

Bolu Ajayi

Software Engineer | Backend | Python, TypeScript, PostgreSQL, AWS | Payments, Data & AI

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SUMMARY

Backend-focused software engineer with 5+ years building production systems in Python, TypeScript, PostgreSQL and AWS. Currently leading the technology for SmartSustain, an Innovate UK-funded planning platform used by five West Yorkshire councils, from geospatial pipelines to search and an AI agent. Previously Senior Backend Engineer at Falcon Aerospace, promoted from Full Stack Developer, owning a private-jet booking platform's backend: booking state machine, idempotent Stripe payments, audit logging and 100+ tests. Strongest in transactional data models, payments and event-driven services.

TECHNICAL SKILLS

Languages: Python, TypeScript, SQL

Frontend: React, Next.js, MapLibre

Backend: FastAPI, Node.js, Express, SQLAlchemy, Pydantic, Alembic, REST APIs, WebSockets, background jobs

Data: PostgreSQL (spatial queries, pgvector), Redis, Elasticsearch, ETL pipelines, schema design, query tuning

Distributed Systems & Payments: RabbitMQ, event-driven design, sagas, outbox pattern, idempotency, Stripe, webhooks

Cloud & DevOps: AWS (EC2, S3), Docker, Kubernetes, Terraform, GitHub Actions, Nginx

Testing & Observability: Pytest, OpenTelemetry, Jaeger, Prometheus, Grafana, structured logging

AI: LangChain, AI agents, tool calling, RAG, vector search, OpenAI API

EXPERIENCE

CGLS Tech Ltd | Leeds, UK

May 2026 – Present

Full Stack Software Engineer | Contract

Project: SmartSustain. Innovate UK-funded planning platform used across five West Yorkshire councils.

- Led the technology for SmartSustain, working with technical colleagues and non-technical planning officers and council stakeholders to turn loosely defined planning requirements into working features and explain trade-offs in plain terms.
- Designed and built the FastAPI backend on PostgreSQL and SQLAlchemy, with async endpoints for site search, assessment, scoring, map data and the AI assistant.
- Wrote ETL pipelines that clean, normalise and load millions of records from inconsistent government and open-data sources into PostgreSQL, and designed the data model and indexes to keep queries responsive at that size.
- Built geospatial queries over flood risk, road noise, air quality and other environmental layers, with Redis caching and bounds-based queries so the map only loads data for the area in view.
- Built an AI agent workflow using Python, LangChain and OpenAI models, enabling planning officers to ask natural-language questions, invoke relevant backend tools, retrieve site-specific information and synthesise findings into actionable planning insights.
- Built the assistant's RAG pipeline on pgvector, combining vector search with location and metadata filters so answers are grounded in the data for that specific site.
- Built Elasticsearch site search by address, postcode, council or developer, with typo-tolerant matching and faceted filters by sustainability score, developability and site size.
- Implemented a deterministic, weighted scoring engine that rates 700+ candidate sites from 0 to 100 across environmental, economic, social and regulatory pillars.

Falcon Aerospace Limited | Hybrid

Feb 2024 – May 2026

Senior Backend Engineer | Full-time · promoted from Full Stack Developer

Project: FlyPJX, a private-jet booking platform at a regulated aviation tech company.

- Owned the backend architecture for FlyPJX (FastAPI, PostgreSQL) across six domains: bookings, passengers, payments, documents, compliance and notifications. Worked with frontend developers, DevOps and non-technical product and business stakeholders to agree requirements and API contracts.
- Replaced 10+ ad hoc booking status flags with a state machine that only allows valid transitions, using PostgreSQL transactions and row locks so simultaneous customer and agent edits can't leave a booking in a bad state.
- Integrated Stripe payments and webhooks with signature checks, idempotency keys and safe retries, and built instalment plans that handle failed payments and retry on a schedule.
- Designed the PostgreSQL schema (20+ tables) with SQLAlchemy and Alembic migrations, improving key booking query performance by around 30%.
- Built audit logging that commits in the same transaction as the change it records, and a document upload pipeline on S3 with file-type checks, size limits, rate limiting and presigned URLs.
- Wrote 100+ Pytest unit and API tests, including state-machine and payment cases, and ran them in CI. Deployed with Docker on EC2 behind Nginx, with separate staging and production environments.
- Joined as a Full Stack Developer on the React and Next.js booking flow, where cutting steps and saving partial progress lifted booking-funnel session retention by 22%, then was promoted to lead the backend.

Software Engineer | Full-time

- Built backend services for a live-shopping marketplace in TypeScript, Python (FastAPI) and PostgreSQL, covering auth, sellers, products, orders, payments and logistics.
- Built WebSocket services for livestream sessions, live bidding and chat, using Redis to hold fast-changing session and bid state and coordinate updates across connections.
- Separated real-time live-commerce workloads from the transactional order and payment services, so high-frequency stream events didn't contend with checkout writes in PostgreSQL.
- Integrated Paystack and Stripe payment callbacks and Agora streaming events with asynchronous processing, with PostgreSQL transactions around payment-critical steps and automated API tests.

MyLegalSoftware

Dec 2020 – Nov 2022

Software Developer | Full-time

- Built backend APIs for case, client and solicitor management on a legal tech platform used by law firms for case management and client intake.
- Wrote the rule-based matching algorithm that recommends solicitors to clients by case type, expertise, location and availability.
- Built PostgreSQL-backed features with relational models, validation and query tuning, integrated with the React frontend.

SELECTED PROJECTS

Wevna | *Open-source runtime dashboard for Node.js and Python backends*github.com/wevna/wevna

- Built and published **@wevna/sdk** on npm: a local dashboard that groups every HTTP request, SQL query, Redis command and log line under the request that caused it, for Node.js (stable) and FastAPI (alpha) over one shared event protocol.
- Makes N+1s and slow paths visible without manual logging by normalising query shape to flag repeated queries, slow requests and long SQL. Supports session record and replay, and never stores headers, bodies or query parameters.

Fetch | *Event-driven microservices on Kubernetes*github.com/boluwatifeajayi/fetch

- Six Node.js and FastAPI services, each with its own database, coordinating order, payment and driver assignment through a choreographed RabbitMQ saga with compensating refunds, behind a gateway with RS256 JWTs verified at every service.
- Kept it consistent under failure with idempotency keys, a transactional outbox and inbox, retries, dead-letter queues and circuit breakers, verified by stopping RabbitMQ mid-flow and confirming queued events published once it recovered. Traced with OpenTelemetry and Jaeger; deployed on Kubernetes with autoscaling and Terraform.

Materia | *AI agent for finding costly errors in financial spreadsheets*github.com/boluwatifeajayi/materia

- Hackathon build in Python. Deterministic detectors propose candidate errors, the LLM judges which ones change a decision, and a recompute tool must confirm the impact before a finding is kept.
- On a 12-workbook test set, reduced 267 flagged cells to 13 findings, raising precision from 5% (rules only) to 100% at 93% recall.

OPEN SOURCE

AWS Cloud Development Kit (aws-cdk): Opened a pull request adding SQL Server 2025 (engine v17) support to the RDS module, verified against the live RDS engine list with unit tests, and worked through maintainer review on test coverage and integration snapshots. Currently in review.

EDUCATION

MSc Software Engineering | Leeds Beckett University, Leeds, UK

Dissertation: Measuring technical debt in large microservices codebases, comparing LLM-based analysis with SonarQube across ten open-source repositories.

BSc Computer Information Systems | Covenant University