TASK A-1

No of Servers = 6 and shards = 4 , each shard has 3 replicas.

For 10,000 Write requests:

Total time taken is 604.9438951015472 seconds.

Speed is 16.530458578016358 requests per second.

For 10,000 Read requests:

Total time taken is 469.18102192878723 seconds.

Speed is 21.31373506731014 requests per second.

Configuration used:

```
{
    "N": 6,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "shards": [
        {
            "Stud_id_low": 0,
            "Shard_id": "sh1",
            "Shard_size": 4096
        },
        {
            "Stud_id_low": 4096,
            "Shard_id": "sh2",
            "Shard_size": 4096
        },
        {
            "Stud_id_low": 8192,
            "Shard_id": "sh3",
            "Shard_size": 4096
        },
        {
            "Stud_id_low": 12288,
```

```json
            "Shard_id": "sh4",
            "Shard_size": 4096
        }
    ],
    "servers": {
        "Server0": [
            "sh1",
            "sh2"
        ],
        "Server1": [
            "sh3",
            "sh4"
        ],
        "Server3": [
            "sh1",
            "sh3"
        ],
        "Server4": [
            "sh4",
            "sh2"
        ],
        "Server5": [
            "sh1",
            "sh4"
        ],
        "Server6": [
            "sh3",
            "sh2"
        ]
    }
}
```

TASK A-2

For 10,000 write requests:
Total time taken is 1287.2572157382965 seconds.
Speed is 7.768455191190812 requests per second.

Write Speed down w.r.t Task 1 = 0.47

For 10,000 read requests:
Total time taken is 446.0694181919098 seconds.
Speed is 22.418035382326433 requests per second.

Read Speed up w.r.t Task 1 = 1.05

Configuration used:

```
{
    "N": 8,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "shards": [
        {
            "Stud_id_low": 0,
            "Shard_id": "sh1",
            "Shard_size": 2048
        },
        {
            "Stud_id_low": 2048,
            "Shard_id": "sh2",
            "Shard_size": 2048
        },
        {
            "Stud_id_low": 4096,
            "Shard_id": "sh3",
            "Shard_size": 2048
        },
        {
            "Stud_id_low": 6144,
            "Shard_id": "sh4",
            "Shard_size": 2048
        },
        {
            "Stud_id_low": 8192,
            "Shard_id": "sh5",
```

```json
            "Shard_size": 2048
        },
        {
            "Stud_id_low": 10240,
            "Shard_id": "sh6",
            "Shard_size": 2048
        },
        {
            "Stud_id_low": 12288,
            "Shard_id": "sh7",
            "Shard_size": 2048
        },
        {
            "Stud_id_low": 14336,
            "Shard_id": "sh8",
            "Shard_size": 2048
        }
    ],
    "servers": {
        "Server1": [
            "sh2",
            "sh3",
            "sh4",
            "sh5",
            "sh6",
            "sh7",
            "sh8"

        ],
        "Server2": [
            "sh1",
            "sh3",
            "sh4",
            "sh5",
            "sh6",
            "sh7",
            "sh8"
        ],
        "Server3": [
            "sh1",
            "sh2",
            "sh4",
```

```
            "sh5",
            "sh6",
            "sh7",
            "sh8"
        ],
        "Server4": [
            "sh1",
            "sh2",
            "sh3",
            "sh5",
            "sh6",
            "sh7",
            "sh8"
        ],
        "Server5": [
            "sh1",
            "sh2",
            "sh4",
            "sh3",
            "sh6",
            "sh7",
            "sh8"
        ],
        "Server6": [
            "sh1",
            "sh2",
            "sh4",
            "sh5",
            "sh3",
            "sh7",
            "sh8"
        ],
        "Server7":[
            "sh1",
            "sh2",
            "sh4",
            "sh5",
            "sh6",
            "sh3",
            "sh8"
        ],
        "Server8":[
```

```
        "sh1",
        "sh2",
        "sh4",
        "sh5",
        "sh6",
        "sh7",
        "sh3"
      ]
    }
}
```

TASK A-3

For 10,000 write requests:
Total time taken is 1264.0156018733978 seconds.
Speed is 7.911294753940535 requests per second.

Write speed up = 1.01
For 10,000 read requests
Total time taken is 392.66022419929504 seconds.
Speed is 25.46731088027 requests per second.

Read speed up = 1.13

Configuration used
```
{
    "N": 10,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "shards": [
        {
            "Stud_id_low": 0,
            "Shard_id": "sh1",
```

```
                    "Shard_size": 2048
            },
            {
                    "Stud_id_low": 2048,
                    "Shard_id": "sh2",
                    "Shard_size": 2048
            },
            {
                    "Stud_id_low": 4096,
                    "Shard_id": "sh3",
                    "Shard_size": 2048
            },
            {
                    "Stud_id_low": 6144,
                    "Shard_id": "sh4",
                    "Shard_size": 2048
            },
            {
                    "Stud_id_low": 8192,
                    "Shard_id": "sh5",
                    "Shard_size": 2048
            },
            {
                    "Stud_id_low": 10240,
                    "Shard_id": "sh6",
                    "Shard_size": 2048
            }
    ],
    "servers": {
        "Server1": [
            "sh1",
            "sh2",
            "sh3",
            "sh5",
            "sh6"
        ],
        "Server2": [
            "sh4",
            "sh2",
            "sh3",
            "sh5",
            "sh6"
```

```json
        ],
        "Server3": [
            "sh4",
            "sh2",
            "sh5",
            "sh6"
        ],
        "Server4": [
            "sh1",
            "sh2",
            "sh3",
            "sh4",
            "sh6"
        ],
        "Server5": [
            "sh1",
            "sh2",
            "sh4",
            "sh5"
        ],
        "Server6": [
            "sh1",
            "sh4",
            "sh3",
            "sh5",
            "sh6"
        ],
        "Server7": [
            "sh1",
            "sh2",
            "sh3",
            "sh5",
            "sh4"
        ],
        "Server8": [
            "sh1",
            "sh2",
            "sh3",
            "sh5",
            "sh6"
        ],
        "Server9": [
```

```
                "sh1",
                "sh2",
                "sh3",
                "sh4",
                "sh6"
            ],
        "Server10": [
                "sh1",
                "sh3",
                "sh5",
                "sh4",
                "sh6"
            ]
        }
    }
```

TASK A-4

Endpoints:

/init:

POST http://127.0.0.1:5001/init

Payload: {
```
    "N": 6,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "shards": [
        {
            "Stud_id_low": 0,
            "Shard_id": "sh1",
            "Shard_size": 4096
```

```json
        },
        {
            "Stud_id_low": 4096,
            "Shard_id": "sh2",
            "Shard_size": 4096
        },
        {
            "Stud_id_low": 8192,
            "Shard_id": "sh3",
            "Shard_size": 4096
        },
        {
            "Stud_id_low": 12288,
            "Shard_id": "sh4",
            "Shard_size": 4096
        }
    ],
    "servers": {
        "Server0": [
            "sh1",
            "sh2"
        ],
        "Server1": [
            "sh3",
            "sh4"
        ],
        "Server3": [
            "sh1",
            "sh3"
        ],
        "Server4": [
            "sh4",
            "sh2"
        ],
        "Server5": [
            "sh1",
            "sh4"
        ],
        "Server6": [
            "sh3",
            "sh2"
        ]
```

```
        }
    }
```

Response

```
{
    "message": "Configured Database"
}
```


/status:
GET http://127.0.0.1:5001/status

Response:
```
{
    "N": 6,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
```

```json
        ]
    },
    "servers": {
        "Server0": [
            "sh1",
            "sh2"
        ],
        "Server1": [
            "sh3",
            "sh4"
        ],
        "Server3": [
            "sh1",
            "sh3"
        ],
        "Server4": [
            "sh4",
            "sh2"
        ],
        "Server5": [
            "sh1",
            "sh4"
        ],
        "Server6": [
            "sh3",
            "sh2"
        ]
    },
    "shards": [
        {
            "Shard_id": "sh1",
            "Shard_size": 4096,
            "Stud_id_low": 0
        },
        {
            "Shard_id": "sh2",
            "Shard_size": 4096,
            "Stud_id_low": 4096
        },
        {
            "Shard_id": "sh3",
            "Shard_size": 4096,
```
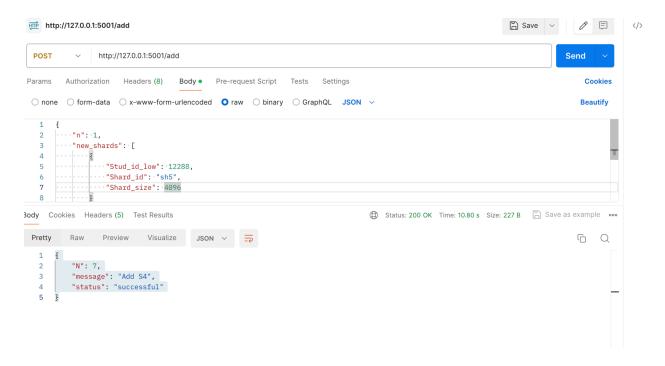
```json
        "Stud_id_low": 8192
    },
    {
        "Shard_id": "sh4",
        "Shard_size": 4096,
        "Stud_id_low": 12288
    }
    ]
}
```

```
{
    "N": 6,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "servers": {
        "Server0": [
            "sh1",
            "sh2"
        ],
        "Server1": [
            "sh3",
            "sh4"
        ],
        "Server3": [
            "sh1",
            "sh3"
```

GET http://127.0.0.1:5001/status — Status: 200 OK Time: 45 ms Size: 1.01 KB

/add
POST   http://127.0.0.1:5001/add

Payload:
```json
{
    "n": 1,
    "new_shards": [
        {
            "Stud_id_low": 12288,
            "Shard_id": "sh5",
            "Shard_size": 4096
        }
    ],
    "servers": {
        "S4": [
```

```
            "sh3",
            "sh5"
        ]
    }
}
```

Response:
```
{
    "N": 7,
    "message": "Add S4",
    "status": "successful"
}
```

After doing /status
```
{
    "N": 7,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "servers": {
        "S4": [
            "sh3",
            "sh5"
        ],
        "Server0": [
            "sh1",
            "sh2"
        ],
        "Server1": [
            "sh3",
            "sh4"
        ],
        "Server3": [
```

```json
            "sh1",
            "sh3"
        ],
        "Server4": [
            "sh4",
            "sh2"
        ],
        "Server5": [
            "sh1",
            "sh4"
        ],
        "Server6": [
            "sh3",
            "sh2"
        ]
    },
    "shards": [
        {
            "Shard_id": "sh1",
            "Shard_size": 4096,
            "Stud_id_low": 0
        },
        {
            "Shard_id": "sh2",
            "Shard_size": 4096,
            "Stud_id_low": 4096
        },
        {
            "Shard_id": "sh3",
            "Shard_size": 4096,
            "Stud_id_low": 8192
        },
        {
            "Shard_id": "sh4",
            "Shard_size": 4096,
            "Stud_id_low": 12288
        }
    ]
}
```

http://127.0.0.1:5001/add

POST | http://127.0.0.1:5001/add | Send

Params   Authorization   Headers (8)   Body ●   Pre-request Script   Tests   Settings   Cookies

○ none   ○ form-data   ○ x-www-form-urlencoded   ● raw   ○ binary   ○ GraphQL   JSON ⌄   Beautify

```
1  {
2      "n": 1,
3      "new_shards": [
4          {
5              "Stud_id_low": 12288,
6              "Shard_id": "sh5",
7              "Shard_size": 4096
8          }
```

Body   Cookies   Headers (5)   Test Results   Status: 200 OK   Time: 10.80 s   Size: 227 B   Save as example ⚬⚬⚬

Pretty   Raw   Preview   Visualize   JSON ⌄

```
1  {
2      "N": 7,
3      "message": "Add S4",
4      "status": "successful"
5  }
```

/rm

DELETE http://127.0.0.1:5001/rm
Payload:

```
{
    "n" : 2,
    "servers" : ["Server4"]
}
```

Response:

```
{
    "message": {
        "N": 5,
        "servers": [
            "Server4",
            "Server0"
        ]
    }
}
```

After doing status:

```
{
    "N": 5,
```

```json
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "servers": {
        "S4": [
            "sh3",
            "sh5"
        ],
        "Server1": [
            "sh3",
            "sh4"
        ],
        "Server3": [
            "sh1",
            "sh3"
        ],
        "Server5": [
            "sh1",
            "sh4"
        ],
        "Server6": [
            "sh3",
            "sh2"
        ]
    },
    "shards": [
        {
            "Shard_id": "sh1",
            "Shard_size": 4096,
            "Stud_id_low": 0
        },
        {
            "Shard_id": "sh2",
```

```json
            "Shard_size": 4096,
            "Stud_id_low": 4096
        },
        {
            "Shard_id": "sh3",
            "Shard_size": 4096,
            "Stud_id_low": 8192
        },
        {
            "Shard_id": "sh4",
            "Shard_size": 4096,
            "Stud_id_low": 12288
        }
    ]
}
```

http://127.0.0.1:5001/rm   💾 Save ▾   ✏️ 💬   ‹/›

| DELETE ▾ | http://127.0.0.1:5001/rm | **Send** ▾ |

Params   Authorization   Headers (8)   Body ●   Pre-request Script   Tests   Settings   Cookies

○ none   ○ form-data   ○ x-www-form-urlencoded   ⦿ raw   ○ binary   ○ GraphQL   JSON ▾   Beautify

```
1  {
2      "n": 2,
3      "servers": ["Server4"]
4  }
```

Body   Cookies   Headers (5)   Test Results   🌐 Status: 200 OK   Time: 7.53 s   Size: 256 B   💾 Save as example   •••

Pretty   Raw   Preview   Visualize   JSON ▾

```
1  {
2      "message": {
3          "N": 5,
4          "servers": [
5              "Server4",
6              "Server0"
7          ]
8      }
9  }
```

/write

POST http://127.0.0.1:5001/write

Payload:
```json
{
    "data": [
        {
            "Stud_id": 3124,
            "Stud_name": "Student_0",
```

```json
        "Stud_marks": 8
    },
    {
        "Stud_id": 2568,
        "Stud_name": "Student_1",
        "Stud_marks": 96
    },
    {
        "Stud_id": 3455,
        "Stud_name": "Student_2",
        "Stud_marks": 86
    },
    {
        "Stud_id": 4107,
        "Stud_name": "Student_3",
        "Stud_marks": 30
    },
    {
        "Stud_id": 3887,
        "Stud_name": "Student_4",
        "Stud_marks": 80
    },
    {
        "Stud_id": 4402,
        "Stud_name": "Student_5",
        "Stud_marks": 100
    },
    {
        "Stud_id": 4304,
        "Stud_name": "Student_6",
        "Stud_marks": 32
    },
    {
        "Stud_id": 2825,
        "Stud_name": "Student_7",
        "Stud_marks": 40
    },
    {
        "Stud_id": 1489,
        "Stud_name": "Student_8",
        "Stud_marks": 16
    },
```

```json
    {
        "Stud_id": 3495,
        "Stud_name": "Student_9",
        "Stud_marks": 34
    },
    {
        "Stud_id": 2899,
        "Stud_name": "Student_10",
        "Stud_marks": 39
    },
    {
        "Stud_id": 4004,
        "Stud_name": "Student_11",
        "Stud_marks": 98
    },
    {
        "Stud_id": 3949,
        "Stud_name": "Student_12",
        "Stud_marks": 90
    },
    {
        "Stud_id": 4732,
        "Stud_name": "Student_13",
        "Stud_marks": 45
    },
    {
        "Stud_id": 1150,
        "Stud_name": "Student_14",
        "Stud_marks": 96
    },
    {
        "Stud_id": 4577,
        "Stud_name": "Student_15",
        "Stud_marks": 34
    },
    {
        "Stud_id": 2071,
        "Stud_name": "Student_16",
        "Stud_marks": 65
    },
    {
        "Stud_id": 3894,
```

```json
        "Stud_name": "Student_17",
        "Stud_marks": 37
    },
    {

        "Stud_id": 4274,
        "Stud_name": "Student_18",
        "Stud_marks": 86
    },
    {

        "Stud_id": 2021,
        "Stud_name": "Student_19",
        "Stud_marks": 37
    },
    {

        "Stud_id": 8029,
        "Stud_name": "Student_20",
        "Stud_marks": 39
    },
    {

        "Stud_id": 9752,
        "Stud_name": "Student_21",
        "Stud_marks": 19
    },
    {

        "Stud_id": 9546,
        "Stud_name": "Student_22",
        "Stud_marks": 95
    },
    {

        "Stud_id": 11225,
        "Stud_name": "Student_23",
        "Stud_marks": 41
    },
    {

        "Stud_id": 10543,
        "Stud_name": "Student_24",
        "Stud_marks": 54
    },
    {

        "Stud_id": 9504,
        "Stud_name": "Student_25",
        "Stud_marks": 97
```

```json
    },
    {
        "Stud_id": 11292,
        "Stud_name": "Student_26",
        "Stud_marks": 81
    },
    {
        "Stud_id": 10748,
        "Stud_name": "Student_27",
        "Stud_marks": 62
    },
    {
        "Stud_id": 9635,
        "Stud_name": "Student_28",
        "Stud_marks": 56
    },
    {
        "Stud_id": 8507,
        "Stud_name": "Student_29",
        "Stud_marks": 79
    },
    {
        "Stud_id": 10351,
        "Stud_name": "Student_30",
        "Stud_marks": 97
    },
    {
        "Stud_id": 8471,
        "Stud_name": "Student_31",
        "Stud_marks": 89
    },
    {
        "Stud_id": 9892,
        "Stud_name": "Student_32",
        "Stud_marks": 5
    },
    {
        "Stud_id": 11538,
        "Stud_name": "Student_33",
        "Stud_marks": 35
    },
    {
```
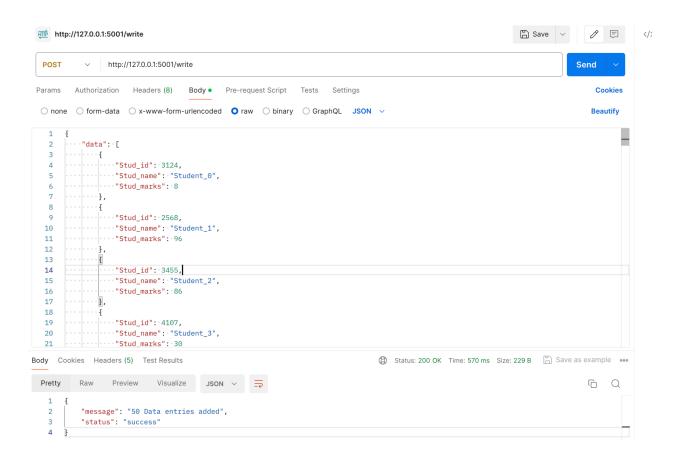
```json
        "Stud_id": 9649,
        "Stud_name": "Student_34",
        "Stud_marks": 78
    },
    {
        "Stud_id": 11138,
        "Stud_name": "Student_35",
        "Stud_marks": 8
    },
    {
        "Stud_id": 9341,
        "Stud_name": "Student_36",
        "Stud_marks": 73
    },
    {
        "Stud_id": 9708,
        "Stud_name": "Student_37",
        "Stud_marks": 79
    },
    {
        "Stud_id": 9629,
        "Stud_name": "Student_38",
        "Stud_marks": 69
    },
    {
        "Stud_id": 11613,
        "Stud_name": "Student_39",
        "Stud_marks": 49
    },
    {
        "Stud_id": 333,
        "Stud_name": "Student_40",
        "Stud_marks": 26
    },
    {
        "Stud_id": 1107,
        "Stud_name": "Student_41",
        "Stud_marks": 3
    },
    {
        "Stud_id": 2060,
        "Stud_name": "Student_42",
```

```json
            "Stud_marks": 1
        },
        {
            "Stud_id": 2846,
            "Stud_name": "Student_43",
            "Stud_marks": 2
        },
        {
            "Stud_id": 5560,
            "Stud_name": "Student_44",
            "Stud_marks": 72
        },
        {
            "Stud_id": 1174,
            "Stud_name": "Student_45",
            "Stud_marks": 49
        },
        {
            "Stud_id": 1534,
            "Stud_name": "Student_46",
            "Stud_marks": 31
        },
        {
            "Stud_id": 7341,
            "Stud_name": "Student_47",
            "Stud_marks": 81
        },
        {
            "Stud_id": 2222,
            "Stud_name": "Student_48",
            "Stud_marks": 88
        },
        {
            "Stud_id": 2914,
            "Stud_name": "Student_49",
            "Stud_marks": 69
        }
    ]
}
```

Response:

```json
{
    "message": "50 Data entries added",
    "status": "success"
}
```


/read

POST http://127.0.0.1:5001/read?id=89

Payload:

```json
{
    "Stud_id": {
        "low": 1000,
        "high": 8889
    }
}
```

Response:

```json
{
    "data": [
        {
            "Stud_id": 1107,
            "Stud_marks": "3",
            "Stud_name": "Student_41"
        },
        {
            "Stud_id": 1150,
            "Stud_marks": "96",
            "Stud_name": "Student_14"
        },
        {
            "Stud_id": 1174,
            "Stud_marks": "49",
            "Stud_name": "Student_45"
        },
        {
            "Stud_id": 1489,
            "Stud_marks": "16",
            "Stud_name": "Student_8"
        },
        {
            "Stud_id": 1534,
            "Stud_marks": "31",
            "Stud_name": "Student_46"
        },
        {
            "Stud_id": 2021,
            "Stud_marks": "37",
            "Stud_name": "Student_19"
        },
        {
            "Stud_id": 2060,
            "Stud_marks": "1",
            "Stud_name": "Student_42"
        },
        {
            "Stud_id": 2071,
            "Stud_marks": "65",
            "Stud_name": "Student_16"
```
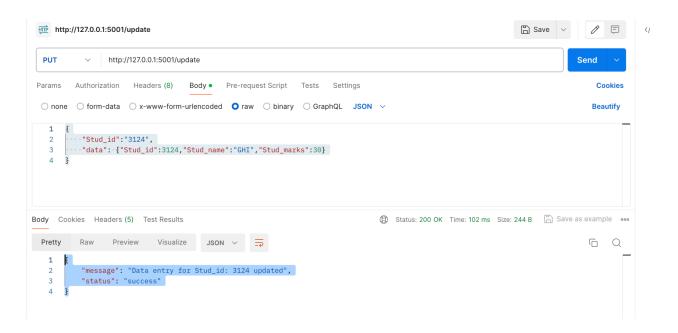
```json
    },
    {
        "Stud_id": 2222,
        "Stud_marks": "88",
        "Stud_name": "Student_48"
    },
    {
        "Stud_id": 2568,
        "Stud_marks": "96",
        "Stud_name": "Student_1"
    },
    {
        "Stud_id": 2825,
        "Stud_marks": "40",
        "Stud_name": "Student_7"
    },
    {
        "Stud_id": 2846,
        "Stud_marks": "2",
        "Stud_name": "Student_43"
    },
    {
        "Stud_id": 2899,
        "Stud_marks": "39",
        "Stud_name": "Student_10"
    },
    {
        "Stud_id": 2914,
        "Stud_marks": "69",
        "Stud_name": "Student_49"
    },
    {
        "Stud_id": 3124,
        "Stud_marks": "8",
        "Stud_name": "Student_0"
    },
    {
        "Stud_id": 3455,
        "Stud_marks": "86",
        "Stud_name": "Student_2"
    },
    {
```

        "Stud_id": 3495,
        "Stud_marks": "34",
        "Stud_name": "Student_9"
    },
    {
        "Stud_id": 3887,
        "Stud_marks": "80",
        "Stud_name": "Student_4"
    },
    {
        "Stud_id": 3894,
        "Stud_marks": "37",
        "Stud_name": "Student_17"
    },
    {
        "Stud_id": 3949,
        "Stud_marks": "90",
        "Stud_name": "Student_12"
    },
    {
        "Stud_id": 4004,
        "Stud_marks": "98",
        "Stud_name": "Student_11"
    },
    {
        "Stud_id": 4107,
        "Stud_marks": "30",
        "Stud_name": "Student_3"
    },
    {
        "Stud_id": 4274,
        "Stud_marks": "86",
        "Stud_name": "Student_18"
    },
    {
        "Stud_id": 4304,
        "Stud_marks": "32",
        "Stud_name": "Student_6"
    },
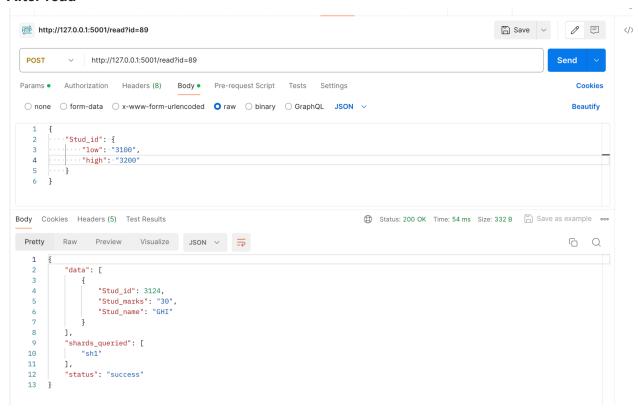   {
        "Stud_id": 4402,
        "Stud_marks": "100",

```json
            "Stud_name": "Student_5"
        },
        {
            "Stud_id": 4577,
            "Stud_marks": "34",
            "Stud_name": "Student_15"
        },
        {
            "Stud_id": 4732,
            "Stud_marks": "45",
            "Stud_name": "Student_13"
        },
        {
            "Stud_id": 5560,
            "Stud_marks": "72",
            "Stud_name": "Student_44"
        },
        {
            "Stud_id": 7341,
            "Stud_marks": "81",
            "Stud_name": "Student_47"
        },
        {
            "Stud_id": 8029,
            "Stud_marks": "39",
            "Stud_name": "Student_20"
        },
        {
            "Stud_id": 8471,
            "Stud_marks": "89",
            "Stud_name": "Student_31"
        },
        {
            "Stud_id": 8507,
            "Stud_marks": "79",
            "Stud_name": "Student_29"
        }
    ],
    "shards_queried": [
        "sh1",
        "sh2",
        "sh3"
```

```
    ],
    "status": "success"
}
```


/update:

PUT http://127.0.0.1:5001/update

Payload:

```
{
    "Stud_id":"3124",
    "data": {"Stud_id":3124,"Stud_name":"GHI","Stud_marks":30}
}
```

Response:

```
{
    "message": "Data entry for Stud_id: 3124 updated",
    "status": "success"
}
```

http://127.0.0.1:5001/update

Save

PUT | http://127.0.0.1:5001/update | Send

Params   Authorization   Headers (8)   Body ●   Pre-request Script   Tests   Settings   Cookies

none   form-data   x-www-form-urlencoded   ● raw   binary   GraphQL   JSON ⌄   Beautify

```json
1  {
2      "Stud_id":"3124",
3      "data":{"Stud_id":3124,"Stud_name":"GHI","Stud_marks":30}
4  }
```

Body   Cookies   Headers (5)   Test Results   Status: 200 OK   Time: 102 ms   Size: 244 B   Save as example •••

Pretty   Raw   Preview   Visualize   JSON ⌄

```json
1  {
2      "message": "Data entry for Stud_id: 3124 updated",
3      "status": "success"
4  }
```

After read

http://127.0.0.1:5001/read?id=89

Save

POST | http://127.0.0.1:5001/read?id=89 | Send

Params ●   Authorization   Headers (8)   Body ●   Pre-request Script   Tests   Settings   Cookies

none   form-data   x-www-form-urlencoded   ● raw   binary   GraphQL   JSON ⌄   Beautify

```json
1  {
2      "Stud_id": {
3          "low": "3100",
4          "high": "3200"
5      }
6  }
```

Body   Cookies   Headers (5)   Test Results   Status: 200 OK   Time: 54 ms   Size: 332 B   Save as example •••

Pretty   Raw   Preview   Visualize   JSON ⌄

```json
1  {
2      "data": [
3          {
4              "Stud_id": 3124,
5              "Stud_marks": "30",
6              "Stud_name": "GHI"
7          }
8      ],
9      "shards_queried": [
10          "sh1"
11      ],
12      "status": "success"
13  }
```

/delete

DELETE http://127.0.0.1:5001/delete

Payload:

```json
{
    "Stud_id":3124
}
```

Response:

```json
{
    "message": "Data entry with Stud_id: 3124 removed",
    "status": "success"
}
```

http://127.0.0.1:5001/delete

| DELETE ⌄ | http://127.0.0.1:5001/delete | | Send ⌄ |

Params   Authorization   Headers (8)   Body •   Pre-request Script   Tests   Settings   Cookies

○ none   ○ form-data   ○ x-www-form-urlencoded   ● raw   ○ binary   ○ GraphQL   JSON ⌄   Beautify

```
1  {
2  ····"Stud_id":3124
3  }
```

Body   Cookies   Headers (5)   Test Results   ⊕ Status: 200 OK   Time: 92 ms   Size: 245 B   💾 Save as example •••

Pretty   Raw   Preview   Visualize   JSON ⌄

```
1  {
2      "message": "Data entry with Stud_id: 3124 removed",
3      "status": "success"
4  }
```

After read:

http://127.0.0.1:5001/read?id=89

| POST ⌄ | http://127.0.0.1:5001/read?id=89 | | Send ⌄ |

Params •   Authorization   Headers (8)   Body •   Pre-request Script   Tests   Settings   Cookies

○ none   ○ form-data   ○ x-www-form-urlencoded   ● raw   ○ binary   ○ GraphQL   JSON ⌄   Beautify

```
1  {
2  ····"Stud_id": {
3  ········"low": "3100",
4  ········"high": "3200"
5  ····}
6  }
```

Body   Cookies   Headers (5)   Test Results   ⊕ Status: 200 OK   Time: 55 ms   Size: 242 B   💾 Save as example •••

Pretty   Raw   Preview   Visualize   JSON ⌄

```
1  {
2      "data": [],
3      "shards_queried": [
4          "sh1"
5      ],
6      "status": "success"
7  }
```

Spawning:

Containers present :

```
(base) ranivenigalla@Ranis-MacBook-Air DS_ASSIGNMENT_1 % docker ps -a
CONTAINER ID   IMAGE         COMMAND               CREATED          STATUS          PORTS                                       NAMES
cc29a211dfbf   flaskserver   "/ser/custom-entry.s…"  22 minutes ago   Up 22 minutes   3306/tcp, 5000/tcp, 33060/tcp               S4
f9500b6a3540   flaskserver   "/ser/custom-entry.s…"  30 minutes ago   Up 30 minutes   3306/tcp, 5000/tcp, 33060/tcp               Server6
92a65e1feec6   flaskserver   "/ser/custom-entry.s…"  30 minutes ago   Up 30 minutes   3306/tcp, 5000/tcp, 33060/tcp               Server5
e8abf5bae183   flaskserver   "/ser/custom-entry.s…"  30 minutes ago   Up 30 minutes   3306/tcp, 5000/tcp, 33060/tcp               Server3
9e8f27c3ebcc   flaskserver   "/ser/custom-entry.s…"  30 minutes ago   Up 30 minutes   3306/tcp, 5000/tcp, 33060/tcp               Server1
6c218591360c   lb_image      "/lb/custom-entry.sh…"  31 minutes ago   Up 31 minutes   3306/tcp, 33060/tcp, 0.0.0.0:5001->5000/tcp   lb_server
(base) ranivenigalla@Ranis-MacBook-Air DS_ASSIGNMENT_1 %
```

Stopping container S4 by:
        docker container stop S4

```
(base) ranivenigalla@Ranis-MacBook-Air DS_ASSIGNMENT_1 % docker ps -a
CONTAINER ID   IMAGE         COMMAND               CREATED          STATUS                  PORTS                                       NAMES
cc29a211dfbf   flaskserver   "/ser/custom-entry.s…"  24 minutes ago   Exited (0) 5 seconds ago                                            S4
f9500b6a3540   flaskserver   "/ser/custom-entry.s…"  32 minutes ago   Up 32 minutes           3306/tcp, 5000/tcp, 33060/tcp               Server6
92a65e1feec6   flaskserver   "/ser/custom-entry.s…"  32 minutes ago   Up 32 minutes           3306/tcp, 5000/tcp, 33060/tcp               Server5
e8abf5bae183   flaskserver   "/ser/custom-entry.s…"  32 minutes ago   Up 32 minutes           3306/tcp, 5000/tcp, 33060/tcp               Server3
9e8f27c3ebcc   flaskserver   "/ser/custom-entry.s…"  32 minutes ago   Up 32 minutes           3306/tcp, 5000/tcp, 33060/tcp               Server1
6c218591360c   lb_image      "/lb/custom-entry.sh…"  32 minutes ago   Up 32 minutes           3306/tcp, 33060/tcp, 0.0.0.0:5001->5000/tcp   lb_server
```

After /status:

```
{
    "N": 5,
    "schema": {
        "columns": [
            "Stud_id",
            "Stud_name",
            "Stud_marks"
        ],
        "dtypes": [
            "Number",
            "String",
            "String"
        ]
    },
    "servers": {
        "S4_7": [
            "sh3",
            "sh5"
        ],
        "Server1": [
            "sh3",
            "sh4"
        ],
        "Server3": [
```

```json
            "sh1",
            "sh3"
        ],
        "Server5": [
            "sh1",
            "sh4"
        ],
        "Server6": [
            "sh3",
            "sh2"
        ]
    },
    "shards": [
        {
            "Shard_id": "sh1",
            "Shard_size": 4096,
            "Stud_id_low": 0
        },
        {
            "Shard_id": "sh2",
            "Shard_size": 4096,
            "Stud_id_low": 4096
        },
        {
            "Shard_id": "sh3",
            "Shard_size": 4096,
            "Stud_id_low": 8192
        },
        {
            "Shard_id": "sh4",
            "Shard_size": 4096,
            "Stud_id_low": 12288
        }
    ]
}
```

New server S4_7 is spawned and shards sh3 ,sh5 are written from other servers.

```
(base) ranivenigalla@Ranis-MacBook-Air DS_ASSIGNMENT_1 % docker ps
CONTAINER ID   IMAGE        COMMAND                CREATED         STATUS          PORTS                                         NAMES
d37094110c52   flaskserver  "/ser/custom-entry.s…"  8 seconds ago   Up 7 seconds    3306/tcp, 5000/tcp, 33060/tcp                 S4_7
f9500b6a3540   flaskserver  "/ser/custom-entry.s…"  32 minutes ago  Up 32 minutes   3306/tcp, 5000/tcp, 33060/tcp                 Server6
92a65e1feec6   flaskserver  "/ser/custom-entry.s…"  32 minutes ago  Up 32 minutes   3306/tcp, 5000/tcp, 33060/tcp                 Server5
e8abf5bae183   flaskserver  "/ser/custom-entry.s…"  32 minutes ago  Up 32 minutes   3306/tcp, 5000/tcp, 33060/tcp                 Server3
9e8f27c3ebcc   flaskserver  "/ser/custom-entry.s…"  32 minutes ago  Up 32 minutes   3306/tcp, 5000/tcp, 33060/tcp                 Server1
6c218591360c   lb image     "/lb/custom-entry.sh…"  33 minutes ago  Up 33 minutes   3306/tcp, 33060/tcp, 0.0.0.0:5001->5000/tcp   lb server
```