

# Insights from block propagation in the Ethereum P2P network

DevCon 2024, Bangkok

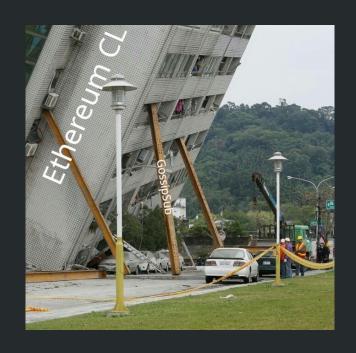


ProbeLab @ Shipyard

# Which role does GossipSub play in Ethereum?

**GossipSub** is one of the **central pieces** of Ethereum:

- Propagates all validator duties
- Essential for chain-finality
- **Every node** runs it
- Key component in Ethereum's scalability roadmap (PeerDAS / FullDAS)





## Why is it important to monitor it then?

**Many external vectors** affect the network performance:

- Block building time-games
- Size of the block content
- Geographical location of the nodes

GossipSub still provides:

- Fast propagation of blocks → reduce late block arrival
- Resilience

The ecosystem leans towards GossipSub with **more topics** and larger messages (PeerDAS)



#### What are the current limitations?

GossipSub **enforces some** soft/indirect **limitations**:

- Redundant information or duplicated messages
- Direct impact on **bandwidth requirements**

PLUS: these effects are **proportional to** the number of **bytes we** want to **propagate** 





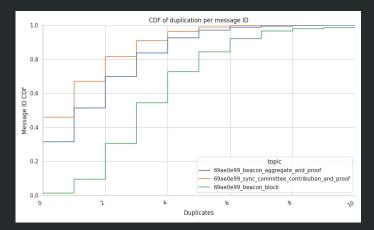
#### Message duplicates

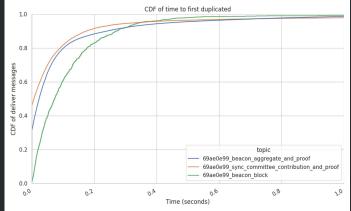
#### Message duplicates are guaranteed

- Bigger messages mean more duplicates
- Bigger messages also generate larger action times

There are some optimizations:

- **IDONTWANT** control messages
- Topic observation

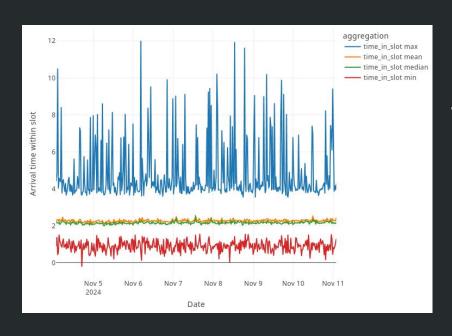






# Impact of GossipSub to Block propagation

- Monitoring block arrival times is crucial to spot major network limitations
- Constant monitoring of the arrival times allows identifying the performance benefits of protocol upgrades





#### Impact of GossipSub to Block propagation

#### ProbeLab

**Block Arrival Times** 

Methodology

Week 2024-44

Week 2024-43

Week 2024-42

Week 2024-41 Week 2024-41 Week 2024-40

Week 2024-39

Week 2024-38

Week 2024-29

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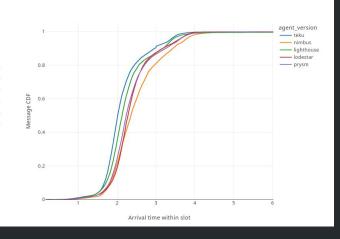
#### Ethereum block broadcasting latency report 2024-44

The following results show measurement data that were collected in **calendar week** 44 **of** 2024 from 2024-10-28 to 2024-11-04.

This report provides charts and metrics for the beacon block broadcasting latency on the Ethereum network. The methodology we used is available here.

#### Block arrival time within the slot

The line plot displays the Cumulative Distribution Function (CDF) of the block arrival times within the slot for the different Ethereum clients (listed here). The line plot aggregates all the locations we collect data from for each client.







# More info in our public reports

Mesh Stability
GRAFTs & PRUNEs



**GossipSub Effectiveness IHAVEs & IWANTs** 



MessageMetrics DUPLICATES



GossipSub BANDWIDTH



CL Block
ARRIVAL TIMES







**∥** ProbeLab

Q&A

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