Baixuan Ning

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Work Experience

Intel Nov. 2022 – Current

(Software Engineer) - FPGA Quartus Core Compiler Team Toronto, Canada

- Optimized a lightweight compiler's algorithms in C++, boosting frequency by 14% and narrowing the performance gap with the production Quartus compiler to 3.5%.
- Improved parallelism and efficiency in the lightweight compiler, reducing runtime by 15% and memory by 20%.
- Ensured a 100% pass rate for the Quartus compiler in a quality-of-results suite by meticulously resolving routing issues, addressing hold failures, and optimizing runtime outliers.
- Conducted a comprehensive analysis of routing congestion, reducing 5% routing issues for the compiler.
- Improved the lightweight compiler to support multiple routing graph data sources, increasing its versatility.
- Advanced compiler's debug capabilities by developing an automated monitoring tool and integrating key performance metrics, facilitating faster issue identification and resolution.

Kuaishou Technology Jul. 2021 – Dec. 2021

(Software Engineer) - Key-Value Storage Engine Team Beijing, China

- Engineered a high-performance hash-based key-value storage engine tailored for NVMe SSDs using C++, resulting in a 300% increase in write throughput and a 50% decrease in CPU usage during reads, outperforming RocksDB benchmarks.
- Developed core components including log builder, compaction, and multi-version concurrency control, enhancing the engine's capabilities in operations, recovery, garbage collection, and handling high concurrency demands.
- Diagnosed and resolved performance bottlenecks in RocksDB v6.20, optimizing the put/get operations of the memory table by approximately 7%.
- Extended TitanDB integration for Apache Flink State Backends in Java, achieving a 2x increase in read throughput and a 3x increase in write performance for large-value data scenarios.

Microsoft Jul. 2020 – Oct. 2020

(Software Engineer Intern) - Bing ObjectStore Team Remote

- Engineered a robust data comparison tool using Apache Spark, Apache Yarn, and Java Native Interface to ensure data consistency across ObjectStore's geographically distributed data centers, utilizing C#, Java, and C++.
- Boosted tool efficiency by implementing data compression and hashing, optimizing algorithms to minimize shuffle operations, refining comparison granularity, and fine-tuning Java garbage collection for Spark.
- Improved data comparison performance, enabling the analysis of 100TB across five data centers in 1.5 hours, marking a 19x increase in speed over the previous solution.

ByteDance Aug. 2019 – Apr. 2020

(Software Engineer Intern) - Message Queue Team Beijing, China

- Designed and implemented a distributed transoceanic data synchronization system for MySQL binary logs and Redis datasets using Apache RocketMQ in Java, ensuring data integrity, high availability, and consistent performance across data centers in Asia and North America.
- Optimized network performance to achieve 96% cross-ocean bandwidth utilization, reduced P95 latency to 70ms, and scaled throughput to 80,000 TPS on a single node.
- Fortified the web backend by integrating RocketMQ management, user authentication, scheduled tasks, alerts, and monitoring features in Go, leveraging ByteDance Cloud Platform's capabilities.

Projects

Distributed KV System: Implemented consensus algorithm with log replication, leader election and error recovery.
LSM-based KV Storage Engine: Designed a fault-tolerant storage engine with write-ahead logging process.

Skills

Languages: 2 years of work experience in C/C++ and Java; have experience with Go, C#, Scala, Python.
Systems: have experience in Quartus, RocksDB, Apache Flink, Apache Spark, Apache RocketMQ, Apache Yarn.
Tools: experienced in Linux, Git, Gprof, VTune, Docker, CI/CD; familiar with team tools like Jira, GitLab, Swarm.

Education

University of Toronto Toronto, Canada

M.Eng. in Computer Engineering; Grade: 3.84/4.0 Jan. 2022 – Jun. 2023

Beijing University of Posts and Telecommunications Beijing, China

B.Eng. in Computer Science; Grade: 88.2/100 (Top 15%) Sep. 2017 – Jul. 2021