Assignment No. 9

6CS371 : Advanced Database System Lab

Study of NoSQL Databases

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TY CSE

Aim

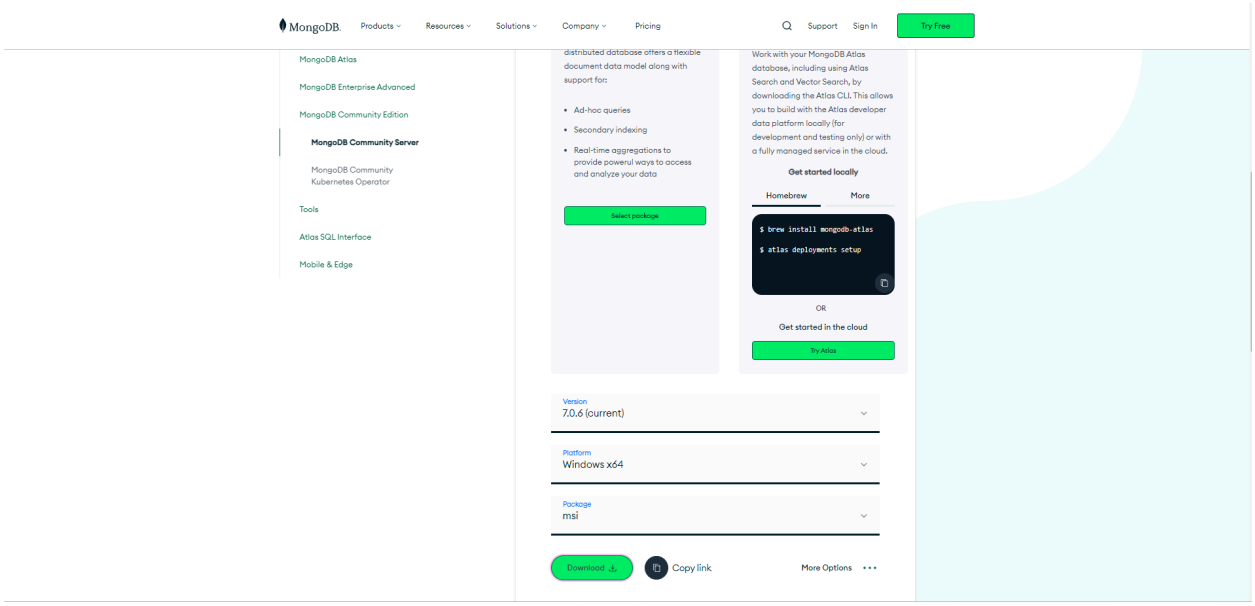
Install & deploy the MongoDB and CassandraDB cloud databases on windows platform

Introduction

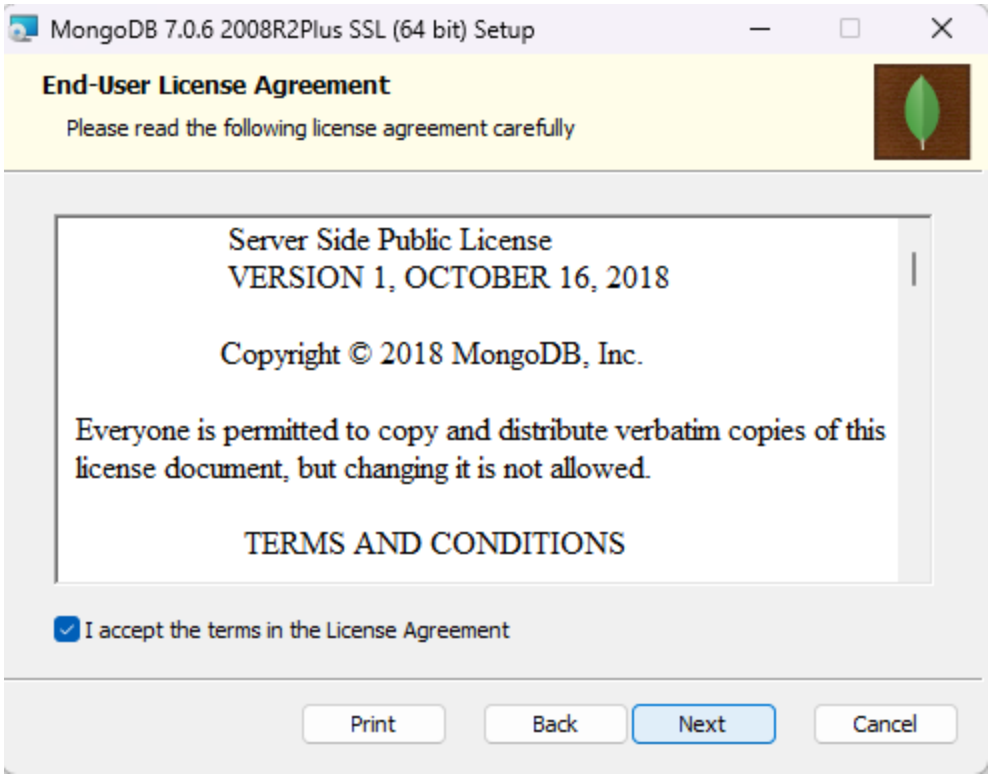
This assignment focuses on practical deployment of cloud databases and Python application development. Deploy MongoDB and CassandraDB on Windows. Develop a Python app showcasing CRUD operations with both databases. Gain hands-on experience in cloud database deployment and application development.

Procedure

1. **Installation of MongoDB**
    a. Download the MongoDB .msi installer from https://www.mongodb.com/try/download/community



b. Run the installer and proceed with configuration.


MongoDB 7.0.6 2008R2Plus SSL (64 bit) Setup
End-User License Agreement
Please read the following license agreement carefully
Server Side Public License
VERSION 1, OCTOBER 16, 2018
Copyright © 2018 MongoDB, Inc.
Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.
TERMS AND CONDITIONS
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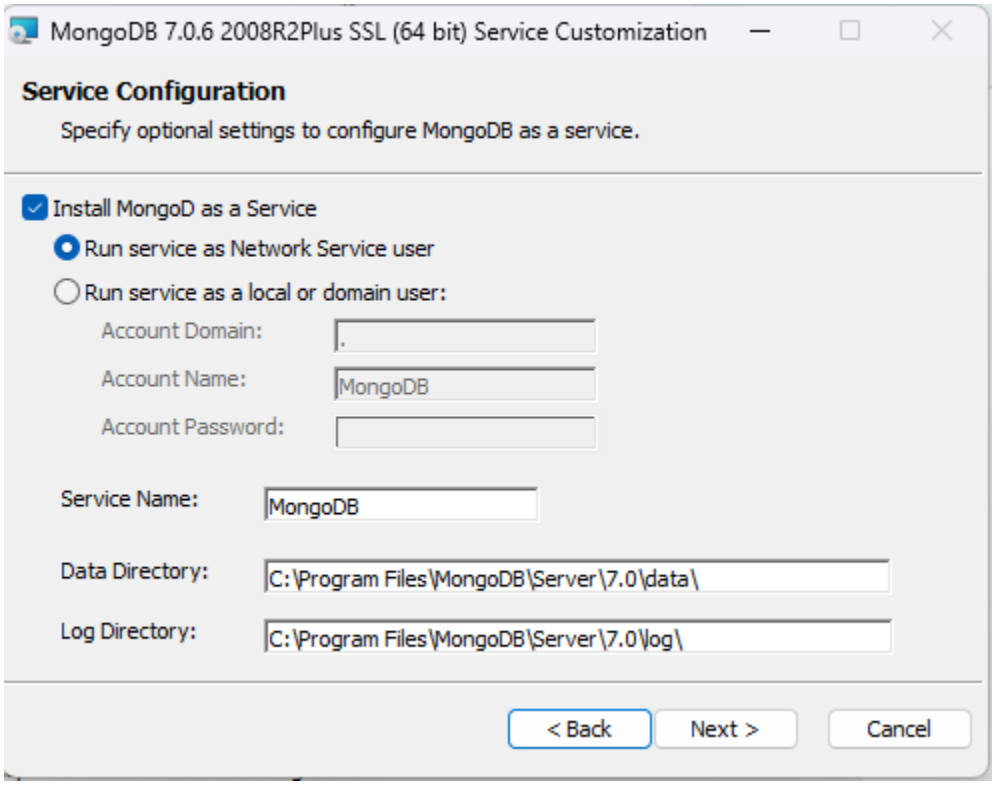
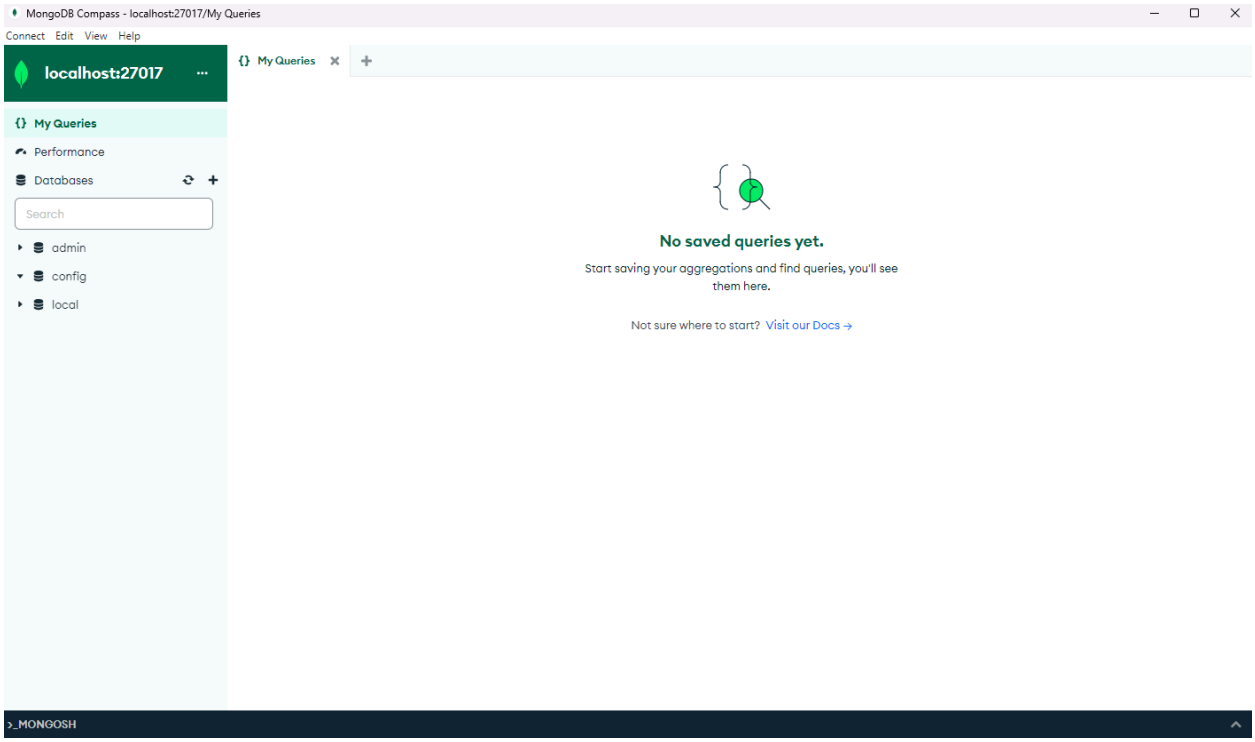

MongoDB 7.0.6 2008R2Plus SSL (64 bit) Service Customization
Service Configuration
Specify optional settings to configure MongoDB as a service.
Install MongoD as a Service
Run service as Network Service user
Run service as a local or domain user:
Account Domain:
.
Account Name:
MongoDB
Account Password:
Service Name:
MongoDB
Data Directory:
C:\Program Files\MongoDB\Server\7.0\data\
Log Directory:
C:\Program Files\MongoDB\Server\7.0\log\
< Back
Next >
Cancel

Welcome to Compass

Build aggregation pipelines, optimize queries, analyze schemas, and more. All with the GUI built by - and for - MongoDB.

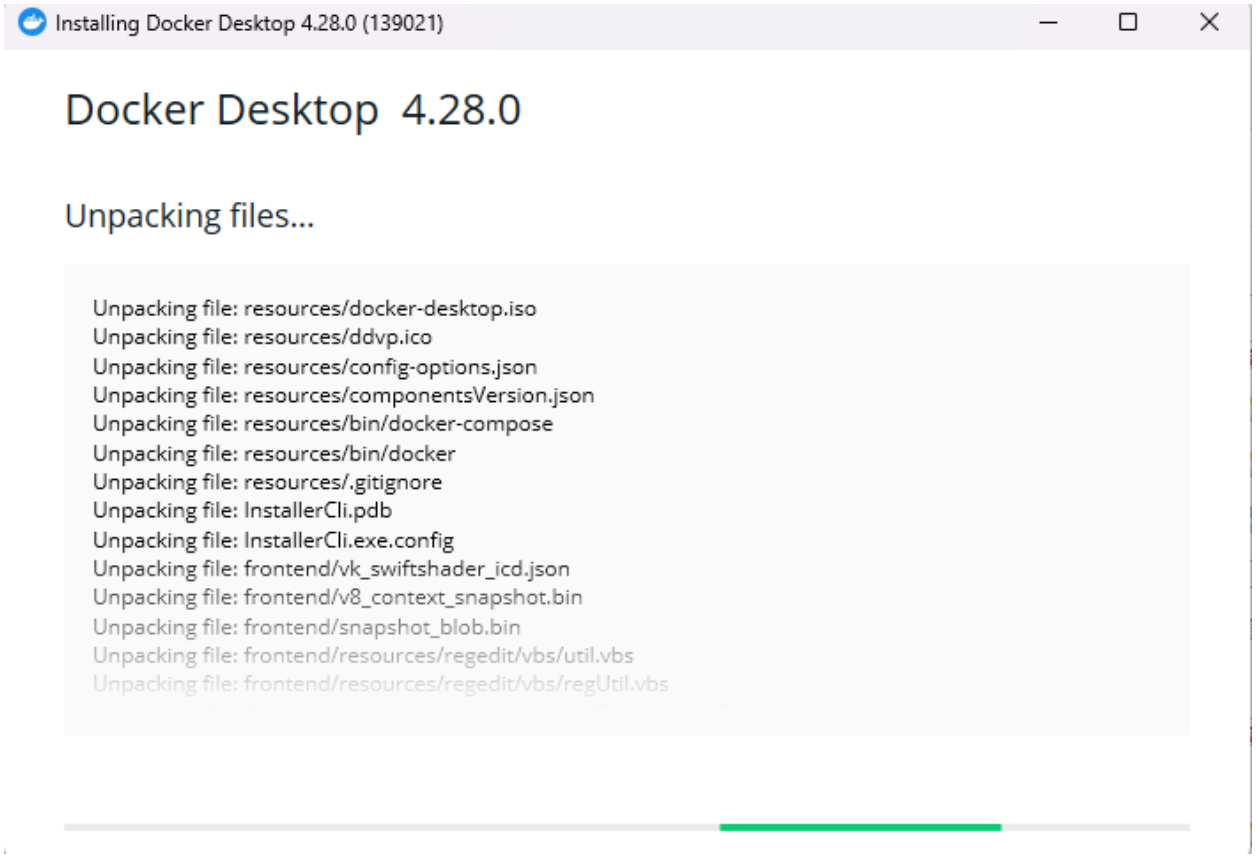
To help improve our products, anonymous usage data is collected and sent to MongoDB in accordance with MongoDB's privacy policy.
Manage this behaviour on the Compass Settings page.

Start



2. Installation of CassandraDB

a. Install docker desktop



b. Pull the latest docker image of cassandra.

```
oneautumleaf@oneautumleaf-IdeaPad-Gaming-3-15IHU6:~$ docker pull cassandra:latest
latest: Pulling from library/cassandra
23828d760c7b: Downloading [==================================>                ]  21.83MB/30.45MB
8069355d5739: Download complete
8592575b47d2: Downloading [====================================>              ]  37.09MB/47.07MB
c61e678dec2f: Download complete
932693503cb0: Download complete
27b6af0b2cc7: Download complete
b7978028f9bf: Download complete
fbbfbd91d85b: Download complete
5b5aa90188be: Downloading [=>                                                 ]  1.029MB/50.53MB
e1f6c9e5666e: Waiting
```

c. Start a new cassandra container

```
oneautumleaf@oneautumleaf-IdeaPad-Gaming-3-15IHU6:~$ docker run --name my-cassandra-container -d cassandra
0f2e414243176cc01e2ba883a1e49680e3960e2cf7e7a3770bae6e62beed94eb
oneautumleaf@oneautumleaf-IdeaPad-Gaming-3-15IHU6:~$
```

d. Access the container and run commands inside it

```
oneautumleaf@oneautumleaf-IdeaPad-Gaming-3-15IHU6:~$ docker exec -it my-cassandra-container cqlsh
Connected to Test Cluster at 127.0.0.1:9042
[cqlsh 6.1.0 | Cassandra 4.1.4 | CQL spec 3.4.6 | Native protocol v5]
Use HELP for help.
cqlsh> SHOW VERSION;
[cqlsh 6.1.0 | Cassandra 4.1.4 | CQL spec 3.4.6 | Native protocol v5]
cqlsh> CREATE KEYSPACE test_keyspace WITH replication = {'class': 'SimpleStrategy', 'replication_factor': 1};
cqlsh> USE test_keyspace;
cqlsh:test_keyspace>
cqlsh:test_keyspace> CREATE TABLE test_table (
                ...     id UUID PRIMARY KEY,
                ...     name TEXT,
                ...     age INT
                ... );
cqlsh:test_keyspace> INSERT INTO test_table (id, name, age) VALUES (uuid(), 'John', 30);
cqlsh:test_keyspace> SELECT * FROM test_table;

 id                                   | age | name
--------------------------------------+-----+------
 55f9472a-4ddf-4c91-b8b7-fed79c93bb4e |  30 | John

(1 rows)
cqlsh:test_keyspace>
```

3. Python Desktop Application to demonstrate CRUD operations

a. Install the pymongo library

```
PS C:\Users\jns29\OneDrive\Desktop\COLLEGE_ASSIGNMENT\ADSL> pip install pymongo
Collecting pymongo
  Downloading pymongo-4.6.2-cp311-cp311-win_amd64.whl (472 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 472.8/472.8 kB 1.2 MB/s eta 0:00:00
Collecting dnspython<3.0.0,>=1.16.0 (from pymongo)
  Downloading dnspython-2.6.1-py3-none-any.whl (307 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 307.7/307.7 kB 3.2 MB/s eta 0:00:00
Installing collected packages: dnspython, pymongo
Successfully installed dnspython-2.6.1 pymongo-4.6.2

[notice] A new release of pip is available: 23.1.1 -> 24.0
```

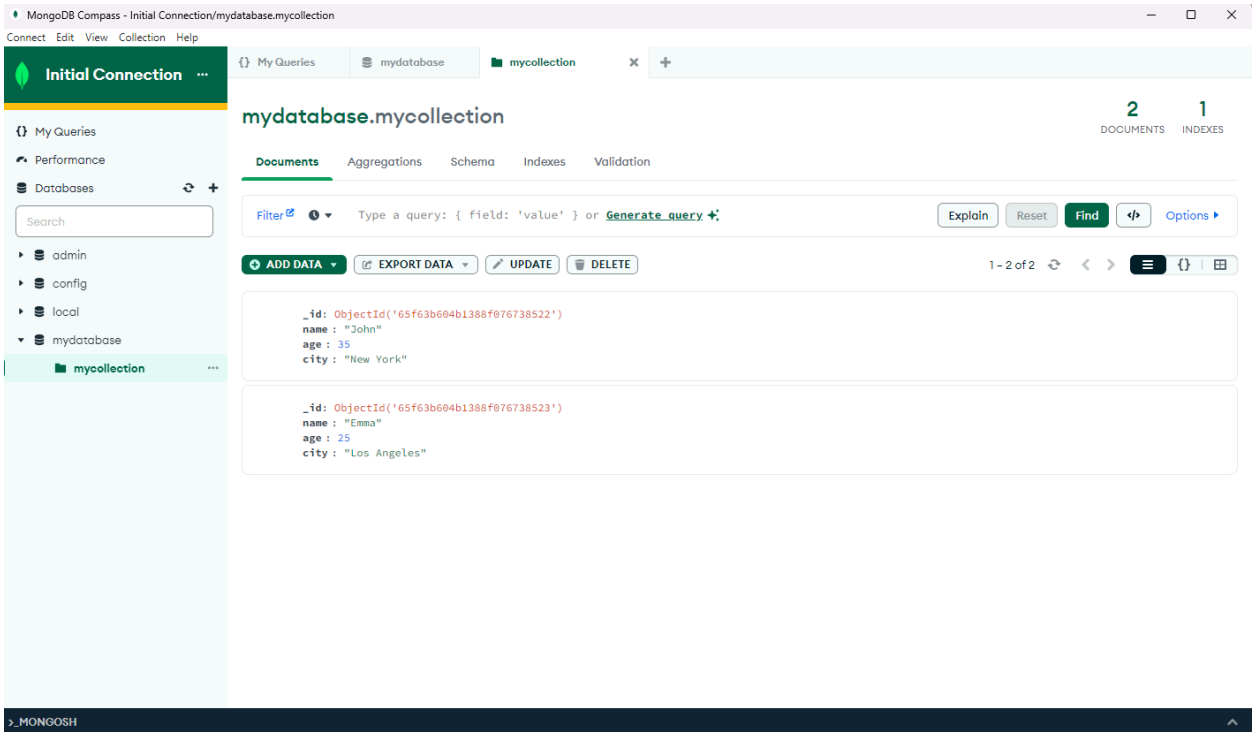
b. Write a program in python to perform CRUD operations

```python
from pymongo import MongoClient

# Connect to MongoDB
client = MongoClient('localhost', 27017)
db = client['mydatabase']
collection = db['mycollection']

# Create Operation
data1 = {'name': 'John', 'age': 30, 'city': 'New York'}
data2 = {'name': 'Emma', 'age': 25, 'city': 'Los Angeles'}
data3 = {'name': 'Michael', 'age': 35, 'city': 'Chicago'}
collection.insert_many([data1, data2, data3])

# Read Operation
result = collection.find_one({'name': 'John'})
print(result)

# Update Operation
collection.update_one({'name': 'John'}, {'$set': {'age': 35}})

# Delete Operation
collection.delete_one({'name': 'Michael'})

# Close connection
client.close()
```

c. Execute the program

```
PS C:\Users\jns29\OneDrive\Desktop\COLLEGE_ASSIGNMENT\ADSL> & C:/Users/jns29/AppData/Local/Microsoft/Windows
LLEGE_ASSIGNMENT/ADSL/crud.py
{'_id': ObjectId('65f63b604b1388f076738522'), 'name': 'John', 'age': 30, 'city': 'New York'}
PS C:\Users\jns29\OneDrive\Desktop\COLLEGE_ASSIGNMENT\ADSL>
```

d. Verify if the changes have been made to the database



Conclusion

In conclusion, we have gained practical skills in deploying cloud databases and developing Python applications for efficient data management. By successfully deploying MongoDB and CassandraDB on a Windows platform and implementing CRUD operations within a Python desktop application, we have deepened our understanding of database management and application development. This assignment has provided a solid foundation for our future endeavors in cloud computing and software engineering, equipping us with practical skills to tackle real-world challenges in the digital landscape

References

https://www.mongodb.com/try/download/community
https://cassandra.apache.org/doc/stable/cassandra/getting_started/installing.html
https://cassandra.apache.org/_/download.html
https://www.apache.org/dyn/closer.lua/cassandra/4.1.4/apache-cassandra-4.1.4-bin.tar.gz