MongoDB & PHP - Welcome

What we'll cover:

- MongoDB quick overview
- Setting up MongoDB + PHP
- Actual PHP code! (https://github.com/gatesvp/php_get_started)

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MongoDB & PHP – Who Am I?

```
{
  name: 'Gaëtan (Gates) Voyer-Perrault',
  job_title: 'Customer Success Engineer',
  email: 'gates@10gen.com',
  twitter: '@gatesvp',
  specialties: [ 'php', 'content monetization',
    'mongodb', 'powershell', ':)' ]
}
```

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What is MongoDB?

From the website: *"Scalable, high-performance, document-oriented database"*:

So it's a database, with specific features:

- Data is stored in BSON (*think JSON*)
- Native arrays, nested documents
- Indexing for faster queries
- Map / Reduce for aggregation

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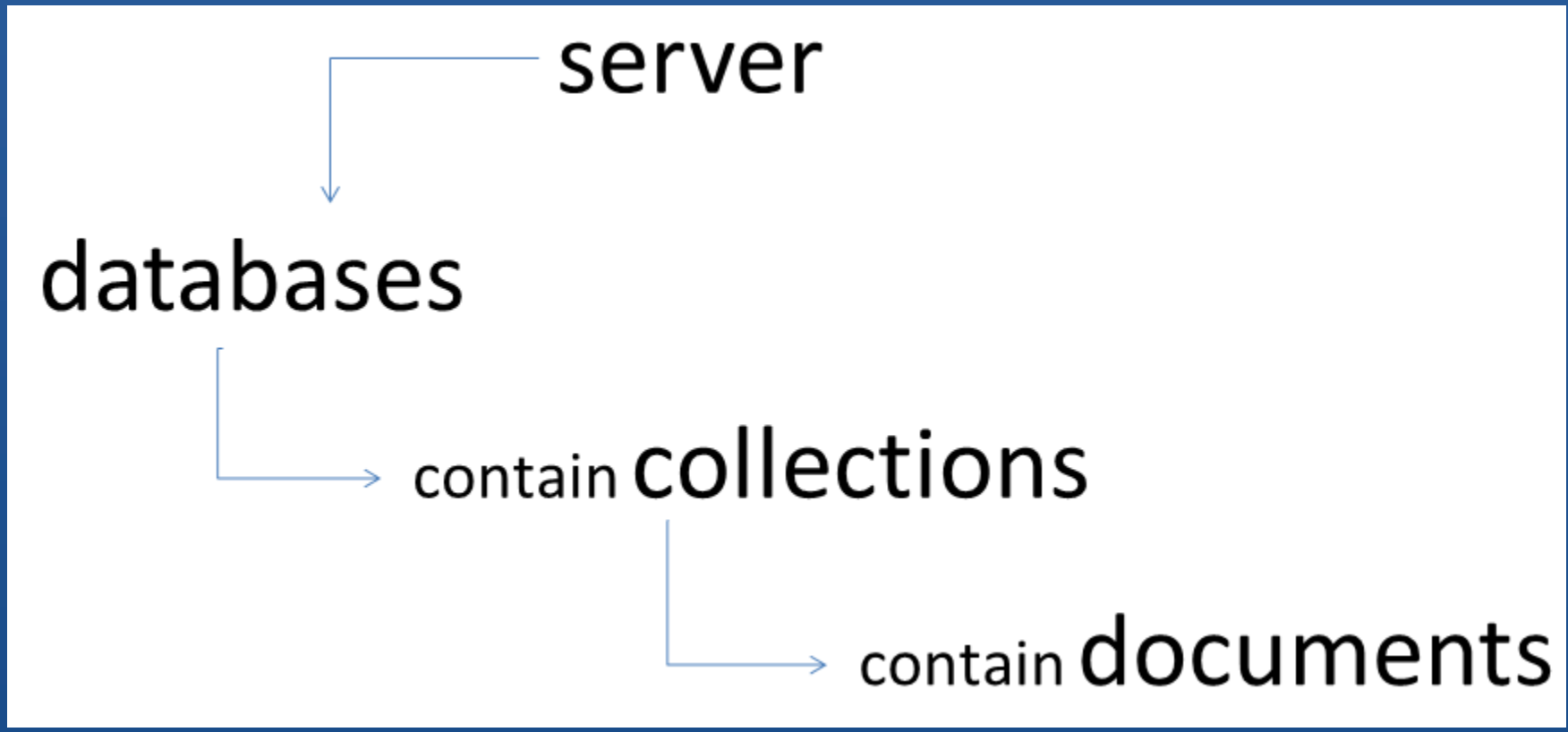
What is MongoDB? Document-oriented



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What is MongoDB? Document-oriented

Collections are basically “bags of documents”.
In our case, bags of JSON objects.

- Different Fields
- Different Sizes
- Indexable

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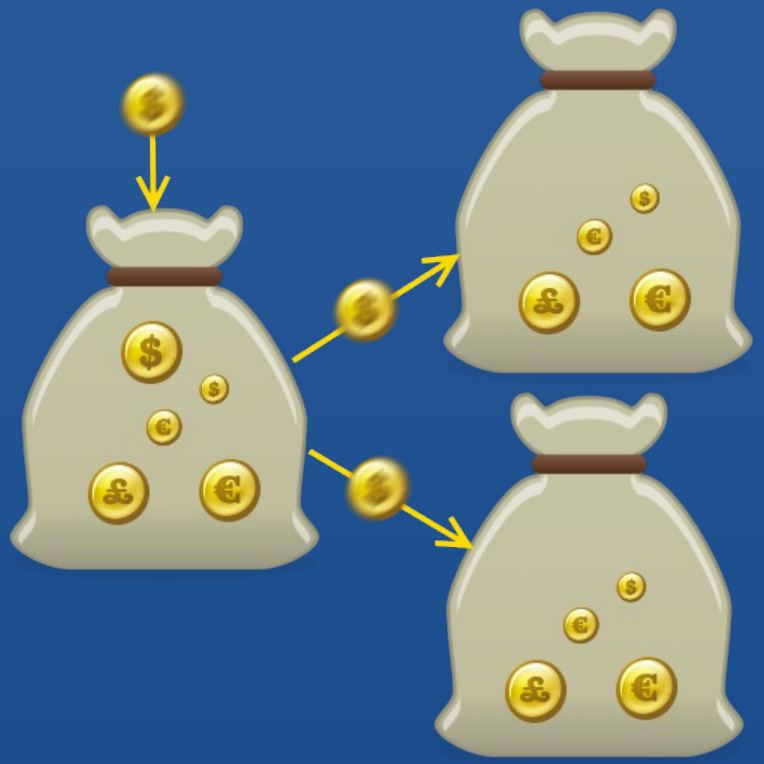
What is MongoDB? Scalable

Read scaling and HA via **Replication**



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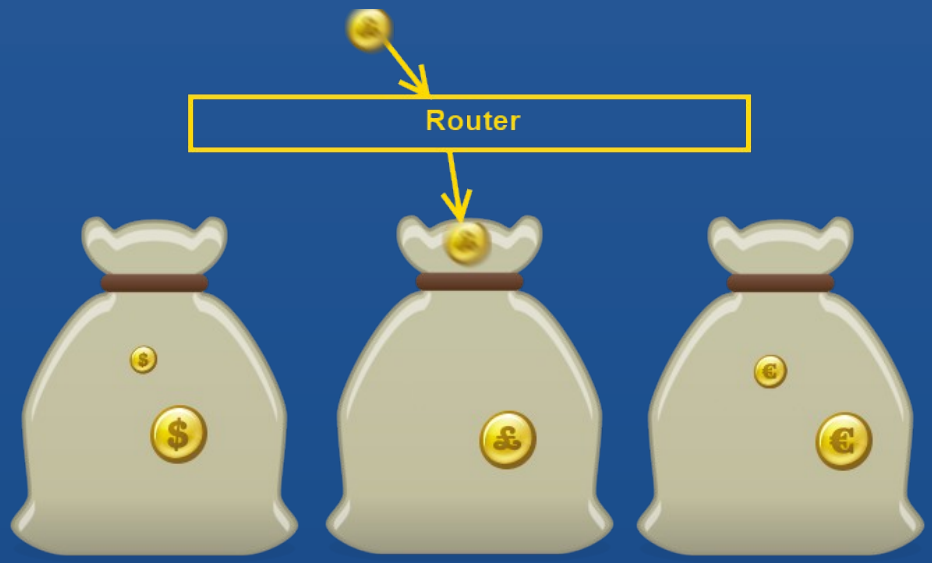
What is MongoDB? Scalable

Write scaling via **Sharding**



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Installing MongoDB & PHP

Installing MongoDB:

- Download your version
  http://www.mongodb.org/downloads

On Linux:

```
$ curl http://downloads.mongodb.org/linux/mongodb-linux-
x86_64-1.8.1.tgz > mongo.tgz
$ tar xzf mongo.tgz
$ sudo mkdir -p /data/db/
$ sudo chown `id -u` /data/db
$ ./mongodb-xxxxxxx/bin/mongod
```

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Installing MongoDB & PHP

Installing PHP Driver:

```
$ sudo apt-get install php5-dev php5-cli php-pear
$ sudo pecl install mongo
```

Open `php.ini` file and add:

```
extension=mongo.so
```

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Let's start saving documents

Basic Connection:

```
<?php
try {
  $mongo = new Mongo('localhost:27017'); // default
  $db = $mongo->example;
  $collection = $db->test;

  $document = array('x' => 1);
  $collection->insert($document);

  print_r($document);
}
catch(Exception $e) { print($e->getMessage()); }
?>
```

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Saving – Some notes

When we insert the document, a couple of “magic” things happen:

- The `example` DB is created
- The `test` collection is created
- An index is created the `_id` field
- An `_id` is created for the document
- The `_id` is added to the document

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A more complex document

JSON representation

- Notice the friends array, contact sub-document.

```
{
  _id: 'gates',
  name: 'Gaëtan Voyer-Perrault',
  friends: ['bernie', 'alvin'],
  followers: 18,
  contact: {
   twitter: '@gatesvp',
   email: 'gates@10gen.com'
  }
}
```

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A more complex document

PHP representation

- Nested hashtables

```
$doc = array( '_id' => 'gates',
   'name' => 'Gaëtan Voyer-Perrault',
   'friends' => array('bernie', 'alvin'),
   'followers' => 18,
   'contact' => array( 'twitter' => '@gatesvp',
     'email' => 'gates@10gen.com')
   )
)
```

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Some Basic Queries

Queries accept a document / hashtable:

```
// Basic query
$query = array( '_id' => 'gates');
$result = $collection->findOne($query);

// Query on array
$query = array( 'friends' => 'alvin');
$result = $collection->findOne($query);

// Query on sub-document
$query = array( 'contact.twitter' => '@gatesvp');
$result = $collection->findOne($query);
```

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Some Basic Queries – less fields

Queries can specify only certain fields

```
// Filter fields
$query = array( '_id' => 'gates');
$fields = array( '_id' => 0, 'name' => 1, 'friends' => 1);
$result = $collection->findOne($query, $fields);
```

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Some Advanced Queries

Mongo has several $operators:

```
// Greater than ($gt)
$query = array( 'followers' => array( '$gt' => 10 ) );
$results = $collection->find($query);

// IN ($in)
$query = array( '_id' =>
  array( '$in' => array('gates','jim') )
);
$results = $collection->find($query);

// also support for $or, $exists, $mod, $type, $size
// regexes and negated versions of these.
```

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Cursoring through results

Result of a find() is cursor.
Cursor works with foreach.

```
$collection->insert(array('x' => 1));
$collection->insert(array('x' => 2));
$collection->insert(array('x' => 3));

$results = $collection->find();

foreach($results as $r) {
  print_r($r);
}
```

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Cursoring through results

Alternately works with while loop:

```
$collection->insert(array('x' => 1));
$collection->insert(array('x' => 2));
$collection->insert(array('x' => 3));

$results = $collection->find();

while($results->getNext()){
  $r = $results->hasNext();
  print_r($r);
}
```

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Cursoring through results

Cursor also does counting, skipping, limiting:

```
// Greater than ($gt)
$collection->insert(array('x' => 1));
$collection->insert(array('x' => 2));
$collection->insert(array('x' => 3));

print($collection->find()->count());  // 3
$res = $collection->find()->limit(1);  // x=>1
$res2 = $collection->find()->skip(1)->limit(1); // x=>2
```

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Updating Documents

Query + Update command

```
// Does not behave as you would expect
$query = array( '_id' => 'gates' );
$update = array( 'followers' => 19 );
$collection->update($query, $update);

// Instead
$query = array( '_id' => 'gates' );
$update = array( '$set' => array('followers' => 19) );
$collection->update($query, $update);
```

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Updating Documents

Other operators

```
// Instead
$query = array( '_id' => 'gates' );
$update = array(
   '$set' => array('name' => 'GVP',
     'contact.website' => 'http://10gen.com/'),
   '$inc' => array('followers' => 1),
   '$push' => array('friends' => 'antoine'),
   '$unset' => array('contact.twitter' => 1)
);
$collection->update($query, $update);
```

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More on updating

- There are several more operators
  `$push, $pop, $pull, $addToSet`
  `$rename`
- Operators are atomic within a document.
- Only one operation per field.
  You cannot `$pop` & `$pull` an array in one command.

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Updating multiples

Be default, only first doc is updated.
We can change this.

```
$collection->insert(array('x'=>1));
$collection->insert(array('x'=>1));
$collection->insert(array('x'=>3));

$query = array('x' => 1);
$update = array('$inc' => array('x' => 1)));
$options = array('multiple' => true);
$collection->update($query, $update, $options);
```

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Deleting

Very similar to updating.

```
$collection->remove(); // deletes everything!

$query = array('x' => 1);
$collection->remove($query); // deletes where x=>1
```

Beware empty query!

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Update if not exist

We call this the '**upsert**'

```
// Upsert
$query = array('_id' => 'gates');
$update = array('$inc' => array('followers' => 1));
$options = array('upsert' => true);
$collection->update($query, $update, $options);
```

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A word about transactions

MongoDB does **not** have joins.

Likewise:

- … no transactions across documents
- … no transactions across collections

If you need these take a look at

`findAndModify` + two-phase commit

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A word about exceptions

Catch them.

Especially when using Replica Sets.
Failover is not instant.

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More words about exceptions

Timeouts you'll want to check or set.

Connection timeouts:

```
try{
  $connString = 'server1:27017';
  $connOptions = array('timeout' => 3000); // 3 seconds
  $mongo = new Mongo($connString, $connOptions);
}
catch(MongoConnectionException $ex){ // log }
```

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More words about exceptions

Timeouts you'll want to check or set.

Cursor timeouts:

```
try{
  ...
  $res = $coll->find($query)->timeout(1000) // 1 second

  while($res->hasNext()){
    $data = $res->getNext();
  }
}
catch(MongoCursorException $ex){ // log }
catch(MongoCursorTimeoutException $ex){ // log }
```

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A word about arrays

PHP arrays are a funny beast.
Take the following doc

```
  $document = array(
    'normal' => array('first','second'),
    'crazy' => array("0" => 'first', '1' => 'second'),
    'arrayObj' => new ArrayObject(array('first',
'second')),
    'object' => array('1' => 'first', '2' => 'second')
  );

  $collection->insert($document);
```

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A word about arrays

$push only works on arrays as stored in the DB.

```
$collection->update(array(),
  // works
  array('$push' => array('normal' => 'third')),
  array('$push' => array('crazy' => 'third')),

  // fails
  array('$push' => array('object' => 'third')),
  array('$push' => array('arrayObj' => 'third'))
);
```

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Other features

MongoDB has lots of other features.

- DB commands: accessible from PHP
- GridFS: store large files
- Indexing: optimize queries
- Geo-spatial queries

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try at try.mongodb.org

A Tiny MongoDB Browser Shell (mini tutorial included)
Just enough to scratch the surface

```
MongoDB browser shell version: 0.1.2
connecting to random database
type "help" for help
type "tutorial" to start the tutorial
>
```

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drivers at mongodb.org

mongodb.org Supported

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

Community Supported

- REST
- Clojure
- ColdFusion
- Delphi
- Erlang
- F#
- Go: gomongo
- Groovy
- Haskell
- Javascript
- Lua
- node.js
- Objective C
- PHP
- PowerShell
- Blog post
- Python
- Ruby
- Scala
- Scheme (PLT)
- Smalltalk: Dolphin
- Smalltalk

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