Principles of Distributed and Parallel Database Systems

Parallel Sorting and Joins

Ira A. Fulton Schools of Engineering
Arizona State University

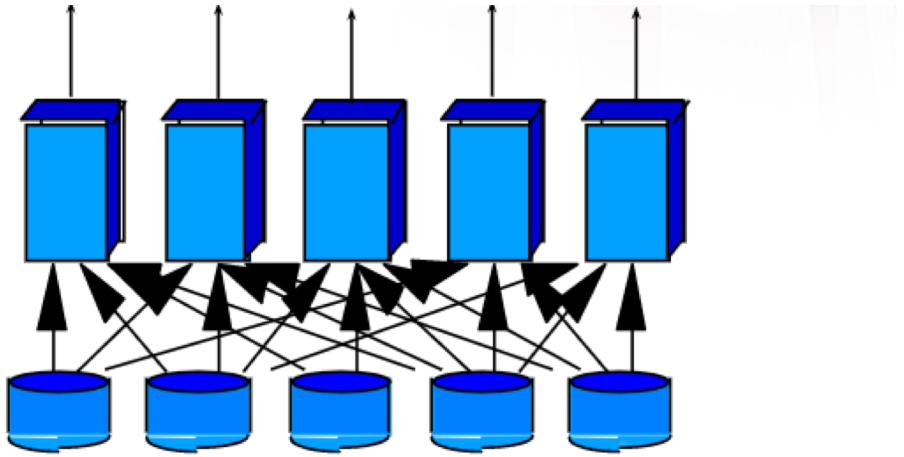
Objectives

Objective

Understand major parallel database architectures

Parallel Sorting

- Idea:
  - Scan in parallel, and range-partition as you go.
  - As tuples come in, begin “local” sorting on each
  - Resulting data is sorted, and range-partitioned.
  - **Problem**: skew!
  - **Solution**: “sample” the data at start to determine partition points.



Parallel Joins

- Nested loop:
  - Each outer tuple must be compared with each inner tuple that might join.
  - Easy for range partitioning on join cols, hard otherwise!
- Sort-Merge (or plain Merge-Join):
  - Sorting gives range-partitioning.
  - Merging partitioned tables is local.

Complex Parallel Query Plans

- Complex Queries: Inter-Operator parallelism
  - Pipelining between operators:
  - Bushy Trees