

MongoDB Day 1

#MongoDB Notes

| Introduction



What is NoSQL?

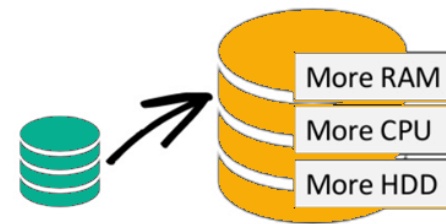
- **NoSQL** Database is a non-relational Data Management System, that does not require a fixed schema. It avoids joins, and is easy to scale.
- The major purpose of using a NoSQL database is for distributed data stores with humongous data storage needs.
- NoSQL is used for Big data and real-time web apps. For example, companies like Twitter, Facebook and Google collect terabytes of user data every single day.



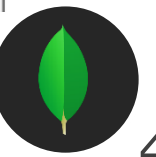
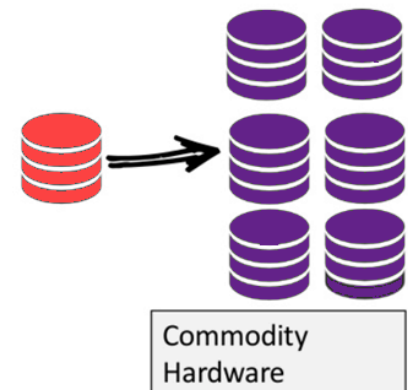
Why NoSQL?

- The concept of NoSQL databases became popular with Internet giants like Google, Facebook, Amazon, etc. who deal with huge volumes of data.
- The system response time becomes slow when you use RDBMS for massive volumes of data.
- To resolve this problem, we could “scale up” our systems by upgrading our existing hardware. This process is expensive.

Scale-Up (*vertical scaling*):



Scale-Out (*horizontal scaling*):

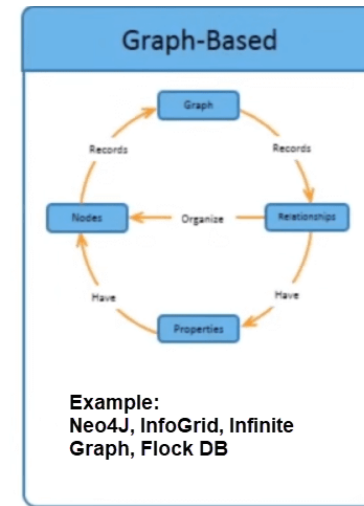
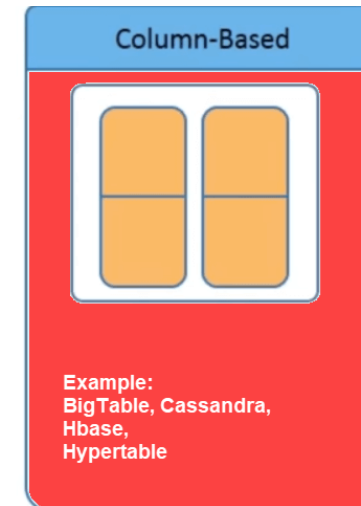
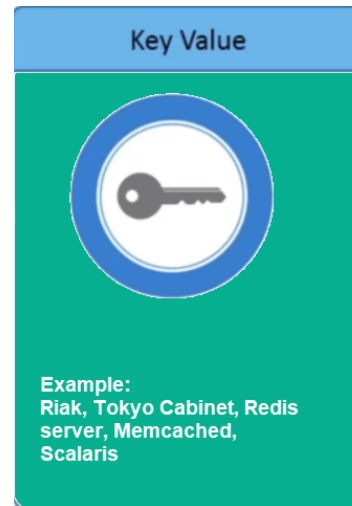


Types of NoSQL Databases

- **NoSQL Databases** are mainly categorized into four types: Key-value pair, Column-oriented, Graph-based and Document-oriented.
- Every category has its unique attributes and limitations. None of the above-specified database is better to solve all the problems.
- Users should select the database based on their product needs.

- **Types of NoSQL Databases:**

- Key-value Pair Based
- Column-oriented Graph
- Graphs based
- Document-oriented

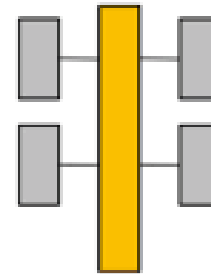


SQL Database

Relational

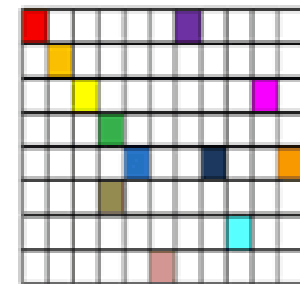


Analytical (OLAP)

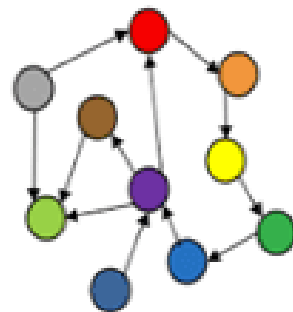


NoSQL Database

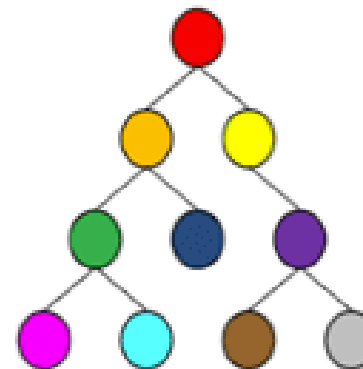
Column-Family



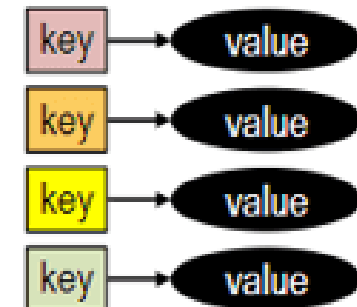
Graph



Document



Key-Value



JSON vs BSON

- JSON is **Javascript Object Notation**. It is a standard format used for storing and interchanging the data.
- JSON is a user readable and it is a completely language format. It is light weight.
- When we read the JSON data of any application so that is language independent. We can send information through **JSON** very easily.
- JSON is basically a combination of key/value pair and arrays.
- In JSON, we can embed more than one json documents in a single json file. The maximum 100 documents can be embedded in a single json document.



```
{
  "_id": 1,
  "name" : { "first" : "John", "last" : "Backus" },
  "contribs" : [ "Fortran", "ALGOL", "Backus-Naur Form", "FP" ],
  "awards" : [
    {
      "award" : "W.W. McDowell Award",
      "year" : 1967,
      "by" : "IEEE Computer Society"
    }, {
      "award" : "Draper Prize",
      "year" : 1993,
      "by" : "National Academy of Engineering"
    }
  ]
}
```



BSON

- BSON is a Binary **Javascript Object notation**.
- It is not in the human readable format as it is in the binary format. In MongoDB, BSON is used to encrypt the JSON data.
- It provides additional data types over the JSON data.
- It is also a language independent, and can be easily parsed.
- It supports the adding of documents and arrays within other documents and arrays.
- <https://www.mongodb.com/json-and-bson>



```

{"hello": "world"} → \x16\x00\x00\x00 // total document size
                     \x02 // 0x02 = type String
                     hello\x00 // field name
                     \x06\x00\x00\x00world\x00 // field value
                     \x00 // 0x00 = type E00 ('end of object')

```

```

{"BSON": ["awesome", 5.05, 1986]} → \x31\x00\x00\x00
                                   \x04BSON\x00
                                   \x26\x00\x00\x00
                                   \x02\x30\x00\x08\x00\x00\x00awesome\x00
                                   \x01\x31\x00\x33\x33\x33\x33\x33\x33\x14\x40
                                   \x10\x32\x00\xc2\x07\x00\x00
                                   \x00
                                   \x00

```



MongoDB

- MongoDB is an open source, document oriented database that stores data in form of documents (key and value pairs).
- MongoDB provides high performance, high availability, and easy scalability.
- MongoDB works on concept of collection and document.
- MongoDB is also a schema-less database, so we don't need to specify the number or type of columns before inserting our data.
- MongoDB is a database which came into light around the mid-2000s.



SQL Database	NoSQL Database (MongoDB)
Relational database	Non-relational database
Supports SQL query language	Supports JSON query language
Table based	Collection based and key-value pair
Row based	Document based
Column based	Field based
Support foreign key	No support for foreign key
Support for triggers	No Support for triggers
Contains schema which is predefined	Contains dynamic schema
Not fit for hierarchical data storage	Best fit for hierarchical data storage
Vertically scalable - increasing RAM	Horizontally scalable - add more servers
Emphasizes on ACID properties (Atomicity, Consistency, Isolation and Durability)	Emphasizes on CAP theorem (Consistency, A



Why Use MongoDB?

- **Document Oriented Storage** – Data is stored in the form of JSON style documents.
- Index on any attribute
- Replication and high availability
- Auto-sharding
- Rich queries
- Fast in-place updates
- Professional support by MongoDB



When to go for MongoDB

- Load Balancing
- Avoid JOINS
- Not Relational data
- Best suited for changing schema



Where to Use MongoDB?

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



Problem : Insert Data for table Student and Subject. And link Subject to Student entry.

RDBM

1st INSERT - Data into Subject

Insert into Subject(1, 'Drawing');

2nd INSERT - Data into Student with Subject Id

Insert into Student(1, 1, 'Viraj', 'Nursery')

NoSQL

SINGLE INSERT

Student :

```
{
  student_id : 1,
  stu_name : "Viraj",
  stu_class : "Nursery",
  subject : ["Drawing", "English"]
}
```

Student :

- student_id
- subject_id
- stu_name
- stu_class

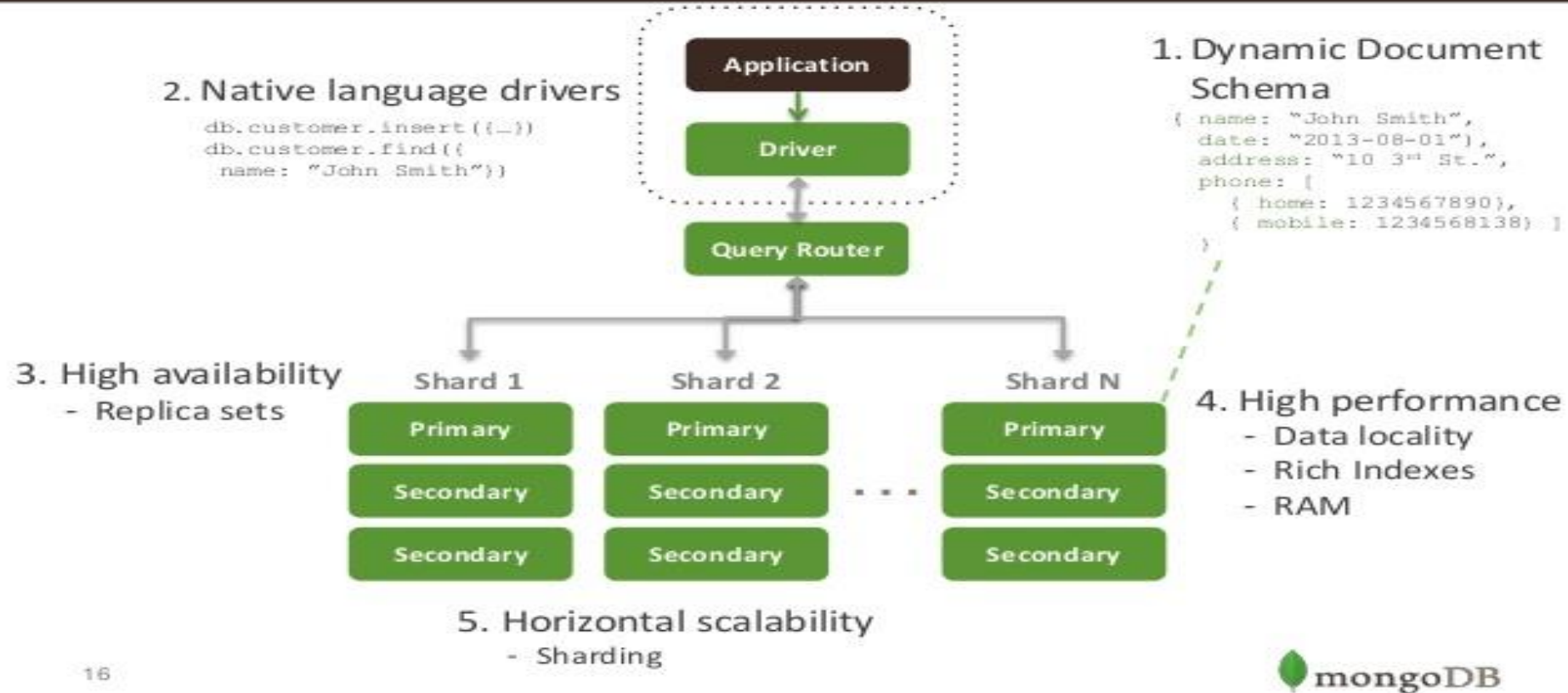
Subject :

- subject_id
- sub_name



Architecture

Modern DB Architecture



16



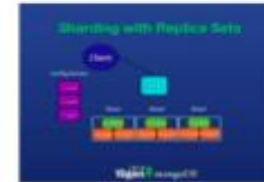
Features Of MongoDB



Faster process



Open Source



Sharding



Schemaless

```
{ "id": "12345678901234567890",  
  "studentName": "Narath Kumar",  
  "age": "20",  
  "course": "MCA",  
  "address": "Bangalore"
```

Document based



No SQL Injection

Organizations that use MongoDB

- Adobe
- LinkedIn
- McAfee
- FourSquare
- eBay
- MetLife
- SAP



Date	MySQL	MongoDB
Written in	C++, C	C++, C and JavaScript
Type	RDBMS	Document-oriented
Main points	<ul style="list-style-type: none">- Table- Row- Column	<ul style="list-style-type: none">- Collection- Document- Field
License	GPL v2 / Commercial licenses available OD	GNU AGPL v3.0 / Commercial licenses available OD
Schemas	Strict	Dynamic
Scaling	Vertically	Horizontally
Key features	<ul style="list-style-type: none">- Full-text searching and indexing- Integrated replication support- Triggers- SubSELECTs- Query caching- SSL support- Unicode support- Different storage engines with various performance characteristics	<ul style="list-style-type: none">- Auto-sharding- Native replication- In-memory speed- Embedded data models support- Comprehensive secondary indexes- Rich query language support- Various storage engines support
Best used for	<ul style="list-style-type: none">- Data structure fits for tables and rows- Strong dependence on multi-row transactions- Frequent updates and modifications of large volume of records- Relatively small datasets	<ul style="list-style-type: none">- High write loads- Unstable schema- Your DB is set to grow big- Data is location based- HA (high availability) in unstable environment is required- No database administrators (DBAs)
Examples	NASA, US Navy, Bank of Finland, UCR, Walmart, Sony, S2 Security Corporation, Telenor, Italtel, iStock, Uber, Zappos, Booking.com, Twitter, Facebook, others.	Expedia, Bosch, Otto, eBay, Gap, Forbes, Foursquare, Adobe, Intuit, Metlife, BuzzFeed, Crittercism, CitiGroup, the City of Chicago, others.

Advantages

- ✓ Performance
- ✓ Document Model

- ✓ Flexible Schema



mongoDB

Disadvantages

- ✓ No transaction
- ✓ No join

- ✓ Memory limitation



MongoDB Terminology

SQL Server	MongoDB
Database	Database
Table	Collection
Row	Document
Column	Field
Index	Index



Mongo DB Version

- Current Version is : 5.0



Download

- Mongo DB Setup
- Mongo DB Compass
-



Mongo DB Port Number

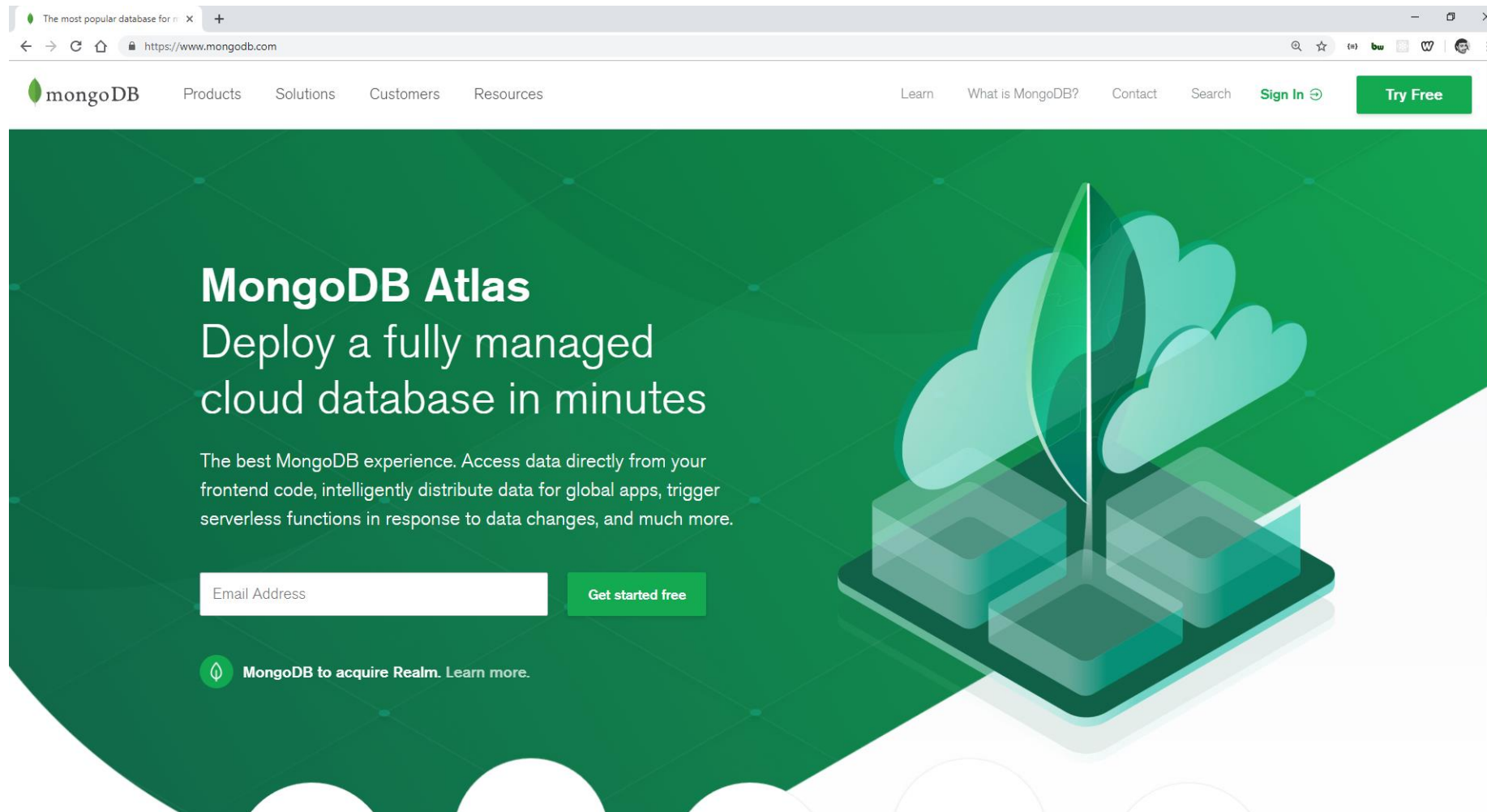
- 27017



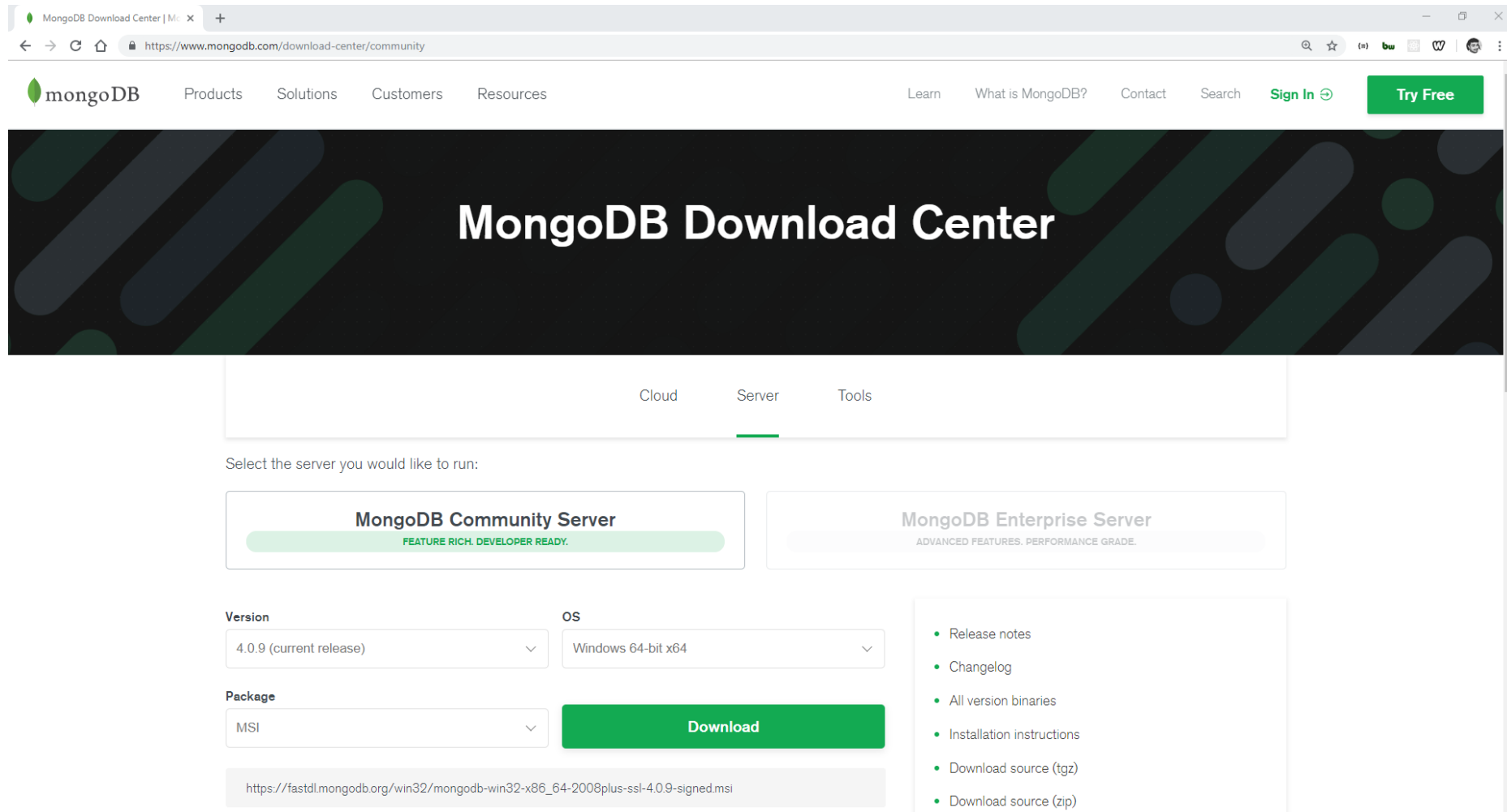
| Installation



Download MongoDB



Download Community Server



The screenshot shows the MongoDB Download Center website. The browser address bar displays <https://www.mongodb.com/download-center/community>. The navigation bar includes the MongoDB logo, links for Products, Solutions, Customers, Resources, Learn, What is MongoDB?, Contact, Search, Sign In, and a Try Free button. The main header features the text "MongoDB Download Center" on a dark background with green and blue geometric patterns. Below the header, there are tabs for Cloud, Server (which is selected), and Tools. A message says "Select the server you would like to run:". Two server options are presented: "MongoDB Community Server" with the tagline "FEATURE RICH. DEVELOPER READY." and "MongoDB Enterprise Server" with "ADVANCED FEATURES. PERFORMANCE GRADE.". Under the Community Server option, there are dropdown menus for Version (4.0.9 (current release)) and OS (Windows 64-bit x64), and a Package dropdown (MSI). A green Download button is next to these. Below the button, a URL is provided: https://fastdl.mongodb.org/win32/mongodb-win32-x86_64-2008plus-ssl-4.0.9-signed.msi. To the right of the download options, a list of links is shown: Release notes, Changelog, All version binaries, Installation instructions, Download source (tgz), and Download source (zip).



Download Compass

Thank you for downloading MongoDB Community Server. Your download will begin shortly. ×

Want an alternative to installing and running MongoDB yourself?

Get the fully managed MongoDB service on AWS, Azure, and GCP.

- ✓ Designed to make it easy to deploy, operate, and scale MongoDB databases
- ✓ Turnkey data distribution across regions to serve apps with a global audience
- ✓ Secure by default for sensitive workloads
- ✓ Highly available out of the box with a 99.995% Uptime SLA
- ✓ Built for optimal performance

Get started free! No credit card required

✓ 8 characters minimum

✓ One number

✓ One letter

✓ One special character

☐ I agree to the [terms of service](#).

Get started free



Clusters | Atlas: MongoDB Atlas x MongoDB Download Center | M: x +

← → ↻ 🏠 🔒 https://www.mongodb.com/download-center

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MongoDB Download Center

Cloud Server Tools

MongoDB Atlas Global Cloud Database

Deploy, operate, and scale a MongoDB database in the cloud with just a few clicks. Fully elastic and highly available by default, MongoDB Atlas is the easiest way to try out the latest version of the database, **MongoDB 4.0**.

- Secure from the start
- Fully managed backups
- Comprehensive monitoring and customizable alerts
- Easily migrate existing deployments with minimal downtime

Ops Manager
Compass
Connector for BI
Charts

Load necessary
ee cluster now

First name Last name

.....

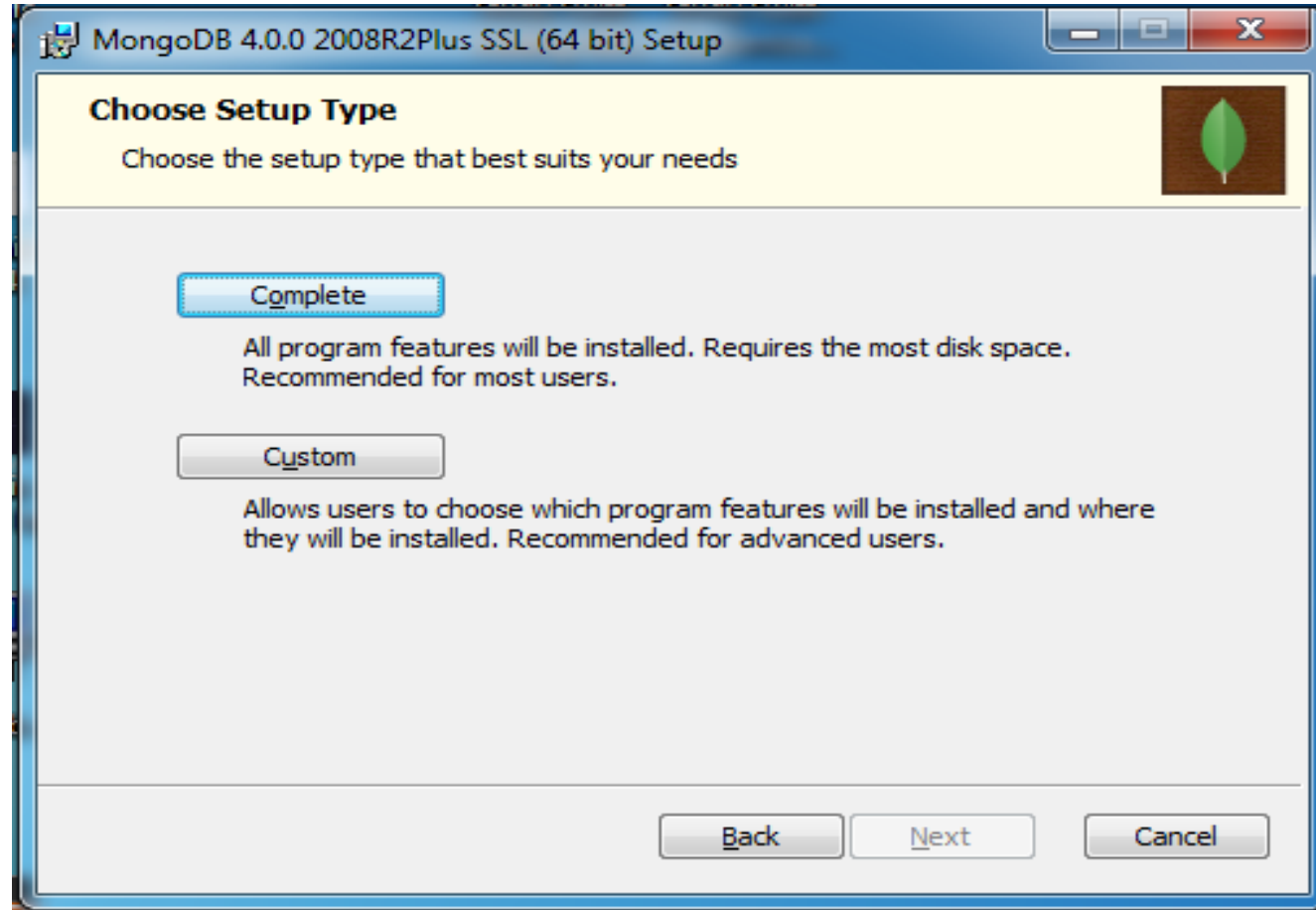
- ✓ 8 character minimum
- ✓ One number
- ✓ One letter



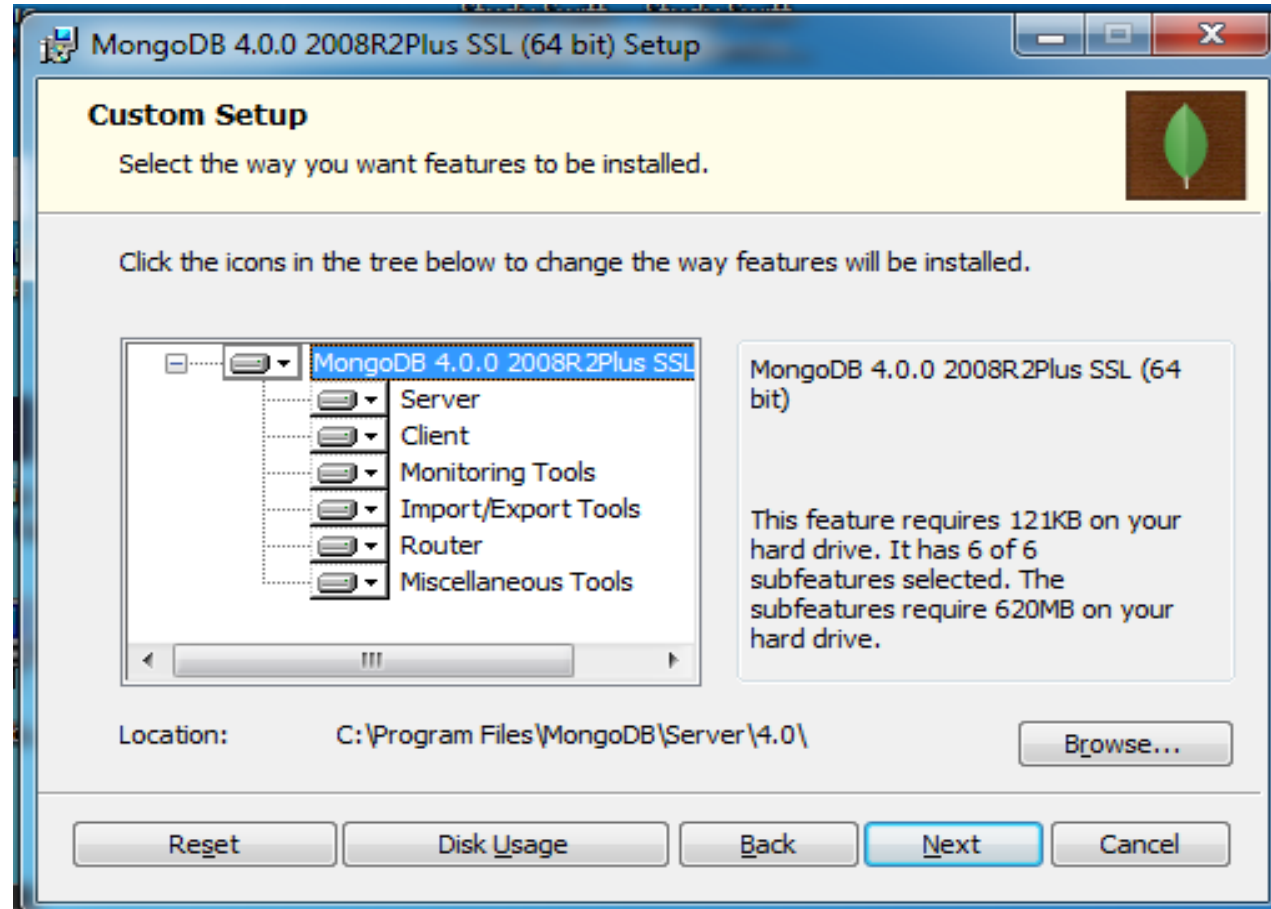
Installation MongoDB



Select Custom Option



Click Next



Click Next

MongoDB 4.0.0 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:

Account Password:

Service Name:

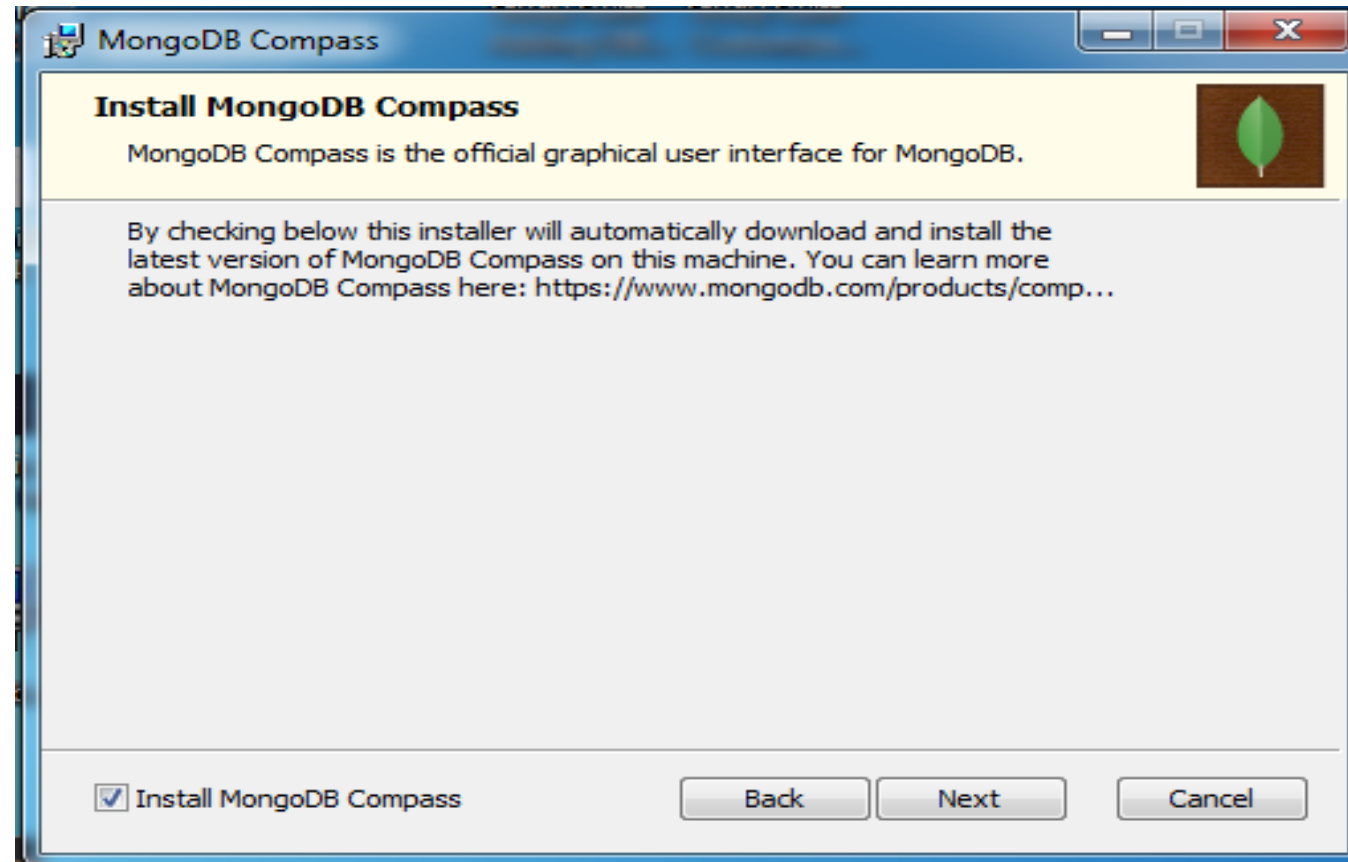
Data Directory:

Log Directory:

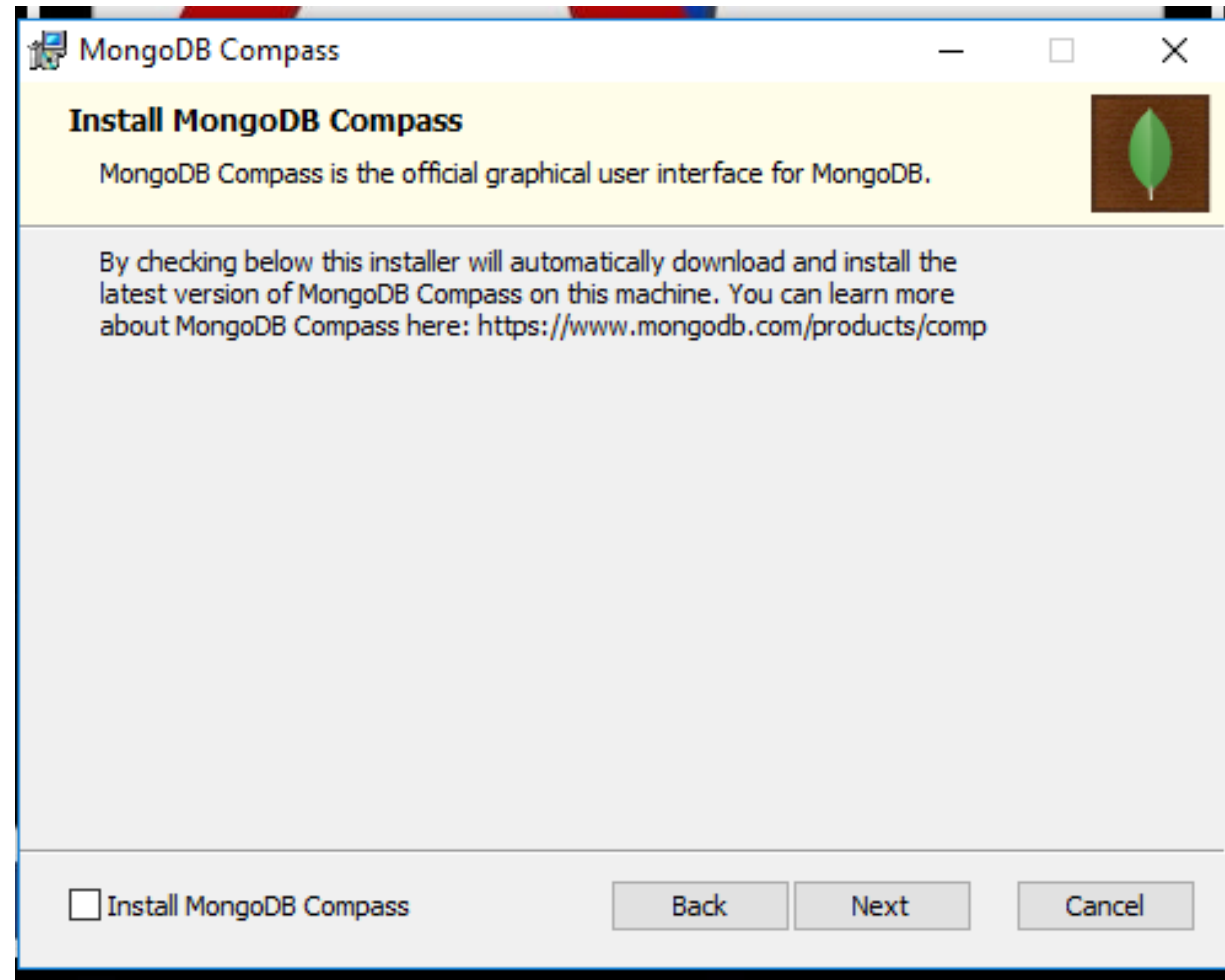
< Back Next > Cancel



UnCheck Install MongoDB Option

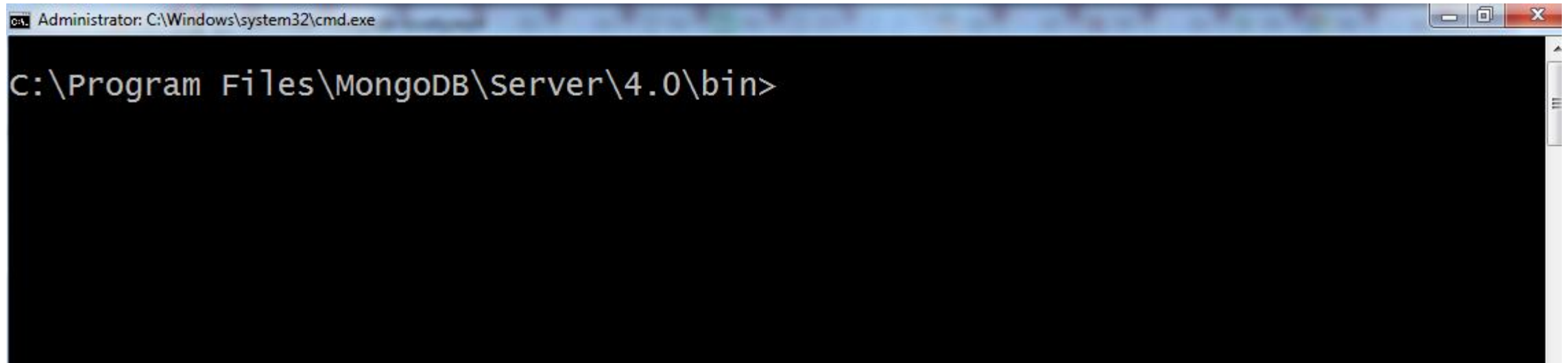


Install MongoDB Compass Seprate



Mongo DB Path

- Mongo DB Install Path



A screenshot of a Windows command prompt window. The title bar at the top reads "Administrator: C:\Windows\system32\cmd.exe". The command prompt shows the current directory as "C:\Program Files\MongoDB\Server\4.0\bin>".



MongoDB Path Set

If MongoDB is not Connecting Using Command Line



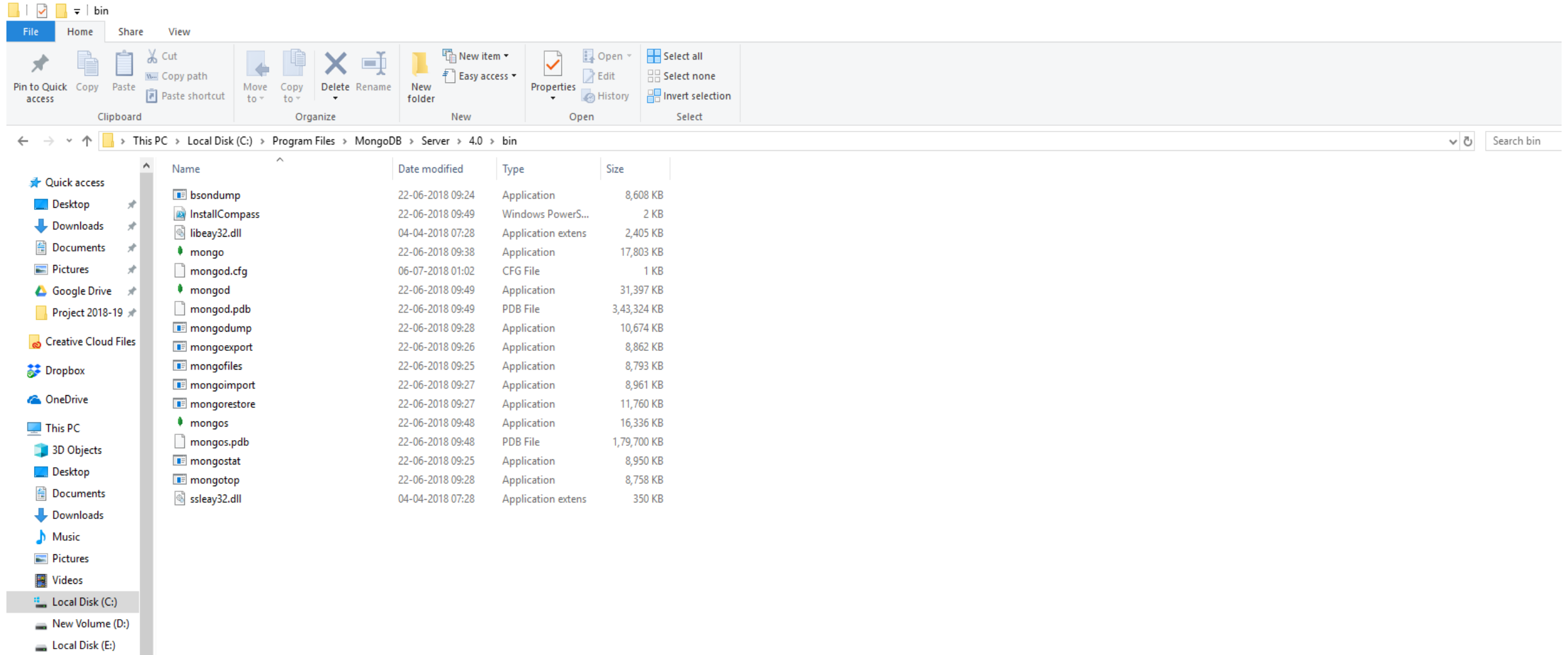
Goto Data Path

The screenshot shows a Windows File Explorer window with the address bar displaying the path: `This PC > Local Disk (C:) > Program Files > MongoDB > Server > 4.0 > data`. The left sidebar shows the navigation pane with 'Local Disk (C:)' selected. The main pane displays a list of files and folders in the 'data' directory.

Name	Date modified	Type	Size
diagnostic.data	16-08-2018 05:29	File folder	
journal	16-08-2018 12:46	File folder	
_mdb_catalog.wt	16-08-2018 12:46	WT File	36 KB
collection-0-3565865991260102949.wt	16-08-2018 12:46	WT File	36 KB
collection-0--4572183532997249978.wt	16-08-2018 12:46	WT File	16 KB
collection-0-6457572793683452181.wt	16-08-2018 12:46	WT File	36 KB
collection-0--9143208926439511899.wt	16-08-2018 12:46	WT File	16 KB
collection-2--9143208926439511899.wt	16-08-2018 12:47	WT File	52 KB
collection-4--9143208926439511899.wt	16-08-2018 12:46	WT File	24 KB
index-1-3565865991260102949.wt	13-08-2018 05:59	WT File	36 KB
index-1--4572183532997249978.wt	13-08-2018 06:01	WT File	16 KB
index-1-6457572793683452181.wt	13-08-2018 06:00	WT File	36 KB
index-1--9143208926439511899.wt	16-08-2018 12:46	WT File	16 KB
index-3--9143208926439511899.wt	16-08-2018 12:47	WT File	36 KB
index-5--9143208926439511899.wt	13-08-2018 06:00	WT File	24 KB
index-6--9143208926439511899.wt	16-08-2018 12:47	WT File	24 KB
mongod.lock	16-08-2018 12:46	LOCK File	1 KB
sizeStorer.wt	16-08-2018 12:48	WT File	36 KB
storage.bson	06-07-2018 01:02	BSON File	1 KB
WiredTiger	06-07-2018 01:02	File	1 KB
WiredTiger.lock	06-07-2018 04:26	LOCK File	1 KB
WiredTiger.turtle	16-08-2018 12:48	TURTLE File	2 KB
WiredTiger.wt	16-08-2018 12:48	WT File	76 KB
WiredTigerLAS.wt	16-08-2018 12:46	WT File	4 KB



Goto Bin Folder

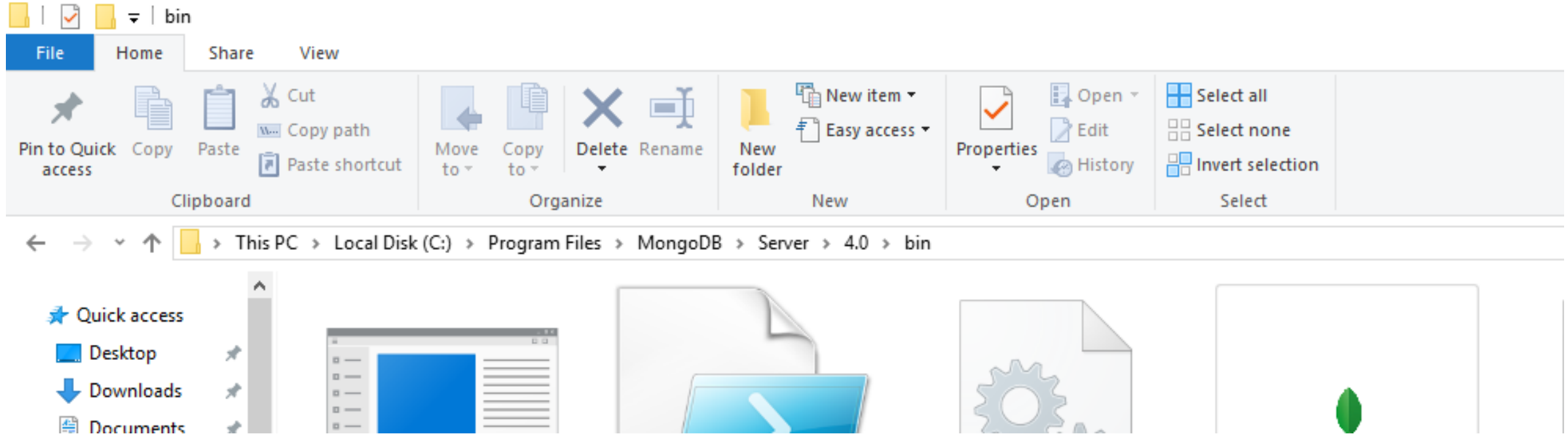


The screenshot shows a Windows File Explorer window with the address bar displaying the path: This PC > Local Disk (C:) > Program Files > MongoDB > Server > 4.0 > bin. The left sidebar shows the navigation pane with 'Local Disk (C:)' selected. The main pane displays a list of files and folders in the 'bin' directory.

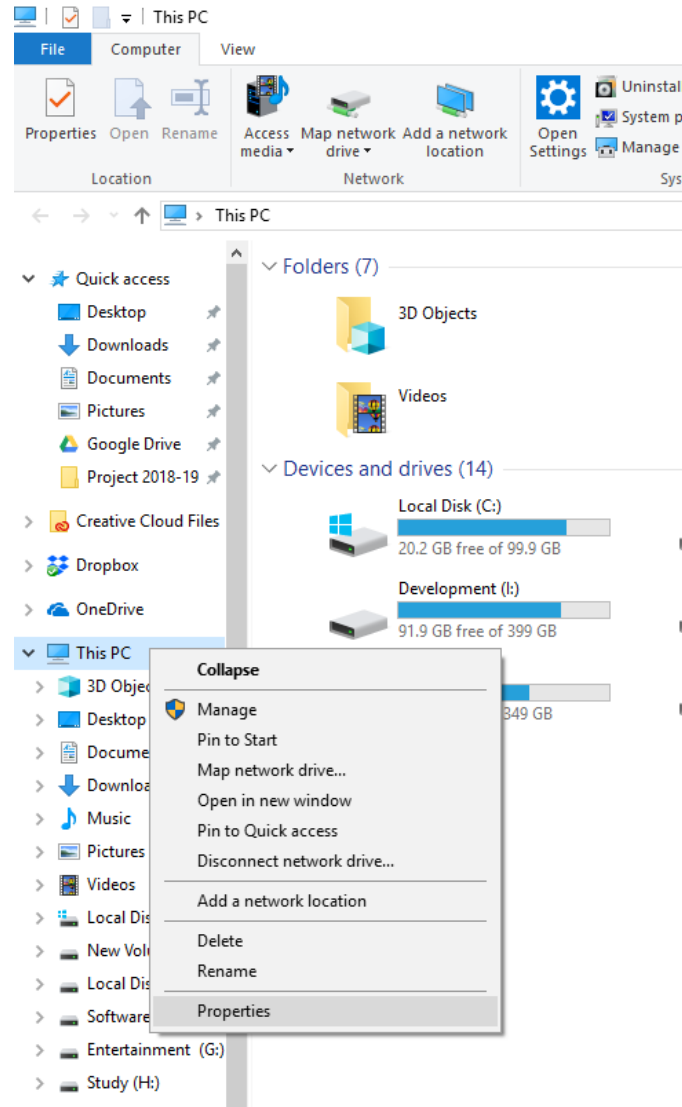
Name	Date modified	Type	Size
bsondump	22-06-2018 09:24	Application	8,608 KB
InstallCompass	22-06-2018 09:49	Windows PowerS...	2 KB
libeay32.dll	04-04-2018 07:28	Application extens	2,405 KB
mongo	22-06-2018 09:38	Application	17,803 KB
mongod.cfg	06-07-2018 01:02	CFG File	1 KB
mongod	22-06-2018 09:49	Application	31,397 KB
mongod.pdb	22-06-2018 09:49	PDB File	3,43,324 KB
mongodump	22-06-2018 09:28	Application	10,674 KB
mongoexport	22-06-2018 09:26	Application	8,862 KB
mongofiles	22-06-2018 09:25	Application	8,793 KB
mongoimport	22-06-2018 09:27	Application	8,961 KB
mongorestore	22-06-2018 09:27	Application	11,760 KB
mongos	22-06-2018 09:48	Application	16,336 KB
mongos.pdb	22-06-2018 09:48	PDB File	1,79,700 KB
mongostat	22-06-2018 09:25	Application	8,950 KB
mongotop	22-06-2018 09:28	Application	8,758 KB
ssleay32.dll	04-04-2018 07:28	Application extens	350 KB



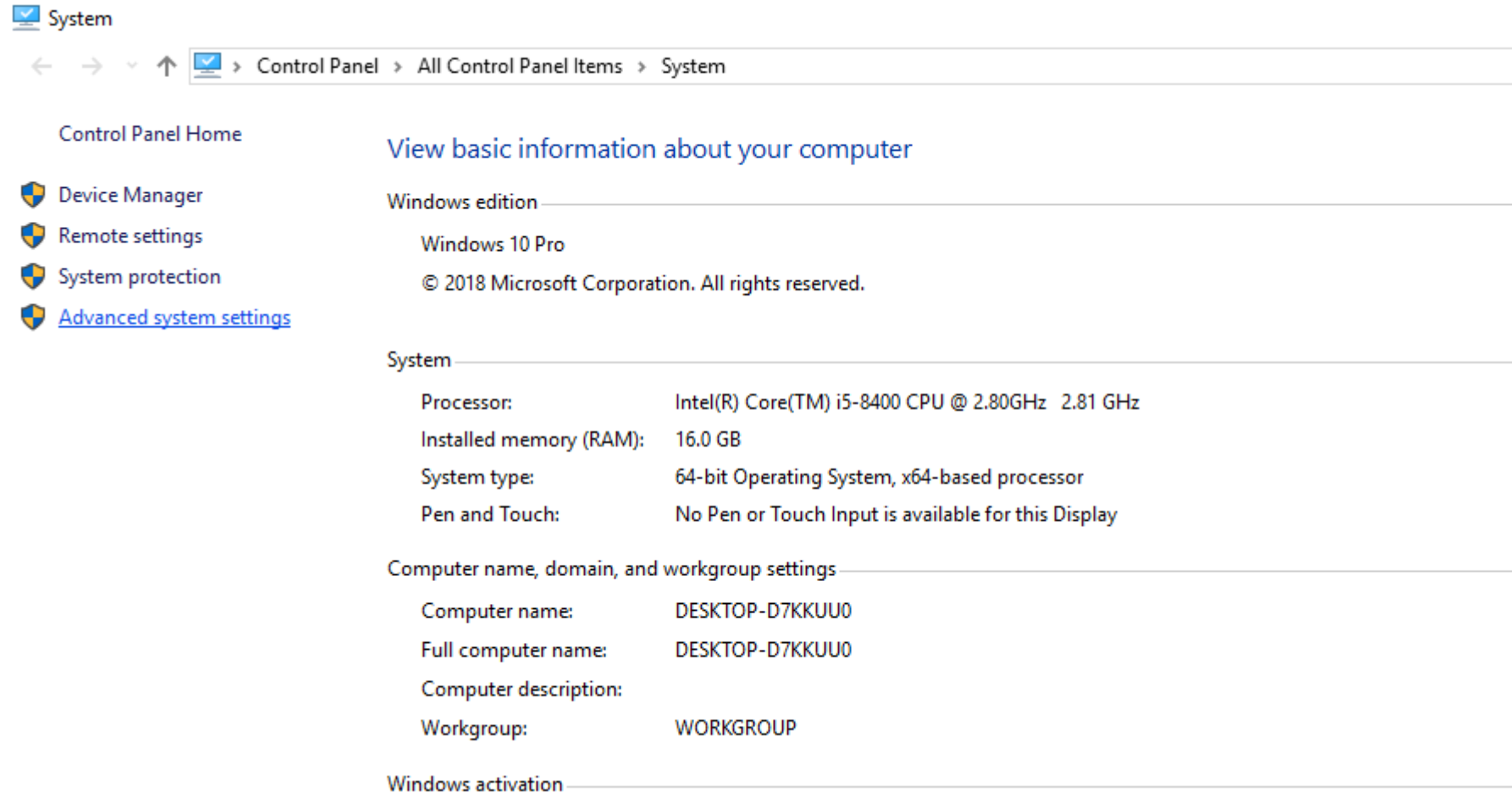
Select Path



Goto Computer Properties



Click on Advance System Settings



The screenshot shows the Windows 'System' settings page. On the left, there is a sidebar with links: 'Control Panel Home', 'Device Manager', 'Remote settings', 'System protection', and 'Advanced system settings' (which is highlighted with a blue link). The main content area is titled 'View basic information about your computer'. It contains several sections: 'Windows edition' showing 'Windows 10 Pro' and '© 2018 Microsoft Corporation. All rights reserved.'; 'System' showing 'Processor: Intel(R) Core(TM) i5-8400 CPU @ 2.80GHz 2.81 GHz', 'Installed memory (RAM): 16.0 GB', 'System type: 64-bit Operating System, x64-based processor', and 'Pen and Touch: No Pen or Touch Input is available for this Display'; 'Computer name, domain, and workgroup settings' showing 'Computer name: DESKTOP-D7KKUU0', 'Full computer name: DESKTOP-D7KKUU0', 'Computer description:', and 'Workgroup: WORKGROUP'; and 'Windows activation'.

System

Control Panel Home

Device Manager

Remote settings

System protection

[Advanced system settings](#)

View basic information about your computer

Windows edition

Windows 10 Pro

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System

Processor: Intel(R) Core(TM) i5-8400 CPU @ 2.80GHz 2.81 GHz

Installed memory (RAM): 16.0 GB

System type: 64-bit Operating System, x64-based processor

Pen and Touch: No Pen or Touch Input is available for this Display

Computer name, domain, and workgroup settings

Computer name: DESKTOP-D7KKUU0

Full computer name: DESKTOP-D7KKUU0

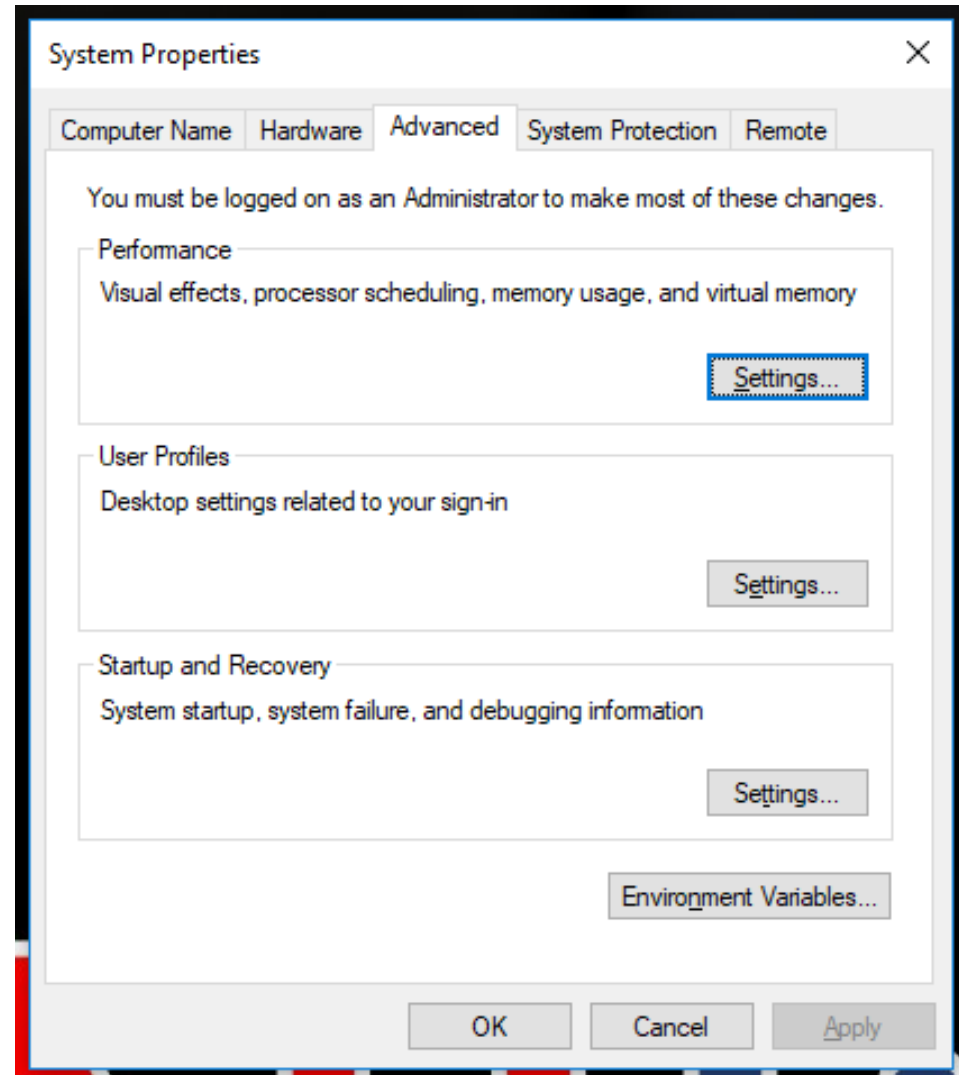
Computer description:

Workgroup: WORKGROUP

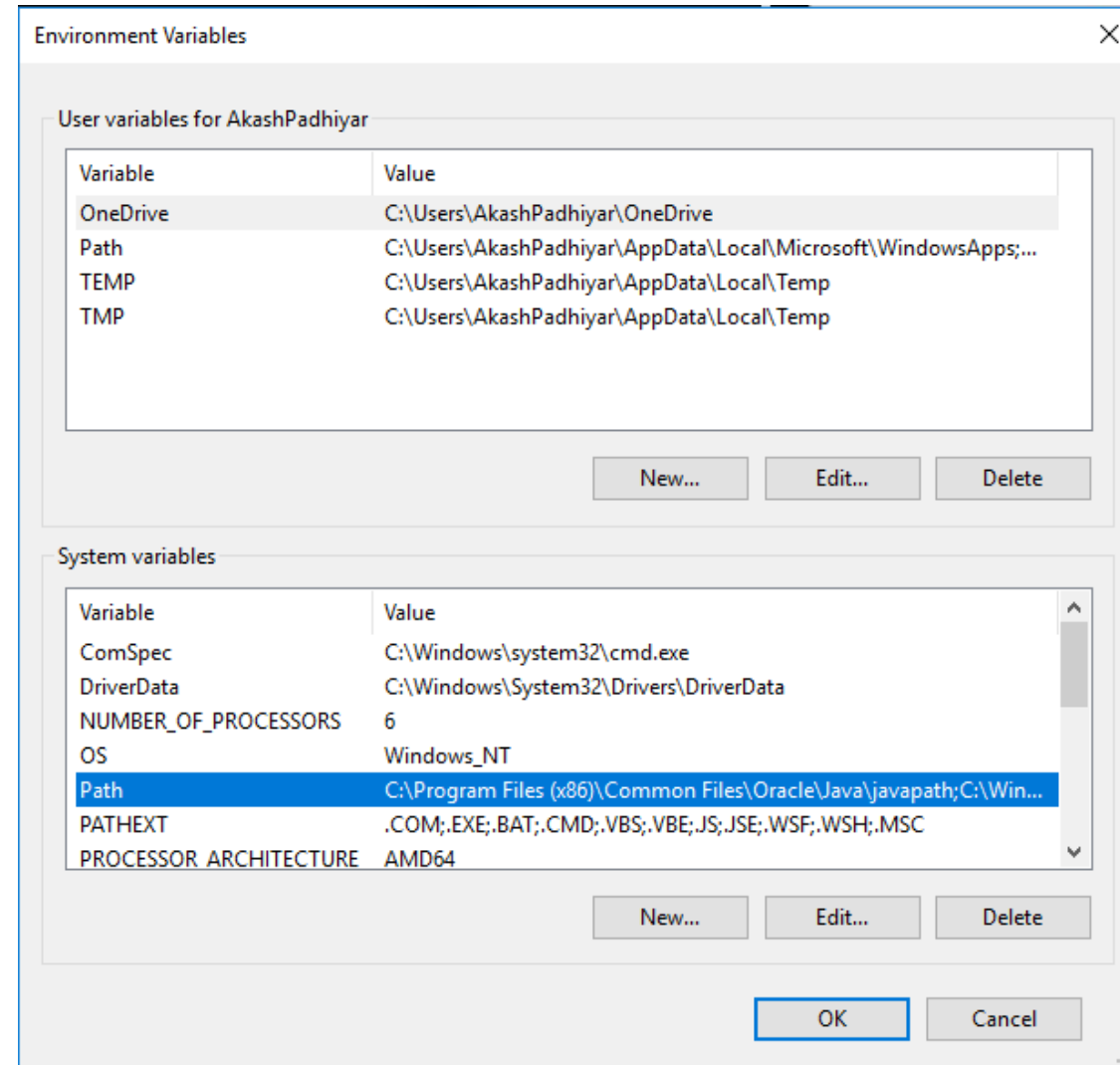
Windows activation



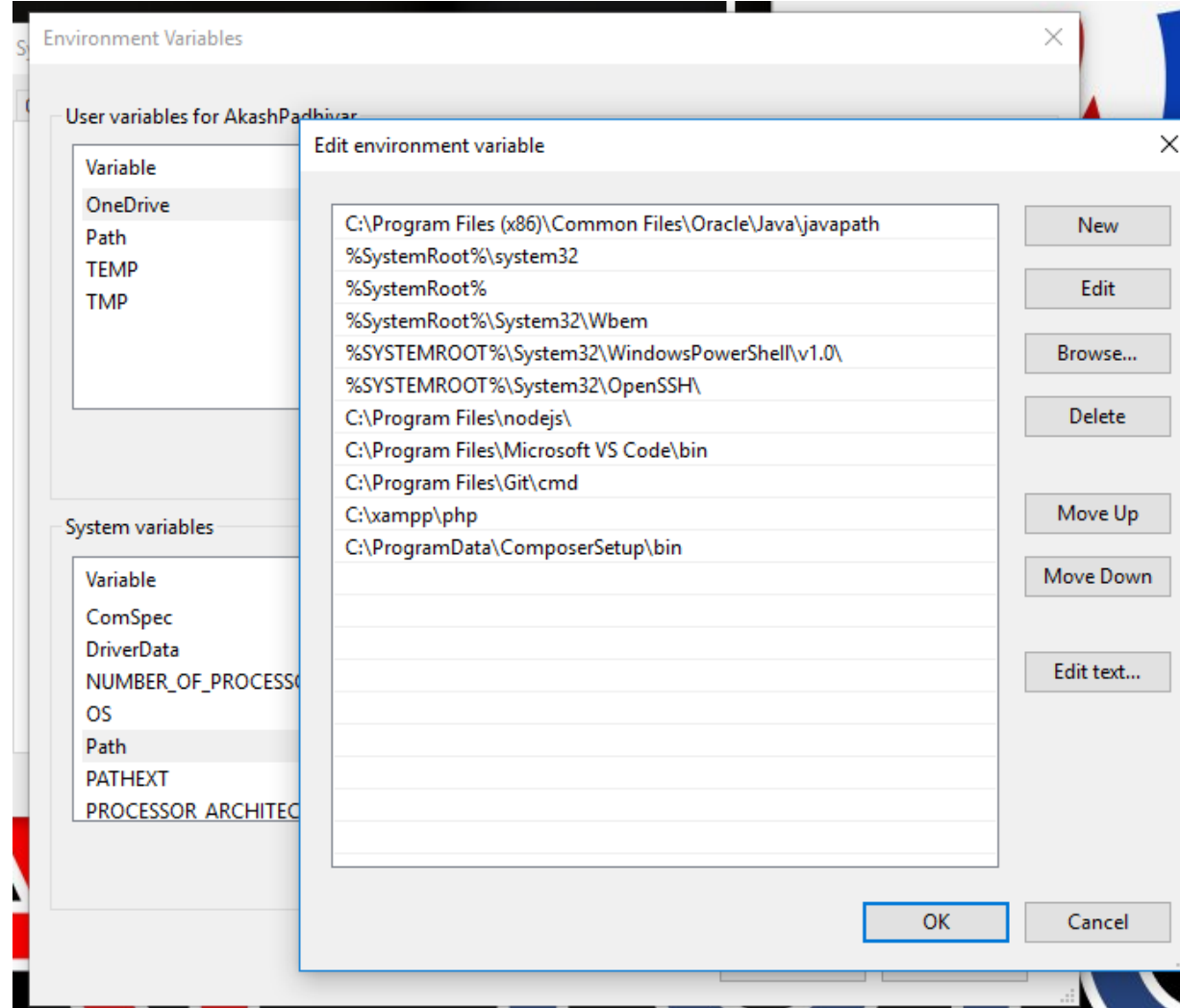
Click on Environment



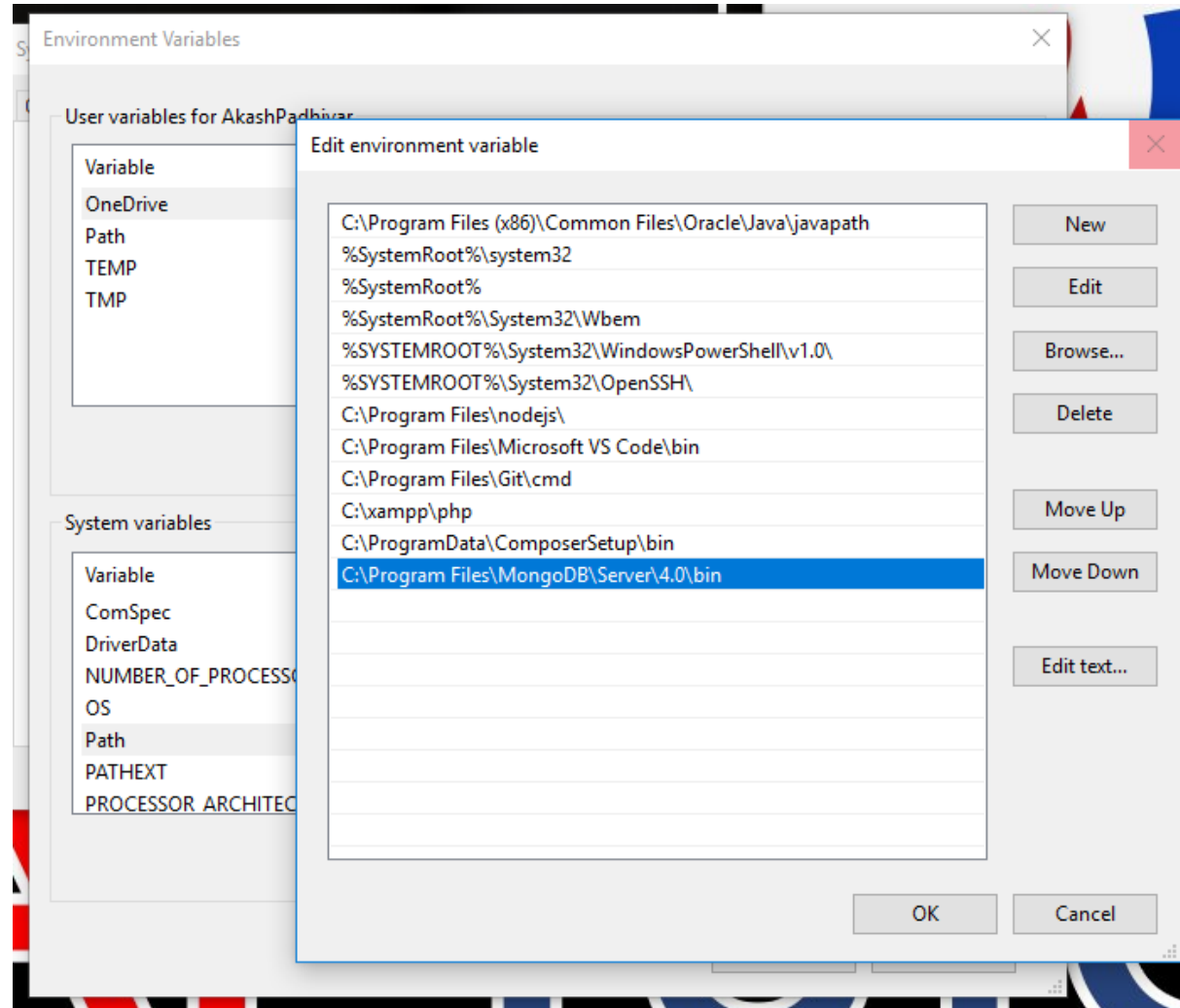
Add Path



Click on New



Paste Path



Connect MongoDB

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.17134.165]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\AkashPadhiyar>
```



Connect Using Mongo

```
C:\Windows\system32\cmd.exe
Microsoft Windows [Version 10.0.17134.165]
(c) 2018 Microsoft Corporation. All rights reserved.

C:\Users\AkashPadhiyar>mongo
```



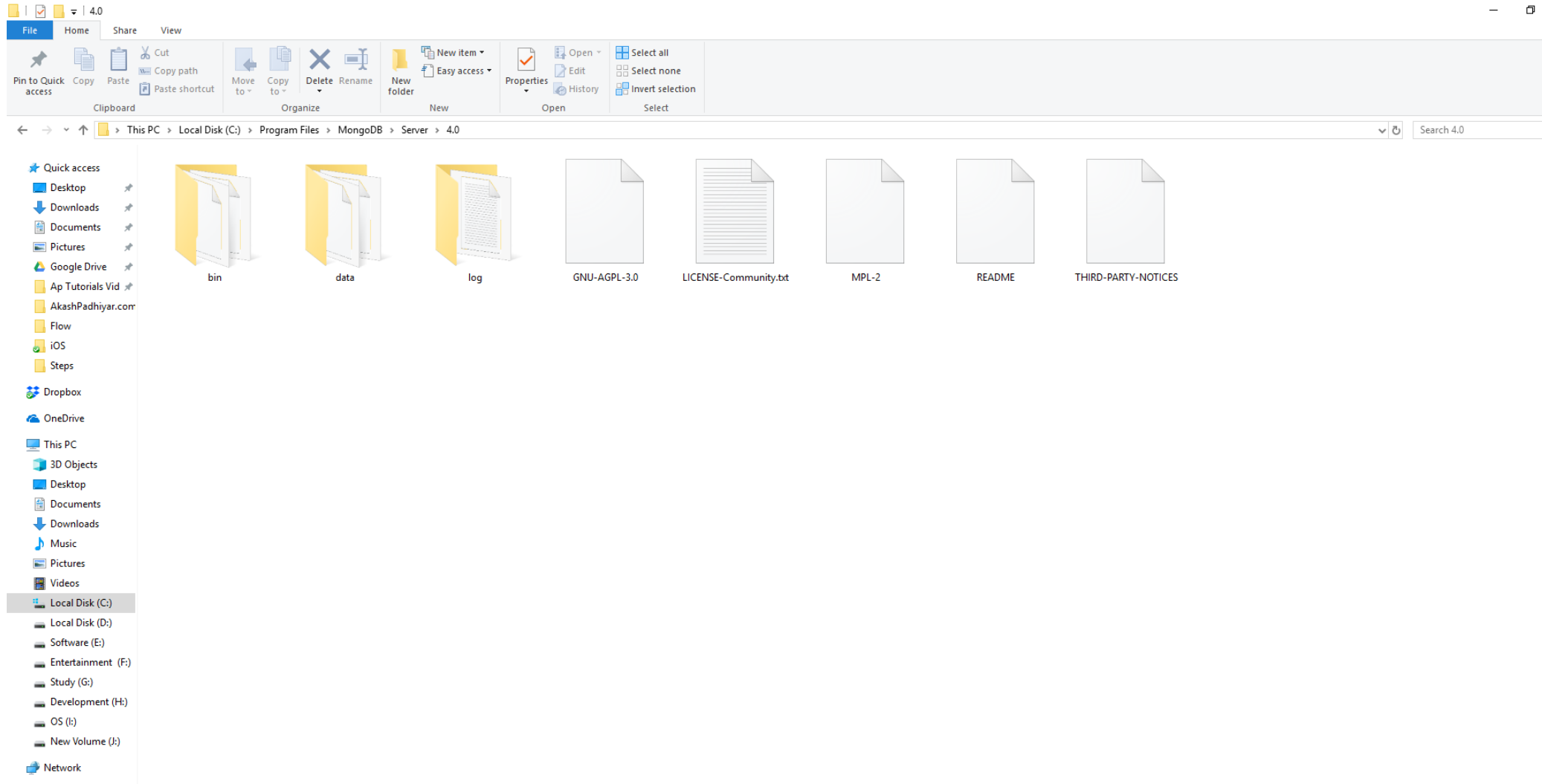
MongoDB Path Port Number

C:\Windows\system32\cmd.exe - mongo

```
Microsoft Windows [Version 10.0.17134.165]  
(c) 2018 Microsoft Corporation. All rights reserved.  
  
C:\Users\AkashPadhiyar>mongo  
MongoDB shell version v4.0.0  
connecting to: mongodb://127.0.0.1:27017
```



Mongo DB Installation Directory



| Mongo DB Compass



What is MongoDB Compass ?

- **MongoDB Compass** is a simple-to-use, sophisticated GUI that allows any user within your organization to visualize and explore your data with ad-hoc queries in just a few clicks – all with zero knowledge of the **MongoDB** query language.



How to Install MongoDB Compass

- There are two ways to Download MongoDB Compass
 1. Download From Official Website
 2. Using Inbuilt Command

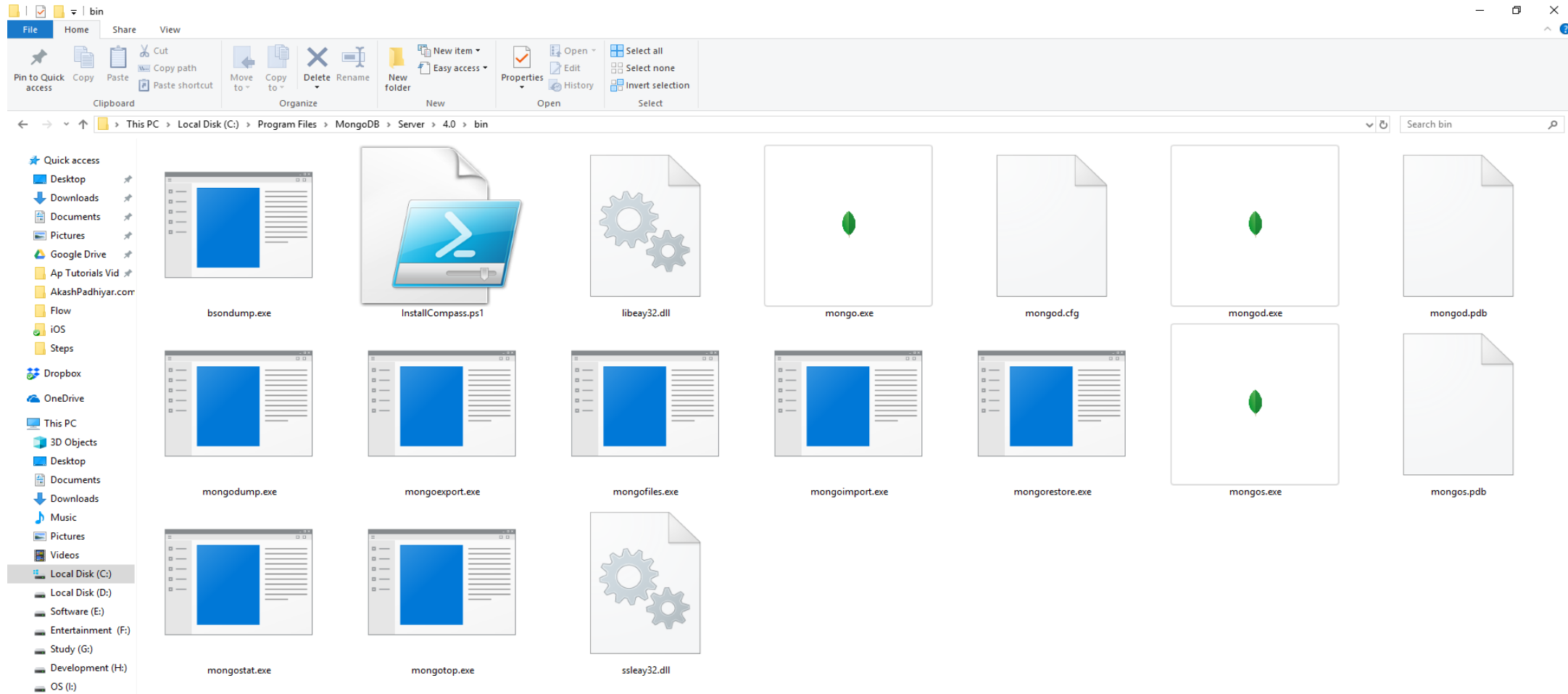


Download MongoDB Compass

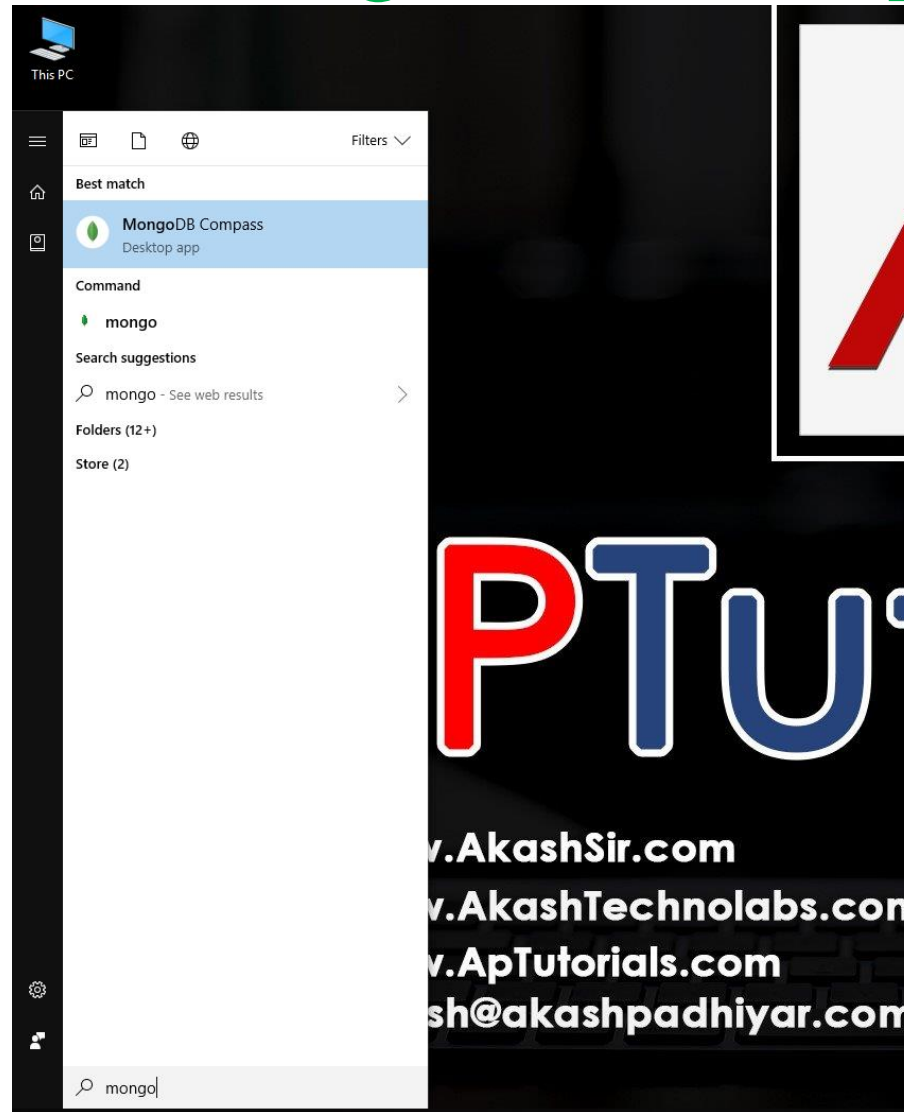
- To Download Mongo DB Compass
 - <https://www.mongodb.com/products/compass>



Install Mongo Compass Using InstallCompass.ps1



Run MongoDB Compass



MongoDB Compass UI

MongoDB Compass - Connect

Connect View Help

[CREATE FREE ATLAS CLUSTER](#)
Includes 512 MB of data storage.
[Learn more](#)

New Connection

Favorites

RECENTS

AUG 29, 2018 4:36 PM
localhost:27017

AUG 27, 2018 7:20 PM
localhost:27017

A DAY AGO
localhost:27017

AUG 28, 2018 3:02 PM
localhost:27017

Connect to Host

Hostname

Port

SRV Record ☐

Authentication

Replica Set Name

Read Preference

SSL

SSH Tunnel

Favorite Name ⓘ

CONNECT



MongoDB Compass - localhost:27017

Connect View Help

My Cluster

localhost:27017 STANDALONE

MongoDB 4.0.1 Community

4 DBS 2 COLLECTIONS

filter

> admin

> config

> local

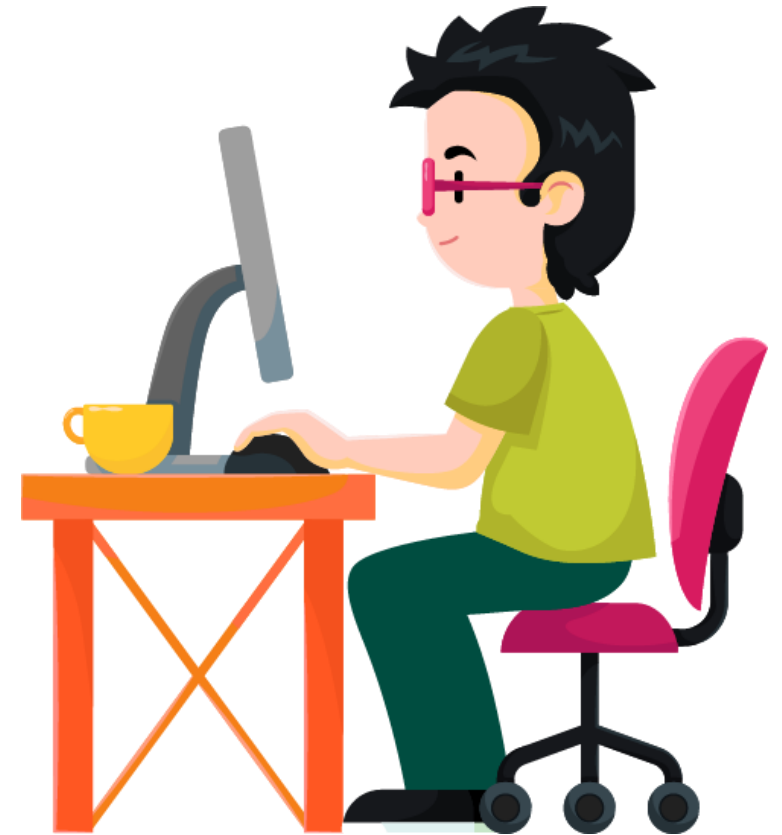
> test

CREATE DATABASE

Database Name	Storage Size	Collections	Indexes
admin	16.0KB	0	1
config	24.0KB	0	2
local	36.0KB	1	1
test	16.0KB	1	1



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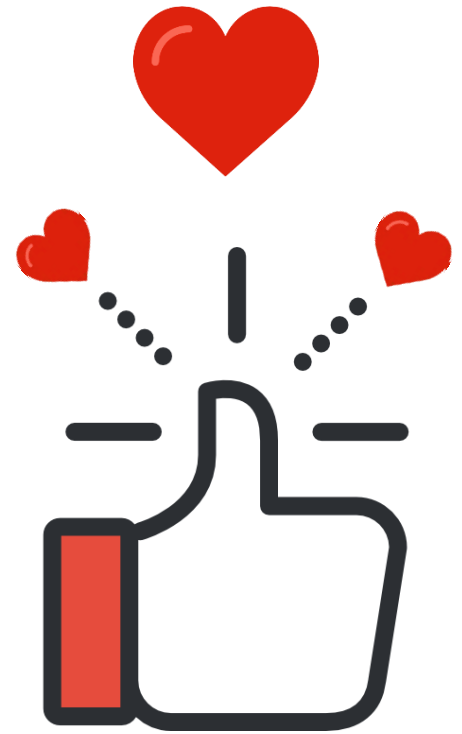
Just Dial

https://www.justdial.com/Ahmedabad/Akash-Technolabs-Navrangpura-Bus-Stop-Navrangpura/079PXX79-XX79-170615221520-S5C4_BZDET



Sulekha

<https://www.sulekha.com/akash-technolabs-navrangpura-ahmedabad-contact-address/ahmedabad>





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