Kelp

rsETH

by Kelp DAO

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1.

Executive summary



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Restaking on Ethereum is a concept introduced by EigenLayer that allows users to reuse their already staked Ethereum or Liquid Staking Tokens. By restaking, users contribute additional security measures to various new decentralized services (referred to as Actively Validated Service or AVS) on Ethereum, while also earning extra rewards for themselves.

EigenLayer enables this by allowing stakers to reallocate their staked assets to secure additional decentralized services on the Ethereum network. This process optimizes the staked capital base and enhances cryptoeconomic security across various applications.

This creates a host of opportunities for users. For Stakers and Operators, this provides ways to earn additional rewards while for Services, there is a way to tap into the security of Ethereum without having to bootstrap the initial security layer.

While restaking offers many benefits, it also brings along several challenges that restakers need to navigate.

- Discovering services to provide security might be a challenging task for stakers
- Claiming and swapping multiple tokens earned as rewards might be cumbersome and will require a high amount of gas fees
- Liquidity on restaked assets would be lost due to the unstaking period

To solve such challenges, Kelp introduces rsETH, a Liquid Restaked Token (LRT), designed to offer liquidity to illiquid assets deposited into restaking platforms, such as EigenLayer. Here is how rsETH helps:

- Simplifying restaking decision: Kelp DAO whitelists high-quality services and operators thereby reducing the effort for the Restakers
- Liquidity: As rsETH is a liquid token, it can be utilized in other DeFi applications
- Automated background process: Kelp DAO will manage all the processes to ensure that users can directly claim all the rewards into their wallets

With rsETH, Kelp aims to further the adoption of the restaking ecosystem and benefit the Ethereum community.

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2.

Introduction to restaking



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Restaking allows users to stake their ETH on both Ethereum and other protocols that integrate with EigenLayer, securing multiple networks, and applications simultaneously and earning higher rewards. Restaking also lowers the cost barriers for protocols to launch and innovate, as they can leverage Ethereum's robust security layer without needing to bootstrap their validator set.

Restaking can enable various use cases, such as data availability layers, decentralized sequencers, fast-mode bridges, oracles, MEV management, low-latency settlement chains, single-slot finality and more.

Restaking utilizes existing trust networks and is associated with increased slashing risk, which is why restakers are compensated with higher staking rewards for undertaking more risk. Restaking ensures efficient, secure, and aggregated rewards for restakers in the staking ecosystem.

Restaking of ETH can create opportunities for:

- Protocols that want to utilize Ethereum’s trust network for security, innovation, and keeping capital allocation efficient

- Users who want higher rewards by staking the same ETH on both Ethereum and other protocols simultaneously

EigenLayer’s offering

EigenLayer is a protocol built on the Ethereum network designed to commoditize decentralized trust. It allows other protocols that integrate with it to leverage Ethereum’s highly secure trust network without needing to establish their own validator set, effectively reducing cost barriers for these protocols and increasing their security.
For users, EigenLayer enables increased capital efficiency by allowing them to restake their ETH, which in turn leads to more staking rewards.

Additionally, building on EigenLayer, protocols can retain sovereignty to customize their architecture, including the type of consensus mechanism and slashing conditions. Read more about EigenLayer here.

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3. Understanding the restaking ecosystem



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Restaking can be an important catalyst for self-sovereignty and economic freedom. It offers a host of benefits for the participants of the ecosystem. However, it also brings a few challenges for the users.

Let's dive deeper into understanding the benefits & challenges of restaking, and the potential opportunities that exist within the space.

Benefits of restaking

Restaking brings a plethora of advantages for the users. Here are some of them.



Increased protocol security

Protocols can tap into Ethereum’s security layer by incentivizing ETH stakers to stake in their protocol, gaining access to a larger set of validators, & improving their initial security.



High degree of flexibility

Protocols building on platforms like EigenLayer can retain sovereignty and have the freedom to customize their architecture, including the type of consensus mechanism and slashing conditions.



Increased capital efficiency

Restaking allows stakers to earn rewards from multiple protocols with the same capital, improving capital efficiency.



Restaking governance token

The dual advantage of securing other services and earning additional rewards/governance tokens could make this approach increasingly popular among users/ stakers.

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Potential challenges for users

While restaking offers many benefits, it also brings along several challenges that restakers need to navigate.

Complex discovery process

The sheer number of services adopting restaking could make the discovery for restakers a complex task. Assessing the kinds of rewards being generated, risks associated with each service, and dealing with different slashing mechanisms, among other aspects, could become a challenge for restakers.

Since each service could potentially have its own set of rules and risk factors, a staker will have to thoroughly evaluate those elements before re-staking their LSTs. This process would require considerable research and understanding of the landscape, which can be overwhelming, especially for novice users.

Complex user interface/user experience (UI/UX)

Another potential problem is the complexity of the user interface and user experience. As stakers earn different governance tokens, they must manage multiple assets across several platforms.

Additionally, claiming these tokens typically requires the execution of multiple transactions, which can be very cumbersome and expensive.

High gas fees

Claiming & swapping multiple tokens acquired through restaking leads to prohibitively high gas fees. Gas fees can significantly cut into the final rewards from staking and re-staking for users.

Liquidity issues

Restaked assets lose liquidity due to unstaking constraints imposed by EigenLayer. Lack of liquidity creates challenges for users who want to trade during volatile market conditions.

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Market opportunity

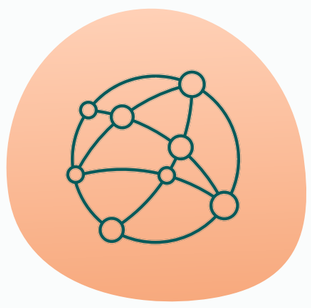
Liquid Restaked Token (LRT) can solve the above challenges elegantly to further the adoption of restaking.

For restakers



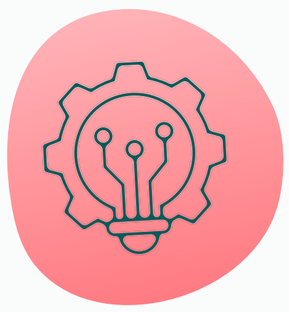
- Provide liquidity to the restaked ETH/LST
- Save the effort in identifying the right services and validators
- Help manage rewards that come in with Restaking

For AVSs



- Save effort to identify and partner with Operators
- Save effort to bootstrap security
- Help reduce emissions on rewards

For operators



- Save the effort in identifying the right services
- Reduce the effort to get restakers and restaked assets
- Help manage rewards that come in with Restaking

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4.

Introducing Liquid Restaked Token: rsETH



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At its core, an LRT is a liquid token designed to offer liquidity to illiquid assets deposited into restaking platforms, such as EigenLayer.

rsETH, an LRT, is issued by Kelp DAO aims to address the risks and challenges posed by the current offering of restaking.

How does rsETH work?

1. Restakers stake their LST to mint rsETH tokens indicating fractional ownership of the underlying assets

2. rsETH contracts distribute the deposited tokens into different Node Operators that operate with the Kelp DAO

3. Rewards accrue from the various services to the rsETH contracts. The price of rsETH token assumes the underlying price of the various rewards and staked tokens

4. Restakers can swap their rsETH tokens for other tokens on AMMs for instant liquidity or choose to redeem underlying assets through rsETH contracts

5. Restakers can further leverage their rsETH tokens in DeFi

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Technical architecture

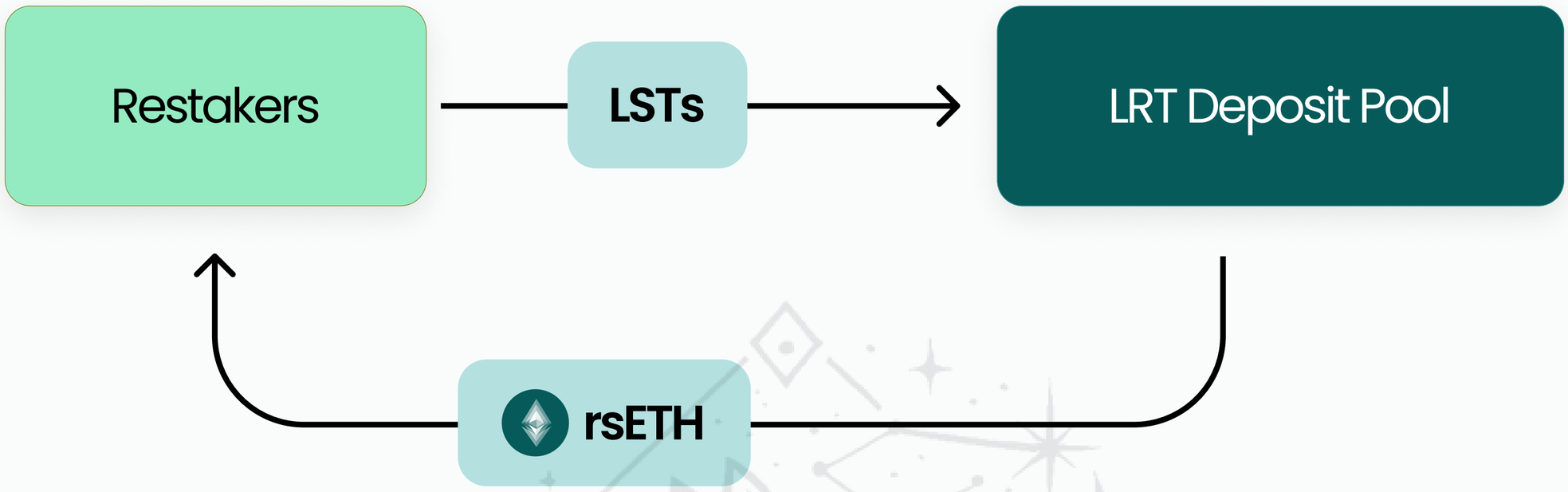


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rsETH smart contracts are designed to isolate deposits, delegations, and withdrawals. These contracts provide a separation of concerns, reducing the surface area of risk.

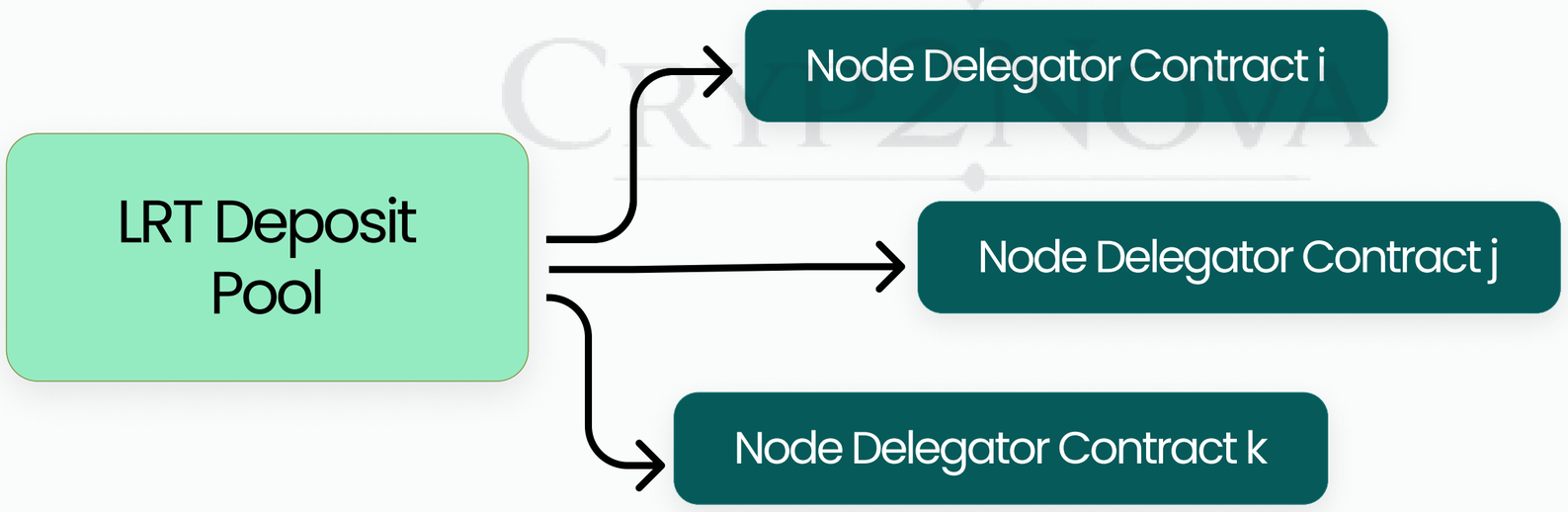
Let’s understand the most important modules of rsETH in detail.

1. Restaker Deposits LST and Mints LRT



- Provide liquidity to the restaked ETH/LST
- Save the effort in identifying the right services and validators
- Help manage rewards that come in with Restaking

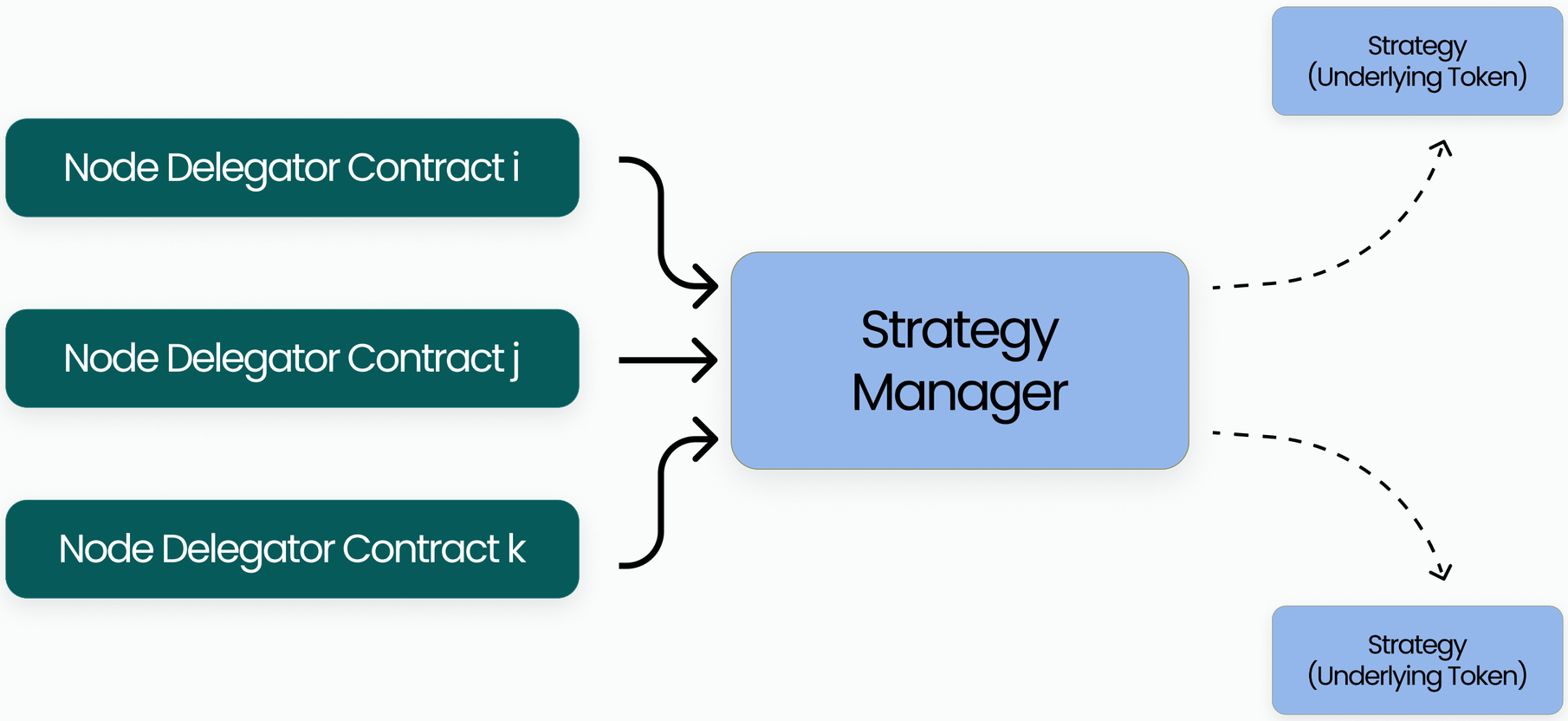
2. Moving Assets to Node Delegator Contracts (NDCs)



- Move assets from the LRT deposit pool to Node Delegator Contracts based on tokenomics or NOs weights or equal distribution

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3. Moving Assets to Strategies



- Deposit funds into StrategyManager.depositIntoStrategy once per asset per NDC per run (daily). This call pulls ERC-20s into the right strategy. So approval is necessary before execution

- StrategyManager is an EigenLayer contract, so the deposit goes to EigenLayer in this stage

Delegation to Operator and Undelegation from Operator is also done through EigenLayer smart contracts. Details are available here.

4. Withdrawing Assets

- On successful undelegation, the assets come to NDCs which are then passed on to the Withdrawal Manager smart contract

- The withdrawal manager will decide the amount of asset to be given to the restaker basis the latest exchange rate

- Once the funds are successfully withdrawn, rsETH is burned.

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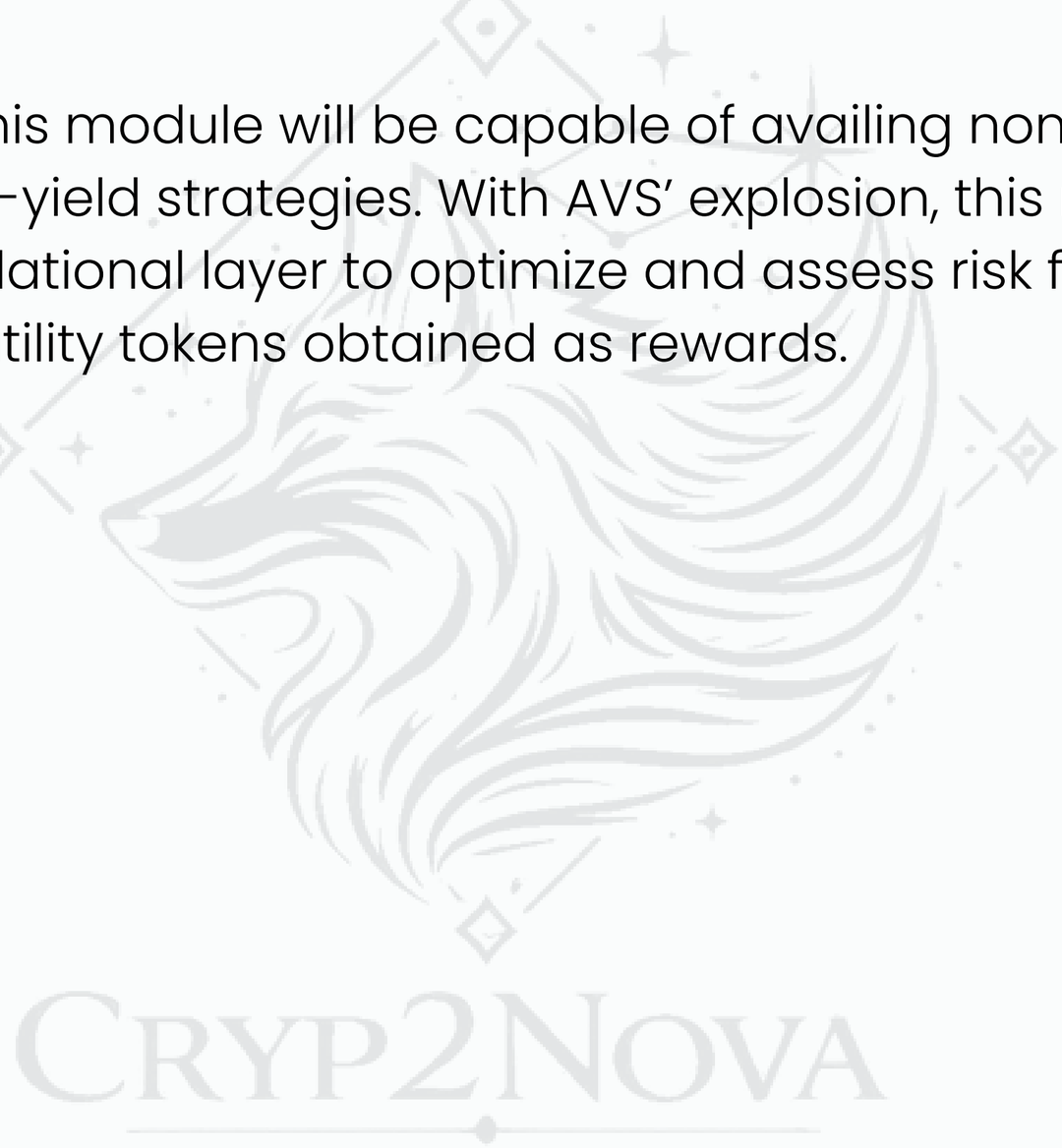
There are various other modules that support the main flows. They are as follows-

Registry: All operators, services, and assets part of the rsETH ecosystem will be registered on the Registry Module. This module also stores metadata associated with these entities and some key central properties of rsETH

Oracle: This module will be used to push real-time prices of supported assets to the rsETH contracts. The exchange rate thus formulated with the help of these real-time prices will be useful in minting and burning the right amount of rsETH for deposits and redemptions respectively.

Governance: Set of contracts that translate successful proposals into executable code to change smart contract behavior.

Reward Market: This module will be capable of availing non-ETH rewards into different extra-yield strategies. With AVS' explosion, this module will become the foundational layer to optimize and assess risk for different governance and utility tokens obtained as rewards.



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Security Measures

An important part of Kelp's development process is to keep the deposited assets safe and secure. And we take great measures to ensure the same.

Audits

Kelp's smart contract is undergoing multiple rounds of Audits from renowned auditors to make sure that there are no gaps that can be exploited by bad actors

Risk committee

It is a Committee of individuals and entities, whitelisted by DAO, with deep expertise in restaking, and economic security requirements of services.

The risk committee makes recommendations on collaterals, rewards, services, and operators that could be part of the rsETH ecosystem. Detailed responsibilities of the Risk Committee are available here.

This will help ensure that everything that gets added to the rsETH ecosystem, be it AVSs or Operators, is thoroughly evaluated by the Risk Committee.

Kelp DAO

Based on the recommendations of the Risk Committee, all changes within the ecosystem will be put to vote through the Kelp DAO. This will ensure there is no centralization risk in the decision-making process.

As restaking and LRTs provide numerous opportunities for users to benefit, they also pose risks and challenges for several ecosystem participants. Kelp DAO will evaluate these thoroughly and address/ mitigate these risks/ challenges. Let's dive into these in the next section.

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Key risks and mitigation



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Several Ethereum OGs and community members have highlighted multiple risks posed by Restaking to Ethereum.

Slashing related **Centralization** **Impacting Social Consensus**

Slashing related

- **Risk to Ethereum's security in case of slashing by EigenLayer/Services**
  If restaked ETH gets slashed by a Service, the ETH on the Consensus layer also reduces. If this happens on a large scale, it could pose a risk to the Ethereum Consensus layer.

- **Ransom attacks on stakers by Service**
  A situation where services could do a ransom attack on stakers by threatening to slash their restaked ETH if a certain payment is not made

Centralization risk

- **Erosion of solo staking**
  With restaking, there would be more avenues to earn rewards on top ETH yield. However, that will be a function of the kind of Services an operator is working with. Theoretically, sophisticated operators with more resources and deeper pockets would better understand the risks and rewards of specific restaking services. And so, delegators would start pivoting towards trusted and sophisticated operators rather than solo operators.

Impacting social consensus

- **Increasing surface area of attack**
  As there are multiple services and contracts entering the ecosystem, the surface area for attack increases drastically, which poses a risk for stakers and delegators, and in turn to the Ethereum network

- **Overloading social consensus (due to high-risk use cases of restaking)**
  If there is a protocol where, even if everything completely breaks, the losses are kept contained to the validators and users who opted in to participating in and using the protocol, this is low-risk.
  If, on the other hand, there is an intent to rope in the broader Ethereum ecosystem's social consensus to fork or reorg to solve problems of the protocol, this is a high-risk use case (Examples are available here)

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How does rsETH tackle these risks?

Slashing related

- rsETH will initially work with LSTs instead of native ETH restaking. So even if there is a slashing due to bad behavior by a service, the underlying ETH staked on Ethereum will not be impacted directly. Further modules that introduce native Ethereum restaking will be designed to minimize any impact on Ethereum.
- rsETH will be operated by Kelp DAO which will act on the recommendations of the Risk Committee. This setup will ensure that only those Services are selected that have slashing criteria that are clearly defined and don't pose a significant risk to the user's funds.

Centralization Risk

- As the selection of Services will be done by the DAO, operators do not need to put in the effort and resources to understand the underlying risks posed by services. Kelp DAO will thereby serve as a benchmark for solo restakers while staking their Ethereum. Subsequent versions of rsETH will have a module to onboard permissionless operators that will further help in decentralization.

Impacting social consensus

- Kelp DAO and the Risk Committee will consider key risks posed by AVSes during the whitelist process. Services posing high risk to users' funds and Ethereum would be carefully evaluated and excluded from whitelisting.

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7.

Conclusion

With rsETH as a Liquid Restaked Token, Kelp aims to solve the challenges with restaking to benefit different stakeholders. We believe this will help with the adoption of restaking and further the decentralization of Ethereum.

The approach towards operations that involves a Risk Committee and Kelp DAO is also to ensure that the ecosystem is benefitted and the decision-making is decentralized.

We would love to hear thoughts, comments, and opinions from the community.

Dive into the discussion and tell us what you think

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Appendix



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Risk Committee

Kelp DAO selects the members of the Risk Committee who provide recommendations regarding:

1. Selection of Operators
2. Guidelines and whitelisting of AVSes
3. Other areas related to the security of the rsETH protocol

Specific roles and responsibilities of the Risk Committee and selection criteria will be published soon.

Glossary

Restaker: A restaker is an actor who supplies any eligible collateral that could be deposited through rsETH contracts into EigenLayer. A restaker could be an EOA or a contract and is looking to tokenize their restaking position.

Approved Asset: Any asset rsETH contracts support and can be deposited into EigenLayer strategies to be utilized as economic security.

Deposit Pool: A rsETH contract that coordinates deposits of any supported assets. The deposit pool can mint rsETH tokens at the current exchange rate supplied by Oracle contracts. Supported assets are added to the rsETH contracts by the risk committee.

Approved Service: An AVS leveraging EigenLayer that passes the risk assessment from the rsETH Risk Committee. Several parameters around slashing conditions, reward emission schedule, physical infrastructure requirements, diversity of collaterals, and economic security size are all going to be considered for making a service eligible to avail economic security through the rsETH ecosystem.

rsETH Token: A receipt ERC-20 token that is minted by restakers by providing any approved asset. rsETH minted varies by the amount of approved asset provided and the recent exchange rate of rsETH with respect to ETH value.

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Oracle: Module capable of pushing real-time prices of supported assets to the rsETH contracts. The exchange rate thus formulated with the help of these real-time prices is useful in minting and burning the right amount of rsETH for deposits and redemptions respectively.

Operator: An EigenLayer entity representing a party intending to run nodes to provide economic security for AVSes. Operator owners must register with EigenLayer and prove competence to the rsETH risk committee to be considered a rsETH Node Operator. An initial set of 10-20 operators will be enabled to bootstrap the rsETH ecosystem.

Physical Infrastructure: Every operator registered with rsETH contracts is expected to provide node execution services to each AVS enabled by the Risk Committee to be part of the rsETH ecosystem. This expectation will be coupled with objective node operator performance metrics over time with enforceable penalties for sub-optimal service.

Node Delegator: Contracts designed to delegate all their assets to an operator. In doing so, each node delegator contract will be eligible for all rewards accrued to the operator due to their node services to AVSes. A single operator could have multiple node delegators delegating to them. Node Delegators provide flexibility to balance delegations between different operators.

Withdrawal Manager: Contract designed to handle redemptions of rsETH tokens. A portion of underlying assets from one or more node delegators along with rewards are withdrawn to the withdrawal manager from which restakers can claim assets back.

Registry: All operators, services, and assets part of the rsETH ecosystem will be registered on the Registry Module. This module also stores metadata associated with these entities and some key central properties of rsETH.

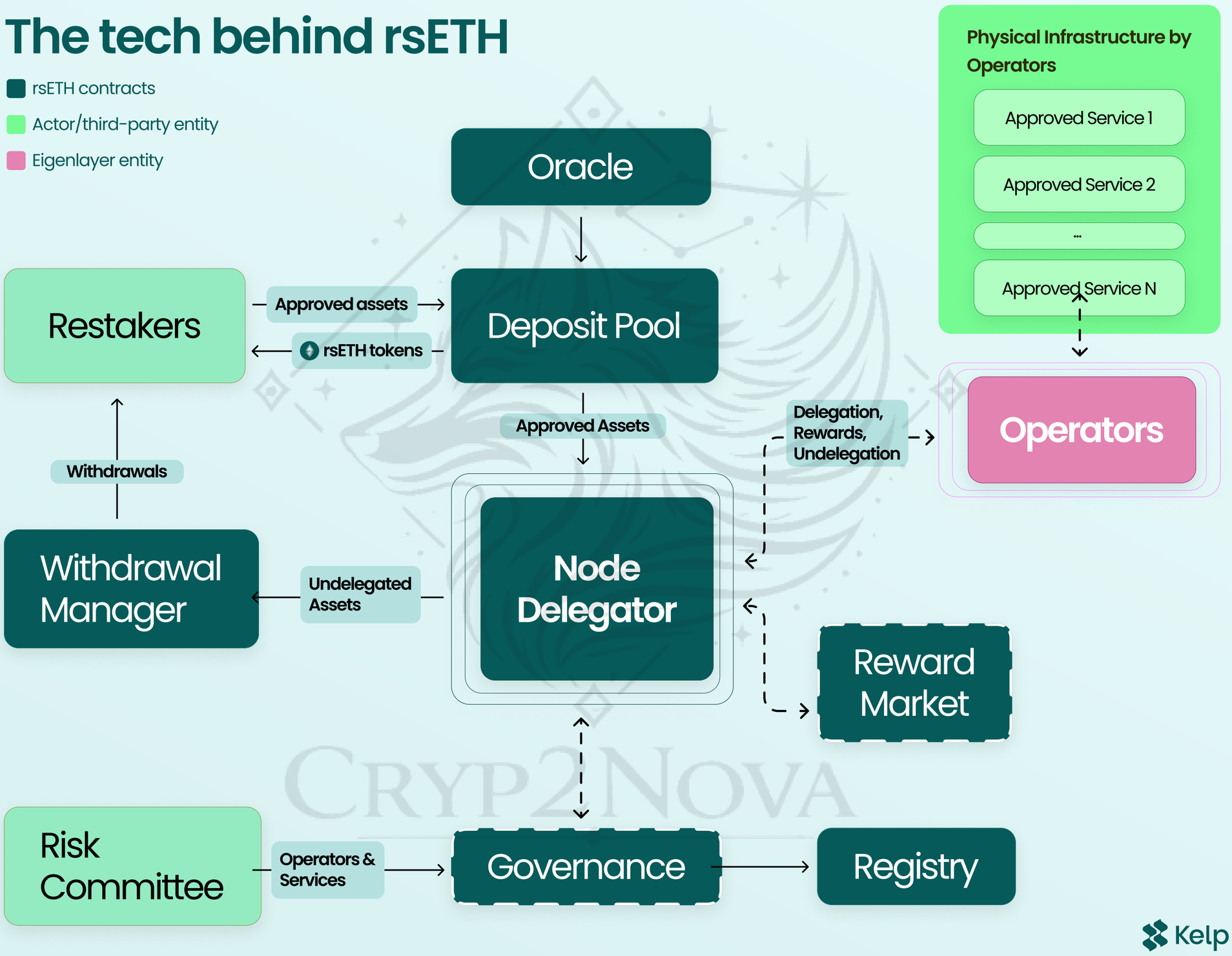
Risk Committee: A committee made of individuals and entities with deep expertise on restaking, and economic security requirements of services. The risk committee makes recommendations on collaterals, rewards, services, and operators that could be part of the rsETH ecosystem. The Risk Committee also sets guidelines for operating nodes, and fee commissions, monitors the health of the rsETH ecosystem and its different stakeholders. These recommendations are eventually implemented through the governance system subject to the DAO approval.

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Reward Market: Module capable of availing non-ETH rewards into different extra-yield strategies. With AVS' explosion, this module will become the foundational layer to optimize and assess risk for different governance and utility tokens obtained as rewards.

Governance: Set of contracts that translate successful proposals into executable code to change smart contract behavior.

A detailed user flow of the entire rsETH offering



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