Use case II

Indexing various Devices in IoT platform

Aim :-

To design and implement a data storage mechanism for an IoT platform that can efficiently store, retrieve and index data from a wide range of heterogeneous devices. The mechanism should support querying schema to handle all device types easily

Explanation :-

A generic IoT platform collects data from different types of devices such as temperature sensors, chemical sensors and energy meters. Each device transmits data at different intervals. Traditional relational databases require a fixed schema, making it difficult to handle new or variable device data structure

Why MongoDB ?

→ Schema-less structure supports device types dynamically

→ Documents are stored in JSON format suitable for IoT data

→ Supports indexing on single and multiple fields

→ Allows fast retrieval of data for specific device or parameters

Temperature Sensor example:

```
{
"device_id": "01001",
"device_type": "Temperature Sensor",
"location_id": 100,
"time stamp": "2025-11-03T10:45".out",
"data":{
"temperature": 2805
"humidity": 70
},
"status": "active"
}
```

Energy meter example:

```
{
"device_id", "f-2001",
"device_type": Energy_meter",
"location_id": "100",
"timestamp": "2025-11-03-10:46:005
"data":{
"voltage": 220,
"Current": 1.5
"Power": 330
},
"Status": "inactive"
}
```

Sample Queries:

1. Retrieve all records of a particular device
db.iot_devices.find({"device_id": 1})

2. Retrieve data for a device in a particular location:
db.iot_devices.find({"device_id": 1, "location": "Location A"})

Result:- Using mongo DB allows the BOT platform to store and retrieve data from devices without modifying the database structure. Indexes helps in fast query execution especially when searching data by device location or parameters like temperature. The system is scalable and adaptable to new devices and data types as it grows.