Incremental join view maintenance on distributed log-structured storage

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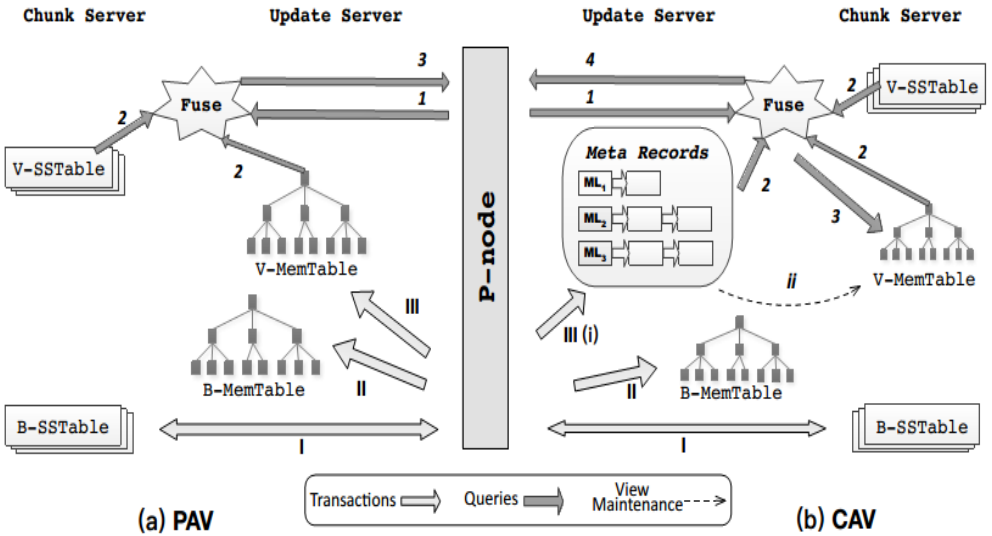
Frontiers of Computer Science, DOI: 10.1007/s11704-020-9310-y

Problems & Ideas

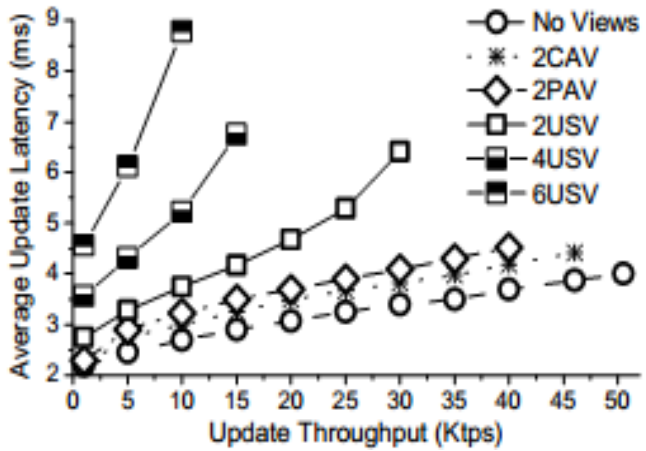
- Problems of supporting join views on LSM-tree
  - modifications on a base table cause access to all joined tables.
  - the more base tables contain in the view, the higher the maintenance cost is
  - In an LSM-tree system, the resources of the memtable's server are usually precious and the burden on it is heavy
  - serves both the transactional update and view query at the same time
- Ideas: develop two incremental maintenance approaches on LSM
  - One avoids join computation in view maintenance transactions（PAV）
  - Another decouples the view maintenance with the transaction process（CAV）



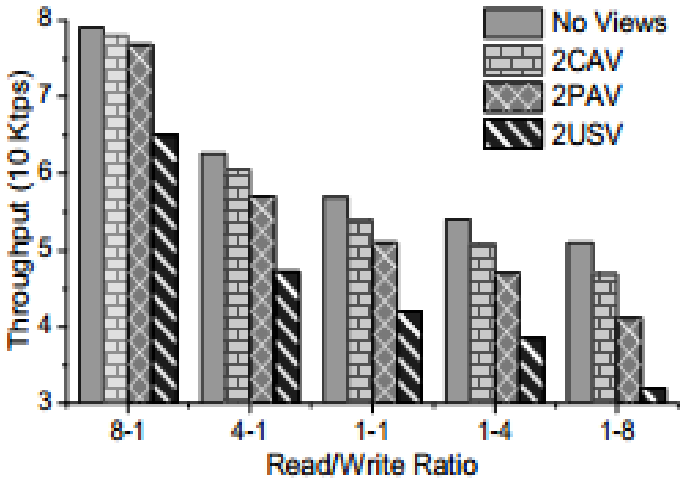
Main Contributions

- process the hybrid workload and leverage the materialized view to optimize query processing
- provide higher transactional throughput capability
- prevent a substantial decline in the performance of transaction processing
- ensure that a consistent snapshot is accessed

- **Update latency**



- **Throughput**



Experiments on TPCH benchmark show our methods achieve better performance than straightforward methods on different workloads