Mridul Balani

Software Engineer
Full-stack, infrastructure, security & agents

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Professional Experience

- **Analytiqo** *December 2025 - Present*
  Founding Engineer | Contract **Website**
  - Own end-to-end engineering across full-stack web, backend APIs, mobile apps, CI/CD, infrastructure, and production operations. Build commerce, booking, membership, and internal operations systems with React, Next.js, Capacitor, Hono on Bun, PostgreSQL with Drizzle or Prisma, Docker, and GitHub Actions.
  - Adapted **stay-liquid** to render a native iOS 26 Liquid Glass tab bar above a React app running in Capacitor's WKWebView. Added Swift Package Manager support and two-way navigation between native tab events and React Router, allowing one React codebase to ship across web, the iOS App Store, and Android. Also implemented Stripe billing, Amazon SES email, ClickSend SMS, push notifications, localization, and legacy data migrations.

- **Heurist.ai** *January 2025 - June 2026*
  Software Engineer | Contract **Website**
  - Built Heurist's **Model Context Protocol (MCP)** interface for Cursor, Windsurf, Claude Desktop, and other LLM clients. Created a **CLI utility** for installing SSE-powered MCP tools and an **agent Skill** exposing 30+ mesh agents to Claude Code and other coding agents.
  - Built the developer platform around **Heurist Mesh**: API-key management, Stripe billing, usage analytics, an agent API playground, and a unified sign-in widget with email authentication and anti-spam controls.
  - Led the **Heurist Agent Framework** and its production infrastructure, using Docker Swarm and GitHub Actions CI/CD for safe, repeatable deployments. Built agents integrating with AAVE, Zerion, Solana, Twitter, and Truth Social.
  - Led full-stack development of **Ask Heurist**, building resumable streaming chat with the Vercel AI SDK, chat sharing, x402 payments, usage quotas, unified web and wallet authentication, and the product's CI/CD and deployment infrastructure.
  - Contributed to **Imagine**, an image generation platform powered by Heurist models, adding smart generation and Hunyuan video models; also built the frontend for **Heurist Finance**, an AI finance chat product, with full English and Chinese localization.

- **Lilypad Network** *June 2025 - August 2025*
  Software Engineer | Contract **Website**
  - Built the high-availability backup inference system for **Anura**, **Lilypad**'s AI inference API on a decentralized GPU network: a LiteLLM-based failover proxy with fallback mechanisms in the Go API for both chat and image completions, covering streaming response mapping, timeouts for stuck LLM jobs, and response normalization to stay consistent with the primary network.
  - Instrumented the fallback path with OpenTelemetry metrics and observability dashboards, deployed services to EC2 with CI/CD auto-deploy pipelines, and hardened the admin service with API key auth and Cloudflare tunnels.
  - Implemented reputation tracking for job lifecycle events across the network's solver, surfacing per-module reputation events through the stats API to enable reliability scoring of compute providers.

Projects

- **Kleis** *February 2026*
  TypeScript **GitHub**
  - Built a multi-provider authentication gateway for **OpenCode** and other coding agents, unifying GitHub Copilot, OpenAI Codex, and Anthropic Claude behind one API with centralized OAuth credentials, automatic token refresh, and scoped client keys.
  - Implemented protocol adapters that normalize provider-specific headers, parameters, tools, and streaming responses; added a models.dev-compatible discovery registry and non-blocking request analytics outside the proxy hot path.

- **Local Diffshub** *May 2026*
  TypeScript **GitHub**
  - Built a local-first take on Pierre's **Diffshub** for reviewing private repositories and worktrees, with virtualized branch, commit, staged, and unstaged diffs rendered through a Shiki WASM worker pool sized to available CPU cores.
  - Built a read-only Bun and Hono Git backend with bounded subprocesses, output and timeout caps, origin checks, constant-time authentication, and live review updates over Server-Sent Events.

- **s3enum-ng** *July 2026*
  Go **GitHub**
  - Rebuilt **s3enum** in Go as a faster, compatible replacement. It generates likely bucket names from company names, wordlists, and suffixes, then supports DNS-only scans, HTTP existence checks, and checks for buckets that allow public listing.
  - Wrote the DNS implementation from scratch, including query encoding, compressed CNAME parsing, concurrent queries across Amazon S3's authoritative nameservers, and resolver failover. Fixed s3enum's us-east-1 blind spot by checking AWS HTTP statuses, redirects, and region headers.

- **Vulpix** *May 2025*
  Next.js & PolkaVM **Deployment** | **GitHub**
  - Built an NFT battle platform on Polkadot AssetHub combining AI-generated artwork with strategic turn-based combat, winning 1st Place ($1,500) at DoraHacks' **Polkadot AssetHub Hackathon**.
  - Engineered Ethereum-compatible smart contracts executed through PolkaVM for on-chain battle logic, with NFT creation, ownership, and management handled on AssetHub.

- **flora** *November 2024 - Present*
  Go, Rust & React **Website** | **GitHub**
  - Co-run an open source collective building web utilities, including Go microservices for avatar and placeholder-image generation, a Rust analytics suite, and **orchid**, a lightweight image editor with AI background removal and a Flask backend.

- **Infobahn CTF'25 & CSCTF'24** *2024 - 2025*
  Security Infrastructure **Infobahn** | **CSCTF**
  - Led infrastructure for Infobahn CTF'25, serving 10,000+ players across 800+ scoring teams and millions of requests during event weekend; secured Google Cloud infrastructure and a $5,000+ prize pool with OffSec, OtterSec, RET2 Systems, Cybersharing, and Rapid Risk Radar.
  - Led infrastructure for CSCTF'24, serving 5,000+ participants and securing Google Cloud infrastructure plus $5,000+ in rewards from OtterSec, Intigriti, OffSec, and other sponsors.
  - Built CTFd and kCTF challenge infrastructure across GKE and dedicated VMs with autoscaling and NSJail isolation, plus a custom per-player orchestrator with dynamic flags and real-time flag-sharing detection.

Open Source & Security

- **Open Source**: Contributed upstream to Coinbase's **x402** payments protocol, including early JavaScript runtime-compatibility work, alongside patches to Vercel's core codebase, OpenCode, NousResearch's Hermes, and vercel-labs projects.
- **Competitive CTF**: Player since 2023; formerly competed with **CyberSpace**, a top-five CTFtime team, and with **Infobahn**, globally top 10 in 2025 and 2026 and currently ranked #4. Back-to-back winner of **Superteam CTF** (1st Place, 2025 and 2026), leading to selection for a **Superteam Talent Spotlight**.

Technical Skills

- **Languages**: TypeScript, JavaScript, Go, Python, Bash, SQL
- **Application Development**: Bun, React, Next.js, Vite, React Router, Capacitor, Hono, FastAPI, Flask, Tailwind CSS
- **Developer Tooling**: Git, CLI development, package and release automation, local-first applications, Web Workers, file-system watchers
- **Data**: PostgreSQL, Redis, SQLite, Drizzle ORM, Prisma, Zod
- **Infrastructure & DevOps**: AWS, Google Cloud, Kubernetes, Docker, Docker Compose, Docker Swarm, GitHub Actions, Terraform, Cloudflare, Nginx, Vercel, OpenTelemetry, Linux
- **AI & Agents**: Agent development, MCP integrations, model/provider APIs, tool calling, Vercel AI SDK, LiteLLM
- **Security & Systems**: HTTP, DNS, OAuth/OIDC, container isolation, CTFd, kCTF, NSJail, reverse engineering, web application security

Education

- **Bachelor of Computer Applications**
  Bharati Vidyapeeth Deemed University