

Kofi E. Ampaabeng, Ph.D.

Principal Software Architect & Engineering Lead — Regulated Banking · Data Platforms · Distributed Systems

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SUMMARY

The “can-do” engineer-leader: I take on undefined problems in unfamiliar fields — often with the obvious tools off the table — learn them, and ship. 20+ years across regulated banking, data platforms, and applied ML.

- **Build *and* lead** — architect and ship distributed systems, *and* built three teams from scratch across two co-founded ventures and a Director role.
 - **Production proof** — core-banking & regulatory platform live for banks across Ghana & South Africa (Fidelity Bank, Izwe, ASA International, Sinapi Aba, Adehyeman, GRA Co-op Credit Union).
 - **Distributed data at scale** — built **RegAuth** (Spark/Solr over the full U.S. federal legal corpus) and **Vigil** (live streaming NLP/LLM), mentoring junior teams to deliver both.
 - **Range under constraint** — led a WebSphere→WildFly migration with no prior experience in either; built a custom queue when Kafka/ActiveMQ were off the table.
 - **The moat** — a PhD economist who hand-builds the pipeline: measurement rigor most engineers lack, engineering depth most economists lack.
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CORE COMPETENCIES

- **Domains** — Regulated core banking (IFRS 9, IAS 21, Basel III, XBRL) · regulatory reporting (Bank of Ghana) · enterprise IAM · insurance · applied ML/NLP
 - **Architecture** — Event-driven (transactional outbox, Kafka) · multi-tenant isolation · maker-checker / immutable audit · DDD · OAuth2/OIDC · ADR-driven governance
 - **Backend** — Java 11–21 · Spring Boot 3/4 · Python (FastAPI) · Node (Hono/Bun) · Go · Swift/SwiftUI
 - **Data & distributed** — Apache Spark (PySpark/Spark SQL) · Parquet · Celery · Solr · Kafka · Oracle 10g–21c · PostgreSQL
 - **AI-augmented dev** — Agentic Claude SDLC automation (ticket→code→tests→MR) · MCP · enforced quality gates · self-hosted LLM inference (vLLM/Ollama)
 - **Cloud & IaC** — **Terraform** (AWS/Azure/GCP) · AWS (VPC, RDS, EC2, IAM, ECS, S3) · Azure (Container Apps, DevOps, ACR) · cost-aware right-sizing (cloud-native vs. self-hosted to budget & business indicators)
 - **Platform / DevOps** — Self-hosted bare-metal data center · Docker · OpenShift · Kubernetes · multi-registry & air-gapped delivery · Prometheus/Grafana · CalVer · GitFlow
 - **Leadership** — Built & led teams from scratch · mentorship-led management · cross-border program management · client & delivery ownership
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SELECTED PROJECTS

RSS / rss-next — Regulatory Returns Framework

Production flagship · live since 2019 (Excenit → Cape Wesley) · config-driven re-architecture

- Automates statistical returns to the **Bank of Ghana** for a **real client base across Ghana & South Africa** — Fidelity Bank, Izwe S&L, ASA International, Sinapi Aba, Adehyeman, GRA Co-op Credit Union — multi-tenant / multi-jurisdiction.
- **rss-next** — the brilliantly-simple **config-driven** re-architecture (retiring the legacy CUBA platform): a regulator's Excel template is scanned once into a JSON **TemplateConfig** that drives validation, mapping, generation, and submission. **New regulator or return = new config, not code.**
- **CBS-agnostic** — XBRL as the connecting channel; pluggable data-source strategies (GL / warehouse / XBRL / formula) with no engine branching; integrates **FlexCube, T24, and CWC Banking at exact cell parity.**
- Spring Boot 3.5 / Java 21, React/TanStack; maker-checker submission workflow; one 12-factor config deploys to Docker / Podman / OpenShift; air-gap-capable.

RegAuth — Distributed Regulatory-Data Platform

Visionary, architect & engineering manager · built and mentored the team

- **One of the few production systems that renders the full U.S. federal legal corpus as structured, queryable data** (obligation extraction, regulatory quantification) — extends the RegData/QuantGov approach I helped pioneer at Mercatus.
- **PySpark / Spark SQL** → partitioned Parquet; **Celery** distributed workers; Postgres → **Solr** indexing; React/Express serving.
- Python monorepo with a SemVer'd stable-core API (ADR-governed), Azure DevOps CI/CD, four-audience docs + on-call runbooks.
- I owned vision & architecture, stayed hands-on, and **hired and mentored the junior engineers who built it** — original work predating AI code generation.

Vigil (Medusa) — Public-Discourse Intelligence Platform

Visionary, architect & engineering manager · larger infra than RegAuth

- Ingests **28+ sources** — social (X GraphQL, Facebook/Threads, YouTube, TikTok, Telegram), 11 news outlets (**archive to 2010**), and **live radio/TV capture + Whisper transcription** — and correlates discourse with electoral & socioeconomic data.
- **Tight architecture** — single-responsibility **Celery** fleets on Redis with a **custom DB-driven scheduler** (live-editable, no Airflow); shared medusa_core lib, frozen-Pydantic boundaries; PostgreSQL + **Solr**; Docker Compose, custom images, Nginx TLS.
- **Pluggable LLM** (vLLM GPU / Anthropic / Ollama, auto-selected): sentiment, emotion, entity/topic extraction, **coordination detection** (cross-author near-duplicate), entity resolution, sentiment attribution; 15K-locality geo-resolution.
- **Correlation & forecast** — 100+ sub-national indicators (WB/FRED/IMF/census), elections 1992–2024, **40K geocoded polling stations**, EC pink-sheet OCR (Claude Vision); FastAPI + Next.js dashboard.
- **Governance-first & documented** — role-based module permissions, tiered access, admin curation gates, ADR-governed, audit/lineage fields; four-audience docs. Architected by me; team I hired &

mentored. ~1,100 files, 359 commits.

CWC Banking — Config-as-Code Core Banking

Production-bound · Fund Manager goes live at GRA Co-op Credit Union next month · architected & owned

- **Configuration-as-code** — posting templates, product versions, fee schedules, rates, limits, calendars, and tax rules are **versioned, effective-dated data**, not code: new product behaviour = new config over a small generic engine.
- **Auditable by construction** — single-writer ledger, **three-currency (IAS 21) on every journal line** with FX-rate IDs, immutable posted entries (reversals-only), transactional outbox + idempotency, maker-checker, multi-tenant.
- **Complete — matches and exceeds FlexCube** — 57 Gradle modules, ~200K LoC, **108 integration tests**, 69 runnable API workflows, 360+ doc pages; exceeds FlexCube on auditability (config-as-code, three-currency on every line, reversals-only, effective-dated versioning).
- Spring Boot 4 / Java 21; Oracle EE + PostgreSQL; Kafka outbox; Keycloak.

CW DevOps — Internal Developer Platform

Designed & built · the platform that runs my distributed team · being open-sourced

- **Provider-neutral developer platform** — 38 implementations across 11 categories (PM, VCS, CI, artifact, deployment, notification, docs, test, infra, LLM, coding), swappable at runtime via Python protocols. No platform lock-in.
- **Self-service infrastructure** — bundled **Terraform** for **AWS/Azure/GCP** (product templates + modules: VPC, RDS, ECS, ALB, IAM, ElastiCache, CloudWatch).
- **One pipeline, six CI platforms** — a Pipeline IR renders a single definition to GitHub Actions, GitLab CI, Azure, Bitbucket, Jenkins (Groovy), CircleCI.
- **Governed AI delivery** — autonomous Claude worker (ticket → implement → tests → auto-retry → MR) with a **compliance engine that blocks the merge on any violation**; MCP server (~30 tools).
- **Four developer surfaces** — CLI (34+ commands), a **VSCode extension** (sidebar + embedded AI assistant), web UI, and the MCP server — one source of auth/config across all.
- **Governance & insight** — policy-driven quality gates, DORA metrics, multi-tenant isolation; **self-hostable / air-gappable**. ~32,000 LoC, **2,682 tests**.

Also in the portfolio

- **CWC Universal Auth** — OAuth2/OIDC server, MFA (WebAuthn/FIDO2 → TOTP → SMS → Email), Spring Boot 3.4 / React 19, Keycloak, ModSecurity WAF.
- **Self-hosted data center & corporate AI** — on-prem private cloud (cloud-repatriation for cost); Open WebUI + Ollama, vLLM/LiteLLM behind PII/injection guardrails.
- **SYNCopated** — real-time collaborative music-instruction platform (Swift/SwiftUI iOS + Node/LiveKit; **<100ms MIDI/score sync**, on-device audio DSP & pitch detection, AI lesson summaries; TestFlight beta, 14 builds) · **NewsDiary** (iOS + Chrome MV3 social news reader) · **Insurance & ERP**.

EXPERIENCE

Cape Wesley — Founder & Principal Engineer / Architect

2024–Present · Remote (concurrent with ECS)

- Own architecture, engineering standards, and delivery across a regulated banking / IAM / ML / mobile portfolio.
- **Hired and built a globally distributed engineering team (Ghana, Rwanda, US)** serving clients across South Africa, Ghana, Pakistan, and the US.
- Set the ADR-driven governance model and 11-point engineering baseline; run the full build → deploy → verify lifecycle incl. air-gapped bank deployments.

Excenit — Co-Founder & Executive Director (*fintech startup*)

2019–2024 · Ghana / US · work subsumed into Cape Wesley

- Founded a regulatory-reporting & core-banking software company; **built the client base from zero** across Ghana & South Africa.
- Architected and led delivery of the RSS Bank platform (now the Cape Wesley flagship); owned product, engineering, deployment, and client relationships.

ECS — Senior Backend Engineer

2022–Present · Fairfax, VA

- Technical owner of the national-scale **USPS Change-of-Address** web application (cleared, SF-85P).
- **Led the WebSphere → WildFly migration with no prior experience in either** — learned both runtimes on the job and delivered.
- **Re-architected the application across major Spring Boot versions (1.x → 4.x).**
- **Built a custom email-queuing system** when organizational constraints precluded Kafka/ActiveMQ.
- **Re-architected authentication to a backend-for-frontend (BFF) model**, removing OAuth2 from the frontend apps; owned security & the Apache tier.

Mercatus Center, George Mason University — Senior Research Fellow & Director, Open Health Policy

2019–2023 · Arlington, VA

- Progressed *Research Fellow & Data Scientist* → *Sr. Research Fellow, Health Policy* → *Sr. Research Fellow & Director, Open Health Policy*.
- As Director: **built the HealthRegData product and a team of research scholars.**
- **Built the data-science team from the ground up** — RegCensus data platform + API + Python/R client libraries.
- Drove ML classification of regulatory text; mentored analysts and fellows to published co-authorship.

IMPAQ International — Research Associate / Task Lead

2013–2019 · Columbia, MD

- **Task lead** with significant client engagement across **multi-year, multi-million-dollar federal contracts** — **CMS (3), USDA / FNS, and DOL** (incl. a **randomized controlled trial in Malawi**) — delivering research, evaluation, and data-systems work.
- Designed technical-solution architectures for federal data systems (SNAP national database; point-of-sale capture); led econometric analysis and large-scale public/administrative data management.

Earlier — Ghana Banking & Software (2003–2007)

- **Infrastructure Manager, Fidelity Bank** — owned the Oracle 10g environment and core-banking rollout for a startup bank.
 - **DBA, Agricultural Development Bank** — Oracle + MS SQL Server, backup/recovery, capacity planning.
 - **Senior Developer & DB Consultant, Bsystems** — led full-SDLC delivery of a financial asset-management system for Ghana's largest insurer.
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LEADERSHIP & STANDARDS

- **Built three teams from scratch** — Mercatus data-science, Open Health Policy research scholars, CWC engineering.
 - **Mentorship-led management** — e.g., grew Mercatus analysts and fellows (R, SQL, research methodology) to published co-authorship; mentored junior engineers to deliver RegAuth and Vigil.
 - **Cross-border program management** — concurrent, high-stakes projects across Ghana, Rwanda, and the US; competing client timelines across four countries.
 - **Governance as architecture** — I treat engineering standards the way a bank treats controls (ADRs, tickets, tests, append-only audit). CW DevOps applies the same to AI: the model writes the code and opens the merge request, but a **compliance engine blocks the merge on any violation** — speed without surrendering control.
 - **ADR-driven governance** + an 11-point engineering baseline on every new project.
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EDUCATION

- **Ph.D., Economics** — Clark University, 2013
- **B.A., Computer Science & Economics (First Class Honors)** — University of Ghana, 2004

CERTIFICATIONS

- **PgMP — Program Management Professional (PMI)** — *in progress*. Formalizing a decade of running concurrent, high-stakes technical programs across distributed, multi-country teams.

OTHER

- **Adjunct Faculty, University of Baltimore** (2018) — university-level teaching; informs my mentorship-led management.
- **Languages** — English (native), French (working).
- **Selected publication** — “The Long-term Cognitive Consequences of Early Childhood Malnutrition,” *Journal of Health Economics* 32(6), 2013 — **179 citations** (Google Scholar). Plus federal Congressional/legislative testimony and 30+ policy papers (Mercatus). (*Full list available.*)