



THORChain — Research Document (23.08.24)

Product

Product Overview

Project overview: Built atop the Cosmos SDK as a cross-chain liquidity protocol, THORChain can generally be understood as an independent layer 1 cross-chain decentralized exchange (DEX) enabling users to seamlessly swap native assets across multiple chains.

THORChain benefits:

- Enable seamless, decentralized cross-chain swaps without the need for wrapped tokens or intermediaries.
- High liquidity efficiency thanks to the leveraging of Continuous Liquidity Pool (CLP)
- Supports a wide range of external wallets
- RUNE Pool allow holders to earn yield on native assets
- THORChain will enhance privacy, security, and scalability through Bitcoin Taproot integration for Bitcoin transactions.

Project architecture

From an architectural standpoint, the design of the THORChain protocol is akin to the one of a decentralized leaderless vault manager relying on the four following

core technical primitives:

- **1 way state Pegs** – Allowing state syncing from external chains.
- **State machine** – Coordinating asset exchange logic and delegating outgoing transactions.
- **Bitfröst Chain Client** – Processing chain specific transactions
- **TSS protocol** – Enabling the distributed threshold key-signing required by the Bitfröst protocol.





In the context of a trading platform, the **vault manager** is the entity responsible for:

- Creating and managing user accounts and balances to support receiving deposits.
- Generating addresses
- Updating user balances
- Making withdrawals

Network roles

Thorchain ecosystem showcases six active network participants roles:

- **Node Operators:** Secure the network by bonding value, validating transactions, and maintaining protocol integrity.
- **Liquidity Providers (LPs):** Deposit assets into liquidity pools to enable cross-chain swaps and earn rewards.
- **Savers:** Deposit a single asset into the network to earn yield without participating in traditional two-sided pools.
- **Swappers:** Perform cross-chain swaps using the THORChain protocol.
- **Protocol Owned Liquidity (POL):** Managed by the protocol to stabilize liquidity, reduce risks, and enhance network security.
- **Affiliates:** Promote and integrate with THORChain, driving usage and adoption across the ecosystem.

THORChain mechanisms:

I. Validator's mechanism

Validators description

Validators in THORChain, referred to as "nodes," play a critical role in maintaining the network's security, consensus, and operational efficiency. Here's how they function:

Bonding and Node Selection:

- Any individual or entity can become a node by bonding a required amount of the network's native asset (RUNE) and sending this capital into the system's primary vault.
- Nodes are selected based on the amount of bonded capital. The nodes with the highest bonds are chosen to participate in the network.
- To ensure decentralization and avoid capture, nodes are regularly churned out of the network. This means that nodes are rotated in and out on a regular cycle, typically every few days.

Vault Management and Transactions:

- Nodes manage the network's vaults, which hold assets associated with liquidity pools, bonds, and reserves. They ensure that all outgoing transactions are authorized according to the network's rule-set.
- Nodes participate in a Threshold Signature Scheme (TSS) to sign transactions, which ensures that no single node can control or steal funds. A super-majority of nodes is required to authorize and sign transactions.

Consensus and Network Operations:

- Nodes observe and witness transactions on connected blockchains, such as Bitcoin and Ethereum. They reach consensus on the validity of these transactions and then process them according to the network's logic.
- Nodes are responsible for generating and validating blocks that comprise the state changes resulting from these transactions. This ensures that the network's state is accurately updated and maintained.

Penalties and Churning:

- Nodes are penalized for failing to perform their duties, such as missing witness transactions, failing to commit blocks, or aborting key-signing







ceremonies.

- When a node is churned out (either voluntarily or as part of the regular cycle), it receives back its bonded capital and any earned incentives. The node must purge its old infrastructure and rebuild it before re-entering the network, ensuring that it runs the latest software.

Current THORChain ecosystem state (22/08/24)

total addresses	111,379
Active nodes	100
Total Rune pooled	\$253.7M
Total Rune bonded	\$432.5M
Swap volume (year)	\$46,684,405,328

Top Active Bonds		
Total Bond 97,825,622 (\$423,433,936.88)	Average Bond 978,256 (\$4,234,339.36)	Total Node Count 100
Maximum Bond 1,128,258 (\$4,848,953.23)	Median Bond 1,000,000 (\$4,328,456.35)	Minimum Bond 523,631 (\$2,266,513.93)
Max efficient bond 1,023,771 (\$4,431,348.89)		

 Swap Volume (24hr) \$52,390,738	 Total Value Locked (Pool + Bond) \$571,571,401	 Total Addresses 111,492
 Bond Pool APY 13.39% 13.09%	 Earnings (24hr) \$186,280	 Next Churn Time (Local) 08/28 3:18 PM

II. Deterministic RUNE's Price mechanism:

- **Liquidity Pools and RUNE:**
 - THORChain operates decentralized liquidity pools where RUNE is always paired with other assets (e.g., BTC/RUNE, ETH/RUNE). This means that for every asset deposited into a pool, a corresponding amount of RUNE must be deposited as well, creating a direct relationship between the value of RUNE and the value of the other assets in the pools.
- **Total Value Locked (TVL):**
 - The Total Value Locked (TVL) in the THORChain network represents the total value of all assets held within its liquidity pools. Since RUNE is paired

with these assets, the protocol ensures that the value of RUNE in the pools is proportional to the value of the non-RUNE assets.

- **The Deterministic Pricing Formula:**

- The deterministic price of RUNE can be expressed through the following relationship: $\text{RUNE's Market Cap} = 3 \times \text{TVL}$
- In simpler terms, the market capitalization of RUNE should be three times the Total Value Locked (TVL) in the network's pools. This ratio is designed to ensure that there is enough RUNE in the system to cover the value of all assets in the pools, plus a margin for security and governance. Therefore, the price of RUNE can be calculated as: **$\text{RUNE Deterministic's Price} = (3 \times \text{TVL}) / \text{Total Supply of RUNE}$**

- **Why 3x TVL?:**

- The 3x multiplier is a design choice to ensure the security of the network. It ensures that for every dollar of non-RUNE assets in the liquidity pools, there are three dollars of RUNE. This buffer helps protect the network against various risks, such as potential insolvency or the effects of impermanent loss in liquidity pools.

- **Market Forces vs. Deterministic Price:**

- While the deterministic price provides a baseline valuation of RUNE based on the protocol's economics, the actual market price of RUNE can still fluctuate due to market forces, investor sentiment, and broader market conditions.
- However, over time, the market price should tend to align with the deterministic price, especially as the protocol grows and the TVL increases.

- **Importance of Deterministic RUNE's Price:**

- **Incentives for Liquidity Providers:** Knowing that RUNE's price is tied to the TVL incentivizes liquidity providers to add more liquidity to the pools, which in turn can drive up the price of RUNE.
- **Network Security:** The 3x TVL rule is crucial for maintaining the security of the network, ensuring that there is always sufficient RUNE to cover

liabilities within the protocol.



Protocol Features

Cross-Chain Swaps:

- THORChain enables non-custodial cross-chain swaps of native assets without the need for wrapped or pegged assets. This unique feature allows users to swap assets across different blockchains seamlessly.

Savers Feature:

- Introduced in November 2021, this feature allows users to deposit a single asset (like Bitcoin or Ethereum) into the THORChain network and earn yield without needing to provide liquidity in a traditional two-sided pool.

Streaming Swaps:

- This feature optimizes asset swapping by executing a series of smaller, incremental swaps over time rather than a single large swap. It has become increasingly significant in generating fees on the platform.

Protocol-Owned Liquidity (POL):

- Expected to be launched in Q3 2024, RUNE Pool will allow users to participate in POL, enabling them to own a share of liquidity across all POL-enabled pools rather than just a single pool. This aims to reduce impermanent loss and stabilize yields.

Trade Account & Asset:

- Trade account are a new primitive built for frequent traders and arbitrageurs. Trade Accounts are assets native to THORChain that hold the price of the corresponding native asset. These assets are held 1:1 within THORChain's vaults, but outside of the liquidity pools.
- Trade assets are **twice as capital efficient as Synthetic Assets**, meaning that it takes half as much capital to arb the pools with Trade Assets as it does with Synths. There are no slip fees when entering or exiting Trade Assets, so they can be redeemed to their native counterparts for only the cost of gas fees.

Lending

- Lending enables users to deposit native collateral and create a dollar denominated debt for a given collateralization ratio. Technically speaking, all

loans have 0% interest, no liquidation and no expiration thanks to pool collateral limit, slip-based fee mechanism and dynamic collateralization ratio allowing altogether to contain the debt risk.

THORChain tokenomic design

Balancing system states

Overall, the THORChain can experience 5 economical states:

- Optimal
- Unsafe
- Under-bonded
- Over-bonded
- Inefficient

Optimal state

In the desired optimal state, for any given amount of connected assets held in the protocol, THORChain is by default enforcing a 1:1 FIAT pairing in each pool between the connected asset and \$RUNE as well as the bonding of twice the dollar value of the aggregate connected assets holdings.



As such we logically obtain the following situation:



Unsafe State

In the situation where the pooled capital becomes much higher than the bonded capital, the system might become unsafe as it becomes now economically profitable for bonded node to work together to steal assets. To solve, this situation, the protocol then increases drastically the amount of node operators

rewards while inversely decreasing severely LPs rewards. This way, more nodes are incentivized to enter the ecosystem leading to an increase in the aggregated bonded \$RUNE while LPs are leaving the protocol towards more profitable alternate investments and enable a decrease of the overall pooled liquidity in the protocol.

Observation: While theoretically sound, the probability of such events happening on the network are absent given the existence of a hard coded limit for pool depth preventing any pool to surpass 1/3 of the aggregated bonded \$RUNE in the protocol.

Inefficient state

In the situation where the pooled capital becomes drastically lower than the bonded capital, the system become increasingly inefficient as liquidity diminishes and swapping costs increase. As such, in this situation the protocol would increase LPs reward while diminishing node rewards to attract new LPs and push out of the network existing nodes to decrease the aggregated bonded \$RUNE.

Under- and over-bonded states

The under and over-bonded states are less severe intermediary states. Indeed, while not optimal THORChain being under-bonded do not pose a threat given that it does not become profitable for node operators to actively attempt to steal connected assets. On the contrary, being slightly over-bonded is not really an issue given that the system is still operating quite well in this scenario.

Observation: Would be interesting to analyze those empirically proven assertions to try to highlight the over-bonding and under-bonding breaking point of the protocol.

Incentive pendulum

As exposed previously, the protocol state can lose its balance over time with sometimes too much capital allocated in liquidity pool or inversely too much capital allocated toward the protocol security via the node bunding mechanism. As such, THORChain implements a built-in rebalancing mechanism called the incentive pendulum dynamically increasing and decreasing rewards for active

participants in order to always incentivize a convergence towards the balance state defined in the prior section.

Continuous liquidity pool

Instead of limit order-books, THORChain is leveraging continuous liquidity pools to enable its users to get access to the following benefits:

- “Always-on” liquidity to all assets in the system
- Allows transparent and fair-trade price.
- Trustless on-chain price source for internal and external use
- Democratized arbitrage opportunities
- Fair and transparent fee collection for LPs
- Efficient handling of liquidity demand fluctuation

Value Creation & Market Traction

THORChain traction study

Token: Value Capture & Accrual

\$RUNE utility functions

- **Security Bonding:** RUNE is used by nodes as a bond to secure the network. Nodes are required to bond a significant amount of RUNE to participate in the network, ensuring they have skin in the game.
- **Liquidity Pooling:** RUNE is paired with other assets in liquidity pools, which are essential for enabling swaps between different assets. The depth of RUNE

in these pools determines the purchasing power of other assets in the network, making RUNE the base asset for all swaps.

- **Fee Payment:** RUNE is used to pay network fees, including gas fees for transactions. These fees are collected from the users when they perform swaps or other operations within the network, and a portion of these fees is allocated to nodes and liquidity providers as rewards.

Token Allocation

A total of 500M \$RUNE was created at genesis and distributed via the following mechanisms:

- Capital investors – 5% (SEED) and 16% (IDO) was sold for capital to start the network and give it value.
- Core Team – 10% allocated to a group of dev who worked on the program development since 2018.
- Community – 24% distributed to active member of the community who helped bootstrap the network.
- Network rewards – 44% locked in the protocol to ensure future rewards of active participants of the network for the next 10 years.

Observation: The network reward emission schedule implies that the network feels confident that over the current decade DEXs will be able to capture sufficient market share to cover active participants financial incentives from fees alone.

Volume on Coinbase & Kraken [23/08/24]

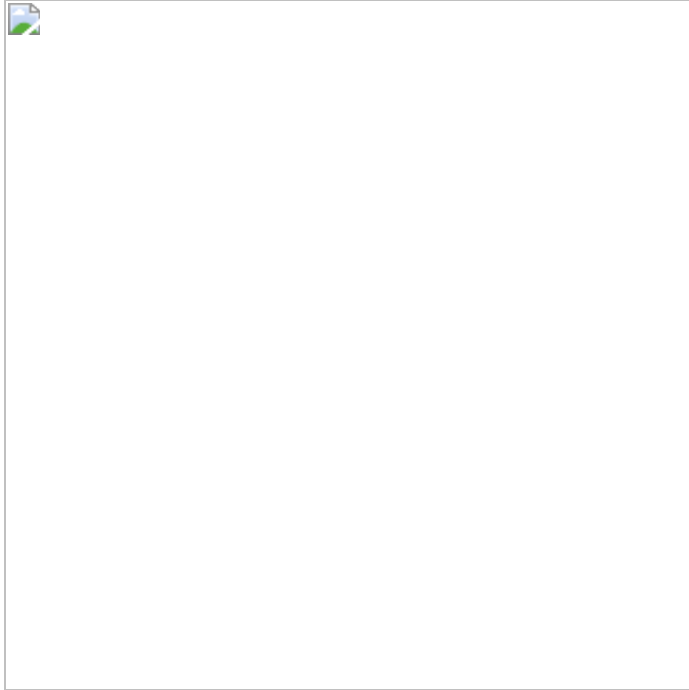
Exchange	Volume (in \$)	+2% Depth	-2% Depth
Kraken	1,392,899	54,385	56,389

Source: [Coinmarketcap](#)

Value Accrual Mechanisms in the THORChain Protocol

Block rewards emission:

Block rewards are calculated as follows:



As such if the reserve has 180m rune, a single block will emit ~4.28 \$RUNE from the reserve, meaning 2/3rds of that is awarded to the node operators and the rest paid to Liquidity providers.

Observation: The emission curve is designed to start at around 30% APR and target 2% after 10 years. At that point, most of the revenue will come from fees.

Bonded Capital vs. Staked Capital:

The protocol is designed to ensure that the value of bonded RUNE (used by nodes) always exceeds the value of staked RUNE (used in liquidity pools). This coupling ensures that the network's security is directly tied to the economic value locked within it, driving demand for RUNE as both a security and a liquidity asset.

Slip-Based Fees:

The protocol charges a slip-based fee on asset swaps, which is higher for impatient trades and lower for patient ones. These fees are collected in RUNE and help maintain liquidity and incentivize market participants to provide liquidity over time, adding to the value of the RUNE token.

Incentive Pendulum:

The protocol uses an incentive pendulum to maintain an optimal balance between bonded and staked capital. When the ratio of bonded to staked capital deviates from the target (67% bonded, 33% staked), the protocol adjusts incentives, thereby influencing the demand for RUNE.

Network Fees and Protocol Reserve:

The network collects fees in RUNE for every outgoing transaction, which are added to the protocol reserve. This reserve can be used to cover network costs and ensure long-term sustainability, contributing to the underlying value of RUNE.

Liquidity Incentives:

Liquidity providers (who stake assets in the network's pools) are also incentivized. They receive a portion of the fees generated from swaps and other transactions, ensuring that there is always sufficient liquidity in the network.

Team / Community

Team

Being a fully open-source project, THORChain does not have an official company structure nor an official CEO or founders. Instead, the project relies on a dynamic community of like-minded people to usher the core protocol development while ultimately relying on community governance to make key decisions.

Governance

THORChain's Governance Model - The Æsir Protocol

- THORChain addresses these issues with the Æsir Protocol, an on-chain governance model inspired by projects like Tezos and Dfinity, aiming to empower all participants equally.
- **Entities in Governance:**
 - **Validators:** Propose and commit blocks, requiring staked RUNE to be part of the top 100 Validators (Validator Set) responsible for securing the network and reaching consensus on protocol changes.
 - **Delegators:** Token holders who stake their assets with Validators to earn rewards and propose changes through staking pools. This system encourages decentralization by promoting staking with lower-ranking Validators for higher rewards.
 - **Standby Validators:** Validators not in the top 100, but ready to replace any Validator that drops out, maintaining network resilience.

Two-Layer Governance

- **Voting Inside Staking Pools:** Delegators vote on protocol changes within staking pools, and Validators submit votes on behalf of inactive Delegators, ensuring 100% voter turnout. Quadratic Voting prevents plutocracy by making it costly to cast multiple votes, empowering minority stakeholders.
- **Signaling Between Validators:** Validators read and propose changes every block, requiring a 51% majority within staking pools and a 67% consensus among Validators for changes to be implemented on the mainnet. Validators who don't participate risk having their stakes slashed.

Continuous Improvement

- The Æsir on-chain governance model ensures that all entities are empowered, voter participation is enforced, and each vote is meaningful. This model is crucial for THORChain, where frequent security and structural changes are necessary. Like the Æsir gods of Norse mythology, all participants in THORChain's governance can make their voices heard, ensuring a dynamic, secure, and decentralized ecosystem.

Explanation for the anti-thesis

Here's a breakdown of key reasons that will explain I don't want to go for an investment thesis:

Limited Market Share and Competitiveness:

- **Small Market Share:** Despite being the first project on cross-swap chain, THORChain has failed to capture a significant portion of the DEX market. For instance, even at its peak in early 2024, THORChain's Total Value Locked (TVL) only reached approximately \$500 million, a small fraction of the total DEX ecosystem's TVL. Since March 2022, the TVL on THORChain has been relatively stable at around \$100 million, highlighting its limited growth compared to competitors.
- **Declining Market Share:** After its peak, THORChain's market share has been declining. By the end of 2023 and into 2024, THORChain began losing traction, and its market share within the DEX space started went back to values pre-spike levels. This decline indicates that the platform is struggling to maintain its momentum and increase its core user base.

Missed Opportunity with First-Mover Advantage

- **Failure to Capitalize on First-Mover Advantage:** THORChain was the first protocols to offer cross-chain swaps, giving it a significant early advantage. However, it has not fully leveraged this position to dominate the market. For example, despite its early start, by mid-2024, THORChain's TVL were far behind major players in DeFi like Uniswap or GMX.
- In one of its best months, THORChain's trading volumes reached \$1 billion, which is relatively small compared to Uniswap's average monthly trading volume during the same period. This demonstrates that despite being an innovator, THORChain has not managed to establish a strong demand for cross chain swap in the market.

High Volatility and Unsustainable Growth

- **Volatility in TVL:** The Total Value Locked in THORChain has shown high volatility, with significant spikes followed by sharp declines. For instance, there was a sharp increase in TVL in early 2024, which coincided with a broader market surge, reaching over \$500 million. However, this spike was not sustained, and the TVL quickly dropped back to lower levels. This volatility is concerning for long-term investors seeking consistent performance.
- **Dependency on Market Trends:** Much of THORChain's recent growth has been tied to broader cryptocurrency market trends, particularly the Bitcoin L2 narrative. The sharp increase in TVL from \$100 million to \$500 million was driven more by external factors than by organic growth within the THORChain ecosystem. This dependency on external market conditions makes THORChain's growth unpredictable and potentially unstable.

Challenges in User Retention

- **Difficulty in Retaining Users:** Despite spikes in user activity, THORChain has struggled to retain its user base. After significant growth periods, the number of unique users on THORChain tends to revert to pre-pump levels. For example, the number of new addresses was higher during the 2022 spike than in 2024, indicating that user interest was not sustained despite the platform's innovations.

Integration of New Wallets Didn't Increase Trading Volumes

- **Lack of Impact from Wallet Integrations:** THORChain has integrated several well-known wallets, including MetaMask, Trust Wallet, and OKX Wallet, to broaden its user base and increase trading volumes.
- However, these integrations have not significantly boosted trading activity on the platform. For instance, despite the integration of major wallets, wallet volume never exceeded 30% of the total swap volumes on THORChain.
- Moreover, while OKX Wallet contributed to an increase in total swap volumes, this was primarily a redistribution of existing volumes rather than an influx of

new trading activity. This suggests that wallet integration alone is insufficient to drive growth on THORChain, pointing to deeper issues in user engagement and platform adoption.

Revenue vs. Expenses Imbalance

- **Unsustainable Financials:** Since its inception, THORChain has consistently spent more than it has earned. For example, in October 2022, when the price of RUNE dropped to its all-time low of \$0.85, the protocol's expenses were 350% of its revenue due to high impermanent loss protection payouts. This unsustainable financial model raises concerns about the long-term viability of the platform.
- **High Expenses During Market Downturns:** THORChain's financial model has shown vulnerability during market downturns, particularly when the price of its native token, RUNE, drops. This creates a scenario where the protocol is forced to cover large expenses, such as impermanent loss protection, which could strain its financial resources. Outside of market spikes, THORChain has been spending at least twice as much as it earns, further highlighting the platform's financial instability.

Emerging Competition

- **Stronger Competitors:** New competitors like Chainlink's Cross-Chain Interoperability Protocol (CCIP) and NEAR Protocol are emerging with potentially superior solutions. For example, while THORChain managed to generate about \$48 million in fees since its inception, Uniswap generated approximately \$3.6 billion in the same timeframe, which is 75 times more than THORChain. Additionally, CCIP and NEAR Protocol offer more integrated and efficient cross-chain services, which could outpace THORChain's current offerings.

Conclusion

While THORChain has innovated in the cross-chain space, it faces significant challenges that may make it a less attractive investment. Its limited market share,

failure to capitalize on its first-mover advantage, struggles with user retention, lack of impact from wallet integrations, unsustainable financials, and the rise of strong competitors all contribute to the argument that building an investment thesis for THORChain isn't worthy for the moment.

 [Investment Committee Call \[27.08.2024\] - Minutes](#)

Sources

Official documentation


<https://github.com/thorchain/>

Video & Podcast

THORChain (RUNE) Introduction - Explained for Beginners

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What is THORChain? What is the RUNE Token? Get these

 <https://www.youtube.com/watch?v=IVPCGkWW4oo&t=6638s>



The Dark Side of THORChain RUNE

 Course with Larsson Line 

<https://www.ctolarsson.com/offer>

 Larsson Line Pro 


 <https://www.youtube.com/watch?v=mF3zPV0CoPg&t=891s>



GrassRoots Crypto

GrassRoots Crypto channel is about providing understandable information about Crypto to the average person.

I am passionate about crypto education and helping people

 https://www.youtube.com/channel/UCuC_PiCEsNIT6HH88r7vCsw



How Does THORCHAIN Work? DEFI Explained

So what is Thorchain all about? How does it work? And how does it make it possible to swap between native assets across different blockchains? You'll find answers to these questions in

 <https://youtu.be/dNDh-mPboPc?si=9w0zKdp56XQzyDDu>

THORCHAIN **EXPLAINED**



News outlet articles

<https://medium.com/thorchain/governing-thorchain-b04f1f0f656f>

<https://medium.com/thorchain/thorchain-q2-2024-ecosystem-report-13911bd5c7a5>

<https://gitlab.com/thorchain/thornode/-/issues/1841>

Explorer

<https://thorchain.network/>

<https://thorchain.net/dashboard>

<https://thorchain.live/>

<https://thorcharts.org/>