

-----Condiciones Iniciales-----

- Dad 1: 5
- Dad 2: Ext 4
- Dad 3: 6
- Dad 4: 3

-----Paso1-----

- ➔ Comando: modprobe brd rd_nr=6 rd_size=563200
- ➔ Documentación: lsblk -af

```
julieta@julieta-standardpcq35ich92009:~$ sudo lsblk -af
NAME        FSTYPE     FSVER LABEL      UUID                                  FSAVAIL FSUSE% MOUNTPOINTS
ram0
ram1
ram2
ram3
ram4
ram5
loop0       squashfs   4.0                                0      100% /snap/bare/5
loop1       squashfs   4.0                                0      100% /snap/core22/1122
loop2       squashfs   4.0                                0      100% /snap/core22/1380
loop3       squashfs   4.0                                0      100% /snap/firefox/4424
loop4       squashfs   4.0                                0      100% /snap/gnome-42-2204/141
loop5       squashfs   4.0                                0      100% /snap/gnome-42-2204/172
loop6       squashfs   4.0                                0      100% /snap/gtk-common-themes/1535
loop7       squashfs   4.0                                0      100% /snap/snapd/21465
loop8       squashfs   4.0                                0      100% /snap/snapd/21759
loop9       squashfs   4.0                                0      100% /snap/snapd/21759
loop10      squashfs   4.0                                0      100% /snap/firefox/4451
sda
  sda1 vfat      FAT32 NO_LABEL B8D7-E951                291.8M    3% /boot/efi
  sda2 ext4       1.0      9fb90f51-102f-4916-9bc2-1a040024a0db 49G       16% /var/snap/firefox/common/host-hunspell/
sr0
```

-----Paso2-----

- ➔ Comando: gdisk /dev/ram0

```
julieta@julieta-standardpcq35ich92009:~$ sudo gdisk /dev/ram0
GPT fdisk (gdisk) version 1.0.8

Partition table scan:
  MBR: not present
  BSD: not present
  APM: not present
  GPT: not present

Creating new GPT entries in memory.

Command (? for help): n
Partition number (1-128, default 1):
First sector (34-1126366, default = 2048) or {+}size{KMGT}:
Last sector (2048-1126366, default = 1126366) or {+}size{KMGT}: +500M
Current type is 8300 (Linux filesystem)
Hex code or GUID (L to show codes, Enter = 8300): fd00
Changed type of partition to 'Linux RAID'

Command (? for help): n
Partition number (2-128, default 2):
First sector (34-1126366, default = 1026048) or {+}size{KMGT}:
Last sector (1026048-1126366, default = 1126366) or {+}size{KMGT}:
Current type is 8300 (Linux filesystem)
Hex code or GUID (L to show codes, Enter = 8300):
Changed type of partition to 'Linux filesystem'

Command (? for help): w

Final checks complete. About to write GPT data. THIS WILL OVERWRITE EXISTING
PARTITIONS!!

Do you want to proceed? (Y/N): y
OK; writing new GUID partition table (GPT) to /dev/ram0.
The operation has completed successfully.
```

→ Documentación : `gdisk -l /dev/ram0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo gdisk -l /dev/ram0
GPT fdisk (gdisk) version 1.0.8

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/ram0: 1126400 sectors, 550.0 MiB
Sector size (logical/physical): 512/4096 bytes
Disk identifier (GUID): 370597AF-D461-4D56-BEB4-CF561F65EC71
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1126366
Partitions will be aligned on 2048-sector boundaries
Total free space is 2014 sectors (1007.0 KiB)

Number  Start (sector)    End (sector)  Size      Code  Name
   1            2048         1026047   500.0 MiB   FD00   Linux RAID
   2          1026048         1126366    49.0 MiB   8300   Linux filesystem
```

→ Documentación : `gdisk -l /dev/ram1`

```
julieta@julieta-standardpcq35ich92009:~$ sudo gdisk -l /dev/ram1
GPT fdisk (gdisk) version 1.0.8

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/ram1: 1126400 sectors, 550.0 MiB
Sector size (logical/physical): 512/4096 bytes
Disk identifier (GUID): 68F17AB3-C8F4-4B1E-B6F9-2371DE62B972
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1126366
Partitions will be aligned on 2048-sector boundaries
Total free space is 102333 sectors (50.0 MiB)

Number  Start (sector)    End (sector)  Size      Code  Name
   1            2048         1026047   500.0 MiB   FD00   Linux RAID
```

→ Documentación : `gdisk -l /dev/ram2`

```
julieta@julieta-standardpcq35ich92009:~$ sudo gdisk -l /dev/ram2
GPT fdisk (gdisk) version 1.0.8

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/ram2: 1126400 sectors, 550.0 MiB
Sector size (logical/physical): 512/4096 bytes
Disk identifier (GUID): EB7AA184-107B-4A02-B0C7-2A0BF4A436DE
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1126366
Partitions will be aligned on 2048-sector boundaries
Total free space is 102333 sectors (50.0 MiB)

Number  Start (sector)    End (sector)  Size      Code  Name
   1            2048         1026047   500.0 MiB   FD00   Linux RAID
```

→ Documentación : `gdisk -l /dev/ram3`

```
julieta@julieta-standardpcq35ich92009:~$ sudo gdisk -l /dev/ram3
GPT fdisk (gdisk) version 1.0.8

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/ram3: 1126400 sectors, 550.0 MiB
Sector size (logical/physical): 512/4096 bytes
Disk identifier (GUID): 0FF3A40C-B151-4FA2-B713-10F9E5C7D0D7
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1126366
Partitions will be aligned on 2048-sector boundaries
Total free space is 102333 sectors (50.0 MiB)

Number  Start (sector)    End (sector)  Size      Code  Name
   1            2048          1026047   500.0 MiB  FD00   Linux RAID
```

→ Documentación : `gdisk -l /dev/ram4`

```
julieta@julieta-standardpcq35ich92009:~$ sudo gdisk -l /dev/ram4
GPT fdisk (gdisk) version 1.0.8

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/ram4: 1126400 sectors, 550.0 MiB
Sector size (logical/physical): 512/4096 bytes
Disk identifier (GUID): 4F77E6E0-1246-4231-B516-E5C5A94CB9CE
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1126366
Partitions will be aligned on 2048-sector boundaries
Total free space is 102333 sectors (50.0 MiB)

Number  Start (sector)    End (sector)  Size      Code  Name
   1            2048          1026047   500.0 MiB  FD00   Linux RAID
```

→ Documentación : `gdisk -l /dev/ram5`

```
julieta@julieta-standardpcq35ich92009:~$ sudo gdisk -l /dev/ram5
GPT fdisk (gdisk) version 1.0.8

Partition table scan:
  MBR: protective
  BSD: not present
  APM: not present
  GPT: present

Found valid GPT with protective MBR; using GPT.
Disk /dev/ram5: 1126400 sectors, 550.0 MiB
Sector size (logical/physical): 512/4096 bytes
Disk identifier (GUID): 2DFCCE72-DABB-40ED-B1A3-FE20D391F8C3
Partition table holds up to 128 entries
Main partition table begins at sector 2 and ends at sector 33
First usable sector is 34, last usable sector is 1126366
Partitions will be aligned on 2048-sector boundaries
Total free space is 102333 sectors (50.0 MiB)

Number  Start (sector)    End (sector)  Size      Code  Name
   1            2048          1026047   500.0 MiB  FD00   Linux RAID
```

→ Documentación : `lsblk -af`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lsblk -af
NAME        FSTYPE FSVER LABEL UUID                                 FSAVAIL FSUSE% MOUNTPOINTS
ram0
|--ram0p1
|--ram0p2
ram1
|--ram1p1
ram2
|--ram2p1
ram3
|--ram3p1
ram4
|--ram4p1
ram5
|--ram5p1
loop0       squashfs 4.0                                0      100% /snap/bare/5
loop1       squashfs 4.0                                0      100% /snap/core22/1122
loop2       squashfs 4.0                                0      100% /snap/core22/1380
loop3
loop4       squashfs 4.0                                0      100% /snap/firefox/4424
loop5       squashfs 4.0                                0      100% /snap/gnome-42-2204/141
loop6       squashfs 4.0                                0      100% /snap/gnome-42-2204/172
loop7       squashfs 4.0                                0      100% /snap/gtk-common-themes/1535
loop8       squashfs 4.0                                0      100% /snap/snapd/21465
loop9       squashfs 4.0                                0      100% /snap/snapd/21759
loop10      squashfs 4.0                                0      100% /snap/firefox/4451
sda
|--sda1     vfat     FAT32 NO_LABEL B8D7-E951                        291.8M   3% /boot/efi
|--sda2     ext4     1.0      9fb90f51-102f-4916-9bc2-1a040024a0db 49G     16% /var/snap/firefox/common/host-hunspell
sr0
```

Paso3

→ Comando: `mdadm --create /dev/md0 --level=5 --raid-devices=3 --force /dev/ram0p1 /dev/ram1p1 /dev/ram2p1`

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --create /dev/md0 --level=5 --raid-devices=3 --force /dev/ram0p1 /dev/ram1p1 /dev/ram2p1
mdadm: Defaulting to version 1.2 metadata
mdadm: array /dev/md0 started.
```

→ Documentación : `mdadm --detail /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --detail /dev/md0
/dev/md0:
  Version : 1.2
  Creation Time : Wed Jun 19 18:54:47 2024
  Raid Level : raid5
  Array Size : 1019904 (996.00 MiB 1044.38 MB)
  Used Dev Size : 509952 (498.00 MiB 522.19 MB)
  Raid Devices : 3
  Total Devices : 3
  Persistence : Superblock is persistent

  Update Time : Wed Jun 19 18:54:52 2024
  State : clean
  Active Devices : 3
  Working Devices : 3
  Failed Devices : 0
  Spare Devices : 0

  Layout : left-symmetric
  Chunk Size : 512K

Consistency Policy : resync

   Name : julieta-standardpcq35ich92009:0 (local to host julieta-standardpcq35ich92009)
   UUID : 8ee6b333:c6bea51c:b218d8c5:1a5774a7
   Events : 17

  Number Major Minor RaidDevice State
    0     259     0        0     active sync  /dev/ram0p1
    1     259     2        1     active sync  /dev/ram1p1
    2     259     3        2     active sync  /dev/ram2p1
```

→ Documentación: `lsblk -af`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lsblk -af
NAME        FSTYPE     FSVER LABEL      UUID                                  FSAVAIL FSUSE% MOUNTPOINTS
ram0
├─ram0p1
│ └─md0
├─ram0p2
└─ram1
   └─ram1p1
      └─md0
ram2
├─ram2p1
└─md0
ram3
├─ram3p1
└─md0
ram4
├─ram4p1
└─md0
ram5
├─ram5p1
└─md0
loop0       squashfs 4.0          0 100% /snap/bare/5
loop1       squashfs 4.0          0 100% /snap/core22/1122
loop2       squashfs 4.0          0 100% /snap/core22/1380
loop3       squashfs 4.0          0 100% /snap/firefox/4424
loop4       squashfs 4.0          0 100% /snap/gnome-42-2204/141
loop5       squashfs 4.0          0 100% /snap/gnome-42-2204/172
loop6       squashfs 4.0          0 100% /snap/gtk-common-themes/1535
loop7       squashfs 4.0          0 100% /snap/snapd/21465
loop8       squashfs 4.0          0 100% /snap/snapd/21759
loop9       squashfs 4.0          0 100% /snap/snapd/21759
loop10      squashfs 4.0          0 100% /snap/firefox/4451
sda
├─sda1      vfat      FAT32 NO_LABEL B8D7-E951          291.8M  3% /boot/efi
└─sda2      ext4      1.0        9fb90f51-102f-4916-9bc2-1a040024a0db 49G    16% /var/snap/firefox/common/host-hunspell
sr0
```

Paso4

→ Comando: `mkfs.ext4 -L ACSO /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo mkfs.ext4 -L ACSO /dev/md0
mke2fs 1.46.5 (30-Dec-2021)
Creating filesystem with 254976 4k blocks and 63744 inodes
Filesystem UUID: 32bf539f-7b12-481b-b1db-a14a3a1577da
Superblock backups stored on blocks:
    32768, 98304, 163840, 229376

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

→ Documentación: `fsck -N /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo fsck -N /dev/md0
fsck from util-linux 2.37.2
[/usr/sbin/fsck.ext4 (1) -- /dev/md0] fsck.ext4 /dev/md0
```

Paso5

→ Comando: `mkdir /acso`
`mount /dev/md0 /acso`

```
dd if=/dev/urandom of=/tmp/bigfile bs=1M count=100
cp /tmp/bigfile /acso/datos
```

```
julieta@julieta-standardpcq35ich92009:~$ mkdir /acso
mkdir: cannot create directory '/acso': File exists
julieta@julieta-standardpcq35ich92009:~$ sudo mount /dev/md0 /acso
julieta@julieta-standardpcq35ich92009:~$ sudo dd if=/dev/urandom of=/tmp/bigfile bs=1M count=100
100+0 records in
100+0 records out
104857600 bytes (105 MB, 100 MiB) copied, 2,2492 s, 46,6 MB/s
julieta@julieta-standardpcq35ich92009:~$ sudo cp /tmp/bigfile /acso/datos
```

→ Documentación: lsblk -af

```
julieta@julieta-standardpcq35ich92009:~$ sudo lsblk -af
```

NAME	FSTYPE	FSVER	LABEL	UUID	FSAVAIL	FSUSE%	MOUNTPOINTS
ram0							
└ram0p1							
└└md0	ext4	1.0	ACSO	b5721c5b-4b5f-4d38-95f3-cd907510d4b8	796,1M	10%	/acso
└ram0p2							
ram1							
└ram1p1							
└└md0	ext4	1.0	ACSO	b5721c5b-4b5f-4d38-95f3-cd907510d4b8	796,1M	10%	/acso
ram2							
└ram2p1							
└└md0	ext4	1.0	ACSO	b5721c5b-4b5f-4d38-95f3-cd907510d4b8	796,1M	10%	/acso
ram3							
└ram3p1							
ram4							
└ram4p1							
ram5							
└ram5p1							
loop0	squashfs	4.0			0	100%	/snap/bare/5
loop1	squashfs	4.0			0	100%	/snap/core22/1122
loop2	squashfs	4.0			0	100%	/snap/core22/1380
loop3							
loop4	squashfs	4.0			0	100%	/snap/firefox/4424
loop5	squashfs	4.0			0	100%	/snap/gnome-42-2204/141
loop6	squashfs	4.0			0	100%	/snap/gnome-42-2204/172
loop7	squashfs	4.0			0	100%	/snap/gtk-common-themes/1535
loop8	squashfs	4.0			0	100%	/snap/snapd/21465
loop9	squashfs	4.0			0	100%	/snap/snapd/21759
loop10	squashfs	4.0			0	100%	/snap/firefox/4451
sda							
└sda1	vfat	FAT32	NO_LABEL	8807-E951	291,8M	3%	/boot/efi
└sda2	ext4	1.0		9fb90f51-102f-4916-9bc2-1a040024a0db	48,9G	17%	/var/snap/firefox/common/host-hunspell
sr0							

→ Documentación: mount | grep acso

```
julieta@julieta-standardpcq35ich92009:~$ sudo mount | grep acso
/dev/md0 on /acso type ext4 (rw,relatime,stripe=256)
```

→ Documentación: df -h /dev/md0

```
julieta@julieta-standardpcq35ich92009:~$ sudo df -h /dev/md0
```

Filesystem	Size	Used	Avail	Use%	Mounted on
/dev/md0	962M	101M	797M	12%	/acso

→ Documentación: ls -la /acso/datos

```
julieta@julieta-standardpcq35ich92009:~$ ls -la /acso/datos
```

-rw-r--r--	1	root	root	104857600	jun 19 19:01	/acso/datos

Paso6

→ Comando: mdadm --grow /dev/md0 --level=6 --raid-devices=5 --add /dev/ram3p1 /dev/ram4p1

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --grow /dev/md0 --level=6 --raid-devices=5 --add /dev/ram3p1 /dev/ram4p1
mdadm: level of /dev/md0 changed to raid6
mdadm: added /dev/ram3p1
mdadm: added /dev/ram4p1
```

→ Documentación: mdadm --detail /dev/md0

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --detail /dev/md0
/dev/md0:
    Version : 1.2
  Creation Time : Wed Jun 19 20:05:36 2024
    Raid Level : raid6
  Array Size : 1529856 (1494.00 MiB 1566.57 MB)
  Used Dev Size : 509952 (498.00 MiB 522.19 MB)
  Raid Devices : 5
  Total Devices : 5
 Persistence : Superblock is persistent

  Update Time : Wed Jun 19 20:07:45 2024
    State : clean
  Active Devices : 5
 Working Devices : 5
 Failed Devices : 0
  Spare Devices : 0

    Layout : left-symmetric
  Chunk Size : 512K

Consistency Policy : resync

           Name : julieta-standardpcq35ich92009:0 (local to host julieta-standardpcq35ich92009)
          UUID : 660a12b2:7058862c:86036ef4:5372c804
        Events : 42

   Number   Major   Minor   RaidDevice State   /dev/ram0p1
     0         259         0         0   active sync
     1         259         2         1   active sync
     2         259         3         2   active sync
     5         259         5         3   active sync
     4         259         4         4   active sync
```

→ Documentación: lsblk -af

```
julieta@julieta-standardpcq35ich92009:~$ sudo lsblk -af
NAME        FSTYPE FSVER LABEL UUID                                 FSAVAIL FSUSE% MOUNTPOINTS
ram0
├─ram0p1
├─md0 ext4 1.0 ACSO 32bf539f-7b12-481b-b1db-a14a3a1577da 796,1M 10% /acso
├─ram0p2
├─ram1
├─ram1p1
├─md0 ext4 1.0 ACSO 32bf539f-7b12-481b-b1db-a14a3a1577da 796,1M 10% /acso
├─ram2
├─ram2p1
├─md0 ext4 1.0 ACSO 32bf539f-7b12-481b-b1db-a14a3a1577da 796,1M 10% /acso
├─ram3
├─ram3p1
├─md0 ext4 1.0 ACSO 32bf539f-7b12-481b-b1db-a14a3a1577da 796,1M 10% /acso
├─ram4
├─ram4p1
├─md0 ext4 1.0 ACSO 32bf539f-7b12-481b-b1db-a14a3a1577da 796,1M 10% /acso
├─ram5
├─ram5p1
loop0 squashfs 4.0 0 100% /snap/bare/5
loop1 squashfs 4.0 0 100% /snap/core22/1122
loop2 squashfs 4.0 0 100% /snap/core22/1380
loop3 squashfs 4.0 0 100% /snap/firefox/4424
loop4 squashfs 4.0 0 100% /snap/firefox/4451
loop5 squashfs 4.0 0 100% /snap/gnome-42-2204/141
loop6 squashfs 4.0 0 100% /snap/gnome-42-2204/172
loop7 squashfs 4.0 0 100% /snap/gtk-common-themes/1535
loop8 squashfs 4.0 0 100% /snap/snapd/21465
loop9 squashfs 4.0 0 100% /snap/snapd/21759
loop10
sda
├─sda1 vfat FAT32 NO_LABEL B8D7-E951 291,8M 3% /boot/efi
├─sda2 ext4 1.0 9fb90f51-102f-4916-9bc2-1a040024a0db 48,9G 17% /var/snap/firefox/common/host-hunspell
sr0
```

→ Documentación: `df -h /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo df -h /dev/md0
Filesystem      Size  Used Avail Use% Mounted on
/dev/md0        962M  101M  797M  12% /acso
```

Paso7

→ Comando: `sudo resize2fs /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo resize2fs /dev/md0
resize2fs 1.46.5 (30-Dec-2021)
Filesystem at /dev/md0 is mounted on /acso; on-line resizing required
old_desc_blocks = 1, new_desc_blocks = 1
The filesystem on /dev/md0 is now 382464 (4k) blocks long.
```

→ Documentación: `lsblk -af`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lsblk -af
NAME        FSTYPE FSVER LABEL UUID                                 FSAVAIL FSUSE% MOUNTPOINTS
ram0
├─ram0p1
│   └─md0
├─ram0p2
│   └─md0
├─ram1
│   └─ram1p1
│       └─md0
├─ram2
│   └─ram2p1
│       └─md0
├─ram3
│   └─ram3p1
│       └─md0
├─ram4
│   └─ram4p1
│       └─md0
└─ram5
    └─ram5p1
        └─I
loop0      squashfs 4.0          0 100% /snap/bare/5
loop1      squashfs 4.0          0 100% /snap/core22/1122
loop2      squashfs 4.0          0 100% /snap/core22/1380
loop3      squashfs 4.0          0 100% /snap/firefox/4424
loop4      squashfs 4.0          0 100% /snap/firefox/4451
loop5      squashfs 4.0          0 100% /snap/gnome-42-2204/141
loop6      squashfs 4.0          0 100% /snap/gnome-42-2204/172
loop7      squashfs 4.0          0 100% /snap/gtk-common-themes/1535
loop8      squashfs 4.0          0 100% /snap/snapd/21465
loop9      squashfs 4.0          0 100% /snap/snapd/21759
loop10
sda
├─sda1      vfat     FAT32 NO_LABEL B8D7-E951          291,8M    3% /boot/efi
└─sda2      ext4     1.0      9fb90f51-102f-4916-9bc2-1a040024a0db 48,9G    17% /var/snap/firefox/common/host-hunspell/
sr0
```

→ Documentación: `df -h /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo df -h /dev/md0
Filesystem      Size  Used Avail Use% Mounted on
/dev/md0        1,5G  101M  1,3G   8% /acso
```

→ Documentación: `ls -la /acso/datos`


```
julieta@julieta-standardpcq35ich92009:~$ sudo ls -la /acso/datos
-rw-r--r-- 1 root root 104857600 jun 19 20:07 /acso/datos
```

Paso8

→ Comando: mdadm --fail /dev/md0 /dev/ram2p1

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --fail /dev/md0 /dev/ram2p1
mdadm: set /dev/ram2p1 faulty in /dev/md0
```

→ Documentación: mdadm --detail /dev/md0

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --detail /dev/md0
/dev/md0:
  Version : 1.2
  Creation Time : Wed Jun 19 20:05:36 2024
  Raid Level : raid6
  Array Size : 1529856 (1494.00 MiB 1566.57 MB)
  Used Dev Size : 509952 (498.00 MiB 522.19 MB)
  Raid Devices : 5
  Total Devices : 5
  Persistence : Superblock is persistent

  Update Time : Wed Jun 19 20:18:42 2024
  State : clean, degraded
  Active Devices : 4
  Working Devices : 4
  Failed Devices : 1
  Spare Devices : 0

  Layout : left-symmetric
  Chunk Size : 512K

Consistency Policy : resync

  Name : julieta-standardpcq35ich92009:0 (local to host julieta-standardpcq35ich92009)
  UUID : 660a12b2:7058862c:86036ef4:5372c804
  Events : 44

   Number Major Minor RaidDevice State
    0       259      0        0     active sync  /dev/ram0p1
    1       259      2        1     active sync  /dev/ram1p1
    -         0      0        2     removed
    5       259      5        3     active sync  /dev/ram4p1
    4       259      4        4     active sync  /dev/ram3p1
    2       259      3        -     faulty    /dev/ram2p1
```

→ Documentación: ls -la /acso/datos

```
julieta@julieta-standardpcq35ich92009:~$ sudo ls -la /acso/datos
-rw-r--r-- 1 root root 104857600 jun 19 20:07 /acso/datos
```

Paso9

→ Comando: mdadm --remove /dev/md0 /dev/ram2p1

mdadm --add /dev/md0 /dev/ram2p1

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --remove /dev/md0 /dev/ram2p1
mdadm: hot removed /dev/ram2p1 from /dev/md0
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --add /dev/md0 /dev/ram2p1
mdadm: added /dev/ram2p1
```

→ Documentación: mdadm --detail /dev/md0

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --detail /dev/md0
/dev/md0:
  Version : 1.2
  Creation Time : Wed Jun 19 20:05:36 2024
  Raid Level : raid6
  Array Size : 1529856 (1494.00 MiB 1566.57 MB)
  Used Dev Size : 509952 (498.00 MiB 522.19 MB)
  Raid Devices : 5
  Total Devices : 5
  Persistence : Superblock is persistent

  Update Time : Wed Jun 19 20:22:42 2024
  State : clean
  Active Devices : 5
  Working Devices : 5
  Failed Devices : 0
  Spare Devices : 0

  Layout : left-symmetric
  Chunk Size : 512K

  Consistency Policy : resync

  Name : julieta-standardpcq35ich92009:0 (local to host julieta-standardpcq35ich92009)
  UUID : 660a12b2:7058862c:86036ef4:5372c804
  Events : 64

  Number Major Minor RaidDevice State
    0     259     0        0     active sync  /dev/ram0p1
    1     259     2        1     active sync  /dev/ram1p1
    6     259     3        2     active sync  /dev/ram2p1
    5     259     5        3     active sync  /dev/ram4p1
    4     259     4        4     active sync  /dev/ram3p1
```

→ Documentación: ls -la /acso/datos

```
julieta@julieta-standardpcq35ich92009:~$ sudo ls -la /acso/datos
-rw-r--r-- 1 root root 104857600 jun 19 20:07 /acso/datos
```

Paso10

→ Comando: umount /acso

→ Documentación: mount | grep acso

```
julieta@julieta-standardpcq35ich92009:~$ sudo mount | grep acso
julieta@julieta-standardpcq35ich92009:~$
```

Paso11

→ Comando: `lvm pvcreate /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm pvcreate /dev/md0
WARNING: ext4 signature detected on /dev/md0 at offset 1080. Wipe it? [y/n]: y
Wiping ext4 signature on /dev/md0.
Physical volume "/dev/md0" successfully created.
```

→ Documentación: `lvm pvdisplay`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm pvdisplay
"/dev/md0" is a new physical volume of "<1,46 GiB"
--- NEW Physical volume ---
PV Name           /dev/md0
VG Name
PV Size           <1,46 GiB
Allocatable       NO
PE Size           0
Total PE          0
Free PE           0
Allocated PE      0
PV UUID           L12RRY-mpZB-FDza-qHjf-AzUm-fBnT-lNUJSM
```

Paso12

→ Comando: `lvm vgcreate vg_datos /dev/md0`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm vgcreate vg_datos /dev/md0
Volume group "vg_datos" successfully created
```

→ Documentación: `lvm vgdisplay`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm vgdisplay
--- Volume group ---
VG Name           vg_datos
System ID
Format            lvm2
Metadata Areas     1
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            1
Act PV             1
VG Size            <1,46 GiB
PE Size            4,00 MiB
Total PE           373
Alloc PE / Size    0 / 0
Free PE / Size     373 / <1,46 GiB
VG UUID            raMj8z-1Rpw-wlXW-8DB4-ckvd-2Ec4-opFJQD
```

Paso13

- Comando:
- ```
lvm lvcreate -L 300M -n lv_vol1 vg_datos
lvm lvcreate -L 250M -n lv_vol2 vg_datos
```

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm lvcreate -L 300M -n lv_vol1 vg_datos
Logical volume "lv_vol1" created.
julieta@julieta-standardpcq35ich92009:~$ sudo lvm lvcreate -L 250M -n lv_vol2 vg_datos
Rounding up size to full physical extent 252,00 MiB
Logical volume "lv_vol2" created.
```

- Documentación: lvm lvdisplay

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm lvdisplay
--- Logical volume ---
LV Path /dev/vg_datos/lv_vol1
LV Name lv_vol1
VG Name vg_datos
LV UUID 6BPck0-UNMa-cbLP-tYtT-wq03-3oFw-2ddB9A
LV Write Access read/write
LV Creation host, time julieta-standardpcq35ich92009, 2024-06-19 20:36:17 -0300
LV Status available
open 0
LV Size 300,00 MiB
Current LE 75
Segments 1
Allocation inherit
Read ahead sectors auto
- currently set to 6144
Block device 252:0

--- Logical volume ---
LV Path /dev/vg_datos/lv_vol2
LV Name lv_vol2
VG Name vg_datos
LV UUID FfvFWo-SuHR-AOUj-ZjNs-IrIa-roiJ-IsxL04
LV Write Access read/write
LV Creation host, time julieta-standardpcq35ich92009, 2024-06-19 20:36:40 -0300
LV Status available
open 0
LV Size 252,00 MiB
Current LE 63
Segments 1
Allocation inherit
Read ahead sectors auto
- currently set to 6144
Block device 252:1
```

## Paso14

- Comando:
- ```
mkfs.ext4 /dev/mapper/vg_datos-lv_vol1  
mkfs.fat -F 32 /dev/mapper/vg_datos-lv_vol2
```

```
julieta@julieta-standardpcq35ich92009:~$ sudo mkfs.ext4 /dev/mapper/vg_datos-lv_vol1  
mke2fs 1.46.5 (30-Dec-2021)  
Creating filesystem with 76800 4k blocks and 76800 inodes  
Filesystem UUID: 6270bc67-9e5d-462f-a410-0b33fccb6782  
Superblock backups stored on blocks:  
    32768  
  
Allocating group tables: done  
Writing inode tables: done  
Creating journal (4096 blocks): done  
Writing superblocks and filesystem accounting information: done  
  
julieta@julieta-standardpcq35ich92009:~$ sudo mkfs.fat -F 32 /dev/mapper/vg_datos-lv_vol2  
mkfs.fat 4.2 (2021-01-31)
```

→ Documentación: fsck -N /dev/mapper/vg_datos-lv_vol1

```
julieta@julieta-standardpcq35ich92009:~$ sudo fsck -N /dev/mapper/vg_datos-lv_vol1
fsck from util-linux 2.37.2
[/usr/sbin/fsck.ext4 (1) -- /dev/mapper/vg_datos-lv_vol1] fsck.ext4 /dev/mapper/vg_datos-lv_vol1
```

→ Documentación: tune2fs -l /dev/mapper/vg_datos-lv_vol1

```
julieta@julieta-standardpcq35ich92009:~$ sudo tune2fs -l /dev/mapper/vg_datos-lv_vol1
tune2fs 1.46.5 (30-Dec-2021)
Filesystem volume name: <none>
Last mounted on: <not available>
Filesystem UUID: 6270bc67-9e5d-462f-a410-0b33fccb6782
Filesystem magic number: 0xEF53
Filesystem revision #: 1 (dynamic)
Filesystem features: has_journal ext_attr resize_inode dir_index filetype extent 64bit flex_bg sparse_super large_file huge_file dir_nlink extr
a_isize metadata_csum
Filesystem flags: signed_directory_hash
Default mount options: user_xattr acl
Filesystem state: clean
Errors behavior: Continue
Filesystem OS type: Linux
Inode count: 76800
Block count: 76800
Reserved block count: 3840
Overhead clusters: 8980
Free blocks: 67814
Free inodes: 76789
First block: 0
Block size: 4096
Fragment size: 4096
Group descriptor size: 64
Reserved GDT blocks: 37
Blocks per group: 32768
Fragments per group: 32768
Inodes per group: 25600
Inode blocks per group: 1600
RAID stride: 128
RAID stripe width: 384
Flex block group size: 16
Filesystem created: Wed Jun 19 20:39:45 2024
Last mount time: n/a
Last write time: Wed Jun 19 20:39:45 2024
Mount count: 0
Maximum mount count: -1
Last checked: Wed Jun 19 20:39:45 2024
Check interval: 0 (<none>)
Lifetime writes: 173 kB
Reserved blocks uid: 0 (user root)
```

```
Reserved blocks uid: 0 (user root)
Reserved blocks gid: 0 (group root)
First inode: 11
Inode size: 256
Required extra isize: 32
Desired extra isize: 32
Journal inode: 8
Default directory hash: half_md4
Directory Hash Seed: 6b8393c7-8e23-4972-bb06-6deacf0ca825
Journal backup: inode blocks
Checksum type: crc32c
Checksum: 0x7946a5c9
```

→ Documentación: fsck -N /dev/mapper/vg_datos-lv_vol2

```
julieta@julieta-standardpcq35ich92009:~$ sudo -N /dev/mapper/vg_datos-lv_vol2
sudo: invalid option -- 'N'
usage: sudo -h | -K | -k | -V
usage: sudo -v [-ABkns] [-g group] [-h host] [-p prompt] [-u user]
usage: sudo -l [-ABkns] [-g group] [-h host] [-p prompt] [-U user] [-u user] [command]
usage: sudo [-ABbEHknPS] [-r role] [-t type] [-C num] [-D directory] [-g group] [-h host] [-p prompt] [-R directory] [-T timeout] [-u user]
[VAR=value] [-i|-s] [<command>]
usage: sudo -e [-ABkns] [-r role] [-t type] [-C num] [-D directory] [-g group] [-h host] [-p prompt] [-R directory] [-T timeout] [-u user] file ...
```

Paso18

→ Comando:

```
lvremove /dev/vg_datos/lv_vol1
lvremove /dev/vg_datos/lv_vol2
vgremove vg_datos
pvremove /dev/md0
```

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvremove /dev/vg_datos/lv_vol2
Do you really want to remove and DISCARD active logical volume vg_datos/lv_vol2? [y/n]: y
Logical volume "lv_vol2" successfully removed
julieta@julieta-standardpcq35ich92009:~$ sudo vgremove vg_datos
Volume group "vg_datos" successfully removed
julieta@julieta-standardpcq35ich92009:~$ sudo pvremove /dev/md0
Labels on physical volume "/dev/md0" successfully wiped.
```

→ Documentación: `lvm lvdisplay`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm lvdisplay
julieta@julieta-standardpcq35ich92009:~$
```

→ Documentación: `lvm vgdisplay`

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm vgdisplay
julieta@julieta-standardpcq35ich92009:~$
```

Paso19

→ Comando:

```
mdadm --stop /dev/md0
mdadm --zero-superblock /dev/ram0p1
mdadm --zero-superblock /dev/ram1p1
mdadm --zero-superblock /dev/ram2p1
mdadm --zero-superblock /dev/ram3p1
mdadm --zero-superblock /dev/ram4p1
```

→ Documentación: `mdadm -detail -scan`

```
julieta@julieta-standardpcq35ich92009:~$ sudo mdadm --detail --scan
julieta@julieta-standardpcq35ich92009:~$
```

Preguntas

1.1) ¿Qué tipo de discos se generan usando el driver brd?

El driver brd (block ramdisk) se utiliza para crear discos RAM, que son discos virtuales almacenados en la memoria RAM del sistema. Estos discos son extremadamente rápidos debido a la naturaleza volátil de la RAM, pero todos los datos se pierden cuando el sistema se apaga o se reinicia. Los discos generados con el driver brd son conocidos como RAM disks o RAM drives.

1.2) ¿Y usando el de loopback?

El driver de loopback (loop) se utiliza para asociar archivos regulares o imágenes de disco con dispositivos de bloque virtuales. Los discos generados usando el driver de loopback son dispositivos de bloque virtuales que se crean a partir de archivos en el sistema de archivos subyacente. Esto permite que los archivos sean tratados como si fueran discos físicos. Los dispositivos loopback son útiles para montar imágenes de disco, realizar pruebas y emular dispositivos de almacenamiento adicionales sin necesidad de hardware físico adicional.

6.1) ¿Por qué el RAID que sigue montado en /acso sigue mostrándola misma capacidad que antes de extender el RAID?

El RAID que sigue montado en /acso muestra la misma capacidad que antes de extender el RAID porque, aunque el nivel del RAID y su tamaño físico han sido modificados, el sistema de archivos que reside en el RAID aún no ha sido redimensionado para aprovechar el nuevo espacio disponible.

Cuando se cambia el nivel de RAID y se agregan nuevas particiones, el dispositivo RAID subyacente (/dev/md0) se redimensiona físicamente para reflejar la nueva capacidad. Sin embargo, el sistema de archivos que está montado en /acso (como EXT4) no se redimensiona automáticamente. El sistema de archivos debe ser expandido manualmente para utilizar el nuevo espacio disponible en el RAID.

Para que el sistema de archivos utilice el espacio adicional, se debe ejecutar un comando de redimensionamiento del sistema de archivos, como `resize2fs` para EXT4. Este paso es necesario para que el sistema de archivos pueda reconocer y utilizar el espacio adicional proporcionado por la expansión del RAID.

7.1) ¿Por qué puede o no ser necesario desmontar el disco para llevar adelante este paso?

Desmontar el disco puede ser necesario si el sistema de archivos no soporta redimensionamiento en línea (es decir, mientras está montado). En algunos casos, ciertos sistemas de archivos (como EXT4) pueden redimensionarse en línea sin desmontar, mientras que otros (como FAT32 o NTFS) pueden requerir que el

sistema de archivos esté desmontado para evitar la corrupción de datos y asegurar que el redimensionamiento se realice correctamente.

11.1) ¿Hubo alguna advertencia al inicializar el PV? ¿Por qué?

```
julieta@julieta-standardpcq35ich92009:~$ sudo lvm pvcreate /dev/md0
WARNING: ext4 signature detected on /dev/md0 at offset 1080. Wipe it? [y/n]: y
Wiping ext4 signature on /dev/md0.
Physical volume "/dev/md0" successfully created.
```

Sí, puede haber una advertencia al inicializar el PV si se detecta un sistema de archivos existente o datos en el dispositivo RAID. La advertencia se presenta para evitar la pérdida accidental de datos existentes, ya que inicializar un PV sobrescribe la información de superbloque del dispositivo, lo que puede provocar la pérdida de cualquier dato previo.

14.1) ¿Cuál es la cantidad total de bloques que tiene el filesystem EXT4 recién creado?

La cantidad total de bloques que tiene el filesystem EXT4 recién creado es 76800.

14.2) ¿Cuántos iNodes tiene?

La cantidad de iNodes que tiene es 76800.

14.3) ¿Del total de iNodes creados, cuántos están libres?

Del total de iNodes creado, 76789 están libres.