WHITE PAPER

Maya

A future inspired in our past

Maya 1.0
How we started

How
we started

The impressive feat of first designing and building a technically viable, completely decentralized, permissionless exchange is credited to THORChain and its relentless team of developers. Maya Protocol was meant to be nothing more than an effort to create a backup system, an alternative to $RUNE and to THORChain, for several fundamental reasons outlined below.

Maya Protocol's team believes there have been four technological breakthroughs that will soon change how our current economic systems work, they are:

>> Bitcoin's Proof of Work
>> Ethereum's Smart Contracts
>> Tendermint's simple BFT Proof of Stake - easily programmable with Cosmos SDK
>> THORChain sovereign blockchain - open-source and cross-chain

Like THORChain, Maya Protocol is a CosmosSDK-powered, replicated state machine to overwatch and coordinate the movement of digital assets, swaps or stakes without the need to wrap or peg any of them. In our own way, we are validating THORChain's lead and paying tribute to it. The idea to create Maya Protocol was born when a developer of THORChain publicly mentioned that he expected the market to be filled with at least 3 to 5 similar protocols in the future.

Maya will be the second to market.

Maya Protocol has its own native token called $CACAO. Why this name? We all know cacao is the main ingredient used for making chocolate nowadays but, in antiquity, this seed was also used as a medium of exchange and commerce by the Maya civilization in what today is the Yucatán Peninsula and Central America.

Here is an overview of why we think THORChain cannot and should not be the only cross-chain DEX out there:

- They need backup as a universal backend provider.
- THORChain cannot grow fast enough to capture all the addressable market.
- THORChain will eventually hit its TPS limit.
- The technology needs validation.
- Collaboration instead of competition.
- Focus on different target markets.
- Compatibility.
- They should not be dancing alone!
- Version Stability.
- Two minds are better than one.

Let's go through each one of them:

Backup as a universal backend provider.

01

We believe that Cross-Chain Decentralized Liquidity Protocols will serve as the backend to most of the volume moving across wallets, central exchanges, protocols and crypto businesses. It is very important to have a backup to any such system in case any problem could affect it and to prevent critical failure across the market. Think of somebody carrying a Visa and a Mastercard, both networks generate loads of transaction volume when people use their debit or credit cards to pay for goods and services but, if for any reason the Visa network stopped working, then all those users could still use their Mastercard instead. If THORChain was Visa, then Maya would be MasterCard.

THORChain cannot grow fast enough to capture all the market.

02

This is not a lack of trust in THORChain's ability to grow, rather a statement that stems from the understanding of the protocol. THORChain (and Maya) have some sort of a virtuous cycle that cannot be artificially accelerated: the growth of their security and the growth of their liquidity. One cannot grow without the other and this creates a constant "chicken and egg" problem. Security scales as more nodes join, bonding bigger amounts of $RUNE —$CACAO, in our case — but if the bonds grow too much then the protocol becomes very capital inefficient. On the other side, if too much liquidity is provided relative to the bonded capital, then the system becomes riskier. This process is continuously being optimized by specialized economic incentives, but it takes time to do so. We believe there is more demand for liquidity in the market and people willing to provide the underlying necessary bonds than the speed at which THORChain can currently capture it.

THORChain will eventually hit its TPS limit.

03

Even when THORChain continuously increases the liquidity in the protocol, eventually they will hit the Transactions Per Second limit, which sits around 100 - 500 t/s. At that point, swappers will either start clogging the network or will need to rely on another protocol, this is where Maya comes in.

Providing validation to the technology.

04

There are still naysayers of what THORChain has created. Once more protocols, like Maya, enter the picture and continue with the mission that THORChain set out to do, we will provide validation to the market and increase the confidence in this product. Our mission is clear: for Decentralized Exchanges to manage more liquidity than Centralized ones. Former smart contract DEXes do not have what it takes, we need a new generation of cross-chain Layer Zero DEXs that actually and definitively handle the majority of the market's transaction volume in an efficient, simple, quick and instantly-final fashion.

Collaboration instead of competition.

05

Some people might think we are competing with THORChain and some THORChain supporters might feel threatened by Maya, but this is completely unfounded: our real competition comes from CEXs and traditional DEXs. Any user that we bring from those alleys is a net positive for both THORChain and Maya. In other words, this is a game of adoption, and Maya will help drive this adoption forward!.

Any user that comes from a CEX to Maya and then switches to THORChain for any given reason will still make us very happy. We also believe that increases in THORChain's market share will help Maya Protocol, and that the reverse will also hold true!

Focus on different target markets.

06

The Market is huge and although there might be commonality with some of THORChain's users —especially hardcore yield seekers— Maya will be focused in the LATAM market and into much less technically oriented audiences.

Maya's emphasis is geared towards DeFi education, even using marketing channels like Tiktok and Instagram, to inform a segment of crypto users that has not been addressed by THORChain or anybody else - yet.

Compatibility.

07

We believe big institutional liquidity investors and swappers will take advantage of the compatibility between both protocols and that the same will be true for wallets, exchanges, and other platforms. Having code compatibility —due to the forked nature of Maya— will lead to easy implementation for bigger players that cannot rely on only one option. We believe most end users will eventually use THORChain and Maya interchangeably and unknowingly, kind of how we can use VISA and MasterCard with the same user experience. Every E-Commerce handles both since coded solutions support both.

Becoming price leaders together.

08

Simply put, today THORChain is dancing in an empty room. The arbitrage opportunities are constantly big since they have to be carried out against centralized exchanges and order books. This in turn creates more impermanent loss on THORChain's books, which although insured through Impermanent Loss Protection, still have a negative effect on the protocol's economy.

Having a second identical twin with whom to dance will create tighter arbitrage, distributed amongst both protocols and creating a smaller percentage of economic capture. We believe eventually an ecosystem of *Thorlikes* will exist that will dictate the actual prices of assets in a decentralized fashion. This would further drive down arbitrage value capture as a percentage of Total Value Locked in the protocols, protecting the liquidity capital of both Maya and THORChain. The objective is to create a network of L0's like Maya, THORChain and others who together become price leaders over CEXes. At that point, impermanent losses would be negligible.

Version Stability.

09

Some users look for new features and opportunities, others look for reliability and dependability. The first group will probably not choose Maya over THORChain since we will always lag behind them in updates and versions, making sure the implemented upgrades have been battle-tested first. These users will be using THORChain to take advantage of its exciting opportunities and rapid pace, but there will always be room for both groups.

Two minds are better than one.

10

Our community will grow in parallel to THORChain's and in turn bring more developers to both networks. Our teams and driving forces can help increase the rate of improvement of the THORChain ecosystem through both cooperation and competition. Additionally, we have come up with ways to further improve the protocol with an innovative multi-chain approach. Although we will be followers of the THORChain technology, we want to have a proactive approach as well, creating some cool first-mover advantages with new technologies and ideas we have developed like Stable Pools and Liquidity Nodes — more on this later.

Maya 2.0
Where we are going

Where we are going

THORChain paved the way with their cleverly designed Proof of Bond protocol using Tendermint's powerful consensus algorithm along with excellent economic incentives for an ultra-secure Layer-0 protocol. Maya seeks to go even further by increasing the implied capital efficiency, by having more uses for its native currency, $CACAO, and by using the high security of Maya's node infrastructure for other valuable functionalities. It is important to mention that Maya will be backwards compatible with THORChain, which essentially means that Maya will inherit ThorFi - into MayaFi. We have been very selective with the changes that we do to our protocol, taking care of this compatibility with any future upgrades to the protocols we are emulating. This is very powerful, since Maya will be able to enjoy its own improvements plus the improvements of the other protocols included in its network.

Maya takes security very seriously, which is why the most sensitive aspects of the THORChain protocol, such as Bifröst, were left untouched. Additionally, audits will be conducted both before and after our launch —periodically— to ensure the security of all funds. The safer a protocol is, the more funds it attracts, especially from institutional entities.

Maya is not only committed to security, it is also committed to decentralization and censorship resistance, especially by governmental bodies, that are ever more involved in how we use cryptocurrencies. Because of this, our team will remain pseudonymous and our nodes will always be encouraged to remain anonymous.

It is our belief that delegation in protocols does not enhance security but rather harms it. Delegation creates artificially bonded nodes which have a higher incentive to become bad actors and an incentive for the node operators to reveal and promote their identities, decreasing overall censorship resistance. For these reasons, Maya Protocol and its multiple components will always work without delegation.

Besides, $CACAO holders will have other better uses for their tokens, like generating yield through liquidity providing or lending.

So what are we bringing to the table to achieve this mission? First, we will make the fairest launch possible by holding a Liquidity Auction, where all $CACAO ever to exist is shared in one event at the same discovered price by everyone, from the smallest investor to the largest whale. The team, investors and key strategic individuals will earn through their share of tokenized fees, which essentially means we only earn if we create value for $CACAO holders, liquidity providers and nodes. The Maya team then designed a whole different economic model for Nodes to increase Capital Efficiency without compromising Security, called Liquidity Nodes. This Security will be used to secure other algorithms, through our Security Node design. This feature will secure a popular Burn & Mint algorithm for truly decentralized and safe Stablecoins and Smart Contract compatibility. Some of these stablecoins can be made eligible as a trading pair in Maya for a more stable investment and to create deeper pools with decreased slippage.

We hope that the crypto community throughout the world will understand the huge implications of what we have designed and that they understand the importance and necessity of a decentralized, wide base and permissionless network of cross-chain alternatives. Centralized services in the cryptocurrency world will remain the cheapest option until a critical mass of adoption is reached, Maya Protocol is our team's shot at making this future more likely. Join us in the mission to topple Centralize Exchanges for good.

Read along each of the chapters of this whitepaper to see what we bring to the table. They cover our six unique features in detail and they all include sections such as an Introduction, Explain me like I'm five (ELI5), Philosophical perspective, Economic overview, Technical overview and Code.

Part 1. Fair Launch

No complex IDO, Maya will launch $CACAO with our own Liquidity Auction design!

Maya has aimed to maintain its motto from the beginning: a **multi-chain liquidity protocol** in the hands of the community, protected by code and open to exchange. Initially we felt that the most successful way to achieve this goal was through an Airdrop allocation, but **it's time to upgrade to something that will boost liquidity** in the system even further: a Liquidity Auction.

ELI5

1. Different strategies are used to raise funds everytime a new crypto/DeFi project is born. Some models might be better than others but that really depends on the team's needs and creativity. There are many different ways in which DeFi projects can distribute their tokens to their users or community, some examples include holding public sales — 2017 ICOs are the classic example — Airdrops, farm rewards and more.

2. Maya Protocol's token distribution will work using a Liquidity Auction with the following cool pros:

>> Lots of transparency – everybody knows when everything is happening and how.

>> Permissionless – anybody can participate, there are no prohibitive minimum amounts or whitelists.

>> Reduced volatility – there is symmetry of information, no one is excluded or earns less because they participated later.

3. "Liquidity Auction" sounds sophisticated but it is actually very simple:

>> Anybody can contribute supported assets, such as $BTC, $BNB, $ETH, $LUNA, and even $RUNE, to the auction during a 21-day timeframe by sending them to a specified address. No KYC or registration of any kind is required, except creating a Maya wallet beforehand (User Interfaces can do this for you). Also, no swaps and no withdrawals will be allowed during this period, only adding and withdrawing liquidity!

>> After the auction finishes, all the $CACAO tokens to ever exist —100M— are distributed to the participants proportional to their liquidity contributions. For example: if $BTC is 40% of the liquidity raised, that pool receives 40% of the $CACAO allocation.

$BTC

$CACAO $BTC

$BNB

$CACAO $BNB

$ETH

$CACAO $ETH

$CACAO

>> That's it! Participants end up being Liquidity Providers by having their contributed assets + their new $CACAO tokens deposited inside Maya's pools, facilitating swaps to other users and earning a share of the fees generated.

BTC

Philosophical perspective

We truly believe that our Fair Launch process is one to be proud of. Learning from the experience of other protocols and DAOs, we came across what we think is something really open to anybody in the DeFi space to participate in. Compared to an IDO where investors with large amounts of tokens can manipulate the price and cause disadvantages for the rest, in Maya there is no minimum entry ticket, there is no previous whitelist, no special allocation for larger investors and the time range is wide and pre-announced.

In the end, we are pushing towards the objective of having one more protocol in a network of decentralized, Layer Zero cross-chain facilitators that dictate prices over the market. We want to concentrate the markets' liquidity there, instead of how it currently concentrates around centralized venues, and that is why we are looking to attract a diverse and wide user base that will become part of a community from the moment they get their first tokens.

The process also takes advantage of the built-in Asymmetrical Liquidity functionality from the THORChain codebase. We aim to:

A. Reduce Founding Team risks.
B. Make a decentralized protocol that is completely owned by its community.
C. Create incentives for the Founding Team to continue developing over the long-term.
D. Bootstrap the largest amount of external asset liquidity possible to secure the sustainable future of our protocol.

How does the Liquidity Auction tackle these issues? Let's look at its advantages:

The community ends up owning the token.

01

So the system governance is decentralized and permissionless. No founding person or investor can pump & dump, rugpull, etc. The team gets only a percentage of the fees, which means we only earn money if the community does. The team simply cannot create sell pressures for the token.

Symmetry of information.

02

Everyone has the same chances to participate during the 21 days duration of the auction. There are no discounts, no privileged information, front running or unfair allocations. Everyone essentially gets a 2x ROI during the launch, regardless of how much money is raised and what kind of assets they contributed with. There are no disincentives to share the liquidity auction details with other people, since everyone gets the same terms regardless of participation size and depth.

No inflation.

03

Which would lead to better and more attractive price action. Because we can have users and investors earn fees through the L1 codebase, it is no longer necessary to have an inflationary asset to incentivize staking. People can earn nice APY's or simply hold to keep a valuable non-inflationary asset. This will generate a more liquidity demand-sensitive system.

Large incentives to participate.

04

Remember there will not be any other $CACAO issuances, so anybody that wants to own the token will have to acquire it from somebody that got it during this mint. It is very likely that $CACAO's price will be the cheapest ever (in $BTC terms) right after the auction. This makes it more attractive for people to invest heavily during the liquidity auction - which is of course what we want, as it leads to deeper pools, reduced slippage and slip fees, attractive arbing opportunities, and overall liquidity depth. Deep liquidity attracts swap volume.

Simplicity.

05

Only one open permissionless cross-chain liquidity event to rule them all. The rules are clear: there are no KYC processes, people will have to understand and use Maya to participate - the Liquidity Auction will serve as a live Demo to our target participants - , the whole thing happens during an extended period of time and everyone participates under the same conditions. Everything is also managed directly in the Maya Blockchain, so it becomes very secure and everyone ends up being a liquidity provider!

A Liquidity Auction simply makes sense to secure the long-term future of Maya. It keeps us honest as a team, it gives everyone a fair set of rules to participate in and it will surely raise significant resources to start up a virtuous cycle for our liquidity blackhole. By having only one event, we are making sure it will be simple, interesting, and even urgent for anyone to participate, while helping Maya jump into the big leagues!

Economic overview

Under normal operational conditions (after the Liquidity Auction finishes), all of Maya's AMM pools will have a 1:1 ratio between native assets and $CACAO, which means that anybody wanting to participate in the protocol would ideally have to match their native asset contributions with the same amount denominated in $CACAO tokens; this is called "symmetric liquidity".

If for some reason we would want to add only one of the two assets - "asymmetric liquidity" - a slip fee would be charged because imbalances would be generated within the liquidity pool.

During the liquidity auction, all the external liquidity provided will be asymmetric because nobody has had the possibility of buying $CACAO yet - it virtually does not exist yet! Particularly interesting is that users can participate in the auction by contributing $RUNE into our $RUNE / $CACAO pool and the effects that this pool will have for the Maya <> THORChain interconnection, presenting many arbitrage opportunities and inviting traders and bots to bridge between the two protocols continuously to take advantage of them (the first step in our vision of a network of L0's becoming price leaders in the crypto market!).

It is important to mention that, because $CACAO is a native coin to a CosmosSDK blockchain, it would be very easy to integrate into any wallet or exchange that can already handle $RUNE, $LUNA, $ATOM, $OSMO and many others. $CACAO enjoys the rest of the ecosystem's advantages as well, such as cheap transaction costs, fast settlement times (<10s), ease of use and secure wallet/transaction systems. Any exchange that wished to list our coin would be able to do so quickly and easily.

Technical overview

I. Liquidity Auction

To make the Liquidity Auction work, we will use already existing attributes of Ixmu - our equivalent for Mimir, in THORChain — plus some of our own. These attributes will control the actions that all liquidity providers can take on a specified time frame in order to successfully execute our Fair Launch.

Using Ixmu Key terms, we want to accomplish the following:

     1. Users should only add/withdraw liquidity.
     2. Users should not be able to swap or send.
     3. Users should not be able to get $CACAO until the end of the Liquidity Auction.

The process we will follow starts by enabling the new "LiquidityAuction" Ixmu attribute which stops users from being able to swap between any assets, because all swaps between native assets without $CACAO would be discarded. This behavior will work for 21 days, after which the $CACAO is distributed and "LiquidityAuction" is disabled.

Here are the already existing transactions, along with the new ones and the specific actions that they disable:

ATTRIBUTE	SEND	SWAP	ADD	WHITDRAW
HaltChainGlobal	✅	✕	✕	✕
PauseLP	✅	✅	✕	✕
HaltTrading	✅	✕	✕	✅
LiquidityAuction	✅	✕	✅	✅

Maya

Distributing $CACAO tokens after the Auction process is simple and will require the use of the "Donate" message to dispense them into our pools, proportionally to their depth in USD terms, using an End-of-Auction over-all market price snapshot.

Any user that contributed their native assets ends up having their original assets plus their newly earned $CACAO. Any and all UI's supporting the Maya Stagenet —and therefore our Mainnet— can host the Liquidity Auction. Code Savvy individuals may also use the API/Transaction Memos directly.

User stories:

    1. As a user I should only be able to provide asymmetric liquidity throughout the Fair Launch, so that I can get $CACAO in the Liquidity Auction.

        Acceptance criteria:
            1.1 Users should only add/withdraw liquidity.
            1.2 Users should not be able to swap or send.
            1.3 Users should not be able to get $CACAO until the end of the Liquidity Auction.

    2. As a Liquidity Provider I should be able to withdraw my liquidity at any point in time, so that I can recover my money if I no longer want to participate in the Auction.

II. Genesis Nodes

Our first nodes will be called "Genesis Nodes", and there will be six of them. Because they will start running the protocol with no $CACAO bonds — remember there will still be no $CACAO tokens until after the Liquidity Auction is finished — we will need them to already have some dependable reputation, which is why they will need to be pseudo-doxxed nodes, run by decentralized organizations close to Maya.
Once our chain and systems have been started, these initial nodes will exit over time as other nodes enter the network.

Genesis nodes will be approved using a specific custom-made token for this purpose, they will not be entitled to any fees, special allocations or pre-mines of any kind. For more details on our Genesis Nodes please refer to Part 4: Security Nodes of this document.
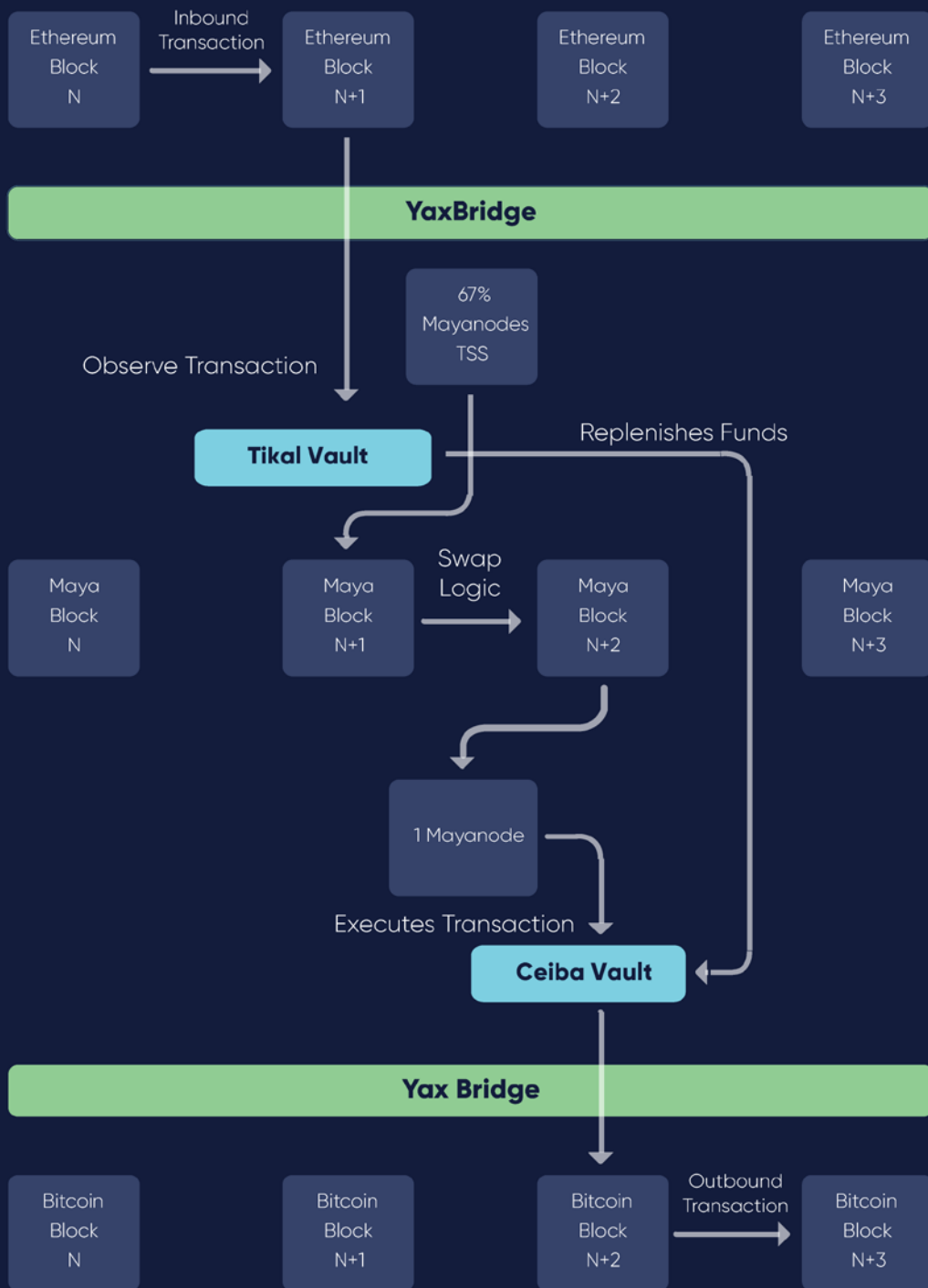
User story:
> 1. As a genesis node, I should be able to be a validator in the chain without contributing economically and without affecting the $CACAO supply. Also, I should not get any sort of pre-mine or reward during this period.

III. $RUNE

THORChain uses Bifröst, a module that makes it possible to generate a native asset exchange network. The Maya equivalent is Yax bridge. We are fully capable of receiving $RUNE transactions and have this token incorporated into our pool offering by adding our own THORChain client to the Yax bridge.

User story:
> 1. As a user, I should be able to add and withdraw $RUNE liquidity on Maya during and after the Liquidity Auction.
> 2. As a user, I should be able to swap $RUNE for any other asset in Maya after the end of the Liquidity Auction.

CODE

1. Liquidity Auction

https://gitlab.com/mayachain/thornode/-/issues/32
https://gitlab.com/mayachain/thornode/-/issues/34

2. Genesis Nodes

https://gitlab.com/mayachain/thornode/-/issues/33

3. $RUNE – Yax Bridge

https://gitlab.com/mayachain/thornode/-/issues/37

Part 2. $MAYA Token

Best way to benefit in Maya, passively

We want to have an **additional option** to participate in our project, and that's why **$MAYA tokens** exist. With their profit-sharing model, **anybody can participate** from the fees generated by the protocol.

ELI5

1. Maya Protocol has been designed to be optimally fair and open. To accomplish this, two different tokens are contemplated: $MAYA and $CACAO. Both tokens can be freely traded and have different and important use cases.

2. $CACAO is our flagship token, and we will have 100M of them. They will all be minted at once and then distributed to the people participating in our Liquidity Auction. Aside from being required to run a node, they can be paired against other assets inside our liquidity pools to earn a percentage of the transaction fees generated by swaps.

3. $MAYA coins can be used to participate in our protocol's total revenues and there are exactly 1M of them. They served as our initial stages' funding mechanism and, by design, keep incentives for our developer team to continue their hard work in the short term and long term.

Philosophical perspective

Having two tokens is directly related to our decision to launch using a Liquidity Auction and to how we want our community to be as equitable, as big and as widespread as possible.

$MAYA's design has been carefully planned to prevent incentives' misalignments for the insiders holding them and they allowed us to financially bootstrap our project in its earliest stages without having to recur to any pre-sales of $CACAO, which we really wanted to avoid.

Both tokens can be freely traded and they both offer their respective holders the right to earn a percentage of the fees generated inside our protocol although with different approaches, as described below.

> **On Governance.** To achieve a high level of decentralization Maya has minimal governance, in a similar way to THORChain. This aspect is directly related to the security of the protocol so that the nodes are the ones who carry out the governance and ensure that all incentives are granted through code. In the specific case of $MAYA tokens, they don't give any governance rights to their holders, or any other right whatsoever.

You can see more about this topic here:
https://docs.mayaprotocol.org/how-it-works/governance
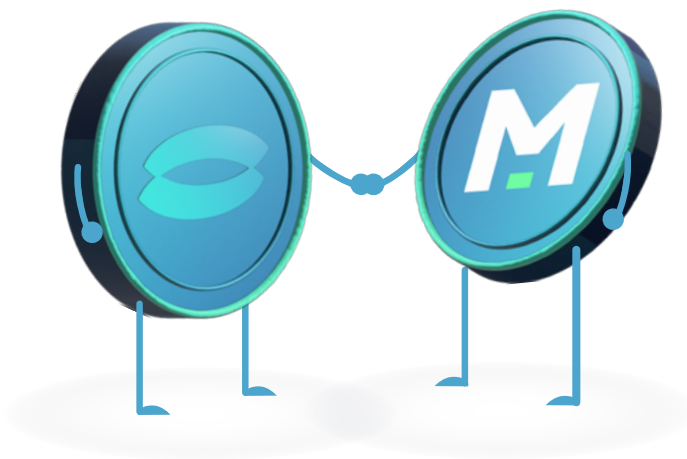
Economic overview

We will highlight the differences between $CACAO and $MAYA.

$CACAO

$CACAO tokens power the Maya Protocol ecosystem and provide the economic incentives to secure the network because they are required to run Maya nodes. Also, all of our liquidity pools consist of a native token paired against $CACAO, for example, $BTC / $CACAO or $ETH / $CACAO.

Because $CACAO is needed to become a liquidity provider but their supply is limited to 100M, the more people that would want to participate in our ecosystem, the higher the value of $CACAO tokens has to be. Their economic value would also grow if $CACAO tokens could be used natively and productively in other chains or projects - which we intend to do.

$CACAO

The bridge between blockchains. It is required to be paired as a settlement asset in continuous liquidity pools.

$MAYA Token

The native fee accrual token of Maya which earns a portion of the fees generated by the protocol.

$MAYA

$MAYA tokens perpetually capture 10% of all the fees generated by the users swapping inside our protocol. They are essentially a tokenization of our present and future cash flows which means, firstly, that the more active our exchange is, the better price they should have and, secondly, that $MAYA's token holders are heavily incentivized to see our protocol grow with time. Lastly, and most importantly, $MAYA holders only earn value if Maya's ecosystem earns 9x as much (and real value, since Maya does not have inflation or other artificial methods to boost APY).

These tokens will be initially held by participants of all levels inside of Maya: our private investors, our development team, our advisors and our founders. There is also a surprise for early Node Operators, for Thorstarter supporters and $RUNE owners.

P/E Ratios

Because of its economic design, $MAYA tokens can be treated as some sort of stock or economic participation in our project and are easy to value using traditional P/E and EPS ratios since $MAYA price, our current daily Fee Revenue and $MAYA's fixed supply are public in real time.

P/E = $MAYA last public price / 10% * Annualized Protocol Fee Revenue

EPS = 10% * Annualized Protocol Fee Revenue / 1,000,000

This also means there usually should not be many irrational fluctuations in its price and that $MAYA tokens will also reflect the market's perceived value of our future cash flows. It is important to mention that $MAYA has no governance rights over Maya Protocol or any other privilege or use aside from collecting 10% of fee revenue.

It is important to note that $MAYA will not be available in Pools on Maya Chain. This means there will be no recursive nature to $MAYA being priced into $CACAO creating artificially high values for $MAYA back. Additionally, this completely cuts off $MAYA of having any influence on the price of $CACAO. Finally, it makes it less liquid and harder to trade, making its owners more likely to simply hold them to collect fees passively.

Technical overview

Who will own the $MAYA tokens?

First of all, $RUNE owners!

We are a friendly fork of THORChain and have no interest in vampiring away none of their capital or any of their users. We even plan on sharing 10% of the total $MAYA token supply with them as an acknowledgement of their support for THORChain, which in turn makes Maya Protocol possible.

$RUNE owners will get $MAYA tokens freely, simply by:

> **A.** Holding $RUNE in their wallets,
> **B.** Having $RUNE locked in their LP positions and/or
> **C.** Having $RUNE bonded in a Node.

To make sure that only "fresh" capital is attracted during our launch (ie. there is no capital leaving THORChain) we designed the following rule set:

> **1.** Daily snapshots of $RUNE distribution on Thorchain will be taken every day at random for 42 days, starting right before the Liquidity Auction and running through 21 days after the end of the Liquidity Auction.
> **2.** $MAYA tokens will be distributed considering the smallest $RUNE position that the $RUNE owners held in any of these 42 snapshots.

This way, if, for example, whomever $RUNE holder sells half of his position to add it to our Liquidity Auction looking to get some $CACAO tokens, that holder would only get half of his $MAYA tokens at distribution.

Ultimately, if you want a bigger share of the $MAYA tokens as an OG THORChain supporter, you are encouraged to hold your $RUNE positions or even increase them, and if you simultaneously want a bigger share of $CACAO allocation, you are encouraged to participate in the Liquidity Auction with capital brought from other, different sources.

The process' details to create a Maya wallet that receives the corresponding $MAYA allocation as a $RUNE holder will be announced separately, but it will simply require you creating a Maya Address and sending at least 1 $RUNE as Add Liquidity asymmetrically or symmetrically (which can be withdrawn during the snapshot period, we only need this transaction to relate your Maya Wallet to your Thorchain Wallet).

	Snapshot 1	Snapshot 2	Snapshot 3	Snapshot 4	Snapshot 5	Smallest $RUNE position	% of allocation
Alice	120	120	120	120	120	120	9.84%
Bob	4,000	3,000	2,000	1,000	0	0	0.00%
Carlos	0	1,000	2,000	3,000	4,000	0	0.00%
David	350	200	350	250	350	200	16.39%
Eve	1,000	1,200	900	1,800	1,100	900	73.77%
					Total $RUNE considered:	1,220	100.00%

* Units are in $RUNE
* Smallest $RUNE position across all the snapshots is highlighted in green, for each person
* Model is simplified to 5 participants and 5 snapshots but this would be made for all wallet addresses in Thorchain (Including LP positions and Node bonds) and for all 42 snapshots.

Second, Early Nodes!

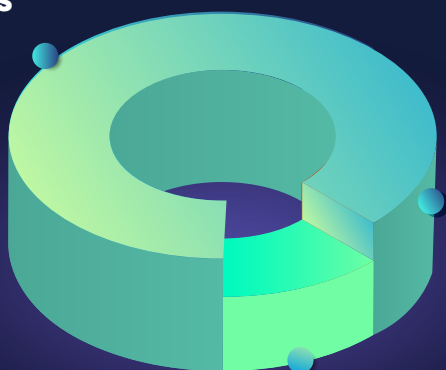An additional 10% of the $MAYA total supply will be used to reward our early node operators like so:

> **1.** 3.33% of all the $MAYA tokens will be shared to the active Validator Nodes securing our network **one month after** the end of the Liquidity Auction.
> **2.** An additional 3.33% of all the $MAYA tokens will be shared to the active Validator Nodes securing the network **four months** after the end of the Liquidity Auction.
> **3.** An additional 3.33% of all the $MAYA tokens will be shared to the active Validator Nodes securing the network **twelve months** after the end of the Liquidity Auction.

This token incentive rewards our early heroes and supporters and potentially catalyzes our first bond wars since only churned-in nodes become eligible. While bond wars are great for THORChain, they will be even more beneficial to Maya's, for reasons that will be covered on Part 3 of this Whitepaper.

Last but not least, the Dev Fund

Finally, the remaining 80% of the tokens will be initially awarded to the Maya team, at all levels of the organization, including our developers, our advisors, our investors and other strategic individuals and institutions that have readily supported us.
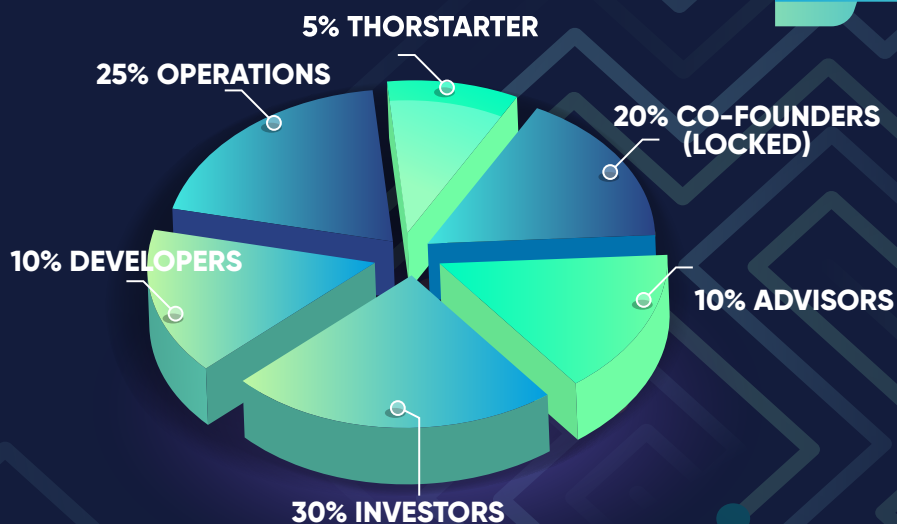
90%
LPs & Nodes

10%
Maya Fund

MAYA FUND

- 10% RUNE OWNERS
- 10% EARLY NODES
- 80% DEV FUND

DEV FUND

5% THORSTARTER

25% OPERATIONS

20% CO-FOUNDERS
(LOCKED)

10% DEVELOPERS

10% ADVISORS

30% INVESTORS

Remember none of them own any $CACAO yet, nor will they do at any point before or after our Liquidity Auction unless they participate in it with their own funds, under the same terms as any other participant. This is very positive for the Maya community, since there is no counterparty risk of these participants dumping or rugpulling $CACAO since they got it at the same price basis as anyone else during the Auction. Likewise, dumping $MAYA has no direct effect on the price of $CACAO. Therefore, $CACAO will have very little sell pressure from its origins, a liability that most protocols often have. $MAYA tokens are the only way to repay them for their big time commitment and sterling efforts, in a fair way that is aligned with the community.

As a final display of the Maya founders' commitment for the long run, their own share of $MAYA tokens will not be transferable and will be permanently locked in perpetuity. These tokens will only accrue $CACAO fees over time, which will be transferable.

Thorstarter's share of $MAYA tokens will be shared with Forge Stakers. Thorstarter will announce separately how their supporters can benefit from our launch.

User Stories:

1. Maya Fund

>> As a Maya user, I want the Maya Fund to be funded with 10% of the gas and swap fees that are generated in the chain to distribute those funds among the Maya users that hold $MAYA Token, denominated in $CACAO.
>> As a Maya user holding $MAYA, I want to receive $CACAO distributions from the Maya Fund proportional to the amount of $MAYA Tokens I own every 14,400 blocks (approximately every 24 hours).

Code

https://gitlab.com/mayachain/thornode/-/issues/39

Part 3. Liquidity Nodes

How MAYA obtains superpowered capital efficiency

How do we accomplish more capital efficiency without compromising security? **What if instead of nodes bonding only $CACAO they bonded LP units?** In this section, we explain how nodes become liquidity providers with little extra steps.

ELI5

1. Traditionally, to secure a place in the Pure Bond Model, you need to buy and stake a big amount of native asstes. It isn't called staking, it's called bonding, but the principle is similar: you entrust your assets to a system that will hold them for you temporarily. This is all ingrained into the Pure Bond Model architecture as a security feature since all of these bonded assets are susceptible to being seized if the node misbehaves or breaks the rules in any serious way. This keeps nodes honest, since bonds are higher than the assets they secure.

2. In Maya Protocol, nodes still need to buy and bond a big amount of $CACAO for the exact same security reasons but we store them in a totally different place. Whereas in the the other model bonded native tokens are locked up unproductively inside a specific address, bonded $CACAO in Maya is deposited inside our Liquidity Pools, paired with other native assets and generating yield! Any capital bonded by our node operators participates in the fees generated by the pools in which they are deposited, making our use of capital much more efficient!

3. This feature is great because it means that Maya node operators can supercharge their invested capital efficiency by earning both Liquidity Provider rewards plus their regular Validator Rewards. Capital efficiency is no longer inversely proportional to Security!

Philosophical perspective

Node operators becoming Liquidity Providers simultaneously have several economic and tokenomic implications:

The efficiency of the capital employed (ie. bonded) to obtain a place in the nodes' list is enhanced considerably when compared to the Pure Bond Model —where the native token is being used solely as an economic guarantee and is not generating any type of yield on its own.

Not all assets will be bondable either. Only, relatively, lower volatile external assets such as stablecoins, BTC or ETH will be; other Bond Pools could be added with a 67% nodes' consensus. For security reasons, it is suggested that no more than 2 assets per chain are bondable (ie. BUSD and BNB on Binance Chain, but not any other BEP2 coins).

This innovative alternative to traditional bonding model simply follows the economic principles of efficient use of capital and resources. Any investor that can generate better risk-adjusted capital returns will tend to do so and so we want to offer our operators this efficient and interesting model.

We should also mention here that whereas the traditional economic design and bonding requirements result in a theoretical deterministic value for $RUNE's market cap of 3X its Total Value Locked (TVL), in Maya $CACAO's deterministic price will be 1X TVL. This might look lower at first glance but is actually the reflection of the higher capital efficiency within our protocol and the tighter relationship of $CACAO price to liquidity and fee generation.

Finally, we designed a model that creates a liquidity flywheel effect while permitting for similar security parameters than the legacy pendulum and brings other advantages that we can test —audits and Maya Stagenet first of course— for THORChain to implement if we all find them practical and successful.

Economic overview

Liquidity Nodes result in adjustments to the Pure Bond Model security policies, which we tailored to accomplish three important things:

1. More than 67% of capital should be bonded by our nodes, to keep them honest, in fact, closer to 85% is preferred. A sybil attack at 67% nets a loss of at least 12% of the attacker's funds, and at 85% nets at least a 20% loss*
2. This capital balance must be found by rational market forces (ie. supply and demand).
3. We must incentivize decentralization (ie. a high node count).

*The magnitude of these losses assumes the $CACAO price did not rise as the attacker accumulated $CACAO, added it as LP in different addresses in one block and churned-in 67% of the Nodes on the same block. This is an unreasonable assumption, since the buy pressure of the accumulation would bring $CACAO's price higher, making the cost basis of the attacker higher relative to incumbent Nodes and LPs; making his/her loss higher. Additionally, adding more LP positions increased TVL which again increased $CACAO price to the attacker at a profit to incumbents. Finally, churning in is limited and successfully doing so with many Nodes while competing against other Nodes is difficult, given the attack so far has made optics for Maya bullish and become a Node more attractive. If there are 40 Nodes, attacker needs to churn-in 27, winning the Liquidity Bond war at least 27 times (and as more of Attacker's nodes are churned-in, it is more likely at churn-out that one of its nodes are churned-out). This all amounts for a significantly higher loss to Attacker than the aforementioned 12% and 20%.

We call our resulting model "The Incentive Curve" and it works by algorithmically balancing the nodes' and markets' incentives to either provide more liquidity or bigger bonds by increasing or decreasing the participants' rewards on each of these sides, periodically.

"The Incentive Curve":
For every new block...

- System income is divided as follows:

$$Yield = 0.9\ System\ Income$$
$$Maya\ Fund\ Allocation = 0.1\ System\ Income$$

- Yield:

$$Yield(x) = NER(x) + LR(x)$$

Where NER = Node Exclusive Rewards and LR = Liquidity Rewards, where clearly

$$LR(x) = Yield - NER(x)$$

- Our incentive curve uses the following equation for NER(X)

$$NER(x) = \begin{cases} 1, & x < 0.6667 \\ 3(1-x), & x \geq 0.6667 \end{cases}$$

$$Where, x = \frac{Bonded\ LP}{Total\ LP}$$

- Thus, Nodes' Average Earnings (NAE)

$$NAE = LR(x)\frac{x}{Node\ Count} + \frac{NER(x)}{Node\ Count}$$

- Liquidity Providers' Average Earnings (LPAE):

$$LPAE = \frac{LR(x)(1-x)}{LP\ Count}$$

For any individual LP, Earnings is equal to the increase in value of their own LP Units due to the Yield that was kept in pools that LP participates in.

For any individual Node, Earnings is equal to the increase in value of their own LP Units due to the Yield that was kept in pools that LP participates in, plus the Node Exclusive Reward divided by the amount of Nodes.

Please note:

>> Nodes earn both Node Exclusive Rewards (NER) and Liquidity Rewards.
>> LP's earn only Liquidity Rewards (LR).
>> Node Exclusive Rewards (NER) is distributed evenly among all nodes whereas Liquidity Provider Rewards (LR) is paid out relative to their bonded liquidity.

All the calibration of the economics and incentives that manage the system are algorithmic and code driven, whenever the total network's liquidity is tilted too much into either side of the spectrum (too much bonded liquidity vs. too much provided liquidity) the incentive mechanism reacts by balancing out the rewards conversely. Visually, the curve looks like so:
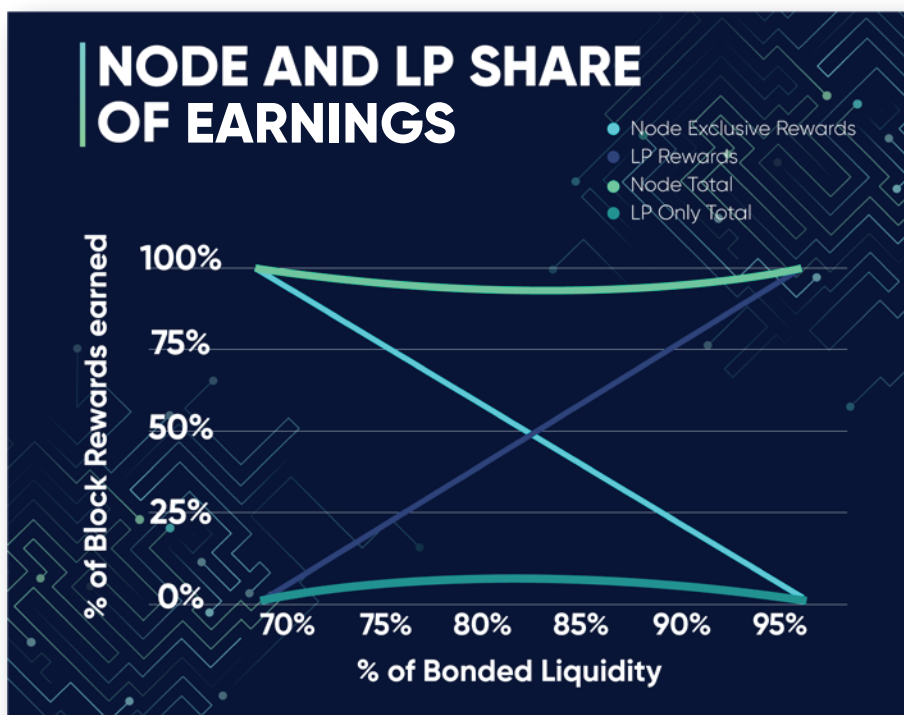
And it basically creates a liquidity flywheel, where:

>> At a moderately highly bonded state, there is an incentive for new capital to be added via LP'ing. Liquidity can be added this way much more rapidly than nodes' can churn in or out.
>> If too much liquidity is provided by LP's then the network would tip into an unsafe state, which would incentivize the nodes to bond more capital, benefiting our depth and volume in the process again.
>> Liquidity is bonded by the nodes that brought the most liquidity on the next churn, and the system comes back to or above balance.

> » Notice that TVL is increased when the incentive mechanism pulls in either direction, whereas on Thorchain the pull increases TVL in only one direction. This means assets are pulled into the protocol regardless of whether it's moving from unsafe towards overbonded or it's moving back.
>
> » This process can go on and on, attracting new liquidity every time, as long as cross-chain swaps remain plentiful, in a bright multichain future.

We can compare the behavior of this model with respect to the traditional one by normalizing through "Node Premium" where Node Premium is a measurement of how much more a node earns with respect to LP's per unit of capital invested, in average. On both Thorchain and Maya the designed equilibrium is at Node Premium = 2, where nodes earn on average twice as much as LPs. This point sits at 66% bonded native tokens in the Pure Bond Model and at 85% bonded liquidity in Maya.

AVERAGE RETURN ON CAPITAL

*All else held equal: tradeable liquidity, swap volume and level of security

x1.4

x1

Pure Bond Model   Liquidity Node Model
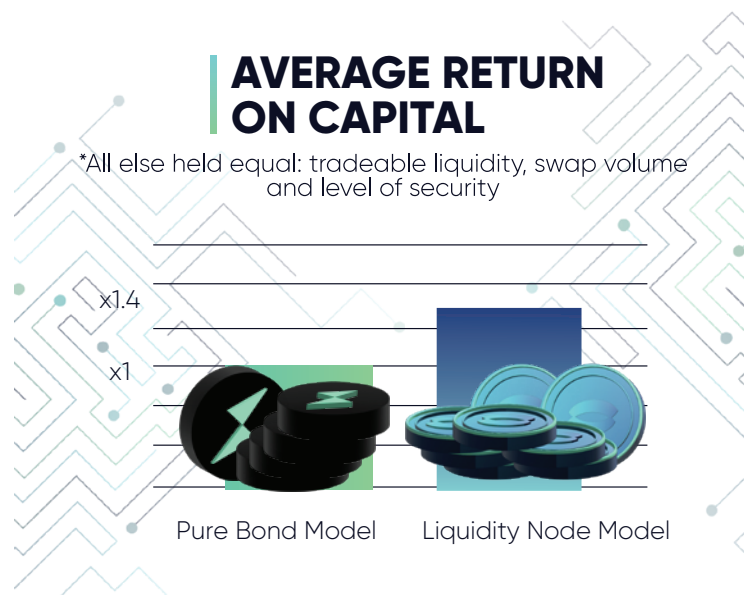
The following table shows this comparison, ie. how much more a Node earns compared to LP´s for the same investment in those conditions, assuming the same fees and tradeable liquidity. "Node M/T" refers to the increase in earnings for equivalent swap volume conditions between our Liquidity Node's model and the Pure Bond Model. Same for "LP M/T" for Liquidity Providers. It is important to mention that the Maya figures in this comparative analysis already take into account the 10% $MAYA Token deduction, we are comparing apples to apples here. Finally, M/T comparisons were done by multiplying a one day ROI by 365, APY would be compounded and show a greater difference.

Shared Criteria	Pure Bond Model		
Node Premium	Bonded RUNE	Pooled RUNE	ASSETS/TVL
0.33	80.00%	20.00%	17%
1	71.90%	28.10%	22%
2	66.67%	33.33%	25%
3	63.75%	36.25%	27%
5	59.90%	40.10%	29%
320	50.30%	49.70%	33%
Infinity	33.00%	67.00%	40%

Shared Criteria	Maya		
Node Premium	Bonded Liquidity	Unbonded Liquidity	ASSETS/TVL
0.33	N/A	N/A	N/A
1	100.00%	0.00%	50%
2	84.70%	15.30%	50%
3	79.75%	20.25%	50%
5	75.00%	25.00%	50%
320	66.77%	33.23%	50%
Infinity	50.00%	50.00%	50%

Shared Criteria	Pure Bond Model	MAYA		
Node Premium	ASSETS/TVL	ASSETS/TVL	Node LN/PB	LP LN/PB
0.33	17%	N/A	N/A	N/A
1	22%	50%	104.86%	105.46%
2	25%	50%	46.22%	46.03%
3	27%	50%	25.98%	28.44%
5	29%	50%	4.76%	13.63%
320	33%	50%	-31.45%	-53.50%
Infinity	40%	50%	-55.67%	N/A

Shared Criteria	Comments
Node Premium	
0.33	This situation is not possible in Maya
1	
2	Designed equilibrium for both
3	
5	Slow Capture attack profitable in both Maya & PB
320	Slightly above where Node coordination attack is profitable on PB
Infinity	Fast Sybil attack profitable in both Maya & PB. To note that in both models, LPs have gotten 0% APY on their Liquidity since the step above.

Notice a few things from the table above. The first is we are conserving the Pure Bond Model security boundaries at the same Node Premium's, making security relatively equivalent. A small caveat here is that losses are steeper with the Pure Bond Model than they are on Maya due to the attacking node losing all its native tokens while on Maya, $CACAO is only half of losses at stake to Attacker. So although breakeven for attacks are at the same Node Premiums, losses rise more quickly from above that point on the traditional model.

This consideration is important since although a rational actor would not consider attacking at a 20%+ loss*, an irrational/externally motivated bad actor could accept the loss. This is why it is important to have a diversity of chains with deep liquidity, making it more difficult and expensive for irrational actors to take down the entirety of cross chain DEX infrastructure. The bigger the TVL, the bigger this loss is in absolute terms and the harder it is for irrational actors to risk enough funds for an attack.

Second thing to notice from the table above is that the increased yield relative to the legacy incentive pendulum model is higher at higher bonded states. This means that Maya operates much better at high bonded states when compared to the old model. This is good, since we generally prefer to err towards the side of overbonding. As the tip scales towards the underbonded state, the system stops becoming noticeable better than the old model.

Finally, notice Nodes never risk earning less returns per dollar invested than LPs do. By the time earning parity is marginally reached (Node Premium = 1.01), although LPs earn great returns on the investment and it is very attractive to become an LP, Nodes still earn more than LPs and then the same at the limit. This means that it is much more likely that more LPs join when reaching these overbonding levels than Nodes leaving, given they are still getting an attractive return on their investment.

On slashing...

Slashing mechanisms needed a little revamp too, since whenever we slash a node we are still interested in keeping their liquidity available in our pools. Additionally, sometimes slashing is a mistake, so we need to account for these slash points but only execute them once a Node withdraws its liquidity. We are thus introducing "anti LP units" which are assigned to nodes that showed potential malicious behavior or downtime in proportion to their merited slash. These Anti LP units specify the value accrual of a slash point's liquidity that no longer belongs to the penalized nodes and how much of their assets will be redirected to the Protocol Owned Liquidity whenever these nodes decide to withdraw their bond.

When any node's Anti LP tokens become 20% of their provided liquidity, it becomes dangerous that they protect any funds since they no longer own a significant part of their original bond. These nodes are therefore subject to being banished, which means they are unbonded and their assets are completely redirected to paying back all owed liquidity to the protocol through the slash fees generated.

Nodes can avoid being banished —also losing ILP seniority and their node spot—by adding more liquidity to offset this Anti LP tokens percentage and then wait to be churned-out to settle any pending accounts while they are unbonded.

Manual and automatic forgiving of slashing work using these Anti LP units too, with mechanisms designed to remove them in special situations like whenever all the nodes accrue them simultaneously or because of any critical consensus failures.

Liquidity Nodes in a Nutshell

1. Capital Efficiency is no longer inversely proportional to Network Security.

2. All of TVL is in pools and is actively traded, making Maya significantly more productive with capital.

3. Increased Capital Efficiency means increased average yield for all ecosystem players.

4. On average, Nodes with lower bonds get higher return per dollar invested than Nodes with higher bonds, making churn-in competitions fiercer and contributing to decentralization and bond homogenization.

5. As more Nodes compete to churn-in, they add more liquidity. This increased liquidity turns Incentive Curve further down making it even more attractive to become the winner Node.

6. As Bond Wars compete on Liquidity Provider Units, Pool Depth increases.

7. As the incentive curve system pulls in any direction, Pool Depth increases.

8. Increased Yield and increased Pool Depth make affordable swaps more likely.

9. Node to LP and LP to Node latency is reduced and very easy to do for Operators, without incurring slip fees.

10. Standby Nodes earn yield while they wait to win the Bond War and churn-in, making it less risky to compete.

11. Nodes no longer need 100% exposure to $CACAO, making it more likely for Institutional Investors to opt-in as Nodes.

12. Node misbehavior causes slashing of a Node's LP units that are converted into Protocol Owned LP Units that count towards unbonded liquidity. These Protocol Owned LP units will never exit, staying as a buyer of last resort.

13. Liquidity Auction makes a lot of sense in Maya due to all capital already being locked in Pools as LP ahead of Liquidity Node churn-in competition.

14. Liquidity Auction is the cheapest time for a Node to acquire enough LP units to compete for churn, making it very attractive for aspiring Nodes to participate in the Auction with as much liquidity as they feel comfortable with, setting Maya up for deep pools from the very beginning.

Technical overview

User stories:

1. LP bonding

>> As a node operator I want to be able to use added liquidity as a bond by providing a node address in the bond message and signing the message with the liquidity provider address, so that the network can take advantage of the bond to be part of the liquidity. The Node address and LP address are one to one.

>> As a liquidity node I want withdrawals to be disabled for the liquidity that was bonded, so that any node operating has stake on the network.

2. AntiLP slashing

>> As a Node Operator, I want other nodes slashed when they don't vote, have downtime or misbehave. This slash is in the form of LP slash points, or Anti-LP Units, that will later be settled by the slashed node at withdrawal.

>> As a node operator I want to forgive LP Slash points with the following format FORGIVE:[Asset]:[Amount]:[Address (optional)] with 67% consensus, so that systemic network problems don't affect node funds and security.

>> As a node operator I want LP Slash points owed by the 1st quartile Node automatically forgiven every 120 blocks, so that most slash points given by network errors are negligible, and Slash is mostly for considerable down time and misbehavior.

>> As a node operator I want other Node Operators forcefully removed from the validator set if their AntiLPT tokens become 20% of their bonded liquidity, so that they do not represent a security risk for the network.

3. Incentive Curve

>> As a liquidity node I want to receive both node-exclusive rewards AND liquidity awards according to the Incentive Curve model, so that I can cover operating expenses of running a node.

>> As a liquidity provider I want to receive liquidity awards according to the Incentive Curve model, so that the network always remains safe.

4. Fair Launch Consideration

⟫ As a genesis node, I want to set an Ixmu Key that overrides the Bonded Liquidity / Total Liquidity parameter to 85% such that LPs do get rewards right after the Liquidity Auction despite there being 0 bonded liquidity at that time.

⟫ As a genesis node, once more than 12 Nodes have churned in, I want to keep overriding Ixmu Keys slowly lower over an extended period of time until the real parameter equals the overwritten parameter, ensuring the network is in a safe state before genesis nodes churn out.

CODE:

LP Bonding
https://gitlab.com/mayachain/thornode/-/issues/43
Slashing
https://gitlab.com/mayachain/thornode/-/issues/44
Fair Launch Considerations:
https://gitlab.com/mayachain/thornode/-/issues/33
Incentive Curve:
https://gitlab.com/mayachain/thornode/-/issues/45

TO BE CONTINUED...
WAIT FOR:

Part 4. Security Nodes

NEXT THURSDAY (MAY 26TH)

Maya