

## Assignment -4: -Tiered Storage

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Benchmark the performance and latency of the following storages on the shared instance with sample file /a/data/ref/pdb6zzz.ent.gz

- US East 1 region, same subnet
- EFS
- EBS
- S3
  - Destination s3://neu-c73-ue1/ref/[user name]/[filename]

You need to identify the directories on the shared server with each above storages except S3 .Turn in the paths, commands screenshots.

### Answer:

#### EFS:

For EFS , We need to use `mount` command to list all the file systems

We need to search for `nfs` type which represents an EFS storage

From that file we can identify the directory on the shared server.

In my case there are 5 of those :

```
fs-0ede440f76d352fa2.efs.us-east-1.amazonaws.com:/scratch on /scratch type nfs4 (rw,relatime,vers=4.1,rsz=1048576,wsz=1048576,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=172.31.89.108,local_lock=none,addr=172.31.90.154)
fs-0ede440f76d352fa2.efs.us-east-1.amazonaws.com:/csye7374 on /csye7374 type nfs4 (rw,relatime,vers=4.1,rsz=1048576,wsz=1048576,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=172.31.89.108,local_lock=none,addr=172.31.90.154)
fs-0ede440f76d352fa2.efs.us-east-1.amazonaws.com:/ on /ue1 type nfs4 (rw,relatime,vers=4.1,rsz=1048576,wsz=1048576,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=172.31.89.108,local_lock=none,addr=172.31.90.154)
fs-0ede440f76d352fa2.efs.us-east-1.amazonaws.com:/a on /a type nfs4 (rw,relatime,vers=4.1,rsz=1048576,wsz=1048576,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=172.31.89.108,local_lock=none,addr=172.31.90.154)
fs-0ede440f76d352fa2.efs.us-east-1.amazonaws.com:/home on /home type nfs4 (rw,relatime,vers=4.1,rsz=1048576,wsz=1048576,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=172.31.89.108,local_lock=none,addr=172.31.90.154)
```

Lets check the performance and latency using following command:

```
hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/csye7374

real    0m22.433s
user    0m0.013s
sys     0m2.689s
```

```
[hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/csye7374
```

```
real    0m24.530s
user    0m0.016s
sys     0m3.108s
```

```
[hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/ue1
```

```
real    0m22.900s
user    0m0.000s
sys     0m2.729s
```

```
[hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/scratch
```

```
real    0m21.128s
user    0m0.011s
sys     0m2.759s
```

```
[hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/home
```

```
real    0m21.029s
user    0m0.006s
sys     0m3.092s
```

## EBS:

We need use the `lsblk` command to list all the block devices on the shared server:

```
[hemanth@sh01:~$ lsblk
```

NAME	MAJ:MIN	RM	SIZE	RO	TYPE	MOUNTPOINT
loop0	7:0	0	25.1M	1	loop	/snap/amazon-ssm-agent/5656
loop1	7:1	0	24.4M	1	loop	/snap/amazon-ssm-agent/6312
loop3	7:3	0	63.3M	1	loop	/snap/core20/1822
loop4	7:4	0	91.8M	1	loop	/snap/lxd/23991
loop5	7:5	0	91.9M	1	loop	/snap/lxd/24061
loop6	7:6	0	49.6M	1	loop	/snap/snapd/17883
loop7	7:7	0	55.6M	1	loop	/snap/core18/2667
loop8	7:8	0	63.3M	1	loop	/snap/core20/1778
loop9	7:9	0	49.8M	1	loop	/snap/snapd/17950
loop10	7:10	0	55.6M	1	loop	/snap/core18/2679
nvme0n1	259:0	0	200G	0	disk	
└─nvme0n1p1	259:1	0	200G	0	part	/

Lets check the performance and latency using following command:

```
hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/nvme0n1
real    0m22.120s
user    0m0.005s
sys     0m2.216s
hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/nvme0n1p1
real    0m22.592s
user    0m0.008s
sys     0m2.512s
```

```
hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/lscratch
real    0m21.318s
user    0m0.025s
sys     0m2.667s
```

### S3:

```
hemanth@sh01:~$ [ -e ~/test/storagePerf/pdb6zzz.ent.gz ] && rm ~/test/storagePerf/pdb6zzz.ent.gz
hemanth@sh01:~$ time cp /a/data/ref/pdb6zzz.ent.gz ~/test/storagePerf
real    0m25.369s
user    0m0.015s
sys     0m3.157s
hemanth@sh01:~$ [ -e ~/test/storagePerf/pdb6zzz.ent.gz ] && rm ~/test/storagePerf/pdb6zzz.ent.gz
hemanth@sh01:~$ time aws s3 sync /a/data/ref s3://neu-c73-ue1/ref --exclude='*' --include='/a/data/ref/pdb6zzz.ent.gz'
warning: Skipping file /a/data/ref/.pdb6zzz_p.ent.gz.ibXvZS. File/Directory is not readable.
upload: ../../a/data/ref/pdb6zzz.ent.gz to s3://neu-c73-ue1/ref/pdb6zzz.ent.gz

real    0m20.026s
user    0m16.901s
sys     0m14.399s
```

```
hemanth@sh01:~$ time aws s3 sync /a/data/ref s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz
warning: Skipping file /a/data/ref/.pdb6zzz_p.ent.gz.ibXvZS. File/Directory is not readable.
upload: ../../a/data/ref/pdb6zzz_b.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_b.ent.gz
upload: ../../a/data/ref/pdb6zzz_c.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_c.ent.gz
upload: ../../a/data/ref/pdb6zzz_d.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_d.ent.gz
upload: ../../a/data/ref/pdb6zzz_a.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_a.ent.gz
upload: ../../a/data/ref/pdb6zzz.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz.ent.gz
upload: ../../a/data/ref/pdb6zzz_e.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_e.ent.gz
upload: ../../a/data/ref/pdb6zzz_f.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_f.ent.gz
upload: ../../a/data/ref/pdb6zzz_g.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_g.ent.gz
upload: ../../a/data/ref/pdb6zzz_h.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_h.ent.gz
upload: ../../a/data/ref/pdb6zzz_i.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_i.ent.gz
upload: ../../a/data/ref/pdb6zzz_j.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_j.ent.gz
upload: ../../a/data/ref/pdb6zzz_l.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_l.ent.gz
upload: ../../a/data/ref/pdb6zzz_k.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_k.ent.gz
upload: ../../a/data/ref/pdb6zzz_m.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_m.ent.gz
upload: ../../a/data/ref/pdb6zzz_u.ent.gz to s3://neu-c73-ue1/ref/hemanth/a/data/ref/pdb6zzz.ent.gz/pdb6zzz_u.ent.gz

real    4m3.582s
user    3m24.178s
sys     3m0.437s
```