Practical 5:-Sharding using Mongodb
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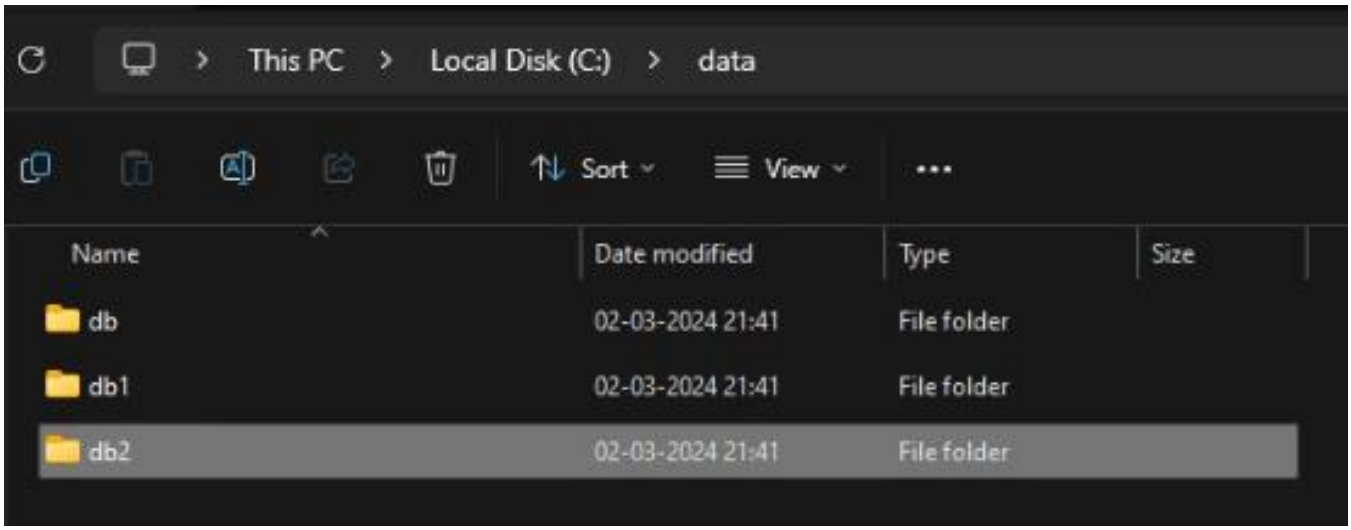
Step 1 :-
create c:\data\db folders otherwise mongo will generate error at startup

STEP 2:-
create other folders for replica set like c:\data\db1 and db2



STEP 3:-
Go to mongodb default folder location and find mongod.conf file
windows default: C:\Program Files\MongoDB\Server\7.0\data
open file in edit mode and find replication:
remove # from `replication` and in the next line add
```cmd
replication:
replSetName: "your_replica_set_name“

```
#replication:
replication:
  replSetName:"rs0"
```

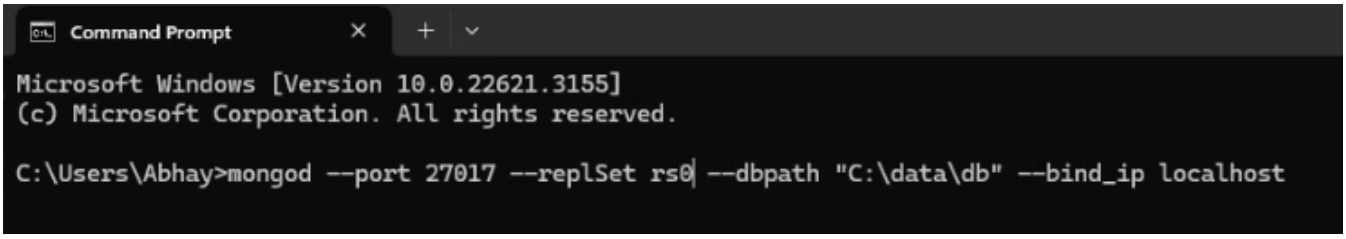
Step 4 :-

open cmd for each replication folder like db, db1, db2 and so on...

STEP 5:-

create other folders for replica set like c:\data\db1 and db2

type the following command to execute each replica node
Cmd > mongod --port 27017 --replSet your_replica_set_name --dbpath "C:\data\db" --bind_ip localhost



repeat above step for all other replica set node with diffrenet ports like 27018, 27019 and so on and db folder names like db1, db2 and so on

STEP 6:-

initiate the settings to add members to replica set
cmd
rs.initiate({_id: "rs0", members: [{_id: 0, host: "localhost:27017"}, {_id: 1, host: "localhost:27018"}, {_id: 2, host: "localhost:27019"}]});

Step 7 :-

check the status cmd> rs.status()

```
    infoMessage: '',
    configVersion: 96329,
    configTerm: -1
  },
  {
    _id: 2,
    name: 'localhost:27019',
    health: 1,
    state: 2,
    stateStr: 'SECONDARY',
    uptime: 19,
    optime: { ts: Timestamp({ t: 1709396225, i: 1 }), t: Long('1') },
    optimeDurable: { ts: Timestamp({ t: 1709396225, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2024-03-02T16:17:05.000Z'),
    optimeDurableDate: ISODate('2024-03-02T16:17:05.000Z'),
    lastAppliedWallTime: ISODate('2024-03-02T16:17:05.502Z'),
    lastDurableWallTime: ISODate('2024-03-02T16:17:05.502Z'),
    lastHeartbeat: ISODate('2024-03-02T16:17:10.975Z'),
    lastHeartbeatRecv: ISODate('2024-03-02T16:17:12.575Z'),
    pingMs: Long('0'),
    lastHeartbeatMessage: '',
    syncSourceHost: 'localhost:27017',
    syncSourceId: 0,
    infoMessage: '',
    configVersion: 96329,
    configTerm: -1
  }
],
ok: 1,
'$clusterTime': {
  clusterTime: Timestamp({ t: 1709396225, i: 1 }),
  signature: {
    hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAAAAAA=', 0),
    keyId: Long('0')
  }
},
operationTime: Timestamp({ t: 1709396225, i: 1 })
```

STEP 8:-

check the status cmd> rs.conf()

```
  },
  {
    _id: 1,
    host: 'localhost:27018',
    arbiterOnly: false,
    buildIndexes: true,
    hidden: false,
    priority: 1,
    tags: {},
    secondaryDelaySecs: Long('0'),
    votes: 1
  },
  {
    _id: 2,
    host: 'localhost:27019',
    arbiterOnly: false,
    buildIndexes: true,
    hidden: false,
    priority: 1,
    tags: {},
    secondaryDelaySecs: Long('0'),
    votes: 1
  }
],
protocolVersion: Long('1'),
writeConcernMajorityJournalDefault: true,
settings: {
  chainingAllowed: true,
  heartbeatIntervalMillis: 2000,
  heartbeatTimeoutSecs: 10,
  electionTimeoutMillis: 10000,
  catchUpTimeoutMillis: -1,
  catchUpTakeoverDelayMillis: 30000,
  getLastErrorModes: {},
  getLastErrorDefaults: { w: 1, wtimeout: 0 },
  replicaSetId: ObjectId('65e3509d6f936be55b29c05c')
}
```

Step 9 :-

now you can add more member using

```
rs0 [direct: primary] test> rs.add({host:"localhost:27020"})


{
  ok: 1,
  '$clusterTime': {
    clusterTime: Timestamp({ t: 1709396687, i: 1 }),
    signature: {
      hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAAAAAA=', 0),
      keyId: Long('0')
    }
  },
  operationTime: Timestamp({ t: 1709396687, i: 1 })
}
```

STEP 10:-

remove memeber from replication set

```
rs0 [direct: primary] test> rs.remove("localhost:27020");
{
  ok: 1,
  '$clusterTime': {
    clusterTime: Timestamp({ t: 1709396796, i: 1 }),
    signature: {
      hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAAAAAA=', 0),
      keyId: Long('0')
    }
  },
  operationTime: Timestamp({ t: 1709396796, i: 1 })
}
```

---------- WARNINGS ----------
if you stepdown primary using:
`rs.stepDown()`
then use below command to check configuration and set primary back
`rs.conf()`

you can set previliges for primary and secondary
`db.getMongo().setReadPref('primaryPreferred')`
and when you on secondary node
`db.getMongo().setReadPref('secondary')`

REMOVING OF REPLICA SETS
_stop mongodb all running instances
_comment back the `replSetName` and `replication` in `mongod.conf` file
_now start an instance using simple command
```cmd
mongod --port 27017 --dbpath "path to db folder"
```

RECONFIG MEMBERS USING rs.initiate();
_remove all secondary nodes and then type:
```cmd
db.adminCommand({ replSetStepDown: 120, force: true })
```
_this will step down the primary node

RECONFIG THE CONFIGURATION
```cmd
rs.reconfig({
  _id: "your_replica_set_name",
  members: [
    { _id: 0, host: "localhost:27017" },
    // Add other members here if needed
  ]
}, { force: true });
```

NOTE: if you want now you can delete all other files if the testing is completed.