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Few MongoDB Interview Question

Basic Questions

1. What is MongoDB and what are its main features?
   - Explain that MongoDB is a NoSQL database that stores data in a flexible, JSON-like format (BSON) and supports features like horizontal scaling, high availability, and rich querying.

2. What is BSON and how is it different from JSON?
   - Describe BSON (Binary JSON) as a binary representation of JSON-like documents that is used by MongoDB for storage and network transfer.

3. How does MongoDB handle schema design?
   - Explain that MongoDB uses a flexible schema, allowing for different structures in the same collection, which supports schema evolution and dynamic data.

4. What are collections and documents in MongoDB?
   - Define collections as groups of documents (similar to tables in relational databases) and documents as individual records (similar to rows).

5. How do you perform CRUD operations in MongoDB?
   - Describe how to create (insert), read (find), update (update), and delete (remove) documents using MongoDB's query language.

6. What is the purpose of the `_id` field in MongoDB?
   - Explain that `_id` is a unique identifier for documents in a collection, automatically indexed and used to ensure uniqueness.

7. How does indexing work in MongoDB?
   - Discuss the role of indexes in improving query performance and the types of indexes available, such as single-field, compound, and text indexes.

8. What are some common use cases for MongoDB?
   - Describe scenarios like content management systems, real-time analytics, IoT applications, and applications requiring flexible schemas.

Intermediate Questions

1. What is the difference between `find()` and `findOne()` methods in MongoDB?
   - Explain that `find()` returns a cursor to multiple documents, while `findOne()` returns a single document that matches the query.

2. How do you handle relationships between documents in MongoDB?
   - Discuss embedding documents for one-to-many relationships and referencing documents for many-to-many relationships.

3. What is a replica set in MongoDB and how does it work?
   - Describe a replica set as a group of MongoDB servers that maintain the same data set, providing high availability and data redundancy.

4. How do you perform data aggregation in MongoDB?
   - Explain the use of the aggregation framework and stages like `$match`, `$group`, `$sort`, and `$project` to process and analyze data.

5. What are the different types of MongoDB queries and how are they used?
   - Discuss query types including simple queries, range queries, and compound queries with operators like `$gt`, `$lt`, `$in`, and `$regex`.

6. How do you perform data validation in MongoDB?
   - Describe schema validation using JSON Schema validation rules and how to enforce data integrity at the database level.

7. What is sharding in MongoDB and why is it used?
   - Explain that sharding is a method of distributing data across multiple servers to handle large datasets and high throughput.

8. How does MongoDB support transactions and what are their use cases?
   - Discuss multi-document transactions introduced in MongoDB 4.0 for ensuring ACID properties in scenarios requiring atomic operations.

Advanced Questions

1. How do you optimize MongoDB performance?
   - Discuss techniques like indexing strategies, query optimization, sharding, and performance profiling using tools like `mongotop` and `mongostat`.

2. What are the differences between MongoDB's WiredTiger and MMAPv1 storage engines?
   - Describe how WiredTiger offers better concurrency and compression compared to MMAPv1, which uses a more traditional file-based storage approach.

3. How do you handle data backup and recovery in MongoDB?
   - Explain backup strategies such as using `mongodump` and `mongorestore`, and managing backups in replica sets and sharded clusters.

4. What are some best practices for MongoDB schema design?
   - Discuss best practices like schema design patterns (embedding vs. referencing), data normalization vs. denormalization, and optimizing query performance.

5. How do you implement security in MongoDB?
   - Describe security features such as authentication, authorization, encryption at rest and in transit, and role-based access control.

6. What are the potential pitfalls of using MongoDB and how do you mitigate them?
   - Discuss common issues such as unoptimized queries, data consistency challenges, and handling large datasets, and ways to address them.

7. How do you handle large-scale data migrations in MongoDB?
   - Describe strategies for data migration, including using tools like `mongomirror`, `mongoimport`, and `mongoexport`, and planning for downtime and data consistency.

8. What is the purpose of the `readConcern` and `writeConcern` options in MongoDB?

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- Explain how `readConcern` specifies the level of isolation for read operations and `writeConcern` defines the acknowledgment level required for write operations.

Scenario-Based Questions

1. How would you design a MongoDB schema for an e-commerce application with products, users, and orders?
   - Discuss how to structure collections and document relationships to support the various features of the application.

2. Explain how you would troubleshoot and optimize a MongoDB query that is running slowly.
   - Describe steps for analyzing the query, checking indexes, and using profiling tools to identify and resolve performance issues.

3. How would you implement a data migration strategy when upgrading MongoDB versions or moving to a new schema?
   - Discuss planning the migration, testing thoroughly, and using tools and techniques to ensure a smooth transition with minimal downtime.