

Building your first app: an introduction to MongoDB

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What is MongoDB?

MongoDB is a _____ database

- Document
- Open source
- High performance
- Horizontally scalable
- Full featured

Document Database

- Not for .PDF & .DOC files
- A document is essentially an associative array
- Document = JSON object
- Document = PHP Array
- Document = Python Dict
- Document = Ruby Hash
- etc

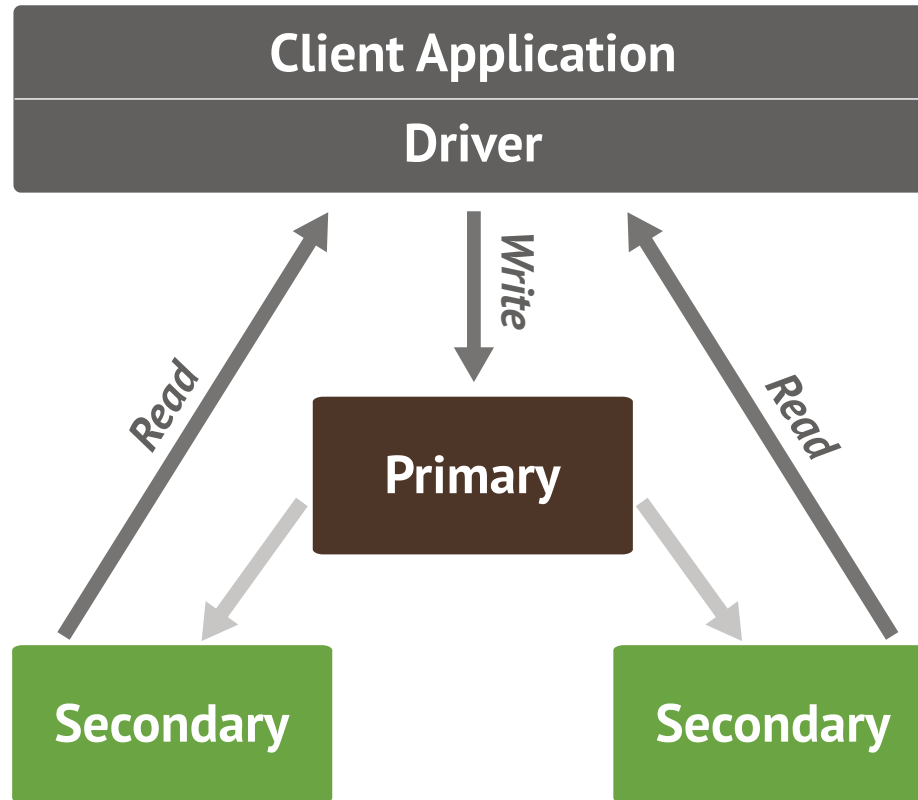
Open Source

- MongoDB is an open source project
- On GitHub
- Licensed under the AGPL
- Started & sponsored by MongoDB Inc (formerly 10gen)
- Commercial licenses available
- Contributions welcome

High Performance

- Written in C++
- Extensive use of memory-mapped files
i.e. read-through write-through memory caching
- Runs nearly everywhere
- Data serialized as BSON (fast parsing)
- Full support for primary & secondary indexes
- Document model = less work

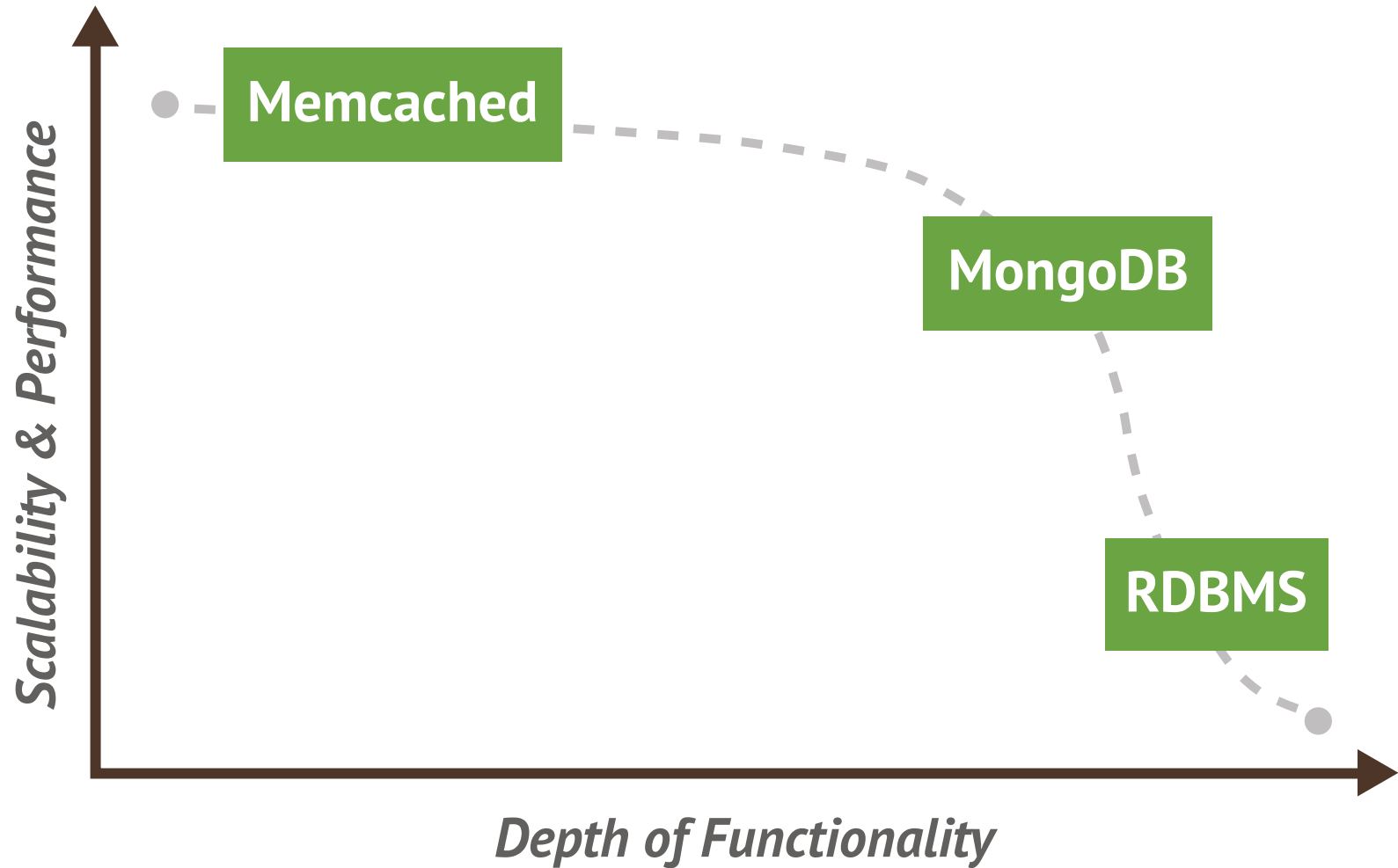
Replication





Horizontally Scalable 

Database Landscape




Full Featured

- Ad Hoc queries
- Real time aggregation
- Rich query capabilities
- Strongly consistent
- Geospatial features
- Support for most programming languages
- Flexible schema

Terminology


RDBMS		MongoDB
Table, View	→	Collection
Row	→	Document
Index	→	Index
Join	→	Embedded Document
Foreign Key	→	Reference
Partition	→	Shard


mongodb.org/downloads


 **mongoDB**
{name: "mongo", type: "DB"}


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 **MONGO DOCS**
MongoDB Documentation »

 **TRY IT OUT**
Try The Online Shell »

 **DOWNLOADS**
Download MongoDB »

 **DRIVERS**
Get The Latest Drivers »

MongoDB Downloads

This table lists MongoDB distributions by platform and version. We recommend using these binary distributions, but there are also [packages](#) available for various package managers.

	OS X 64-bit	Linux 32-bit <i>note</i>	Linux 64-bit	Windows 32-bit <i>note</i>	Windows 64-bit	Solaris 64-bit	Source
Production Release (Recommended)							
2.4.4 6/4/2013 Changelog Release Notes	download	download	download	download	download *2008R2+	download	tgz zip

Running MongoDB

```
$ tar -z xvf mongodb-osx-x86_64-2.4.x.tgz
```

```
$ cd mongodb-osx-i386-2.4.4/bin
```

```
$ mkdir -p /data/db
```

```
$ ./mongod
```

Mongo Shell

```
MacBook-Air-:~ $ mongo
```

```
MongoDB shell version: 2.4.4
```

```
connecting to: test
```

```
> db.test.insert({text: 'Welcome to MongoDB'})
```

```
> db.test.find().pretty()
```

```
{
  "_id" : ObjectId("51c34130fbd5d7261b4cdb55"),
  "text" : "Welcome to MongoDB"
}
```

Let's Build a Blog



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Private, On-Demand Training for MongoDB Now Available

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By shannon-bradshaw | [September 17, 2013](#)

New York—September 17, 2013—MongoDB today announced that Enterprise Subscribers now have access to private, on-demand training. These courses are provided by MongoDB University through its successful online learning platform, which has amassed more than 100,000 DBA and developer enrollments in its first year...

See the full [press release](#).

MongoDB University

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By shannon-bradshaw | [August 27, 2013](#)

Today we become MongoDB University. We are coordinating this with the company [changing its name to MongoDB, Inc.](#) It has been nearly a year since Andrew Erlichson started the education program at MongoDB, Inc. Since then we have had more than 100,000 registrations for our online [courses](#)! Today we offer MongoDB developer courses in Python, Java, and Node.js. We also offer MongoDB for DBAs. We also offer several [in-person training](#) options both onsite and as public events. More courses are in the works (no hints just yet)!

First step in any application is

Determine your entities

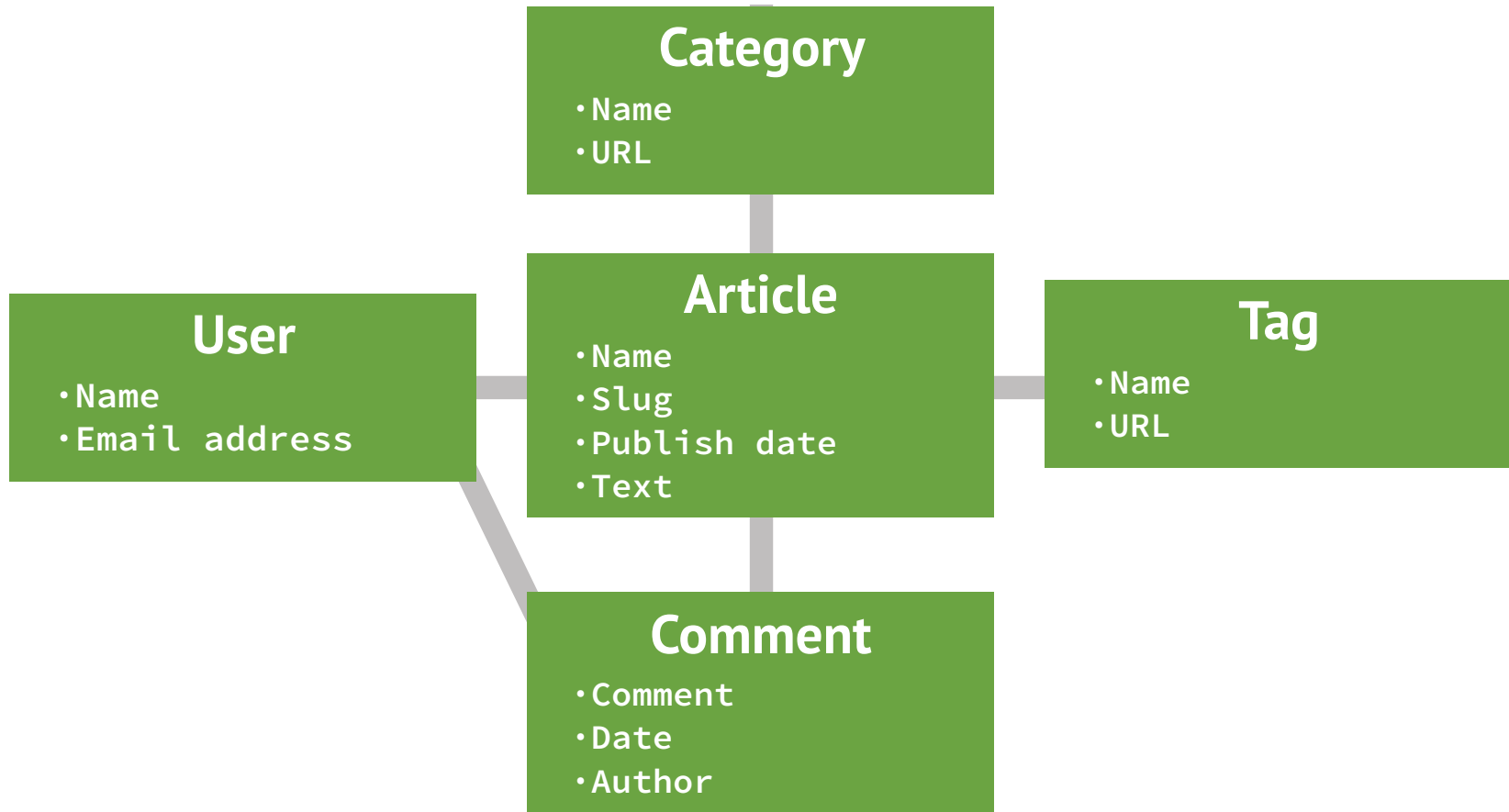
Entities in our Blogging System

- Users (post authors)
- Article
- Comments
- Tags

In a relational base app

We would start by doing schema design

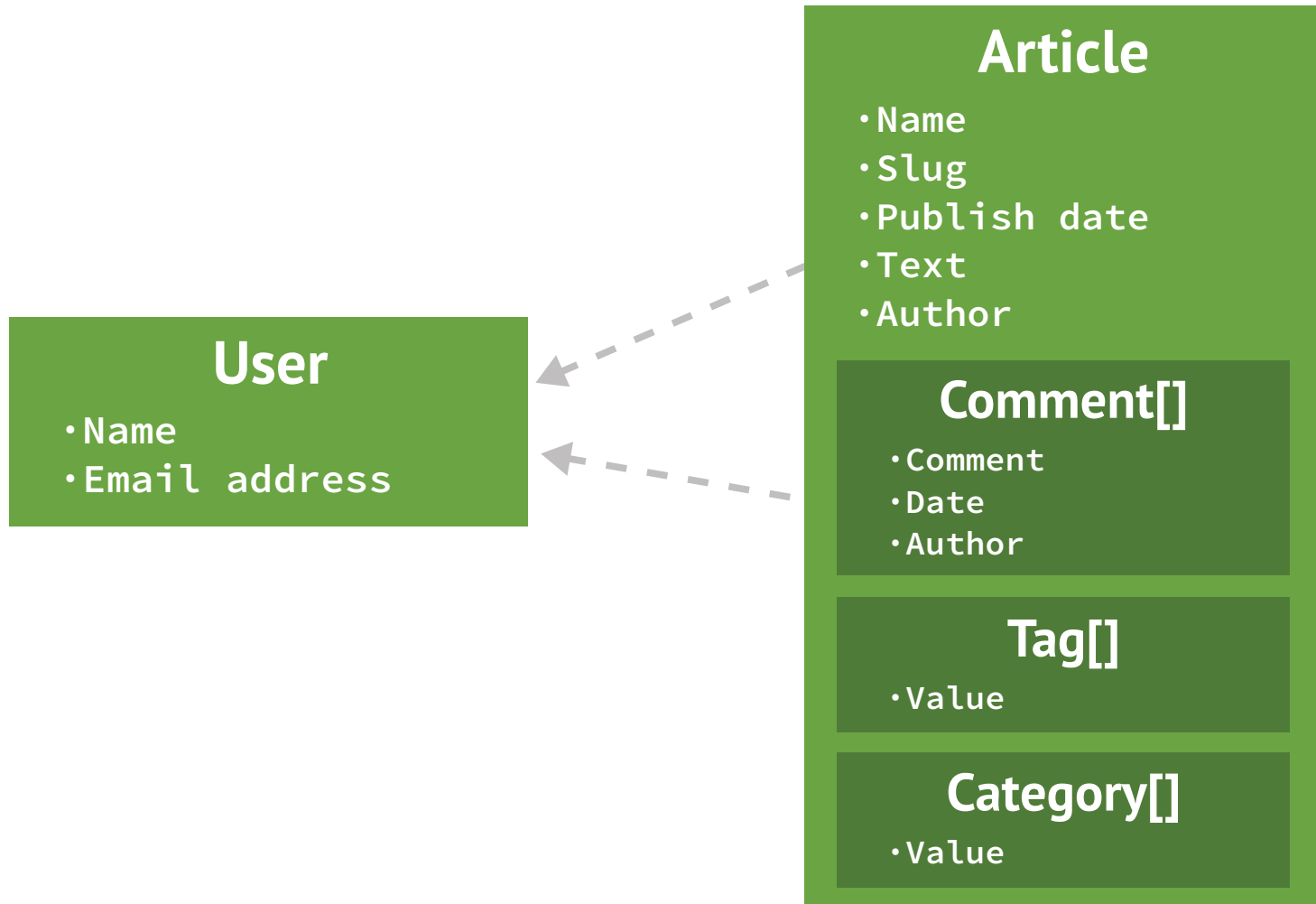
Typical (relational) ERD



In a MongoDB based app

We start building our app
and let the schema evolve

MongoDB ERD



Start with an object (or array, hash, dict, etc)

```
var user = {  
    username: 'erlichson',  
    first_name: 'Andrew',  
    last_name: 'Erlichson',  
}
```

Switch to Your DB

```
>db
```

```
test
```

```
> use blog
```

```
switching to db blog
```

```
> db.users.insert( user )
```

Insert the Record

```
> db.users.insert(user)
```

No collection creation necessary

Find One Record

```
> db.users.findOne()  
{  
  "_id" : ObjectId("50804d0bd94ccab2da652599"),  
  "username" : "erlichson",  
  "first_name" : "Andrew",  
  "last_name" : "Erlichson"  
}
```

`_id`

- `_id` is the primary key in MongoDB
- Automatically indexed
- Automatically created as an ObjectId if not provided
- Any unique immutable value could be used

ObjectId

- ObjectId is a special 12 byte value
- Guaranteed to be unique across your cluster

ObjectId("50804d0bd94ccab2da652599")
TS-----Mac---PID-Count-

Creating a Blog Post

```
> db.article.insert({  
    title: 'Hello World',  
    body: 'This is my first blog post',  
    date: new Date('2013-06-20'),  
    username: 'erlichson',  
    tags: ['adventure', 'mongodb'],  
    comments: [ ]  
})
```

Finding the Post

```
> db.article.find().pretty()
{
  "_id" : ObjectId("51c3bafafbd5d7261b4cdb5a"),
  "title" : "Hello World",
  "body" : "This is my first blog post",
  "date" : ISODate("2013-06-20T00:00:00Z"),
  "username" : "erlichson",
  "tags" : [
    "adventure",
    "mongodb"
  ],
  "comments" : [ ]
}
```

Querying An Array

```
> db.article.find({tags:'adventure'}).pretty()
{
  "_id" : ObjectId("51c3bcddfbfd5d7261b4cdb5b"),
  "title" : "Hello World",
  "body" : "This is my first blog post",
  "date" : ISODate("2013-06-20T00:00:00Z"),
  "username" : "erlichson",
  "tags" : [
    "adventure",
    "mongodb"
  ],
  "comments" : [ ]
}
```

Using Update to Add a Comment

```
> db.article.update({_id:  
  
  new ObjectId("51c3bcddfbfd5d7261b4cdb5b")},  
  
  {$push:{comments:  
  
    {name: 'Steve Blank', comment: 'Awesome Post'}}})  
  
>
```

Post with Comment Attached

```
> db.article.findOne({_id: new ObjectId("51c3bcddfbfd5d7261b4cdb5b")})
{
  "_id" : ObjectId("51c3bcddfbfd5d7261b4cdb5b"),
  "body" : "This is my first blog post",
  "comments" : [
    {
      "name" : "Steve Blank",
      "comment" : "Awesome Post"
    }
  ],
  "date" : ISODate("2013-06-20T00:00:00Z"),
  "tags" : [
    "adventure",
    "mongodb"
  ],
  "title" : "Hello World",
  "username" : "erlichson"
}
```

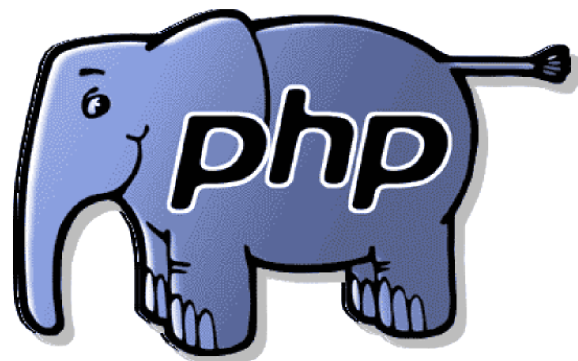

MongoDB Drivers

Real applications are not built in the shell

MongoDB has native bindings for over 12 languages

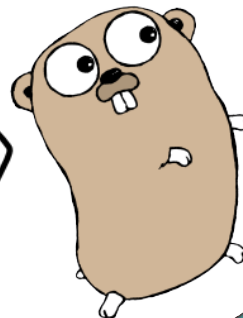


C++



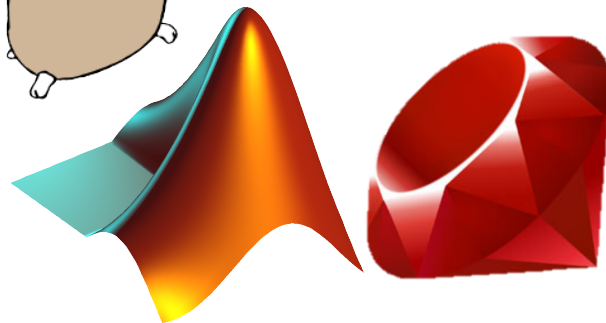
C

nodeJS



C++

ProLog



Microsoft®
.NET

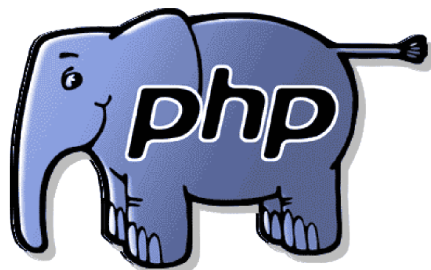
ERLANG

CF



small
TALK

Scala



C

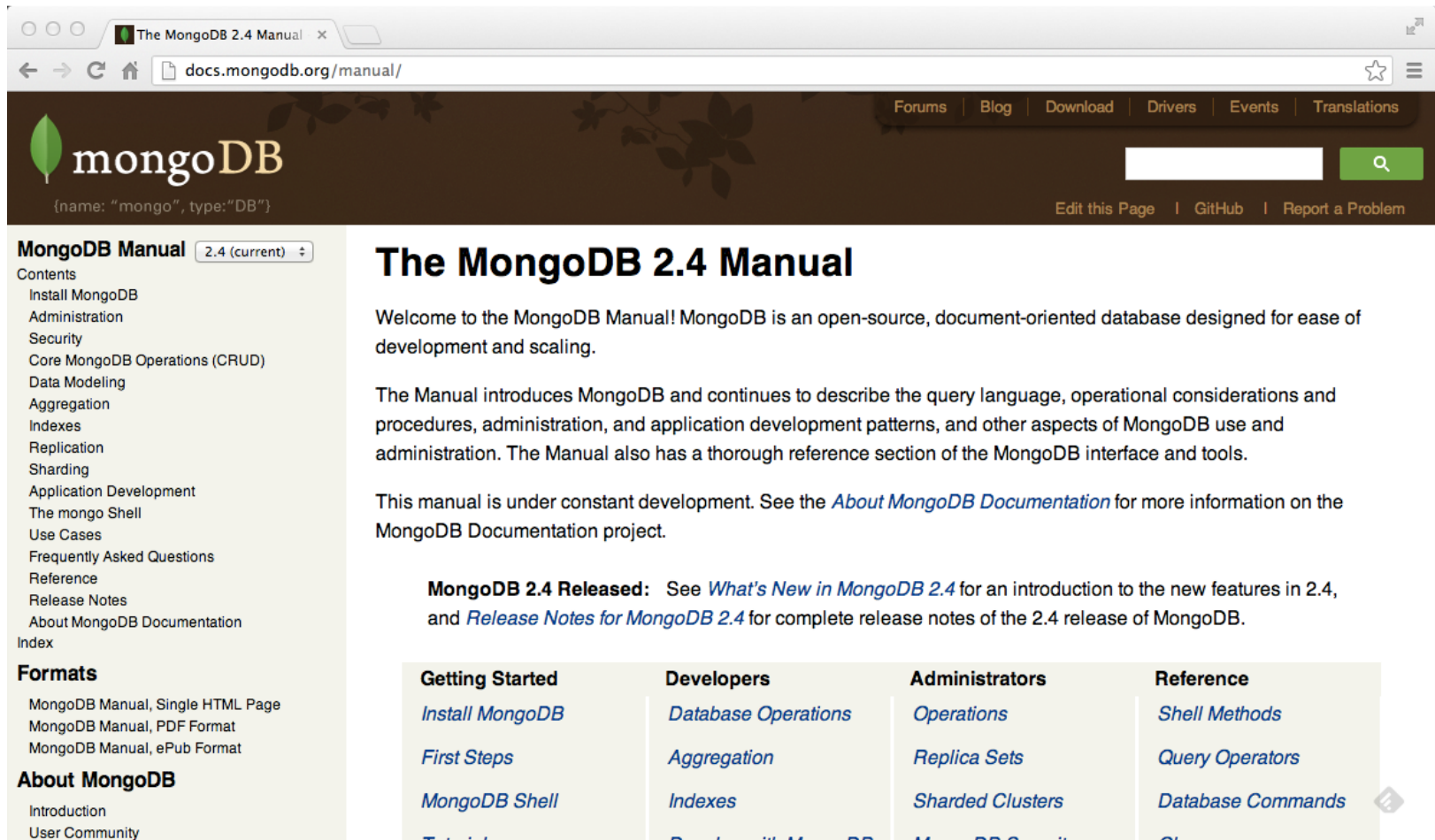


nodeJS

MongoDB Drivers

- Official Support for 12 languages
- Community drivers for tons more
- Drivers connect to mongo servers
- Drivers translate BSON into native types
- mongo shell is not a driver, but works like one in some ways
- Installed using typical means (npm, pecl, gem, pip)

docs.mongodb.org



The screenshot shows a web browser window with the address bar displaying `docs.mongodb.org/manual/`. The page title is "The MongoDB 2.4 Manual". The header features the MongoDB logo and a navigation bar with links for Forums, Blog, Download, Drivers, Events, and Translations. A search bar is located on the right side of the header. Below the header, the main content area is titled "The MongoDB 2.4 Manual" and contains a welcome message, an introduction to the manual, and a section for the 2.4 release. A left sidebar contains a table of contents and links to various manual formats. A bottom section provides quick links to different parts of the manual.

MongoDB Manual 2.4 (current) ▾

Contents

- Install MongoDB
- Administration
- Security
- Core MongoDB Operations (CRUD)
- Data Modeling
- Aggregation
- Indexes
- Replication
- Sharding
- Application Development
- The mongo Shell
- Use Cases
- Frequently Asked Questions
- Reference
- Release Notes
- About MongoDB Documentation
- Index

Formats

- MongoDB Manual, Single HTML Page
- MongoDB Manual, PDF Format
- MongoDB Manual, ePub Format

About MongoDB

- Introduction
- User Community

The MongoDB 2.4 Manual

Welcome to the MongoDB Manual! MongoDB is an open-source, document-oriented database designed for ease of development and scaling.

The Manual introduces MongoDB and continues to describe the query language, operational considerations and procedures, administration, and application development patterns, and other aspects of MongoDB use and administration. The Manual also has a thorough reference section of the MongoDB interface and tools.

This manual is under constant development. See the [About MongoDB Documentation](#) for more information on the MongoDB Documentation project.

MongoDB 2.4 Released: See [What's New in MongoDB 2.4](#) for an introduction to the new features in 2.4, and [Release Notes for MongoDB 2.4](#) for complete release notes of the 2.4 release of MongoDB.

Getting Started	Developers	Administrators	Reference
Install MongoDB	Database Operations	Operations	Shell Methods
First Steps	Aggregation	Replica Sets	Query Operators
MongoDB Shell	Indexes	Sharded Clusters	Database Commands
Tutorials	Develop with MongoDB	MongoDB Security	Glossary

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Schema Design @

