### Java Development with MongoDB

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#### Outline

- MongoDB + Java Basics
  - Setting up your Java environment
  - Connecting to MongoDB
- Working with MongoDB
  - Collections + Documents
  - Inserting Documents to MongoDB
  - Querying MongoDB





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## Adding the MongoDB Driver To Your Project

# Assuming you're using a dependency manager, make setup simple...

Maven Dependency

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<dependency>
<groupId>org.mongodb</groupId>
<artifactId>mongo-java-driver</artifactId
<version>1.4</version>
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Ivy Dependency

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# Getting connected to MongoDB is simple; Connections are pooled, so you only need one...

```
import com.mongodb.Mongo;
import com.mongodb.DB;

    Mongo m = new Mongo();

    Mongo m = new Mongo("localhost");

    Mongo m = new Mongo("localhost", 27017);

    Fetch a Database Handle (lazy)...

    DB db = m.getBB("lavabemo");
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boolean auth = db.authenticate("login", "password");





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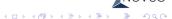
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## Working with Collections

#### Collections are MongoDB "tables"...

List all of the collections in a database...

- Get a specific collection (lazy)...
   DBCollection coll = db.getCollection("testData");
- Count the number of documents in a collection...
   coll.getCount();





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Count the number of documents in a collection...

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coll.getCount();
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## MongoDB Documents BSON

- "Documents" are MongoDB's "rows".
- MongoDB's Internal Document representation is 'BSON'
  - BSON is a binary optimized flavor of JSON
  - Corrects JSON's inefficiency in string encoding (Base64)
  - Supports extras including Regular Expressions, Byte Arrays, DateTimes & Timestamps, as well as datatypes for Javascript code blocks & functions.
  - Creative Commons licensed.
  - BSON implementation being split into its own package in most drivers.
  - bsonspec.org





- Java representation of BSON is the map-like DBObject (Java 2.0 driver has a new base class of **BSONObject** related to the **BSON** split-off)
- Easiest way to work with Mongo Documents is BasicDBObject...
  - BasicDBObject implements
  - Mutable object
  - Can take a Map as a constructor parameter
  - Example: DBObject doc = new BasicDBObject();
  - toString returns a JSON serialization.
- Use BasicDBList (implements) iava.util.ArravList<Object>) to represent Arrays. 口 > 《圖 > 《意 > 《意 >





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- BasicDBObjectBuilder follows the *Builder* pattern.
- add() your keys & values:
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builder.add("presentation", "Java Development with MongoDB");
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- A BasicDBObjectBuilder is not a DBObject.
- Call *get()* to return the built-up **DBObject**.
- add() returns itself so you can chain calls instead

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BasicDBOBjectBuilder.start().add("username", "bwmcadams").add("password",
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Implementation by Extension: DBObject

- If you want to create your own concrete objects, extend & implement DBObject
  - Requires you implement a map-like interface including ability to get & set fields by key (even if you don't use them, required to deserialize)
  - Instances of DBObject can be saved directly to MongoDB.
- Feeling Fancy? Reflect instead...
  - Use **ReflectionDBObject** as a base class for your *Beans*.
  - ReflectionDBObject uses reflection to proxy your getters & setters and behave like a DBObject.
  - Downside: With Java's single inheritance you are stuck using this as your base class.
- Existing Object Model? ORM-Like Solutions (*Detailed later*)...
  - Daybreak
  - Morphia



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- Get a Set<String> of a DBObject's field names with keySet()
- Get a specific field with get(String key). This returns Object so you will need to cast to an expected value.
- Call toMap() to get back a Map (String, Object) instead.





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coll insert/dep:
```

- Got multiple documents? Call insert() in a loop, or pass
   DBObject[] or List<DBObject>
- Three ways to store your documents:
  - INSERT (insert()) always attempts to add a new row.
  - SAVE (save()) only attempts to insert unless \_id is defined.
     Otherwise, it will attempt to update the identified document.
  - UPDATE (update()) Allows you to pass a query to filter by and the fields to change. Boolean option "multi" specifies if multiple documents should be updated. Boolean "upsert" specifies that the object should be inserted if it doesn't exist (e.g. query doesn't match).

## **Inserting Documents**

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- Find a single row with findOne(). Takes the first row returned.
- Getting a cursor of all documents (find() with no query):

```
DBCursor cur = coll.find();
while (DBObject doc : cur) {
          System.out.println(doc);
}
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Query for a specific value...

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# MongoDB Querying Query Operators

MongoDB is no mere Key-value store. There are myriad powerful operators to enhance your MongoDB queries...

- Conditional Operators: \$gt (>), \$lt (<), \$gte (>=), \$lte (<=)</li>
- Negative Equality: \$ne (!=)
- Array Operators: \$in (SQL "IN" clause...takes an array), \$nin (Opposite of "IN"), \$all (Requires all values in the array match), \$size (Match the size of an array)
- Field Defined: \$exists (boolean argument)(Great in a schemaless world)
- Regular Expressions (Language dependent most drivers support it)
- Pass Arbitrary Javascript with \$where (No OR statements, so use WHERE for complex range filters)
- Negate any operator with \$not



# MongoDB Querying Putting Operators to Work

#### Using a query operator requires nested objects...

- All posts since a particular date:
   DBObject q = new BasicDBObject("postDate", new
   BasicDBObject("\$gte", new java.util.Date()));
   DBCursor posts = coll.find(q);
- Find all posts NOT by me:
   DBObject q = new BasicDBObject("postedBy", new
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