# BALA SUBRAMANYAM DUGGIRALA

Full-Stack Software Engineer
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## Summary

Full-stack engineer with **6+ years** designing, deploying, and scaling microservices and event-driven systems on **AWS**, leveraging **Java 11–17**, **Spring Boot 3.x**, and services like (**Lambda**, **API Gateway**, **ECS/EKS**, **MSK**, **S3**). Experienced in RESTful API integration, cloud-first modernization, and CI/CD automation using **Jenkins**, **GitHub Actions**, and **Cloud Build**. Proven track record in test-driven development, dual-database architectures, and Agile team collaboration across distributed environments.

## Skills

**Languages:** Java 11–17, Python, JavaScript/TypeScript, SQL, C, C++
**Cloud & DevOps:** AWS (ECS, EKS, Lambda), Docker, Kubernetes, Terraform, Git
**Frameworks:** Spring Boot 3.x, Spring Cloud Netflix (Eureka, Feign, Resilience4j), React, Flask, Django, Kafka, REST APIs
**Databases:** PostgreSQL, Oracle 19c (PL/SQL), MongoDB, MS SQL Server, Redis
**Testing & Monitoring:** JUnit 5, Mockito, Cucumber, pytest, Prometheus, Grafana

## Experience

**Graduate Research Assistant (Data)** **University of Nebraska–Lincoln** *Jan 2025 – May 2025*

- Developed an event-driven data pipeline (**Java Spring Boot** backend, Canvas click events → GCP Pub/Sub → BigQuery) that ingests **1M+** events/day; back-filled metrics to **Oracle 19c** via PL/SQL for executive dashboards.
- Built real-time **React+D3.js** dashboards and ran two-week Agile sprints with weekly stakeholder demos, boosting dashboard adoption by **30%** across multiple UNL departments.
- Enforced **85%** test coverage (**JUnit**); automated container builds and deployments via **Cloud Build** CI/CD.

**Graduate Research Assistant (GIS)** **University of Nebraska–Lincoln** *Aug 2024 – Dec 2024*

- Designed a RESTful **Java Spring Boot** API serving **100k+** preprocessed GeoJSON records; cached hot tiles in **MongoDB/Redis**, cutting map load times by **60%**; built an interactive **React+Leaflet.js (ES2022)** Nebraska map with user-location tracking, driving-distance & directions, and filterable choropleth outlines.
- Led iterative development and change management using **JIRA** and **Confluence** for Agile project-tracking and documentation, ensuring high code quality and effective collaboration across a cross-functional team (4 Lawyers+5 Data Scientists).
- Modernized the stack using **Docker**, **Nginx**, and **Spring Boot**, integrating observability via **Prometheus/Grafana**.
- Developed integration solutions using RESTful APIs and AWS microservices (**Java Spring Boot**, **Lambda**, **API Gateway**, **ECS/EKS**, **MSK**, **S3**) to connect vendor-supplied applications and deliver scalable GIS data services.

**Graduate Research Assistant (AI/ML)** **University of Nebraska–Lincoln** *Nov 2021 – Dec 2023*

- Conducted advanced research on scalable decision-making AI algorithms (**PBVI**, **I-POMCP-PF**) for multi-agent systems, involving intricate algorithmic analysis, and development of scalable solutions (to-be published).
- Optimized recursive tree structures and particle filter algorithms in **Cython** to eliminate Python runtime overhead, reducing execution time by **40%**; resolved memory leaks using **GDB** and **Valgrind**, significantly improving system stability.
- Accelerated multi-agent decision simulations leveraging GPU-enabled **TensorFlow** on **NVIDIA A100 and V100** nodes on the HCC Swan cluster; restructured agent policies to prune unreachable state–action subspaces and implemented hierarchical caching of state, action, and observation tensors to scale the system from 4 to **20+** agents.
- Engineered interactive **R Shiny** applications for real-time exploration of high-dimensional decision spaces.

**Programmer Analyst** **Cognizant, India** *Feb 2018 – Aug 2021*

- Decomposed a **50k LOC J2EE** monolith into **12 Java-11 Spring-Boot** microservices on **AWS EKS**, enabling independent scaling and achieving **99.95%** uptime; drove containerized modernization with **ECS** and **Lambda** services.
- Implemented **Resilience4j** circuit breakers and **Kafka** event streams on **AWS MSK**, reducing mean time-to-recover from outages by **65%**; collaborated with API gateway teams and integrated services via **MuleSoft** for robust orchestration and seamless connectivity between microservices.
- Designed **IBM DataStage** ETL jobs to process **5 TB/month** of insurance claims from **SQL Server** and **Oracle**, ensuring data integrity and efficient pipeline execution.
- Established **Jenkins** and **GitHub Actions** CI/CD pipelines guarded by **JUnit 5** and **Mockito** tests, achieving **zero** post-deployment defects across two customer portals (**~20k** users).
- Utilized **JIRA** and **Confluence** for Agile collaboration, sprint planning, and documentation; participated in iterative Agile sprints with onsite–offshore teams to ensure timely delivery and continuous improvement.
- Mentored junior developers and facilitated cross-team knowledge sharing to enhance cloud-first development practices and container orchestration.

## Education

**Master of Science** **University of Nebraska–Lincoln** *Aug 2021 – Aug 2025*
Computer Science (Thesis in AI/ML Decision Planning Algorithms)
**Courses: Advanced Software Engineering, Data Structures and Algorithms, Graph Algorithms, Cybersecurity & Cloud Computing, Databases, Computational Linguistics, Multi-Agent Systems**

**Bachelor of Technology** **SRM Institute of Science and Technology** *Aug 2013 – May 2017*
Electrical and Electronics Engineering

## Portfolio and Projects

- **Full-Stack Portfolio System: Spring Boot** backend with **JPA/Hibernate**, REST APIs, **React** frontend, **SQL Server** + **Flyway**, email notifications via **SendGrid**, and **Azure** CI/CD deployment — live site.
- **Equipment Marketplace:** Full-stack **ASP.NET Core MVC** app using **Entity Framework Core**, role-based access control, **Azure SQL** integration, and **GitHub Actions** CI/CD — live site.
- **Multi-Agent RL Combat Simulation: PyTorch**-based multi-agent system with **DQN** policy networks, configurable agent types (**RL**/heuristic/random), real-time strategy adaptation, and browser visualization on **Azure** — live site.