

Himanshu Mishra

Senior Software Engineer — Multi-Runtime Systems — Distributed Computing — Cloud & DevOps

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Professional Summary

Senior Software Engineer with 4+ years building high-performance distributed systems in **Go** and **Node.js**. Primary architect of Rival.io's **Cortex Universal Execution Engine** — a multi-tier FaaS platform executing untrusted Python/JS/Lua/WASM/CUDA across containers, **Firecracker microVMs**, and VM sandboxes on **NATS JetStream** — and author of its **MCP execution service** powering AI agent and workflow authoring. Previously **sole engineer** on EI Networks' multi-tenant biometric platform across seven enterprise and government deployments. Strong in system design, sandbox/isolation security, and measurement-driven performance work.

Core Skills

- **Languages:** Golang, TypeScript, JavaScript, Python, Lua
- **Runtimes & Protocols:** Node.js, WASM, gRPC, MCP, REST, GraphQL
- **Databases:** MySQL, PostgreSQL, MongoDB, Redis
- **DevOps & Cloud:** Docker, Podman, Firecracker/KVM, Terraform, AWS, GCP
- **Messaging:** NATS JetStream, MQTT, WebSocket
- **Frontend:** React.js, Angular, Tailwind CSS
- **Systems:** Linux, Distributed Systems, Sandbox Security
- **Other:** AI Agents & Workflows, LLM Infra, Web3

Professional Experience

Senior Software Engineer *Rival.io* *Sep 2025 – Present*

- Primary architect (**540+ commits**, top contributor) of the **Cortex Universal Execution Engine (UEE)** behind **CortexOne** — a multi-tier FaaS platform running **Python, JS/V8, Lua, WASM, and CUDA** across Docker, Podman, Firecracker microVMs, and full-VM sandboxes.
- Built the **Firecracker microVM runtime** (kernel-level isolation per invocation, closing the container-escape/runc CVE surface for untrusted code; concurrent cold-boot cut via shared read-only rootfs with copy-on-write overlays) and the **interactive VM sandbox** tier — SSH sessions with per-sandbox host keys and a dual-backend session store.
- Built the **NATS JetStream** job-delivery layer — **at-least-once delivery with exactly-once processing**, backpressure, and zone-aware routing across GCP/AWS/Azure.
- Top contributor (**450+ commits**) to **Cortex Connect**, the execution gateway — migrated the hot path Lua → Go, added gRPC connection pooling, memory-aware routing, and the autoscaler; fixed balance-guard races in metering.
- Built the **MCP (Model Context Protocol) execution service** end-to-end in Go and the **agent function-invocation API** — powering **AI agent & workflow authoring** on the CortexOne platform.
- Profiled production PostgreSQL: traced **40% of instance query time** to one 5s polling loop running an unbounded COUNT(*), deferring a tier upgrade until the fixes shipped.
- Implemented **zero-trust security** (SSRF-resistant egress guard blocking cloud-metadata endpoints, process hardening, AES-256-GCM licensing) and **Terraform IaC** for multi-zone GCP.

Backend Engineer *EI Networks Pvt. Ltd.* *Jul 2022 – Sep 2025*

- **Sole engineer (1,500+ commits)** on **Attendance Middleware AMS** — a multi-tenant biometric platform for enterprise and government clients (UNO Minda, HPSEBL, Kalpataru, Veris); owned database-per-tenant sharding, MySQL range partitioning, Redis + in-process caching, and **hardware capacity planning** for new deployments. **Load-tested to 10M+ employee records across 1M+ simulated devices**.
- Built **SmartListener** — a WebSocket server **load-tested to 20,000+ concurrent connections** for IVR services on uWebSockets.js, made horizontally scalable by moving all connection state into Redis.
- Replaced a Python MQTT middleware with an integrated Node.js service for **100K+ face-recognition devices** (20M+ monthly events); **cut punch sync 4s → 400ms (10×)** by decoupling device acknowledgement from synchronous image persistence, ending a retransmit feedback loop.
- Modernized the legacy Angular 7 frontend (**+40% performance**) — built a React 18 replacement, then consolidated the platform on **Angular 19** standalone components; achieved **STQC certification** via security hardening.
- Migrated license server AWS → on-prem, rewriting encryption in Node.js to cut infra costs.

Critical Recovery Cases: **HPSEBL** — recovered a non-booting air-gapped server with no backups; **UNO Minda** — migrated a **50M+ row** database to a new server in 3 hours; **Kalpataru Group** — reconstructed all employee data from CSV after an accidental “Delete All”.

Backend Developer Intern *EI Networks Pvt. Ltd.* *Feb 2022 – Jul 2022*

- Configured Nginx, SSL, and load balancing on AWS EC2; built attendance-reporting APIs with Node.js & Express.

Node.js Developer Intern *Frshr Technologies* *Dec 2021 – Feb 2022*

- Built an ROI Calculator (role-based access, Excel export, automated email) with logging and monitoring.

Key Projects

- **CortexOne Execution Engine** cortexone.rival.io *Rival.io*
- **Elixia (Web3)** — decentralized document authentication on Ethereum smart contracts. elixia.vercel.app

Education

• **B.Tech in Computer Science Engineering** — CGPA 7.42 *CCS University, Meerut* *2018 – 2022*

Certifications & Awards

- **Encouragement Award + Grant** — Startup Cell, SRIET, CCS University for Elixia (Web3 platform)
- **Arctic Code Vault Contributor** — GitHub (code preserved for future generations)
- **AWS Solutions Architect Associate** — Udemy
- **Computer Networks & Internet Protocol** — NPTEL

Links

- github.com/HimanshuMishir
- [</> leetcode.com/HimanshuMishir](https://leetcode.com/HimanshuMishir)
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