

Betini Akarandut

Backend & Cloud Engineer

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PROFESSIONAL SUMMARY

Backend and cloud engineer who designs, deploys and operates reliable production systems. I lead backend and infrastructure engineering at TracTrac Mechanisation Services Limited, running two coordinated FastAPI backends for 60,000+ users on PostgreSQL/PostGIS, PgBouncer, Redis, Kafka and Celery, deployed on self-managed infrastructure that operates 20+ containerised applications.

My work centres on distributed and event-driven systems, production reliability, database migrations, financial correctness and data infrastructure that supports operational and programme decisions. I also build across the stack when a product needs it, from Next.js consoles to a full React/TypeScript client.

CORE TECHNICAL SKILLS

Backend	FastAPI, Django / Django REST Framework, Flask, Node.js / Express, SQLAlchemy, Pydantic; REST API design, OpenAPI, OAuth2, 2FA, role-based access control
Data	PostgreSQL, PostGIS, row-level security, SQLite, MySQL, MongoDB, Alembic, Drizzle ORM; audit trails, Decimal-precision financial calculations, reporting and KPI systems
Distributed systems	Kafka (consumer groups, transactional outbox), Redis (caching, pub/sub), Celery, WebSockets, Firebase Cloud Messaging; idempotent APIs, offline sync and batch reconciliation
Cloud & DevOps	Docker, Docker Compose, Linux / VPS (Contabo), Coolify, Traefik, Nginx, Caddy, PgBouncer, Railway, Render, AWS EC2; GitHub Actions, health and readiness checks, migration-gated deployments, capacity modelling
Payments	Paystack (cards, virtual accounts, split payments, webhooks), VTPass, VTU.ng; wallet ledgers, escrow-style and payout workflows, refunds, reconciliation
Geospatial	GPS processing, WGS84 geodesic area (pyproj), spike filtering, Shapely, live vehicle tracking
Frontend	React, TypeScript, Next.js, Vue.js, Vite, TanStack Query, Zustand, React Hook Form, Zod, Vitest, Redux, Tailwind CSS

PROFESSIONAL EXPERIENCE

Lead Backend/DevOps Engineer — TracTrac Mechanisation Services Limited

Feb 2025 – Present

Abuja, Nigeria · On-site

TracTrac Plus is a nationwide on-demand farm mechanisation platform connecting farmers, mechanisation service providers (MSPs), field agents and operations teams: onboarding, land mapping, demand logging, job assignment, tracking and closure, and payments.

- Architect and operate two coordinated production FastAPI backends serving 60,000+ users: a shared users table, versioned event contracts in a shared tracrac-core kernel, and namespaced Kafka consumer groups and Celery queues, on PostgreSQL/PostGIS, PgBouncer, Redis and Kafka.
- Introduced a transactional outbox (events written in the same transaction as the business change, relayed to Kafka with FOR UPDATE SKIP LOCKED) and multi-tenant scaffolding with PostgreSQL row-level security.
- Root-caused a cross-worker WebSocket delivery bug (each uvicorn worker held its own connection map) and fixed it with per-worker Kafka consumer groups and de-duplication.
- Led an offline-first workflow for tractor and labour-saving-device requests in low-connectivity areas, built on idempotent create/sync APIs and batch reconciliation; it replaced a paid third-party data-collection tool and extended digital access to remote farming communities.

- Diagnosed intermittent production 502s on the admin dashboard: ruled out cache hit ratio, query time, locks, pool exhaustion and memory before tracing them to request fan-out (60+ requests for one screen); split the endpoint into single-purpose Redis-cached endpoints with capped pagination and page-1-only fetching, kept the old contract during migration, and recorded the decision as an ADR.
- Migrated production from Render to a hardened, self-managed Contabo VPS with Coolify and Traefik (non-root deploy user, firewall, TLS), now operating 20+ containerised applications with staging, health checks and migration-gated deployments; right-sized capacity through capacity modelling.
- Resolved PostgreSQL connection-pool exhaustion with PgBouncer transaction pooling, then removed the root cause by moving notification fan-out from in-process threads to Celery workers.
- Built Paystack split payments to cooperative subaccounts, row-locked duplicate-safe payment creation, and a Decimal-precision cash-collection ledger with unit tests.
- Integrated CommCare and built reporting that reconciles platform and field data (hectares mechanised, farmers reached, revenue, cooperatives, states, service delivery); deliver monthly and quarterly technical reporting for programme monitoring and donor documentation.
- Full-stack: built the Next.js support console solo (live WebSocket tickets, unified login across both backends) and features in the admin dashboard and public website.

Sole Backend Engineer + Frontend Contributor — VITAL 2 (Ikore International Development)

Feb 2026 – Present

Remote

Livestock vaccination and farmer field-operations platform. Sole backend engineer, working alongside two frontend engineers and contributing frontend features.

- Delivered a production-ready FastAPI/PostgreSQL backend within six weeks; the platform onboarded 5,000+ farmers.
- Built voucher campaigns and QR-code generation, contributing to a 15% increase in farmer onboarding.
- Built offline synchronisation for field data capture in low-connectivity areas and hardened its idempotency so replayed submissions are applied once; batched mass email within Brevo's sending limits.
- Built programme reporting for partners: KPI and deliverable tracking, campaign drill-downs, history backfill and data-quality fixes (fuzzy matching, normalising combination-vaccine labels).
- Contributed React 19 / TanStack Query frontend features: admin metrics, DVS screens, campaign and kit-distribution administration, programme KPI views and a chunk-error boundary.

Backend/DevOps Engineer (Contract) — SolarAfriC (Feexet Limited)

Apr 2026 – Jun 2026

Remote · Contract

Two-sided marketplace connecting solar equipment owners with verified technicians. Backend delivered independently, from architecture through production implementation.

- Built a 7-state booking lifecycle with Paystack escrow-style payments, technician payout wallets, bank account resolution and a dispute workflow.
- Engineered context-aware diagnostics on OpenAI GPT-4o-mini: vision input and structured JSON output grounded in equipment specifications, GPS location, nearby verified technicians, learning content and booking history, with multi-turn investigation and safety/severity escalation.

Co-Founder, Product & Engineering Lead — SUBSEL Digital Services

Nov 2025 – Present

Remote · Pre-launch (no public users or revenue yet) · subsel.co

Fintech and marketplace platform: wallets, VTU, digital-product marketplace, rewards and merchant tools. I own product direction and wrote both repositories: the FastAPI backend and the React/TypeScript client.

- Built a wallet ledger where every balance change goes through one service, with row locking (SELECT ... FOR UPDATE), Decimal money and separate prepaid, reserved and earned pools.
- Re-architected the wallet as closed-loop in response to Paystack's compliance review: top-ups are spend-only, only earned money is withdrawable, and real-money games were suspended; the enforced rules are documented so any statement to the provider can be checked against code.

- Verified 10 financial invariants with behavioural tests that run duplicate, concurrent, failed and reversed settlements and re-check every invariant afterwards.
- Shipped real-time Whot card gameplay: a game engine with an AI opponent, PvP matchmaking and presence over WebSockets, Redis pub/sub fan-out across instances, reconnect/resume and a background reconciler for abandoned sessions.
- Made it production-ready: non-root Docker image, fail-fast production configuration checks, readiness probe, migrations gated before release and a backup/restore runbook.

Backend Developer — Join Momentum

Jun 2024 – Jan 2025

Dover, Delaware, United States · Remote

- Designed scalable Django REST APIs for an AI-powered Job Simulator platform, reducing response time by 25%.
- Integrated OpenAI GPT and LangChain for automated candidate feedback, and automated certificate issuance via Certifier.io.

Backend/Mobile Engineer — Retiny

Mar 2024 – Jun 2024

Port Harcourt, Nigeria

- Designed APIs with Swagger documentation, 2FA, third-party OAuth and role-based mobile routes.

Backend/DevOps Engineer — ALX Africa

Jan 2023 – Oct 2023

Kigali, Rwanda · Software engineering programme placement

- Built secure authentication and user-management systems.
- Deployed APIs on AWS EC2 with logging, validation and error tracking.

Earlier: Backend internship at Scoplex Technologies (2022); research work with Extern; community contribution with United People Global.

SELECTED SYSTEMS

TracTrac Plus — offline-first agricultural mechanisation platform · tractrac.co

Offline-capable field workflows, mobile apps, a Next.js admin dashboard and support console, and CommCare feed two coordinated FastAPI backends over PostgreSQL/PostGIS, PgBouncer, Redis, Kafka and Celery.

FastAPI · PostgreSQL · PostGIS · PgBouncer · Redis · Kafka · Celery · WebSockets · Docker · Coolify · Traefik · Next.js · React · TanStack Query · Paystack · CommCare

VITAL 2 — field operations and programme reporting

Offline field capture, reversible bulk imports with audit trails, QR voucher campaigns and programme KPI reporting for partners.

FastAPI · PostgreSQL · Alembic · React · TanStack Query · QR generation · Brevo · RBAC

ATOM — MongoDB → PostgreSQL migration (migration lead)

Strangler-pattern migration with a repository layer, per-table backfills and sync workers, shadow-read diffing and CI-gated wave cutover; 26 tables backfilled.

Node.js · Express · Drizzle ORM · PostgreSQL · MongoDB · GitHub Actions

SolarAfRiC — context-aware AI diagnostics and marketplace payments · feexet.com

GPT-4o-mini diagnostics grounded in equipment, location, technician and booking context with structured JSON output, plus escrow-style payments through a 7-state booking lifecycle.

FastAPI · PostgreSQL · Alembic · OpenAI GPT-4o-mini · Paystack · WebSockets · Firebase Cloud Messaging · Mux · Cloudinary

SUBSEL — fintech and marketplace platform, built end to end (pre-launch) · subsel.co

React/TypeScript client and FastAPI backend designed together: row-locked Decimal wallet ledger, closed-loop compliance design, refund engine, real-time WebSocket gameplay and a permission-gated admin console.

FastAPI · PostgreSQL · SQLAlchemy · Alembic · WebSockets · Redis pub/sub · React · TypeScript · Vite · Zustand · React Hook Form · Zod · Vitest · Paystack · Docker

EDUCATION

B.Eng. Chemical Engineering — University of Port Harcourt
Second Class Honours (Upper Division)

2017 – 2024

Professional training

- ALX Africa / Holberton School: Software Engineering programme (2022–2023), including backend specialisation and a backend/DevOps placement in Kigali, Rwanda.

CERTIFICATIONS & AWARDS

- Software Engineering Certification: ALX / Holberton School, 2023
- Web Development Certification: Zero To Mastery Academy, 2022
- AWS Certified Solutions Architect – Associate: in progress, expected 2026
- Hacktoberfest Winner: open-source contribution, 2022