Ruo Liu

217-200-1083 | ruoliu.nj@gmail.com | github

Education

University of Illinois at Urbana-Champaign

Bachelor of Science in Computer Science; GPA: 3.83 *May 2024*

- Courses: Distributed Systems, Network, Database Systems, Algorithms and Data Structures, Machine Learning

Technical Skills

Languages: Java, Go, Python, JavaScript, TypeScript, C/C++, SQL/NoSql, HTML/CSS
Frameworks: Spring Boot, React, NextJS, Node.js, Gin, Django, gRPC, graphQL
Technologies: Git, Docker, Kafka, SQS, Kubernetes, Nginx, Redis, Terraform, AWS (SAA certified), OCI
Concepts: Agile, Frontend, Backend, System Design, Object-Oriented Programming, Linux, CI/CD

Projects

Tiktok ShortLink SaaS System | *Java, Spring Boot, Hibernate, Redis, MySQL, SQS* Jan 2024 - May 2024

Built Spring Boot SaaS platform to create, manage, and monitor short links; Support high-concurrency redirection functionality; Provide comprehensive stats for user demography and conversion analysis

- Migrated data query strategy from Redission locking to Bloom filter, improving **TPS by 5 times**
- Used **Kafka** to store and process data, reduced shortlink access traffic spikes, speeding up data processing by **22%**
- Utilized **Redis** to ensure idempotency of tasks in MQ, ensuring message consumption within 2 minutes
- **Optimized query response time by 55%** by sharding shortlink tables with ShardingSphere and adding routing table

Ticketmaster Clone | *NodeJS, NextJS, Express, MongoDB, k8s* June 2023 – Sep 2023

Built full stack ticket trading web microservices; allow user to trade and sell tickets; used Nats as MQ to ensure high scalability; handled concurrency with version control, using Docker with K8s for scalability

- Use **ingress-Nginx** for load balancing, allowing high availability and optimization of system resources, reducing query response time by **20%**
- Created robust Auth middleware using **JWT**, cookie, **Typescript**, **Express** allowing user login, ensuring user request privileges and system security
- Created cart, catalogue, and authentication page using **NextJS**, **Zustand**, and **TailwindCSS**
- Created scalable order service using **NodeJS**, **MongoDB**, and Stripe API, allowing easy payment through Stripe

Bank System | *Go, Postgres, AWS, k8s, gRPC* Mar 2023 – May 2023

Developed bank backend using go, allowing secure transactions between accounts and registration through email verification; create production deployment

- Migrate API calls from Gin to **gRPC** and gRPC gateway, reduce API response time by **78%**
- Handled deadlock issues using proper locking in **Postgres** table, and use **Gomock** for **74%** coverage unit testing
- Implemented access and refresh token using **PASETO**, creating reusable Auth middleware
- Deployed **k8s** with **AWS EKS** and **ECR**, load balancing with **Nginx**, allowing auto scaling, reduce system response time by **20%**

Distributed Transaction | *Go* Jan 2023 – March 2023

Implemented distributed nodes each with ability to handle new transactions from clients to maintain distributed accounts and transactions

- Used timestamped concurrency control for ACID properties in asynchronous system, allowing for **25%** more throughput than 2-Phase Locking approach
- Allowed clients to initiate, commit or abort transactions and get notified of the execution/failure of the transaction

Mini Amazon | *Java, Spring, MySQL, Kafka, Redis* Jan 2023 – March 2023

Developed Amazon clone with Spring Boot microservice, allowing user to sell and buy from website; Manage using Docker & Kubernetes, load balancing with Nginx; Monitor using Prometheus & Grafana

- Integrated **Kafka** enabling reliable and decoupled services, increased system throughput by **40%**
- Implemented caching with **Redis** storing frequently accessed data, reducing latency by **1-20X**
- Added rate limiting and circuit breaker by integrating **Resilience4J** for system resilience, allowing **12%** more system uptime
- Streamlined CI/CD pipeline with Github Actions to build, test, and publish Docker images, achieving **30%** reduction in lead time