

Bài thực hành 03 Cấu hình RAID

Yêu cầu: Sinh viên thực hành trên hệ điều hành Ubuntu hoặc CentOS đã cài đặt trước. Sau mỗi bài lab, thực hiện Snapshot để lưu lại quá trình làm.

I. Cấu hình RAID1, RAID5

Chuẩn bị: Sinh viên mở lại snapshot đã tạo ra ở bài Lab02 để tiếp tục làm trong bài Lab03

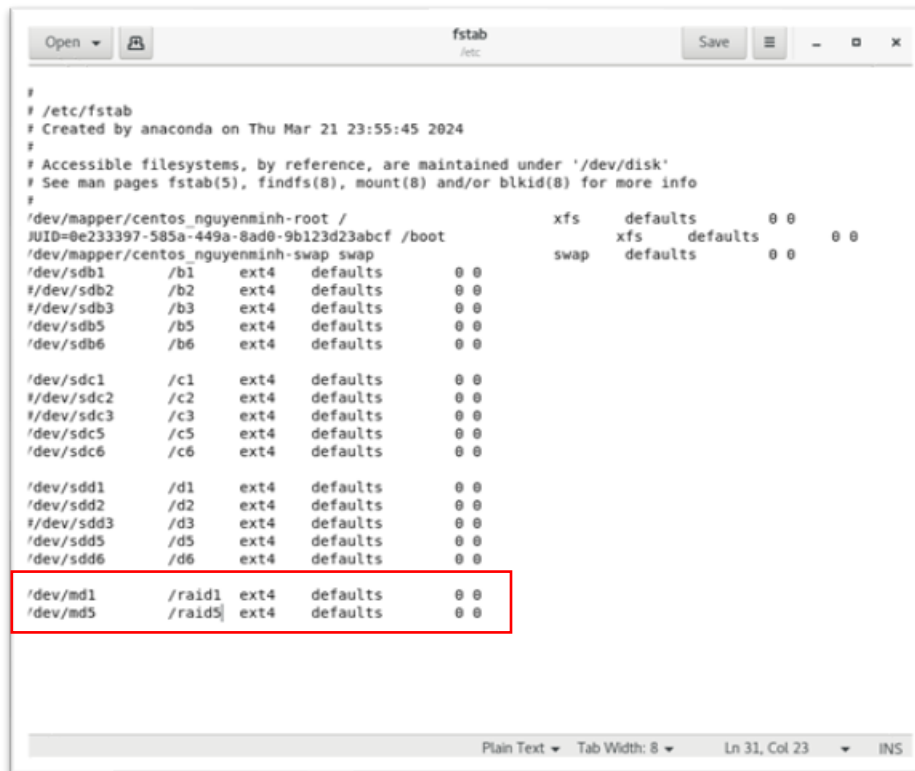
Yêu cầu:

- Thực hiện cấu hình RAID1 cho các phân vùng sdb2, sdc2
- Cấu hình RAID5 cho các phân vùng sdb3, sdc3, sdd3

```
[root@nguyenminh nguyenminh]# mdadm -C /dev/md1 -l 1 -n 2 /dev/sdb2 /dev/sdc2
mdadm: /dev/sdb2 appears to contain an ext2fs file system
       size=5242880K  mtime=Thu Mar 28 20:07:07 2024
mdadm: Note: this array has metadata at the start and
       may not be suitable as a boot device.  If you plan to
       store '/boot' on this device please ensure that
       your boot-loader understands md/v1.x metadata, or use
       --metadata=0.90
mdadm: /dev/sdc2 appears to contain an ext2fs file system
       size=10485760K  mtime=Thu Mar 28 20:07:07 2024
mdadm: largest drive (/dev/sdc2) exceeds size (5237760K) by more than 1%
Continue creating array? Y
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md1 started
[root@nguyenminh nguyenminh]# mkfs.ext4 /dev/md1
mke2fs 1.42.9 (28-Dec-2013)
Filesystem label=
OS type: Linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
327680 inodes, 1309440 blocks
55472 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=1342177280
10 block groups
32768 blocks per group, 32768 fragments per group
3192 inodes per group
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376, 294912, 819200, 884736

Allocating group tables: done
Writing inode tables: done
Creating journal (32768 blocks): done
Writing superblocks and filesystem accounting information: done
```

Hệ điều hành Linux – Lab03



```
#  
# /etc/fstab  
# Created by anaconda on Thu Mar 21 23:55:45 2024  
#  
# Accessible filesystems, by reference, are maintained under '/dev/disk'  
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info  
#  
/dev/mapper/centos_nguyenminh-root / xfs defaults 0 0  
/dev/mapper/centos_nguyenminh-swap swap xfs defaults 0 0  
/dev/sdb1 /b1 ext4 defaults 0 0  
#/dev/sdb2 /b2 ext4 defaults 0 0  
#/dev/sdb3 /b3 ext4 defaults 0 0  
/dev/sdb5 /b5 ext4 defaults 0 0  
/dev/sdb6 /b6 ext4 defaults 0 0  
  
/dev/sdc1 /c1 ext4 defaults 0 0  
#/dev/sdc2 /c2 ext4 defaults 0 0  
#/dev/sdc3 /c3 ext4 defaults 0 0  
/dev/sdc5 /c5 ext4 defaults 0 0  
/dev/sdc6 /c6 ext4 defaults 0 0  
  
/dev/sdd1 /d1 ext4 defaults 0 0  
/dev/sdd2 /d2 ext4 defaults 0 0  
#/dev/sdd3 /d3 ext4 defaults 0 0  
/dev/sdd5 /d5 ext4 defaults 0 0  
/dev/sdd6 /d6 ext4 defaults 0 0  
  
/dev/md1 /raid1 ext4 defaults 0 0  
/dev/md5 /raid5 ext4 defaults 0 0
```

```
root@nguyenminh nguyenminh)# mount -a  
root@nguyenminh nguyenminh)# mount | grep md  
:group on /sys/fs/cgroup/systemd type cgroup (rw,nosuid,nodev,noexec,relatime,seclabel,xattr,release_agent=/usr/lib/systemd/systemd-cgroups-agent,name=systemd)  
/dev/md1 on /raid1 type ext4 (rw,relatime,seclabel,data=ordered)
```

```
[root@nguyenminh nguyenminh]# mdadm -C /dev/md5 -l 5 -n 3 /dev/sdb3 /dev/sdc3 /dev/sdd3  
mdadm: /dev/sdb3 appears to contain an ext2fs file system  
size=5242880K mtime=Thu Mar 28 20:07:07 2024  
mdadm: /dev/sdc3 appears to contain an ext2fs file system  
size=15728640K mtime=Thu Mar 28 20:07:07 2024  
mdadm: /dev/sdd3 appears to contain an ext2fs file system  
size=31457280K mtime=Thu Mar 28 20:07:07 2024  
mdadm: largest drive (/dev/sdd3) exceeds size (5237760K) by more than 1%  
Continue creating array? Y  
mdadm: Defaulting to version 1.2 metadata  
mdadm: array /dev/md5 started.  
[root@nguyenminh nguyenminh]# cat /proc/mdstat  
Personalities : [raid1] [raid6] [raid5] [raid4]  
md5 : active raid5 sdd3[3] sdc3[1] sdb3[0]  
10475520 blocks super 1.2 level 5, 512k chunk, algorithm 2 [3/3] [UUU]  
  
md1 : active raid1 sdc2[1] sdb2[0]  
5237760 blocks super 1.2 [2/2] [UU]  
  
unused devices: <none>
```

Hệ điều hành Linux – Lab03

```
[root@nguyenminh ~]# mdadm --detail /dev/md5
/dev/md5:
    Version : 1.2
    Creation Time : Fri Mar 29 08:48:49 2024
    Raid Level : raid5
    Array Size : 10475520 (9.99 GiB 10.73 GB)
    Used Dev Size : 5237760 (5.00 GiB 5.36 GB)
    Raid Devices : 3
    Total Devices : 3
    Persistence : Superblock is persistent

    Update Time : Fri Mar 29 08:53:01 2024
    State : clean
    Active Devices : 3
    Working Devices : 3
    Failed Devices : 0
    Spare Devices : 0


    Layout : left-symmetric
    Chunk Size : 512K

Consistency Policy : resync

    Name : nguyenminh.localdomain:5 (local to host nguyenminh.localdomain)
    UUID : 488a4e18:f63c3c62:d1f0d5b3:55bee1c5
    Events : 20

Number   Major   Minor   RaidDevice State
  0         8       19         0     active sync  /dev/sdb3
  1         8       35         1     active sync  /dev/sdc3
  2         8       51         2     active sync  /dev/sdd3
```

```
16 mdadm --version
17 fdisk -l | grep sd
18 umount -a
19 umount -a
20 mount -a
21 mdadm --examine /dev/sd[b-c]
22 mdadm -C /dev/md1 -l 1 -n 2 /dev/sdb2 /dev/sdc2
23 mkfs.ext4 /dev/md1
24 mdadm --detail --scan --verbose > /etc/mdadm.conf
25 cat /etc/mdadm.conf
26 cat /proc/mdstat
27 mkdir /raid1
28 mount -a
29 mount | grep md
30 mdadm -C /dev/md5 -l 5 -n 3 /dev/sdb3 /dev/sdc3 /dev/sdd3
31 umount -a
32 umount a
33 mount -a
34 mdadm -C /dev/md5 -l 5 -n 3 /dev/sdb3 /dev/sdc3 /dev/sdd3
35 mkfs.ext4 /dev/md5
36 mdadm --detail --scan --verbose > /etc/mdadm.conf
37 cat /etc/mdadm.conf
38 cat /proc/mdstat
39 mkdir /raid5
40 mount -a
41 mount | grep md
42 init 6
```

History

II. Cấu hình mất mát và phục hồi

Yêu cầu: Thực hiện xóa 1 ổ cứng trên hệ điều hành, sau đó thay thế bằng 1 ổ cứng khác.

Cấu hình mô phỏng thay thế và phục hồi.

```
[root@nguyenminh ~]# cat /proc/mdstat
Personalities : [raid1] [raid0] [raid5] [raid4]
md1 : active raid1 sdb2[0]
      5237760 blocks super 1.2 [2/1] [U_]

md5 : active raid5 sdc3[3] sdb3[0]
      10475520 blocks super 1.2 level 5, 512k chunk, algorithm 2 [3/2] [U_U]

unused devices: <none>
```

```
[root@nguyenminh ~]# mdadm --manage /dev/md1 --add /dev/sdc2
mdadm: added /dev/sdc2
[root@nguyenminh ~]# mdadm --detail /dev/md1
/dev/md1:
    Version : 1.2
  Creation Time : Fri Mar 29 00:25:30 2024
    Raid Level : raid1
    Array Size : 5237760 (5.00 GiB 5.36 GB)
  Used Dev Size : 5237760 (5.00 GiB 5.36 GB)
    Raid Devices : 2
  Total Devices : 2
 Persistence : Superblock is persistent

    Update Time : Fri Mar 29 00:37:52 2024
      State : clean
  Active Devices : 2
 Working Devices : 2
 Failed Devices : 0
  Spare Devices : 0

Consistency Policy : resync

        Name : nguyenminh.localdomain:1 (local to host nguyenminh.localdomain)
        UUID : 08612939:4698c5b2:a3c23882:a766bc34
    Events : 44

   Number   Major   Minor   RaidDevice State
     0         8        18         0   active sync   /dev/sdb2
     2         8        34         1   active sync   /dev/sdc2
```

Hệ điều hành Linux – Lab03

```
cat /proc/mdstat
Personalities : [raid1] [raid6] [raid5] [raid4]
md1 : active raid1 sdc2[2] sdb2[0]
      5237760 blocks super 1.2 [2/2] [UU]

md5 : active raid5 sdd3[4] sdc3[3] sdb3[0]
      10475520 blocks super 1.2 level 5, 512k chunk, algorithm 2 [3/3] [UUU]

unused devices: <none>
```

Lưu ý: Sau khi hoàn thành tất cả bài Lab, thực hiện snapshot các máy, đặt tên là Lab3.