

# SPPU-TE-COMP-CONTENT – KSKA Git

Q1.

what is NoSQL and enlist its benefits.

Ans.

The term NoSQL, short for "not-only SQL", refers to non-relational databases that store data in a non-tabular format, rather than in rule-based, relational ~~but~~ tables like relational databases do.

→ Benefits:-

1. Scalability:

- NoSQL databases replicate data across multiple servers, data centers or cloud resources, so a single-node failure ~~will~~ doesn't cause downtime or data loss.

2. Scalability:

- NoSQL databases scale out horizontally by using distributed clusters of hardware, so you can add or remove nodes without impacting availability.

3. Agile development:

- NoSQL databases ~~are~~ can adapt quickly to changing requirements.

4. Security:

- NoSQL databases are typically backed up, replicated, and secured against intrusion.

Q2.

Explain CRUD operations in MongoDB with suitable example.

Ans 1. Create operations:

- Create an insert operation, add new documents to a collection.
- If the collection does not currently exist, insert

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Operations will create the collection.

eg: db.users.insertOne({  
name: "Shubh",  
age: 26,  
status: "pending"}  
)

1. Insert operations

- 2. Read operations
- Read operations retrieve documents from a collection; i.e. query a collection for documents.

eg:

db.users.find({

age: {\$gt: 18},  
name: "l", address: "13"

).limit(5)

3. Update operations

- Update operations modify existing documents in a collection.

eg:

db.users.updateMany({

age: {\$lt: 18},

status: "reject")  
})

4. Delete operations

- Delete operations remove documents from a collection.

eg:

db.users.deleteMany({

status: "reject")  
})

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Q2. Show the relationship of RDBMS terminology with MongoDB.

Ans.

RDBMS mapping to MongoDB

Table → Database

1. Database

Database

2. Table

collection

3. Tuple / Row

Document

4. column

Field

5. Table Join

Embedded Documents

6. Primary Key

Primary Key (Key-Id)

Q4. What are the advantages of MongoDB over RDBMS?

Ans. → Advantages of MongoDB over RDBMS:

1. MongoDB is schema less. It is a document database in which one collection holds different documents.

2. Structure of a single object is clear

3. No complex joins

4. Deep query-ability. MongoDB supports dynamic queries on documents using a document-based query language that is nearly as powerful as SQL.

5. Easy to scale-out - MongoDB is easy to scale.

6. Conversion / mapping of application objects to database objects not needed.

7. Uses internal memory for storing the documents.

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working set, enabling faster access of data.

QUESTION 5

Q5. Explain various datatypes of MongoDB.

Ans. The basic datatypes of MongoDB are:-

1. String

2. Integer

3. Boolean

4. Double

5. ObjectId

6. Array

7. Timestamp

8. ObjectID is to represent id of document.

9. Null

10. Symbol

11. Date

12. ObjectID is object identifier used for doc.

13. Binary data

14. Code

15. Regular expression

Q6. What is difference between SAVE and UPDATE method?

Ans. → Difference between SAVE and UPDATE method:

i) Usage

ii) SAVE is used to insert a new document or not?

The save method is used to add a new document to the database or to save changes to an existing document.

iii) It can update multiple documents at once based

on the filter condition.

## 2. Behaviour

- (i) **SAVE**: When you call `save()` on a document, MongoDB will check if the document is new or already exists on the database.
- If it's new, it is inserted, otherwise, MongoDB updates it.

## (ii) **UPDATE**

- It directly modifies documents on the database that match the query and does not return the modified documents.

Q2: What is ObjectId in MongoDB?

- Ans.: ObjectIds are small, likely unique, fast to generate, and ordered by time of entry.
- Object Id values are 12 bytes in length, consisting of:

1. A 4-byte timestamp, representing the Object ID's creation, measured in seconds since the Unix epoch.

2. A 3-byte random value generated once per process. This random value is unique to the machine and process.

3. A 3-byte incrementing counter, initialized to a random value.

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- For timestamp and counter values, the most significant bytes appear first on the byte sequence (big-endian).
- This is unlike other BSON values, where the least significant bytes appear first (little-endian).

Q8. Explain different method to insert document in MongoDB.

Ans → The different methods to insert document in MongoDB:

- Insert a single document: `db.collection.insert()` inserts a single document onto a collection.
- If the document does not specify an `_id` field, MongoDB adds the `_id` field with an object ID value to the new document.

e.g: `db.movies.insert({ title: "The Favourite", count: 121, rated: "R", year: 2018 })`

- Insert multiple documents

- `db.collection.insertMany()` can insert multiple documents onto a collection.
- It passes an array of documents to the method.

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eg:

db.movies.insertmany(CE

{

title: "Dunkirk",

runtime: 130

},

{

title: "AOT",

runtime: 105

}

})

Q2 Explain CAP and BASE theorem with NoSQL with suitable example.

Ans. 1. CAP theorem states according to it is impossible

• This theorem explains that in a distributed system, a database can only guarantee two out of three of the following:

→ Consistency: all data is kept consistent.

• All clients see the same data at the same time.

→ Availability:

• Every request receives a response from a reasonable amount of time.

→ Partition tolerance:

• The system continues to operate even if some messages are lost or some nodes fail.

2. BASE

• This model is often used by companies that deal with large amounts of unstructured data, such as social networking feeds.

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- Basically Available:
  - Guarantees the availability of data.
- Soft state:
  - The state of the system could change over time.
- ~~Guarantees~~ Eventual consistency:
  - The system will eventually become consistent once it stops receiving input.

Q10. what are different key features of MongoDB.

Ans. Some key features of mongoDB:

1. Document model:
  - MongoDB is a document database that's schema-less meaning it can manage data without a pre-defined blueprint.
2. Replication:
  - MongoDB can deploy multiple servers for backup and disaster recovery.
3. Sharding:
  - MongoDB can split large datasets across multiple distributed collections.
4. Storage:
  - MongoDB can store very large files.
5. Security:
  - MongoDB features security mechanisms like role-based access control, encryption at rest, and transport encryption.