

Argha Ray

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Software engineer with nine years in production backend systems. Currently at Motorola Solutions — RBAC engines, HA PostgreSQL, deployment tooling, cross-service integrations across the WAVE PTX platform. Outside of work, deep into harness engineering — building the infrastructure layer that wires agents to tools, memory, and the real world. Built a 24/7 autonomous agent with its own cognitive architecture, structured knowledge system, and reasoning loops. Practitioner of context engineering: designing what goes into an agent's context window and why. Looking for roles at the intersection of agent systems and production-grade engineering.

WORK EXPERIENCE

Senior Software Engineer — Motorola Solutions

Aug 2021 – Present

Full-time | Bengaluru, India | Hybrid | Engineer → Senior (Aug 2023)

WAVE PTX is Motorola's subscription-based push-to-talk platform connecting teams across devices, networks, and locations. Worked across multiple codebases and teams — from the main provisioning portal to backend microservices to serverless device cloud infrastructure.

2026 — Microservices & Platform DB Teams

- **Authorization Service (Java, Spring Boot, PostgreSQL):** Owned the RBAC engine controlling access for all users across the Kodiak platform — six roles, thirty-five resource types, permissions encoded as hex bitmasks. Wrote the full API integration test suite (449 test methods, 666+ with parameterized expansion, 100% endpoint coverage). Added JSR-303 validation across all request models. Refactored the monolith — split request/approval flow into its own service boundary, extracted the expiration scheduler, pulled validation logic out of controllers. Removed a deprecated role and trimmed permissions based on actual usage analysis. Built the integration between AuthZ and CAT — twelve endpoints for external request management with pagination and cross-service token validation.
- **pgEdge / Asset Manager PostgreSQL (Python, PostgreSQL, Patroni, pgBackRest):** Helped design and validate the HA PostgreSQL backend for a new asset management service — 60TB of call recordings, two-year retention, replicated across two data centers. Built a Python wrapper around pgBackRest for automated backup/restore with monitoring (CPU, memory, disk I/O, WAL accumulation, page cache). Architecture: Active/Standby per site via Patroni, inter-site replication via pgEdge, PgBouncer for pooling, Consul for discovery. Ran the PoC end to end.
- **Universal Deployer (Bash):** Built a deployment tool for the team's shared test servers that became the team's daily driver. Twenty commands (deploy, rollback, status, logs, diff, lock/unlock, snapshot, audit, fix). Multi-user safe with deployment locking, per-user timestamped backups, health checks with auto-rollback, golden image management for config drift detection.
- **OnePortal Security Hardening (ASP.NET Core, C#, Angular):** Token sanitization and security refactoring. HTTP-only cookie enforcement, login validation hardening, JWE token cleanup across the portal's reverse proxy, authentication surface audit.
- **Agentic Engineering Workshop:** Ran a multi-session internal workshop on context engineering and agentic development — requested by senior management. Created slide decks, speaker scripts, and live demos. Also designed fifteen no-code agent blueprints for Google Workspace Studio.
- **CAT — Requests & Approvals (Java, Spring Boot):** Built twelve API endpoints for external request lifecycle with pagination, expiration scheduling, and authorization integration. CAT Server team.

2025 — OnePortal & Device Cloud Services

- **Kaiser Program — WiFi Enterprise Certificate Management (ASP.NET Core, C#, Angular, SQL Server, AWS S3, TypeScript, Lambda, IoT Core):** Biggest feature of the year. Cross-repo effort spanning the portal and serverless device cloud. Designed DB schema from scratch (four tables, migrations, triggers, batch expiration). Full certificate lifecycle APIs — upload to S3, replace with device remapping, expiration extraction, SFDC linking. On

the device cloud side, built a new Lambda handler with IoT topic rules for certificate distribution. Shipped across four environments over two months.

- **License Renewal & Expiry Webhooks (ASP.NET Core, C#):** Subscription lifecycle event system — renewal notifications, expiry webhooks, partial renewal handling, grace period logic, self-service renewal integration, multi-region (EMEA) support.
- **Mototrbo R7 DualMode Device Support (Angular, ASP.NET Core, C#):** Supported launch of a new dual-mode device (radio + cellular). DB migrations, registration flow changes, firmware upgrades, EMEA config. CSS integration with EVA token generation for Kodiak auth.
- **Reseller Portal & Bulk Operations:** CSV import for mass subscriber updates, bulk deactivation, bulk corporate name updates, license allocation.
- **KALKI Pilot (ASP.NET Core, C#):** Early access pilot — TLK140 device profile, MVNO activation/deactivation flows, reseller license allocation.
- **Production Incident Investigation (.NET, SQL Server, AWS CloudTrail):** Independently reinvestigated a portal outage. Found the actual cause (database connectivity disruption poisoning the connection pool) after the original RCA had been accepted for months.

2023–2024 — OnePortal Full-Stack

Full-stack ownership of Motorola's multi-tenant provisioning portal — Angular frontend + ASP.NET Core backend with 90+ database entities.

- **Device cloning:** Full multi-zone feature — Kodiak subscriber API, group API, portal UI, notifications, RBAC, cross-zone association. Patent candidate.
- **Carrier transition:** Managed Telna to WirelessLogic migration. New API integration, webhook updates, subscriber lifecycle changes. Received Moment Award.
- **Gateway management:** Full UI and API for Wave PTX gateway listing, editing, and task execution.
- **Notification center:** Redesigned with header-bar notifications, multi-app integration across OnePortal, CAT, and UGW.
- **EVA token & CSS integration:** Enterprise Voice Auth token generation for Kodiak PTT, DCS topic integration for Cloud Services Suite.
- **Webhook integrations:** OnePortal to DCS for real-time device state updates. License webhooks for SMP and reseller entities.
- **User preferences system:** Cross-app preference storage with Hangfire scheduling. Used by three portals.
- **SMP integration:** Multi-quarter work — license updates, user accounts, subscription management, reseller support.
- **Okta & Keycloak auth:** Server-side Okta token generation, OAuth flow implementation.
- **.NET and Angular upgrades:** Led major framework migrations across both stacks.
- **Load testing:** 5,000 subscriber load test for bottleneck identification in Entity Framework queries.
- **IPR analysis:** Identified seven patent candidates from the OnePortal and DCS codebases.

2021–2022 — OnePortal Ramp-Up

- Migrated six MVNO carrier APIs (BeQuick, Telna, IJJ, CiscoJasper, WirelessLogic, HotMobile) from .NET Framework to .NET Core. First test coverage the carrier layer ever had.
- Built the full device listing UI, device parameter configuration (WiFi, Bluetooth, APN, location, stun/unstun), and device actions — all integrated with AWS IoT device shadows.
- Okta integration, Entity Framework concurrency fixes, Unit of Work pattern implementation.
- By end of 2022: handling production deployments, code reviews, SIT/UAT support, and training new team members.

Software Engineer — First American (India)

Apr 2019 – Aug 2021

Full-time | Bengaluru, India | 2 yrs 5 mos

Properties Team

- Piloted the project — set up structure, created quick POCs that helped shape the product
- Built property search via map click, address search, and APN search
- Integrated xUnit framework for unit testing across projects
- Developed GlobalNav — a JavaScript library consumed at runtime across applications
- Designed reports: Property Detail, School Information, Transaction History using ActiveReports

Eagle-Status Team

- Extended multi-select dropdown, created custom drag-and-drop directives using DOM APIs
- Optimized AgGrid to load large row counts at startup
- Set up HMR (Hot Module Reloading) in Angular with .NET Core
- Fixed 20+ critical UI bugs that unblocked initial release

Member Technical Staff — First American (India)

Aug 2017 – Mar 2019

Bengaluru, India | 1 yr 8 mos

- Built zip code property search, REST APIs for property data from DataTree
- Built adapter layer for WCF to DTAPI migration
- Saved ~\$80K/year by implementing Static Street View instead of Panoramic View
- Wrote Terraform scripts for AWS infrastructure as part of cloud migration

Technical Trainee — First American (India)

Feb 2017 – Aug 2017

Bengaluru, India | 7 mos

- Redesigned the UI using razor views and jQuery
- Introduced unit testing, increased test coverage by 20%
- Migrated the project from MVC to WebAPI

SIDE PROJECTS

Vesper — Personal AI Agent | Python, FastAPI, Claude API, SearXNG

24/7 autonomous agent on a VPS. Telegram bot with cognitive architecture — seven modes of engagement, emotional signal detection, scheduled reviews, auto-research loops, wiki compilation. Guest web chat at vesper.argha.dev. Git-synced knowledge base (Helix) with 3,000+ markdown files. Docker on Oracle ARM VPS behind Cloudflare Tunnel.

TVOD Streaming Platform | NestJS, React, Shaka Player, Bunny Stream, PostgreSQL

Transactional video-on-demand platform. Two versions — self-hosted HLS (zero cost) and Bunny Stream CDN with per-segment token auth. Stream session tracking, JWT auth, same-origin reverse proxy. Swapping the delivery layer required zero changes to auth, sessions, or the player.

harnesskit — Agent Orchestration Framework | TypeScript, Model-Agnostic

Open-source framework extracting production agent patterns into reusable modules: tool registry, permission engine, query loop, context manager with cache-aware compaction, agent spawner, hook system, and model router. Three intelligence levels — rule-based (no model), hybrid (local model), full agent (cloud model) — same architecture across all three.

Helix — Personal Knowledge System | Markdown, Git, Python

Structured knowledge base that replaced a vector database (Milvus + Ollama embeddings). Four-layer architecture: immutable raw sources, active goals/decisions/journal, personal context, and cognitive architecture. Git-synced across MacBook, GitHub, and VPS. Powers Vesper's memory and every development session.

Jira Ticket Creator — VS Code Extension | JavaScript, VS Code Extension API, Copilot LM API

Zero-dependency VS Code extension for creating Jira tickets with AI. Single and bulk ticket creation with AI-generated summaries. Cookie auth for enterprise Jira behind SSO/IAP. Distributed to team via GitHub Releases.

OnlineExam | .NET 9, Clean Architecture, PostgreSQL

College project rewritten a decade later — Carter endpoints, MediatR CQRS, EF Core 9, xUnit, GitHub Actions CI. Twenty-plus endpoints with auto-grading.

argha.dev | Astro, Tailwind CSS, Cloudflare Pages

Personal blog and portfolio. Technical writing on streaming architecture, agent memory systems, and infrastructure.

TECHNICAL SKILLS

Languages	Java, C#, TypeScript, Python, Bash, SQL
Backend	Spring Boot, ASP.NET Core, NestJS, FastAPI
Data	PostgreSQL, SQL Server, DynamoDB, Redis, Kafka
Cloud & Infra	AWS (Lambda, IoT Core, S3), Docker, Cloudflare, GitHub Actions, Azure DevOps
Frontend	Angular, React
Agent Engineering	Claude Code, Prompt Engineering, Prompt Chaining, Context Engineering, MCP Servers, Tool Orchestration, RAG

EDUCATION

B.E. Computer Science — Atria Institute of Technology (now Atria University), Bengaluru 2012 – 2016

First Class with Distinction

Certifications: AWS Technical Essentials | Architecting On AWS

PUBLICATIONS

Crop disease classification using texture analysis

2016 IEEE RTEICT | ieeexplore.ieee.org/document/7807942

Image processing for sunflower crop disease detection using k-means clustering and ML classifiers. Accepted to IEEE Xplore.

ACHIEVEMENTS

- **Moment Award** — Motorola Solutions, 2026. Recognized by the India R&D Site Head for building the AuthZ API test suite (400+ test cases, 100% endpoint coverage), developing deployment tooling, and enabling the team through engineering training.
- **Moment Award** — Motorola Solutions, 2023. For Telna to WirelessLogic carrier transition for 10L+ customers.
- **IPR Analysis** — Identified 7 patent candidates from the OnePortal and DCS codebases (2023).
- **Quarterly Awards** — Best performance Q3 2018, Q4 2020 at First American.
- **Tech Talk Finalist** — Blockchain Transactions (2018), Home Warranty via IoT (2019) at First American.
- **International Informatics Olympiad** — State rank 52, Olympiad rank 771.
- **IEEE Conference Paper** — Presented at IEEE RTEICT 2016, accepted to IEEE Xplore.