Hands-on Lab: Setup and Practice Assignment

Estimated time needed: 30 minutes

Objectives

In this assignment, you will:

- Export data from a MongoDB database.
- Import data into a MongoDB database.
- Export data from a Cassandra database.
- Import data into a Cassandra database.
- Create indexes on a Cassandra database.

About this SN Labs Cloud IDE

This Skills Network Labs Cloud IDE provides a hands-on environment for course and project-related labs. It utilizes Theia, an open-source IDE platform that runs on a desktop or the cloud. To complete this lab, you will use the Cloud IDE based on Theia Cassandra and MongoDB running in a Docker container.

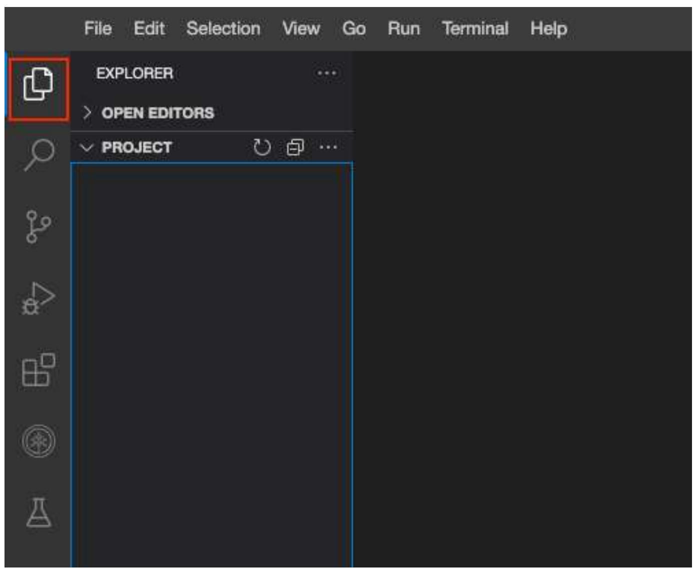
Important notice about this lab environment

Please be aware that sessions for this lab environment do not persist. You will see a new environment every time you connect to this lab. Any data you may have saved in the earlier session would get lost. Plan to complete these labs in a single session to avoid losing your data.

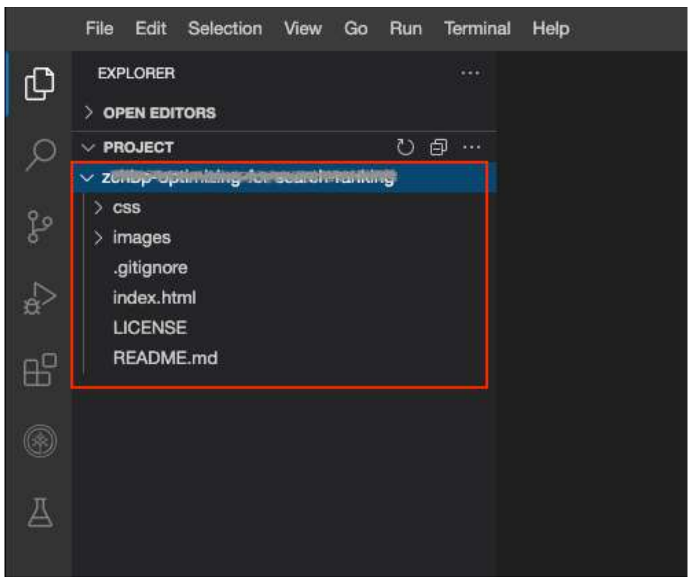
Working with Files in Cloud IDE

If you are new to Cloud IDE, this section will show you how to create and edit files in Cloud IDE.

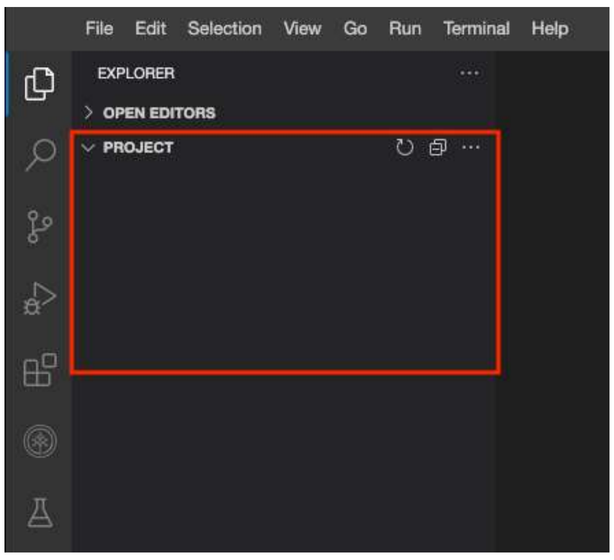
To view your files and directories in Cloud IDE, click the file icon to reveal it.



If you have cloned (using the `git clone` command) boilerplate or starting code, then it will look like the following image:

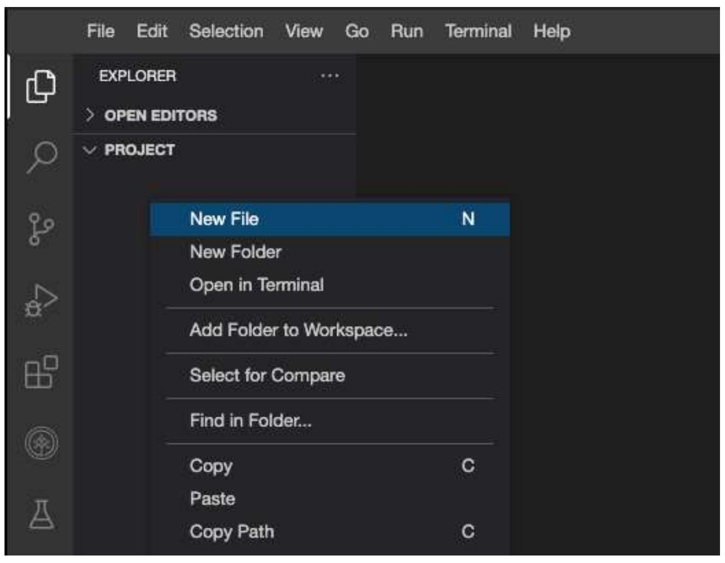


If you have not cloned and are starting with a blank project, it will look like this:

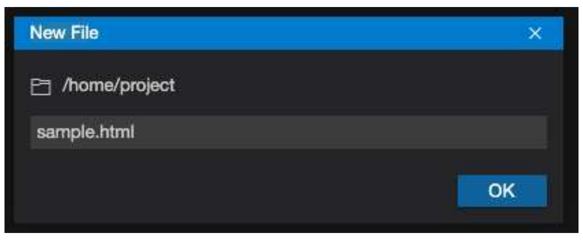


Create a new file

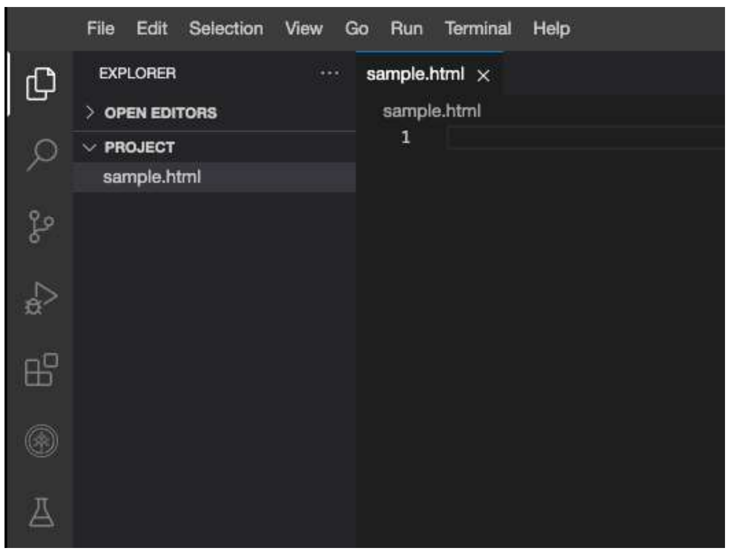
To create a new file in your project, right-click and select the New File option. You can also choose `File -> New File` to do the same.



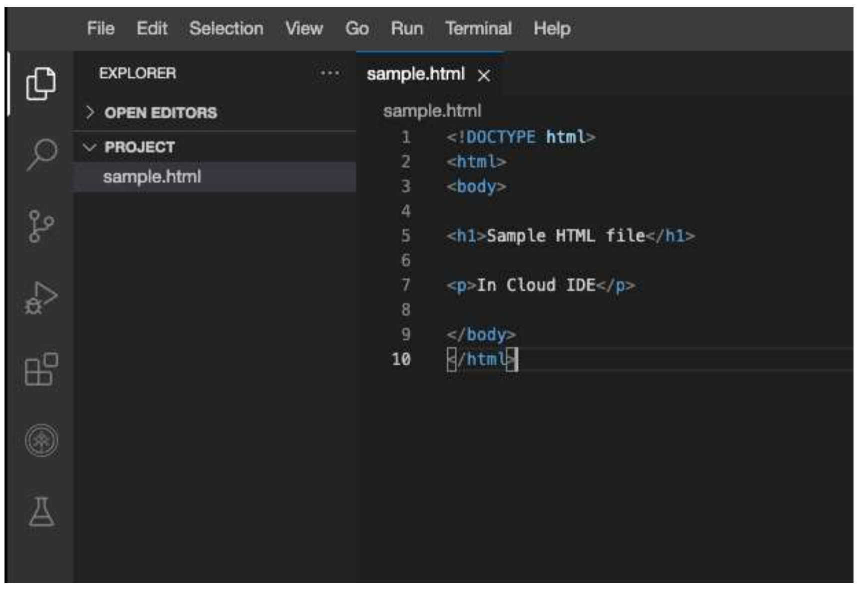
You will then need to name the new file. In this scenario, let's name it `sample.html`.



Clicking the file name `sample.html` in the directory structure will open the file on the right pane. You can create all different types of files, for example, `FILE_NAME.js` for JavaScript files.



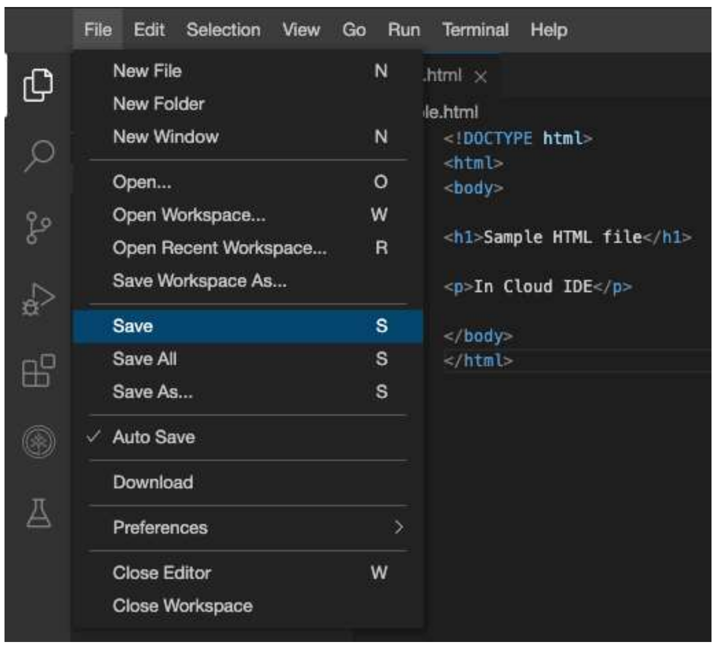
In the example below, we pasted some basic HTML code and then saved the file.



```
<!DOCTYPE html>
<html>
<body>

<h1>Sample HTML file</h1>

<p>In Cloud IDE</p>

</body>
</html>
```

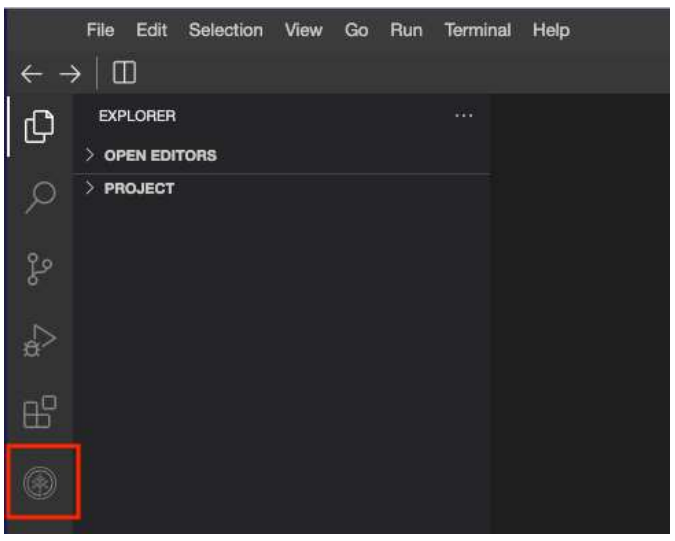
You can save this file in three different ways:

- Select File > Save
- Select `Command + S` on Mac or `CTRL + S` on Windows
- Alternatively, it will Autosave your work as well

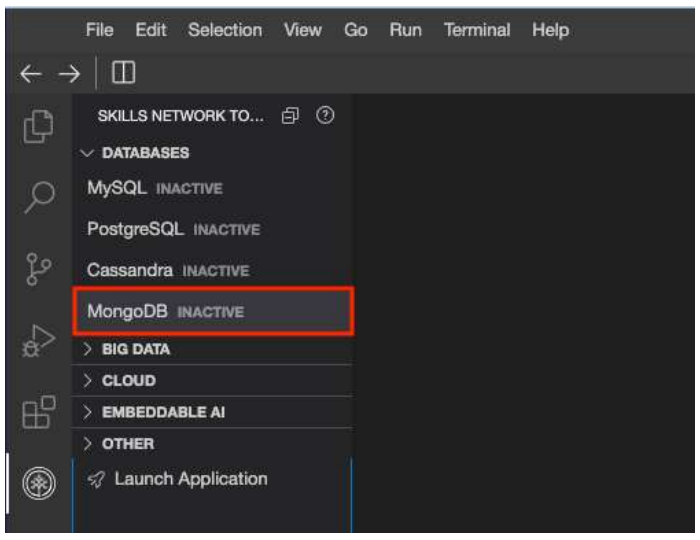


Setup: Start MongoDB

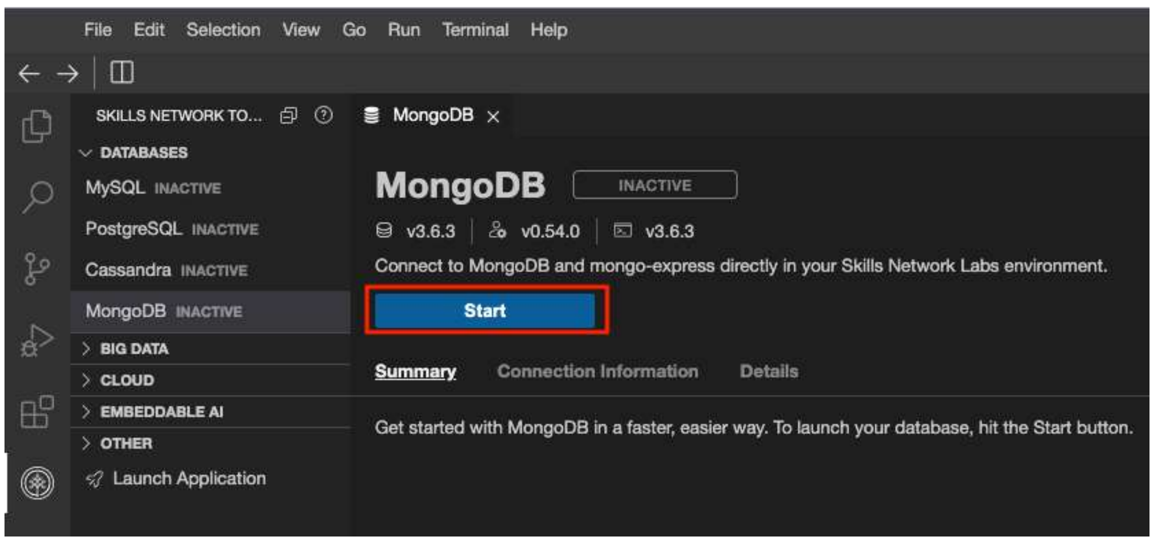
Navigate to Skills Network Toolbox.



You will notice MongoDB is listed there but inactive. Which means the database is not available for use.



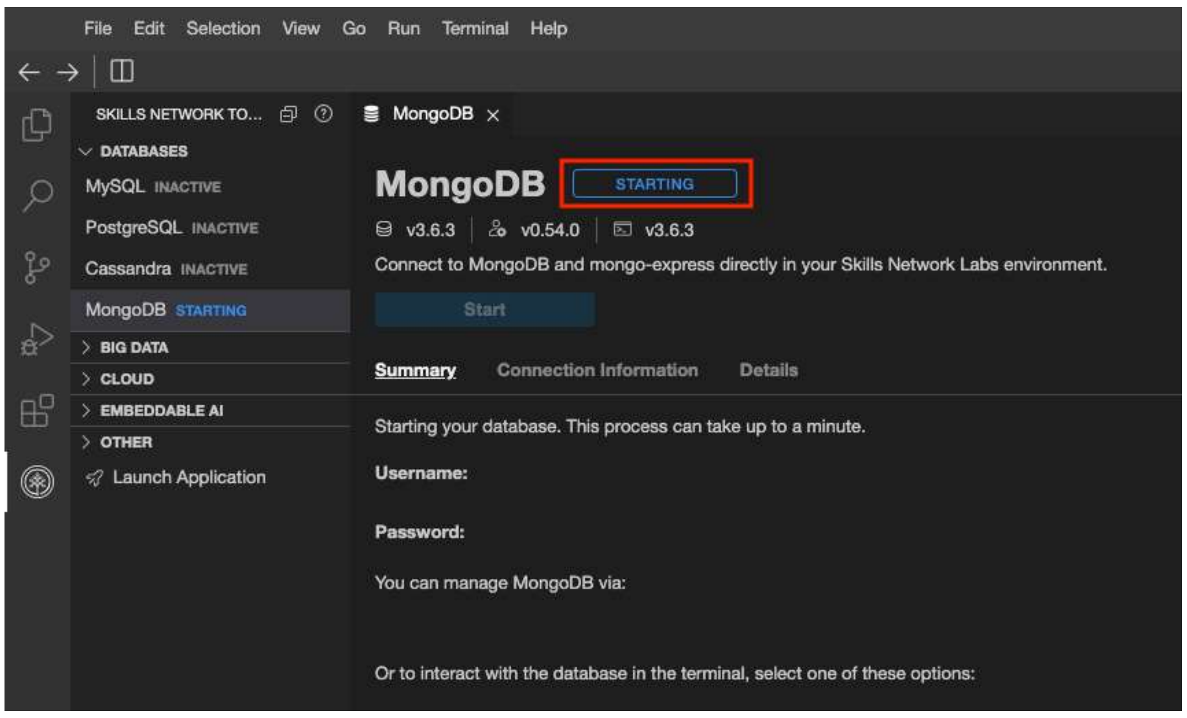
Once you click on it, you will see more details and a button to start it.



Connect to MongoDB and mongo-express directly in your Skills Network Labs environment.

Get started with MongoDB in a faster, easier way. To launch your database, hit the Start button.

Clicking the start button will run a background process to configure and start your MongoDB server.



Connect to MongoDB and mongo-express directly in your Skills Network Labs environment.

Starting your database. This process can take up to a minute.

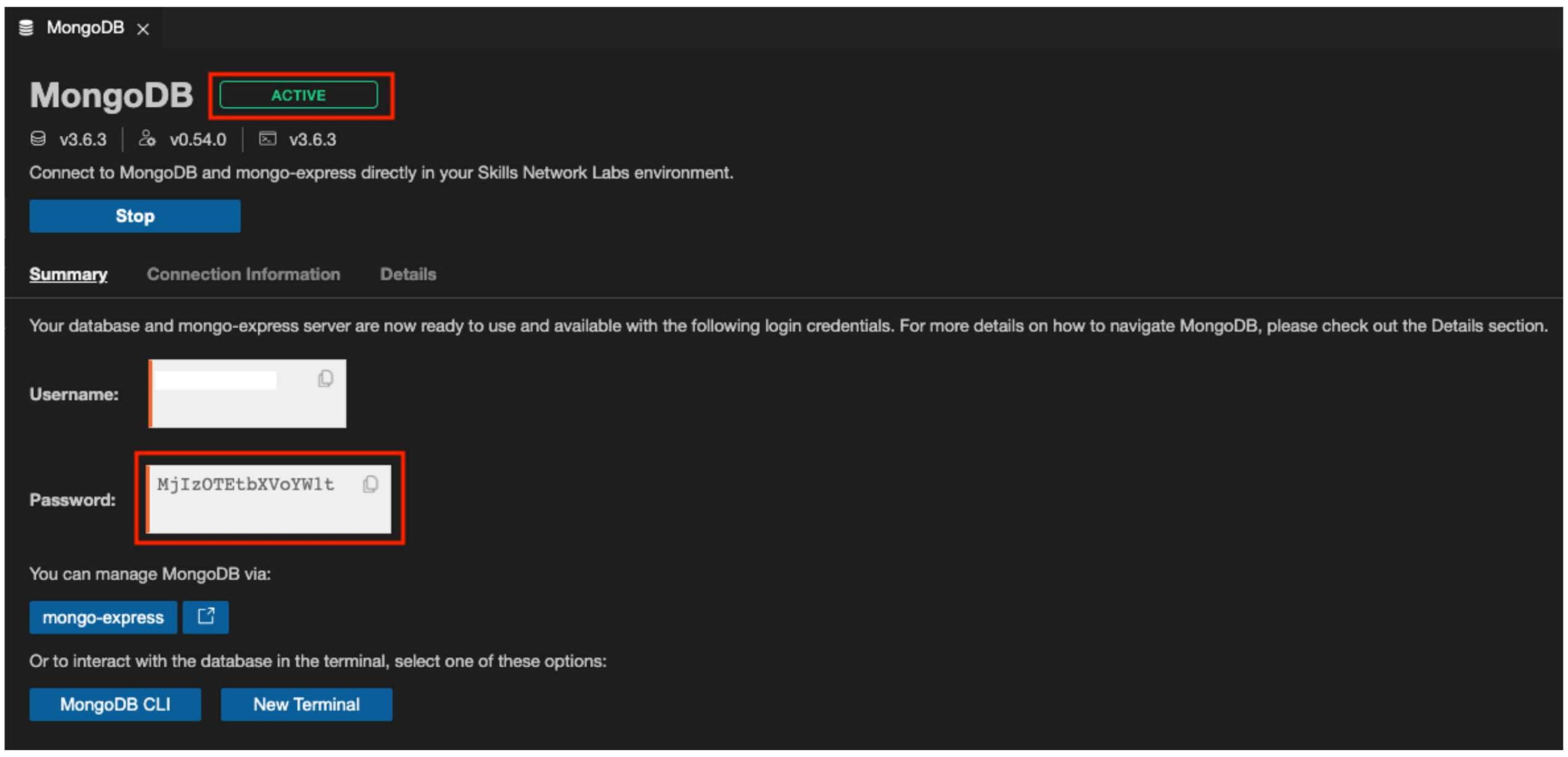
Username:

Password:

You can manage MongoDB via:

Or to interact with the database in the terminal, select one of these options:

Shortly after that, your server is ready for use. This deployment has access control enabled, and MongoDB enforces authentication. So, take note of the password, as you will need it to log in as the `root` user.


MongoDB ×

MongoDB ACTIVE

v3.6.3 | v0.54.0 | v3.6.3

Connect to MongoDB and mongo-express directly in your Skills Network Labs environment.

Stop

Summary Connection Information Details

Your database and mongo-express server are now ready to use and available with the following login credentials. For more details on how to navigate MongoDB, please check out the Details section.

Username: [redacted]

Password: MjIzOTEtbXVoYW1t

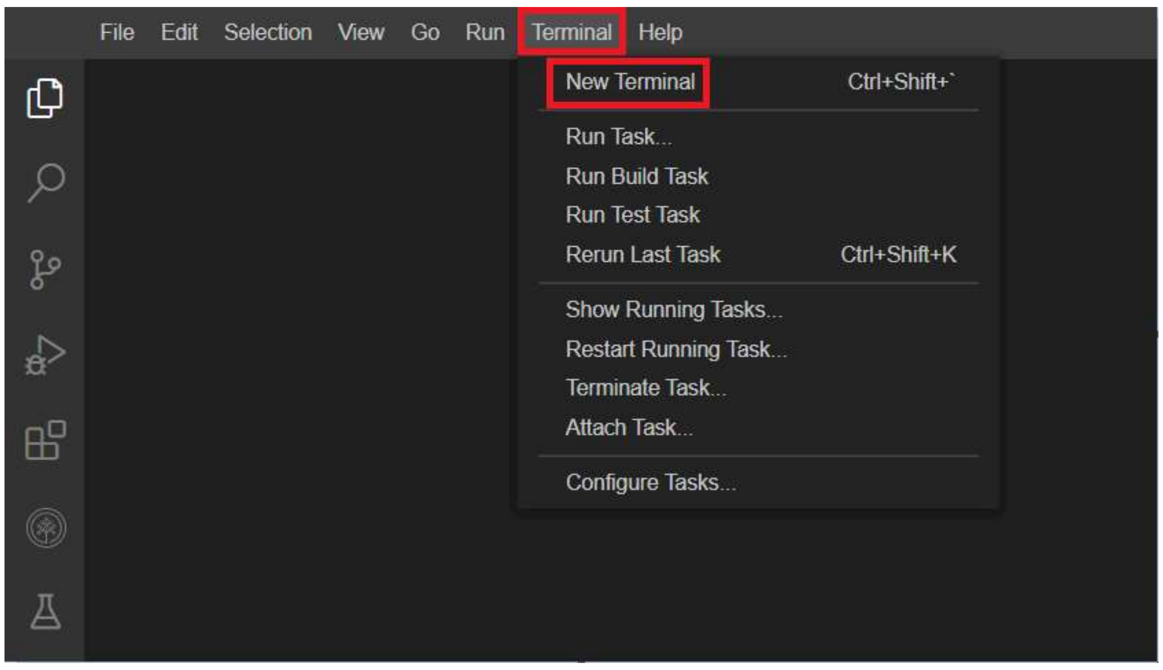
You can manage MongoDB via:

mongo-express

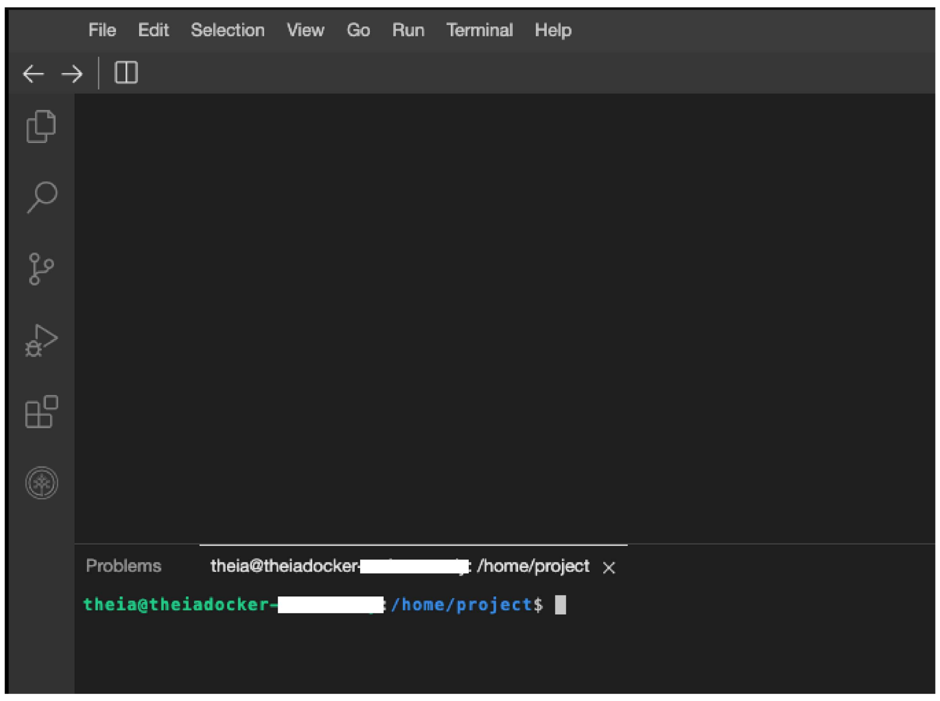
Or to interact with the database in the terminal, select one of these options:

MongoDB CLI New Terminal

You can now open the terminal and enter details yourself.



This action will open a new terminal at the end of the screen, like the following image.

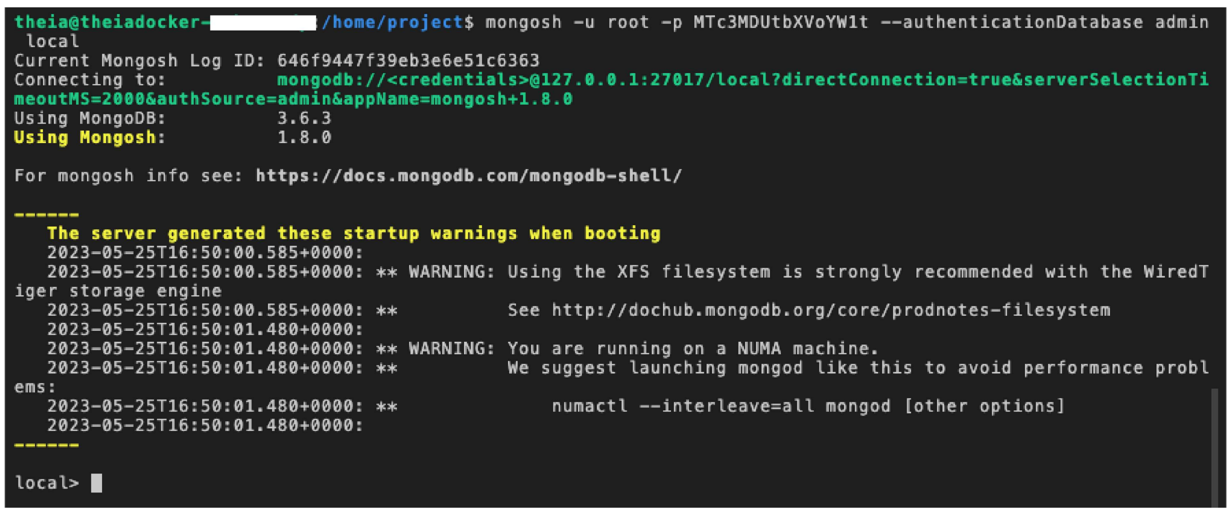


```
theia@theiadocker-[redacted]:/home/project$ 
```

Run the below command on the newly opened terminal. Copy the code by selecting copy on the right of the code block below and then paste it wherever you wish.

```
1. 1

1. mongosh -u root -p PASSWORD --authenticationDatabase admin local
```

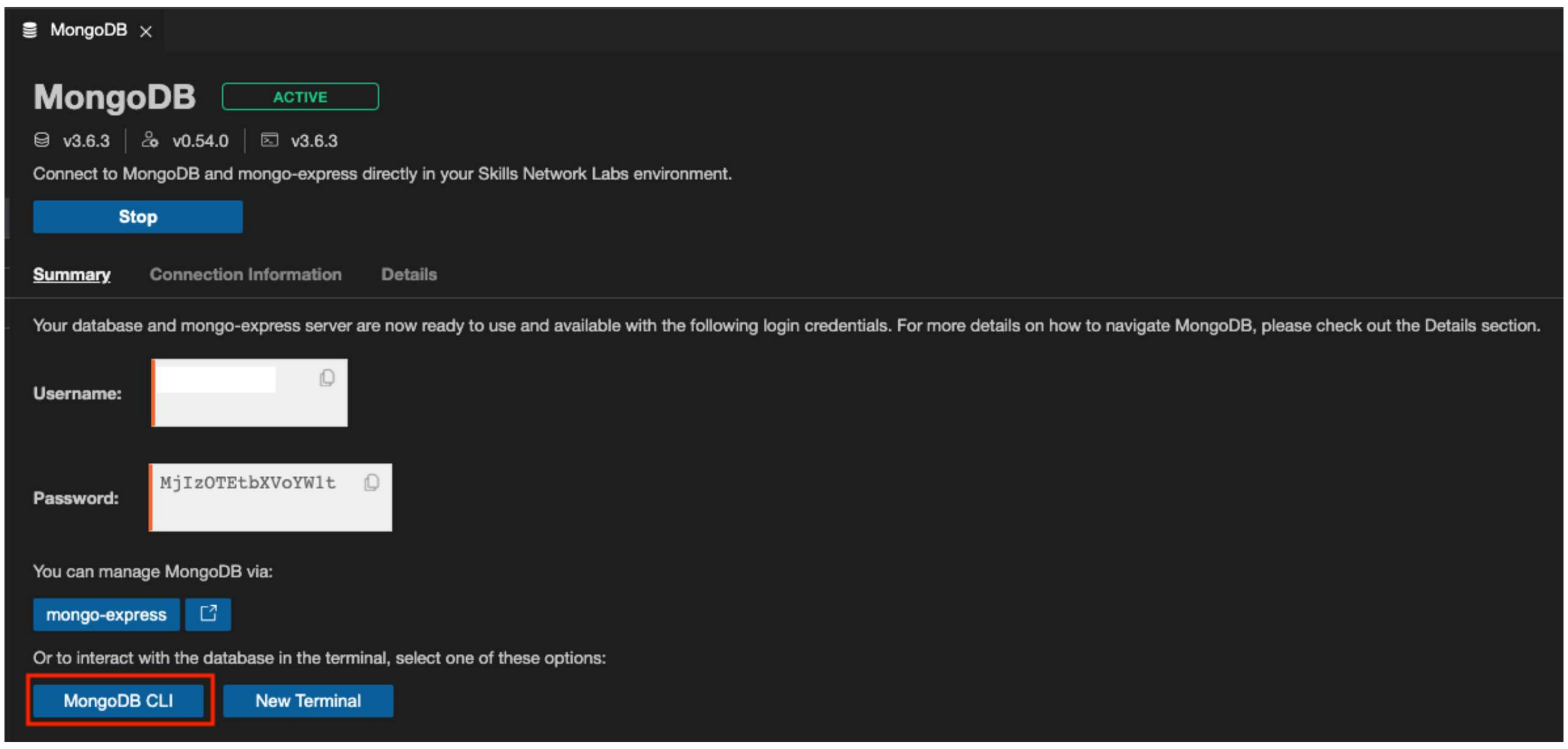
Copied! Executed!



```
theia@theiadocker-[redacted]/home/project$ mongosh -u root -p MTc3MDUtbXVoYW1t --authenticationDatabase admin
 local
Current Mongosh Log ID: 646f9447f39eb3e6e51c6363
Connecting to:          mongodb://<credentials>@127.0.0.1:27017/local?directConnection=true&serverSelectionTi
meoutMS=2000&authSource=admin&appName=mongosh+1.8.0
Using MongoDB:          3.6.3
Using Mongosh:          1.8.0

For mongosh info see: https://docs.mongodb.com/mongodb-shell/

------
   The server generated these startup warnings when booting
   2023-05-25T16:50:00.585+0000:
   2023-05-25T16:50:00.585+0000: ** WARNING: Using the XFS filesystem is strongly recommended with the WiredT
iger storage engine
   2023-05-25T16:50:00.585+0000: **          See http://dochub.mongodb.org/core/prodnotes-filesystem
   2023-05-25T16:50:01.480+0000:
   2023-05-25T16:50:01.480+0000: ** WARNING: You are running on a NUMA machine.
   2023-05-25T16:50:01.480+0000: **          We suggest launching mongod like this to avoid performance probl
ems:
   2023-05-25T16:50:01.480+0000: **              numactl --interleave=all mongod [other options]
   2023-05-25T16:50:01.480+0000:
------

local> 
```

The command contains the username and password to connect to the MongoDB server (the text after the -p option is the password). Your output would be different from the one shown above. Copy the command given to you, and keep it near you. You will need it in the next step.

Or you can click MongoDB CLI, which does that for you.


MongoDB ACTIVE

v3.6.3 | v0.54.0 | v3.6.3

Connect to MongoDB and mongo-express directly in your Skills Network Labs environment.

Your database and mongo-express server are now ready to use and available with the following login credentials. For more details on how to navigate MongoDB, please check out the Details section.

Username: [redacted]

Password: MjIzOTEtbXVoYW1t

You can manage MongoDB via:

Or to interact with the database in the terminal, select one of these options:

In MongoDB CLI (or Mongo shell), switch the context to the `training` database.

```
use training
```

Copied!

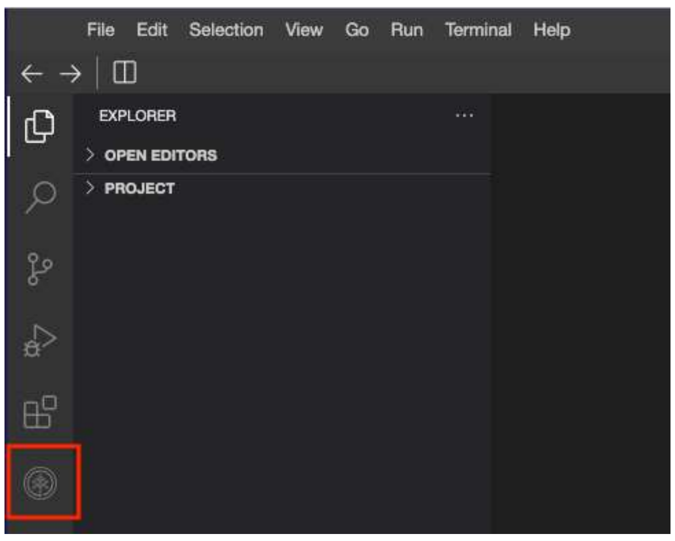
And create a collection called `bigdata`

```
db.createCollection("bigdata")
```

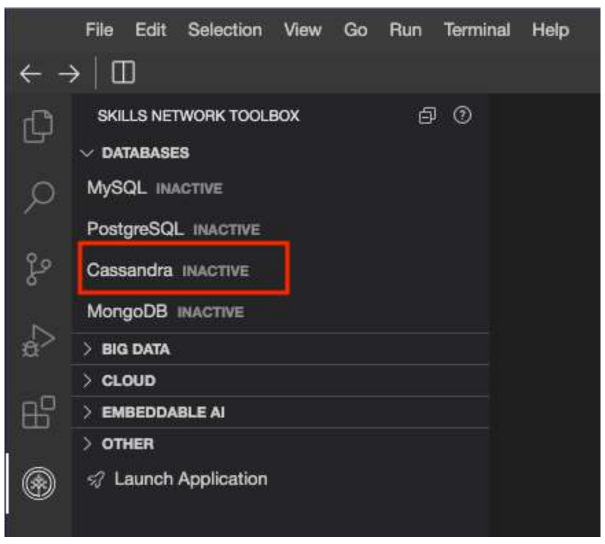
Copied!

Setup: Start Cassandra

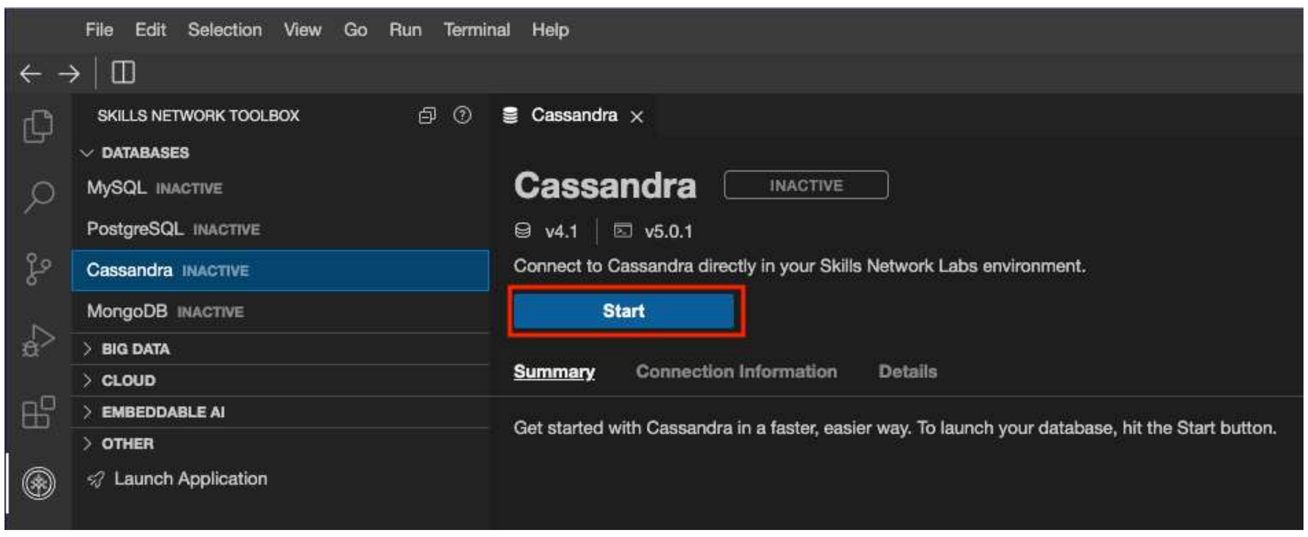
Navigate to Skills Network Toolbox.



You will notice Cassandra is listed there but inactive. Which means the database is not available for use.



You will see more details once you click on it, and then select **Start**.

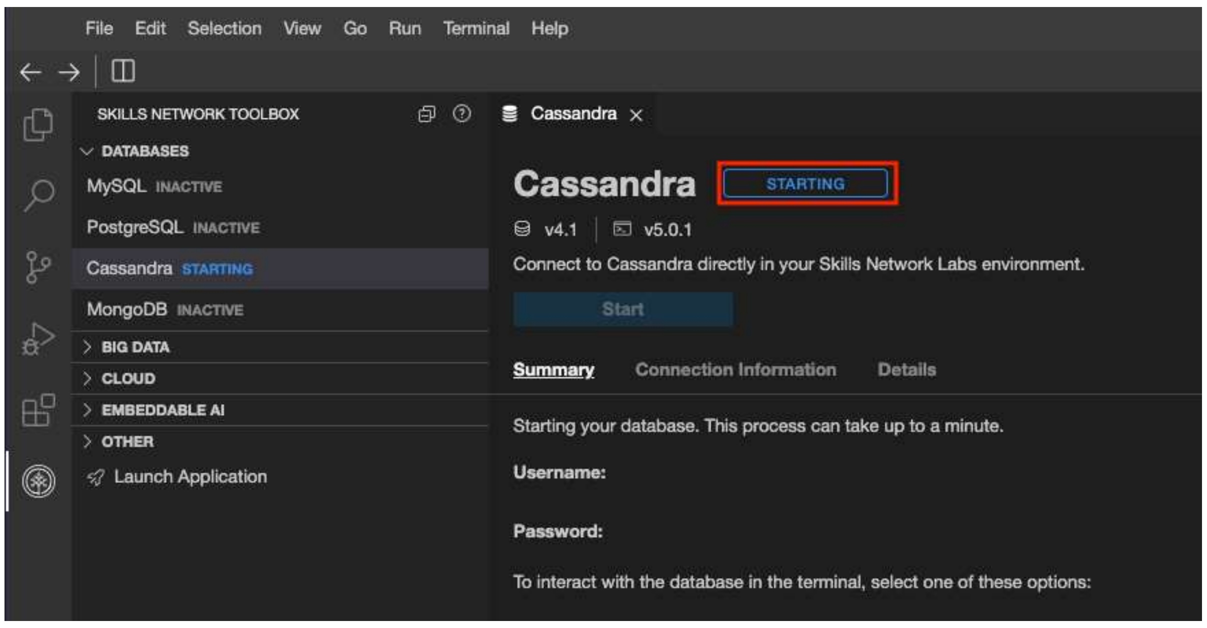

Cassandra INACTIVE

v4.1 | v5.0.1

Connect to Cassandra directly in your Skills Network Labs environment.

Get started with Cassandra in a faster, easier way. To launch your database, hit the Start button.

Selecting **Start** will run a background process to configure and start your Cassandra server.



Connect to Cassandra directly in your Skills Network Labs environment.

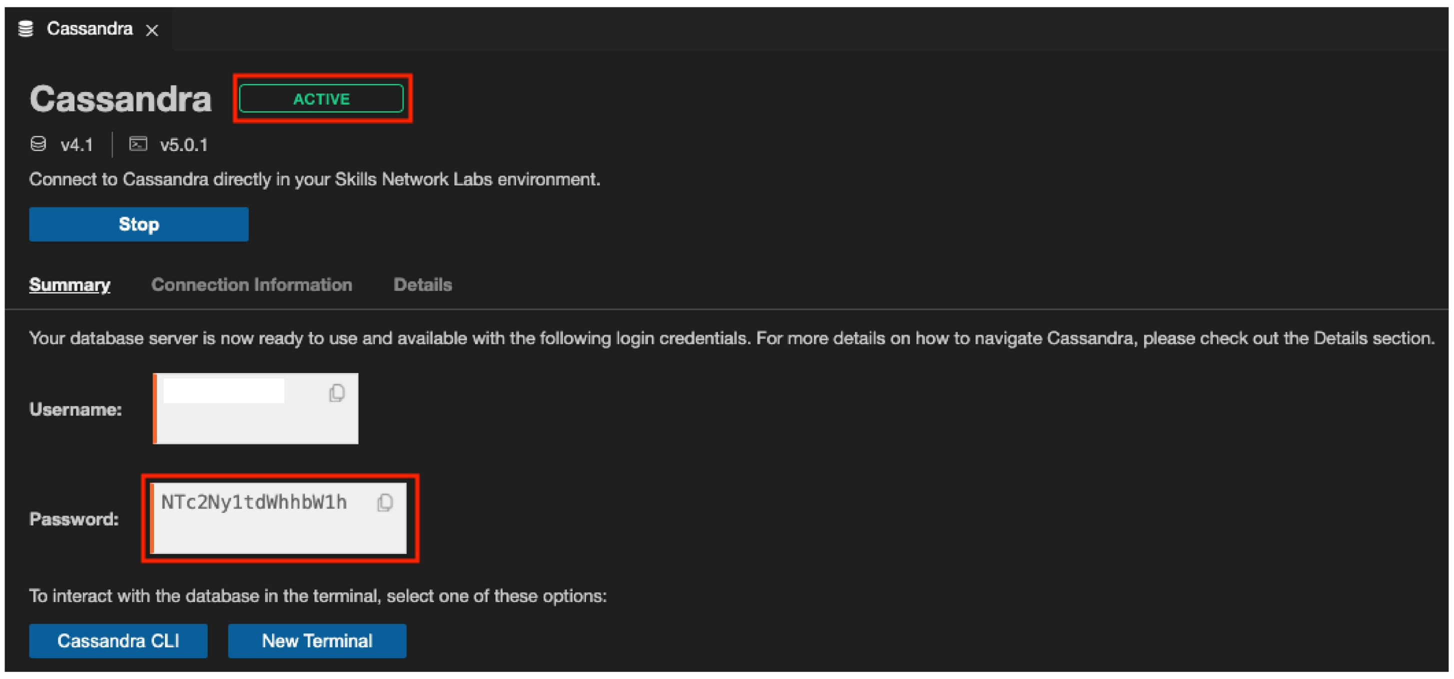
Starting your database. This process can take up to a minute.

Username:

Password:

To interact with the database in the terminal, select one of these options:

Shortly after that, your server is ready for use. This deployment has access control enabled, and Cassandra enforces authentication. So, take note of the password, as you will need it to log in as a `cassandra` user.



Connect to Cassandra directly in your Skills Network Labs environment.

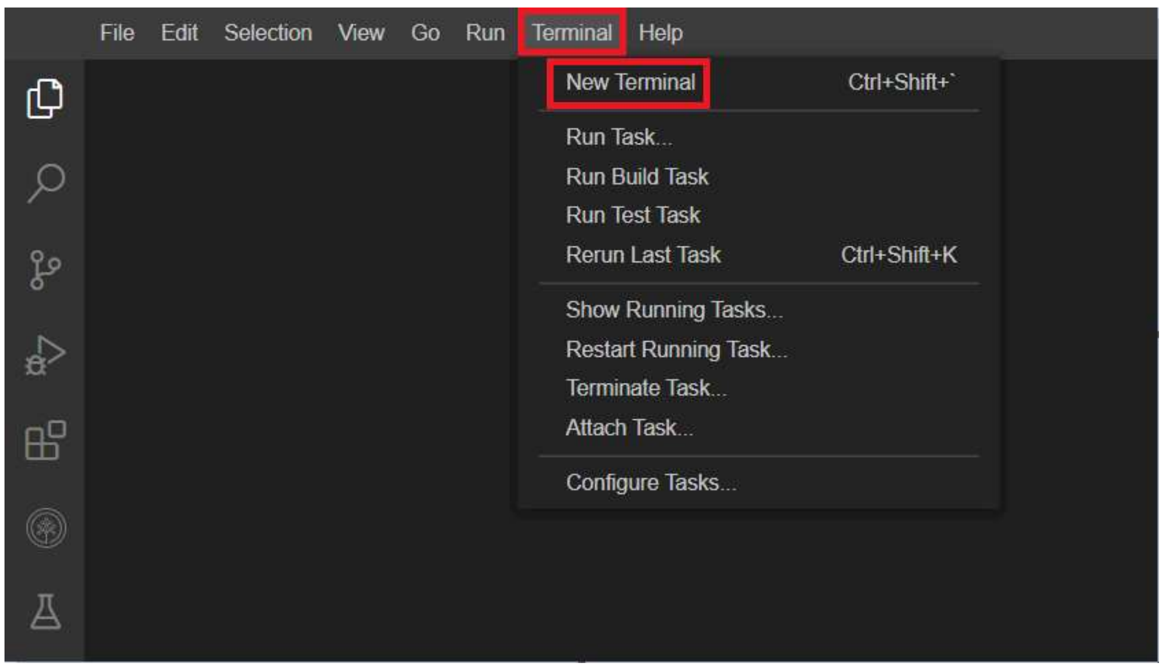
Your database server is now ready to use and available with the following login credentials. For more details on how to navigate Cassandra, please check out the Details section.

Username: [redacted]

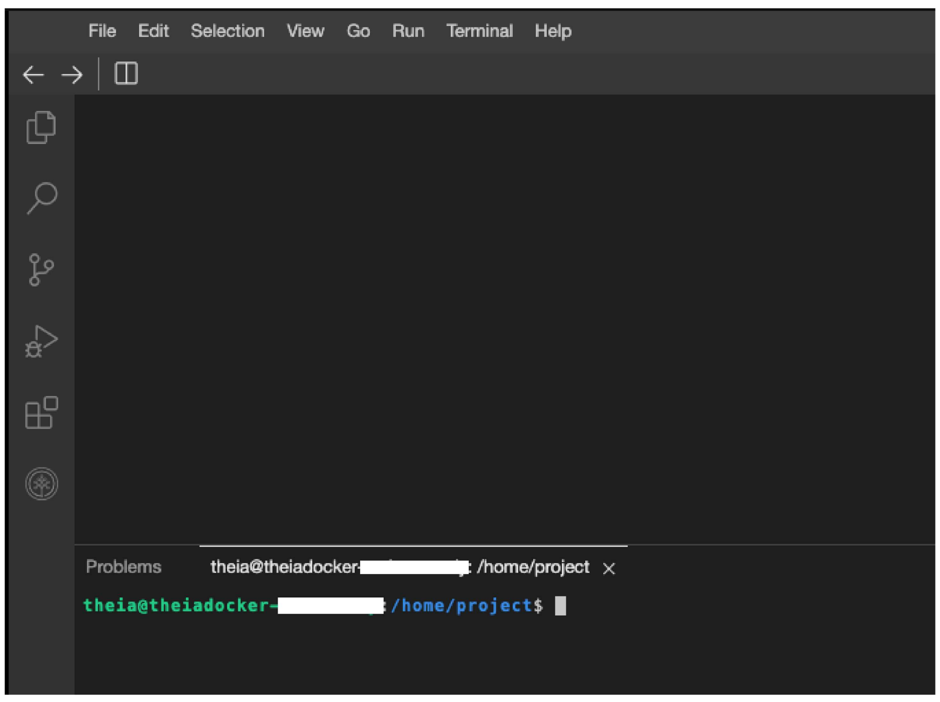
Password: NTc2Ny1tdWhhbW1h

To interact with the database in the terminal, select one of these options:

You can now open the terminal and enter details yourself.



This action will open a new terminal at the bottom of the screen, as in the image below.

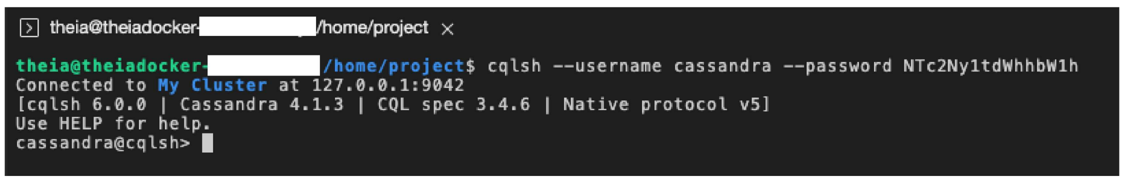

File Edit Selection View Go Run Terminal Help
Problems
theia@theiadocker[redacted]: /home/project

```
theia@theiadocker-[redacted]:/home/project$
```

Run the following command on the newly opened terminal. Copy the code by selecting copy on the right of the code block below and then paste it wherever you wish.

```
cqlsh --username cassandra --password PASSWORD
```

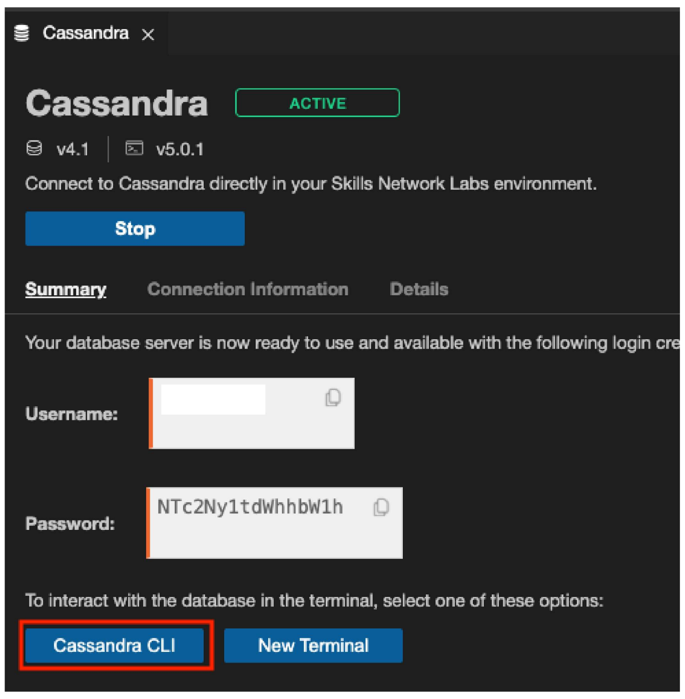
Copied! Executed!



```
theia@theiadocker-[redacted]/home/project ×

theia@theiadocker-[redacted]/home/project$ cqlsh --username cassandra --password NTc2Ny1tdWhhbW1h
Connected to My Cluster at 127.0.0.1:9042
[cqlsh 6.0.0 | Cassandra 4.1.3 | CQL spec 3.4.6 | Native protocol v5]
Use HELP for help.
cassandra@cqlsh>
```

The command contains the username and password to connect to the Cassandra server. Your output could be different from the one shown above. Copy the command given to you, and keep it handy. You will need it in the next step.

Or you can simply click on Cassandra CLI, which does that for you.



Cassandra ×

Cassandra ACTIVE

v4.1 | v5.0.1

Connect to Cassandra directly in your Skills Network Labs environment.

Stop

Summary Connection Information Details

Your database server is now ready to use and available with the following login cre

Username: [redacted]

Password: NTc2Ny1tdWhhbW1h

To interact with the database in the terminal, select one of these options:

Cassandra CLI New Terminal

Exercise 1: Create sample data

Create diamonds.json

First, You will create a `diamonds.json` file with the following content to import in later exercises.

Open **diamonds.json** in IDE

```
{ "carat": 0.31, "cut": "Ideal", "color": "J", "clarity": "SI2", "depth": 62.2, "table": 54, "price": 339 }
{ "carat": 0.2, "cut": "Premium", "color": "E", "clarity": "SI2", "depth": 60.2, "table": 62, "price": 351 }
{ "carat": 0.32, "cut": "Premium", "color": "E", "clarity": "I1", "depth": 60.9, "table": 58, "price": 342 }
{ "carat": 0.3, "cut": "Good", "color": "J", "clarity": "SI1", "depth": 63.4, "table": 54, "price": 349 }
{ "carat": 0.3, "cut": "Good", "color": "J", "clarity": "SI1", "depth": 63.8, "table": 56, "price": 347 }
{ "carat": 0.3, "cut": "Very Good", "color": "J", "clarity": "SI1", "depth": 62.7, "table": 59, "price": 349 }
{ "carat": 0.3, "cut": "Good", "color": "I", "clarity": "SI2", "depth": 63.3, "table": 56, "price": 343 }
{ "carat": 0.23, "cut": "Very Good", "color": "E", "clarity": "VS2", "depth": 63.8, "table": 55, "price": 339 }
{ "carat": 0.23, "cut": "Very Good", "color": "H", "clarity": "VS1", "depth": 61, "table": 57, "price": 323 }
{ "carat": 0.31, "cut": "Very Good", "color": "J", "clarity": "SI1", "depth": 59.4, "table": 62, "price": 346 }
```

Copied!

Exercise 2: MongoDB import/export data

JSON

Import data in `diamonds.json` into a collection named `diamonds` and a database named `training`, replacing the password (the characters following **-p**: `MzA2NDAtcnNhbm5h`) with your password.

```
mongoimport -u root -p MzA2NDAtcnNhbm5h --authenticationDatabase admin --db training --collection diamonds --file /home/project/diamonds.json
```

Copied! Executed!

Log in to mongoDB and checkfor the creation of the `training` database and the `diamonds` collection and the collection has the imported documents.

Export data into json format.

Export data from the `training` database, `diamonds` collection into a file named `mongodb_exported_data.json`

```
mongoexport -u root -p MzA2NDAtcnNhbm5h --authenticationDatabase admin --db training --collection diamonds --out /home/project/mongodb_exported_data.json
```

Copied! Executed!

Verify the output by opening the file.

Open **mongodb_exported_data.json** in IDE

CSV

Export data into CSV format.

Export the fields `_id,clarity,cut,price` from the `training` database, `diamonds` collection into a file named `mongodb_exported_data.csv`

```
mongoexport -u root -p MzA2NDAtcnNhbm5h --authenticationDatabase admin --db training --collection diamonds --out /home/project/mongodb_exported_data.csv --type=csv --fields _id,clarity,cut,price
```

Copied! Executed!

Exercise 3: Cassandra import/export data

Import CSV into Cassandra

Import `diamonds.csv` into the `training` keyspace and the `diamonds` table/column family.

Step 1: Log in to cqlsh.

Step 2: Create a keyspace named `training`.

▼ Click here for hint

CREATE KEYSPACE *name*
WITH *replication details*

▼ Click here for solution

```
CREATE KEYSPACE training
WITH replication = {'class':'SimpleStrategy', 'replication_factor' : 3};
```

Copied!

Step 3: In the `training` keyspace, create a table named `diamonds` with the below schema.

- id - primary key (use 'id' as the primary key; Cassandra does not allow you to create a column starting with underscore(_))
- clarity - text
- cut - text
- price - integer

▼ Click here for hint

```
use KEYSPACE;
CREATE TABLE _table name_(
    column_name type
)
```

Copied!

▼ Click here for solution

```
use training;
CREATE TABLE diamonds(
    id int PRIMARY KEY,
    clarity text,
    cut text,
    price int
);
```

Copied!

Step 4: Run the below commands on cqlsh.

```
use training;
COPY training.diamonds(id,clarity,cut,price) FROM '/home/project/mongodb_exported_data.csv' WITH DELIMITER=',' AND HEADER=TRUE;
```

Copied!

Export the `diamonds` table into a CSV file.

```
COPY diamonds TO '/home/project/cassandra-diamonds.csv';
```

Copied!

Verify the output by opening the file

Open **cassandra-diamonds.csv** in IDE

Exercise 4: Creating an index on Cassandra

The following command creates a `price_index` for the `price` column in the `diamonds` table.

```
create index price_index on diamonds(price);
```

Copied!

Summary

In this lab, you have practiced working on importing and exporting data from MongoDB and Cassandra. You also created an index in Cassandra using cqlsh.

Author(s)

- Muhammad Yahya