Berkeley DB

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Introduction

- Data Model
- Principles of Berkeley DB
- Economics
- Demo

Data Model

- Key-Value Store
- Pros:
  - Simplistic
  - Flexible
  - Scalable
  - Performance
- Cons:
  - No support for complicated searches
  - Not OOP
  - Lack of standardization (e.g. no standards for keys)

Data Model

- Key-Value Store

Key	Value
John	johndoe@hotmail.com
Mammals	Bear, Cat, Dog, Elk, Fox
12984	{ first: “John”, last: “Doe”, age: “5” }
K1	AAA, 2, 01/01/2015
0x352CDF3F	Img://cat.jpg, 120000, 01042019, john, 420

Data Model

Berkeley DB Specifics

- Store Type
  - Ordered Key-Value Store
- Size
  - 2^{32} bytes key <–> 2^{32} bytes value (around 4.2GB)
- Database type
  - Embedded

When to use

- When you can predict data access patterns
- Many customers -> don't have to buy, install, manage separate DB
- End users are non-sophisticated administrators

When NOT to use

- Application needs different services
- You can't predict how you need to access your data
- Complex SQL Queries (non key-value queries)

Principles of Berkeley DB

- ACID
- Performance
- Querying
- Limitations

Cache Size: 1GB, LevelDB Write Buf: 512MB, Avg of: 100K to 2M ops

DB	Single Thread		Multiple Threads (4 on 4core machine)	
	Write (ops/sec)	Read (ops/sec)	Write (ops/sec)	Read (ops/sec)
LevelDB	240,000	265,000	240,000	855,000
BDB	70,000	177,000	88,000	462,000
BangDB	255,000	484,000	394,000	1,020,000

http://highscalability.com/blog/2012/11/29/performance-data-for-leveldb-berkley-db-and-bangdb-for-rando.html

Principles of Berkeley DB

ACID

- Atomicity
- Consistency
- Integrity
- Durability

Principles of Berkeley DB

Querying

- Key-Data
- No SQL

Principles of Berkeley DB

Limitations

- Minimum page size: 512 bytes
- Maximum page size: 65.536 bytes
- Minimum-maximum database file size: 2^41 (2 terabytes)
- Maximum database file size: 2^48 (256 terabytes)
- Largest key/data item is 2^32 bytes (around 4.2GB)
- Maximum Btree depth: 255

Economics

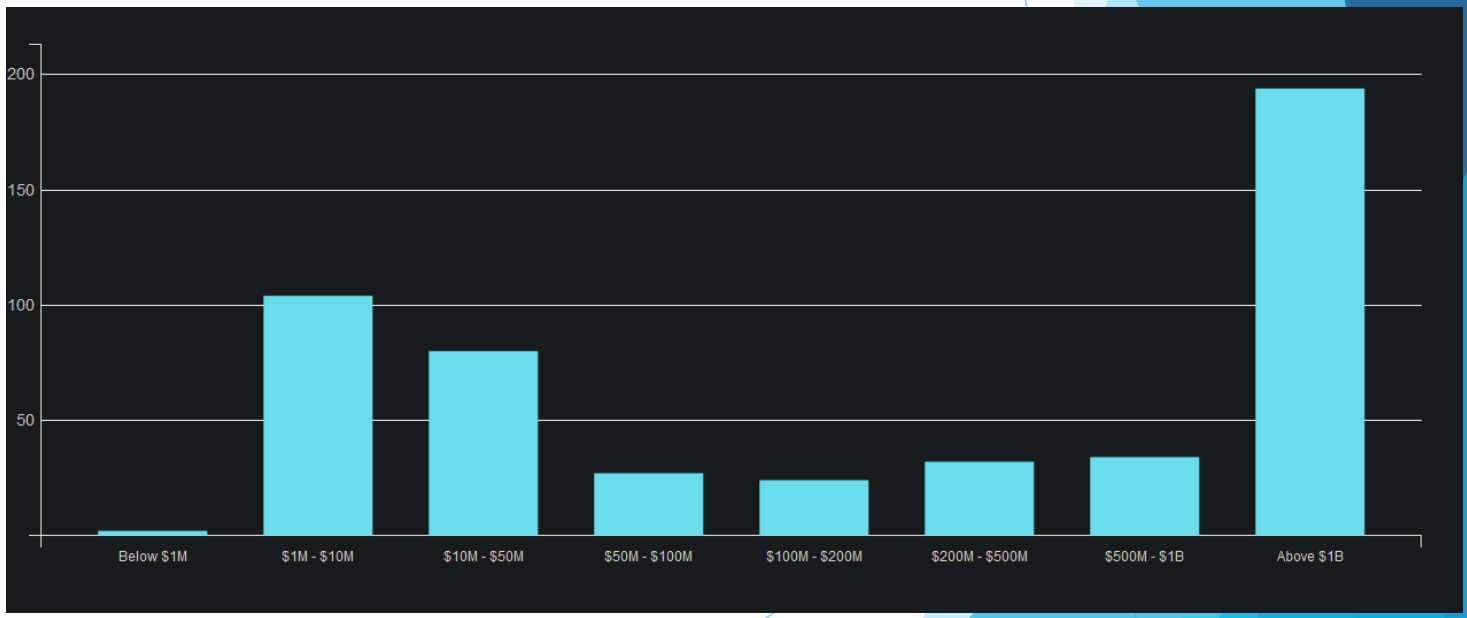
amazon

- Famous Case
- Market Share

Economics

- 14th key-value - https://db-engines.com/en/ranking/key-value+store
- 88th overall - https://db-engines.com/en/ranking
- first released in 1994
- 1996 – 2006 Sleepycat Software
- Acquired in 2006 by Oracle

- Oracle Berkeley DB
- Berkeley DB Java Edition
- Berkeley DB XML.



https://discovery.hgdata.com/product/oracle-berkeley-db

Demo