

Universal Database Acceleration

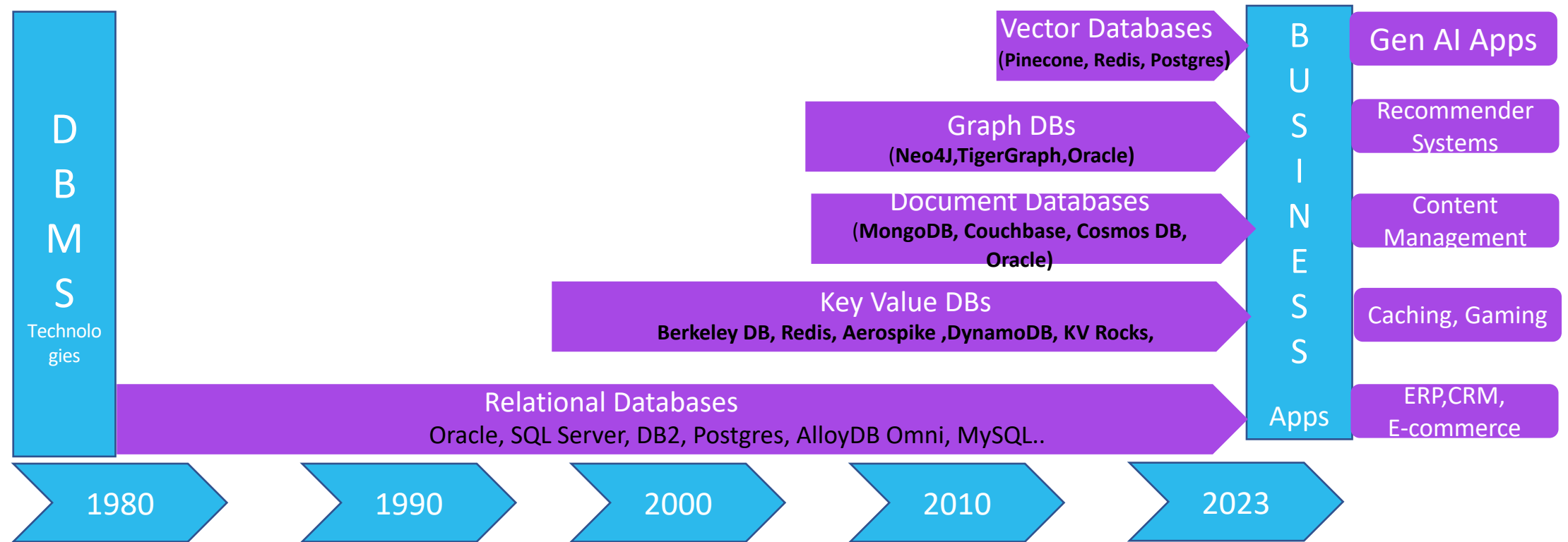


Presenter: Prasad Venkatachar
Sr Director – Products | Solutions@Pliops
IEEE Sr Member & BCS Fellow

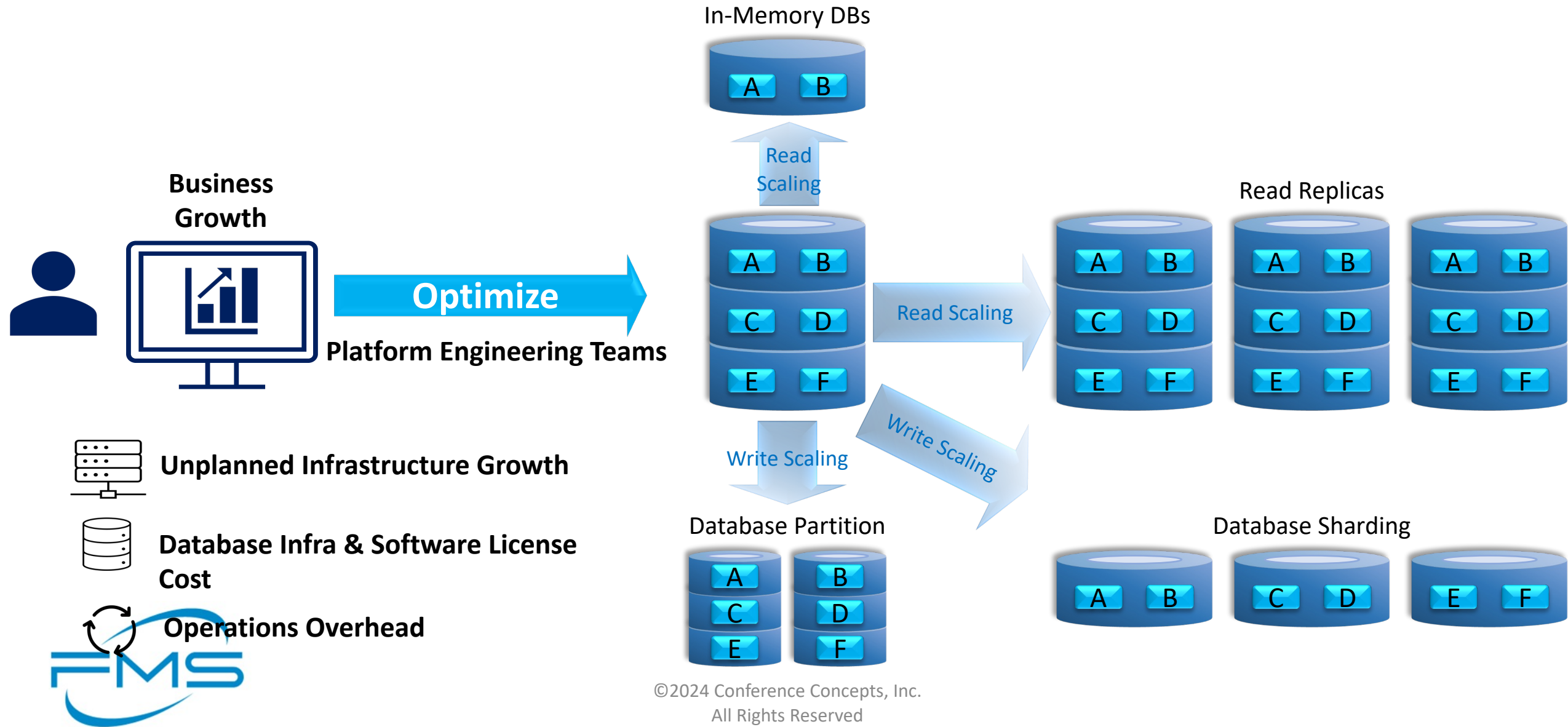


the Future of Memory and Storage

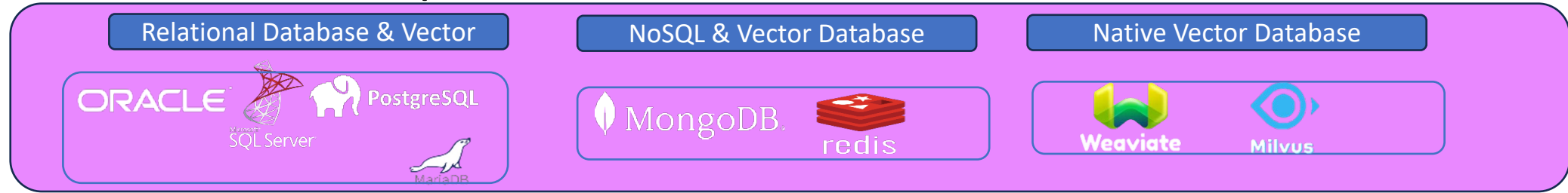
Database Technology Evolution & Apps Adoption



The Challenges of Unplanned Growth



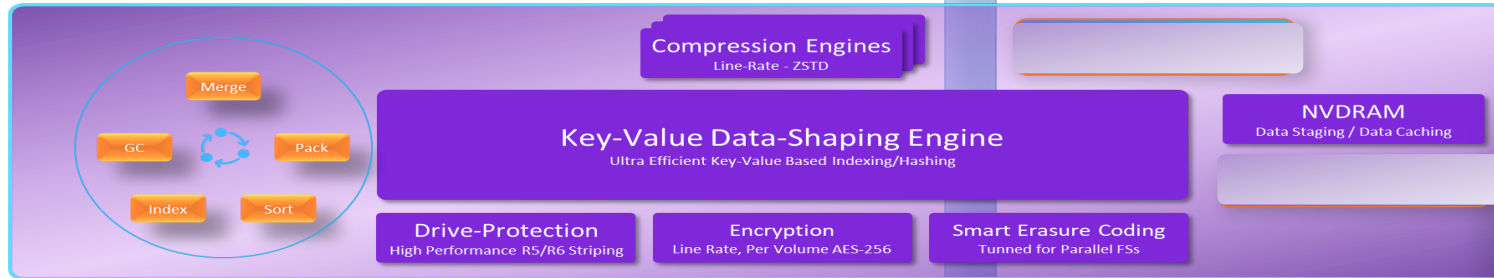
Pliops XDP Acceleration Platform



Block Interface

Key Value Interface

Universal Data Acceleration Engine



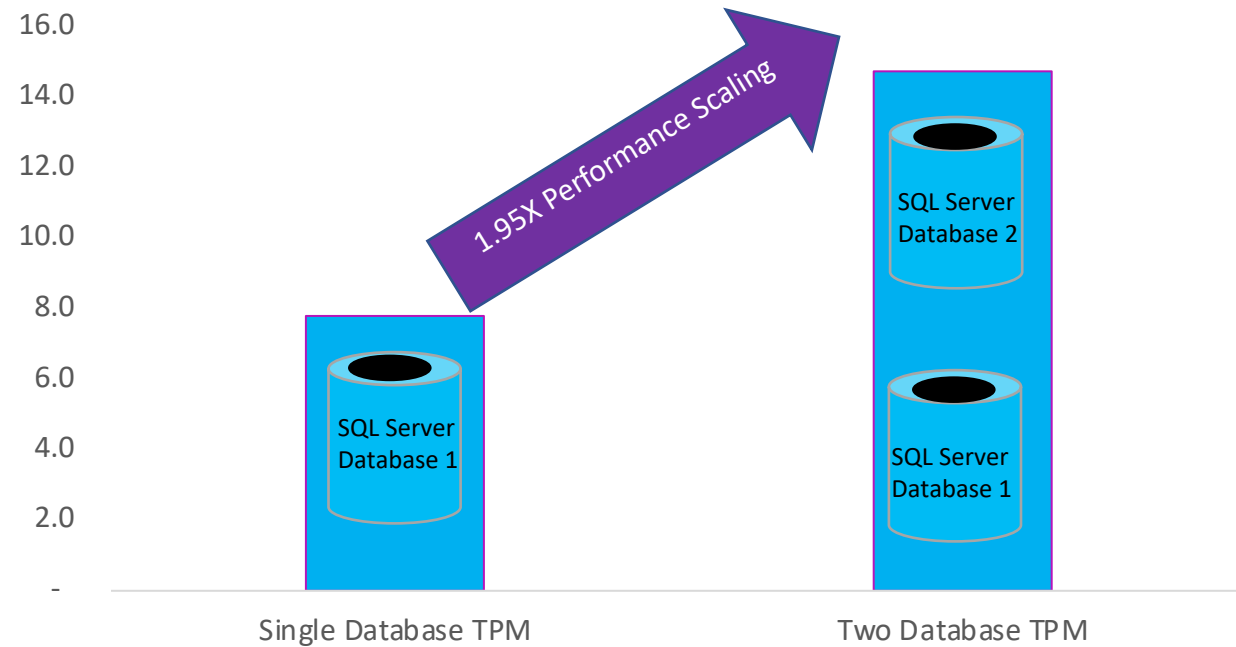
- KV Random Access (Get/Put/Delete)
- Sequential Access (Scan)
- Data Filtering
- Random Sampling, Shuffle
- Checkpoint (Point-in-Time)
- Replication, Backup, Restore



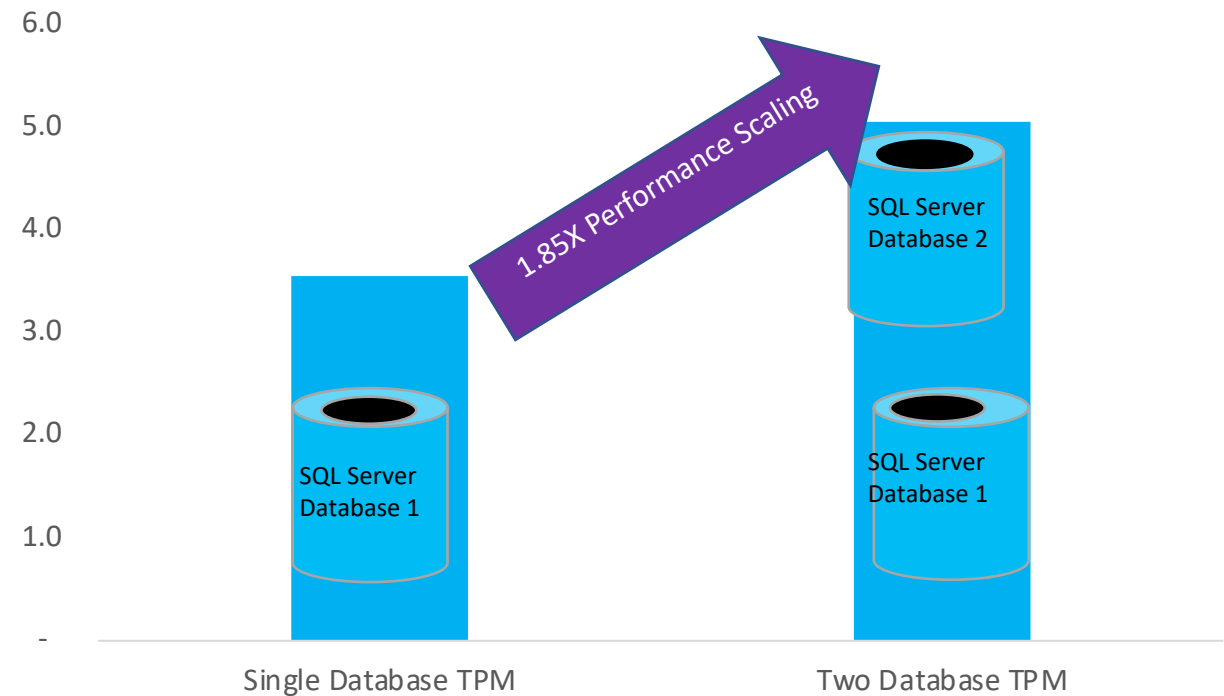
Smartest Key-Value Storage for AI / Database Computing

SQL Server 2022 Performance Scaling

Relative TPM: All Warehouses Disabled

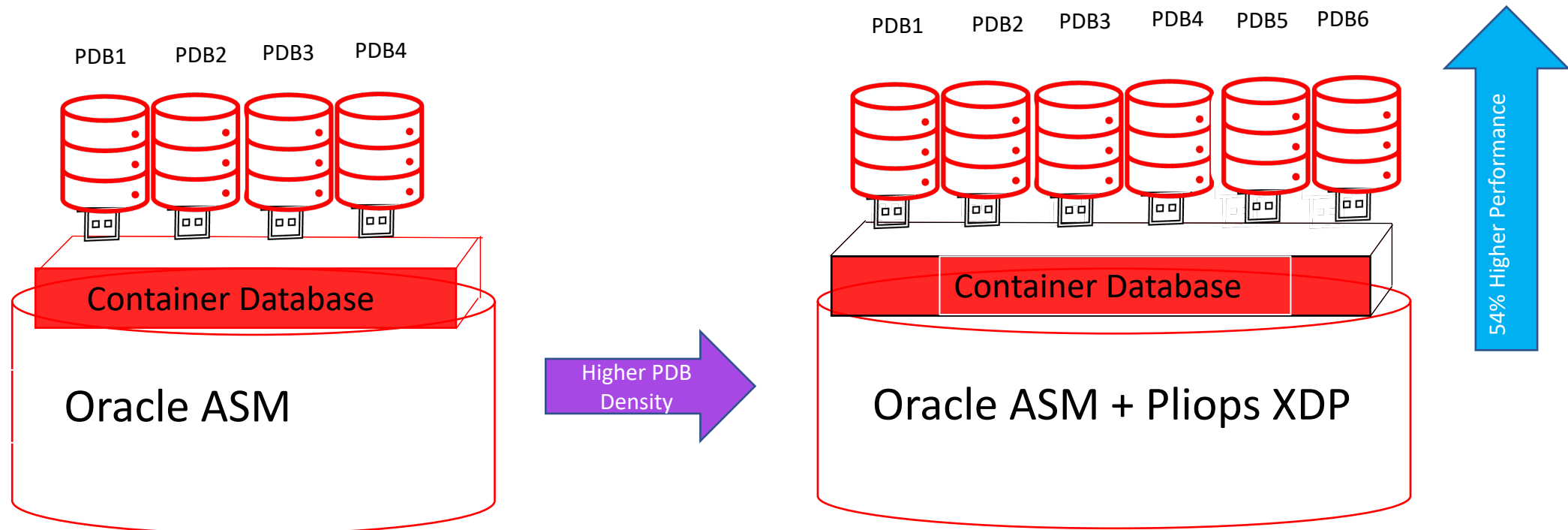


Relative TPM: All Warehouses Enabled



HammerDB : TPC-C

Oracle Pluggable Database Consolidation

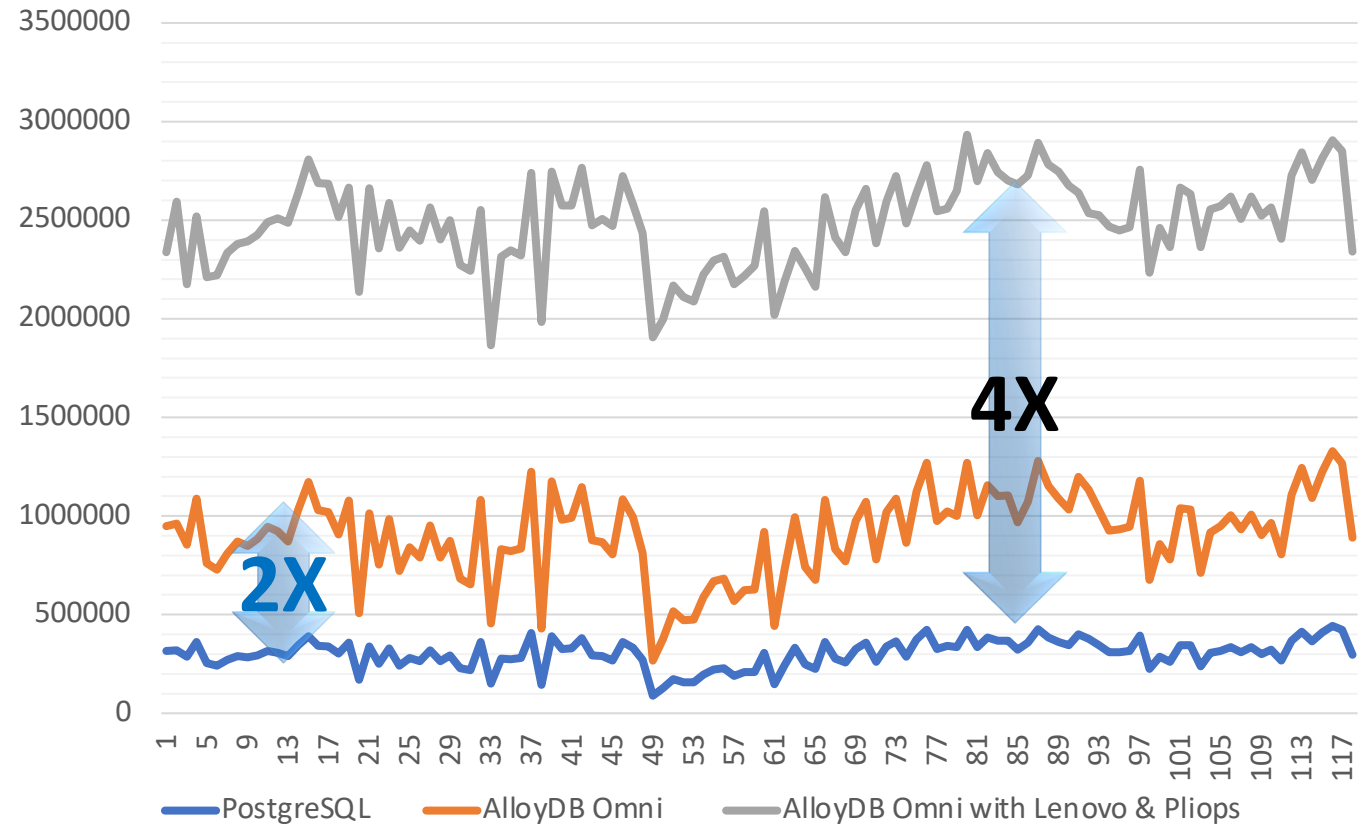


HammerDB : TPC-C Like



4X PostgreSQL Performance: Transactional Workloads

- 2X Higher Transaction served with AlloyDB Omni compared to PostgreSQL
- Up to 4X Transaction served from PostgreSQL to AlloyDB Omni with Pliops & Lenovo
- Serve more Web and Mobile users transaction Requests to meet demand
- Seamlessly scale database while maintaining high performance.

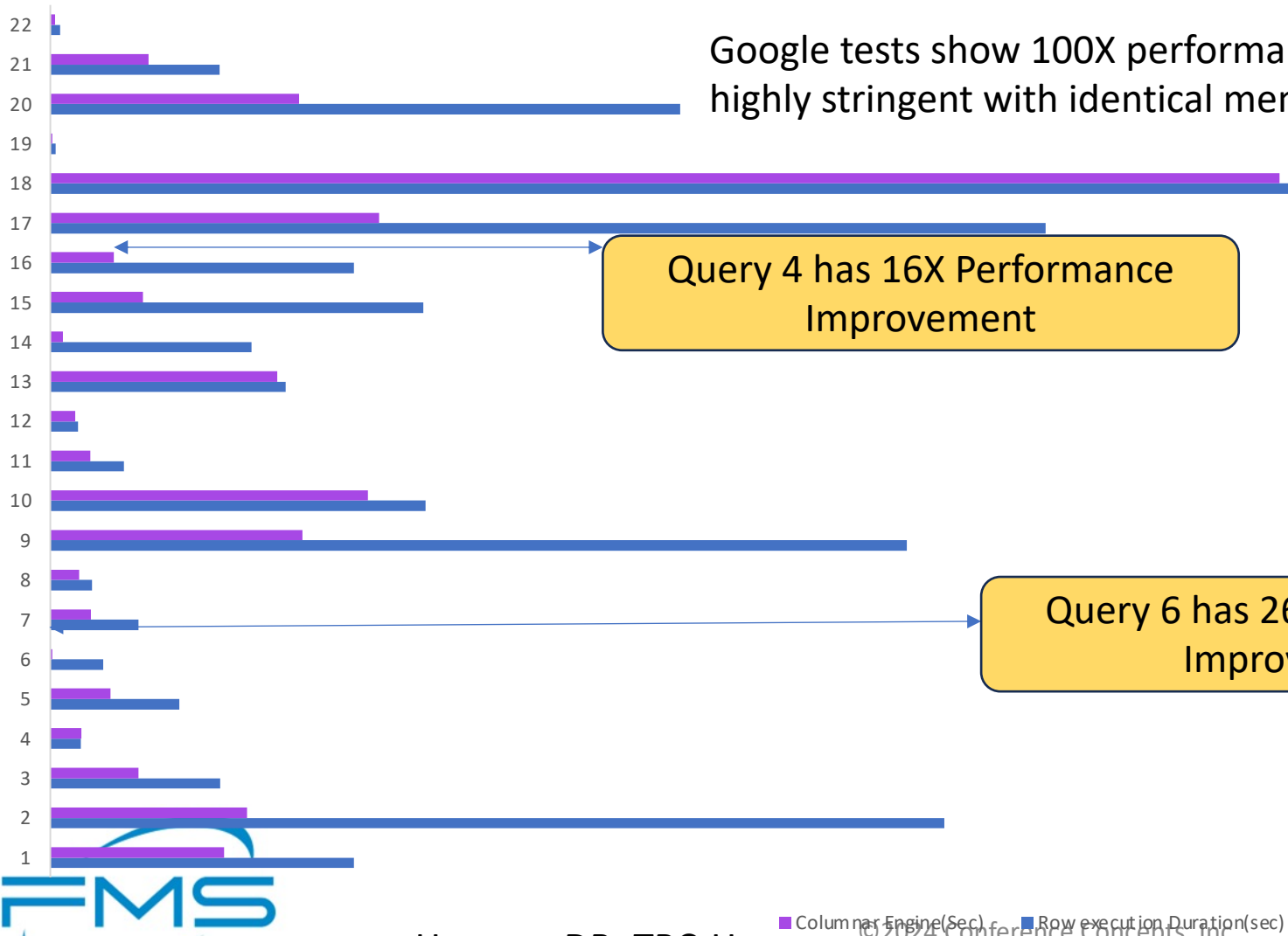


HammerDB: TPC-C

©2024 Conference Concepts, Inc.
All Rights Reserved

Row vs Columnar Execution

Google tests show 100X performance improvements, however, these tests are highly stringent with identical memory setup for rows & columns.



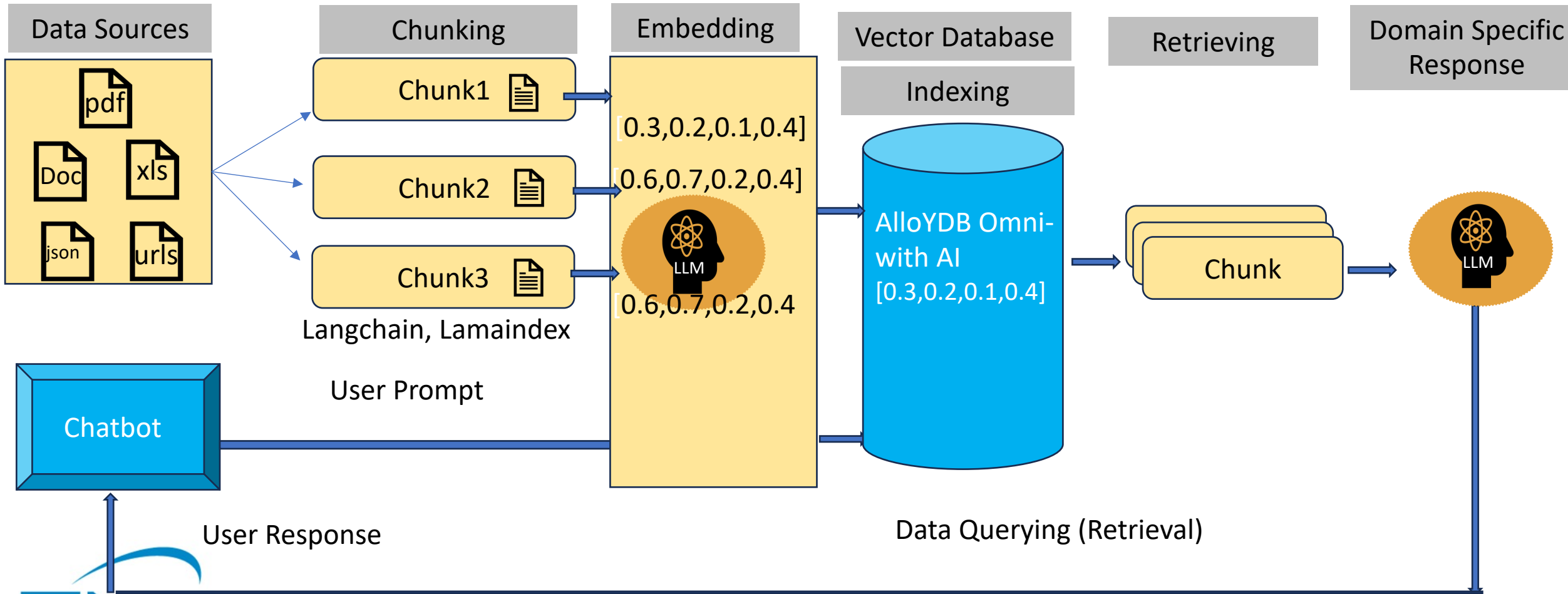
Query 4 has 16X Performance Improvement

Average 4X Performance improvement per Query level

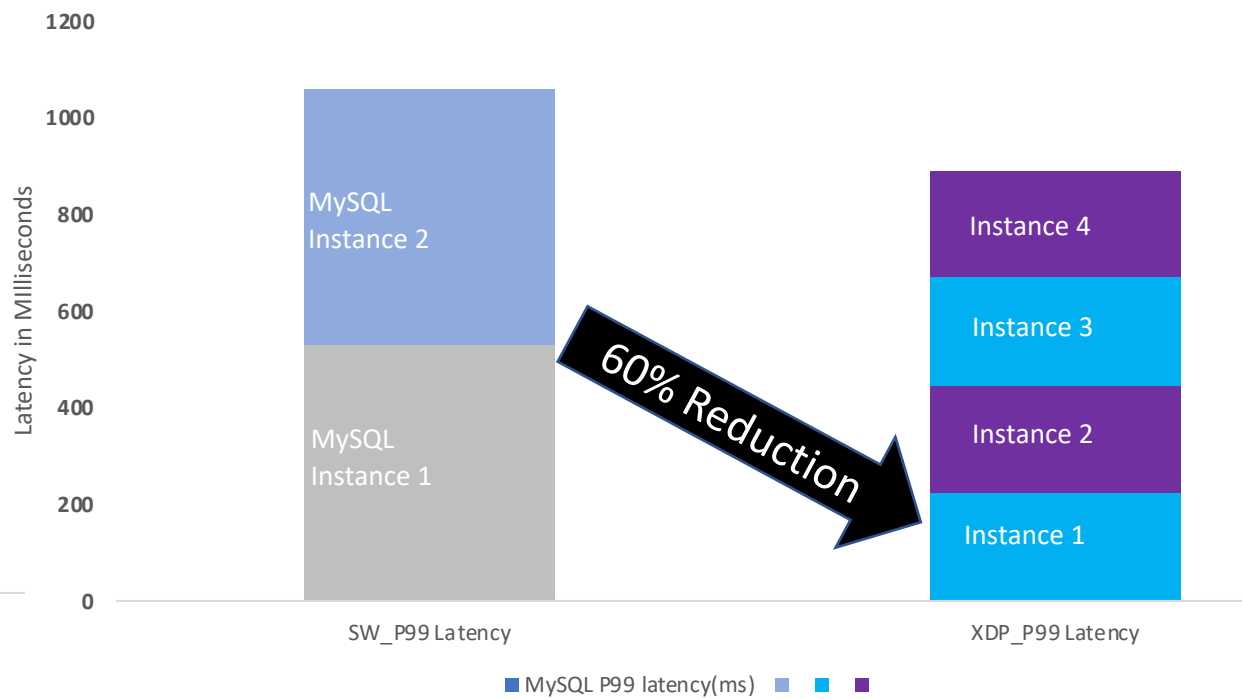
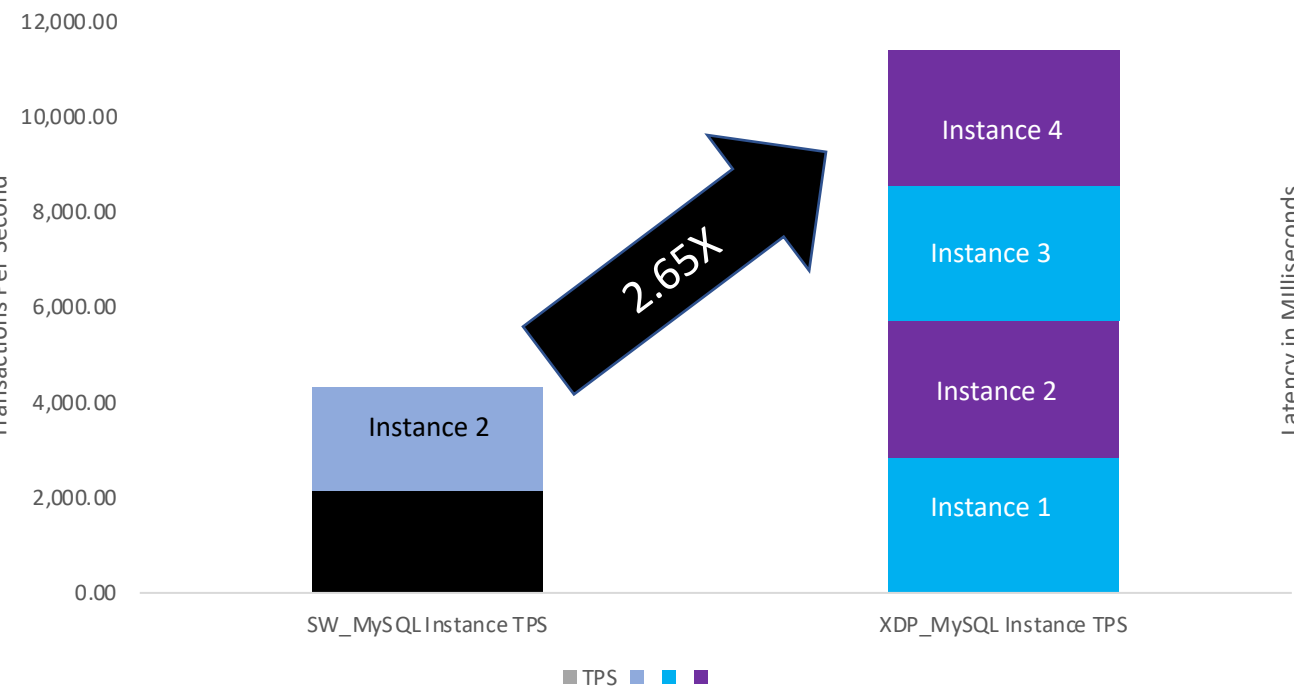
Query 6 has 26X Performance Improvement



Vector Database : RAG with AlloyDB Omni



MySQL Performance Acceleration



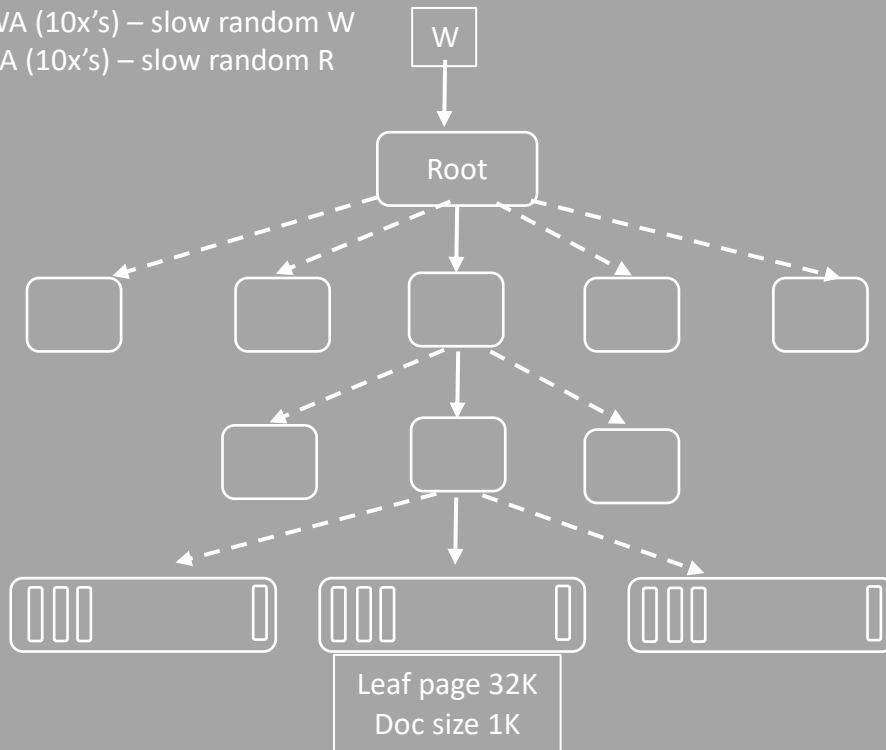
Sysbench: TPC-C

©2024 Conference Concepts, Inc.
All Rights Reserved

XDP-Mongo Key-Value Data Shaping

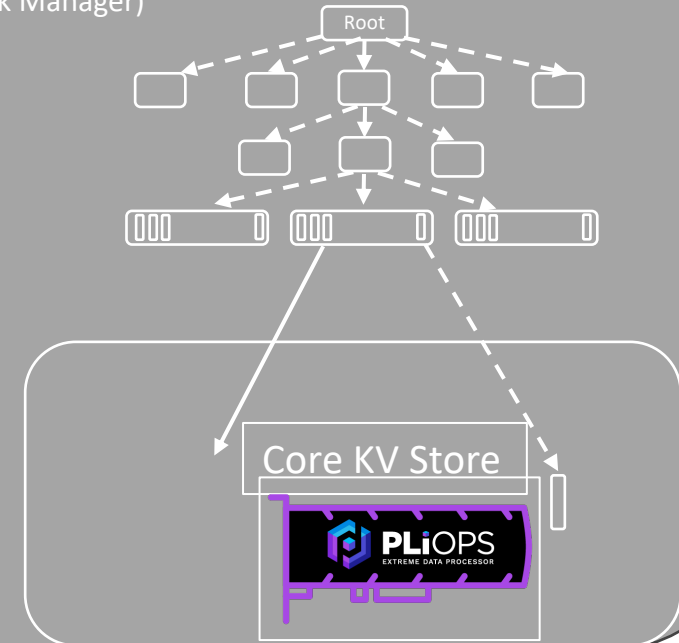
B⁺-Tree

High WA (10x's) – slow random W
High RA (10x's) – slow random R



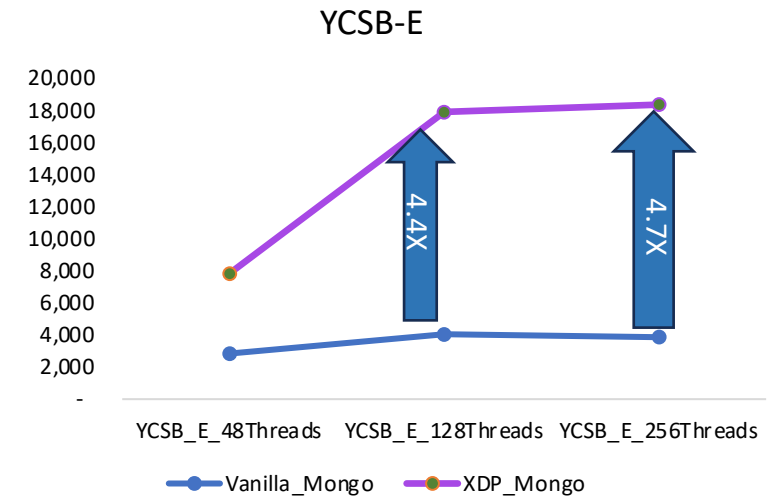
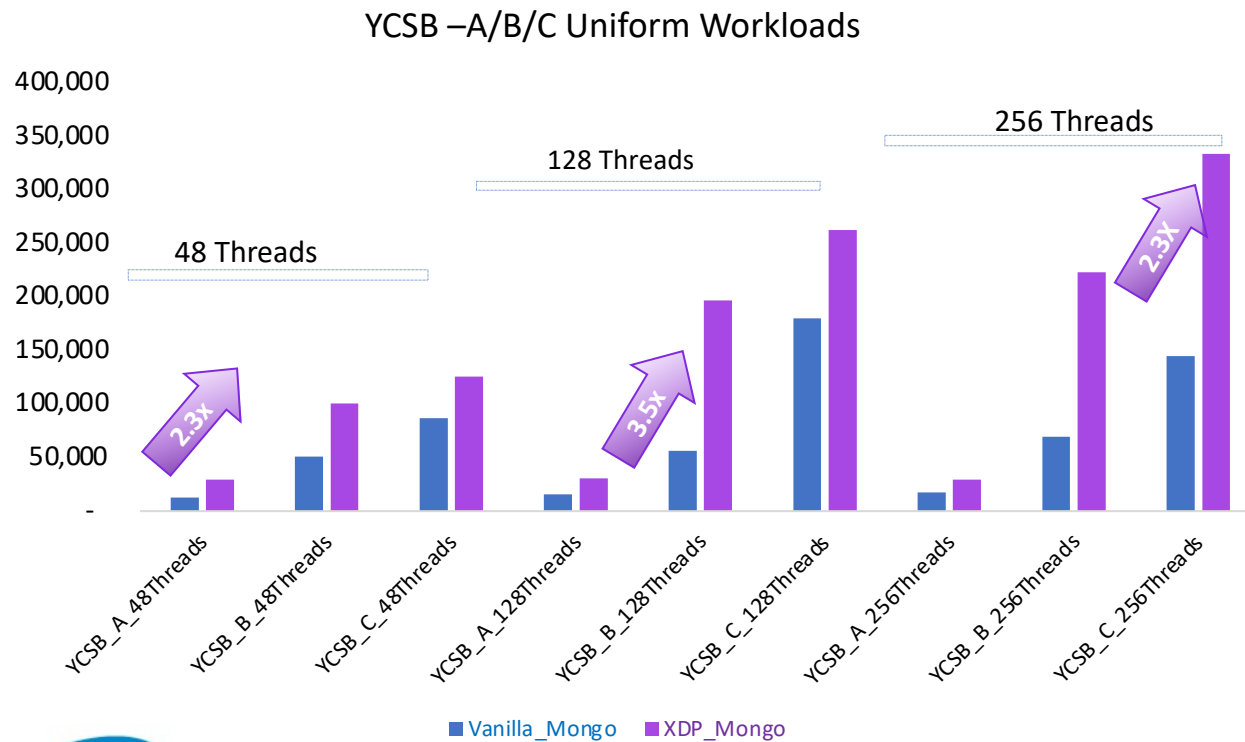
Key-Value Separated B⁺-Tree

Low WA (~1x) – fast random W
Low RA (~1x) – fast random R
Reduced SA (KV vs WT Block Manager)



Performance & Scalability Benefits for MongoDB

10% Dataset in-Memory



YCSB : A/B/C

Summary & QA

- Enterprises need unified acceleration platform
- It should serve across Database platforms
- Pliops helps to deliver performance benefits
 - For Relational Databases
 - NoSQL Database
 - Vector Databases

