

Abdul Rafay Zahid

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PROFESSIONAL SUMMARY

Backend and systems engineer with ~3 years on production infrastructure: C++ networking, Python/FastAPI services, and streaming data pipelines. Scaled a C++ TLS gateway from 200 to 5,000 concurrent clients, and built solo a 131K-line email platform now sending 200K+ messages a day across 1,000+ domains. The work I like best is where the documentation is wrong and the fix is three layers down, in the connection pool or the event loop or the index.

WORK EXPERIENCE

Softaims

May 2025 - Present

Software Engineer | Lahore

- Built an enterprise email infrastructure platform solo, **131K LoC in ~2 months**: a FastAPI + PostgreSQL + Redis + Celery control plane driving KumonMTA edge nodes across multi-region VPS, running at **200K+ emails/day across 1,000+ domains** and beating the Salesforce tool it replaced on campaign response rates.
- Wrote the per-node agent daemon (polls the control plane every 5s, injects over local SMTP, tails MTA logs, reports bounces and deliveries) plus the deliverability layer: SPF/DMARC/DKIM publishing, bulk chunked DNS with partial-failure handling, Redis-locked warmup cycles, blacklist monitoring. Domain onboarding went from hours to minutes.
- Kept the data layer fast under load: async SQLAlchemy with tuned pools, a send-log time-series fact table across 87 migrations, single-scan conditional aggregation instead of eight, and `SELECT ... FOR UPDATE SKIP LOCKED` batching in the workers.
- Before that: a RAG recommendation engine over student profiles (Next.js, OpenAI embeddings), Playwright scrapers pulling 10,000+ records/day, and a LangChain agent framework for internal research tools.

Ebryx

Jun 2024 - Apr 2025

Associate Software Engineer | Lahore | invisily.com

- Scaled a C++ TLS WebSocket gateway from **200 to 5,000 concurrent clients** through connection pooling, network I/O and memory work, and a threading redesign.
- Got the C++ ZTNA client running on Solaris for a banking client after the task had stalled between engineers: the vendor's tunnelling API docs were wrong, so I reverse-engineered the real behavior against the OS. Also ported the gateway from x86-64 to ARM for an on-premises deployment.
- Built the Kafka pipeline behind a multi-tenant device profiler, carrying packet-level telemetry for both model training and live inference; the risk scores fed access-policy decisions in real time.
- Re-architected policy evaluation from cron to event-driven, **cutting database load 29%** (cProfile); replaced MySQL pooling with RAII-style context managers to end pool exhaustion.

Active Takeoff

Nov 2023 - Apr 2024

Software Engineer | Remote

- Wrote a custom OCR pipeline to parse tabular data out of scanned construction blueprints into MySQL, and indexed the result in Elasticsearch for sub-millisecond search across 10,000+ documents.

PROJECTS

NPI Discovery Service

Search and bulk-export over the public NPPES registry of US healthcare providers. The interesting part is the partition-aware collector: it splits by provider type, then recursively narrows by postal prefix until each leaf query fits under the upstream result ceiling, and reports incomplete partitions in response metadata instead of silently truncating. Redis caching, WebSocket-streamed job progress across API instances, Terraform deploys.

NestJS | Next.js | TypeScript | Redis | Terraform | github.com/Sarb0Z/npi-discovery-service

Balloon Game in 8086 Assembly

DOS text-mode animation written straight to the CGA video buffer at segment 0xB800 with no BIOS or DOS print calls, hooking the IRQ 0 timer through the interrupt vector table to drive a live tick counter.

x86 assembly | github.com/Sarb0Z/balloon-game-8086

Music Tools

Discord bot streaming a GitHub-hosted music library with no local storage: ffmpeg transcode to 16-bit PCM at 48 kHz, next-track preloading to avoid dropouts. A separate terminal player is where I have been learning Rust, tokio and async streaming.

Node.js | ffmpeg | Rust (learning) | github.com/Sarb0Z/music-tools

SKILLS

Languages: Python, C++, TypeScript, SQL, Bash, Rust (learning) **Backend:** FastAPI, SQLAlchemy (async), Celery, NestJS, REST, WebSockets, Cython

Data & Infra: PostgreSQL, Redis, Kafka, Elasticsearch, MongoDB, Docker, Linux, Terraform, AWS, GCP

AI/ML: LangChain, OpenAI embeddings and RAG, PyTorch, OpenCV, NumPy, Pandas **Tools:** Git, GitHub Actions, Playwright, cProfile

EDUCATION

B.S. Computer Science - FAST NUCES

Aug 2020 - Jun 2024

Coursework: Parallel and Distributed Computing, Advanced Database Concepts, Computer Vision, AI. Final-year project: a real-time OpenCV facial-expression pipeline with a CNN trained from scratch on FER2013, exported to ONNX for on-device inference.