

Richard Liu

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Work Experience

Flexport

SOFTWARE ENGINEER II

San Francisco, CA

February 2020 - present

- Tech lead on Reporting & Analytics team, newly spun up to modernize legacy codebase written in Rails.
 - Team owns client-facing Reporting and Analytics products, which provide clients with a birds-eye view of their business.
 - Led team in building new features, including On-time Performance Analytics and support for shipment tracking as a service
- Mentored three engineers onboarding onto team. Primary interface with other engineering teams as well as with business stakeholders.
- Led team initiative to eject Reporting and Analytics products from the Flexport monolith.
 - **Primary owner of rearchitecture design effort** for SOA migration. Developed plans for converging data infrastructure with internal data analytics organization and integrating a future service with Snowflake and Looker.
 - Working with other teams owning data dependencies to transition reporting data updates from polling to event-driven.
- Identified and resolved performance bottlenecks across both Reporting and Analytics products.
 - Parallelized CSV and JSON rendering. **Decreased p95 response times by 75% and enabled p99 to load (previously timeout).**
 - Implemented prototype enabling **further 80-90% speedup**, to be implemented as part of SOA migration rewrite of DB interface.
 - Rebuilt analytics to perform computations in backend, not frontend. Decrease in bandwidth required; sped up load times by 80%.
 - Eliminated parallel set of analytics data caching jobs, **saving 6000 thread-hours of CPU time** every month.
- Led initiative to improve team's engineering quality. Independently identified and implemented enhancements to system stability.
 - Built observability for backend by reporting health metrics (error rates, data lag, etc.) and creating Datadog dashboards.
 - Improved error handling for gRPC calls, introduced dead letter queue to prevent repeated alerting while keeping error signal.
- Led team of three engineers in implementing a comprehensive update of data fields available in the Reporting product to clients.
 - Updated and/or added a total of 300 distinct data fields, while delivering a refactor of the backend to reduce redundant code.
 - Identified and fixed multiple issues (e.g. access control, data filter compatibility) as primary owner of pre-rollout testing.
 - Implemented tooling to enable phased rollouts of new data fields without needing deploys. Reused in future projects.
- Consolidated fragmented legacy data pipeline into unified data denormalization infrastructure.
 - Decreased system complexity and **lowered data lag** from application update to availability **from 2 hours to 15 min.**

Google

SOFTWARE ENGINEERING INTERN

Kirkland, WA

May 2019 - August 2019

- Designed and implemented general framework for triggering event messages on state transitions in resource management FSM.
- Decoupled event publishers from consumers over message queue, and implemented prototype event consumer.

Blend Labs

SOFTWARE ENGINEERING INTERN, DATA

San Francisco, CA

May 2018 - August 2018

- Designed and implemented data pipeline engine in Apache Spark. Decoupled data model and transform definitions from execution.
- Enabled scaling pipeline by adding more cores. This enabled faster data refreshes, and higher ingestion frequency (1 hr to 15 min).

SOFTWARE ENGINEERING INTERN, INFRASTRUCTURE

May 2017 - August 2017

- Deployed Zipkin (distributed tracing system), enabling request lifecycle monitoring in production.
- Implemented example tracing client, run on internal services and monolith as TypeScript middleware.

Education

University of California, Berkeley

B.A. COMPUTER SCIENCE. MAJOR GPA: 3.93, DEPARTMENTAL HONORS W/ HISTORY CONCENTRATION

2016 - 2019

- Research Assistant @ RISELab working on RLlib (distributed reinforcement learning)
- Course Reader for CS 162 (Operating Systems). Graded homeworks and exams, and contributed to office hours.
- Chief of Staff for the Technology Office of the ASUC (Student Government), ML Team Lead for berkeleytime.com
- Member of Upsilon Pi Epsilon (CS Honors Society)

Selected Awards

- 2018 **Student Fellow**, 8VC
- 2016 **Gold Division**, USA Computing Olympiad. Note: Gold was previously the highest tier possible.
- 2016 **2nd Place**, US Department of Energy National Science Bowl
- 2016 **Semifinalist**, USA Physics Olympiad

Tooling

Languages: C, C++, Java, Python, Ruby on Rails, Typescript, React, GraphQL | Tools: Pytorch, OpenCV, Docker, Cloudformation, Redshift, Spark, LaTeX