**2025/04/21**

**MongoDB Introduction**

**1. Introduction to MongoDB**

In my practical, I learned about **MongoDB**, which is a NoSQL database. Unlike traditional databases like MySQL that use tables and rows, MongoDB stores data in a flexible format using **documents** and **collections**. It’s really useful when we work with unstructured or changing data. I found it interesting because it allows storing different types of data without needing a fixed format.

#### **2. Key Features of MongoDB:**

* **NoSQL Database**: MongoDB is a NoSQL database, which means it doesn't use rows and tables like SQL.
* **Document-Oriented**: It stores data in documents using a format similar to JSON (called BSON), making it flexible and easy to read.
* **Schema-less Structure**: Documents in the same collection can have different structures, which makes MongoDB very adaptable.
* **High Performance**: It handles large amounts of data efficiently and supports fast read/write operations.
* **Scalable**: MongoDB supports horizontal scaling, which allows adding more servers to handle more data.
* **Rich Query Language**: It allows powerful queries using filters, conditions, and aggregations.
* **Indexing Support**: MongoDB supports indexing, which helps improve the performance of queries.

**3. Installation of MongoDB**

To use MongoDB, I first installed the **MongoDB Community Edition**, which is the main server software. During the installation, I made sure to include **MongoDB Compass**, which is a graphical tool that makes it easier to work with MongoDB.

Here are the steps I followed:

* I went to the official MongoDB website and downloaded the **Community Server**.
* I installed it by following the setup instructions.
* Once installed, I opened **MongoDB Compass**.

**4. Adding a New Connection**

After opening MongoDB Compass, I clicked on **"New Connection"**. I used the default connection string:  
mongodb://localhost:27017

Then I clicked on **"Save & Connect"**, and it successfully connected to the server.

Once connected, I saw that MongoDB already had three default databases:

* admin
* config
* local

These databases are created by MongoDB by default and are used internally by the system.

**5. What I Learned About Database, Collection, and Document**

From this practical, I understood the basic structure of MongoDB:

* A **Database** is like a big folder where all the data is stored.
* A **Collection** is like a table in SQL, but it’s more flexible and doesn't need a fixed structure.
* A **Document** is a single piece of data in JSON format. It’s like a row in a table but much more flexible.

For example, a document can look like this:

json

CopyEdit

{

"name": "Ali",

"age": 22,

"course": "IT"

}

This format is easy to read and work with.

**6. Difference Between SQL and NoSQL (MongoDB)**

From my learning, I understood that there are some key differences between SQL and NoSQL databases:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | **Feature** | **SQL (Relational)** | **NoSQL (MongoDB)** | | --- | --- | --- | | Structure | Tables with rows & columns | Collections with documents | | Schema | Fixed (structured) | Flexible (schema-less) | | Data Format | Tabular (rows) | JSON-like documents (BSON) | | Scalability | Vertical (scale up) | Horizontal (scale out) | | Best For | Structured data | Unstructured or flexible data | |