

BÁO CÁO LAB3 LƯU TRỮ XỬ LÝ DỮ LIỆU LỚN : CÀI ĐẶT CỤM CƠ SỞ DỮ LIỆU NOSQL MONGODB



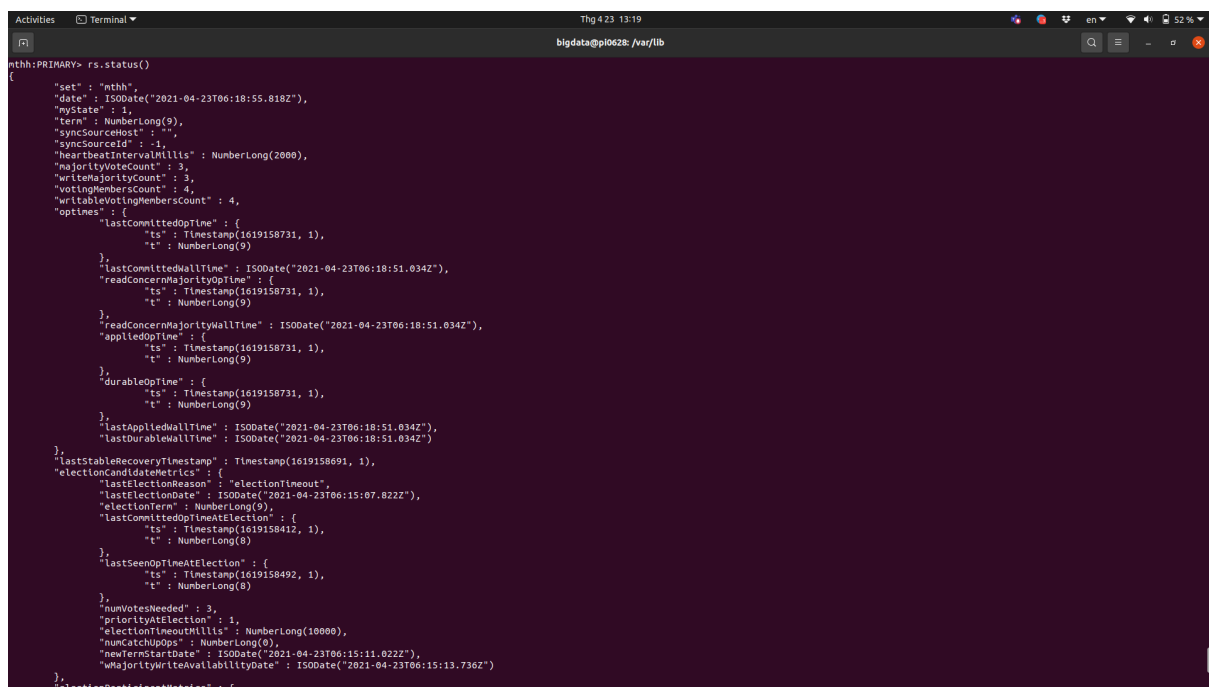
Nhóm	MTHH	
Thành viên	Nguyễn Quang Huy	20183554
	Trần Quang Minh	20183594
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1. Kết quả cài đặt

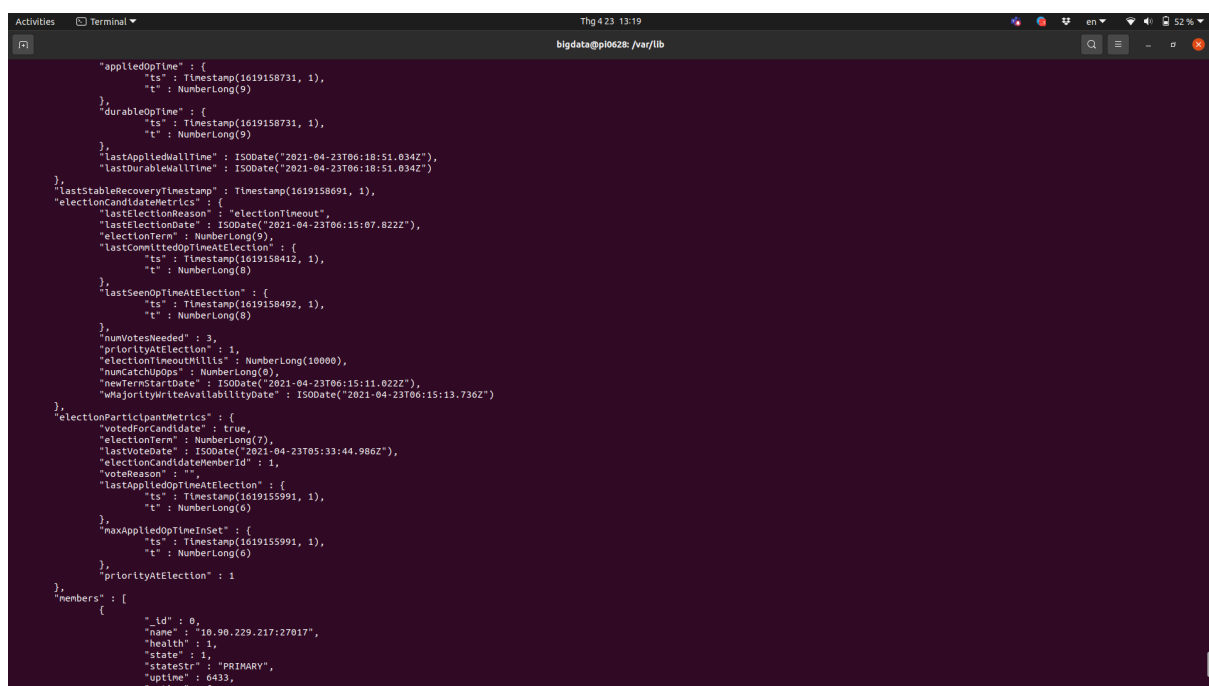
Nhóm đã cài đặt thành công hệ cơ sở dữ liệu NoSQL trên cụm gồm 3 máy.

Dưới đây là minh chứng cho việc cài đặt thành công, để kiểm tra thông tin cụm, trên một node bất kì sử dụng câu lệnh :

```
rs.status()
```



```
nthh:PRIMARY> rs.status()
{
  "set" : "nthh",
  "date" : ISODate("2021-04-23T06:18:55.818Z"),
  "myState" : 1,
  "term" : NumberLong(9),
  "syncSourceHost" : "",
  "syncSourceId" : -1,
  "heartbeatIntervalMillis" : NumberLong(2000),
  "majorityVoteCount" : 3,
  "writeMajorityCount" : 3,
  "votingMembersCount" : 4,
  "writableVotingMembersCount" : 4,
  "optimes" : {
    "lastCommittedOptime" : {
      "ts" : Timestamp(1619158731, 1),
      "t" : NumberLong(9)
    },
    "lastCommittedWallTime" : ISODate("2021-04-23T06:18:51.034Z"),
    "readConcernMajorityOptime" : {
      "ts" : Timestamp(1619158731, 1),
      "t" : NumberLong(9)
    },
    "readConcernMajorityWallTime" : ISODate("2021-04-23T06:18:51.034Z"),
    "appliedOptime" : {
      "ts" : Timestamp(1619158731, 1),
      "t" : NumberLong(9)
    },
    "durableOptime" : {
      "ts" : Timestamp(1619158731, 1),
      "t" : NumberLong(9)
    },
    "lastAppliedWallTime" : ISODate("2021-04-23T06:18:51.034Z"),
    "lastDurableWallTime" : ISODate("2021-04-23T06:18:51.034Z")
  },
  "lastStableRecoveryTimestamp" : Timestamp(1619158691, 1),
  "electionCandidateMetrics" : {
    "lastElectionReason" : "electionTimeout",
    "lastElectionDate" : ISODate("2021-04-23T06:15:07.822Z"),
    "electionTerm" : NumberLong(9),
    "lastCommittedOptimeAtElection" : {
      "ts" : Timestamp(1619158412, 1),
      "t" : NumberLong(8)
    },
    "lastSeenOptimeAtElection" : {
      "ts" : Timestamp(1619158492, 1),
      "t" : NumberLong(8)
    },
    "numVotesNeeded" : 3,
    "priorityAtElection" : 1,
    "electionTimeoutMillis" : NumberLong(10000),
    "numCatchUpOps" : NumberLong(0),
    "newTermStartDate" : ISODate("2021-04-23T06:15:11.022Z"),
    "majorityWriteAvailabilityDate" : ISODate("2021-04-23T06:15:13.736Z")
  },
  "electionParticipantMetrics" : {
```



```
    "appliedOptime" : {
      "ts" : Timestamp(1619158731, 1),
      "t" : NumberLong(9)
    },
    "durableOptime" : {
      "ts" : Timestamp(1619158731, 1),
      "t" : NumberLong(9)
    },
    "lastAppliedWallTime" : ISODate("2021-04-23T06:18:51.034Z"),
    "lastDurableWallTime" : ISODate("2021-04-23T06:18:51.034Z")
  },
  "lastStableRecoveryTimestamp" : Timestamp(1619158691, 1),
  "electionCandidateMetrics" : {
    "lastElectionReason" : "electionTimeout",
    "lastElectionDate" : ISODate("2021-04-23T06:15:07.822Z"),
    "electionTerm" : NumberLong(9),
    "lastCommittedOptimeAtElection" : {
      "ts" : Timestamp(1619158412, 1),
      "t" : NumberLong(8)
    },
    "lastSeenOptimeAtElection" : {
      "ts" : Timestamp(1619158492, 1),
      "t" : NumberLong(8)
    },
    "numVotesNeeded" : 3,
    "priorityAtElection" : 1,
    "electionTimeoutMillis" : NumberLong(10000),
    "numCatchUpOps" : NumberLong(0),
    "newTermStartDate" : ISODate("2021-04-23T06:15:11.022Z"),
    "majorityWriteAvailabilityDate" : ISODate("2021-04-23T06:15:13.736Z")
  },
  "electionParticipantMetrics" : {
    "votedForCandidate" : true,
    "electionTerm" : NumberLong(7),
    "lastVoteDate" : ISODate("2021-04-23T05:33:44.986Z"),
    "electionCandidateMemberId" : 1,
    "voteReason" : "",
    "lastAppliedOptimeAtElection" : {
      "ts" : Timestamp(1619155991, 1),
      "t" : NumberLong(6)
    },
    "maxAppliedOptimeInSet" : {
      "ts" : Timestamp(1619155991, 1),
      "t" : NumberLong(6)
    },
    "priorityAtElection" : 1
  },
  "members" : [
    {
      "_id" : 0,
      "name" : "10.90.229.217:27017",
      "health" : 1,
      "state" : 1,
      "stateStr" : "PRIMARY",
      "uptime" : 6433,
      "optime" : {
```

```
Activities Terminal Thg 4/23 13:19
bigdata@pl0628: /var/lib

    },
    "priorityAtElection" : 1
  },
  "members" : [
    {
      "id" : 0,
      "name" : "10.90.229.217:27017",
      "health" : 1,
      "state" : 1,
      "stateStr" : "PRIMARY",
      "uptime" : 6433,
      "optime" : {
        "ts" : Timestamp(1619158731, 1),
        "t" : NumberLong(9)
      },
      "optimeDate" : ISODate("2021-04-23T06:18:51Z"),
      "syncSourceHost" : "",
      "syncSourceId" : 1,
      "infoMessage" : "",
      "electionTime" : Timestamp(1619158507, 1),
      "electionDate" : ISODate("2021-04-23T06:15:07Z"),
      "configVersion" : 5,
      "configTerm" : 9,
      "self" : true,
      "lastHeartbeatMessage" : ""
    },
    {
      "id" : 1,
      "name" : "node1:27017",
      "health" : 1,
      "state" : 2,
      "stateStr" : "SECONDARY",
      "uptime" : 762,
      "optime" : {
        "ts" : Timestamp(1619158731, 1),
        "t" : NumberLong(9)
      },
      "optimeDurable" : {
        "ts" : Timestamp(1619158731, 1),
        "t" : NumberLong(9)
      },
      "optimeDate" : ISODate("2021-04-23T06:18:51Z"),
      "optimeDurableDate" : ISODate("2021-04-23T06:18:51Z"),
      "lastHeartbeat" : ISODate("2021-04-23T06:18:55.538Z"),
      "lastHeartbeatRecv" : ISODate("2021-04-23T06:18:54.122Z"),
      "pingMs" : NumberLong(151),
      "lastHeartbeatMessage" : "",
      "syncSourceHost" : "10.90.229.217:27017",
      "syncSourceId" : 0,
      "infoMessage" : "",
      "configVersion" : 5,
      "configTerm" : 9
    }
  ],
}
```

```
Activities Terminal Thg 4/23 13:19
bigdata@pl0628: /var/lib

    },
    {
      "id" : 2,
      "name" : "node2:27017",
      "health" : 0,
      "state" : 8,
      "stateStr" : "(not reachable/healthy)",
      "uptime" : 0,
      "optime" : {
        "ts" : Timestamp(0, 0),
        "t" : NumberLong(-1)
      },
      "optimeDurable" : {
        "ts" : Timestamp(0, 0),
        "t" : NumberLong(-1)
      },
      "optimeDate" : ISODate("1970-01-01T00:00:00Z"),
      "optimeDurableDate" : ISODate("1970-01-01T00:00:00Z"),
      "lastHeartbeat" : ISODate("2021-04-23T06:18:45.002Z"),
      "lastHeartbeatRecv" : ISODate("2021-04-23T06:17:03.368Z"),
      "pingMs" : NumberLong(1598),
      "lastHeartbeatMessage" : "Couldn't get a connection within the time limit of 1000ms",
      "syncSourceHost" : "",
      "syncSourceId" : -1,
      "infoMessage" : "",
      "configVersion" : 3,
      "configTerm" : 6
    },
    {
      "id" : 3,
      "name" : "vlethoang:27017",
      "health" : 1,
      "state" : 2,
      "stateStr" : "SECONDARY",
      "uptime" : 237,
      "optime" : {
        "ts" : Timestamp(1619158731, 1),
        "t" : NumberLong(9)
      },
      "optimeDurable" : {
        "ts" : Timestamp(1619158731, 1),
        "t" : NumberLong(9)
      },
      "optimeDate" : ISODate("2021-04-23T06:18:51Z"),
      "optimeDurableDate" : ISODate("2021-04-23T06:18:51Z"),
      "lastHeartbeat" : ISODate("2021-04-23T06:18:54.065Z"),
      "lastHeartbeatRecv" : ISODate("2021-04-23T06:18:54.065Z"),
      "pingMs" : NumberLong(44),
      "lastHeartbeatMessage" : "",
      "syncSourceHost" : "10.90.229.217:27017",
      "syncSourceId" : 0,
      "infoMessage" : "",
      "configVersion" : 5,
      "configTerm" : 9
    }
  ],
}
```

Trên một node SECONDARY bất kì, sử dụng lệnh :

```
rs.isMaster()
```

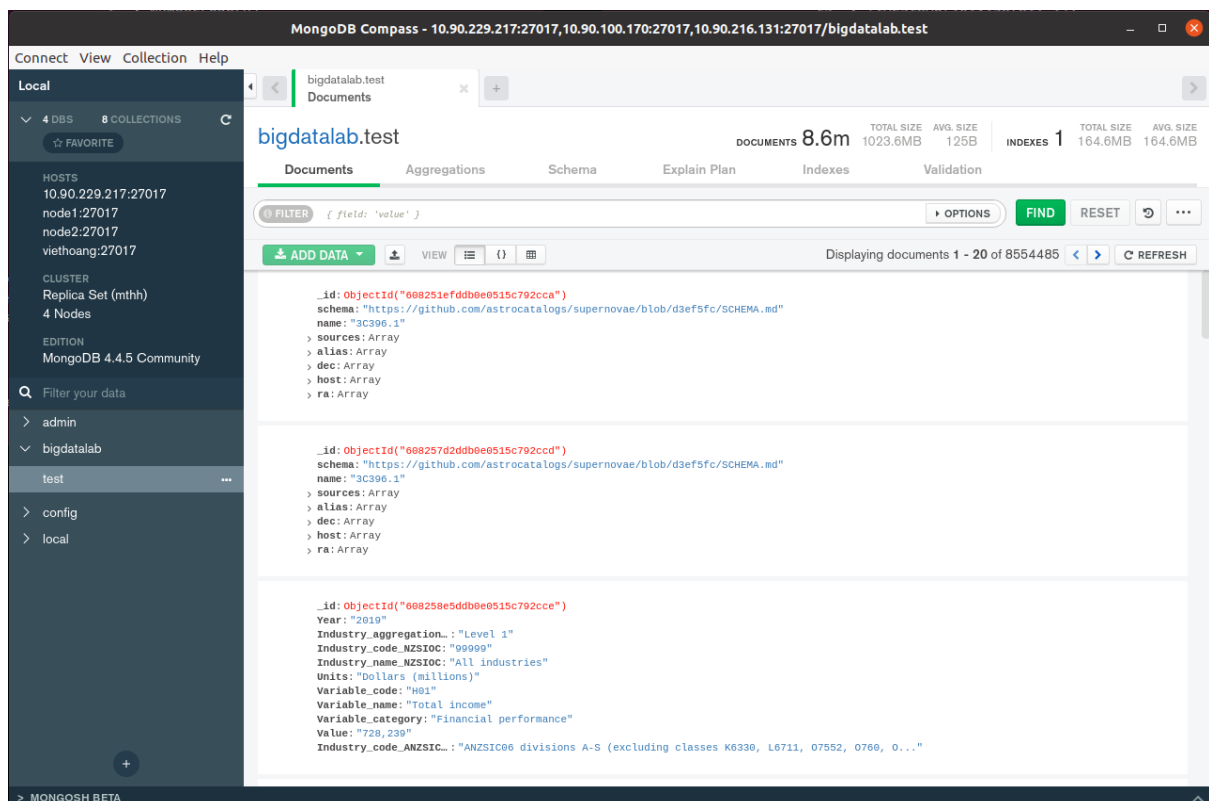
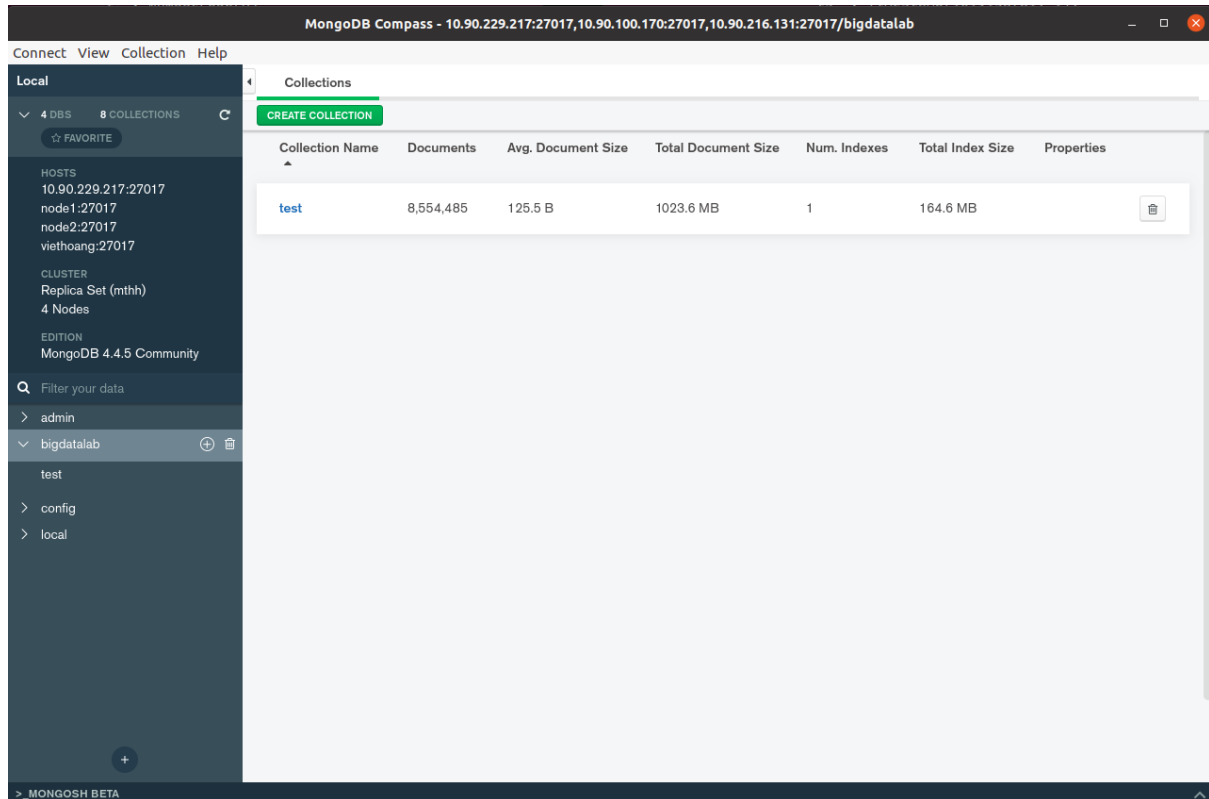
để kiểm tra node master trong cụm.

```
Activities Terminal Thg 4/23 13:20 bigdata@viethoang: ~  
@shell:1:1  
mthh:SECONDARY> rs.secondaryOk()  
mthh:SECONDARY> db.test.count()  
8554485  
mthh:SECONDARY> rs.isMaster()  
rs.isMaster() {  
  "topologyVersion": {  
    "processId": ObjectId("6082629f6788b0b279b2151b"),  
    "counter": NumberLong(4)  
  },  
  "hosts": [  
    "10.90.229.217:27017",  
    "node1:27017",  
    "node2:27017",  
    "vlethoang:27017"  
  ],  
  "setName": "mthh",  
  "setVersion": 5,  
  "ismaster": false,  
  "secondary": true,  
  "me": "vlethoang:27017",  
  "lastWrite": {  
    "opTime": {  
      "ts": Timestamp(1619158801, 1),  
      "t": NumberLong(9)  
    },  
    "lastWriteDate": ISODate("2021-04-23T06:20:01Z"),  
    "majorityOpTime": {  
      "ts": Timestamp(1619158781, 1),  
      "t": NumberLong(9)  
    },  
    "majorityWriteDate": ISODate("2021-04-23T06:19:41Z")  
  },  
  "maxBsonObjectSize": 16777216,  
  "maxMessageSizeBytes": 48000000,  
  "maxWriteBatchSize": 100000,  
  "localTime": ISODate("2021-04-23T06:20:16.361Z"),  
  "logicalSessionTimeoutMinutes": 30,  
  "connectionId": 43,  
  "minWireVersion": 0,  
  "maxWireVersion": 9,  
  "readOnly": false,  
  "ok": 1,  
  "$clusterTime": {  
    "clusterTime": Timestamp(1619158801, 1),  
    "signature": {  
      "hash": BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAAA"),  
      "keyId": NumberLong(0)  
    }  
  },  
  "operationTime": Timestamp(1619158801, 1)  
}  
mthh:SECONDARY>
```

```
Activities Terminal Thg 4/23 13:20 bigdata@modet: /var/lib/mongod  
test  
mthh:SECONDARY>  
mthh:SECONDARY> use bigdata  
switched to db bigdata  
mthh:SECONDARY> db.test.count()  
8554485  
mthh:SECONDARY> rs.isMaster()  
rs.isMaster() {  
  "topologyVersion": {  
    "processId": ObjectId("60824ce49742920bdfc730f3"),  
    "counter": NumberLong(19)  
  },  
  "hosts": [  
    "10.90.229.217:27017",  
    "node1:27017",  
    "node2:27017",  
    "vlethoang:27017"  
  ],  
  "setName": "mthh",  
  "setVersion": 5,  
  "ismaster": false,  
  "secondary": true,  
  "me": "node2:27017",  
  "lastWrite": {  
    "opTime": {  
      "ts": Timestamp(1619158801, 1),  
      "t": NumberLong(9)  
    },  
    "lastWriteDate": ISODate("2021-04-23T06:20:01Z"),  
    "majorityOpTime": {  
      "ts": Timestamp(1619158781, 1),  
      "t": NumberLong(9)  
    },  
    "majorityWriteDate": ISODate("2021-04-23T06:19:41Z")  
  },  
  "maxBsonObjectSize": 16777216,  
  "maxMessageSizeBytes": 48000000,  
  "maxWriteBatchSize": 100000,  
  "localTime": ISODate("2021-04-23T06:20:47.156Z"),  
  "logicalSessionTimeoutMinutes": 30,  
  "connectionId": 166,  
  "minWireVersion": 0,  
  "maxWireVersion": 9,  
  "readOnly": false,  
  "ok": 1,  
  "$clusterTime": {  
    "clusterTime": Timestamp(1619158837, 1),  
    "signature": {  
      "hash": BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAAA"),  
      "keyId": NumberLong(0)  
    }  
  },  
  "operationTime": Timestamp(1619158801, 1)  
}  
mthh:SECONDARY>
```

2. Kết quả lưu trữ 1GB dữ liệu

Ngoài kiểm tra thông tin cụm bằng cửa sổ dòng lệnh, còn có thể kiểm tra thông tin cụm bằng công cụ UI MongoDB Compass. Minh chứng lưu trữ 1GB dữ liệu trong MongoDB :

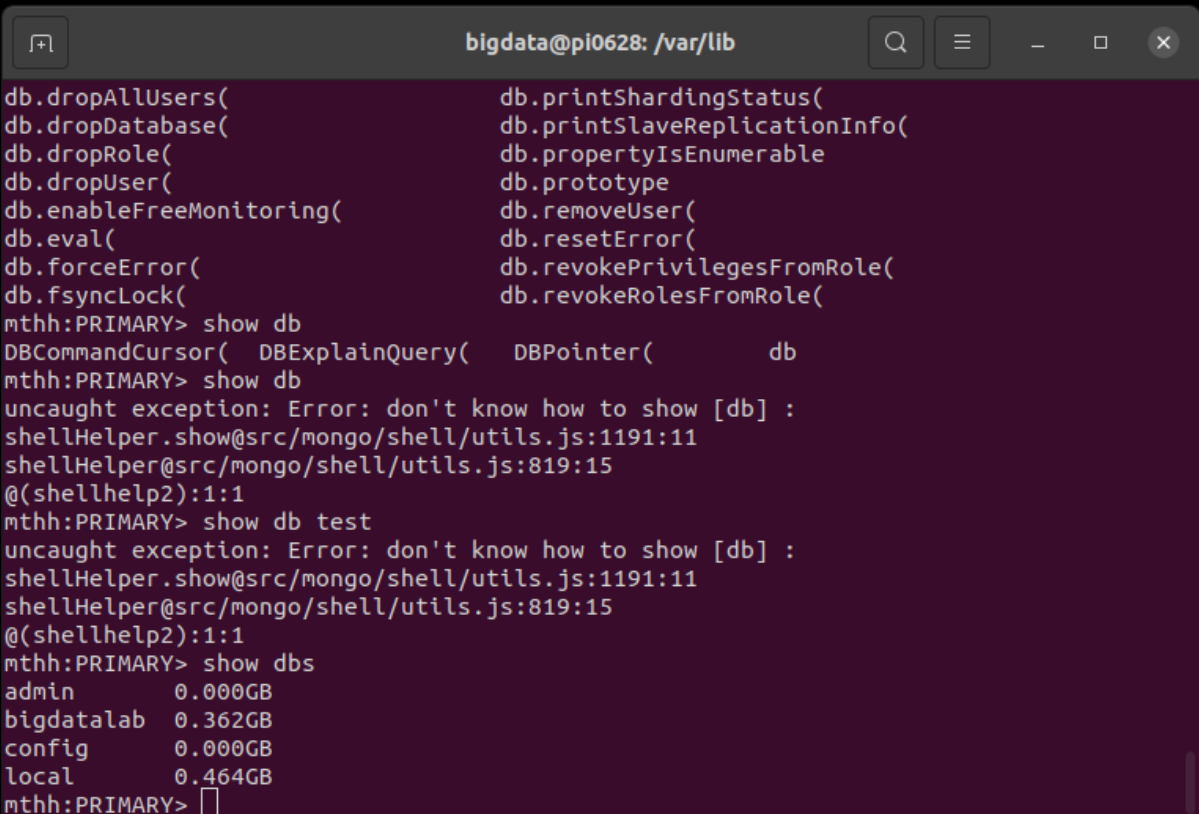


3. Kết quả dữ liệu được lưu trữ phân tán trên 3 máy

Sử dụng lệnh :

```
show dbs
```

Sẽ nhìn được thấy dung lượng lưu trữ trên các database như sau :



```
bigdata@pi0628: /var/lib
db.dropAllUsers(
db.dropDatabase(
db.dropRole(
db.dropUser(
db.enableFreeMonitoring(
db.eval(
db.forceError(
db.fsyncLock(
db.printShardingStatus(
db.printSlaveReplicationInfo(
db.propertyIsEnumerable
db.prototype
db.removeUser(
db.resetError(
db.revokePrivilegesFromRole(
db.revokeRolesFromRole(
mthh:PRIMARY> show db
DBCommandCursor( DBExplainQuery( DBPointer( db
mthh:PRIMARY> show db
uncaught exception: Error: don't know how to show [db] :
shellHelper.show@src/mongo/shell/utils.js:1191:11
shellHelper@src/mongo/shell/utils.js:819:15
@(shellhelp2):1:1
mthh:PRIMARY> show db test
uncaught exception: Error: don't know how to show [db] :
shellHelper.show@src/mongo/shell/utils.js:1191:11
shellHelper@src/mongo/shell/utils.js:819:15
@(shellhelp2):1:1
mthh:PRIMARY> show dbs
admin      0.000GB
bigdatalab 0.362GB
config     0.000GB
local      0.464GB
mthh:PRIMARY>
```

```
bigdata@viethoang: ~  
"maxWireVersion" : 9,  
"readOnly" : false,  
"ok" : 1,  
"$clusterTime" : {  
  "clusterTime" : Timestamp(1619158801, 1),  
  "signature" : {  
    "hash" : BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAAA="),  
    "keyId" : NumberLong(0)  
  },  
  "operationTime" : Timestamp(1619158801, 1)  
}  
mthh:SECONDARY> db.test.totalSize(  
... )  
287662080  
mthh:SECONDARY> db.test.count()  
8554485  
mthh:SECONDARY> show dbs  
admin          0.000GB  
bigdatalab     0.268GB  
config         0.000GB  
local          0.000GB  
mthh:SECONDARY> 
```

```
bigdata@node1: ~  
shellHelper@src/mongo/shell/utils.js:819:15  
@(shellhelp2):1:1  
mthh:SECONDARY> rs.secondaryOk()  
mthh:SECONDARY> show dbs  
admin          0.000GB  
bigdatalab     0.403GB  
config         0.000GB  
local          0.482GB  
mthh:SECONDARY> db.test.totalSize()  
0  
mthh:SECONDARY> db.test.count()  
0  
mthh:SECONDARY> use bigdatalab  
switched to db bigdatalab  
mthh:SECONDARY> db.test.totalSize()  
432943104  
mthh:SECONDARY> db.test.count()  
8554485  
mthh:SECONDARY> show dbs  
admin          0.000GB  
bigdatalab     0.403GB  
config         0.000GB  
local          0.482GB  
mthh:SECONDARY> 
```

Chú ý vào cơ sở dữ liệu **bigdatalab** sẽ thấy được dung lượng lưu trữ lên 3 máy là khác nhau, và tổng dung lượng cộng lại ~1GB, bằng tổng số dung lượng dữ liệu đã thêm vào cơ sở dữ liệu.