Kechen Liu

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Dedicated engineer passionate about technology, driven by continuous learning. Thrives in dynamic environments, eager to contribute to meaningful projects and foster continual growth in innovative settings.

EMPLOYMENT

Software Engineer | Industrial Placement | JPMorgan | Bournemouth, UK | Jun 2023 to Jun 2024

Software Developer at the DBPortal team, specializing in database inventory and metadata processing.

- Backend Development: Utilized **Spring, Spring Boot**, and Django Rest Framework (**DRF**) to create robust software solutions. Experience with RESTful and GraphQL APIs.
- Database Management: Managed and optimized **SQL** databases for efficient data retrieval and integrity.
- Automation: Developed Jenkins-based **CI/CD** pipelines to streamline automation and software delivery. Leveraged **Docker**, **Kubernetes**, **AWS**, and **Terraform** to design **cloud** solutions, enhancing deployment efficiency and system reliability.
- Software Engineering Practice: Designed and developed scalable, modular SaaS applications using microservices and client-server architectures with the **MVC** framework. Implemented **BDD** and **TDD** to ensure high code quality. Proficient in **version control** systems.

Cloud Engineer | Internship | NVIDIA | Reading, UK | Jun 2024 to Sep 2024

Cloud Engineer at Cloud Engineering and Security Team, sepecialzing at distributed systems and infrastructure.

- Spearheaded the redesign of application infrastructure by decoupling **ALB**, creating detailed design documentation, and ensuring scalability and robustness through modular architecture.
- Security Implementation: Configured Security Groups and Web Application Firewall (WAF) using **Terraform** to enhance security. Implemented access controls and real-time threat detection to safeguard critical services.
- **Kubernetes** Cluster Management: Led the migration from Kustomize to a **Helm**-based deployment. Developed common libraries, templated resource creation, and managed multi-cluster environments, leveraging **Envoy**'s benefits for load balancing and service discovery.
- Logging Pipeline & **Observability**: Established a comprehensive logging and observability pipeline using Grafana, Thanos, and **CloudWatch**. Automated dashboard creation and metric tracking through Infrastructure as Code (IaC), enabling proactive monitoring and quick issue resolution.

PROJECTS

ICS Virtual Machine | C, Computer Systems, Operating Systems | Jun 2024 https://github.com/kechenkristin/PA

The side project for ICS (Introduction to Computer Systems) course, focuses on various aspects of computer systems.

- Infrastructure and Debugging Tool: Implemented single-step execution, program state printing, memory scanning, expression evaluation, setting, and deleting watchpoints for robust debugging and infrastructure.
- Library, Driver Implementation, and System Integration: Developed C library functions, device drivers, and extended the NEMU emulator; integrated NEMU with Abstract Machine and Nanos-Lite for a real computer system.
- Performance Optimization and System Calls: Enhanced performance through debugging and context-saving mechanisms; implemented system calls and a virtual file system for comprehensive file operations management.

TCP/IP Protocol Stack | *C++, Networking* | Mar 2024 https://github.com/kechenkristin/cs144

Stanford's CS144 (Introduction to Computer Networking): A **C++** implementation of the **TCP/IP** protocol stack.

- Socket API and Reliable Data Transfer: Developed TCP stream sockets for web server connections, ensuring reliable data transfer through reassembly, timeout mechanisms, fast retransmissions, and cumulative acknowledgments.
- Congestion and Flow Control: Implemented sliding window protocols and pipelines to manage sender and receiver window sizes, utilizing piggybacked window size information and the AIMD algorithm for dynamic adjustment.
- ARP Protocol and Router Implementation: Created a network interface with ARP for translating Network Layer addresses to Link Layer addresses, including auto-learning through broadcast and the longest prefix-matching algorithm for routing decisions.

MyDB | *JAVA, Database Systems* | Sep 2023 to Dec 2023 https://github.com/kechenkristin/myDB

Side project for learning Carnegie Mellon University's 15445(Database Systems), skeleton code forks from MIT 6.830.

- Storage and Bufferpool Management: Optimized data retrieval with efficient storage architecture and bufferpool management using an **LRU** Replacement Policy.
- Query Execution and Optimization: Implemented operators for query execution (Sequential Scan, Filter, Join, Aggregation, Insert, Delete) and applied cost-based optimization techniques for improved query efficiency.
- Indexing and Transaction Control: Enhanced data access with **B+** tree indexing, achieved **ACID** transaction features through **Two-Phase** Locking and a timestamp-based deadlock detection algorithm, and implemented logging for checkpoint, rollback, and recovery.

EDUCATION

BSc Computer Science with Industrial Placement | University of Exeter | Sep 2021 to Jun 2025 | First Class

- Achieved **First** Class academic honors.
- Contributed to the international welcome team, organizing and coordinating events, fostering soft skills.
- Engaged in the Exeter Grand Challenge event week, enhancing creativity and presentation skills.

High school Attached to Yunnan Normal University - Gaokao (equivalent to A-level) | Sep 2018 to June 2021

High school Attached to Yunnan Normal University - Huikao (equivalent to GCSE) | Sep 2018 to June 2020

Self Learning Experience

CMU15213 (Introduction to Computer Systems), Stanford CS144 (Introduction to Computer Networking), CMU 15445 (Database Systems MIT 6.S081(Operating System Engineering), UCB CS61A (Structure and Interpretation of Computer Programs), UCB CS61B(Data Structures and Algorithms), MIT 6.824(Distributed Systems)

ACHIEVEMENTS

Global Excellence Full Scholarship Issued by University of Exeter 2021
Junction X Exeter Hackathon 2023 2nd
Vice President of Exeter Computer Science Society in 24/25 academic year

TECH STACK

Languages:
JAVA, Python, C, C++

Frameworks:
Spring, Springboot, Django, DRF

Infrastructures:
Cloud (AWS)
CICD (Jenkins, GitOps), Containerization (Docker, Kubernates), Observability, IAAC (Terraform)

Tools:
Maven, Version Control (Git), Helm, Kustomize, Envoy, Vault

Foundations:
Data Structure and Algorithms, Computer Networks, Computer Architectures, Operating Systems, Database Systems, Distributed Systems, Security

CERTIFICATIONS

Huawei HCIA-Artificial Intelligence

AWS Certified Cloud Practitioner

AWS Certified Solutions Architect – Associate

AWS Certified Developer – Associate

AWS Certified SysOps Administrator - Associate

AWS Certified Security - Specialty

AWS Certified DevOps Engineer - Professional

CKA: Certified Kubernetes Administrator

CKAD: Certified Kubernetes Application Developer

CKS: Certified Kubernetes Security Specialist

HashiCorp Terraform Associate (003)