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OLTP and OLAP

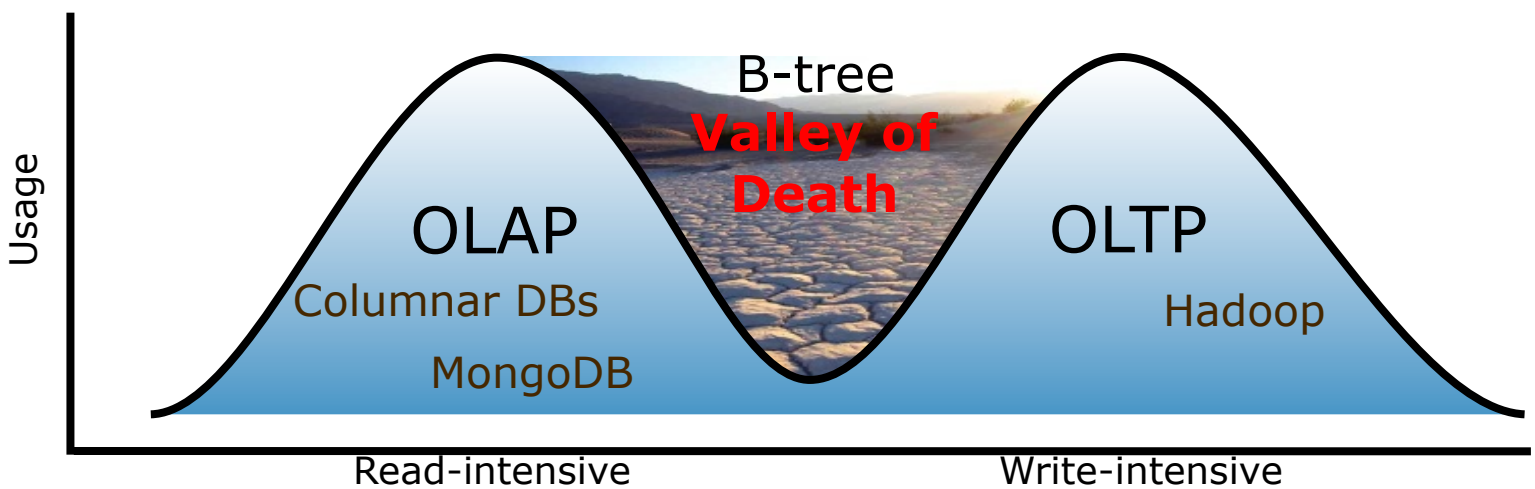
Have Your Cake and Eat it Too!

Lawrence Schwartz

Avoiding the B-tree Valley of Death

"The real end-game for Big Data is to have transactional and analytic data on the same database."

***However*, Today's database categories - OLAP, OLTP are compromises to get around dated, rigid indexing technology**



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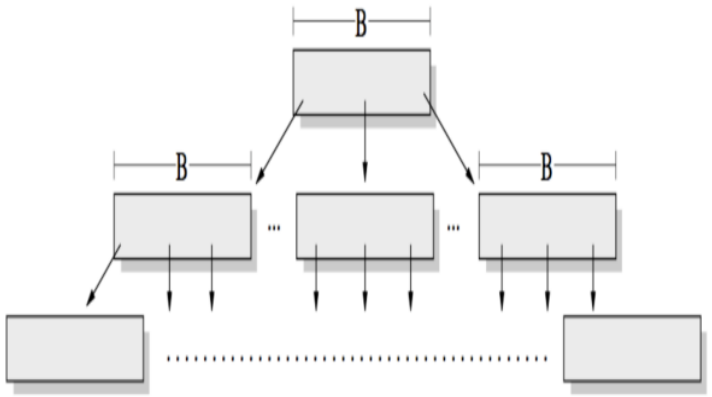
B-trees Perform Poorly on Disk

MySQL + InnoDB

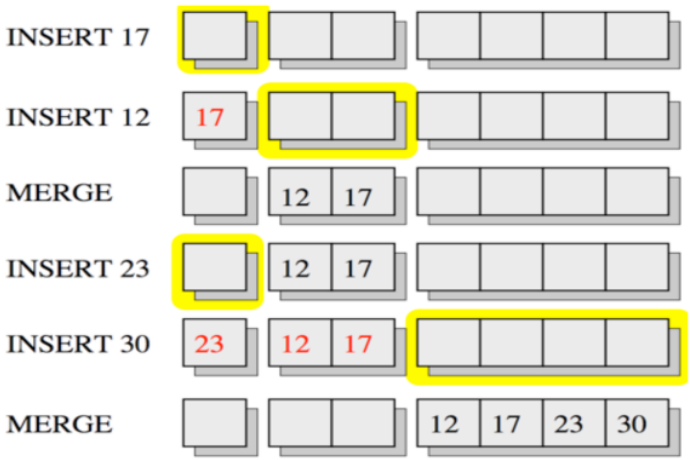
Based on **B-Tree** Indexes



- **Random Workloads Lead To Frequent Drive Head Movement**
- **MySQL Can't Take Advantage of Full Drive I/O Potential**

MySQL + TokuDB

Based on **Fractal Tree** Indexes



- **Continuous Rebalancing and Aggregation at Nodes**
- **Eliminates Fragmentation, Maximizes Disk I/O**

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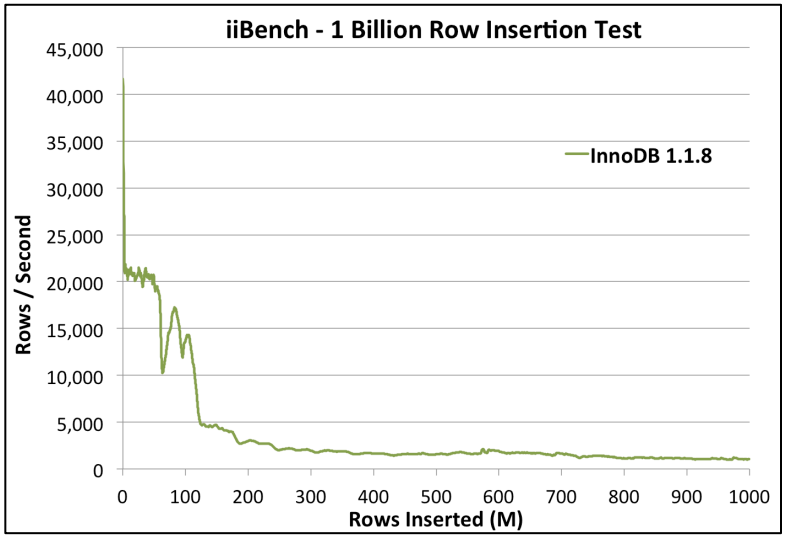
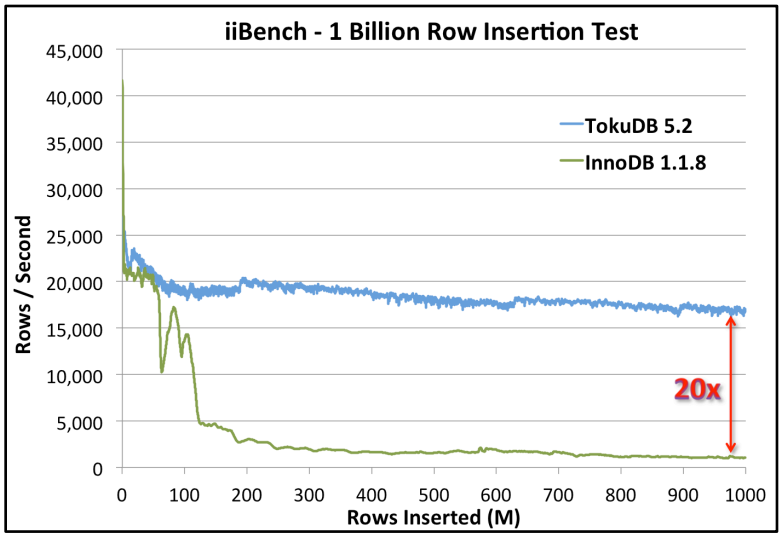
B-trees Can't Handle Big Data

MySQL + InnoDB



MySQL + TokuDB



- **Performance Drops to a Trickle above 50-100M Rows**
- **Delayed Checkpoints Diminish Performance**

- **20x Insertion Rates at One Billion Rows**
- **Stand Up More Indexes for Better Query Performance**

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B-trees Aren't Agile

MySQL + InnoDB

InnoDB
Index Creation

00:31:34

InnoDB
Column Addition

17:44:41

- **Big Database Schema Changes Take Hours To Complete**
- **Changes Have to Wait for Scheduled Downtime**

MySQL + TokuDB

TokuDB
Hot Indexing

00:00:02

TokuDB
Hot Column Addition

00:00:03

- **Changes Complete in Seconds**
- **Allows Business' Data Models to Immediately Adapt**

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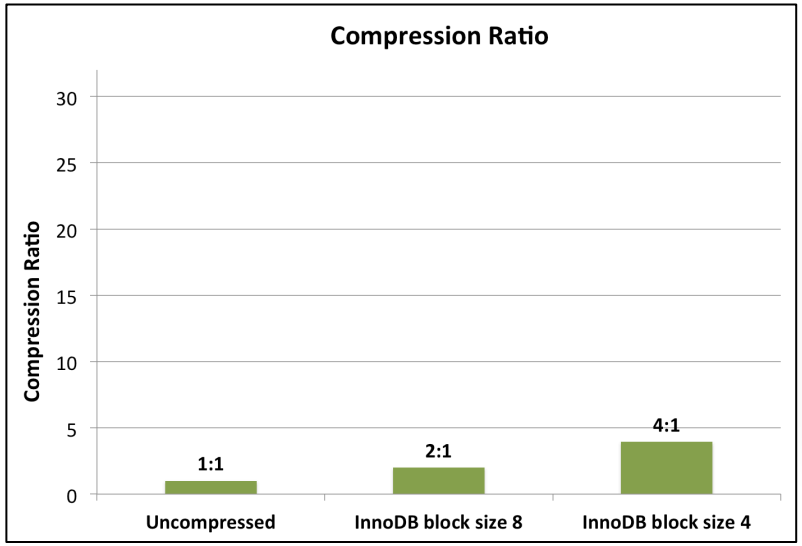
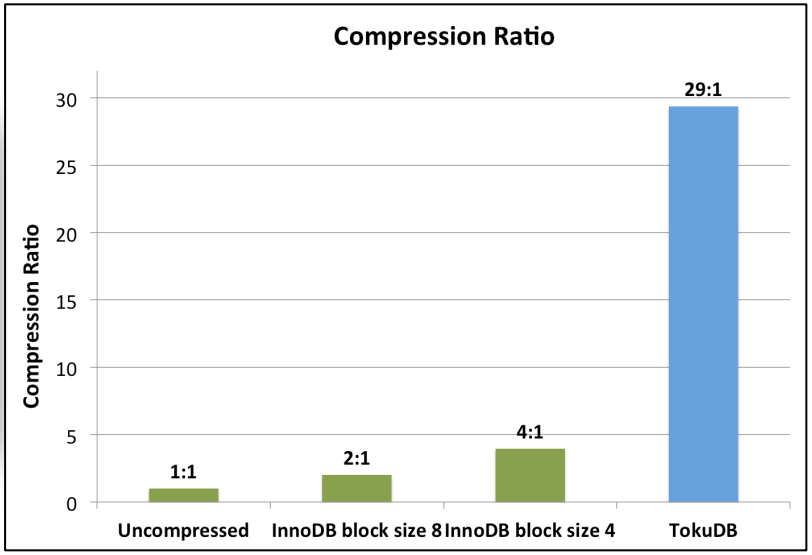
B-trees Don't Compress Well

MySQL + InnoDB



MySQL + TokuDB



- **Compression ~2x to ~2.5x Typical**
- **Compression Impacts Performance**

- **High Compression**
- **No Impact to Performance**

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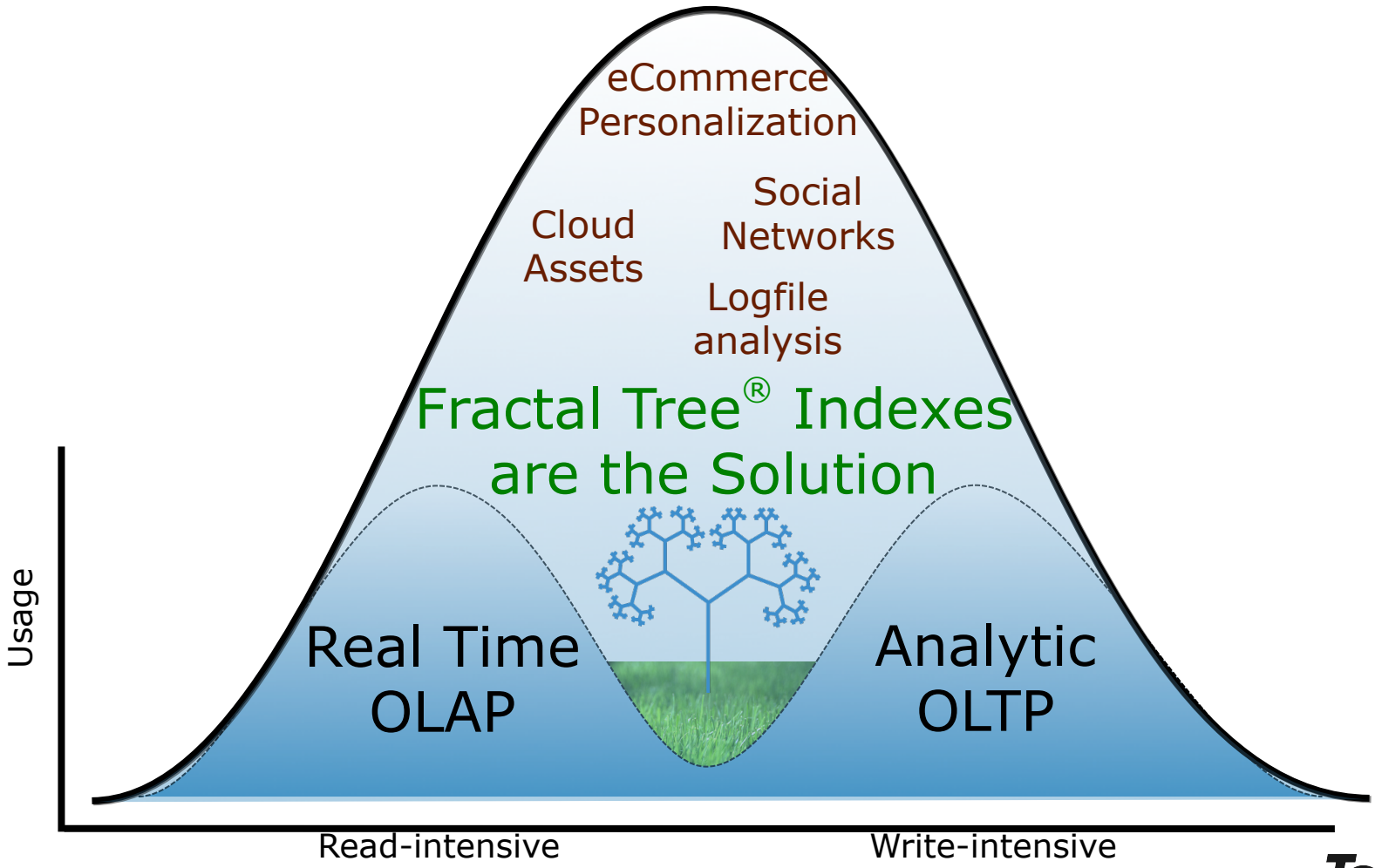
TokuDB Eliminates Death Valley

the 451 group

"While TokuDB® is effectively an operational database technology, it does blur the lines between operations and analytics"



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