AzothSolver Whitepaper 📄

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Abstract

AzothSolver is a performance-focused solver implementation for CoW Protocol, built with Frankfurt-based bare metal infrastructure and optimized for sub-5millisecond execution latency. This document outlines our technical architecture, development approach, and transparent progress toward CoW Protocol's shadow competition entry in Q4 2025.

1. Technical Challenge

CoW Protocol's batch auction system creates a competitive environment where solver performance directly impacts settlement efficiency and user outcomes. Success requires optimizing these key areas:

- **Infrastructure Latency**: Network round-trip time to CoW Protocol infrastructure significantly impacts bid submission timing and settlement opportunities.
- **Routing Efficiency**: Advanced pathfinding algorithms that can identify optimal settlement paths within the auction's time constraints.
- **System Reliability**: Consistent performance under varying network conditions and order volumes.

2. Technical Implementation

Infrastructure Architecture

- **Location**: Frankfurt-based bare metal server optimized for <0.5ms latency to CoW Protocol endpoints.
- **Operating System**: Ubuntu 24.04 with real-time kernel patches for predictable scheduling.
- **Networking**: DPDK-based packet processing with kernel bypass for reduced latency variance.
- **Node Setup**: Local node infrastructure for direct blockchain state access and transaction broadcasting.

Software Stack

- **Core Language**: Rust for performance-critical components with memory safety guarantees.

- **Pathfinding**: Custom graph algorithms optimized for CoW Protocol's batch auction constraints.
- **Monitoring**: Comprehensive telemetry for latency analysis and performance optimization.
- **Testing**: Extensive simulation framework for algorithm validation before deployment.

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3. Development Team

AzothSolver is being developed by an experienced infrastructure engineer with a background in high-performance systems:

- **Lead Developer**: Self-taught engineer with previous experience building and operating large-scale crypto mining infrastructure, cross-chain messaging protocols, and Web3 educational curricula for European institutions.
- **Approach**: Solo development with focus on deep technical understanding and iterative improvement based on real performance data.

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4. System Specifications

Component	Specification
Hardware	High-performance bare metal server (specs optimized for latency)
Operating System	Ubuntu 24.04 + RT kernel
Primary Network	Base (Ethereum L2)
Monitoring Stack	Prometheus + Grafana + PostgreSQL
Execution Environment	Containerized services with custom Rust scheduler

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5. Development Roadmap

Phase 1: Infrastructure Setup (Q3 2025)

- Deploy and configure Frankfurt bare metal server
- Implement monitoring and telemetry systems
- Benchmark latency performance to CoW Protocol endpoints

Success Metric: Consistent sub-5 millisecond latency to target infrastructure

Phase 2: Core Solver Development (Q4 2025)

- Implement basic solver with AMM routing capabilities
- Connect to CoW Protocol shadow competition environment
- Begin performance data collection and analysis

Success Metric: Successful participation in shadow competition with measurable performance data

Phase 3: Algorithm Optimization (Q1 2026)

- Analyze shadow competition performance data

- Implement advanced routing algorithms based on findings
- Optimize for CoW-specific settlement patterns

Success Metric: Demonstrable improvement in settlement efficiency metrics

Phase 4: Network Expansion (Q2-Q3 2026)

- Expand solver capabilities to Ethereum mainnet
- Evaluate additional network opportunities based on CoW Protocol expansion
- Scale infrastructure as needed for multi-network operations

Success Metric: Successful operation across multiple networks with maintained performance

Future Considerations

Long-term development will be guided by:

- Performance data from shadow competition and live operations
- CoW Protocol's roadmap and network expansion plans
- Opportunities for infrastructure optimization and algorithm improvement
- Potential for open-source contributions to the CoW Protocol ecosystem

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Contact & Updates

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Development progress and performance metrics will be shared transparently as we progress through the shadow competition and beyond.