Aakash Kumar

Software & Cloud Architect
18+ Years Experience
AWS Cloud Certified (Pro + Security Specialty)

EMAIL: aakash.kumar1980@yahoo.com

LINKEDIN: https://www.linkedin.com/in/aakash-kumar1980

GITHUB: https://github.com/aakashkumar1980?tab=repositories

PHONE: +1 623 268 7048

Professional Summary

CLOUD-NATIVE ARCHITECTURE & MICROSERVICES

Accomplished Software and Cloud Architect with 18 years of experience in financial and technology domains, specializing in Java 21, Spring Boot, Vert.X, Kafka, and AWS (EKS/Kubernetes). Skilled in building scalable, high- throughput, event-driven platforms using CQRS, Saga, reactive frameworks, and caching strategies.

EVENT-DRIVEN SYSTEM

Designed and implemented an Offers Lifecycle platform on AWS EKS at American Express, using Apache Kafka to enable event-driven microservices. Kafka topics decouple services for campaign management, eligibility, assignment, merchant linking, and Saga-based flows.

PERFORMANCE ENGINEERING

Boosted throughput by 30%+ on high-TPS microservices by migrating to reactive Vert.X and introducing Redis caching. Applied advanced concurrency patterns with Java Streams and CompletableFuture to process customer profile, campaign budget, merchant risk, and enrollment checks in parallel — reducing assignment latency and improving overall customer experience.

RESILIENCE AND AVAILABILITY

Hardened platform resilience by embedding Resilience4j circuit breakers, retries with backoff, and fallback flows. Designed fault-tolerant microservices deployed in multi-AZ clusters on AWS EKS, ensuring zero data loss through idempotent event processing and dead-letter queue recovery. Automated incident workflows through CloudWatch alarms feeding into ServiceNow, accelerating detection and resolution.

SECURITY & COMPLIANCE

Implemented a multi-layered security model for sensitive financial data. Secured APIs behind API Gateway with WAF and Shield protections, integrated Okta federation with Cognito for identity and access, enforced IAM least-privilege policies, and safeguarded secrets with KMS and Secrets Manager. Delivered solutions aligned with PCI-DSS standards and organizational compliance policies.

DATA & ANALYTICS PIPELINES

Designed S3, Lambda, Spark pipelines to process merchant master, redemption transactions, and authorization feeds at scale. Enabled real-time analytics with Glue/Athena queries and partitioning strategies for campaign reporting and fraud analysis. Delivered self-service dashboards through QuickSight, empowering business teams with near real-time insights.

SCALABILITY & COST OPTIMIZATION

Architected services for elastic scale-out with AWS auto-scaling groups and Kubernetes horizontal pod autoscalers. Adopted serverless components (Lambda, Step Functions) for event orchestration, reducing infrastructure footprint and operational costs. Leveraged S3 lifecycle policies and Athena pay-per-query optimizations to keep analytical workloads both efficient and cost-effective.

Core Skills

Architecture & Patterns: Microservices, Event-Driven Architecture, CQRS, Saga, Domain-Driven Design, Reactive Programming (Vert.x, WebFlux), Circuit Breaker (Resilience4j), Caching Strategies

Languages & Frameworks: Java 21, Spring Boot, Spring Data, REST API (OpenAPI/Swagger), Concurrency (CompletableFuture, Java Streams, Multithreading), Python (data processing)

Data, Messaging & Stores: Kafka (MSK), AWS Kinesis (Streams, Firehose), SQS, Redis Cache, Couchbase, DynamoDB, Aurora, RDS, Amazon S3

Security & Compliance: OAuth 2.0, OpenID Connect (OIDC), Okta Federation with Cognito, AWS IAM, KMS, Secrets Manager, API Gateway, AWS WAF & Shield, HashiCorp Vault (legacy), Compliance via GuardDuty & AWS Config

Cloud & Platforms: EKS, Lambda, Step Functions, Glue, Athena, QuickSight, Kubernetes, Docker, Terraform, GitHub Actions CI/CD

Big Data & Analytics: AWS S3 + Glue + Athena pipelines, Apache Spark on S3, Reporting with QuickSight, campaign analytics via Athena queries

CI/CD & Quality Engineering: GitHub Actions, SonarQube, SAST/DAST Scanning, JUnit/Mockito

Observability & Operations: AWS CloudWatch, X-Ray, ServiceNow integration, Performance tuning, resilience testing, automated alerting

Work Experience

Software Architect
American Express (contract) | Phoenix, Arizona, United States   Apr 2023 - Present

Event-Driven Offers Platform on AWS
At American Express, I architected and led an event-driven microservices platform on AWS EKS to modernize the digital marketing offers ecosystem. The system was designed to scale reliably and allow independent team deployments, while orchestrating the end- to-end Offers Lifecycle — campaign setup and update, eligibility evaluation, merchant linking with budget controls, Saga-based cancellation, and redemption flows

Real-Time Data Pipeline
Built a Kinesis, Firehose, S3 pipeline to capture high-velocity impressions data. Lambda consumers enriched these streams in near real time, while Athena queries provided marketers with actionable insights on campaign engagement.

Stateful Data Management with Atomic Counters & Analytical Querying
Implemented DynamoDB to manage campaign state and budget counters, integrated with Aurora for complex analytical queries. Step Functions orchestrated approval workflows, ensuring compliance and audit trails for campaign changes.

Event Broadcasting & Low-Latency Processing and Caching
Utilized MSK (Kafka) to broadcast eligibility and assignment events. Vert.X processed with low latency, while Redis caching was applied for hot customer profiles and segment data. SQS DLQs ensured safe handling of failed messages.

Idempotent Writes & Data Processing with DynamoDB Streams

Designed DynamoDB conditional writes to guarantee single, idempotent enrollments. Enrollment side effects (notifications, reporting hooks) were triggered using DynamoDB Streams, Lambda, ensuring reliable processing.

Streaming Data Processing & Analytics

Built redemption flows on Kafka ingestion with Lambda-based enrichment and archival into S3 (Parquet format). Leveraged Glue Catalog + Athena to enable both ad-hoc and scheduled reporting on redemption trends and fraud analysis.

Data Lake Architecture

Established a data lake on S3 cataloged by Glue, queried through Athena, and visualized using QuickSight dashboards. Scheduled Lambda aggregations refreshed KPI datasets, enabling near real-time campaign and redemption reporting.

API Security Architecture & Compliance Automation

Secured APIs behind API Gateway integrated with Okta OIDC via Cognito. Applied WAF and Shield to protect from external threats, with IAM/KMS/Secrets Manager ensuring least-privilege, encrypted data, and secure secrets rotation. Monitored compliance and incidents via CloudWatch, X-Ray, and automated workflows into ServiceNow.

Software Architect
Infosys Limited | Pune, Maharashtra, India   Aug 2016 - Apr 2023

Architected scalable, cloud-native software solutions, leading the design and implementation of comprehensive architectural blueprints and system diagrams. Developed responsive web interfaces and robust backend services, leveraging AWS EKS for container orchestration and AWS S3 for secure, scalable data storage. Implemented event-driven microservices using Kafka to support real-time processing and decoupled workflows.

User Scoring Module

Designed and integrated a user scoring module to support credit risk assessment and personalized user experiences. The scoring engine ingested transactional and behavioral data from multiple sources, processed it in real time using microservices deployed on EKS, and stored scoring results securely in S3. The module incorporated configurable scoring algorithms, supported explainability for compliance, and exposed APIs for downstream systems to retrieve risk scores and trigger business workflows.

Security & Compliance

Ensured solutions adhered to PCI-DSS standards for credit card data, implementing multi-layered security controls:

Network Security: Used Amazon VPC for network isolation, private subnets for sensitive workloads, and security groups to restrict traffic.

Identity & Access Management: Enforced least-privilege access with IAM roles for service accounts (IRSA) in EKS, and granular S3 bucket policies.

Encryption: Enabled encryption at rest using AWS KMS for S3 and EKS secrets and enforced TLS for data in transit.

Monitoring & Auditing: Integrated AWS CloudTrail and CloudWatch for audit logging, alerting, and incident response.

Vulnerability Management: Automated container image scanning in CI/CD pipelines and enforced patch management for EKS nodes.

API Security: Secured APIs behind AWS API Gateway with WAF and Shield protections, and integrated Okta/Cognito for federated authentication.

Compliance Automation: Leveraged AWS Security Hub and Config to continuously monitor compliance with PCI-DSS controls and remediate deviations.

Lead Software Engineer

Trimble Mobility Solutions India Pvt. Ltd. | Pune, Maharashtra, India   *Oct 2011 - Aug 2016*

Developed system for handling large-scale streaming GPS data, utilizing Netty 3 Sockets and a JBoss Queue.

Senior Software Engineer

BNP Paribas India Solutions Pvt. Ltd. | Chennai, Tamil Nadu, India   *Apr 2009 - Oct 2011*

UI development was performed using the ExtJS 3 UI Framework for a reconciliation project.

Software Engineer

KPIT Cummins Infosystems Ltd. | Pune, Maharashtra, India   *Dec 2006 - Dec 2008*

Worked on the promotions section of the e-commerce website were based on the customer profile

Education

Bachelor's degree in electrical, electronics and communications engineering

Dr. Babasaheb Ambedkar Marathwada University | Aurangabad, Maharashtra, India   *Aug 1997 - Jun 2002*