

Betini Akarandut

Backend & Cloud Engineer

Abuja, Nigeria betiniakarandut@gmail.com +234 701 193 3504 betiniakarandut.com github.com/betiniakarandut
linkedin.com/in/betiniakarandut hashnode.com/@betiniakarandut

PROFESSIONAL SUMMARY

Backend & Cloud Engineer with 3+ years of experience designing, building and operating production backend systems and the infrastructure beneath them. I lead backend and infrastructure engineering at TracTrac Mechanisation Services Limited, where two production FastAPI backends serve 60,000+ users of a nationwide agricultural mechanisation platform, spanning offline-first field workflows, event-driven processing, geospatial services and payment reconciliation.

I have delivered production backends for an AI-assisted solar services marketplace (SolarAfRiC) and a livestock vaccination and field-operations platform (VITAL 2), and co-founded a pre-launch digital services venture (SUBSEL). My work increasingly extends beyond implementation into performance investigation, infrastructure ownership, technical communication and programme delivery. A BEng in Chemical Engineering gives me a quantitative foundation in numerical methods, modelling and operations research, and I am building toward data science and decision analytics.

CORE TECHNICAL COMPETENCIES

Backend	Python, FastAPI, Django / Django REST Framework, Flask, SQLAlchemy, Pydantic, Node.js / Express; REST API design, OpenAPI / Swagger, OAuth2, 2FA, role-based access control
Data	PostgreSQL, PostGIS, TimescaleDB, SQLite, MySQL, MongoDB, SQL; Alembic migrations, audit trails, decimal-precision financial calculations
Distributed systems	Kafka with the outbox pattern, Redis, Celery, WebSockets / Socket.IO, Firebase Cloud Messaging
Cloud & DevOps	Docker, Docker Compose, Linux / VPS (Contabo), Coolify, Traefik, Nginx, PgBouncer, Render, AWS EC2, GCP; CI/CD (GitHub Actions, Azure DevOps), health checks, migration-gated deployments, capacity modelling
Geospatial	GPS processing, farm measurement (Shoelace and Haversine formulas), live vehicle tracking, Shapely, pyproj
Payments	Paystack, Monify; wallet, escrow-style and payout workflows, transaction reconciliation
Applied AI	OpenAI APIs (GPT-4o-mini), vision workflows, structured outputs, LangChain, LangGraph
Integrations	CommCare, Brevo, Mux, Cloudinary, S3-compatible storage, Contentful, Certifier.io
Frontend (supporting)	JavaScript, TypeScript, React, Next.js, Redux, TanStack Query
Practice	Testing and TDD, Postman, Git, architecture decision records (ADRs), technical and programme reporting

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: farmer onboarding, land mapping, soil testing, demand logging, job assignment, tracking and closure, and payment recording.

Engineering and infrastructure (personal contribution)

- Architect and operate two production FastAPI backends on shared PostgreSQL, Redis and Kafka infrastructure, serving 60,000+ registered users.
- 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 reliance on a paid third-party data-collection tool and extended digital access to remote farming communities.
- Designed Kafka/outbox event flows, Redis caching, Celery workers, PostgreSQL/PostGIS infrastructure and PgBouncer transaction pooling.
- Built GPS-based farm measurement (Shoelace and Haversine calculations), live vehicle tracking, booking and hire workflows, and wallet/payment reconciliation with Paystack using decimal-precision, concurrency-safe calculations.
- Integrated CommCare and built Excel exports and reporting infrastructure that reconciles platform and field data on hectares mechanised, farmers reached, revenue, cooperatives, states and service delivery.
- Provisioned and migrated infrastructure to a self-managed Contabo VPS with Coolify and Traefik, operating 20+ containerised applications with staging, health checks and migration-gated deployments; reduced infrastructure cost through capacity modelling and right-sizing.
- Diagnosed an administrative dashboard that failed intermittently under load, with one screen issuing 60+ backend requests. Investigated database performance, caching, locking, pagination and aggregate queries, then redesigned it around SWR caching, page-1-only fetching and server-side summary endpoints while preserving the response contract, and recorded the decision as an ADR.

Leadership and delivery

- Lead, Young Innovators in Agricultural Mechanisation Pitch Challenge Team, TracTrac Mechanization Investment Promotion Roadshow 2026 (see Technical Leadership).
- Contributed to the ISSAM Year 2 Learning Event explainer, “ISSAM: Two Years In”.
- Provided field and technical support, and trained mechanisation service providers in Nasarawa and Kaduna on the technology they use to serve smallholder farmers.
- Deliver monthly and quarterly technical reporting supporting programme monitoring and donor documentation.

Programme context (team and programme outcomes, not personal metrics). The platform operates within ISSAM, a TracTrac and Mastercard Foundation partnership. Within the programme, 146,170 farmers were registered or onboarded onto TracTrac Plus; 8,577 service requests were logged and 7,872 fulfilled (91.8%); 8,719.88 hectares were worked; and 5,012 mechanisation service providers were certified.

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.

- Designed the FastAPI/PostgreSQL backend: 14 models, 22 endpoint modules and 29 Alembic migrations.
- 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.
- Built the technician learning platform: Mux/Cloudflare video playback, quizzes, learner progress and signed PDF certificates.

- Implemented resilient file storage (Cloudinary → S3-compatible → local fallback) with MIME sniffing, plus WebSocket messaging and Firebase Cloud Messaging notifications.

Backend/DevOps Engineer — VITAL 2 (Ikore International Development)

May 2026 – Aug 2026

Remote

Livestock vaccination and farmer field-operations platform. Sole backend engineer supporting two frontend engineers.

- Delivered a production-ready FastAPI/PostgreSQL backend within six weeks (24 models, 33 endpoint modules, 39 migrations); the platform onboarded 5,000+ farmers.
- Built voucher campaigns and QR-code generation, contributing to a 15% increase in farmer onboarding.
- Implemented bulk farmer import with rollback, audit trails and role-based access control.
- Built offline synchronisation for field data capture in low-connectivity areas, and batched mass email within Brevo's sending limits.
- Owned backend updates, bug resolution, production support and post-review improvements.

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

Sep 2026 – Present

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

- Designed a FastAPI backend of 28 models and 26 routers spanning VTU, wallet funding and withdrawals, marketplace, task earnings, referrals, challenges and merchant advertising.
- Integrated two payment providers (Paystack and Monify) behind one wallet, with Celery and Redis for asynchronous processing, and implemented a pay-to-activate account model.
- Own product direction alongside engineering for the venture ("Where Innovation Meets Opportunity").

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.
- Integrated secure digital-badge APIs over OAuth2, increasing engagement by 40%, and automated workflows that reduced errors by 30%.
- Mentored junior developers, two of whom progressed into key contributors, within Agile Scrum teams.

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.
- Delivered RESTful APIs and database schemas for client real estate management and stock exchange platforms (Node.js, Express, PostgreSQL).
- Introduced standardised error handling, Postman testing workflows and Nginx load balancing.

Backend/DevOps Engineer — ALX Africa

Jan 2023 – Oct 2023

Kigali, Rwanda · Software engineering programme placement

- Built secure authentication and user-management systems.
- Designed database schemas shared across services.
- 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 ENGINEERING PROJECTS

TracTrac Plus — offline-first agricultural mechanisation platform · [tractrac.co](#)

Field agent workflows (offline-capable), a Next.js/Redux admin dashboard and CommCare integration feed two FastAPI backends; PostgreSQL/PostGIS behind PgBouncer, Redis caching and Kafka outbox event flows sit beneath

them, with Celery workers and WebSockets driving booking and hire, GPS vehicle tracking, farm measurement, payments and reporting. Offline requests are replayed safely through idempotent create/sync APIs and reconciled in batches against server state.

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

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

A customer report (text and photos) and a multi-turn diagnostic conversation are combined with equipment specifications, GPS location, nearby verified technicians, learning content and booking history, then sent to GPT-4o-mini with vision input and structured JSON output. The structured result drives the next action: guided self-fix, further investigation, severity escalation or technician booking. Payments are held escrow-style through a 7-state booking lifecycle before release to technician payout wallets.

FastAPI · PostgreSQL · Alembic · OpenAI GPT-4o-mini · Paystack · WebSockets · Firebase Cloud Messaging · Mux · Cloudinary · S3-compatible storage

VITAL 2 — bulk field data with rollback and audit

Mobile app and admin dashboard (not publicly accessible).

Bulk farmer uploads are imported with rollback and recorded in an audit trail; voucher campaigns generate QR codes that feed farmer onboarding; offline synchronisation supports capture where connectivity is unreliable.

FastAPI · PostgreSQL · Alembic · QR code generation · Brevo · RBAC

Other projects

- **Job Simulator AI (backend):** API backend for an AI-powered job simulation platform with OpenAI and LangChain feedback and automated certificate issuance. Django REST Framework, PostgreSQL, Celery, Redis.
- **MeetDevs (open source):** pagination API (12 talents per page) and navigation for a talent–employer matching platform. github.com/Ayobami6/MeetDevs
- **Estimate SBHP:** static bottom hole pressure estimation using the Sukkar and Cornell method, with 98% accuracy; final-year Chemical Engineering project. Python, PostgreSQL. github.com/betiniakarandut/Estimate-SBHP
- **YouTube server clone:** system-design practice backend with video upload, streaming endpoints, authentication, 2FA and Nginx load balancing. Node.js, Express, Docker, PostgreSQL.
- **OTP Gmail API auth flow:** one-time-password verification delivered through the Gmail API. FastAPI.
- **Smart Brain:** face-detection web application. React, Node.js, PostgreSQL. github.com/betiniakarandut/smart-brain
- **betiniakarandut.com:** this portfolio. FastAPI, PostgreSQL and Alembic behind a Vite frontend on Railway, with migrations and an idempotent content sync run as a pre-deploy step and a database readiness check.

TECHNICAL LEADERSHIP & PROFESSIONAL CONTRIBUTIONS

Young Innovators in Agricultural Mechanisation — #1 Million Pitch Challenge

2026

Lead, Young Innovators in Agricultural Mechanisation Pitch Challenge Team

Led the team responsible for designing and coordinating a youth-focused pitch challenge within the TracTrac Mechanization Investment Promotion Roadshow 2026, themed “Powering the Future of Agricultural Mechanisation in Nigeria through Young People”. Open to young Nigerians aged 18–35, as individuals or teams, with early-stage ideas or existing businesses and MSPs, via a 1-minute video pitch and a pitch deck.

- Designed the challenge structure, application, eligibility and requirements.
- Ran finalist communications, briefings and event reminders.
- Coordinated a pitch-preparation webinar and pitch-deck guidance.
- Set up the judging structure and live-pitch preparation, for a ₦1,000,000 participant prize pool (₦500,000 / ₦300,000 / ₦200,000).

“ISSAM: Two Years In” — ISSAM Year 2 Learning Event explainer

2026

Contributed to the development and production of an approximately 14-minute documentary-style doodle explainer, structured as Problem → Programme → Impact → Horizon. It translates the architecture, operating model and two

years of evidence of a technology-enabled agricultural programme (including the TracTrac and Mastercard Foundation partnership, mechanisation-as-a-service, the technology, programme results, policy engagement and the 2029 horizon) into a narrative for stakeholders.

EDUCATION

B.Eng. Chemical Engineering — University of Port Harcourt

2017 – 2024

CGPA 3.72/5.00 · Second Class Honours (Upper Division)

Relevant quantitative coursework: Calculus; Probability & Statistics; Numerical Methods & Computer Applications; Mathematical Modelling & Operations Research; Computer Programming for Engineers. Final-year project: Estimate SBHP (see Selected Engineering Projects).

Professional training

- ALX Africa / Holberton School: Software Engineering programme (2022–2023), including backend specialisation and a backend/DevOps placement in Kigali, Rwanda.
- Zero To Mastery Academy: web development (2022).
- AWS / Udacity: AWS Machine Learning Foundations (2022).
- Pursuing advanced training in data science and decision analytics.

SCHOLARSHIPS, AWARDS & CERTIFICATIONS

Certifications

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

Scholarships

- Bertelsmann Gen-Y Tech Booster Scholarship, 2024
- AWS Machine Learning Foundations Scholarship: AWS / Udacity, 2022

Awards

- Hacktoberfest Winner: open-source contribution, 2022

ADDITIONAL PROFESSIONAL ACTIVITIES

Technical writing (Hashnode)

- [Offline-First Systems in Low-Connectivity Environments](#) (Jun 2026)
- [Production AI Isn't an ML Problem. It's a Systems Problem.](#) (Jun 2026)
- [Teaching the Revolution: Field Notes from ISSAM, TracTrac Plus, and the Future of Nigerian Agriculture](#) (May 2026)
- [When More Workers Made It Worse: Connection Pools, Shared Postgres, and Demo-Day](#) (May 2026)
- [I Deployed My First Cloud Server...](#) (Mar 2026)
- [Estimating Static Bottom Hole Pressure](#) (Dec 2023)

Open source and community

- Open-source contributions, including MeetDevs and Hacktoberfest (2022).
- Volunteer, Clean Sweep Community, Abuja: community cleanups and advocating for practical waste-bin solutions.

CONTACT & LINKS

betiniakarandut@gmail.com +234 701 193 3504 Portfolio: [betiniakarandut.com](#) GitHub: [github.com/betiniakarandut](#)

LinkedIn: [linkedin.com/in/betiniakarandut](#) Hashnode: [hashnode.com/@betiniakarandut](#)

CoderLegion: [coderlegion.com/user/Betini+Akarandut](#)

References available on request.