Hedera ($15k Track) | Uniswap ($5k Track) | ENS ($5k Track) | Apache-2.0 Open Source

AegisMM

ENS-Governed Autonomous Market Maker with Uniswap Execution Guardrails & Hedera HCS SHA-256 Verifiable Audit Trails

Live Web Console
alphonshhhomenicmtu.github.io/aegismm-agentic-markets/

GitHub Repository
github.com/alphonshhhomenicmtu/aegismm-agentic-markets

1080p Demo Video
youtube.com/watch?v=u7LpbzdVYrQ
(Public · 25/25 Vitest PASS)

Why Unbounded Autonomous Trading Agents Fail in Production DeFi

1. No Runtime Policy Kill-Switch

Hardcoded risk limits inside agent containers cannot be revoked atomically when keys leak or market regimes shift.

- Requires full bot redeploy
- Zero decentralized ownership trail

2. Flash-Crash & MEV Exploitation

Naive quoting bots execute into manipulated spot pools or stale oracles during sudden liquidity vacuums.

- Unbounded `minAmountOut`
- No TWAP circuit breaker

3. Opaque Off-Chain Logs

Local JSON logs can be silently edited or deleted after a bad fill, breaking institutional accountability.

- No cryptographic commitment
- No verifiable reputation score

Deterministic Policy → Execution → Consensus Audit Loop

1. ENS Policy Registry

`ViemEnsAgentRegistry` resolves `agent.aegismm.eth` text records.

`agent.status`
`maxSlippageBps`
`maxTwapDeviationBps`
`hederaTopicId`

2. Risk & Circuit Breaker

`AgentMarketEngine` enforces 4 pre-trade deterministic gates.

1. TWAP Deviation
2. Oracle Staleness
3. Slippage Ceiling
4. ENS Status Active

3. Uniswap v3/v4

Computes `sqrtPriceX96` quote & `minAmountOut` from ENS ceiling.

`@uniswap/v3-sdk`
`@uniswap/sdk-core`
Execute or VETO

4. Hedera HCS Audit

`HederaHcsAdapter` seals canonical JSON with SHA-256.

HCS Topic Submit
Mirror Node Read
Verifiable Reputation

ENS Text-Record Policy Governance & Instant Revocation

Live Viem Resolution (`agent.aegismm.eth`)

- Uses `viem` (`^2.40.0`) for live Sepolia / Mainnet ENS lookups directly from the Web Console.
- Parses typed risk limits: `agent.maxSlippageBps` , `agent.maxTradeUsd` , `agent.maxTwapDeviationBps` , `agent.maxOracleAgeSec` , and `agent.allowedPairs` .
- Stores cross-chain audit pointer `agent.hederaTopicId` inside ENS so any verifier discovers the HCS stream from the agent's ENS name.

Zero-Redeploy Decentralized Kill-Switch

Setting `agent.status = revoked` in ENS immediately halts all Uniswap execution on the next pre-trade check.

0 ms Redeploy

Verified in Vitest Scenario 4 (`RISK_VETOED: ENS_REVOKED`) and live in the interactive Web Console.

`sqrtPriceX96` Math, Fee-Tier Slippage & TWAP Circuit Breaker

Deterministic Uniswap v3/v4 Quoting

- Integrates `@uniswap/v3-sdk` (`^3.31.11`) and `@uniswap/sdk-core` (`^7.22.0`).
- Derives exact execution bounds: `minAmountOut = expectedOut * (10_000 - maxSlippageBps) / 10_000` .
- Models fee-tier price impact (500 / 3000 / 10000 bps) and tracks vault inventory skew (`WETH / USDC`).

Pre-Trade Flash-Crash Protection

Guardrail	Default ENS Cap	Action on Breach
TWAP Deviation	`250 bps`	`RISK_VETOED`
Slippage Ceiling	`50 bps`	`RISK_VETOED`
Oracle Freshness	`120 sec`	`RISK_VETOED`

Immutable HCS Commitments & Mirror Node SHA-256 Audit

`@hashgraph/sdk` + Mirror Node Reader

- `HederaHcsAdapter` submits canonicalized JSON decision records to Hedera Consensus Service (`@hashgraph/sdk ^2.81.0`).
- `HederaMirrorReader` queries `testnet.mirrornode.hedera.com/api/v1` to verify sequence numbers and consensus timestamps.
- `verifyDecisionCommitment` recomputes SHA-256 in-browser and in tests to detect any post-hoc log tampering.

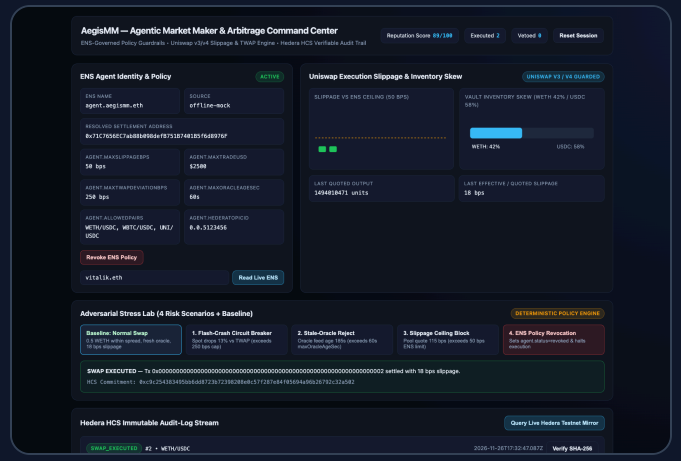
Verifiable Agent Reputation Score

`computeAgentReputation` aggregates `SWAP_EXECUTED` and `RISK_VETOED` records directly from HCS Mirror Node history.

100% Verifiable

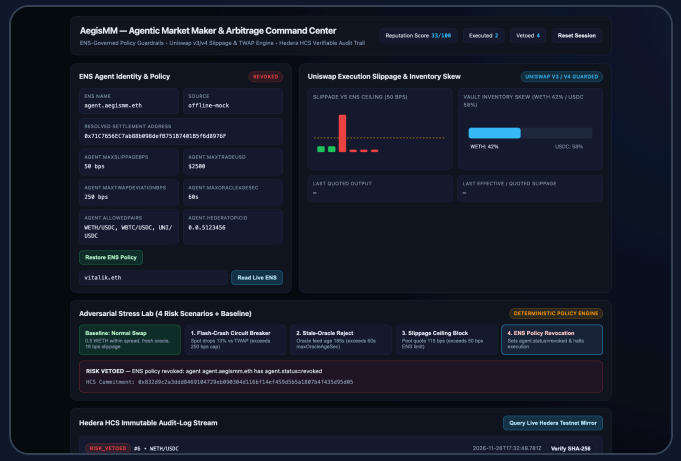
Safe vetoes preserve reputation; tampered commitments fail SHA-256 verification immediately.

Interactive Command Center, ENS Controls & Slippage Telemetry



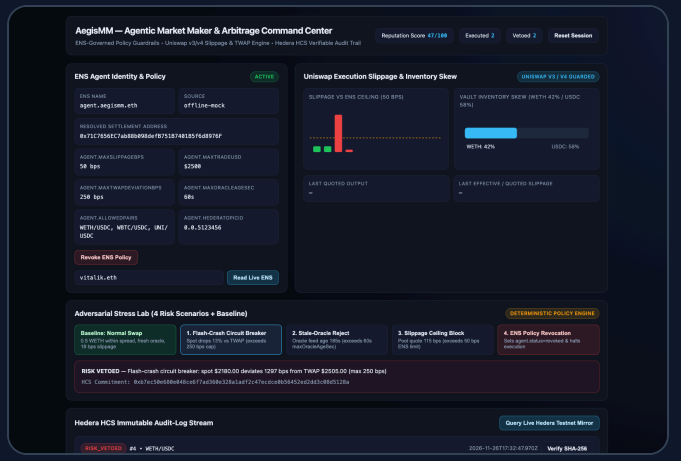
Command Center

Live ENS policy resolution & real-time trade decision feed.



ENS Revocation

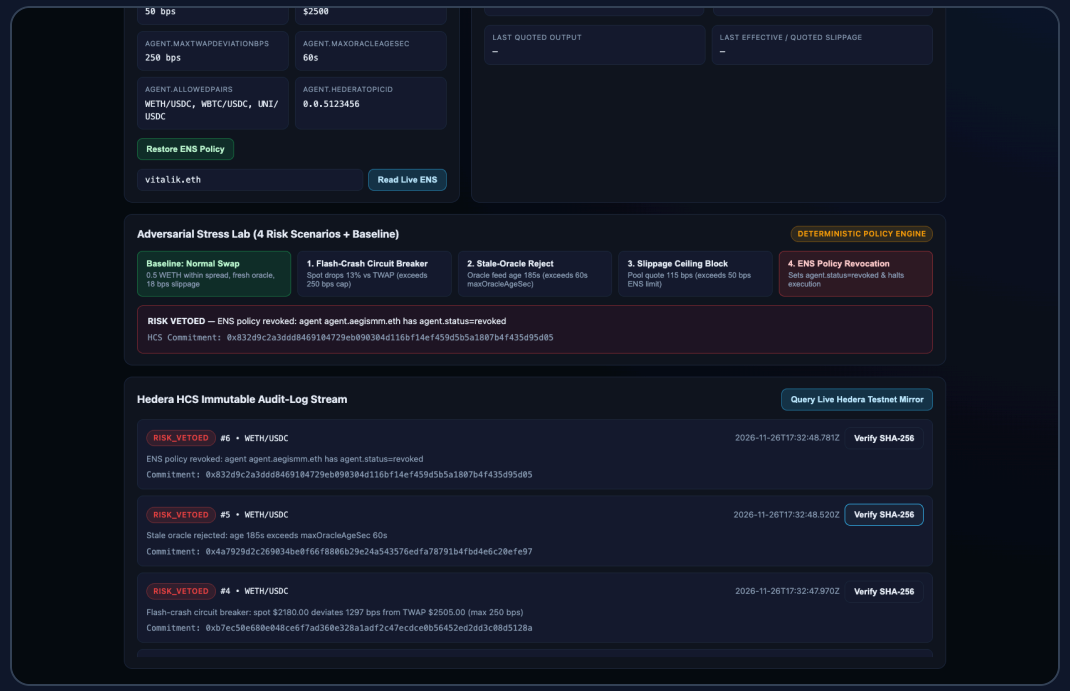
One-click `agent.status=revoked` kill-switch verification.



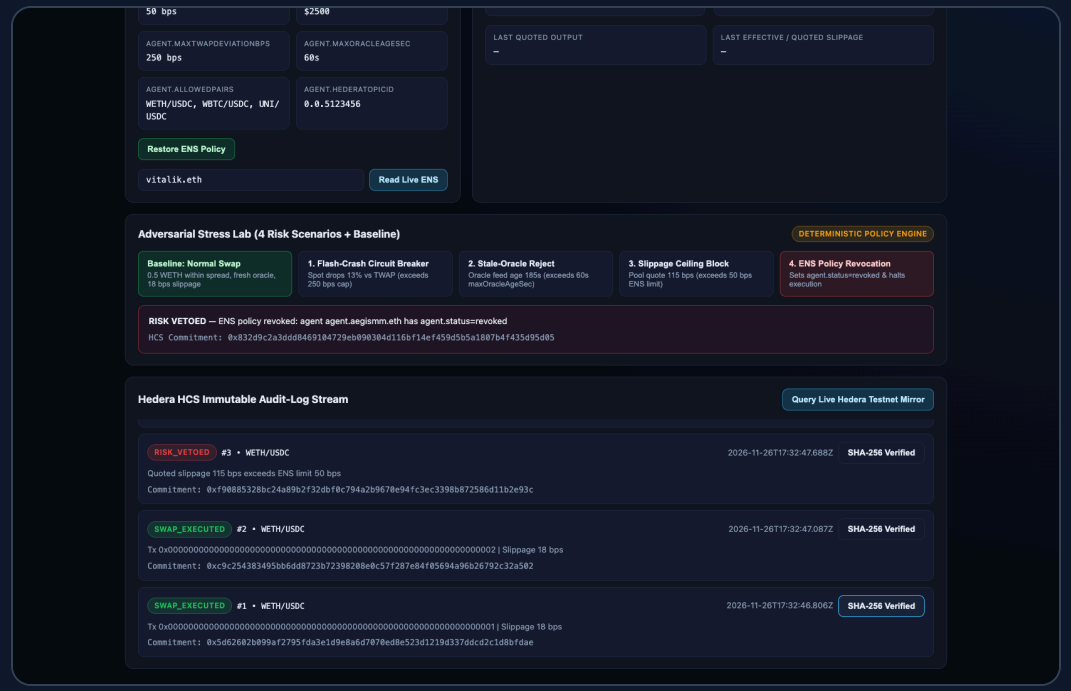
Uniswap Slippage

Execution slippage vs. ENS ceiling & WETH/USDC skew.

4-Scenario Adversarial Breaker Lab & SHA-256 Audit Stream



Flash-crash TWAP, stale oracle, slippage breach & ENS revocation all deterministically vetoed.



Live Hedera HCS SHA-256 commitment verification & Mirror Node reputation stream.

Full-Stack Verification Matrix & Transparent AI Disclosure

Automated Verification (100% PASS)

Check	Result
`npm run typecheck`	PASS (0 TS errors)
`npm run build:all`	PASS (Core + Vite Web)
`npm test` (Vitest)	**25 / 25 PASS**
Headless Chrome QA	0 console / page errors
YouTube 1080p Demo	Public · oEmbed HTTP 200

Explicit AI-Tool Disclosure

In accordance with ETHGlobal rules, LLM coding assistants were used for TypeScript/React refactoring, Vitest generation, and demo-video scripting.

All architecture design, ENS policy schemas, Uniswap TWAP/slippage math, Hedera HCS hashing, and all 25/25 test assertions were reviewed and verified by the human builder.

Open-Source Artifacts & Production Roadmap

Live Links (Apache-2.0)

- **GitHub**: `github.com/alphonshhhomenicmtu/aegismm-agentic-markets`
- **Live Console**: `alphonshhhomenicmtu.github.io/aegismm-agentic-markets/`
- **YouTube 1080p**: `youtube.com/watch?v=u7LpbzdVYrQ`
- **This Deck (PDF)**: `.../aegismm-architecture-deck.pdf`

Mainnet & Uniswap v4 Hook Roadmap

- **Phase 2**: Deploy Uniswap v4 `beforeSwap` Hook enforcing ENS policy signatures on-chain.
- **Phase 3**: Multi-agent HCS reputation staking & automated liquidity rebalancing across Base/Arbitrum.