

# Baixuan Ning

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## WORK EXPERIENCE

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### Intel

Nov. 2022 – Current

(Software Engineer) - FPGA Compiler Team

Toronto, Canada

- Ensured a 100% pass rate for hold closure for the Quartus place-and-route tool in a quality-of-results suite by meticulously resolving no-routes, addressing hold failures, and optimizing runtime outliers.
- Optimized a lightweight research router's algorithms, narrowing the frequency performance gap to the Quartus place-and-route tool to 3.5%.
- Improved parallelism and efficiency in the lightweight router, reducing runtime by 15% and memory by 20%.
- Conducted a comprehensive analysis of routing congestion, leading to significant routability enhancements for both lightweight and incremental routers.
- Improved the incremental router to support multiple routing graph data sources, increasing its versatility.
- Advanced router'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 back-end by integrating RocketMQ management, user authentication, scheduled tasks, alerts, and monitoring features in Go, leveraging ByteDance Cloud Platform's capabilities.

## PROJECTS

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**Distributed KV System:** Implemented consensus algorithm with log replication, leader election and error recovery.  
**Log Search System:** Extended distributed search feature for Compressed Log Processor using Celery and RabbitMQ.  
**LSM-based KV Storage Engine:** Designed a fault-tolerant storage engine with write-ahead logging process.

## SKILLS

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**Languages:** most experienced with C/C++ and Java; some experience with Go and C#; dabbled in Scala and Python.  
**Systems:** have experience in Quartus, RocksDB, Apache Flink, Apache Spark, Apache RocketMQ, Apache Yarn.

## EDUCATION

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### University of Toronto

M.Eng. in Computer Engineering; Grade: 3.84/4.0

Toronto, Canada

Jan. 2022 – Jun. 2023

### Beijing University of Posts and Telecommunications

B.Eng. in Computer Science; Grade: 88.2/100 (Top 15%)

Beijing, China

Sep. 2017 – Jul. 2021