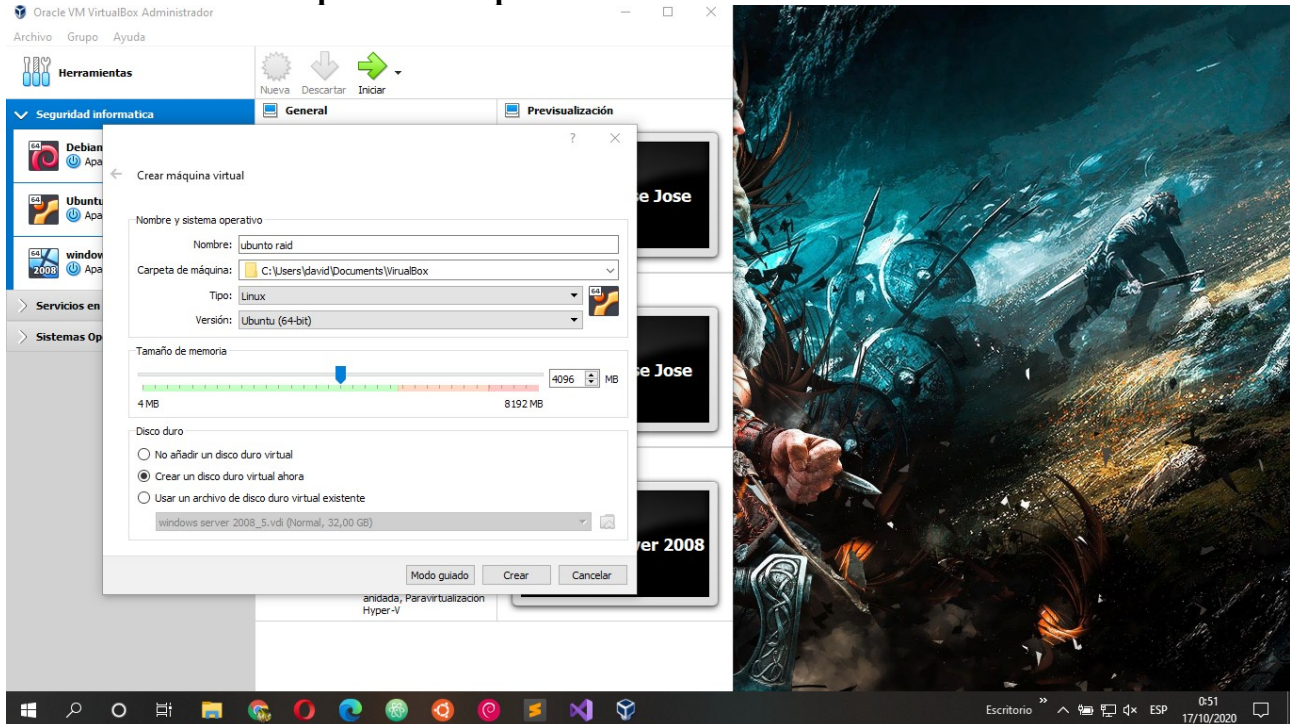
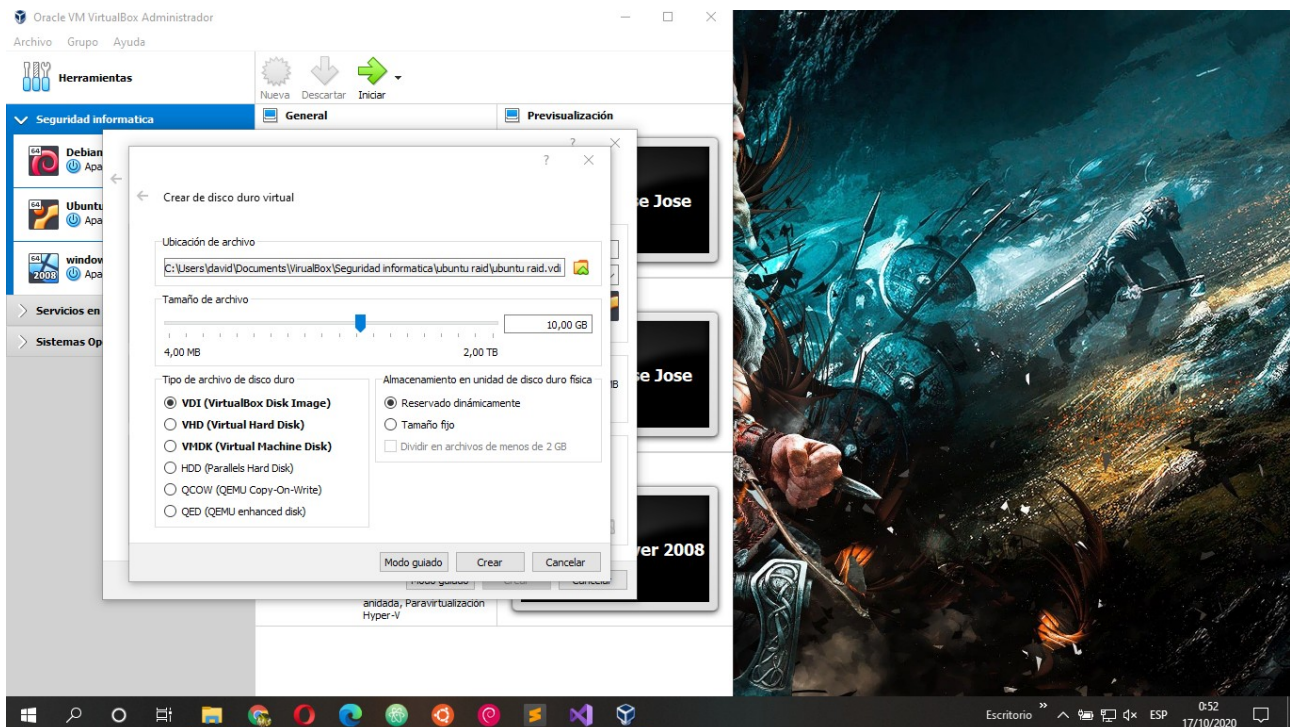


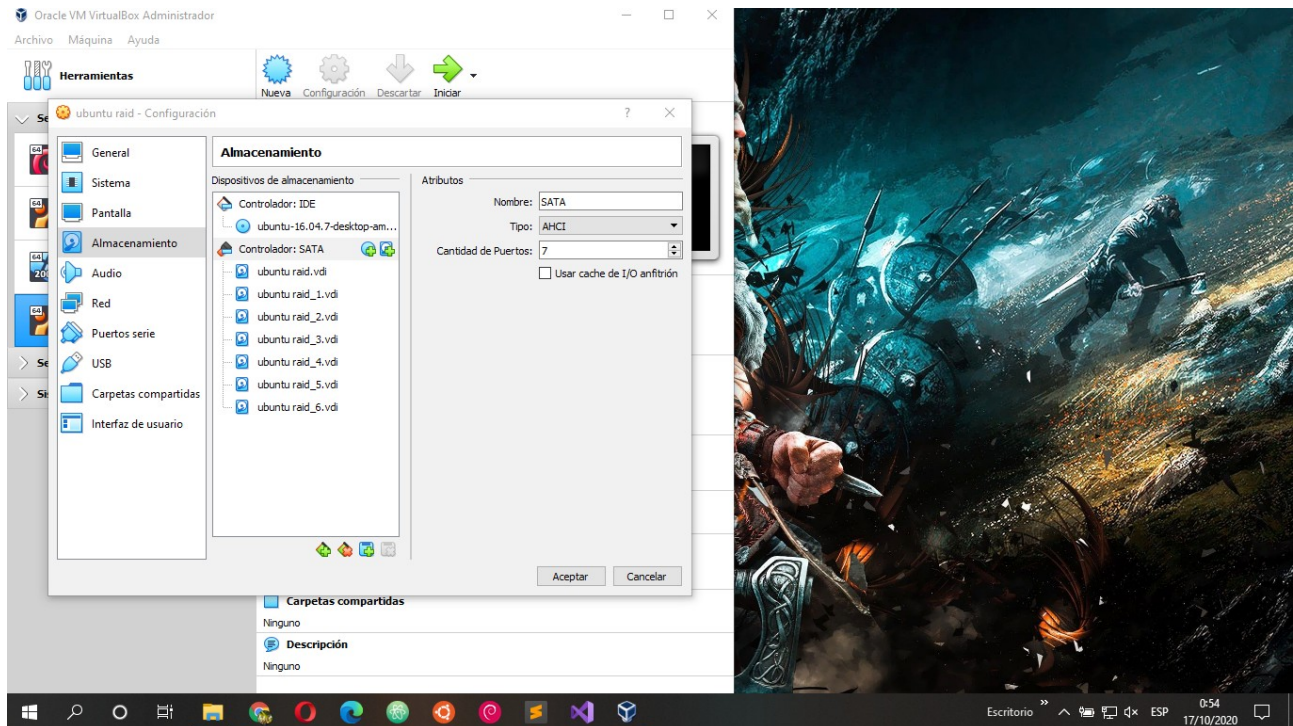
Los sistemas RAID se utilizan para respaldar la información teniendo varias paridades en los discos que forman este sistema RAID, la información se divide en los diferentes discos pudiendo recuperar la información cuando un disco duro falla o deja de funcionar.

- Creamos la maquina virtual para realizar el RAID en Ubuntu.



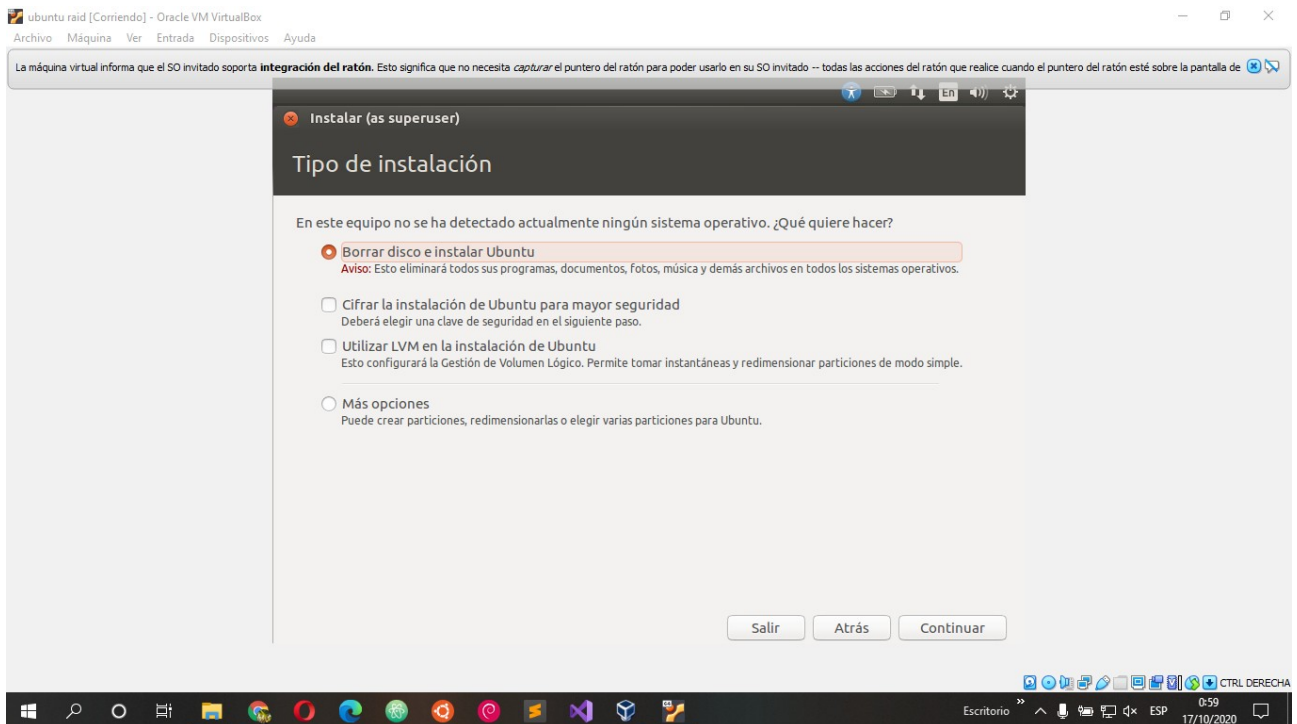
- Creamos los discos duros de 10GB



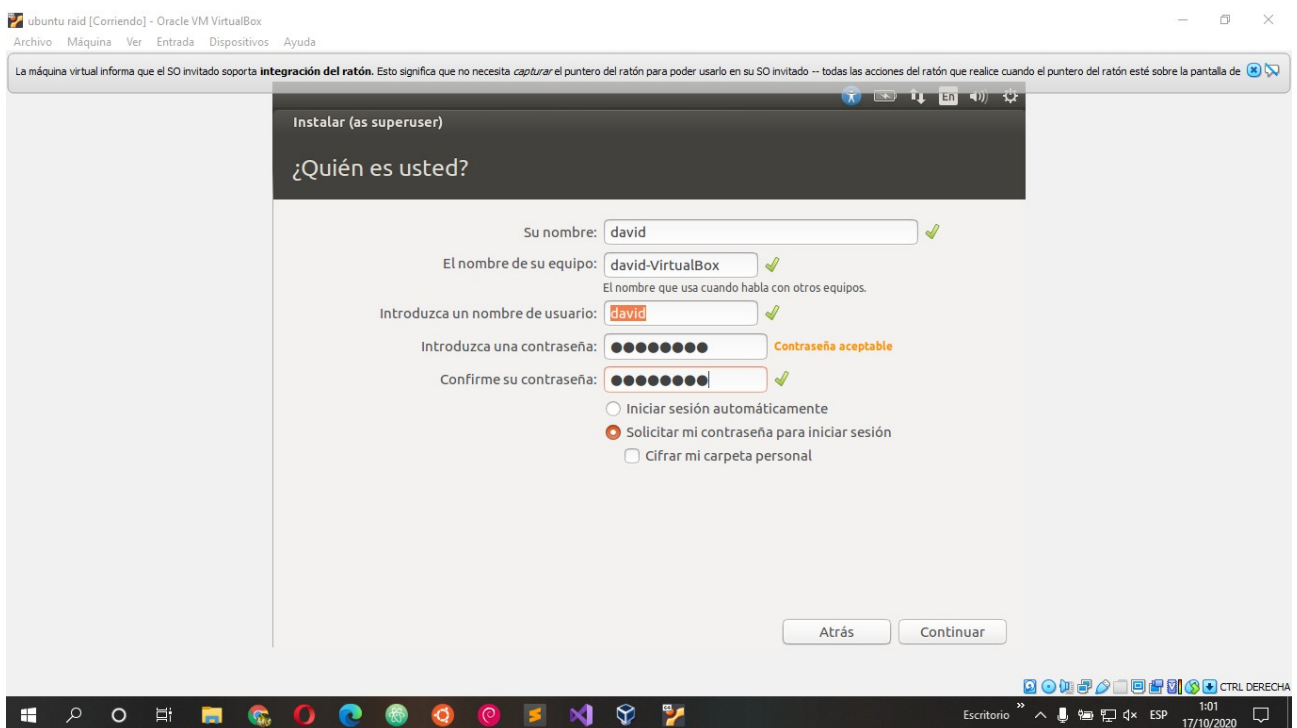


- Empezamos instalando Ubuntu.



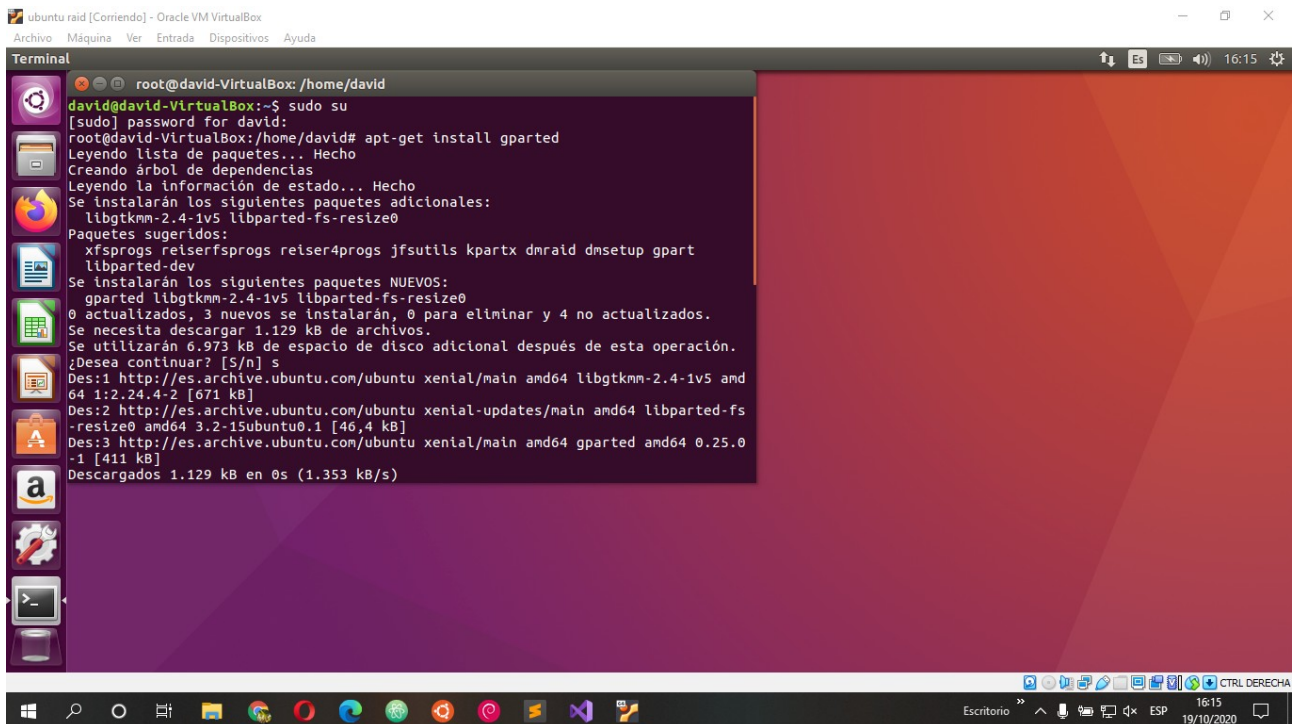


- Creamos usuario para iniciar el sistema operativo.



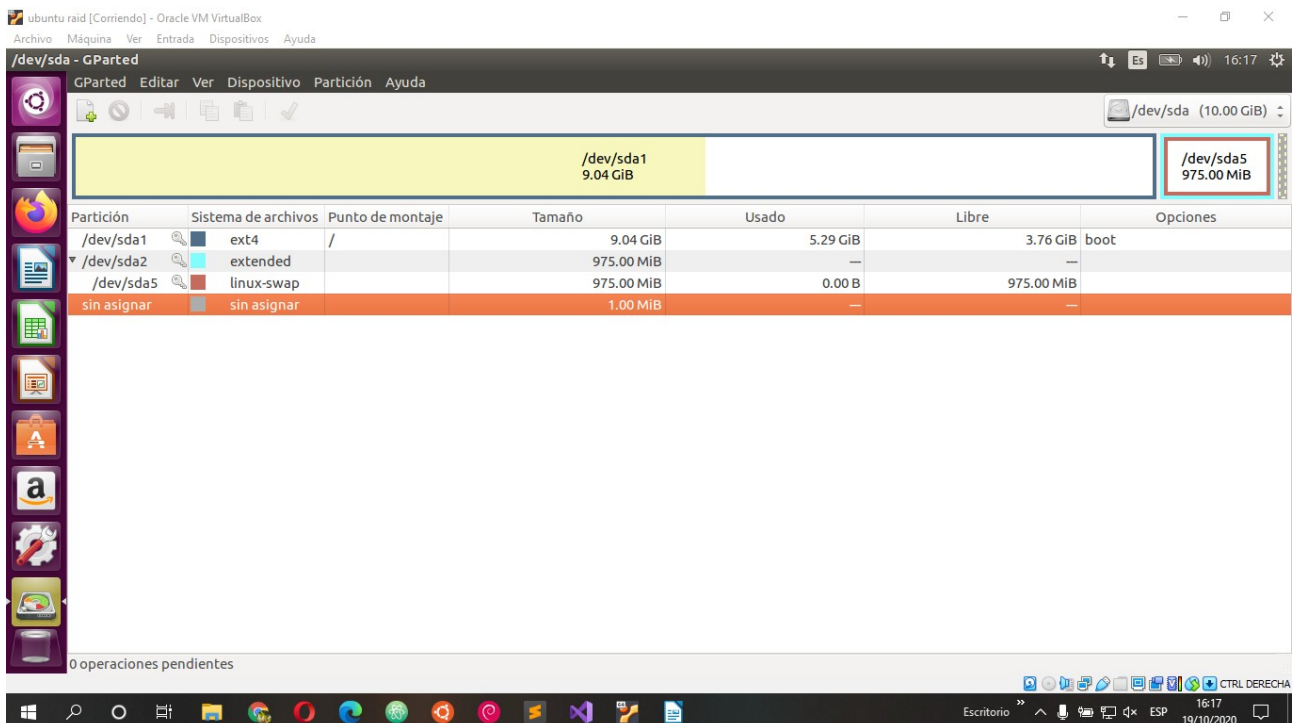


- Instalamos el programa Gparted.

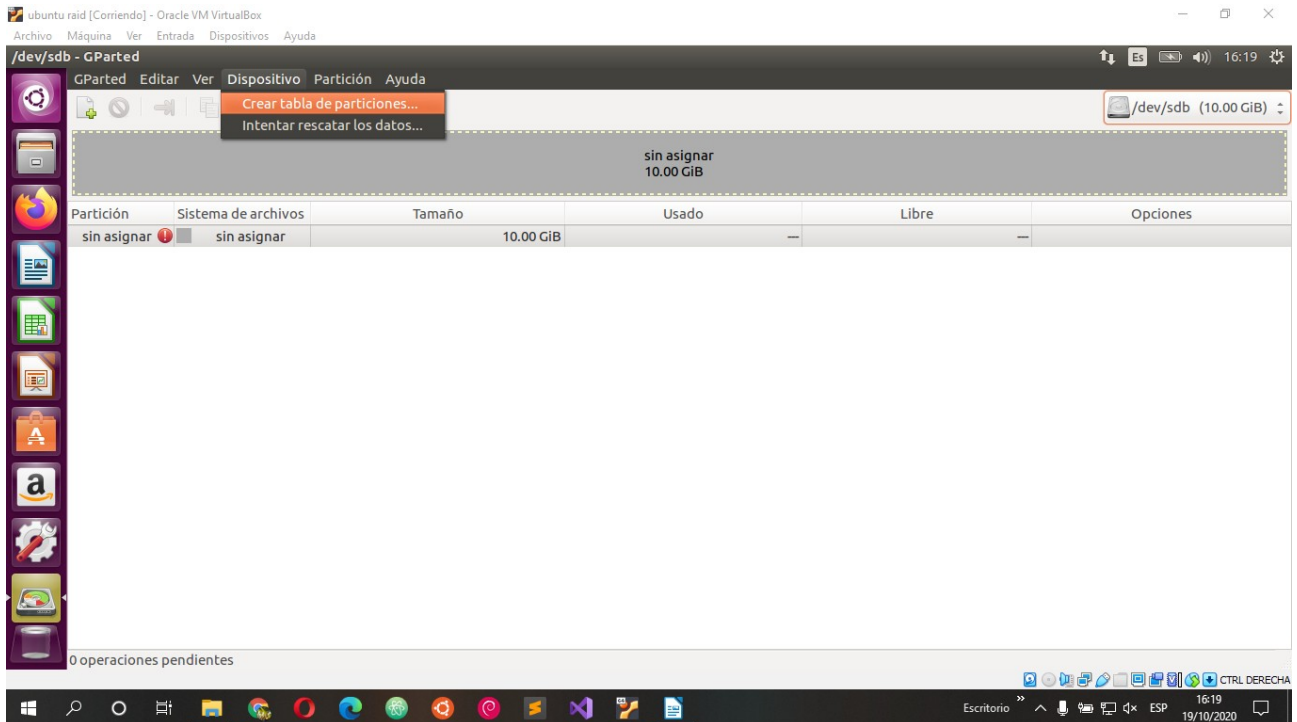


```
root@david-VirtualBox: /home/david
david@david-VirtualBox:~$ sudo su
[sudo] password for david:
root@david-VirtualBox:/home/david# apt-get install gparted
Leyendo lista de paquetes... Hecho
Creando árbol de dependencias
Leyendo la información de estado... Hecho
Se instalarán los siguientes paquetes adicionales:
  libgtkmm-2.4-1v5 libparted-fs-resize0
Paquetes sugeridos:
  xfsprogs reiserfsprogs reiser4progs jfsutils kpartx dmraid dmsetup gpart
  libparted-dev
Se instalarán los siguientes paquetes NUEVOS:
  gparted libgtkmm-2.4-1v5 libparted-fs-resize0
0 actualizados, 3 nuevos se instalarán, 0 para eliminar y 4 no actualizados.
Se necesita descargar 1.129 kB de archivos.
Se utilizarán 6.973 kB de espacio de disco adicional después de esta operación.
¿Desea continuar? [S/n] s
Des:1 http://es.archive.ubuntu.com/ubuntu xenial/main amd64 libgtkmm-2.4-1v5 amd
64 1:2.24.4-2 [671 kB]
Des:2 http://es.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libparted-fs
-resize0 amd64 3.2-15ubuntu0.1 [46,4 kB]
Des:3 http://es.archive.ubuntu.com/ubuntu xenial/main amd64 gparted amd64 0.25.0
-1 [411 kB]
Descargados 1.129 kB en 0s (1.353 kB/s)
```

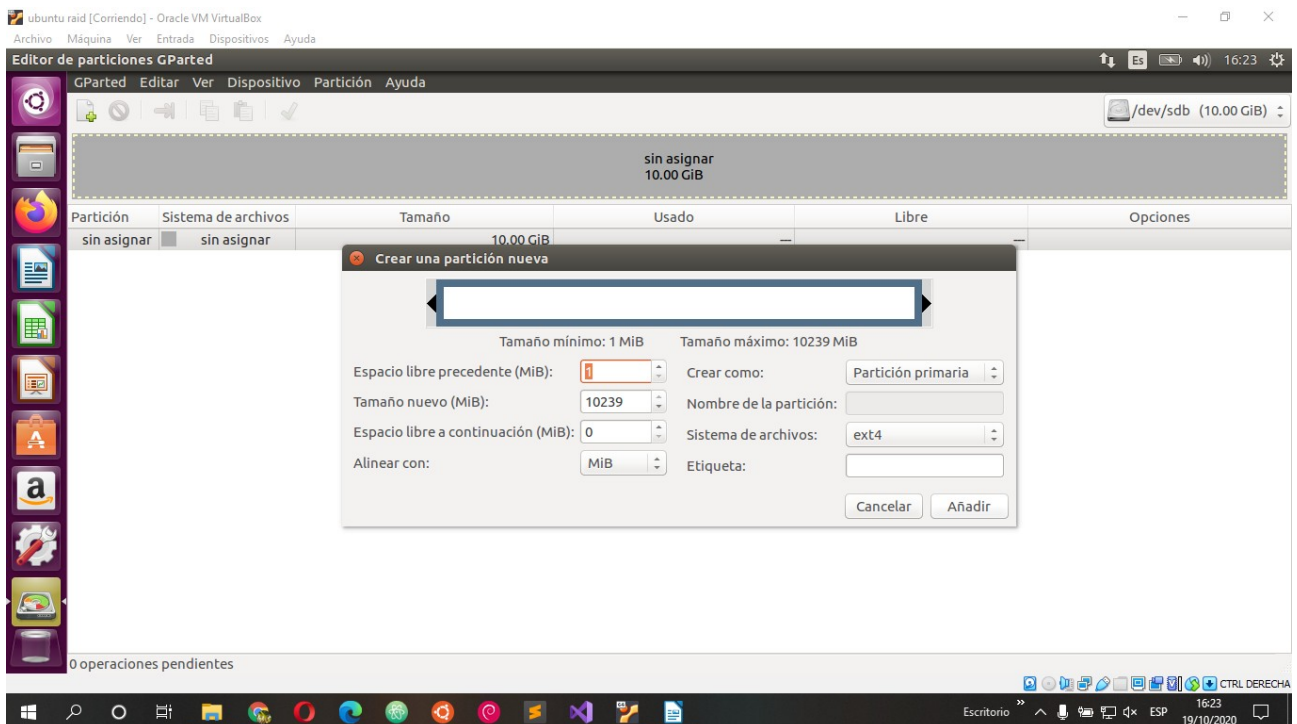
- Abrimos el Gparted.



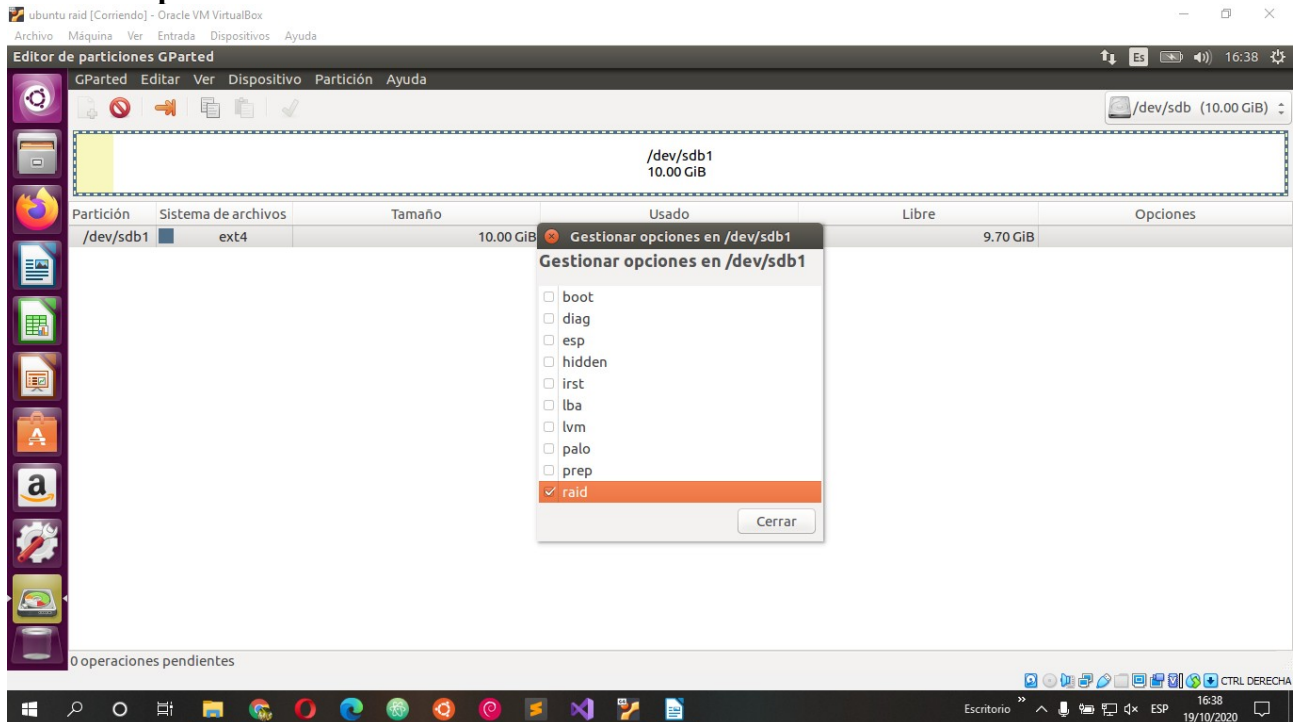
- Creamos tabla de particiones en todos los discos que tengamos.



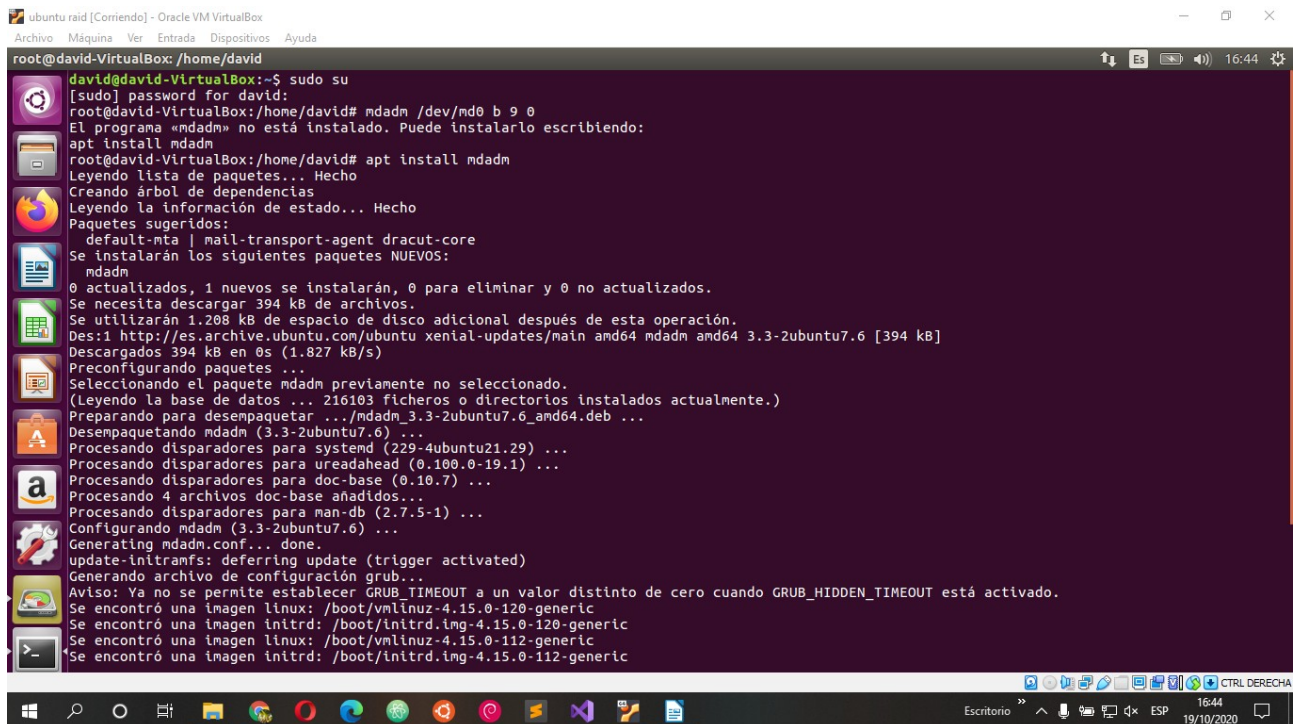
- Creamos partición primaria en todos los discos que tengamos.



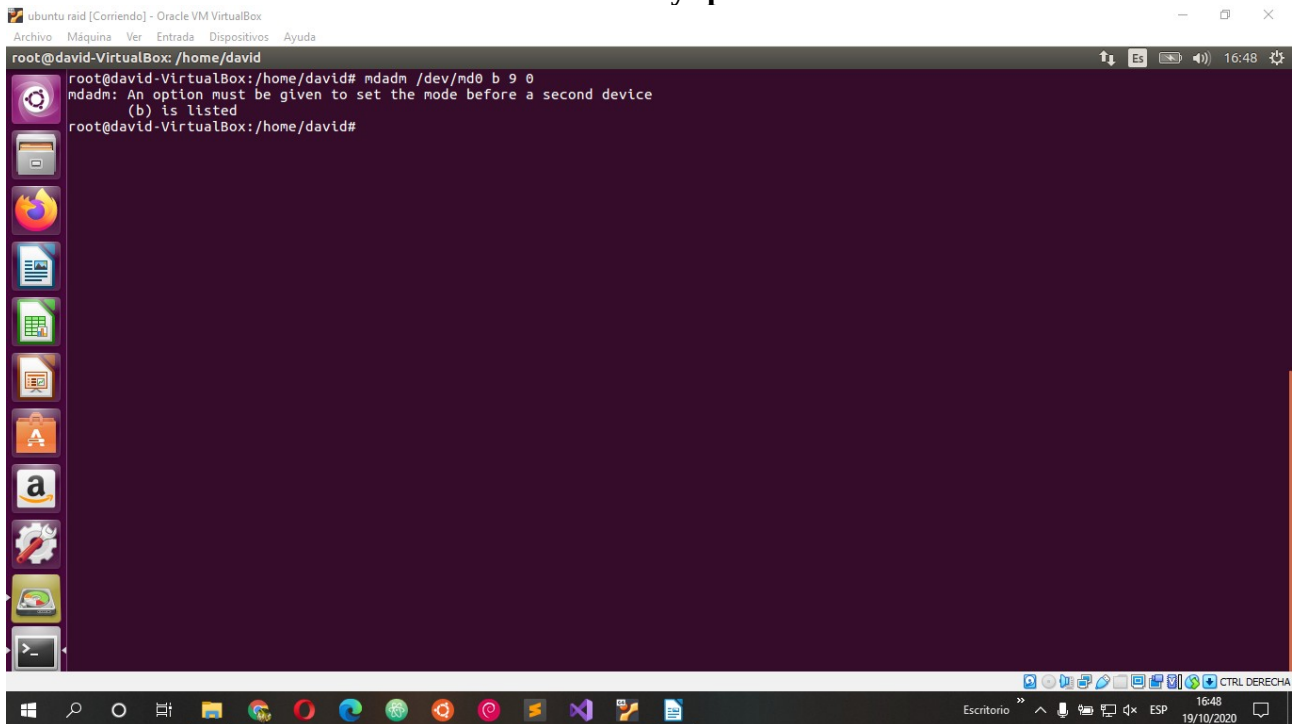
- Después de crear particiones primarias en 4 discos duros para formar el RAID 5 que nos piden debemos darle formato de RAID a los 4 discos duros.



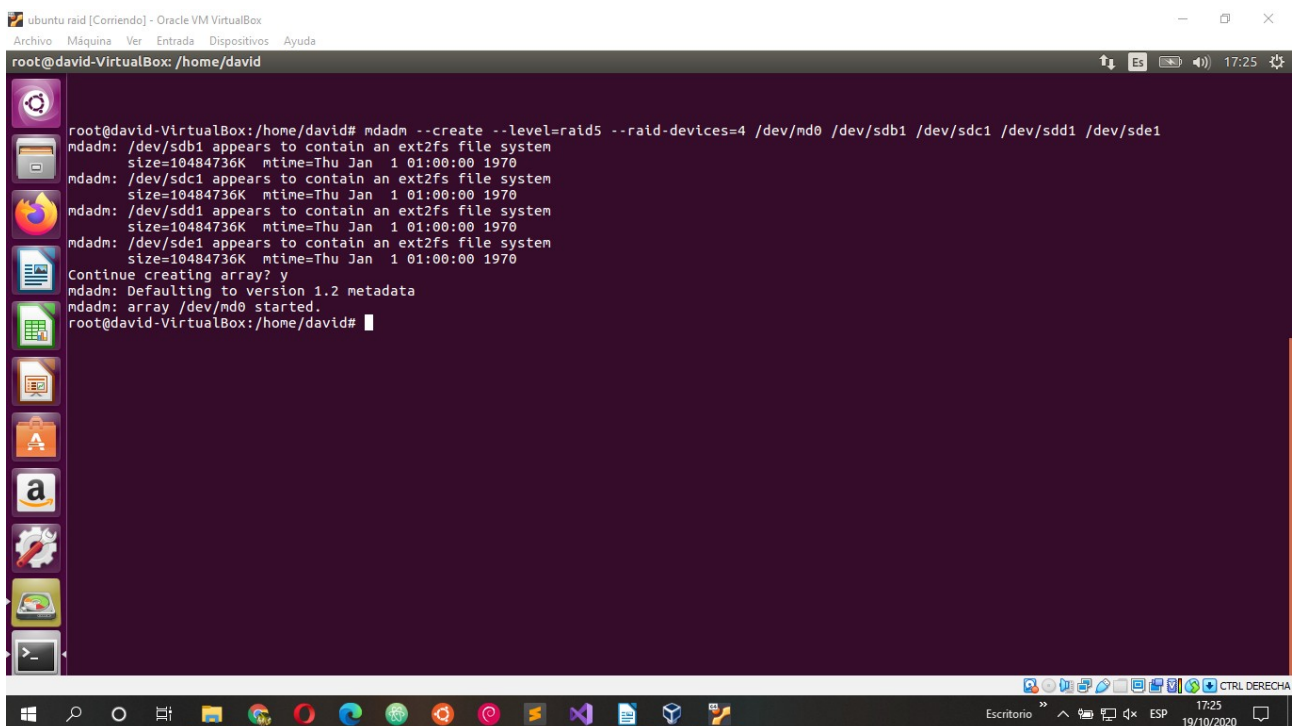
- Ahora abrimos la terminal para configurar el RAID 5 pero primero debemos instalar el mdadm con el comando apt install mdadm.



- Con el comando mdadm creamos los arrays para el RAID 5.



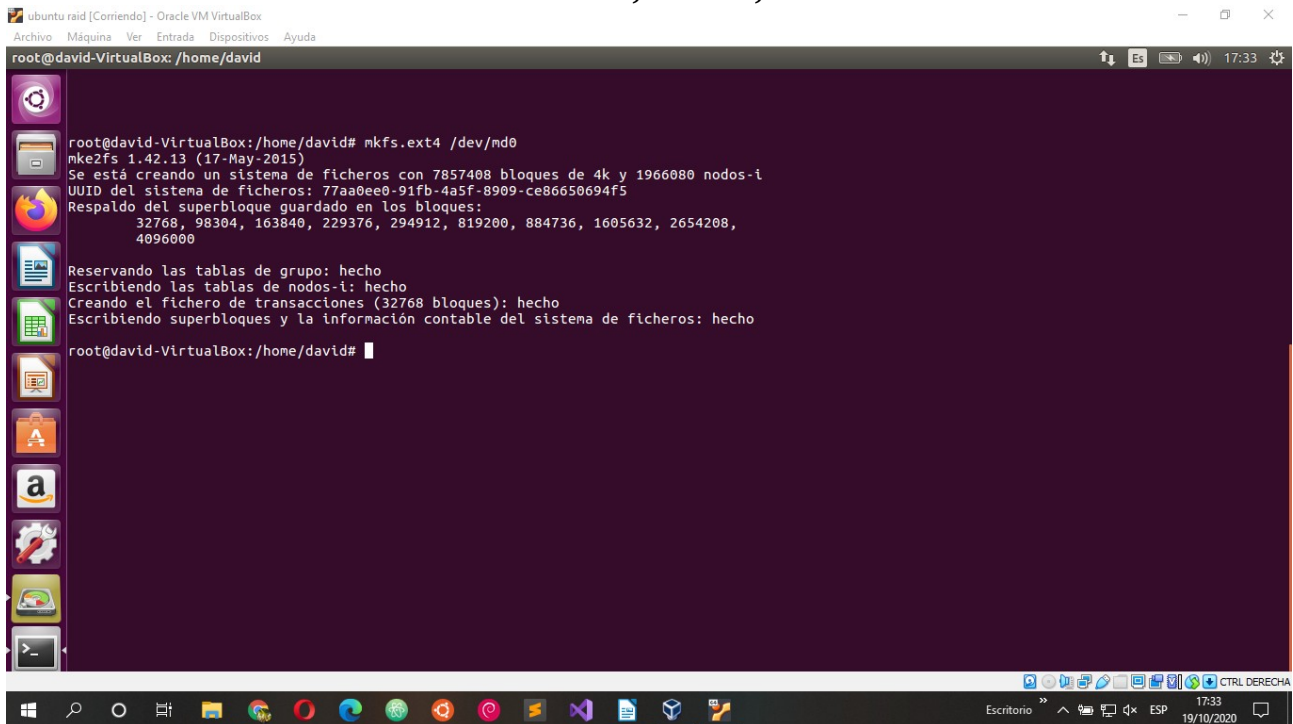
```
root@david-VirtualBox: /home/david
root@david-VirtualBox:/home/david# mdadm /dev/md0 b 9 0
mdadm: An option must be given to set the mode before a second device
(b) is listed
root@david-VirtualBox:/home/david#
```



```
root@david-VirtualBox: /home/david
root@david-VirtualBox:/home/david# mdadm --create --level=raid5 --raid-devices=4 /dev/md0 /dev/sdb1 /dev/sdc1 /dev/sdd1 /dev/sde1
mdadm: /dev/sdb1 appears to contain an ext2fs file system
size=10484736K mtime=Thu Jan 1 01:00:00 1970
mdadm: /dev/sdc1 appears to contain an ext2fs file system
size=10484736K mtime=Thu Jan 1 01:00:00 1970
mdadm: /dev/sdd1 appears to contain an ext2fs file system
size=10484736K mtime=Thu Jan 1 01:00:00 1970
mdadm: /dev/sde1 appears to contain an ext2fs file system
size=10484736K mtime=Thu Jan 1 01:00:00 1970
Continue creating array? y
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md0 started.
root@david-VirtualBox:/home/david#
```

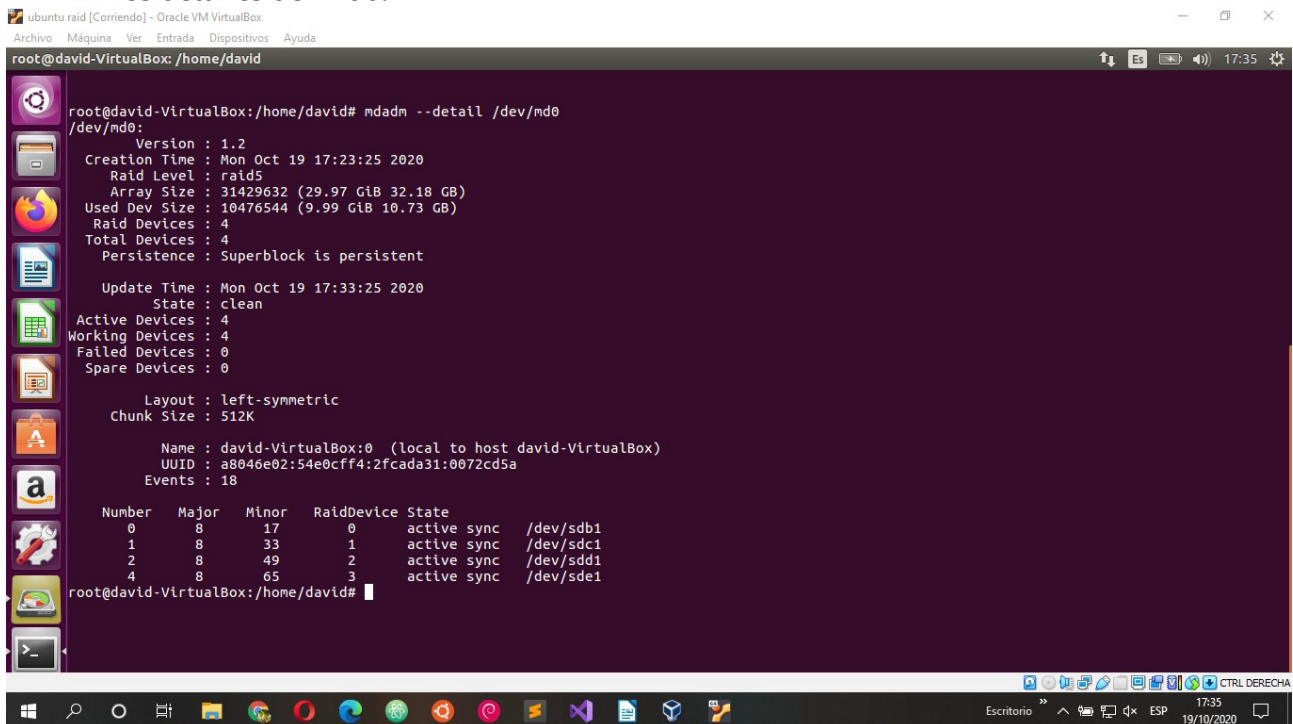


- Formateamos o damos formato al md0; es decir, el raid.



```
root@david-VirtualBox: /home/david# mkfs.ext4 /dev/md0
mke2fs 1.42.13 (17-May-2015)
Se está creando un sistema de ficheros con 7857408 bloques de 4k y 1966080 nodos-i
UUID del sistema de ficheros: 77aa0ee0-91fb-4a5f-8909-ce8650694f5
Respaldo del superbloque guardado en los bloques:
 32768, 98304, 163840, 229376, 294912, 819200, 884736, 1605632, 2654208,
4096000
Reservando las tablas de grupo: hecho
Escribiendo las tablas de nodos-i: hecho
Creando el fichero de transacciones (32768 bloques): hecho
Escribiendo superbloques y la información contable del sistema de ficheros: hecho
root@david-VirtualBox: /home/david#
```

- Los detalles del md0.



```
root@david-VirtualBox: /home/david# mdadm --detail /dev/md0
/dev/md0:
  Version : 1.2
  Creation Time : Mon Oct 19 17:23:25 2020
  Raid Level : raid5
  Array Size : 31429632 (29.97 GiB 32.18 GB)
  Used Dev Size : 10476544 (9.99 GiB 10.73 GB)
  Raid Devices : 4
  Total Devices : 4
  Persistence : Superblock is persistent

  Update Time : Mon Oct 19 17:33:25 2020
  State : clean
  Active Devices : 4
  Working Devices : 4
  Failed Devices : 0
  Spare Devices : 0

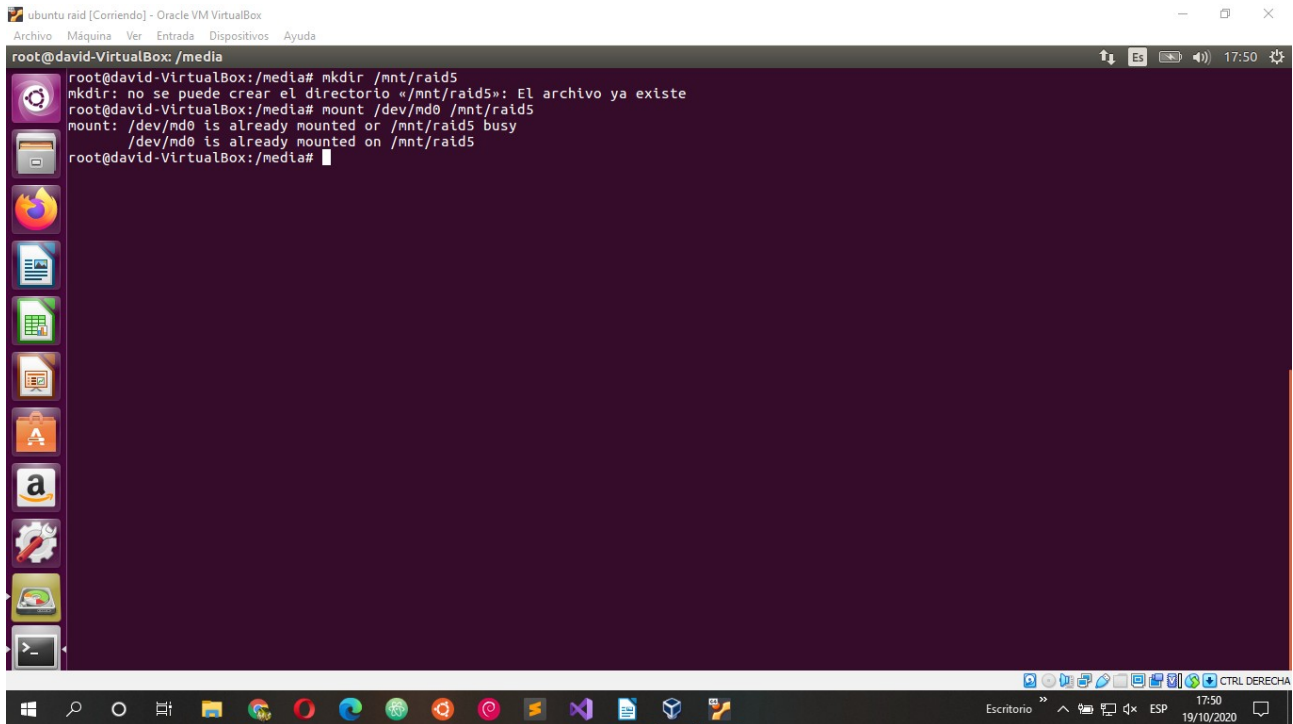
  Layout : left-symmetric
  Chunk Size : 512K

  Name : david-VirtualBox:0 (local to host david-VirtualBox)
  UUID : a8046e02:54e0cff4:2fcada31:0072cd5a
  Events : 18

   Number Major Minor RaidDevice State
    0       8      17        0  active sync  /dev/sdb1
    1       8      33        1  active sync  /dev/sdc1
    2       8      49        2  active sync  /dev/sdd1
    4       8      65        3  active sync  /dev/sde1
root@david-VirtualBox: /home/david#
```

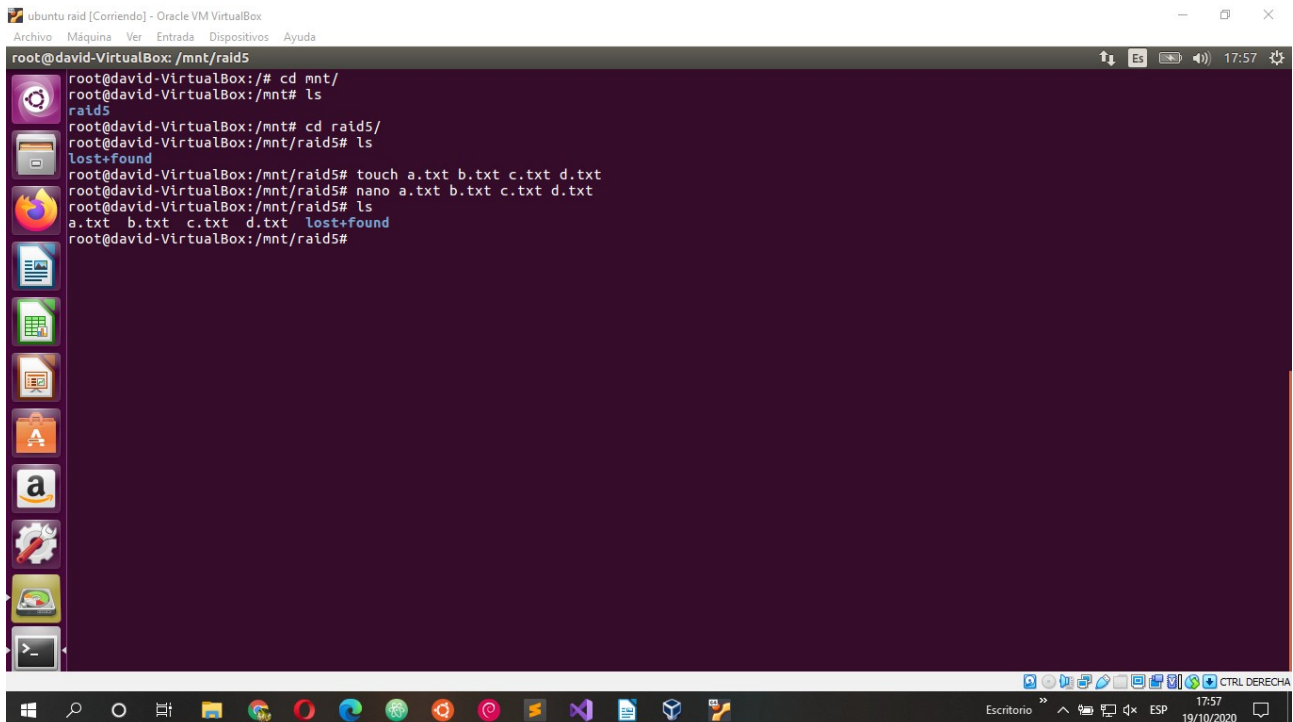


- Montamos el raid en *mnt*



```
root@david-VirtualBox: /media
root@david-VirtualBox:/media# mkdir /mnt/raid5
mkdir: no se puede crear el directorio «/mnt/raid5»: El archivo ya existe
root@david-VirtualBox:/media# mount /dev/md0 /mnt/raid5
mount: /dev/md0 is already mounted or /mnt/raid5 busy
/dev/md0 is already mounted on /mnt/raid5
root@david-VirtualBox:/media#
```

- Probamos que un disco duro falla y lo removemos y añadimos otro disco y creamos unos ficheros para que se vea que el raid funciona.



```
root@david-VirtualBox: /mnt/raid5
root@david-VirtualBox:/# cd /mnt/
root@david-VirtualBox:/mnt# ls
raid5
root@david-VirtualBox:/mnt# cd /mnt/raid5/
root@david-VirtualBox:/mnt/raid5# ls
lost+found
root@david-VirtualBox:/mnt/raid5# touch a.txt b.txt c.txt d.txt
root@david-VirtualBox:/mnt/raid5# nano a.txt b.txt c.txt d.txt
root@david-VirtualBox:/mnt/raid5# ls
a.txt b.txt c.txt d.txt lost+found
root@david-VirtualBox:/mnt/raid5#
```

```
root@dauid-VirtualBox:/mnt/raid5# mdadm --fail /dev/md0 /dev/sdb1
mdadm: set /dev/sdb1 faulty in /dev/md0
root@dauid-VirtualBox:/mnt/raid5# mdadm --detail /dev/md0
/dev/md0:
  Version : 1.2
  Creation Time : Mon Oct 19 17:23:25 2020
  Raid Level : raid5
  Array Size : 31429632 (29.97 GiB 32.18 GB)
  Used Dev Size : 10476544 (9.99 GiB 10.73 GB)
  Raid Devices : 4
  Total Devices : 4
  Persistence : Superblock is persistent

  Update Time : Mon Oct 19 17:58:17 2020
  State : clean, degraded
  Active Devices : 3
  Working Devices : 3
  Failed Devices : 1
  Spare Devices : 0

  Layout : left-symmetric
  Chunk Size : 512K

  Name : dauid-VirtualBox:0 (local to host dauid-VirtualBox)
  UUID : a8046e02:54e0cff4:2fcada31:0072cd5a
  Events : 20

  Number Major Minor RaidDevice State
    0       8       0        0      removed
    1       8      33        1      active sync  /dev/sdc1
    2       8      49        2      active sync  /dev/sdd1
    4       8      65        3      active sync  /dev/sde1

  0       8      17        -      faulty    /dev/sdb1
root@dauid-VirtualBox:/mnt/raid5#
```

```
root@dauid-VirtualBox:/mnt/raid5# mdadm --fail /dev/md0 /dev/sdb1
mdadm: set /dev/sdb1 faulty in /dev/md0
root@dauid-VirtualBox:/mnt/raid5# mdadm --detail /dev/md0
/dev/md0:
  Version : 1.2
  Creation Time : Mon Oct 19 17:23:25 2020
  Raid Level : raid5
  Array Size : 31429632 (29.97 GiB 32.18 GB)
  Used Dev Size : 10476544 (9.99 GiB 10.73 GB)
  Raid Devices : 4
  Total Devices : 4
  Persistence : Superblock is persistent

  Update Time : Mon Oct 19 17:58:17 2020
  State : clean, degraded
  Active Devices : 3
  Working Devices : 3
  Failed Devices : 1
  Spare Devices : 0

  Layout : left-symmetric
  Chunk Size : 512K

  Name : dauid-VirtualBox:0 (local to host dauid-VirtualBox)
  UUID : a8046e02:54e0cff4:2fcada31:0072cd5a
  Events : 20

  Number Major Minor RaidDevice State
    0       8       0        0      removed
    1       8      33        1      active sync  /dev/sdc1
    2       8      49        2      active sync  /dev/sdd1
    4       8      65        3      active sync  /dev/sde1

  0       8      17        -      faulty    /dev/sdb1
root@dauid-VirtualBox:/mnt/raid5#
```

```
ubuntu raid [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
root@david-VirtualBox: /mnt/raid5
root@david-VirtualBox:/mnt/raid5# mdadm --fail /dev/md0 /dev/sdb1mdadm: set /dev/sdb1 faulty in /dev/md0
root@david-VirtualBox:/mnt/raid5# mdadm --detail /dev/md0/dev/md0:
Version : 1.2
Creation Time : Mon Oct 19 17:23:25 2020
Raid Level : raid5
Array Size : 31429632 (29.97 GiB 32.18 GB)
Used Dev Size : 10476544 (9.99 GiB 10.73 GB)
Raid Devices : 4
Total Devices : 4
Persistence : Superblock is persistent

Update Time : Mon Oct 19 17:58:17 2020
State : clean, degraded
Active Devices : 3
Working Devices : 3
Failed Devices : 1
Spare Devices : 0

Layout : left-symmetric
Chunk Size : 512K

Name : david-VirtualBox:0 (local to host david-VirtualBox)
UUID : a8046e02:54e0cff4:2fcada31:0072cd5a
Events : 20

Number Major Minor RaidDevice State
0 0 0 0 removed
1 8 33 1 active sync /dev/sdc1
2 8 49 2 active sync /dev/sdd1
4 8 65 3 active sync /dev/sde1

0 8 17 - faulty /dev/sdb1
root@david-VirtualBox:/mnt/raid5# mdadm --add /dev/md0 /dev/sdb1
mdadm: Cannot open /dev/sdb1: Device or resource busy
root@david-VirtualBox:/mnt/raid5# mdadm --remove /dev/md0 /dev/sdb1
mdadm: hot removed /dev/sdb1 from /dev/md0
root@david-VirtualBox:/mnt/raid5#
```

```
ubuntu raid [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda
root@david-VirtualBox: /mnt/raid5
Version : 1.2
Creation Time : Mon Oct 19 17:23:25 2020
Raid Level : raid5
Array Size : 31429632 (29.97 GiB 32.18 GB)
Used Dev Size : 10476544 (9.99 GiB 10.73 GB)
Raid Devices : 4
Total Devices : 4
Persistence : Superblock is persistent

Update Time : Mon Oct 19 17:58:17 2020
State : clean, degraded
Active Devices : 3
Working Devices : 3
Failed Devices : 1
Spare Devices : 0

Layout : left-symmetric
Chunk Size : 512K

Name : david-VirtualBox:0 (local to host david-VirtualBox)
UUID : a8046e02:54e0cff4:2fcada31:0072cd5a
Events : 20

Number Major Minor RaidDevice State
0 0 0 0 removed
1 8 33 1 active sync /dev/sdc1
2 8 49 2 active sync /dev/sdd1
4 8 65 3 active sync /dev/sde1

0 8 17 - faulty /dev/sdb1
root@david-VirtualBox:/mnt/raid5# mdadm --add /dev/md0 /dev/sdb1
mdadm: Cannot open /dev/sdb1: Device or resource busy
root@david-VirtualBox:/mnt/raid5# mdadm --remove /dev/md0 /dev/sdb1
mdadm: hot removed /dev/sdb1 from /dev/md0
root@david-VirtualBox:/mnt/raid5# mdadm --add /dev/md0 /dev/sdb1
mdadm: added /dev/sdb1
root@david-VirtualBox:/mnt/raid5#
```



```
ubuntu raid [Corriendo] - Oracle VM VirtualBox
Archivo Máquina Ver Entrada Dispositivos Ayuda

root@david-VirtualBox: /mnt/raid5# mdadm --detail /dev/md0
/dev/md0:
  Version : 1.2
  Creation Time : Mon Oct 19 17:23:25 2020
  Raid Level : raid5
  Array Size : 31429632 (29.97 GiB 32.18 GB)
  Used Dev Size : 10476544 (9.99 GiB 10.73 GB)
  Raid Devices : 4
  Total Devices : 4
  Persistence : Superblock is persistent

  Update Time : Mon Oct 19 18:07:15 2020
  State : clean, degraded, recovering
  Active Devices : 3
  Working Devices : 4
  Failed Devices : 0
  Spare Devices : 1

  Layout : left-symmetric
  Chunk Size : 512K

  Rebuild Status : 37% complete

    Name : david-VirtualBox:0 (local to host david-VirtualBox)
    UUID : a8046e02:54e0cff4:2fcada31:0072cd5a
    Events : 29

   Number Major Minor RaidDevice State
    5       8      17        0     spare rebuilding /dev/sdb1
    1       8      33        1     active sync /dev/sdc1
    2       8      49        2     active sync /dev/sdd1
    4       8      65        3     active sync /dev/sde1
root@david-VirtualBox: /mnt/raid5#
```