FINAL PROJECT REPORT

To run the service on EC2 instance, first we will need to start an ec2 instance and follow below steps:

- Spin up EC2 instance with Ubuntu 18.04 as OS and medium.t2 as processing.
- Create an S3 bucket to store our files.
- Create an IAM role to grant EC2 access to our S3 bucket.
- Connect to EC2 instance using the ssh key.
- Update the system using “sudo apt update” command.
- Download and install Docker, Kubernetes and minikube.
- Install git.
- Either get the project from zipfile submitted or clone it using “git clone https://github.com/devansh1305/project3.git” command.
- As we have used sudo privileges to install required packages, we will have to enter run our programs using root by running “sudo -i” command.
- Start minikube using “minikube start” command.

Git repo incase clone command does not work: https://github.com/devansh1305/project3

Information needed to test Kubernetes cluster:

zipCont -> service to compress and uncompress files
storageCont -> service to upload and download files from s3 bucket
webserverCont -> service to host webserver to accept user requests
contData -> directory to share data between host and three services

To build docker images for each service:

- Go into webserverCont/zipCont/storageCont and input below commands respectively:
    - docker build -t webserver-image .
    - docker build -t zip-image .
    - docker build -t storage-image .

To start the kubernetes cluster:

- kubectl create -f config.yaml

To delete the kubernetes cluster:

- kubectl delete -f config.yaml

To upload a file:

- curl "http://172.17.0.3:82/upload?filepath=./contData/&cflag=<Y/N>" -X POST
  example - curl "http://172.17.0.3:82/upload?filepath=./contData/hellofile&cflag=Y" -X POST

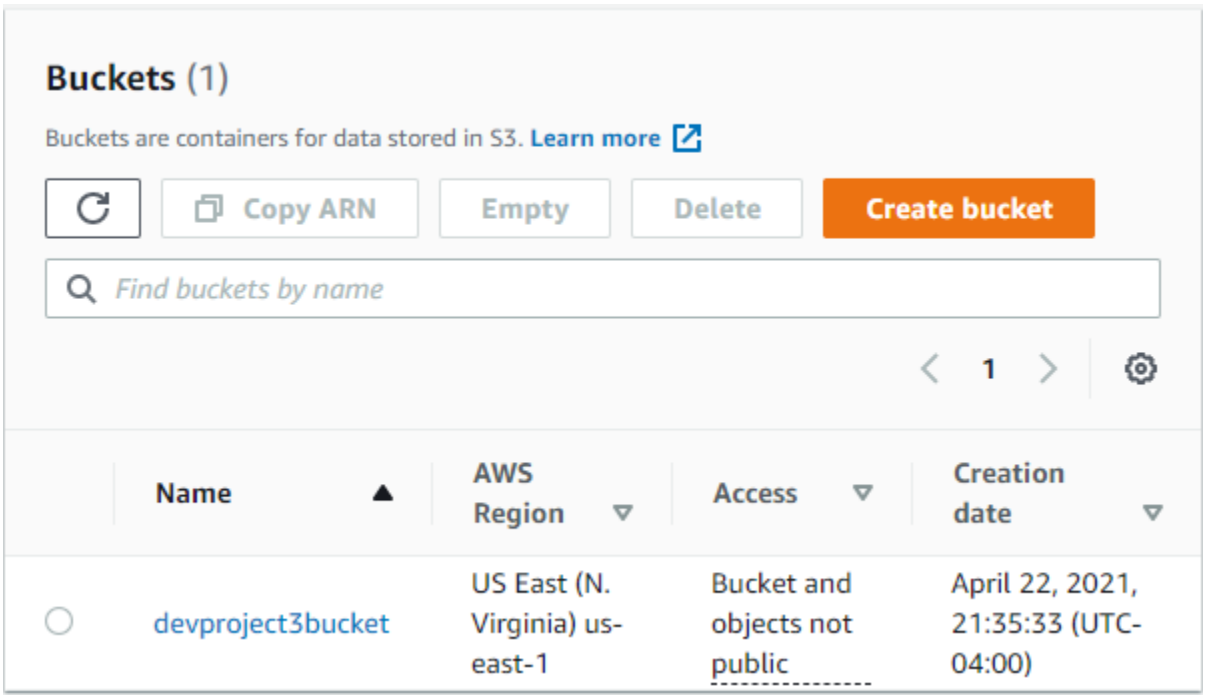
To download a file:

- curl "http://172.17.0.3:82/getfile?filename="
  example - curl "http://172.17.0.3:82/getfile?filename=hellofile.gz"

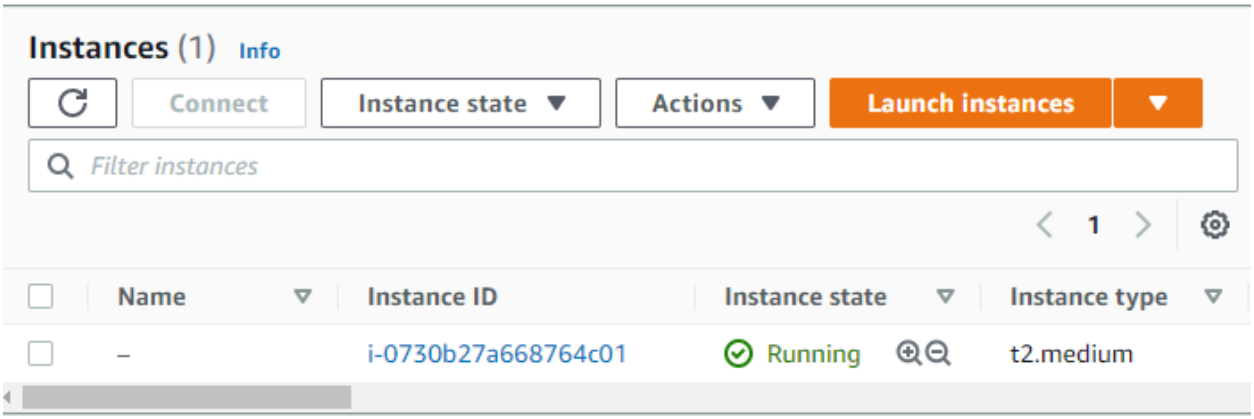
Note: IP address might change so might have to get IP address by running “kubectl”

Output Logs:

S3 buckets:



EC2 instance:



Start cluster:

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# kubectl create -f config.yaml
pod/microservice created
```

Upload file:

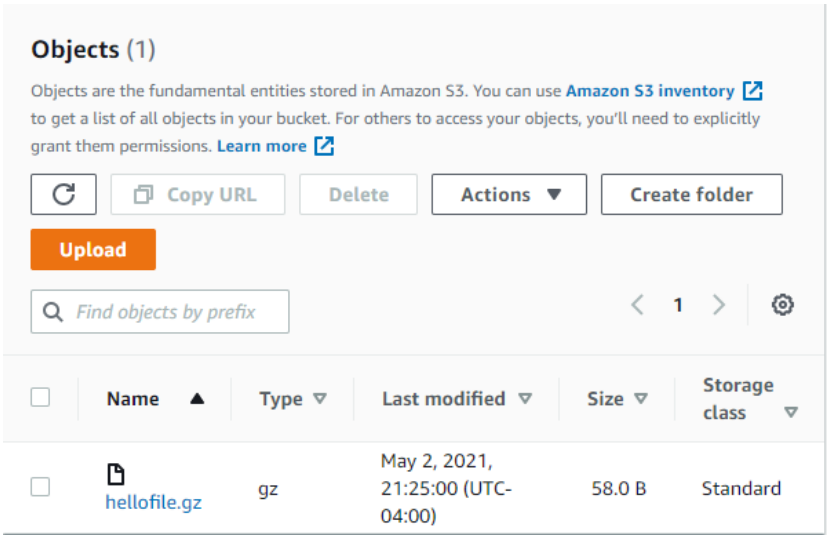
We will be uploading “hellofile” with compress flag (cflag) as “yes”

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData# ls
hellofile
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData# cat hellofile
hi this is my file

devansh


root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData#
```

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# curl "http://172.17.0.3:82/upload?filepath=./contData/hellofile&cflag=Y" -X POST
upload: ../../contData/hellofile.gz to s3://devproject3bucket/hellofile.gz
```



We will be uploading “testfile” with compress flag (cflag) as “no”

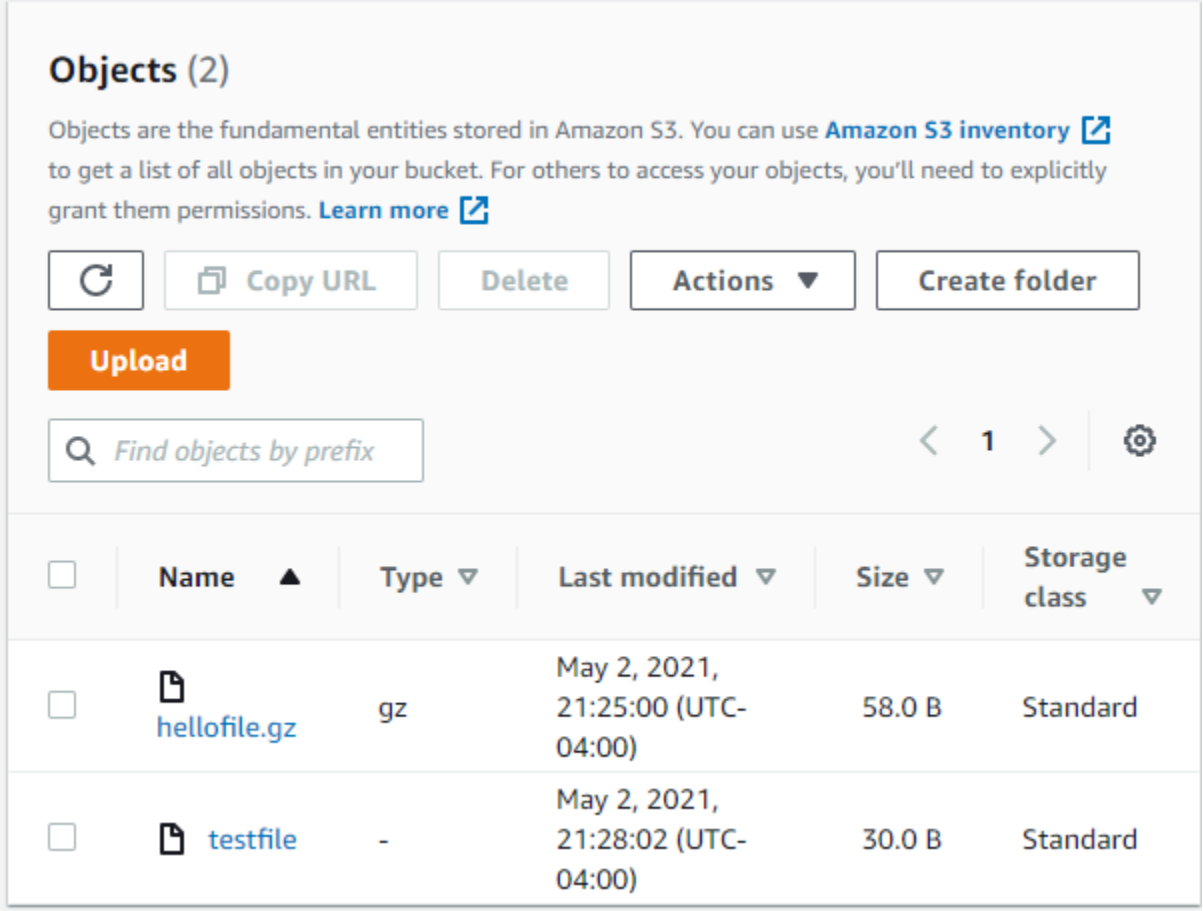
```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData# cat testfile
this is testfile

panirwala


root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData#
```

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# curl "http://172.17.0.3:82/upload?filepath=./contData/testfile&cflag=N" -X POST
upload: ../../contData/testfile to s3://devproject3bucket/testfile

root@ip-172-31-64-8:/home/ubuntu/Desktop/project3#
```



Download file:

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData# ls
hellofile.gz  testfile
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData# rm testfile
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData# rm hellofile.gz
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData# ls
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3/contData#
```

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# curl "http://172.17.0.3:82/getfile?filename=hellofile.gz"
gunzip /contData/hellofile.gz success
download: s3://devproject3bucket/hellofile.gz to ../../contData/hellofile.gz

root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# curl "http://172.17.0.3:82/getfile?filename=testfile"
download: s3://devproject3bucket/testfile to ../../contData/testfile

root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# ls
README.md  clean_services.sh  config.yaml  contData  docker-compose.yml  storageCont  useful_commands  webserverCont  zipCont
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# ls contData/
hellofile  testfile
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3#
```

Cluster information:

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# docker ps
CONTAINER ID   IMAGE                  COMMAND                  CREATED          STATUS          PORTS     NAMES
5a4b5222378f   b05c6611847b           "/bin/sh -c 'python …"   14 minutes ago   Up 14 minutes             k8s_webservercont_microservice_default_abff436f-4149-45a2-91c0-bf102ae15cc6_0
8420530aecb6   c442b2245cdc           "/bin/sh -c 'python …"   14 minutes ago   Up 14 minutes             k8s_zipcont_microservice_default_abff436f-4149-45a2-91c0-bf102ae15cc6_0
c5a7083c5637   dcaf942dab1c           "/bin/sh -c 'python …"   14 minutes ago   Up 14 minutes             k8s_storagecont_microservice_default_abff436f-4149-45a2-91c0-bf102ae15cc6_0
6a38daafe3c3   k8s.gcr.io/pause:3.2   "/pause"                 14 minutes ago   Up 14 minutes             k8s_POD_microservice_default_abff436f-4149-45a2-91c0-bf102ae15cc6_0
6c6e7161ba49   6e38f40d628d           "/storage-provisioner"   24 minutes ago   Up 24 minutes             k8s_storage-provisioner_storage-provisioner_kube-system_70120a96-ef63-475a-8db0-a880a84888f6_12
1d4142476a42   43154ddb57a8           "/usr/local/bin/kube…"   25 minutes ago   Up 25 minutes             k8s_kube-proxy_kube-proxy-r5pwg_kube-system_570b5e46-014d-44ca-aba6-468e09e994d5_6
ddc933afe96e   bfe3a36ebd25           "/coredns -conf /etc…"   25 minutes ago   Up 25 minutes             k8s_coredns_coredns-74ff55c5b-m5qq5_kube-system_fcb7d6cc-4546-4181-8b9a-0b2aec295593_6
0eb9abfe5f8a   k8s.gcr.io/pause:3.2   "/pause"                 25 minutes ago   Up 25 minutes             k8s_POD_kube-proxy-r5pwg_kube-system_570b5e46-014d-44ca-aba6-468e09e994d5_6
2a52d24b8f78   k8s.gcr.io/pause:3.2   "/pause"                 25 minutes ago   Up 25 minutes             k8s_POD_storage-provisioner_kube-system_70120a96-ef63-475a-8db0-a880a84888f6_6
f64ee2e6766b   k8s.gcr.io/pause:3.2   "/pause"                 25 minutes ago   Up 25 minutes             k8s_POD_coredns-74ff55c5b-m5qq5_kube-system_fcb7d6cc-4546-4181-8b9a-0b2aec295593_6
a2f822948cd7   a27166429d98           "kube-controller-man…"   25 minutes ago   Up 25 minutes             k8s_kube-controller-manager_kube-controller-manager-ip-172-31-64-8_kube-system_932a378e61cc6a1200c45041
6ec5a896_6
c4c9ee6718d9   0369cf4303ff           "etcd --advertise-cl…"   25 minutes ago   Up 25 minutes             k8s_etcd_etcd-ip-172-31-64-8_kube-system_cf02d4d15bf02ab8b00d7dc708530019_6
81a555d04c6f   a8c2fdb8bf76           "kube-apiserver --ad…"   25 minutes ago   Up 25 minutes             k8s_kube-apiserver_kube-apiserver-ip-172-31-64-8_kube-system_c25dc683ecc65224cfa796984e5d8b2e_6
823259965b97   ed2c44fbdd78           "kube-scheduler --au…"   25 minutes ago   Up 25 minutes             k8s_kube-scheduler_kube-scheduler-ip-172-31-64-8_kube-system_6b4a8ee8b3d15a1c2e47c15d32e6eb0d_6
43253348ce26   k8s.gcr.io/pause:3.2   "/pause"                 25 minutes ago   Up 25 minutes             k8s_POD_kube-scheduler-ip-172-31-64-8_kube-system_6b4a8ee8b3d15a1c2e47c15d32e6eb0d_6
794476d08708   k8s.gcr.io/pause:3.2   "/pause"                 25 minutes ago   Up 25 minutes             k8s_POD_kube-controller-manager-ip-172-31-64-8_kube-system_932a378e61cc6a1200c450416ec5a096_6
cba5dda4d82f   k8s.gcr.io/pause:3.2   "/pause"                 25 minutes ago   Up 25 minutes             k8s_POD_kube-apiserver-ip-172-31-64-8_kube-system_c25dc683ecc65224cfa796984e5d8b2e_6
fab620cf2808   k8s.gcr.io/pause:3.2   "/pause"                 25 minutes ago   Up 25 minutes             k8s_POD_etcd-ip-172-31-64-8_kube-system_cf02d4d15bf02ab8b00d7dc708530019_6
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3#
```

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# kubectl get pods -o wide
NAME           READY   STATUS    RESTARTS   AGE   IP            NODE              NOMINATED NODE   READI
NESS GATES
microservice   3/3     Running   0          15m   172.17.0.3    ip-172-31-64-8    <none>           <none
>
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3#
```

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# kubectl describe pod microservice
Name:         microservice
Namespace:    default
Priority:     0
Node:         ip-172-31-64-8/172.31.64.8
Start Time:   Mon, 03 May 2021 01:16:16 +0000
Labels:       <none>
Annotations:  <none>
Status:       Running
IP:           172.17.0.3
IPs:
  IP:  172.17.0.3
Containers:
  storagecont:
    Container ID:   docker://c5a7083c5637648d9753cec4fcaaaea641324a225a6f32d26e2bd5c7a2199c85
    Image:          storage-image:latest
    Image ID:       docker://sha256:dcaf942dab1c43cc4520fe90f95922efddd9de6fa5e4f96068ef457bd1e48b9a
    Port:           80/TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Mon, 03 May 2021 01:16:17 +0000
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /contData from shared-data (rw)
      /var/run/secrets/kubernetes.io/serviceaccount from default-token-hcx8g (ro)
  zipcont:
    Container ID:   docker://8420530aecb6adadde1beaf7787ec4bbb2eeb1b2ab252417dae4f958e596cde3
    Image:          zip-image:latest
    Image ID:       docker://sha256:c442b2245cdcdc065f9277a94c10779ad5df86be19b71ec2be512cb0f4c7f784
    Port:           81/TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Mon, 03 May 2021 01:16:17 +0000
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /contData from shared-data (rw)
      /var/run/secrets/kubernetes.io/serviceaccount from default-token-hcx8g (ro)
  webservercont:
    Container ID:   docker://5a4b5222378f08b8de548316a308ad37ca834c87b02180175cc07f965f09b8d6
    Image:          webserver-image:latest
    Image ID:       docker://sha256:b05c66118 47bf794f2383739b269df80bcc6498 42f0cb925b761d88b0f58469f2
    Port:           82/TCP
    Host Port:      0/TCP
    State:          Running
      Started:      Mon, 03 May 2021 01:16:18 +0000
    Ready:          True
    Restart Count:  0
    Environment:    <none>
    Mounts:
      /contData from shared-data (rw)
      /var/run/secrets/kubernetes.io/serviceaccount from default-token-hcx8g (ro)
Conditions:
  Type              Status
  Initialized       True
  Ready             True
  ContainersReady   True
  PodScheduled      True
Volumes:
  shared-data:
    Type:          HostPath (bare host directory volume)
    Path:          /home/ubuntu/Desktop/project3/contData
    HostPathType:
  default-token-hcx8g:
    Type:       Secret (a volume populated by a Secret)
    SecretName: default-token-hcx8g
    Optional:   false
QoS Class:      BestEffort
Node-Selectors: <none>
Tolerations:    node.kubernetes.io/not-ready:NoExecute op=Exists for 300s
                node.kubernetes.io/unreachable:NoExecute op=Exists for 300s
Events:
  Type    Reason     Age   From               Message
  ----    ------     ----  ----               -------
  Normal  Scheduled  16m   default-scheduler  Successfully assigned default/microservice to ip-172-31-64-8
  Normal  Pulled     16m   kubelet            Container image "storage-image:latest" already present on machine
  Normal  Created    16m   kubelet            Created container storagecont
  Normal  Started    16m   kubelet            Started container storagecont
  Normal  Pulled     16m   kubelet            Container image "zip-image:latest" already present on machine
  Normal  Created    16m   kubelet            Created container zipcont
  Normal  Started    16m   kubelet            Started container zipcont
  Normal  Pulled     16m   kubelet            Container image "webserver-image:latest" already present on machine
  Normal  Created    16m   kubelet            Created container webservercont
  Normal  Started    16m   kubelet            Started container webservercont
```

Log information

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# kubectl logs microservice webservercont
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:82/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 203-204-728
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100    35  100    35    0     0  11666      0 --:--:-- --:--:-- --:--:-- 11666
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   143  100   143    0     0     58      0  0:00:02  0:00:02 --:--:--    58
172.17.0.1 - - [03/May/2021 01:24:59] "POST /upload?filepath=./contData/hellofile&cflag=Y HTTP/1.1" 200 -
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   135  100   135    0     0     84      0  0:00:01  0:00:01 --:--:--    84
172.17.0.1 - - [03/May/2021 01:28:01] "POST /upload?filepath=./contData/testfile&cflag=N HTTP/1.1" 200 -
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   143  100   143    0     0     87      0  0:00:01  0:00:01 --:--:--    87
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100    37  100    37    0     0   4111      0 --:--:-- --:--:-- --:--:--  4111
172.17.0.1 - - [03/May/2021 01:29:49] "GET /getfile?filename=hellofile.gz HTTP/1.1" 200 -
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100   137  100   137    0     0     80      0  0:00:01  0:00:01 --:--:--    80
172.17.0.1 - - [03/May/2021 01:30:00] "GET /getfile?filename=testfile HTTP/1.1" 200 -
```

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# kubectl logs microservice storagecont
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:80/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 246-939-862
172.17.0.3 - - [03/May/2021 01:24:59] "GET /upload?filepath=/contData/hellofile.gz HTTP/1.1" 200 -
172.17.0.3 - - [03/May/2021 01:28:01] "GET /upload?filepath=/contData/testfile HTTP/1.1" 200 -
172.17.0.3 - - [03/May/2021 01:29:49] "GET /getfile?filename=hellofile.gz HTTP/1.1" 200 -
172.17.0.3 - - [03/May/2021 01:30:00] "GET /getfile?filename=testfile HTTP/1.1" 200 -
```

```
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3# kubectl logs microservice zipcont
 * Serving Flask app "app" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: on
 * Running on http://0.0.0.0:81/ (Press CTRL+C to quit)
 * Restarting with stat
 * Debugger is active!
 * Debugger PIN: 997-294-716
172.17.0.3 - - [03/May/2021 01:24:57] "GET /gzip?filename=/contData/hellofile HTTP/1.1" 200 -
172.17.0.3 - - [03/May/2021 01:29:49] "GET /gunzip?filename=hellofile.gz HTTP/1.1" 200 -
root@ip-172-31-64-8:/home/ubuntu/Desktop/project3#
```