Introduction to MongoDB

Agenda

- What is MongoDB
- Features of MongoDB
- MongoDB Data types
- Installation
- Commands
- MongoDB compass & MongoDB shell(Mongosh)

What is MongoDB?

MongoDB is an open source NoSQL database management program. NoSQL (Not only SQL) is used as an alternative to traditional relational databases. NoSQL databases are quite useful for working with large sets of distributed data. MongoDB is a tool that can manage document-oriented information, store or retrieve information.

MongoDB is used for high-volume data storage, helping organizations store large amounts of data while still performing rapidly. Organizations also use MongoDB for its ad-hoc queries, indexing, load balancing, aggregation, server-side JavaScript execution and other features.

Structured Query Language (SQL) is a standardized programming language that is used to manage relational databases. SQL normalizes data as schemas and tables, and every table has a fixed structure.

Instead of using tables and rows as in relational databases, as a NoSQL database, the MongoDB architecture is made up of collections and documents. Documents are made up of Key-value pairs -- MongoDB's basic unit of data. Collections, the equivalent of SQL tables, contain document sets. MongoDB offers support for many programming languages, such as C, C++, C#, Go, Java, Python, Ruby and Swift.

Features of MongoDB

Features of MongoDB include the following:

- **Replication.** A replica set is two or more MongoDB instances used to provide high availability. Replica sets are made of primary and secondary servers. The primary MongoDB server performs all the read and write operations, while the secondary replica keeps a copy of the data. If a primary replica fails, the secondary replica is then used.
- **Scalability.** MongoDB supports vertical and horizontal scaling. Vertical scaling works by adding more power to an existing machine, while horizontal scaling works by adding more machines to a user's resources.
- **Load balancing.** MongoDB handles load balancing without the need for a separate, dedicated load balancer, through either vertical or horizontal scaling.
- **Schema-less.** MongoDB is a schema-less database, which means the database can manage data without the need for a blueprint.
- **Document.** Data in MongoDB is stored in documents with key-value pairs instead of rows and columns, which makes the data more flexible when compared to SQL databases.

Sample Document

```
{ id : ObjectId("5099803df3f4948bd2f98391"),
name : {first: "Alan", last: "Turing" },
birth:new Date('Jun 23, 1912'),
death : new Date('Jun 07, 1954'),
contribs: [ "Turing machine", "Turing test", "Turingery" ],
view : NumberLong(1250000)
 }
```

MongoDB Data types:

• String − This is the most commonly used datatype to store the data. String in MongoDB must be UTF-8 valid.

• Integer − This type is used to store a numerical value. Integer can be 32 bit or 64 bit depending upon your server.

• Boolean − This type is used to store a boolean (true/ false) value.

• Double − This type is used to store floating point values.

• Min/ Max keys − This type is used to compare a value against the lowest and highest BSON elements.

• Arrays − This type is used to store arrays or list or multiple values into one key.

• Object − This datatype is used for embedded documents.

• Null − This type is used to store a Null value.

• Symbol − This datatype is used identically to a string; however, it's generally reserved for languages that use a specific symbol type.

• Object ID − This datatype is used to store the document's ID.

• Binary data − This datatype is used to store binary data.

• Regular expression − This datatype is used to store regular expression.

MongoDB Shell Commands:

- To clear the screen:

cls

- To view existing databases:

show dbs

- To create/connect to an existing database:

use

- To check currently selected database:

db

- To drop database, first select the database and then drop it by:

db.dropDatabase()

- To view collections:

show collections

Installation of MongoDB on Windows :

Requirements to Install MongoDB on Windows: -

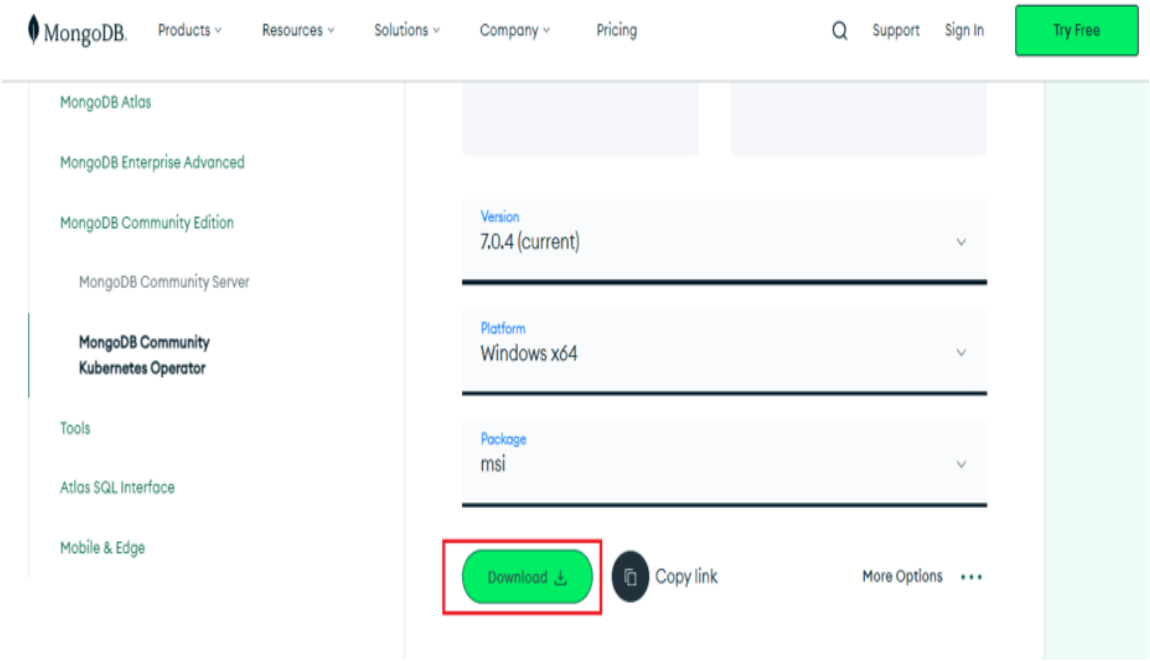
- MongoDB versions 4.4 and later only support 64-bit versions of Windows.

- If you're using an older version (e.g., MongoDB 7.0), supported Windows versions include:
    - ✓ Windows Server 2022 (64-bit)
    - ✓ Windows Server 2019 (64-bit)
    - ✓ Windows 11 (64-bit)

Steps to Install MongoDB on windows using MSI: -

To install MongoDB on Windows, first, download the MongoDB server and then install the MongoDB shell.

STEP1: Go to the MongoDB Download Center to download the MongoDB Community Server.

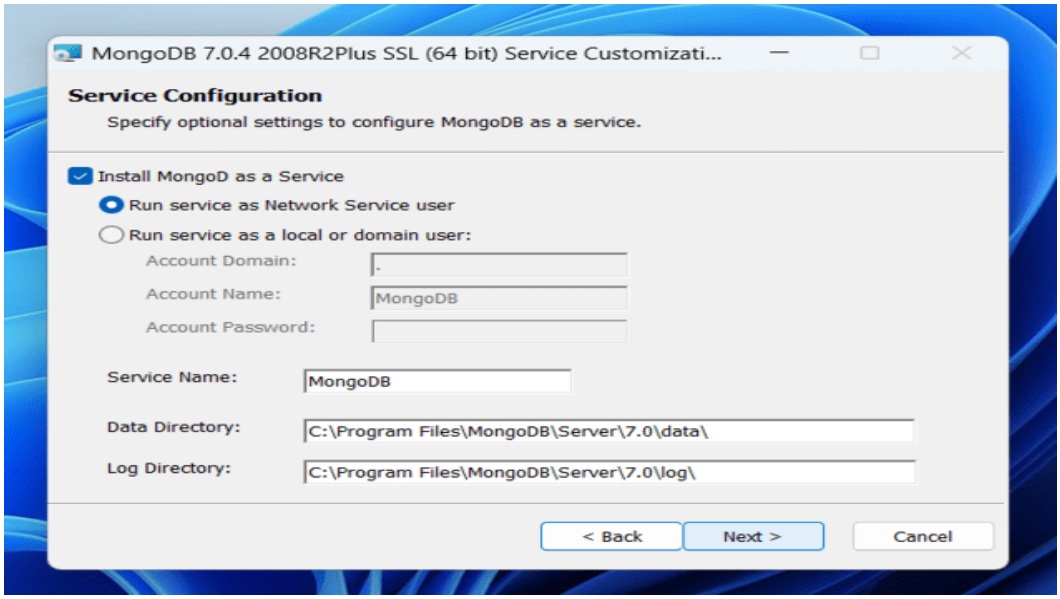


select any version, Windows, and package according to your requirement. For Windows, we need to choose:

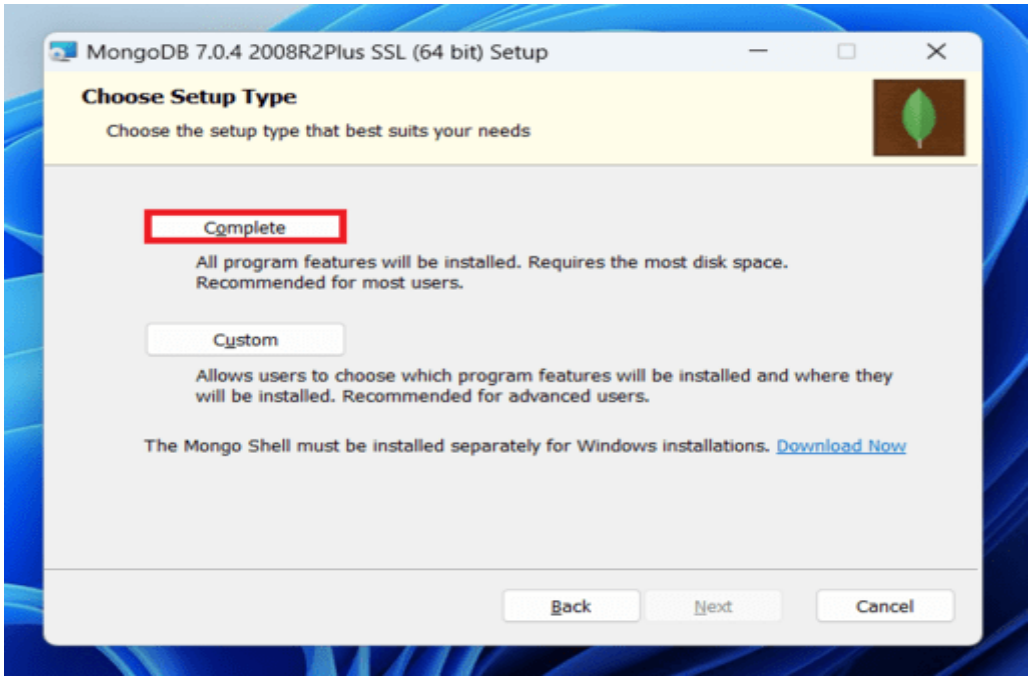
- ✓ Version: 7.0.4
- ✓ OS: Windows x64
- ✓ Package: msi

Step2: When the download is complete open the msi file and click the next button in the startup screen:

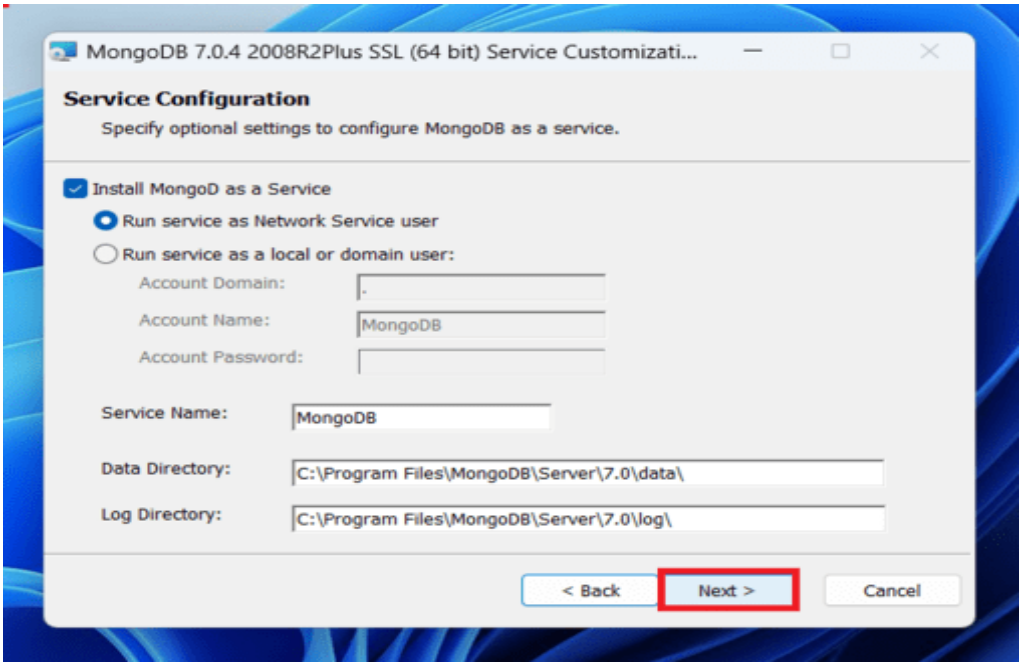
Step3: Now accept the End-User License Agreement and click the next button:



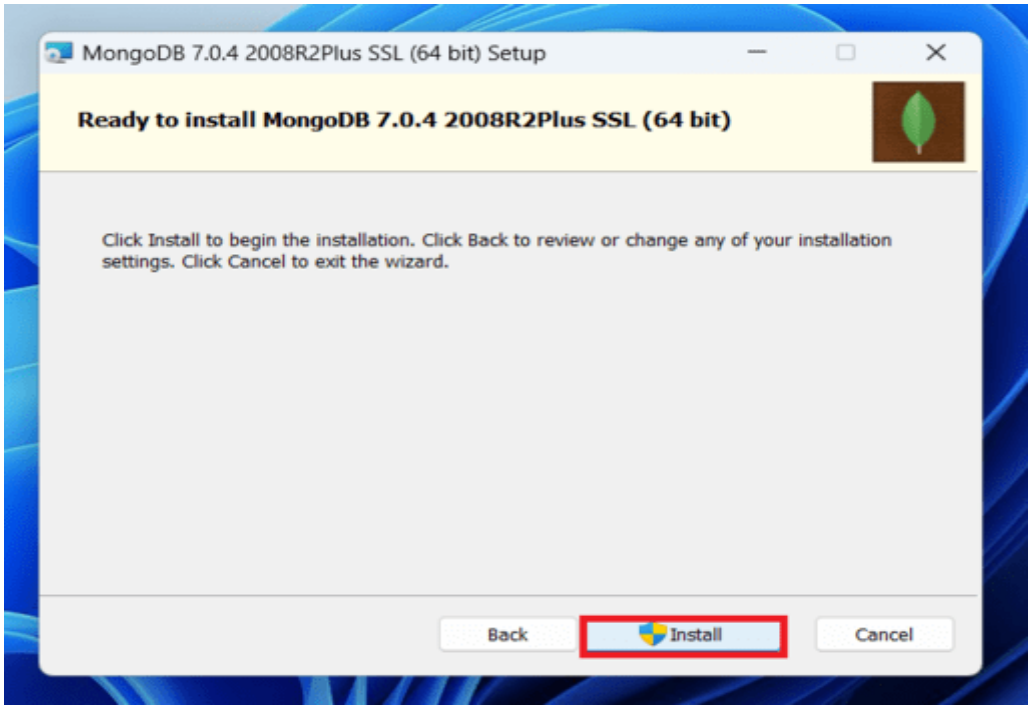
Step4: Now select the complete option to install all the program features. Here, if you can want to install only selected program features and want to select the location of the installation, then use the Custom option: +



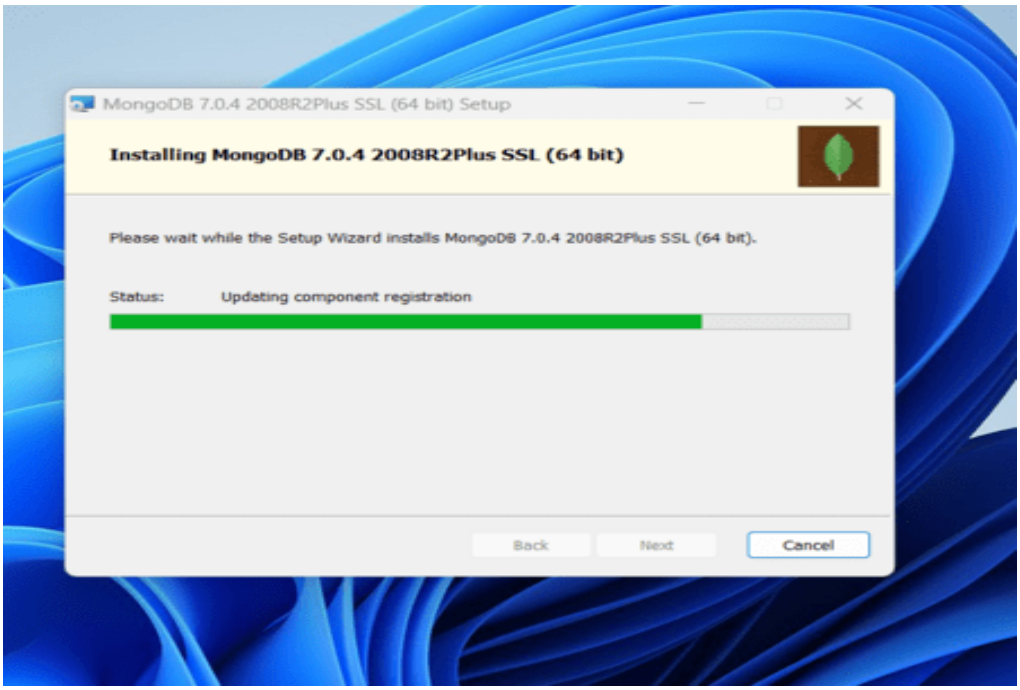
Step5: Select “Run service as Network Service user” and copy the path of the data directory. Click Next:



Step6: Click the Install button to start the MongoDB installation process:



Step 7: After clicking on the install button installation of MongoDB begins:



Step 8: Now click the Finish button to complete the MongoDB installation process:

Installation of Mongo Shell on Windows:

MongoDB Shell is the quickest way to connect to (and work with) MongoDB. Easily query data, configure settings, and execute other actions with this modern, extensible command-line interface — replete with syntax highlighting, intelligent autocomplete, contextual help, and error messages.

Note: MongoDB Shell is an open source (Apache 2.0), standalone product developed separately from the MongoDB Server.

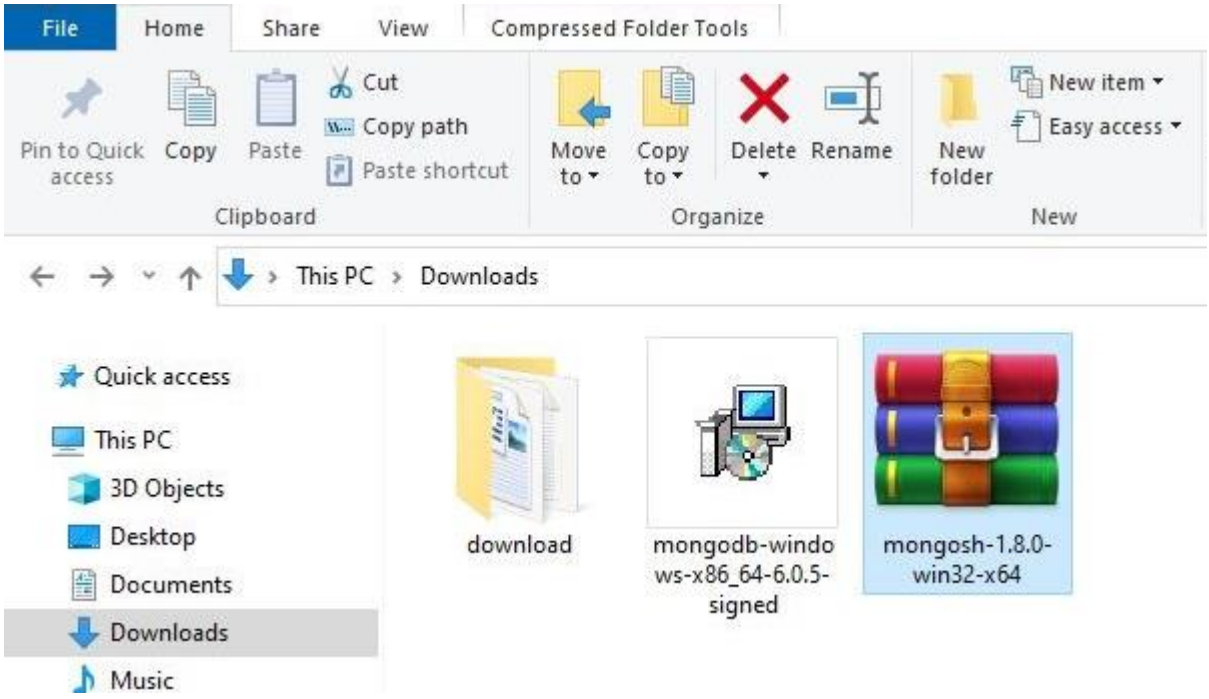
Steps to Download MongoDB Shell: -

Step1: Open the MongoDB Shell download page and open the MongoDB Download Center .

Select any version, Windows, and package according to your requirement. For Windows, we need to choose:

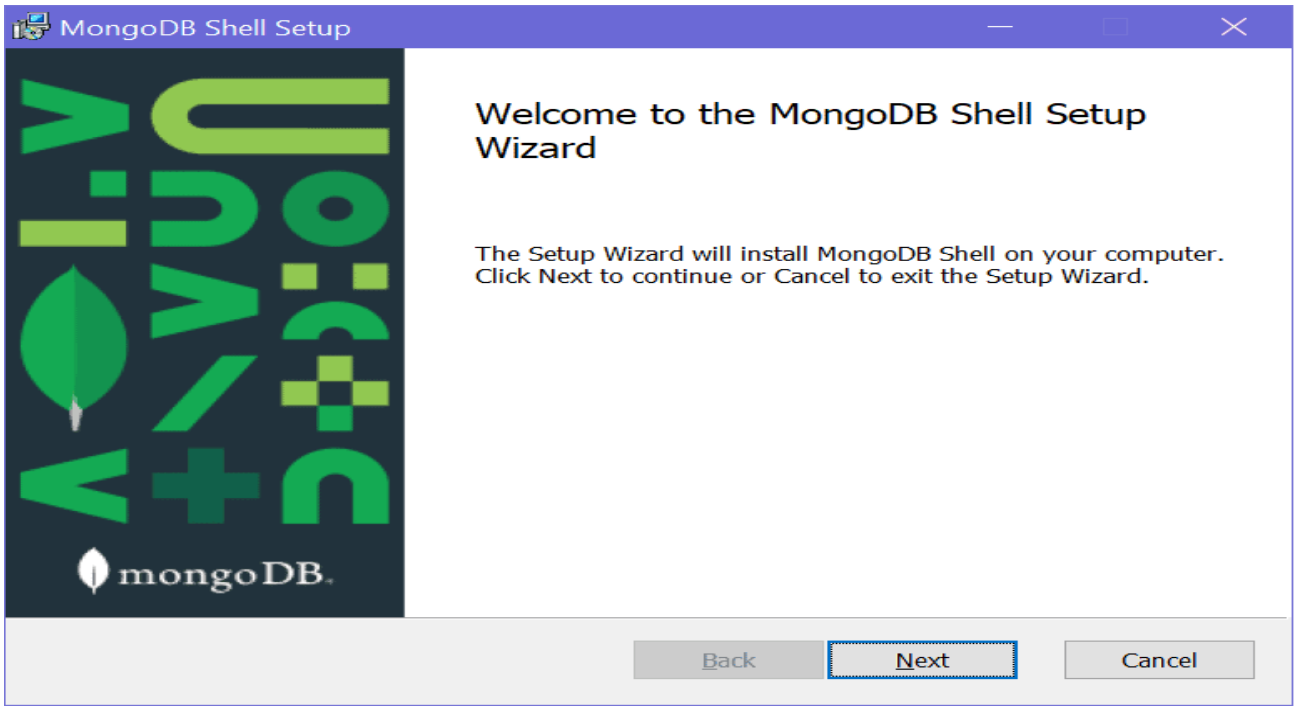
- ✓ Version: 2.2.6
- ✓ OS: Windows x64
- ✓ Package: zip

Step2: Locate the downloaded .zip file in your Downloads folder (or wherever you saved it).



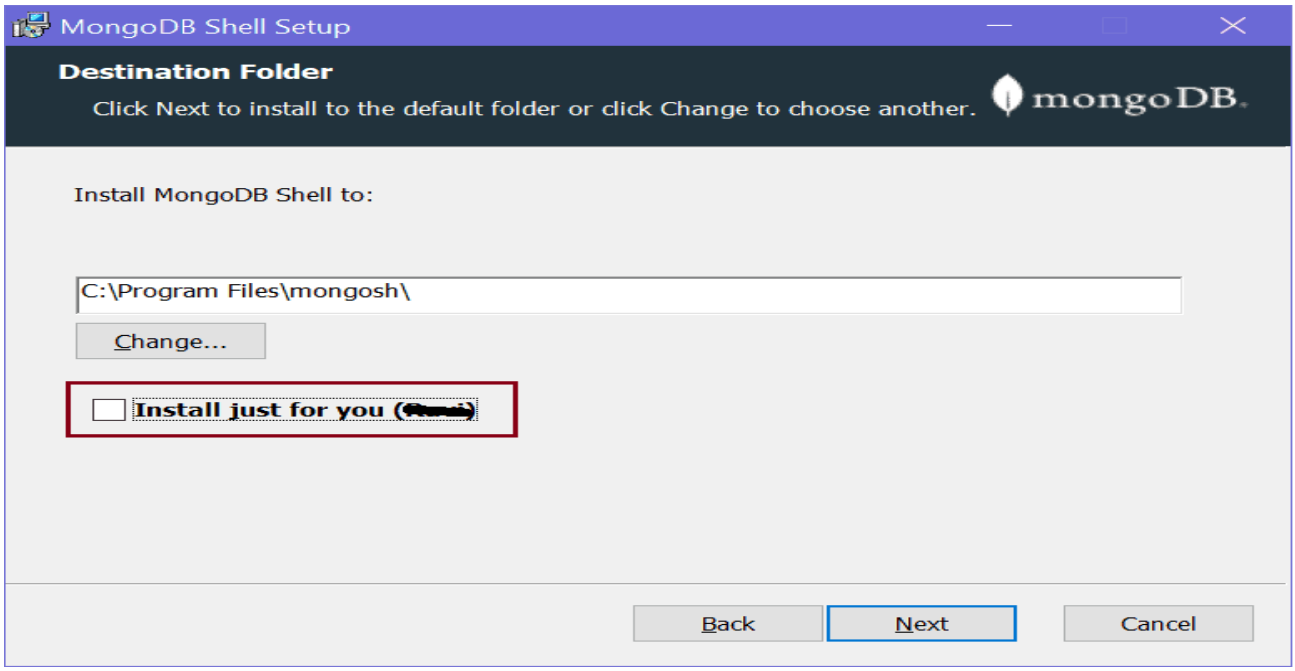
Step3: Right-click on the mongosh-2.2.6-win32-x64 file and select "Extract Here".

Now, click on the downloaded installer file to start the installation wizard, as shown below.



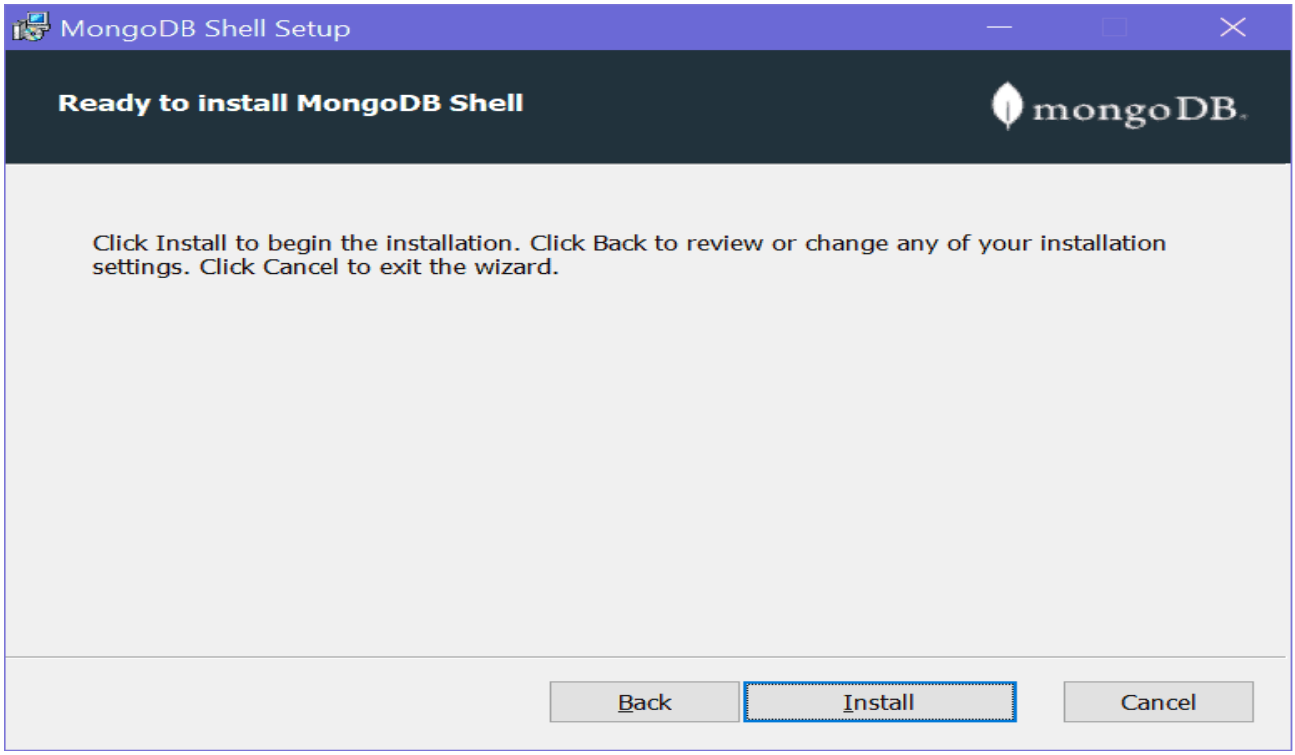
Install New MongoDB Shell - mongosh

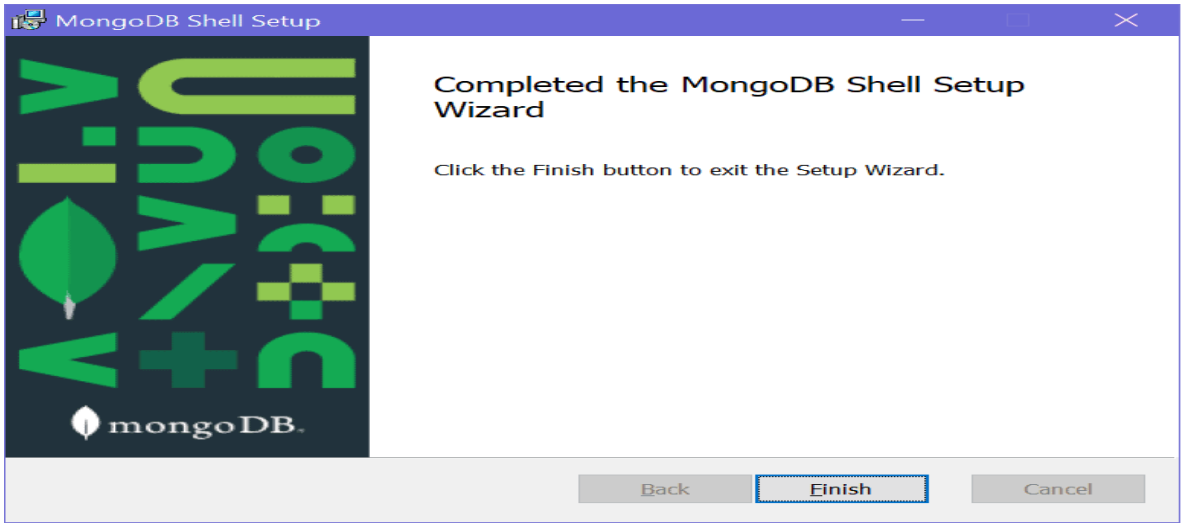
Click Next to go to next step shown below.



Here, uncheck the checkbox if you want to install shell for all users on your local machine and click Next.

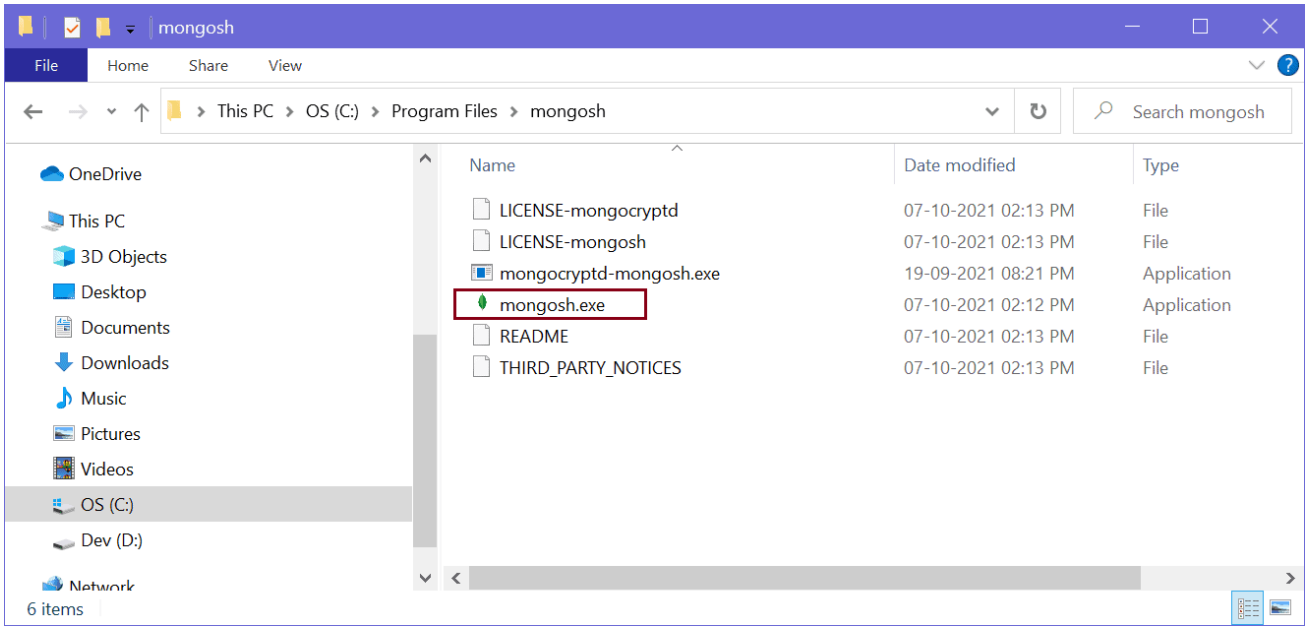
Click on the Install button to start the installation. It should quickly install it.



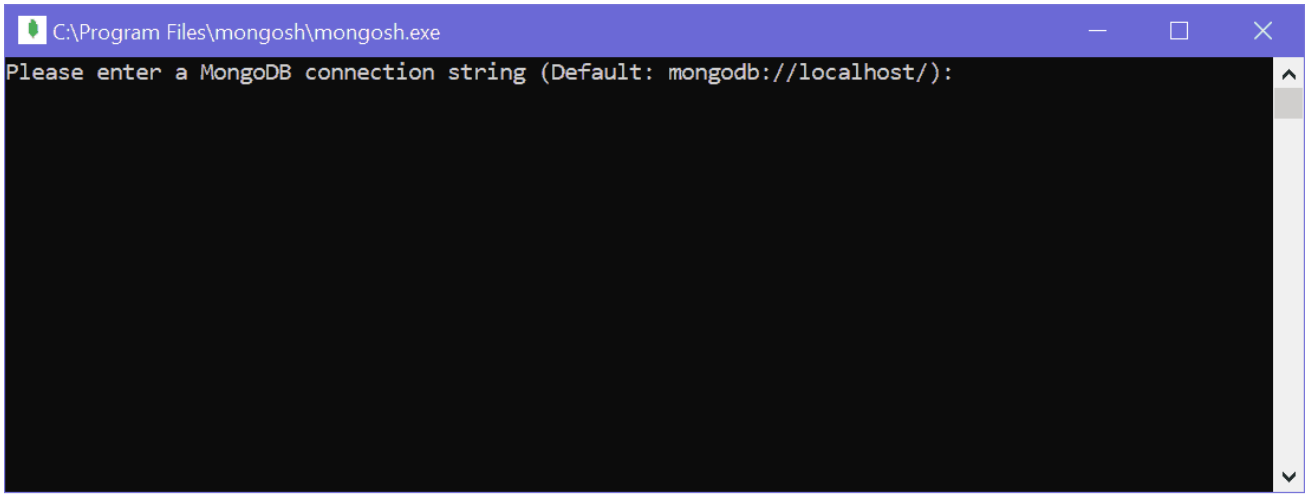


Once installation completes, click the Finish button to close the wizard.

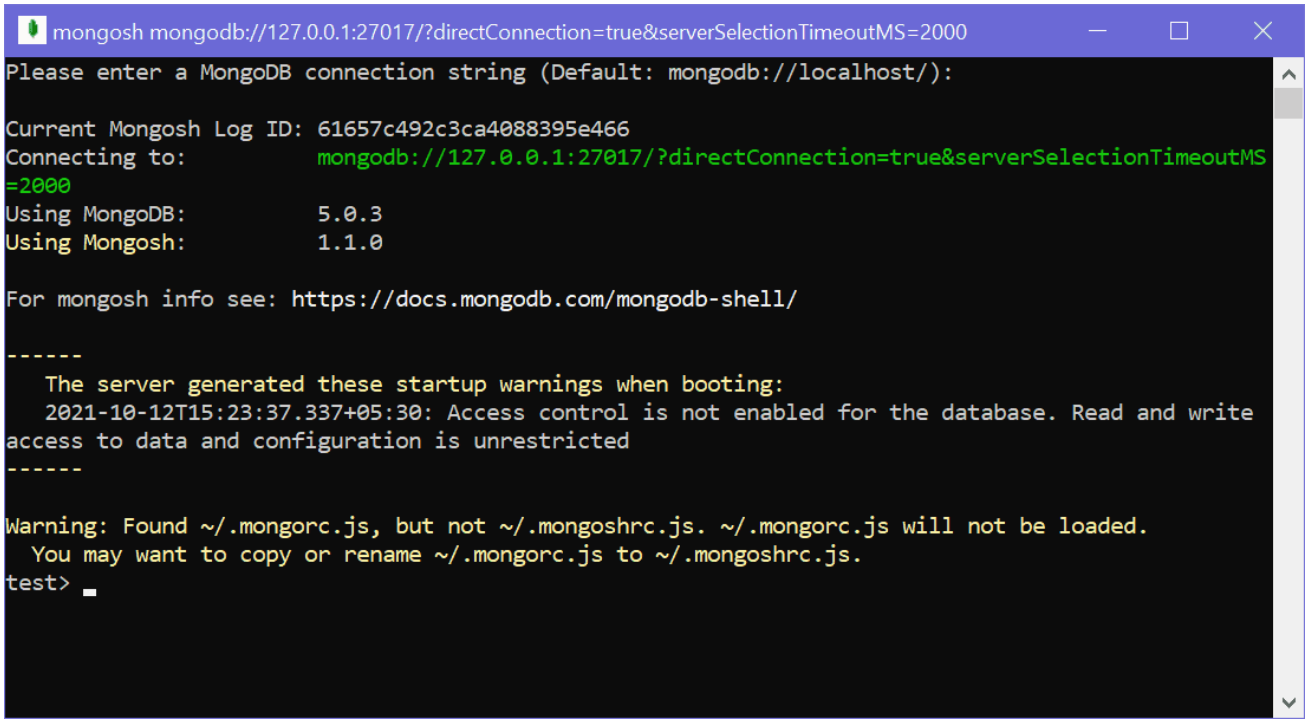
This should have installed mongosh in "C:\Program Files\mongosh" folder on Windows, as shown below.



Click on the mongosh.exe to open a new MongoDB shell, as shown below.



Press Enter to start the shell, as shown below.



Now we can use Mongosh to solve any problems releated to database collections.