AVENASH KUMAR

New York, USA
avenash.kumar@outlook.com · https://avenash-kumar.com/
https://www.linkedin.com/in/avenashkumar

Principal Engineer, Payments & Fraud Platforms

Principal with 11+ years of experience architecting high-scale, low-latency distributed systems across telecom, fintech, and security domains. Proven track record of designing resilient customer-facing platforms processing billions of transactions, with deep experience in fraud prevention, bot and abuse protection, web/API security, CDN, and edge security.

Expert in Java (Spring Boot, Reactive), microservices architecture, and cloud-native platforms including AWS, GCP, and Kubernetes. Experienced in designing defense-in-depth security architectures spanning CDN/edge controls, WAF, rate limiting, identity and access controls, application security, and real-time fraud and attack detection.

Experienced in leading cross-functional architecture initiatives, mentoring engineers, and translating complex security and business requirements into scalable, highly available solutions while driving technical strategy from architecture through production implementation.

Principle Engineer · Backend Developer · Cloud Engineer · Web Application Development · Web Security · Test Driven Development · Quality & Code Review · Continuous Integration · Continuous Deployment · Agile Development

Languages & Frameworks:	Java (8–21), Python (3.x), Spring Boot (MVC, Reactive, WebFlux), JavaScript, Node.js, Next.js, React
Messaging & Data:	Kafka, RabbitMQ, Redis, MongoDB, PostgreSQL, ElasticSearch
Cloud & DevOps:	AWS (EC2, Lambda, S3, ElastiCache, API Gateway), GCP (Cloud Run, Pub/Sub, Kubernetes Engine), Docker, Kubernetes, Helm, Jenkins, Datadog, SonarQube
Security, CDN & Edge:	Cloudflare CDN, WAF, Bot Management, Turnstile, Edge Security, Rate Limiting, DDoS/API Abuse Protection, Spring Security, JWT, Okta SSO
Security & Compliance:	PCI DSS, SOC 2, Encryption-at-Rest, Vulnerability Management, Penetration Testing
AI & ML:	LangChain, Llama 2, Mistral, Ollama, Hugging Face Transformers Claude Code (AI-assisted development workflows) Custom MCP Servers (LLM integrations, internal tooling, observability insights)

PROFESSIONAL EXPERIENCE

US Mobile, New York · May 2021 – Present

US Mobile is on a mission to revolutionize connectivity by helping to connect the next billion connected devices from smartphones to pet trackers and everything in between to wireless networks with a brand built around empathy.

Principle Engineer, Backend Developer: Design and implement scalable microservices for distributed design eco system using Java Spring Boot, Spring Reactive, RabbitMQ, MongoDB, and Google Cloud Services.

Responsibilities:

- Architected and built a real-time fraud decisioning platform using Spring Reactive that evaluates 200+ risk signals across customer, device, behavioral, and transaction domains with sub-200ms latency, protecting revenue while minimizing friction for legitimate customers.

- Architected layered **bot** and **automated-abuse** protection using **Cloudflare WAF, Bot Management/Turnstile, rate limiting, device/IP intelligence, and application-level fraud controls** to protect login, registration, checkout, and sim swap workflows.

- Designed and managed **Cloudflare CDN and edge-security controls**, including WAF policies, **traffic filtering, rate limiting, IP/network restrictions, TLS/security configuration**, and origin protection for high-traffic customer-facing applications and APIs.

- Implemented a **defense-in-depth security architecture** combining Cloudflare edge controls with Spring Security and backend fraud/risk decisioning to detect and mitigate credential stuffing, automated account creation, API abuse, and suspicious transaction activity.

- Developed monitoring and observability for bot/abuse activity using **Cloudflare security telemetry and Datadog**, enabling investigation of attack patterns and tuning of WAF/rate-limiting controls.

- Improved **fraud detection accuracy to 98.6%** by integrating adaptive decisioning and human feedback loops, enhancing customer trust and reducing false positives.

- Developed a **dark web credential monitoring system (Watchtower)** using Java Spring Boot and Redis to detect exposed customer credentials and send real-time alerts, reducing account takeover incidents by 31%.

- Led payment platform architecture and **compliance initiatives PCI DSS, SOC 2**, by designing secure Stripe PaymentIntent workflows, defining security controls, and integrating third-party vendors to support audit readiness and secure transaction processing.

- Rolled out **Okta SSO organization-wide**, strengthening security with MFA, centralized identity management, and streamlined access provisioning.

- Enhanced **infrastructure resilience and platform security** by integrating Cloudflare WAF/Turnstile, Spring Security, encryption-at-rest, automated vulnerability scanning, and penetration testing.

- Directed modernization of mission-critical Node.js microservices to Java Spring Boot, optimizing MongoDB performance, implementing multi-threaded RabbitMQ messaging, and leveraging Redis for high-throughput caching and operational scalability.

- **Architected and led development of AccessHub**, an internal access-management platform built with **Next.js, React, TypeScript, MongoDB, and Okta OIDC**, enabling employees to securely request and manage application access through centralized **RBAC, approval workflows, and audit trails**.

- **Developed data-intensive operational dashboards and internal tools using React and Next.js**, integrating real-time backend APIs to support fraud investigation, security operations, and engineering workflows.

- Architected an **AI-powered internal support platform (MCP-based)** by introducing an MCP service layer and leveraging existing APIs to enable real-time querying of logs and knowledge bases; reduced response times by 40% and engineering escalations by ~45%.

- Developed **Python services integrating LangChain, Hugging Face Transformers**, and local LLMs to support internal knowledge retrieval, workflow automation, and engineering productivity initiatives.

- Strengthened **system reliability and observability** using Redis, RabbitMQ, and Datadog, enabling high-throughput processing and faster incident resolution.

- Mentored 6+ engineers and led cross-team architecture initiatives, influencing backend engineering strategy, platform evolution, and technical roadmap decisions.

ENSCO Rail, Inc. Springfield, Virginia · **May 2020 – May 2021**
Since 1970, ENSCO has led the rail industry in developing new, advanced technologies for transportation, delivering solutions for the passengers, transit, and freight rail markets.

Software Engineer III, Full Stack Developer: Design and architect both Frontend and Backend systems using Angular 9, Spring Boot 2.3, and HiveMQ (MQTT 2020.2).

Responsibilities:

- **Architected and implemented a microservices-based platform** to process continuous IoT sensor data in real time using Spring Boot, WebFlux, and HiveMQ (MQTT).

- **Designed and deployed scalable backend services** with REST APIs, MySQL, and Redis caching, ensuring high reliability and maintainability across distributed rail operations.
- Implemented **CDN** and **edge-security controls** for customer-facing **web applications** and APIs, including **TLS termination**, **traffic filtering**, **rate limiting**, and secure origin access, improving application availability, performance, and protection against malicious traffic.

- **Engineered reactive streaming pipelines** to handle terabytes of sensor data with sub-second latency, enabling predictive maintenance and improved operational safety.

- **Delivered operator-facing dashboards** with Angular & Bootstrap, reducing reporting and inspection times by **40%**.

- **Secured mission-critical APIs** with Spring Security and JWT-based authentication, ensuring compliance with federal data protection standards.

- **Introduced centralized observability** with the ELK stack, reducing mean time to resolution (MTTR) for anomalies by **30%** and improving system uptime.

Experis™ ManpowerGroup · **Client - Verizon, Basking Ridge, New Jersey** · **October 2018 – March 2020**
Experis, a ManpowerGroup company is a world leader in the workforce solutions, creating and delivering services that enable its clients to get success in the changing world of work.

Senior Software Engineer, Backend Developer: Led migration of monolithic middleware and backend systems into Spring Boot microservices.

Responsibilities:

- **Led migration** of monolithic systems to Spring Boot microservices, improving scalability, modularity, and resilience.

- Designed secure access control layers with Spring Security & JPA, reducing unauthorized access incidents by **80%**.

- Improved throughput by **30%** with RabbitMQ, AWS SQS, and Reactive Spring, enabling reliable high-volume transaction processing.

- **Implemented AWS ElastiCache Redis**, boosting TPS by **10%** and reducing latency for critical services.

- Built a cost-efficient observability layer with AWS ELK + Fluentd, reducing incident resolution time by **25%**.

- **Enhanced container security** with Twistlock compliance scans and penetration testing (SQLi, XSS, CSRF).

MATRIX SYSTEMS PVT. LTD., Karachi, Pakistan · **January 2014 - November 2017**
US-based software company specializing in enterprise apps for financial firms including Citigroup http://www.citigroup.com, Fidelity Investments www.fidelity.com and Regent Atlantic www.regentatlantic.com.

Software Engineer, C++, Java Backend Developer: Assist in developing flagship software product MARS (Manage Account Rebalancing Service) for financial clients. Worked in Agile SCRUM and CMMI environments.

Responsibilities:

- Created **high-performance financial libraries** and a rule-based engine in C++, improving processing throughput by **23%**.

- **Refactored legacy systems** using asynchronous messaging using RabbitMQ, enabling non-blocking communication across services.

- Designed and developed a **Python-based workload orchestration** framework that distributed financial transaction processing across multiple servers, improving throughput, resource utilization, and operational scalability.

- Configured **Jenkins pipelines** and enforced TDD with SonarQube, Jacoco, and coverage tools, raising code quality across teams.

EDUCATION

Master of Science in Computer Science, December 2019
Maharishi International University, Fairfield, Iowa

Master of Science in Computer Science, August 2017 (Bronze Medalist)
National University of Computer and Emerging Sciences, FAST-NU, Karachi, Pakistan

Bachelor of Science in Computer Science, December 2014
University of Karachi, Karachi, Pakistan

- Collaborated with product, compliance, security, and engineering stakeholders to define payment processing requirements, fraud controls, and operational workflows supporting customer-facing transaction systems.
- Defined architecture patterns and engineering standards for scalable backend services, promoting consistency in resiliency, observability, and secure service-to-service communication across teams.