MongoDB Indexes

what is it

- Indexes are special data structures [1] that store a small portion of the collection's data set in an easy to traverse form.
- The index stores the value of a specific field or set of fields, ordered by the value of the field.
- The ordering of the index entries supports efficient equality matches and range-based query operations

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motivation

Performance

- Indexes support the efficient execution of queries in MongoDB.
- Without indexes, MongoDB must perform a *collection scan*, i.e. scan every document in a collection, to select those documents that match the query statement
- If an appropriate index exists for a query, MongoDB can use the index to limit the number of documents it must inspect.

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example

Put the sample from the docs because the index should be sorted

Define an index

To create an index in the Mongo Shell, use db.collection.createIndex().

db.collection.createIndex(<key and index type specification>, <options>)

db.collection.createIndex({ name: 1 })

Create an index for name attribute. The index name is the concatenation of name and 1 i.e. name_1

db.collection.getIndexes()

You can view all indexed using this command

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Default index

Atlas atlas-53upxd-shard-0 [primary] test> use db-quiz-app

switched to db db-quiz-app

Atlas atlas-53upxd-shard-0 [primary] db-quiz-app> show collections

users_quiz_results

Atlas atlas-53upxd-shard-0 [primary] db-quiz-app>
db.users_quiz_results.getIndexes()

[{ v: 2, key: { _id: 1 }, name: '_id_' }] ← The default index is on _id

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Operation performance

db.users_quiz_results.explain("executionStats").find({subject:"reactjs"})

Execution time < 1 ms because very few documents

Number of indexes scanned

Number of docs (quiz results) examined

Number of docs (quiz results) found for reactjs quiz

```
executionStats: {
  executionSuccess: true,
  nReturned: 150,
  executionTimeMillis: 0,
  totalKeysExamined: 0,
  totalDocsExamined: 253,
  executionStages: {
    stage: 'COLLSCAN',
    filter: { subject: { '$eq': 'reactjs' } },
    nReturned: 150,
    executionTimeMillisEstimate: 0,
    works: 255,
    advanced: 150,
    needTime: 104,
    needYield: 0,
    saveState: 0,
    restoreState: 0,
    isEOF: 1,
    direction: 'forward',
    docsExamined: 253
  }
}
```

references

 Complete MongoDB Tutorial #24 - Indexes - apr 2022

indexed - official docs

 16 MongoDB Indexing: Example 7 ExecutionStats without Index - jan 2020

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