EIPs For Nerds research grant proposal

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Summary

EIPs For Nerds is a research series (published on the Ethereum 2077 blog) focused on Ethereum Improvement Proposals (EIPs)—including core EIPs proposed for implementation in the Layer 1 (L1) protocol and application/infrastructure-layer EIPs (ERCs). Each EIPs For Nerds article provides a comprehensive overview of an EIP (an ELI5 description of the EIP spec is usually part of the article) and assists in shaping consensus around the EIP by discussing potential benefits, drawbacks, and considerations associated with the EIP's implementation.

EIPs For Nerds (and the Ethereum 2077 project) is entering a pilot phase—after a trial run between November and January to create a proof of concept—to further solidify its status as a valuable educational resource for anyone interested in learning about Ethereum's protocol development. For the purposes of this grant (which is for producing research content for a timeline of roughly four months), EIPs For Nerds will dedicate significant attention to EIPs considered for inclusion in upcoming hard forks, particularly the Prague/Electra upgrade. Already, the blog has published in-depth explainers two EIPs (EIP-7002 and and EIP-7251) currently proposed for Prague/Electra based on this forum post.

EIPs featured in the series will be selected based on the extent to which they fulfil some basic criteria: (1) The EIP proposes novel solutions to existing problems (2) Adoption of the EIP has significant implications for the core protocol and the wider ecosystem (3) Implementation of the EIP will be beneficial for Ethereum and the Ethereum community. The list of EIPs currently scheduled for coverage in the EIPs For Nerds series includes*:

- EIP-7547: Inclusion lists
- EIP-6110: Supply validator deposits on chain
- EIP-4788: Beacon block root in the EVM
- ERC-7281: Sovereign Bridged Tokens
- EIP-2537: Precompile for BLS12-381 curve operations

*: The list has been trimmed down from the original described in this document to highlight EIPs with the most relevance to the Lido ecosystem.

Motivation

EIPs For Nerds is a solution to a problem that exists today: a dearth of educational resources around Ethereum Improvement Proposals (EIPs) proposed for adoption by ecosystem projects or activation at the base layer. Except for a few "popular" or controversial EIPs that get a lot of press, many draft EIPs fail to garner attention from and thus cannot gain the support from developers working on upgrades as well as the community of users that will benefit from those proposals. Moreover, where certain EIPs are discussed in blogs/articles, it's often the case that authors may leave out more specific, technical details of an EIP and focus on the high-level details (e.g., proposed benefits) of the EIP.

While this approach is useful for readers that simply want to "skim" and have no interest in the finer details of an EIP, readers that do

want answers to specific questions about an EIP's inner workings are left without any option—except to try and read through comments on forums like Etheresear.ch and The Fellowship of Ethereum Magicians, or follow a trail of comments scattered across crypto-Reddit, Twitter, and other online platforms. Both require a non-trivial amount of effort, which makes it hard for such readers to truly understand how an EIP works and discourages efforts to learn more about mission-critical work undertaken by core developers.

EIPs For Nerds solves this problem by providing comprehensive, reader-friendly explanations of selected EIPs for anyone (e.g., researchers, developers, and other members of the Ethereum community) that wants a deeper understanding of an EIP without necessarily reading through the formal specification first. Moreover, each EIPs For Nerds article provides a detailed overview of considerations associated with an EIP's implementation/adoption—making it a valuable resource for readers for whom a particular EIP has significant implications (e.g., as a business owner/product builder or end-user).

Impact

The aforementioned motivations make EIPs For Nerds useful in the context of Lido's goals for the LEGO program (one of which is to "fund individuals, projects and initiatives which benefit both Lido and/or the surrounding space"), especially as some of the EIPs covered in the series will have implications for the protocol's technical roadmap and end-user experience.

To illustrate: this post from Lido's Department of Decentralization recommends a bond of 4 ETH for operators in the

Community Staking Module (CSM) with a caveat: the recommended bond size may change depending on implementation of proposals like EIP-7002 (execution-layer exits) and EIP-7251 (increase MAX_EFFECTIVE_BALANCE) that modify Ethereum's validator mechanics and staking economics. The post links to the official specification of both EIPs, but those alone may be insufficient for an average member of the community (e.g., stETH holders), or even developers working on the protocol (e.g., CSM) with intermediate and advanced-level knowledge to understand the implications of and rationale for changes proposed by either EIP.

Here, EIPs For Nerds can be a valuable resource for the Lido community to understand important details of each proposal, especially from the perspective of an end-user invested in a protocol affected by the proposed changes (i.e., Lido). For example, EIPs For Nerds #2: EIP-7002 (Execution Layer Triggerable Exits) provides background for the proposed validator withdrawal mechanism and further highlights potential risk vectors that affect staking pools like Lido once execution-layer exits (triggered by a validator's withdrawal credentials) become active. The post also provided useful information on the EIP to assist the community in making informed decisions:

- EIP-7002 will reduce trust assumptions due to the possibility of protocol-enforced exits of validators, which security-conscious stakers may consider ideal as it provides stronger guarantees around the safety of staked funds— even in the presence of one or more faulty validator node operators.
- A mechanism/plan (e.g., operator insurance) to protect node operators in the event of governance capture that leads to unwanted/unapproved forced exits—due to governance control of withdrawal contracts (that can now trigger exits via EIP-7002's exit precompile)—may help reduce concerns around adopting EIP-7002 and ensure long-term alignment between staking pools and node operators.

Furthermore, we expect that developers working on the Lido protocol will rely on articles from the EIPs For Nerds series to provide rationale for design decisions that touch mission-critical components. For example, EIPs For Nerds #3: EIP-7251 (Increase MAX_EFFECTIVE_BALANCE) highlights a second-order effect of changes to validator economics for on-chain staking pools like Lido: variability to validator balances will require rethinking risk assessment for permissionless operator sets and necessitate some level of governance to enable upgrades until the core protocol has ossified. Such analyses can provide useful input for the community during conversations around timelines for relinquishing DAO control of protocol contracts, for example.

In summary: By publishing in-depth, unbiased research on various EIPs, the EIPs For Nerds project is able to contribute to shaping public sentiment and consensus around proposals; improve end-user awareness of proposals that are worth championing; and promote Ethereum's vision of credible neutrality by explaining the motivating factors behind each EIP. Ideally, teams and individuals working on the core Lido protocol will be able to rely on content from the EIPs For Nerds series to educate the community about mission-critical protocol design decisions and communicate the implications of upgrades to the community effectively

and transparently

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Project timeline, deliverables, and implementation cost

The pilot phase for the EIPs For Nerds project will last for four months (February 2024 to May 2024) during which Ethereum 2077 will aim to publish a detailed overview + research report on a selected EIP on a weekly basis. Altogether, a total of ~16 EIPs will be covered by work funded by this grant. The Ethereum 2077 website (EIPs For Nerds section) will serve as a source of truth for progress on the project.

At the end of the proposed grant period, this post will be updated with a report on the project's progress and achievement of the various goals described in the proposal. Funds received through LEGO will go towards completing research, writing, and editing for the EIPs For Nerds series as well as promotion and distribution of articles for visibility.

Grant amount: $10,000 USD

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