University of Science and Technology of Hanoi

Distributed System

PRACTICAL WORK 6: GLUSTERFS

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Hanoi, Mar 2021

1. Implementatation

In this labwork, we used the 3 virtual machines to act as the servers and client to perform the distributed replicated volume using GlusterFS. Each machine was set to 1 CPU, 1 GB of RAM and using Ubuntu 20.04 LTS, they connected each other via internal network.

1.1 Configuring the Host File

The first step we need to do before installing glusterfs on all servers is configuring the hosts' file.

```
sudo nano /etc/hosts
```

And then we add the IP of all servers, client to the host file of each machine. In this case, 2 servers (server,client) have the IP address 192.168.115.1 and 192.168.115.2, respectively. The client has the IP address 192.168.115.3

```
192.168.115.1  server
192.168.115.2 client
192.168.115.3 client-new
```

1.2 Installing GlusterFS Server, Configuring GlusterFS Servers

The second step is to install and configuring the GlusterFS in each server.
To install GlusterFS, we follow the steps:

```
sudo apt install software-properties-common
sudo add-apt-repository ppa:gluster/glusterfs-7
sudo apt update
sudo apt install glusterfs-server
```

Next, in the both server, we need to enable the `glusterd` service as the following command

```
sudo systemctl start glusterd
sudo systemctl enable glusterd
```

From the server 1 (server), the server 2 (client) could be added to the storage trusted pool by the command

```
sudo gluster peer probe client
```

To check the storage pool status

```
sudo gluster pool list
```

And here is the output result

```
chaeyoung@server:~$ sudo gluster pool list
UUID                                    Hostname        State
7fb59b51-3ac7-465e-ba89-cd7341d2d96e    client          Connected
98848b3c-5e75-4408-b1e7-af1475445253    localhost       Connected
```

1.3 Setting up the Distributed GlusterFS Volume

First, we created new directory `/glusterfs/test` on both 2 servers

```
sudo mkdir -p /glusterfs/test
```

Then in the server 1 (server), we created the distributed glusterfs volume named `voltest` with 2 replicas `server` and `client`

```
sudo gluster volume create voltest transport tcp server:/glusterfs/test
    client:/glusterfs/test force
```

Before accessing the data, we need to first start the volume

```
sudo gluster volume start voltest
```

And here is the information of the volume `voltest` after creation

```
chaeyoung@server:~$ sudo gluster volume info voltest

Volume Name: voltest
Type: Distribute
Volume ID: 8eb5d574-e68c-4ca8-a96d-785d9b267477
Status: Started
Snapshot Count: 0
Number of Bricks: 2
Transport-type: tcp
Bricks:
Brick1: server:/glusterfs/test
Brick2: client:/glusterfs/test
Options Reconfigured:
transport.address-family: inet
storage.fips-mode-rchecksum: on
nfs.disable: on
```

1.4 Configuring GlusterFS Client

First, we need to install `glusterfs-client` package.
Then, we created a new directory `/mnt/glusterfs` and then, mounted the distributed glusterfs volume `voltest` to the `/mnt/glusterfs` directory.

```
sudo mkdir -p /mnt/glusterfs
sudo mount -t glusterfs server:/voltest /mnt/glusterfs
```

And here is result

```
chaeyoung@client-new:~$ df -h /mnt/glusterfs
Filesystem       Size  Used Avail Use% Mounted on
server:/voltest   20G  7.5G   12G  40% /mnt/glusterfs
```

2. Benchmark

First, we created 2 test file, one is `file1.txt` with a small size of 6 bytes and `file3.txt` with a size of 524 KB.

```
sudo touch file1.txt file2.txt
```

And the following figures are the implementation of measuring the file I/O

```
chaeyoung@client-new:/mnt/glusterfs$ sudo dd if=file3.txt of=/mnt/file3.txt
1047+1 records in
1047+1 records out
536475 bytes (536 kB, 524 KiB) copied, 0.0347264 s, 15.4 MB/s
```

```
chaeyoung@client-new:/mnt/glusterfs$ sudo dd if=file1.txt of=/mnt/file1.txt
0+1 records in
0+1 records out
6 bytes copied, 0.002479 s, 2.4 kB/s _
```

As we can see here, the first text file has a very small size, as a result, the read speed is also small.

3. Contribution

Student	**Student ID**	**Contribution**
Pham Minh Long	BI9-146	Write report
Phung Kim Son	BI9-202	GlusterFS implementation
Trinh Thao Phuong	BI9-191	Write report
Doan Tuyet Mai	BI9-162	Implement benchmark
Nguyen Phuong Thao	BI9-212	Research for GlusterFS