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Handling Multi-Dimensional Complex Queries in Key-Value Data Stores

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Highlights

- We propose SP-Index, a two-level indexing scheme, to support efficient complex queries of large scale multi-dimensional datasets on the basis of the original pyramid index technique by reducing the number of data items to be scanned.
- We have designed and implemented SPIKE with SP-Index and demonstrate its replication and querying mechanisms. Besides, we have applied SPIKE to Cassandra to implement a practical key-value store that supports efficient multi-dimensional complex queries.
- We have performed an extensive set of experiments based on synthetically generated datasets, TPC-H benchmark datasets and a real world dataset. The results show that SPIKE can achieve dozens of times better performance in comparison with existing indexing methods.
- We have discussed the application scenarios that SPIKE is suited for, and the limitations of the proposed approach.

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