

Overview

The Certus One Ethereum validators, run as part of the Lido liquid staking protocol failed to validate for a period of approximately 6 hours on February 11 2023. This impacted staking rewards on the Lido protocol.

Certus One was acquired by Jump Crypto in 2021.

Execution Environment

Inside Google Kubernetes Engine (GKE)

- We run one Lighthouse and one Prysm beacon client each connected to their own geth instance.
- A single Vouch instance communicates with the two beacon clients, and mevboost

Outside GKE:

- We have a cluster of three dirk threshold signers that Vouch uses

Incident Timeline

All times UTC

- 2023-02-11 14:55 geth-lighthouse

restarted and started resyncing, looked like it was catching up

- 2023-02-11 21:40 geth-prysm

instance rebooted, and started resyncing. The Prsym instance lost connection and stopped syncing

- 2023-02-11 21:48 Alerted that dirk

instances were signing fewer than expected attestations, operator investigated Dirk node and seemed operational (all pods & process were reporting up, but not progressing as expected)

- 2023-02-11 22:30 Notified that Lido validators were down in Telegram room, alerting for down pods did not occur (as processes were all up)
- 2023-02-12 00:00 Operator started investigating, discovering issues on both nodes
- 2023-02-12 05:18 Validators back online

Root Cause

- The Prysm Beacon client OOMed, restarted and stuck at block 16591518 (but reported up)
- The Lighthouse Beacon chain OOMed earlier in the day but was yet to catch up
- The geth pods were repeatedly OOMing because of --cache

flag exceeding pod memory limit of 16gb

Workaround

- Pointed Lighthouse client at geth node running on dedicated node. Lighthouse returned to operation and validator was able to start proposing blocks.
- Reduced --cache

amount from 8192 to 4096 on geth nodes & increased pod memory limit.

- Adjust termination grace period for pods from 10 seconds to 5 minutes; this allows geth pods to flush sync data to persistent disk.

Things to improve

- Alerting, escalation and knowledge transfer to wider team, from Telegram and Discord (complete)

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- Improve alerting on specific components in the stack, rather than final attestation (complete

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- Investigate splitting stake across two instances or moving to a hot/warm vouch instance in multiple clusters (under consideration

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- Expand the number of Beacon/Consensus nodes that the vouch instance is using, including nodes outside the GKE cluster (complete

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Reimbursement

To compensate for the missed proposals and attestations during the outage, Jump Crypto reimbursed the Lido rewards vault 2.2939 ETH:

total value lost = 2*penalties + missed rewards

This is because penalties would have been rewards if not incurred, so total value lost is actual penalties plus opportunity cost of not operating correctly.

- 0.9549 in missed rewards
- 0.6695 in penalties

Reimbursement transactions:

- [Ethereum Transaction Hash \(Txhash\) Details | Etherscan](#)
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