

**Mithibai College Department of Computer Science
Msc (Data Science and AI)**

Practical 7: Sharding using Mangodb

Date: 21/02/2025

Submission Date: 28/02/2025

Write-up: -

- Sharding
- Sharding Architecture
- Sharding Types, benefits and limitations

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**

<https://gist.github.com/DGamer007/0864c6aeefb27e3821602d9dd5ca7375>
<https://aleson-itc.com/en/creating-a-sharded-cluster-in-mongodb%EF%BF%BC/>

To perform sharding first perform replication

First we create a folder in c drive and then create the following folders in it

	Name	Date modified	Type	Size
S	configsrv	23-02-2025 21:26	File folder	
S	configsrv1	23-02-2025 21:12	File folder	
S	configsrv2	23-02-2025 21:12	File folder	
S	shard2rep1	23-02-2025 21:13	File folder	
S	shard2rep2	23-02-2025 21:13	File folder	
S	shard2rep3	23-02-2025 21:13	File folder	
S	shardrep1	23-02-2025 21:12	File folder	
S	shardrep2	23-02-2025 21:12	File folder	
S	shardrep3	23-02-2025 21:13	File folder	

ache
ts
personal

1. Initialize MongoDB Config Servers with **configsvr** and **replSet** options to form a Replica Set of Config Servers

Perform these commands in powershell or command prompt

mongod --configsvr --port=5050 --replSet="config-repl" --dbpath="D:\MSc_1\ADBMS\sharding\configsvr"

```
C:\Users\mulla>mongod --configsvr --port=1030 --replSet="config-repl" --dbpath="D:\MSc_1\ADBMS\sharding\configsrv"
{"t": {"$date": "2025-02-23T21:26:49.719+05:30"}, "s": "I", "c": "CONTROL", "id": 23285, "ctx": "thread1", "msg": "Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t": {"$date": "2025-02-23T21:26:49.726+05:30"}, "s": "I", "c": "NETWORK", "id": 4915701, "ctx": "thread1", "msg": "Initialize d wire specification", "attr": {"spec": {"incomingExternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "incomingInternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "outgoing": {"minWireVersion": 6, "maxWireVersion": 21}, "isInternalClient": true}}}
{"t": {"$date": "2025-02-23T21:26:49.728+05:30"}, "s": "I", "c": "NETWORK", "id": 4648602, "ctx": "thread1", "msg": "Implicit TCP FastOpen in use."}
{"t": {"$date": "2025-02-23T21:26:49.732+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfuly registered PrimaryOnlyService", "attr": {"service": "ReshardingCoordinatorService", "namespace": "config.reshardingOperations"}}
{"t": {"$date": "2025-02-23T21:26:49.732+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfuly registered PrimaryOnlyService", "attr": {"service": "ConfigsvrCoordinatorService", "namespace": "config.sharding_configsrv_coordinators"}}
{"t": {"$date": "2025-02-23T21:26:49.732+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfuly registered PrimaryOnlyService", "attr": {"service": "RenameCollectionParticipantService", "namespace": "config.localRenameParticipants"}}
{"t": {"$date": "2025-02-23T21:26:49.732+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfuly registered PrimaryOnlyService", "attr": {"service": "ShardingDDLCoordinator", "namespace": "config.system.sharding_ddl_coordinators"}}
{"t": {"$date": "2025-02-23T21:26:49.732+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfuly registered PrimaryOnlyService", "attr": {"service": "ReshardingDonorService", "namespace": "config.localReshardingOperations.donor"}}
{"t": {"$date": "2025-02-23T21:26:49.732+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfuly registered PrimaryOnlyService", "attr": {"service": "ReshardingRecipientService", "namespace": "config.localReshardingOperations.recipient"}}
```

This PC > New Volume (D:) > MSc_1 > ADBMS > sharding > configsrv >

	Name	Date modified	Type	Size
	diagnostic.data	23-02-2025 21:29	File folder	
	journal	23-02-2025 21:26	File folder	
	_mdb_catalog.wt	23-02-2025 21:27	WT File	20 KB
	collection-0-6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	collection-2-6292775972615884402.wt	23-02-2025 21:26	WT File	4 KB
	collection-4-6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	collection-6-6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	collection-8-6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	collection-10-6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
ache	index-1--6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
s	index-3--6292775972615884402.wt	23-02-2025 21:26	WT File	4 KB
ersonal	index-5--6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	index-7--6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	index-9--6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	index-11--6292775972615884402.wt	23-02-2025 21:27	WT File	20 KB
	mongod.lock	23-02-2025 21:26	LOCK File	1 KB
	sizeStorer.wt	23-02-2025 21:27	WT File	20 KB
	storage.bson	23-02-2025 21:26	BSON File	1 KB
	WiredTiger	23-02-2025 21:26	File	1 KB
	WiredTiger.lock	23-02-2025 21:26	LOCK File	1 KB
	WiredTiger.turtle	23-02-2025 21:28	TURTLE File	2 KB
	WiredTiger.wt	23-02-2025 21:28	WT File	84 KB
	WiredTigerHS.wt	23-02-2025 21:26	WT File	4 KB

mongod --configsvr --port=5151 --replSet="config-repl" --dbpath="D:\MSc_1\ADBMS\sharding\configsrv1"

```
C:\Users\mulla>mongod --configsvr --port=1040 --replSet="config-repl" --dbpath="D:\MSc_1\ADBMS\sharding\configsrv1"
{"t":{"$date":"2025-02-23T21:31:29.255+05:30"},"s":"I", "c":"CONTROL", "id":23285, "ctx":"thread1","msg":"Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T21:31:29.257+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"thread1","msg":"Initialized wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":21}, "incomingInternalClient":{"minWireVersion":0,"maxWireVersion":21}, "outgoing":{"minWireVersion":6,"maxWireVersion":21}, "isInternalClient":true}}}
{"t":{"$date":"2025-02-23T21:31:32.688+05:30"},"s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1","msg":"Implicit TCP FastOpen in use."}
{"t":{"$date":"2025-02-23T21:31:32.691+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ReshardingCoordinatorService","namespace":"config.reshardingOperations"}}
{"t":{"$date":"2025-02-23T21:31:32.692+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ConfigsvrCoordinatorService","namespace":"config.sharding_configsrv_coordinators"}}
{"t":{"$date":"2025-02-23T21:31:32.692+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"RenameCollectionParticipantService","namespace":"config.localRenameParticipants"}}
{"t":{"$date":"2025-02-23T21:31:32.692+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ShardingDDLCoordinator","namespace":"config.system.sharding_ddl_coordinators"}}
{"t":{"$date":"2025-02-23T21:31:32.692+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ReshardingDonorService","namespace":"config.localReshardingOperations.donor"}}
{"t":{"$date":"2025-02-23T21:31:32.692+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ReshardingRecipientService","namespace":"config.localReshardingOperations.recipient"}}
```

File Explorer View					
		Name	Date modified	Type	Size
ls		diagnostic.data	23-02-2025 21:31	File folder	
ts		journal	23-02-2025 21:31	File folder	
		_mdb_catalog.wt	23-02-2025 21:31	WT File	4 KB
		collection-0-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
		collection-2-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
		collection-4-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
		collection-6-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
		collection-8-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
		collection-10-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
cache		index-1-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
ts		index-3-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
Personal		index-5-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
		index-7-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
s		index-9-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
ts		index-11-1552849760270970644.wt	23-02-2025 21:31	WT File	4 KB
ls		mongod.lock	23-02-2025 21:31	LOCK File	1 KB
		sizeStorer.wt	23-02-2025 21:31	WT File	4 KB
(C:		storage.bson	23-02-2025 21:31	BSON File	1 KB
		WiredTiger	23-02-2025 21:31	File	1 KB
		WiredTiger.lock	23-02-2025 21:31	LOCK File	1 KB
		WiredTiger.turtle	23-02-2025 21:31	TURTLE File	2 KB
		WiredTiger.wt	23-02-2025 21:31	WT File	4 KB
		WiredTigerHS.wt	23-02-2025 21:31	WT File	4 KB

```
mongod --configsvr --port=5252 --replSet="config-repl" --dbpath="D:\MSc_1\ADBMS\sharding\configsrv2"
```

```
C:\Users\mulla>mongod --configsvr --port=1050 --replicaSet="config-repl" --dbpath="D:\MSc_1\ADBMS\sharding\configsrv2"
{"t": {"$date": "2025-02-23T21:33:20.118+05:30"}, "s": "I", "c": "NETWORK", "id": 4915701, "ctx": "thread1", "msg": "Initialize minWireVersion specification", "attr": {"spec": {"incomingExternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "incomingInternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "outgoing": {"minWireVersion": 6, "maxWireVersion": 21}, "isInternalClient": true}}}
{"t": {"$date": "2025-02-23T21:33:20.126+05:30"}, "s": "I", "c": "CONTROL", "id": 23285, "ctx": "thread1", "msg": "Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t": {"$date": "2025-02-23T21:33:23.614+05:30"}, "s": "I", "c": "NETWORK", "id": 46448602, "ctx": "thread1", "msg": "Implicit TCP FastOpen in use."}
{"t": {"$date": "2025-02-23T21:33:23.618+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingCoordinatorService", "namespace": "config.reshardingOperations"}}
{"t": {"$date": "2025-02-23T21:33:23.618+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ConfigsvrCoordinatorService", "namespace": "config.sharding_configsrv_coordinators"}}
{"t": {"$date": "2025-02-23T21:33:23.619+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "RenameCollectionParticipantService", "namespace": "config.localRenameParticipants"}}
{"t": {"$date": "2025-02-23T21:33:23.619+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ShardingDDLCoordinator", "namespace": "config.system.sharding_ddl_coordinators"}}
{"t": {"$date": "2025-02-23T21:33:23.619+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingDonorService", "namespace": "config.localReshardingOperations.donor"}}
{"t": {"$date": "2025-02-23T21:33:23.619+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingRecipientService", "namespace": "config.localReshardingOperations.recipient"}}
```

This PC > New Volume (D:) > MSc_1 > ADBMS > sharding > configsrv2 >					
		Name	Date modified	Type	Size
ds		diagnostic.data	23-02-2025 21:33	File folder	
ts		journal	23-02-2025 21:33	File folder	
		_mdb_catalog.wt	23-02-2025 21:33	WT File	4 KB
		collection-0--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		collection-2--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		collection-4--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		collection-6--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		collection-8--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		collection-10--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
cache		index-1--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
ots		index-3--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
Personal		index-5--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		index-7--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		index-9--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
ts		index-11--6417136958028851345.wt	23-02-2025 21:33	WT File	4 KB
		mongod.lock	23-02-2025 21:33	LOCK File	1 KB
ts		sizeStorer.wt	23-02-2025 21:33	WT File	4 KB
ds		storage.bson	23-02-2025 21:33	BSON File	1 KB
(C)		WiredTiger	23-02-2025 21:33	File	1 KB
		WiredTiger.lock	23-02-2025 21:33	LOCK File	1 KB
		WiredTiger.turtle	23-02-2025 21:33	TURTLE File	2 KB
		WiredTiger.wt	23-02-2025 21:33	WT File	4 KB
		WiredTigerHS.wt	23-02-2025 21:33	WT File	4 KB

2. Connect to anyone of them using mongosh and Initiate Replica Set
mongosh --host="localhost:5050"

```
C:\Users\mulla>mongosh --host="localhost:5050"
Current Mongosh Log ID: 67bb564c65f528a633fa4213
Connecting to:      mongodb://localhost:5050/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.
4.0
Using MongoDB:      7.0.16
Using Mongosh:      2.4.0

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

-----
The server generated these startup warnings when booting
2025-02-23T22:36:58.645+05:30: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
2025-02-23T22:36:58.646+05:30: This server is 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
-----

test> rs.initiate({_id:'config-repl', configsvr:true, members:[{_id:0, host:"localhost:5050"}, {_id:1, host:"localhost:5151"}, {_id:2, host:"localhost:5252"}]});
{ ok: 1 }
config-repl [direct: other] test> 

rs.initiate({_id:'config-repl', configsvr:true,
members:[{_id:0, host:"localhost:5050"}, {_id:1, host:"localhost:5151"}, 
{_id:2, host:"localhost:5252"}]});
```

```
test> rs.initiate({_id:'config-repl', configsvr:true, members:[{_id:0, host:"localhost:5050"}, {_id:1, host:"localhost:5151"}, {_id:2, host:"localhost:5252"}]});
{ ok: 1 }
config-repl [direct: other] test>
```

3. Check the status

```
rs.status();
```

```
config-repl [direct: other] test> rs.status();
{
  set: 'config-repl',
  date: ISODate('2025-02-23T17:14:59.726Z'),
  myState: 1,
  term: Long('1'),
  syncSourceHost: '',
  syncSourceId: -1,
  configsvr: true,
  heartbeatIntervalMillis: Long('2000'),
  majorityVoteCount: 2,
  writeMajorityCount: 2,
  votingMembersCount: 3,
  writableVotingMembersCount: 3,
  optimes: {
    lastCommittedOpTime: { ts: Timestamp({ t: 1740330899, i: 1 }), t: Long('1') },
    lastCommittedWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    readConcernMajorityOpTime: { ts: Timestamp({ t: 1740330899, i: 1 }), t: Long('1') },
    appliedOpTime: { ts: Timestamp({ t: 1740330899, i: 1 }), t: Long('1') },
    durableOpTime: { ts: Timestamp({ t: 1740330899, i: 1 }), t: Long('1') },
    lastAppliedWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    lastDurableWallTime: ISODate('2025-02-23T17:14:59.210Z')
  },
  lastStableRecoveryTimestamp: Timestamp({ t: 1740330846, i: 1 }),
  electionCandidateMetrics: {
    lastElectionReason: 'electionTimeout',
    lastElectionDate: ISODate('2025-02-23T17:11:18.107Z'),
    electionTerm: Long('1'),
    lastCommittedOpTimeAtElection: { ts: Timestamp({ t: 1740330665, i: 1 }), t: Long('-1') },
    lastCommittedOpTimeAtLastStableRecovery: { ts: Timestamp({ t: 1740330846, i: 1 }), t: Long('1') }
  }
}
```

```
members: [
  {
    _id: 0,
    name: 'localhost:5050',
    health: 1,
    state: 1,
    stateStr: 'PRIMARY',
    uptime: 484,
    optime: { ts: Timestamp({ t: 1740330899, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2025-02-23T17:14:59.000Z'),
    lastAppliedWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    lastDurableWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    syncSourceHost: '',
    syncSourceId: -1,
    infoMessage: '',
    electionTime: Timestamp({ t: 1740330678, i: 1 }),
    electionDate: ISODate('2025-02-23T17:11:18.000Z'),
    configVersion: 1,
    configTerm: 1,
    self: true,
    lastHeartbeatMessage: ''
  },
  {
    _id: 1,
    name: 'localhost:5151',
    health: 1,
    state: 2,
    config-repl [direct: primary] test>
    uptime: 233,
    optime: { ts: Timestamp({ t: 1740330898, i: 1 }), t: Long('1') },
    optimeDurable: { ts: Timestamp({ t: 1740330898, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2025-02-23T17:14:58.000Z'),
    optimeDurableDate: ISODate('2025-02-23T17:14:58.000Z'),
    lastAppliedWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    lastDurableWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    lastHeartbeat: ISODate('2025-02-23T17:14:58.594Z'),
    lastHeartbeatRecv: ISODate('2025-02-23T17:14:59.628Z'),
    pingMs: Long('0'),
    lastHeartbeatMessage: '',
    syncSourceHost: 'localhost:5050',
    syncSourceId: 0,
    infoMessage: '',
    configVersion: 1,
    configTerm: 1
  },
  {
    _id: 2,
    name: 'localhost:5252',
    health: 1,
```

```

    _id: 2,
    name: 'localhost:5252',
    health: 1,
    state: 2,
    stateStr: 'SECONDARY',
    uptime: 233,
    optime: { ts: Timestamp({ t: 1740330898, i: 1 }), t: Long('1') },
    optimeDurable: { ts: Timestamp({ t: 1740330898, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2025-02-23T17:14:58.000Z'),
    optimeDurableDate: ISODate('2025-02-23T17:14:58.000Z'),
    lastAppliedWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    lastDurableWallTime: ISODate('2025-02-23T17:14:59.210Z'),
    lastHeartbeat: ISODate('2025-02-23T17:14:58.594Z'),
    lastHeartbeatRecv: ISODate('2025-02-23T17:14:59.593Z'),
    pingMs: Long('0'),
    lastHeartbeatMessage: '',
    syncSourceHost: 'localhost:5050',
    syncSourceId: 0,
    infoMessage: '',
    configVersion: 1,
    configTerm: 1
  }
],
ok: 1,
'$clusterTime': {
  clusterTime: Timestamp({ t: 1740330899, i: 1 }),
  signature: {
    hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAA='), 0),
    keyId: Long('0')
  }
},
operationTime: Timestamp({ t: 1740330899, i: 1 })
}

```

Configuration server replica is done.

Shard server:

Now, we'll configure Shards which are responsible for storing actual data.

Open a new command prompt

1. Initialize MongoDB Shards using shardsvr and replSet options to form a Replica Set of Shards

```
mongod --shardsvr --port=1130 --dbpath=""D:\MSc_1\ADBMS\sharding\shardrep1"""
--replSet="shard_repl"
```

```
C:\Users\mulla>mongod --shardsvr --port=1130 --dbpath=""D:\MSc_1\ADBMS\sharding\shardrep1"" --replSet="shard_repl"
{"t": {"$date": "2025-02-23T22:53:12.611+05:30"}, "s": "I", "c": "NETWORK", "id": 4915701, "ctx": "thread1", "msg": "Initialized wire specification", "attr": {"spec": {"incomingExternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "incomingInternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "outgoing": {"minWireVersion": 6, "maxWireVersion": 21}, "isInternalClient": true}}}
{"t": {"$date": "2025-02-23T22:53:14.398+05:30"}, "s": "I", "c": "CONTROL", "id": 23285, "ctx": "thread1", "msg": "Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t": {"$date": "2025-02-23T22:53:14.398+05:30"}, "s": "I", "c": "NETWORK", "id": 4648602, "ctx": "thread1", "msg": "Implicit TCP FastOpen in use."}
{"t": {"$date": "2025-02-23T22:53:14.401+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "RenameCollectionParticipantService", "namespace": "config.localRenameParticipants"}}
{"t": {"$date": "2025-02-23T22:53:14.401+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ShardingDDLCoordinator", "namespace": "config.system.sharding_ddl_coordinators"}}
{"t": {"$date": "2025-02-23T22:53:14.401+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingDonorService", "namespace": "config.localReshardingOperations.donor"}}
{"t": {"$date": "2025-02-23T22:53:14.401+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingRecipientService", "namespace": "config.localReshardingOperations.recipient"}}
{"t": {"$date": "2025-02-23T22:53:14.402+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationDonorService", "namespace": "config.tenantMigrationDonors"}}
{"t": {"$date": "2025-02-23T22:53:14.402+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationRecipientService", "namespace": "config.tenantMigrationRecipients"}}
```

		Name	Date modified	Type	Size
s	↗	diagnostic.data	23-02-2025 22:55	File folder	
s	↗	journal	23-02-2025 22:53	File folder	
	↗	_mdb_catalog.wt	23-02-2025 22:54	WT File	20 KB
	↗	collection-0--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
	↗	collection-2--8415269727707915292.wt	23-02-2025 22:53	WT File	4 KB
	↗	collection-4--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
	↗	collection-6--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
	↗	collection-8--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
	↗	collection-10--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
:ache	↗	index-1--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
ts	↗	index-3--8415269727707915292.wt	23-02-2025 22:53	WT File	4 KB
Personal	↗	index-5--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
	↗	index-7--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
	↗	index-9--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
s	↗	index-11--8415269727707915292.wt	23-02-2025 22:54	WT File	20 KB
	↗	mongod.lock	23-02-2025 22:53	LOCK File	1 KB
s	↗	sizeStorer.wt	23-02-2025 22:55	WT File	20 KB
s	↗	storage.bson	23-02-2025 22:53	BSON File	1 KB
	↗	WiredTiger	23-02-2025 22:53	File	1 KB
	↗	WiredTiger.lock	23-02-2025 22:53	LOCK File	1 KB
	↗	WiredTiger.turtle	23-02-2025 22:55	TURTLE File	2 KB
	↗	WiredTiger.wt	23-02-2025 22:55	WT File	84 KB
	↗	WiredTigerHS.wt	23-02-2025 22:53	WT File	4 KB

```
mongod --shardsvr --port=1140 --dbpath=""D:\MSc_1\ADBMS\sharding\shardrep2"" --replSet="shard_repl"
```

```
C:\Users\mulla>mongod --shardsvr --port=1140 --dbpath="D:\MSc_1\ADBMS\sharding\shardrep2" --replSet="shard_repl"
{"t":{"$date":"2025-02-23T22:57:38.735+05:30"},"s":"I", "c":"CONTROL", "id":23285, "ctx":"thread1","msg":"Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T22:57:38.736+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"thread1","msg":"Initialized wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":21},"incomingInternalClient":{"minWireVersion":0,"maxWireVersion":21}, "outgoing":{"minWireVersion":6,"maxWireVersion":21}, "isInternalClient":true}}}
{"t":{"$date":"2025-02-23T22:57:38.737+05:30"},"s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1","msg":"Implicit TCP FastOpen in use."}
{"t":{"$date":"2025-02-23T22:57:38.739+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"RenameCollectionParticipantService","namespace":config.localRenameParticipants}}
{"t":{"$date":"2025-02-23T22:57:38.739+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ShardingDDLCoordinator","namespace":config.system.sharding_ddl_coordinators}}
 {"t":{"$date":"2025-02-23T22:57:38.739+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ReshardingDonorService","namespace":config.localReshardingOperations.donor}}
 {"t":{"$date":"2025-02-23T22:57:38.739+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ReshardingRecipientService","namespace":config.localReshardingOperations.recipient}}
 {"t":{"$date":"2025-02-23T22:57:38.740+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationDonorService","namespace":config.tenantMigrationDonors}}
 {"t":{"$date":"2025-02-23T22:57:38.740+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationRecipientService","namespace":config.tenantMigrationRecipients"}}

```

This PC > New Volume (D:) > MSc_1 > ADBMS > sharding > shardrep2					
		Name	Date modified	Type	Size
		diagnostic.data	23-02-2025 22:58	File folder	
		journal	23-02-2025 22:57	File folder	
		_mdb_catalog.wt	23-02-2025 22:57	WT File	4 KB
		collection-0-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		collection-2-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		collection-4-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		collection-6-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		collection-8-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		collection-10-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
:ache		index-1-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
ts		index-3-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
Personal		index-5-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		index-7-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		index-9-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		index-11-2361241404456543782.wt	23-02-2025 22:58	WT File	4 KB
		mongod.lock	23-02-2025 22:57	LOCK File	1 KB
		sizeStorer.wt	23-02-2025 22:57	WT File	4 KB
		storage.bson	23-02-2025 22:57	BSON File	1 KB
		WiredTiger	23-02-2025 22:57	File	1 KB
		WiredTiger.lock	23-02-2025 22:57	LOCK File	1 KB
		WiredTiger.turtle	23-02-2025 22:57	TURTLE File	2 KB
		WiredTiger.wt	23-02-2025 22:57	WT File	4 KB
		WiredTigerHS.wt	23-02-2025 22:57	WT File	4 KB

```
mongod --shardsvr --port=1150 --dbpath=""D:\MSc_1\ADBMS\sharding\shardrep3"" --replSet="shard_repl"
```

```
C:\Users\mulla>mongod --shardsvr --port=1150 --dbpath=""D:\MSc_1\ADBMS\sharding\shardrep3"" --replicaSet="shard_repl"
{"t":{"$date":"2025-02-23T23:00:44.158+05:30"},"s":"I", "c":"CONTROL", "id":23285, "ctx":"thread1","msg":"Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T23:00:44.160+05:30"},"s":"I", "c":"NETWORK", "id":4915701, "ctx":"thread1","msg":"Initialized wire specification","attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":21}, "incomingInternalClient":{"minWireVersion":0,"maxWireVersion":21}, "outgoing":{"minWireVersion":6,"maxWireVersion":21}, "isInternalClient":true}}}
 {"t":{"$date":"2025-02-23T23:00:44.165+05:30"},"s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1","msg":"Implicit TCP FastOpen in use."}
 {"t":{"$date":"2025-02-23T23:00:44.168+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"RenameCollectionParticipantService","namespace":"config.localRenameParticipants"}}
 {"t":{"$date":"2025-02-23T23:00:44.170+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ShardingDDLCoordinator","namespace":"config.system.sharding_ddl_coordinators"}}
 {"t":{"$date":"2025-02-23T23:00:44.171+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ReshardingDonorService","namespace":"config.localReshardingOperations.donor"}}
 {"t":{"$date":"2025-02-23T23:00:44.172+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"ReshardingRecipientService","namespace":"config.localReshardingOperations.recipient"}}
 {"t":{"$date":"2025-02-23T23:00:44.172+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationDonorService","namespace":"config.tenantMigrationDonors"}}
 {"t":{"$date":"2025-02-23T23:00:44.172+05:30"},"s":"I", "c":"REPL", "id":5123008, "ctx":"thread1","msg":"Successfully registered PrimaryOnlyService","attr":{"service":"TenantMigrationRecipientService","namespace":"config.tenantMigrationRecipients"}}

```

This PC > New Volume (D:) > MSc_1 > ADBMS > sharding > shardrep3 >					
	Name	Date modified	Type	Size	
ls	diagnostic.data	23-02-2025 23:00	File folder		
ts	journal	23-02-2025 23:00	File folder		
	_mdb_catalog.wt	23-02-2025 23:00	WT File	4 KB	
	collection-0-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
	collection-2-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
	collection-4-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
	collection-6-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
	collection-8-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
	collection-10-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
cache	index-1-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
ts	index-3-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
Personal	index-5-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
	index-7-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
s	index-9-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
ts	index-11-7059448718810251044.wt	23-02-2025 23:00	WT File	4 KB	
ls	mongod.lock	23-02-2025 23:00	LOCK File	1 KB	
	sizeStorer.wt	23-02-2025 23:00	WT File	4 KB	
	storage.bson	23-02-2025 23:00	BSON File	1 KB	
	WiredTiger	23-02-2025 23:00	File	1 KB	
	WiredTiger.lock	23-02-2025 23:00	LOCK File	1 KB	
	WiredTiger.turtle	23-02-2025 23:00	TURTLE File	2 KB	
	WiredTiger.wt	23-02-2025 23:00	WT File	4 KB	
(C)	WiredTigerHS.wt	23-02-2025 23:00	WT File	4 KB	

2. Initiate that Replica Set by connecting it to mongosh

mongosh --host="localhost:1130"

```
Microsoft Windows [Version 10.0.19045.5131]
(c) Microsoft Corporation. All rights reserved.

C:\Users\mulla>mongosh --host="localhost:1130"
Current Mongosh Log ID: 67bb5bc4a37ca9c867fa4213
Connecting to:      mongodb://localhost:1130/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.
4.0
Using MongoDB:      7.0.16
Using Mongosh:       2.4.0

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

-----
The server generated these startup warnings when booting
2025-02-23T22:53:14.830+05:30: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
2025-02-23T22:53:14.830+05:30: This server is 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
-----

test> -
rs.initiate({_id:'shard_repl',
members:[{_id:0,host:"localhost:1130"},{_id:1,host:"localhost:1140"},
{_id:2,host:"localhost:1150"}]);
test> rs.initiate({_id: 'shard_repl', members:[{_id:0,host:"localhost:1130"},{_id:1,host:"localhost:1140"}, {_id:2,host:"localhost:1150"}]});
{ ok: 1 }
shard_repl [direct: other] test> -
```

3. Check the status

```
rs.status();
```

```
members: [
  {
    _id: 0,
    name: 'localhost:1130',
    health: 1,
    state: 1,
    stateStr: 'PRIMARY',
    uptime: 1082,
    optime: { ts: Timestamp({ t: 1740332467, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2025-02-23T17:41:07.000Z'),
    lastAppliedWallTime: ISODate('2025-02-23T17:41:07.064Z'),
    lastDurableWallTime: ISODate('2025-02-23T17:41:07.064Z'),
    syncSourceHost: '',
    syncSourceId: -1,
    infoMessage: 'Could not find member to sync from',
    electionTime: Timestamp({ t: 1740332386, i: 1 }),
    electionDate: ISODate('2025-02-23T17:39:46.000Z'),
    configVersion: 1,
    configTerm: 1,
    self: true,
    lastHeartbeatMessage: ''
  },
  {
    _id: 1,
    name: 'localhost:1140',
    health: 1,
    state: 2,
    stateStr: 'SECONDARY',
    uptime: 98,
    optime: { ts: Timestamp({ t: 1740332467, i: 1 }), t: Long('1') },
    optimeDurable: { ts: Timestamp({ t: 1740332467, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2025-02-23T17:41:07.000Z'),
    optimeDurableDate: ISODate('2025-02-23T17:41:07.000Z'),
    lastAppliedWallTime: ISODate('2025-02-23T17:41:07.064Z'),
    lastDurableWallTime: ISODate('2025-02-23T17:41:07.064Z'),
    lastHeartbeat: ISODate('2025-02-23T17:41:12.745Z'),
    lastHeartbeatRecv: ISODate('2025-02-23T17:41:13.754Z'),
    pingMs: Long('0'),
    lastHeartbeatMessage: '',
    syncSourceHost: 'localhost:1130',
    syncSourceId: 0,
    infoMessage: '',
    configVersion: 1,
    configTerm: 1
  }
],
```

```
{
shard_repl [direct: primary] test> [
  name: 'localhost:1150',
  health: 1,
  state: 2,
  stateStr: 'SECONDARY',
  uptime: 98,
  optime: { ts: Timestamp({ t: 1740332467, i: 1 }), t: Long('1') },
  optimeDurable: { ts: Timestamp({ t: 1740332467, i: 1 }), t: Long('1') },
  optimeDate: ISODate('2025-02-23T17:41:07.000Z'),
  optimeDurableDate: ISODate('2025-02-23T17:41:07.000Z'),
  lastAppliedWallTime: ISODate('2025-02-23T17:41:07.064Z'),
  lastDurableWallTime: ISODate('2025-02-23T17:41:07.064Z'),
  lastHeartbeat: ISODate('2025-02-23T17:41:12.769Z'),
  lastHeartbeatRecv: ISODate('2025-02-23T17:41:13.780Z'),
  pingMs: Long('0'),
  lastHeartbeatMessage: '',
  syncSourceHost: 'localhost:1130',
  syncSourceId: 0,
  infoMessage: '',
  configVersion: 1,
  configTerm: 1
]
],
ok: 1,
'$clusterTime': {
  clusterTime: Timestamp({ t: 1740332467, i: 1 }),
  signature: {
    hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAA='),
    keyId: Long('0')
  }
},
operationTime: Timestamp({ t: 1740332467, i: 1 })
}
shard_repl [direct: primary] test>
```

Repeat the same steps again in a new command prompt for another shard

mongod --shardsvr --port=1230 --dbpath="D:\MSc_1\ADBMS\sharding\shard2rep1" --replicaSet="shard2_repl"

```
C:\Users\mulla>mongod --shardsvr --port=1230 --dbpath="D:\MSc_1\ADBMS\sharding\shard2rep1" --replSet="shard2_repl"
{"t": {"$date": "2025-02-23T23:14:17.407+05:30"}, "s": "I", "c": "NETWORK", "id": 4915701, "ctx": "thread1", "msg": "Initialized wire specification", "attr": {"spec": {"incomingExternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "incomingInternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "outgoing": {"minWireVersion": 6, "maxWireVersion": 21}, "isInternalClient": true}}}
{"t": {"$date": "2025-02-23T23:14:19.407+05:30"}, "s": "I", "c": "CONTROL", "id": 23285, "ctx": "thread1", "msg": "Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t": {"$date": "2025-02-23T23:14:19.408+05:30"}, "s": "I", "c": "NETWORK", "id": 4648602, "ctx": "thread1", "msg": "Implicit TCP FastOpen in use."}
{"t": {"$date": "2025-02-23T23:14:19.410+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "RenameCollectionParticipantService", "namespace": "config.localRenameParticipants"}}
{"t": {"$date": "2025-02-23T23:14:19.410+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ShardingDDLCoordinator", "namespace": "config.system.sharding_ddl_coordinators"}}
{"t": {"$date": "2025-02-23T23:14:19.410+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingDonorService", "namespace": "config.localReshardingOperations.donor"}}
{"t": {"$date": "2025-02-23T23:14:19.411+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingRecipientService", "namespace": "config.localReshardingOperations.recipient"}}
{"t": {"$date": "2025-02-23T23:14:19.411+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationDonorService", "namespace": "config.tenantMigrationDonors"}}
{"t": {"$date": "2025-02-23T23:14:19.411+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationRecipientService", "namespace": "config.tenantMigrationRecipients"}}
```

This PC > New Volume (D:) > MSc_1 > ADBMS > sharding > shard2rep1					
		Name	Date modified	Type	Size
		diagnostic.data	23-02-2025 23:14	File folder	
		journal	23-02-2025 23:14	File folder	
		_mdb_catalog.wt	23-02-2025 23:14	WT File	4 KB
		collection-0-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		collection-2-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		collection-4-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		collection-6-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		collection-8-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		collection-10-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
cache		index-1-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
ts		index-3-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
Personal		index-5-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		index-7-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		index-9-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		index-11-3824208608763415549.wt	23-02-2025 23:14	WT File	4 KB
		mongod.lock	23-02-2025 23:14	LOCK File	1 KB
		sizeStorer.wt	23-02-2025 23:14	WT File	4 KB
		storage.bson	23-02-2025 23:14	BSON File	1 KB
		WiredTiger	23-02-2025 23:14	File	1 KB
		WiredTiger.lock	23-02-2025 23:14	LOCK File	1 KB
		WiredTiger.turtle	23-02-2025 23:14	TURTLE File	2 KB
		WiredTiger.wt	23-02-2025 23:14	WT File	4 KB
		WiredTigerHS.wt	23-02-2025 23:14	WT File	4 KB

```
mongod --shardsvr --port=1240 --dbpath="D:\MSc_1\ADBMS\sharding\shard2rep2" --replSet="shard2_repl"
```

```
C:\Users\mulla>mongod --shardsvr --port=1240 --dbpath="D:\MSc_1\ADBMS\sharding\shard2rep2" --replSet="shard2_repl"
{"t":{"$date":"2025-02-23T23:18:16.919+05:30"}, "s":"I", "c":"NETWORK", "id":4915701, "ctx":"thread1", "msg":"Initialized wire specification", "attr":{"spec":{"incomingExternalClient":{"minWireVersion":0,"maxWireVersion":21}, "incomingInternalClient":{"minWireVersion":0,"maxWireVersion":21}, "outgoing":{"minWireVersion":6,"maxWireVersion":21}, "isInternalClient":true}}}
{"t":{"$date":"2025-02-23T23:18:16.922+05:30"}, "s":"I", "c":"CONTROL", "id":23285, "ctx":"thread1", "msg":"Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T23:18:18.611+05:30"}, "s":"I", "c":"NETWORK", "id":4648602, "ctx":"thread1", "msg":"Implicit TCP FastOpen in use."}
{"t":{"$date":"2025-02-23T23:18:18.613+05:30"}, "s":"I", "c":"REPL", "id":5123008, "ctx":"thread1", "msg":"Successfully registered PrimaryOnlyService", "attr":{"service":"RenameCollectionParticipantService", "namespace": "config.localRenameParticipants"}}
{"t":{"$date":"2025-02-23T23:18:18.613+05:30"}, "s":"I", "c":"REPL", "id":5123008, "ctx":"thread1", "msg":"Successfully registered PrimaryOnlyService", "attr":{"service":"ShardingDDLCoordinator", "namespace": "config.system.sharding_ddl_coordinators"}}
{"t":{"$date":"2025-02-23T23:18:18.613+05:30"}, "s":"I", "c":"REPL", "id":5123008, "ctx":"thread1", "msg":"Successfully registered PrimaryOnlyService", "attr":{"service":"ReshardingDonorService", "namespace": "config.localReshardingOperations.donor"}}
{"t":{"$date":"2025-02-23T23:18:18.614+05:30"}, "s":"I", "c":"REPL", "id":5123008, "ctx":"thread1", "msg":"Successfully registered PrimaryOnlyService", "attr":{"service":"ReshardingRecipientService", "namespace": "config.localReshardingOperations.recipient"}}
{"t":{"$date":"2025-02-23T23:18:18.614+05:30"}, "s":"I", "c":"REPL", "id":5123008, "ctx":"thread1", "msg":"Successfully registered PrimaryOnlyService", "attr":{"service":"TenantMigrationDonorService", "namespace": "config.tenantMigrationDonors"}}
{"t":{"$date":"2025-02-23T23:18:18.614+05:30"}, "s":"I", "c":"REPL", "id":5123008, "ctx":"thread1", "msg":"Successfully registered PrimaryOnlyService", "attr":{"service":"TenantMigrationRecipientService", "namespace": "config.tenantMigrationRecipients"}}
```

▶ This PC > New Volume (D:) > MSc_1 > ADBMS > sharding > shard2rep2 >

	Name	Date modified	Type	Size
	diagnostic.data	23-02-2025 23:18	File folder	
	journal	23-02-2025 23:18	File folder	
	_mdb_catalog.wt	23-02-2025 23:18	WT File	4 KB
	collection-0-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	collection-2-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	collection-4-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	collection-6-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	collection-8-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	collection-10-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
ache	index-1-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	index-3-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
ersonal	index-5-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	index-7-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	index-9-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	index-11-7757649374729435945.wt	23-02-2025 23:18	WT File	4 KB
	mongod.lock	23-02-2025 23:18	LOCK File	1 KB
	sizeStorer.wt	23-02-2025 23:18	WT File	4 KB
	storage.bson	23-02-2025 23:18	BSON File	1 KB
	WiredTiger	23-02-2025 23:18	File	1 KB
	WiredTiger.lock	23-02-2025 23:18	LOCK File	1 KB
	WiredTiger.turtle	23-02-2025 23:18	TURTLE File	2 KB
	WiredTiger.wt	23-02-2025 23:18	WT File	4 KB
C:	WiredTigerHS.wt	23-02-2025 23:18	WT File	4 KB

```
mongod --shardsvr --port=1250 --dbpath="D:\MSc_1\ADBMS\sharding\shard2rep3" --replSet="shard2_repl"
```

```
C:\Users\mulla>mongod --shardsvr --port=1250 --dbpath="D:\MSc_1\ADBMS\sharding\shard2rep3" --replSet="shard2_repl"
{"t":{"$date":"2025-02-23T23:19:58.197+05:30"}, "s": "I", "c": "NETWORK", "id": 4915701, "ctx": "thread1", "msg": "Initialized wire specification", "attr": {"spec": {"incomingExternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "incomingInternalClient": {"minWireVersion": 0, "maxWireVersion": 21}, "outgoing": {"minWireVersion": 6, "maxWireVersion": 21}, "isInternalClient": true}}}
{"t":{"$date":"2025-02-23T23:19:58.201+05:30"}, "s": "I", "c": "CONTROL", "id": 23285, "ctx": "thread1", "msg": "Automatically disabling TLS 1.0, to force-enable TLS 1.0 specify --sslDisabledProtocols 'none'"}
{"t":{"$date":"2025-02-23T23:19:58.202+05:30"}, "s": "I", "c": "NETWORK", "id": 4648602, "ctx": "thread1", "msg": "Implicit TCP FastOpen in use."}
{"t":{"$date":"2025-02-23T23:19:58.205+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "RenameCollectionParticipantService", "namespace": "config.localRenameParticipants"}}
{"t":{"$date":"2025-02-23T23:19:58.205+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ShardingDDLCoordinator", "namespace": "config.system.sharding_ddl_coordinators"}}
{"t":{"$date":"2025-02-23T23:19:58.206+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingDonorService", "namespace": "config.localReshardingOperations.donor"}}
{"t":{"$date":"2025-02-23T23:19:58.206+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "ReshardingRecipientService", "namespace": "config.localReshardingOperations.recipient"}}
{"t":{"$date":"2025-02-23T23:19:58.206+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationDonorService", "namespace": "config.tenantMigrationDonors"}}
{"t":{"$date":"2025-02-23T23:19:58.206+05:30"}, "s": "I", "c": "REPL", "id": 5123008, "ctx": "thread1", "msg": "Successfully registered PrimaryOnlyService", "attr": {"service": "TenantMigrationRecipientService", "namespace": "config.tenantMigrationRecipients"}}
```

This PC > New Volume (D:) > MSc_1 > ADBMS > sharding > shard2rep3 >				
	Name	Date modified	Type	Size
ls	diagnostic.data	23-02-2025 23:21	File folder	
s	journal	23-02-2025 23:19	File folder	
	_mdb_catalog.wt	23-02-2025 23:20	WT File	20 KB
	collection-0-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
	collection-2-5998760358002247008.wt	23-02-2025 23:20	WT File	4 KB
	collection-4-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
	collection-6-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
	collection-8-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
	collection-10-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
:ache	index-1-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
ts	index-3-5998760358002247008.wt	23-02-2025 23:20	WT File	4 KB
Personal	index-5-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
	index-7-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
	index-9-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
s	index-11-5998760358002247008.wt	23-02-2025 23:20	WT File	20 KB
	mongod.lock	23-02-2025 23:19	LOCK File	1 KB
:s	sizeStorer.wt	23-02-2025 23:20	WT File	20 KB
ls	storage.bson	23-02-2025 23:19	BSON File	1 KB
(C)	WiredTiger	23-02-2025 23:19	File	1 KB
ne (D:)	WiredTiger.lock	23-02-2025 23:19	LOCK File	1 KB
	WiredTiger.turtle	23-02-2025 23:21	TURTLE File	2 KB
	WiredTiger.wt	23-02-2025 23:21	WT File	84 KB
	WiredTigerHS.wt	23-02-2025 23:19	WT File	4 KB

mongosh --host="localhost:1230"

```

Microsoft Windows [Version 10.0.19045.5131]
(c) Microsoft Corporation. All rights reserved.

C:\Users\mulla>mongosh --host="localhost:1230"
Current Mongosh Log ID: 67bb617311fb826d9efa4213
Connecting to:      mongodb://localhost:1230/?directConnection=true&serverSelectionTimeoutMS=2000&appName=mongosh+2.4.0
Using MongoDB:      7.0.16
Using Mongosh:      2.4.0

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

-----
  The server generated these startup warnings when booting
  2025-02-23T23:14:19.908+05:30: Access control is not enabled for the database. Read and write access to data and configuration is unrestricted
  2025-02-23T23:14:19.909+05:30: This server is 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
-----

test> rs.initiate({_id:'shard2_repl',
members:[{_id:0,host:"localhost:1230"},{_id:1,host:"localhost:1240"},{_id:2,host:"localhost:1250"}]});

test> rs.initiate({_id: 'shard2_repl', members:[{_id:0,host:"localhost:1230"},{_id:1,host:"localhost:1240"}, {_id:2,host:"localhost:1250"}]});
{ ok: 1 }
shard2_repl [direct: other] test> rs.status();

members: [
  {
    _id: 0,
    name: 'localhost:1230',
    health: 1,
    state: 1,
    stateStr: 'PRIMARY',
    uptime: 2505,
    optime: { ts: Timestamp({ t: 1740335155, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2025-02-23T18:25:55.000Z'),
    lastAppliedWallTime: ISODate('2025-02-23T18:25:55.261Z'),
    lastDurableWallTime: ISODate('2025-02-23T18:25:55.261Z'),
    syncSourceHost: '',
    syncSourceId: -1,
    infoMessage: '',
    electionTime: Timestamp({ t: 1740333964, i: 1 }),
    electionDate: ISODate('2025-02-23T18:06:04.000Z'),
    configVersion: 1,
    configTerm: 1,
    self: true,
    lastHeartbeatMessage: ''
  },
  {
    _id: 1,
    name: 'localhost:1240',
    health: 1,
    state: 2,
    stateStr: 'SECONDARY',
    uptime: 1208,
    optime: { ts: Timestamp({ t: 1740335155, i: 1 }), t: Long('1') },
    optimeDurable: { ts: Timestamp({ t: 1740335155, i: 1 }), t: Long('1') },
    optimeDate: ISODate('2025-02-23T18:25:55.000Z'),
    optimeDurableDate: ISODate('2025-02-23T18:25:55.000Z'),
    lastAppliedWallTime: ISODate('2025-02-23T18:25:55.261Z'),
    lastDurableWallTime: ISODate('2025-02-23T18:25:55.261Z'),
    lastHeartbeat: ISODate('2025-02-23T18:26:01.233Z'),
    lastHeartbeatRecv: ISODate('2025-02-23T18:26:02.194Z'),
    pingMs: Long('0'),
    lastHeartbeatMessage: '',
    syncSourceHost: 'localhost:1230',
    shard2_repl [direct: primary] test>
    infoMessage: '',
    configVersion: 1,
    configTerm: 1
  },
  {
    _id: 2,
    name: 'localhost:1250',
    health: 1,
    state: 2,
    stateStr: 'SECONDARY'
  }
]

```

MongoDB Shards – DONE

Now, initialize a Query Router which is a mongos process

```
mongos --port=6565 --configdb="config-repl/localhost:5050, localhost:5151, localhost:5252"
```

Now, Connect Shards and Query Router (mongos)

1. Connect to 'mongos' using 'mongosh'

```
mongosh --host="localhost:6565"
```

Microsoft Windows [Version 10.0.19045.5131]
(c) Microsoft Corporation. All rights reserved.

```
C:\Users\mulla>mongosh --host="localhost:6565"
Current Mongosh Log ID: 67bb723286c46526a2fa4213
Connecting to:          mongodb://localhost:6565/?directConnection=true&serverSelecti
4.0
Using MongoDB:         7.0.16
Using Mongosh:          2.4.0

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

-----
The server generated these startup warnings when booting
2025-02-24T00:36:12.623+05:30: Access control is not enabled for the database. Rea
iuguration is unrestricted
2025-02-24T00:36:12.625+05:30: This server is bound to localhost. Remote systems w
rver. Start the server with --bind_ip <address> to specify which IP addresses it shou
bind_ip_all to bind to all interfaces. If this behavior is desired, start the server |
this warning
-----
[direct: mongos] test> S■
```

2. Add Shard Replica Set to Sharded Cluster

This will be repeated for all the Shard ReplicaSets we have configured

```
sh.addShard("shard_repl/localhost:1130,localhost:1140,localhost:1150");
```

```
[direct: mongos] test> sh.addShard("shard_repl/localhost:1130,localhost:1140,localhost:1150");
{
  shardAdded: 'shard_repl',
  ok: 1,
  '$clusterTime': {
    clusterTime: Timestamp({ t: 1740337960, i: 3 }),
    signature: {
      hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAA='),
      keyId: Long('0')
    }
  },
  operationTime: Timestamp({ t: 1740337960, i: 3 })
}
```

```
sh.addShard("shard2_repl/localhost:1230,localhost:1240,localhost:1250");
```

```
[direct: mongos] test> sh.addShard("shard2_repl/localhost:1230,localhost:1240,localhost:1250");
{
  shardAdded: 'shard2_repl',
  ok: 1,
  '$clusterTime': {
    clusterTime: Timestamp({ t: 1740338029, i: 2 }),
    signature: {
      hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAA='),
      keyId: Long('0')
    }
  },
  operationTime: Timestamp({ t: 1740338026, i: 3 })
}
```

```
sh.status();
```

```
[direct: mongos] test> sh.status();
shardingVersion
{ _id: 1, clusterId: ObjectId('67bb56b7a1aab4a2e6c13897') }

shards
[
  {
    _id: 'shard2_repl',
    host: 'shard2_repl/localhost:1230,localhost:1240,localhost:1250',
    state: 1,
    topologyTime: Timestamp({ t: 1740338026, i: 1 })
  },
  {
    _id: 'shard_repl',
    host: 'shard_repl/localhost:1130,localhost:1140,localhost:1150',
    state: 1,
    topologyTime: Timestamp({ t: 1740337959, i: 1 })
  }
]
active mongoses
[ { '7.0.16': 1 } ]

autosplit
{ 'Currently enabled': 'yes' }

[direct: mongos] test> -
{
  'Currently enabled': 'yes',
  'Failed balancer rounds in last 5 attempts': 0,
  'Currently running': 'no',
  'Migration Results for the last 24 hours': 'No recent migrations'
}
```

Open mongodb compass, edit -> mongodb://localhost:6565/

The screenshot shows the MongoDB Compass interface. At the top, there's a navigation bar with 'MongoDB Compass' and links for 'Connections', 'Edit', 'View', and 'Help'. Below the bar, the main window has a title 'Compass' and a 'Welcome' message. On the left, a sidebar titled 'CONNECTIONS (1)' shows a single connection entry: 'localhost:27017'. A central modal window is open, titled 'New Connection', with the sub-instruction 'Manage your connection settings'. It contains a 'URI' field with the value 'mongodb://localhost:6565/'. Below it are fields for 'Name' (set to 'localhost:6565') and 'Color' (set to 'No Color'). There are also checkboxes for 'Favorite this connection' and 'Advanced Connection Options'. To the right of the modal are two informational boxes: 'How do I find my connection string in Atlas?' and 'How do I format my connection string?'. At the bottom of the modal are three buttons: 'Cancel', 'Save', 'Connect', and a prominent green 'Save & Connect' button. The background of the main window shows the 'CONNECTIONS (2)' section, which lists the two connections: 'localhost:27017' and 'localhost:6565', with 'localhost:6565' expanded to show its databases: 'admin' and 'config'.

Now, create database “demo”, collection name-> “test”

Create Database

Database Name

demo

Collection Name

test

Time-Series

Time-series collections efficiently store sequences of measurements over a period of time. [Learn More ↗](#)

» **Additional preferences** (e.g. Custom collation, Clustered collections)

Cancel

Create Database

The screenshot shows the Compass MongoDB interface. On the left, the 'CONNECTIONS' sidebar lists two connections: 'localhost:27017' and 'localhost:6565'. Under 'localhost:6565', there are three databases: 'admin', 'config', and 'demo'. The 'test' collection is selected under the 'demo' database. The main interface shows the 'Welcome' screen for the 'test' collection. It displays the following details:

- Documents: 0
- Aggregations: 0
- Schema: 0
- Indexes: 1
- Validation: 0

Below these, there is a search bar with placeholder text 'Type a query: { field: 'value' } or [Generate query +](#)'. To the right of the search bar are buttons for 'EXPLAIN', 'Reset', 'Find', and 'Options'. At the bottom of the interface, there is a message: 'This collection has no data' followed by a small note: 'It only takes a few seconds to import data from a JSON or CSV file.' A 'Import Data' button is located at the bottom right.

Import random dataset into it

Compass

Welcome test

My Queries

CONNECTIONS (2)

Search connections

localhost:27017 localhost:6565

admin config demo

Import

To collection demo.test

Import file: phone_usage_india.csv

Options

Select delimiter: Comma

Ignore empty strings

Stop on errors

Specify Fields and Types Learn more about data types

User ID	Age	Gender	Location	Phone Brand	OS
U00001	53	Male	Mumbai	Vivo	Android
U00002	60	Other	Delhi	Realme	iOS
U00003	37	Female	Ahmedabad	Nokia	Android
U00004	32	Male	Pune	Samsung	Android

Cancel Import

Import completed. 178 documents imported.

Documents 17.7K Aggregations Schema Indexes 1 Validation

CONNECTIONS (2)

Search connections

localhost:27017 localhost:6565

admin config demo

Type a query: { field: 'value' } or [Generate query](#)

[ADD DATA](#) [EXPORT DATA](#) [UPDATE](#) [DELETE](#)

```
_id: ObjectId('67bb823cccd6c3804c52d2a7d')
User ID : "U00001"
Age : 53
Gender : "Male"
Location : "Mumbai"
Phone Brand : "Vivo"
OS : "Android"
Screen Time (hrs/day) : 3.7
Data Usage (GB/month) : 23.9
Calls Duration (mins/day) : 37.9
Number of Apps Installed : 104
Social Media Time (hrs/day) : 3.9
E-commerce Spend (INR/month) : 469
Streaming Time (hrs/day) : 5.2
Gaming Time (hrs/day) : 4.1
Monthly Recharge Cost (INR) : 803
Primary Use : "Education"
```

```
_id: ObjectId('67bb823cccd6c3804c52d2a7e')
User ID : "U00002"
Age : 60
Gender : "Other"
Location : "Delhi"
Phone Brand : "Realme"
OS : "iOS"
Time (hrs/day) : 9.2
Usage (GB/month) : 28.1
Calls Duration (mins/day) : 13.7
```

Import completed. 17686 documents imported.

Create index -> Age (-1: desc)

Create Index

demo.test

Index fields

Age ▾ 1 (asc) ▾ +

➤ Options

Cancel Create Index

Name & Definition	Type	Size	Usage	Properties	Status
➤ _id_	REGULAR <small>i</small>	466.9 KB	2 (since Mon Feb 24 2025)	UNIQUE <small>i</small>	READY
➤ Age_1	REGULAR <small>i</small>	98.3 KB	0 (since Mon Feb 24 2025)		READY

Now, go to current cmd/powershell terminal (not a new one) and type
use demo

show collections

```
[direct: mongos] test> use demo
switched to db demo
[direct: mongos] demo> show collections
test
[direct: mongos] demo>
sh.enableSharding("demo");

[direct: mongos] demo> sh.enableSharding("demo");
{
  ok: 1,
  '$clusterTime': {
    clusterTime: Timestamp({ t: 1740340135, i: 1 }),
    signature: {
      hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAA='),
      keyId: Long('0')
    }
  },
  operationTime: Timestamp({ t: 1740340135, i: 1 })
}
[direct: mongos] demo>
```

[direct: mongos] demo> sh.shardCollection("demo.test", {_id:1})

```
[direct: mongos] demo> sh.shardCollection("demo.test", {_id:1})
{
  collectionsharded: 'demo.test',
  ok: 1,
  '$clusterTime': {
    clusterTime: Timestamp({ t: 1740344906, i: 1 }),
    signature: {
      hash: Binary.createFromBase64('AAAAAAAAAAAAAAAAAAAAAAA='),
      keyId: Long('0')
    }
  },
  operationTime: Timestamp({ t: 1740344906, i: 1 })
}
[direct: mongos] demo> -
[direct: mongos] demo> sh.status();
shardingVersion
{ _id: 1, clusterId: ObjectId('67bb56b7a1aab4a2e6c13897' ) }
---
shards
[
  {
    _id: 'shard2_repl',
    host: 'shard2_repl/localhost:1230,localhost:1240,localhost:1250',
    state: 1,
    topologyTime: Timestamp({ t: 1740338026, i: 1 })
  },
  {
    _id: 'shard_repl',
    host: 'shard_repl/localhost:1130,localhost:1140,localhost:1150',
    state: 1,
    topologyTime: Timestamp({ t: 1740337959, i: 1 })
  }
]
---
active mongoses
[ { '7.0.16': 1 } ]
---
autosplit
{ 'Currently enabled': 'yes' }
---
balancer
{
  'Currently enabled': 'yes',
  'Currently running': 'no',
  'Failed balancer rounds in last 5 attempts': 0,
  'Migration Results for the last 24 hours': 'No recent migrations'
}
---
shardedDataDistribution
[
  {
    ns: 'demo.test',
    shards: [
      {
        shardName: 'shard2_repl',
        numOrphanedDocs: 0,
        numOwnedDocuments: 17686,
        ownedSizeBytes: 7994072,
        orphanedSizeBytes: 0
      }
    ],
    ns: 'config.system.sessions',
  }
]
```

```

databases
[
  {
    database: { _id: 'config', primary: 'config', partitioned: true },
    collections: {
      'config.system.sessions': {
        shardKey: { _id: 1 },
        unique: false,
        balancing: true,
        chunkMetadata: [ { shard: 'shard_repl', nChunks: 1 } ],
        chunks: [
          { min: { _id: MinKey() }, max: { _id: MaxKey() }, 'on shard': 'shard_repl', 'last modified': Timestamp({ t: 1, i: 0 }) }
        ],
        tags: []
      }
    }
  },
  {
    database: {
      _id: 'demo',
      primary: 'shard2_repl',
      partitioned: false,
      version: {
        uuid: UUID('47af83fe-02eb-4fa2-bf48-515840f1f8a9'),
        timestamp: Timestamp({ t: 1740338595, i: 1 }),
        lastMod: 1
      }
    },
    collections: {
      'demo.test': {
        shardKey: { _id: 1 },
        unique: false,
        balancing: true,
        chunkMetadata: [ { shard: 'shard2_repl', nChunks: 1 } ],
        chunks: [
          { min: { _id: MinKey() }, max: { _id: MaxKey() }, 'on shard': 'shard2_repl', 'last modified': Timestamp({ t: 1, i: 0 }) }
        ],
        tags: []
      }
    }
  }
]
[direct: mongos] demo>

```

```

[direct: mongos] demo> db.test.getShardDistribution();
[direct: mongos] demo> db.test.getShardDistribution();
Shard shard2_repl at shard2_repl/localhost:1230,localhost:1240,localhost:1250
{
  data: '7.62MiB',
  docs: 17686,
  chunks: 1,
  'estimated data per chunk': '7.62MiB',
  'estimated docs per chunk': 17686
}
---
Totals
{
  data: '7.62MiB',
  docs: 17686,
  chunks: 1,
  'Shard shard2_repl': [
    '100 % data',
    '100 % docs in cluster',
    '452B avg obj size on shard'
  ]
}
[direct: mongos] demo> pd-on more modern projects.

```