

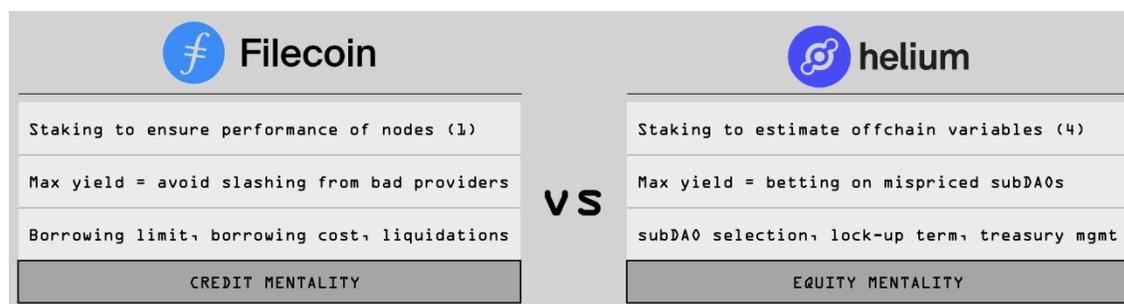
## DePIN Staking Pt 2: Liquid (Re-)Staking

Wherever staking emerges, liquid staking tokens follow.<sup>1</sup> Less than 10% of DePIN's \$50B market cap is staked today, and less than 1% is liquid staked. If DePIN sees similar staking dynamics as Ethereum and doubles in market cap, **DePIN liquid staking TVL can grow by a factor of 50x+.**<sup>2</sup>

Given we redefined *economic security* for the context of DePIN, we must also redefine liquid staking tokens (LSTs). From first principles, the purpose of any LST is to maximize (risk-adjusted) yields. *How* to maximize yield depends on the specific purpose that staking serves in the underlying network:

| Purpose of Staking                                   | Purpose of Liquid Staking                                  | How to Maximize Staking Yield  |
|--|--|--|
| 1. To <b>ensure performance</b> of supply-side nodes | Underwriting service providers<br><i>(onchain refunds)</i> | Avoid delegating to unreliable nodes with high slashing risk         |
| 2. To <b>determine governance</b> participation      | Voting on proposals<br><i>(outsourced governance)</i>      | <u>N/A</u> : typically no slashing penalties for non-voters          |
| 3. To <b>prioritize service</b> to demand-side nodes | Signaling demand<br><i>(group purchasing)</i>              | <u>N/A</u> : network resources are monetized off-chain               |
| 4. To <b>estimate offchain variables</b>             | Market intelligence<br><i>(outsourced management)</i>      | Make high-quality predictions or "correct bets" on certain variables |

In some ways, LSTs play opposing roles in scenarios (1) and (4). In (1), LSTs are like TradFi credit funds: they underwrite borrowers, set leverage limits and interest rates, and manage liquidations. In (4), they're like TradFi equity funds: they build independent conviction on a trade, bet aggressively when they have a [variant perception](#), and rebalance portfolios as known facts change. For this reason, **fundamentally different types of LSTs will win on networks like Filecoin vs Helium.**



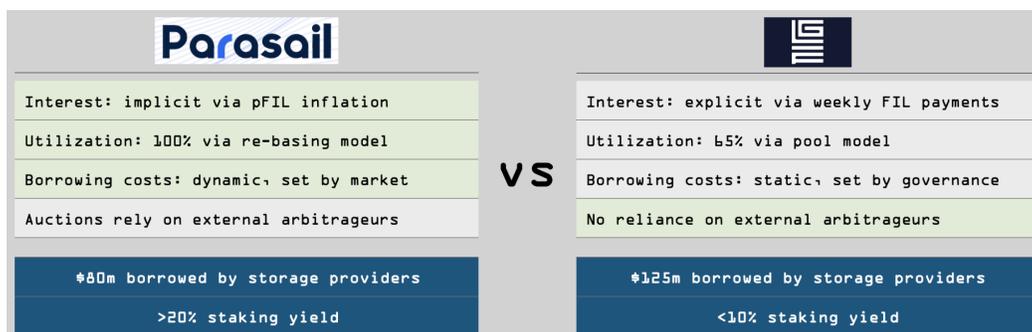
Given we covered Helium LSTs in Pt 1, today's essay focuses on Filecoin LSTs. Filecoin is the most mature DePIN staking ecosystem, with three LSTs reaching >\$100m TVL since the [FVM](#) launch in March 2023.<sup>3</sup> We think it's likely that the future category-leading DePIN LST will emerge first on Filecoin and leverage early momentum to expand horizontally to other networks. Today's essay discusses the two leading Filecoin LSTs - [GLIF](#) and [Parasail](#) - and a handful of DePIN liquid re-staking tokens (LRTs).

<sup>1</sup> Liquid staking tokens (LSTs) are derivative tokens backed 1:1 by native tokens staked by a validator. LSTs can be deposited into DeFi smart contracts - as exchange liquidity or loan collateral - to earn incremental yield on top of the usual validator rewards. Liquid re-staking tokens (LRTs) are like LSTs, except they're used simultaneously in DeFi and to bootstrap security for other networks. Both LSDs and LRDs improve capital efficiency by re-hypothecating validator's locked tokens to be re-used in parallel for other purposes.

<sup>2</sup> 27% of ETH's circulating supply is [staked](#) and roughly 15% is liquid staked per [DeFiLlama](#).

<sup>3</sup> [GLIF](#), [Parasail](#), and [stFIL](#) hit >\$100m TVL and [SFT](#), [FilFi](#), [Filet](#), [MineFi](#), [Hashking](#), and [Hashmix](#) hit >\$1m TVL per DeFi Llama.

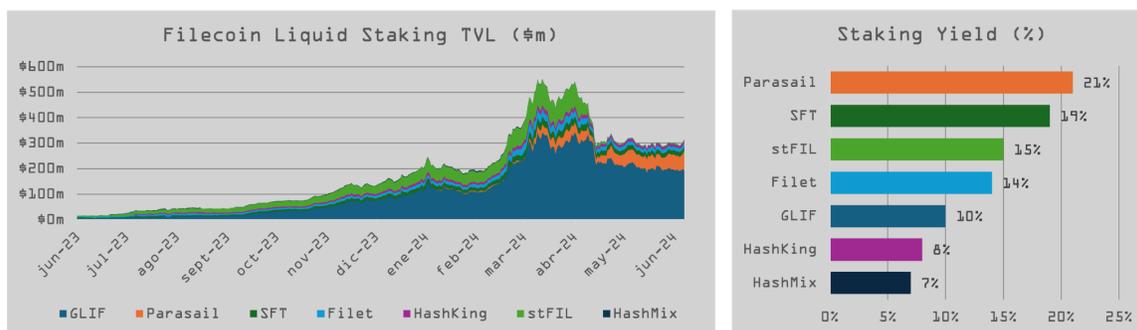
LSTs in Filecoin act like credit funds: they underwrite borrowers (decide which storage providers to lend to and how much to lend), set borrowing costs (interest rates), and manage liquidations in case of default. How do the two leading projects compare along these axes?



Parasail uses a rebasing model where borrowers (storage providers) pay interest *implicitly* in the form of pFIL [inflation](#), and inflation rates (borrowing costs) are determined by the price at which arbitrageurs are willing to participate in pFIL/FIL [auctions](#). By introducing a reliance on external arbitrageurs to provide FIL liquidity, Parasail gains two highly-attractive properties: 1) **borrowers never need to worry about interest payments**, and 2) the protocol operates at **100% utilization** by design, maximizing staking yield.

In GLIF's pool model, storage providers pay interest *explicitly* via weekly payments in FIL at a fixed 16% APR.<sup>4</sup> While \$125m worth of iFIL has been minted from the pool, the interest paid on that amount is split among \$200m of deposits. The implied [65% utilization](#) rate dilutes the yield earned by iFIL holders from 16% down to below 10%. In short, GLIF **eliminates the dependency on external arbitrageurs** at the cost of burdening borrowers with interest payments and diluting staking yield with underutilized TVL.

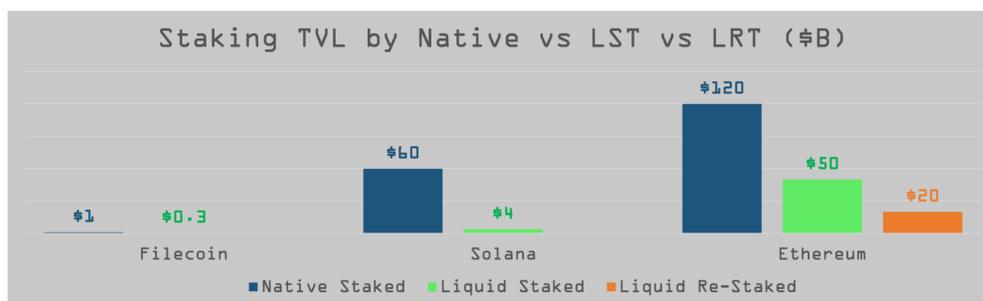
It's worth noting GLIF's infinity pool (iFIL) explicitly targets [zero losses](#) and correspondingly lower staking yields; other, more aggressive pools will spin up over time. That said, Parasail's pFIL also targets [zero losses](#) and already offers **double the yield of iFIL with a similar level of risk**. Additionally, future GLIF pools will suffer from the same fundamental limitation: if borrowing costs are fixed, utilization must be variable; and if utilization is below 100%, then staking yield is being diluted by dormant capital.



Per DeFiLlama and protocol frontends as of June 7, 2024

<sup>4</sup> There are plans to implement dynamic [rates](#) based FIL rewards per TB.

GLIF and Parasail drive capital efficiency by re-hypothecating staked capital from *within* Filecoin. By definition, this creates an upper limit on TVL: the total amount native stake in Filecoin. Today, there's ~\$1B of locked FIL (26% of circulating supply) vs \$60B of native stake on Solana or \$120B on Ethereum. The remainder of this essay discusses liquid re-staking tokens (LRTs) that **re-hypothecate staked capital from beyond the Filecoin network**, tapping into a 50-100x+ bigger opportunity.



Source: DeFiLlama, Beaconcha.in, @ilemi on Dune

It's not trivial to secure services from one chain with staked assets on another chain. Consider the case where a Solana staker wants to earn yield on JitoSOL by lending to Filecoin storage providers. If storage providers could mint pJitoSOL against locked FIL, then the re-staking protocol would be structurally short FIL/SOL: its liabilities are denominated in SOL, while assets are denominated in (locked) FIL.<sup>5</sup>

To create balance, **DePIN re-staking protocols look more like insurance markets than lending markets**. For example, Solana stakers can re-stake JitoSOL by insuring storage services by a certain Filecoin miner. If the miner provides valid proofs to Filecoin, stakers earn MEV yield from Jito (~8%) plus yield from insurance "premiums"; if the miner fails to submit proofs, stakers' JitoSOL gets slashed.

There are obvious sellers of insurance - LST holders looking for yield - but no obvious buyers. Therefore, **the core job-to-be-done by DePIN re-staking protocols is to find buyers of DePIN insurance**. One way is to acquire customers directly by bundling service guarantees (and paying premiums out-of-pocket). However, the breadth of DePIN services makes it incredibly difficult for a startup to be a competitive provider across multiple verticals. For context, despite [many well-funded attempts](#), not a single DeFi insurance protocol has product-market fit. We think the more scalable path is to partner with DePIN gateways and become their **embedded insurance** provider: this is the path being taken by Parasail, as they expand beyond Filecoin with [cross-chain DePIN re-staking](#) for FIL, SOL, BTC and other assets.

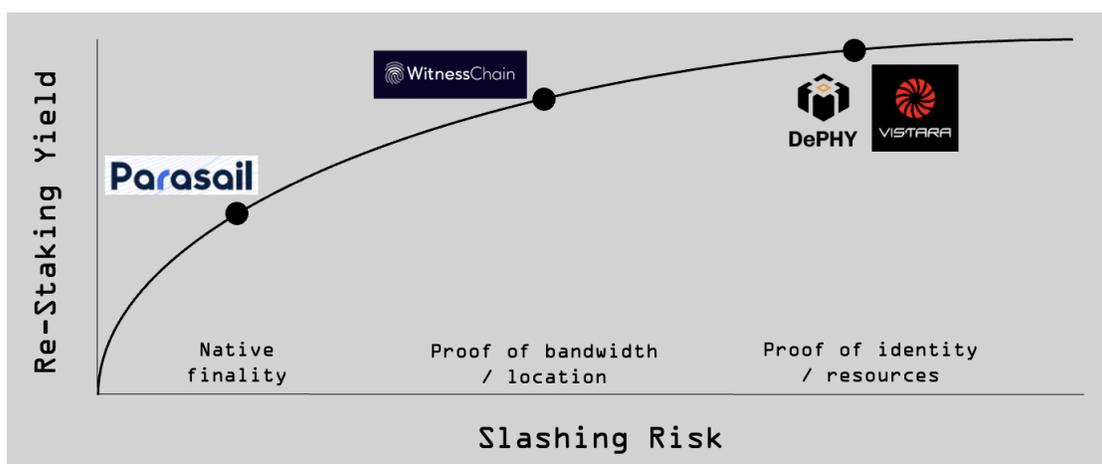
Parasail still relies on Filecoin for finality when re-staking assets on other chains. In other words, the decision on whether to pay out an "insurance claim" or not is based on whether valid proofs of storage are posted to the Filecoin blockchain. Parasail's smart contract on Solana listens to Parasail's node network, which relays the status of Filecoin service contracts to Solana (the two chains cannot communicate natively). Parasail's nodes run as an Eigenlayer AVS backed by re-staked ETH security.

<sup>5</sup> We expect future designs to experiment with hedging out this structural short at the protocol-level. One idea is to purchase puts to lock-in the future price, and bake the option premium into the collateral requirements for storage providers; however this requires taking counterparty risk to the options dealer whether onchain or offchain. Another idea is to create a three-sided network where storage providers borrow FIL, stakers stake SOL, and liquidity providers lock two-sided FIL/SOL LP liquidity.

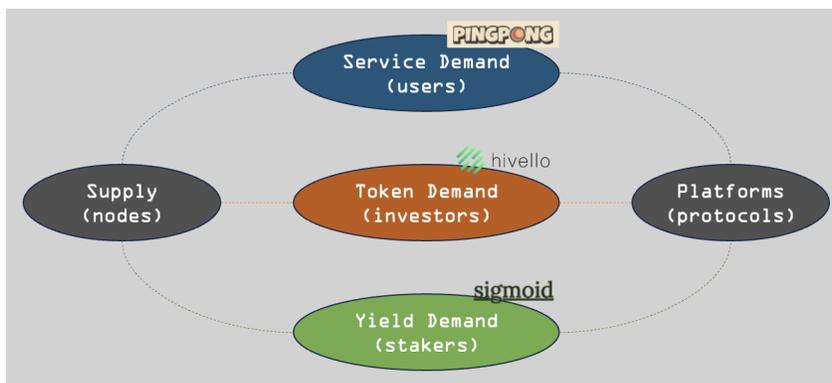
Rather than relying on native finality, another approach - taken by [WitnessChain](#) - involves enabling **proprietary consensus mechanisms**. WitnessChain has emerged as one of the leading AVSs on Eigenlayer with more than 2.4B re-staked ETH (>\$8B) securing their [proof-of-location](#) and [proof-of-bandwidth](#). In PoL, “watchtower” nodes - which are geographically distributed - ping a miner’s IP address and ping latencies are used to triangulate a location. If a watchtower receives a ping faster than what is physically possible (given speed of light constraints) then the attested location must be wrong and a slashing event is triggered. Similarly, in PoB, watchtowers transfer a small file to the miner and measure how quickly it can transfer the file back (with a signature)—a slashing event is triggered if the file takes longer to download + upload than the attested bandwidth implies. Over time, WitnessChain will not only serve their own first-party consensus mechanisms, but will also enable DePINs to share/rent consensus mechanisms from each other—a protocol-ized version of early partnerships that are already [springing up](#) around the DePIN ecosystem.

Consensus mechanisms take years - maybe decades - to become truly battle-tested. For novel ones like WitnessChain’s PoL & PoB, re-stakers will demand higher yields than in Parasail where settlement relies on Filecoin’s already battle-tested [proof-of-spacetime](#) consensus. This makes sense when you consider the source of the yield: for WitnessChain, yield comes directly from protocols using PoL/PoB to determine inflationary token rewards & slashing; for Parasail, yield comes from gateways using bundled service guarantees to differentiate their products, which in turn drives protocol utilization. We think both approaches can work, with WitnessChain attracting re-stakers further out on the risk curve than Parasail.

A related approach is to build consensus on *device identity*. Protocols like [DePHY](#) and [Vistara](#) are *hardware abstraction layers* that allow developers to verify a device’s connected hardware resources. In theory, any device can run a small piece of code that communicates with a network of watchtower-like nodes to verify its attested hardware resources (e.g., TEE, GPU, LoRa chips). Vistara calls its solution [Hypercore](#) and is initially focused on compute use cases, like decentralized AI with [Morpheus](#). DePHY calls its solution [DePHY ID](#) and is initially focused on sensor use cases, like decentralized energy with [Starpower](#). These projects make it easier for DePINs to manage diverse device manufacturer ecosystems by pushing device verification to the edge, rather than at the manufacturer level. Because these projects make an even stronger claim than WitnessChain - they attest not just to current location and bandwidth, but to the future computing capabilities of a device - we expect re-stakers will demand even higher yields.



A final cohort of DePIN re-staking protocols are focused on **aggregating supply**. Projects like [PingPong](#), [Hivello](#) and [Sigmoid](#) are bootstrapping liquidity with user-facing apps that automatically spin-up and manage DePIN nodes on users' laptops/smartphones while optimizing mining earnings across multiple networks. Given the extremely low switching costs, DePIN supply aggregators have little moat in isolation. Instead, each project is taking a unique approach to building defensible three-sided network effects.



PingPong was the first to launch a [DePIN multi-miner app](#), which has seen [>10k users register and >2k DAUs](#) in the first two months since launch.<sup>6</sup> PingPong's app can run various blockchain nodes (for stable yield) and DePIN nodes (for variable yield) in parallel, while also earning PingPong governance tokens. Longer-term, the third leg of PingPong's network effects come from *demand-side users* who use PingPong's [all-in-one DePIN SDK](#) to access underlying DePIN services like compute, storage and bandwidth. As PingPong scales and integrates multiple DePINs for each service, it can route demand to the lowest-cost and/or highest-performance rails. In the extreme case, PingPong may even "roll its own" proprietary DePIN services and cut out the underlying protocols entirely for some workloads (e.g., those with lower security or performance requirements)—like [Amazon Basics](#).

Sigmoid recently landed a partnership to launch the [first liquid staking token on Autonolas](#) (sigOLAS). Long-term, the third leg of Sigmoid's network effects come from *liquid stakers* who are looking to earn yield on their AI tokens. Under the hood, Sigmoid uses trusted computing (TEEs) to securely spin up nodes (AI agents) and then shares the yield with LST holders. With trusted computing, Sigmoid verifies the integrity of nodes and reduces slashing risks while being extremely scalable via one-click node deployment. As Sigmoid scales and integrates more protocols, its token functions as a yield-bearing index of AI tokens.<sup>7</sup>

Hivello's [beta app](#) is live on Windows and supports parallel mining of Livepeer, Mysterium and Sia. Longer-term, the third leg of Hivello's network effects come from *retail investors* who want to invest in the leading DePINs early, similar to a launchpad like [CoinList](#). Hivello aims to offer DePINs both an initial node network (via its miners) and a path to raise capital from their communities (via pre-sales). Combined, Hivello has an opportunity to become the shelling point for new DePIN token launches.

Eventually the strategies will overlap: the winning protocol will be a demand aggregator (for established DePINs), a launchpad (for new DePINs), and a yield-bearing DePIN index. That said, each strategy faces significant challenges. Demand aggregators may be too early; they're only useful/differentiated if *multiple DePINs* offer a certain service. Launchpads have built great platforms (see: CoinList) but haven't captured much equity value. LSTs have the clearest business model, but also the most competition.

<sup>6</sup> PingPong currently supports parallel mining of AOIZ + Masq + Titan, with [eight more](#) networks being integrated.

<sup>7</sup> See Helium LST discussion from [Pt 1](#).