

# Amar Mahato

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## PROFILE

Backend-focused Software Developer with hands-on experience building distributed systems, event-driven architectures, and security tooling. Proficient in **TypeScript, Python, and Go** with practical experience in microservices, message queues (RabbitMQ), and API development (REST, WebSocket, gRPC). Designed and built backend systems spanning real-time data pipelines, RAG workflows, envelope encryption, and binary analysis tooling. Comfortable working across the stack but strongest in system design, database modeling (PostgreSQL, MongoDB), and backend services. Currently pursuing B.Tech in Computer Science at Dr. B.C. Roy Engineering College.

## PROJECTS

- Concize** | *Node.js, RabbitMQ, Cerebras, Sarvam AI, Groq, Gemini, Qdrant, MongoDB* [GitHub](#)
- Led **backend design** as part of a 2-person team; owned the transition to an event-driven microservice architecture, decoupling HTTP audio chunk ingestion from heavy AI workloads using RabbitMQ to eliminate pipeline bottlenecks.
  - Engineered a **Hybrid LLM-Based Chunking RAG Pipeline**; utilized Sarvam AI for bulk transcription and Cerebras/Groq to synthesize semantically coherent, speaker-aware narratives embedded into Qdrant via Gemini.
  - Guaranteed global meeting timeline precision across distributed workers by implementing a custom *x-audio-offset* header to seamlessly synchronize asynchronously uploaded audio chunks sent from the Chrome Extension.
  - Implemented **Defense-in-Depth LLM Security**: atomic MongoDB locking for strict sequential data consistency, multi-key API rotation with exponential backoff, prompt guardrails, and relevance filtering.
- Wombat** | *TypeScript, Next.js, Express, Go, Google KMS, Supabase, Prisma* [GitHub](#)
- Led backend design and development as part of a 2-person team (frontend by co-developer); designed the overall system architecture, security model, API contracts, and authentication flows (JWT, RBAC, Zod validation).
  - Built a **secrets management platform** enabling secure API credential injection and rotation without application redeployment, serving real-time usage analytics through RESTful APIs.
  - Implemented **envelope encryption using Google Cloud KMS**, encrypting keys at the application layer before database storage via Prisma ORM, ensuring credentials are never stored in plaintext.
  - Developing a **high-performance proxy service in Go** for granular API traffic interception, rate-limiting, and usage metering, with SDK wrappers for multi-provider integration (Gemini, MongoDB).
- Headless Ghidra MCP** | *Python, Java, Ghidra, MCP, Capstone, pefile* [GitHub](#)
- Built a **cross-platform MCP server** enabling LLM clients to perform automated binary analysis, decompilation, call-graph traversal, and malware triage without Ghidra's GUI; fully functional and actively being extended with new analysis tools.
  - Designed a **Python-Java bridge** with a custom Ghidra script that serializes functions, strings, imports, exports, and cross-references into cached JSON, enabling stateless analysis across sessions.
  - Built **high-speed native inspection tools** using Capstone disassembly, PE/ELF parsing, and mmap-based regex search to complement Ghidra's deep analysis with sub-second triage on large binaries.
  - Ongoing work focuses on expanding tool coverage, improving analysis depth and accuracy, and scaling capacity for larger and more complex binary files; includes a 60-test automated suite with full Windows/Linux compatibility.

## TECHNICAL SKILLS

**Languages:** TypeScript, JavaScript, Python, Go, Java, SQL, HTML/CSS  
**Backend & APIs:** Node.js, Express.js, FastAPI, RabbitMQ, gRPC, REST APIs, WebSockets, JWT, OAuth2  
**Frontend Development:** React.js, Next.js, Tailwind CSS, Chrome Extension API, SSE  
**Database & Storage:** PostgreSQL, MySQL, MongoDB, Redis, Supabase, Prisma ORM, NeonDB  
**AI & NLP:** RAG Pipelines, LLM Tool Use (MCP/LangChain), Vector Search (Qdrant), Whisper V3, Gemini/Groq SDKs  
**DevOps & Security:** Docker, AWS (EC2/S3), GitHub Actions (CI/CD), Render, Vercel, Nginx, Linux, Google KMS, Zod, Jest

## EDUCATION

<b>Dr. B. C. Roy Engineering College</b> <i>Bachelor of Technology, Computer Science and Engineering</i>	Durgapur, West Bengal, India
<b>Beachwood School</b> <i>Higher Secondary</i>	Durgapur, West Bengal, India