

Designing an Index for ZooDB

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Outline

- 1 What is...?
- 2 The new Index Implementation
- 3 Benchmarks

ZooDB

- an open source object database in Java
- JDO standard
- 4 times faster than competitor db4o
- zoodb.org

Index

datastructure that allows rapid lookup

- where indices are used in zoodb

B+ Tree

- node fills one disk page
- inner node contains keys and children pointer, leaves contain keys and values
- key unique vs. key-value unique

Example: insert

3908 loc + 2665 loc of test

Goals

- faster
- buffer manager
- prefix sharing

Challenges

- edge cases
- runtime dominated by disk access
 - change nodes infrequently
 - fewer nodes is better
- only parent to child pointer
- determine best when its time to split/redistribute
- key unique vs. key-value unique
- buffer manager lookup takes time
- prefix-sharing encoding/decoding takes time
- prefix-sharing rebalancing takes time
- general optimizations
 - avoid polymorphism
 - bit-level operations

Our B+ Tree

Prefix Sharing

Fine grained

- insert, remove, write
- duration, number of nodes
- prefix-sharing vs. no prefix-sharing

Whole system

- test harness
- partial PolePosition benchmark
- StackOverflow

Summary

- ...

Outlook

- ...