

Ethereum Sharding P2P Requirements

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Outline

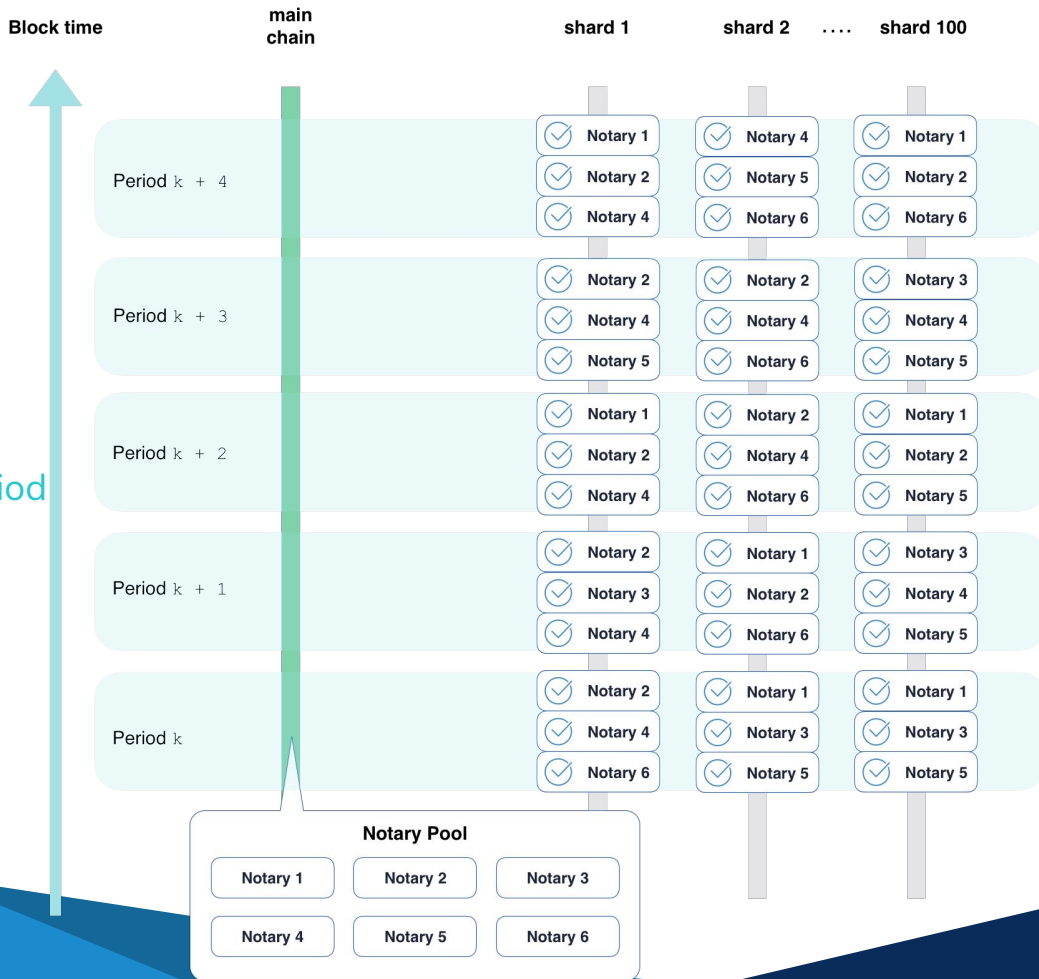
1. Sharded P2P Networking
2. Requirements
3. Proposals
4. Attack resistance
5. More requirements



Sharded P2P Networking

Sharding Notaries

- are pseudo-randomly sampled to verify the block availability **per period**
 - goal: 5 sec block time
- need to **jump between the shard chains**



Sharded P2P Networking

Network Requirements

- o fast jump between 100 networks or peer groups



Requirements

- **Client can connect to multiple shards**
 - Total shard chains: ~100 shards
 - Concurrent connections: ~10 shards
 - **Client can jump between shards**
 - Clients should be able to find peers in other shards in a short time
 - **Latency and reliability**
 - Beacon chain block time: 5 sec
 - High delivery guarantees
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Proposals

- **Proposal 1** - 100 separated networks for 100 shards
 - Peer management and reputation system may be tricky for the validators.
- **Proposal 2** - Multiple gossip channels
 - One single **transport layer network**
 - Multiple shard-specific **gossip channels**.
 - The validator can watch some specific channel
- **Proposal 3** - One gossip channel for all shards
 - Nodes gossip the shards which they are currently listening to



Attack Resistance (1/2)

- **Sybil attack**

- Node identity and authentication

- **Eclipse attack**

- Node identity and authentication
- Peer selection strategy and peer routing
 - Recommend using current [random-walk DHT discovery](#) for sharding?
- Minimum connection peers number
- Indegree and outdegree method



Attack Resistance (2/2)

- **Anti-spam and anti-DDoS attack on gossip channel**
 - What's the strategy for DDoS attack now?



More Requirements

- Persistence layer
- Fast subscriptions
- Ease of maintenance

