

Abhinav Anand

Principal Software Engineer | Identity, Access & Data Platforms | Distributed Java Systems at Scale

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Summary of Qualifications

- 22 years in enterprise Java, 12+ of them architecting large-scale, highly available Spring services on Kubernetes across Azure, GCP, and AWS; currently technical lead of **AccessIntel**, Walmart's centralised authorization platform for HR and people data (15+ business-critical consuming applications, 3 production regions).
- Identity and access specialist: OIDC-compliant SSO for 4M+ customers across Walmart International; multi-issuer PingFederate OAuth2/OIDC validation, Active Directory/LDAP enrolment, XACML-style policy decision points with OPA/Rego, and a five-layer query-time security model (OAuth2, RBAC, row-, column-, and attribute-level security).
- Architected and shipped **Sage** (sage.walmart.com), Walmart's governed agentic-analytics platform, as sole engineer: ~186K lines across Java 21, TypeScript, and Python, governing thousands of certified tables for the enterprise; cut dashboard load from 20-30s to 2-3s with a Java 21 re-architecture.
- Distributed-systems delivery: Kafka access-log and change-data-capture pipelines, Cosmos DB and BigQuery at scale, Istio service mesh, read-through caches with stale-while-revalidate, single-flight, and negative caching; sub-minute real-time detection replacing a two-hour batch pipeline.
- Leads through metrics and architecture: chaired Walmart's Operational and Engineering Excellence Council (a weekly DORA-style scorecard with SLIs/SLOs across 20+ services), ran the weekly Cloud Cost Council that cut the portfolio's cloud run rate by 12-20% (roughly \$100K a year) through traffic-based right-sizing and environment decommissioning, authored 90+ Architecture Decision Records and whitepapers, and exposed governed data to AI agents through MCP servers (43 tools across two platforms).

Core Competencies

- Identity & Access Management (OAuth2, OIDC, SSO, JWT/JWKS, RBAC/ABAC, XACML PDP/PIP, OPA/Rego; PingFederate, Keycloak, Active Directory/LDAP, Auth0)
- Distributed Systems & Messaging (Kafka consumer groups, change-data-capture, Cosmos DB change feed, RabbitMQ, idempotent and fail-closed design)
- Caching & Performance (read-through and stale-while-revalidate caches, in-flight deduplication, connection-pool tuning, Java 21 Virtual Threads)
- Cloud-Native Engineering (Spring Boot 3, Spring Security, WebFlux, Kubernetes/AKS, Istio, Docker, multi-region deployment; Azure, GCP, AWS)
- Query-Time Data Governance (SQL AST parsing/rewriting; row-, column-, and attribute-level security; certified-table allow-lists)
- Operational & Engineering Excellence (SLIs, SLOs, golden signals, OpenTelemetry, Grafana, cost optimisation, change governance, ADRs)
- MCP & Agentic Integration (Spring AI MCP servers, tool-level authorization and audit, LLM gateways, RAG) and AI-augmented development (Claude Code, Copilot)

Tech Stack

- **Languages:** Java 21, TypeScript, Python, JavaScript, Rego, SQL
- **Frameworks:** Spring Boot 3, Spring Security, Spring AI, WebFlux, Hibernate/JPA, JUnit 5, React 19, FastAPI, LangGraph
- **Messaging & Data:** Apache Kafka, RabbitMQ, Cosmos DB, PostgreSQL (incl. pgvector), BigQuery, MongoDB, Redis, FAISS
- **Cloud & Platform:** Azure (AKS), GCP, AWS, Kubernetes, Istio, Docker, Jenkins, GitHub Actions, Ansible, Cloudflare, SonarQube
- **Identity & Observability:** PingFederate, Keycloak, Active Directory/LDAP, Auth0, Google STS, OneTrust; OpenTelemetry, Grafana, Prometheus, OpenObserve, Langfuse

Professional Experience

Principal Software Engineer - Walmart Global Tech - Bengaluru, India

Feb 2022 - Present

AccessIntel (HR Data Authorization Platform) - Technical Lead - Jul 2026 - Present

- Technical lead for the control plane of Walmart's centralised, XACML-style authorization platform that decides who may see or act on employee data for 15+ business-critical consuming applications across 3 production regions: a Java policy decision point with an OPA/Rego sidecar, a policy information point for subject and organisation attributes, and Kafka plus change-feed ingest keeping Cosmos DB in step with the HR system of record and the BigQuery warehouse.
- Designed and built the control plane from zero to staging in about five weeks: a Java 21/Spring Boot service, a TypeScript/React portal, and a Spring AI MCP server that observe decision traffic, API usage, consumer catalogue, and platform health and own access lists and alerts; 30+ ADRs and a 244-test suite that runs fully offline against a Keycloak realm shaped like PingFederate and a Cosmos emulator. Production rollout in progress.
- Identity model: multi-issuer PingFederate OAuth2/OIDC bearer validation with per-issuer principal-claim canonicalisation, a stateless Spring Security chain, and default-deny route authorization; Cosmos-backed allow-list as primary authorization with Active Directory nested-group membership as secondary, enrolled once per principal with single-flight lookups, negative caching, and directory outages surfacing as 503 rather than 403.
- Real-time detection architecture: joined the existing Kafka access-log topic as a second consumer group and made the service the OPA decision-log sink for every sidecar, cutting decision-to-alert latency from a two-hour batch to under a minute, with threshold, rate-versus-baseline, and never-seen rules, revision-aware alerts, and a containment runbook that proves a policy rollback landed.
- Data and performance: BigQuery repositories with keyset pagination and bound parameters; a per-verb read-through cache with stale-while-revalidate semantics and scheduled warming that serves ~97-second cold queries sub-second and keeps working when the warehouse is unreachable; minute-bucket aggregation for streaming counters; provenance endpoints publishing the exact SQL behind every screen.
- Agent-operable and private by design: 12 read-only MCP tools with tool-level authorization as a fail-closed AspectJ gate and an audit wrapper recording every call including denials, sharing service methods with the REST API; employee identifiers masked server-side, lookups keyed by event id rather than person, decision logs masked in the consumer's pod before transmission.
- Architecture governance: superseded a proposed self-issued second authorization token with an ADR establishing that authorization travels as audited identity assertions with a joinable audit trail, making revocation latency and delegation semantics explicit decisions rather than token side effects.

Sage - People Data Platform - Architect and Sole Engineer - Jun 2025 - Jul 2026

- Architected and shipped **Sage** to production at **sage.walmart.com** on Azure/AKS with BigQuery on GCP: Walmart's first governed agentic-analytics platform, where AI agents turn natural language into RLS/CLS-secured dashboards. Built as the sole engineer via a specification-first, AI-augmented workflow: first production release in ~5 months, 14 epics and 100+ stories, ~186K lines of code, 60+ ADRs.
- Designed the polyglot microservices architecture: Java/Spring Boot for authentication, RBAC, the REST gateway (single front door and sole owner of auth), and the MCP server; TypeScript/React 19 for the dashboard frontend; Python/FastAPI for the SQL security firewall.
- Built the five-layer security model enforced on every query, centred on a **Data Firewall** that parses each SQL statement into an abstract syntax tree and rewrites it per viewer through an ordered deterministic pipeline: variable resolution, filter-sentinel rewrite, an atomic CTE-aware certified-table allow-list pre-gate (one uncertified reference fails the whole query with 403, which is what makes agent-authored SQL safe), RLS predicate injection, SELECT * expansion to permitted columns, attribute-conditional masking, and CLS.
- Identity design: a strict two-token model in which the OIDC bearer comes only from the external IdP (PingFederate; Keycloak locally), is validated against IdP JWKS and never minted internally, while a backend context JWT carries authorization context and can never substitute for it; governed "view-as" delegation honoured by the firewall (RLS re-derived) with full audit attribution; RBAC single source of truth in Postgres; user-identity BigQuery scoping via Sign-in-with-Google OAuth2 and Google STS.
- Re-architected the Core query engine from Python to Java 21 (Virtual Threads, a refresh-aware three-tier Postgres-backed BigQuery cache with in-flight query deduplication), cutting multi-widget dashboard load from ~20-30s to ~2-3s.
- Governed-AI surface: an MCP server exposing 31 certified query tools with client allow-listing and multi-provider

OIDC validation, so agents (Code Puppy, Wibey, VS Code Copilot chat mode) run analytics under the same access controls as every other client; Sage agent definition distributed across three hosts with a version-staleness check; a LangGraph natural-language-to-SQL layer built behind a feature flag.

- Delivered an interactive Dashboard Builder (26 widget types, event-driven pub/sub, cascading variables with topological resolution) and end-to-end production observability (OpenTelemetry golden signals, Grafana alerting, OpenObserve logging, Azure Container Insights, Langfuse LLM tracing with PII masking).
- Production forensics: root-caused a 100-minute service hang to a HikariCP connection timeout exceeding the Postgres idle-session timeout and re-tuned pool lifetimes; fixed production-only HTTP/2 “protocol error” resets by sanitising hop-by-hop headers echoed into Istio/Envoy; resolved OAuth callback state mismatches caused by SameSite=Strict session cookies on cross-site redirects.
- **[Over-and-above] Security remediation, ULearn International reporting platform:** led an unplanned HackerOne bug-bounty and Snyk remediation, closing all 23 in-scope findings (15 Critical, 8 High) across 7 microservices under a 3-week SLA with zero production incidents; re-architected the JWT model (single mint point, server-side RBAC, no client-parameter trust) and built an 882-assertion SQL-injection regression suite retained as a permanent CI gate. Mentored an intern through delivery, coordinating their cross-team dependencies.

International Market Customer Engagement (Accounts, Identity) - Feb 2022 - May 2025

- Led technical initiatives for Identity, Profile, and Membership across Walmart International markets (Mexico, Canada, Chile).
- Architected OIDC-compliant SSO for the Digital Connections Program (Mexico), serving 4M+ customers with an 82% login rate; owned Bill C64 Phase 3 delivery for Walmart Canada, designing the Walmart Compliance Adapter and integrating OneTrust for centralised consent management.
- Chaired the Operational and Engineering Excellence Council for the Profile, Identity, and Membership domains: a weekly scorecard across 20+ services tracking cycle time, development cycle time, automated code coverage, Sonar blocker violations, open security vulnerabilities, unplanned-work share, change failure rate, DevOps maturity score, OE score, and per-application cloud cost against published targets, with SLOs, SLIs, and deployment governance enforced from it; chaired the daily Change Council for UI, orchestration, and backend layers.
- Ran the weekly Cloud Cost Council for the portfolio: custom cost models and dashboards flagged every spend movement, year-over-year traffic reviews right-sized pod counts per service, and idle test and dev environments were decommissioned, cutting the portfolio’s monthly cloud run rate by 12-20% (roughly \$100K a year); authored whitepapers on Java 21 patterns, the Privacy Compliance Adapter, and Single Identity architecture.

Principal Solution Architect - Applied Materials - Bengaluru, India

Aug 2020 - Feb 2022

- Led the Software Development Accelerator CoE; built code generators, drove tech-stack standardisation and cloud-native framework adoption.

Associate Director - Cognizant (Client: Apple) - Bengaluru, India

May 2016 - Aug 2020

- Delivered 15+ global projects across customer systems, including the Apple Jobs Portal and contact-centre tools.

Solution Architect - Custologix Solutions - Bengaluru, India

Mar 2015 - Apr 2016

- Developed a full-stack ERP for a retail customer and integrated ESL middleware.

Principal Product Specialist - X-ISS Inc. (HealthSignz) - Bengaluru, India

Jun 2014 - Mar 2015

- Architected an HPC monitoring and analytics tool used by global HPC customers.

Entrepreneur - Techworks Technologies Pvt. Ltd. - Kolkata, India

Nov 2009 - Jun 2014

- Founded a software-product startup; built Antida, a distributed P2P file-sharing solution; published 50+ mobile apps; developed JavaFX POS and embedded Java middleware.

Senior Software Engineer - Adept Software Avenues - Kolkata, India

Aug 2006 - Oct 2009

- Android, NFC, and J2ME projects including Visa Mobile and SIP-client apps.

System Engineer - Elecom Software Pvt. Ltd. - Kolkata, India

Jan 2004 - Jul 2006

- SCADA-based HMI software for industrial automation in Java.

Personal Projects (in production)

- **QuizWrap** (<https://quizwrap.com>, live since Nov 2025; formerly Quiz Ajit): free AI study platform generating quizzes and grounded chat from students' own notes. React 19/TypeScript; Spring Boot 3 gateway as the trust boundary (Auth0 JWT validation for Google/Apple/email, guest-token issuance, IP and user rate limiting); Python/FastAPI with FAISS retrieval; PostgreSQL; a LiteLLM gateway fronting a self-hosted Qwen2.5-7B with budget-capped OpenAI failover, now shared by two other products; Docker on Linode behind Cloudflare, GitHub Actions CI/CD, self-hosted OpenObserve over WireGuard. ~420 users in 60+ countries with zero paid acquisition; 22 ADRs; privacy-by-design analytics.
- **SeekAnswers.in** (<https://seekanswers.in>, live with payments since Jun 2026; founded by Anindita Sarkar, engineering partner): paid numerology readings plus an LLM chat guide on a credits model. Java 25/Spring Boot 4 (Spring Security OAuth2 resource server) serving a React 19 SPA; Python/FastAPI and LangGraph chat service; PostgreSQL; Firebase identity (Google, email, phone OTP) with stateless offline JWT validation and first-request user upsert; exactly-once credit grants under duplicate Razorpay webhooks via row locks; Java owns identity, money and deterministic engines while Python owns the AI path calling the same public API with the user's relayed token; SSE streaming with heartbeats and cancellation; a human-in-the-loop confirm gate so only a UI action spends credits; MCP server exposing readings to agents. 33 ADRs; first prize, Outskill hackathon capstone, Aug 2026.
- **Educational tools:** <https://sinhaacademy.com> and <https://ajitkids.com> (Hindi and English learning). **Writing:** technical blogging at <https://cyberaka.com>.

Recognition

- Demo Day presentations that helped the pillar win Walmart International's Best Pillar Engagement Award (Feb 2025); recognised for AI innovation and teamwork at Walmart's EBS Elevate GenAI Hackathon (Aug 2025).
- 11 peer-recognition badges at Walmart (2023-2026): Customer Champion, Impact Driver (x2), Innovation (x2), Inspirer (x2), Collaborator (x3), and Fire Fighter, for Bill C64 delivery, SSO, security remediation, and the Sage dashboard integration used in leadership reviews.

Certifications

- AI Engineering Program, Outskill, 2025 - 6-month intensive: LLMs, RAG, Prompt Engineering, Multimodal AI, AI Deployment
- Cyber Security (Using AI Tools), MSME-PPDC (Govt. of India), 2026
- Ethical Hacking, MSME-PPDC (Govt. of India), 2025
- Sun Certified Java Developer (2002)
- Sun Certified Java Programmer (2001)

Education

- Master of Business Administration, 2017
- Bachelor of Computer Applications, 2003