

# MongoDB

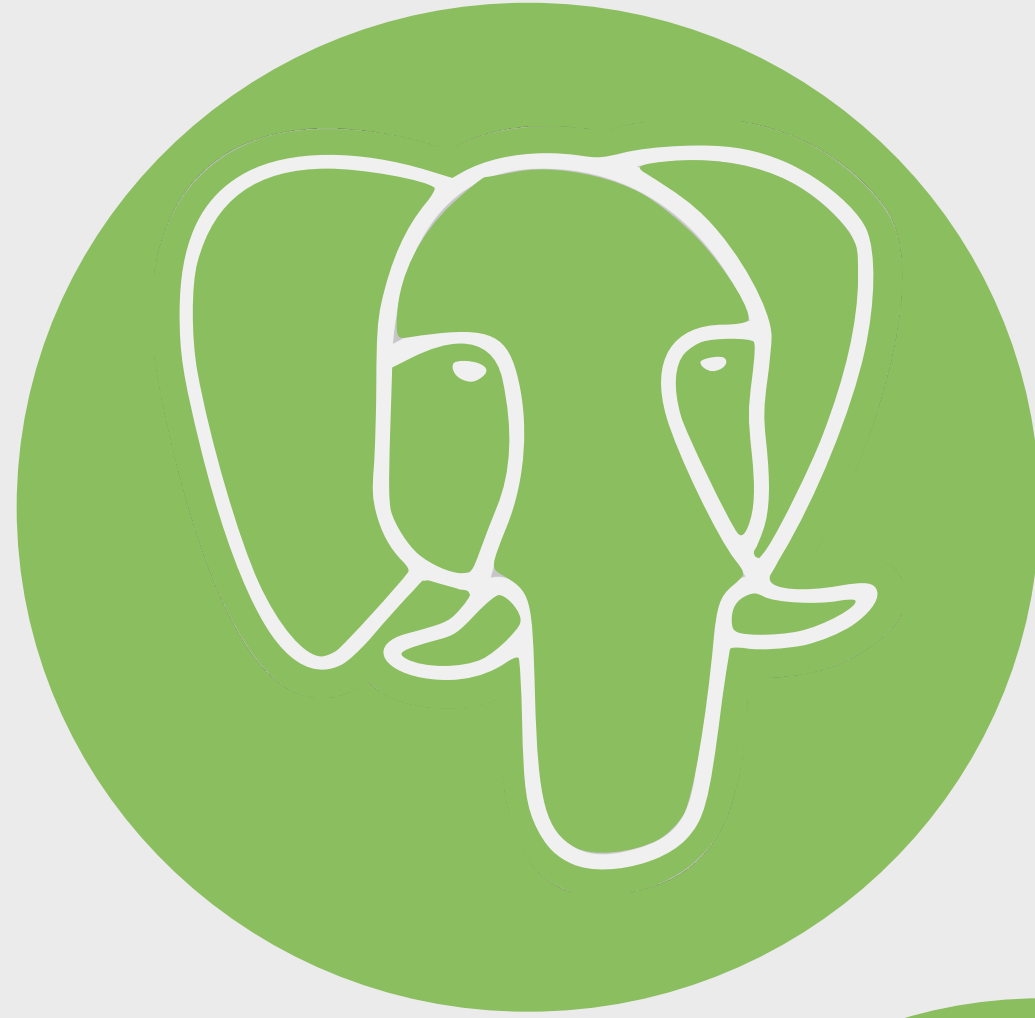


# Types of DBs

- ▶ Relational database
- ▶ NoSQL database
- ▶ Centralized database
- ▶ Cloud database
- ▶ Commercial database
- ▶ Distributed database
- ▶ ...



# Relational DBs



**TABLES**

**JOINS**

**ROWS**

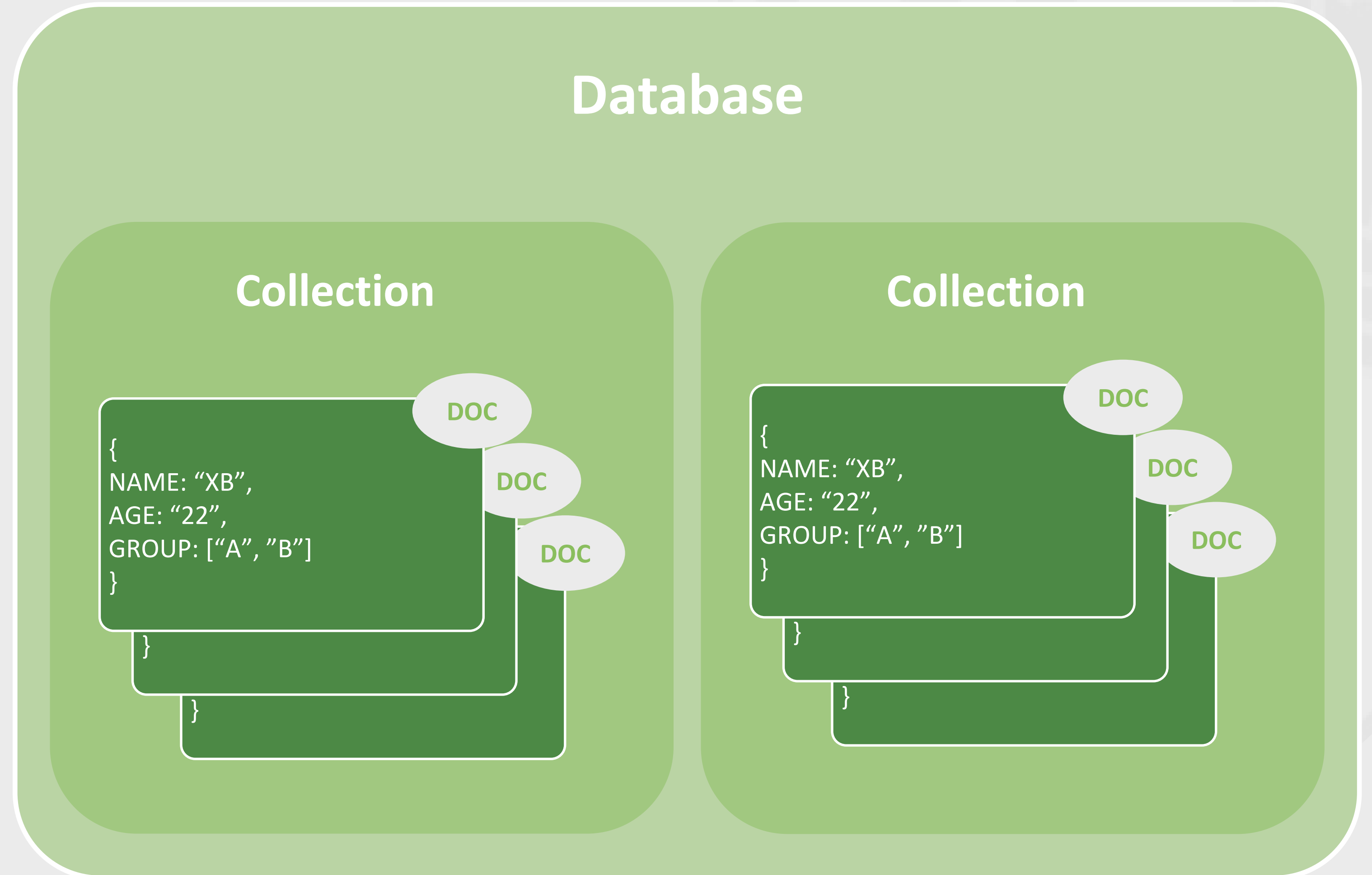
**FOREIGN KEYS**

# What is MongoDB?

- ▶ “MongoDB is a **document database** with the scalability and flexibility that you want with the querying and indexing that you need.”
- ▶ Features:
  - ▶ Built for speed
  - ▶ Rich Document based queries for **easy readability**
  - ▶ Full index support for **High Performance**
  - ▶ Replication and Failover for **High Availability**
  - ▶ Auto Sharing for **Easy Scalability**
  - ▶ Map/Reduce for **Aggregation**
- ▶ **JSON-style** data store with dynamic schema

# Architecture of MongoDB

- ▶ You can think of
  - ▶ Database as Database
  - ▶ Collections as Tables
  - ▶ Documents as Record/Row



# How to install MongoDB?




# How to install MongoDB?

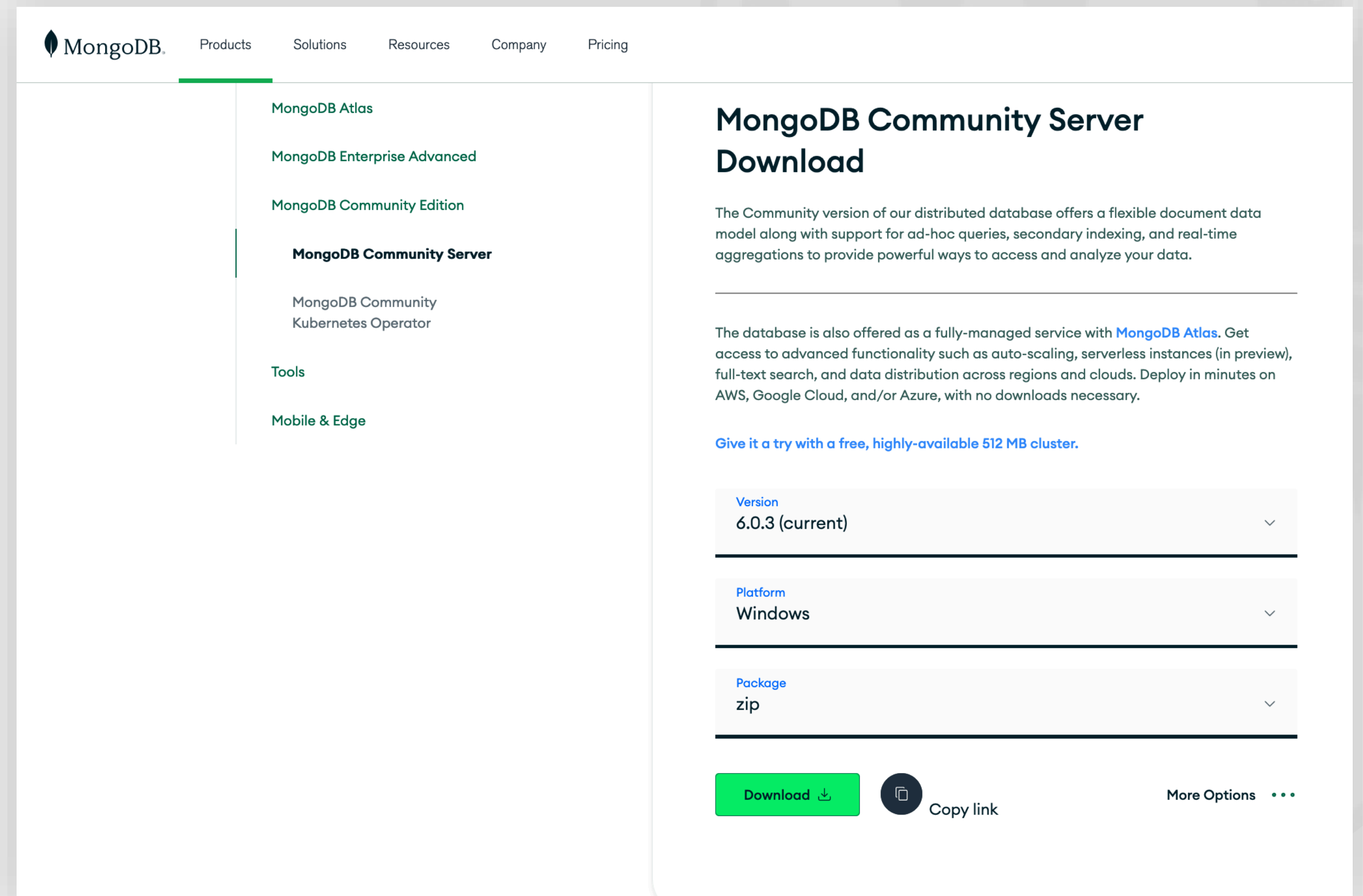
- ▶ Official MongoDB website
- ▶ Docker



# How to install MongoDB?



1. Go to [MongoDB Community Server Download](#)
2. Specify Version, Platform and Package format
3. Click 
4. Wait for the download to finish



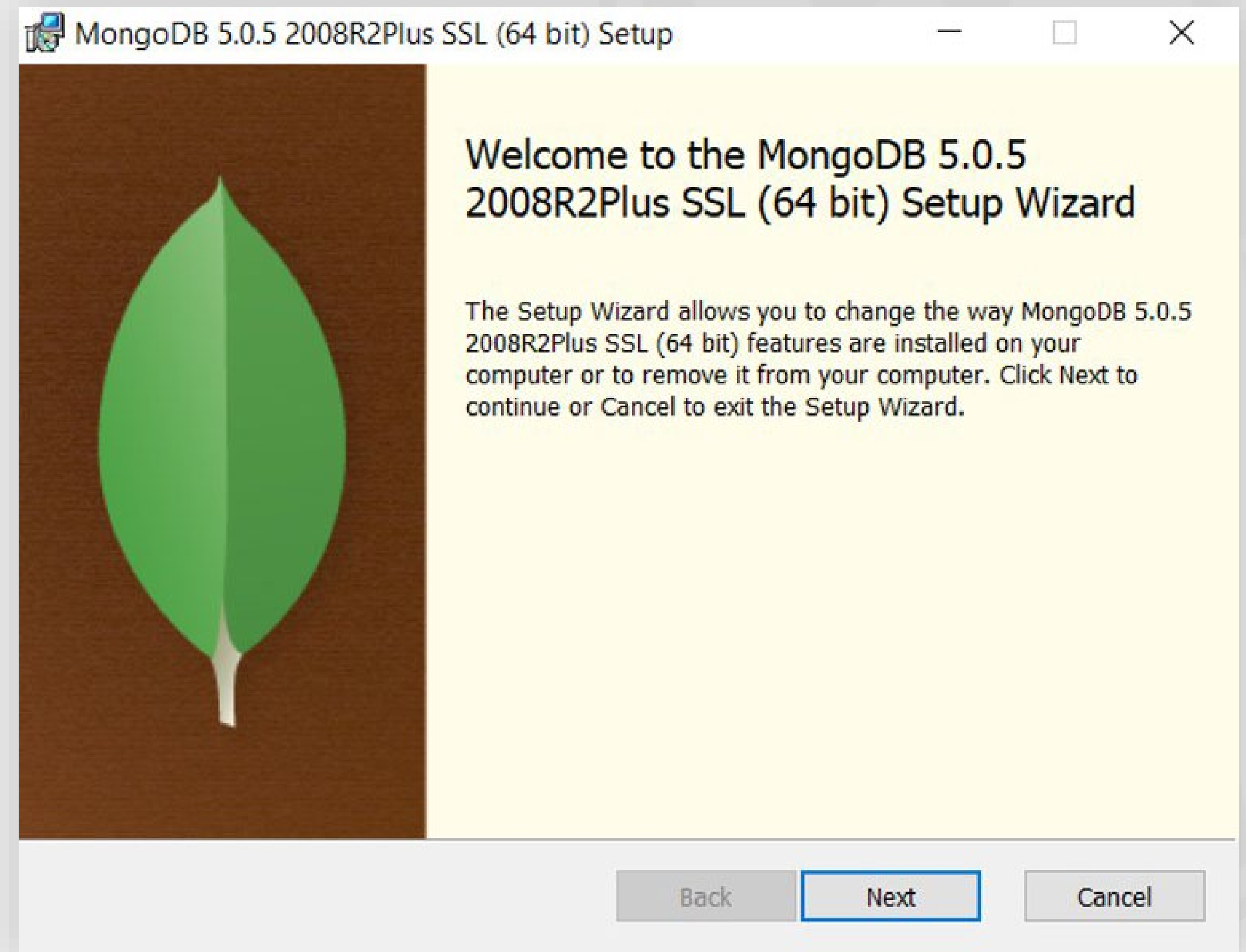
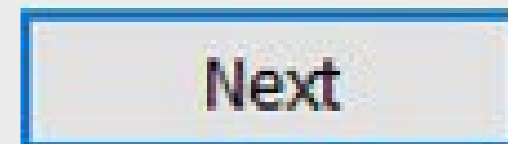


# How to install MongoDB?



5. Run the **Installation Wizard**

6. Click



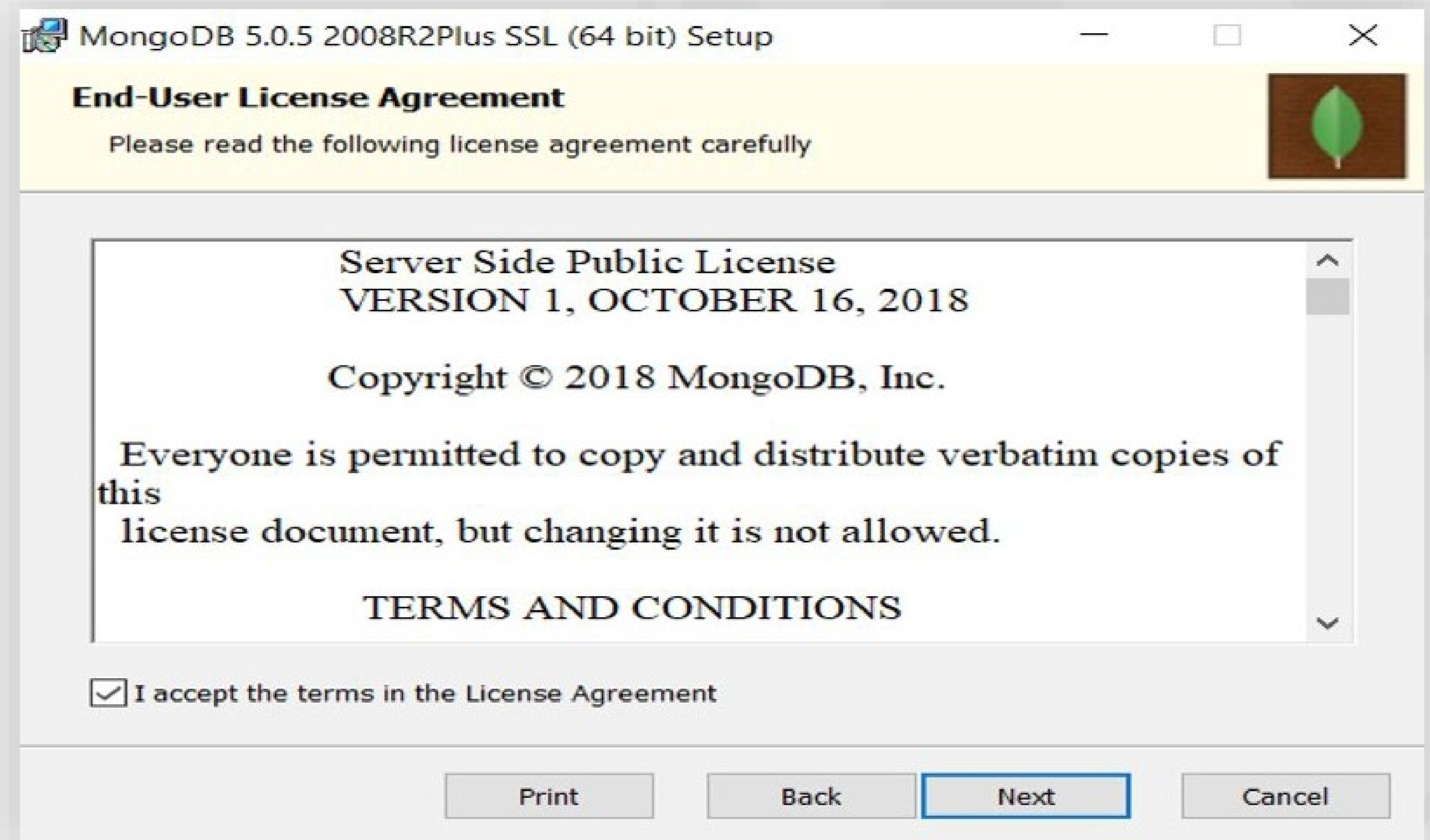
# How to install MongoDB?



5. Run the **Installation Wizard**

6. Click 

7. Accept the terms and click 



# How to install MongoDB?

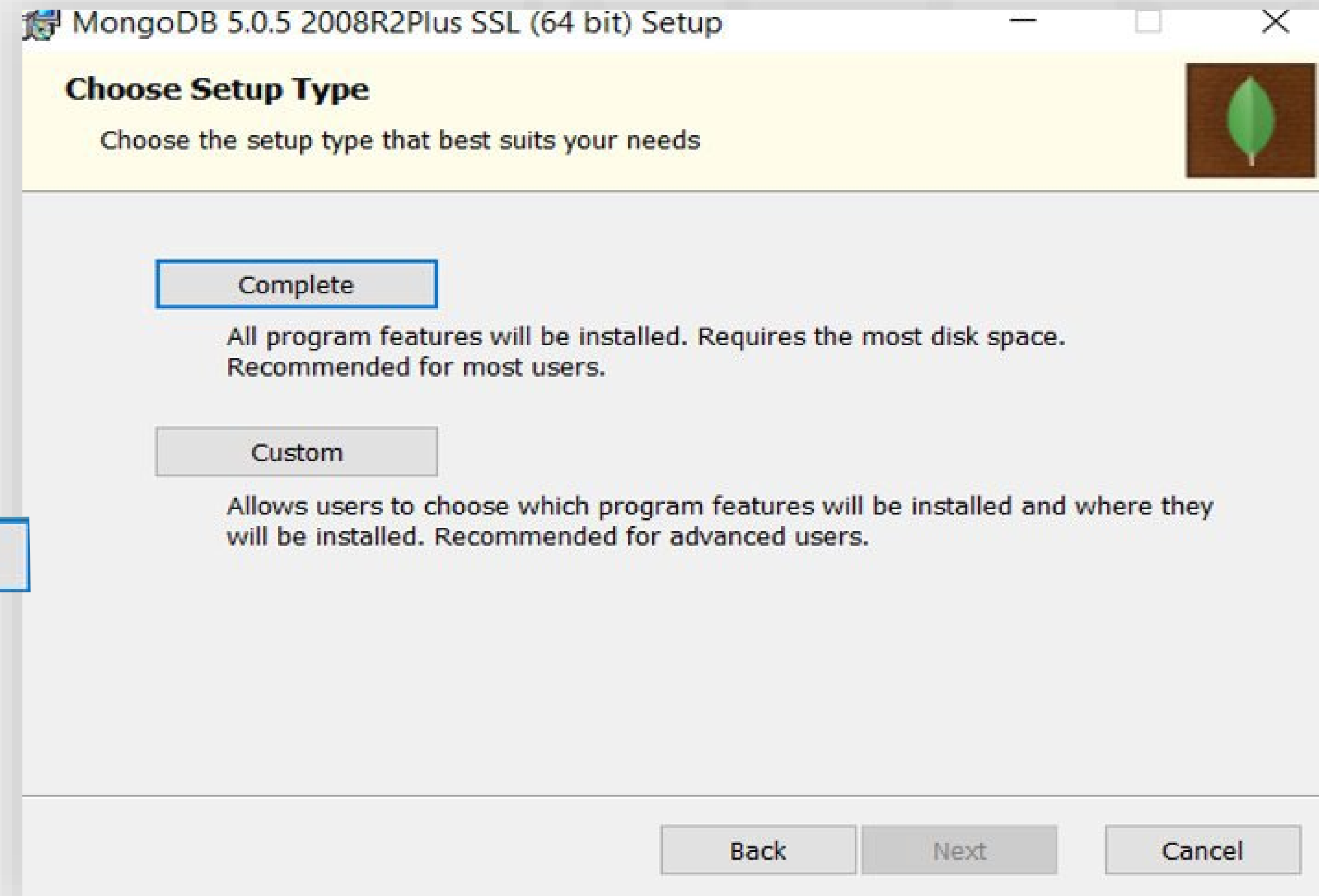


5. Run the **Installation Wizard**

6. Click **Next**

7. Accept the terms and click **Next**

8. Choose **Complete** Setup Type and click **Next**



# How to install MongoDB?



5. Run the **Installation Wizard**

6. Click **Next**

7. Accept the terms and click **Next**

8. Choose **Complete** Setup Type and click **Next**

9. Modify fields to your preferences and click **Next**

MongoDB 5.0.5 2008R2Plus SSL (64 bit) Service Customization

### Service Configuration

Specify optional settings to configure MongoDB as a service.

☒ Install MongoDB as a Service

☒ Run service as Network Service user

☐ Run service as a local or domain user:

Account Domain: .

Account Name: MongoDB

Account Password:

Service Name: MongoDB

Data Directory: C:\Program Files\MongoDB\Server\5.0\data\

Log Directory: C:\Program Files\MongoDB\Server\5.0\log\

< Back Next > Cancel

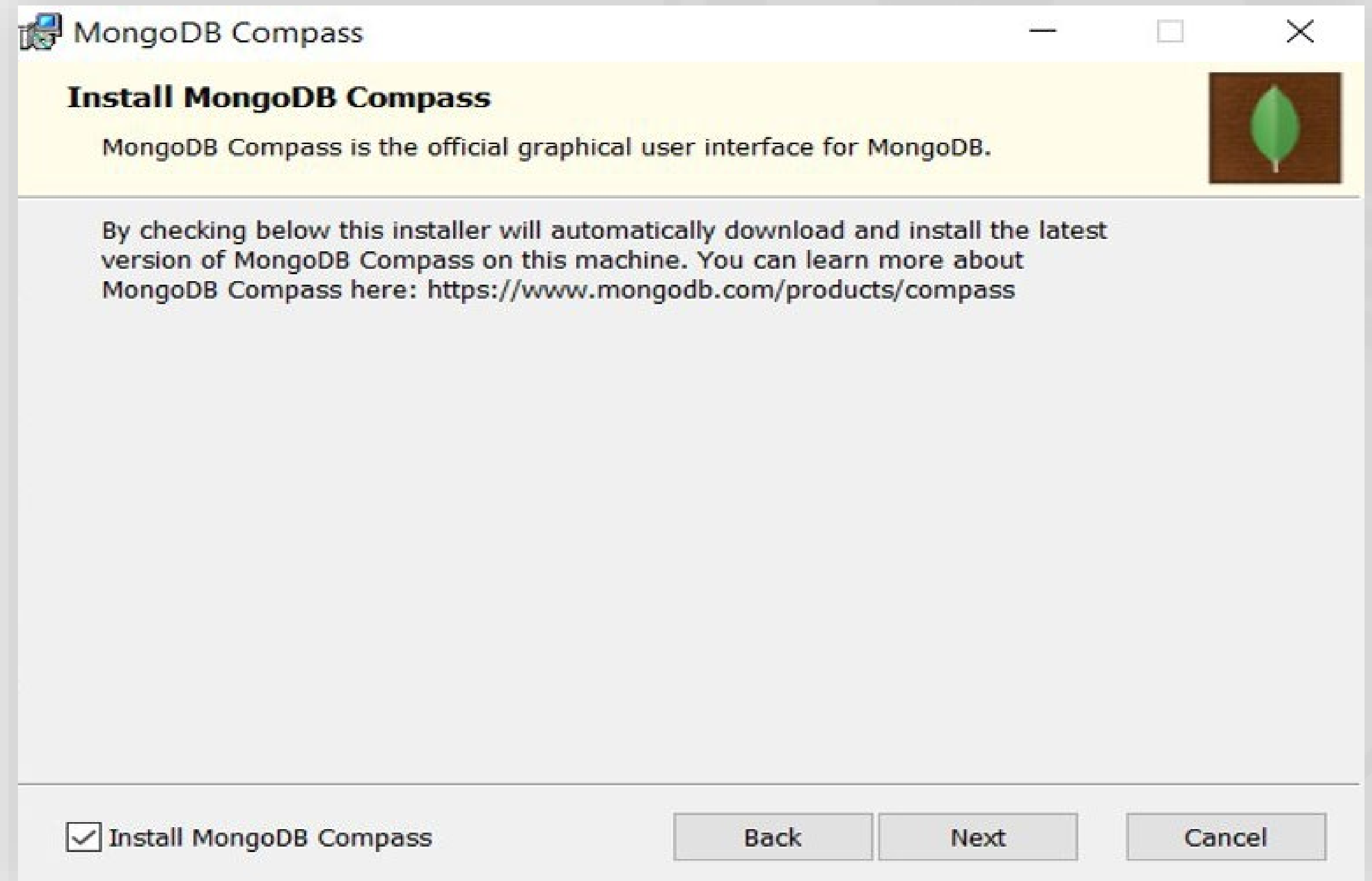
# How to install MongoDB?



## 10. Install MongoDB Compass for GUI

administration and click

Next



# How to install MongoDB?



10. Install MongoDB Compass for GUI

administration and click

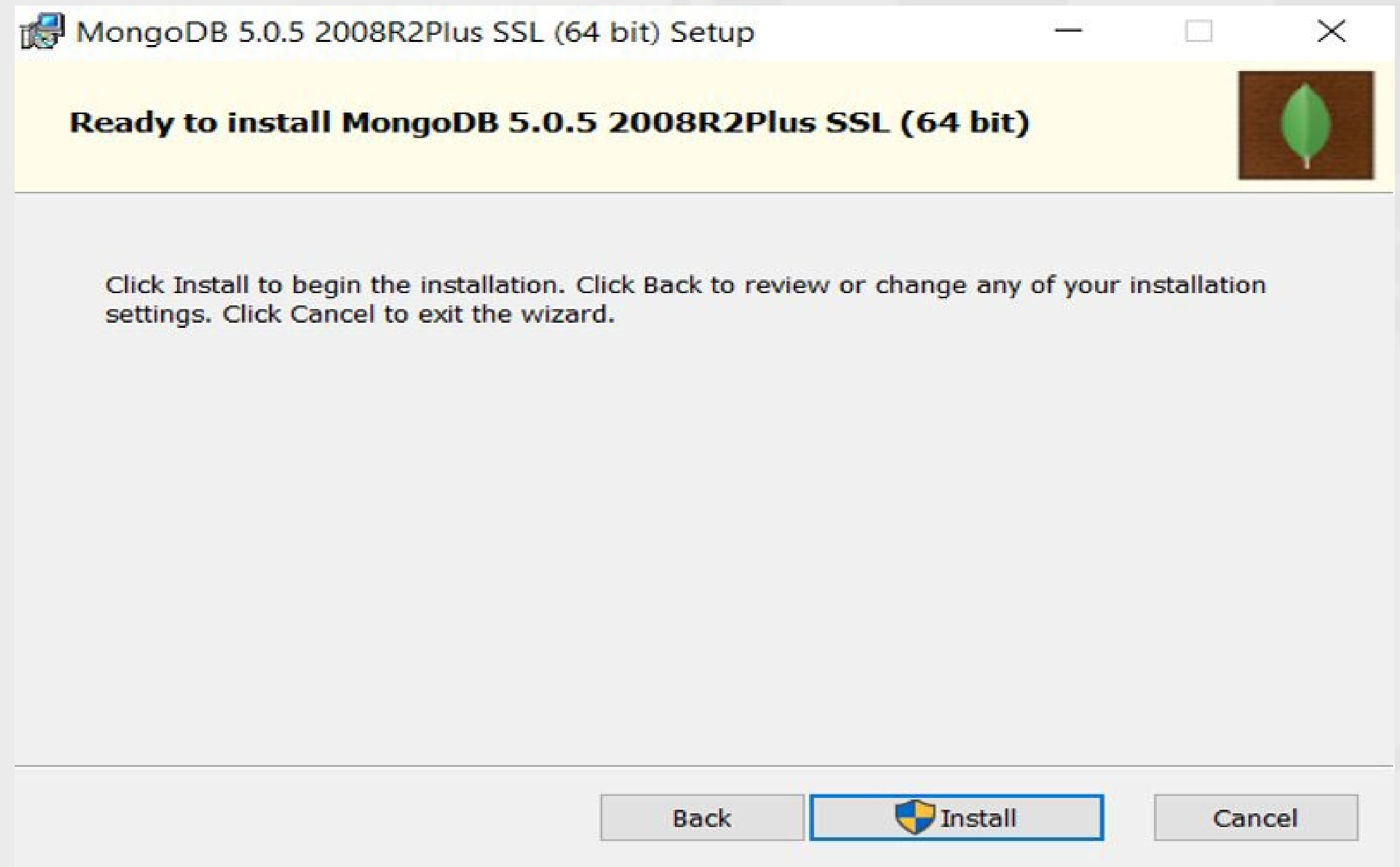
Next

11. Click

Install

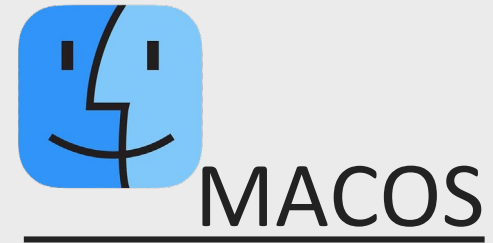
and then

Finish





# How to install MongoDB?



1. Go to the [Installation Guide Documents](#) link
2. Go to your Platform Installation Guide
3. Follow the steps for installing **XCode Command-Line Tools** and **Homebrew**

The screenshot shows the MongoDB documentation website. The top navigation bar includes links for Products, Solutions, Resources, Company, and Pricing. A search icon is on the right. The left sidebar shows a navigation menu with categories like Introduction, Installation, MongoDB Enterprise, and MongoDB Shell. The 'Installation' section is expanded, showing options for Linux, macOS, and Windows. The 'Install MongoDB Community Edition' link is highlighted. The main content area shows the 'Install MongoDB Community Edition' page, which provides instructions for installing the Community Edition on Linux, macOS, and Windows. The 'Install on macOS' section is highlighted with a green border and contains the text: 'Install MongoDB Community Edition on macOS systems from MongoDB archives.' Navigation links at the bottom of the page include '← Install MongoDB' and 'Install MongoDB Community Edition on Linux →'. The URL at the bottom of the page is 'https://www.mongodb.com/docs/mongodb-shell/'.

# How to install MongoDB?

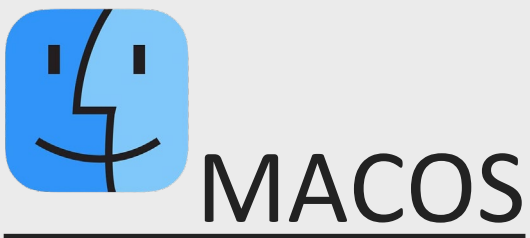


4. Open the terminal and run the following commands:

- brew tap mongodb/brew
- brew install mongodb-community@6.0
- brew services start mongodb-community
- ==> Successfully started `mongodb-community` (label: homebrew.mxcl.mongodb-community)
- brew services stop mongodb-community #To stop server if needed
- ==> Successfully stopped `mongodb-community` (label: homebrew.mxcl.mongodb-community)
- brew services List #To check if MongoDB-community service is running



# How to install MongoDB?



5. Installation creates the following files and directories at the location specified below, depending on your Apple hardware:

	Intel Processor	M1 Processor
Configuration File	/usr/local/etc/mongod.conf	/opt/homebrew/etc/mongod.conf
log directory	/usr/local/var/log/mongodb	/opt/homebrew/var/log/mongodb
data directory	/usr/local/var/mongodb	/opt/homebrew/var/mongodb

# How to install MongoDB?



6. Run the Mongo daemon in one of your terminal windows to start the Mongo server using:

- mongosh

```
$ mongosh
Current Mongosh Log ID: 63bb133c57a2492bbc7e5c57
Connecting to: mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+1.6.1
Using MongoDB: 6.0.3
Using Mongosh: 1.6.1

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

To help improve our products, anonymous usage data is collected and sent to MongoDB periodically (https://www.mongodb.com/legal/privacy-policy).
You can opt-out by running the disableTelemetry() command.

-----
The server generated these startup warnings when booting
2023-01-08T14:00:58.976-05:00: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
-----

Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

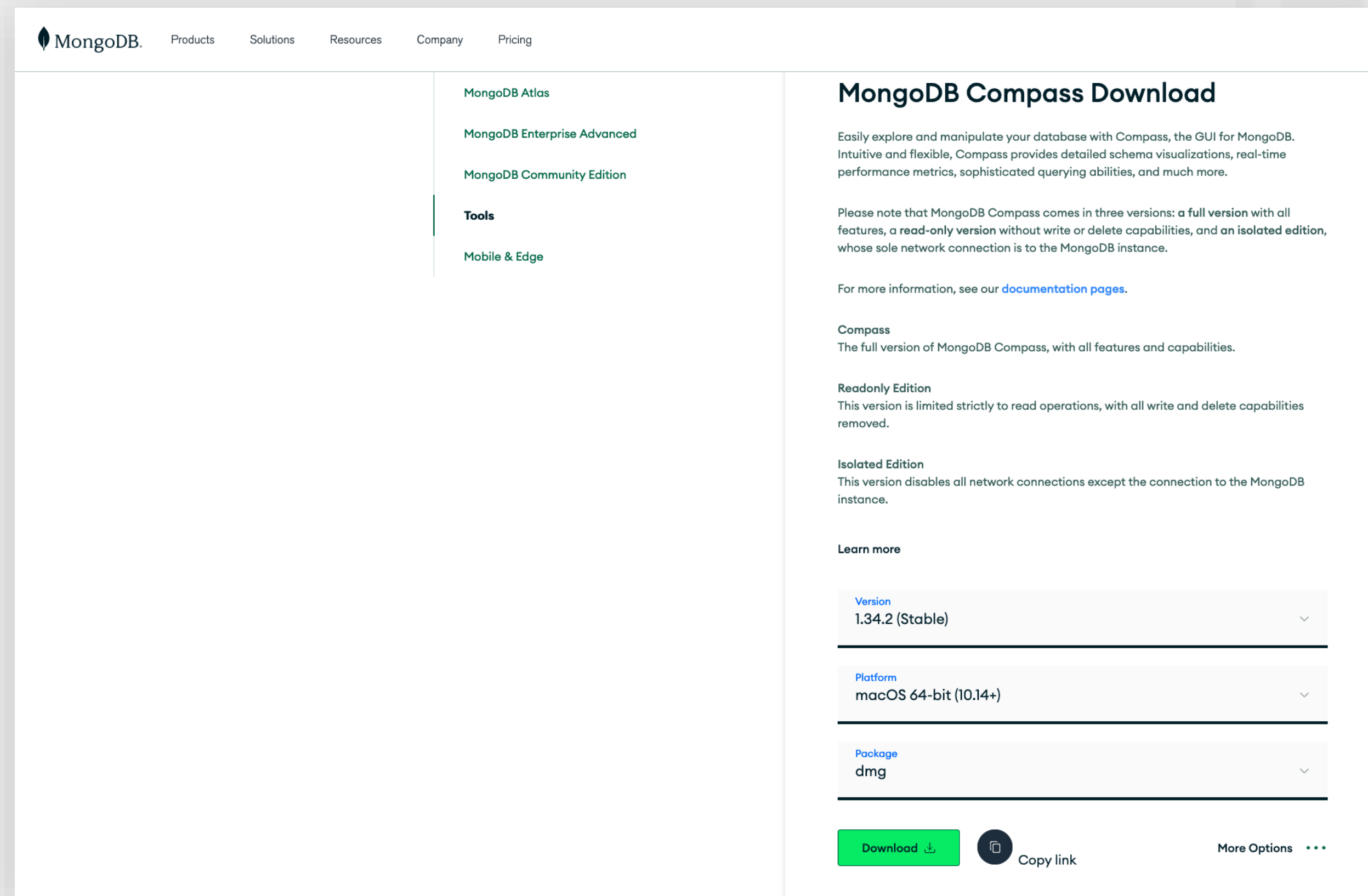
To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
-----

test> show dbs
admin    40.00 KiB
config  12.00 KiB
local   72.00 KiB
test> 
```

# How to install MongoDB?



6. Go to [Mongo Compass download page](https://www.mongodb.com/try/download/compass) and download GUI for your macOS processor



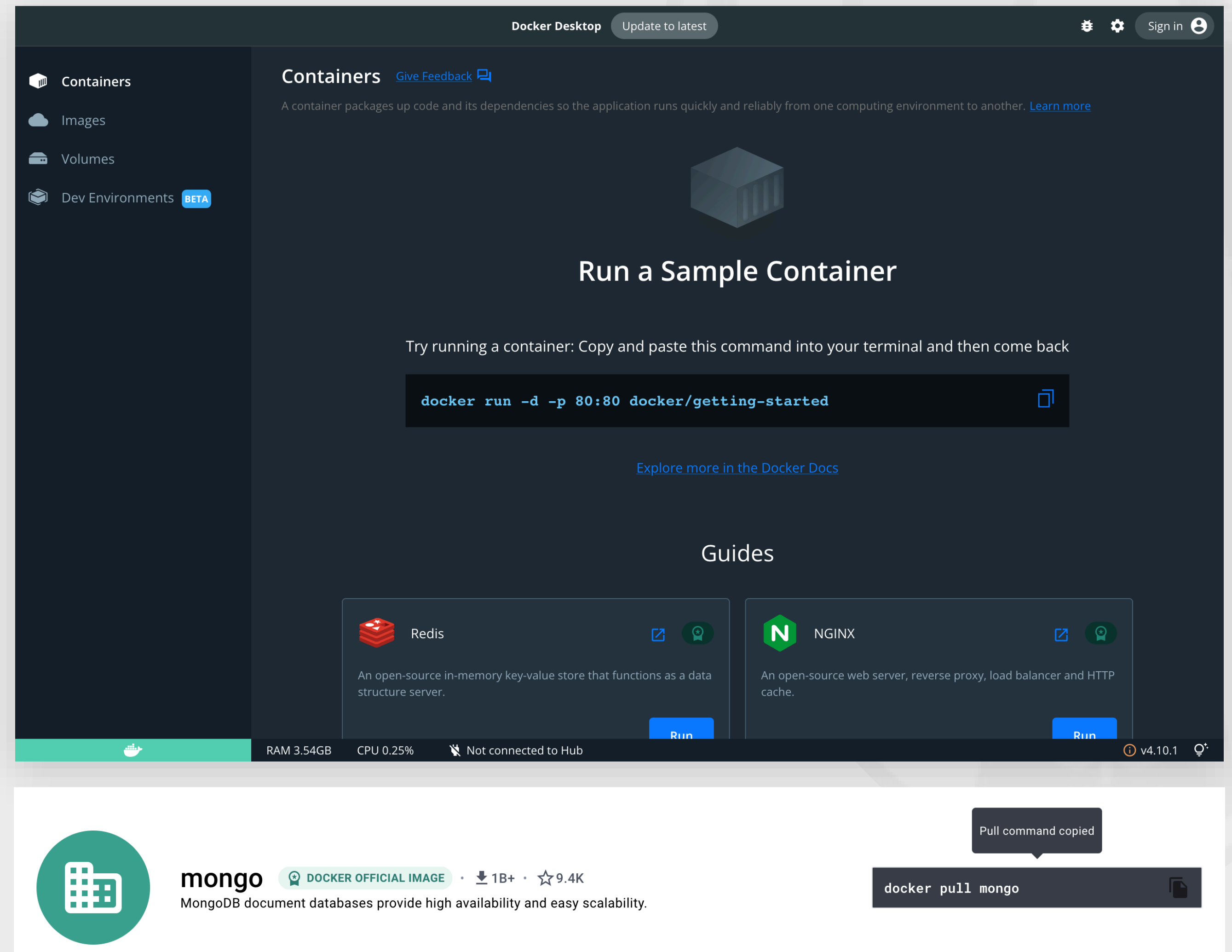
# How to install MongoDB?

- ▶ Official MongoDB website
- ▶ Docker



# How to use MongoDB with Docker?

1. Download and Install Docker Desktop for your platform from the official docker [website](#)
2. Start your docker engine by opening Docker Desktop
3. Find The official image available on [Docker Hub](#) contains the community edition of MongoDB and is maintained by the Docker team.





# How to use MongoDB with Docker?


4. Open your terminal and enter following command and wait for the image and its containers to download:

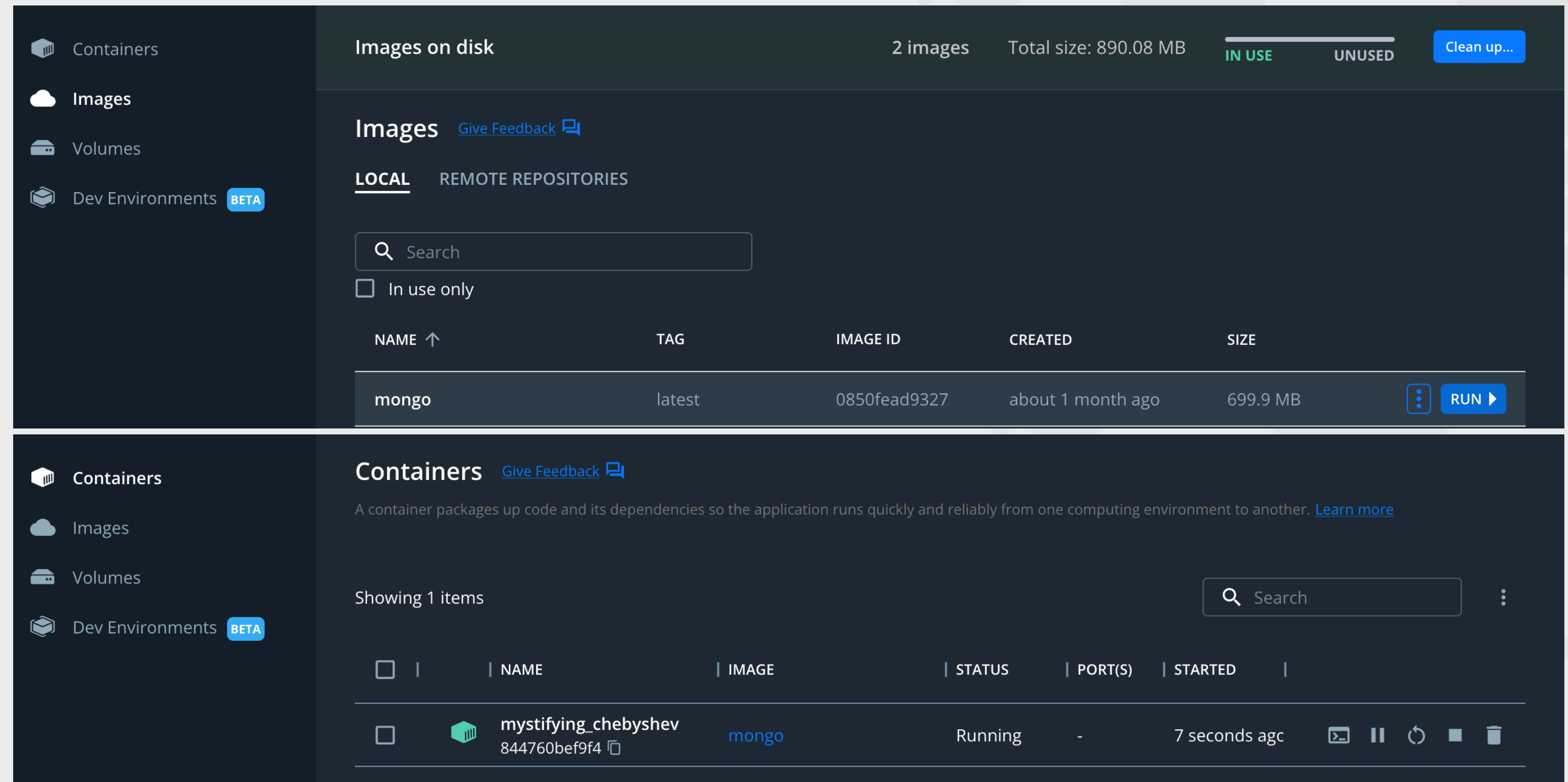
- `docker pull mongo`

```
$ docker pull mongo
Using default tag: latest
latest: Pulling from library/mongo
846c0b181fff: Pull complete
ef773e84b43a: Pull complete
2bfad1efb664: Pull complete
84e59a6d63c9: Pull complete
d2f00ac700e0: Pull complete
96d33bf42f45: Pull complete
ebaa69d77b61: Pull complete
aa77b709a7d6: Pull complete
245bd0c9ace2: Pull complete
Digest: sha256:c015870b10451c414911aff5648495bd3fcc9fe0cec340f46bb852706697a72f
Status: Downloaded newer image for mongo:latest
docker.io/library/mongo:latest
```

# How to use MongoDB with Docker?

## 1. Run MongoDB containa:

- ▶ Go to your Docker Desktop and on the Images tab find mongo image
- ▶ Go to your containers tab and click **RUN ▶** and Then open a terminal with 



The screenshot displays the Docker Desktop interface. The top section, 'Images on disk', shows a list of images. The bottom section, 'Containers', shows a list of running containers.

**Images on disk**

NAME ↑	TAG	IMAGE ID	CREATED	SIZE
mongo	latest	0850fead9327	about 1 month ago	699.9 MB

**Containers**

NAME	IMAGE	STATUS	PORT(S)	STARTED
mystifying_chebyshev 844760bef9f4	mongo	Running	-	7 seconds ago

# Create Database





# Create Database

## Using MongoDB Compass

1. Click **Create database** and name the database.
2. Click **ADD DATA** and create new documents

The screenshot displays the MongoDB Compass interface for a local connection at localhost:27017. The left sidebar shows the 'Databases' section with a search bar and a list of databases: admin, config, and local. The main panel is divided into two sections. The top section, titled 'Databases', shows a list of databases with columns for Storage size, Collections, and Indexes. The bottom section, titled 'TestDB.TestCollection', shows the 'Documents' tab with a search bar and a list of documents. The documents are displayed in a table format with columns for \_id, name, and GPA. The first document has \_id: ObjectId('63bc6b26c83b960a4fc51b8f'), name: 'John', and GPA: 90. The second document has \_id: ObjectId('63bc72cac83b960a4fc51b90'), name: 'Olivia', and GPA: 90.

**localhost:27017**

My Queries **Databases** Performance

Create database View

Sort by Database Name

**admin**

Storage size: 20.48 kB Collections: 1 Indexes: 1

**config**

Storage size: 20.48 kB Collections: 1 Indexes: 2

My Queries Databases

Search

admin config local

**TestDB.TestCollection**

2 DOCUMENTS 1 INDEXES

Documents Aggregations Schema Explain Plan Indexes Validation

Filter Type a query: { field: 'value' } Reset Find More Options

ADD DATA EXPORT COLLECTION

1 - 2 of 2

**\_id: ObjectId('63bc6b26c83b960a4fc51b8f')**  
name: "John"  
GPA: 90

**\_id: ObjectId('63bc72cac83b960a4fc51b90')**  
name: "Olivia"  
GPA: 90

# Create Database

## Using Manosh

- ▶ Create database
  - use DATABASE\_NAME
- ▶ To check selected database
  - db
- ▶ Check database list
  - show dbs
- ▶ Note: To display the created database in database list you need to add at least one Collection to it using following command
  - db.createCollection("COLLECTION\_NAME", options)
- ▶ To remove a database
  - db.dropDatabase()

# CRUD

Create,  
Read,  
Update,  
Delete



# Create

Create individual document:

- `db.COLLECTION_NAME.insertOne({"FIELD_NAME": value, ... })`

Create multiple document at once:

- `db.COLLECTION_NAME.insertMany([{"FIELD_NAME": value, ... }, {"FIELD_NAME": value, ... }, ... ])`

**example:**

```
db.students.insertOne(  
  {  
    name: "John",  
    age: 26,  
    GPA: 90  
  })
```

collection

field : value

field : value

field : value



document

# Read

Retrieve a document from a collection

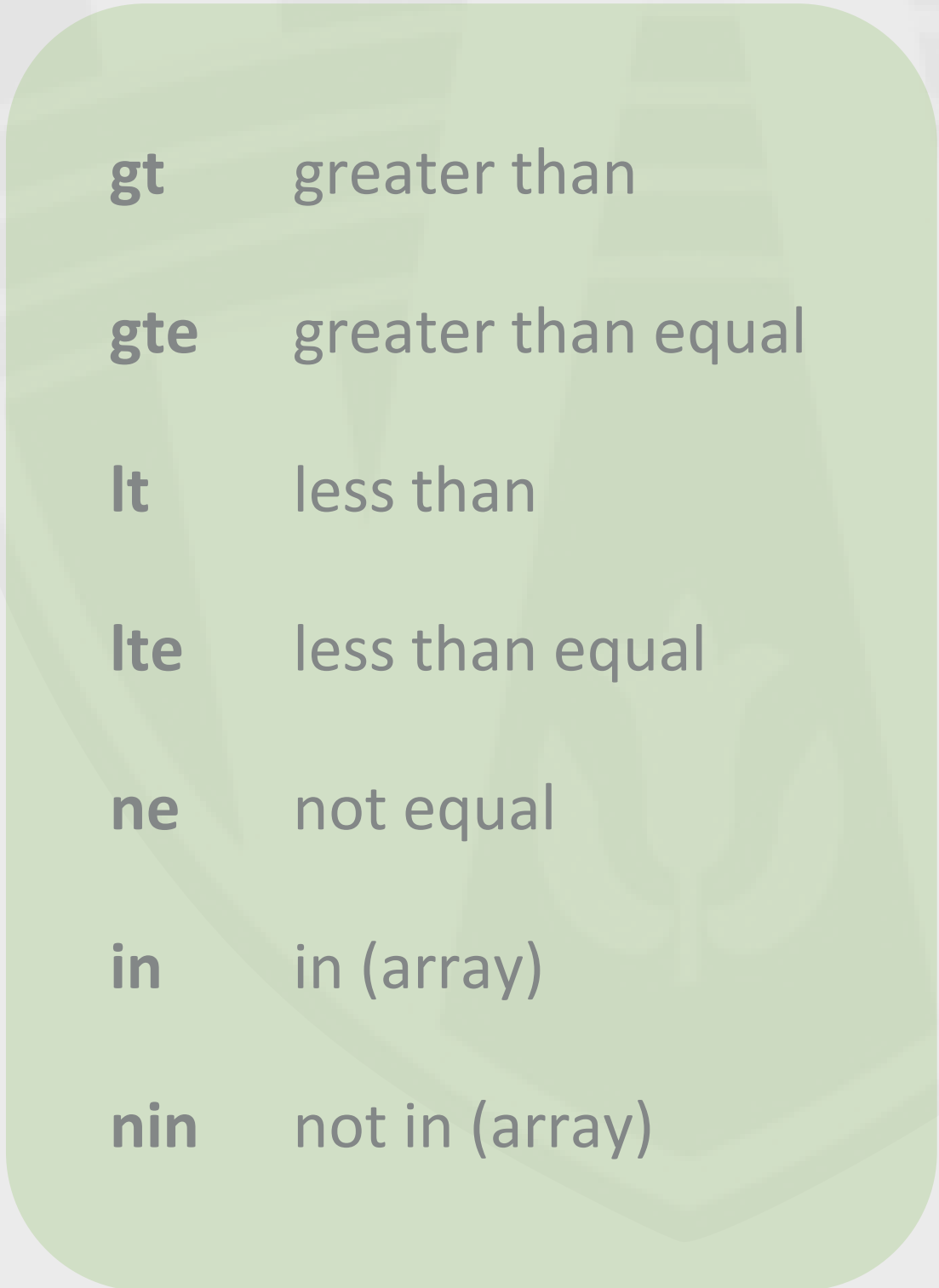
- `db.COLLECTION_NAME.find(Query Criteria)`

**example:**

```
db.students.find(  
  { age: { $gt: 18 } }  
).limit(5)
```

students with age greater than 18

limit the results up to five instances



<b>gt</b>	greater than
<b>gte</b>	greater than equal
<b>lt</b>	less than
<b>lte</b>	less than equal
<b>ne</b>	not equal
<b>in</b>	in (array)
<b>nin</b>	not in (array)

# Update

To modify a single document from a collection

- `db.COLLECTION_NAME.updateOne()`

To modify multiple documents from a collection

- `db.COLLECTION_NAME.updateMany()`

## example:

```
db.students.updateMany(  
  { age: { $lt: 18 } }  
  { set: { GPA: 80 } }  
)
```

Only update the students with the age of less than 18

Set the GPA of them equal to 80

update filter

update action

# Delete

To delete a single document from a collection

- `db.COLLECTION_NAME.deleteOne()`

To delete multiple documents from a collection

- `db.COLLECTION_NAME.deleteMany()`

**example:**

```
db.students.deleteMany(  
  { name: "Alice" }  
)
```

delete student with the name of Alice

delete filter

# Assignment

- ▶ Take a look at the official [MongoDB cheat sheet](#).
- ▶ Create a Database and name it with your `name+"_"+surname`
- ▶ Create a collection called “customers” and add 5 customers using the following template:

```
{  
  customer_name: ""  
  age: number  
  email: ""  
  phone_number: ""  
  address: ""  
  city: ""  
  zipcode: ""  
  order_amount: ""  
  order_date: date  
  order_status_completed: false/true  
}
```

---