MongoDB Lab

Download Resources

- https://goo.gl/GvjLD3

MongoDB

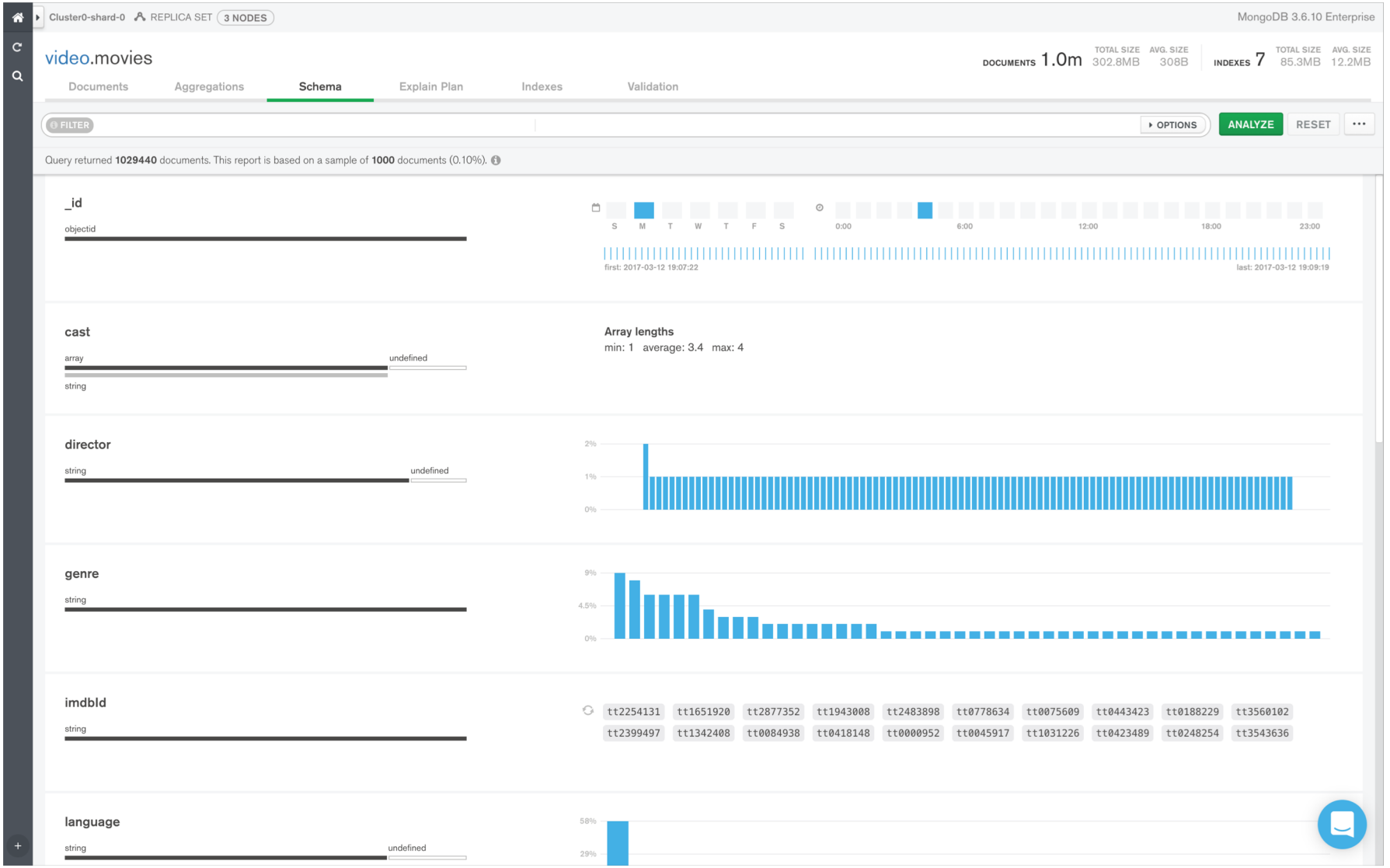
Explore Datasets using Mongo Compass

Connect to a MongoDB Atlas Server

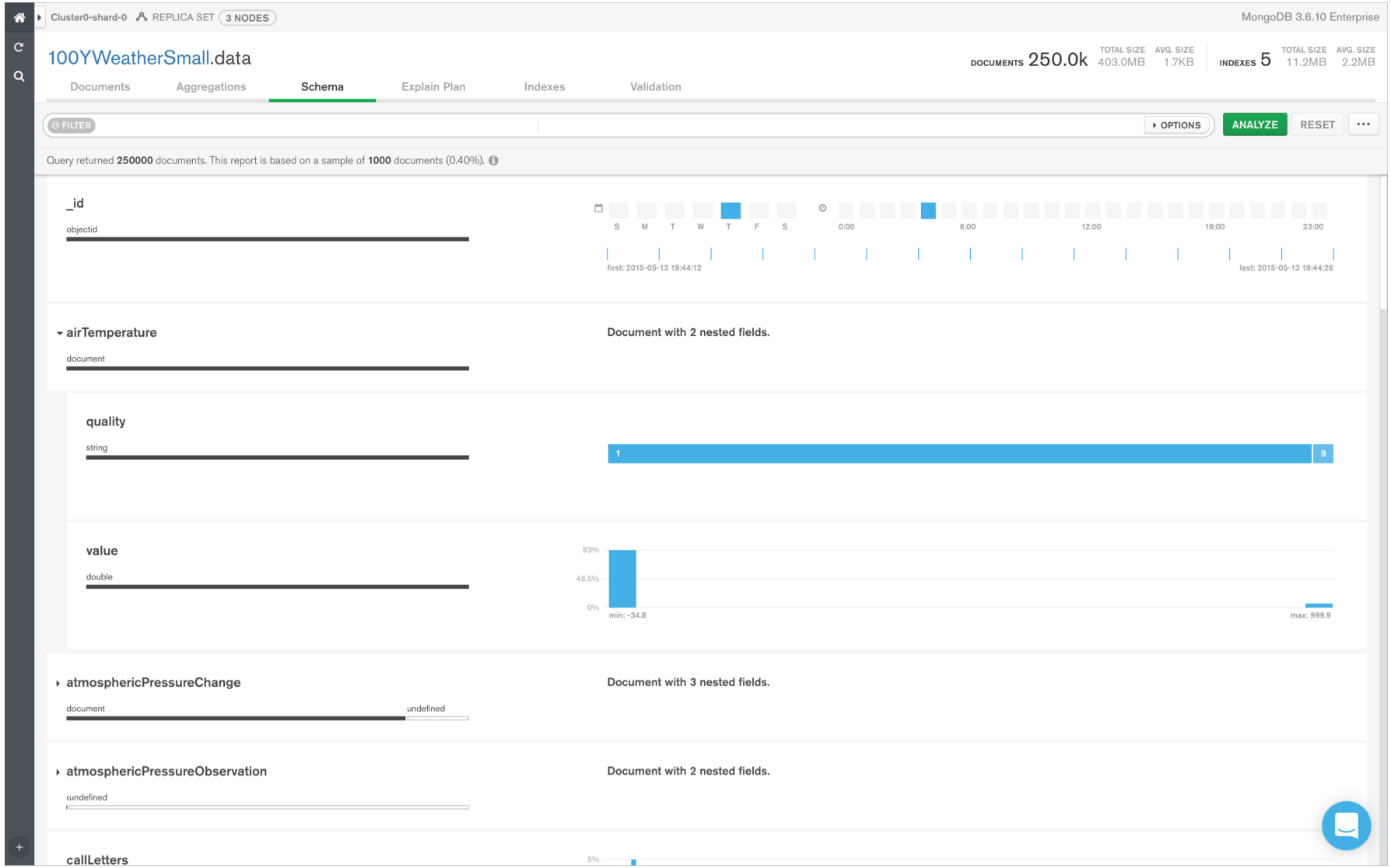
- Setup Mongo Compass and connect to Atlas Server using the following information:

- **Hostname:** cluster0-shard-00-00-jxeqq.mongodb.net
- **Username:** m001-student
- **Password:** m001-mongodb-basics
- **Replica Set Name:** Cluster0-shard-0
- **Read Preference:** Primary Preferred

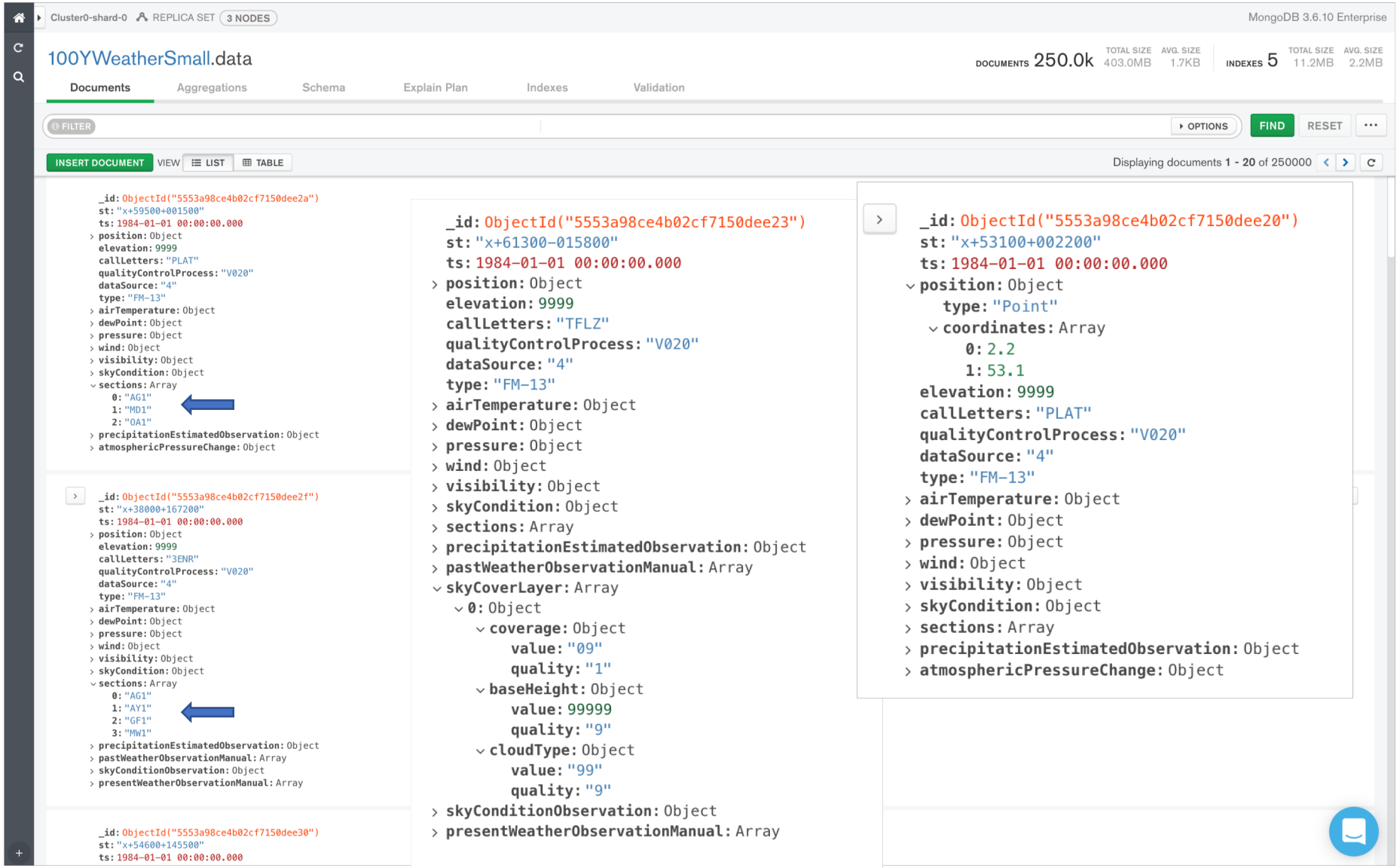
Explore Data Types From Schema Screen



Documents: Aggregate Value Types



Documents: Fields with Complex Values

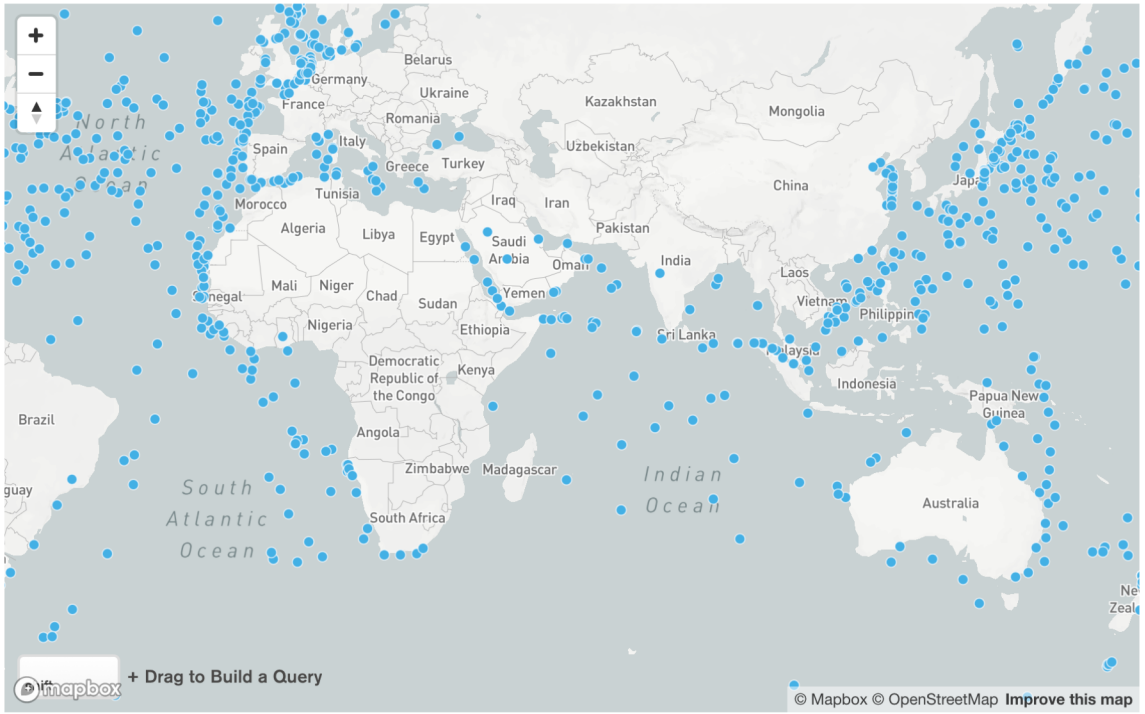


Geospatial Fields

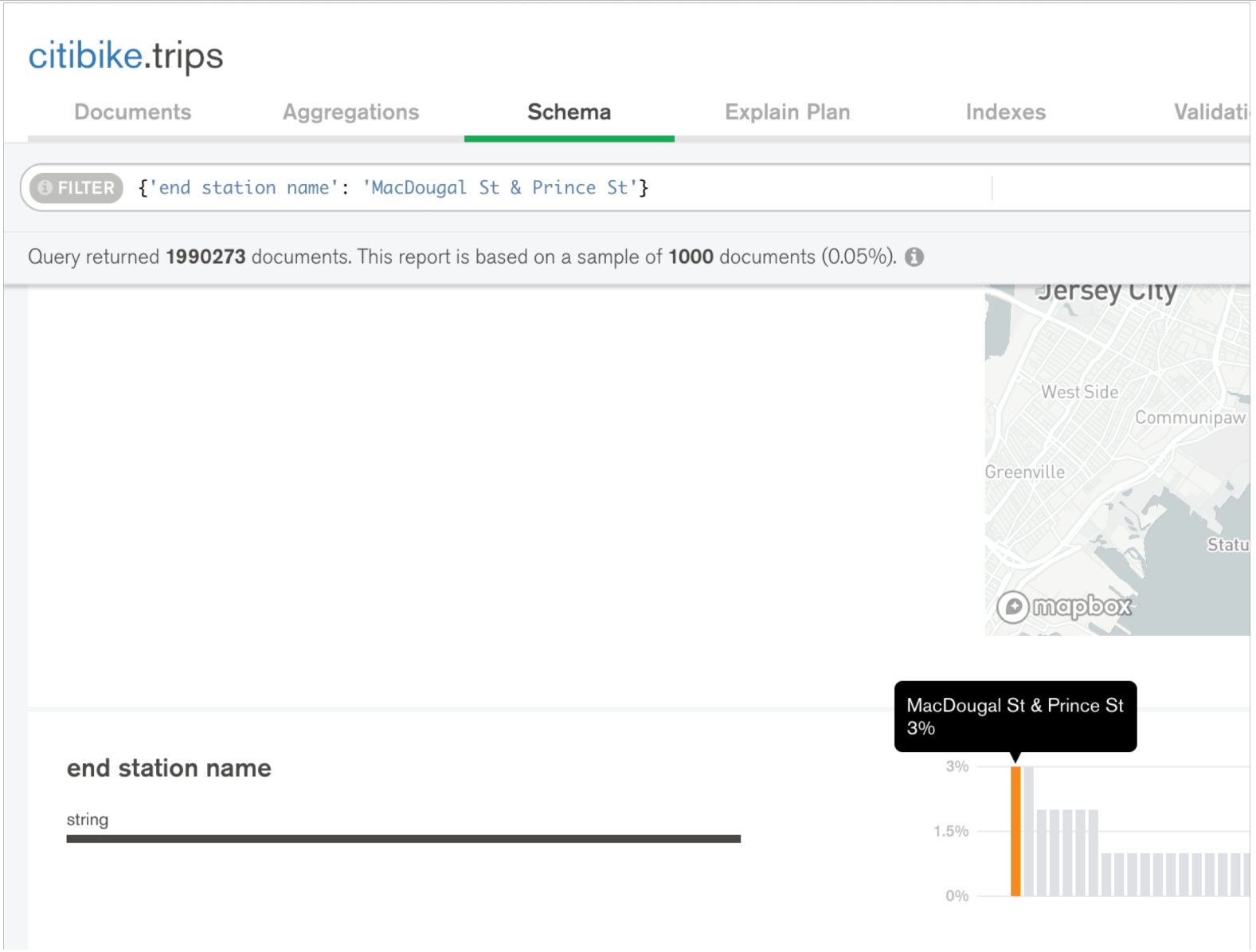
- Geospatial is not a field type per se, however, MongoDB is able to use fields like Position and do various calculations
  - Various shapes
  - Distance
  - Within Radius

position

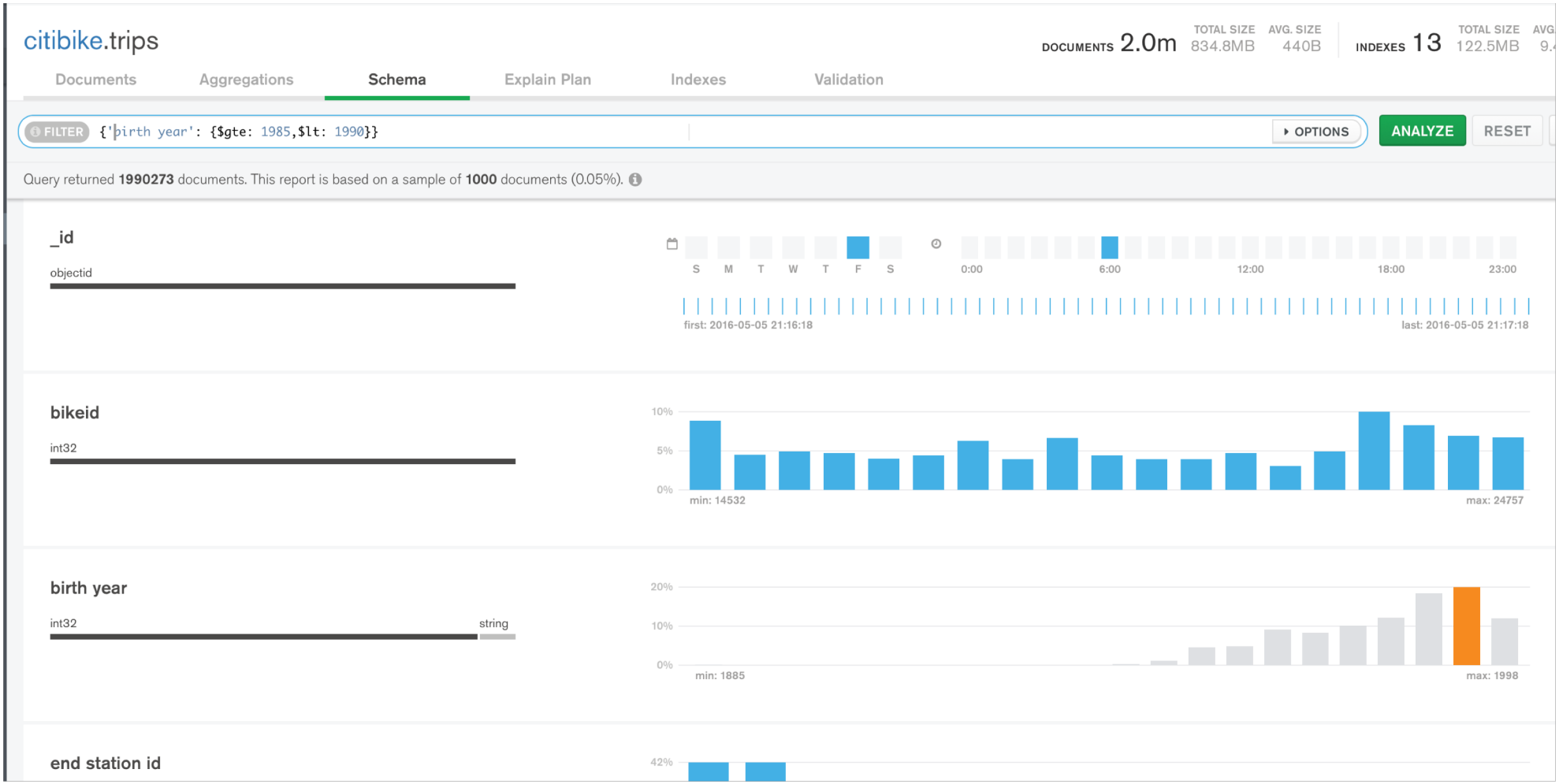
coordinates



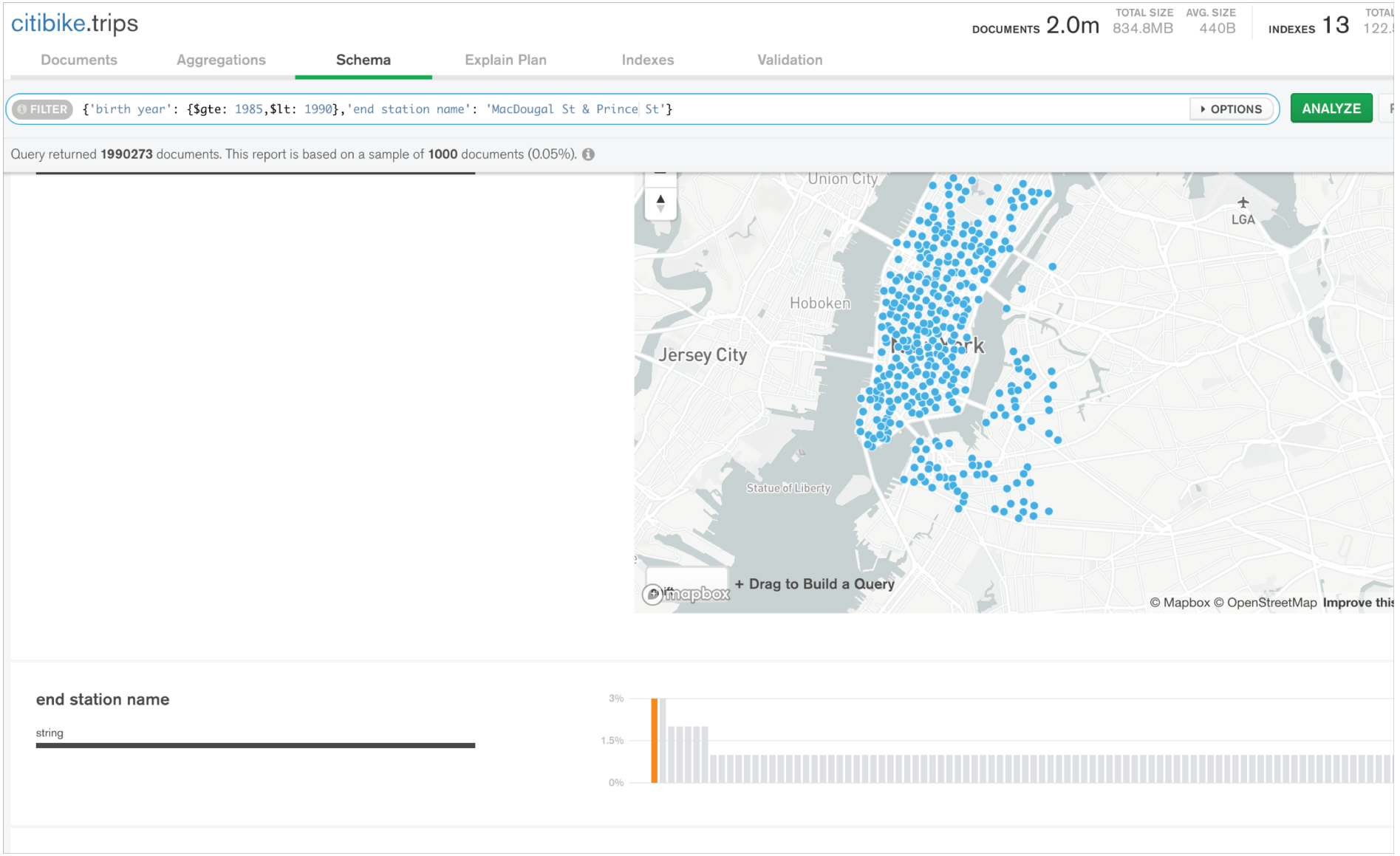
Filtering Collections with Queries



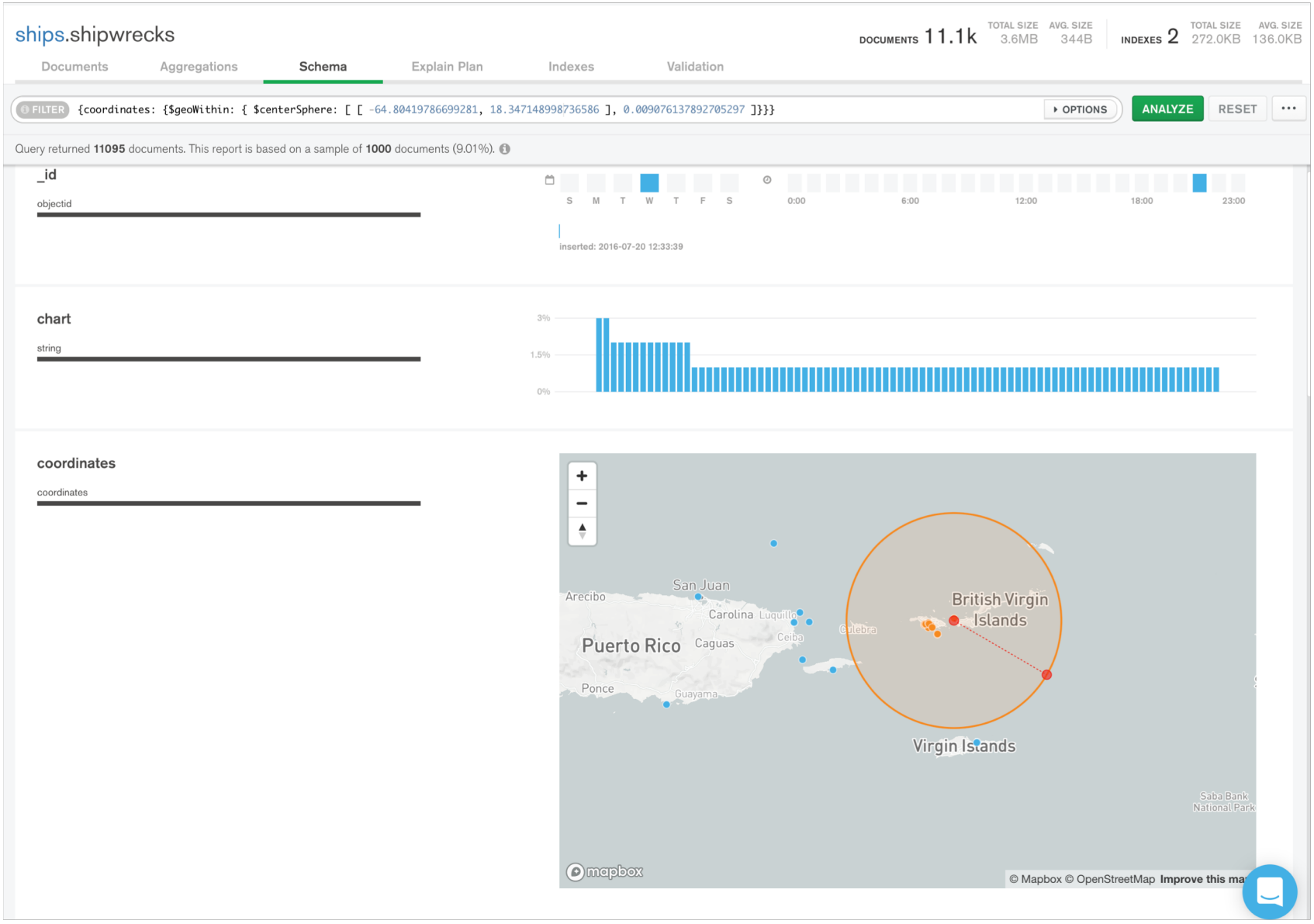
Filtering Collections with Queries



Filtering Collections with Queries



Filtering on Geospatial Coordinates



MongoDB

Introduction to CRUD
(Create, Read, Update, Delete)

MongoDB

Create

Install Enterprise MongoDB

- Follow the instructions here for your OS version
  - https://docs.mongodb.com/manual/installation/
- We use SSL so make sure you get version 3.6 or higher
- Once installed, issue the following command:

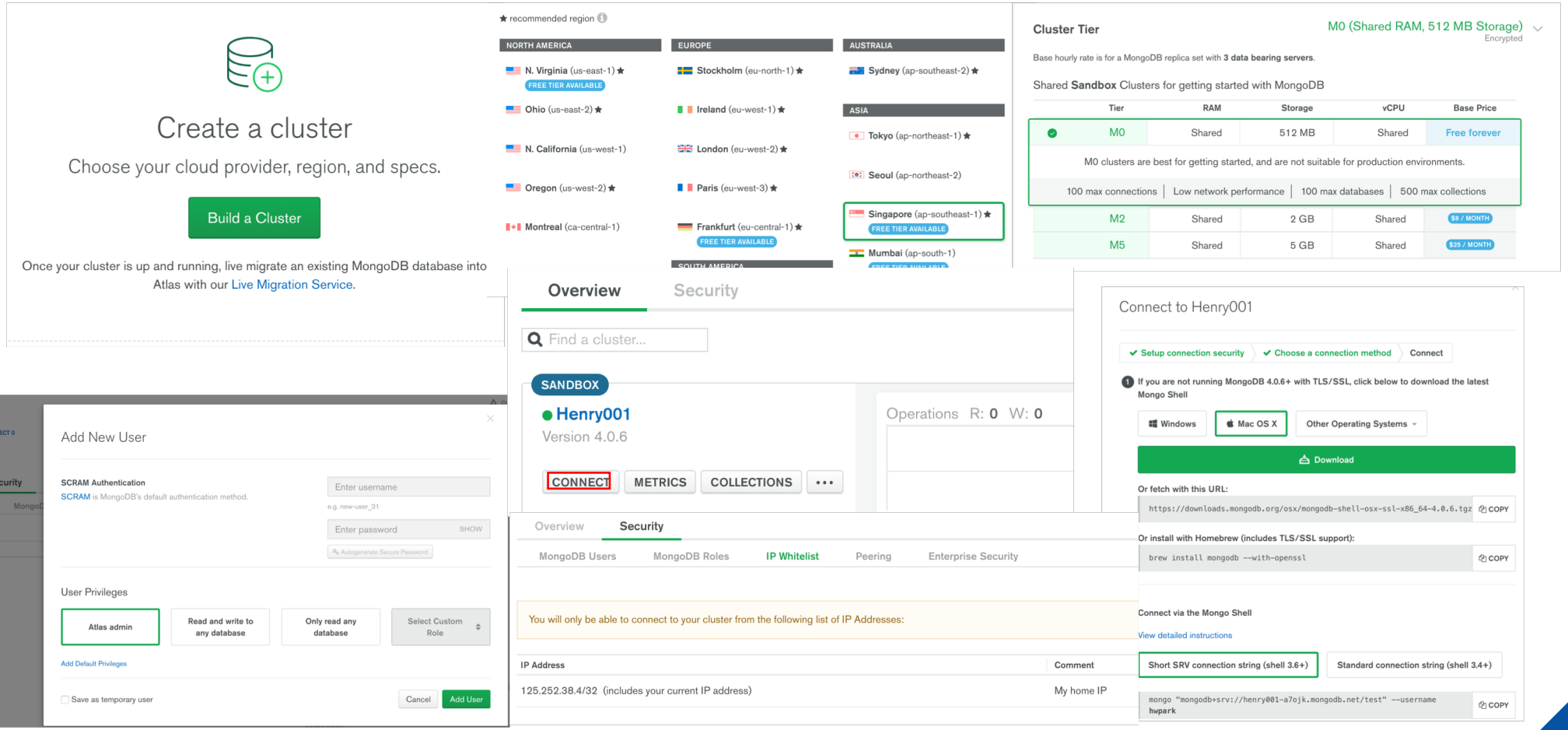
```
mongo "mongodb://cluster0-shard-00-00-jxeqq.mongodb.net:27017,cluster0-
shard-00-01-jxeqq.mongodb.net:27017,cluster0-shard-00-02-jxeqq.mongodb.
net:27017/test?replicaSet=Cluster0-shard-0" --authenticationDatabase ad
min --ssl --username m001-student --password m001-mongodb-basics
```

- Test the following commands:

```
MongoDB Enterprise Cluster0-shard-0:PRIMARY> use movies
MongoDB Enterprise Cluster0-shard-0:PRIMARY> show collections
MongoDB Enterprise Cluster0-shard-0:PRIMARY> db.movies.find().pretty()
```

Sign-up for free Atlas Account

- Sign up for a Atlas account and create your first cluster using the free-tier servers



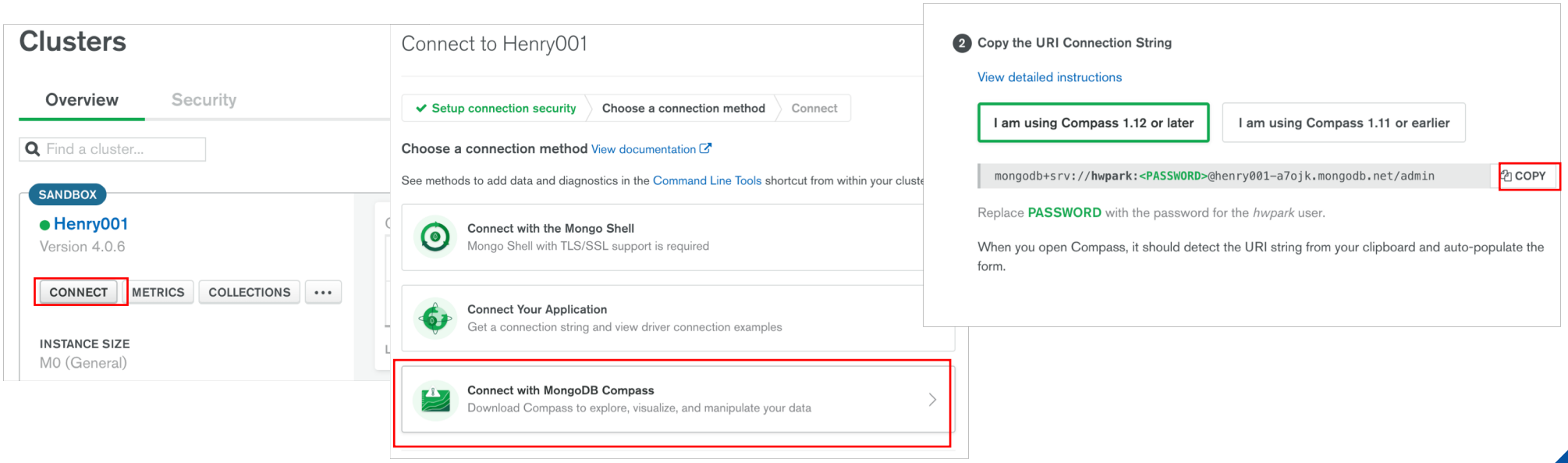
Login to your Cluster and Import Data

- Download the sample data script from the following URL
  - https://goo.gl/3VpyuN
- Load the javascript to create the video database

```
HenryMac:M001 hwpark$ mongo "mongodb+srv://henry001-a7ojk.mongodb.net/test" --us
ername hwpark
…Successfully connected to henry001-shard-00-00-a7ojk.mongodb.net:27017
MongoDB Enterprise Henry001-shard-0:PRIMARY> show dbs
admin  0.000GB
local  4.374GB
MongoDB Enterprise Henry001-shard-0:PRIMARY> load("loadMovieDetailsDataset.js")
true
MongoDB Enterprise Henry001-shard-0:PRIMARY> show dbs
admin  0.000GB
local  4.374GB
video  0.000GB
MongoDB Enterprise Henry001-shard-0:PRIMARY> use video
switched to db video
MongoDB Enterprise Henry001-shard-0:PRIMARY> show collections
movieDetails
```

Connect to your Cluster from Compass

- Obtain the Compass connection string by following the steps below and then copy the string to the clipboard
- Start Compass
  - Compass will automatically detect the connection string in your clipboard and fill in the necessary details



Lab

Create New Collection and Insert Documents

- Create a new collection “moviesScratch” from Compass
- Add the following documents from Compass
  - {title : “Rocky”, year : 1976, imdb : “tt0075148”}
  - {title : “Creed”, year : 2015, imdb : “tt3076658”}
- Add the following document from Mongo Shell
  - We will use insertOne api

```
MongoDB Enterprise Henry001-shard-0:PRIMARY> show collections
movieDetails
movieScratch
MongoDB Enterprise Henry001-shard-0:PRIMARY> db.moviesScratch.insertOne({title:
"Star Trek II: The Wrath of Khan", year: 1982, imdb: "tt0084726"})
{
        "acknowledged" : true,
        "insertedId" : ObjectId("5c716f37c5d874198072740a")
}
```

insertMany – Insert Multiple Documents

- There are two types of insertMany() operations
  - Ordered – Stops when an error is encountered
  - Unordered – Keeps going with the rest even after an error

```
db.moviesScratch.insertMany(
    [
        {
      "_id" : "tt0084726",
      "title" : "Star Trek II: The Wrath of Khan",
      "year" : 1982,
      "type" : "movie"
        },
        {
      "_id" : "tt0796366",
      "title" : "Star Trek",
      "year" : 2009,
      "type" : "movie"
        },
        {
      "_id" : "tt0084726",
      "title" : "Star Trek II: The Wrath of Khan",
      "year" : 1982,
      "type" : "movie"
        },
        {
      "_id" : "tt1408101",
      "title" : "Star Trek Into Darkness",
      "year" : 2013,
      "type" : "movie"
        },
        {
      "_id" : "tt0117731",
      "title" : "Star Trek: First Contact",
      "year" : 1996,
      "type" : "movie"
        }
    ]
);
```

```
db.moviesScratch.insertMany(
    [
        {
    "_id" : "tt0084726",
    "title" : "Star Trek II: The Wrath of Khan",
    "year" : 1982,
    "type" : "movie"
        },
        {
    "_id" : "tt0796366",
    "title" : "Star Trek",
    "year" : 2009,
    "type" : "movie"
        },
        {
    "_id" : "tt0084726",
    "title" : "Star Trek II: The Wrath of Khan",
    "year" : 1982,
    "type" : "movie"
        },
        {
    "_id" : "tt1408101",
    "title" : "Star Trek Into Darkness",
    "year" : 2013,
    "type" : "movie"
        },
        {
    "_id" : "tt0117731",
    "title" : "Star Trek: First Contact",
    "year" : 1996,
    "type" : "movie"
        }
    ],
    {
        "ordered": false
    }
);
```

MongoDB

Read

Lab

Using find({query}) to Read from Dataset

- Go to Compass and filter the video.movies collection and observe the filter condition
  - Choose to view movies with mpaaRating of PG-13
  - Add the condition that the year of the movie is 2009

- Now from the shell, use the find() command to display the same query from above

```
db.movies.find({mpaaRating: 'PG-13', year: 2009}).pretty()
```

Lab

Query on Nested Fields

- Go to Compass and choose the 100YWeatherSmall.data collection and observer the filter for nested fields
  - Filter on the wind -> type -> ”C” or “N”
  - Observe the dot notation and quotes around the key

```
{'wind.type': 'N'}
```

- This type, choose wind -> direction -> 290
  - Observe the filter notation

```
{'wind.direction.angle': 290}
```

- Now go to Mongo Shell and try the above queries

```
use 100YWeatherSmall
db.data.find({"wind.direction.angle": 290}).pretty()
```

Try this Query On Your Own

- Explore the movieDetails collection that you loaded into your Atlas sandbox cluster and then issue a query to answer the following question.
  - How many movies in the movieDetails collection have exactly 2 award wins and 2 award nominations?
  - How about rated PG movies with 10 award nominations?
    - You will find the count() method useful in answering this question using the mongo shell

Querying Array Fields

- Try the following query from movies collection

```
use video
db.movies.find({cast: ["Jeff Bridges", "Tim Robbins"]}).pretty()
```

- Notice that this selects a document with an exact match
  - Even the order of the cast must match
  - Even the actual movie does not match because there are extra casts

```
db.movies.find({title: "Arlington Road"}).pretty()
```

- What if I just want to choose a movie where Jeff Bridges is a cast

```
db.movies.find({cast: "Jeff Bridges"}).pretty()
```

- Or perhaps in a movie where he is the star

```
db.movies.find({'cast.0': "Jeff Bridges"}).pretty()
```

Try this Query On Your Own

- Explore the movieDetails collection that you loaded into your Atlas sandbox cluster and then issue a query to answer the following question.
  - How many documents list just two writers: "Ethan Coen" and "Joel Coen", in that order?
  - How many movies are Family oriented movies?
  - How many movies are listed as Western as the second entry?
    - You will find the count() method useful in answering this question using the mongo shell.

Introduction to Cursors

- The find() operator returns a cursor
- In the shell, 20 documents are printed automatically
- From the shell, we can type `it` to get the next 20

```
        "actors" : [
                "Peter Cushing",
                "Bernard Cribbins",
                "Ray Brooks",
                "Andrew Keir"
        ],
        "plot" : "The Daleks' fiendish plot in 2150 against Earth and its people is foiled when Dr. Who and friends arrive from the 20th century and
figure it out.",
        "poster" : "http://ia.media-imdb.com/images/M/MV5BMTg0OTc0MDc0M15BMl5BanBnXkFtZTgwMTg5ODYxMTE@._V1_SX300.jpg",
        "imdb" : {
                "id" : "tt0060278",
                "rating" : 6,
                "votes" : 2236
        },
        "awards" : {
                "wins" : 0,
                "nominations" : 0,
                "text" : ""
        },
        "type" : "movie"
}
Type "it" for more
MongoDB Enterprise >
```

Projections

- Select only certain fields to be returned from a find() query
- Second argument to the find() operator
  - Use 1 if you want to explicitly select that field
  - Use 0 if you want to explicitly remove that field
- Try the following command from the class cluster

```
db.movies.find({genre: "Action, Adventure"}, {title: 1})
```

- Notice that the primary field _id is included automatically
  - How might we explicitly exclude this field

```
db.movies.find({genre: "Action, Adventure"}, {title: 1, _id: 0})
```

- Try explicitly removing some of the fields

MongoDB

Update

Dynamic and Flexible Schema

- One of the core advantages of MongoDB is that the schema is dynamic and flexible
  - Not all documents are required to have the same fields
  - This means that we do not need to have fields with NULL values
- Let's look at movieDetails – notice that many of the documents are missing fields such as awards and posters
- From movieDetails, locate the movie title "The Martian"

```
use video
db.movieDetails.find({title: "The Martian"}).pretty()
```

- Notice that this document does not have a link to a poster picture

Lab

Updating a document with updateOne()

- We will use the updateOne() operator to add a poster field to the movie – The Martian
- The update operator allows us to specify how fields should be modified in matching documents
- The first parameter specifies the filter
- The second parameter specifies the type of update
- Here we will use the $set operator
  - Think of it as write or replace
  - If the field does not exist, if will write
  - If it exists, $set will overwrite with the new data

```
db.movieDetails.updateOne({
    title: "The Martian"
}, {
    $set: {
        poster: "https://www.imdb.com/title/tt3659388/mediaviewer/rm1391324160"
    }
})
```

MongoDB Update Operators - $inc

- Please review the update operators
  - https://docs.mongodb.com/manual/reference/operator/update/
- Let's try one - $inc
  - While we can also use $set to just change, it may be prone to errors

```
db.movieDetails.updateOne({
    title: "The Martian"
}, {
    $inc: {
        "tomato.reviews": 3,
        "tomato.userReviews": 25
    }
})
```

MongoDB Update Operators - $push

- Let's try another one that works on Arrays

```
let reviewText1 = [
    "The Martian could have been a sad drama film, instead it was a",
    "hilarious film with a little bit of drama added to it.  The Martian is what ",
    "everybody wants from a space adventure.  Ridley Scott can still make great ",
    "movies and this is one of the best"
].join()

db.movieDetails.updateOne({
    title: "The Martian"
}, {
    $push: {
        reviews: {
            rating: 4.5,
            date: ISODate("2016-01-12T09:00:00Z"),
            reviewer: "Spencer H.",
            text: reviewText1
        }
    }
})
```

Lab

Updating Multiple Documents with updateMany()

- With updateMany(), you can update multiple documents that match your filter criteris
- Observe that many of the documents contain a null rated field
- Let's remove them

```
db.movieDetails.updateMany({
    rated: null
}, {
    $unset: {
        rated: ""
    }
})
```

```
db.movieDetails.updateMany({
    poster: null
}, {
    $unset: {
        poster: ""
    }
})
```

- You try: Remove all empty poster fields

Replace Document with replaceOne()

- Use findOne() to get the document into memory
  - find() returns a cursor, findOne() returns the first matching document
- Update the document in memory
- Use replaceOne() to substitute with my in-memory document

```
detailDoc = db.movieDetails.findOne({"imdb.id": "tt4368814"});
detailDoc.poster;
detailDoc.poster =
"https://www.imdb.com/title/tt4368814/mediaviewer/rm2926634240";
detailDoc.genres;
detailDoc.genres.push("Documentary");
db.movieDetails.replaceOne({
    "imdb.id": detailDoc.imdb.id
    },
    detailDoc
);
```

MongoDB

Delete

MongoDB deleteOne() operation

- First copy the loadReviewDataset.js script to the directory where you are running your shell for your personal cluster
- Run the script with `load("loadReviewDataset.js")`
- This will create a review collection in the video database
- Run the following to delete a document:

```
db.reviews.deleteOne({_id: ObjectId("5c754f064ad41406ab794dfa")})
db.reviews.deleteMany({reviewer_id: 759723314})
```