Realtime Blockspace Commitment markets set Ethereum down an accelerated path to fixed-rate staking with greater relevance to the traditional financial markets. The following post is a formal introduction of ETHGas to the Lido community alongside a discussion of how the development of these markets at the micro level might evolve on a macro level.

Resources

- Documentation
- Testnet: https://app.ethgas.com (Devnet, and Holesky)
- General: https://docs.ethgas.com
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- General: https://docs.ethgas.com
- Validators
- ETHGas Commit Boost Module Github
- ETHGas Commit Boost Module Github
- Traders
- Dev Docs: https://developers.ethgas.com
- Python Package:
- Github
- pypi: python-ethgas · PyPI
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- Builders
- Modified rbuilder
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TL;DR

ETHGas is an out-of-protocol sequencing, preconfirmation and blockspace marketplace for both Validators and Traders/Commitment Buyers alike. Its purpose is to establish and standardize a communications protocol between the Validators that power blockchains, and the Users of such blockchains so that realtime blockspace negotiations and transactions can occur. Key Points:

- Validators can maximize rewards

through a broad, robust product suite

- Validators have the option

to offer one, or many different types of Blockspace Commitments, up to 64 slots in advance

- Latency is < 5ms for a blazingly fast

UX

- No new sidecar - relying on Commit-Boost, which has a fallback to PBS
- Validators can post ETH, stETH

, or provide collateral through our AVS to secure the commitments offered

- The ETHGas team held leadership positions

building core rates and credit financial markets infra in TradFi where security and robustness are of critical focus

- ETHGas has been working with Validators, Operators, Relays, Block Builders, Researchers, and Traders for months, and has been on Holesky since early November.
- ETHGas has presented on the Sequencing Calls, participated in the Preconf Mainnet POC (link here), and is a one of the contributors to the Preconf API Specifications initiative (link here)
- ETHGas has articulated a critical path from Preconfs to Fixed Rate Staking

which will have a transformative impact on Lido, Ethereum, and the broader financial markets as a whole

We are looking for feedback and engagement from the broader Lido community for potential consideration to the Lido Alliance, and as we continue to refine the product and go-to-market.

For the most up-to-date information, please visit: https://docs.ethgas.com/

Background and Key Value Propositions

- Ethereum's Blocktimes
- ETHGas provides a sub-5ms latency experience (vs the 12 sec block time) enabling a blazingly fast presettlement on Ethereum and on par with the best centralized venues. Married with Ethereum's decentralized validator set, we envision the Fast UX/Decentralized Security to be aligned with the end-game UX desired across the community.
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- The Future(s) of Commitments:
- There are as-yet No Futures or longer-dated Lookahead Markets for Commitments.
- The Majority of market participants (Protocols, Oracles, Traders, and more…) however have a consistent/recurring need for blockspace far beyond the Spot market, and yet there are no ways to gain certainty or hedge these risks.
- To address this, the ETHGas platform decouples the Commitment from the Transaction/Bundle enabling blockspace commitments (currently) up to 64 slots in advance. This enables participants to reserve and for Validators to sell blockspace capacity far in advance of their need so that they may plan accordingly
- Once positions and counterparty risk can seamlessly transfer from from one slot to the next, much longer-dated commitments will then become possible
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- Preconfs, Sequencing Rights, Whole Block Markets and more…
- In between Inclusion Preconfirmations, Execution Preconfirmations and a variety of other specific blockspace products, ETHGas enables the Validator to sell the entire block which includes Sequencing rights. This Whole Block market will contribute the maximum possible rewards to Validators beyond any combination of the current MEV-Boost pipeline alongside any set of underlying commitments as it provides Buyers with the most flexibility and optionality to

order their trades accordingly. Whether the Validator elects to sell only Inclusion Preconfs or the entire block is entirely at their discretion. We provide the tools that allow validators to participant in these markets, but leave the choice to them

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- Price Transparency for Rewards Maximization and Risk Mitigation
- A concern that ETHGas has seen with many preconf proposals is the lack of pricing transparency or know-how. This gives rise to two risks, both of which harm Validators:
- Traders Under-Bidding: With both their private orderflow and trading infrastructure, Traders have an information advantage that enables them to take advantage of Validators by way of off-market pricing resulting in net-lower rewards for Validators
- Validators Over-Offering: Alternatively, if the Validator lists the price of commitments too-high, the opportunity cost of not selling at the market-price also results in the Validator foregoing that revenue resulting in net-lower rewards.
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- Arbitrary pricing mechanisms (e.g. model-driven, deterministic, or similar) can introduce economic rents and information asymmetries which limit public utility and harm users. Introducing such features at the very core of Ethereum risks propagating/exacerbating harm across the broader network.
- To address this, the ETHGas Marketplace enables blockspace commitments to trade actively on a realtime basis providing price transparency to any Buyer or Validator at any point along the futures curve so that each party can be informed and make decisions accordingly.
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- Capturing Volatility to Enhance Rewards
- Gas is inherently one of the most volatile instruments exhibiting a 2,000% annualized vol at times (vs ETH at 75%, for example). While we are unable to forecast how much trading or turnover there will be in the forthcoming blockspace markets, marketplace fees are typically directly correlated with the volatility of the underlying instruments traded.
- The ETHGas marketplace as such, will benefit directly from such volatile gas markets but fort he benefit of Validators,

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- A Foundation and Path to Fixed Rate and Institutional Staking
- Importantly, by building a composable product suite, introducing a Futures Market, and potentially moving beyond the 2-epoch lookahead window, we look to set the foundation for Validators to eventually offer fixed-rate staking products within a risk-neutral environment (i.e. they would be able to, but be indifferent to offering variable-rate vs fixed-rate staking). This foundation will lead to the first native fixed-rate blockchain staking curve - the Ethereum Fixed Rate Yield Curve, enabling both tighter integration and competitive positioning for Ethereum within the global capital markets.
- With reference to Hasu's point on moving from a Product to Product Line

and its relevance to Institutional Staking

and differentiated staking products

, fixed rate staking positions Lido at the forefront of DeFi financial innovation opening up what is an entirely larger, broader use case for staking

- The majority of institutional TradFi shun assets with price-risk

and exhubit a strong preference for stability

as it relates to long-term decision making

. The majority of institutional players require certainty which is why the global Fixed Income markets ($141 Trillion outstanding) are a much larger asset class by comparison to their Equity counterparts ($115 Trillion, Source: SIFMA). By spearheading Fixed Rate staking, Lido opens up an opportunity for Corporate Treasuries, Central Banks, Insurance Funds, Pension Funds, Sovereign Wealth Funds, and other players who potentially have not adopted crypto, a familiar environment to do so. This not only positions Lido as a thought leader, but a technological catalyst for accelerating Ethereum's broader TradFi adoption.

- I shared this talk on how Preconfs are relevant to the global fixed income markets that I hacked together last-minute following discussions and feedback during Sequencing Week and on Sequencing Day at Devcon 2024 in Thailand.
- See furthermore this product map of the financial markets and how Fixed-Rate Staking unlocks the rest of the Financial Markets from a financial market construction / risk-neutral standpoint - all on Ethereum. As a starting point, the futures and swaps markets would thrive with Interest Rate Parity

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ETHGas Overview

ETHGas is an out-of-protocol venue for the trading of blockspace commitments that is compatible within the current PBS pipeline. Providing Validator integration through the Commit-Boost sidecar, Validators are presented with a robust suite of Commitment Types or Products that are purchased from Commitment Buyers via APIs and RPCs.

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The Commitments Flow is as follows:

- At the bottom of the above diagram, Validators register with the ETHGas Exchange by using the Commit-Boost ETHGas module. Here, they generate signatures to prove their ownership of the BLS keys such that their BLS public keys can be mapped with their EOA addresses in our Exchange.
- For unsophisticated validators, they may delegate the specific offering of preconfs and blockspace commitments to a 3rd party called a Pricer, which may be automated algorithms/bots or to another 3rd party (i.e. Market Maker) who would act on their behalf
- For sophisticated validators, they may sell preconfs and blockspace commitments by calling the exchange API directly
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- After Users have bought preconfs and submitted their bundles/transactions accordingly, the Exchange broadcasts the constraints via websocket to Relays and Builders
- Builders then build a valid block in compliance with the constraints and submit it to the Relays which ensures that the block conforms to the commitments accordingly.
- If the Builder-built blocks do not conform, then the Relay delivers a fall-back block which will conform (although it may not have captured a meaningful amount of private order-flow)
- The Proposer gets the block header from the Relay for signing and submits it back to the Relay which then releases

the block to all the other validators to perform attestations

Commitments are traded on a per-slot basis, up to 64 slots in advance, where the price of such commitments may vary from one slot to the next, and for different product types. As noted earlier, Validators may elect to sell one or many of the Commitment products for a given slot.

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Each market (e.g. Slot, and by Product Type) has a central limit orderbook ('CLOB'), where Validators, Buyers, and Sellers may place Limit Orders, Market Orders, or FoK Orders. Markets are initially 'opened' by Validators (or their delegates), who engage in Primary Market sales following which the Buyers may then turn around and subsequently sell those commitments via Secondary Sales.

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As future slots roll-down to the Next Slot, Commitment Buyers will likely then submit their transactions or bundles as attached to their Commitment Purchase lest they forgo using their reserved blockspace. The blocks will then be sequenced / constructed by whomever owns the sequencing rights or to a 3rd party which has been delegated to on behalf of the sequencing rights owner.

Onboarding

Validators are required to run the Commit-Boost sidecar to offer commitments. We chose to use Commit-Boost due to its open-source nature (i.e. reduce vendor lock-in), neutrality and flexibility that it affords Validators. This, alongside the adoption it is gaining from the majority of blockspace builders.

Commit-Boost uses the Validator BLS key to sign messages signaling their intent to register on the ETHGas platform and, optionally, delegate pricing or market-making of commitments to 3rd parties.

Collateral & Slashing

Validators are held to honor their commitments. In the event they do not honor their commitments, this is considered a Slashable Event or Default. Validators are required to post 1 ETH (or equivalent), or more, as collateral, via either our Eigenlayer AVS, or within our collateral smart contract.

Collateral types include ETH, stETH, with potentially other LST, LRTs, and other variants down the line.

Product Roadmap & Status

ETHGas is currently on Holesky with a view to go to Mainnet in Q1 2025. As articulated above, the product roadmap has been designed to extend far beyond blockspace commitments, into setting up a foundation for fixed-rate staking and a yield curve for Ethereum. The following is broken into two sections in this respect with focus/emphasis on the former.

Blockspace Commitment Types

- Ethereum L1 Commitments
- Inclusion Preconfirmations (Holesky) - These offer buyers the right to include certain transactions within the block without specifying any positionplacement within the block or state guarantee.
- Execution Preconfs (Research, Q3/4 '2025 for Testing) - These are Inclusion Preconfirmations with added State Guarantees - for example, that trades will not revert. These are currently in the research and discussion phases with a number of interested parties engaged. Please reach out if this is a particular area of interest
- Whole Blocks (Holesky) - These offer the buyers the right to put any transactions into the block, reserving the entire

30mm gas units for the buyer accordingly.

- Sequencing Rights (Holesky) - The Whole Block owner confers the buyer with Sequencing Rights accordingly. In these cases, the buyer may reserve the ‘Top-of-Block’ for themselves, and sell off other parts of the blockspace, at their discretion. They may also then resell these positions into the open market.
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- Whole Blocks (Holesky) - These offer the buyers the right to put any transactions into the block, reserving the entire 30mm gas units for the buyer accordingly.
- Sequencing Rights (Holesky) - The Whole Block owner confers the buyer with Sequencing Rights accordingly. In these cases, the buyer may reserve the ‘Top-of-Block’ for themselves, and sell off other parts of the blockspace, at their discretion. They may also then resell these positions into the open market.
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- Inclusion Lists (Research)
- L2 & Based Rollups
- Inclusion Preconfirmations (Research, Q3/4 ‘2025 for Testing)
- Execution Preconfirmations (Research Q3/4 ‘2025 for Testing)
- Inclusion Preconfirmations (Research, Q3/4 ‘2025 for Testing)
- Execution Preconfirmations (Research Q3/4 ‘2025 for Testing)
- Blob Trading

(Private Devnet, Q3/4 ‘2025 for Testing)

On the Path to Fixed Rate Staking, and Beyond

- Base Fee Trading (Private Devnet):

With execution-layer rewards largely standardized with the above product suite, the Base Fee becomes the remaining source of volatility and uncertainty for users. The Base Fee markets, while initially crafted as a means to stabilize gas price volatility, are unfortunately arbitrary, deterministic and prone to manipulation within the context of market-driven mechanics. This causes negative externalities and may prevent the broader Blockspace Markets from thriving and evolving as intended. For this reason, we will continue research and testing within a Private Devnet environment until such time that i) we have more data, and have sought more feedback from the broader community, and/or ii) the Base Fee has been removed or is otherwise relatively stable at close-to-zero.

- Swaps (Research):

A Swaps market enables participants (either a Validator or Whole Block Buyer) to ‘swap’ their variable-rate rewards from a given slot into a fixed-rate stream of payments for one or many periods. This enables the broader market to extend the look-ahead window from 2-epochs to as far in the future as practical from a liquidity standpoint (e.g. days, or months, or perhaps on standardized futures expiration dates).

- Options on Blockspace (Research):

Options enable far more precise risk management capabilities to both Commitment Buyers and Sellers. See these three primers (Article 1, Article 2, Article 3) on Energy Risk Management from the CME for background.

Infrastructure Roadmap & Path to TEEs

ETHGas has been live on the Holesky Network since Nov '24 and has been heavily engaged with the broader community across Validators, Relays, Builders, Researchers, and Commitment Buyers. Buyers include the traditional Block Builders, as well as a number of future market participants: Searchers, Market Makers, and Quant trading firms.

Our priority has been to maximize both public utility through a unified marketplace which would lead to greater rewards for both Commitment Buyers and Validators. While a unified marketplace eliminates fragmentation, it is counter to the decentralized ethos that many uphold. We respect that "more rewards" however may not be the primary objective of some validators and that there are those Validators who would prefer more decentralization over more utility/rewards - for example, about 1/10 validators do not even employ MEV-Boost itself despite the opportunity to earn higher rewards.

To this effect, we have invested in research considering either i) deploying ETHGas on a blockchain, or ii) placing it within a Trusted Execution Environment (TEE). For reasons beyond this article, we have elected to focus our research on TEEs. We have spent ~6 months thus far working with rbuilder within a TEE environment (similar to Flashbot's Builder.Net initiative), as well as consulting with two companies experienced in this space, and believe that it will be possible to put the majority of ETHGas within a TEE. While this would be no small undertaking and would require significant investment, it would retain both the fast UX and provide more utility than the status quo. The ETHGas TEE will continue to be an area of research to the extent there are the resources available and the community felt this was a worthwhile endeavor.

From the Perspective of a Lido Node Operator

Onboarding to ETHGas is relatively straightforward with a number of operators already in testing on Holesky:

- It's Easy

: ETHGas is very easy to adopt - for some validators, this may take minutes, let alone hours, although for larger validators, there may be custom work involved.

- Safeguards

: While the prospect of blockspace commitment markets may sound exciting, the fallback is to MEV-Boost ensures a baseline in respect of managing risk and positioning oneself for future opportunities

- Less Block Building Centralization

: By opening up access to a number of new market participants (e.g. quant funds, market makers, speculators), there will be more competition and less centralization among block builders

- Status Quo for Everyday Users

: While the general consensus among Searchers and BUilders is that there will be heavy competition for sequencing rights and top-of-block positioning, bottom-of-block transactions are expected to remain unaffected

- Enhanced Rewards

: ETHGas is obsessively Proposer-centric. By combining i) More choice/certainty from Commitment Buyers, ii) Capturing Volatility from one of the most volatile instruments, iii) Having a secondary market for products, iv) Building a composable product suite, and v) Opening up the Sequencing markets to non-traditional players, ETHGas should strictly result in higher rewards for Validators than that which could be achieved by either selling Inclusion Preconfirmations or Execution Preconfirmations on a standalone basis, or MEV-Boost as it currently stands

From the Perspective of Lido

Supporting Lido, and their broad, diverse ecosystem of Node Operators is important at ETHGas. The feedback of dozens of such node operators over the product design phase has led us to the current version of ETHGas.

To align with both Lido and their Operators, we made the decisions to:

- Enable Whole Block Markets
- Inclusion preconfirmations, while they provide a much faster UX, are not expected to offer meaningful enhancements in rewards. Sequencing rights and top-of-block positioning however are expected to offer substantially higher rewards. For this reason, we included the Whole Block market in our first release so that the work involved in preparing for blockspace commitments is commensurate with the potential rewards.
- Focus on Price Discovery

- We designed ETHGas around a marketplace and realtime price discovery because the question of “how do you price blockspace commitments” is a focal point of almost every discussion. On virtually every one of the Preconf calls, Preconf Events, and public forums, there is grave uncertainty and even fear on behalf of the Validators that they are ill-equipped to price Blockspace products and are at an informational disadvantage when paired with sophisticated searchers and traders. While they are excited at the idea of blockspace commitments, they don’t want to be taken advantage of. As the number of market participants is sufficiently diverse and as Gas is so volatile, Market-driven CLOB approaches provide meaningfu transparency, public utility, and thus fairness to Validators and Node Operators

- Eliminate Economic Rents

- By doing so, the marketplce can pass on the most value (i.e. rewards) to the Validators and Operators as possible

- More Choice

: With a growing suite of products and extensive roadmap, we wanted to empower the Validators to offer those products that align best with their ideology

- Support stETH

: Staked ETH is a critical feature and bedrock for which most of Ethereum relies on. Supporting it would be encourage further adoption and relevancy.

These decisions, alongside Lido’s support, will ultimately drive rapid innovation in both the micro blockspace markets that will lead to more long-term macro relevancy for Ethereum within the global capital markets.

From the Ethereum Perspective

The Blockspace markets are inherently at the intersection of offchain and onchain, and we have designed ETHGas to thrive within such an environment. With this in mind:

- Maximizing for Public Utility

: We focus first and foremost on maximizing the Public Utility. While highlighted earlier, this extends far beyond the prospective active Buyers and Sellers of blockspace commitments into the far reaches of even the smallest users and validators on Ethereum. It’s important for us and the community at large that the most critical fabric be as economically optimal as possible.

- Product Innovation

: We have taken a relatively aggressive stance on both accelerating the product suite offered and maximizing choice, whilst accounting as best we can for both ideological and economic considerations. Doing so enables the community to better envision the future, with a different set of products, opportunities, and risks, and to be able to discuss, research, and plan accordingly for its arrival. We believe that some of the UX nuances when highlighted in this new light (e.g. Base Fee uncertainty, among others), demand further research and discussion accordingly.

- Long-Term Foundations

: Ultimately, realtime Blockspace markets at the micro-level unlock a critical path for Ethereum thus rapidly accelerating the timeline for more direct competition with Centralized Finance on a macro-level.

We believe our approaches above align with the broader initiatives at play around both broader adoption and higher/faster throughput. We actively seek guidance and community feedback on how we align better whilst accelerating mass adoption of Ethereum.

Security

The team is obsessive with security. While much of the project is out-of-protocol, and offchain, much of the team have an extensive background building large-scale enterprise cloud infrastructure, and within the Financial Services sector where security is paramount. Both of these arenas require a daily working knowledge of OWASP, ISO27001, and a number of other related security controls and processes.

Onchain, our smart contracts are expected to finalize their audit by the end of January.

Finally, while we outline a path that takes both Staking and Ethereum far into the future, we’re cognisant that many slow, well thought-out steps are required to be taken in the near-term. Thank you for your interest and consideration - we’re excited to walk this path with the broader Lido Community and look forward to engaging accordingly.