

LAPORAN PRAKTIKUM ARSITEKTUR DAN ORGANISASI KOMPUTER

SETTING UP – RAID 1



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DIII TEKNOLOGI KOMPUTER

**INSTITUT TEKNOLOGI DEL
FAKULTAS VOKASI**

Judul Praktikum

Minggu/Sesi	:	VI/2
Kode Mata Kuliah	:	1031103
Nama Mata Kuliah	:	ARSITEKTUR DAN ORGANISASI KOMPUTER
Setoran	:	Laporan Materi Setting Up — RAID 1 dikirimkan dalam bentuk PDF dengan aturan penamaan file " <i>Prak5_RAID_1_NIM.pdf</i> "
Batas Waktu Setoran	:	31 Oktober 2023 jam 08:00
Tujuan	:	1. Mahasiswa mampu mengetahui RAID 1. 2. Mahasiswa dapat menerapkan sistem RAID 1 pada Linux dengan Sistem Operasi CentOS 7.

Petunjuk

1. Laporan praktikum dikerjakan secara individu (tidak berkelompok).
2. Setiap individu diperbolehkan memberikan pertanyaan dan diskusi melalui WAG pada sesi kedua di hari praktikum.
3. Laporan praktikum akan dikirimkan pada H+3 (hari kerja) melalui e-course dan mengikuti format yang telah disediakan sebelumnya.
4. Tidak ada toleransi keterlambatan, jika terlambat maka akan terjadi pengurangan nilai.
5. Dalam pengerjaan laporan praktikum, dilarang keras melakukan plagiasi (mencontek).

Arsitektur dan Organisasi Komputer

Tugas

1. Buatlah raid1 kembali dengan penamaan md1 menggunakan Harddisk 3 dan Harddisk 4.

Jawab:

```
[root@localhost agus]# mdadm --create /dev/md1 --level=mirror --raid-devices=2 /dev/sd[d-e]1
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
Continue creating array? y
mdadm: Fail to create md1 when using /sys/module/md_mod/parameters/new_array, fallback to creation v
ia node
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md1 started.
[root@localhost agus]#
```

2. Mounting md1 ke /mnt/raid1/

Jawab:

```
[root@localhost agus]# mount /dev/md1 /mnt/raid1/
```

3. Sehingga anda akan memiliki 2 raid level 1 yaitu md0 dan md1.

Jawab:

```
[root@localhost agus]# df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/cl-root 17G  1.2G   16G   7% /
devtmpfs         910M    0   910M   0% /dev
tmpfs            920M    0   920M   0% /dev/shm
tmpfs            920M  8.5M   912M   1% /run
tmpfs            920M    0   920M   0% /sys/fs/cgroup
/dev/md0         2.0G  6.1M   1.9G   1% /mnt/raid1
/dev/sda1       1014M  139M   876M  14% /boot
tmpfs            184M    0   184M   0% /run/user/1000
/dev/md1         2.0G  6.0M   1.9G   1% /mnt/raid2
```

4. Tuliskan dan jelaskan tujuan, langkah, goals praktikum pada modul Setting Up RAID 1.

Jawab:

Tujuan:

1. Memahami pembuatan RAID di CentOS

Penjelasan:

Di nomor 1, kita dapat memahami pembuatan RAID 1 pada system CentOS 7.

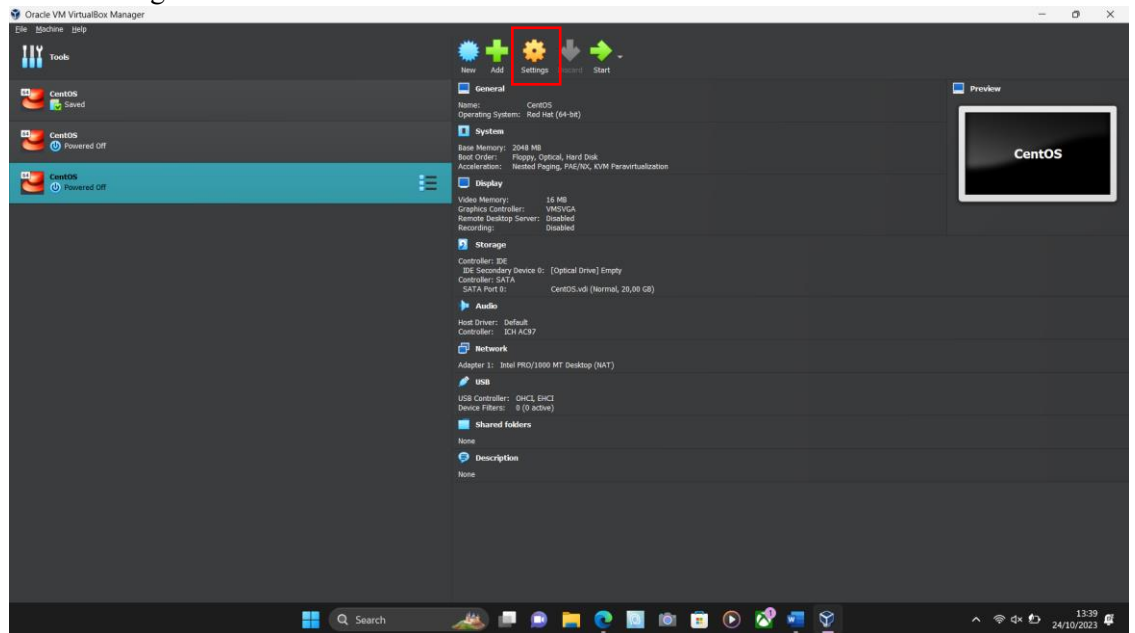
2. Memahami pembuatan instalasi OS dan harddisk di Mesin Virtual

Penjelasan:

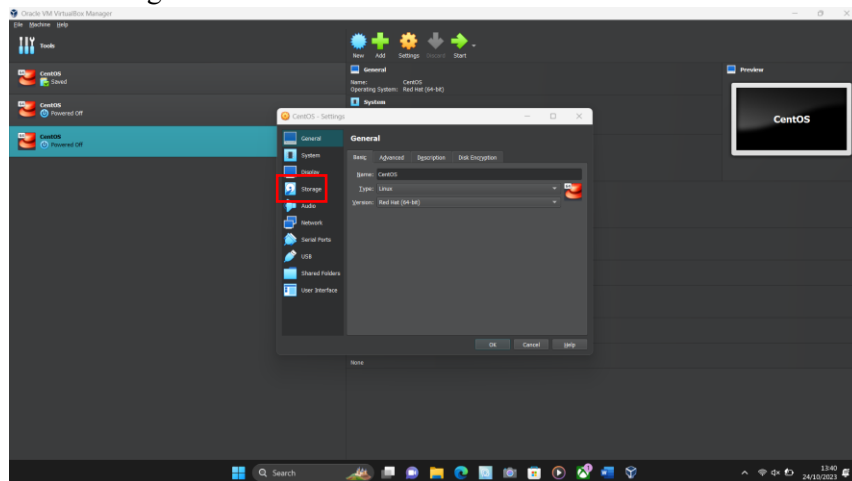
Pada nomor 2, kita dapat memahami pembuatan instalasi dan harddisk di mesin virtual.

Langkah:

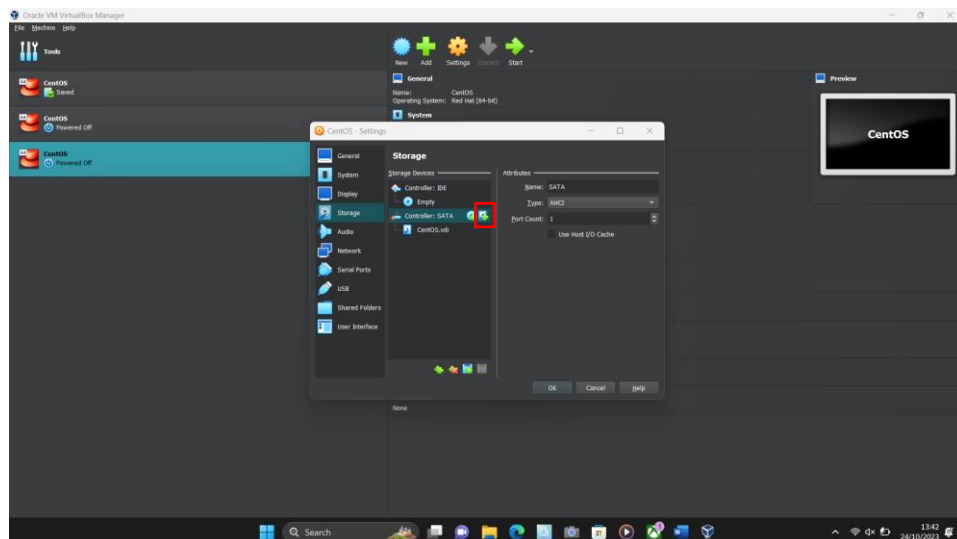
1. Klik “Settings”



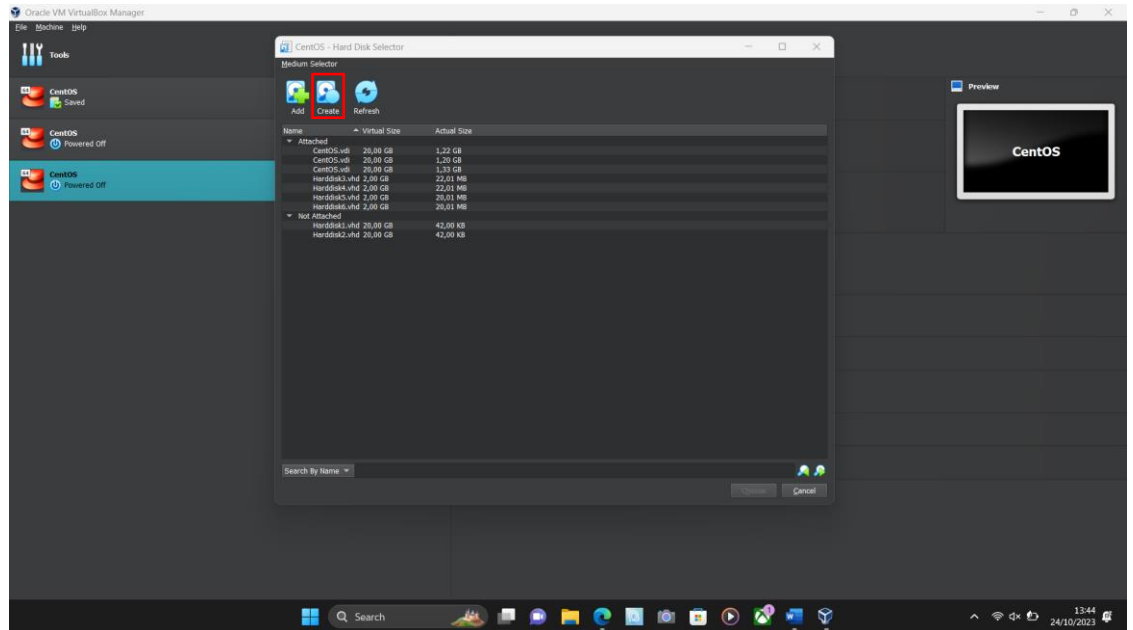
2. Pilih “Storage”



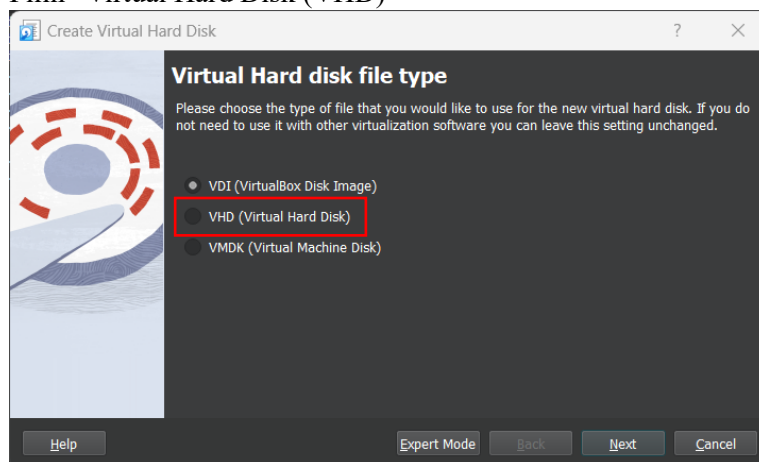
3. Pilih ikon “Harddisk”



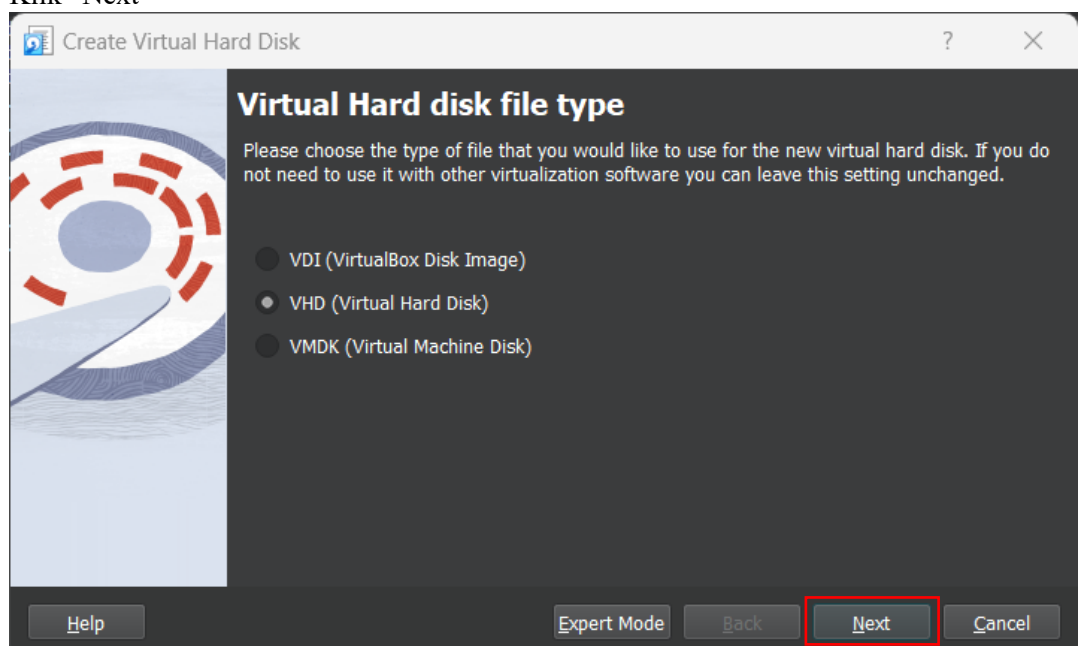
4. Klik “Create”



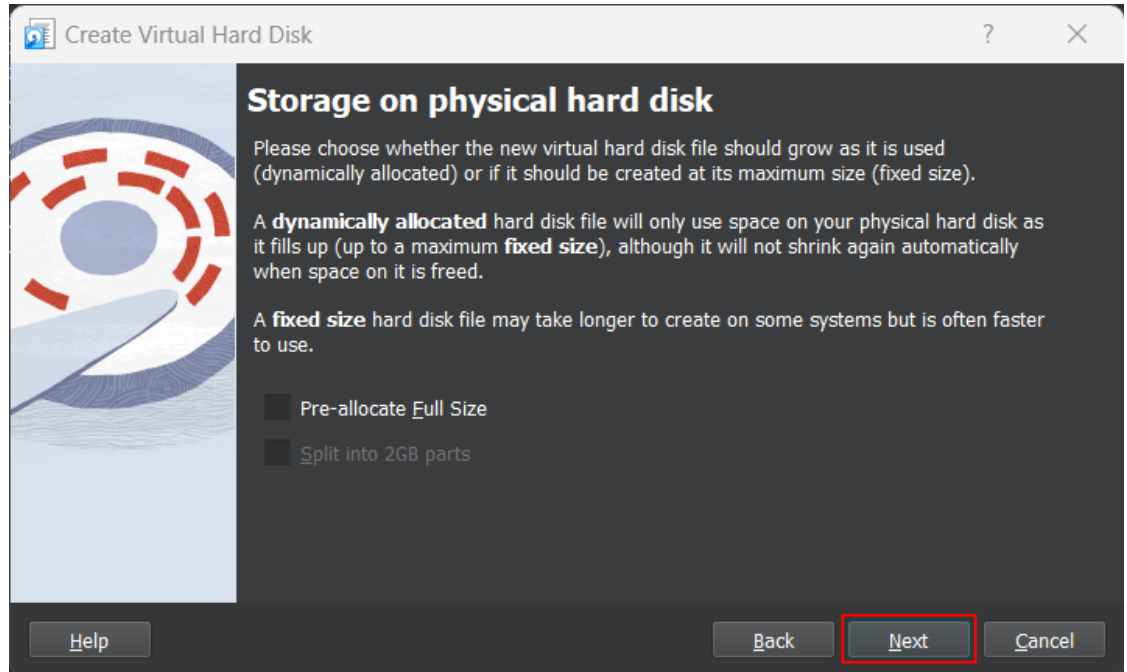
5. Pilih “Virtual Hard Disk (VHD)”



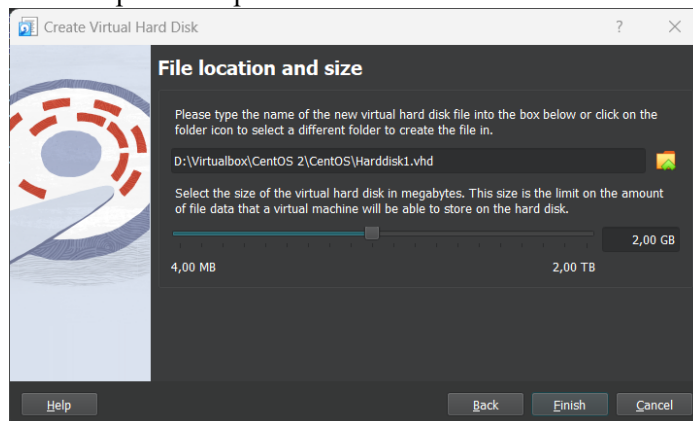
6. Klik “Next”



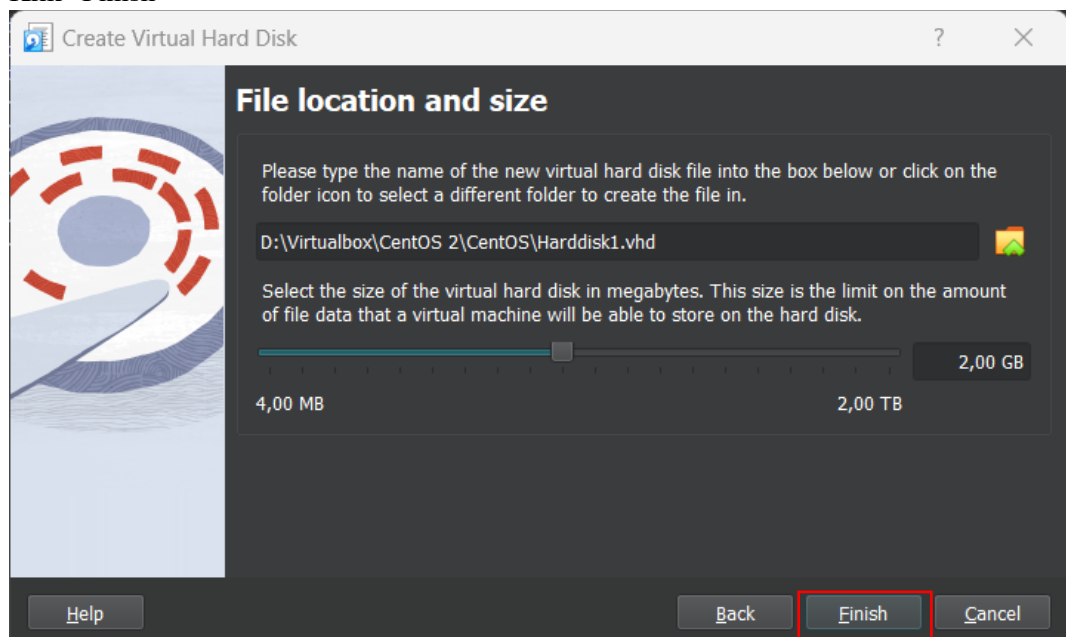
7. Klik “Next”



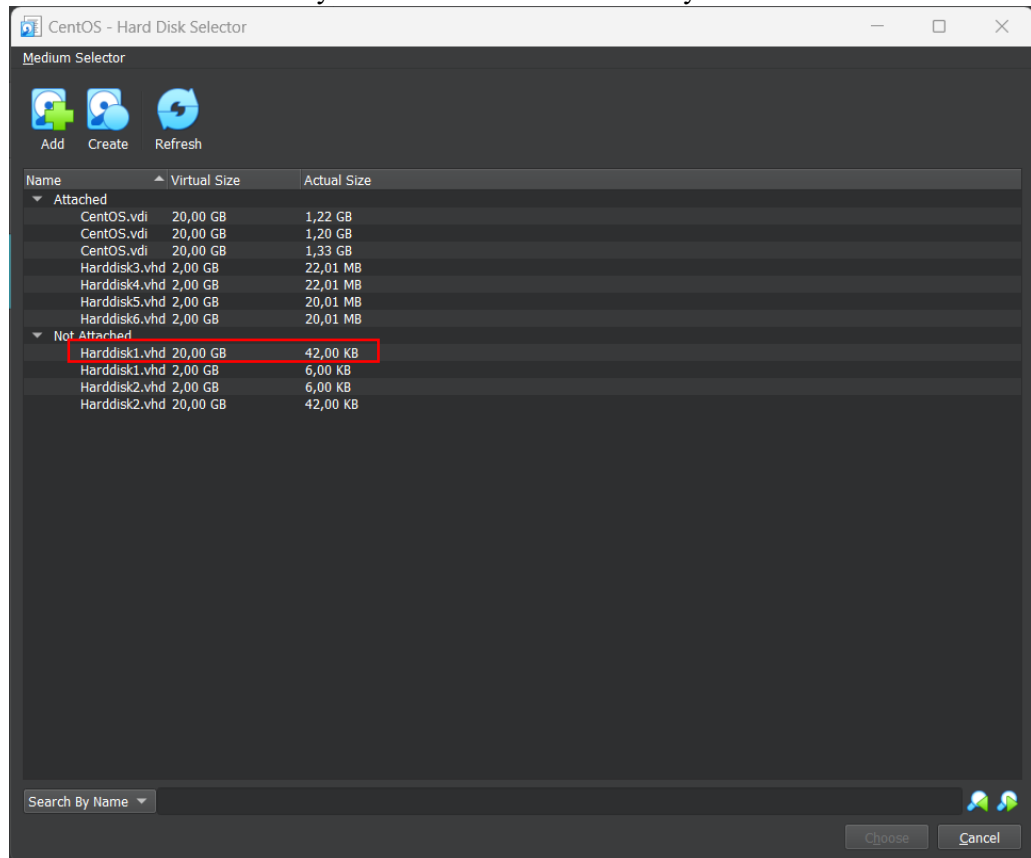
8. Buat tempat untuk peletakan harddisk di Mesin Virtual dan ukurannya sebesar 2GB



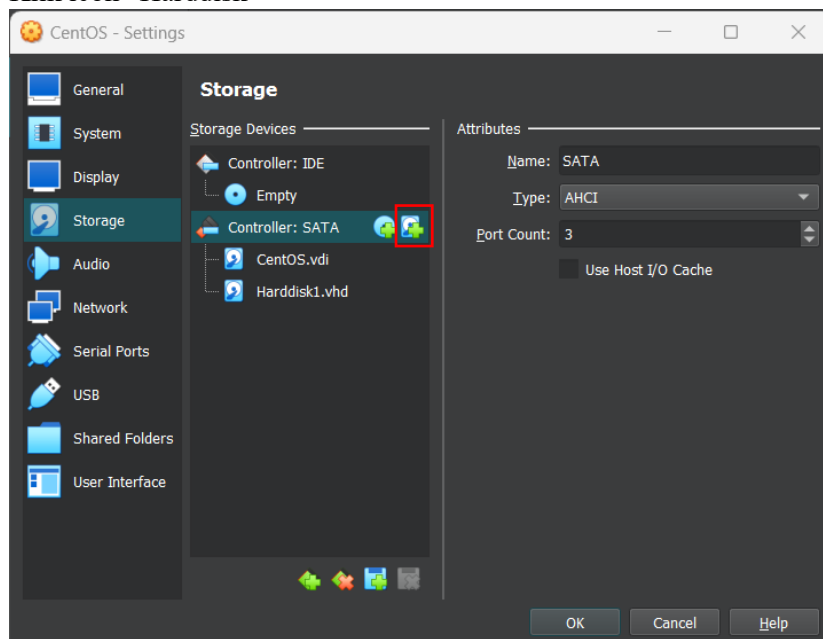
9. Klik “Finish”



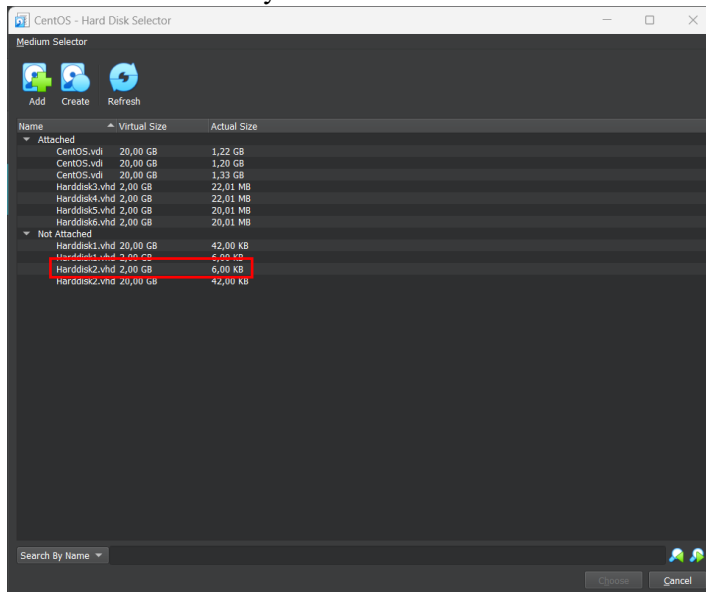
10. Lakukan Kembali ke nomor 12 untuk membuat Harddisk2
11. Klik Harddisk1.vhd sebanyak 2 kali untuk memasukkannya



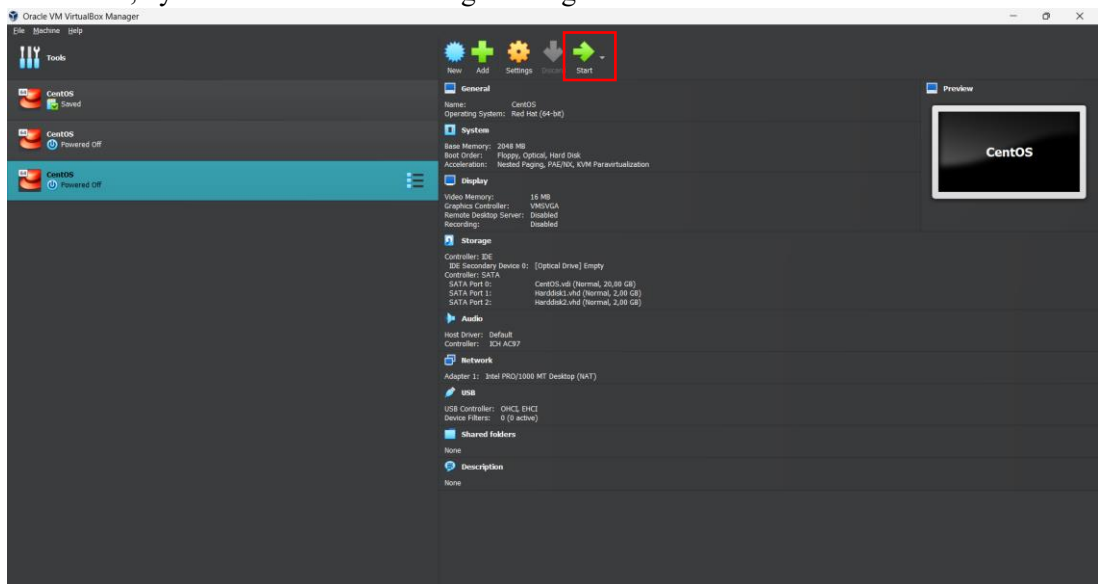
12. Klik icon “Harddisk”



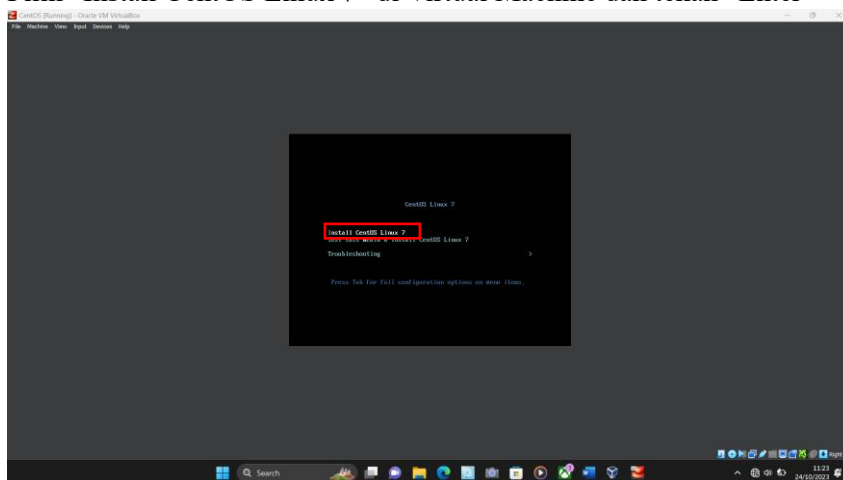
13. Klik Harddisk2 sebanyak 2 kali



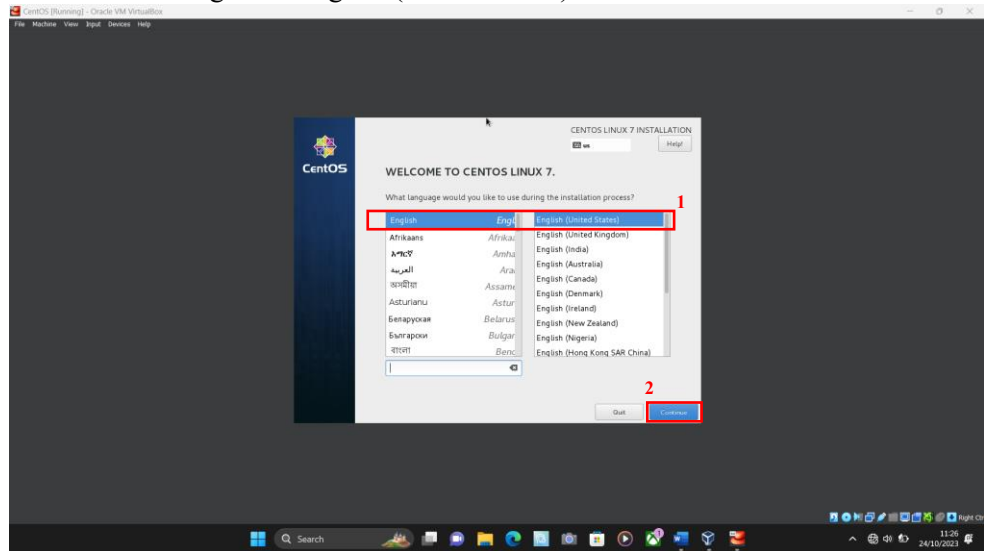
14. Kemudian, nyalakan mesin virtual dengan mengklik “Start”



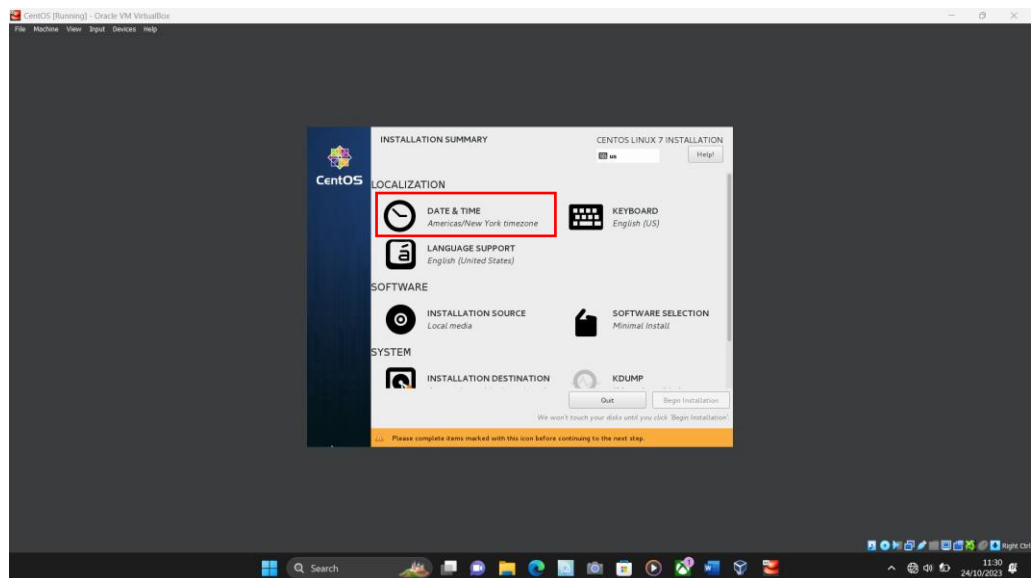
15. Pilih “Install CentOS Linux 7” di Virtual Machine dan tekan “Enter”



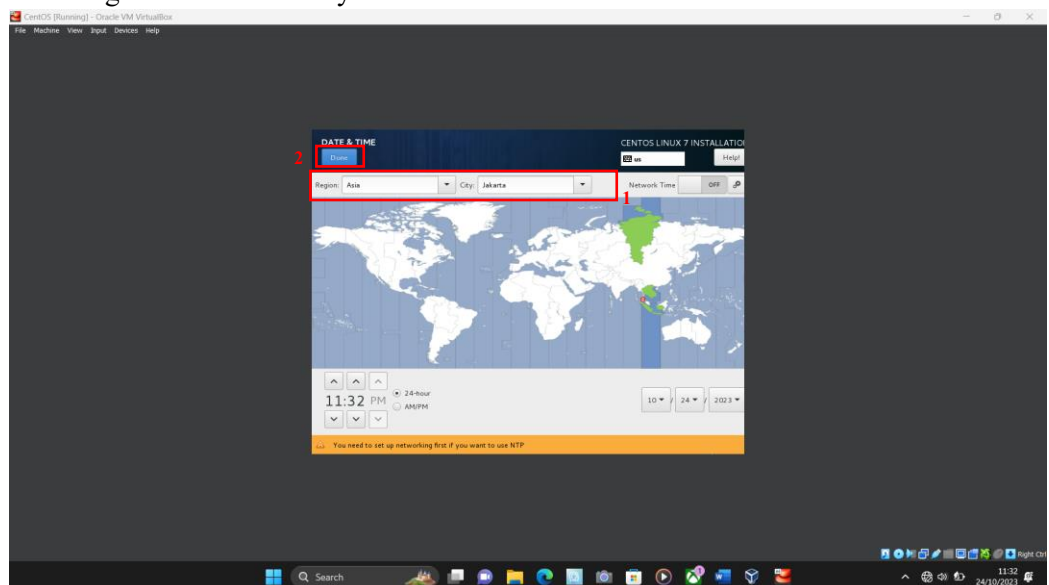
16. Pilih Bahasa “English – English (United States)” dan klik Continue



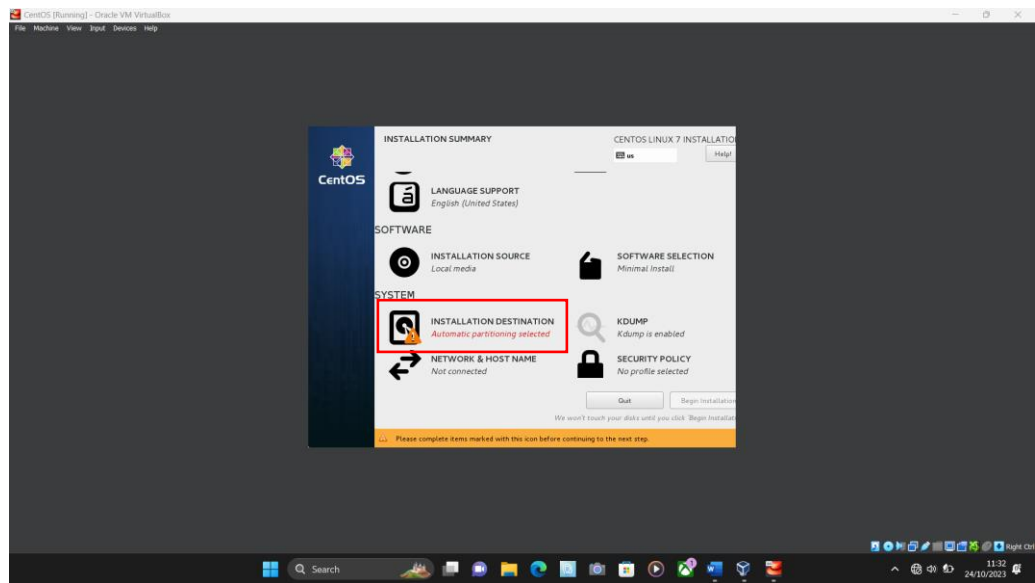
17. Klik “Date & Time”



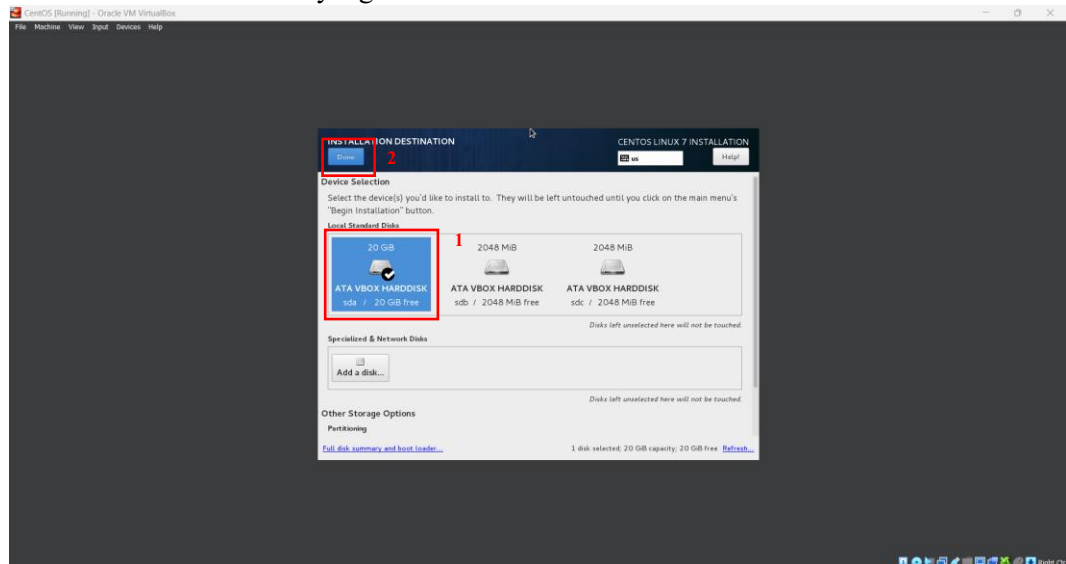
18. Pilih Region “Asia” dan City “Jakarta” dan klik “Done”



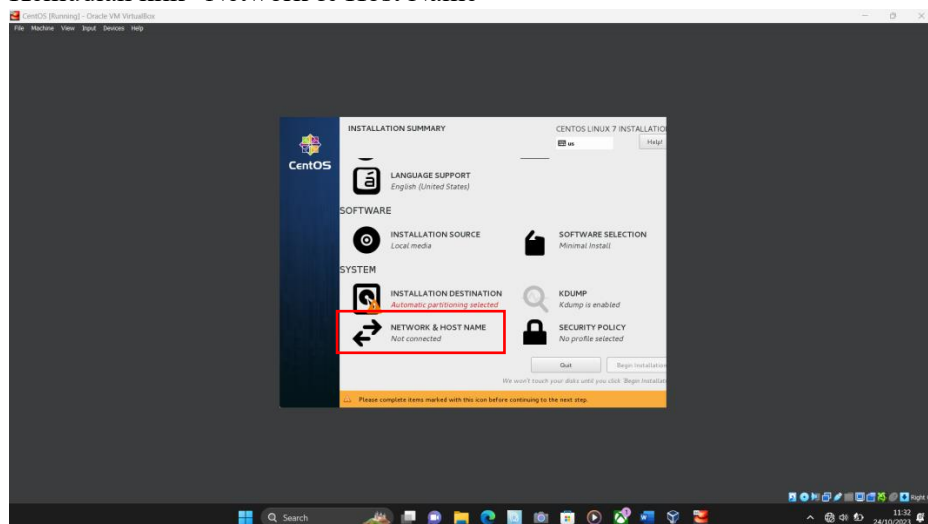
19. Kemudian klik “Installation Destination”



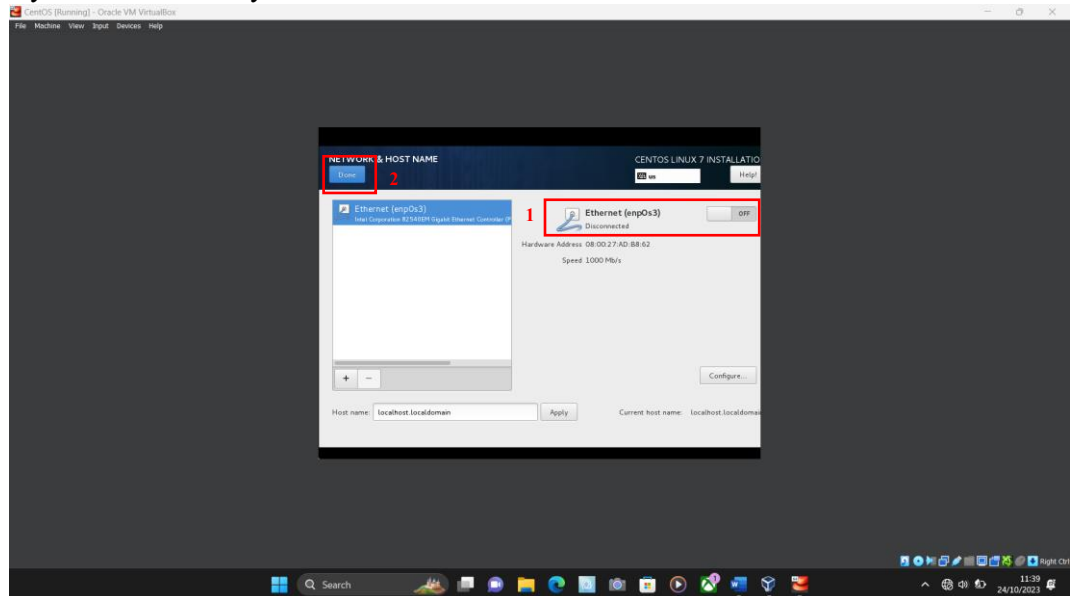
20. Kemudian Pilih Harddisk yang diinstal dan klik “Done”



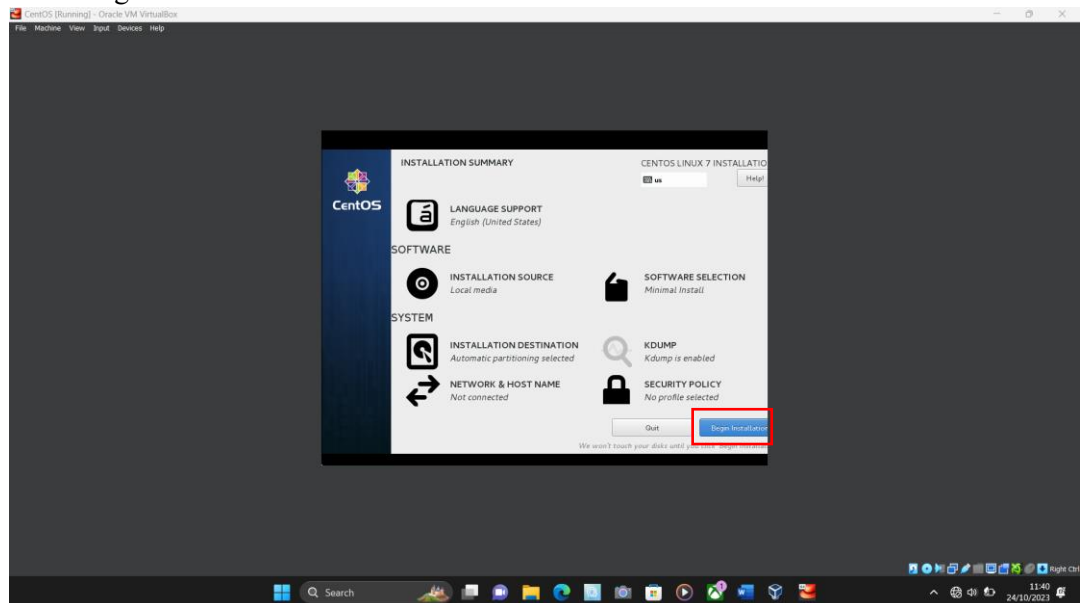
21. Kemudian klik “Network & Host Name”



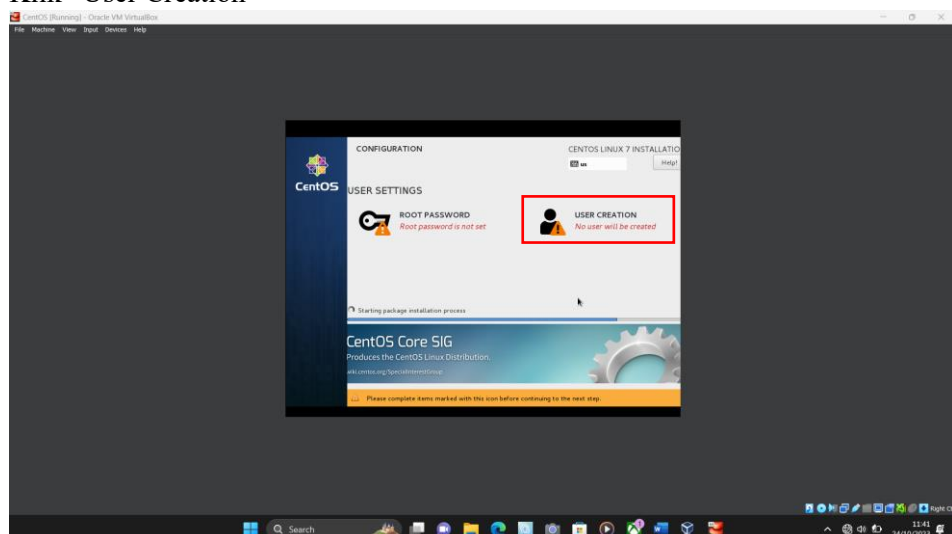
22. Nyalakan Ethernet nya dan klik “Done”



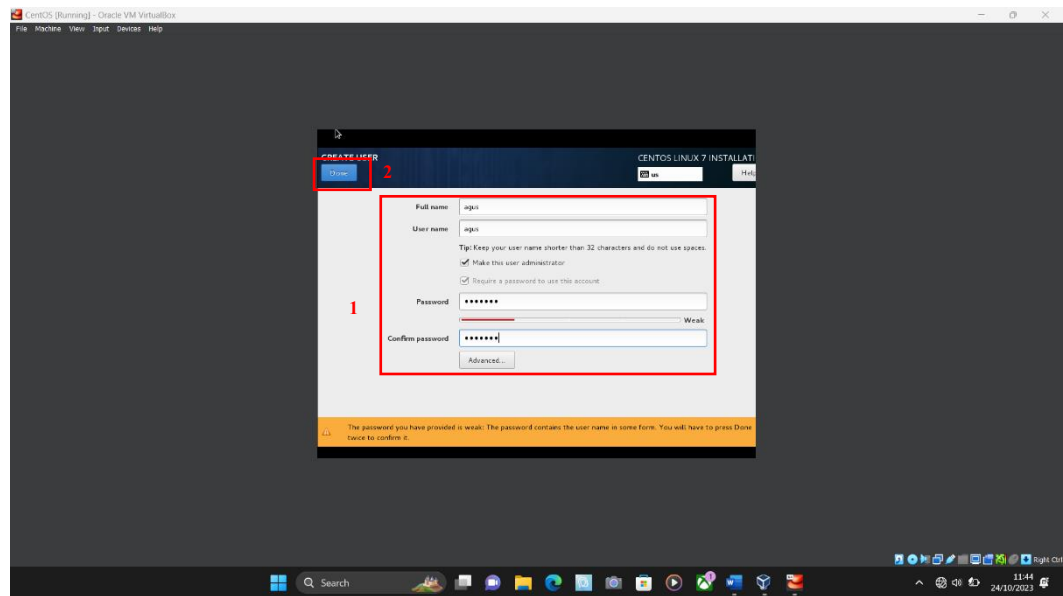
23. Klik “Begin Installation”



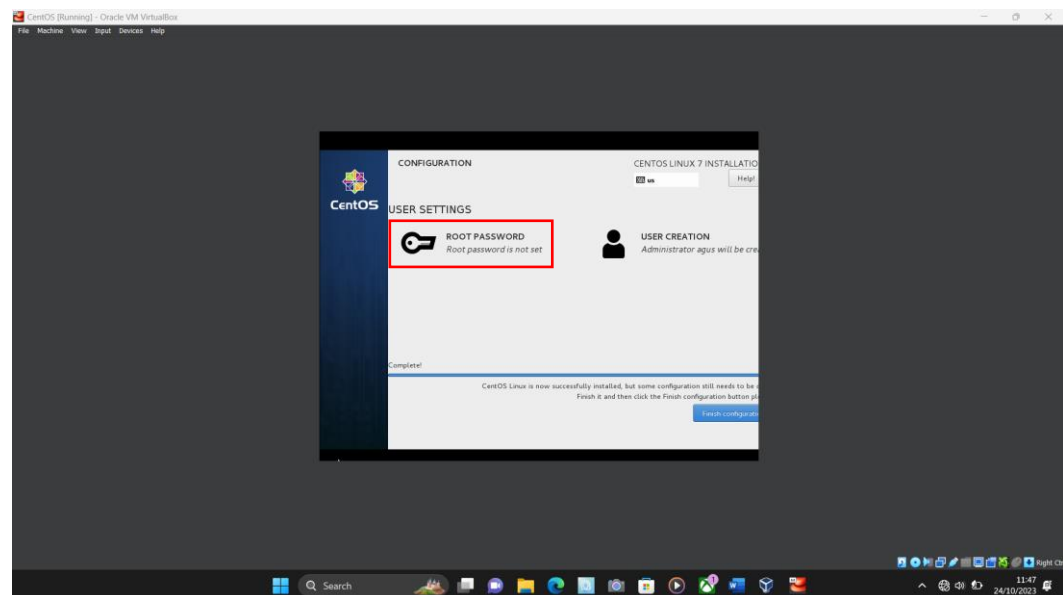
24. Klik “User Creation”



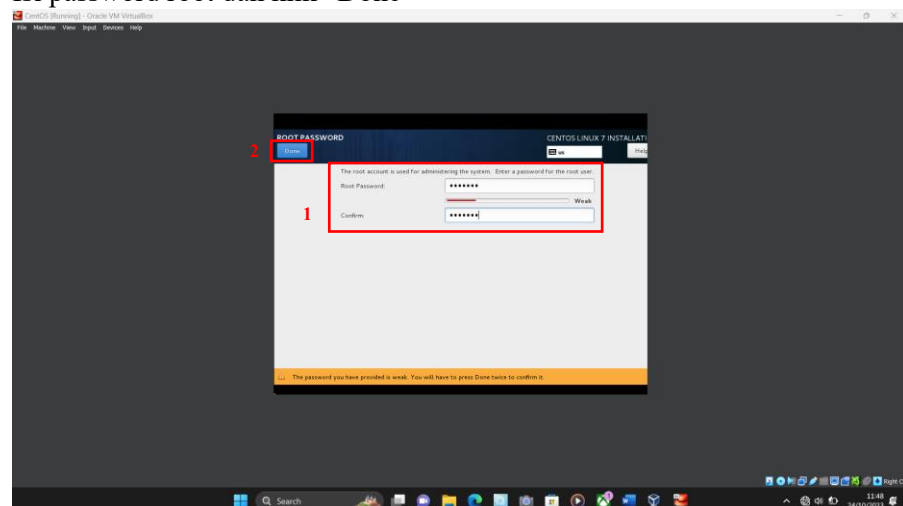
25. Kemudian isi nama, password user nya, dan ceklis “Make this user administrator”. Kemudian klik “Done”



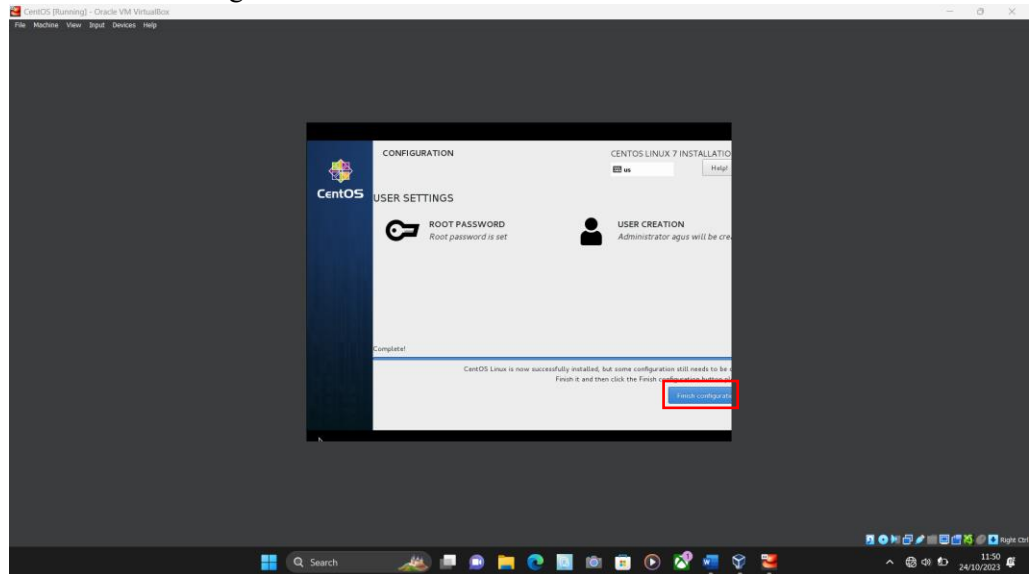
26. Klik “Root Password”



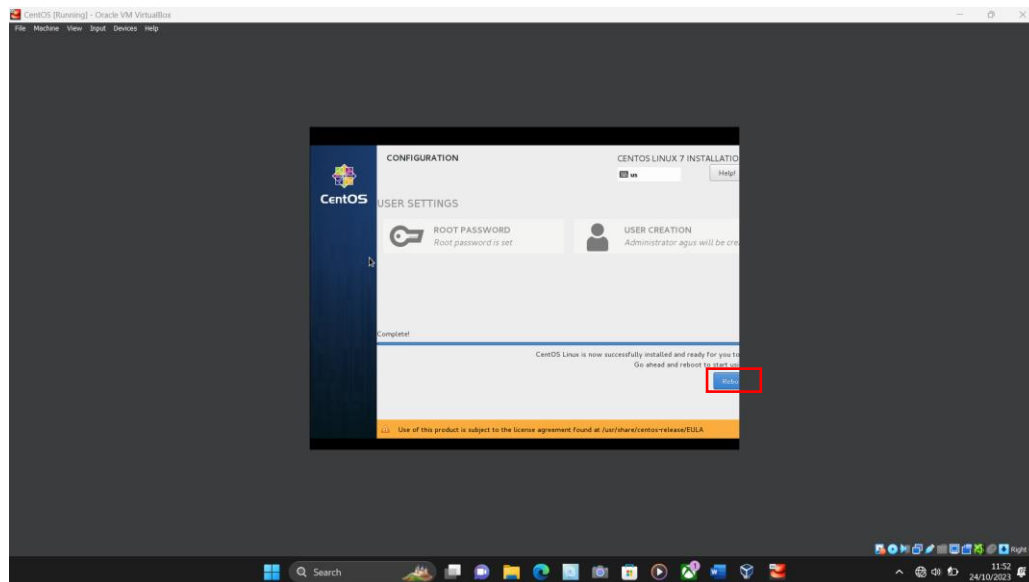
27. Isi password root dan klik “Done”



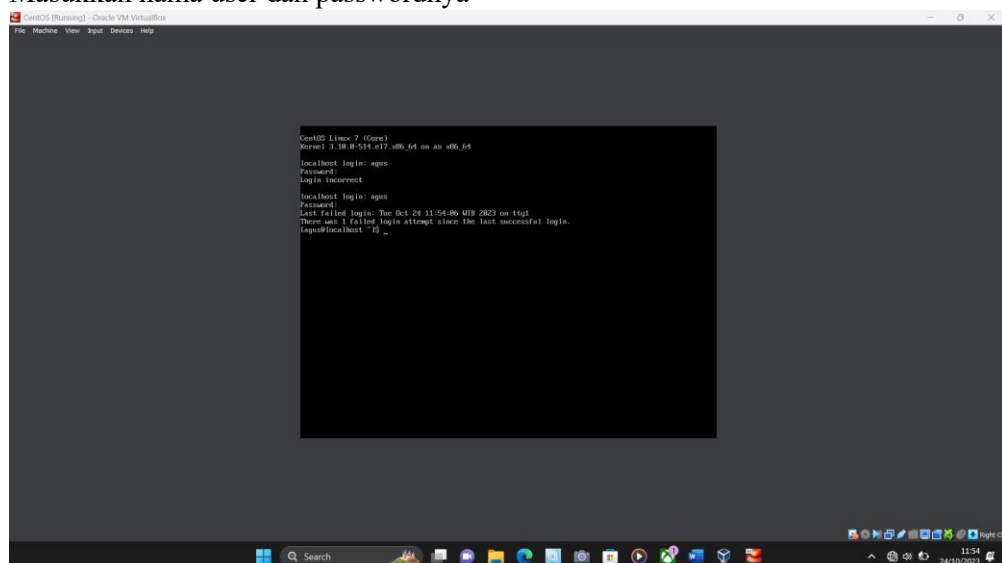
28. Klik “Finish Configuration”



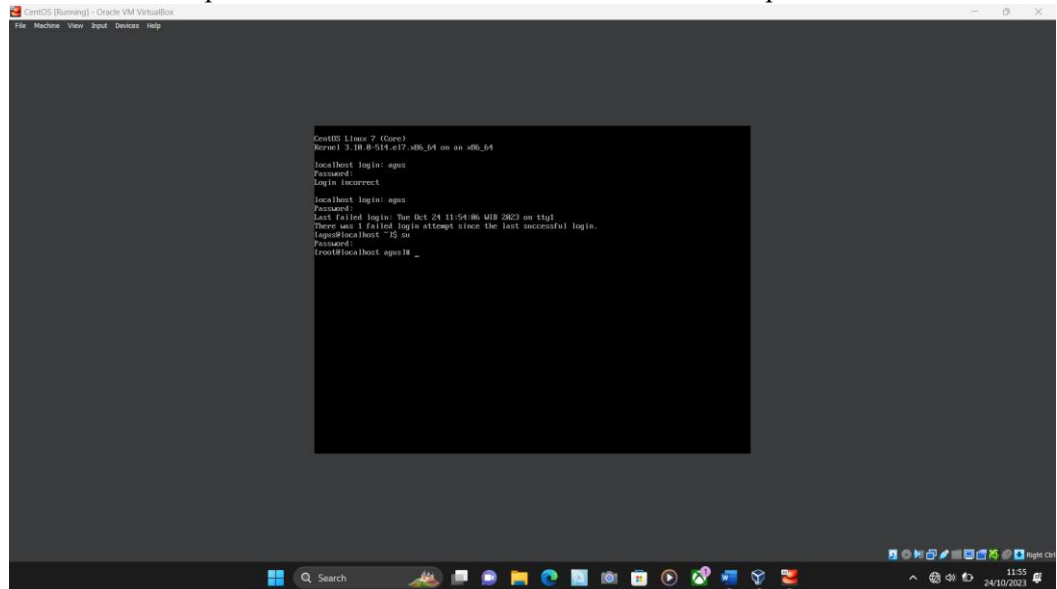
29. Kemudian klik “Reboot”



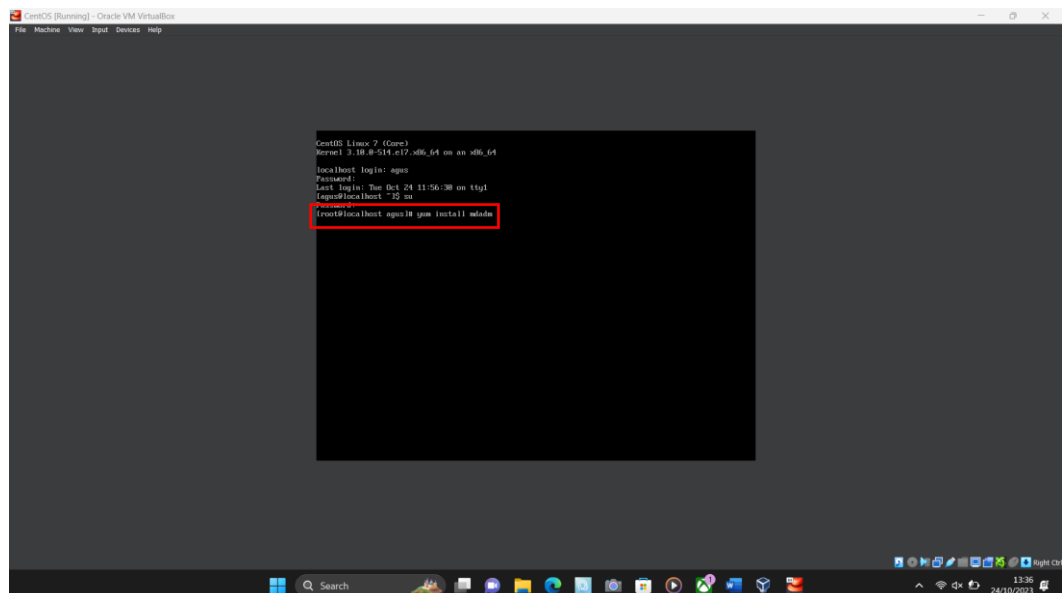
30. Masukkan nama user dan passwordnya



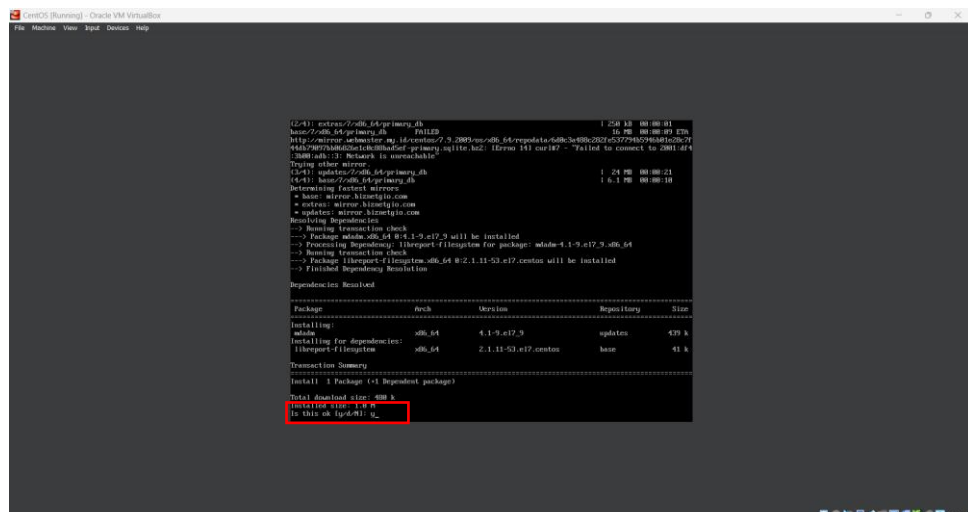
31. Kemudian ketik perintah su untuk masuk ke root dan masukkan password root



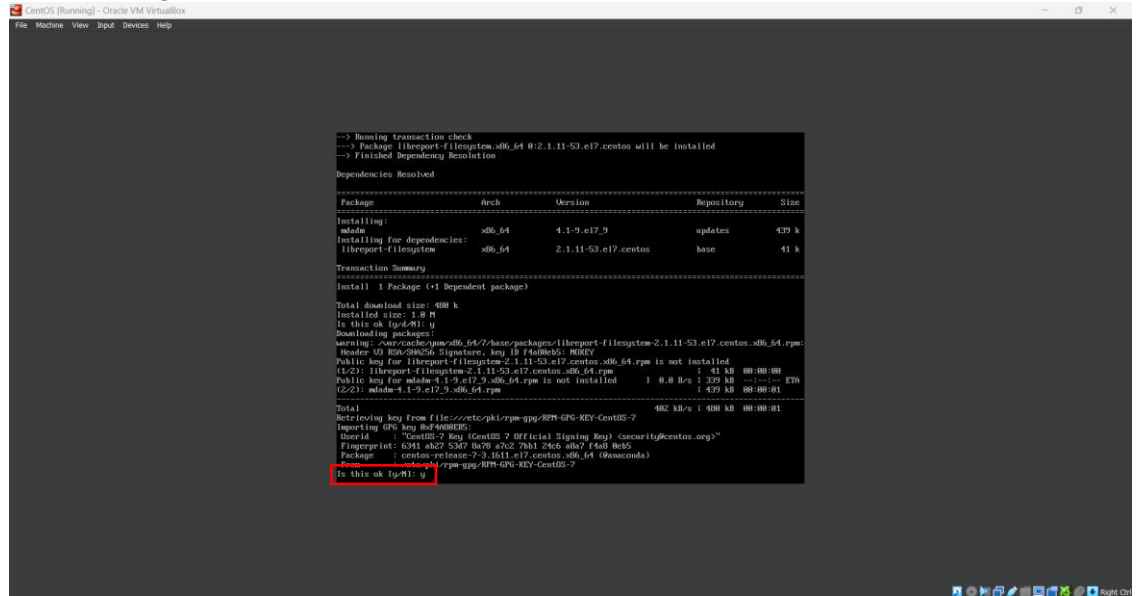
32. Ketikkan perintah untuk menginstall mdadm dengan mengetik perintah yang ada di gambar ini dan tekan Enter



33. Ketik “Y” dan Enter



34. Ketik “Y” lagi dan Enter

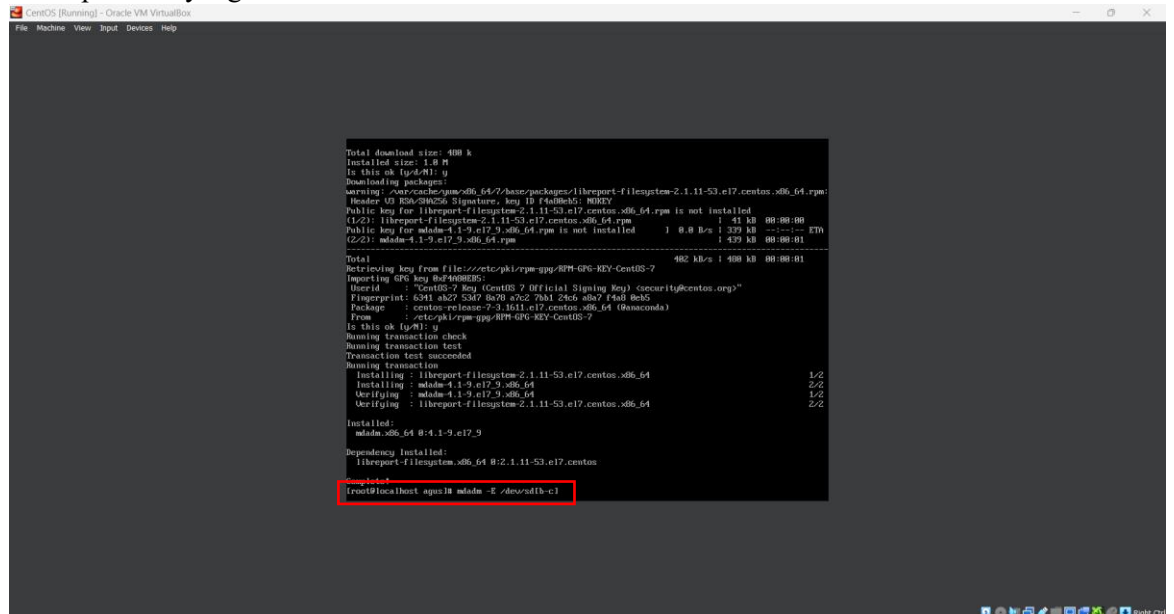


```
--> Running transaction check
--> Package libreport-filestream.x86_64 0:2.1.11-53.el7.centos will be installed
--> Finished Dependency Resolution

Dependencies Resolved

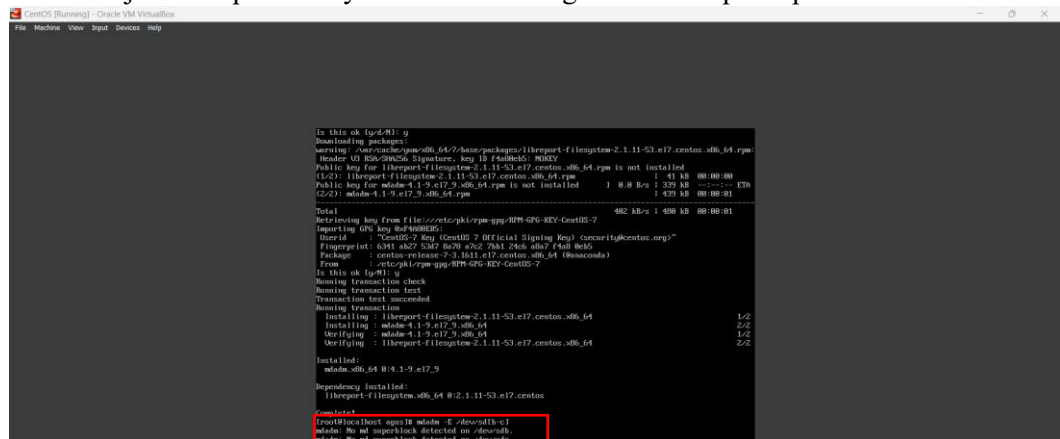
=====
Package                Arch          Version           Repository        Size
=====
Installing:
mdadm                  x86_64        4.1-9.el7.9       updates          439 k
Installing for dependencies:
libreport-filestream   x86_64        2.1.11-53.el7.centos base              41 k
=====
Transaction Summary
=====
Install 1 Package (+1 Dependent package)
Total download size: 480 k
Installed size: 1.9 M
Is this ok [y/n]: y
Downloading packages:
warning: /var/cache/yum/x86_64/7/base/packages/libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm:
Header V0 RSA/SHA256 Signature, key ID f4008e25: NOKEY
Public key for libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm is not installed
(1/2): libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm | 41 kB 00:00:00
Public key for mdadm-4.1-9.el7.9.x86_64.rpm is not installed | 0.8 B/s | 329 kB --:-- ETD
(2/2): mdadm-4.1-9.el7.9.x86_64.rpm | 439 kB 00:00:01
Total: 482 kB/s | 480 kB 00:00:01
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key 8d608805:
Userid : "CentOS-7 Key (CentOS 7 Official Signing Key) <security@centos.org>"
Fingerprint: 6341 ab27 5378 8c79 a2c2 78a1 24c6 a827 f6a8 8b35
Package : centos-release-7-3.1611.el7.centos.x86_64 (baseos)
From : centos-pki-rpm-gpg-RPM-GPG-KEY-CentOS-7
Is this ok [y/n]: y
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : libreport-filestream-2.1.11-53.el7.centos.x86_64 1/2
Installing : mdadm-4.1-9.el7.9.x86_64 2/2
Verifying : mdadm-4.1-9.el7.9.x86_64 1/2
Verifying : libreport-filestream-2.1.11-53.el7.centos.x86_64 2/2
Installed:
mdadm.x86_64 0:4.1-9.el7.9
Dependency Installed:
libreport-filestream.x86_64 0:2.1.11-53.el7.centos
Completed
[root@localhost ~]# mdadm -E /dev/sdb1-c1
```

35. Ketik perintah yang ada di kotak warna merah dan tekan enter



```
Total download size: 480 k
Installed size: 1.9 M
Is this ok [y/n]: y
Downloading packages:
warning: /var/cache/yum/x86_64/7/base/packages/libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm:
Header V0 RSA/SHA256 Signature, key ID f4008e25: NOKEY
Public key for libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm is not installed
(1/2): libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm | 41 kB 00:00:00
Public key for mdadm-4.1-9.el7.9.x86_64.rpm is not installed | 0.8 B/s | 329 kB --:-- ETD
(2/2): mdadm-4.1-9.el7.9.x86_64.rpm | 439 kB 00:00:01
Total: 482 kB/s | 480 kB 00:00:01
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key 8d608805:
Userid : "CentOS-7 Key (CentOS 7 Official Signing Key) <security@centos.org>"
Fingerprint: 6341 ab27 5378 8c79 a2c2 78a1 24c6 a827 f6a8 8b35
Package : centos-release-7-3.1611.el7.centos.x86_64 (baseos)
From : centos-pki-rpm-gpg-RPM-GPG-KEY-CentOS-7
Is this ok [y/n]: y
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : libreport-filestream-2.1.11-53.el7.centos.x86_64 1/2
Installing : mdadm-4.1-9.el7.9.x86_64 2/2
Verifying : mdadm-4.1-9.el7.9.x86_64 1/2
Verifying : libreport-filestream-2.1.11-53.el7.centos.x86_64 2/2
Installed:
mdadm.x86_64 0:4.1-9.el7.9
Dependency Installed:
libreport-filestream.x86_64 0:2.1.11-53.el7.centos
Completed
[root@localhost ~]# mdadm -E /dev/sdb1-c1
```

36. Setelah dijalankan perintahnya maka akan mengeluarkan output seperti ini



```
Is this ok [y/n]: y
Downloading packages:
warning: /var/cache/yum/x86_64/7/base/packages/libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm:
Header V0 RSA/SHA256 Signature, key ID f4008e25: NOKEY
Public key for libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm is not installed
(1/2): libreport-filestream-2.1.11-53.el7.centos.x86_64.rpm | 41 kB 00:00:00
Public key for mdadm-4.1-9.el7.9.x86_64.rpm is not installed | 0.8 B/s | 329 kB --:-- ETD
(2/2): mdadm-4.1-9.el7.9.x86_64.rpm | 439 kB 00:00:01
Total: 482 kB/s | 480 kB 00:00:01
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key 8d608805:
Userid : "CentOS-7 Key (CentOS 7 Official Signing Key) <security@centos.org>"
Fingerprint: 6341 ab27 5378 8c79 a2c2 78a1 24c6 a827 f6a8 8b35
Package : centos-release-7-3.1611.el7.centos.x86_64 (baseos)
From : centos-pki-rpm-gpg-RPM-GPG-KEY-CentOS-7
Is this ok [y/n]: y
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
Installing : libreport-filestream-2.1.11-53.el7.centos.x86_64 1/2
Installing : mdadm-4.1-9.el7.9.x86_64 2/2
Verifying : mdadm-4.1-9.el7.9.x86_64 1/2
Verifying : libreport-filestream-2.1.11-53.el7.centos.x86_64 2/2
Installed:
mdadm.x86_64 0:4.1-9.el7.9
Dependency Installed:
libreport-filestream.x86_64 0:2.1.11-53.el7.centos
Completed
[root@localhost ~]# mdadm -E /dev/sdb1-c1
mdadm: No md superblock detected on /dev/sdb1-c1.
mdadm: No md superblock detected on /dev/sdb1-c1.
```

37. Kemudian ketik perintah yang ada di kotak ini kemudian tekan enter

```

CentOS (Running) - Oracle VM VirtualBox
File Machine View Input Devices Help

Is this ok (y/n)? y
Downloading packages:
warning: /var/cache/yum/x86_64/7/base/packages/libreport-filemgstew-2.1.11-53.el7.centos.x86_64.rpm:
header US RSA-SHA256 Signature, key ID f40683c5: NOKEY
Public key for libreport-filemgstew-2.1.11-53.el7.centos.x86_64.rpm is not installed
(1/2): libreport-filemgstew-2.1.11-53.el7.centos.x86_64.rpm | 41 kB | 88 MB/s
Public key for mdadm-4.1.9.el7.3.x86_64.rpm is not installed
(2/2): mdadm-4.1.9.el7.3.x86_64.rpm | 8.0 kB | 129 kB | 129 MB/s
Total: 482 kB/s | 400 kB | 88 MB/s
Retrieving key from file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Importing GPG key f40683c5:
Userid : "CentOS-7 Official Signing Key [centos@centos.org]"
Fingerprint: 6341 ab27 5378 b08b c725 7313 2455 ab47 f4d8 b4b5
Package : centos-release-7-3.1011.el7.centos.x86_64 (BaseOS)
From :
       file:///etc/pki/rpm-gpg/RPM-GPG-KEY-CentOS-7
Is this ok (y/n)? y
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction:
Installing : libreport-filemgstew-2.1.11-53.el7.centos.x86_64 1/2
Installing : mdadm-4.1.9.el7.3.x86_64 2/2
Verifying : mdadm-4.1.9.el7.3.x86_64 1/2
Verifying : libreport-filemgstew-2.1.11-53.el7.centos.x86_64 2/2
Installed:
mdadm.x86_64 4:4.1.9.el7.3
Dependency Installed:
libreport-filemgstew.x86_64 0:2.1.11-53.el7.centos
Complete!
[root@localhost apus18 ~]# mdadm -E /dev/sdb-c1
mdadm: No md superblock detected on /dev/sdb.
mdadm: No md superblock detected on /dev/sdc.
[root@localhost apus18 ~]# fdisk -l more_

```

38. Setelah dijalankan perintah di atas maka akan menghasilkan output seperti ini

```

CentOS (Running) - Oracle VM VirtualBox
File Machine View Input Devices Help

[root@localhost apus18 ~]# fdisk -l more_
Disk /dev/sda: 21.5 GB, 21474836480 bytes, 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x00000000

   Boot   Start      End  Blocks  Id System
/dev/sda1 *    2048    2897379    2897376  83 Linux
/dev/sda2      2897380    41943039    39045660  8e Linux LVM

Disk /dev/sdb: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdc: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/c1-root: 10.2 GB, 10249416704 bytes, 20038032 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/c1-sap: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

[root@localhost apus18 ~]#

```

Note:

- Yang diberi kotak merah tersebut yaitu menampilkan harddisk tetapi hanya sda yang ditampilkan sehingga sdb dan sdc belum dapat digunakan karena belum diformat.

39. Ketik perintah yang ada di kotak ini dan tekan enter

```

CentOS (Running) - Oracle VM VirtualBox
File Machine View Input Devices Help

[root@localhost apus18 ~]# fdisk -l more_
Disk /dev/sda: 21.5 GB, 21474836480 bytes, 41943040 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x00000000

   Boot   Start      End  Blocks  Id System
/dev/sda1 *    2048    2897379    2897376  83 Linux
/dev/sda2      2897380    41943039    39045660  8e Linux LVM

Disk /dev/sdb: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/sdc: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

Disk /dev/mapper/c1-root: 10.2 GB, 10249416704 bytes, 20038032 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

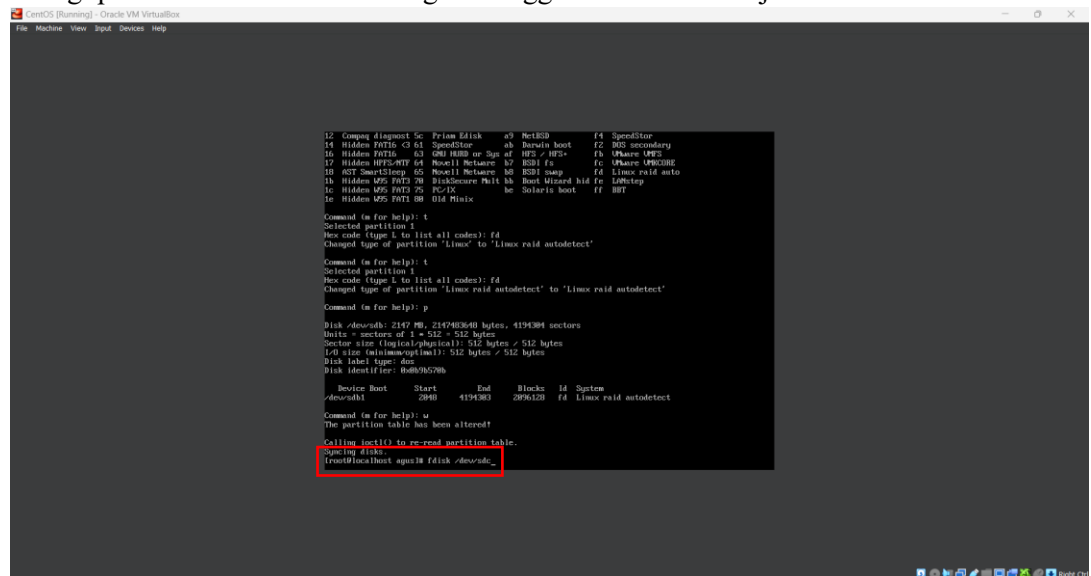
Disk /dev/mapper/c1-sap: 2147 MB, 2147483648 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes

[root@localhost apus18 ~]# fdisk /dev/sdb_

```


Note:

1. Fungsi dari perintah `/dev/sdb` yaitu membuat format untuk `sdb` pada harddisk 1
40. Setelah dijalankan perintah nya, ketik sesuai perintah yang ada di bawah ini:
 1. Ketikkan `n` untuk membuat partisi baru dan tekan enter
 2. Kemudian ketik `p` untuk partisi primary dan tekan enter
 3. Kemudian ketik `1` untuk nomor partisi dan tekan enter
 4. Berikan default full size dengan cara menekan enter dua kali
 5. Ketikkan `p` untuk mencetak partisi yang sudah didefinisikan dan tekan enter
 6. Ketikkan `l` untuk melihat semua list tipe yang ada dan tekan enter
 7. Ketikkan `t` untuk memilih partisi dan tekan enter
 8. Ketikkan `fd` untuk membuat otomatis raid linux dan tekan enter
 9. Ketikkan `p` untuk mencetak perubahan yang anda buat dan tekan enter
 10. Ketikkan `w` untuk menyimpan perubahan dan tekan enter
41. Ulangi perintah nomor 39 – 40 dengan mengganti `/dev/sdb` menjadi `/dev/sdc`



```
12 Compaq diskette 5c Priam Edisk 49 NetBSD f4 SpeedStar
14 Hidden PART1 61 SpeedStar 4b Darwin boot f2 DOS secondary
16 Hidden PART1 63 C&D HDD ar 3up 4f UFS /usr f3 UShare UFS
17 Hidden HPFS-NTFS 64 Maxwell Netware 67 BSDI fs f6 UShare UFS
18 HPFS-NTFS 65 Maxwell Netware 68 C&D 3sup f4 Linux raid auto
19 Hidden UFS PART1 70 DiskSecure Mail kb Boot Wizard hid fe LdMtop
16 Hidden UFS PART1 75 PC/IX be Solaris boot ff BBT
1e Hidden UFS PART1 98 OLA Unix

Command (n for help): t
Selected partition 1
Hex code (type l to list all codes): fd
Changed type of partition 'Linux' to 'Linux raid autodetect'

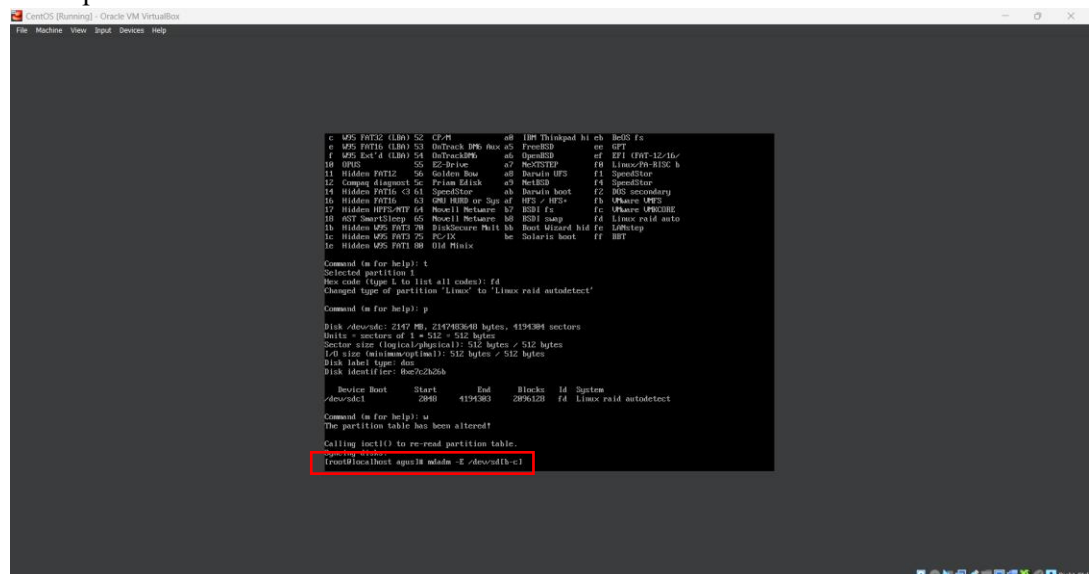
Command (n for help): t
Selected partition 1
Hex code (type l to list all codes): fd
Changed type of partition 'Linux raid autodetect' to 'Linux raid autodetect'

Command (n for help): p
Disk /dev/sdb: 2147 MB, 2147403520 bytes, 4194304 sectors
Units = sectors of 1 = 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x00090570b

   Device Boot      Start         End      Blocks   Id  System
/dev/sdb1             2048        4194303        2096128    fd  Linux raid autodetect

Command (n for help): w
The partition table has been altered!
Calling ioctl() to re-read partition table.
Syncing disks.
Linux raid autodetect again! fdisk /dev/sdb_
```

42. Ketik perintah di kotak merah ini untuk melakukan verifikasi raid dan tekan enter



```
c UFS PART2 (LBA) 52 CP/M 4b IBM Thinkpad hi kb NetOS fs
e UFS PART6 (LBA) 53 OnTrack DM6 Aux 45 FreeBSD ee GPT
f UFS Ext'd (LBA) 54 OnTrack DM6 46 OpenBSD ee ZFI (EFI) 12,16
18 UFS 55 EZ-Drive 47 MFSSTEP f8 Linux/PA-RISC b
11 Hidden PART2 56 Golden Boot 48 Darwin UFS f1 SpeedStar
12 Compaq diskette 5c Priam Edisk 49 NetBSD f4 SpeedStar
14 Hidden PART1 61 SpeedStar 4b Darwin boot f2 DOS secondary
16 Hidden PART1 63 C&D HDD ar 3up 4f UFS /usr f3 UShare UFS
17 Hidden HPFS-NTFS 64 Maxwell Netware 67 BSDI fs f6 UShare UFS
18 HPFS-NTFS 65 Maxwell Netware 68 C&D 3sup f4 Linux raid auto
19 Hidden UFS PART1 70 DiskSecure Mail kb Boot Wizard hid fe LdMtop
16 Hidden UFS PART1 75 PC/IX be Solaris boot ff BBT
1e Hidden UFS PART1 98 OLA Unix

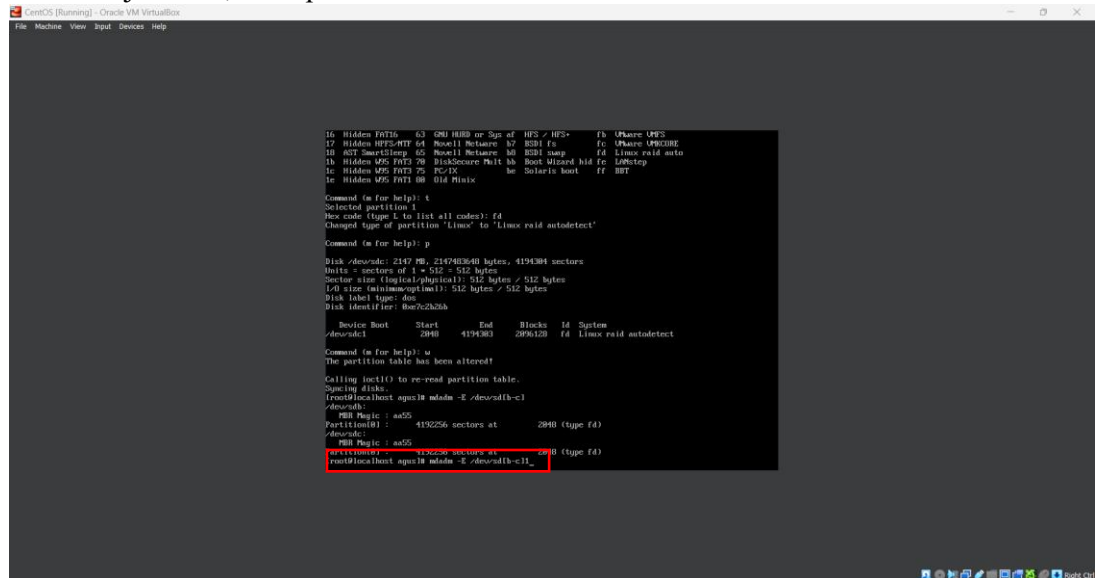
Command (n for help): t
Selected partition 1
Hex code (type l to list all codes): fd
Changed type of partition 'Linux' to 'Linux raid autodetect'

Command (n for help): p
Disk /dev/sdc: 2147 MB, 2147403520 bytes, 4194304 sectors
Units = sectors of 1 = 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x0002262b

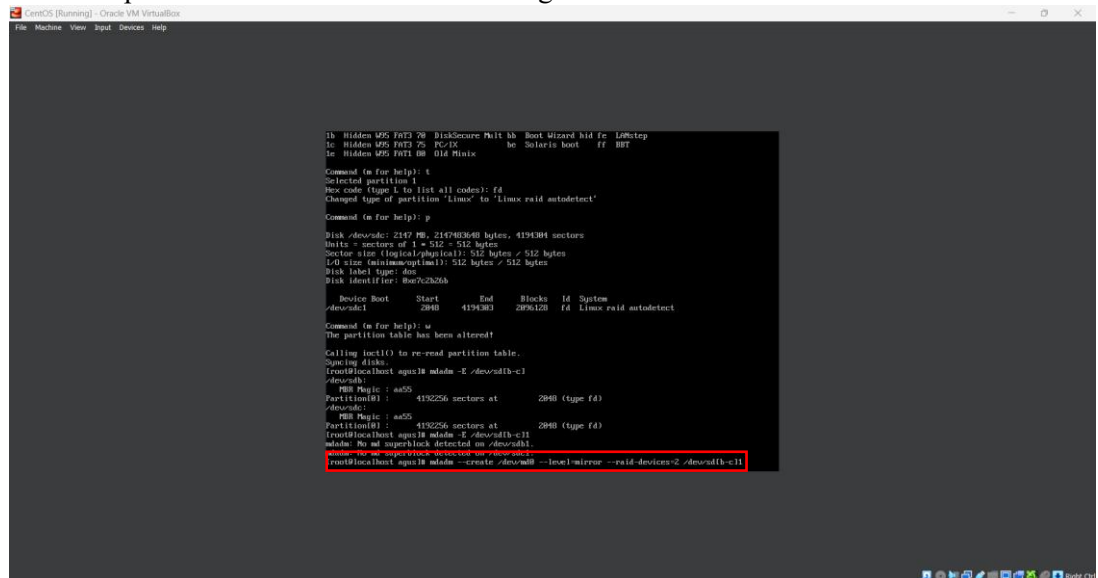
   Device Boot      Start         End      Blocks   Id  System
/dev/sdc1             2048        4194303        2096128    fd  Linux raid autodetect

Command (n for help): w
The partition table has been altered!
Calling ioctl() to re-read partition table.
Syncing disks.
Linux raid autodetect again! mda -E /dev/sdc1
```

43. Setelah dijalankan, ketik perintah di kotak merah ini dan tekan enter



44. Ketikkan perintah ini untuk melakukan konfigurasi raid dan tekan enter



Note:

1. Pada bagian `--create /dev/md0` yaitu penamaan drive, `--level=mirror` yaitu tingkatan untuk melakukan raid, `--raid-devices` yaitu jumlah harddisk yang dilakukan untuk raid dan `/dev/sd[b-c]1` yaitu bagian harddisk yang dilakukan untuk raid.

45. Ketik y untuk melanjutkan pembuatan array dan tekan enter



46. Ketik perintah yang ada di kotak merah dan tekan enter

```

Disk /dev/sdc: 2147 MB, 214743040 bytes, 4194304 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk label type: dos
Disk identifier: 0x7c2b26b

Device Boot      Start         End      Blocks   Id  System
/dev/sdc1        2048        4194303    2096128    fd   Linux raid autodetect

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@localhost ~]# mdadm -E /dev/sdc1
/dev/sdc1:
  Magic : aa55
  Partition0 : 4192256 sectors at 2048 (type fd)
/dev/sdc1:
  Magic : aa55
  Partition0 : 4192256 sectors at 2048 (type fd)
[root@localhost ~]# mdadm -E /dev/sdc1-c11
mdadm: No md superblock detected on /dev/sdc1-c11
mdadm: No md superblock detected on /dev/sdc1.
[root@localhost ~]# mdadm --create /dev/md0 --level=mirror --raid-devices=2 /dev/sdc1-c11
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
Continue creating array? y
mdadm: Fail to create md0 when using /sys/module/md_mod/parameters/new_array, fallback to creation v
is mode
mdadm: Reformatting in version 1.2 metadata
mdadm: array /dev/md0 started.
[root@localhost ~]# cat /proc/mdstat

```

47. Ketik perintah yang ada di kotak merah ini dan tekan enter

```

/dev/sdc1        2048        4194303    2096128    fd   Linux raid autodetect

Command (m for help): w
The partition table has been altered!

Calling ioctl() to re-read partition table.
Syncing disks.
[root@localhost ~]# mdadm -E /dev/sdc1
/dev/sdc1:
  Magic : aa55
  Partition0 : 4192256 sectors at 2048 (type fd)
/dev/sdc1:
  Magic : aa55
  Partition0 : 4192256 sectors at 2048 (type fd)
[root@localhost ~]# mdadm -E /dev/sdc1-c11
mdadm: No md superblock detected on /dev/sdc1-c11
mdadm: No md superblock detected on /dev/sdc1.
[root@localhost ~]# mdadm --create /dev/md0 --level=mirror --raid-devices=2 /dev/sdc1-c11
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
Continue creating array? y
mdadm: Fail to create md0 when using /sys/module/md_mod/parameters/new_array, fallback to creation v
is mode
mdadm: Reformatting in version 1.2 metadata
mdadm: array /dev/md0 started.
[root@localhost ~]# cat /proc/mdstat
mdm : active raid1 sdc1[1] sdc1[0]
      2096128 blocks super 1.2 [2/2] [UU]

unused devices: (none)
[root@localhost ~]# mdadm -E /dev/sdc1-c11
mdadm: cannot open /dev/sdc1-c11: no such file or directory
[root@localhost ~]# mdadm -E /dev/sdc1-c11

```

48. Ketikkan perintah yang ada di kotak merah ini dan tekan enter

```

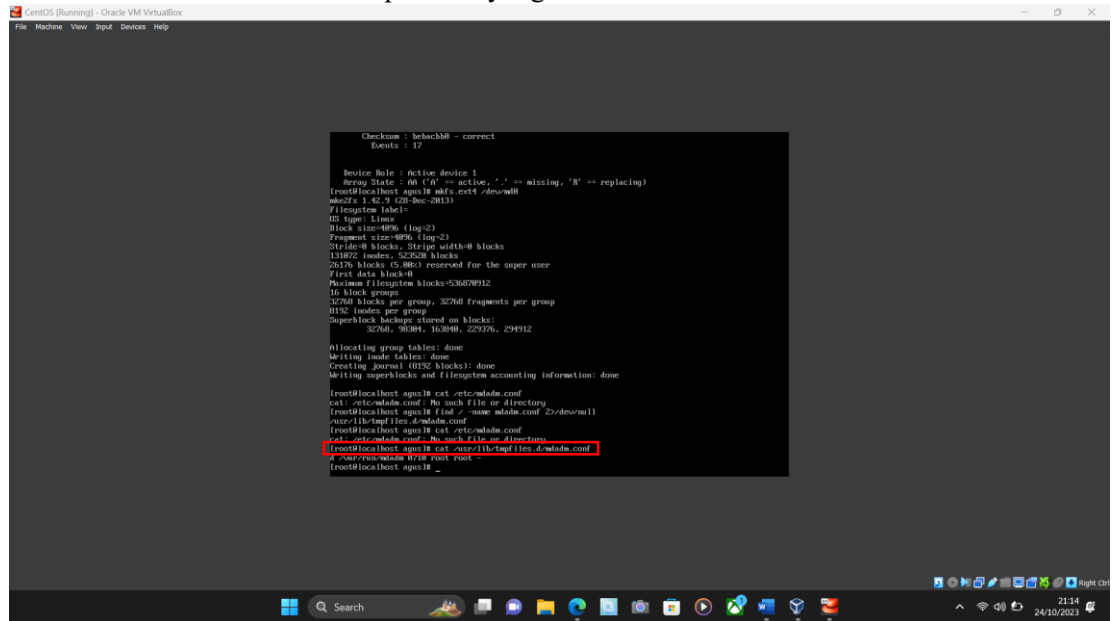
Device UUID : 3a1dc1f-c2865553-18c13862-18411749
Update Time : Tue Oct 24 18:59:27 2023
Int. Block Log : 512 entries available at offset 16 sectors
Checksums : 0x7c2b26b - correct
Events : 17

Device Role : Active device 0
Array State : RR 'A' -- active, 'I' -- missing, 'R' -- replacing)
/dev/sdc1:
  Magic : a92b4efc
  Version : 1.2
  Feature Map : 80d
  Array UUID : 3a1dc1f-c2865553-18c13862-18411749
  Name : localhost.localdomain:0 (local to host localhost.localdomain)
  Creation Time : Tue Oct 24 18:59:17 2023
  Raid Level : raid1
  Raid Devices : 2
  Avail Dev Size : 4180160 sectors (2090080 MB)
  Array Size : 2090080 K (2090080 MB)
  Data Offset : 4096 sectors
  Super Offset : 8 sectors
  Unused Space : before=4096 sectors, after=0 sectors
  State : clean
  Device UUID : 8a55995d-c916d6e4-c911719f-1a1d409f
Update Time : Tue Oct 24 18:59:27 2023
Int. Block Log : 512 entries available at offset 16 sectors
Checksums : 0x7c2b26b - correct
Events : 17

Device Role : Active device 1
Array State : RR 'A' -- active, 'I' -- missing, 'R' -- replacing)

```

49. Reboot mesin virtual. Ketikkan perintah yang ada di kotak merah ini dan tekan enter



```
CentOS (Running) - Oracle VM VirtualBox
File Machine View Input Devices Help

Checksum : beba6b8 - correct
Events : 17

Device Role : active device 1
Array State : ah ('a' == active, '.' == missing, 'R' == replacing)
[root@localhost ~]# cat /etc/mdadm.conf
mdadm2fs 1.42.9 (20-Dec-2013)
Filesystem label:
OS type: linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
131072 inodes, 528256 blocks
26176 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=536870912
16 block groups
32768 blocks per group, 32768 fragments per group
0152 inodes per group
Superblock backups stored on blocks:
32768, 90304, 163840, 225376, 294912

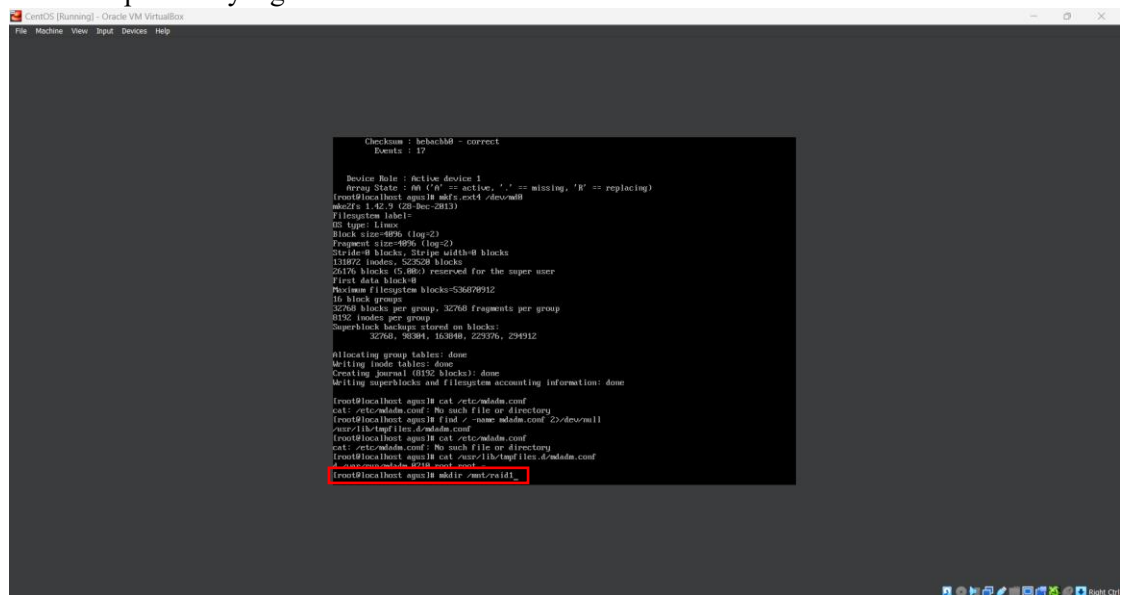
Allocating group tables: done
Writing inode tables: done
Creating journal (0152 blocks): done
Writing superblocks and filesystem accounting information: done

[root@localhost ~]# cat /etc/mdadm.conf
cat: /etc/mdadm.conf: No such file or directory
[root@localhost ~]# find / -name mdadm.conf 2>/dev/null
/usr/lib/tmpfiles.d/mdadm.conf
[root@localhost ~]# cat /etc/mdadm.conf
cat: /etc/mdadm.conf: No such file or directory
[root@localhost ~]# cat /usr/lib/tmpfiles.d/mdadm.conf
d /usr/lib/tmpfiles.d/mdadm.conf root root
[root@localhost ~]#
```

Note:

1. Di modul, perintah untuk `cat /etc/mdadm.conf` tidak dapat dieksekusi karena tidak ditemukan, untuk mengganti perintahnya yaitu `cat /usr/lib/tmpfiles.d/mdadm.conf`.

50. Ketikkan perintah yang ada di kotak ini dan tekan enter



```
CentOS (Running) - Oracle VM VirtualBox
File Machine View Input Devices Help

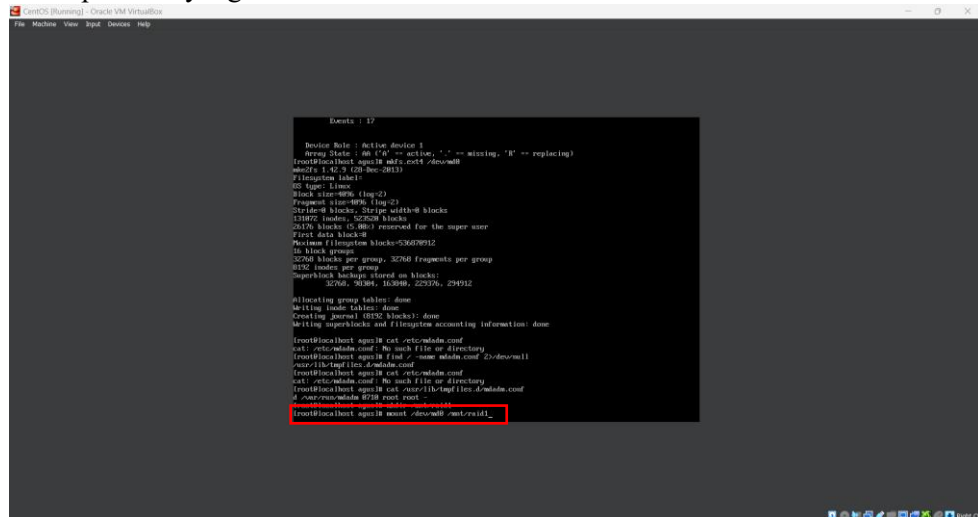
Checksum : beba6b8 - correct
Events : 17

Device Role : active device 1
Array State : ah ('a' == active, '.' == missing, 'R' == replacing)
[root@localhost ~]# cat /etc/mdadm.conf
mdadm2fs 1.42.9 (20-Dec-2013)
Filesystem label:
OS type: linux
Block size=4096 (log=2)
Fragment size=4096 (log=2)
Stride=0 blocks, Stripe width=0 blocks
131072 inodes, 528256 blocks
26176 blocks (5.00%) reserved for the super user
First data block=0
Maximum filesystem blocks=536870912
16 block groups
32768 blocks per group, 32768 fragments per group
0152 inodes per group
Superblock backups stored on blocks:
32768, 90304, 163840, 225376, 294912

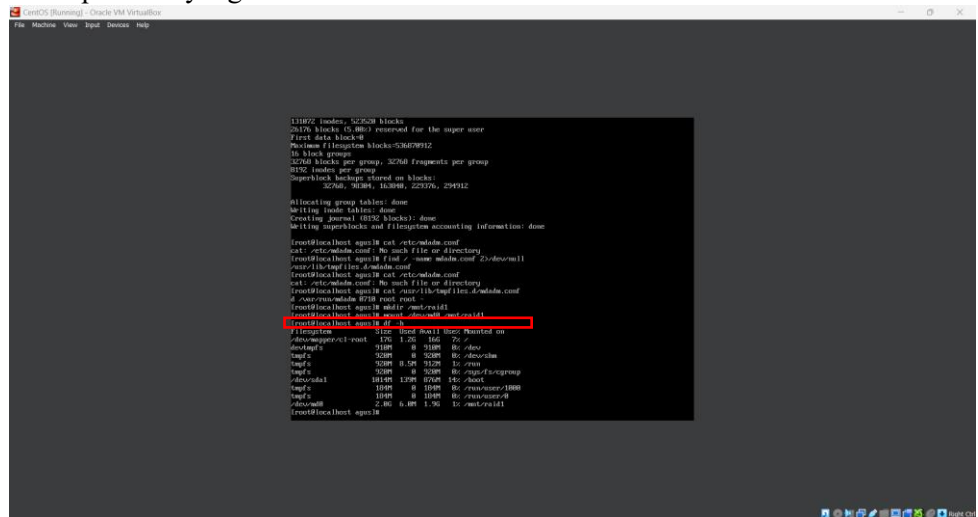
Allocating group tables: done
Writing inode tables: done
Creating journal (0152 blocks): done
Writing superblocks and filesystem accounting information: done

[root@localhost ~]# cat /etc/mdadm.conf
cat: /etc/mdadm.conf: No such file or directory
[root@localhost ~]# find / -name mdadm.conf 2>/dev/null
/usr/lib/tmpfiles.d/mdadm.conf
[root@localhost ~]# cat /etc/mdadm.conf
cat: /etc/mdadm.conf: No such file or directory
[root@localhost ~]# cat /usr/lib/tmpfiles.d/mdadm.conf
d /usr/lib/tmpfiles.d/mdadm.conf root root
[root@localhost ~]#
```

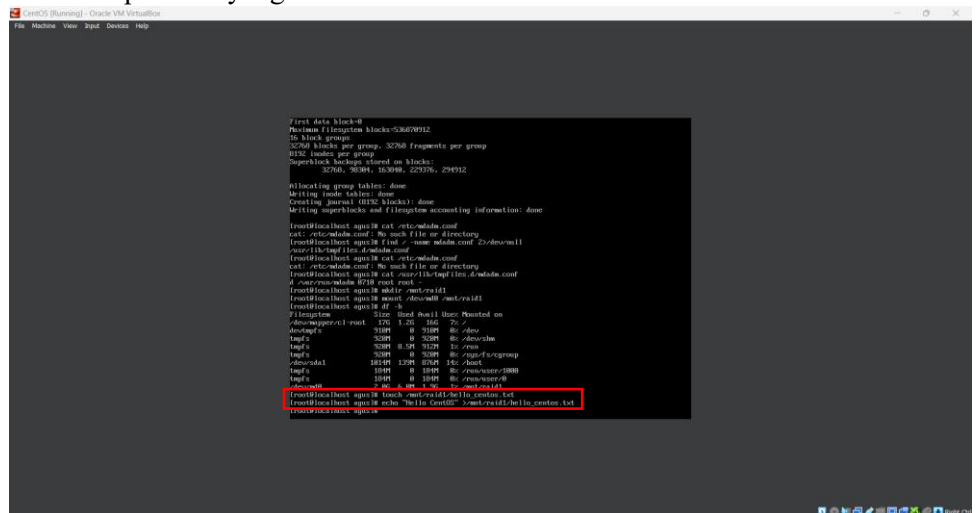
51. Ketik perintah yang ada di kotak merah dan tekan enter



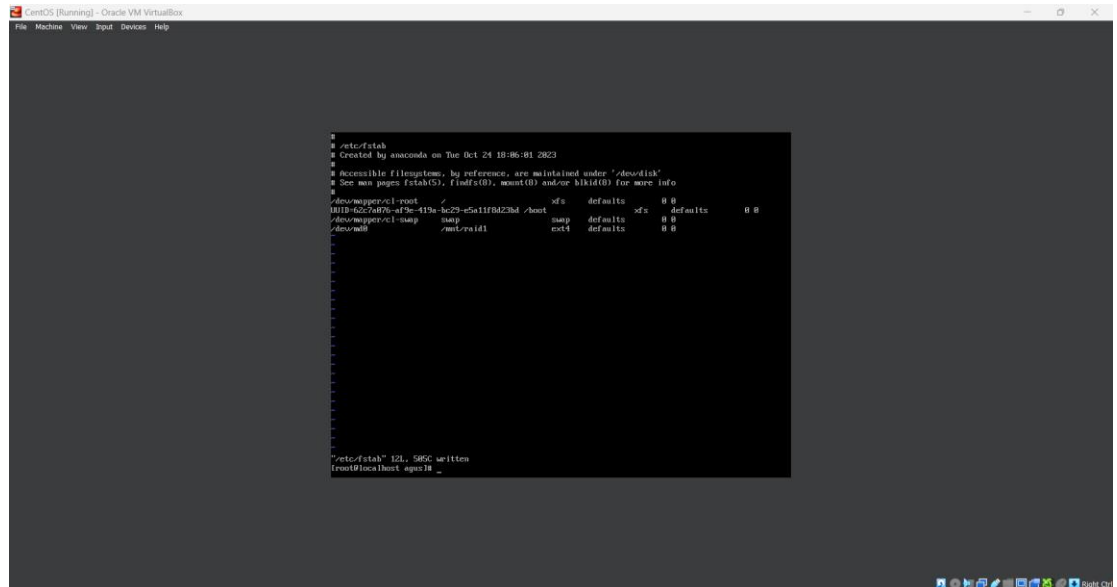
52. Ketik perintah yang ada di kotak merah ini dan tekan enter



53. Ketikkan perintah yang ada di kotak merah ini dan tekan enter



54. Reboot CentOS dan Ketikkan vi /etc/fstab dan masukkan file berikut

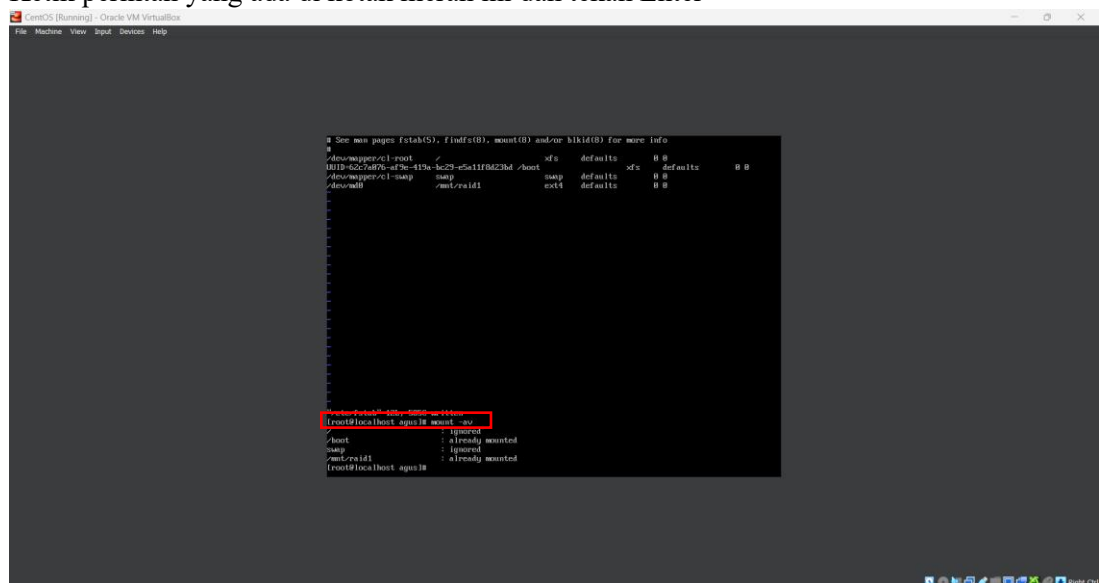


```
# # /etc/fstab
# Created by anaconda on Tue Oct 24 18:06:01 2023
#
# Accessible filesystems, by reference, are mounted under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/csl-root / xfs defaults 0 0
UUID-62c7d876-af3e-419a-bc29-e5a1f0d23bd /boot xfs defaults 0 0
/dev/mapper/csl-swap swap defaults 0 0
/dev/mdb /mnt/raid1 ext4 defaults 0 0

"/etc/fstab" 12L, 585C written
[root@localhost ~]#
```

1. Tekan L pada keyboard untuk menginsert
2. Setelah selesai input, tekan esc
3. Ketik :wq untuk keluar

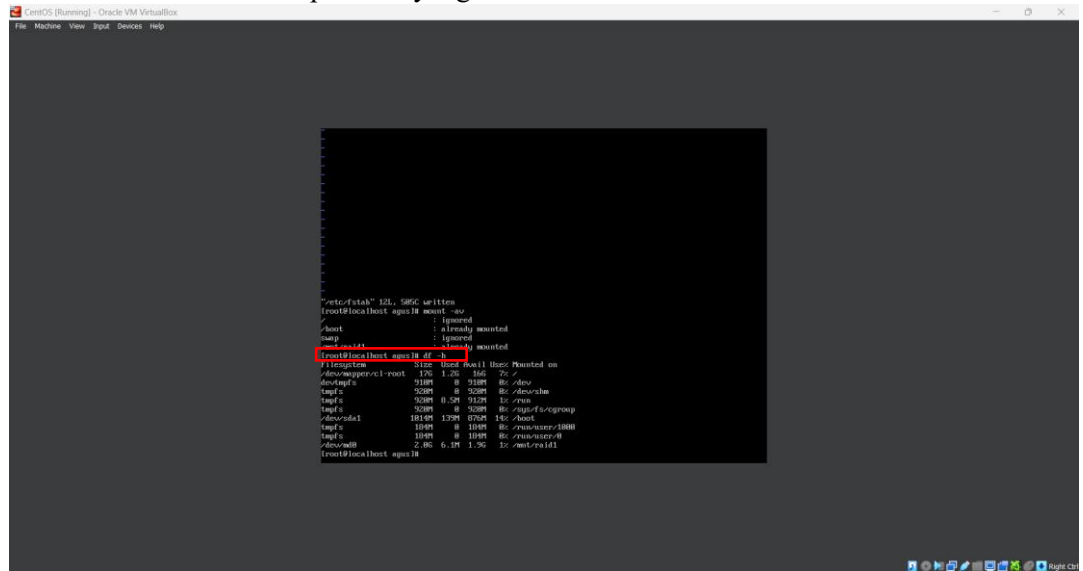
55. Ketik perintah yang ada di kotak merah ini dan tekan Enter



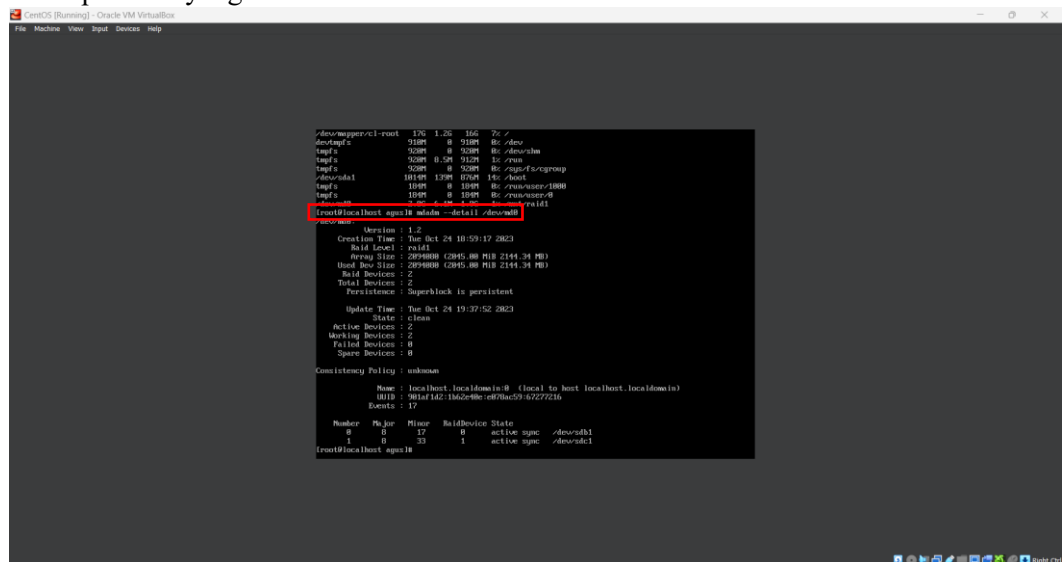
```
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
#
/dev/mapper/csl-root / xfs defaults 0 0
UUID-62c7d876-af3e-419a-bc29-e5a1f0d23bd /boot xfs defaults 0 0
/dev/mapper/csl-swap swap defaults 0 0
/dev/mdb /mnt/raid1 ext4 defaults 0 0

df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/mapper/csl-root 100G  10G  89G   10% /
/dev/mapper/csl-swap 100G  0B   100G   0% /dev/swap
/dev/mdb          100G  0B   100G   0% /mnt/raid1
[root@localhost ~]#
```

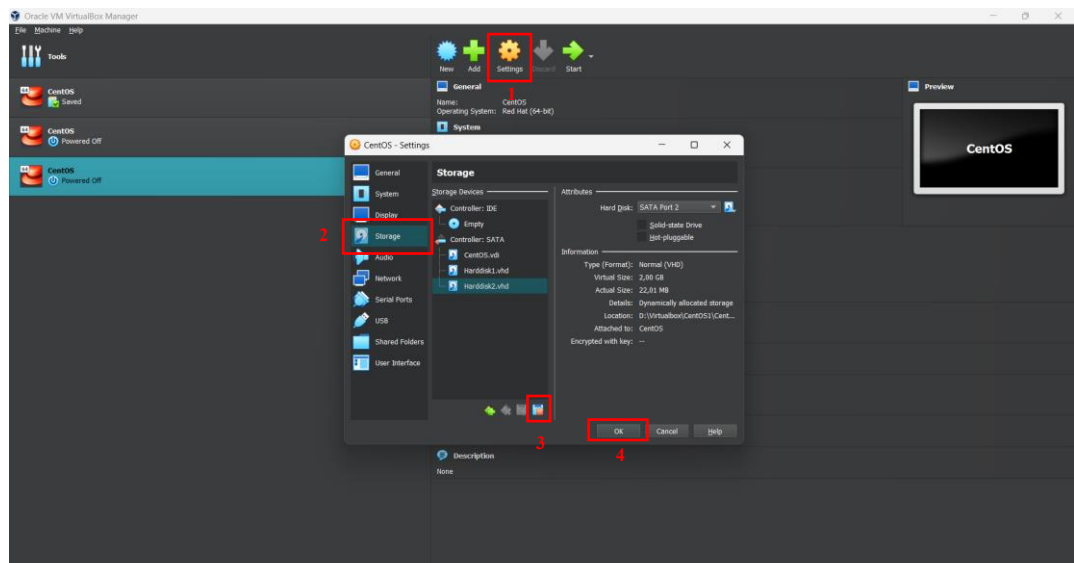
56. Reboot CentOS dan ketik perintah yang ada di kotak merah ini dan tekan enter



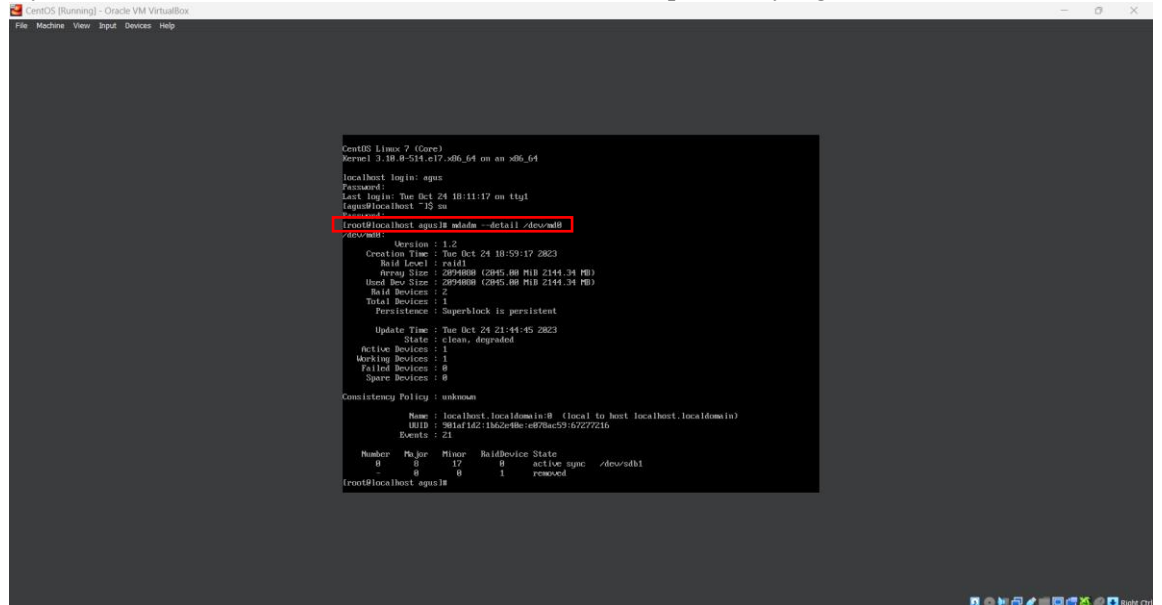
57. Ketik perintah yang ada di kotak merah ini dan tekan enter



58. Shutdown CentOS. Klik Settings > Storage > Pilih salah satu harddisk > Remove Attachment dan klik OK

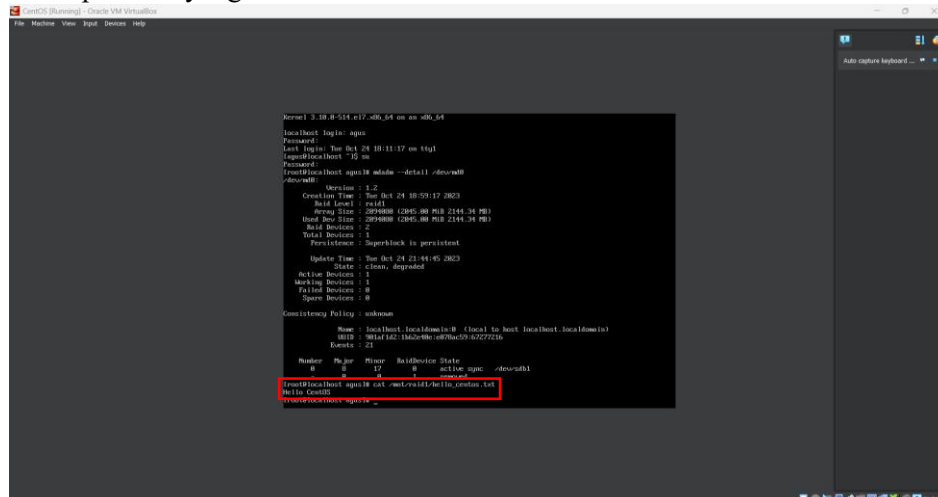


59. Nyalakan mesin dan masuk ke root dan kemudian ketik perintah yang ada di kotak merah



```
CentOS Linux 7 (Core)
Kernel 3.10.0-514.el7.x86_64 on an x86_64
localhost login: agrus
Password:
Last login: Tue Oct 24 10:11:17 on ttty1
agrus@localhost: ~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/sbin/nologin
daemon:x:2:2:daemon:/usr/sbin:/usr/sbin/nologin
nscd:x:541:541:NSS Daemon:/var/lib/nscd:/usr/sbin/nologin
dbus:x:81:81:DBus Daemon:/usr/share/dbus-1/systemd:/usr/sbin/nologin
agrus:x:1000:1000:agrus:/home/agrus:/bin/bash
root:x:0:0:root:/root:/bin/bash
```

60. Ketik perintah yang ada di kotak merah dan tekan enter



```
CentOS Linux 7 (Core)
Kernel 3.10.0-514.el7.x86_64 on an x86_64
localhost login: agrus
Password:
Last login: Tue Oct 24 10:11:17 on ttty1
agrus@localhost: ~$ cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
bin:x:1:1:bin:/bin:/usr/sbin/nologin
daemon:x:2:2:daemon:/usr/sbin:/usr/sbin/nologin
nscd:x:541:541:NSS Daemon:/var/lib/nscd:/usr/sbin/nologin
dbus:x:81:81:DBus Daemon:/usr/share/dbus-1/systemd:/usr/sbin/nologin
agrus:x:1000:1000:agrus:/home/agrus:/bin/bash
root:x:0:0:root:/root:/bin/bash
```

Goals:

1. Memahami perintah yang dieksekusi di CentOS untuk pembuatan RAID

Penjelasan:

Pada nomor 1, kita bisa memahami perintah yang sudah dieksekusi di CentOS dan bisa diterapkan ketika melakukan raid.

2. Mengimplementasikan harddisk untuk penyimpanan server

Penjelasan:

Pada nomor 2, kita bisa mengimplementasikan perintah untuk melakukan raid pada penyimpanan server.

5. Jelaskan apa yang dimaksud dengan RAID.

Jawab:

RAID adalah suatu teknologi penyimpanan data komputer yang digunakan untuk menambahkan penyimpanan pada suatu komputer. Teknologi ini dapat digunakan pada perangkat lunak atau unit perangkat keras RAID terpisah.

6. Jelaskan perbedaan konsep penyimpanan pada RAID 0, RAID 1, RAID 5, RAID 10.

Jawab:

1. RAID 0

Pada sistem RAID 0, data dipecah menjadi blok-blok yang ditulis di semua drive dalam baris dengan menggunakan beberapa disk (setidaknya ada 2 disk).

2. RAID 1

Pada sistem RAID 1, data melakukan mirroring atau data yang sama persis yang melibatkan setidaknya dua drive. Jika salah satu hard disk rusak, drive akan memindahkan data tersebut ke drive yang tidak rusak.

3. RAID 5

Pada sistem RAID 5, data melakukan penyimpanan data yang memerlukan 3 hard disk. Jika ada terjadi kerusakan, data tersebut akan disatukan dan disimpan ke drive yang lain.

4. RAID 10

Pada sistem RAID 10, RAID ini melakukan kombinasi dari RAID 1 dengan RAID 0 yang berarti RAID 1 yaitu mirror dan RAID 0 yaitu striping. Data tersebut dibagi menjadi blok-blok yang ditulis di beberapa disk (stripping) dan juga disalin ke disk yang lain (mirroring).