

KARABO OLIPHANT

Junior Software Engineer

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PROFILE

Junior Software Engineer with professional experience building production web applications for South African non-profits. Interested in distributed systems, backend engineering, and research-driven software development. Built production payment systems, implemented the Raft consensus algorithm from the original paper, and shipped software used by real organizations.

KEY PROJECTS

Spark — Programming Language Interpreter

Side Project

C# · .NET 10 · Pratt Parser · Tree-Walk Evaluator

GitHub: github.com/Omnivex3/Spark

- Built a specification-driven programming language and tree-walk interpreter from scratch in C#/.NET 10 with zero external dependencies — hand-written zero-allocation lexer, Pratt syntax parser, lexical scoping, first-class closures, and recursion.
- Delivered in phases (lexer → parser → evaluator) with a complete specification document and 223 automated tests. CI green on GitHub Actions.

Conductor — Raft Consensus Engine

Full Stack Developer

C# · .NET 10 · React 19 · TypeScript · SignalR · WebSockets · Vite

GitHub: github.com/Omnivex3/Conductor

- Implemented the Raft distributed consensus algorithm from the original research paper (Ongaro & Ousterhout, 2014) in C#/.NET 10 with zero external Raft libraries — leader election, log replication, election restriction, and the commit rule translated directly from the paper's pseudocode.
- Built a real-time React dashboard over SignalR WebSockets visualising a live 5-node cluster, with automated tests verifying the four core Raft safety properties. CI green on GitHub Actions.

Al-Taawun Fi Al — Donation Platform

Full Stack Developer

React · TypeScript · Vite · Tailwind · PayFast · Supabase · Next.js API Routes

Live: altaawunfial.org.za

- Built a donation website for a registered South African NPO enabling supporters to contribute via credit card and instant EFT through PayFast — the first online donation channel the organisation has operated. Custom MD5 signature generation with PHP-compatible URL encoding ensures secure ZAR payment processing.
- Designed a frictionless donation flow with zero account requirement and support for Islamic giving categories (Zakat, Sadaqah, Lillah, Waqf), architected as a hybrid SPA with server-side API routes and Supabase persistence.

ADDITIONAL EXPERIENCE

1. **EduTrack** — Class attendance tracker: refactored a 1,100-line monolith into a modular 26-file React/TypeScript architecture with typed hooks, CSV import/export, dark mode, and undo. Vitest tested, live at class-app-alpha.vercel.app.
2. **Mpumi Mtsweni** — Artist booking website with custom PHP email handler, responsive video hero, and CPanel deployment. Live at mpumimtsweni.co.za.
3. **5+ NPO websites** — Built and deployed websites for Joy At Work Day Care, Reyahola ECD Centre, Ndofaya Hospitality Academy, and Kganya Yabatho Dropping Centre. Each site serves a real organisation in Soweto and surrounding communities.

TECHNICAL SKILLS

Languages:	C#, TypeScript, JavaScript, SQL, PHP
Frameworks:	ASP.NET Core, React, Next.js, Node.js, SignalR, Tailwind CSS, Vite
Databases & Payments:	PostgreSQL (Supabase), PayFast (MD5 signatures, IPN, sandbox/production)
Infrastructure:	Docker, GitHub Actions CI, Vercel, CPanel, Git/GitHub, npm, CLI
Concepts:	Distributed Systems (Raft), WebSockets, REST APIs, CI/CD, Accessibility, Responsive design

EDUCATION

Level 4 National Certificate — Software Development

Sep 2025 — Present

DynamicDNA · Johannesburg, South Africa

National Senior Certificate (Matric)

2024

Completed with bachelor's endorsement