Introduction to

MongoDB

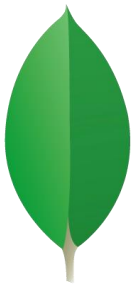
The Great Divide

Easy Flexible Scalable

What is MongoDB ?

•Scalable High-Performance Open-source, Document-orientated database.

- Built for Speed
- Rich Document based queries for Easy readability.
- Full Index Support for High Performance.
- Replication and Failover for High Availability.
- Auto Sharding for Easy Scalability.
- Map / Reduce for Aggregation.



Why use MongoDB?

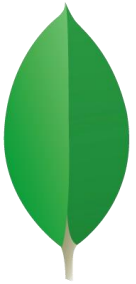
- SQL was invented in the 70's to store data.

- MongoDB stores documents (or) objects.

- Now-a-days, everyone works with objects (Python/Ruby/Java/etc.)

- And we need Databases to persist our objects. Then why not store objects directly ?

- Embedded documents and arrays reduce need for joins. No Joins and No-multi document transactions.



What is MongoDB great for?

- RDBMS replacement for Web Applications.

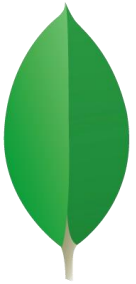
  Semi-structured Content Management.

  Real-time Analytics & High-Speed Logging.

- Caching and High Scalability

  Web 2.0, Media, SAAS, Gaming

  HealthCare, Finance, Telecom, Government



Not great for?

- Highly Transactional Applications.
- Problems requiring SQL.

Some Companies using MongoDB in Production

Let’s Dive in !

When I say

- Made up of Multiple Collections.
- Created on-the-fly when referenced for the first time.

When I say

- Schema-less, and contains Documents.

  Indexable by one/more keys.

- Created on-the-fly when referenced for the first time.

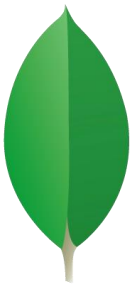
  Capped Collections: Fixed size, older records get dropped after reaching the limit.

When I say

- Stored in a Collection.
- Can have _id key – works like Primary keys in MySQL.
- Supported Relationships – Embedded (or) References.
- Document storage in BSON (Binary form of JSON).

Understanding the Document Model.

```
var p = {
'_id': '3432',
'author': DBRef('User', 2),
'title': 'Introduction to MongoDB',
'body': 'MongoDB is an open sources.. ',
'timestamp': Date('01-04-12'),
'tags': ['MongoDB', 'NoSQL'],
'comments': [{'author': DBRef('User', 4),
                'date': Date('02-04-12'),
                'text': 'Did you see.. ',
                'upvotes': 7, ... ]
}
> db.posts.save(p);
```



Secondary Indexes

Create Index on any field in the document

// 1 means ascending, -1 means descending

> db.posts.ensureIndex({'author': 1});

//Index Nested Documents

> db.posts.ensureIndex('comments.author': 1);

// Index on tags

> db.posts.ensureIndex({'tags': 1});

// Geo-spatial Index

> db.posts.ensureIndex({'author.location': '2d'});

What about Queries? So Simple

// find posts which has 'MongoDB' tag.

> db.posts.find({tags: 'MongoDB'});

// find posts by author's comments.

>db.posts.find({'comments.author': DBRef('User',2)}).count();

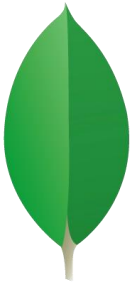
// find posts written after 31st March.

> db.posts.find({'timestamp': {'gte': Date('31-03-12')}});

// find posts written by authors around [22, 42]

> db.posts.find({'author.location': {'near':[22, 42]}});

$gt, $lt, $gte, $lte, $ne, $all, $in, $nin, count, limit, skip, group, etc...



Whatabout Updates? Atomic Operations makes it simple

```
db.posts.update({_id: '3432'},
{'title': 'Introduction to MongoDB (updated)',
'text': 'Updated text',
${addToSet: {'tags': 'webinar'}});
```

$set, $unset

$push, $pull, $pop, $addToSet

$inc, $decr, many more…

Where are my joins and transactions? !!!

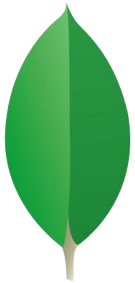
Some Cool features

- Geo-spatial Indexes for Geo-spatial queries.
  $near, $within_distance, Bound queries (circle, box)

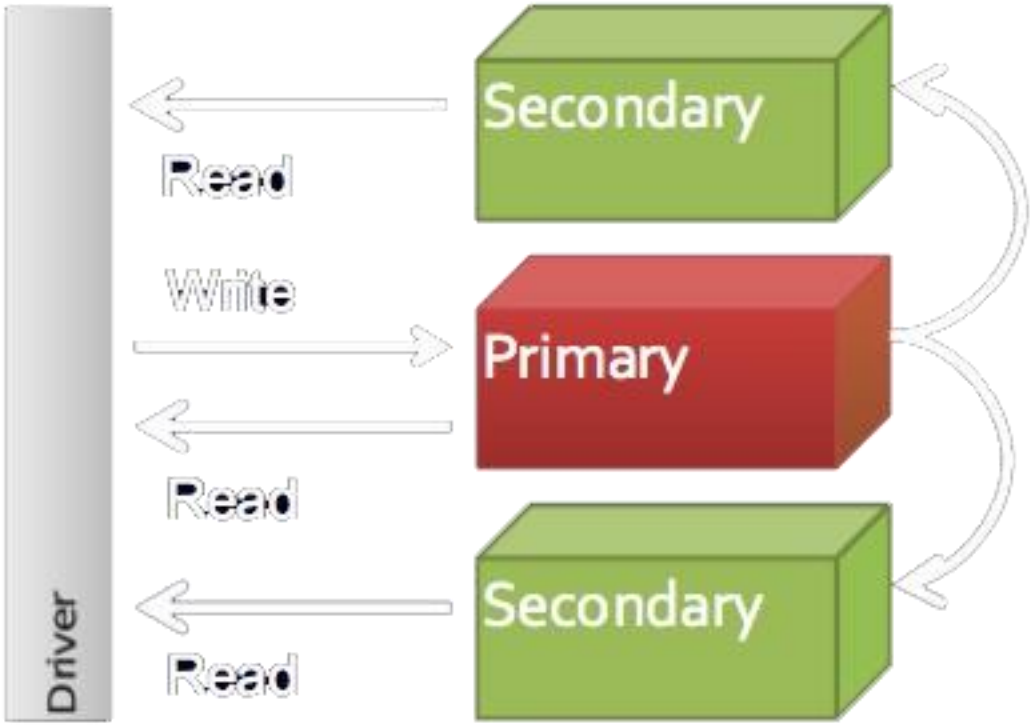
- GridFS
  Stores Large Binary Files.

- Map/Reduce
  GROUP BY in SQL, map/reduce in MongoDB.

Deployment & Scaling



Replica Sets



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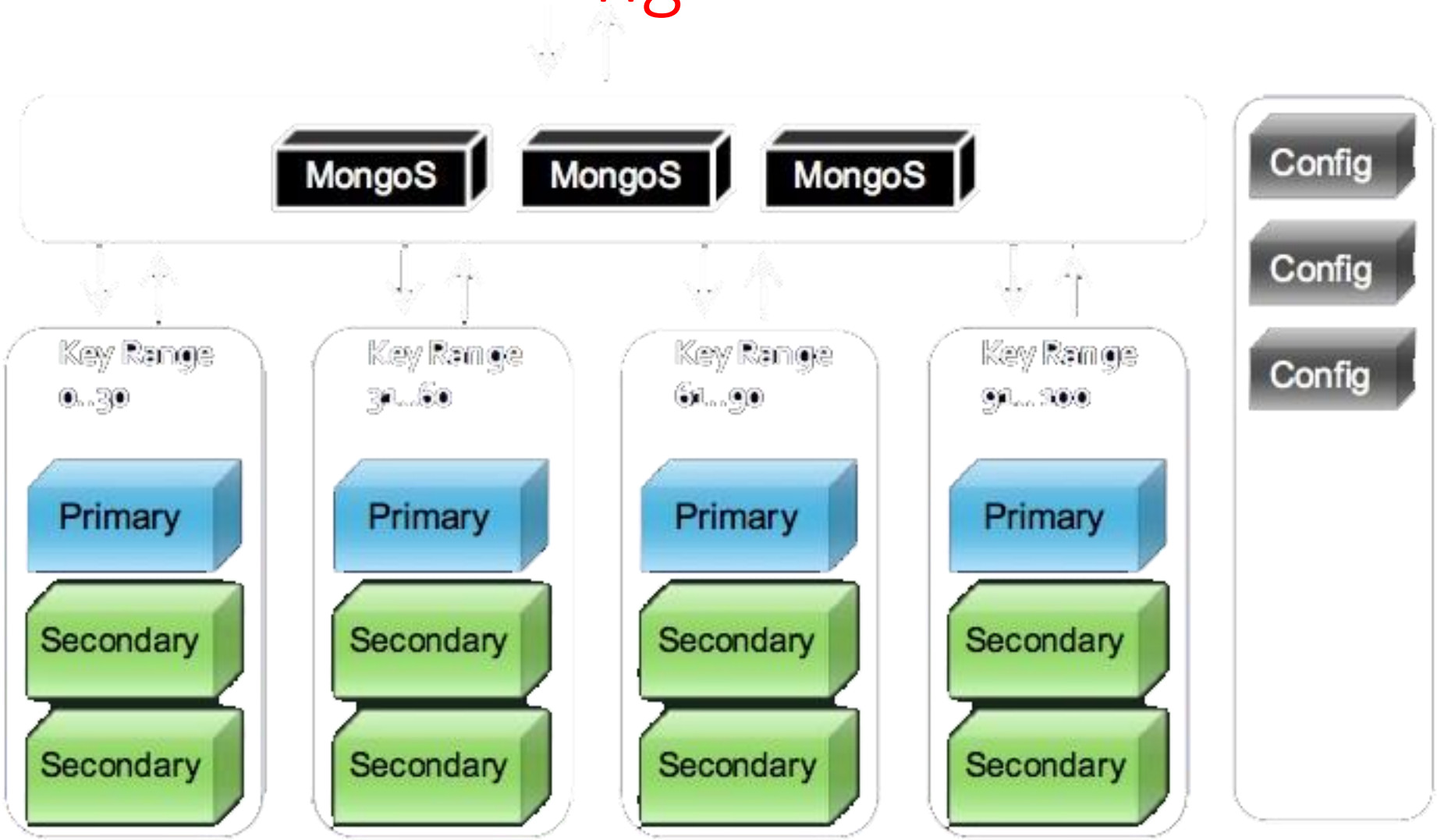
MongoS
MongoS
MongoS
Config
Config
Config
Key Range
0..30
Key Range
31..60
Key Range
61..90
Key Range
91..100
Primary
Secondary
Secondary
Primary
Secondary
Secondary
Primary
Secondary
Secondary
Primary
Secondary
Secondary