mongoDB

MongoDB
Or how I learned to stop worrying and love the database

Mathias Stearn

10gen

October 22th, 2009

mongoDB

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Document Oriented
JavaScript Enabled
Fast, Scalable, Available, and Reliable

mongoDB

- Organized into Databases and Collections (like Tables)
- Document Oriented
- JSON-like (BSON)
- Schemaless
- Dynamic, Strong Typing
- Database can "reach into" objects

```
db.people.insert({
  _id: "mstearn",
  name: "Mathias Stearn",
  karma: 42,
  active: true,
  birthdate: new Date(517896000000),
  interests: ["MongoDB", "Python", "Ampelmännchen"],
  subobject: {foo: "bar"}
});
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Document Oriented
JavaScript Enabled
Fast, Scalable, Available, and Reliable

mongoDB

JavaScript used for:

- Shell and Documentation
- (Very) Advanced Queries
- "Group By" Queries
- MapReduce (new)

```
db.users.find({$where: "this.a + this.b >= 42"});
db.posts.group(
  { key: "user"
  , initial: {count:0, comments:0}
  , reduce: function(doc,out){
      out.count++;
      out.comments += doc.comments.length; }
  , finalize: function(out){
      out.avg = out.comments / out.count; }
  });
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Document Oriented
JavaScript Enabled
Fast, Scalable, Available, and Reliable

mongoDB

- Master-Slave replication for Availability and Reliability
  - Replica-Pairs support auto-negotiation for master
- Auto-Sharding for Horizontal Scalability
  - Distributes based on specified field
  - Currently alpha
- MMAP database files to automatically use available RAM
- Asynchronous modifications

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

Official

- Python
- Ruby
- C++
- Perl
- PHP
- Java

Third-Party

Erlang, C#, ColdFusion, *and More*

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

JSON

- String (UTF8)
- Double
- Object (hash/map/dict)
- Array
- Bool
- Null / Undefined

Extras

- Date
- Int32 / Int64
- OID (12 bytes)
- Binary (with type byte)

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

- $set
- $inc
- $multiply (soon)
- $push / $pushAll
- $pull / $pullAll

```
db.posts.update({_id:SOMEID}, {$push:{tags:"mongodb"}})
db.tags.update({_id:"mongodb"}, {$inc:{count:1}},
                        {upsert:true})
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

Simple

```
db.posts.findOne({ user: "mstearn" });

var cursor = db.posts.find({ user: "mstearn" });
cursor.forEach(function(){
  doSomething(this.text);
});
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

Sorted

```
db.posts.find(
  { user: "mstearn" }
).sort({timestamp:-1})
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

Paginated

```
db.posts.find(
  { user: "mstearn" }
).sort({timestamp:-1}).skip(10).limit(10);
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

Simple Tag Search

```
db.posts.find(
  { user: "mstearn"
  , tags: "mongo"
  }
).sort({timestamp:-1}).skip(10).limit(10);
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

Complex Tag Search

```
db.posts.find(
  { user: "mstearn"
  , tags: {$in: ["mongo", "mongodb"]}
  }
).sort({timestamp:-1}).skip(10).limit(10);
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

Nested Objects

```
db.posts.find(
  { user: "mstearn"
  , tags: {$in: ["mongo", "mongodb"]}
  , comments.user: "mdirolf"
  }
).sort({timestamp:-1}).skip(10).limit(10);
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

Regular Expressions

```
db.posts.find(
  { user: "mstearn"
  , tags: {$in: ["mongo", "mongodb"]}
  , comments.user: "mdirolf"
  , text: /windows/i
  }
).sort({timestamp:-1}).skip(10).limit(10);
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

mongoDB

Ranges

```
db.posts.find(
  { user: "mstearn"
  , tags: {$in: ["mongo", "mongodb"]}
  , comments.user: "mdirolf"
  , text: /windows/i
  , points: {$gt: 10, $lt 100}
  }
).sort({timestamp:-1}).skip(10).limit(10);
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Native Language Support
Rich Data Types
Atomic Modifiers
Dynamic Queries

Arbitrary JavaScript

```
db.posts.find(
  { user: "mstearn"
  , tags: {$in: ["mongo", "mongodb"]}
  , comments.user: "mdirolf"
  , text: /windows/i
  , points: {$gt: 10, $lt 100}
  , $where: "this.a + this.b >= 42"
  }
).sort({timestamp:-1}).skip(10).limit(10);
```

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Use Cases
Links

Good

- Websites
- Complex Objects
- High-Volume Low-Value
- Real-time analysis

Bad

- Not Spelled S-Q-L
- Complex Transactions
- Business Intelligence

mongoDB

Outline
What is MongoDB?
What Makes Mongo Special?
Summary

Use Cases
Links

- http://www.mongodb.org
- http://jira.mongodb.org
- http://www.github.com/mongodb/

- #mongodb on irc.freenode.net
- mongodb-user on google groups
- mathias@10gen.com