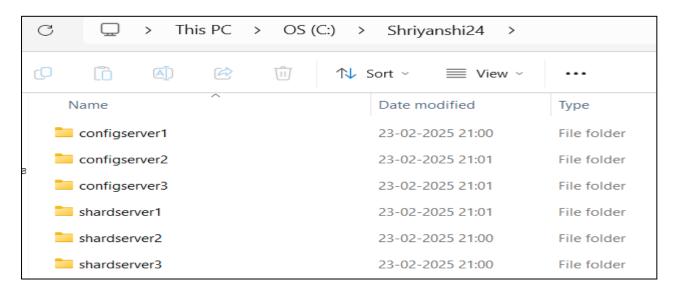
PRACTICAL 7

SHARDING IN MONGODB

You are a database administrator tasked with setting up MongoDB sharding to handle a growing dataset. You need to configure a MongoDB sharded cluster with the following requirements:

- · One Config Server (Replica set)
- · Two Shard Servers
- · One Mongos Router
- · Sharding enabled for a database and collection

Create 6 folders in drive.



Initialize MongoDB Config Servers

mongod --configsvr --port=1230 --replSet="replica-set1" --dbpath="C:\Shriyanshi24\configserver1"

```
C:\Windows\System32>mongod --configsvr --port=1230 --replSet="replica-set1" --dbpath="C:\Shriyanshi24\configserver1"

{"t":{"$date":"2025-02-23T21:34:30.943+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"-","msg":"Initialized wir specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"isInternalClient":true t":{"minWireVersion":0,"maxWireVersion":17},"isInternalClient":true t":{"minWireVersion":0,"maxWireVersion":17},"isInternalClient":true t":{"sdate":"2025-02-23T21:34:30.959+05:30"},"s":"I", "c":"CONTROL", "id":23285, "ctx":"thread1","msg":"Automatic thread1 thread2 thread1 thread1 thread2 thread2 thread3 thread3
```

 $mongod --configsvr --port = 1240 --replSet = "replica-set1" --dbpath = "C:\Shriyanshi24\configserver2" --dbpa$

```
C:\Windows\System32>mongod --configsvr --port=1240 --replSet="replica-set1" --dbpath="C:\Shriyanshi24\configserver2"
{"t":{"$date":"2025-02-23T20:34:43.192+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"thread1","msg":"Initialize
d wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incomingInterna
lClient":{"minWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient"
:true}}
{"t":{"$date":"2025-02-23T20:34:43.193+05:30"},"s":"I", "c":"CONTROL", "id":23285, "ctx":"thread1","msg":"Automatica
lly disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T20:34:44.163+05:30"},"s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1","msg":"Implicit T
CP FastOpen in use."}
```

```
C:\Windows\System32>mongod --configsvr --port=1250 --replSet="replica-set1" --dbpath="C:\Shriyanshi24\configserver3"
{"t":{"$date":"2025-02-23T20:35:04.112+05:30"},"s":"I", "c":"CONTROL", "id":23285, "ctx":"-","msg":"Automatically d
sabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T20:35:05.083+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"thread1","msg":"Initializ
d wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incomingIntern
lClient":{"minWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient
```

Connect using mongosh

```
mongosh --host="localhost:1230"
```

```
C:\Windows\System32>mongosh --host="localhost:1230"
Current Mongosh Log ID: 67bb39347f3d892af5fa4213
Connecting to:
                         mongodb://localhost:1230/?directConnection=
1.0
Using MongoDB:
                          6.0.3
Using Mongosh:
                          2.4.0
For mongosh info see: https://www.mongodb.com/docs/mongodb-shell/
rs.initiate({
 id:"replica-shriyanshi",
 configsvr:true,
 members:[
   { id:0, host:"localhost:1230"},
   { id:1, host:"localhost:1240"},
   { id:2, host:"localhost:1250"}}}
test> rs.initiate({
 .. _id:"replica-set1",
 .. configsvr:true,
 .. members:[
 .. {_id:0,host:"localhost:1230"},
 .. {_id:1,host:"localhost:1240"},
 .. {_id:2,host:"localhost:1250"}
 ok: 1, lastCommittedOpTime: Timestamp({ t: 1740323214, i: 1 }) }
```

Configure Shards

mongod --shardsvr --port=1330 --dbpath="C:\Shriyanshi24\shardserver1" --replSet="replica-set2"

```
C:\Windows\System32>mongod --shardsvr --port=1330 --dbpath="C:\Shriyanshi24\shardserver1" --replSet="replica-set2"
{"t":{"$date":"2025-02-23T20:37:15.726+05:30"},"s":"I", "c":"CONTROL", "id":23285,
                                                                                        "ctx":"thread1","msg":"Automatic
lly disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
("t":{"$date":"2025-02-23T20:37:15.726+05:30"},"s":"I<sup>"</sup>, "c":"NETWORK", "id":4915701, "ctx":"thread1","msg":"Initiali
d wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incomingIntern
lClient":{"minWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient
  t":{"$date":"2025-02-23T20:37:15.728+05:30"},"s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1","msg":"Implicit'
mongod --shardsvr --port=1340 --dbpath="C:\Shriyanshi24\shardserver2" --replSet="replica-set2"
 :\Windows\System32>mongod --shardsvr --port=1340 --dbpath="C:\Shriyanshi24\shardserver2" --replSet="replica-set2"
"t":{"$date":"2025-02-23T20:37:45.694+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"-","msg":"Initialized wird specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incomingInternalClient":
 ; aninWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient":true
 "t":{"$date":"2025-02-23T20:37:45.698+05:30"},"s":"I", "c":"CONTROL", "id":23285,
                                                                                         "ctx":"thread1","msg":"Automatic
lly disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
["t":{"$date":"2025-02-23T20:37:45.699+05:30"},"s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1","msg":"Implicit
P FastOpen in use."}
mongod --shardsvr --port=1350 --dbpath="C:\Shriyanshi24\shardserver3" --replSet="replica-set2"
C:\Windows\System32>mongod --shardsvr --port=1350 --dbpath="C:\Shriyanshi24\shardserver3" --replSet="replica-set2"
["t":{"$date":"2025-02-23T20:38:06.691+05:30"},"s":"I", "c":"CONTROL", "id":23285,
                                                                                        "ctx":"-","msg":"Automatically d
sabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T20:38:06.692+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"-","msg":"Initialized wire
 specification", "attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incomingInternalClient":
 ":{"minWireVersion":0,"maxWireVersion":17},"outgoing":{"minWireVersion":6,"maxWireVersion":17},"isInternalClient":true"
 t":{"$date":"2025-02-23T20:38:07.639+05:30"},"s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1","msg":"Implicit"
CP FastOpen in use."}
# Connect using mongosh
mongosh --host="localhost:1330"
C:\Windows\System32>mongosh --host="localhost:1330"
Current Mongosh Log ID: 67bb39eac735bd2fd4fa4213
Connecting to:
                                     mongodb://localhost:1330/?directConnection
4.0
Using MongoDB:
                                      6.0.3
Using Mongosh:
                                      2.4.0
For mongosh info see: https://www.mongodb.com/docs/mongodb-shell/
rs.initiate({
  id:"replica-set2",
  members: [
     { id: 0, host: "localhost:1330"},
     { id: 1, host: "localhost:1340"},
```

```
{ id: 2, host: "localhost:1350"}]})
```

```
test> rs.initiate({ _id: "replica-set2", members: [ { _id: 0, host: "localhost:1330" }, { _id: 1, host: "localhost:1340"
}, { _id: 2, host: "localhost:1350" }] })
{ ok: 1 }
replica-set2 [direct: secondary] test>
```

Initialize a Query Router which is a mongos process.

mongos --port=1210 --configdb="replica-set1/localhost:1230,localhost:1240,localhost:1250"

```
C:\Windows\System32>mongos --port=1210 --configdb="replica-set1/localhost:1230,localhost:1240,localhost:1250"
{"t":{"$date":"2025-02-23T20:42:43.382+05:30"},"s":"I", "c":"CONTROL", "id":23285, "ctx":"-","msg":"Automa sabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T20:42:44.409+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"thread1","msg":'d wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":17},"incom lClient":{"minWireVersion":0,"maxWireVersion":17},"isInteruce}}}

":true}}}
```

Now, Connect Shards and Query Router

mongosh --host="localhost:1210"

```
C:\Windows\System32>mongosh --host="localhost:1210"

Current Mongosh Log ID: 67bb3b076001c01959fa4213

Connecting to: mongodb://localhost:1210/?directConnection=tpName=mongosh+2.4.0

Using MongoDB: 6.0.3

Using Mongosh: 2.4.0

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

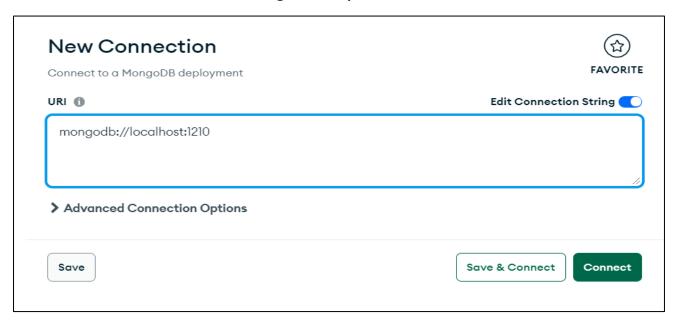
Add Shard Replica Set to Sharded Cluster

sh.addShard("replica-set2/localhost:1330,localhost:1340,localhost:1350")

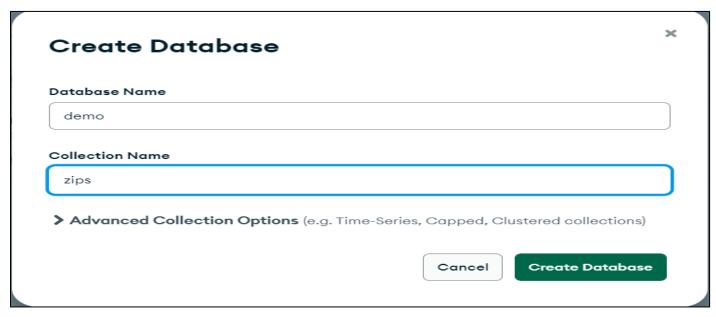
Enable Sharding on a Specific Database of Shards Replica Set

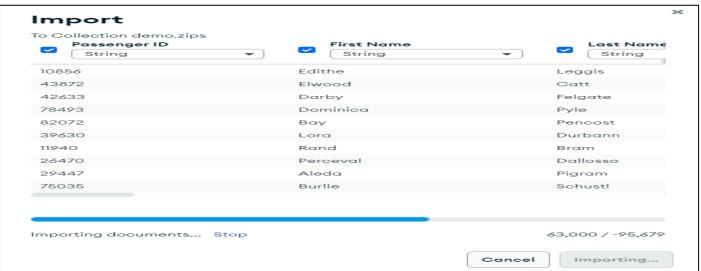
```
direct: mongos] test> sh.status()
shardingVersion
 _id: 1, clusterId: ObjectId('67bb3999d36f80453c57dd87') }
shards
 {
   _id: 'replica-set2',
   host: 'replica-set2/localhost:1330,localhost:1340,localhost:1350'
   state: 1,
   topologyTime: Timestamp({ t: 1740323722, i: 5 })
active mongoses
 { '6.0.3': 1 } ]
autosplit
 'Currently enabled': 'yes' }
balancer
 'Currently running': 'no',
 'Currently enabled': 'yes',
 'Failed balancer rounds in last 5 attempts': 0,
 'Migration Results for the last 24 hours': 'No recent migrations'
```

Now connect to the localhost in mongodb compass



And create database and collection and import dummy data

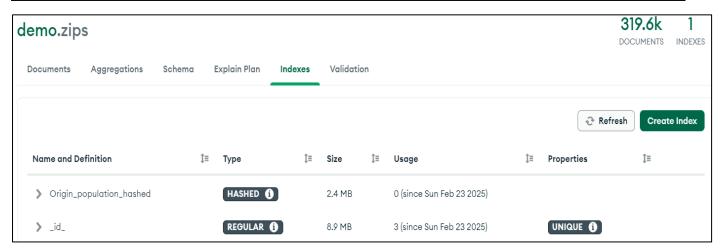




Creating index

```
[direct: mongos] test> show collections

[direct: mongos] test> use demo
switched to db demo
[direct: mongos] demo> show collections
zips
[direct: mongos] demo> db.zips.createIndex({"Origin_population":"hashed"})
Origin_population_hashed
```



Data is been sharded.