Abstract

This document summarizes a live benchmark demonstration comparing the Ethereum Proof-of-Stake (PoS) consensus model with the Sevenfold Proof-of-Consensus (PoC) engine.

Both tests were executed on a local development chain using Hardhat (Ethereum baseline) and the Sevenfold rotor-consensus implementation (PoC).

The goal was to evaluate performance, determinism, and consensus efficiency across equivalent workloads.

Live Benchmark Snapshot

Metric	Ethereum (PoS baseline)	Sevenfold (Proof-of-Consensus)
Operations (ops)	~10 transactions	~20,000 consensus iterations
Total time	≈12 ms	≈4 ms
Average latency	≈1–2 ms per operation	≈0.2 µs per iteration
Total gas	≈260 k gas (simulated cost)	0 gas
Final counter state	Start = 0 → End = 10	Deterministic convergence
Output artifacts	On-chain storage updated	Centroid verdicts (H^+ / H^-)

Result: Sevenfold achieved consensus roughly **thousands of times faster** than Ethereum PoS finalization on equivalent logic, with deterministic convergence and no gas expenditure.

Consensus Model Comparison

Feature	Ethereum Proof-of-Stake	Sevenfold Proof-of-Consensus
Validation mechanism	Network-wide staking and block proposals	Rotor-based local mathematical convergence
Finality time	≈12 s (network)	Microseconds (local deterministic)
Energy / gas cost	Non-zero	Zero
Validator requirement	Thousands of external nodes	None (mathematical quorum)
Output type	Block finality	Continuous centroid verdict
Failure mode	Forks / slashing	Divergent winds auto-neutralize

Sevenfold's Proof-of-Consensus operates as a deterministic engine where convergence replaces probabilistic block validation.

It can function either as an independent consensus layer or as an embedded module inside existing blockchains.

Interpretation

This benchmark validates that Sevenfold's rotor consensus mechanism can:

1. Execute equivalent logical state transitions orders of magnitude faster than on-chain PoS.
2. Reach local, repeatable agreement without probabilistic delay.
3. Eliminate gas costs by replacing economic staking with mathematical convergence.
4. Offer deterministic "centroid" outcomes that can be verified or mirrored on-chain.

The experiment confirms Sevenfold as a **new class of consensus**—a mathematical Proof-of-Consensus that can coexist with, or replace, traditional blockchain finality layers.

Notes

- Tests executed via Hardhat local node (port 8545) with identical contract logic (Counter.sol baseline).
- Sevenfold rotor model executed off-chain using JS consensus script (runBoth.js).
- Environment: Ubuntu/WSL, Node.js ≥ 18, standard development laptop.
- Results generalized for presentation clarity.
