

STEPHEN TARTER

Senior Software Architect | Data Engineering & AI Professional

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PROFESSIONAL SUMMARY

A Senior Software Architect and AI/Data Engineering leader with over 30 years of experience building real-time simulation, embedded avionics, and cloud-native platforms. Co-inventor of patented container-based simulation technology, delivering Kubernetes-based, GIS-enabled systems for industrial safety and defense applications. Architected and deployed a cloud-native, freight platform on AWS from the ground up. Most recently designed and built the Roadrunner distributed vehicle simulation platform, demonstrating production-grade proficiency with Apache Kafka, Redis, Terraform, and React/TypeScript. Seeking to leverage deep expertise in scalable architecture and data pipelines to drive innovation in a Principal or Staff Software Architect role.

TECHNICAL SKILLS

- **Programming Languages:** Python, Java, C, C#, SQL, JavaScript/TypeScript, Bash
- **Cloud & DevOps:** AWS (EKS, ALB, Cognito), Kubernetes, Docker, Terraform, Azure, GCP, Jenkins, Azure DevOps, Git, CI/CD
- **Data, AI & Streaming:** Apache Kafka, Redis, AWS SageMaker, LightGBM, Scikit-learn, Optuna, Generative AI / LLM Fine-Tuning, MLOps
- **Platforms & Frameworks:** Spring Boot / Spring Framework, React, J2EE, EJB, Hibernate, Tomcat, nginx
- **Databases & Messaging:** Oracle, MongoDB, PostgreSQL, RabbitMQ, JDBC
- **GIS:** GeoServer, QGIS, OpenStreetMap, GDAL, WorldWind, MapBox
- **Operating Systems:** Linux, UNIX, Windows, Android, Embedded OS (Green Hills)
- **Legacy & Additional:** FORTRAN, various Assembly languages, BASIC, Perforce, X/Motif, MIL-STD-1553, ARINC 429

PORTFOLIO PROJECT

Roadrunner — Distributed Vehicle Simulation Platform | *Architect & Sole Developer* | Personal Project | 2025 – 2026

GitHub: [roadrunner](#) | Demo: [YouTube](#)

- Designed and delivered a mono-repository, full-stack distributed simulation system from scratch, demonstrating end-to-end architecture ownership across backend, frontend, and infrastructure layers.
- Built a high-performance Java/Spring Boot simulation engine using Hexagonal Architecture (Ports & Adapters), achieving sub-millisecond jitter tracking while managing dozens of concurrent vehicle simulations.
- Implemented event-driven telemetry with Apache Kafka (Strimzi operator, topic vehicle.position.v1), enabling asynchronous, low-latency vehicle position broadcasting and event-sourced state recovery at scale.
- Integrated Redis as a distributed caching layer for route geometry and Mapbox Directions data, eliminating redundant external API calls and ensuring low-latency simulation updates.
- Developed a React/TypeScript frontend with real-time MapBox map rendering, a first-person Driver's View, simulation playback controls, active-vehicle charting, and an interactive Criss-Cross route generator.
- Authored Terraform IaC (HCL) with modular workspace support for both local Minikube and production AWS EKS deployment, provisioning Kafka via Strimzi, Redis via Bitnami Helm charts, and TLS-secured ALB/NGINX ingress.
- Integrated AWS Cognito (OIDC) for user authentication, MapBox for geospatial routing, and WGS84↔UTM coordinate transformations for geospatial accuracy across long-distance simulations.
- Implemented CI/CD pipelines with GitHub Actions and containerized all services via Docker, deploying to Kubernetes on both local and AWS EKS environments.

PROFESSIONAL EXPERIENCE

Oway | *Chief Technical Officer* | Remote | Jun 2023 – Mar 2024

- Architected and delivered an AI-powered freight ride-sharing platform on AWS as the sole engineer, taking the system from concept to production deployment.

- Engineered a scalable, real-time matching system integrating MapBox for route optimization, Stripe for secure payment processing, and Auth0 for user authentication.
- Developed Python services leveraging AI models to automate translation of user shipment descriptions into standardized shipping codes, improving data consistency.
- Deployed all services on a Kubernetes-based architecture to ensure high availability, resilience, and scalability.

Wabtec | *Senior Software Engineer* | Fort Worth, TX | Sep 2018 – May 2023

- Led design and development of a “Geofence Protection for Rail Workers” system, utilizing Kubernetes and GIS (QGIS) to proactively alert and safeguard track personnel, enhancing operational safety.
- Integrated a GPS unit with a Windows-based system via RS-232 to provide real-time location tracking for critical railway assets.
- Served as Vice Scrum Master in an Agile environment, leading pull request reviews and contributing to multiple concurrent projects to ensure code quality and timely delivery.

ZedaSoft / Collinear Systems | *Senior Software Architect* | Fort Worth, TX | Oct 2001 – Jul 2017

- **Container-Based Architecture (CBA):** Served as one of the principal developers and a co-inventor for a patented Container-Based Architecture (US Patent 8,150,664), a Java and OpenGL framework that redefined real-time simulation performance across platforms from Android devices to multi-computer flight decks.
- **Simulation & Avionics Modernization:** Led the engineering effort to rehost the FAA’s Advanced General Aviation Research Simulator (AGARS) from legacy C code to the modern CBA solution, improving maintainability and extending simulator life by a decade. Integrated Garmin G1000 emulators and custom cockpit displays.
- **Defense & Commercial Programs:** Acted as principal engineer in collaboration with Textron on the Scorpion Jet attack plane simulator. Developed and integrated high-fidelity cockpit simulations for the F-22, F-16, F-35, AH-64, OH-58, and MH-60.
- **GIS & Systems Integration:** Established and managed a full GIS stack (GeoServer, OpenStreetMap, PostgreSQL, WorldWind) to provide foundational visualization and operational planning data for simulation systems.

Tensor Information Systems | *Senior Software Engineer* | Fort Worth, TX | Feb 2000 – Jul 2001

- Developed enterprise web applications using Java (BEA WebLogic, WebObjects, EJB) and Oracle databases on Windows NT, with deployment to UNIX production environments.
- Engineered and extended UNIX shell scripts to automate application configuration, monitor critical processes, and provide administrator alerting.

Lockheed Martin | *Senior Specialist* | Fort Worth, TX | May 1985 – Feb 2000

- Achieved an estimated \$20M in annual cost savings by leading the rehosting of simulation software to run on workstations with emulated flight computers, leveraging existing avionics models.
- Served as Technical Lead for Modular Test Stations, defining architectural design, reviewing baseline submissions, and mentoring junior engineers.
- Developed and maintained critical simulation software in FORTRAN and C to support testing and verification of F-16 Operational Flight Programs (OFP).
- Re-architected and implemented threat target models and interfaces, increasing supported target capacity fivefold while simultaneously improving execution efficiency.

PATENTS

- US Patent 8,150,664: Container-based architecture for simulation of entities in time domain.

CERTIFICATIONS

- AWS Certified Machine Learning – Specialty (2025)
- AWS Certified Solutions Architect – Associate (2025)
- AWS Certified AI Practitioner (2025)
- Certified Associate Python Programmer (PCAP) – Python Institute (2025)

EDUCATION

Bachelor of Science in Computer Engineering — Mississippi State University, Starkville, MS (1981-1985)

- Magna Cum Laude, University Honors Student