MongoDB

Open-source, High-performance,
Schema-free, Document-Oriented Database

Who Use MongoDB

Justin.tv

Boxed Ice

sourceforge

linode.com

github SOCIAL CODING

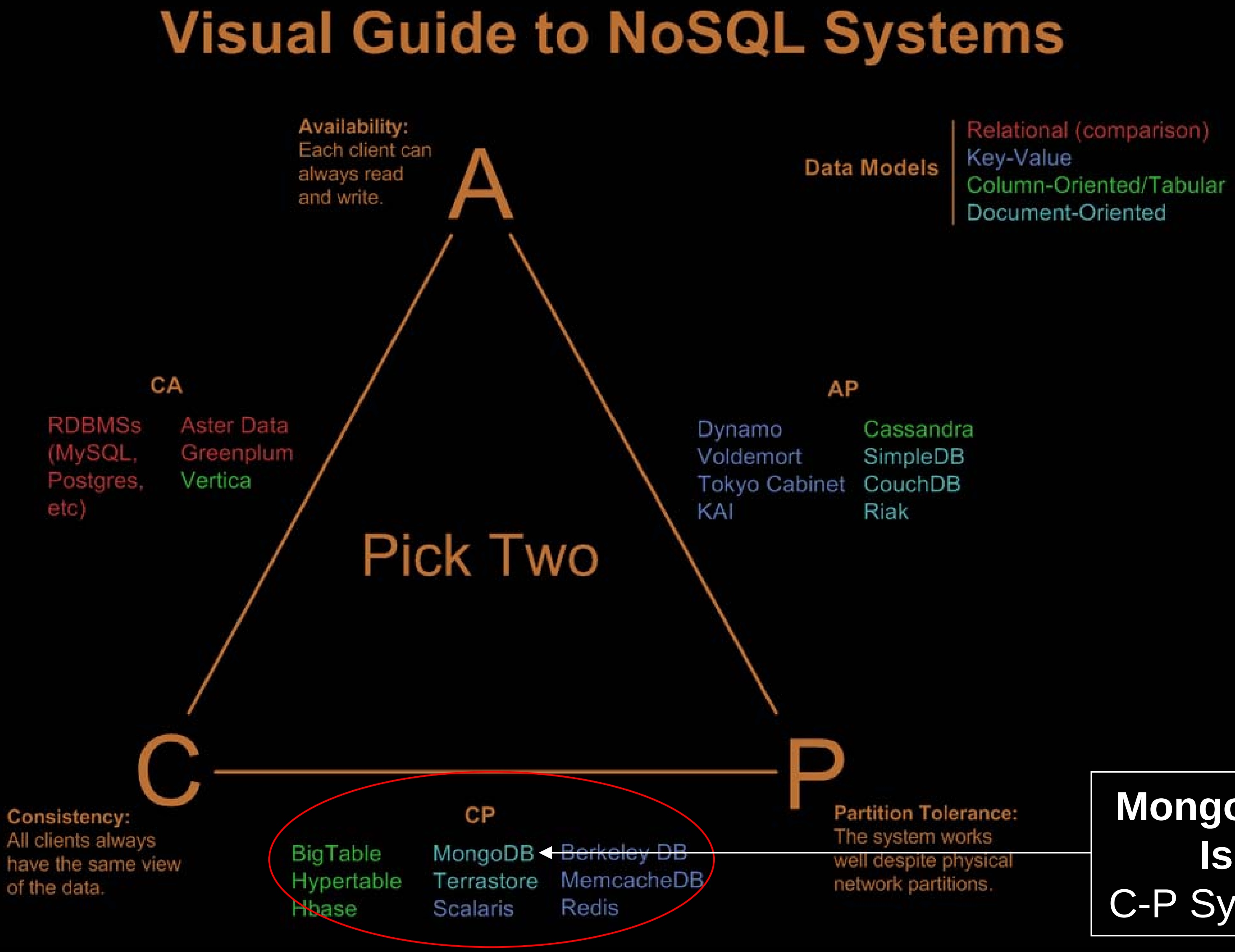
BUSINESS INSIDER

DISQUS COMMENTS

HASHROCKET EXPERTLY CRAFTED WEB

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

MongoDB & CAP Principle



MongoDB Is
C-P System

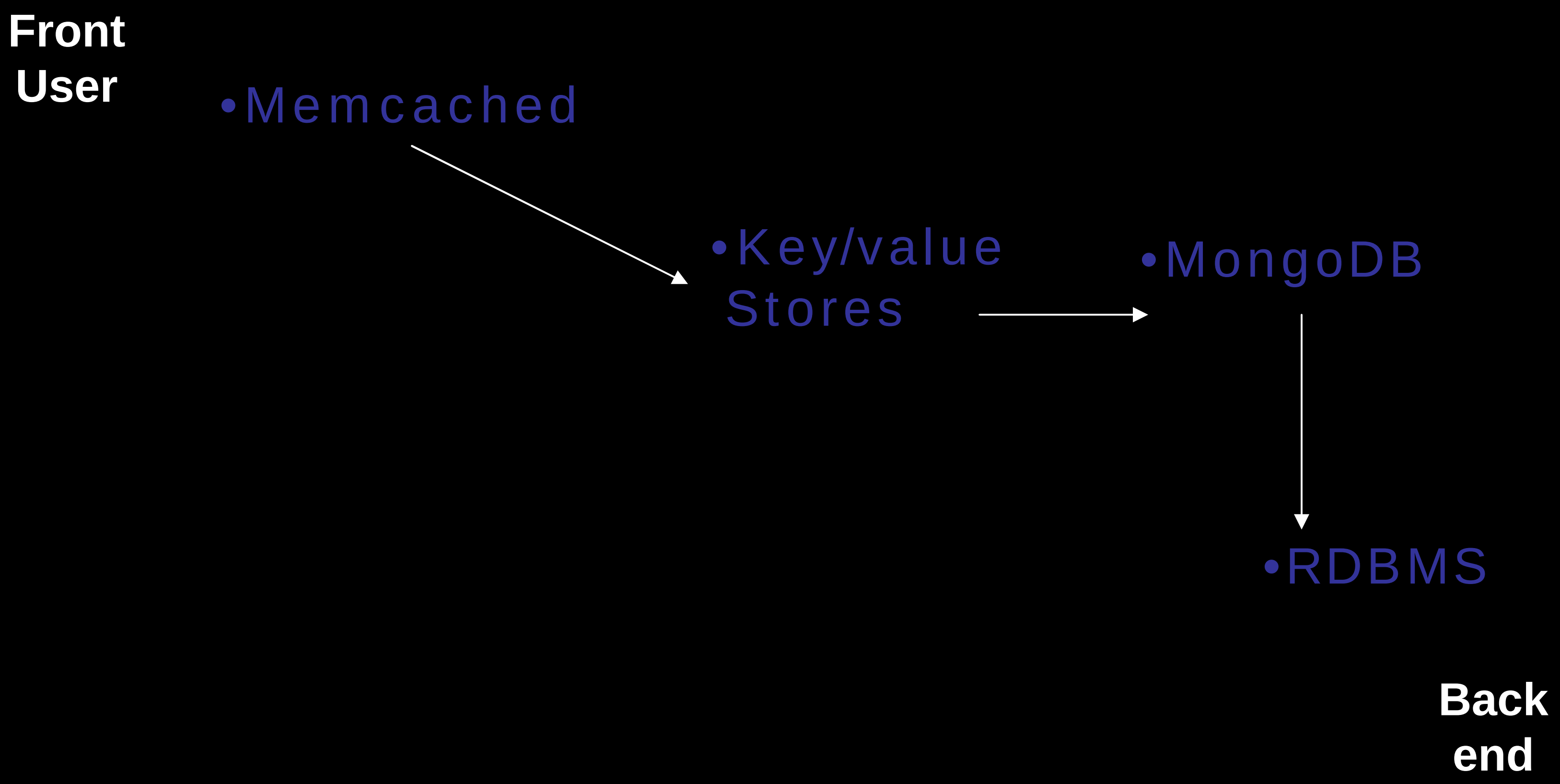
MongoDB features

- Collection storage;
- Dynamic query;
- Complete index of support;
- Query monitoring, Query optimization;
- Replication automatic failover;
- Support binary data and large objects;
- Auto-sharding Support cloud level of flexibility;

RDBMS

- Great for many applications
- Shortcomings
- Scalability
- Flexibility

Scalability & performance



JSON-style Documents

Example

```
{ title : "My First Post", author: “javabloger",
    comments : [{ by: "Abe", text: "First" },
           { by : "Ada", text : "Good post" } ]
}
```

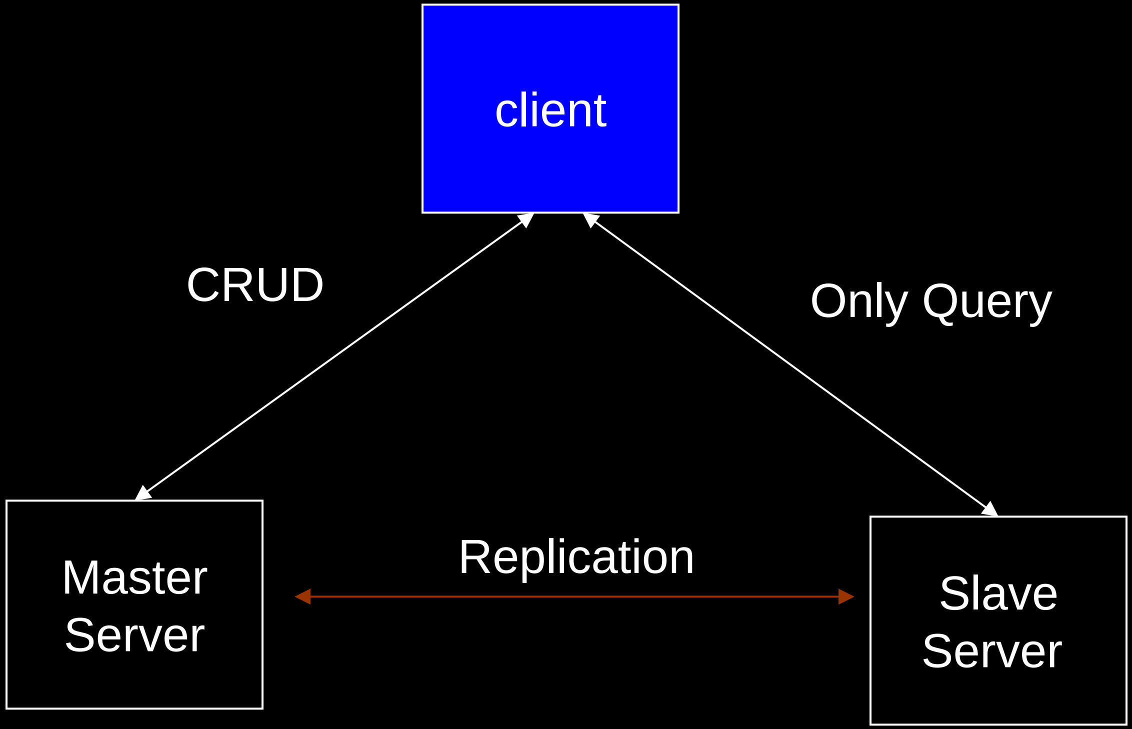
Schema-free

- Loosening constraints - added flexibility
- Dynamically typed languages (like Ruby!)
- Migrations

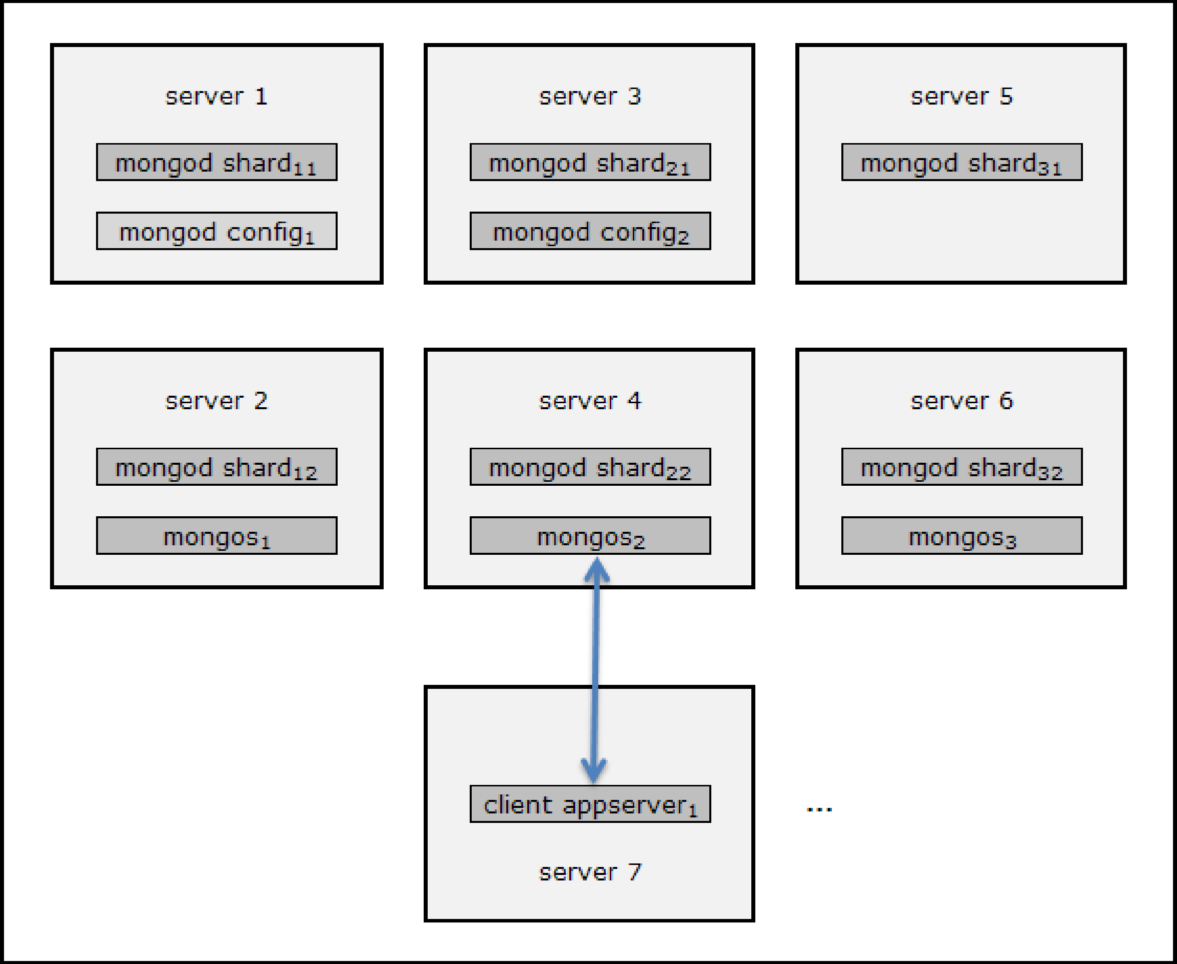
Dynamic queries

- Administration
- Ease of development
- Familiarity

Replication



Auto-sharding



MapReduce

Command syntax:

```
db.runCommand(
  { mapreduce : <collection>,
  map : <mapfunction>,
  reduce : <reducefunction>
  [, query : <query filter object>]
  [, sort : <sort the query. useful for optimization>]
  [, limit : <number of objects to return from collection>]
  [, out : <output-collection name>]
  [, keeptemp: <true|false>]
  [, finalize : <finalizefunction>]
  [, scope : <object where fields go into javascript global scope >]
  [, verbose : true]  } );
```

Many Supported

- Platforms
  Windows
  Linux
  Unix
  bsd

- Languages
  Java
  C++
  Ruby
  PHP

- Docs
  Administrate
  Developer
  Online API

Good at

- The web
- Caching
- High volume data
- Scalability

Less good at

- Highly transactional
- Ad-hoc business intelligence
- Problems that require SQL

MongoDB Basics

Document

- Unit of storage (think row)
- BSON (Binary JSON)
- Represented as a Hash

Collection

- Schema-free equivalent of a table
- Logical groups of documents
- Indexes are per-collection

_id

- Special key
- Present in all documents
- Unique across a Collection
- Any type you want

Blog back-end

Post

```
{:author => "mike",
 :date => Time.new,
 :text => "my blog post",
 :tags => ["mongodb", "ruby"]}
```

Comment

```
{:author => “eliot”,
 :date => Time.new,
 :text => “great post!”}
```

New post

```
post = {:author => "mike",
        :date => Time.new,
        :text => "my blog post",
        :tags => ["mongodb", "ruby"]}

db[“posts”].save(post)
```

Embedding a comment

```
c = {:author => “eliot”,
      :date => Time.new,
      :text => “great post!”}

db[“posts”].update({:_id => post[:_id]},
              {:$push => {:comments => c}})
```

Posts by author

```
db[“posts”].find(:author => “mike”)
```

Last 10 posts

```
db[“posts”].find.sort([[:date, :desc]])
.limit(10)
```

Posts in the last week

```
last_week = Time.utc(2009, 11, 12)
db[“posts”].find(:date => {:$gt => last_week})
```

Posts ending with ‘Ruby’

```
db[“posts”].find(:text => /Ruby$/)
```

Posts with a tag

```
db[“posts”].find(:tags => “mongodb”)
```

... and fast

```
db[“posts”].create_index(“tags”)
```

Counting posts

```
db[“posts”].count

db[“posts”].find(:author => “mike”).count
```

Basic paging

```
page = 2
page_size = 15

db[“posts”].find.limit(page_size)
                .skip(page * page_size)
```

Migration: adding titles

- Easy - just start adding them:

```
post = {:author => “mike”,
        :date => Time.new,
        :text => “another blog post”,
        :tags => [“RubyConf”],
        :title => “Review from RubyConf”}

post_id = db[“posts”].save(post)
```

Advanced queries

- $gt, $lt, $gte, $lte, $ne, $all, $in, $nin
- $where

```
db[“posts”].find :$where => “this.author == ‘mike’ ||
                                        this.title == ‘hello’”})
```

MongoMapper, Mongoid, MongoRecord, etc.

MongoMapper

```
class User
    include MongoMapper::Document
    many :posts
end

class Post
   include MongoMapper::Document
   key :user_id, String
   key :title, String
end

 user = User.create
 user.posts.create(:title => 'Foo')

 # would return post we just created
 user.posts.find_by_title('Foo')
```

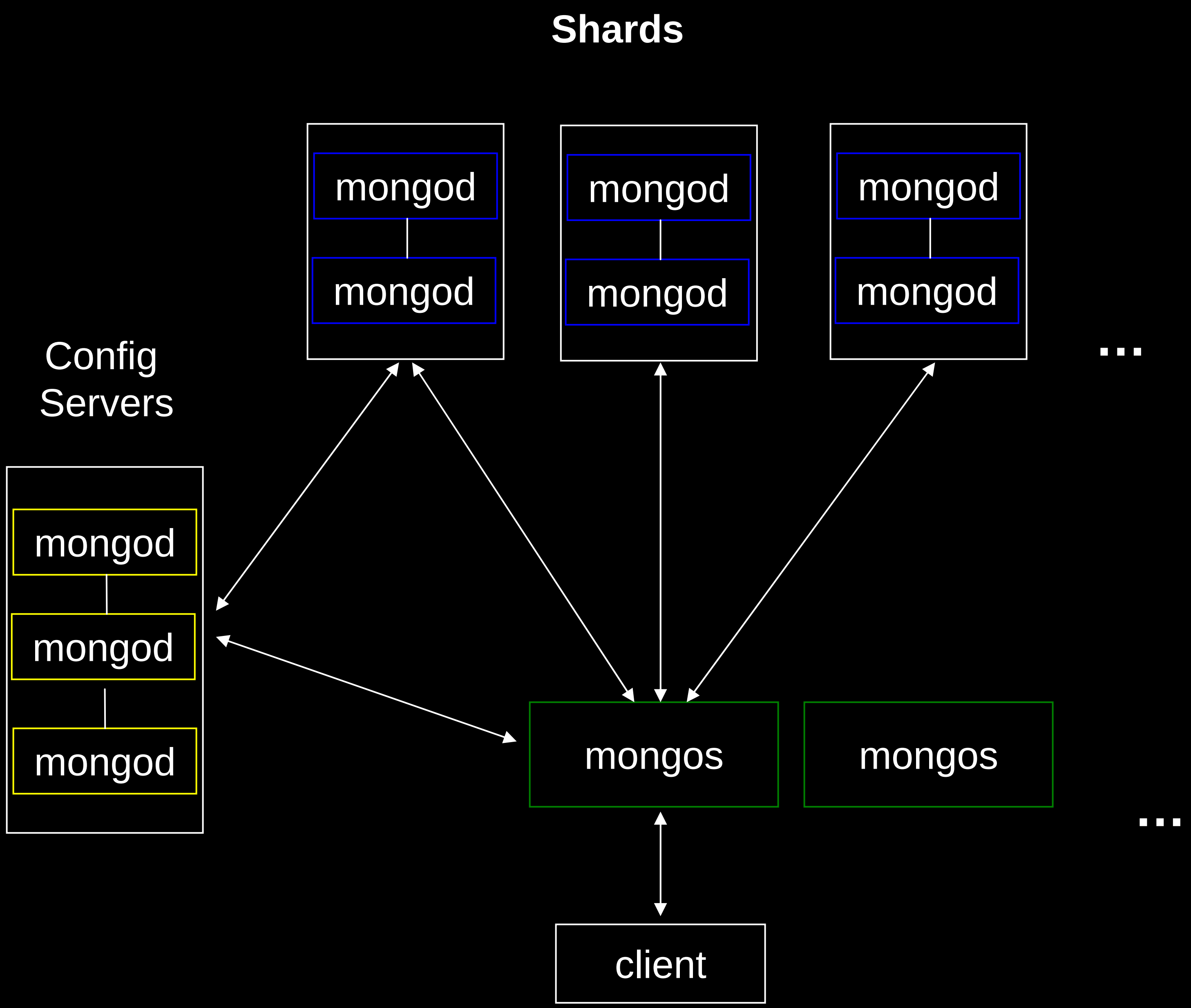
Other cool stuff

- Aggregation and map reduce
- Capped collections
- Unique indexes
- Mongo shell
- GridFS

Sharding

Terminology

- Shard key
- Chunk
  - Range of the value space
  - (collection, key, min_val, max_val)
- Shard
  - Single node (or replica pair)
  - Responsible for set of chunks


Shards
mongod
mongod
mongod
mongod
mongod
mongod
...
Config Servers
mongod
mongod
mongod
mongos
mongos
...
client

- Download MongoDB
  http://www.mongodb.org

- Try it out

- Let us know what you think!

- http://www.mongodb.org
- http://www.javabloger.com
- njthnet@javabloger.com