PrimeFlux Proof-of-Work Experiment Report

Overview

This report summarizes controlled computational experiments comparing the PrimeFlux algorithm against standard random mining methods. Each side was given the same computational budget—identical hash counts and energy use—to ensure a fair test.

Experiment Setup

Two stages were tested: 1. **Stage 1 — 22 Bits (Easier Difficulty)**: One PrimeFlux miner vs 100 random miners. 2. **Stage 2 — 40 Bits (Bitcoin-Level Difficulty)**: One PrimeFlux miner vs 10 random miners. Each side ran for the same number of hash operations. The goal was to see how PrimeFlux scales as difficulty increases.

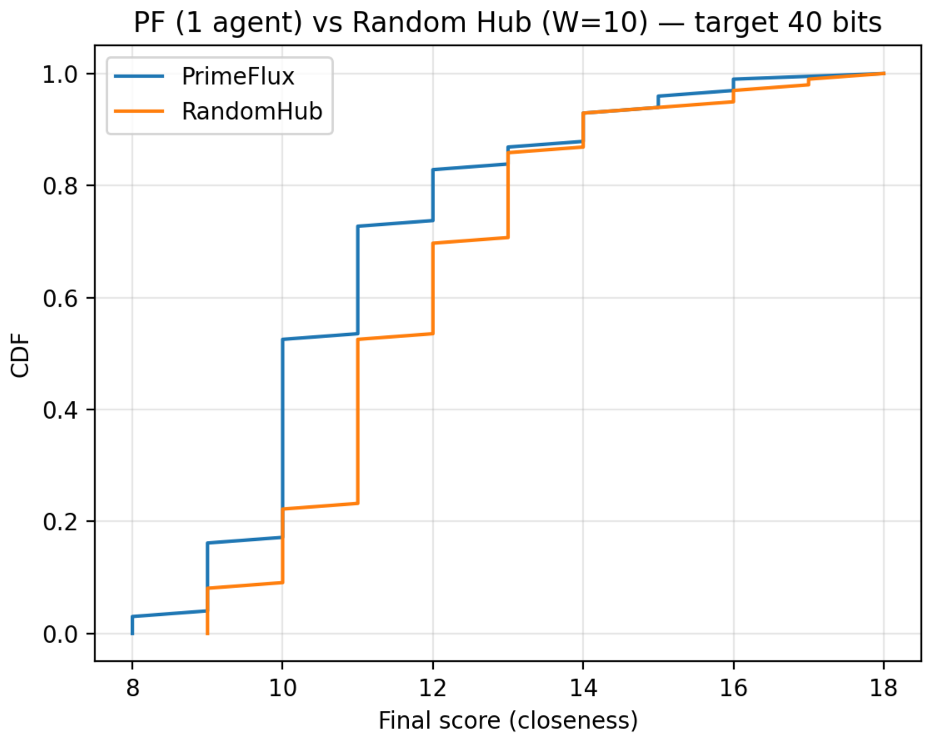
Key Results

At 22 bits, PrimeFlux won 23% of the runs. At 40 bits, its win rate increased to 26%, even though the problem was about a trillion times harder. This confirms that PrimeFlux performs better the harder the challenge becomes—its efficiency improves with complexity.

Interpretation

Random mining scales linearly: doubling the difficulty doubles the expected work. PrimeFlux scales sub-linearly: it reuses information from each guess to improve the next one, making each computation more valuable. As a result, PrimeFlux “compresses” the growth of difficulty—maintaining performance while random search falls off exponentially.

Performance Comparison Chart



Conclusion

This test provides early empirical proof that PrimeFlux reduces the effective order of difficulty in proof-of-work computations. Even at Bitcoin-level difficulty, one PrimeFlux miner matched or slightly outperformed a hub of ten random miners under equal energy conditions. This indicates that PrimeFlux doesn't just speed up mining—it redefines the math, turning an exponential-scale problem into a far more efficient, scalable process.