

MONGO DB

MongoDB Atlas

Initial release:

February 11, 2009

Stable release :

5.0[2] Edit this on Wikidata / 13 July 2021

Repository:

github.com/mongodb/mongo

Written in:

C++, JavaScript, Python

Operating system:

Windows Vista and later, Linux,
OS X 10.7 and later, Solaris,[3] FreeBSD[4]

DB Type:

Type Document-oriented database

License:

Server Side Public License

Website:

www.mongodb.com



INTRODUCTION TO MongoDB

It is an open source non-relational database that stores the data in the form of collections and documents

It preserves most of the functionalities while offering horizontal scalability

This eases the work of a developer by providing persistence to the data and enhancing agility

It stores the JSON documents in the form of collections having dynamic schemas

It stores all the related information together which enhances the speed of query processing

FEATURES OF MongoDB



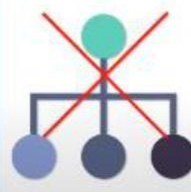
Indexing



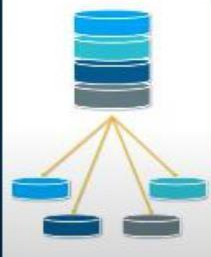
Replication



Ad-hoc
Queries



Schemaless



Sharding

Official Site Doc Link:

<https://docs.mongodb.com/manual/crud/>

<https://docs.mongodb.com/manual/tutorial/query-documents/>

MongoDB

It is a cross-platform, document oriented database that provides, high performance, high availability, and easy scalability. MongoDB works on concept of collection and document.

Database

Database is a physical container for collections. Each database gets its own set of files on the file system. A single MongoDB server typically has multiple databases.

Collection

Collection is a group of MongoDB documents. **It** is the equivalent of an RDBMS table. A collection exists within a single database. Collections do not enforce a schema. Documents within a collection can have different fields. Typically, all documents in a collection are of similar or related purpose.

Document

A document is a set of key-value pairs. Documents have dynamic schema. Dynamic schema means that documents in the same collection do not need to have the same set of fields or structure, and common fields in a collection's documents may hold different types of data. The following table shows the relationship of RDBMS terminology with MongoDB

Any relational database has a typical schema design that shows number of tables and the relationship between these tables. While in MongoDB, there is no concept of relationship.

Advantages of MongoDB over RDBMS

❏ Schema less: MongoDB is a document database in which one collection holds different documents. Number of fields, content and size of the document can differ from one

document to another.

- ☐ Structure of a single object is clear.
- ☐ No complex joins.
- ☐ Deep query-ability. MongoDB supports dynamic queries on documents using a document-based query language that's nearly as powerful as SQL.
- ☐ Tuning.
- ☐ Ease of scale-out: MongoDB is easy to scale.
- ☐ Conversion/mapping of application objects to database objects not needed.
- ☐ Uses internal memory for storing the (windowed) working set, enabling faster access of data.

Why Use MongoDB?

Flexibility :-

It is sets of documents that can contain sub documents which may have complex hierarchy is really expressive and flexible.

Flexible query Model:-

A user can select some part of a document based on attribute values, regular expression or ranges.

Native Aggregation:-

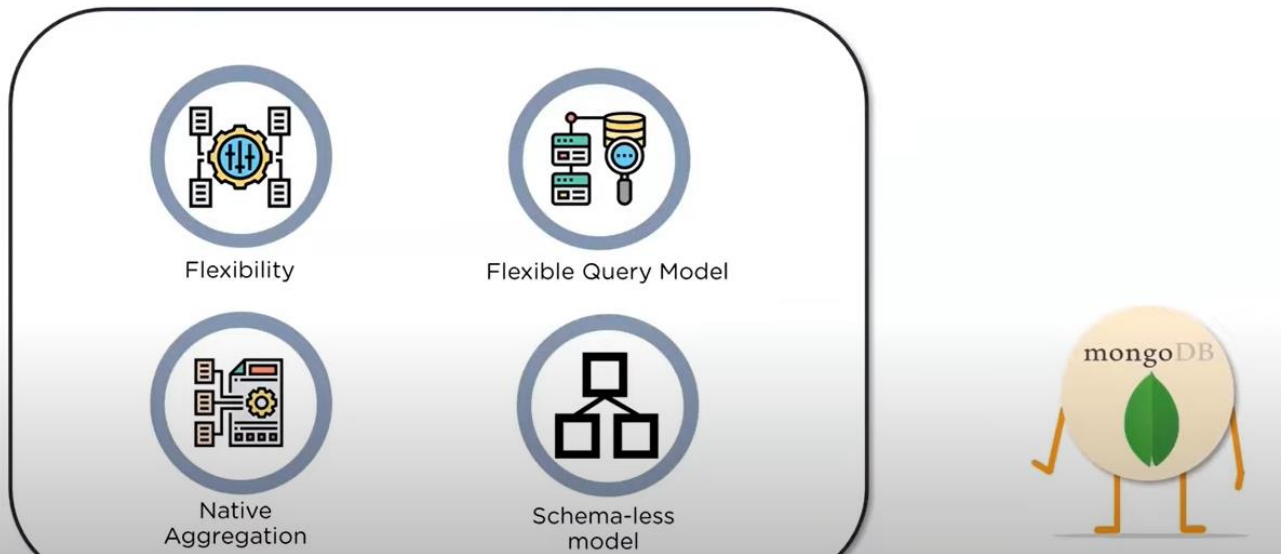
It allows a user to extract and transform data from Mongo DB and load them in a new format or export to other data source.

Schema less Model: -

Application get the power and responsibility to interpret different properties in different ways.

- ☐ Document Oriented Storage: Data is stored in the form of JSON.
- ☐ Index on any attribute
- ☐ Replication and high availability.
- ☐ Auto-sharing
- ☐ Rich queries
- ☐ Fast in-place updates
- ☐ Professional support by MongoDB

Why MongoDB?



Characteristic of mongo db

1. General purpose db –

Mongo db can serve heterogeneous loads at multiple purposes within an application.

2. Flexible schema design :-

Document oriented database can be modified on a fly. It is key contrast of mongo db and any other relational db.

3. Scalability and load balancing :-

It is build to scale vertically but most importantly horizontally using sharding and architect can share load between different instances and achieve both read and write scalability. Load balancing happens automatically.

4. Aggregation framework :-

Mongo db offers extract transform and load framework that eliminate the need for complex data bindings.

5. Native replication:-

Data will get replicated across replica set without complicated setup.

6. Security features :-

Both authentication and authorisation are linked to account in mongo db.

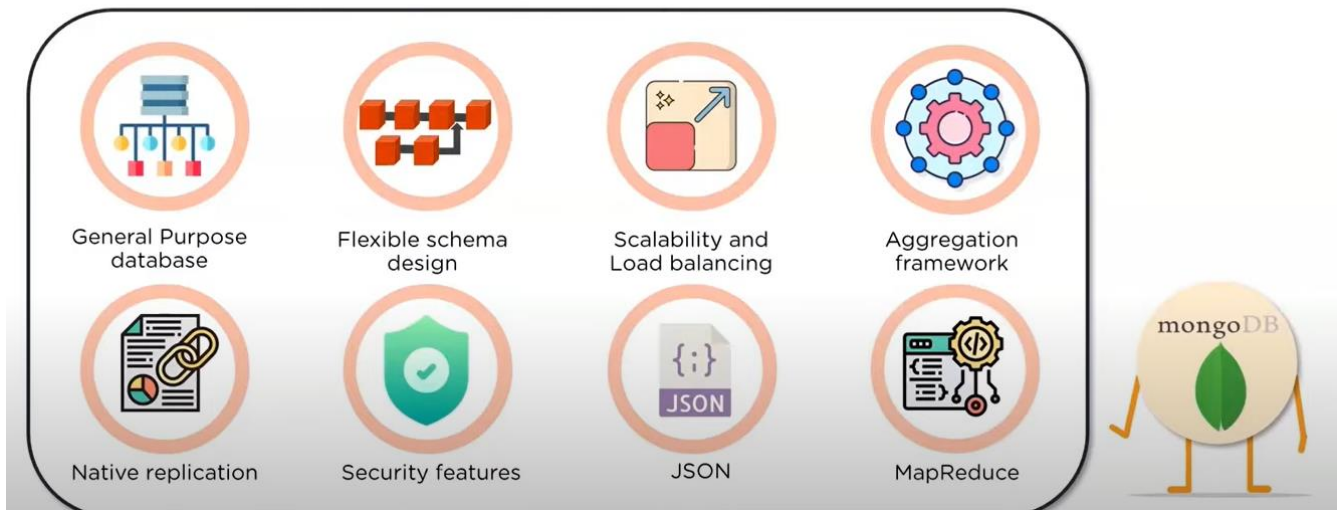
7. Json :-

Json is widely used across web applications for front end and api communication.

8. Map reduce :-

It is an excellent tool to build data pipeline and mongo db uses map reduce readyE.

Characteristics of MongoDB



Where to Use MongoDB?

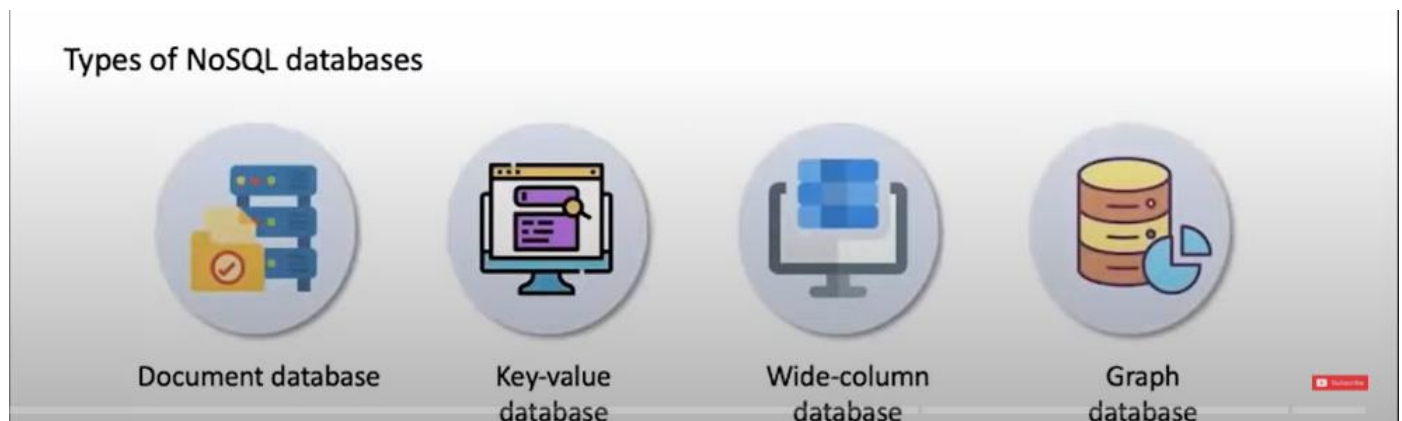
- Big Data
- Content Management and Delivery
- Mobile and Social Infrastructure
- User Data Management
- Data Hub

What is No SQL

It is non relational database that is traditional database which is having tables with rows and columns.

Sql server , my sql etc.

Types of No SQL



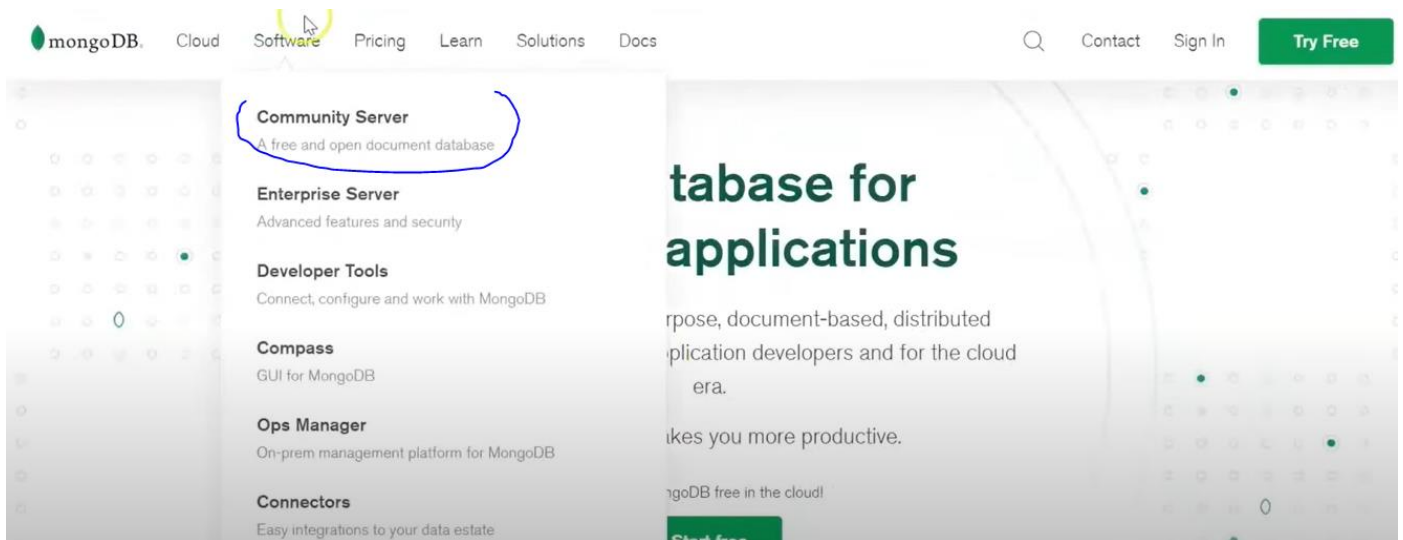
Applications of Mongo DB :-

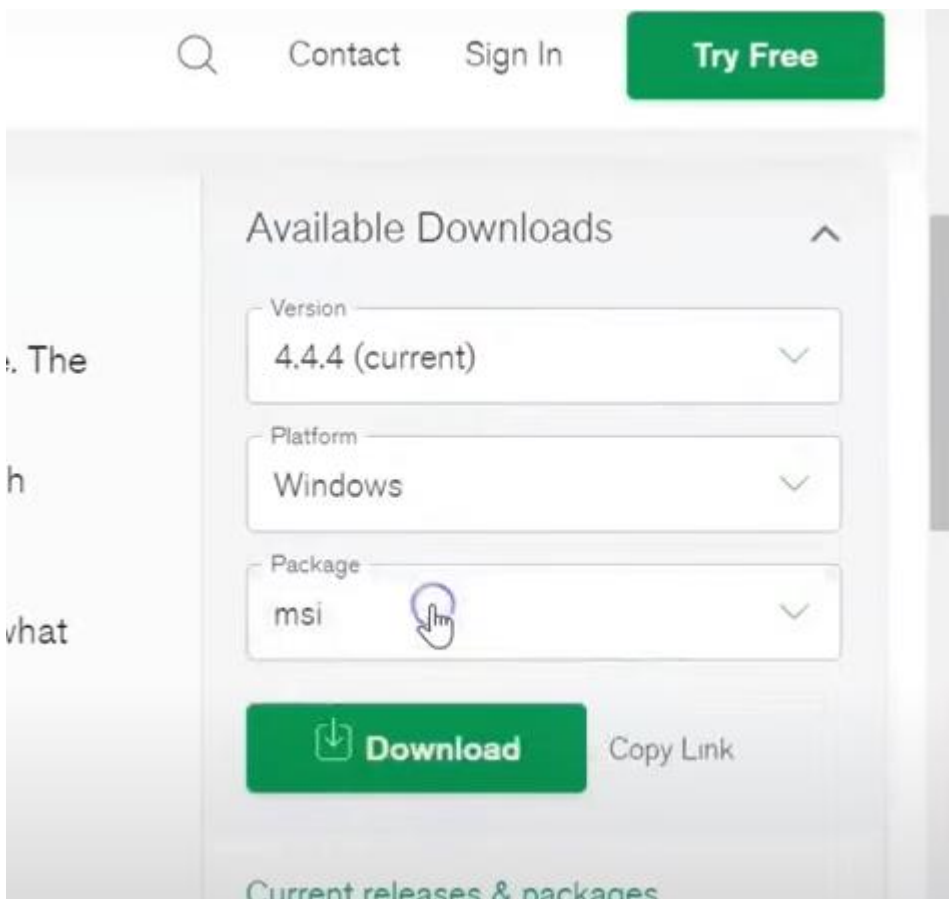
- Internet of things

2. Mobile applications
3. Real time analysis
4. Personalization
5. Catalog management
6. Content management

Installation:-

For 64 bit OS





Then add it in environment variable under user variable option.

For 32 bit OS:-

Mongo DB From Below URL (32 Bit)

<https://www.mongodb.org/dl/win32/i386>

Download File :- (mongodb-win32-i386-v3.2-latest-signed.msi) and **install**.

Now create a Project Like (D:\MERN\NodeExpressMongo_Project)

open CMD

```
> npm init
```

replace index.js to app.js

you **will** get your package.json file. Now **install** some dependencies.

```
> npm install express
```

```
> npm install mongodb
```

```
> npm install mongoose
```

```
> npm install -g nodemon --save-dev
```

Package.json -


```

"name": "nodeexpressmongo_project",
"version": "1.0.0",
"description": "",
"main": "app.js",
"scripts": {
  "start": "nodemon app.js" // replace test with start.
},
"author": "MEN",
"license": "ISC",
"dependencies": {
  "express": "^4.17.1",
  "mongodb": "^4.0.0",
  "mongoose": "^5.13.3"
},
"devDependencies": {
  "nodemon": "^2.0.12"
}
}

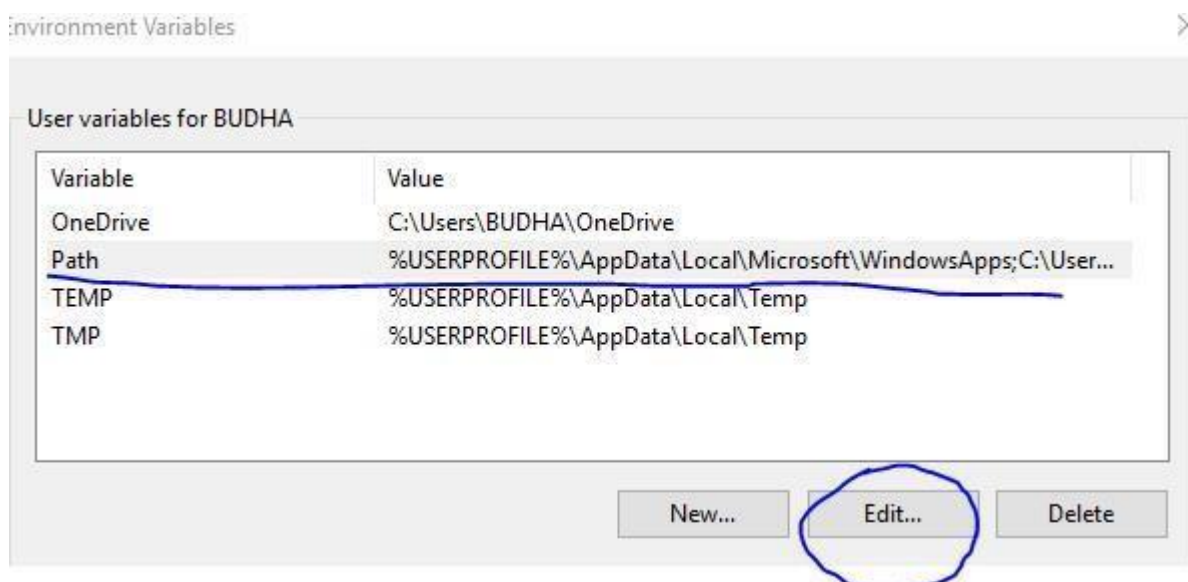
```

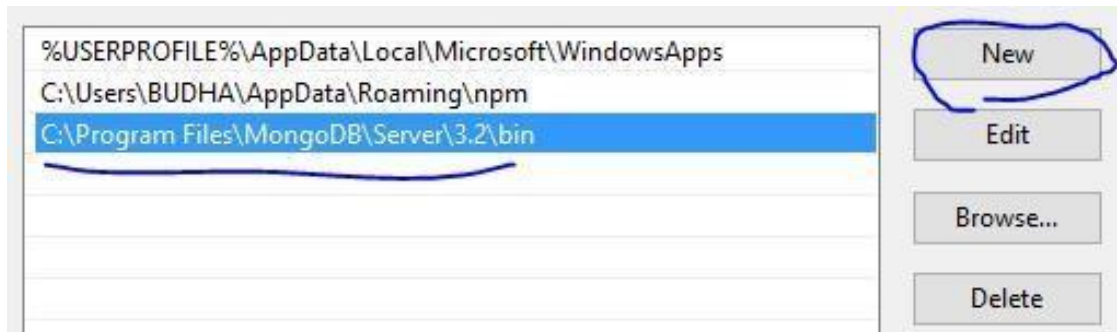
Configuration:-

C:\Program

Files\MongoDB\Server

\3.2\bin





Create a folder as below (To save data in local Mongo DB): -

C:\data\db

Go to your Project path and open cmd and run below command to start server (only for 32 bit PC.)

D:\MERN\NodeExpressMongo_Project>mongod --storageEngine=mmapv1 --dbpath "C:\data\db"

you will get below screen



for 64 bit PC

D:\MERN\NodeExpressMongo_Project>mongod

IF your Server started successfully you will see below screen.

```
2021-07-18T19:22:51.126+0530 I CONTROL [main]
2021-07-18T19:22:51.154+0530 I CONTROL [initandlisten] MongoDB starting : pid=620 port=27017 dbpath=C:\data\db 32-bit h
ost=ExploreMe-PC
2021-07-18T19:22:51.154+0530 I CONTROL [initandlisten] targetMinOS: Windows Vista/Windows Server 2008
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] db version v3.2.21-2-g105acca0d4
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] git version: 105acca0d443f9a47c1a5bd608fd7133840a58dd
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] allocator: tcmalloc
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] modules: none
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] build environment:
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] distarch: i386
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] target_arch: i386
2021-07-18T19:22:51.155+0530 I CONTROL [initandlisten] options: { storage: { dbPath: "C:\data\db", engine: "mmapv1" } }

2021-07-18T19:22:52.470+0530 I CONTROL [initandlisten]
2021-07-18T19:22:52.470+0530 I CONTROL [initandlisten] ** WARNING: This 32-bit MongoDB binary is deprecated
2021-07-18T19:22:52.471+0530 I CONTROL [initandlisten]
2021-07-18T19:22:52.471+0530 I CONTROL [initandlisten]
2021-07-18T19:22:52.472+0530 I CONTROL [initandlisten] ** NOTE: This is a 32 bit MongoDB binary.
2021-07-18T19:22:52.472+0530 I CONTROL [initandlisten] ** 32 bit builds are limited to less than 2GB of data (or
less with --journal).
2021-07-18T19:22:52.473+0530 I CONTROL [initandlisten] ** Note that journaling defaults to off for 32 bit and is
currently off.
2021-07-18T19:22:52.473+0530 I CONTROL [initandlisten] ** See http://dochub.mongodb.org/core/32bit
2021-07-18T19:22:52.473+0530 I CONTROL [initandlisten]
2021-07-18T19:22:53.062+0530 I NETWORK [HostnameCanonicalizationWorker] Starting hostname canonicalization worker
2021-07-18T19:22:56.736+0530 I FTDC [initandlisten] Initializing full-time diagnostic data capture with directory 'C
:\data\db\diagnostic.data'
2021-07-18T19:22:56.744+0530 I NETWORK [initandlisten] waiting for connections on port 27017
```

You need to open two terminal

```
C:\Windows\System32\cmd.exe - mongod --storageEngine=mmapv1 --dbpath "C:\data\db"
```

```
D:\MERN\NodeExpressMongo_Project>mongod --storageEngine=mmapv1 --dbpath "C:\data\db"
```

```
C:\Windows\System32\cmd.exe - nodemon run start
```

```
D:\MERN\NodeExpressMongo_Project>nodemon run start
[nodemon] 2.0.12
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): *.*
[nodemon] watching extensions: js,mjs,json
[nodemon] starting `node run start app.js`
(node:4328) [MONGODB DRIVER] Warning: Current Server Discovery and Monitoring engine is deprecated, and will be removed in a future version. To use the new Server Discover and Monitoring engine, pass option uri to the MongoClient constructor.
(Use `node --trace-warnings ...` to show where the warning was created)
connected..
```

Open new command prompt and run below command

```
D:\MERN\NodeExpressMongo_Project>mongod -- storageEngine=mmapv1 --dbpath  
"C:\data\db"(to keep server running)
```

Again Open new command prompt and run below command

```
D:\MERN\NodeExpressMongo_Project>nodemon run start
```

to run your application.

Adding Code to get response using PostMan

Now create a app.js file and add below code.

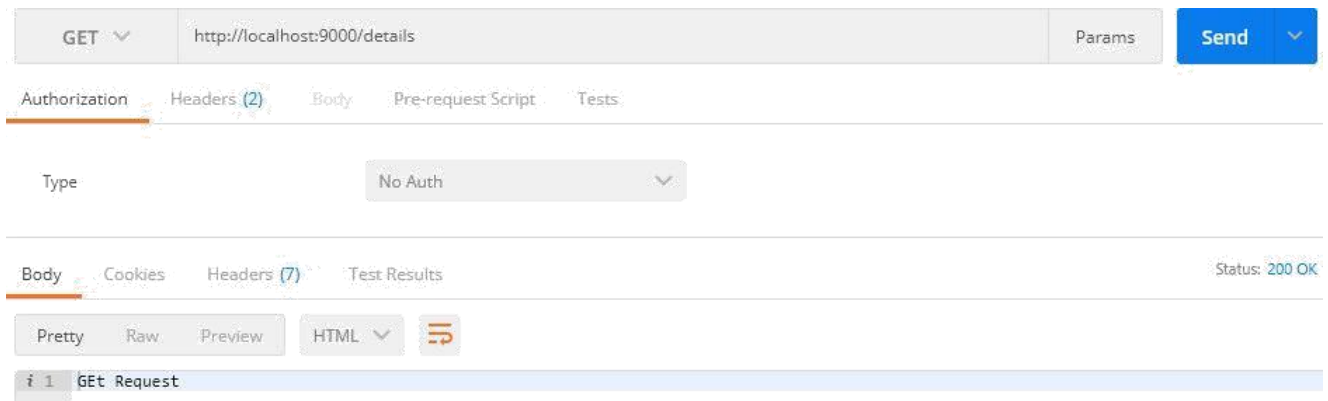
```
const express = require('express');  
const mongoose = require('mongoose');  
const url = 'mongodb://localhost/MENApp';  
const app = express();  
  
mongoose.connect(url, {useNewUrlParser:  
true}); const con = mongoose.connection;  
con.on('open', () => {  
  console.log('connected..')  
});  
  
const customRoute = require('./Router/menappRoute');  
app.use('/details', customRoute); // this is a middleware.  
app.listen(9000, () => {  
  console.log('Server Started.')  
});
```

IF your server work correctly you will get connected... message in CMD. Now we need to create Router to use (GET/POST/PATCH/DELETE Operations) so create a folder let say Router → menAppRoute.js and add below code

```
const express = require('express');  
const router = express.Router();  
router.get('/', (req, res) => {  
  res.send('GET Request');  
});
```

```
module.exports = router;
```

Now press send button of your Postman. (URL : <http://localhost:9000/details>)



MONGO DB COMMANDS

To run mongo commands first you have to open a new command prompt and run below command (for 32 bit) to keep database active and in running state.

Open new command prompt and run below command

> mongod --storageEngine=mmapv1 --dbpath "C:\data\db"(mongod for 64 bit)

Again Open new command prompt and run below command

> nodemon run start

Again Open new command prompt and run below command

> mongo

you will see a shell like below with a cursor blinking.

```
D:\MERN\MEN_CRUD_App\MEN_Project>mongo
MongoDB shell version: 3.2.22
connecting to: test
Server has startup warnings:
2021-10-09T19:20:16.377+0530 I CONTROL
2021-10-09T19:20:16.378+0530 I CONTROL
2021-10-09T19:20:16.380+0530 I CONTROL
2021-10-09T19:20:16.383+0530 I CONTROL
2021-10-09T19:20:16.385+0530 I CONTROL
2021-10-09T19:20:16.387+0530 I CONTROL
less with --journal).
2021-10-09T19:20:16.390+0530 I CONTROL
currently off.
2021-10-09T19:20:16.395+0530 I CONTROL
2021-10-09T19:20:16.397+0530 I CONTROL
> show dbs
local 0.078GB
> use local
switched to db local
> show collections
startup_log
system.indexes
> use mdb
switched to db mdb
> _
```


1. To see all db

> show dbs

2. To create new

db > use db_name

To see your newly created db you need to insert at least one record.

3. db.dbs.insert({"mdb_userName": "Sandee"});

4. show dbs

```
> show dbs
local  0.078GB
> use local
switched to db local
> show collections
startup_log
system.indexes
> use mdb
switched to db mdb
> db.dbs.insert({"mdb_userName": "Sandee"});
WriteResult({ "nInserted" : 1 })
> show dbs
local  0.078GB
mdb    0.078GB
>
```

creating collections

> db.createCollection("cars")

```
> db.createCollection("cars")
{ "ok" : 1 }
>
```

> show collections

```
> show collections
cars
dbs
system.indexes
>
```

Insert document inside collection

```
> db.cars.insert({name: 'TATA', manufacture: 2010, model: "tata
indica", price: 500000})
db.cars.insert({name: 'TATA', manufacture: 2010, model: "tata
indica", price: 500000})
```

show docs created inside collection

```
> db.cars.find().pretty()
```



```

> db.cars.insert({name: 'TATA', manufacture: 2010, model: "tata indica", price: 500000})
WriteResult({ "nInserted" : 1 })
> db.cars.find().pretty()
{ "_id" : ObjectId("6161a53a164b3d58b89f1f60") }
{
  "_id" : ObjectId("6161a57b164b3d58b89f1f61"),
  "name" : "TATA",
  "manufacture" : 2010,
  "model" : "tata indica",
  "price" : 500000
}
> db.cars.insert({name: 'honda', manufacture: 2020, model: 'fortuner', price: 220000})
WriteResult({ "nInserted" : 1 })
> db.cars.find().pretty()
{ "_id" : ObjectId("6161a53a164b3d58b89f1f60") }
{
  "_id" : ObjectId("6161a57b164b3d58b89f1f61"),
  "name" : "TATA",
  "manufacture" : 2010,
  "model" : "tata indica",
  "price" : 500000
}
{
  "_id" : ObjectId("6161a69f164b3d58b89f1f62"),
  "name" : "honda",
  "manufacture" : 2020,
  "model" : "fortuner",
  "price" : 220000
}
>

```

Updating specific field inside any record.

```
> db.cars.update({name: 'honda'}, {$set: {name: 'Ford'}})
```

```

> db.cars.update({name: 'honda'}, {$set: {name: 'Ford'}})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.cars.find().pretty()
{ "_id" : ObjectId("6161a53a164b3d58b89f1f60") }
{
  "_id" : ObjectId("6161a57b164b3d58b89f1f61"),
  "name" : "TATA",
  "manufacture" : 2010,
  "model" : "tata indica",
  "price" : 500000
}
{
  "_id" : ObjectId("6161a69f164b3d58b89f1f62"),
  "name" : "Ford",
  "manufacture" : 2020,
  "model" : "fortuner",
  "price" : 220000
}
>

```

Adding new field to existing record.

```
> db.cars.update({name: "Ford"}, {$set: {quantity: 400}}, {$upsert: true})
```

```
> db.cars.update({name: 'Ford'}, {$set: {quantity: 400}}, {$upsert: true})
WriteResult({ "nMatched" : 1, "nUpserted" : 0, "nModified" : 1 })
> db.cars.find().pretty()
{ "_id" : ObjectId("6161a53a164b3d58b89f1f60") }
{
  "_id" : ObjectId("6161a57b164b3d58b89f1f61"),
  "name" : "TATA",
  "manufacture" : 2010,
  "model" : "tata indica",
  "price" : 500000
}
{
  "_id" : ObjectId("6161a69f164b3d58b89f1f62"),
  "name" : "Ford",
  "manufacture" : 2020,
  "model" : "fortuner",
  "price" : 220000,
  "quantity" : 400
}
>
```

Practice Mongo DB Link:-

<https://www.youtube.com/watch?v=IBBtg3Oawqw>

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