Release: 20230414

Topics we cover

The MongoDB Database

Atlas Managed MongoDB Clusters

Launch an Atlas Cluster

Configure Atlas Cluster Security

Connect to MongoDB with mongosh

Useful basic commands

Other tools

MongoDB Database

MongoDB's original product: A Document model

- Similarities to RDBMS
- BSON not JSON - Data stored as binary typed objects
- Container types: Document and Array
- Fewer 'tables', more denormalization
- 3rd normal form isn't optimal in many cases
- Optimized for Availability, Usability, Scaling, and Speed
- Idiomatic development drivers

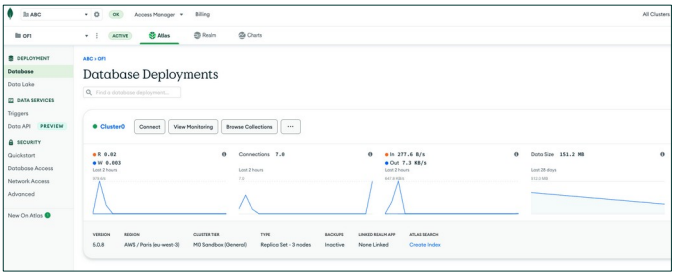
Recap
Emphasis on :

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

Atlas Managed Clusters

MongoDB Atlas is MongoDB as a Service.

- Highly available, scalable clusters in AWS/GCP/Azure
- Global availability and scaling
- Development and Business focus
- Manage Database infrastructure



M0 clusters are free sandbox replica set clusters. You can deploy one M0 cluster per Atlas project.
If you do not have an account / corporate login, you can create one:
https://www.mongodb.com/cloud
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.

Launch an Atlas cluster

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.

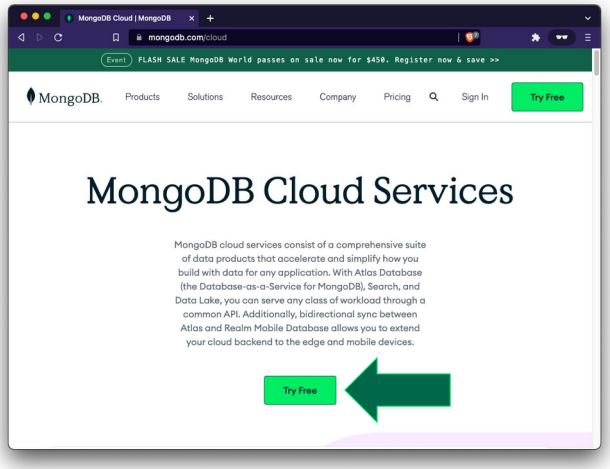
Some functionalities are not available/limited (throughput, number of connections, data transfer limits, monitoring, alerting, API access, etc.)

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

Go to MongoDB Cloud

Navigate to cloud.mongodb.com

Try Free



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

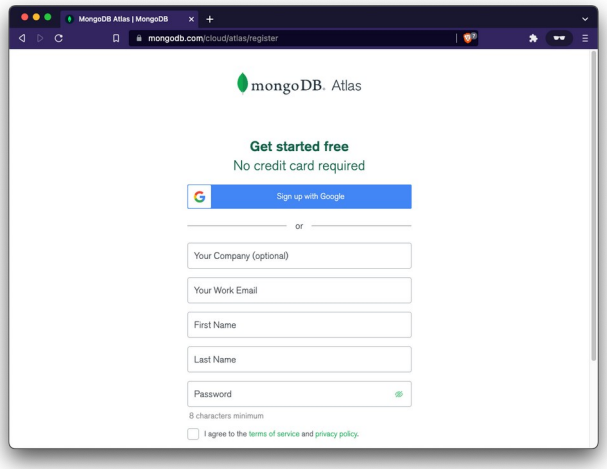
Click the button **Try MongoDB Cloud Now**.

Sign up or Sign in

Fill details

Complete the Captcha

Confirm Email

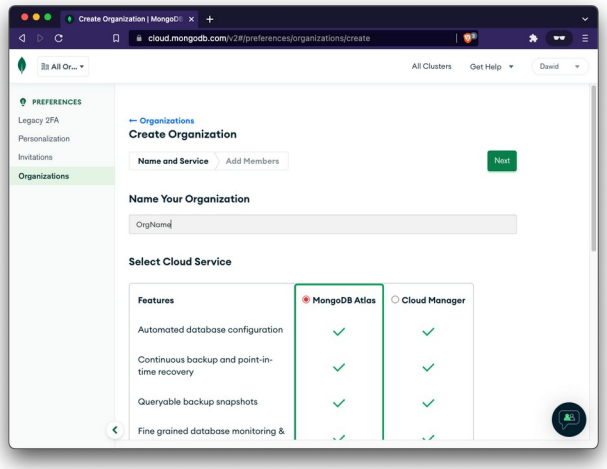


Sign up with your name and email

Organization and Project

Create an Organization

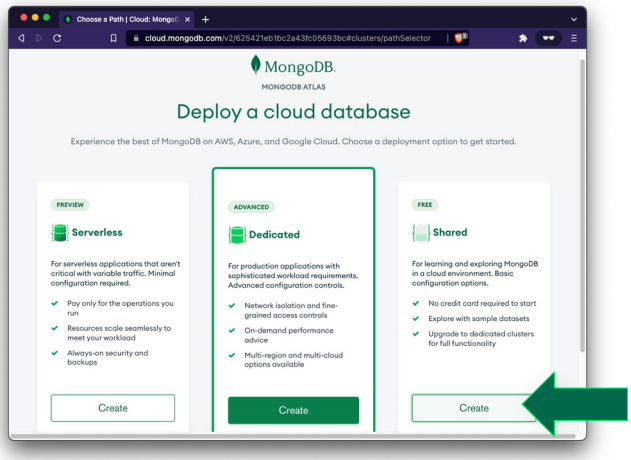
Create a Project



Choose the Free Cluster

Build New Cluster

Free Shared Cluster (M0)



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.

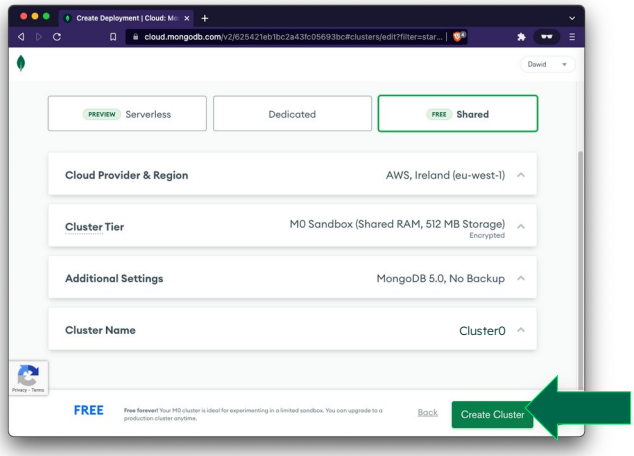
Create the Cluster

Provider: AWS

Region: Ireland (eu-west-1)

Version: Latest available

Cluster Name: Cluster0



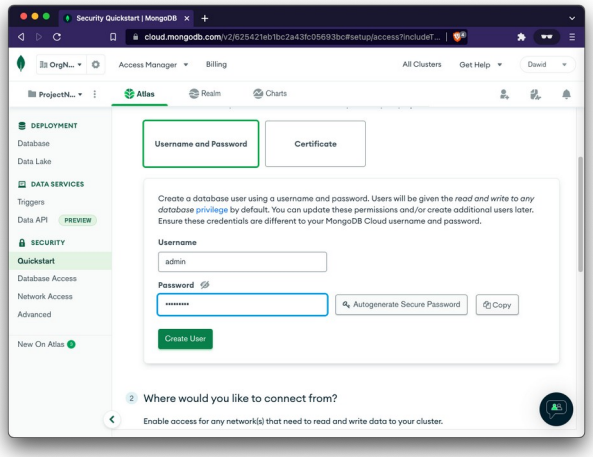
Configure Atlas cluster security

Add a user (Quick Start)

User: admin

Password: qwerty123

NOTE: Never use bad passwords for any public facing databases! The above is for training purposes only.



Add a database user with:

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

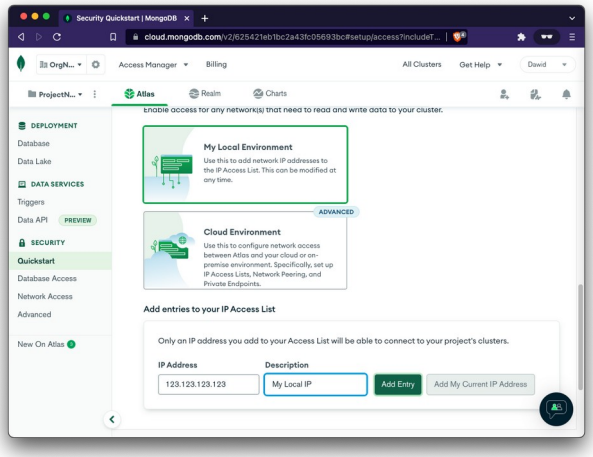
Click **Create Database User** and then click **Choose a connection method** to go to the next step.

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

Network Setup (Quick Start)

Add Strigo IP Address

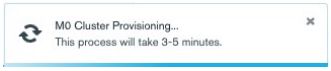


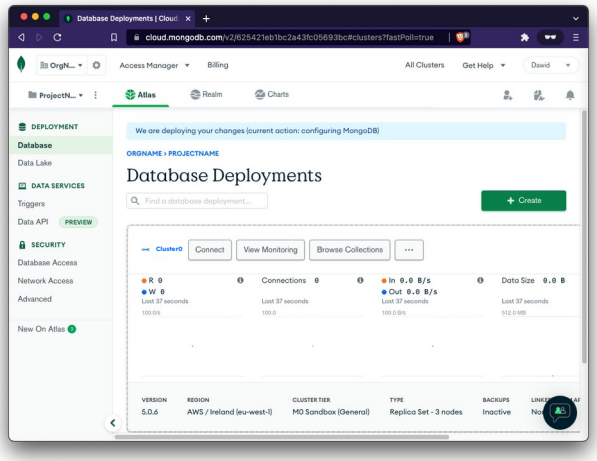
Click **Connect**
Atlas requires us to specify what hosts can connect to our cluster for security reasons.
Ideally, it is good to always select **Add a Different IP Address**.

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

Wait for cluster to start up

Can take upto 5 minutes.



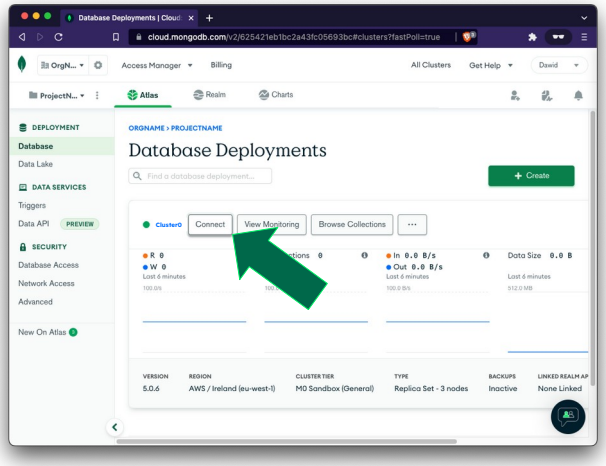


Wait for the cluster to be created (up to 5 mins approx) - Wait for the blue bar at the top to disappear

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

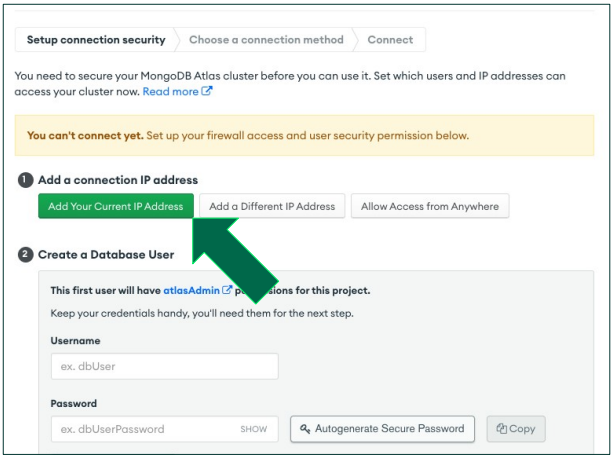
Connect to MongoDB with mongosh

Connect to the cluster



Network Setup (No Quick Start)

Add Strigo IP Address



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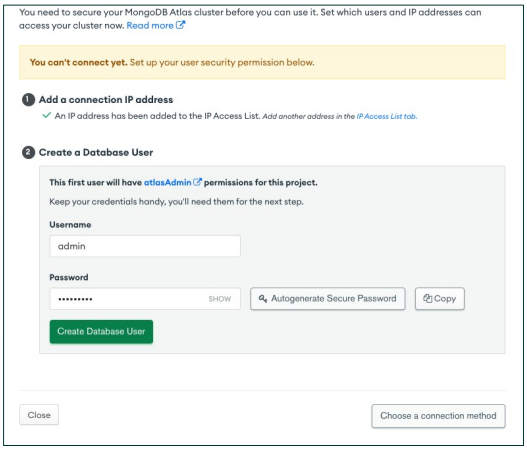
Add a user (No Quick Start)

User: admin

Password: qwerty123



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- PASSWORD: `qwerty123`

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- Data is on encrypted disks
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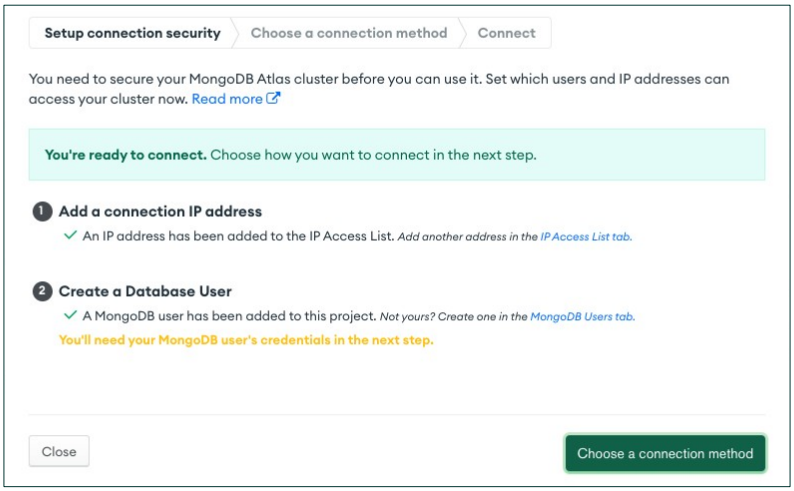
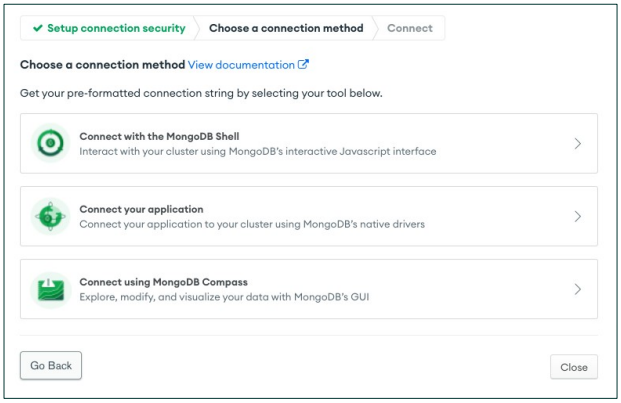
Connection method



Connect with mongosh

MongoDB shell (mongosh) - Javascript Read Evaluate Print Loop (REPL)

MongoDB Compass

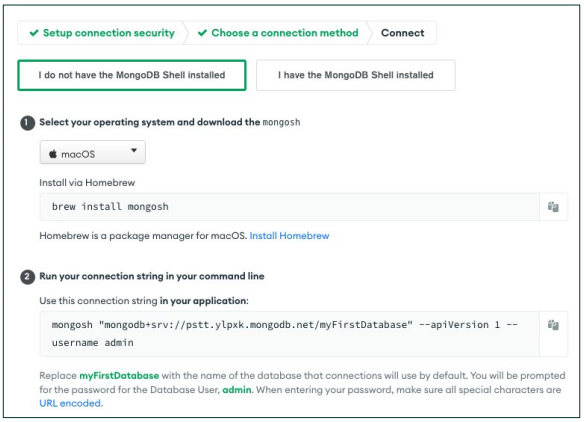


Now we have the cluster configured; applications can connect.
One application is **mongosh** - a javascript REPL (Read Eval Print Loop) we will use to learn some basic MongoDB concepts.
Details are also provided for connecting with a GUI tool such as Compass or a programming language driver.

Install mongosh

If you are working in your own environment

- Specify Operating System
- Download and Install mongosh
- Run the connect command

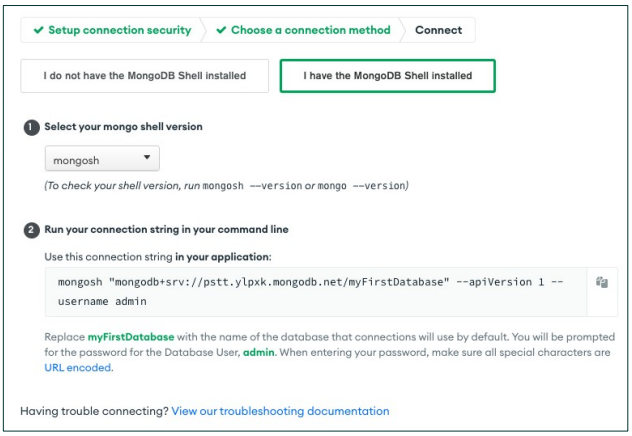


If we are working locally we can install MongoDB Shell.
This step is not needed if we are using the Strigo VM as the mongosh has been installed already in the VM

Connecting to MongoDB Atlas

If you have a mongosh already

- Select mongosh version from dropdown
- Run the connect command



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.

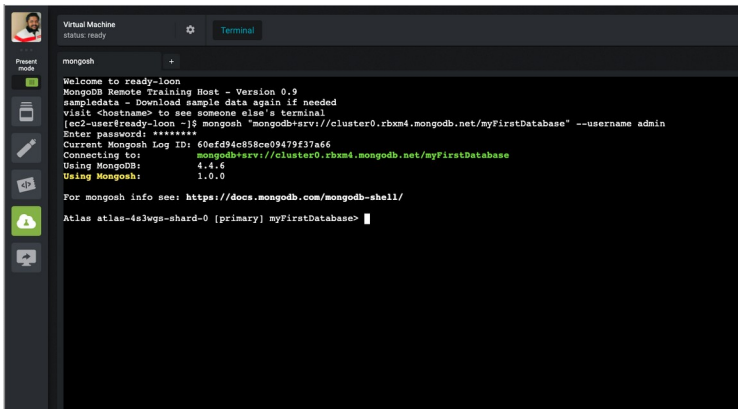
- This specifies the DNS entry for our cluster (address knows about all the hosts)
- We specify a username and that we will be prompted for a password

Connect to MongoDB via mongosh

Start a Terminal

User: admin

Password: qwerty123



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

Essential commands

Useful MongoDB Commands

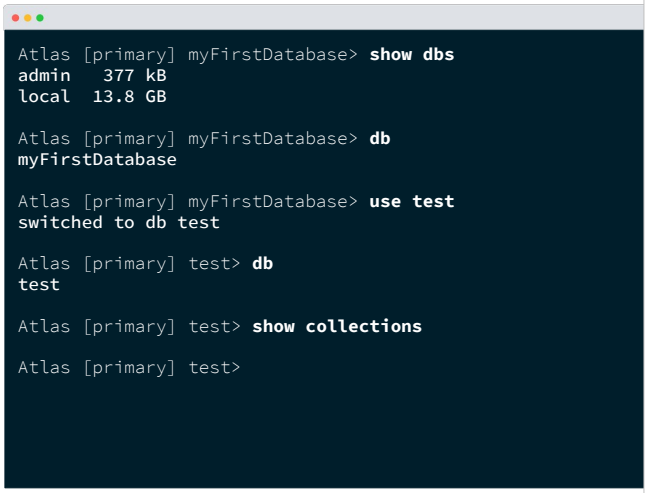
Show all databases in the cluster

Check the **current database**

Set db to the **test** database

Check the current database again

Show the collections in the database



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.

Database Interaction

Find all documents in a collection

Create new document object **as variable**

Insert a Document in the collection

Find Documents based on a filter

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

Some commands:

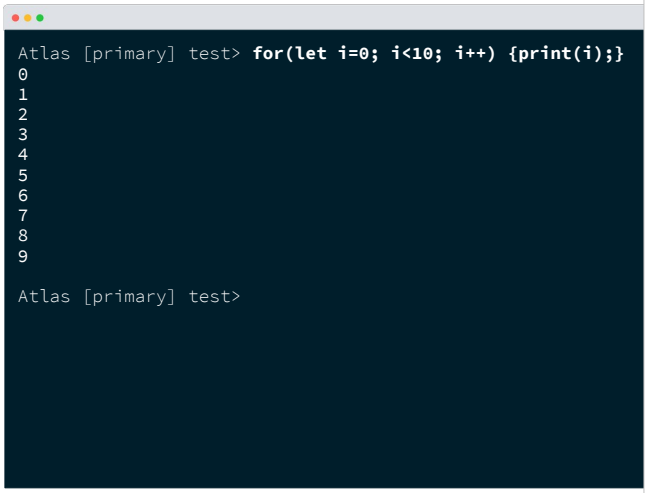
- **db** - this is a database object and is used at the beginning of most commands to run against a db
- **insertOne()** - this allows us to insert an object e.g. db.getCollection('test').insertOne({name:"bob"})
- **find()** - this allows us to query e.g. db.getCollection('test').find()

Note: The **employees** collection is automatically created when we execute the insert command. Demo:

1. db.employees.find({})
2. var employee = { "name" : "Jon", "hungry" : true, "title" : "director" } { name: 'Jon', hungry: true , title: 'director' }
3. db.employees.insertOne(employee)
4. db.employees.find({hungry:true})
5. show collections

A JavaScript REPL

mongosh - JavaScript and NodeJS REPL



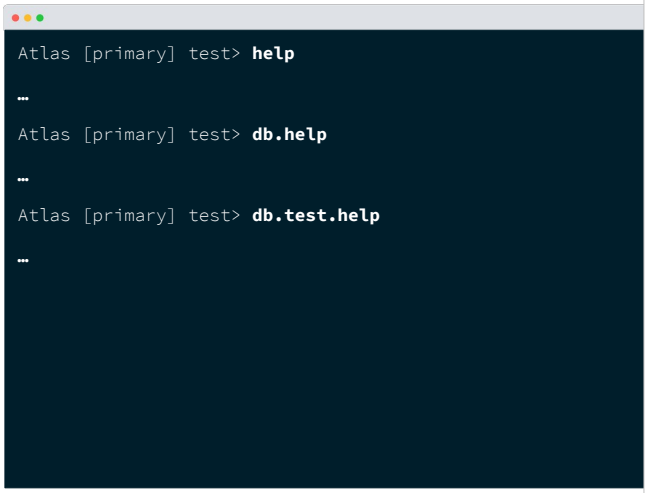
We can run JavaScript code snippets in mongosh. It is a fully functional JavaScript and NodeJS REPL for interacting with MongoDB deployments.

Help!

help

db.help

db.<collection>.help



- help - Shell help
- db.help - Database class help
- db.col.help - Collection class help

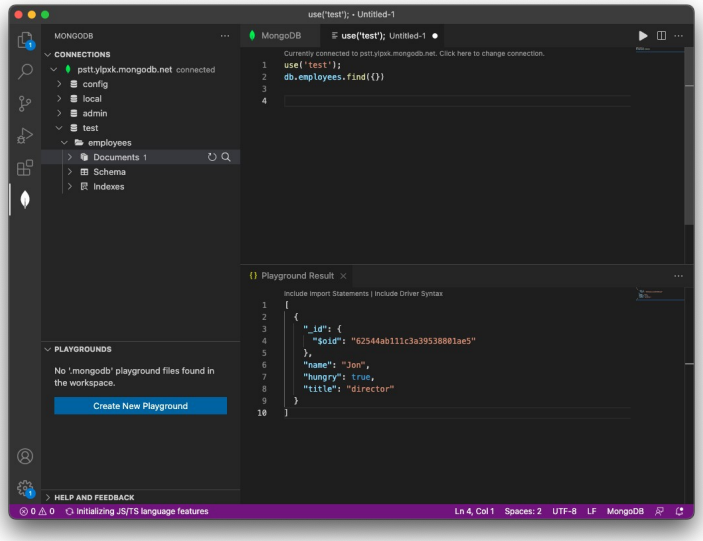
Useful tools

VSCode Playground

Preview

Visual Studio Marketplace

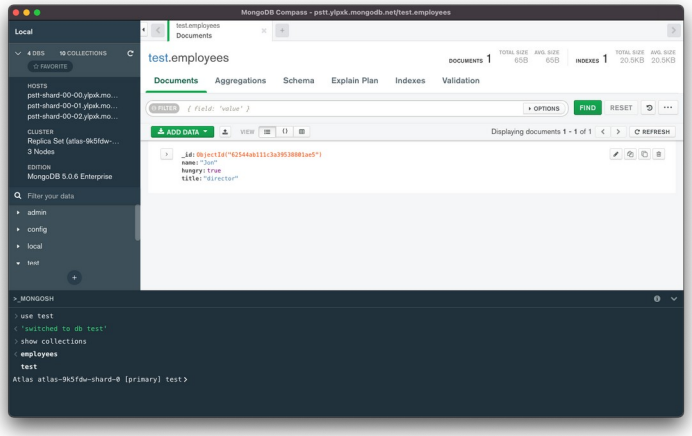
Intelligent Autocomplete



Compass

GUI tool that includes:

- Aggregation Builder
- Mongosh
- Visual explain Plans



You can download and install MongoDB Compass

Quiz Time!

#1. Which of the following statements describes best MongoDB Atlas?

A	Self-managed DB installed locally
B	Service to install a database on a server
C	Cloud provider used to deploy clusters
D	Managed database service on the cloud
E	Group of tools to work with a database

Answer in the next slide.

#1. Which of the following statements describes best MongoDB Atlas?

A	Self-managed DB installed locally
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C	Cloud provider used to deploy clusters
D	Managed database service on the cloud
E	Group of tools to work with a database

#2. What three cloud providers we can use when creating a cluster in Atlas?

A	Google Cloud	B	IBM Cloud	C	Amazon Web Services
D	Adobe Creative Cloud	E	Microsoft Azure		

Answer in the next slide.

#2. What three cloud providers we can use when creating a cluster in Atlas?

A. Google Cloud

B. IBM Cloud

C. Amazon Web Services

D. Adobe Creative Cloud

E. Microsoft Azure

#3. Select the steps required to set up an Atlas database for the first time:

A	Register as an Atlas user	B	Add an IP address to the access list	C	Create a database user
D	Add a project to organization	E	Select the connection mode		

Answer in the next slide.

#3. Select the steps required to set up an Atlas database for the first time:

- A — Register as an Atlas user
- B — Add an IP address to the access list
- C — Create a database user
- D — Add a project to organization
- E — Select the connection mode

#4. Which of the following statements describes best the mongosh?

A	A GUI tool that works as a JS REPL
B	An app that interacts with the MongoDB Atlas GUI
C	A CLI to load data in MongoDB using Compass
D	A CLI that works as a JS REPL
E	A cloud application that manages Atlas

Answer in the next slide.

#4. Which of the following statements describes best the mongosh?

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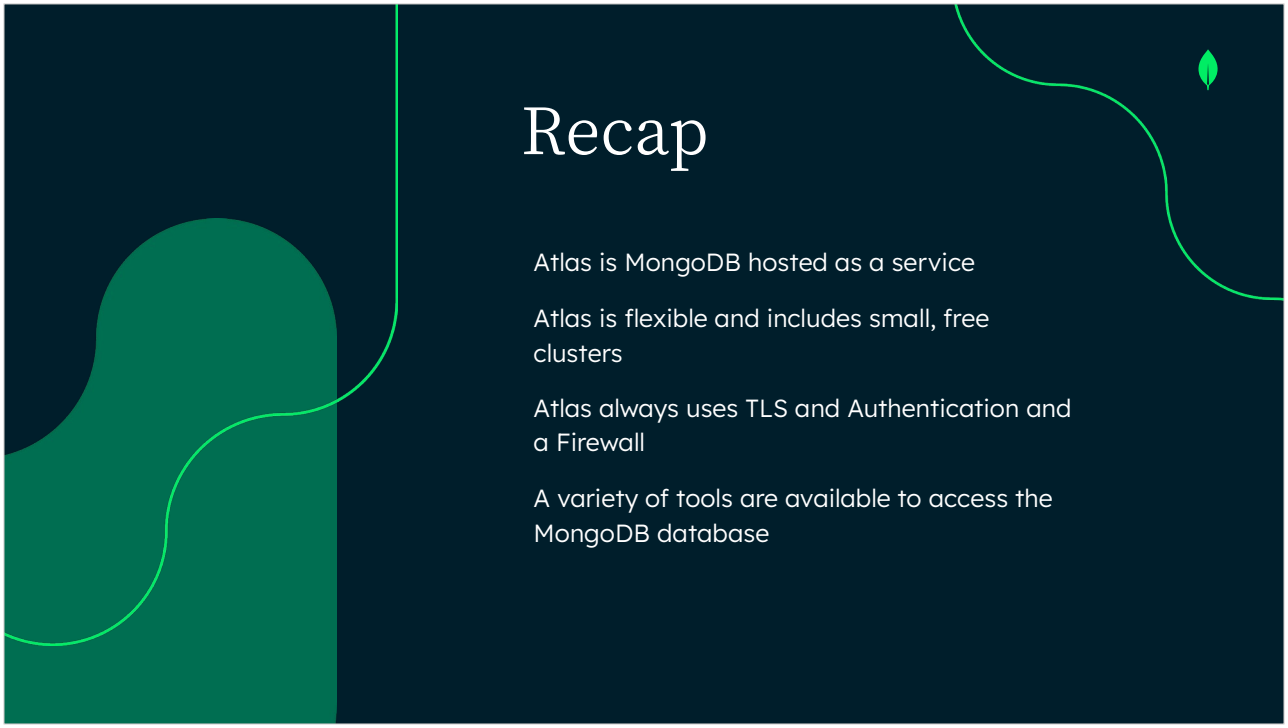


mongosh is installed in the Training lab (Strigo VM)

Appendix

The MongoDB Web Shell

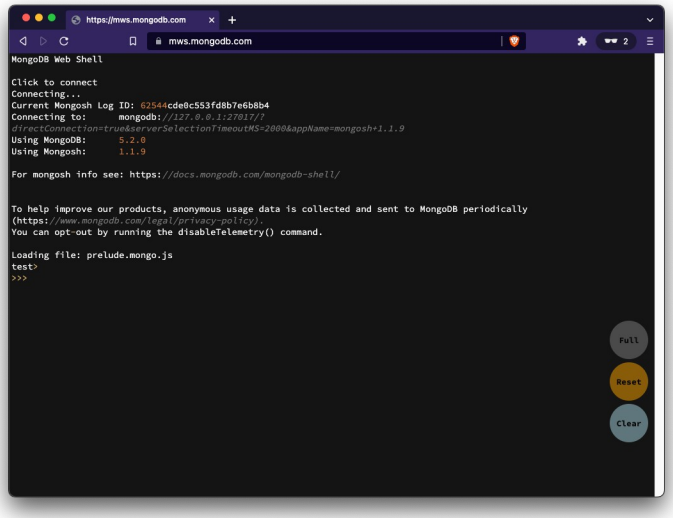
Hosted in a Browser

Auto-connects to shared cluster

Can connect to your cluster

https://mws.mongodb.com

```
db = new Mongo( <atlas URL> ).getDB("admin")
```

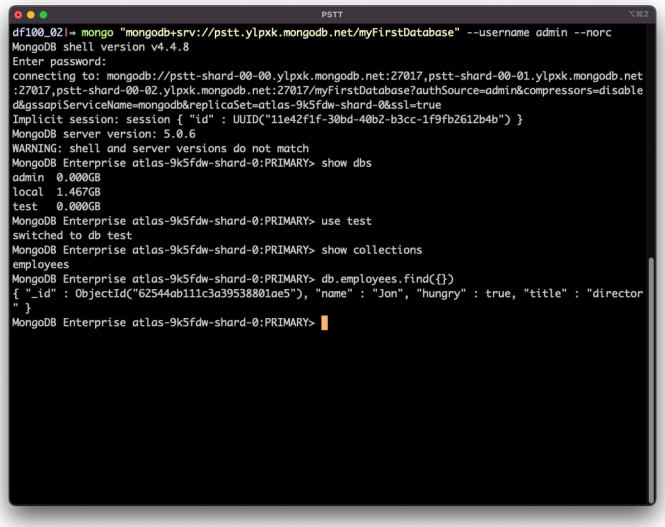


You **can access** a shell from a browser too. You can connect it to your own cluster by replacing the following value with your own

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

Legacy MongoDB Shell

- mongo shell
- Packaged with older servers
- No syntax highlighting



There is an older MongoDB shell (mongo) included in the core MongoDB installation 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.