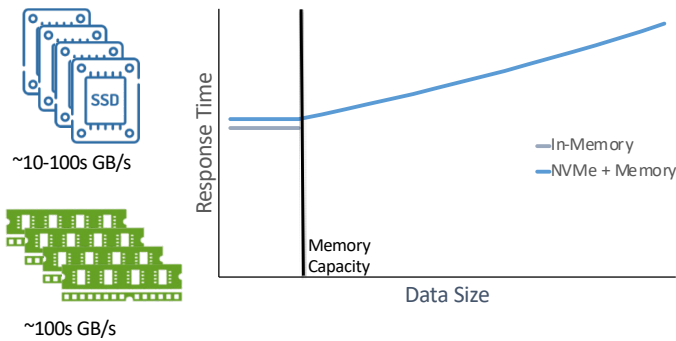


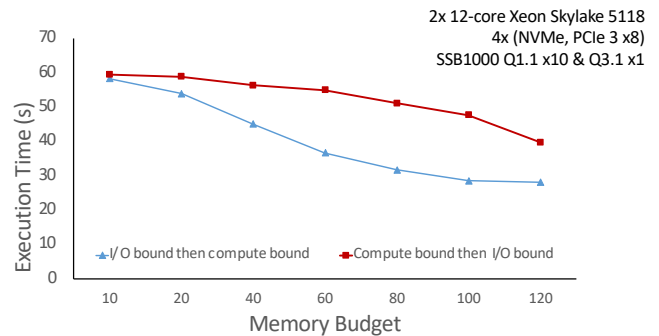
HPCache: Memory-Efficient OLAP through Proportional Caching

Hamish Nicholson, Periklis Chrysogelos and Anastasia Ailamaki

Fast Analytics Demands Memory

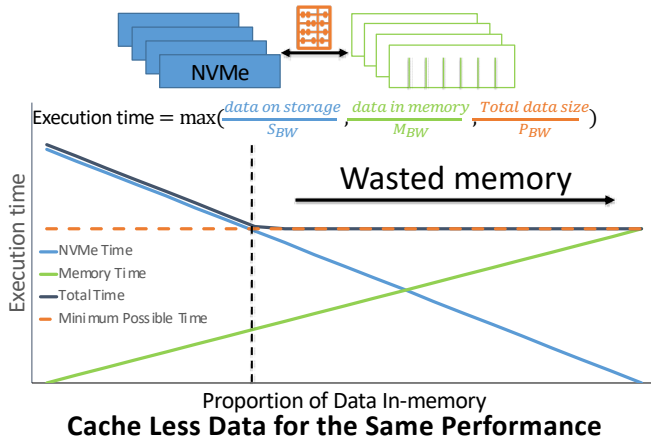


NVMe Requires New Caching Policies



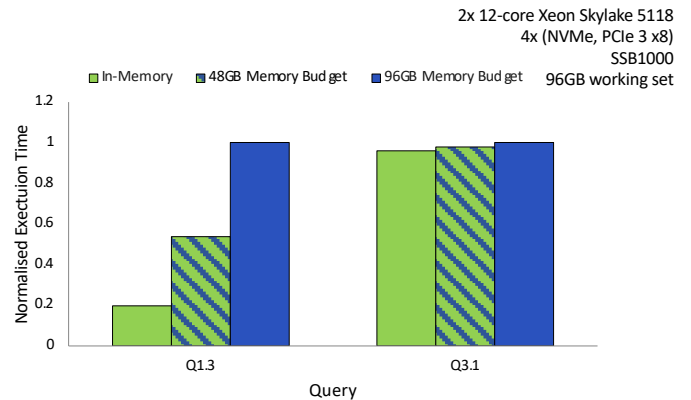
Need Efficient Memory Use to Scale to Large Datasets

Match Scan Time to Processing Time



High-bandwidth Storage → Opportunity for Better Caching

Match Processing Time for In-Memory and On-Storage inputs

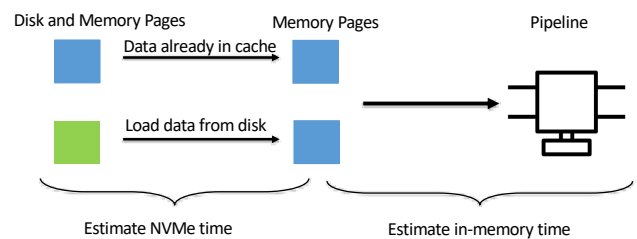


Caching without Query-Info Wastes Performance

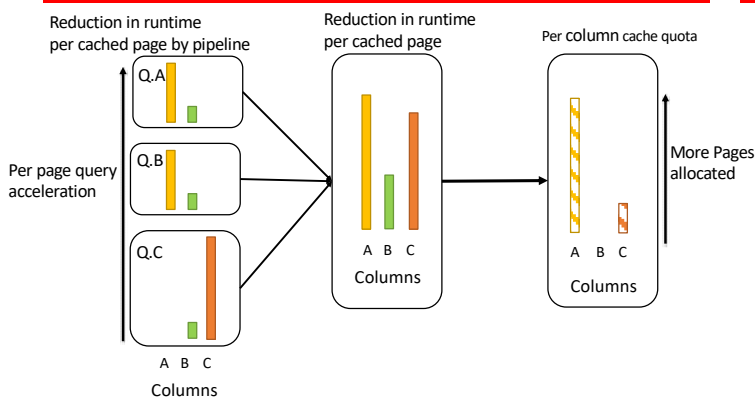
Determine Pipeline Throughput at Runtime

Observe pipeline invocation time

- Derive good estimate of in-memory execution time
- Mostly independent of current data placement



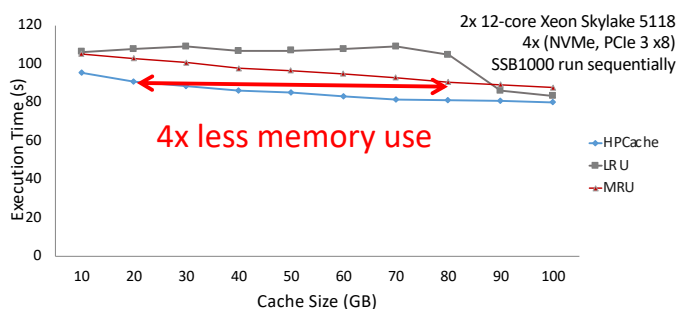
Constrained Memory Budgets



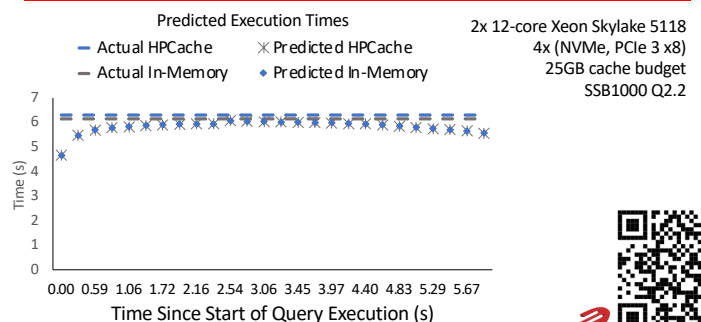
Cache Data to Minimize Workload Execution Time

Predict In-Memory Performance for Any Data Placement

Improved Memory Efficiency



Accurate Runtime Performance Predictions



75% Less Memory Use Through Proportional Caching

Average Prediction Within 15% Through Runtime Prediction

