PRACTICAL 6

AIM :- Implementation of Sharding in MongoDB.

➢ Sharding :-

Sharding is the process of storing data records across multiple machines and it is MongoDB's approach to meeting the demands of data growth. As the size of the data increases, a single machine may not be sufficient to store the data nor provide an acceptable read and write throughput. Sharding solves the problem with horizontal scaling. With sharding, you add more machines to support data growth and the demands of read and write operations.

➢ Sharded Cluster :-

A MongoDB sharded cluster consists of the following components:

- shard: Each shard contains a subset of the sharded data. Each shard can be deployed as a replica set.
- mongos: The mongos acts as a query router, providing an interface between client applications and the sharded cluster.
- config servers: Config servers store metadata and configuration settings for the cluster. As of MongoDB 3.4, config servers must be deployed as a replica set (CSRS).
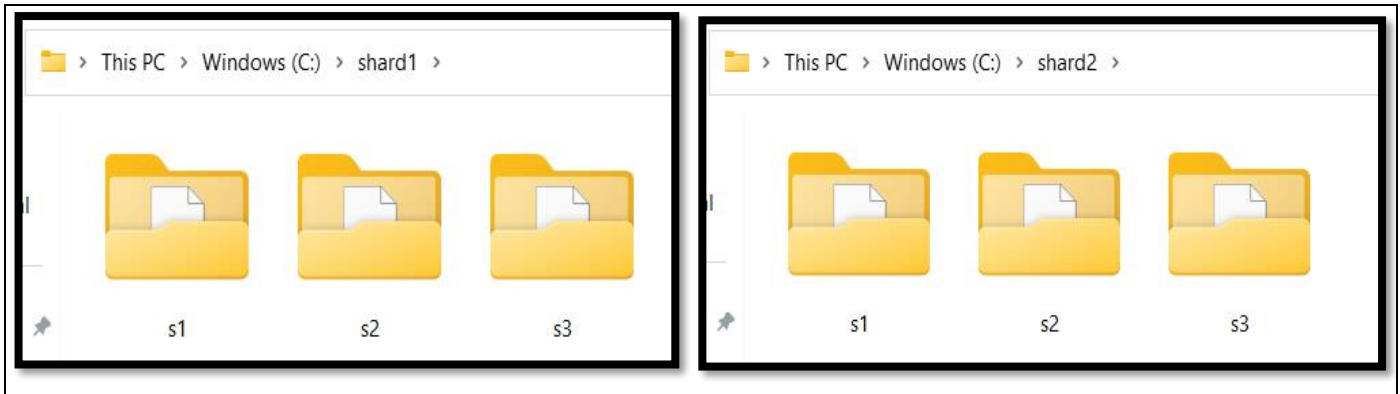
Step - 1 :-

Create config folder in C Drive. Inside that create three folders like c1,c2,c3.
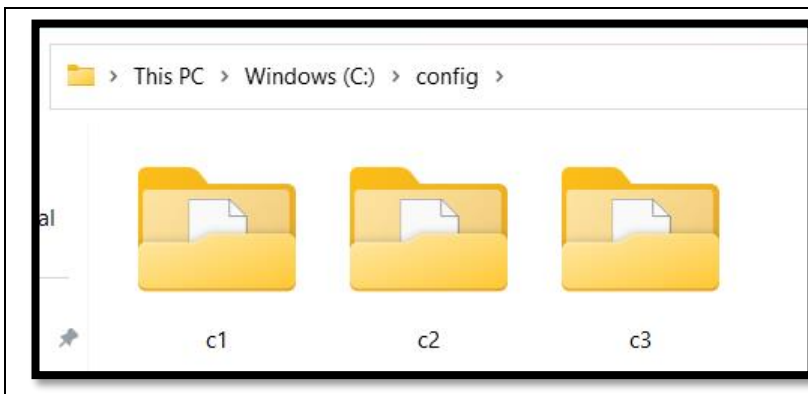
Step – 2 :-

Create two shard folders(shard1,shard2) in C drive. Inside that create three folders like s1,s2,s3.

Step – 3 :- Open Command prompt.

Create three config servers and set one as primary and remaining as secondary.

Using below commands :-

mongod --configsvr --dbpath "C:\config\c1" --port 27018 --replSet=c0

mongod --configsvr --dbpath "C:\config\c2" --port 27019 --replSet=c0

mongod --configsvr --dbpath "C:\config\c3" --port 27020 --replSet=c0

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongod --configsvr --dbpath "C:\config\c2" --port 27019 --replSet=c0
{"t":{"$date":"2023-03-23T11:27:17.224+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,  "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:27:17.499+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T11:27:17.499+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"Mong
oDB starting","attr":{"pid":4452,"port":27019,"dbPath":"C:/config/c2","architecture":"64-bit","host":"GURU"}}
{"t":{"$date":"2023-03-23T11:27:17.499+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,  "ctx":"initandlisten","msg":"Targ
et operating system minimum version","attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:27:17.499+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,  "ctx":"initandlisten","msg":"Buil
d Info","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"al
locator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:27:17.499+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,  "ctx":"initandlisten","msg":"Oper
ating System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T11:27:17.499+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,  "ctx":"initandlisten","msg":"Opti
ons set by command line","attr":{"options":{"net":{"port":27019},"replication":{"replSet":"c0"},"sharding":{"clusterRole
":"configsvr"},"storage":{"dbPath":"C:\\config\\c2"}}}}
{"t":{"$date":"2023-03-23T11:27:17.500+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,  "ctx":"initandlisten","msg":"Open
ing WiredTiger","attr":{"config":"create,cache_size=7514M,session_max=33000,eviction=(threads_min=4,threads_max=4),confi
g_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_t
ime=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progress,checkpoin
t_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:27:17.523+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,  "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551037:522916][4452:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_R
ECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:27:17.523+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,  "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551037:522916][4452:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_R
ECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:27:17.527+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"Wire
dTiger opened","attr":{"durationMillis":27}}
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongod --configsvr --dbpath "C:\config\c3" --port 27020 --replSet=c0
{"t":{"$date":"2023-03-23T11:27:48.729+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,  "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:27:49.013+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T11:27:49.014+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"Mong
oDB starting","attr":{"pid":12888,"port":27020,"dbPath":"C:/config/c3","architecture":"64-bit","host":"GURU"}}
{"t":{"$date":"2023-03-23T11:27:49.014+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,  "ctx":"initandlisten","msg":"Targ
et operating system minimum version","attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:27:49.014+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,  "ctx":"initandlisten","msg":"Buil
d Info","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"al
locator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:27:49.014+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,  "ctx":"initandlisten","msg":"Oper
ating System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T11:27:49.014+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,  "ctx":"initandlisten","msg":"Opti
ons set by command line","attr":{"options":{"net":{"port":27020},"replication":{"replSet":"c0"},"sharding":{"clusterRole
":"configsvr"},"storage":{"dbPath":"C:\\config\\c3"}}}}
{"t":{"$date":"2023-03-23T11:27:49.015+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,  "ctx":"initandlisten","msg":"Open
ing WiredTiger","attr":{"config":"create,cache_size=7514M,session_max=33000,eviction=(threads_min=4,threads_max=4),confi
g_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_t
ime=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progress,checkpoin
t_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:27:49.036+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,  "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551069:36144][12888:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_R
ECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:27:49.037+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,  "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551069:36144][12888:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_R
ECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:27:49.040+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"Wire
dTiger opened","attr":{"durationMillis":25}}
```

➢ **Now open new command prompt and connect any one of the client with the server using below command.**

```
mongo --port 27019
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongo --port 27019
MongoDB shell version v4.4.18
connecting to: mongodb://127.0.0.1:27019/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("f05c66c7-f769-4d93-a2cb-50b3ff651781") }
MongoDB server version: 4.4.18
---
The server generated these startup warnings when booting:
        2023-03-23T11:27:17.537+05:30: Access control is not enabled for the database. Read and write access to data and
 configuration is unrestricted
        2023-03-23T11:27:17.537+05:30: This server is bound to localhost. Remote systems will be unable to connect to th
is server. Start the server with --bind_ip <address> to specify which IP addresses it should serve responses from, or wi
th --bind_ip_all to bind to all interfaces. If this behavior is desired, start the server with --bind_ip 127.0.0.1 to di
sable this warning
---
---
        Enable MongoDB's free cloud-based monitoring service, which will then receive and display
        metrics about your deployment (disk utilization, CPU, operation statistics, etc).

        The monitoring data will be available on a MongoDB website with a unique URL accessible to you
        and anyone you share the URL with. MongoDB may use this information to make product
        improvements and to suggest MongoDB products and deployment options to you.

        To enable free monitoring, run the following command: db.enableFreeMonitoring()

> config = { _id: "c0", members:[{ _id : 0, host : "localhost:27018" },{ _id : 1, host : "localhost:27019" },{ _id : 2,
```

> ➢ Make any server as primary server

config = { _id: "c0", members:[{ _id : 0, host : "localhost:27018" },{ _id : 1, host : "localhost:27019" },{ _id : 2, host : "localhost:27020" }]};

```
> config = { _id: "c0", members:[{ _id : 0, host : "localhost:27018" },{ _id : 1, host : "localhost:27019" },{ _id : 2,
host : "localhost:27020" }]};rs:[{ _id : 0, host : "localhost:27018" },{ _id : 1, host : "localhost:27019" },{ _id : 2,
{
        "_id" : "c0",
        "members" : [
                {
                        "_id" : 0,
                        "host" : "localhost:27018"
                },
                {
                        "_id" : 1,
                        "host" : "localhost:27019"
                },
                {
                        "_id" : 2,
                        "host" : "localhost:27020"
                }
        ]
}
>
```

rs.initiate(config)

```
> rs.initiate(config)
{
        "ok" : 1,
        "$gleStats" : {
                "lastOpTime" : Timestamp(1679551240, 1),
                "electionId" : ObjectId("000000000000000000000000")
        },
        "lastCommittedOpTime" : Timestamp(0, 0)
}
c0:SECONDARY> |
```

Step – 4 :- Now open command prompt for create three shard servers(shard1).

```
mongod --replSet s1 --dbpath "C:\shard1\s1" --port 37019 --shardsvr

mongod --replSet s1 --dbpath "C:\shard1\s2" --port 37020 --shardsvr

mongod --replSet s1 --dbpath "C:\shard1\s3" --port 37021 --shardsvr
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongod --replSet s1 --dbpath "C:\shard2\s1" --port 37019 --shardsvr
{"t":{"$date":"2023-03-23T11:40:59.112+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:40:59.114+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T11:40:59.115+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"Mong
oDB starting","attr":{"pid":22284,"port":37019,"dbPath":"C:/shard2/s1","architecture":"64-bit","host":"GURU"}}
{"t":{"$date":"2023-03-23T11:40:59.115+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,   "ctx":"initandlisten","msg":"Targ
et operating system minimum version","attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:40:59.115+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx":"initandlisten","msg":"Buil
d Info","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"al
locator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:40:59.115+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx":"initandlisten","msg":"Oper
ating System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T11:40:59.115+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx":"initandlisten","msg":"Opti
ons set by command line","attr":{"options":{"net":{"port":37019},"replication":{"replSet":"s1"},"sharding":{"clusterRole
":"shardsvr"},"storage":{"dbPath":"C:\\shard2\\s1"}}}}
{"t":{"$date":"2023-03-23T11:40:59.116+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,   "ctx":"initandlisten","msg":"Open
ing WiredTiger","attr":{"config":"create,cache_size=7514M,session_max=33000,eviction=(threads_min=4,threads_max=4),confi
g_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_t
ime=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progress,checkpoin
t_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:40:59.138+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551859:138648][22284:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:40:59.139+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551859:138648][22284:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:40:59.143+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"Wire
dTiger opened","attr":{"durationMillis":27}}
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongod --replSet s1 --dbpath "C:\shard2\s2" --port 37020 --shardsvr
{"t":{"$date":"2023-03-23T11:41:21.426+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:41:21.429+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T11:41:21.430+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"Mong
oDB starting","attr":{"pid":22436,"port":37020,"dbPath":"C:/shard2/s2","architecture":"64-bit","host":"GURU"}}
{"t":{"$date":"2023-03-23T11:41:21.430+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,   "ctx":"initandlisten","msg":"Targ
et operating system minimum version","attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:41:21.430+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx":"initandlisten","msg":"Buil
d Info","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"al
locator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:41:21.430+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx":"initandlisten","msg":"Oper
ating System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T11:41:21.430+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx":"initandlisten","msg":"Opti
ons set by command line","attr":{"options":{"net":{"port":37020},"replication":{"replSet":"s1"},"sharding":{"clusterRole
":"shardsvr"},"storage":{"dbPath":"C:\\shard2\\s2"}}}}
{"t":{"$date":"2023-03-23T11:41:21.431+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,   "ctx":"initandlisten","msg":"Open
ing WiredTiger","attr":{"config":"create,cache_size=7514M,session_max=33000,eviction=(threads_min=4,threads_max=4),confi
g_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_t
ime=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progress,checkpoin
t_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:41:21.453+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551881:453724][22436:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:41:21.453+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551881:453724][22436:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:41:21.457+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"Wire
dTiger opened","attr":{"durationMillis":26}}
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongod --replSet s1 --dbpath "C:\shard2\s3" --port 37021 --shardsvr
{"t":{"$date":"2023-03-23T11:42:25.213+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:42:25.216+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T11:42:25.217+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"Mong
oDB starting","attr":{"pid":19728,"port":37021,"dbPath":"C:/shard2/s3","architecture":"64-bit","host":"GURU"}}
{"t":{"$date":"2023-03-23T11:42:25.217+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,   "ctx":"initandlisten","msg":"Targ
et operating system minimum version","attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:42:25.217+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx":"initandlisten","msg":"Buil
d Info","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"al
locator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:42:25.218+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx":"initandlisten","msg":"Oper
ating System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T11:42:25.218+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx":"initandlisten","msg":"Opti
ons set by command line","attr":{"options":{"net":{"port":37021},"replication":{"replSet":"s1"},"sharding":{"clusterRole
":"shardsvr"},"storage":{"dbPath":"C:\\shard2\\s3"}}}}
{"t":{"$date":"2023-03-23T11:42:25.219+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,   "ctx":"initandlisten","msg":"Open
ing WiredTiger","attr":{"config":"create,cache_size=7514M,session_max=33000,eviction=(threads_min=4,threads_max=4),confi
g_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_t
ime=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progress,checkpoin
t_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:42:25.242+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551945:242063][19728:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:42:25.242+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679551945:242063][19728:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:42:25.248+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"Wire
dTiger opened","attr":{"durationMillis":29}}
```

> ➤ **Now open new command prompt and connect any one of the client with the server using below command.**

```
mongo --port 37019
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongo --port 37019
MongoDB shell version v4.4.18
connecting to: mongodb://127.0.0.1:37019/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("c5e36a1a-2968-467b-8781-23218663f371") }
MongoDB server version: 4.4.18
---
The server generated these startup warnings when booting:
        2023-03-23T11:40:59.154+05:30: Access control is not enabled for the database. Read and write access to data and
 configuration is unrestricted
        2023-03-23T11:40:59.155+05:30: This server is bound to localhost. Remote systems will be unable to connect to th
is server. Start the server with --bind_ip <address> to specify which IP addresses it should serve responses from, or wi
th --bind_ip_all to bind to all interfaces. If this behavior is desired, start the server with --bind_ip 127.0.0.1 to di
sable this warning
---
---
        Enable MongoDB's free cloud-based monitoring service, which will then receive and display
        metrics about your deployment (disk utilization, CPU, operation statistics, etc).

        The monitoring data will be available on a MongoDB website with a unique URL accessible to you
        and anyone you share the URL with. MongoDB may use this information to make product
        improvements and to suggest MongoDB products and deployment options to you.

        To enable free monitoring, run the following command: db.enableFreeMonitoring()
        To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
--config = { _id: "s1", members:[{ _id : 0, host : "localhost:37019" },{ _id : 1, host : "localhost:37020" },{ _id : 2,
```

> ➢ Make any server as primary server

config = { _id: "s1", members:[{ _id : 0, host : "localhost:37019" },{ _id : 1, host : "localhost:37020" },{ _id : 2, host : "localhost:37021" }]];

```
--config = { _id: "s1", members:[{ _id : 0, host : "localhost:37019" },{ _id : 1, host : "localhost:37020" },{ _id : 2,
host : "localhost:37021" }]};rs:[{ _id : 0, host : "localhost:37019" },{ _id : 1, host : "localhost:37020" },{ _id : 2,
{
        "_id" : "s1",
        "members" : [
                {
                        "_id" : 0,
                        "host" : "localhost:37019"
                },
                {
                        "_id" : 1,
                        "host" : "localhost:37020"
                },
                {
                        "_id" : 2,
                        "host" : "localhost:37021"
                }
        ]
}
>
```

rs.initiate(config)

```
> rs.initiate(config)
{ "ok" : 1 }
s1:SECONDARY>
```

Step – 5 :- Now open command prompt for create three shard servers(shard2).

```
mongod --replSet s0 --dbpath "C:\shard2\s1" --port 50001 --shardsvr

mongod --replSet s0 --dbpath "C:\shard2\s2" --port 50002 --shardsvr

mongod --replSet s0 --dbpath "C:\shard2\s3" --port 50003 --shardsvr
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongod --replSet s0 --dbpath "C:\shard1\s1" --port 50001 --shardsvr
{"t":{"$date":"2023-03-23T11:50:12.261+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:50:12.533+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T11:50:12.534+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"Mong
oDB starting","attr":{"pid":15076,"port":50001,"dbPath":"C:/shard1/s1","architecture":"64-bit","host":"GURU"}}
{"t":{"$date":"2023-03-23T11:50:12.534+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,   "ctx":"initandlisten","msg":"Targ
et operating system minimum version","attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:50:12.534+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx":"initandlisten","msg":"Buil
d Info","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"al
locator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:50:12.534+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx":"initandlisten","msg":"Oper
ating System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 21051)"}}}
{"t":{"$date":"2023-03-23T11:50:12.534+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx":"initandlisten","msg":"Opti
ons set by command line","attr":{"options":{"net":{"port":50001},"replication":{"replSet":"s0"},"sharding":{"clusterRole
":"shardsvr"},"storage":{"dbPath":"C:\\shard1\\s1"}}}}
{"t":{"$date":"2023-03-23T11:50:12.535+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,   "ctx":"initandlisten","msg":"Open
ing WiredTiger","attr":{"config":"create,cache_size=7514M,session_max=33000,eviction=(threads_min=4,threads_max=4),confi
g_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_t
ime=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progress,checkpoin
t_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:50:12.561+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679552412:560328][15076:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:50:12.561+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679552412:560328][15076:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:50:12.565+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"Wire
dTiger opened","attr":{"durationMillis":30}}
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongod --replSet s0 --dbpath "C:\shard1\s2" --port 50002 --shardsvr
{"t":{"$date":"2023-03-23T11:50:28.767+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:50:28.770+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T11:50:28.771+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"Mong
oDB starting","attr":{"pid":22024,"port":50002,"dbPath":"C:/shard1/s2","architecture":"64-bit","host":"GURU"}}
{"t":{"$date":"2023-03-23T11:50:28.771+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,   "ctx":"initandlisten","msg":"Targ
et operating system minimum version","attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:50:28.771+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx":"initandlisten","msg":"Buil
d Info","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"al
locator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:50:28.771+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx":"initandlisten","msg":"Oper
ating System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T11:50:28.771+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx":"initandlisten","msg":"Opti
ons set by command line","attr":{"options":{"net":{"port":50002},"replication":{"replSet":"s0"},"sharding":{"clusterRole
":"shardsvr"},"storage":{"dbPath":"C:\\shard1\\s2"}}}}
{"t":{"$date":"2023-03-23T11:50:28.772+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,   "ctx":"initandlisten","msg":"Open
ing WiredTiger","attr":{"config":"create,cache_size=7514M,session_max=33000,eviction=(threads_min=4,threads_max=4),confi
g_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journal,compressor=snappy),file_manager=(close_idle_t
ime=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progress,checkpoin
t_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:50:28.791+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679552428:790638][22024:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:50:28.791+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,   "ctx":"initandlisten","msg":"Wire
dTiger message","attr":{"message":"[1679552428:790638][22024:140709273151312], txn-recover: [WT_VERB_RECOVERY | WT_VERB_
RECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:50:28.795+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"Wire
dTiger opened","attr":{"durationMillis":23}}
```

```
C:\Program Files\MongoDB\Server\4.4\bin>mongod --replSet s0 --dbpath "C:\shard2\s3" --port 50003 --shardsvr
{"t":{"$date":"2023-03-23T11:50:39.889+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,  "ctx":"main","msg":"Automatically disabling TLS 1.0, to force-enable
TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T11:50:39.894+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP FastOpen in use."}
{"t":{"$date":"2023-03-23T11:50:39.896+05:30"},"s":"I",  "c":"STORAGE",  "id":4615611, "ctx":"initandlisten","msg":"MongoDB starting","attr":{"pid":4880,"po
rt":50003,"dbPath":"C:/shard2/s3","architecture":"64-bit","host":"DivyPC"}}
{"t":{"$date":"2023-03-23T11:50:39.896+05:30"},"s":"I",  "c":"CONTROL",  "id":23398,  "ctx":"initandlisten","msg":"Target operating system minimum version"
,"attr":{"targetMinOS":"Windows 7/Windows Server 2008 R2"}}
{"t":{"$date":"2023-03-23T11:50:39.896+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,  "ctx":"initandlisten","msg":"Build Info","attr":{"buildInfo":{"versio
n":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"allocator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_6
4","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T11:50:39.896+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,  "ctx":"initandlisten","msg":"Operating System","attr":{"os":{"name":"
Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T11:50:39.896+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,  "ctx":"initandlisten","msg":"Options set by command line","attr":{"op
tions":{"net":{"port":50003},"replication":{"replSet":"s0"},"sharding":{"clusterRole":"shardsvr"},"storage":{"dbPath":"C:\\shard2\\s3"}}}}
{"t":{"$date":"2023-03-23T11:50:39.898+05:30"},"s":"I",  "c":"STORAGE",  "id":22315,  "ctx":"initandlisten","msg":"Opening WiredTiger","attr":{"config":"cr
eate,cache_size=3239M,session_max=33000,eviction=(threads_min=4,threads_max=4),config_base=false,statistics=(fast),log=(enabled=true,archive=true,path=journ
al,compressor=snappy),file_manager=(close_idle_time=100000,close_scan_interval=10,close_handle_minimum=250),statistics_log=(wait=0),verbose=[recovery_progre
ss,checkpoint_progress,compact_progress],"}}
{"t":{"$date":"2023-03-23T11:50:39.971+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,  "ctx":"initandlisten","msg":"WiredTiger message","attr":{"message":"[
1679552439:971182][4880:140715624048464], txn-recover: [WT_VERB_RECOVERY | WT_VERB_RECOVERY_PROGRESS] Set global recovery timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:50:39.971+05:30"},"s":"I",  "c":"STORAGE",  "id":22430,  "ctx":"initandlisten","msg":"WiredTiger message","attr":{"message":"[
1679552439:971182][4880:140715624048464], txn-recover: [WT_VERB_RECOVERY | WT_VERB_RECOVERY_PROGRESS] Set global oldest timestamp: (0, 0)"}}
{"t":{"$date":"2023-03-23T11:50:39.986+05:30"},"s":"I",  "c":"STORAGE",  "id":4795906, "ctx":"initandlisten","msg":"WiredTiger opened","attr":{"durationMill
is":88}}
{"t":{"$date":"2023-03-23T11:50:39.986+05:30"},"s":"I",  "c":"RECOVERY", "id":23987,  "ctx":"initandlisten","msg":"WiredTiger recoveryTimestamp","attr":{"r
ecoveryTimestamp":{"$timestamp":{"t":0,"i":0}}}}
{"t":{"$date":"2023-03-23T11:50:40.041+05:30"},"s":"I",  "c":"STORAGE",  "id":22262,  "ctx":"initandlisten","msg":"Timestamp monitor starting"}
{"t":{"$date":"2023-03-23T11:50:40.053+05:30"},"s":"W",  "c":"CONTROL",  "id":22120,  "ctx":"initandlisten","msg":"Access control is not enabled for the da
tabase. Read and write access to data and configuration is unrestricted","tags":["startupWarnings"]}
{"t":{"$date":"2023-03-23T11:50:40.054+05:30"},"s":"W",  "c":"CONTROL",  "id":22140,  "ctx":"initandlisten","msg":"This server is bound to localhost. Remot
e systems will be unable to connect to this server. Start the server with --bind_ip <address> to specify which IP addresses it should serve responses from,
or with --bind_ip_all to bind to all interfaces. If this behavior is desired, start the server with --bind_ip 127.0.0.1 to disable this warning","tags":["st
artupWarnings"]}
{"t":{"$date":"2023-03-23T11:50:40.055+05:30"},"s":"I",  "c":"STORAGE",  "id":20536,  "ctx":"initandlisten","msg":"Flow Control is enabled on this deployme
nt"}
{"t":{"$date":"2023-03-23T11:50:40.057+05:30"},"s":"W",  "c":"SHARDING", "id":22074,  "ctx":"initandlisten","msg":"Started with --shardsvr, but no shardIde
ntity document was found on disk. This most likely means this server has not yet been added to a sharded cluster","attr":{"namespace":"admin.system.version"
```

> ➤ **Now open new command prompt and connect any one of the client with the server using below command.**

mongo --port 50001

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongo --port 50001
MongoDB shell version v4.4.18
connecting to: mongodb://127.0.0.1:50001/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("55b6eeda-1e01-4d40-b6f6-26e748c502fc") }
MongoDB server version: 4.4.18
---
The server generated these startup warnings when booting:
        2023-03-23T11:50:12.577+05:30: Access control is not enabled for the database. Read and write access to data and
 configuration is unrestricted
        2023-03-23T11:50:12.578+05:30: This server is bound to localhost. Remote systems will be unable to connect to th
is server. Start the server with --bind_ip <address> to specify which IP addresses it should serve responses from, or wi
th --bind_ip_all to bind to all interfaces. If this behavior is desired, start the server with --bind_ip 127.0.0.1 to di
sable this warning
---
---
        Enable MongoDB's free cloud-based monitoring service, which will then receive and display
        metrics about your deployment (disk utilization, CPU, operation statistics, etc).

        The monitoring data will be available on a MongoDB website with a unique URL accessible to you
        and anyone you share the URL with. MongoDB may use this information to make product
        improvements and to suggest MongoDB products and deployment options to you.

        To enable free monitoring, run the following command: db.enableFreeMonitoring()
        To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---
>
```

➢ Make any server as primary server

```
config = { _id: "s0", members:[{ _id : 0, host : "localhost:50001" },{ _id : 1, host : "localhost:50002" },{ _id : 2, host : "localhost:50003" }]};
```

```
--config = { _id: "s0", members:[{ _id : 0, host : "localhost:50001" },{ _id : 1, host : "localhost:50002" },{ _id : 2,
host : "localhost:50003" }]};rs:[{ _id : 0, host : "localhost:50001" },{ _id : 1, host : "localhost:50002" },{ _id : 2,
{
        "_id" : "s0",
        "members" : [
                {
                        "_id" : 0,
                        "host" : "localhost:50001"
                },
                {
                        "_id" : 1,
                        "host" : "localhost:50002"
                },
                {
                        "_id" : 2,
                        "host" : "localhost:50003"
                }
        ]
}
>
```

```
rs.initiate(config)
```

```
> rs.initiate(config)
{ "ok" : 1 }
s0:SECONDARY>
```

**Step – 6 :- Communication with both shards is possible using config servers.
So open cmd and write command. This creates mongos config server.**

```
mongos.exe --configdb c0/localhost:27018,localhost:27019,localhost:27020 --port 1000
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongos.exe --configdb c0/localhost:27018,localhost:27019,localhost:27020 --p
ort 1000
{"t":{"$date":"2023-03-23T12:07:34.561+05:30"},"s":"I",  "c":"CONTROL",  "id":23285,   "ctx":"main","msg":"Automatically
 disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2023-03-23T12:07:34.811+05:30"},"s":"I",  "c":"NETWORK",  "id":4648602, "ctx":"main","msg":"Implicit TCP
FastOpen in use."}
{"t":{"$date":"2023-03-23T12:07:34.812+05:30"},"s":"I",  "c":"HEALTH",   "id":5936503, "ctx":"main","msg":"Fault manager
 changed state ","attr":{"state":"StartupCheck"}}
{"t":{"$date":"2023-03-23T12:07:34.817+05:30"},"s":"W",  "c":"CONTROL",  "id":22120,   "ctx":"main","msg":"Access contro
l is not enabled for the database. Read and write access to data and configuration is unrestricted","tags":["startupWarn
ings"]}
{"t":{"$date":"2023-03-23T12:07:34.818+05:30"},"s":"W",  "c":"CONTROL",  "id":22140,   "ctx":"main","msg":"This server i
s bound to localhost. Remote systems will be unable to connect to this server. Start the server with --bind_ip <address>
 to specify which IP addresses it should serve responses from, or with --bind_ip_all to bind to all interfaces. If this
behavior is desired, start the server with --bind_ip 127.0.0.1 to disable this warning","tags":["startupWarnings"]}
{"t":{"$date":"2023-03-23T12:07:34.818+05:30"},"s":"I",  "c":"CONTROL",  "id":23403,   "ctx":"mongosMain","msg":"Build I
nfo","attr":{"buildInfo":{"version":"4.4.18","gitVersion":"8ed32b5c2c68ebe7f8ae2ebe8d23f36037a17dea","modules":[],"alloc
ator":"tcmalloc","environment":{"distmod":"windows","distarch":"x86_64","target_arch":"x86_64"}}}}
{"t":{"$date":"2023-03-23T12:07:34.818+05:30"},"s":"I",  "c":"CONTROL",  "id":51765,   "ctx":"mongosMain","msg":"Operati
ng System","attr":{"os":{"name":"Microsoft Windows 10","version":"10.0 (build 22621)"}}}
{"t":{"$date":"2023-03-23T12:07:34.818+05:30"},"s":"I",  "c":"CONTROL",  "id":21951,   "ctx":"mongosMain","msg":"Options
 set by command line","attr":{"options":{"net":{"port":1000},"sharding":{"configDB":"c0/localhost:27018,localhost:27019,
localhost:27020"}}}}
{"t":{"$date":"2023-03-23T12:07:34.821+05:30"},"s":"I",  "c":"NETWORK",  "id":4603701, "ctx":"mongosMain","msg":"Startin
g Replica Set Monitor","attr":{"protocol":"streamable","uri":"c0/localhost:27018,localhost:27019,localhost:27020"}}
{"t":{"$date":"2023-03-23T12:07:34.822+05:30"},"s":"I",  "c":"-",       "id":4333223, "ctx":"mongosMain","msg":"RSM now
 monitoring replica set","attr":{"replicaSet":"c0","nReplicaSetMembers":3}}
{"t":{"$date":"2023-03-23T12:07:34.822+05:30"},"s":"I",  "c":"-",       "id":4333226, "ctx":"mongosMain","msg":"RSM hos
t was added to the topology","attr":{"replicaSet":"c0","host":"localhost:27018"}}
{"t":{"$date":"2023-03-23T12:07:34.822+05:30"},"s":"I",  "c":"-",       "id":4333226, "ctx":"mongosMain","msg":"RSM hos
```

➢ Open a client mongos command window to communicate with server.

```
mongo.exe --host localhost --port 1000
```

```
PS C:\Program Files\MongoDB\Server\4.4\bin> mongo.exe --host localhost --port 1000
MongoDB shell version v4.4.18
connecting to: mongodb://localhost:1000/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("d6e98de9-1811-438d-8a46-695956d9d38b") }
MongoDB server version: 4.4.18
---
The server generated these startup warnings when booting:
        2023-03-23T12:07:34.817+05:30: Access control is not enabled for the database. Read and write access to data and
 configuration is unrestricted
        2023-03-23T12:07:34.818+05:30: This server is bound to localhost. Remote systems will be unable to connect to th
is server. Start the server with --bind_ip <address> to specify which IP addresses it should serve responses from, or wi
th --bind_ip_all to bind to all interfaces. If this behavior is desired, start the server with --bind_ip 127.0.0.1 to di
sable this warning
---
mongos> sh.addShard("s0/localhost:50001");
```

➢ And then both the shards which we are created add that shards into shard cluster using given below commands.

```
sh.addShard("s0/localhost:50001");

sh.addShard("s1/localhost:37019");
```

```
mongos> sh.addShard("s0/localhost:50001");
{
        "shardAdded" : "s0",
        "ok" : 1,
        "operationTime" : Timestamp(1679553557, 7),
        "$clusterTime" : {
                "clusterTime" : Timestamp(1679553557, 7),
                "signature" : {
                        "hash" : BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAAA="),
                        "keyId" : NumberLong(0)
                }
        }
}
```

```
mongos> sh.addShard("s1/localhost:37019");
{
        "shardAdded" : "s1",
        "ok" : 1,
        "operationTime" : Timestamp(1679553572, 6),
        "$clusterTime" : {
                "clusterTime" : Timestamp(1679553572, 6),
                "signature" : {
                        "hash" : BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAAA="),
                        "keyId" : NumberLong(0)
                }
        }
}
mongos>
```

Step – 7 :-

1. Now create database.

```
use projectionDB
```

```
mongos> use projectionDB
switched to db projectionDB
```

2. Move to admin mode.

```
use admin
```

```
mongos> use admin
switched to db admin
```

3. Enable Database Sharding property.So that table data can be distributed on multiple shards using given command.

```
db.runCommand({enableSharding:"projectionDB"});
```

```
mongos> db.runCommand({enableSharding:"projectionDB"});
{
        "ok" : 1,
        "operationTime" : Timestamp(1679554514, 7),
        "$clusterTime" : {
                "clusterTime" : Timestamp(1679554514, 8),
                "signature" : {
                        "hash" : BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAA="),
                        "keyId" : NumberLong(0)
                }
        }
}
```

4. Create collection and set hash key.

```
sh.shardCollection("projectionDB.bios", {"name":"hashed"})
```

```
mongos> use projectionDB
switched to db projectionDB
mongos> sh.shardCollection("projectionDB.bios", {"name":"hashed"})
{
        "collectionsharded" : "projectionDB.bios",
        "collectionUUID" : UUID("24520542-30be-4d84-a346-dc35ffeaf3c5"),
        "ok" : 1,
        "operationTime" : Timestamp(1679554559, 47),
        "$clusterTime" : {
                "clusterTime" : Timestamp(1679554559, 47),
                "signature" : {
                        "hash" : BinData(0,"AAAAAAAAAAAAAAAAAAAAAAAAAAA="),
                        "keyId" : NumberLong(0)
                }
        }
}
```

5. Now insert data into bios table.

db.bios.insert({ name:"Prachi", lname:"Shah", city:"Mehsana",state:"Gujarat"});

db.bios.insert({name:"sunita",lname:"chauhan",city:"Ahmedabad",state:"Gujarat" })

db.bios.insert({name:"agam",lname:"shah",city:"Mehsana",state:"Gujarat"})

db.bios.insert({name:"Shraddha",lname:"Mehta",city:"Baroda",state:"Gujarat"})

db.bios.insert({name:"Shurya",lname:"Pandya",city:"Mehsana",state:"Gujarat"})

```
mongos> db.bios.insert({ name:"Prachi", lname:"Shah", city:"Mehsana",state:"Gujarat"});
WriteResult({ "nInserted" : 1 })
mongos> db.bios.insert({name:"sunita",lname:"chauhan",city:"Ahmedabad",state:"Gujarat" })
WriteResult({ "nInserted" : 1 })
mongos> db.bios.insert({name:"agam",lname:"shah",city:"Mehsana",state:"Gujarat"})
WriteResult({ "nInserted" : 1 })
mongos> db.bios.insert({name:"Shraddha",lname:"Mehta",city:"Baroda",state:"Gujarat"})
WriteResult({ "nInserted" : 1 })
mongos> db.bios.insert({name:"Shurya",lname:"Pandya",city:"Mehsana",state:"Gujarat"})
WriteResult({ "nInserted" : 1 })
```

➢ Run the command to see the total number of documents in bios table

db.bios.count()

```
mongos> db.bios.count()
5
```

Step – 8 :- To see how data is distributed on shard 1. Open the mongo client of shard 1 which is on port 50001.

Run the following command :-

Show dbs
Show collection
use projectionDB
db.bios.count()

```
s0:SECONDARY> show dbs
admin          0.000GB
config         0.001GB
local          0.001GB
projectionDB   0.000GB
s0:PRIMARY> use projectionDB
```

Step – 9 :- To see how data is distributed on shard 2. Open the mongo client of shard 2 which is on port 37019.

Run the following command :-

Show dbs
Show collection
use projectionDB
db.bios.count()

```
s1:SECONDARY> show dbs
admin          0.000GB
config         0.001GB
local          0.001GB
projectionDB   0.000GB
s1:PRIMARY> use projectionDB
switched to db projectionDB
s1:PRIMARY> show collections
bios
s1:PRIMARY> db.bios.count()
2
s1:PRIMARY>
```

Step – 10 :- Now check the replica of shard 1 which is 5002.

➤ Open new cmd for that

```
C:\Program Files\MongoDB\Server\4.4\bin>mongo --port 50002
MongoDB shell version v4.4.18
connecting to: mongodb://127.0.0.1:50002/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("53b59c2f-c0ba-4a39-9c3b-913d42195523") }
MongoDB server version: 4.4.18
---
The server generated these startup warnings when booting:
        2023-03-23T11:50:29.137+05:30: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
        2023-03-23T11:50:29.138+05:30: This server is bound to localhost. Remote systems will be unable to connect to this server. Start the server with --b
ind_ip <address> to specify which IP addresses it should serve responses from, or with --bind_ip_all to bind to all interfaces. If this behavior is desired,
 start the server with --bind_ip 127.0.0.1 to disable this warning
---
---
        Enable MongoDB's free cloud-based monitoring service, which will then receive and display
        metrics about your deployment (disk utilization, CPU, operation statistics, etc).

        The monitoring data will be available on a MongoDB website with a unique URL accessible to you
        and anyone you share the URL with. MongoDB may use this information to make product
        improvements and to suggest MongoDB products and deployment options to you.

        To enable free monitoring, run the following command: db.enableFreeMonitoring()
        To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---
```

```
s0:SECONDARY> rs.secondaryOk()
s0:SECONDARY> show dbs
admin         0.000GB
config        0.001GB
local         0.001GB
projectionDB  0.000GB
s0:SECONDARY> use projectionDB
switched to db projectionDB
s0:SECONDARY> show collections
bios
s0:SECONDARY> db.bios.count()
3
s0:SECONDARY>
```