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Speaker

Software architect/developer Pronetics/Sourcesense

Founder Spring Italian User Group

Chairman JugSardegna

Committer/Contributor OpenNMS - MongoDb

Author Spring 2.5 Aspect Oriented Programming

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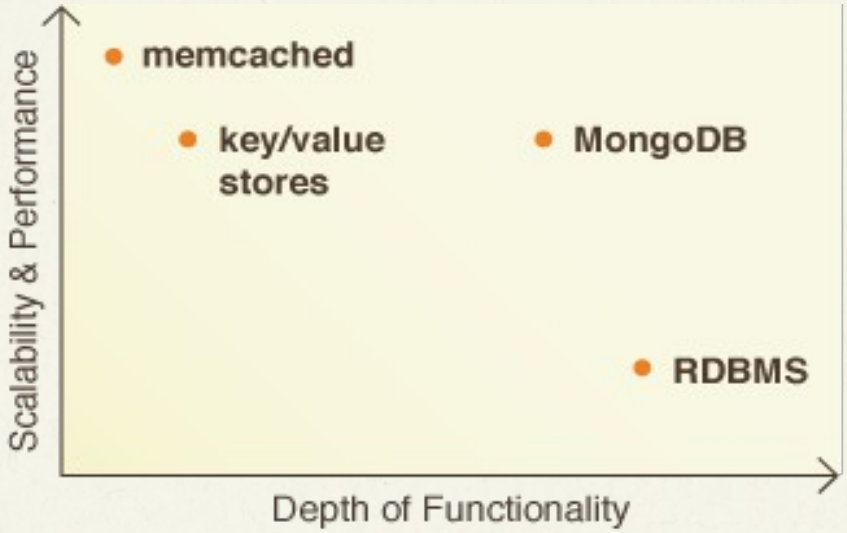
MongoDB Philosophy



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Some MongoDB production deployments

http://www.mongodb.org/display/DOCS/Production+Deployments

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Main Features

- Document Oriented
  - Documents (objects) map nicely to programming language data types
  - Documents (objects) map nicely to programming language data types
  - Dynamically-typed (schemaless) for easy schema evolution
  - No joins and no transactions for high performance and easy scalability
- High Performance
  - No joins and no transactions makes reads and writes fast
  - Indexes with indexing into embedded documents and arrays
  - Optional asynchronous writes
- Rich Query Language
- Easy scalability
  - 'slaveOK' reads are distributed over replicated servers
  - Automatic sharding (auto-partitioning of data across servers)
  - Reads and writes are distributed over shards
  - No joins and no transactions make distributed queries easy and fast
- High Availability
  - Replicated servers with automatic master failover
- Indexing
- Stored JavaScript
- Fixed-size collection
- File storage
- MapReduce

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No Sql Injection

Mongo is invulnerable to injection attacks, no code execution

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Document as Basic unit of Data in BSON (Binary JSON) format

```
{ "name" : "MongoDB",
   "info" : { "storage" : "Binary JSON (BSON)",
              "full index" : "true",
              "scale" : "Autosharding",
              "query" : "Rich document-base queries",
              "replication" : "Replica sets",
              "atomic modifiers" : "Fast in place update",
              "binary content" : "GridFS",
              "batch operation" : "Map/Reduce”,
              "js server side" : ”true”
   }
   "greeting": {"international" : "Hello, world!", "italy" :"Ciao Mondo !" }
}, "_id” : "024x6f279578a64bb0666945"
```

Document: an Ordered set of keys with associated values

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Grouping

SQL

Table contains Rows

MONGO

Collection and subcollections contains Documents

* Document Limit: Larger than 4 Mb, the entire text of War and Peace is 3.14 Mb...

Collection are are created dynamically and automatically grow in size to fit additional data

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A single instance of MongoDB can host multiple independent databases, each of which can have its own collections and permissions.

Photo from http://www.aibento.net/

No Join's cost

- SQL

```
SELECT * FROM posts
INNER JOIN posts_tags ON posts.id = posts_tags.post_id
INNER JOIN tags ON posts_tags.tag_id == tags.id
WHERE tags.text = 'politics' AND posts.vote_count > 10;
```

- MONGO

```
db.posts.find({'tags': 'politics', 'vote_count': {'$gt': 10}});
```

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Collections Schema free

Documents within a single collection can have any number of different 'shapes”

In theory, each document in a collection

can have a completely different structure;

in practice, a collection’s documents

will be relatively uniform.

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Driver

C, C#, C++, Clojure, D, Delphi, Erlang,

Factor, Fantom, F#, Go, Groovy,

Haskell, Java, Javascript, Lua, Nodejs,

ObjectiveC, Perl, PHP, Python, R,

Ruby, Scala, Scheme (PLT), Smalltalk

http://www.mongodb.org/display/DOCS/Drivers

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Common operation

Server side Javascript via mongo shell

Java via MongoDB Official 10gen Driver

Scala via Casbah Official 10gen scala driver

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Inserting

```
//mongo shell
db.dcComicsCollection.insert({"name" : "bruce", "surname" : "wayne", "alias" : "batman"})

//Java
Map fields = batman.toMap()
dcComicsCollection.insert(BasicDBObjectBuilder.start(fields).get())  //java driver

//scala
val batman = MongoDBObject("name" -> "bruce", "surname" -> "wayne", "alias" -> batman)
dcComicsCollection.insert(batman))
```

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Removing

```
db.dcComicsCollection.delete({"alias" : "superman"})
```

```
Map query = batman.getMap()
DBObject obj = BasicDBObjectBuilder.start(fields).get()
coll.remove(obj);

mongoColl.remove(BlogPostConverter.postToDbObject(post))
```

Updating (The schema can be changed dinamically)

```
var hero = db.dcComicsCollection.findOne({"alias" : "batman"});
hero.gadget = {"car" : "batmobile”};
db.mycollection.update({”aias” : ”batman"}, hero, true);

DbObject query = BasicDBObjectBuilder.start().add("surname",”wayne”).get();
DbObject hero = BasicDBObjectBuilder.start().add("gadget",”batmobile”).get();
coll.update(query, hero, false, true);

val query = MongoDBObject("name" -> "bruce")
val hero = MongoDBObject("gadget" -> "batmobile")
mongoColl.update(query, hero, false, true)
```

* The third blue value it’s the upsert, Update or insert if not present

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Querying

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Admin Interface

mongod localhost

List all commands | Replica set status

Commands: assertInfo buildInfo cursorInfo features isMaster replSetGetStatus serverStatus top

```
db version v1.6.5, pdfile version 4.5
git hash: 0eb017e9b2828155a67c5612183337b89e12e291
sys info: Darwin erh2.10gen.cc 9.6.0 Darwin Kernel Version 9.6.0: Mon Nov 24 17:37:00 PST 2008; root:xnu-1228.9.59~1/RELEASE_I386 i386 BOOST_LIB_VERSION=1_40
uptime: 13 seconds
```

low level requires read lock

```
time to get readlock: 0ms
# databases: 1

replication:
master: 0
slave:  0
initialSyncCompleted: 1
```

clients

Client	OpId	Active	LockType	Waiting	SecsRunning	Op	Namespace	Query	client	msg	progress
initandlisten	0		W			2004	security	{ name: /^local.temp./ }	0.0.0.0:0		
snapshotthread	0		0			0			(NONE)		
clientcursormon	0		R			0			(NONE)		
websvr	0		0			0			(NONE)		

dbtop (occurences|percent of elapsed)

NS	total		Reads		Writes		Queries		GetMores		Inserts		Updates		Removes	
GLOBAL	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%

write lock % time in write lock, by 4 sec periods
0 0
write locked now: false

Log

```
Mon Feb 21 10:34:58 [websvr] web admin interface listening on port 28017
```

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Mongo Shell

```
MongoDB shell version: 1.6.5
connecting to: test
> help command
        db.help()                    help on db methods
        db.mycoll.help()             help on collection methods
        rs.help()                    help on replica set methods
        help connect                 connecting to a db help
        help admin                   administrative help
        help misc                    misc things to know

        show dbs                     show database names
        show collections             show collections in current database
        show users                   show users in current database
        show profile                 show most recent system.profile entries with time >= 1ms
        use <db_name>                set current database
        db.foo.find()                list objects in collection foo
        db.foo.find( { a : 1 } )     list objects in foo where a == 1
        it                           result of the last line evaluated; use to further iterate
        exit                         quit the mongo shell
>
```

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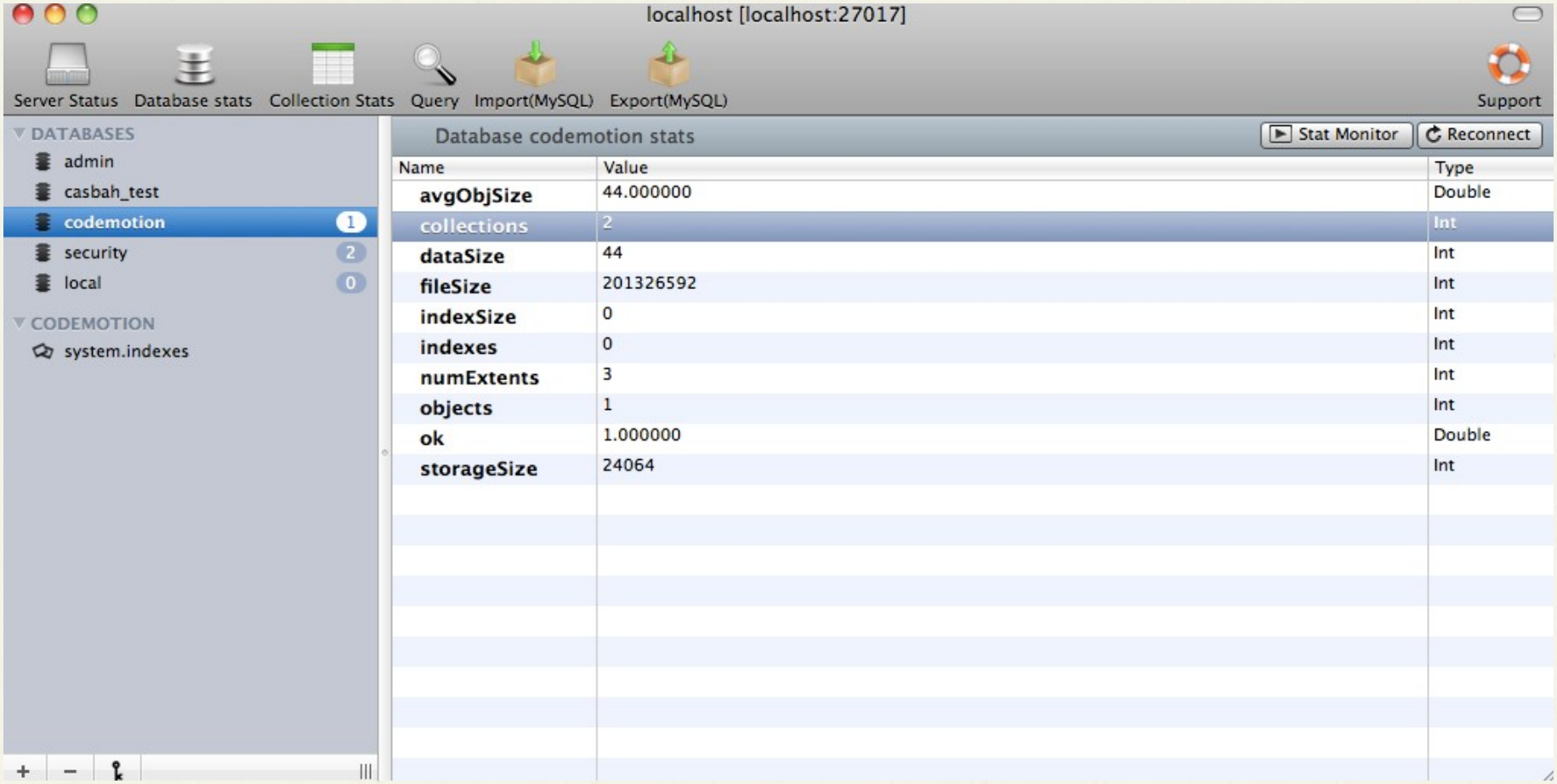
Mac Client MongoHub



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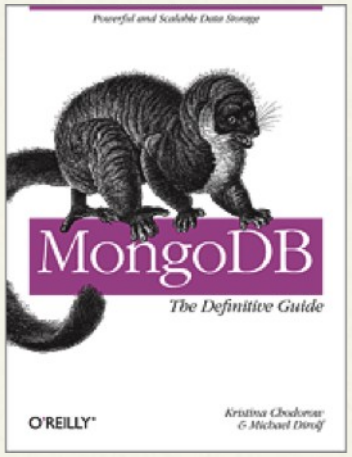
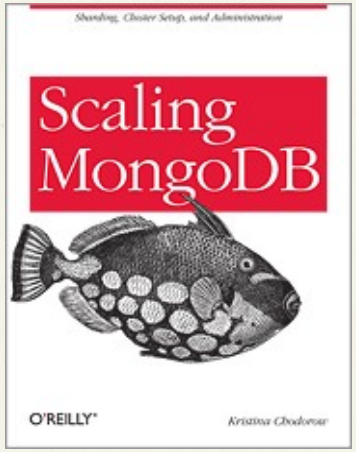
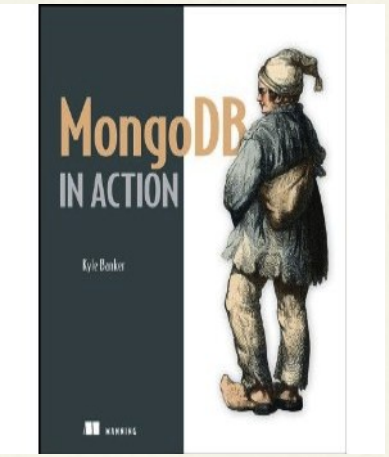
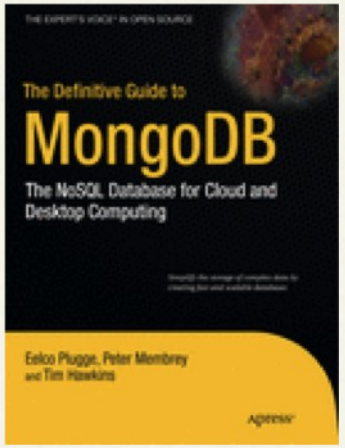
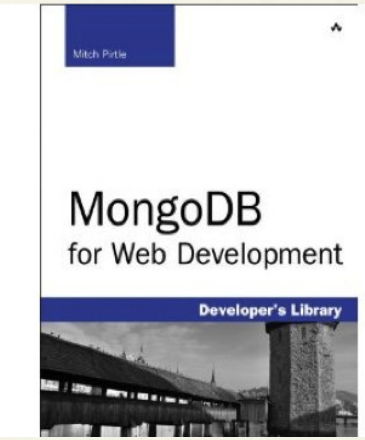
Books











http://www.mongodb.org/display/DOCS/Books

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Thanks !

Massimiliano Dessì

http://jroller.com/desmax

http://twitter.com/desmax74

http://www.linkedin.com/in/desmax74

http://wiki.java.net/bin/view/People/MassimilianoDessi

http://www.jugsardegna.org/vqwiki/jsp/Wiki?MassimilianoDessi