Accessing MongoDB

DF100 - MongoDB Developer Fundamentals

Release: 20211217

Topics we cover

- The MongoDB Database
- Atlas Managed MongoDB Clusters
- How to Launch an Atlas Cluster
- How to configure Security
- How to Connect to MongoDB with mongosh

MongoDB Database

MongoDB's original product.

A Document model as opposed to a Relational Data model.

- Many things in common with an RDBMS.
- Not JSON - data is stored as binary typed objects.
- Has **container** types - Document and Array.
- Allows for fewer 'tables' and more denormalization options.
- Acknowledges that 3rd normal form isn't optimal in many cases.
- Optimized for Availability, Usability, Scaling, and Speed
- Idiomatic development drivers.

Recap

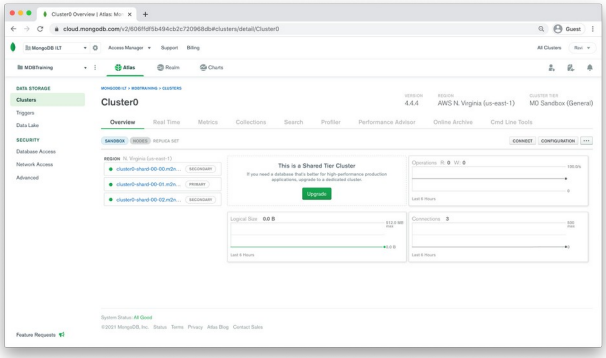
Emphasis on :

- Terminology understanding - Documents / Collections / Databases - Database.Collection = Namespace
- Denormalization is “normal” but 3rd normal form not optimal is many cases

Atlas Managed MongoDB Clusters

MongoDB Atlas is MongoDB as a Service.

- Highly available, scalable clusters in AWS/GCP/Azure
- Global availability and scaling.
- You can focus on Development and Business.
- Think of it as having a team to run and manage all the Database infrastructure.



Explain about free tier (M0) if they do not already have an account / corporate login
We are going to configure a 3-node replica set for this training.
A Node is synonymous to an instance or a single MongoDB server.
A Cluster is a group of nodes.

Setting-up MongoDB Atlas

We will set up an Atlas Free Tier cluster

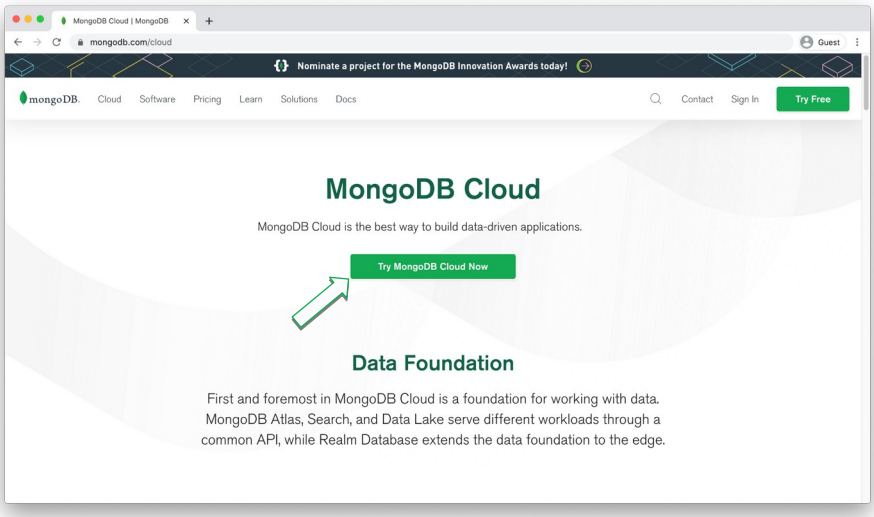
- 3 Nodes in different datacenters
- Highly available
- 512 MB of storage
- Secure by default
- Using TLS network encryption

Atlas free tier is on a shared server.

Some functionalities are not available/limited (throughput, number of connections, data transfer limits, monitoring, alerting, API access, etc.)

It is technically large enough to run most small business applications and is free for life.

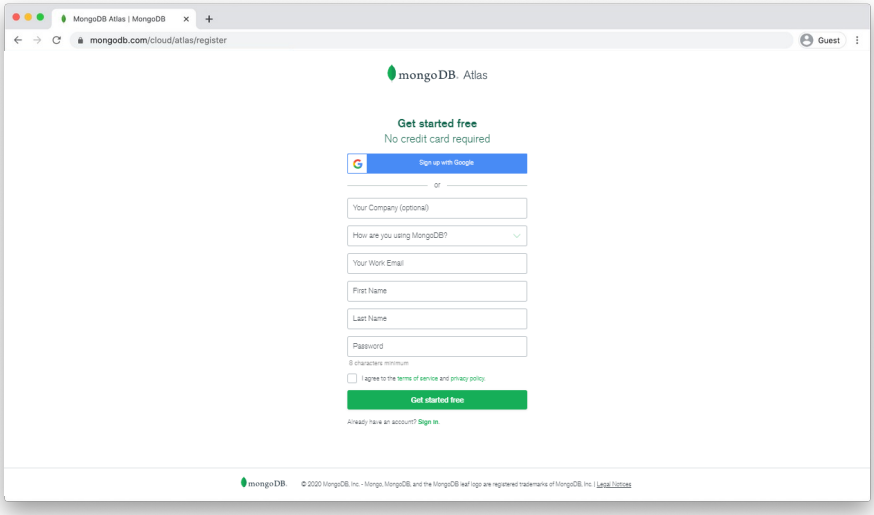
Go to MongoDB Cloud



Navigate to https://www.mongodb.com/cloud in a browser (ideally Chrome).

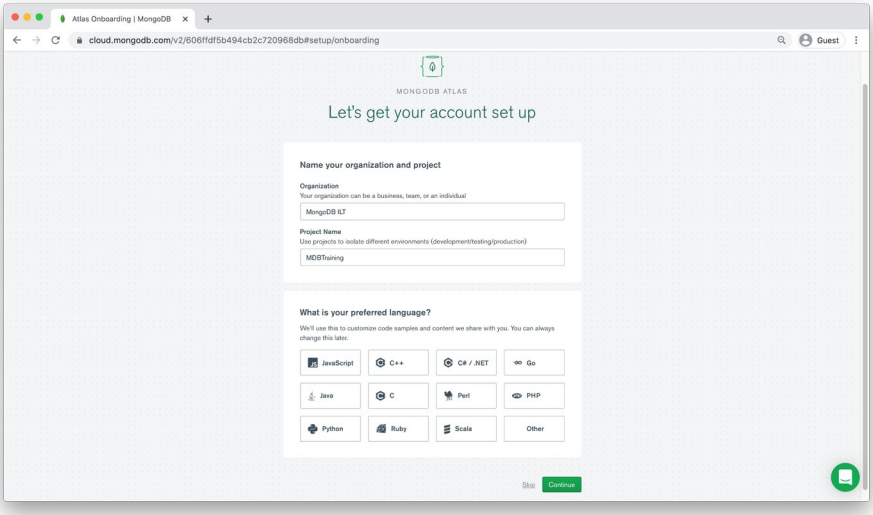
Click the button **Try MongoDB Cloud Now**.

Sign up or Sign in

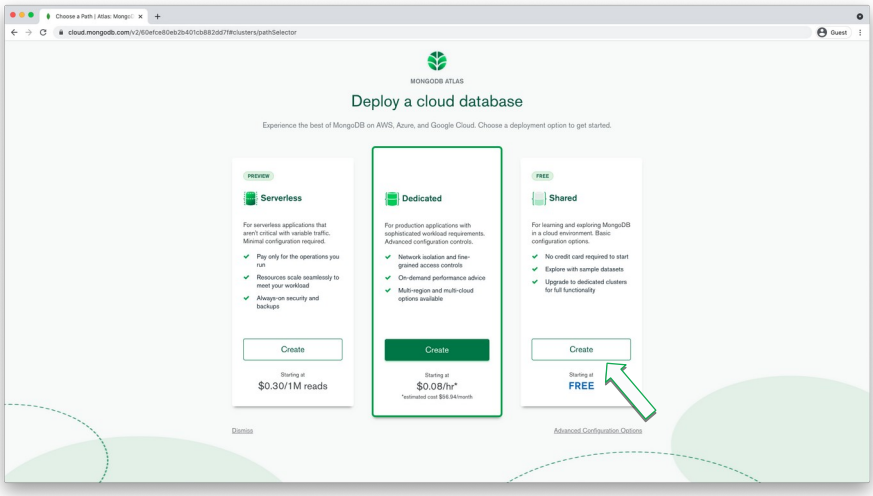


Sign up with your name and email
You shouldn't need to confirm email, but you may have to complete a captcha

Organization and Project Setup



Choose the Free Cluster



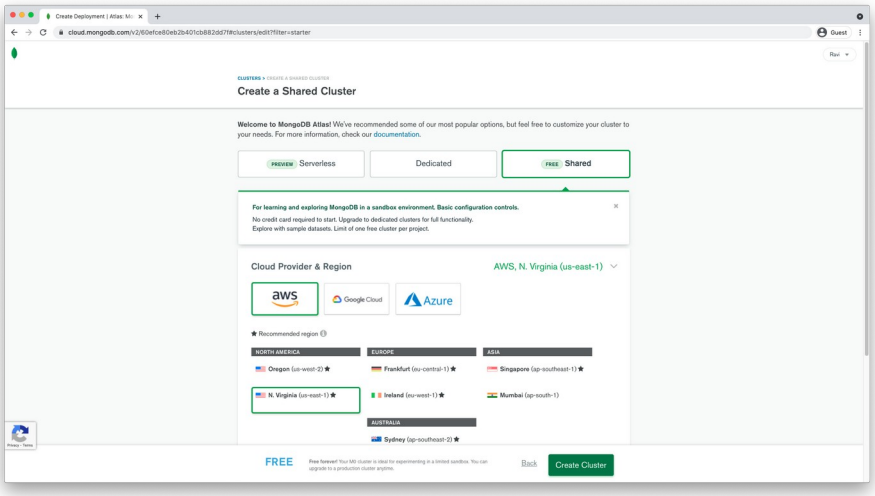
Clusters can be Shared (small), Dedicated (production-ready), or very large indeed and/or distributed globally.

Atlas can go very, very large. You could have a cluster of 50 shards (data partitioned for scaling out) with 768GB of RAM each, 4TB of storage, and 96 CPU's each of which has 7-way replication (350 Massive servers). Of course, this costs $4200 an hour (approx)

Potential to go larger still if required.

Pick the free one (or similar if you already have an account) - you may not get this screen; if not, click 'Build a New Cluster' to get to the next page.

Create the Cluster

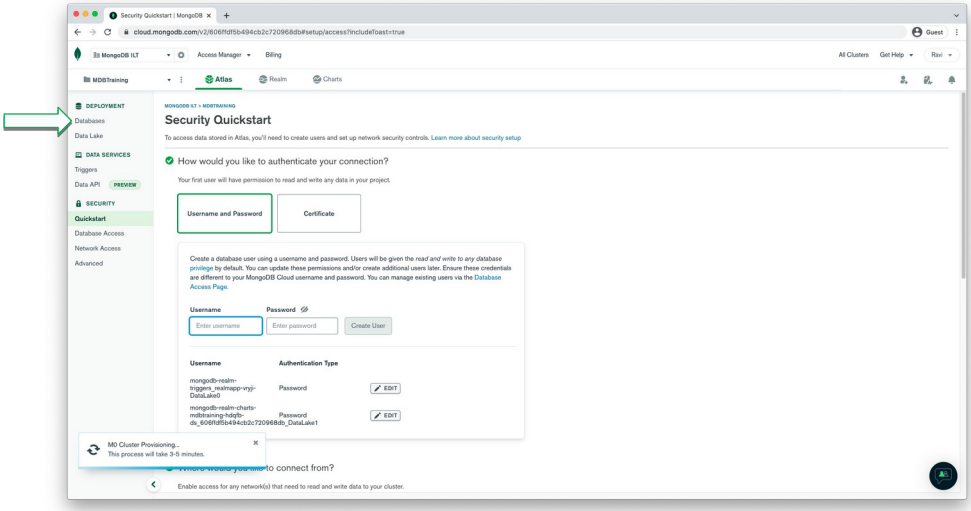


Leave the defaults and click **Create Cluster**

MongoDB 5.0 is supported in M10+ clusters.

M0 doesn't support MongoDB 5.0.

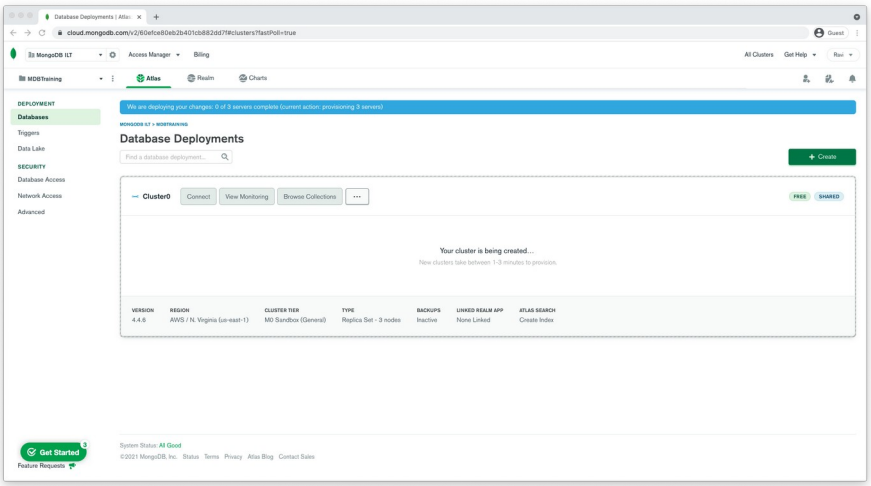
Skip Quickstart Wizard



If you are redirected to the quickstart wizard, go back to the Databases page as shown above;we would set up users later.

Usually one would go with the quickstart wizard because it is very easy to use and while one adds users the database gets deployed.

Wait for cluster to start up

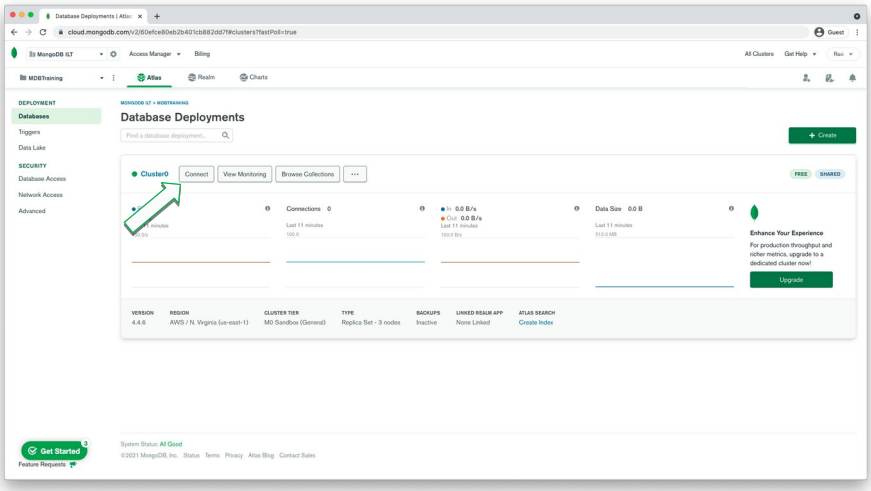


Wait for the cluster to be created (up to 5 mins approx) - Wait for the blue bar at the top to disappear

If you are redirected to the quickstart wizard, go back to the Databases page shown above as we would set up users later.

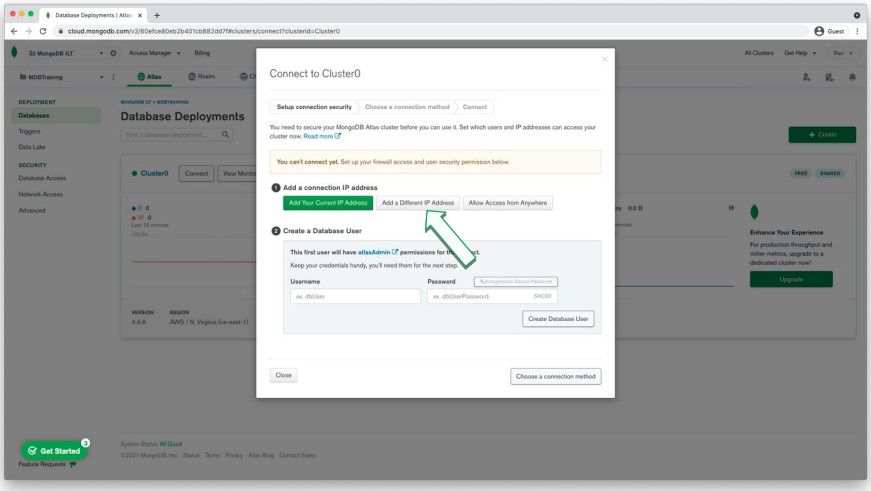
Good time for questions.

Connect to the cluster



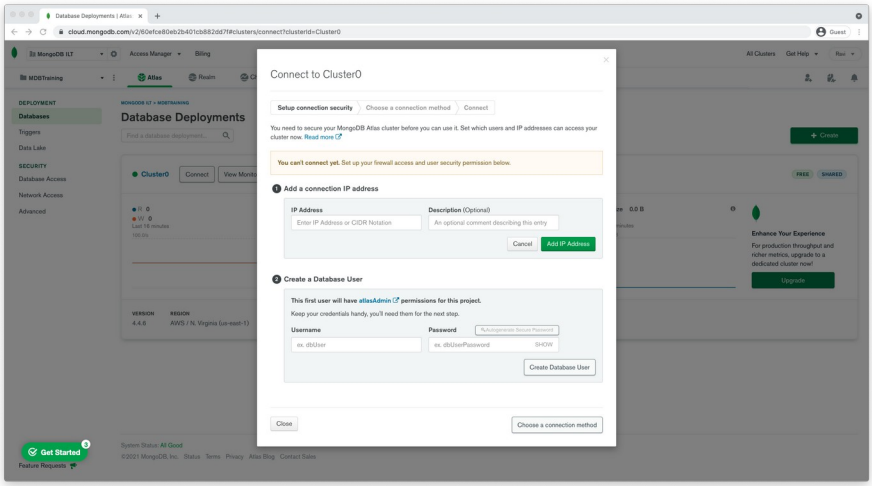
We now have a fully working MongoDB cluster running in three different data centers. Let's connect to it!

Setup firewall



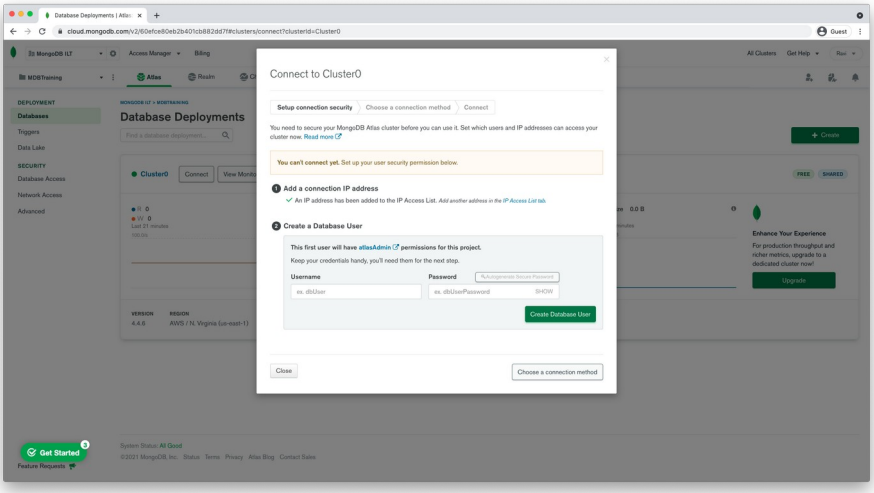
Click **Connect**
Atlas requires us to specify what hosts can connect to our cluster for security reasons. Ideally, it is good to always select **Add a Different IP Address**.

Add IP Address



We can add the Strigo public IP here, we can get it by running **`curl ifconfig.me`** on the Strigo Terminal.

Add a user



Add a database user with:

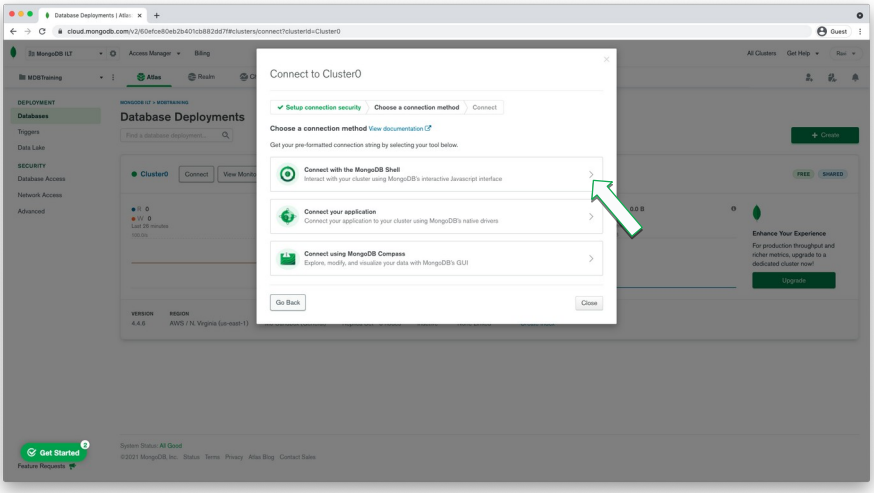
- USERNAME: `admin`
- PASSWORD: `qwerty123`

Click **Create Database User** and then click **Choose a connection method** to go to the next step.

Atlas has a lot of default security mechanisms in place:

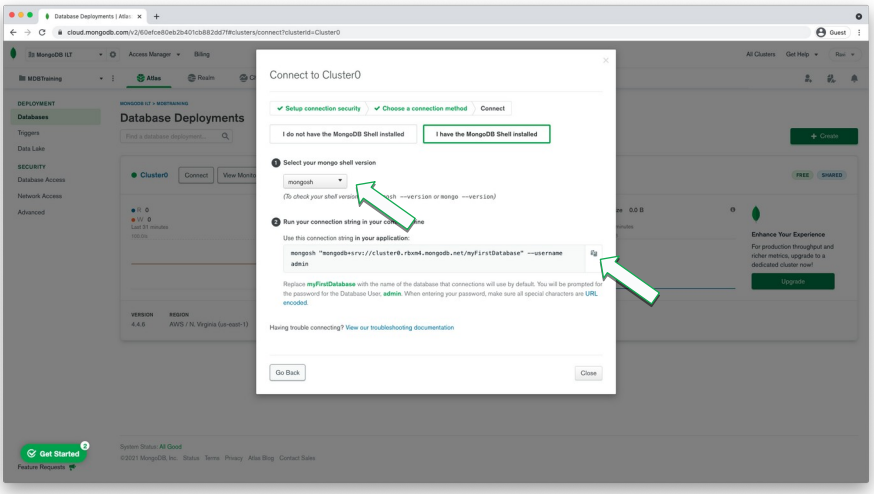
- We need users created
- We have to use TLS
- Data is on encrypted disks
- We need to add IPs to the Access List

Connect with mongosh



Now we have the cluster configured; applications can connect.
One application is **mongosh** - a javascript REPL (Read Eval Print Loop) we will use to learn some basic MongoDB concepts.
Details are also provided for connecting with a GUI tool such as Compass or a programming language driver.

Connecting to MongoDB Atlas

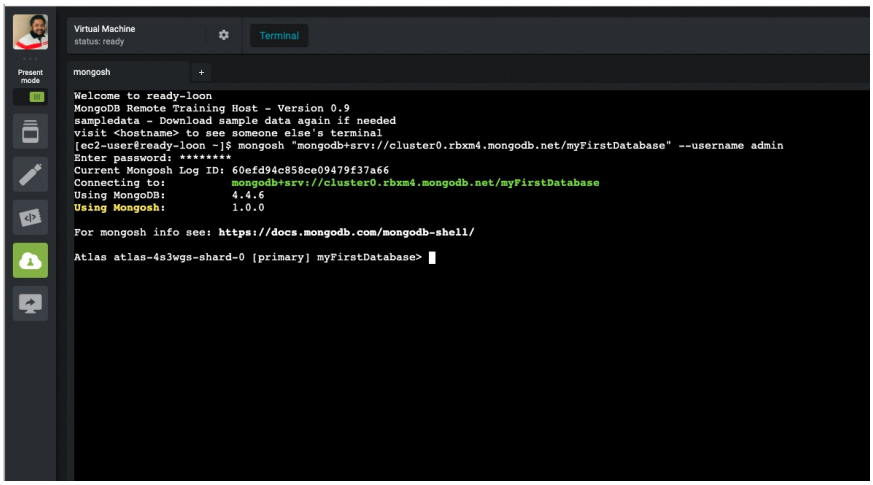


Select **I have the mongo shell installed**, make sure that **mongosh** is selected in the mongo shell version dropdown, and copy the command to connect to the cluster. We can close the dialog box after copying the command.

Now we can run the command shown in Atlas in our terminal.

- This specifies the DNS entry for our cluster (address knows about all the hosts)
- We specify a username and that we will be prompted for a password

Connect to MongoDB via mongosh



Paste the command in your terminal and execute the same. Now we are connected to MongoDB.

What we did so far

- We created a free, three-node shared Cluster in MongoDB Atlas
- This is MongoDB, running on servers in AWS managed by MongoDB
- We opened the network to allow our host to connect
- We created an admin user
- We securely logged in to MongoDB via mongosh

Useful MongoDB Commands

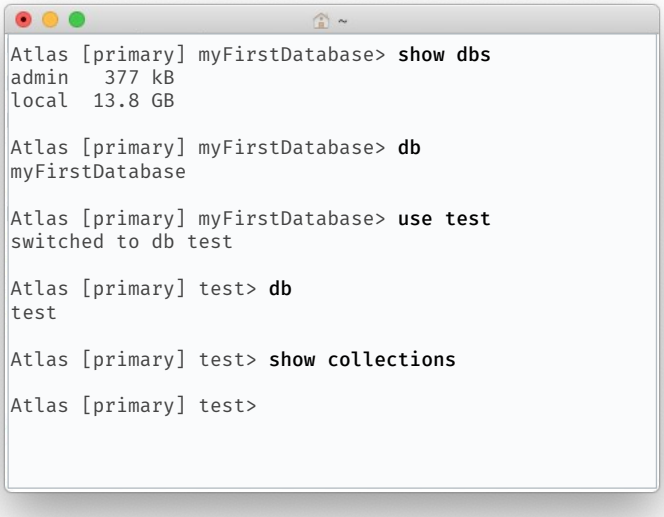
Show all databases in the cluster

Check the current database

Set db to the **test** database

Check the current database again

Show the collections



show dbs is a helper - it's equivalent to a small piece of javascript code to list the databases.

Some commands:

- **db** - this is a database object and is used at the beginning of most commands to run against a DB. Executing just db without any other methods, gives you the current database name.
- **show dbs** - shows available databases
- **use <database>** - selects database to use. Note that it does not need to already exist
- **show collections** - show collections available in the currently selected database. If there are no collections in a database, the command gives an empty response.

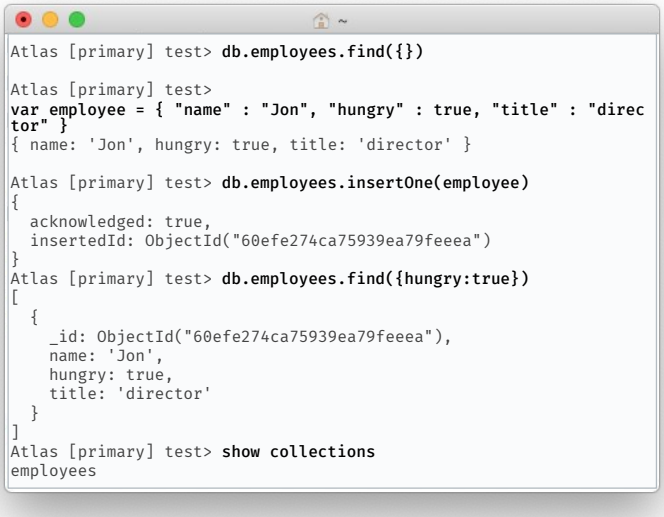
Interacting with the database

Find all documents in the **employees** collection

Create a **`document`** as a variable

Insert the **document** in employees collection

Find all **documents** where **hungry** is equal to **true** in employees collection



Technically you are creating an object - and putting it in MongoDB as a Document, but Record is a generic term.

Some commands:

- **db** - this is a database object and is used at the beginning of most commands to run against a db
- **insertOne()** - this allows us to insert an object e.g. db.getCollection('test').insertOne({name:"bob"})
- **find()** - this allows us to query e.g. db.getCollection('test').find()

Note: We don't have to explicitly create a collection, just executing the insert command would create a collection if the collection doesn't exist. As you can see that the show collections command here returns employees collection.

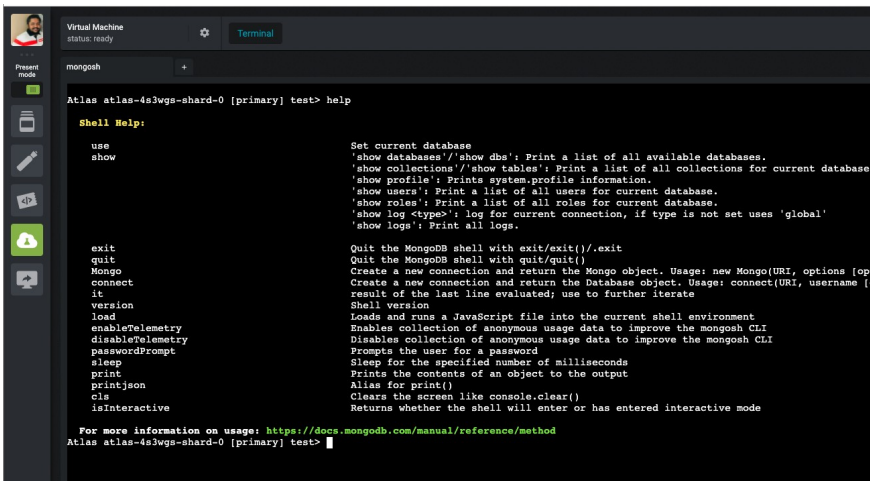
mongosh - A JavaScript REPL


```
Atlas [primary] test> for(let i=0; i<10; i++) {
      print(i);
}

0
1
2
3
4
5
6
7
8
9
Atlas [primary] test>
```


We can run JavaScript code snippets in mongosh. It is a JavaScript REPL which is capable of running ES6 as well.

The Shell has help



We can type just `help` in the shell to see all available help functions.

Most objects as well expose a `help()` method that we can call on them like `db.help()`.

Recap

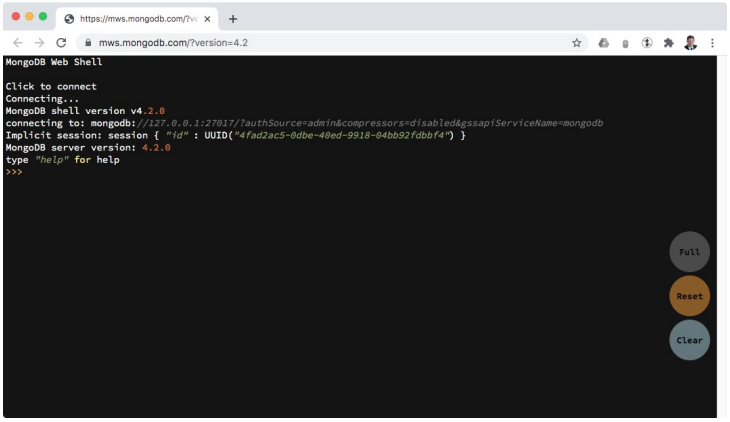
- MongoDB Atlas is MongoDB hosted as a service.
- MongoDB Atlas is very flexible and includes small, free clusters.
- MongoDB Atlas always uses TLS and Authentication and a Firewall.
- For all exercises, it is important to work as a group.
- You can log in to Atlas via mongosh.
- There is mongosh installed on your training instance.

Appendix

Only relevant for repeating these exercise after the course if you wish to.

The MongoDB Web Shell

- Hosted in a Browser
- Auto-connects to shared cluster
- Can connect to your cluster



https://mws.mongodb.com

You **can access** a shell from a browser too - this connects by default to a private Atlas example so you can play - like a sandbox. You can connect it to your own cluster by replacing the following value with your own

- `db = new Mongo("mongodb+srv://admin:<password>@cluster0.bku7p.mongodb.net/myFirstDatabase?retryWrites=true&w=majority").getDB("admin")`
- `Db = db.getSiblingDB("test")`

The Old MongoDB Shell

There is an older MongoDB shell that works in a similar way as the new mongosh.

If mongosh is not available, you can use the old MongoDB shell as well.

Major difference we note is that the old shell doesn't have syntax highlighting.