

# **Laporan Praktikum 8**

## **Administrasi Sistem**

### **Manajemen Partisi dan Filesystem 2**



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**2018**

## Manajemen Partisi dan Filesystem 2

**LVM** adalah metode pengalokasian ruang hard disk menjadi Logical Volumes yang dapat dengan mudah diubah ukurannya dibandingkan sebuah partisi disk biasa.

**RAID** adalah menggabungkan beberapa disk drive yang kecil dan murah ke dalam sebuah array untuk mencapai tujuan kinerja yang lebih baik atau redundansi yang tidak dapat dicapai dengan satu drive besar dan mahal.

Berikut merupakan **implementasi dari manajemen partisi dan filesystem 2** dan sistem operasi yang digunakan adalah **Ubuntu 16.04 LTS** :

### Lab 8.1 Membuat Physical Volumes

- Masuk ke manajemen partisi fdisk dengan drive /dev/sda

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo fdisk /dev/sda  
  
Welcome to fdisk (util-linux 2.27.1).  
Changes will remain in memory only, until you decide to write them.  
Be careful before using the write command.  
  
Command (m for help):
```

- Buat partisi 100M, 100M, dan 200M

```
mazharrasyad@mazharrasyad: ~  
Command (m for help): n  
All primary partitions are in use.  
Adding logical partition 7  
First sector (203806720-207998975, default 203806720):  
Last sector, +sectors or +size{K,M,G,T,P} (203806720-207998975, default 207998975): +100M  
  
Created a new partition 7 of type 'Linux' and of size 100 MiB.  
  
Command (m for help): n  
All primary partitions are in use.  
Adding logical partition 8  
First sector (204013568-207998975, default 204013568):  
Last sector, +sectors or +size{K,M,G,T,P} (204013568-207998975, default 207998975): +100M  
  
Created a new partition 8 of type 'Linux' and of size 100 MiB.  
  
Command (m for help): n  
All primary partitions are in use.  
Adding logical partition 9  
First sector (204220416-207998975, default 204220416):  
Last sector, +sectors or +size{K,M,G,T,P} (204220416-207998975, default 207998975): +200M  
  
Created a new partition 9 of type 'Linux' and of size 200 MiB.  
  
Command (m for help):
```

- Ubah id partisi menjadi 8e untuk Linux LVM

```
mazharrasyad@mazharrasyad: ~  
Command (m for help): t  
Partition number (1-9, default 9): 7  
Partition type (type L to list all types): 8e  
  
Changed type of partition 'Linux' to 'Linux LVM'.  
  
Command (m for help): t  
Partition number (1-9, default 9): 8  
Partition type (type L to list all types): 8e  
  
Changed type of partition 'Linux' to 'Linux LVM'.  
  
Command (m for help): t  
Partition number (1-9, default 9): 9  
Partition type (type L to list all types): 8e  
  
Changed type of partition 'Linux' to 'Linux LVM'.  
Command (m for help):
```

- Simpan partisi yang sebelumnya dibuat

```
mazharrasyad@mazharrasyad: ~  
Command (m for help): w  
The partition table has been altered.  
Calling ioctl() to re-read partition table.  
Re-reading the partition table failed.: Device or resource busy  
  
The kernel still uses the old table. The new table will be used at the next reboot or after you run partprobe(8) or kpartx(8).  
mazharrasyad@mazharrasyad:~$
```

- Selanjutnya agar sistem operasi mengenali partisi yang baru dibuat tersebut, maka sistem harus di reboot.

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ reboot
```

- Kemudian jadikan ketiga partisi baru tersebut sebagai volum fisik (physical volumes) untuk penerapan LVM, gunakan perintah berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo pvcreate /dev/sda7  
/run/lvm/lvmetad.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.  
WARNING: ext3 signature detected on /dev/sda7 at offset 1080. Wipe it? [y/n]: y  
Wiping ext3 signature on /dev/sda7.  
Physical volume "/dev/sda7" successfully created  
mazharrasyad@mazharrasyad:~$ sudo pvcreate /dev/sda8  
/run/lvm/lvmetad.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.  
WARNING: ext3 signature detected on /dev/sda8 at offset 1080. Wipe it? [y/n]: y  
Wiping ext3 signature on /dev/sda8.  
Physical volume "/dev/sda8" successfully created  
mazharrasyad@mazharrasyad:~$ sudo pvcreate /dev/sda9  
/run/lvm/lvmetad.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.  
Physical volume "/dev/sda9" successfully created  
mazharrasyad@mazharrasyad:~$
```

- Coba verifikasi seluruh volum fisik yang telah Anda buat dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo pvdisplay  
/run/lvm/lvmetad.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.  
"/dev/sda7" is a new physical volume of "100,00 MiB"  
--- NEW Physical volume ---  
PV Name                /dev/sda7  
VG Name  
PV Size                100,00 MiB  
Allocatable           NO  
PE Size               0  
Total PE              0  
Free PE               0  
Allocated PE          0  
PV UUID               IvRSDm-1A7D-U6ac-uWgf-jU1X-YpGp-59tfqg  
  
"/dev/sda8" is a new physical volume of "100,00 MiB"  
--- NEW Physical volume ---  
PV Name                /dev/sda8  
VG Name  
PV Size                100,00 MiB  
Allocatable           NO  
PE Size               0  
Total PE              0  
Free PE               0  
Allocated PE          0  
PV UUID               MGPHV4-UCeg-KedP-gQD9-4yY0-Gv3E-eFgNG0  
  
"/dev/sda9" is a new physical volume of "200,00 MiB"  
--- NEW Physical volume ---  
PV Name                /dev/sda9  
VG Name  
PV Size                200,00 MiB  
Allocatable           NO  
PE Size               0  
Total PE              0  
Free PE               0  
Allocated PE          0  
PV UUID               nuR52j-EjcS-trel-bjlE-G2cN-8Gkp-4J5x0o  
mazharrasyad@mazharrasyad:~$
```

## Lab 8.2 Membuat volume groups

- Buatlah kelompok volum logical dari volum volum fisik dengan perintah sebagai berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo vgcreate VGDATA /dev/sda7 /dev/sda8  
/run/lvm/lvmetad.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.  
Volume group "VGDATA" successfully created  
mazharrasyad@mazharrasyad:~$
```

- Lakukan verifikasi apakah telah terbentuk volume group dengan nama VGDATA gunakan perintah berikut ini:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo vgdisplay
/run/lvm/lvm2/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
--- Volume group ---
VG Name                VGDATA
System ID
Format                 lvm2
Metadata Areas         2
Metadata Sequence No   1
VG Access               read/write
VG Status               resizable
MAX LV                 0
Cur LV                 0
Open LV                 0
Max PV                  0
Cur PV                 2
Act PV                  2
VG Size                 192,00 MiB
PE Size                 4,00 MiB
Total PE                48
Alloc PE / Size         0 / 0
Free PE / Size           48 / 192,00 MiB
VG UUID                 jFsySV-qIcL-WBJw-rGzR-npLT-MOU6-o0lbkN

mazharrasyad@mazharrasyad:~$
```

- Perhatikan total Physical Volume (Act PV) dari VGDATA ! **2 Act PV**
- Perhatikan berapa ukuran kapasitas VGDATA (VG Size) ! Apakah benar mendekati ukuran total dari /dev/sdaX dan /dev/sdaY ? **Ya yaitu 192 MB**

## Lab 8.3 Membuat Logical Volumes

- Setelah kelompok volum (volume groups) terbentuk, Anda dapat membagi bagi kelompok volum tersebut menjadi satu atau lebih volum logikal (logical volumes). Buatlah dua buah logical volumes dengan nama volum logikal LV1 dan LV2 dan ukuran masing masing 85M dan 125M. Gunakan perintah sebagai berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo lvcreate -n LV1 --size 85M VGDATA
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
Rounding up size to full physical extent 88,00 MiB
Logical volume "LV1" created.
mazharrasyad@mazharrasyad:~$ sudo lvcreate -n LV2 --size 100M VGDATA
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
Logical volume "LV2" created.
mazharrasyad@mazharrasyad:~$
```

- Jika proses pembuatan volum logikal berhasil, lakukan verifikasi dengan perintah sebagai berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo lvs  
/run/lvm/lvmetad.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.  
--- Logical volume ---  
LV Path                /dev/VGDATA/LV1  
LV Name                 LV1  
VG Name                 VGDATA  
LV UUID                 0wVnn4-n9Mx-8Ynn-2Ibh-XpH7-qCJq-0gjeD7  
LV Write Access         read/write  
LV Creation host, time mazharrasyad, 2019-01-05 22:18:36 +0700  
LV Status                available  
# open                  0  
LV Size                 88,00 MiB  
Current LE              22  
Segments                1  
Allocation               inherit  
Read ahead sectors      auto  
- currently set to      256  
Block device            253:0  
  
--- Logical volume ---  
LV Path                /dev/VGDATA/LV2  
LV Name                 LV2  
VG Name                 VGDATA  
LV UUID                 FYwTfq-0gJU-A9yF-R7BD-1iRd-qHXT-dV3oy6  
LV Write Access         read/write  
LV Creation host, time mazharrasyad, 2019-01-05 22:18:44 +0700  
LV Status                available  
# open                  0  
LV Size                 100,00 MiB  
Current LE              25  
Segments                2  
Allocation               inherit  
Read ahead sectors      auto  
- currently set to      256  
Block device            253:1  
  
mazharrasyad@mazharrasyad:~$
```



## Lab 8.4 Memberi filesystem pada logical volumes

- Kedua logical volume yang telah dibuat yaitu LV1 dan LV2, agar dapat digunakan untuk menyimpan data atau file, terlebih dahulu diberi filesystem (format filesystem), gunakan filesystem ext3. Gunakan perintah berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo mkfs.ext3 /dev/VGDATA/LV1  
mke2fs 1.42.13 (17-May-2015)  
Creating filesystem with 90112 1k blocks and 22528 inodes  
Filesystem UUID: 50f9a8e6-28cf-480e-b5d8-fed571f86b32  
Superblock backups stored on blocks:  
    8193, 24577, 40961, 57345, 73729  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
mazharrasyad@mazharrasyad:~$ sudo mkfs.ext3 /dev/VGDATA/LV2  
mke2fs 1.42.13 (17-May-2015)  
Creating filesystem with 102400 1k blocks and 25688 inodes  
Filesystem UUID: 2f664e3d-e354-4a14-b203-3c1a290a19da  
Superblock backups stored on blocks:  
    8193, 24577, 40961, 57345, 73729  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
mazharrasyad@mazharrasyad:~$
```

## Lab 8.5 Mounting filesystem logical volumes

- Buatlah dua buah direktori untuk target mounting seperti berikut ini:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo mkdir /mnt/{lv1,lv2}  
mazharrasyad@mazharrasyad:~$
```

- Periksa filesystem yang saat ini sedang digunakan dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ df -h  
Filesystem      Size  Used Avail Use% Mounted on  
udev            1,7G   0    1,7G   0% /dev  
tmpfs           389M   6,4M  383M   2% /run  
/dev/sda6       92G   68G   20G   78% /  
tmpfs           1,9G   212K   1,9G   1% /dev/shm  
tmpfs           5,0M   4,0K   5,0M   1% /run/lock  
tmpfs           1,9G   0     1,9G   0% /sys/fs/cgroup  
cgmanagerfs     100K   0     100K   0% /run/cgmanager/fs  
tmpfs           389M   64K   389M   1% /run/user/1000  
/dev/mmcblk0p1  7,4G   2,6G   4,9G  35% /media/mazharrasyad/SD CARD  
mazharrasyad@mazharrasyad:~$
```



- Setelah kedua logical volum diberi filesystem , maka coba Anda mounting kedua logical volumes tersebut dengan perintah sebagai berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mount /dev/VGDATA/LV1 /mnt/lv1
mazharrasyad@mazharrasyad:~$ sudo mount /dev/VGDATA/LV2 /mnt/lv2
mazharrasyad@mazharrasyad:~$
```

- Selanjutnya verifikasi apakah kedua filesystem yang terdapat pada kedua logical volume berhasil di mounting, dengan perintah sebagai berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1,7G   0    1,7G   0% /dev
tmpfs           389M   6,4M  383M   2% /run
/dev/sda6       92G    68G   20G   78% /
tmpfs           1,9G   220K   1,9G   1% /dev/shm
tmpfs           5,0M   4,0K   5,0M   1% /run/lock
tmpfs           1,9G   0     1,9G   0% /sys/fs/cgroup
cgmanagerfs     100K   0     100K   0% /run/cgmanager/fs
tmpfs           389M   64K   389M   1% /run/user/1000
/dev/mmcblk0p1  7,4G   2,6G   4,9G  35% /media/mazharrasyad/SD CARD
/dev/mapper/VGDATA-LV1  82M   1,6M   76M   2% /mnt/lv1
/dev/mapper/VGDATA-LV2  93M   1,6M   87M   2% /mnt/lv2
mazharrasyad@mazharrasyad:~$
```

- Cobalah menulis atau membuat file dan direktori pada masing masing direktori /mnt/lv1 dan /mnt/lv2

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo touch /mnt/lv1/coba.txt
mazharrasyad@mazharrasyad:~$ sudo touch /mnt/lv2/coba.txt
mazharrasyad@mazharrasyad:~$ ls /mnt/lv1/
coba.txt  lost+found
mazharrasyad@mazharrasyad:~$ ls /mnt/lv2/
coba.txt  lost+found
mazharrasyad@mazharrasyad:~$
```

## Lab 8.6 Menambah physical volume kedalam volume groups

- Tambahkan atau masukkan physical volume /dev/sdaZ kedalam volume group VGDATA, dengan perintah berikut ini:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo vgextend VGDATA /dev/sda9
/run/lvm/lvm2/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
Volume group "VGDATA" successfully extended
mazharrasyad@mazharrasyad:~$
```

- Verifikasi ukuran (VG Size) dan jumlah physical volume (Act PV) dari volume group VGDATA dengan perintah :

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo vgdisplay VGDATA
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
--- Volume group ---
VG Name                VGDATA
System ID
Format                 lvm2
Metadata Areas         3
Metadata Sequence No   10
VG Access               read/write
VG Status               resizable
MAX LV                 0
Cur LV                 2
Open LV                 2
Max PV                  0
Cur PV                 3
Act PV                 3
VG Size                 388,00 MiB
PE Size                 4,00 MiB
Total PE                97
Alloc PE / Size        47 / 188,00 MiB
Free PE / Size          50 / 200,00 MiB
VG UUID                jFsySV-qIcL-WBJw-rGzR-npLT-MOU6-o0lbkN

mazharrasyad@mazharrasyad:~$
```

## Lab 8.7 Memperbesar kapasitas logical volumes

- Besarkan ukuran logical volume LV1 menjadi 150M, dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo lvresize -L 150M /dev/VGDATA/LV1
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
Rounding size to boundary between physical extents: 152,00 MiB
Size of logical volume VGDATA/LV1 changed from 88,00 MiB (22 extents) to 152,00 MiB (38 extents).
Logical volume LV1 successfully resized.
mazharrasyad@mazharrasyad:~$
```

- Periksa apakah ukuran logical volume LV1 bertambah dengan perintah (disarankan filesystem LV1 di unmount terlebih dahulu untuk menjaga keutuhan data):

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo lvdisplay /dev/VGDATA/LV1
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
--- Logical volume ---
LV Path                /dev/VGDATA/LV1
LV Name                 LV1
VG Name                 VGDATA
LV UUID                 0wVnn4-n9Mx-8Ynn-2Ibh-XpH7-qCJq-OgjeD7
LV Write Access         read/write
LV Creation host, time mazharrasyad, 2019-01-05 22:18:36 +0700
LV Status                available
# open                  1
LV Size                 152,00 MiB
Current LE               38
Segments                 3
Allocation               inherit
Read ahead sectors      auto
- currently set to      256
Block device             253:0

mazharrasyad@mazharrasyad:~$
```

- Ukuran dari filesystem pada LV1 tidak serta merta bertambah ukurannya, untuk itu perlu diresize ukurannya pada level filesystem ext3, dengan perintah berikut ini, Scan filesystem lebih dahulu dengan perintah:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo umount /dev/VGDATA/LV1 /mnt/lv1
umount: /mnt/lv1: not mounted
mazharrasyad@mazharrasyad:~$ sudo e2fsck -f /dev/VGDATA/LV1
e2fsck 1.42.13 (17-May-2015)
Pass 1: Checking inodes, blocks, and sizes
Pass 2: Checking directory structure
Pass 3: Checking directory connectivity
Pass 4: Checking reference counts
Pass 5: Checking group summary information
/dev/VGDATA/LV1: 12/22528 files (8.3% non-contiguous), 8514/90112 blocks
mazharrasyad@mazharrasyad:~$
```

- Resize dengan perintah:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo resize2fs /dev/VGDATA/LV1
resize2fs 1.42.13 (17-May-2015)
Resizing the filesystem on /dev/VGDATA/LV1 to 155648 (1k) blocks.
The filesystem on /dev/VGDATA/LV1 is now 155648 (1k) blocks long.

mazharrasyad@mazharrasyad:~$
```

- Periksa kini ukuran dari filesystem pada LV1, dengan perintah “ df h ” (jika telah di mounting)

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1,7G   0    1,7G   0% /dev
tmpfs           389M   6,4M  383M   2% /run
/dev/sda6       92G    68G   20G   78% /
tmpfs           1,9G   232K   1,9G   1% /dev/shm
tmpfs           5,0M   4,0K   5,0M   1% /run/lock
tmpfs           1,9G   0     1,9G   0% /sys/fs/cgroup
cgmanagerfs     100K   0     100K   0% /run/cgmanager/fs
tmpfs           389M   64K    389M   1% /run/user/1000
/dev/mmcblk0p1  7,4G   2,6G   4,9G   35% /media/mazharrasyad/SD CARD
/dev/mapper/VGDATA-LV2  93M    1,6M   87M    2% /mnt/lv2
/dev/mapper/VGDATA-LV1 144M    1,6M  135M    2% /mnt/lv1
mazharrasyad@mazharrasyad:~$
```

## Lab 8.8 Menghapus logical volumes

- Untuk menghapus logical volume LV1 dan LV2, lakukan terlebih dahulu proses unmount terhadap filesystem LV1 dan LV2, dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo umount /dev/VGDATA/LV1 /mnt/lv1
umount: /mnt/lv1: not mounted
mazharrasyad@mazharrasyad:~$ sudo umount /dev/VGDATA/LV2 /mnt/lv2
umount: /mnt/lv2: not mounted
mazharrasyad@mazharrasyad:~$
```

- Kemudian hapus kedua volume fisik tersebut dengan perintah:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo lvremove /dev/VGDATA/LV1
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
Do you really want to remove and DISCARD active logical volume LV1? [y/n]: y
Logical volume "LV1" successfully removed
mazharrasyad@mazharrasyad:~$ sudo lvremove /dev/VGDATA/LV2
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
Do you really want to remove and DISCARD active logical volume LV2? [y/n]: y
Logical volume "LV2" successfully removed
mazharrasyad@mazharrasyad:~$
```

- Lakukan verifikasi dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo lvs
/run/lvm/lvmetad.socket: connect failed: No such file or directory
WARNING: Failed to connect to lvmetad. Falling back to internal scanning.
mazharrasyad@mazharrasyad:~$
```

## Lab 8.9 Menghapus volume groups

- Untuk menghapus volume group VGDATA, gunakan perintah berikut ini:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo vgremove VGDATA  
/run/lvm/lvmetadata.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetadata. Falling back to internal scanning.  
Volume group "VGDATA" successfully removed  
mazharrasyad@mazharrasyad:~$
```

- Lakukan verifikasi dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo vgs VGDATA  
/run/lvm/lvmetadata.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetadata. Falling back to internal scanning.  
Volume group "VGDATA" not found  
Cannot process volume group VGDATA  
mazharrasyad@mazharrasyad:~$
```

## Lab 8.10 Menghapus physical volumes

- Untuk menghapus volume fisik (physical volumes), gunakan perintah berikut ini:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo pvremove /dev/sda7 /dev/sda8 /dev/sda9  
/run/lvm/lvmetadata.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetadata. Falling back to internal scanning.  
Labels on physical volume "/dev/sda7" successfully wiped  
Labels on physical volume "/dev/sda8" successfully wiped  
Labels on physical volume "/dev/sda9" successfully wiped  
mazharrasyad@mazharrasyad:~$
```

- Lakukan verifikasi dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo pvdisplay  
/run/lvm/lvmetadata.socket: connect failed: No such file or directory  
WARNING: Failed to connect to lvmetadata. Falling back to internal scanning.  
mazharrasyad@mazharrasyad:~$
```



## Lab 8.11 Membuat device RAID 0 dengan software RAID

- Siapkan 3 partisi yang sebelumnya telah Anda buat yang masing masing berukuran sama yaitu 100M (/dev/sdaX dan /dev/sdaY) dan 200M (/dev/sdaZ).

```
mazharrasyad@mazharrasyad: ~  
Command (m for help): p  
Disk /dev/sda: 298,1 GiB, 320072933376 bytes, 625142448 sectors  
Units: sectors of 1 * 512 = 512 bytes  
Sector size (logical/physical): 512 bytes / 4096 bytes  
I/O size (minimum/optimal): 4096 bytes / 4096 bytes  
Disklabel type: dos  
Disk identifier: 0x6cfdbe18  
  
Device      Boot      Start          End      Sectors      Size Id Type  
/dev/sda1                2046  207998975  207996930     99,2G  5 Extended  
/dev/sda2          207998976  209022975    1024000      500M  7 HPFS/NTFS/exFAT  
/dev/sda3          209022976  457371647  248348672    118,4G  7 HPFS/NTFS/exFAT  
/dev/sda4          457371648  625141759  167770112      80G  83 Linux  
/dev/sda5                2048      7999487      7997440       3,8G  82 Linux swap / Solaris  
/dev/sda6          8001536  203804671  195803136     93,4G  83 Linux  
/dev/sda7          203806720  204011519      204800      100M  8e Linux LVM  
/dev/sda8          204013568  204218367      204800      100M  8e Linux LVM  
/dev/sda9          204220416  204630015      409600      200M  8e Linux LVM  
  
Partition 1 does not start on physical sector boundary.  
Partition table entries are not in disk order.  
Command (m for help):
```

- Ubah id partisi ketiganya menjadi "fd" (Linux raid)

```
mazharrasyad@mazharrasyad: ~  
Command (m for help): t  
Partition number (1-9, default 9): 7  
Partition type (type L to list all types): fd  
  
Changed type of partition 'Linux LVM' to 'Linux raid autodetect'.  
  
Command (m for help): t  
Partition number (1-9, default 9): 8  
Partition type (type L to list all types): fd  
  
Changed type of partition 'Linux LVM' to 'Linux raid autodetect'.  
  
Command (m for help): t  
Partition number (1-9, default 9): 9  
Partition type (type L to list all types): fd  
  
Changed type of partition 'Linux LVM' to 'Linux raid autodetect'.  
Command (m for help):
```

- 3 partisi linux raid siap digunakan

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo fdisk -l
Disk /dev/sda: 298,1 GiB, 320072933376 bytes, 625142448 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disklabel type: dos
Disk identifier: 0x6cfdbe18
```

| Device    | Boot | Start     | End       | Sectors   | Size   | Id | Type                  |
|-----------|------|-----------|-----------|-----------|--------|----|-----------------------|
| /dev/sda1 |      | 2046      | 207998975 | 207996930 | 99,2G  | 5  | Extended              |
| /dev/sda2 |      | 207998976 | 209022975 | 1024000   | 500M   | 7  | HPFS/NTFS/exFAT       |
| /dev/sda3 |      | 209022976 | 457371647 | 248348672 | 118,4G | 7  | HPFS/NTFS/exFAT       |
| /dev/sda4 |      | 457371648 | 625141759 | 167770112 | 80G    | 83 | Linux                 |
| /dev/sda5 |      | 2048      | 7999487   | 7997440   | 3,8G   | 82 | Linux swap / Solaris  |
| /dev/sda6 |      | 8001536   | 203804671 | 195803136 | 93,4G  | 83 | Linux                 |
| /dev/sda7 |      | 203806720 | 204011519 | 204800    | 100M   | fd | Linux raid autodetect |
| /dev/sda8 |      | 204013568 | 204218367 | 204800    | 100M   | fd | Linux raid autodetect |
| /dev/sda9 |      | 204220416 | 204630015 | 409600    | 200M   | fd | Linux raid autodetect |

```
Partition 1 does not start on physical sector boundary.
Partition table entries are not in disk order.

mazharrasyad@mazharrasyad:~$
```

- Selanjutnya buatlah device RAID 0 (stripping), dengan perintah sebagai berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --create --verbose /dev/md0 --level=0 --
raid-devices=3 /dev/sda7 /dev/sda8 /dev/sda9
mdadm: chunk size defaults to 512K
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md0 started.
mazharrasyad@mazharrasyad:~$
```



- Periksa apakah raid device berhasil terbentuk:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
  Creation Time : Sun Jan  6 05:25:24 2019
    Raid Level : raid0
    Array Size : 406528 (397.07 MiB 416.28 MB)
    Raid Devices : 3
    Total Devices : 3
    Persistence : Superblock is persistent

    Update Time : Sun Jan  6 05:25:24 2019
      State : clean
    Active Devices : 3
    Working Devices : 3
    Failed Devices : 0
    Spare Devices : 0

    Chunk Size : 512K

    Name : mazharrasyad:0 (local to host mazharrasyad)
    UUID : a5bd505c:21bac57c:e2e5166c:7205644c
    Events : 0

   Number   Major   Minor   RaidDevice State
     0         8       7         0     active sync  /dev/sda7
     1         8       8         1     active sync  /dev/sda8
     2         8       9         2     active sync  /dev/sda9
mazharrasyad@mazharrasyad:~$
```

- Agar device raid dapat digunakan maka , beri atau format dengan filesystem ext3, gunakan perintah berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mkfs.ext3 /dev/md0
mke2fs 1.42.13 (17-May-2015)
/dev/md0 contains a ext3 file system
    last mounted on /mnt/lv1 on Sat Jan  5 22:33:59 2019
Proceed anyway? (y,n) y
Creating filesystem with 406528 1k blocks and 102000 inodes
Filesystem UUID: 5171a981-dbf4-456d-ae34-448a9480f0f8
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729, 204801, 221185, 401409

Allocating group tables: done
Writing inode tables: done
Creating journal (8192 blocks): done
Writing superblocks and filesystem accounting information: done

mazharrasyad@mazharrasyad:~$
```

- Selanjutnya buat direktori /mnt/raid0

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mkdir /mnt/raid0
mazharrasyad@mazharrasyad:~$ ls /mnt
BEB4CB8FB4CB491B  BootInfo  boot-sav  E4206331206309BE  raid0
mazharrasyad@mazharrasyad:~$
```

- Kemudian mount filesystem /dev/md0 ke direktori tersebut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mount /dev/md0 /mnt/raid0
mazharrasyad@mazharrasyad:~$
```

- Periksa dengan perintah “df -h” apakah filesystem device raid 0 (/dev/md0) sudah berhasil di mount ! Jika berhasil perhatikan ukuran /mnt/raid0 ?

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1,7G   0    1,7G   0% /dev
tmpfs           389M  6,4M  383M   2% /run
/dev/sda6       92G   68G   20G   78% /
tmpfs           1,9G  208K   1,9G   1% /dev/shm
tmpfs           5,0M   4,0K   5,0M   1% /run/lock
tmpfs           1,9G   0    1,9G   0% /sys/fs/cgroup
cgmanagerfs    100K   0    100K   0% /run/cgmanager/fs
tmpfs           389M   48K  389M   1% /run/user/1000
/dev/md0        377M   2,3M  355M   1% /mnt/raid0
mazharrasyad@mazharrasyad:~$
```

## Lab 8.12 Menghapus device RAID

- Untuk menghapus device RAID, gunakan perintah berikut ini:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo umount /mnt/raid0
mazharrasyad@mazharrasyad:~$
```

- Selanjutnya hentikan device RAID dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --stop /dev/md0
mdadm: stopped /dev/md0
mazharrasyad@mazharrasyad:~$
```

- Kemudian hapus device RAID dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --remove /dev/md0
mazharrasyad@mazharrasyad:~$
```

- Terakhir, menghapus superblok dari drive (ini adalah apa yang menandai mereka sebagai bagian dari array RAID), dengan perintah:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --zero-superblock /dev/md0
mdadm: Unrecognised md component device - /dev/md0
mazharrasyad@mazharrasyad:~$
```

- Periksa apakah raid device masih ada:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --detail /dev/md0
/dev/md0:
  Version : 
  Raid Level : raid0
  Total Devices : 0

  State : inactive

  Number   Major   Minor   RaidDevice
mazharrasyad@mazharrasyad:~$
```

## Lab 8.13 Membuat device RAID 1 dengan software RAID

- Siapkan 2 partisi yang sebelumnya telah Anda buat yang masing masing berukuran sama yaitu 100M (/dev/sdaX dan /dev/sdaY). Ubah id partisi keduanya menjadi "fd" (Linux raid)

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo fdisk -l
Disk /dev/sda: 298,1 GiB, 32007293376 bytes, 625142448 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 4096 bytes
Disklabel type: dos
Disk identifier: 0x6cfdbe18

Device      Boot      Start          End      Sectors      Size Id Type
/dev/sda1                2046    207998975    207996930      99,2G  5 Extended
/dev/sda2            207998976    209022975      1024000        500M  7 HPFS/NTFS/exFAT
/dev/sda3            209022976    457371647    248348672    118,4G  7 HPFS/NTFS/exFAT
/dev/sda4            457371648    625141759    167770112        80G  83 Linux
/dev/sda5                2048        7999487        7997440        3,8G  82 Linux swap / Solaris
/dev/sda6            8001536    203804671    195803136      93,4G  83 Linux
/dev/sda7            203806720    204011519        204800        100M fd Linux raid autodetect
/dev/sda8            204013568    204218367        204800        100M fd Linux raid autodetect
/dev/sda9            204220416    204630015        409600        200M fd Linux raid autodetect

Partition 1 does not start on physical sector boundary.
Partition table entries are not in disk order.

mazharrasyad@mazharrasyad:~$
```

- Selanjutnya buatlah device RAID 1 (mirroring), dengan perintah sebagai berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --create --verbose /dev/md1 --level=1 --
raid-devices=2 /dev/sda7 /dev/sda8
mdadm: /dev/sda7 appears to be part of a raid array:
        level=raid0 devices=3 ctime=Sun Jan  6 05:25:24 2019
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/sda8 appears to be part of a raid array:
        level=raid0 devices=3 ctime=Sun Jan  6 05:25:24 2019
mdadm: size set to 102272K
Continue creating array?
Continue creating array? (y/n) y
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md1 started.
mazharrasyad@mazharrasyad:~$
```

- Periksa apakah raid device berhasil terbentuk:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mdadm --detail /dev/md1
/dev/md1:
        Version : 1.2
        Creation Time : Sun Jan  6 05:53:49 2019
        Raid Level : raid1
        Array Size : 102272 (99.89 MiB 104.73 MB)
        Used Dev Size : 102272 (99.89 MiB 104.73 MB)
        Raid Devices : 2
        Total Devices : 2
        Persistence : Superblock is persistent

        Update Time : Sun Jan  6 05:53:53 2019
        State : clean
        Active Devices : 2
        Working Devices : 2
        Failed Devices : 0
        Spare Devices : 0


        Name : mazharrasyad:1 (local to host mazharrasyad)
        UUID : 7fe84cca:2c1fada8:a0c62099:be63da1b
        Events : 17


        Number   Major   Minor   RaidDevice State
         0         8         7         0      active sync   /dev/sda7
         1         8         8         1      active sync   /dev/sda8
mazharrasyad@mazharrasyad:~$
```

- Agar device raid dapat digunakan maka, beri atau format dengan filesystem ext3, gunakan perintah berikut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mkfs.ext3 /dev/md1
mke2fs 1.42.13 (17-May-2015)
Creating filesystem with 102272 1k blocks and 25584 inodes
Filesystem UUID: 0bfa9152-135b-42e3-97fb-5e15f8074d82
Superblock backups stored on blocks:
    8193, 24577, 40961, 57345, 73729

Allocating group tables: done
Writing inode tables: done
Creating journal (4096 blocks): done
Writing superblocks and filesystem accounting information: done

mazharrasyad@mazharrasyad:~$
```

- Selanjutnya buat direktori /mnt/raid1

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mkdir /mnt/raid1
mazharrasyad@mazharrasyad:~$
```

- Kemudian mount filesystem /dev/md1 ke direktori tersebut:

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ sudo mount /dev/md1 /mnt/raid1
mazharrasyad@mazharrasyad:~$
```

- Periksa dengan perintah “df -h” apakah filesystem device raid 1 (/dev/md1) sudah berhasil di mount !. Jika berhasil perhatikan ukuran /mnt/raid1 ?

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ df -h
Filesystem      Size  Used Avail Use% Mounted on
udev            1,7G   0    1,7G   0% /dev
tmpfs           389M   6,4M  383M   2% /run
/dev/sda6       92G    68G   20G   78% /
tmpfs           1,9G   43M   1,9G   3% /dev/shm
tmpfs           5,0M   4,0K   5,0M   1% /run/lock
tmpfs           1,9G   0     1,9G   0% /sys/fs/cgroup
cgmanagerfs    100K   0     100K   0% /run/cgmanager/fs
tmpfs           389M   60K   389M   1% /run/user/1000
/dev/md1        93M    1,6M   87M    2% /mnt/raid1
mazharrasyad@mazharrasyad:~$
```

- Cobalah tulis data ke direktori /mnt/raid1

```
mazharrasyad@mazharrasyad: ~
mazharrasyad@mazharrasyad:~$ ls /mnt/raid1
lost+found
mazharrasyad@mazharrasyad:~$ sudo touch /mnt/raid1/coba.txt
mazharrasyad@mazharrasyad:~$ ls /mnt/raid1
coba.txt  lost+found
mazharrasyad@mazharrasyad:~$
```



## Lab 8.14 Menghapus disk drive dari array RAID 1

- Kejadian salah satu disk dalam raid array rusak atau gagal tidak akan menyebabkan sistem juga gagal, dikarenakan dalam RAID1 memungkinkan redundansi disk (itulah guna dari RAID 1). Untuk mensimulasikan kegagalan salah satu disk (contoh /dev/sda8) dalam array RAID 1, coba lakukan perintah berikut ini:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo mdadm --manage /dev/md1 --fail /dev/sda8  
mdadm: set /dev/sda8 faulty in /dev/md1  
mazharrasyad@mazharrasyad:~$ sudo mdadm --manage /dev/md1 --remove /dev/sda8  
mdadm: hot removed /dev/sda8 from /dev/md1  
mazharrasyad@mazharrasyad:~$
```

- Periksalah status device raid1 Anda kini:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo mdadm --detail /dev/md1  
/dev/md1:  
  Version : 1.2  
  Creation Time : Sun Jan  6 05:53:49 2019  
  Raid Level : raid1  
  Array Size : 102272 (99.89 MiB 104.73 MB)  
  Used Dev Size : 102272 (99.89 MiB 104.73 MB)  
  Raid Devices : 2  
  Total Devices : 1  
  Persistence : Superblock is persistent  
  
  Update Time : Sun Jan  6 06:03:47 2019  
  State : clean, degraded  
Active Devices : 1  
Working Devices : 1  
Failed Devices : 0  
Spare Devices : 0  
  
  Name : mazharrasyad:1 (local to host mazharrasyad)  
  UUID : 7fe84cca:2c1fada8:a0c62099:be63da1b  
  Events : 20  
  
  Number   Major   Minor   RaidDevice State  
    0         8         7         0      active sync  /dev/sda7  
    2         0         0         2      removed  
mazharrasyad@mazharrasyad:~$
```

- Apakah filesystem dari device RAID 1 (/dev/md1) masih tetap dapat diakses dan ditulis ? **Ya masih bisa**

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ ls /mnt/raid1  
coba.txt  lost+found  
mazharrasyad@mazharrasyad:~$ sudo touch /mnt/raid1/coba1.txt  
mazharrasyad@mazharrasyad:~$ ls /mnt/raid1  
coba1.txt  coba.txt  lost+found  
mazharrasyad@mazharrasyad:~$
```

## Lab 8.15 Memasang kembali disk drive ke array RAID 1

- Disk drive `/dev/sdaY` yang telah di remove tadi dapat dimasukkan kembali kedalam array raid 1, dengan perintah berikut:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo mdadm /dev/md1 -a /dev/sda8  
mdadm: added /dev/sda8  
mazharrasyad@mazharrasyad:~$
```

- Periksa status device raid1 Anda kini:

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ sudo mdadm --detail /dev/md1  
/dev/md1:  
  Version : 1.2  
  Creation Time : Sun Jan  6 05:53:49 2019  
  Raid Level : raid1  
  Array Size : 102272 (99.89 MiB 104.73 MB)  
  Used Dev Size : 102272 (99.89 MiB 104.73 MB)  
  Raid Devices : 2  
  Total Devices : 2  
  Persistence : Superblock is persistent  
  
  Update Time : Sun Jan  6 06:12:23 2019  
  State : clean  
Active Devices : 2  
Working Devices : 2  
Failed Devices : 0  
Spare Devices : 0  
  
  Name : mazharrasyad:1 (local to host mazharrasyad)  
  UUID : 7fe84cca:2c1fada8:a0c62099:be63da1b  
  Events : 55  
  
  Number   Major   Minor   RaidDevice State  
    0         8       7         0   active sync  /dev/sda7  
    2         8       8         1   active sync  /dev/sda8  
mazharrasyad@mazharrasyad:~$
```

- Apakah filesystem dari device RAID 1 (`/dev/md1`) masih tetap dapat diakses dan ditulis ? **Ya bisa**

```
mazharrasyad@mazharrasyad: ~  
mazharrasyad@mazharrasyad:~$ ls /mnt/raid1  
coba1.txt  coba.txt  lost+found  
mazharrasyad@mazharrasyad:~$ sudo touch /mnt/raid1/coba2.txt  
mazharrasyad@mazharrasyad:~$ ls /mnt/raid1  
coba1.txt  coba2.txt  coba.txt  lost+found  
mazharrasyad@mazharrasyad:~$
```

----- Selesai -----



## **Referensi**

- Modul praktikum Administrasi sistem dan jaringan – STT NF (Disusun oleh: Henry Saptono, S.Si, M.Kom)