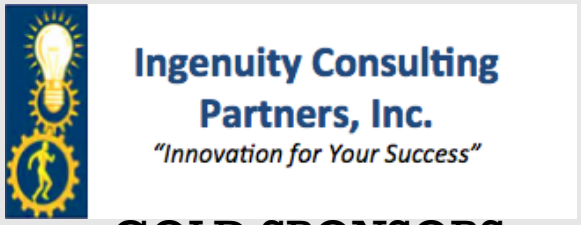
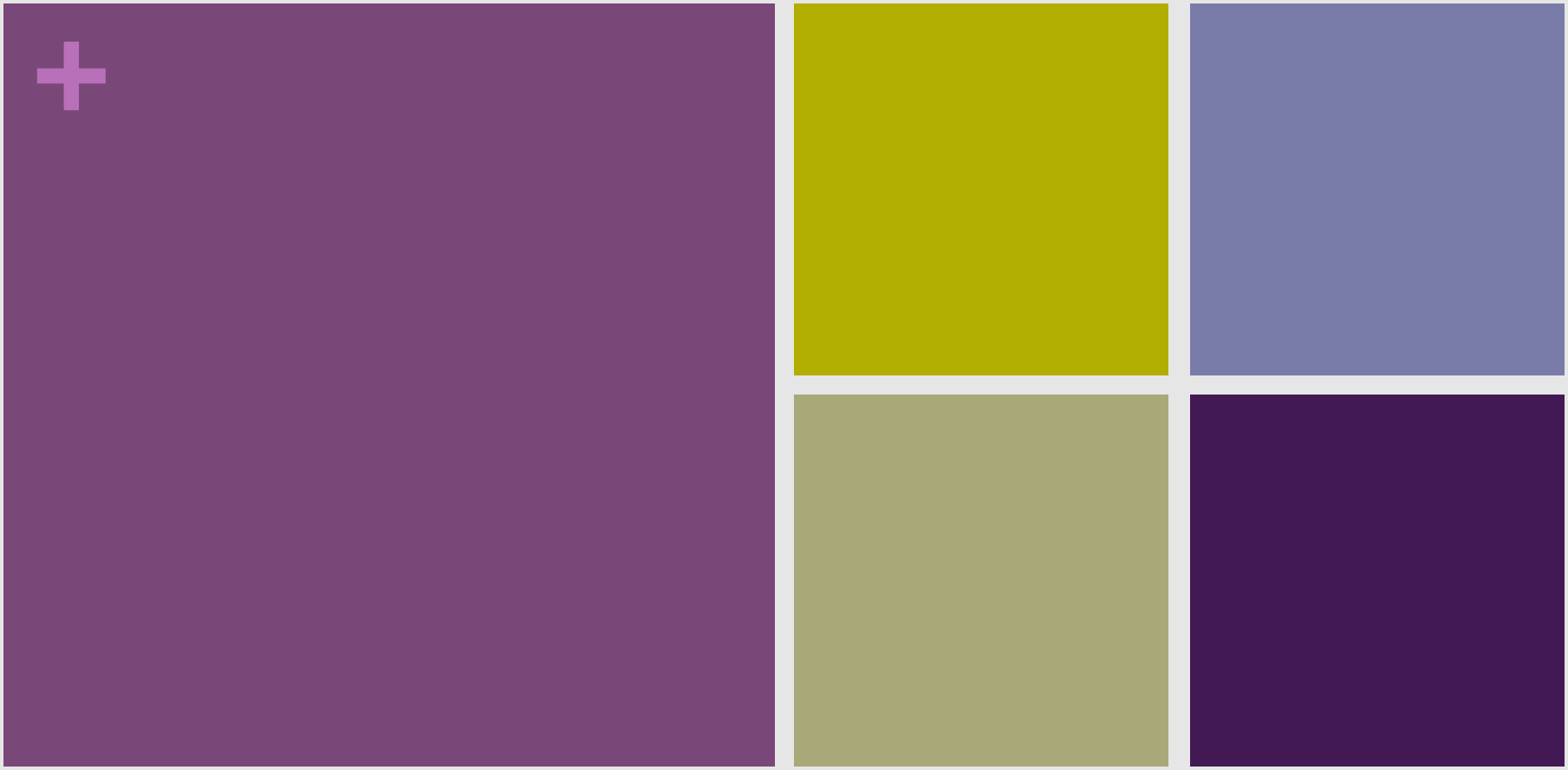
PLATINUM SPONSORS



GOLD SPONSORS

SILVER SPONSORS



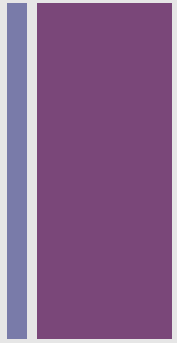
MongoDB Workshop

Bryan Nehl – Copyright 2013

MongoDB for Java Developers

- $: whoami
  - Bryan Nehl
  - Systems Developer
  - @k0emt
  - dbBear.com

You

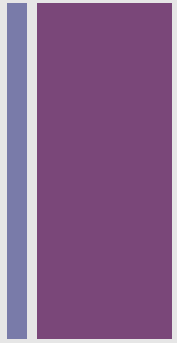


- Familiar with JSON
- Able to work at the command prompt / terminal
- Developer
  - Able to create Java code
  - Able to add a jar/library
  - Able to compile and run code
- Curious, Engaged, Respectful

You

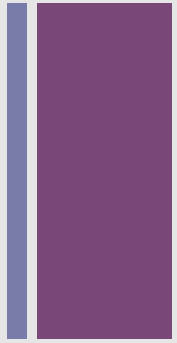
- What is your background?
- What do you want to get out of today?

Your computer



- Windows 7 or 8, Linux or OS X
  - WHY?
- Java Development Kit
  - Please reserve your alternate JVM language experimentation for lab time
- Editor or IDE of your choice

Workshop Primary Goal

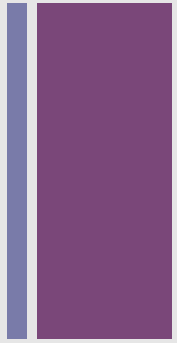


It is my primary goal that you leave the workshop with a functioning MongoDB environment and knowledge of the fundamentals with the skills to do routine development work.

Workshop Topics

- Introduction and Installation
- Schema – databases, collections and documents
- Creating, Reading, Updating and Deleting (CRUD)
- Advanced CRUD – sub documents, arrays, sorting, limiting…
- Backups
- Performance/Indexes
- Aggregation Framework
- GridFS
- Replication
- Sharding Overview
- Open Lab Time

Why MongoDB?



- Document Oriented Schema
- Scalable
  - Commodity Hardware
  - Horizontal
- Fast – memory mapped files
- GridFS

{“section” : “Installation” }

www.mongodb.org/downloads

File Setup

- Copy the flash drive contents to your computer
- Create a project working directory “kcdc”

unzip install

- Easy
- Manual updates
- Manual path setup

Windows

- Which zip to get?
- --smallfiles
  - Initial size reduced
  - Journal files from 1G to 128M
- Unzip
- Set your PATH
- mkdir –p c:\data\db

Linux

- --smallfiles
- Unzip
- Untar
- Set up your path
- mkdir –p /data/db
  - Set permissions
- Packages

OS X

- Take the unzip, path, /data/db approach
- Home Brew
  - Easy updates
  - Don't do it if you use Mac Ports
  - http://mxcl.github.io/homebrew/
  - `ruby -e "$(curl -fsSL https://raw.github.com/mxcl/homebrew/go)"`
  - brew update; brew install mongodb
- Mac Ports

Config File

- --config C:\mongodb\mongod.cfg
- /etc/mongodb.conf
  - smallfiles = true
- Home brew
  - /usr/local/etc/mongod.conf
- http://docs.mongodb.org/manual/reference/configuration-options/

Security

- Basic
- User Privilege Roles
- The Network

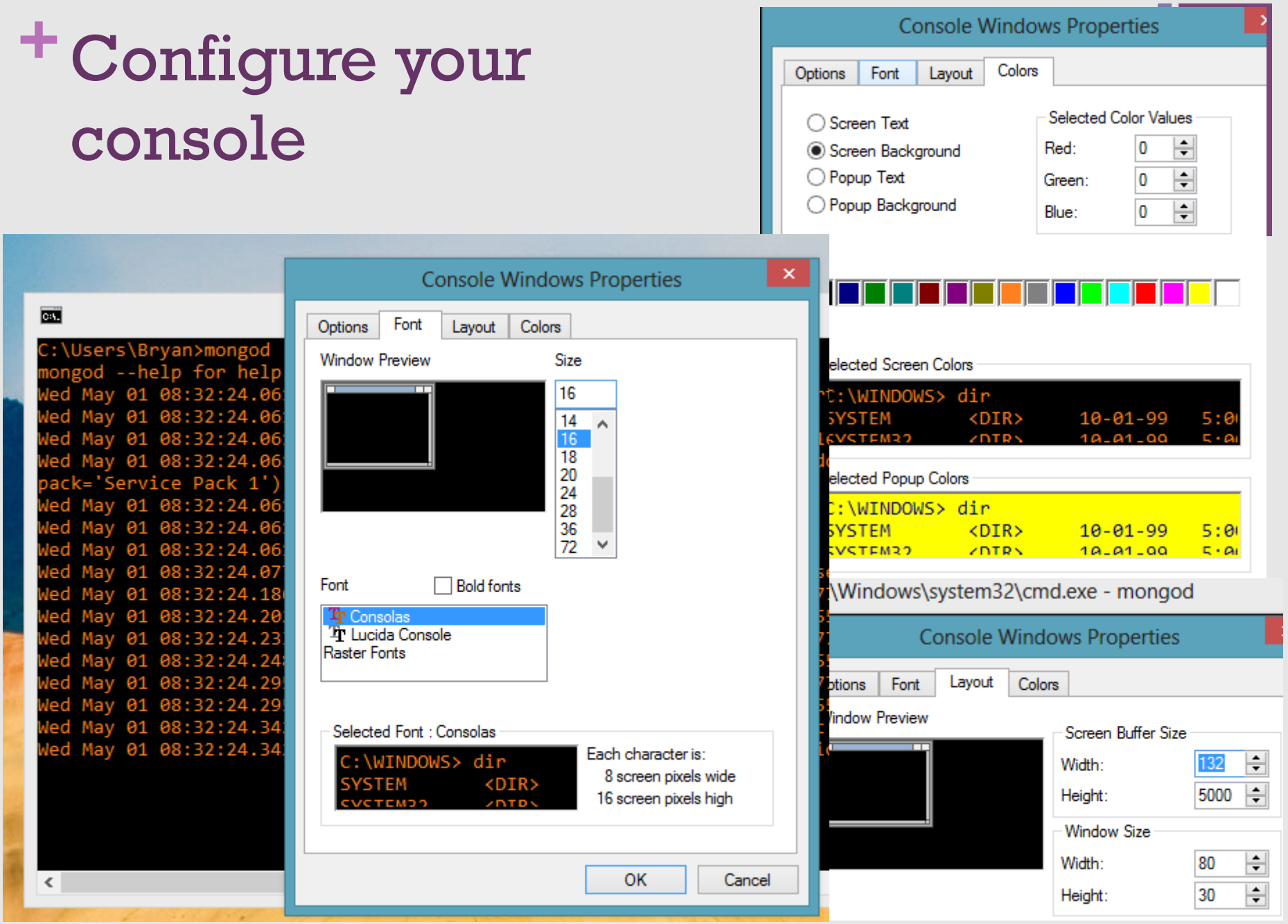
Verifying Installation

- mongod
  - --version
  - Windows: start & <ctrl><c>
  - OS X/Linux: --fork, kill, <ctrl><c>
- mongo
  - The prompt
  - db.version()
  - show dbs
  - quit()

Java Driver

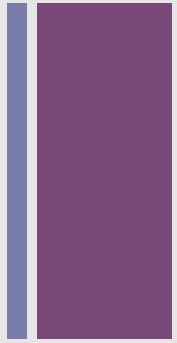
- Start at MongoDB.org -> drivers -> java
- http://docs.mongodb.org/ecosystem/drivers/java/
- Pay careful attention to version numbers in the maven repo
- We are using version 2.11.1
- Add to your Java Project in your IDE / know your classpath

Configure your console



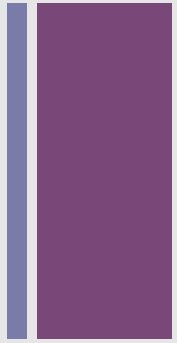
{“section” : “Schema”}

JSON Review



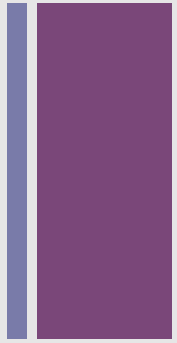
- json.org
- {“key” : “values”}
- JSON types
  - string, number, object, array, true, false, null
- Lists
- Sub-documents

Structure



- Databases
- Collections
- Documents
- Fields

Document Oriented Schema Design



- Naming
  - avoid the . (dot)
  - key name length matters
- No Joins
- Consider the Access Pattern

Relational Design Exercise

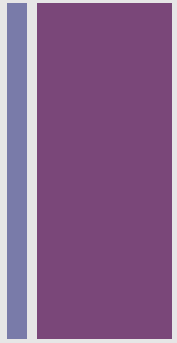
- Using standard relational techniques design an inventory management system that tracks assets.
- Example assets are: vehicles, computers, tables and chairs.
- I want to be able to store a lot of detail.
  - Where is the asset?
  - To whom is an asset assigned?
  - Vehicle detail like: make, model, VIN, color, etc.
  - Table detail like: material type, size, condition, color, etc.

Document Design

- How would we organize this same sort of information in a document oriented system like MongoDB?
- *Consider the access pattern(s).*

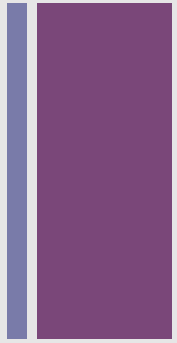
+ {“section” : “CRUD”, “alternateText” : “Create, Read, Update, Delete” }

Start your engines!



- Start up mongod
  - --smallfiles
- Start up mongo
- Open a shell or IDE for java

mongo – the shell



- Javascript
- JSON
  - Variance from strict JSON

Create -- insert

- use workshop
- db.stuff.insert({“hello”:”world”})
- db.stuff.insert({“greeting” : ”people”, ”name” : ”me”})
- show collections

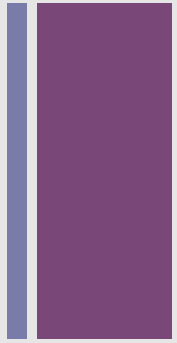
Read -- findOne

- db.stuff.findOne()

_id

- Unique
  - Default is ObjectID
  - A document may be fully duplicated except for the _id
- Any Type
- **ObjectId** is
  - Globally Unique Identifier (GUID)
  - A 12-byte BSON type, constructed using:
  - A 4-byte value representing the seconds since the Unix epoch
  - A 3-byte machine identifier
  - A 2-byte process id
  - A 3-byte counter, starting with a random value

Read -- find



- db.stuff.find()
- db.stuff.find().pretty()
- db.stuff.find({“name”:”me”})
- db.stuff.find({“_id”: ObjectId(“…”)})

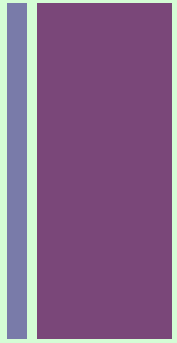
it

- find() returns a cursor
- *it* gets the next set

```
for(var i = 0; i < 30; i++ )
{ db.stuff.insert({"counter":i}) }

db.stuff.find()
```

Let's write some Java!



- What do we need to do?
- Connect to the database server
- Use a database
- Work with a collection
  - **inserts**
  - **finds**
- Close the connection

Update

- db.stuff.insert({"name":"joe"})
- db.stuff.insert({"name":"jo"})
- db.stuff.**update**({"name":"jo"},{"city":"COU"})
- db.stuff.find({"name":"jo"}) ???
- db.stuff.find()
- db.stuff.insert({"name":"jo"})
- db.stuff.**update**({"name":"jo"}, { **$set**: {"city":"COU"}})
- db.stuff.find({"name":"jo"})

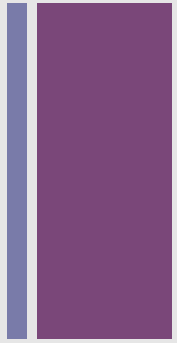
Update multiple documents

- for(var i = 0; i < 5; i++) { db.stuff.insert({"_id":i, "multiDemo":1}) }
- db.stuff.find({"multiDemo":1})
- db.stuff.**update**({"multiDemo":1}, {$set: {"updated":1} })
- db.stuff.find({"multiDemo":1}) **???**
- db.stuff.**update**({"multiDemo":1}, {$set:{"updated":1} }, **{multi : true}**)
- db.stuff.find({"multiDemo":1})
- http://docs.mongodb.org/manual/core/update/#update-multiple-documents

Upserting

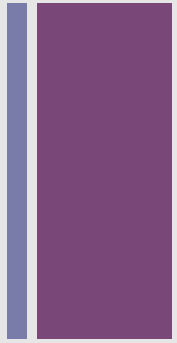
- db.stuff.find({"color":"blue"})
- db.stuff.update({"color":"blue"}, {$set:{”iDidIt":true}}, **{upsert:true}**)
- db.stuff.find({"color":"blue"})
- db.stuff.update({"color":"blue"}, {$set:{"primary":true}}, **{upsert:true}**)
- db.stuff.find({"color":"blue"})

To the Java!



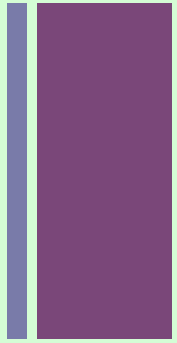
- Match query
- Update document via replacement
- Multi update combined with $set

Delete – remove()



- db.stuff.find({"counter":1})
- db.stuff.**remove**({"counter":1})
- db.stuff.find({"counter":1})

To the Java!



- remove()

Atomic operations

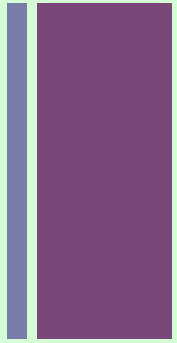
- No Transactions
- Single write operations are atomic
- http://docs.mongodb.org/manual/tutorial/isolate-sequence-of-operations/

{“section” : “Advanced CRUD”, “tags” : [“Advanced”, “Create”, “Read”, “Update”, “Delete”] }

Regular expressions

- db.stuff.find({“name” : /^[m]/})
  - value in name starts with m
- db.stuff.find({“name” : {$regex:/[o]$/}})
  - value in name ends with o

To the Java!



- Regular Expressions
- FindRegularExpressionsDemo.java
- Use of java.util.regex.Pattern

Arrays – the basics

- db.junk.insert({"section":"Advanced CRUD", "tags": **[**"Advanced","Create","Read","Update","Delete"**]**})
- Keep their order
- db.junk.find({tags:"Read"})
- db.junk.find({tags:"READ"})

Arrays – $push

- db.demo.insert({"demo":"array"})
  - {“demo”:”array”} ← there is no magic here. It’s just a document.
- db.demo.update({"demo":"array"},
  {$push: {"movies": "dune"}})
- db.demo.findOne({"demo":"array"})
- db.demo.update({"demo":"array"},
  {$push: {"movies": "dune"}})
- db.demo.findOne({"demo":"array"})
- http://docs.mongodb.org/manual/reference/operator/update-array/

Arrays – $push and $pull

- db.demo.update({"demo":"array"}, **{$pull:{"movies":"dune"}}**)
- db.demo.findOne({"demo":"array"})
- db.demo.update({"demo":"array"}, {$push: {"movies": {**$each**: ["dune","tron"]} } })
- db.demo.findOne({"demo":"array"})
- db.demo.update({"demo":"array"}, **{$pull:{"movies":["dune"]}}**)
- db.demo.findOne({"demo":"array"})

Arrays – $addToSet

- db.demo.update({"demo":"array"}, {**$addToSet:** {"movies":"dune"}})
- db.demo.findOne({"demo":"array"})
- db.demo.update({"demo":"array"}, {$addToSet: {"movies":"aliens"}})
- db.demo.findOne({"demo":"array"})
- db.demo.update({"demo":"array"}, {$addToSet: {"*books*":"ghost"}})
- db.demo.findOne({"demo":"array"})

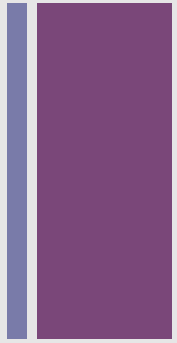
$set and $unset

- db.demo.insert({"demo":"setting"})
- db.demo.findOne({"demo":"setting"})
- db.demo.update({"demo":"setting"}, {**$set**:{"newkey":true}})
- db.demo.findOne({"demo":"setting"})
- db.demo.update({"demo":"setting"}, {**$unset**:{"newkey":true}})
- db.demo.findOne({"demo":"setting"})

+

{“section” : “Backups”}

Database Size



- show dbs
- db.stats()
- db.stuff.stats(1024)
- db.runCommand({listDatabases:1})
- use admin
- db.runCommand({listDatabases:1})
- db.runCommand({listCommands:1})

MongoImport

- mongoimport
  - Unicode / UTF-8 and CP1252
  - Types of imports – external file types
  - --drop
  - --upsert
- mongoimport --db workshop --collection names < names.json
- db.names.count()
- db.names.findOne()

MongoExport

- mongoexport
  - Types supported – csv, json, etc.
- mongoexport --db workshop --collection names > new_names.json
- Compare the names.json and new_names.json files

MongoDump

- File System Snapshots are the recommended backup approach.
- mongodump and mongorestore create and restore
  - Can be run directly against the data files – no mongod running
- mongodump --help
  - Can use cross machine
  - Has default no argument behavior
- mongodump --db workshop --out workshop_dump
  - Check the directory

MongoRestore

- mongorestore --help
- mongorestore --db new_workshop workshop_dump/workshop
  - Note the --drop option
- In the mongo shell
  - show dbs
  - Examine new_workshop…

+

{“section” : “Advanced CRUD”,
“part” : ”deux”,
“tags” :[“Advanced”,“Create”,
“Read”,“Update”,“Delete”] }

find – limiting the returned fields

- use workshop
- db.names.findOne()
- db.names.find({}, {city: **1**, name: **1**, district: **1**})
- db.names.find({}, {_id:**0,** scores:**0**})
- db.names.find({}, { city:**1**, scores:**0**})

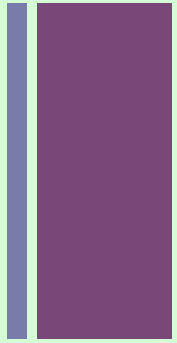
sort, skip and limit

- db.names.find({},{scores:0}).**limit(5)**.pretty()
- Skip and Limit are always applied after Sort
- db.names.find({},{scores:0}).limit(5).**sort({city:1})**.pretty()
- db.names.find({},{scores:0}).limit(5).**sort({city:1, name: 1})**.pretty()
- db.names.find({},{scores:0}).limit(5).sort({city:1, name: 1}).**skip(2)**.pretty()

$and or comma? And $or

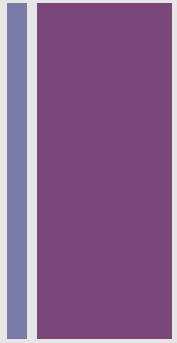
- db.names.findOne({"age":87,"scores":87})
- What if I want to find someone that has a score of 0 and a score of 100?
- db.names.findOne({"scores":0,"scores":100})
- db.names.findOne({**$and**: [{"scores": 100}, {"scores": 0}] })
- db.names.findOne({**$or**: [{"scores": 100}, {"scores": 0}] })

To the Java!



- Find with BasicDBObjectBuilder
- limit()
- FinderBuildAndLimitsDemo.java

Subdocuments



- db.demo.insert({"demo":"subdocs", subdoc: {"sub": "one"} })
- db.demo.findOne({"demo":"subdocs"})
- db.demo.update({"demo":"subdocs"}, {$set:{"**subdoc.ver**":1}})
- db.demo.findOne({"demo":"subdocs"})
- db.demo.findOne({"**subdoc.ver**":1})

Count, $gt, $lte, $not, and $ne

- db.names.find({ age: { **$lte**: 21} }).**count**()
- db.names.find({ age: { **$not** : { **$gt**: 21} } }).count()
- db.names.find({ *madeup*: { **$gt**: 21} }).count()
- db.names.find({ *madeup*: { **$not** : { **$lte**: 21} } }).count()
- db.names.find({ age: { **$ne**: 21} }).count()
- db.names.find({ color: { **$ne**: "purple"} }, {scores:0}).count()

$in and $exists

- db.names.find({name:"STOUT"}).count()
- db.names.find({name:"BROCK"}).count()
- db.names.find({name:
  { **$in**:["STOUT","BROCK"] } }).count()
- db.*demo*.find({movies: { **$exists**: true } })

- http://docs.mongodb.org/manual/reference/operator/

getLastError

- db.runCommand({getLastError:1})
- The getLastError command returns the error status of the last operation on the current connection.

+

{“section” : “Dropping stuff”}

Dropping – Document Review

- use habit
- db.badhabit.insert({“sneeze”:”spray”})
  - show dbs
  - show collections
- db.badhabit.remove({“sneeze”:”spray”})
  - show dbs
  - show collections

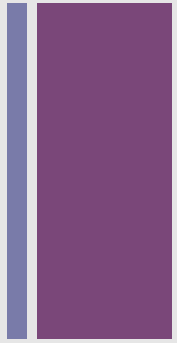
Dropping – Collections and DB

- db.badhabit.drop()
  - show collections
  - db
- db.dropDatabase()
  - show dbs
  - db ???

Dropping – DB

- use new_workshop
- db.dropDatabase()
  - show dbs
  - db ???
- use workshop

Tab completion!

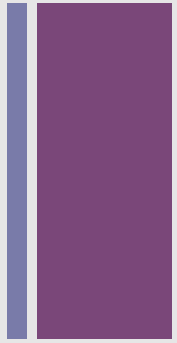


- db.<TAB>
- db.collection.<TAB>
- What's the method do?
  - db.collection.insert
    - Notice NO ( )'s after the insert

+

{“section” : “Performance”}

explain()



- db.names.find({"age":55}).explain()
- scanAndOrder is a boolean that is true when the query *cannot* use the index for returning sorted results.
- http://docs.mongodb.org/manual/reference/explain/

Indexes

- Enhance query performance
  - Introduces insert overhead
  - Use a B-tree data structure
- Only one index is used per operation
  - find, sort, update, etc.
- When can an index be used?
  - Index is a,b,c and query is a or -a or a,b or a,b,-c (yes)
  - Index is a and query is a,b,c (no)
  - The query has to use some **left** subset of the index
- http://docs.mongodb.org/manual/core/indexes/

Covers

- An index "covers" a query if:
  - All the fields in the query are part of the index **and**
  - All the fields returned in the documents that match the query are in the same index

The _id index

- db.names.find({“_id”:65}).explain()

Indexes & getIndexes

- db.junk.insert({"boo":"bunny","days":42})
- db.junk.insert({"boo":"bear","days":33})
- db.junk.ensureIndex({"boo":1,"days":1})
- db.junk.getIndexes()
- db.junk.find().sort({boo:1,days:-1}).explain()
- db.junk.find().sort({boo:-1,days:-1}).explain()
- db.junk.ensureIndex({"days":1})
- db.junk.getIndexes()
- db.junk.find().sort({days:-1}).explain()
- db.junk.find({},{_id:0,days:1}).sort({days:-1}).explain()

Unique indexes

- db.junk.ensureIndex({"boo":1},{unique:true})
- db.junk.insert({"boo":"bear"})
- **Multiple unique indexes?**
- db.junk.ensureIndex({"days":1, "boo":1},{“unique”:true})

- http://docs.mongodb.org/manual/core/indexes/

Revise existing index

- db.junk.ensureIndex({”days":1},{unique:true})
- db.junk.insert({”days”:42})
- What happened?
- db.junk.getIndexes()
  - To revise an index, you must drop it and create it with the new specification.

dropIndex / dropIndexes

- db.*collection*.**dropIndex**({full:1, index:1, specification:1})
- db.junk.**dropIndex**({"boo":1})
- db.junk.getIndexes()
- db.junk.**dropIndexes**()
- db.junk.getIndexes()

Indexes & getIndexes (names)

- db.names.ensureIndex({"name":1})
- db.names.find({"name":"HUMPHREY"}).explain()
  - How many HUMPHREYs are there?
  - Check nscannedObjects and nscanned
  - Millis probably 0 now too
- db.names.find({meh:''meh''}).sort({name: 1}).explain()

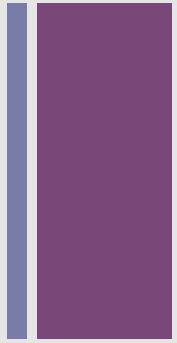
Multikey indexes

- Only one Array type field per index
- Order is important
- db.names.ensureIndex({"city":1,"name":1})
- db.names.find({"city":"Munich","name":"HUMPHREY"}).explain()
- db.names.find({"name":"HUMPHREY","city":"Munich"}).explain()
- db.names.find({"name":"HUMPHREY"}).sort({"city":1,"name":1}).explain()
- db.names.find({"**meh**":"HUMPHREY"}).sort({"city":1,"name":1}).explain()
- db.names.find({}).sort({"city":-1,"name":1}).explain()
- http://docs.mongodb.org/manual/core/indexes/#multikey-indexes

Mongostat

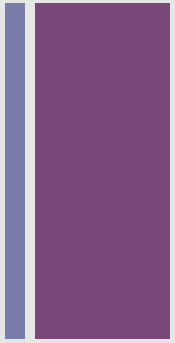
- mongostat
- What's going on with mongod / mongos?
- http://docs.mongodb.org/manual/reference/mongostat/

mongotop



- mongotop
- Where are the reads and writes happening?
- http://docs.mongodb.org/manual/reference/mongotop/

.stats()

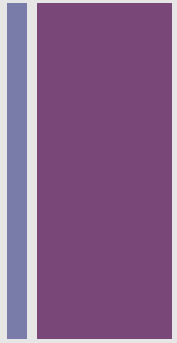


- db.stats()
- db.names.stats()

system.profile

- db.getProfilingStatus( )
- db.setProfilingLevel(0)
- db.getProfilingStatus( )
- db.runCommand({ profile: 1, slowms: 200 })
- db.getProfilingStatus( )
- db.names.find().sort({"age":1})
- db.**system.profile**.find().pretty()
- db.setProfilingLevel(0)

Logs



- mongo.log
  - /usr/local/var/log/mongodb
- Windows
  - By default no log, check the console
- Slow queries are in the log

Mongo Monitoring Service (MMS)

- What is it?
- mms.10gen.com
- http://www.10gen.com/products/mongodb-monitoring-service

Further research

- Sparse indexes
- Query hint() the index to use
- mongod
  - --profile level
  - --slowms

Experiment

- Take a couple minutes to:
- Gather your thoughts and questions you want to research
- Experiment with the things you just learned.

+

{“section” : “Aggregation”}

Stages

- Pipeline style architecture
- $project, $match, $limit, $skip, $unwind, $group, $sort
- db.collection.aggregate({*pipeline operations*}, {}…)
- db.collection.aggregate(**[** {pipeline operations}, {}… **]**)

- http://docs.mongodb.org/manual/core/aggregation/
  - Also contains information on optimization
- http://docs.mongodb.org/manual/reference/aggregation/

$limit, $match and $project

- db.names.aggregate({**$limit** : 3})
- db.names.aggregate({**$match**: {"city": "Columbia"}}, {$limit:3})
- db.names.aggregate({$match:{"city": "Columbia"}}, {$limit:3}, {**$project**:{city:1,district:1 }})
- db.names.aggregate({$match:{"city":"Columbia"}}, {$limit:3}, {**$project**:{city:1, **schoolDistrict : "$district"** }})
- db.names.aggregate({$match:{"city":"Columbia"}}, {$limit:3}, {$project:{city:1, district:1,
  higherDistrict: {$gt: ["$district", "M"] } }})

$skip

- db.names.aggregate({$match:{"city":"Columbia"}}, {$limit:3})
- db.names.aggregate({$match:{"city":"Columbia"}}, {$limit:3}, **{$skip:2}**, {$project:{city:1, district:1 }})
- db.names.aggregate({$match:{"city":"Columbia"}}, **{$skip:2}**, {$limit:3}, {$project:{city:1, district:1 }})

$group, *$sum* and $sort

- db.names.aggregate({**$group**:{_id: "$city"}})
- db.names.aggregate({$group:{_id: "$city", population:{**$sum**:1}} })
- db.names.aggregate({$group:{_id: **null**, population:{$sum:1}} })
- db.names.aggregate({$group:{_id: **{}**, population:{$sum:1}} })
- db.names.aggregate({$group: {_id: "$city", population: {$sum:1}}}, {**$sort**: {"_id": 1 }})
- db.names.aggregate({$group:{_id: "$city", population:{$sum:1}}}, {**$match**:{"_id":"Zurich" }})

$unwind

- db.names.aggregate({$match:{"city":"Columbia"}}, {$limit:1}, **{$unwind: "$scores"}**)
- db.names.find({_id:3})
- db.names.aggregate({$match:{"_id":3}}, {$unwind: "$scores"}, {$group:{_id:"$_id", **totalPoints:{$sum:"$scores"}** } })
- db.names.aggregate({$match:{"_id":3}}, **{$unwind: "$scores"}**, {$group:{ _id: "$_id", max: {**$max**: "$scores"}}})

Aggregation Exercise

- What are the top 5 occurring names?
- What is the _id of the person with the *highest* overall score *average* in Columbia's "Z" district?
  - Person with "_id" : 58737 has the *lowest* score
- HINTS:
  - Build the query in stages!
  - Start with $limit and $match
  - $avg
  - Verify expected results at each stage

Aggregation Answers

- db.names.aggregate(
  {$group: {_id: "$name", frequency: {$sum: 1} } },
  {$sort: {"frequency":-1}},
  {$limit: 5})

- db.names.aggregate(
  {$match: {city: "Columbia","district": "Z" }},
  {$unwind: "$scores"},
  {$group:{_id: "$_id", average: {$avg: "$scores"}}},
  {$sort: {"average": -1}},
  {$limit: 5})

+ {“section” : “GridFS”,
“alternate” : “where did I put that file?”}

Introduction

- Store and Retrieve *files*
- Uses two collections
- Meta data and pointer stored in .files
- Chunks of binary data stored in .chunks

mongofiles

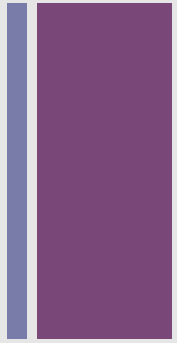
- **$:** mongofiles --db workshop put census_surnames.xls
- show collections
- db.fs.files.findOne()
- db.fs.chunks.findOne()
- mongofiles --db workshop get census_surnames.xls --local surnames.xls
- http://docs.mongodb.org/manual/reference/mongofiles/

GridFS with Java

- Puts in a file with metadata
- Retrieve a file by metadata search
- Save the retrieved file
- Examine the collections in the shell

+ {“section” : “Replication”, “alternate”: “Department of Redundancy Department”}

Replication



- Ensures redundancy
- Backup
- Automatic failover
- Replication is implemented with groups of servers known as replica sets.

- http://docs.mongodb.org/manual/replication/

Node Types and Attributes

- Primary
- Secondary
  - Hidden
  - Delayed
  - Arbiter
  - Non-voting
- http://docs.mongodb.org/manual/core/replication/

Fail Over

- The Primary Server goes down, now what?
- Voting Secondary's elect new Primary
- Elected Secondary Promotes to Primary
- Old primary comes back on line
- It rejoins as secondary
  - Unless it has a higher priority attribute set
- It syncs back up
- Rollback?

Configuration

- Development Environment
  - Multiple mongod on a single machine
  - *Different* port number per mongod
  - What does replication on a single machine accomplish?
- Production Environment
  - One mongod per server
  - Default port number
  - Odd number of mongod
  - Virtual Server versus Physical servers

Hands on, Spin up a Replica Set

- From your flash drive backup files, copy **repset** to your **kcdc** working directory
- Start up the nodes
  - mongod --port 27001 --dbpath n1 --logpath n1/node.log --config repset.conf
  - mongod --port 27002 --dbpath n2 --logpath n2/node.log --config repset.conf
  - mongod --port 27003 --dbpath n3 --logpath n3/node.log --config repset.conf
- Windows
  - Use repset_windows.conf and start at the beginning of the line
  - **start** mongod --port 27001 --dbpath n1 --logpath n1/node.log --config **repset_windows.conf**

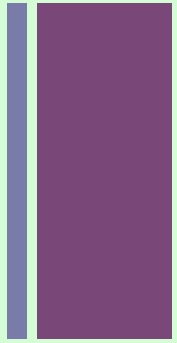
Hands on, Spin up a Replica Set

- Initiate the replication set
  - mongo --port 27001 --shell config.json
  - rs.initiate(cfg)
  - rs.status()
    - Notice prompt SECONDARY or PRIMARY?
- show dbs

Hands on, Spin up a Replica Set

- Insert some data on PRIMARY
  - db.grass.insert({keepOff:true})
- Connect to a SECONDARY
  - mongo –port 27002
- Query for the data – show collections
  - Secondary reads not OK, why?
- Reconfigure to allow SECONDARY read
  - rs.slaveOk()
  - db.grass.findOne()
  - db.grass.insert({mow:true})

To the Java!



- Connecting to a replica set
- Handling of Primary node failure
- Write concern
- Safe Writes – RepSetWriting.java
- Safe Reads – RepSetReading.java

Shutdown your replica set

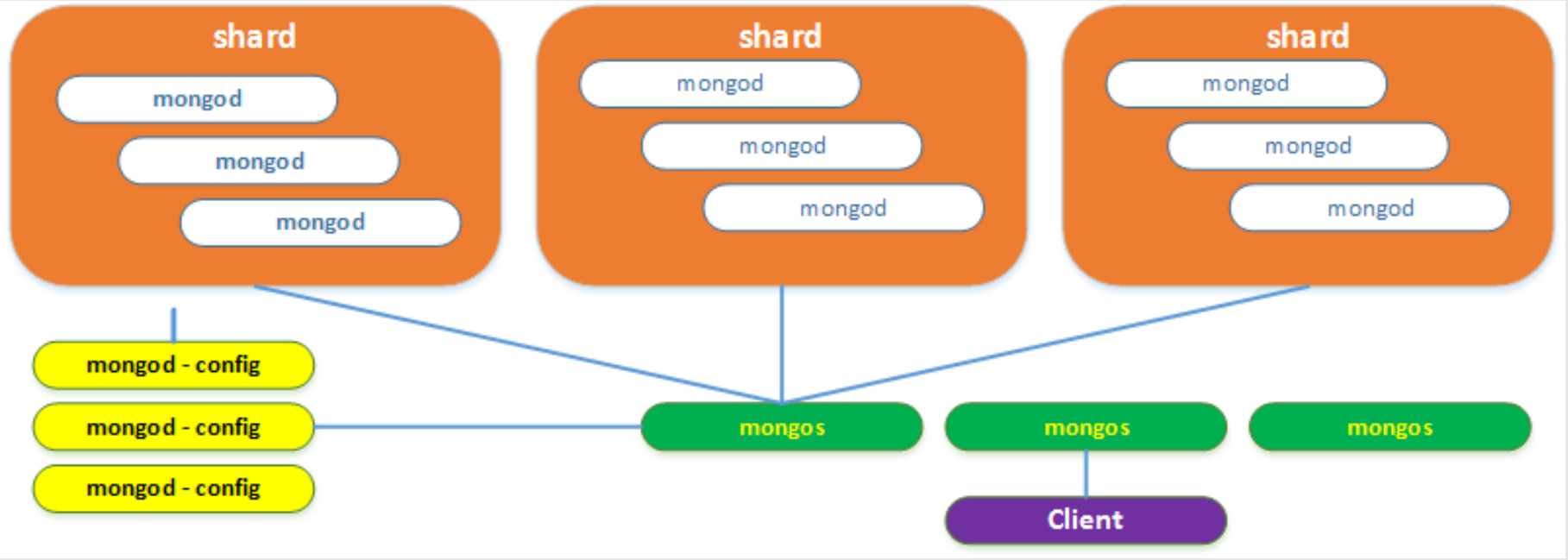
- Poke around in the database directories `n1`
  - Check out the log file
  - Check out the lock file
- Close running consoles
- Find and kill processes

+ {“section” : “Sharding”, “alternate”: “distributed read-write scaling” }

Sharding

- Sharding distributes a single logical database system across a cluster of machines
- Shards
  - Store a portion of the collection – size scalability
  - Balance read/write load and data across machines
  - Enabled per database and collection
- mongos
  - used to access the shards
  - Utilize config servers which have metadata
    - About the cluster
    - About where the chunks are for the shards
- http://docs.mongodb.org/manual/sharding/

Production Sharding Environment



+ {“section” : “Open Lab Time”,
“alternate” : [“experiment”,
“ask questions”]}

Where do I go from here?

- Check out the MongoDB documentation
  - Capped Collections
  - Capped Arrays (New in 2.4)
  - Geospatial / GIS, GeoJSON support (New in 2.4)
  - Role-based privileges (New in 2.4)
  - Full Text Search (Beta in 2.4)
  - Learn more about sharding
  - Query Operators
  - Map-Reduce
- Experiment
  - Share your experience – blog, tweet, present
  - GitHub and Gists

Other languages

- Groovy
- Python
  - generate_names.py

Question

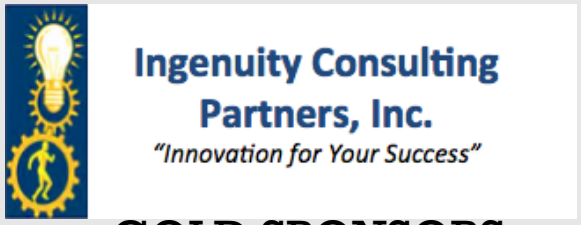
&

Answer

Practice – open lab time

- Experimenting ideas
  - Personal Journal
  - Personnel System
  - Asset Management System
  - Advanced Queries & Aggregation Framework

PLATINUM SPONSORS



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