Kaichen Qu

• +1 (442) 423-8213 • Email: kelsonqu@outlook.com • LinkedIn

EDUCATION

Northeastern University | San Jose, CA   *Sep 2023 – May 2026*
Master of Computer Science | GPA: 4.0 / 4.0
Coursework: Object-Oriented Design, Data Structures and Algorithms, Web Development, Database Management, Cloud Computing, Computer Networking

WORK EXPERIENCE

BMW Group | Shanghai, China   *July 2022 – May 2023*
Development Intern, R&D Department of New Technology │ Python, MySQL, React

- Developed **Python**-based automated test framework for automotive E/E chip validation, leveraged PyQt to build interactive GUIs for test execution and real-time data visualization, streamlined analyses and generating more than 100 technical insights.
- Refactored **SQL** queries of companies' databases in tech scope of automotive connectivity & security, cut retrieval time of startups and corresponding technologies by 30% and improved data processing accuracy.
- Co-maintained BMW Startup website by optimizing server configurations, trimming page latency by 30%. Refined recommend system to enhance search efficiency for articles and startups news on website, updated new login pages and UIs using **React**, resulting in a 20% increase in website visits and registration.
- Conducted data mining and analysis on 100,000+ historical trajectory and city map data, improving analytical precision through optimized **SQL** queries.

CDP Group | Shanghai, China   *July 2021 – Oct 2021*
Development Intern, Development Department │ React, Node.js, Bootstrap, Taro, Jira, Jenkins

- Built responsive web applications using **React** and **Node.js** for Youth China by creating 20+ **RESTful API**s to support various features and enhancing the UI / UX using **Bootstrap**, resulted in high customer satisfaction scores in follow-up surveys.
- Designed interactive WeChat Mini Program using **React**, developed personalized recommendation and real-time notification functions, increasing users by 20%.
- Set up **CI/CD** pipelines using **Jenkins** to automate deployment processes, saving teams 10 hours weekly previously spent on manual deployments. Utilized **Agile** workflows with **Jira** for faster development cycles, reducing deployment times by 30% and minimizing post-release issues by 15%.

PROJECTS

SaaS Short Link Platform | *Java, SpringBoot, SpringCloud, Redis, MySQL, RocketMQ, Apache ShardingSphere, Azure-Sentinel*

- Developed a high-performance short link platform utilizing **SpringBoot**, **SpringCloud**, **Redis**, and **MySQL** for efficient link creation and traffic redirection.
- Implemented message queuing with **RocketMQ** and optimized data handling by cache invalidation strategies, ensuring consistent performance under peak traffic.
- Applied **ShardingSphere** for horizontal database scaling to distribute traffic and optimize load balancing.
- Utilized **Sentinel** for traffic control and rate limiting, ensuring system stability during high concurrency scenarios, which achieves 10k TPS for link creation and 50k QPS for link redirection, even under sudden traffic surges.

Distributed RPC Framework | *Java, Netty, Zookeeper, Guava, FastJSON, Protobuf*

- Developed a distributed RPC framework in **Java**, enabling local services to register, publish and perform remote calls across RPC nodes, and optimized the framework to handle various scenarios effectively.
- Designed a proprietary protocol to address packet fragmentation, implemented custom encoders and decoders with support for **Java** native, **FastJSON**, and **Protobuf** serialization, and utilized **Netty** for non-blocking I/O communication, optimizing connection efficiency.
- Integrated **Zookeeper** for dynamic service registration and configuration, enabling client-side caching with LRU using **Redis**, achieving efficient **load balancing** based on consistent hashing which ensuring high availability and scalability.
- Applied **Guava-Retry** for idempotent service retries, implemented server-side degradation with fault and rate-limiting mechanisms, and developed a client-side circuit breaker for dynamic state transitions and fault recovery through periodic offline node probing.

Career Fair Registration System | *Python, Django, Next.js, Tailwind CSS, MySQL, AWS*

- Designed and developed a maintainable career fair registration platform using **Django**, **Next.js**, **Tailwind CS**S and **MySQL**, supporting high concurrent users in different roles.
- Developed secure **RESTful API**s using Django REST Framework, implementing **JWT** for user authentication and **OAuth** for third-party login integration, ensuring robust security for 30+ features.
- Integrated **AWS** Load Balancer and AutoScaling Group across multiple **EC2** instances, ensuring high availability and fault tolerance for public access.
- Enhanced content delivery by utilizing **Amazon S3** for efficient storage and retrieval of static assets, improving website performance and reducing latency.

Canvas-like Course Management System | *Node.js, React, Bootstrap, MongoDB, GCP*

- Developed full-featured course management systems using **React**, **TypeScript**, and **Node.js**, supporting teaching functions like courses, assignments, and quizzes.
- Implemented JWT-based user authentication with role-based access control and managed global state using **Redux** Toolkit for seamless integration of course content, submissions, and grading.
- Designed responsive UI for device compatibility using **Bootstrap**, achieving a modular codebase with 95% component coverage. Utilized **Axios** to send **RESTful API** requests from frontend platform, ensuring timely interactivity and maintainability.
- Optimized the course management system's scalability and cost-efficiency by leveraging **Google Cloud Platform's** serverless architecture. Utilized **Cloud Functions** to auto-scale resources, ensuring seamless integration of teaching functions and real-time interactivity.

SKILLS

- **Languages**: Java, Python, C/C++, SQL, JavaScript / TypeScript, HTML, CSS
- **Frameworks**: SpringBoot, Maven, Django, Node.js, Next.js, React, Bootstrap, Tailwind CSS
- **Tools**: Linux, Git, MySQL, MongoDB, Redis, MyBatis, Hibernate, AWS, GCP, Docker, Kubernetes, ElasticSearch, Zookeeper, Kafka, RocketMQ, gRPC, Jenkins, Jira