Aneesh Durg

Email: aneeeshdurg17@gmail.com | Website: aneeshdurg.me | Github: github.com/aneeshdurg

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WORK EXPERIENCE

Senior Software Engineer
Bodo.ai — remote

Jul 2023 - Present

- Developing the core engine - an optimizing compiler and scalable distributed runtime (using **MPI**) for **SQL** and python/pandas workflows.
- Designed and implemented a distributed streaming external sort operator capable of sorting larger than memory streams of rows and applying a limit during the sort operation, while being **2x** faster than the original in-memory implementation in some benchmarks.
- Built profiling/tracing infrastructure to analyze and optimize query performance
- Expanded **Iceberg** support by implementing **DDL** operations and adding integrations with the **AWS Glue** catalog
- Expanded compiler and runtime support for data types and operations for snowflake **SQL** compatability.

Senior Software Engineer/Team Lead
KatanaGraph — Austin, TX

Feb 2021 - Jun 2023

- Worked on building a distributed graph compute engine that provides AI, analytics, and a graph database.
- Lead a team of **5** to implement and support graph database querying and ingest.
- Implemented compiler and runtime support for the **Cypher** query language.
- Designed and implemented novel high performance algorithms for distributed subgraph pattern matching (tested on ~**20B** nodes, **44B** edges)
  - Improved performance by **100x** in queries against the **LDBC-SNB** datasets and reduced memory usage by over **95%** on benchmarks simulating specific client workloads.
- Designed and implemented hotswap mechanism to enable testing new code on existing **kubernetes** deployments - reduced iteration time by **30x**
- Built infrastructure for benchmarking the query engine in isolation from the rest of the product using **slurm**

Member of Technical Staff
Qumulo — Seattle, WA

Aug 2019 - Feb 2021

- Worked on building a distributed scale-out filesystem, supporting both on-prem and cloud.
- Designed and implemented a solution for reducing server downtime during upgrades by **10x** in a team of four
- Implemented **SMB3.1** support and features, and extended platform support for two new hardware configurations
- Lead migration of **python2** code to **python3**, and introduced enforced type checking via **mypy**

RESEARCH EXPERIENCE

Research Assistant
University of Washington

Apr 2024 - Present

- Investigating the role runtime reconfigurable networking will play in large scale distributed graph applications
- Benchmarking the effect of changing network topology on real world distributed graph databases
- Built a framework to enable running existing applications (such as distributed graph databases) in customizable network topologies
  - The project is availible at: https://github.com/aneeshdurg/toposim

EDUCATION

University of Illinois at Urbana-Champaign

Aug 2015 - May 2019

Recieved BS in **Computer Science & Mathematics** with **High Distinction**

PROJECTS

rainbow
https://github.com/aneeshdurg/rainbow

- Static analysis tool for **C/C++** to reject semantically invalid callgraphs, powered by **clang** and **Cypher**
- Provides an ergonomic way for users to label functions and lambdas and to define relationships between those labels that should be considered invalid. Some example usecases are:
  - Prevent functions that assume locks are held from being called without a lock
  - Prevent functions using collective **MPI** operations from being called during another collective operation
  - Prevent secure functions from being called from insecure contexts

spycy
https://github.com/aneeshdurg/spycy

- An in-process graph database library for python that implements a **openCypher** frontend
- Provides implementable interfaces for data sources to enable querying real world graphs.
  - Wrote a demo that uses **spycy** and **WASM** to filter HTML nodes in a browser using **openCypher**

What Is a Filesystem?
https://aneeshdurg.me/what_is_a_filesystem

- An online interactive book/visualization for students learning filesystem concepts.
- Implements a interactive **ext2**-esque filesystem simulator with animations to illustrate disk accesses
- Features a terminal simulator demonstrating how standard **GNU/Linux coreutils** might interact with the disk.