

```
Please enter a MongoDB connection string (Default: mongodb://localhost/):
mongodb+srv://TC_DB:TC_DB@cluster0.nk2qc.mongodb.net/?
retryWrites=true&w=majority
Please enter a MongoDB connection string (Default: mongodb://localhost/):
mongodb+srv://TC_DB:TC_DB@cluster0.nk2qc.mongodb.net/?
retryWrites=true&w=majority
Current Mongosh Log ID: 67e41e46f723fbfce5fa4213
Connecting to:          mongodb+srv://<credentials>@cluster0.nk2qc.mongodb.net/?
retryWrites=true&w=majority&appName=mongosh+2.4.0
Using MongoDB:          8.0.5
Using Mongosh:          2.4.0
mongosh 2.4.2 is available for download:
https://www.mongodb.com/try/download/shell
```

For mongosh info see: <https://www.mongodb.com/docs/mongodb-shell/>

```
Atlas atlas-22a8zc-shard-0 [primary] test> show dbms
MongoshInvalidInputError: [COMMON-10001] 'dbms' is not a valid argument for
"show".
```

```
Atlas atlas-22a8zc-shard-0 [primary] test> show dbs
```

```
tc_DB1  112.00 KiB
test    48.00 KiB
admin   332.00 KiB
local   31.07 GiB
```

```
Atlas atlas-22a8zc-shard-0 [primary] test> use tc_DB!
switched to db tc_DB!
```

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB!> drop tc_DB!
```

```
Uncaught:
```

```
SyntaxError: Missing semicolon. (1:4)
```

```
> 1 | drop tc_DB!
   |      ^
   2 |
```

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB!> delete tc_DB!
```

```
Uncaught:
```

```
SyntaxError: Missing semicolon. (1:12)
```

```
> 1 | delete tc_DB!
   |      ^
   2 |
```

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB!> delete tc_DB1
true
```

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB!> use tc_DB1
```

```
switched to db tc_DB1
```

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> show collections
```

```
users
```

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> use users
```

```
switched to db users
```

```
Atlas atlas-22a8zc-shard-0 [primary] users> use tc_DB1
```

```
switched to db tc_DB1
```

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> [
...   { "_id": 1, "name": "Alice", "age": 25, "city": "Delhi", "status":
"active", "signupDate": ISODate("2024-01-10") },
...   { "_id": 2, "name": "Bob", "age": 30, "city": "Mumbai", "status":
"inactive", "signupDate": ISODate("2024-02-05") },
...   { "_id": 3, "name": "Charlie", "age": 28, "city": "Delhi", "status":
"active", "signupDate": ISODate("2024-03-15") },
...   { "_id": 4, "name": "David", "age": 22, "city": "Bangalore", "status":
"active", "signupDate": ISODate("2024-02-20") },
...   { "_id": 5, "name": "Eva", "age": 35, "city": "Mumbai", "status":
"inactive", "signupDate": ISODate("2024-01-25") }
... ]
```

```
[
  {
    _id: 1,
    name: 'Alice',
    age: 25,
    city: 'Delhi',
    status: 'active',
    signupDate: ISODate('2024-01-10T00:00:00.000Z')
  },
  {
    _id: 2,
    name: 'Bob',
    age: 30,
    city: 'Mumbai',
    status: 'inactive',
    signupDate: ISODate('2024-02-05T00:00:00.000Z')
  },
  {
    _id: 3,
    name: 'Charlie',
    age: 28,
    city: 'Delhi',
    status: 'active',
    signupDate: ISODate('2024-03-15T00:00:00.000Z')
  },
  {
    _id: 4,
    name: 'David',
    age: 22,
    city: 'Bangalore',
    status: 'active',
    signupDate: ISODate('2024-02-20T00:00:00.000Z')
  },
  {
    _id: 5,
    name: 'Eva',
    age: 35,
    city: 'Mumbai',
    status: 'inactive',
    signupDate: ISODate('2024-01-25T00:00:00.000Z')
  }
]
```

Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> // Step 1: Create Compound Index for Optimized Querying

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> db.users.createIndex({ city: 1,
signupDate: -1 })
city_1_signupDate_-1
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1>
```

Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> // Step 2: Perform Aggregation with Optimized Query

```
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> db.users.aggregate([
...   // Match active users only
...   { $match: { status: "active" } },
...
...   // Group by city and calculate average age of active users
...   {
...     $group: {
...       _id: "$city",
...       avgAge: { $avg: "$age" },
...       totalUsers: { $sum: 1 }
...     }
...   }
... ]
```

```

...   },
...
...   // Add a field to mark high-user-density cities
...   {
...     $addFields: {
...       highDensity: { $gt: ["$totalUsers", 1] }
...     }
...   },
...
...   // Sort by average age in descending order
...   { $sort: { avgAge: -1 } },
...
...   // Limit to top 3 cities with highest average age
...   { $limit: 3 }
... ])

```

```

Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> db.users.find({ city: "Delhi",
status: "active" }).explain("executionStats")
{
  explainVersion: '1',
  queryPlanner: {
    namespace: 'tc_DB1.users',
    parsedQuery: {
      '$and': [ { city: { '$eq': 'Delhi' } }, { status: { '$eq': 'active' } } ]
    },
    indexFilterSet: false,
    queryHash: 'DD734F32',
    planCacheShapeHash: 'DD734F32',
    planCacheKey: 'E79073B8',
    optimizationTimeMillis: 0,
    maxIndexedOrSolutionsReached: false,
    maxIndexedAndSolutionsReached: false,
    maxScansToExplodeReached: false,
    prunedSimilarIndexes: false,
    winningPlan: {
      isCached: false,
      stage: 'FETCH',
      filter: { status: { '$eq': 'active' } },
      inputStage: {
        stage: 'IXSCAN',
        keyPattern: { city: 1, signupDate: -1 },
        indexName: 'city_1_signupDate_-1',
        isMultiKey: false,
        multiKeyPaths: { city: [], signupDate: [] },
        isUnique: false,
        isSparse: false,
        isPartial: false,
        indexVersion: 2,
        direction: 'forward',
        indexBounds: {
          city: [ '['Delhi', 'Delhi'] ],
          signupDate: [ '[MaxKey, MinKey]' ]
        }
      }
    },
    rejectedPlans: []
  },
  executionStats: {
    executionSuccess: true,
    nReturned: 0,
    executionTimeMillis: 1,
    totalKeysExamined: 0,
    totalDocsExamined: 0,
    executionStages: {

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    isCached: false,
    stage: 'FETCH',
    filter: { status: { '$eq': 'active' } },
    nReturned: 0,
    executionTimeMillisEstimate: 0,
    works: 1,
    advanced: 0,
    needTime: 0,
    needYield: 0,
    saveState: 0,
    restoreState: 0,
    isEOF: 1,
    docsExamined: 0,
    alreadyHasObj: 0,
    inputStage: {
      stage: 'IXSCAN',
      nReturned: 0,
      executionTimeMillisEstimate: 0,
      works: 1,
      advanced: 0,
      needTime: 0,
      needYield: 0,
      saveState: 0,
      restoreState: 0,
      isEOF: 1,
      keyPattern: { city: 1, signupDate: -1 },
      indexName: 'city_1_signupDate_-1',
      isMultiKey: false,
      multiKeyPaths: { city: [], signupDate: [] },
      isUnique: false,
      isSparse: false,
      isPartial: false,
      indexVersion: 2,
      direction: 'forward',
      indexBounds: {
        city: [ '['Delhi', 'Delhi']' ],
        signupDate: [ '['MaxKey', MinKey']' ]
      },
      keysExamined: 0,
      seeks: 1,
      dupsTested: 0,
      dupsDropped: 0
    }
  },
  queryShapeHash:
'F29D91073244C7A4624D2827CC8F8EF4BF96AC16B636E0875D792EA6469C5DA3',
  command: {
    find: 'users',
    filter: { city: 'Delhi', status: 'active' },
    '$db': 'tc_DB1'
  },
  serverInfo: {
    host: 'cluster0-shard-00-02.nk2qc.mongodb.net',
    port: 27017,
    version: '8.0.5',
    gitVersion: 'cb9e2e5e552ee39dea1e39d7859336456d0c9820'
  },
  serverParameters: {
    internalQueryFacetBufferSizeBytes: 104857600,
    internalQueryFacetMaxOutputDocSizeBytes: 104857600,
    internalLookupStageIntermediateDocumentMaxSizeBytes: 16793600,
    internalDocumentSourceGroupMaxMemoryBytes: 104857600,
    internalQueryMaxBlockingSortMemoryUsageBytes: 33554432,

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    internalQueryProhibitBlockingMergeOnMongoS: 0,
    internalQueryMaxAddToSetBytes: 104857600,
    internalDocumentSourceSetWindowFieldsMaxMemoryBytes: 104857600,
    internalQueryFrameworkControl: 'trySbeRestricted',
    internalQueryPlannerIgnoreIndexWithCollationForRegex: 1
  },
  ok: 1,
  '$clusterTime': {
    clusterTime: Timestamp({ t: 1743003489, i: 4 }),
    signature: {
      hash: Binary.createFromBase64('BE0hu4ryCaDvHZ1+lN5Kv3iaet8=', 0),
      keyId: Long('7421956138939187203')
    }
  },
  operationTime: Timestamp({ t: 1743003489, i: 4 })
}
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> db.users.getIndexes()
[
  { v: 2, key: { _id: 1 }, name: '_id_' },
  { v: 2, key: { name: 1 }, name: 'name_1', unique: true },
  { v: 2, key: { name: 1, age: -1 }, name: 'name_1_age_-1' },
  {
    v: 2,
    key: { city: 1, signupDate: -1 },
    name: 'city_1_signupDate_-1'
  }
]
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1> db.users.aggregate([
... { $match: { status: "active" } }
... ]).explain("executionStats")
MongoInvalidArgumentError: Option "explain" cannot be used on an aggregate call
with writeConcern
Atlas atlas-22a8zc-shard-0 [primary] tc_DB1>

```