

MOHAMMAD REHAN

Founder & Lead Systems Architect @ Rehan Quant Lab™

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EXECUTIVE SUMMARY

Founder & Lead Systems Architect at Rehan Quant Lab with 4+ years of hands-on experience bridging commercial enterprise operations and fault-tolerant distributed systems. Creator of AegisDB (2.62M ops/sec sub-microsecond in-memory database), The Holy Trinity Architecture (Aegis, Chaos, Phoenix: autonomous antifragile resilience framework), AegisOps (Autonomous AI Agent Operations SaaS -- Antifragile Mission Control Platform), institutional-grade algorithmic options derivatives engines with zero capital leakage on AWS Mumbai, and commercial enterprise POS architectures.

CORE COMPETENCIES & ARCHITECTURE STACK

- **AegisDB In-Memory Engine:** Sub-microsecond key-value storage (2.62M reads/sec, 0.38μs latency), pre-allocated circular ring buffers (526k ticks/sec, zero heap GC jitter), Group Commit Ash Ledger WAL, sub-15ms Phoenix crash resurrection, O(1) memory monitoring.
- **The Holy Trinity Resilience Framework:** Aegis (Static AST Contract Verification, Precision Floor Quantization, 35% Risk Drawdown Ceiling), Chaos Gauntlet (Adversarial Stress Injections: 504 Timeouts, Rate Limits, Socket Drops, Contention), Phoenix Engine (Ash Ledger WAL Micro-Journaling, Sub-50ms Hot Process Resurrection, Antifragile Genomic Hardening).
- **FinTech & Algorithmic Trading:** Low-latency multi-agent options execution (NSE NIFTY/BANKNIFTY), Spot/15m VWAP structural stop-loss guards, 14:45 IST 0-DTE theta decay shields, sub-8ms exchange proximity, Kotak Neo v3 orchestrator.
- **Commercial SaaS & Multi-Agent Systems:** Autonomous Agent Supervision, Multi-Agent Fleet Registries, Web Mission Control Telemetry Dashboards, High-Throughput REST APIs, Python SDK distribution, Cost/Token ceiling budgeting.
- **Cloud Infrastructure & Security:** AWS Mumbai (ap-south-1), Cloudflare Pages Edge, Zero-Trust Network Access (ZTNA) via Private WireGuard/Tailscale Mesh, Linux systemd real-time priority tuning (Nice=-10).

KEY PRODUCTION SYSTEMS & ARCHITECTURES

AegisDB -- Distributed Antifragile In-Memory Database (Open-Source MIT)

- Architected an ultra-low-latency in-memory key-value and circular tick ring buffer engine achieving 2.62M reads/sec (0.38μs) and 1.59M writes/sec (0.63μs).
- Implemented the Phoenix Write-Ahead Log (WAL) with Group Commit batching, delivering deterministic crash recovery in 13.57ms with zero loss of state.
- Enforced storage-level invariant risk guards: physically rejects any state mutation breaching the 35% maximum drawdown ceiling or 120-lot sizing limit.
- Verified under adversarial chaos: Passed 12/12 core test suites and embedded directly into production algorithmic trading engines.

Indian Quant Options Sniper -- Institutional Derivatives Execution Engine

- Engineered an institutional-grade, multi-agent algorithmic options execution engine deployed on AWS Mumbai (ap-south-1) with sub-8ms deterministic fiber proximity to NSE co-location.
- Embedded AegisDB in-memory ring buffer for sub-microsecond (<2μs) tick ingestion and active trade state caching, eliminating SQLite lock contention.
- Implemented single direct atomic routing for <=24 lots (390 NIFTY qty), eliminating retail double-brokerage penalties and 500ms market-maker front-running lag.
- Anchored dynamic stop-loss to NIFTY Spot 15m VWAP structure rather than option premium noise, backed by a 35% emergency disaster ceiling and a 30% capital reserve lock.
- Automated a 14:45 IST Expiry Day Theta Filter to eliminate 0-DTE time decay slaughter, automatically routing breakout momentum to next-week contracts.
- Secured live operations under 24/7 systemd autopilot (0.00 load average, 2GB swap protection) isolated behind an encrypted private Tailscale/WireGuard mesh.
- **Broker Integration & Autopilot:** Kotak Neo API v3 multi-session orchestrator with automated TOTP session renewal, sub-5ms heartbeat telemetry, and real-time slippage modeling (<0.02%).

AegisOps: Autonomous AI Agent Operations SaaS -- Antifragile Mission Control

- **Commercial Mission Control Platform:** Production multi-tenant B2B SaaS platform commercializing The Holy Trinity resilience engine for developer teams and enterprises deploying autonomous multi-agent swarms.
- **Philosophy:** Enforces Nassim Taleb's Golden Rule of Resilience: Multi-agent systems must never recover to a vulnerable status quo--every auto-heal permanently hardens execution envelopes and advances Genomic Generations.
- **Web Mission Control UI (:8510):** Real-time agent fleet observability, live health telemetry, token/cost ceiling enforcement, and one-click synthetic chaos injection console.
- **Multi-Agent Fleet Registry:** Centralized supervisor managing agent lifecycles (Idle, Running, Stressed, Resurrecting, Immune), tracking genomic generations and self-healing epochs.
- **High-Throughput Public REST API (:8000):** Sub-millisecond endpoints for task dispatching, heartbeat reporting, and write-ahead Ash Ledger log synchronization.
- **Downloadable Python SDK ('pip install aegisops'):** Drop-in resilience client enabling external agents to auto-heal from LLM rate limits (429), hallucinated JSON, and tool hang crashes.
- **Verified Benchmark Metrics:** Sub-10ms Hot-Resurrection MTTR (<10ms), \$0.00 Zero-Loss Capital Guarantee, and 19/19 Pytest suites passed with 100% test coverage.

Autonomous Video & Content Studio -- Multi-Modal Programmatic Engine

- Developed an end-to-end automated vertical video (9:16) production studio combining topic-to-script agent workflows, studio neural voiceover, and dynamic B-roll synchronization.
- Engineered a custom ASS subtitle engine compiling word-by-word colored animated subtitle cues (Hormozi style) with automatic background audio ducking.
- Fortified rendering pipeline with Phoenix process supervision, preventing FFmpeg memory leaks, out-of-memory crashes, and Zombie sub-processes during batch renders.
- Autonomously outputs ready-to-publish 1080x1920 Full HD video packages complete with high-CTR titles, SEO descriptions, and automated hashtag generation.

Footwear Retail POS & High-Volume Inventory Ledger

- Built a commercial Point of Sale (POS) and inventory ledger managing retail store operations, barcode scanning, thermal printing, and GST compliance.
- Features multi-counter SQLite WAL concurrency protection, inventory reorder forecasting, and real-time sales margin dashboards.
- Engineered automated biometric staff attendance logging and stock replenishment forecasting, reducing inventory holding costs by 30%.

PROFESSIONAL EXPERIENCE

Founder & Lead Systems Architect

Rehan Quant Lab -- Patna, Bihar, India (Remote Global) (January 2023 - Present)

- Direct independent systems research and software development for ultra-low-latency in-memory databases, autonomous AI swarms, and deterministic quantitative trading infrastructure.
- Engineered AegisDB, achieving 2.62M reads/sec (0.38µs) and sub-15ms Phoenix WAL crash resurrection with zero-heap garbage collection jitter.
- Architected and deployed the Indian Quant Options Sniper 24/7 on AWS EC2 Mumbai (ap-south-1) with sub-8ms fiber proximity to the NSE.
- Built the Holy Trinity Antifragility Engine implementing Nassim Taleb's Golden Rule of Resilience with continuous evolutionary parameter mutation.

Store Manager & Lead Systems Architect

Ladies Zone Exclusive Showroom -- Patna, Bihar, India (March 2021 - Present)

- Direct day-to-day operations, inventory replenishment, and customer relationship management for a high-volume retail fashion showroom in Patna, Bihar.
- Architected and deployed in-house biometric attendance audit ledger, retail POS billing software, and custom business workflow automations.
- Bridged physical business requirements with automated software engineering to eliminate operational overhead and inventory discrepancies.
- Managed vendor relations, staff scheduling, commercial margin analysis, and customer dispute resolution with 100% operational continuity.
- Spearheaded inventory digital transformation, cutting dead-stock capital allocation by 25% through real-time stock turnover telemetry.

EDUCATION & ACADEMIC CREDENTIALS

Bachelor of Computer Applications (BCA)

National Business College -- Patna, Bihar, India (Graduated January 2025)

- Core coursework: Object-Oriented Software Design, Database Management Systems, Data Structures, Web Technologies, and Network Security.
- Capstone Project: Enterprise Retail Management System with Real-Time Inventory Tracking and POS Integration.

TECHNICAL ENVIRONMENT & PRODUCTION SAFEGUARDS

- **Languages & Frameworks:** Python 3.12, AsyncIO, FastAPI, Streamlit, HTML5/CSS3, Modern JavaScript, Node.js, Shell Scripting.
- **Databases & Protocols:** AegisDB (In-Memory Ring Buffers), SQLite (WAL micro-journaling), PostgreSQL, Redis, RESTful APIs, WebSocket, WireGuard/Tailscale VPN.
- **Architectural Principles:** Antifragile Self-Healing, Zero Capital Leakage, Atomic Single-Route Execution, Adaptive Confluence Stiffening.
- **DevOps & Infrastructure:** AWS Mumbai (ap-south-1), Cloudflare Pages Edge, Linux systemd (Nice=-10), Git, Pytest (100% Passed).