

KOFI FRIMPONG

Software Engineer · Backend, Full Stack, AI Systems & Platform Architecture

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Backend and AI systems engineer with **5+ years** building production software, most of it as the person owning technical direction at early-stage companies. Architected and built a **15-service event-driven platform** in Python/FastAPI as sole engineer, and engineers the **NestJS and gRPC engine powering 9 production products**. Ships LLM systems in production: a **GPT-4o agent** extracting structured investment records from live email, three complementary retrieval systems (Pinecone semantic search, LlamaIndex RAG with citations, Gemini File Search), and real-time speech pipelines. Equally at home in **TypeScript and Python**, from schema and infrastructure through to the React/Next.js interface that consumes it, including the observability, migrations, and production incidents nobody volunteers for.

TECHNICAL SKILLS

Languages	TypeScript, Python, SQL, JavaScript
AI & LLM	OpenAI GPT-4o, Google Gemini, LlamaIndex RAG, Pinecone vector search, semantic retrieval, agentic extraction pipelines, Deepgram speech
Backend	Node.js/NestJS, Express, FastAPI, Django/DRF, gRPC, WebSockets, REST, Celery, BullMQ, event-driven architecture
Frontend	React, Next.js, React Native (Expo), Redux Toolkit, TanStack Query, Tailwind, Vite, Module Federation
Data	PostgreSQL, MongoDB, Redis, Apache Kafka/Redpanda, Prisma, Drizzle, SQLAlchemy, Alembic
Cloud & CI/CD	Docker, Kubernetes, Terraform, AWS (EKS, S3), ArgoCD, GitHub Actions, DigitalOcean, MinIO
Observability	OpenTelemetry, Prometheus, Grafana, OpenSearch, Loki, Sentry, structlog
Testing	pytest, Hypothesis (property-based), testcontainers, Playwright, Vitest, Jest, k6

PROFESSIONAL EXPERIENCE

Software Engineer, Digiits Agency

Mar 2026 – Present · Accra · Full-time

- Engineer on **Polaris**, the core platform engine that powers **9 production products**. Polaris packages the shared backend business logic and domain architecture into **33 domain modules**, consumed as an SDK so each product builds on one engine rather than its own stack.
- Polaris internals: NestJS and gRPC microservices, an **Apache Kafka event bus**, PostgreSQL with schema-per-service isolation, SpiceDB access control, and React micro-frontends composed via Module Federation.
- Built the **G-Money** financial-services admin console end-to-end, the operational tool for **8,200+ mobile-money customers** (98.5% active, ~774 new per month): customer management, transaction monitoring, RBAC, audit logging, feature flags, and CSV/PDF export.
- Owned production observability across the platform: **OpenTelemetry distributed tracing over 15+ microservices**, a transaction-error indexing pipeline into OpenSearch with Grafana dashboards, and Loki structured logging with sensitive-data masking on financial paths.
- Migrated the audit-log subsystem from PostgreSQL to OpenSearch and added admin session management with suspicious-activity detection.
- Shipped **two complete frontends for Xplora in under four weeks**: an organiser dashboard and an 18-phase consumer events app (feed, stories, ticketing, live voting, social matching), alongside backend work on promotions, QR door check-in, and Paystack payments.
- Delivered 7 modules of a supermarket POS/PWA, documented and fixed **30+ platform defects** in the shared platform; built the GitHub App integration for Opero with webhook validation and PR-to-task linking.

Full-Stack Engineer, MySapienta

Dec 2024 – Feb 2026 · Contract

Full-stack engineer on a 7-application school-management platform built with Express, Drizzle ORM, PostgreSQL, Redis, and BullMQ in a Turborepo monorepo; owned two frontends end-to-end and a substantial share of the backend API.

- Rewrote the timetable generation engine as a **bounded backtracking constraint solver**: 1.5-second wall-clock deadline checked on a bitmask interval, viability pre-check, per-class double-block budgeting, and graceful degradation to greedy placement, shipped with a dedicated stress-test harness.
- Built **WhatsApp notification infrastructure** from scratch: provider layer, template management, and WhatsApp-first routing with silent automatic SMS fallback so delivery never fails visibly to a school.
- Built the **student and guardian portals end-to-end**: grades with continuous assessment, attendance heatmaps, multi-ward switching, fees and receipts, PDF term reports, and 2FA OTP sign-in.
- Shipped student check-in/check-out with a **verified-collector flow** ensuring a child is released only to an authorised adult; made all apps installable PWAs with background auto-update.

Full-Stack Engineer (Spok), My Creativity Box

Nov 2024 – Jan 2026 · New Zealand · Contract

Top contributor across both repositories of a venture-capital fund-management platform for a New Zealand company, leading the AI and retrieval workstream. Built on NestJS and Nx, PostgreSQL/Prisma, React and Vite.

- Built an **AI email agent** ingesting investment email over a persistent, health-monitored IMAP connection, using **GPT-4o** to extract companies, founders, valuations, and round terms into structured records with confidence scoring, semantic company matching, and duplicate prevention.

- Implemented **three complementary retrieval systems**: Pinecone semantic search with live index synchronisation, LlamaIndex company-scoped RAG returning document and section citations, and Gemini File Search with rate limiting.
- Built a **mark-to-market valuation engine** with multi-currency conversion driven by a scheduled Wise exchange-rate job; shipped an AI reporting suite with Excel/PDF export and conversational regeneration with inline editing.
- Executed a full **Firestore-to-PostgreSQL migration** including file relocation to object storage; ended recurring production deploy failures by making the entire Prisma migration chain idempotent.

Lead Frontend Engineer, Jampolls (formerly Votitude)

Aug 2021 – Oct 2024 · Contract

Lead engineer on the client application across two products over three years, authoring ~80% of commits on the main repository and setting the testing and release standards the team worked to. Platform has processed 5,600+ responses across 675+ live interactive sessions.

- Built **five product surfaces end-to-end**, each from empty state to production: Quick Polls, Anonymous Q&A, Surveys, Quizzes, and real-time multiplayer Trivia.
- Engineered **real-time multiplayer Trivia over WebSockets**: room join and reconnect, countdown timers synchronised across page refresh, mid-game join with full state resync, session-token rotation, and automatic recovery that removed the manual retry path entirely.
- Designed and shipped **Jam Sessions**, a live presenter mode enforcing a single-running-tool invariant, with QR join overlays, host-to-presentation mirroring via BroadcastChannel, and resilient reconnection with state recovery.
- Built a **survey engine with 8+ question types**, conditional branching, IndexedDB draft persistence, a three-tier authentication fallback chain, and CSV/ZIP export; implemented subscription gating across every creation and submission flow.
- Established the **Playwright E2E suite and CI pipeline**, personally authoring the polls, survey, quiz, and Q&A suites within a 117-test harness.
- Patched **CVE-2025-55182 (React2Shell)**, a critical **CVSS 10.0** remote-code-execution vulnerability in React Server Components, via a Next.js 14 to 15 upgrade; added Sentry instrumentation and full technical SEO.
- Earlier, as Votitude: built an election and awards voting platform with Paystack and MTN Mobile Money payments, CSV/XLSX voter-roll upload with duplicate detection, and live WebSocket vote tallies.

Additional contract work. Sole engineer on **Adesua**, a WASSCE exam-preparation platform (Django/DRF and Next.js), Aug 2025 to Mar 2026. Frontend engineer at **Stimuluz** on Ghana govtech, covering municipal revenue collection and firearm-licensing platforms with officer review and role-based access, Nov 2025 to Feb 2026.

ARCHITECTURE & OWNERSHIP

myBesorah, Architect & Sole Engineer

Apr 2026 – Present · Payments platform

- **Sole technical owner.** Architected and built an event-driven platform of **15 services and 5 Celery workers** in Python 3.13 / FastAPI, covering API gateway, giving, billing, reconciliation, audit, reporting, webhook handling, notification routing, and a MongoDB change-stream watcher.
- Chose **polyglot persistence per workload**: PostgreSQL via async SQLAlchemy with Alembic, MongoDB change streams, Redis for cache and queues, MinIO object storage, and Kafka (Redpanda) as the event bus; provisioned with Terraform and Kubernetes, instrumented with OpenTelemetry, Prometheus, and Grafana.
- Set the engineering standard from scratch with **1,540 Python tests across 142 files**: pytest-asyncio, Hypothesis property-based testing on money and payment paths, and testcontainers for real-dependency integration tests, plus a mock payment provider making the full payment lifecycle deterministically testable end-to-end.
- Implemented **WebAuthn passkey authentication** with Argon2 hashing and security linting enforced in CI; delivered four TypeScript frontends from a shared design system and a generated TypeScript SDK.

Friday, Real-Time Meeting Intelligence

Apr 2026 – Present · Personal project

- Python/FastAPI backend streaming live audio to **Deepgram over WebSockets** for real-time transcription, with an **LLM question-detection pipeline** that surfaces questions directed at the user as they happen; Turborepo monorepo with a React client and shared prompt/type packages.

EDUCATION & CERTIFICATIONS

BSc Computer Science, University of Cape Coast

2020 – 2024

- **Co-Lead, PyClub.** Built the university's Python community and mentored members across **20+ workshops and events**.
- **Certifications.** Google IT Automation with Python, Professional Certificate (Google / Coursera) · Meta: Django Web Framework, APIs, Introduction to Databases for Back-End Development