Scheduling Jobs Across Geo-distributed Datacenters
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Motivation and System Architecture
- Tasks of the jobs are distributed across the datacenters for data locality to save bandwidth and completion time.
- The imbalance in tasks distribution and the workloads at each datacenters necessitate new scheduling techniques.

Reordering-based Scheduling Approach
- Serve as a post-processing adjustment to improve any scheduling results.
- Yield the resources to other tasks if not hurting its job’s overall completion time.
- Provably do no harm to the average job completion time for any job scheduling.

Workload-Aware Greedy Scheduling (SWAG)
- A generic scheduling solution that computes the job order for all the jobs.
- Prioritize the jobs based on estimated finish times along with current workload.
- Greedily schedule the job that can finish quickly across all the datacenters.

Performance Improvements
- ★ SWAG and Reordering result in a significant performance improvement, up to 50% and 30% respectively, over SRPT-based scheduling.
- ★ SWAG and Reordering improve average job completion time while maintaining reasonable fairness, even for the large jobs, compared to SRPT-based scheduling.

Fairness
- ★ The biggest improvements are observed when the system is highly-loaded or there exists a high skew in workload, either in job sizes or in task assignments.

Performance Sensitivity
- ★ Without workload skew or in lightly-loaded systems, SWAG and Reordering exhibit similar performance compared to SRPT-based scheduling.

Summary and Extensions
- SWAG vs. Reordering
  - SWAG provides greater improvements with reasonable overhead.
  - Reordering is light-weight and easily added to any scheduling approach.
- Heterogeneous datacenter capacity (#slots)
- Scheduling jobs with DAG of tasks
- Flow scheduling for intermediate data shuffling