CMP636 Distributed Systems GlusterFS Lab

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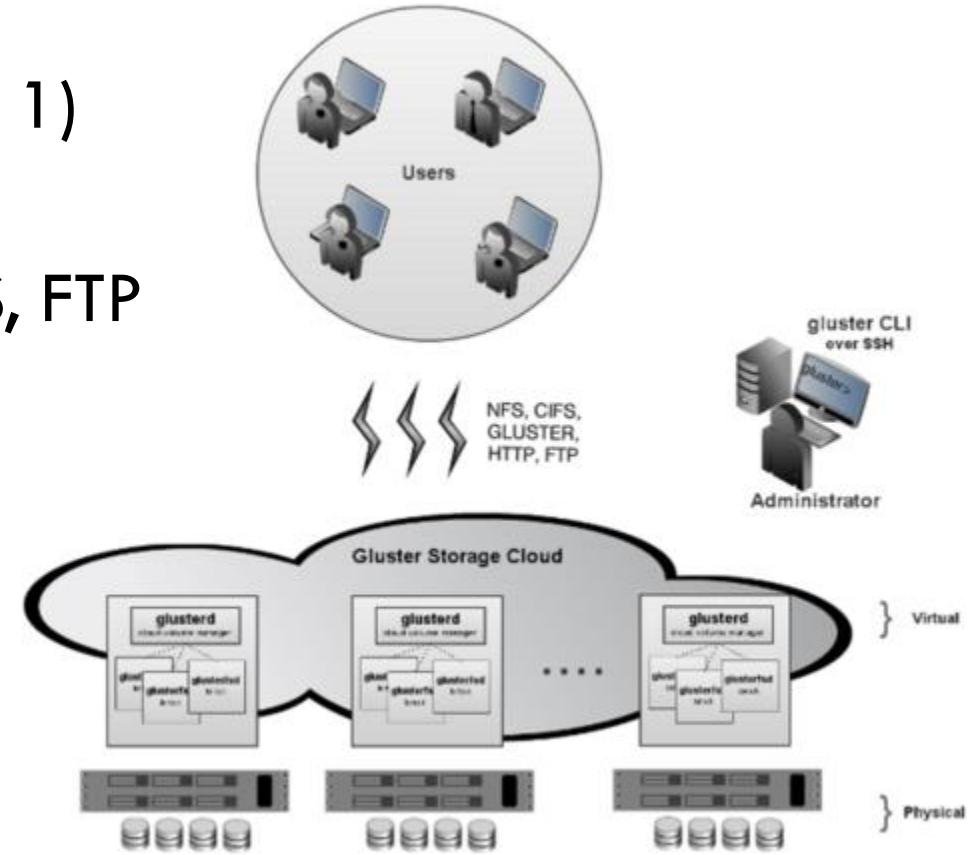
GlusterFS

GNU Cluster File System

- Created in 2005 (Added to RedHat in 2011)
- POSIX Compatible
- Accessible using standard protocols as NFS, FTP
- Provides
  - Replication
  - Quotas
  - Geo-Replication
  - Snapshots
  - Bitrot detection



Prerequisite

1. Install Docker
   - https://docs.docker.com/get-started/
2. Create a docker image from the dockerfile with GlusterFS installed

```
docker build --tag gluster_image .
```

3. Check gluster ports description
   - https://www.jamescoyle.net/how-to/457-glusterfs-firewall-rules

Requirement 0: Create Gluster Cluster

1. Create 2 Gluster containers & 1 client container

```
sudo docker run -t -d --privileged=true --name gluster1 --hostname gluster1
-p 24007 -p 49152-49160 gluster_image
sudo docker run -t -d --privileged=true --name gluster2 --hostname gluster2
-p 24007 -p 49152-49160 gluster_image
sudo docker run -t -d --privileged=true --name client --hostname client -p
24007 -p 49152-49160 gluster_image
```

Requirement 0: Create Gluster Cluster

2. Connect terminals to the created docker containers

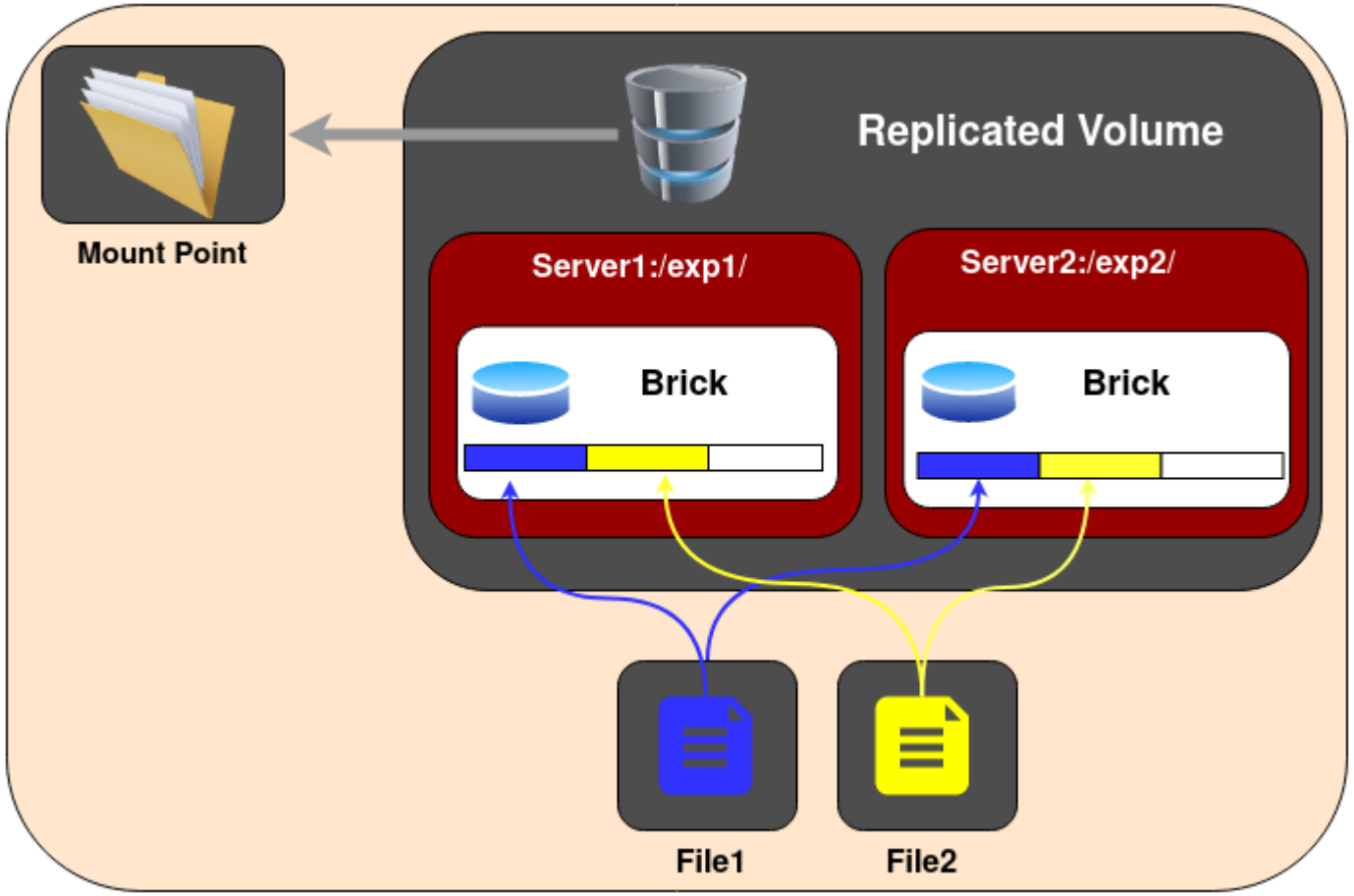
```
# To get the status of the dockers running
sudo docker ps

# To Connect to the clusters
sudo docker exec -it gluster1 /bin/bash
sudo docker exec -it gluster2 /bin/bash # On a different terminal
```

Requirement 0: Create Gluster Cluster

3. Check IPs of each docker container, and add IP address to hosts (to connect the containers with each other)

```
# Check Container IPs
ifconfig

# Add the other gluster for each one in the following file
nano /etc/hosts
#Gluster1 IP ==> 127.17.0.2
#Gluster2 IP ==> 127.17.0.3
```

Requirement 1: Replicated Volume



Requirement 1: Replicated Volume

4. In container gluster1, add gluster2 to trusted pool
5. Create a replicated volume & watch changes

```
# In gluster1 add gluster2 as a trusted pool
gluster peer probe gluster2
# Add gluster2 as a replica for gluster1
gluster volume create replicated1 replica 2 gluster1:/home/disk1/ gluster2:/home/disk1/ force
# Start the gluster volume
gluster volume start replicated1


# On the 2 glusters watch the volume status in real-time
watch ls /home/disk1/
```

Requirement 1: Replicated Volume

6. Mount the replicated volume in client container

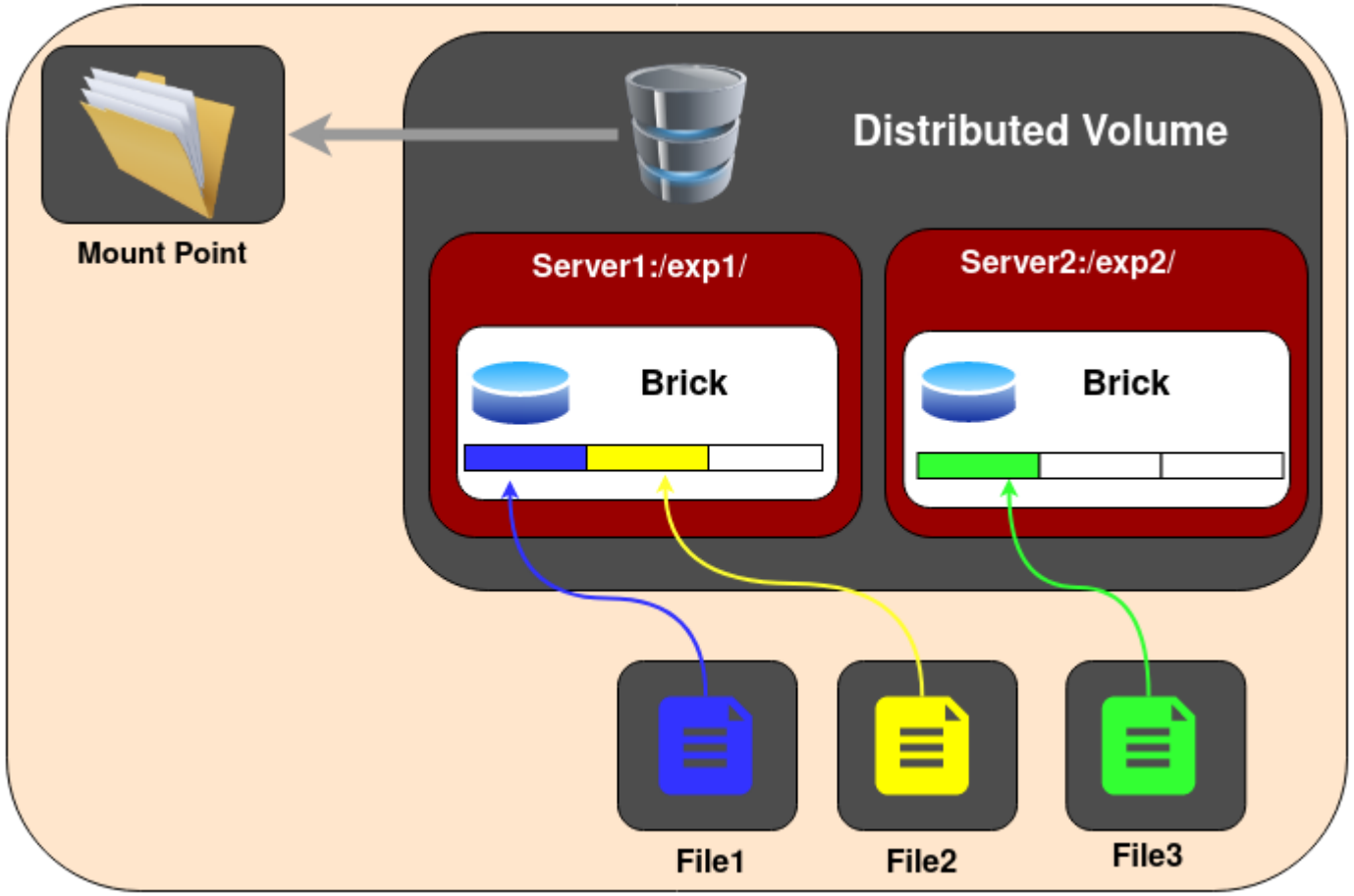
```
# Install Gluster-Client
apt-get install glusterfs-client

# Mount the gluster volume
mkdir /mnt/replicated1
mount.glusterfs gluster1:/replicated1 /mnt/replicated1
```

Requirement 1: Replicated Volume

7. Create a big file on client container
8. Copy the big file locally & to the replicated volume (capture the copying time)

```
# On Client create bob.txt
head -c 200M </dev/urandom> bob.txt
#Copy it to replicated1 & compare copying time between remote server & local
time cp bob.txt /mnt/replicated1
time cp bob.txt copy
```

Requirement 2: Distributed Volume



Requirement 2: Distributed Volume

9. Create a distributed volume on each gluster container

```
# Create a new Directory on each gluster server
mkdir /home/disk2/

# Create Distributed Volume
gluster volume create distributed1 gluster1:/home/disk2/ gluster2:/home/disk2/ force
```

Requirement 2: Distributed Volume

10. On Client, mount the distributed volume and create 20 files

```
# On the Client
mkdir /mnt/distributed1

# Mount the Distributed Volume
mount.glusterfs gluster1:/distributed1 /mnt/distributed1

# Create & copy 20 files
cd /mnt/distributed1
for((i=1; i<=20; i++)); do touch $i; done
```

Requirement 3: Scale-Up Gluster

11. Create a new gluster container
12. Attach the new container to the gluster cluster

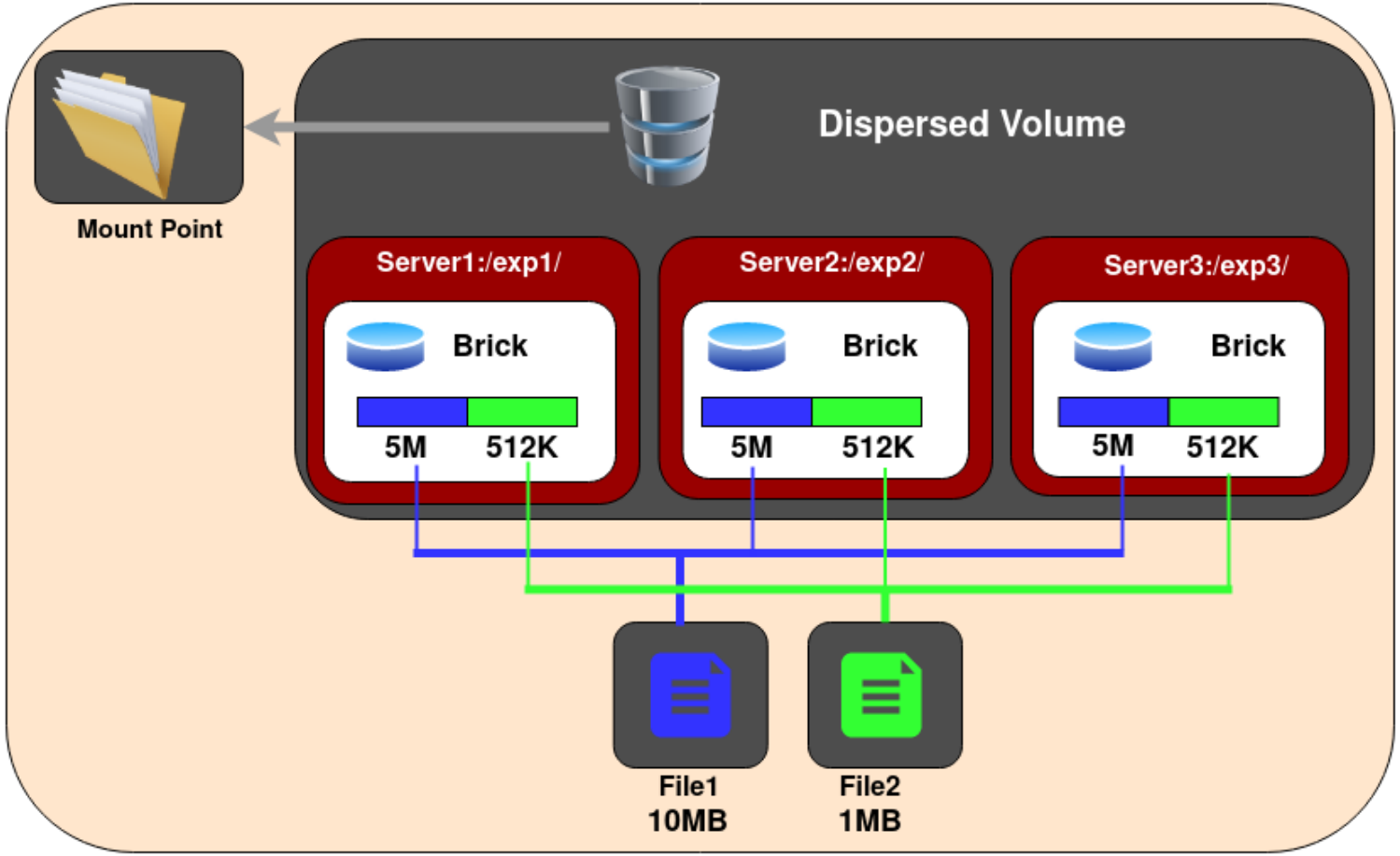
```
# Create a new gluster container
sudo docker run -t -d --privileged=true --name gluster3 --hostname gluster3 -p 24007
-p 49152-49160 gluster_image

# Add the other server & the otherway too
nano /etc/hosts
```

Requirement 3: Scale-Up Gluster

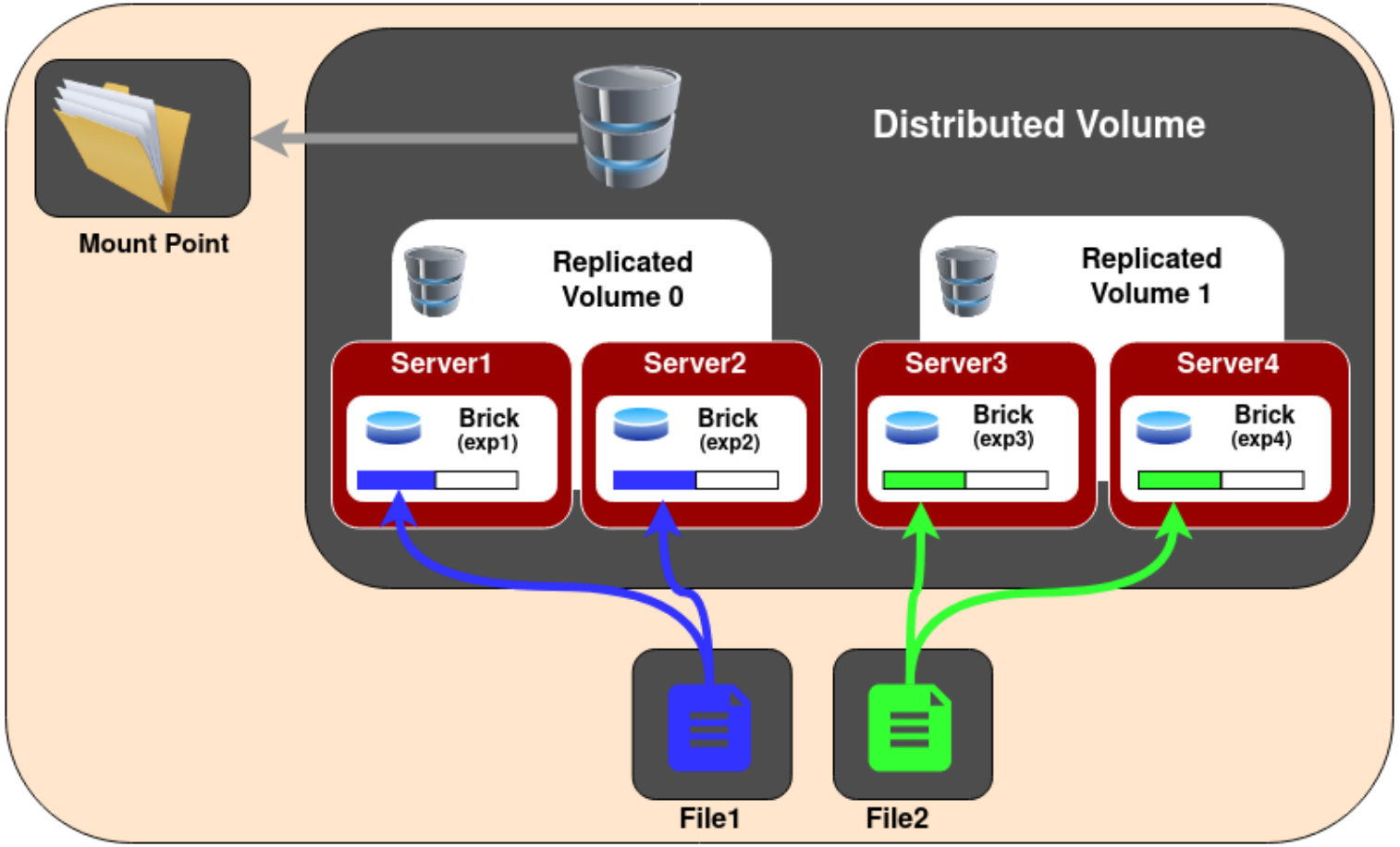
13. Add the new container to the replicated volume & increase the replication factor to 3

```
# From gluster2 server
# To add gluster3 to the old volume
gluster volume add-brick replicated1 replica 3 gluster3:/home/disk1/ force
```

Note: Dispersed Volume



Note: Combined Volume Types



Note: Remove Volume

How to stop & remove a gluster volume

```
# 1- Unmount the volume from all clients
umount /mnt/replicated1
# 2- Stop the volume on gluster1
gluster volume stop replicated1
# 3- Delete the volume
gluster volume delete replicated1
```

Thank you