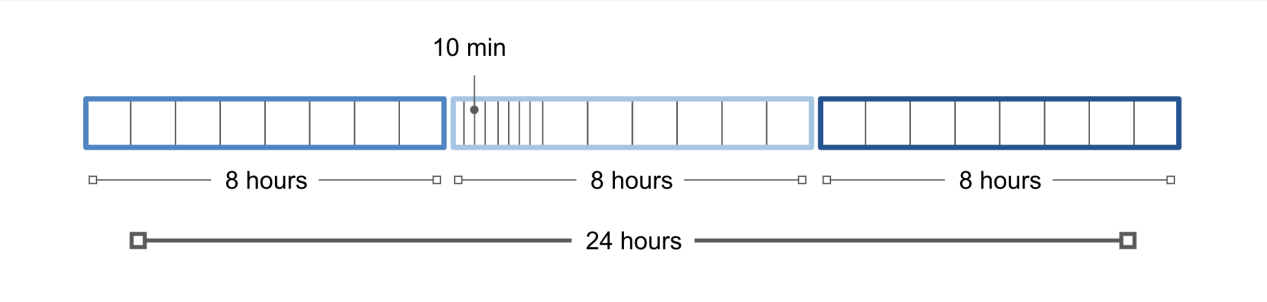
Positive, competitive dynamics should emerge from the implementation of this dynamic inflationary reward scheme.

VI. Oracles

A. TVL & Price Calculations Using Oracles

This section discusses the calculation of TVL for the implementation of inflationary rewards. This calculation requires the use of oracles, incurring a practical cost to the network. This cost must be balanced with security and accuracy. We propose a straightforward Time Weighted Average Price (TWAP) calculation that accounts for different time zone trends whereby the daily TVL will comprise the average of 3 periods, each 8 hours long, and themselves comprising an average of 10 minute snapshots.

The TVL for each participating dApp will be calculated in isolation and the inflationary reward calculation methodology will be applied once per day.



Price Oracle

Oracles will be tasked with providing price data within a minimum of 10-minute intervals; i.e., from 00:00 to 00:10, 00:10 to 00:20, and etc. This time window was selected to provide sufficient price accuracy while balancing practical considerations; primarily, times to provide pricing are not given more specifically to avoid instantaneous TVL manipulations.

Price Accuracy

The accuracy of pricing relates to the volatility of the underlying asset being reported on. The possible inaccuracy of a feed within a time window, under normal operating circumstances, is the possible real variation of the price within that window. EOS has an annual volatility of 140%. The standard deviation, σ, within a time window w, in minutes, is therefore given as follows:

$$\sigma = 140^* \sqrt{(w/(60^*24^*365))}$$

$$\sigma(\text{ten minutes}) = 0.61\%.$$

This is sufficiently precise for our purposes.

TVL Calculation

For each protocol, the TVL values shall be calculated and recorded using 10-minute periods. This equates to 48 data points, t_i, in an 8-hour period by the oracle network. T_i is calculated as the average of these:

$$T_i = \frac{\sum t_i}{48}$$

Market Capitalization Calculation

T_i (EOS) is then converted to T_i (USD) using the previous price point provided by the oracle network. At this point, we also calculate the Market Cap of EOS, MC_i. This sufficiently captures daily price variation in EOS related to time zone trends while limiting oracle usage.

B. Oracle Services

QED Blockchain Oracle Network (DelphiOracle)

QED[27] is a decentralized Oracle protocol[28] with a robust economic model connecting multiple blockchains, smart contract platforms, and off-chain data sources. QED mitigates collusion, provides on-chain dispute resolution, and scores historic oracle accuracy. The QED smart contract is delphioracle.[29]

- Website
- Whitepaper
- EOS Smart Contract

Defibox On-chain Oracle

Defibox Oracle[30] computes the major trading pairs on their Defibox swap DEX and leverages those price feeds to power USN, a stablecoin, and Defibox lending markets.

The oracle contract is oracle.defi[31] and has been audited by SlowMist to ensure its integrity.

- Website
- EOS Smart Contract

C. Oracle Service Cost

Yield+ will have specific requirements for continuously updated prices of supported assets and live updated TVL data records for each protocol supported by the Yield+ platform. To operate and sustain such a service, a minimum level of incentives must be provided to oracle operators for maintaining price & TVL data feeds, as well as on-chain transactional costs.

The service fee structure can be initially established using a flat rate per data entry, up to a maximum daily allocation.

Example: 0.0100 EOS per transaction to update TVL values per protocol.

VII. Treasury Structure and Funding

A. Introduction

Treasury design considerations for a blockchain asset can be as simple as adding an additional instrument among many on the balance sheet and have little or nothing to actually do with blockchain from a technological perspective. Observations and adjustments can be made for how the working capital interacts with each other, but operationally, the process can be relatively routine for an experienced treasurer and rather opaque for the general public.

Treasury design on a blockchain, however, elicits an array of new considerations regarding specific advantages and limitations unique to each blockchain that must be carefully evaluated to ensure safe and integrous function of the treasury; e.g., technical innovations that enable automating and disintermediating elements of the treasury can help minimize the risk of service interruption due to human error or the threat of anyone achieving unjust control. Operational transparency for participants and observers that is simple to visualize and equally accessible at any time can reduce the need for trust. Distributing control broadly as opposed to a small cohort can further inhibit collaborative malfeasance and a number of other benefits beyond a non-blockchain based treasury, but some of these features come at a cost.

In contrast, decentralizing administration of a treasury can increase the complexity of the code involved in the design, as well as coordinating adjustments to function and capital in the event a timely update is needed; humans design the system after all and time is the best test of durability. Although technical architecture is fundamentally important, it is far from the only consideration to be made during the design process.

A particularly pertinent consideration for blockchain-based treasuries is the rapidly evolving international regulatory landscape in which industry advocates, regulatory agencies, and lawmakers are each proposing varying definitions of blockchain activities and functions and how best to regulate them. As these technologies increase in value and usage, it is prudent to anticipate a corresponding increase in scrutiny upon the structure, management, and funding of any treasury designed upon a blockchain.

The following sections provide relevant background on existing and pending regulations in major economic zones, brief review of treasury structures throughout the broader blockchain ecosystem, and highlight some of the advantages inherent to EOS that could be incorporated in the Yield+ treasury design to ensure the integrity of its activities and functions as well as the safety of its assets.

B. Key Terms

Activities and Functions – Distinct activities performed and functions of individuals or programmatic mechanisms that are relied upon for treasury operation.

Soft Governance[32] – A non-binding, informal, and flexible form of governance.

Hard Governance[32] – A binding, formal, and inflexible form of governance.

Multisignature (MSIG) – More than one key is required to sign or approve a transaction. Multisignatures are predominantly used as a security measure to increase the difficulty of making changes to an account or contract such as unauthorized transfers or updates. EOS has native, layered multisignature functionality with discrete permission structures assignable to each layer that eliminates the need to rely upon a third-party solution and provides a customizable range of required authorizations.

Permissions – Required authorizations before an action is performed. On EOS, these authorizations can include a hierarchy of key signatures involving different degrees of authority or weight and a combination of thresholds to meet such as total weight, a specific number of signatures, or elapsed time.

Gnosis Safe[33] – A smart contract wallet with support for multisignatures developed by Gnosis, a Gibraltar-based company, that is accessible via web or mobile app and widely implemented across **tokens**[34] that comply with the ERC20 and ERC721 standards. Gnosis Safe multisignature thresholds are configurable with weights.

C. Regulatory Background

This section provides a broad perspective on the international regulatory landscape that the Yield+ Working Group faces in the design of a blockchain-based treasury and is not intended to analyze how each jurisdiction might engage the treasury. The purpose of developing a sense of scope[35] in this area is to assist in recognizing the complexity brought about by changing policy around the world and the importance of practical approaches that exercise good judgment when planning for future uncertainty.

A complicated interplay both within and between government administrations, regulatory agencies, and central banks exists and at times exhibits synergistic function, but frequently reveals contention to establish dominion or defend conflicting interests. Digital ledger technologies such as cryptocurrencies especially give rise to these conflicts as each party struggles to understand the implications of these nascent technologies.

To conceptualize the structure of international regulations, it can be helpful to start with the largest coordinating body, the Financial Action Task Force[36] (FATF). The FATF is an intergovernmental body that establishes international standards to combat money laundering (AML), counter the financing of terrorism (CFT), and combat weapons of mass destruction proliferation financing through cooperation of its 200+ participating member nations.[37] This task force possesses broad influence over international regulations and the guidance[38] it issues is often implemented in one form or another.

> The FATF standards[39] require countries to assess and mitigate their risks associated with virtual asset financial activities and providers; license or register providers and subject them to supervision or monitoring by competent national authorities.

For the purposes of the Yield+ treasury, special attention is warranted toward the terminology used in the FATF's definition of a Virtual Asset Service Provider[40] (VASP). A Virtual Asset Service Provider is any natural or legal person who is not covered elsewhere under the Recommendations and as a business conducts one or more of the following activities or operations for or on behalf of another natural or legal person:

a. Exchange between virtual assets and fiat currencies;

b. Exchange between one or more forms of virtual assets;

c. Transfer of virtual assets;

d. Safekeeping and/or administration of virtual assets or instruments enabling control over virtual assets; and

e. Participation in and provision of financial services related to an issuer's offer and/or sale of a virtual asset.

A qualifying statement follows with additional guidance on how to interpret these descriptions of a VASP, "...the definition of VASP should be read broadly." In this sense, "broadly" suggests the presence of ambiguity in interpretation and that the author encourages it. For enforcement offices approaching new technology and innovations, ambiguity can often be a favorable characteristic of law. When a person or business entity is captured within the definition of a VASP, they are beholden to a litany of compliance burdens generally related to obtaining detailed information on the identities of participants, as is the case with the Travel Rule.[40]

Under the Travel Rule, VASPs are required to collect and share identifying information on counterparties. The identities of the sender and receiver "travels" with the transaction, a manual process not typically performed on a blockchain at this time. The travel rule is a tedious and complicated requirement for centralized institutions to comply[41] with. It is exceptionally complicated for pseudo-decentralized applications to comply with and impossibly complicated for genuinely decentralized applications. Further yet, if held accountable to the standard of a VASP, standards from other agencies frequently apply, as is the case with FinCEN's definitions[42] of a money services business and transmitter. FATF AML/CFT guidance proliferates internationally, similarly to tax guidance[43] by the Organization for Economic Cooperation and Development (OECD), and financial stability guidance[44] by the Financial Stability Board (FSB). Subtle shifts in the language used throughout regional policy commonly reveals influence from these organizations.

In the European Union, the Economic and Monetary Affairs Committee recently voted[45] to enter a months-long trilogue[46] regarding pending cryptocurrency legislation entitled Markets in Crypto-Assets (MiCA).47 This three-party negotiation process between the European Commission, Parliament, and Council will establish the details of this sweeping package prior to becoming adopted legislation by member states. A key component of MiCA is confirmation of what is a Crypto Asset Service and who is a Crypto Asset Service Provider (CASP). Here we see the influence of FATF guidance on VASPs. Specific language is important and will determine the degree of ambiguity the industry in Europe faces.

MiCA outlines a Crypto Asset Service as:

a. Custody and administration of crypto-assets on behalf of third parties;

b. Operation of a trading platform for crypto-assets;

c. Exchange of crypto-assets for other crypto-assets;

d. Execution of orders for crypto-assets on behalf of third parties;

e. Placing of crypto-assets;

f. Reception and transmission of orders for crypto-assets on behalf of third parties;

g. Providing advice on crypto-assets.

MiCA goes on to define a Crypto Asset Service Provider as any person whose occupation or business is the provision of one or more crypto-asset services to third parties on a professional basis. The use of “any” is intentional and allows for flexible application. Determining an activity as being the “occupation or business” of a professional may prove challenging depending on the degree of involvement.

Though definitions may at times appear to be clear and precise, it is important to understand that legislative processes produce living documents with expanding definitions[48] and varying interpretations. Narrowly defined terms can often be considered more favorable for innovators due to the clarity provided by having known boundaries to build within. Broad definitions[49] are designed to be encompassing and are often crafted for the sake of capturing and rendering unforeseen activities and functions under existing authority.

An example of a broad definition within a recent bill[50] in the United States defines a “broker” as any person who is responsible for regularly providing any service effectuating transfers of digital assets on behalf of another person. Contrarily, a narrow definition would provide specificity that removes doubt and uncertainty as to who or what activity is captured in the terminology. An amendment process preceded this bill in which a narrower definition was proposed,[51] and though lawmakers provided positive signaling toward its adoption, a single senator blocked the change after his own amendment regarding unrelated defense spending was rejected. This punitive behavior by one person resulted in passage of the broad definition.

Brokers within the United States are required by law to report detailed information on the parties they facilitate. Authorities on the matter have offered informal assurances as to the safety of node operators and developers of genuinely decentralized applications; however, this is non-binding commentary, not written law. Administrations and their interpretations change and this struggle over definitions and how to organize them within the appropriate regulatory perimeter is a border-crossing, international phenomenon with occasionally sweeping implications.

In the United Kingdom, FATF guidance on VASPs is being established[52] amidst increased regulatory attention as revealed in the Bank of England’s recent industry report,[53] the Financial Conduct Authority’s industry notice,[54] and the Deputy Governor and CEO of the Prudential Regulatory Authority’s industry letter.[55] Unified approaches such as this are not uncommon and can give key insights regarding the pace at which authorities are learning, the frameworks they are developing,[56] and how they are seeking to apply policies to blockchain.

South Korean innovators in the blockchain space may have reason for renewed, yet cautious, hope as a new president touted as being friendly toward blockchain comes into office; however, campaign aspirations are not guaranteed to become realized. From 2017-2021, the United States experienced this in which the incoming president was expected to embrace blockchain innovators, yet the officials he placed in charge of regulatory bodies often attempted to impose rules[57] counter to a number of blockchain core tenets. South Korea is no stranger to dramatic shifts in the political climate regarding cryptocurrencies. Last year, the Chair of South Korea’s Financial Services Commission threatened[58] that all exchanges could be shut down for not registering with the Korea Financial Intelligence Unit as required[59] by VASPs. Along with Korea’s adoption of the FATF guidance comes one of the earliest implementations of the Travel Rule.[60]

China's three leading financial authorities, the National Internet Finance Association, the China Banking Association, and the Payment and Clearing Association of China, formed a united front and effectively crippled[61] cryptocurrency business within China's borders. A critical lifeline keeping Chinese citizens connected to the public blockchain ecosystem is that cryptocurrency ownership remains legal, creating an opportunity for decentralized applications to service this population.

India's Finance Minister established broadly defined taxation guidance for cryptocurrencies, but the ruling Bharatiya Janata Party appears immobilized in drafting comprehensive blockchain policy as turmoil continues to exist between the government and the Reserve Bank of India.[62,63] Positions among authorities range from embracing the industry, stifling it, or completely outlawing it, leaving cryptocurrency users and businesses frustrated in a persistent state of confusion.

Russian parliamentary working groups and the Ministry of Finance are proposing a more accommodative approach toward blockchain regulation[64] than the Bank of Russia's position in favor of an outright ban. While a recent increase in sanctions revolving around Russia makes it difficult to follow bill revisions and advancements from official sources, an outright ban appears exceedingly unlikely at this point.

Sanctions

International conflicts arise in many forms each year and at times bring about a number of sanctions with varying degrees of compulsory compliance measures. In some instances, such as war, far-reaching restrictions may be all but ubiquitously adopted and carry significant implications for blockchain innovators, particularly true if conflict and sanctions enforcement is co-opted for creating sudden legislation that attempts to expedite due process for the sake of an emergency situation.[65,66]

Considerable attention[67] falls globally upon potential methods of circumventing sanctions and facilitating money laundering. Organizations such as OFAC, OFSI, and the EC exist in similar forms internationally and are tasked with coordinating sanctions and their enforcement.68-70 A subsequent cascade of laws and guidance generally develops with varying degrees of international cooperation in an attempt to bring exposure to these methods and provide authorities the tools to observe, limit, or restrict them. By mandate, regulators are inherently drawn to claims of decentralized blockchains and the applications that run upon them, especially those applications that fall into the realm of decentralized finance (DeFi).

DeFi Education

For the time-being, decentralized applications enjoy a lesser degree of definitive regulatory guidance due to the challenging nature of identifying their specific activities, functions, facts, and circumstances relative to centralized applications; however, enforcement action is taking place on the low-hanging fruit of pseudo-decentralized applications and ongoing departmental education makes certain a future of broader scrutiny. In February 2022, the FSB published their review[44] of risks posed by crypto-assets to global financial stability. On pages 15-17, this G20[71] endorsed organization reveals acute awareness that DeFi, as it exists today, is often a misnomer and involves a spectrum of centralization throughout the function of an application. They specifically identify governance structures and key management surrounding smart contracts that frequently lead to a team with exorbitant influence on decision making or even unilateral control.

Education and training initiatives within legislative branches, regulatory agencies, and enforcement offices are increasing along with the hiring and contracting of experts globally. With guidance from sources such as the FSB, these organizations are developing an understanding of control asymmetries leveraged in permission structures behind accounts and contracts, how funding moves through various mechanisms of different blockchains, when and where custody occurs, who or what is managing custodied funds, how different transaction types are facilitated, and most importantly - how to identify weaknesses in design that place any of these activities and functions under existing authority. Functional mechanisms of blockchain systems such as a treasury involve a number of these elements as funds travel from origin to destination, each of which can carry implications on whether or not a person or entity is obligated to recognize compliance measures.

Summary

The composition of laws, rules, guidance, and influence among distinct regions and administrations, both local and federal, creates many living documents that at times experience unpredictable evolution. This inherently complicates the planning process facing treasury architecture beyond technical features. Poor legislation may be defeated one year only to return another, or rejected in part of the world and resurface elsewhere.[57,72-75] Some of these attempts go as far as targeting the act of simply publishing code or storing assets in a private wallet.[76-78] An unfortunate practice in the United States is recognized as "Midnight Rulemaking,"[79] where officials approaching the end of their administration slip last minute changes into regulations that dramatically increases the difficulty of detecting the changes, as well as the complexity of determining their implications. Though such action can be troublesome for interested parties

with objections, some regimes simply issue decrees with no formal process involving public opinion and no opportunity for amending poor legislation.

Relying on disparate and complex legislative processes to clear a path for innovators through prudential treatment of blockchain technologies will continue to be fraught with victory one year and defeat another. Policy creation and application toward blockchain is distinctly complicated as a vigorous reimagining of legacy technologies and mechanisms is underway throughout the world, ensuring that legislative changes will continue to be necessary for the foreseeable future. Authorities are looking to poke holes in claims of decentralization and identify familiar control structures that determine whether someone or entity should be compelled to abide by jurisdictional compliance measures.

Administrations and their interpretations change.[80] An accommodative jurisdiction now may be hostile later and vice versa. The FATF, OECD, and FSB are just a few of the overarching organizations that issue guidance to member nations that are in the process of examining and developing approaches toward not only blockchain, but more specifically decentralized finance on blockchain. They serve as educators and advisors to regional governments and regulatory offices throughout the world, enjoying broad regard for their guidance as revealed in much of the terminology each region employs in local policy. While adherence is not compulsory, cooperation is often incentivized by continued access to major economic systems of finance and more.

As these organizations study, draft, and revise legislation, confusion persists in many jurisdictions, leaving innovators to cautiously approach or even abstain from participating in activities seemingly as benign as signing a transaction. This diffidence is reasonable given that authorities commonly reveal a penchant for practicing an inverse approach toward innovation which first hesitates and prioritizes problems that could arise from innovations rather than solutions they could provide. Certainty does not exist in legislative processes, making it necessary to design for ambiguity. Judicious planning of systems that resist the whims[81] of changing regimes expects this behavior and durable designs can be both resistant to change while adaptable through change.

Considering the rapidly evolving international regulatory landscape for cryptocurrencies in which industry advocates, regulatory agencies, and lawmakers are each proposing varying definitions of activities and functions and how best to regulate them, it is prudent to anticipate increased scrutiny upon the structure, management, and funding of the Yield+ treasury early and throughout its design process. In the following section we review some of the choices made by public blockchain communities in the design of their treasuries and how they coordinate with any incentive programs, followed by discussion of potential strengths or weaknesses resulting from these choices.

D. Review of Blockchain Treasuries

Examining the design and implementation of existing treasuries and liquidity incentive programs on other blockchains can help shape and refine the deployment of the Yield+ treasury on EOS. Criteria for selecting the following examples at the time of this writing included the value held within the treasury, market capitalization of the native asset, or uniqueness in the approach used for treasury management.

BitDAO

BitDAO is a governance token designed for proposals and voting as opposed to a general-purpose smart contract blockchain; however, the community does have a goal of building innovative treasury management tools and currently hosts a treasury[82] securing a variety of digital assets. BitDAO's treasury management currently relies upon Gnosis Safe for multisignature control over funding and employs soft governance in which holders of the native BIT token are polled and a snapshot of the vote is performed, but the conclusion of voting does not impart changes on-chain.[83,84] After votes are aggregated and the snapshot occurs, it is then up to the "development and operations team" keyholders on the Gnosis Safe multisignature to follow-through with the will of the voters. Voting parameters are determined by BitDAO's Snapshot Space administrators and not enforced by code, but are noted to be discussed in advance at their official forum and polled for community feedback.[85,86]

While there is not an analogous liquidity incentive program to the Yield+ design, BitDAO does make investments into partnerships and offers donations. To date, these efforts have primarily been to popular token swap projects in return for adding BIT token base pairs. Phase 2 of their design roadmap[87] notes the desire to move away from soft governance methods.

Polygon

Polygon offers a liquidity mining incentive program and a general use treasury managed by its founders.[88,89] Their multisignature structure is outlined[90] as a progressive increase in required signatures depending on the purpose of the contract, with 5 of 8 signatures employed for the most critical contracts. Signatories on these specific contracts are Polygon cofounders and select representatives of ecosystem projects chosen by the Polygon cofounders.[91,92] Literature about the Polygon treasury structure, its function, or the mechanisms involved in distributing rewards to qualifying decentralized applications (dApps) is limited. There is an official blog post[93] noting a $1 Billion commitment from the treasury at the discretion of the foundation and press highlighting a commitment of $100 million to an NFT platform, but no information is

publicly available on the distribution mechanisms of the liquidity reward program, nor management of the Polygon treasury.

Tezos

Tezos has an experimental incentive program to attract liquidity in the form of tez and tzBTC deposits.[94,95] With this incentive program, an additional 2.5 tez per block[96] are issued by the protocol every 30 seconds and dispensed directly to the pool. Liquidity providers can withdraw their deposit plus a pro-rata portion of the inflationary subsidy. This appears to eliminate the need for soft governance in the activity of distributing reward to liquidity providers; however, this design does not specifically target DeFi applications to participate. The program is open to anyone willing to make a deposit, roughly similar in this regard to the EOS Resource Exchange. The program is intended to run temporarily for six months before automatically stopping unless the community decides through its governance process[97] to enable its continuance. It remains operational at the time of this writing.

Beyond the noted incentive experiment, a Tezos treasury exists under the authority of the Tezos Foundation and rewards are distributed at the discretion of the foundation. A high-level summary of the Foundation's treasury disbursements is reported in part as a component of a biannual report[98] published by the Tezos Foundation. Treasury addresses are not publicly identified for further examination, but their September 2021 report notes that their Tezos balance is "stored in secure custody solutions."

Avalanche

Avalanche treasuries are not publicized and requests for information were not returned by the target date of this paper. Examining the initial token distribution[99] suggests the existence of various treasuries with some information as to their directives, but details surrounding activities and functions do not appear to exist in the public domain. The Avalanche Foundation is noted as being allocated 9.26% of the initial supply, a community endowment holds 7%, strategic partners hold 5%, and 10% is controlled by the Avalanche team. None of the associated addresses appear to be purposefully identified or widely known. Gnosis Safe multisignatures were recently made available this past December,[100] and though it is likely that these allocations are secured by multisignatures, published information does not provide any indication as to their use, nor structure.

Governance[101] on Avalanche is confined to a predetermined set of five configurable parameters bound within specified ranges related to token economics and staking. Incentive programs appear to involve distributions from the foundation, endowment, and partners directly to recipients at the discretion of unspecified keyholders.[102,103] Some recipients like Pangolin[104] do operate their own liquidity incentive programs, but these efforts are distinct from recurrent or programmatic interaction with Avalanche treasuries.

Fantom

Fantom's original reward program for qualifying dApps claims to be "fully programmatic" with "no decision making" falling upon the network's chief governing body, the Fantom Foundation; however, the Fantom Foundation does have the authority to "halt rewards."105-107 Upon review, there is no further public literature available to elucidate specific mechanisms involved in the flow of funding from the network, into the rewards program, and to participating applicants apart from a vesting schedule and the ability of a dApp to rise and fall throughout the reward tiers based on its Total Value Locked (TVL) reported through DefiLlama.[23] A request for additional information was not returned by the target date of this paper.

Governance[108] on Fantom provides a relatively rich feature set compared to other tokens reviewed in this section, though community directed treasuries supporting major network initiatives do not appear to be commonplace at present. Multisignatures on Fantom Network are performed using a fork of Gnosis Safe called Fantom Safe.[109] A Fantom Foundation treasury does exist, funded by a portion of the initial token sale, and a search for additional information throughout Fantom documentation further alludes to its existence in a single blog post,[110] but this is the extent of transparency regarding treasury operation.

Discussion: Blockchain Treasuries

Direct analogs to the Yield+ treasury and its specific purpose of managing funding for an incentive program are limited and often involve design decisions more suitable for a general-purpose use case. Examination of choices made throughout the broader ecosystem provides interesting insight into some of the challenges and opportunities facing not only the Yield+ treasury, but also future treasury implementations or revisions to existing ones. A few observations reveal treasury architectures employing careful, forward-looking approaches to design while others may be underutilizing some of the key advantages blockchains have to offer or reliant upon conceptualized processes in a nebular state of development.

Transparency can be an important advantage of blockchain-based treasuries; and while it is often touted as the paramount feature of public blockchains, review of publicly available

resources suggests limited presence of on-chain function and a contrary degree of opacity surrounding the operation of some of the largest treasuries supporting their respective networks. A number of these treasuries involve blockchain only as far as assets being held within an on-chain account, but otherwise operate more similarly to a traditional corporate treasury with limited insight available to the public regarding the treasury's activities and functions.

Closer examination of industry practice frequently leads to a small cohort of unspecified individuals that manage a set of keys through a smart contract wallet developed by or forked from Gnosis Safe. A number of the decisions behind attracting liquidity through the use of a treasury's funds thus rely upon the discretion of these keyholders. Structures such as these bring up concerns highlighted in the introduction to this section, particularly the sovereignty of the treasury itself if challenged in the jurisdictions of individual keyholders. Whether or not a treasury and any initiatives that rely upon it could continue to operate in the event regulatory scrutiny or an attacker is drawn to the activities and functions involved is a critical assessment to make prior to its development. While some of the designs raise difficult questions, there are others that implement practical methods to take advantage of their blockchain's capabilities and transition some of the functional burden onto the network itself, thereby improving operational resilience. Some of these examples can be found in Tezos, Fantom, and BitDAO.

Tezos approaches liquidity incentivization through a direct subsidy issued by the network. This separates a formal treasury structure from being involved in rewarding participants, reduces the risk of collaborative malfeasance, and increases resilience to outside scrutiny; however, a key drawback is the lack of targeted incentives. Yield+ is tasked with attracting liquidity specifically from high-value decentralized finance applications and precision of reward distribution is a requirement.

Fantom's incentive program is capable of directing rewards toward targeted participants that are able to achieve published TVL requirements, but specifics of the involved funding mechanisms are not readily transparent. Fantom also employs a dynamic reward mechanism allowing each dApp to transition progressively or regressively between reward tiers based on their individual TVL. A 12-month vesting schedule further safeguards network funds while encouraging prolonged participation of qualifying dApps.

BitDAO, in its current phase 1 of development, has a gap between the on-chain vote of token holders and the implementation of voting outcomes. Their Phase 2 roadmap seeks to resolve this in which the will of the voters would result in execution of proposals. Though yet to be deployed, should BitDAO achieve their Phase 2 design goals, treasury management would see a reduction or elimination of existing intermediaries and distribute a significant portion of responsibilities upon the community broadly.

Genuine distribution of operations will continue to be tested as adoption of these systems increases. Whether it be from a participant, attacker, regional authority, or a casual observer, challenges to a treasury's integrity will perpetually arise in different forms. Being decentralized in practice and relying upon available technologies rather than decentralized in name only and supported by aspirations is a critical factor in determining resilience to these challenges. A forward-looking approach to treasury design that anticipates these challenges is warranted and EOS has the necessary tools and functions available now to ensure prudential treatment of these matters according to the purpose of the treasury.

EOS's simple governance process and robust, native multisignature features provide innovators the ability to carefully distribute operational burdens broadly upon the network. Achieving the Yield+ Working Group's goal of increasing liquidity locked within the EOS ecosystem will inevitably draw the attention of both regulators and attackers toward the involved mechanisms, and weak permission structures will fail their evaluation. A cautiously architected blockchain-based treasury can appreciate this attention as symbolic of success and reassuring that rather than ignoring the inevitable, it was addressed at inception.

E. Treasury Recommendations

The following recommendations serve as a starting point for community deliberation and are intended to offer a forward-looking approach that anticipates political ambiguity and regulatory scrutiny while ensuring the integrity of the Yield+ treasury's activities and functions, the safety of its assets, and the protection of the EOS Network.

Design Features

1. Establishes dependence upon decentralized, hard governance at launch.
2. Reduces the probability of emergency changes due to technical or regulatory factors.
3. Minimizes impact of potential exploits.
4. Obviates or mitigates a number of regulatory concerns by:
    a. Abstracting trusted intermediaries in control of assets or effectuating transactions in the flow of funding from the network to participating dApps;
    b. Not involving deposits, custody, or management of user funds;

c. Having participants initiate a reward “claim” rather than funds being manually or automatically distributed to them; and

d. Programatically distributing the activities and functions of treasury management and funding upon the EOS Network itself.

Treasury Permissions Structure

@owner - 15 of 21 MSIG, Active Block Producers (eosio@active)

↳@active - 5 of 6 MSIG, Yield+ Core Development Team

↳@eosio.code - 1 of 1, Yield+ Contract

Description

This permission structure utilizes the native, layered multisignature features of EOS to provide the development team with moderate flexibility to coordinate necessary code updates during early-stage deployment while remaining under the authority of 15 of 21 community-delegated block producers securing the account’s owner permission.

The use of eosio.active for the owner permission ensures that broad oversight exists at the first stage of deployment by placing the entire Yield+ treasury account, its assets and contract, under the ultimate authority of the network. The keyholders of this permission are redetermined every 120 seconds by calculating the EOS community’s delegated token weight according to the protocol’s native consensus mechanism.

As the design proves itself to be durable, treasury permissions could evolve into a more rigid state by making changes such as adding or removing signatories, modifying signature weights, changing the amount of required signatures, or limiting actions with a time lock.

Yield+ Core Development Team[112-117]

Early success of this initiative requires a developer composition that is exceptionally familiar with the vision and architecture presented in this blue paper. The initial core development team for the Yield+ program would be optimally structured as a team of teams in which technical capacity to soundly produce deliverables in a timely manner is high with accountability remaining paramount among discrete peer groups the EOS community is familiar with.

- Defibox
- EOS Nation
- Origin
- Greymass
- Pizza DeFi
- EOS Asia

Reward Funding and Frequency

Stage 1 and 2 (Launch and Support)
0.0625% of annual network inflation per quarter
This is approximately equivalent to 625,000 EOS per quarter or 0.25% per year.

Stage 3 (Accelerate)
0.25% of annual network inflation per quarter
This is approximately equivalent to 2,500,000 EOS per quarter or 1% per year.

At the end of each period, any unclaimed funding would roll over to future periods and may at times obviate the need for additional funding. An inflection point may also be reached in which increases in funding are no longer necessary as dApp economies begin to grow within the EOS ecosystem. Eligible dApps must perform a daily claim function to withdraw their rewards from the treasury corresponding with their time-weighted TVL. Unclaimed rewards will be forfeited and remain in the treasury.

Discussion: Funding Frequency and Sources

During early-stage operation of an experimental incentive program, limiting the number of automated processes is a simple technique allowing developers the ability to focus on core functions and results while establishing a tight perimeter within which problems can arise and the extent to which they can travel. The flow of reward-funding into the Yield+ treasury is a prime example of one such process that may be performed manually during initial operation.

Further restriction through the use of tranches could provide the community time to periodically evaluate the program and consider changes to the source, amount, and frequency of recurrent funding contingent upon delivery of value to the network, expanding and contracting market cycles, or any number of variables determined by the community. However, depending on their source and frequency, tranches could become tedious to coordinate. This precautionary

measure may also be considered unnecessary given the relative simplicity of the overall program architecture. The mechanism of funding will serve as an accountability tool as much as a safeguard during development.

In the event that the technical architecture of the Yield+ incentive program proves functional and durable, and the outcomes are perceived as being valuable to the community, prudential treatment of the funding mechanism would remove manual processes and their intermediaries, transition to an automated function that broadly distributes the burden of treasury management upon the network itself, and implement an agreed upon source of funding capable of sustaining the Yield+ incentive program as long as the community deems necessary.

Potential sources of network-derived funding for early and late-stage deployment of the Yield+ incentive program include:

1. Transfer a portion of the existing eosio.saving[118] account balance,
2. Allocate[119] a percentage of existing annual network inflation where currently 2% goes to eosio.saving and 1% goes to Block Producers,
3. Allocate a percentage of restored, default parameters[120] for annual network inflation where 3-4% goes to eosio.saving and 1% goes to Block Producers,
4. Request funding from the EOS Network Foundation,
5. Reclaim retired assets from the eosio.saving account that were previously assigned in the technical whitepaper to a conceptualized worker proposal system,[121] or
6. Reallocate unvested tokens initially held by the network on behalf of Block One.

Each of these options present the EOS community with different challenges to be carefully weighed and measured in order to achieve consensus on the best source, amount, and frequency of funding for each stage. While some options will inherently be more contentious than others, the list is provided to be thorough only.

VIII. Deliverables

A. Yield+ Application Portal

Objective

The application portal is a web-based platform that provides application protocols the ability to join the Yield+ reward system, review and edit their project application, and claim daily rewards.

Deliverables

- The application system, the process page for the project party to apply for the reward, helps the applications join the Yield+ reward system.
- Integration with EOS Wallet+ signing protocols (ex: Anchor).
- The review system allows managers to verify, review, annotate application materials, publicize and/or deny ineligible projects.
- Serverless cloud functions to serve Yield+ application data & platform statistics.
- Reward collections section to allow protocols to claim daily rewards.
- Display individual DeFi statistics for individual protocol on Yield+.
- Display aggregated DeFi statistics for all supported protocols on Yield+.
- Administrator functionality to manage & review project applications.

Timelines

- 2 weeks for UX/UI design ($22,500)
- 6 weeks for front-end application development: user specific tasks ($84,000)
- 4 weeks for back-end development ($70,000)
- 3 weeks for admin portal: administrative tasks for Yield+ operating team ($42,000)
- 2 weeks for web graphic designs ($18,000)
- 6 months general platform site hosting/maintenance/feature fixes. (included)
    - Invoice monthly after initial launch period ($7,500)

Budget

- $236,500 for Yield+ Application Portal
- $7,500 per month for general platform maintenance.

B. Yield+ Smart Contracts

Objective

Implement a Yield+ Rewards system that incentivizes DeFi protocols to retain long-term TVL within their application. In addition, an oracle system will be supporting Yield+ to provide reliable TVL data metrics of DeFi protocols and leveraging decentralized data price feeds from existing oracle providers on EOS Network.

KPIs

- Attracting additional TVL on EOS Network into DeFi protocols.
- Increase in lockup of EOS tokens as liquidity within DeFi protocols.
- Increase in utilization of Tether (USDT) on EOS Network.

Deliverables

- The main deliverable should be a github repository that hosts all of the EOSIO smart contract logic for the Yield+ rewards system.
- Ability for DeFi protocols to join the rewards system by providing their application details and smart contracts where their TVL is being recorded.
- Oracle system that supports Time Weighted Average Price (TWAP) calculation that accounts for different time zone trends whereby the daily TVL will be the average of 3 periods, each 8 hours long, and themselves comprising an average of 10 minute snapshots.
- Oracle system shall calculate the TVL for each participating dApp in isolation and the inflationary reward calculation methodology will be applied once per day.
- Oracle server script with iteration over protocols, retry and resume mechanisms.
- Allow protocols to claim a daily allocation of rewards based on their TVL, a minimum and maximum TVL threshold shall be established as system parameters.

- Smart contract contract specifications.
- Smart contract unit testing in bash.
- Technical documentation supporting TABLE, ACTION, and STRUCT of the contract.

Timelines

Yield+ Rewards

- 1 week for contract specification ($22,500)
- 5 weeks for EOS smart contract implementation ($112,500)
- 2 weeks for unit testing ($20,000)
- 2 weeks for auditing ($45,000)
- 1 week for technical documentation ($11,250)

Yield+ TVL Oracle

- 1 week for contract specification ($22,500)
- 4 weeks for EOS smart contract implementation ($90,000)
- 3 days for unit testing ($13,500)
- 1 week for oracle script ($22,500)
- 1 week for auditing ($22,500)
- 7 days for technical documentation ($11,250)

Budgets

- $211,250 for Yield+ Rewards
- $176,750 for Yield+ TVL Oracle

C. Yield+ Analytics and Reports

Objective

Analytics are vital to help understand the performance and growth of the Yield+ system. Yield+ participating protocols shall receive support to construct TVL adapters (code that reads TVL from contracts and records its data) on DefiLlama; having these public adapters available allows the broader crypto community to visualize these TVL metrics.

In addition, this item should aim to establish a framework for evaluating and analyzing the performance of the Yield+ program, as well as to perform comparative analyses of other, similar programs used in other ecosystems. This task also includes gathering and aggregating both participation and usage data into a reporting format, as well as continuously providing strategic intelligence for decision makers to adjust and calibrate the program over time.

KPIs

- Macro TVL metrics for EOS Network and Trust EVM.
- Number of protocols listed on DefiLlama.
- Market Cap / TVL Ratio reporting on CoinGecko.

Deliverables

- Monthly report on the status and usage of the program.
- Ad hoc strategic analysis documents.
- Ad hoc recommendations and suggestions.
- DeFi TVL protocol adapters hosted on DefiLlama or other reliable aggregator sources.

Timelines

- Continuous monthly reports
  - Reevaluated every 6 months
- 1-2 days per TVL DeFi protocol adapter implementation

Budget

- Invoiced monthly
- $20,000 per month for analysis and reports
- $1,000 per protocol external adapter implementation

IX. Conclusion

The Yield+ Working Group presented the case that a liquidity rewards program designed to incentivize TVL in DeFi applications on EOS would be one of the most impactful drivers of network growth. We have shown the effectiveness of similar programs on comparable chains and demonstrated how the deployment of those programs directly led to more and higher-quality economic activity.

Further, the framework for a custom liquidity rewards program on the EOS Network has been provided. The best designs from existing programs were reviewed, evolved, and adapted for use within the EOS ecosystem to meet the needs of the EOS community. This blue paper also proposed recommendations and a plan for building and implementation of the design, as well as maintenance of this liquidity rewards program.

In our research, we spoke directly with a number of teams deeply involved in EOS and its DeFi ecosystem. We received overwhelming support and encouragement for this program, evidenced by some of the feedback included below:

NewDex: Give full play to the performance advantages of EOS, optimize the economic model, empower the ecology, and look forward to the moon.

DFS: Thumb up! We will build an incentive pool and distribute some rewards to those who provide liquidity.

PayCash: Everything is on a smart contract. Everything can be checked, we only welcome it!

Defibox: A successful mode already verified on other chains, hope it will create an opportunity for EOS.

DMD: That's pretty good! it will definitely provide incentives for project parties to launch on EOS.

PIZZA: A reward system that actually works is essential for the current ecosystem. With this and EVM+, I hope we can see the growth of a decent forest by 2023.

Now, we hand this paper off to the community for review, feedback, and ultimate decision-making.

We look forward to your feedback and contributions!

References

1. George B. Why TVL matters in DeFi: Total value locked explained. CoinDesk. Published January 26, 2022. https://www.coindesk.com/learn/why-tvl-matters-in-defi-total-value-locked-explained/

2. cDefiLlama. DefiLlama.com. https://defillama.com/

3. Sergeenkov A. How does Ethereum staking work? CoinDesk. Published August 11, 2021. https://www.coindesk.com/learn/2021/08/11/how-does-ethereum-staking-work/

4. Tan E. DeFi lending: 3 major risks to know. CoinDesk. Published July 13, 2021. https://www.coindesk.com/learn/2021/07/13/defi-lending-3-major-risks-to-know/

5. What is a liquidity pool? Crypto market liquidity. Gemini. Published November 30, 2021. https://www.gemini.com/cryptopedia/what-is-a-liquidity-pool-crypto-market-liquidity

6. Rodriguez J. The 5 big risk vectors of DeFi. CoinDesk. Published February 3, 2022. https://www.coindesk.com/layer2/2022/02/03/the-five-big-risk-vectors-of-defi/

7. Hertig A. What is an oracle? CoinDesk. Published December 22, 2020. https://www.coindesk.com/tech/2020/12/22/what-is-an-oracle/

8. Aramonte S, Huang W, Schrimpf A. DeFi risks and the decentralization illusion. Published online 2021. https://www.bis.org/publ/qtrpdf/r_qt2112b.htm

9. Saha S. Making sense of DeFi's complexity: An opinion. Crypto Bulls Club. Published January 19, 2022. https://cryptobullsclub.com/making-sense-of-defis-complexity/

10. Bosun O. How to spot and avoid being rug-pulled in the DeFi marketplace. Yahoo Finance. Published January 22, 2022. https://ca.finance.yahoo.com/news/spot-avoid-being-rug-pulled-100044822.html

11. Malwa S. DeFi 'Rug pull' scams pulled in $2.8B this year: Chainalysis. CoinDesk. Published December 17, 2021. https://www.coindesk.com/markets/2021/12/17/defi-rug-pull-scams-pulled-in-28b-this-year-chainalysis/

12. Beaver Finance. DeFi Security Lecture 6 —Phishing Attack - beaver-smartcontract-security - Medium. beaver-smartcontract-security. Published January 4, 2022. https://medium.com/beaver-finance/defi-security-lecture-6-phishing-attack-3e6345cc3363

13. CoinMarketCap. What are flash loan attacks? CoinMarketCap Alexandria. Published May 21, 2021. https://coinmarketcap.com/alexandria/article/what-are-flash-loan-attacks

14. Totle. Front Running and its Effect on Decentralized Exchanges. Totle. Published July 26, 2018. https://medium.com/totle/front-running-and-its-effect-on-decentralized-exchanges-e463ca4474db

15. Fantom Foundation. Incentive Framework. Published August 30, 2021. https://fantom.foundation/blog/announcing-370m-ftm-incentive-program/

16. Fantom Foundation. Updated Incentive Framework. Published November 16, 2021. https://fantom.foundation/blog/updated-requirements-for-the-incentive-rewards-program/

17. DefiLlama. Fantom TVL data. DefiLlama.com. https://defillama.com/chain/Fantom

18. Messari. Fantom real volume. Messari.io. https://messari.io/asset/fantom/chart/real-vol

19. Nansen. Fantom daily active addresses. Nansen.ai. Published October 7, 2021. https://pro.nansen.ai/multichain/fantom

20. Nansen. Ethereum vs Fantom contract deployment activity. Nansen.ai. https://pro.nansen.ai/multichain/eth-vs-fantom

21. Nansen. Fantom: Solving the blockchain trilemma. Nansen.ai. https://www.nansen.ai/research/fantom-solving-the-blockchain-trilemma

22. Polygon Team. DeFi for all enters final phase with $15 million for Polygon native DApps. Polygon | Blog. Published January 28, 2022. https://blog.polygon.technology/defi-for-all-enters-final-phase-with-15-million-for-polygon-native-dapps/

23. DefiLlama. Polygon TVL data. DefiLlama.com. https://defillama.com/chain/Polygon

24. Nansen. Polygon daily active addresses. Nansen.ai. https://pro.nansen.ai/multichain/polygon

25. Polygon Team. #DeFiforAll Phase 2: Polygon DeFi summer continues, with 85 million+ USD liquidity rewards for Aave's Polygon markets. Polygon | Blog. Published June 17, 2021. https://blog.polygon.technology/defiforall-phase-2-polygon-defi-summer-continues-with-85-million-usd-liquidity-rewards-for-aaves-polygon-markets-6189f9c8b79/

26. DefiLlama. Protocol categories. DefiLlama.com. https://defillama.com/categories

27. Origin. QED Blockchain Oracle Network. Qed.network. https://qed.network/

28. Origin. QED oracle protocol model. Qed.network. Published September 2021. https://qed.network/QED-Oracle-Protocol.pdf

29. Origin. QED / delphioracle account on EOS. Bloks.io. https://bloks.io/account/delphioracle

30. DeFibox. Defibox releases the on-chain oracle (contract: oracle.defi) officially. Defibox.io. Published November 13, 2020. https://support.defibox.io/hc/en-us/articles/900003474266-Defibox-Releases-the-On-chain-Oracle-contract-oracle-defi-Officially

31. Defibox. Oracle.defi account on EOS. Bloks.io. https://bloks.io/account/oracle.defi

32. Slominski P. Taking hybridity of hard and soft forms of governance seriously: Concept, choice and interaction of legal instruments in the EU. Vienna, Austria: Austrian Academy of Sciences, Institute for European Integration Research; 2008.

33. Schor L, Schubotz T. Getting started. Gnosis-safe.io. Published date unknown. https://help.gnosis-safe.io/en/collections/2289028-getting-started

34. Schubotz T. Supported asset types. Gnosis-safe.io. Published date unknown. https://help.gnosis-safe.io/en/articles/4970832-supported-asset-types

35. Wikipedia contributors. List of financial regulatory authorities by country. Wikipedia.org. Published April 22, 2022. https://en.wikipedia.org/w/index.php?title=List_of_financial_regulatory_authorities_by_country&oldid=1084077231

36. FATF. About - Financial Action Task Force (FATF). Fatf-gafi.org. https://www.fatf-gafi.org/about/

37. FATF. Member Countries. Fatf-gafi.org. https://www.fatf-gafi.org/countries/

38. KPMG. Virtual assets and related providers. Kpmg.us. Published November 23, 2021. https://advisory.kpmg.us/articles/2021/virtual-assets-related-providers.html

39. FATF. FATF standards. FATF-gafi.org. Published October 28, 2021. https://www.fatf-gafi.org/publications/fatfrecommendations/documents/guidance-rba-virtual-assets-2021.html

40. FATF. Updated guidance for a risk-based approach to virtual assets and virtual asset service providers. FATF-gafi.org. Published October 28, 2021. https://www.fatf-gafi.org/media/fatf/documents/recommendations/Updated-Guidance-VA-VASP.pdf

41. Coinbase. Introducing the Travel Rule Universal Solution Technology (“TRUST”). The Coinbase Blog. Published February 16, 2022. https://blog.coinbase.com/introducing-the-trav-

el-rule-universal-solution-technology-trust-232774d76674?gi=570d618da32f

42. FinCEN. Application of FinCEN's regulations to certain business models involving convertible virtual currencies. Fincen.gov. Published May 9, 2019. 2022. https://www.fincen.gov/sites/default/files/2019-05/FinCEN%20Guidance%20CVC%20FINAL%20508.pdf

43. OECD. OECD seeks input on new tax transparency framework for crypto-assets and amendments to the common reporting standard. Oecd.org. Published March 22, 2022. https://www.oecd.org/ctp/exchange-of-tax-information/oecd-seeks-input-on-new-tax-transparency-framework-for-crypto-assets-and-amendments-to-the-common-reporting-standard.htm

44. FSB. Assessment of risks to financial stability from crypto-assets. FSB.org. Published February 16, 2022. https://www.fsb.org/wp-content/uploads/P160222.pdf

45. European Parliament. Cryptocurrencies in the EU: new rules to boost benefits and curb threats. Europa.eu. Published March 14, 2022. https://www.europarl.europa.eu/news/en/press-room/20220309IPR25162/cryptocurrencies-in-the-eu-new-rules-to-boost-benefits-and-curb-threats

46. European Parliament. Understanding trilogue: Informal tripartite meetings to reach provisional agreement on legislative files. Europa.eu. Published May 19, 2021. https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2021)690614

47. MiCA: A guide to the EU's proposed Markets in Crypto-assets regulation. Sygna.io. Published October 6, 2020. https://www.sygna.io/blog/what-is-mica-markets-in-crypto-assets-eu-regulation-guide/

48. Hughes B. A new SEC definition for 'exchanges' has big implications for crypto. CoinDesk. Published April 5, 2022. https://www.coindesk.com/layer2/2022/04/05/a-new-sec-definition-for-exchanges-has-big-implications-for-crypto/

49. DeFi Education Fund. Broad definition of exchange. Published March 30, 2022. https://twitter.com/fund_defi/status/1509167962804166659

50. US Congress. H.R.3684 — 117th Congress (2021-2022). Congress.gov. Published November 15, 2021. https://www.congress.gov/bill/117th-congress/house-bill/3684/text?overview=closed

51. Schapitl A, Chu K. Wyden, Lummis, Toomey amendment would clarify digital asset reporting requirements. Senate.gov. Published August 4, 2021. https://www.finance.senate.gov/

chairmans-news/wyden-lummis-toomey-amendment-would-clarify-digital-asset-reporting-requirements

52. CMS Law-Now. Registration requirements for virtual asset service providers. Cms-lawnow.com. Published March 22, 2022. https://www.cms-lawnow.com/ealerts/2022/03/registration-requirements-for-virtual-asset-service-providers

53. Bank of England. Financial stability in focus: Cryptoassets and decentralized finance. Bankofengland.co.uk. Published March 24, 2022. https://www.bankofengland.co.uk/financial-stability-in-focus/2022/march-2022

54. FCA. Notice to all FCA regulated firms with exposure to cryptoassets. FCA.org.uk. Published March 24, 2022. https://www.fca.org.uk/news/statements/notice-regulated-firms-exposure-cryptoassets

55. Woods S. Industry letter. Bankofengland.co.uk. Published March 24, 2022. https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/letter/2022/march/existing-or-planned-exposure-to-cryptoassets.pdf

56. Bank of England. Financial stability in focus: Cryptoassets and decentralized finance, 6: Regulatory initiatives to mitigate risks from cryptoassets and defi. Bankofengland.co.uk. Published March 24, 2022. https://www.bankofengland.co.uk/financial-stability-in-focus/2022/march-2022#chapter-5

57. Van Valkenburgh P. A midnight rule for cryptocurrency transaction reports. Coin Center. Published December 18, 2020. https://www.coincenter.org/a-midnight-rule-for-cryptocurrency-transaction-reports/

58. Im F. South Korea's top financial regulator suggests all crypto exchanges could be shut down. CoinDesk. Published April 23, 2021. https://www.coindesk.com/policy/2021/04/23/south-koreas-top-financial-regulator-suggests-all-crypto-exchanges-could-be-shut-down/

59. FSC. AML requirements of virtual asset service providers to take effect from March 25. FSC.go.kr. Published March 16, 2021. https://www.fsc.go.kr/eng/pr010101/75563

60. Annie. The Travel Rule has been complied with by Korean crypto exchanges. CoinCu News. Published March 25, 2022. https://news.coincu.com/75535-travel-rule-has-been-complied-korean-crypto/

61. Reuters. Explainer: What Beijing's new crackdown means for crypto in China. Reuters. Published May 19, 2021. https://www.reuters.com/world/china/what-beijings-new-crack-

down-means-crypto-china-2021-05-19/

62. Ghosh K. India's crypto conundrum: Of regulation, taxation and ban. Outlook India. Published March 4, 2022. https://www.outlookindia.com/business/india-s-crypto-conundrum-of-regulation-taxation-and-ban-news-185075

63. Mukherjee P. India to make life hell for crypto investors: MP. Forkast. Published April 5, 2022. https://forkast.news/india-to-make-life-hell-for-crypto-investors-mp/

64. Baydakova A. Russian government introduces crypto bill to parliament over central bank objections. CoinDesk. Published February 21, 2022. https://www.coindesk.com/policy/2022/02/21/russian-government-introduces-crypto-bill-to-parliament-over-central-bank-objections/

65. Bloomberg News. EU seeks to speed up crypto rules in push to tighten sanctions - BNN Bloomberg. BNN. Published April 1, 2022. https://www.bnnbloomberg.ca/eu-seeks-to-speed-up-crypto-rules-in-push-to-tighten-sanctions-1.1746323

66. Anthony N. Senate democrats call for emergency act to target crypto and sanctions. Cato.org. Published March 23, 2022. https://www.cato.org/blog/senate-democrats-call-emergency-act-target-crypto-sanctions

67. Jones H, Milliken D. Bank of England sketches out first regulatory approach to crypto. Reuters. Published March 24, 2022. https://www.reuters.com/business/finance/bank-england-sketches-out-regulatory-approach-crypto-2022-03-24/

68. OFAC. Office of foreign assets control - Sanctions programs and information. U.S. Department of the Treasury. Published date unknown. https://home.treasury.gov/policy-issues/office-of-foreign-assets-control-sanctions-programs-and-information

69. HM Treasury. Financial sanctions: guidance. GOV.uk. Published May 29, 2013. https://www.gov.uk/government/publications/financial-sanctions-faqs

70. European Commission. Restrictive measures (sanctions). EC.europa.eu. Published date unknown. https://ec.europa.eu/info/business-economy-euro/banking-and-finance/international-relations/restrictive-measures-sanctions_en

71. G20. About the G20. G20.org. Published date unknown. https://g20.org/about-the-g20/

72. Post K. What comes next for the US Treasury Department's plans to monitor crypto wallets? The Block. Published March 30, 2021. https://www.theblockcrypto.com/post/99898/

what-comes-next-for-the-us-treasury-departments-plans-to-monitor-crypto-wallets

73. Warren E, Reed J, Warner M, et al. Digital asset sanctions compliance enhancement act of 2022. Senate.gov. Published March 17, 2022. https://www.warren.senate.gov/imo/media/doc/DASCEA%20final5.pdf

74. Blockchain for Europe. Major update on MiCA. Published March 14, 2022. https://twitter.com/BlockchainforEU/status/1503385157021184009

75. Blockchain Association. NY ban on proof of work. Published March 22, 2022. https://twitter.com/BlockchainAssn/status/1506295888720928777

76. Brito J, Van Valkenburgh P. New crypto sanctions bill targets publishing code, facilitating transactions. Coin Center. Published March 17, 2022. https://www.coincenter.org/new-crypto-sanctions-bill-targets-publishing-code-facilitating-transactions/

77. Hansen P. Unhosted wallets crackdown. Published March 31, 2022. https://mobile.twitter.com/paddi_hansen/status/1509536318585454597

78. Brito J, Van Valkenburgh P. Are regulators poised to demand cryptocurrency address whitelisting? Probably not. Coin Center. Published August 31, 2020. https://www.coincenter.org/are-regulators-poised-to-demand-cryptocurrency-address-whitelisting-probably-not/

79. Congressional Research Service. Midnight rulemaking: Background and options for congress. CRSreports.congress.gov. Published October 4, 2016. https://crsreports.congress.gov/product/pdf/R/R42612

80. De N. New OCC chief signals greater caution on crypto. CoinDesk. Published May 18, 2021. https://www.coindesk.com/markets/2021/05/18/new-occ-chief-signals-greater-caution-on-crypto/

81. Redel D, Andoni O. Has the Biden administration lost the plot on crypto regulation? CoinDesk. Published July 1, 2021. https://www.coindesk.com/policy/2021/07/01/has-the-biden-administration-lost-the-plot-on-crypto-regulation/

82. BitDAO. BitDAO treasury address. Etherscan.io. https://etherscan.io/address/0x78605Df79524164911C144801f41e9811B7DB73D

83. BitDAO. Governance phase 1. BitDAO.io. Published date unknown. https://docs.bitdao.io/litepaper-1/governance-phase-1

84. Gnosis Safe Snapshot. Snapshot process. Snapshot.org. https://docs.snapshot.org/gnosis-safe

85. BitDAO. Snapshot profile. Snapshot.org. https://snapshot.org/#/bitdao.eth

86. BitDAO. Official BitDAO forum. https://discourse.bitdao.io/

87. BitDAO. Governance phase 2. BitDAO.io. Published date unknown. https://docs.bitdao.io/litepaper-1/governance-phase-2

88. Polygon Team. #DeFiForAll: Kicking off L2 defi summer with 40 million+ USD in liquidity mining rewards from Polygon for Aave's Polygon markets! Polygon | Blog. Published April 13, 2021. https://blog.polygon.technology/blog-polygon-technology-defiforall-kicking-off-l2-defi-summer-with-40-million-usd-in-liquidity-mining-rewards-from-4937d7c6e287/

89. Polygon Team. About us. Polygon.technology. Published date unknown. https://polygon.technology/about/

90. Polygon - MATIC. Transparency report on polygon multisigs. Published May 14, 2021. https://twitter.com/0xPolygon/status/1393256852201238534

91. Polygon Team. Polygon multisigs. Polygon.technology. Last updated May 1, 2022. https://docs.polygon.technology/docs/faq/commit-chain-multisigs/

92. Polygon - MATIC. Polygon multisig signers. Published May 14, 2021. https://twitter.com/0xPolygon/status/1393256863257358336

93. Polygon Team. The Polygon thesis: Strategic focus on ZK technology as the next major chapter for Polygon; $1B treasury allocation. Polygon | Blog. Published August 13, 2021. https://blog.polygon.technology/the-polygon-thesis-strategic-focus-on-zk-technology-as-the-next-major-chapter-for-polygon-1b-treasury-allocation/

94. Gold S. Liquidity baking: update for new blocktime. Tezos on GitLab. Published April 8, 2021. https://gitlab.com/tezos/tzip/-/blob/master/drafts/current/draft-liquidity_baking.md

95. Ochem N. Liquidity baking in Tezos Granada proposal - how it works. Midl.dev.medium. Published June 1, 2021. https://midl-dev.medium.com/liquidity-baking-in-granadanet-how-it-works-e60c82bee6f1

96. TzKT. Liquidity baking DEX on tzkt.io. Tzkt.io. https://tzkt.io/KT1TxqZ8QtKvLu3V3JH7Gx58n7Co8pgtpQU5/operations/

97. Tezos Wiki. Tezos governance. Tezos.com. Published date unknown. https://wiki.tezos.com/learn/governance/

98. Tezos Foundation. Tezos Foundation reports. Tezos.foundation. Last updated March, 2020. https://tezos.foundation/reports/

99. Messari. Avalanche launch and initial token distribution. Messari.io. Published date unknown. https://messari.io/asset/avalanche/profile/launch-and-initial-token-distribution

100. Avalanche Team. Gnosis Safe integrates with Avalanche, expanding security tools for developers and users. Avalanche. Published December 15, 2021. https://medium.com/avalancheavax/gnosis-safe-integrates-with-avalanche-expanding-security-tools-for-developers-and-users-a4644a57ebc6

101. Sekniqi K, Laine D, Buttolph S, Gün Sirer E . Avalanche platform. Avalanche. Published June 30, 2020. https://assets.website-files.com/5d80307810123f5ffbb34d6e/6008d7bbf8b10d1eb01e7e16_Avalanche%20Platform%20Whitepaper.pdf

102. Avalanche Foundation. Avalanche Foundation announces $180M defi incentive program. Avalanche. Published August 18, 2021. https://medium.com/avalancheavax/avalanche-foundation-announces-180m-defi-incentive-program-d320fdfafff7

103. Avalanche Foundation. Avalanche Foundation launches multiverse, an up to $290M incentive program to accelerate growth of new internet of subnets. Avalanche. Published March 8, 2022. https://medium.com/avalancheavax/avalanche-foundation-launches-multiverse-an-up-to-290m-incentive-program-to-accelerate-growth-of-c815ac5692c7

104. Pangolin DEX. Pangolin tokenomics V2. Pangolin.exchange. Last update April 7, 2022. https://docs.pangolin.exchange/pangonomics

105. Fantom Foundation. Fantom incentive program, how to apply. Fantom.foundation Published September 13, 2021. Last updated March 31, 2022. https://www.fantom.foundation/blog/fantom-incentive-program-how-to-apply/

106. Kampa A, Cronje A, Kong M, Nguyen Q, Samman G. Governance of the Fantom network. Fantom.foundation. Published August 2019. https://docs.pangolin.exchange/pangonomics

107. Fantom Foundation. About the Fantom Foundation. Fantom.foundation. Published date unknown. https://www.fantom.foundation/about/

108. Fantom Foundation. On-chain governance released. Fantom.foundation. Published January 12, 2021. https://fantom.foundation/blog/on-chain-governance-released/

109. Fantom Foundation. Fantom Safe. Fantom.foundation. Published date unknown. https://docs.fantom.foundation/tutorials/fantom-safe

110. Fantom Foundation. A statement from the Fantom Foundation. Fantom.foundation. Published date March 11, 2022. https://fantom.foundation/blog/a-statement-from-the-fantom-foundation/

111. Bloks.io. Active block producers (eosio.prods) on EOS. https://bloks.io/account/eosio.prods#keys

112. Defibox - EOS One-stop DeFi Application Platform. Defibox.io. https://defibox.io/

113. EOS nation. EOS Nation | EOS Block Producer. https://eosnation.io/

114. 0rigin. 0rigin.one. https://0rigin.one/

115. Greymass. Greymass.com. https://greymass.com/en/

116. PIZZA. Pizza.finance. https://pizza.finance/

117. EOS Asia Homepage. EOS Asia. https://www.eosasia.one/

118. Bloks.io. EOS savings account (eosio.saving) on EOS. https://bloks.io/account/eosio.saving

119. Carriere D. Inflation parameters and EOSIO code reference. Published date February 22, 2020. https://github.com/EOS-Nation/setinflation

120. Al-Hassanieh K A, et al. Default EOSIO inflation parameters. Block.one. Last updated December 11. 2019. https://github.com/EOSIO/eosio.contracts/blob/7109f002fa9afff18edcafce5c32b224a21eef98/contracts/eosio.system/include/eosio.system/eosio.system.hpp#L73-L77

121. Larimer D, et al. EOS.IO technical whitepaper v2: Worker proposal system. Published March 16, 2018. Last updated April 28. 2018. https://github.com/EOSIO/Documentation/blob/master/TechnicalWhitePaper.md#worker-proposal-system