Deep Data Partitioning in MapReduce

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What is a data partition?

- Groups data into logical sets.
- Allows for smaller data reads.
- Faster queries.
Example

- Customers database, partitioned on country.
- School database, partitioned by class code.
What is a deep data partition?

- Also known as a “nested” partition.
- Multiple partitions within each partition.
- Greatly minimize data reads.
Example

- A user database has a state, first_name, and last_name column.

- **Layout:** state/last_name/first_name

- **Example:** shire/baggins/bilbo
Difficulties with deep data partitions

- Partition cardinality.
- Data locality during processing.
Naive implementation

Partitions

Reducers

1 2 3 ... n
1 2 3 ... j
Dynamic Fractional Partitioning

1. Collect metrics in previous MapReduce job.

1. Compute partition size relative to data set.

1. Assign reducers by partition size ratio.
Partition metrics

1. Count full partition paths.
   a. Eg: shire/baggins/bilbo == 1

1. Sum them all up to get a total per partition.

1. Find the ratio of each partition to the whole.
Dynamic Fractional Partitioning

Reducers

Partitions

1 2 3 4 ...

1 2 3 4 ...

...
Thanks!

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