

# 华中科技大学

## 数据中心技术课程实验报告

院 系 计算机科学与技术学院

班 级 2107

学 号 M202173756

姓 名 陈 诚

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## 一、系统搭建

服务端：minio

run-minio.cmd:

```
+-----+
| You are running an older version of MinIO released 1 month ago |
| Update: Run mc admin update                                     |
+-----+

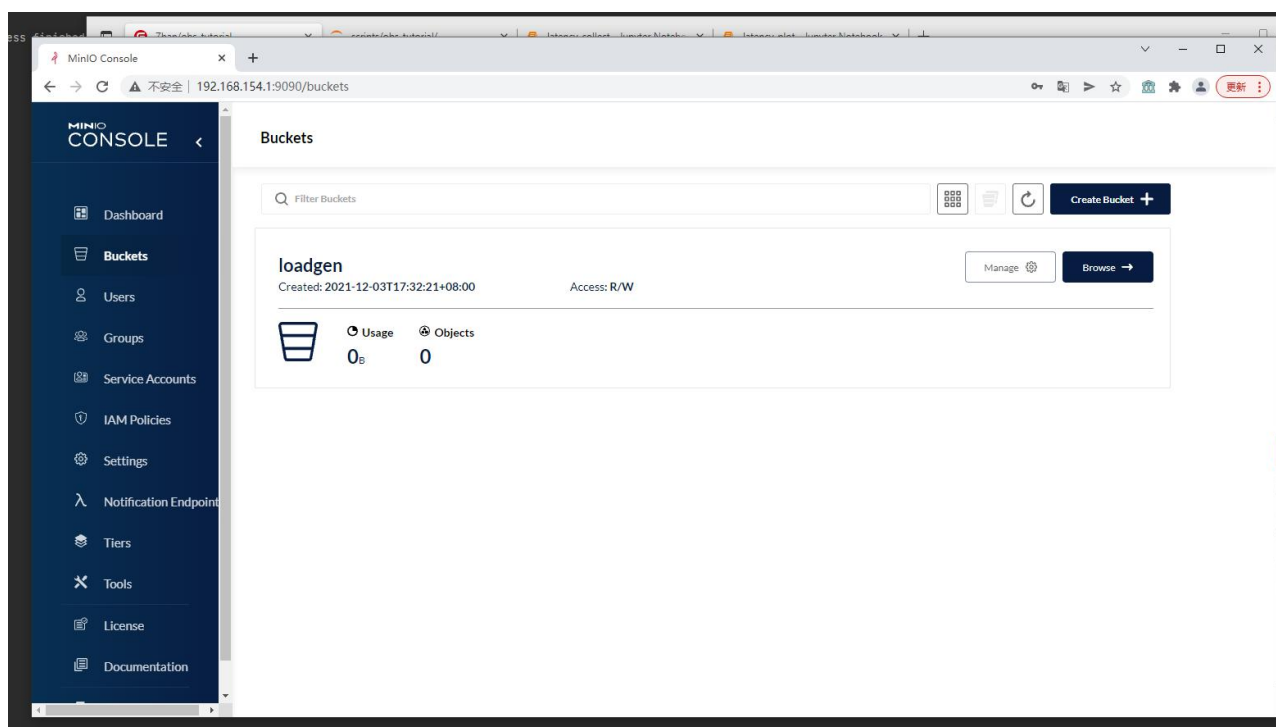
API: http://211.69.197.21:9000 http://192.168.154.1:9000 http://127.0.0.1:9000
RootUser: hust
RootPass: hust_obs

Console: http://211.69.197.21:9090 http://192.168.154.1:9090 http://127.0.0.1:9090
RootUser: hust
RootPass: hust_obs

Command-line: https://docs.min.io/docs/minio-client-quickstart-guide
$ mc.exe alias set myminio http://211.69.197.21:9000 hust hust_obs

Documentation: https://docs.min.io

API: PutObjectPart(bucket=test100objs, object=testObj000000009)
Time: 17:59:12 CST 12/30/2021
DeploymentID: 85516439-c39b-453c-bb5a-0e3a2ece3c94
RequestID: 16C57FFA62F64524
RemoteHost: 192.168.154.1
Host: 192.168.154.1:9000
UserAgent: Boto3/1.20.26 Python/3.10.0 Windows/10 Botocore/1.23.26 Resource
```



## 二、性能观测

### 1. s3bench:

run-s3bench.cmd:

```
E:\coding\python\data-center>s3bench.exe -accessKey=hust -accessSecret=hust_obs -bucket=loadgen
    -endpoint=http://192.168.154.1:9000 -numClients=8 -numSamples=256 -objectNamePrefix=loadgen
    -objectSize=1048576
Test parameters
endpoint(s):      [http://192.168.154.1:9000]
bucket:           loadgen
objectNamePrefix: loadgen
objectSize:       1.0000 MB
numClients:       8
numSamples:       256
verbose:          %!d(bool=false)

Generating in-memory sample data... Done (3.9869ms)

Running Write test...

Running Read test...

Test parameters
endpoint(s):      [http://192.168.154.1:9000]
bucket:           loadgen
objectNamePrefix: loadgen
objectSize:       1.0000 MB
numClients:       8
numSamples:       256
verbose:          %!d(bool=false)

Results Summary for Write Operation(s)
Total Transferred: 256.000 MB
Total Throughput:  4.02 MB/s
Total Duration:    63.643 s
Number of Errors:  0
-----
Write times Max:      3.892 s
Write times 99th %ile: 3.794 s
Write times 90th %ile: 3.023 s
Write times 75th %ile: 2.379 s
Write times 50th %ile: 1.975 s
Write times 25th %ile: 1.513 s
Write times Min:      0.441 s

Results Summary for Read Operation(s)
Total Transferred: 256.000 MB
Total Throughput:  947.49 MB/s
Total Duration:    0.270 s
Number of Errors:  0
-----
Read times Max:       0.043 s
Read times 99th %ile: 0.040 s
Read times 90th %ile: 0.014 s
Read times 75th %ile: 0.008 s
Read times 50th %ile: 0.006 s
Read times 25th %ile: 0.005 s
Read times Min:       0.002 s

Cleaning up 256 objects...
Deleting a batch of 256 objects in range {0, 255}... Succeeded
Successfully deleted 256/256 objects in 549.5487ms |
```

客户数量: 8  
样本数量: 256  
对象大小: 1MB

写操作结果: 总传输量: 256MB  
总吞吐率: 4.02MB/s  
总时间: 63.643s

最大写入延迟: 3.892s  
99%写入延迟: 3.794s  
90%写入延迟: 3.023s  
75%写入延迟: 2.379s  
50%写入延迟: 1.975s  
25%写入延迟: 1.513s  
最小写入延迟: 0.441s

读操作结果: 总传输量: 256MB  
总吞吐率: 947.49MB/s  
总时间: 0.270s

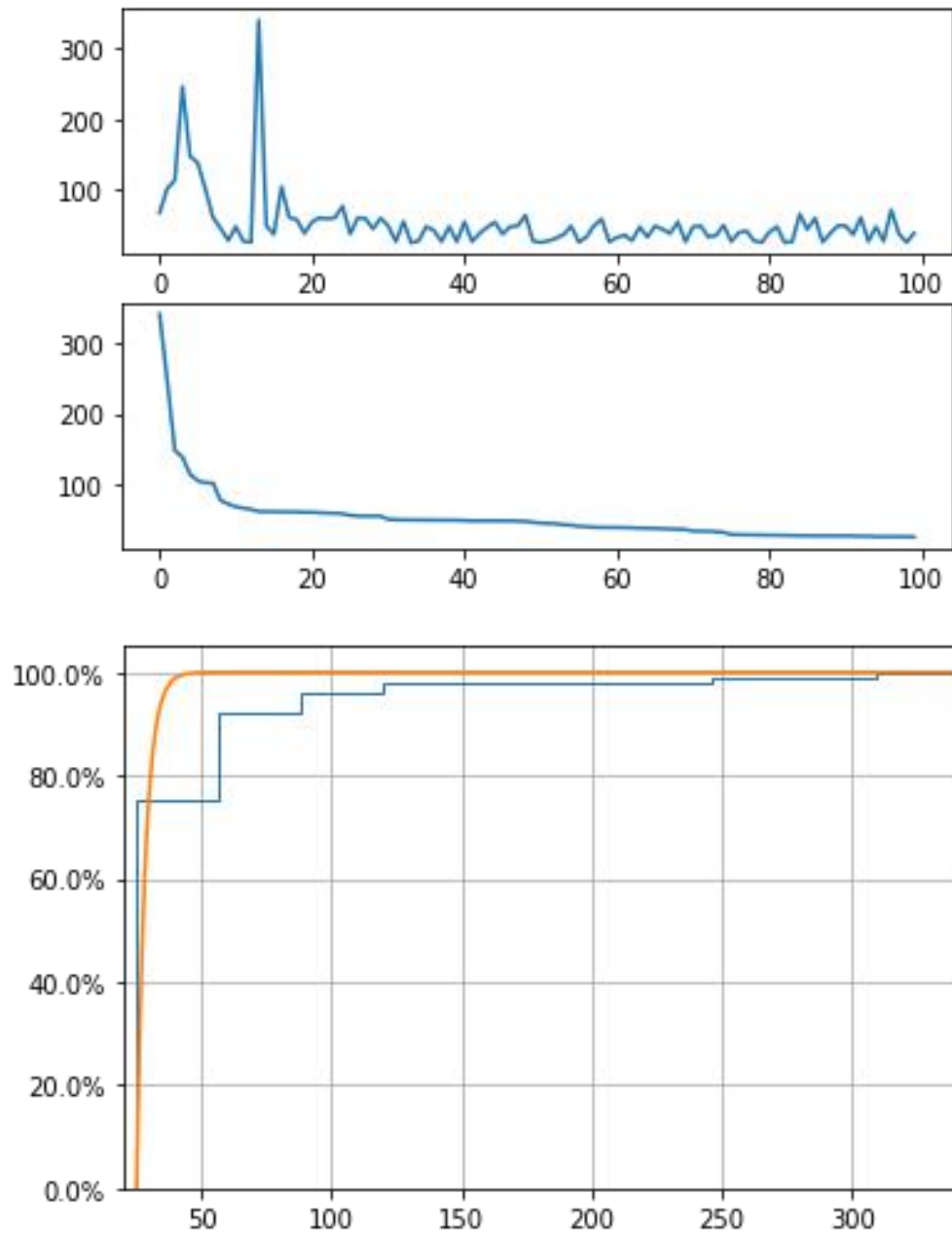
最大读取延迟: 0.043s  
99%读取延迟: 0.040s  
90%读取延迟: 0.014s  
75%读取延迟: 0.008s  
50%读取延迟: 0.006s  
25%读取延迟: 0.005s  
最小读取延迟: 0.002s

## 二、尾延迟

实验设置：文件大小：4KB

文件数量：100 个

### 1. 普通请求：

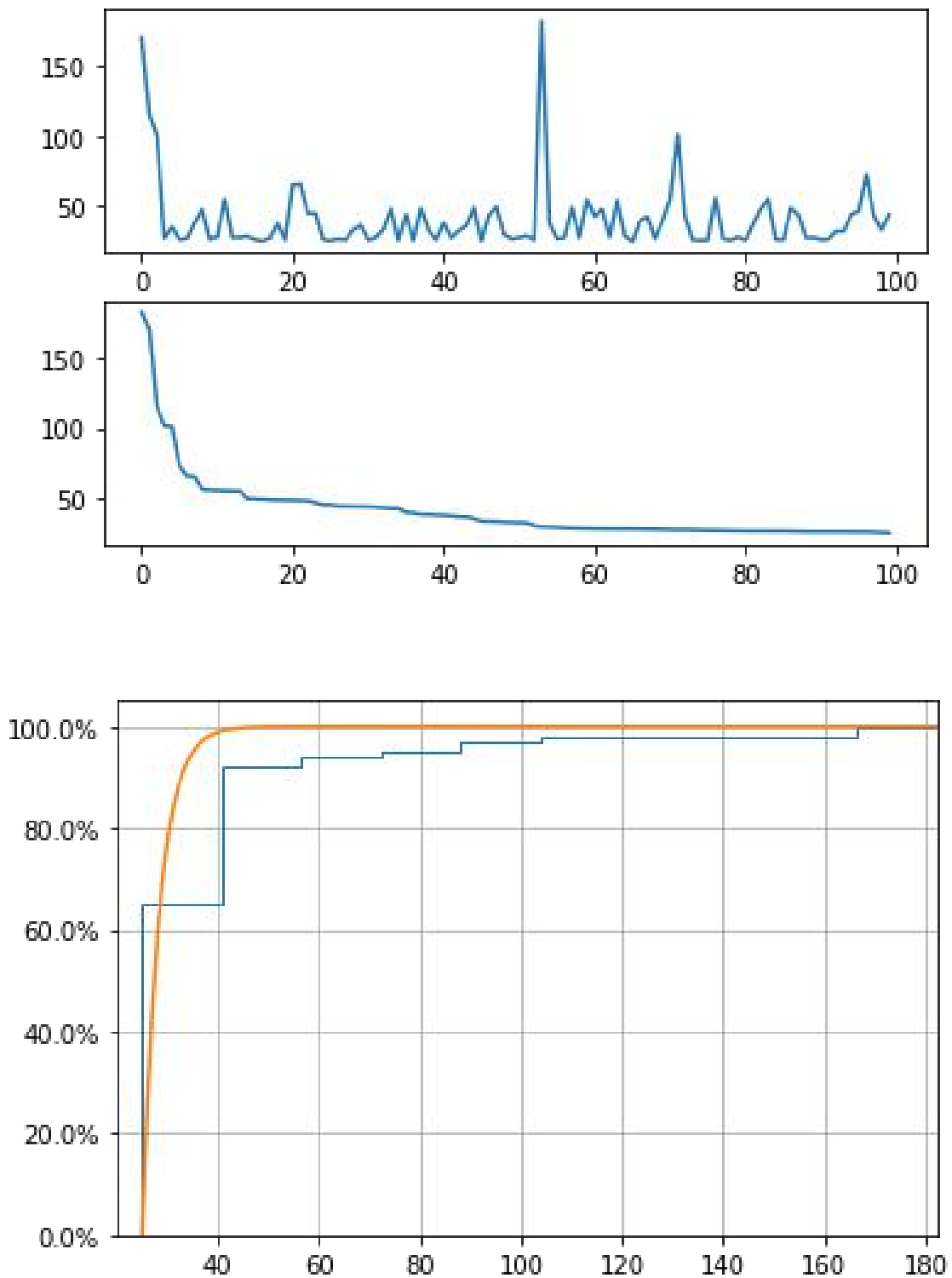


最大延迟：350ms 左右

90%延迟：60ms 内

99%延迟：250ms 内

## 2. 对冲请求

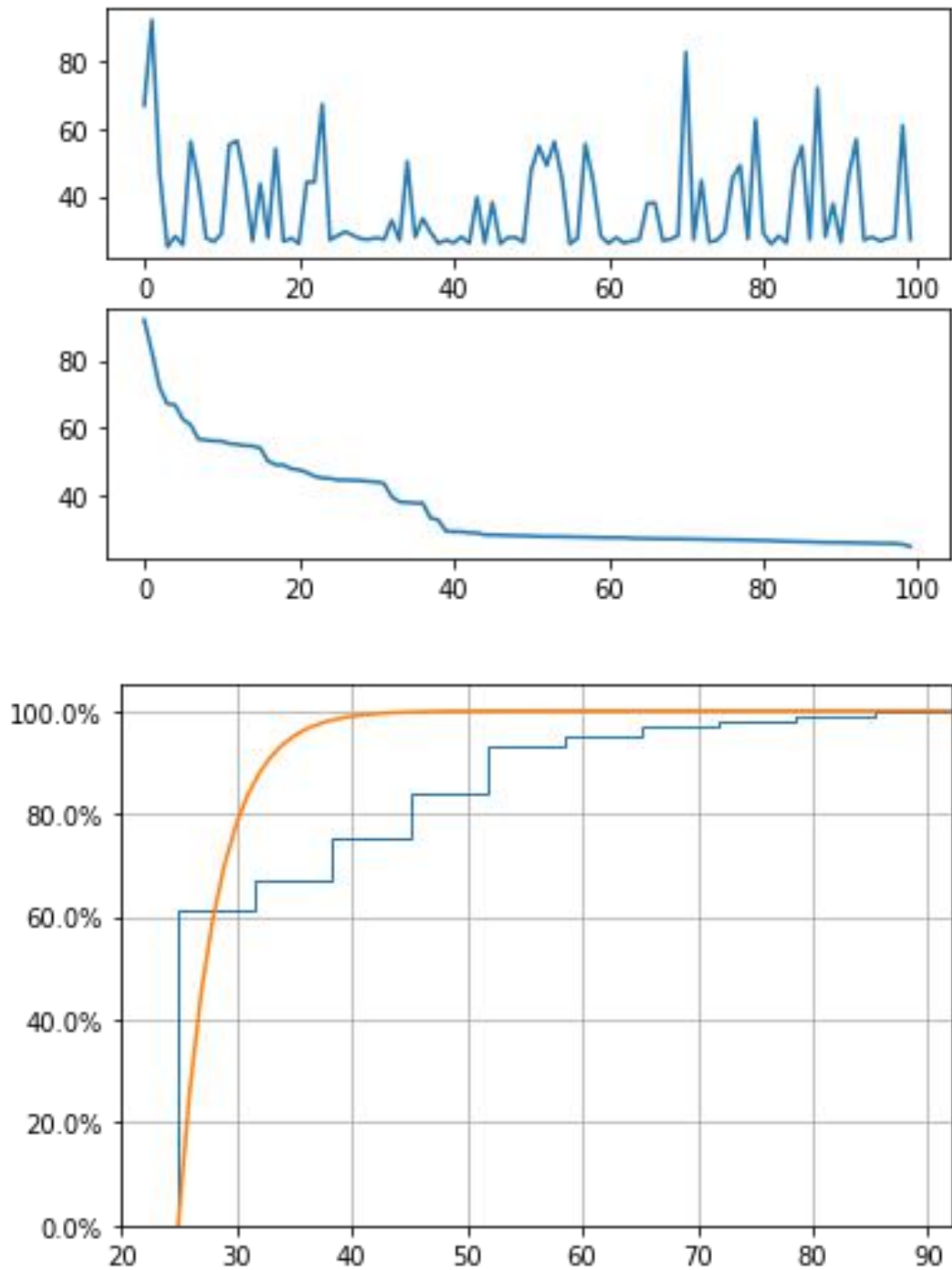


最大延迟: 185ms 左右

90%延迟: 42ms 内

99%延迟: 110ms 内

### 3. 关联请求



最大延迟: 95ms 左右  
90%延迟: 55ms 内  
99%延迟: 80ms 内

从实验结果可以看到: 对冲请求和关联请求都有效的减轻了尾延迟现象