

PROYECTO SEGUNDO CORTE

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1 PUNTO 1

- 1.1 Máquina Virtual con el S.O Debian (Administrador de todas las dependencias)
- 1.2 Máquina Virtual con el S.O Arch Linux (Dependencia de Recursos Humanos)

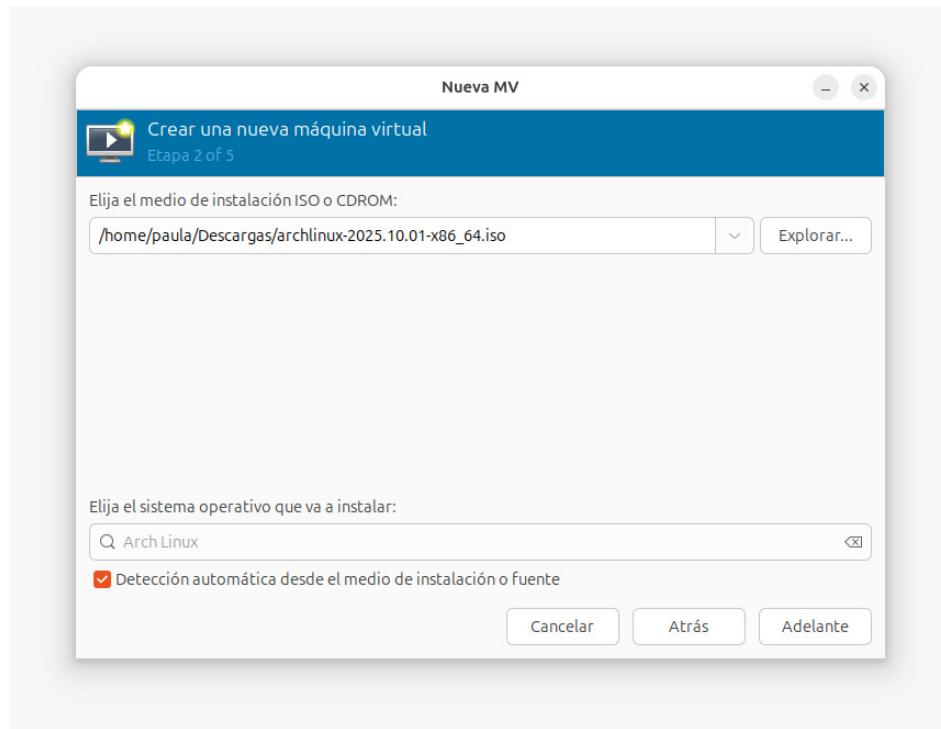


Figure 1: Proceso de Instalación Arch Linux (1).

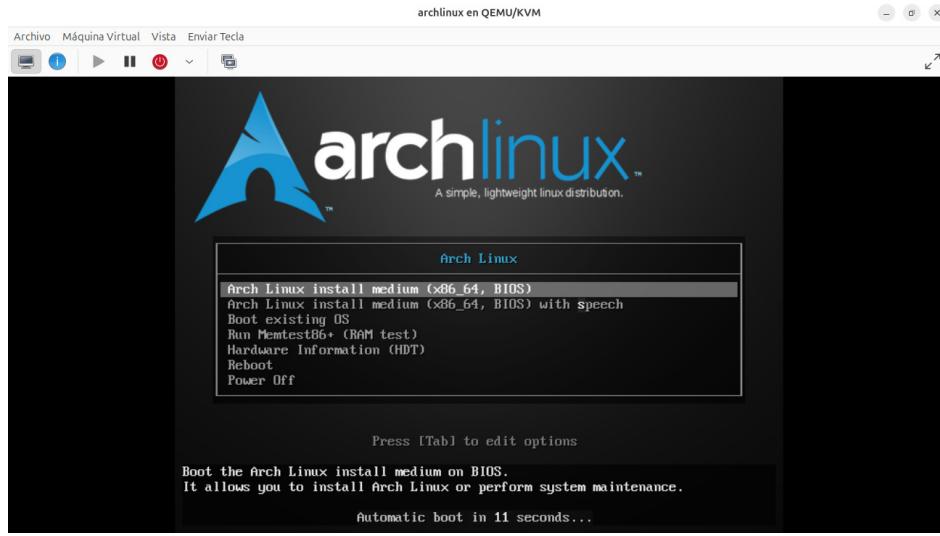


Figure 2: Proceso de Instalación Arch Linux (2).

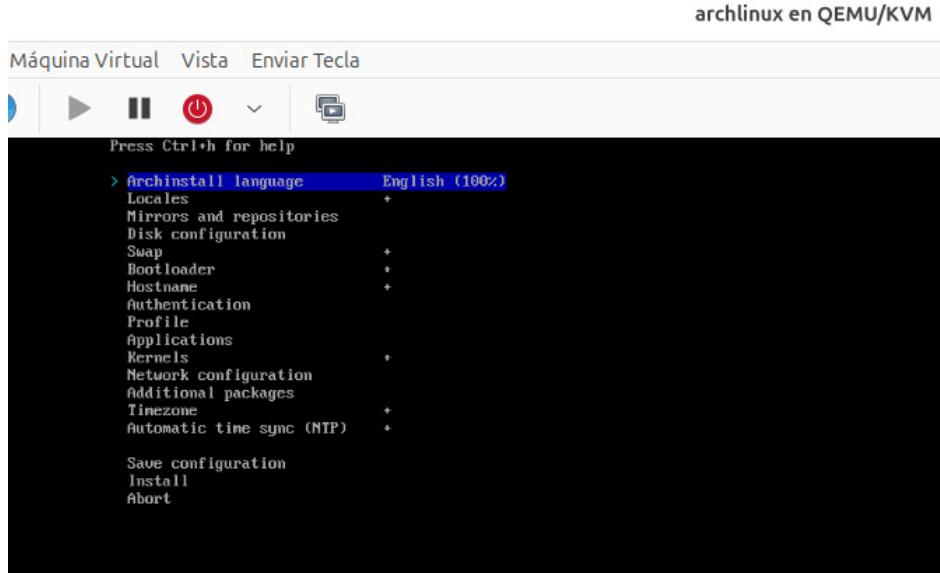


Figure 3: Selección del lenguaje en Arch Linux.

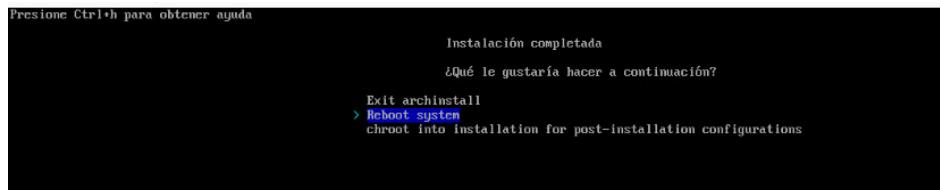


Figure 4: Instalación culminada con éxito Arch Linux.

1.3 Máquina Virtual con el S.O Rocky Linux(Dependencia de Tecnología)

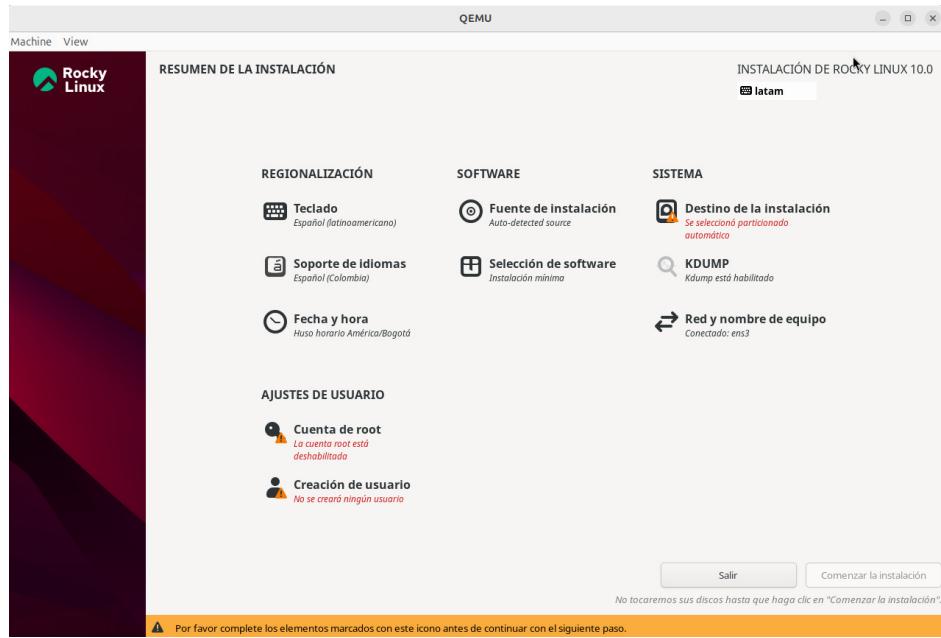


Figure 5: Resumen de la Instalación Rocky Linux.

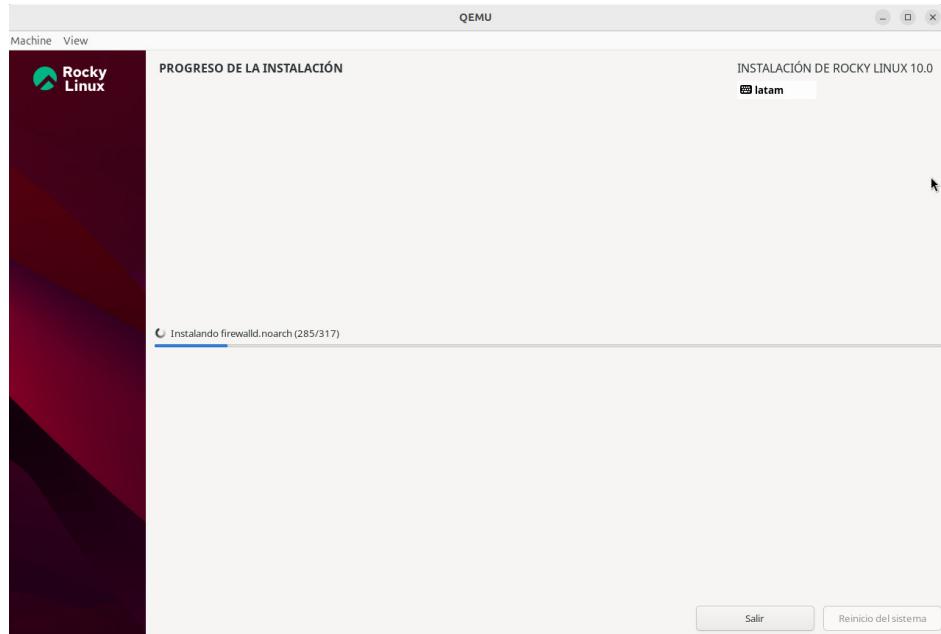


Figure 6: Inicio de la instalación de Rocky Linux.

```
QEMU
Machine View
OK [1] Stopped target network.target - Network.
OK [1] Stopped target network-pre.target - Preparation for Network.
OK [1] Stopped target remote-cryptsetup.target - Remote Encrypted Volumes.
OK [1] Stopped target timers.target - Timer Units.
OK [1] Stopped dbus.socket - D-Bus System Message Bus Socket.
OK [1] Stopped dracut-pre-pivot.service - dracut pre-pivot and cleanup hook.
OK [1] Stopped target initrd-target - Initrd Default Target.
OK [1] Stopped target initrd-root-device - Basic System.
OK [1] Stopped target initrd-root-device.target - Initrd Root Device.
OK [1] Stopped target paths.target - Path Units.
OK [1] Stopped target remote-fs.target - Remote File Systems.
OK [1] Stopped target remote-fs-pre.target - Preparation for Remote File Systems.
OK [1] Stopped target slices.target - Slice Units.
OK [1] Stopped target sockets.target - Socket Units.
OK [1] Stopped target swap.target - Swap Units.
OK [1] Stopped target local-fs.target - Local File Systems.
OK [1] Stopped target local-fs-pre.target - Preparation for Local File Systems.
OK [1] Stopped target swap.target - Swaps.
OK [1] Closed iscsid.socket - Open-iscsi iscsid Socket.
OK [1] Closed iscsiuto.socket - Open-iscsi iscsiuto Socket.
OK [1] Stopped dracut-pre-mount.service - dracut pre-mount hook.
OK [1] Stopped dracut-pre-mount.device - dracut pre-mount hook.
OK [1] Stopped cryptsetup.target - Local Encrypted Volumes.
OK [1] Stopped dracut-initqueue.service - dracut initqueue hook.
Starting plymouth-switch-root.service - Plymouth switch root service...
OK [1] Stopped rdma-load-modules-infinband.service - Load RDMA modules from /etc/rdma/modules/infiniband.conf.
OK [1] Stopped rdma-load-modules-roce.service - Load RDMA modules from /etc/rdma/modules/rdma.conf.
OK [1] Stopped rdma-load-modules-service.service - Load RDMA modules from /etc/rdma/modules/roce.conf.
OK [1] Stopped systemd-udevd - Initialize Udev Variables.
OK [1] Stopped systemd-modules-load.service - Load Kernel Modules.
OK [1] Stopped systemd-tmpfiles-setup.service - Create System Files and Directories.
OK [1] Stopped systemd-udev-trigger.service - Coldplug All udev Devices.
OK [1] Stopped dracut-pre-trigger.service - dracut pre-trigger hook.
Stopping systemd-udevd.service - Rule-based Manager for Device Events and Files...
OK [1] Finished dracut-pre-trigger.service - Clean up after dracut and Shutting Down Demons.
OK [1] Started systemd-udevd.service - Rule-based Manager for Device Events and Files.
OK [1] Started systemd-udevd-control.service - udev Control Socket.
OK [1] Closed systemd-udevd-control.socket - udev Control Socket.
OK [1] Closed systemd-udevd-kernel.socket - udev Kernel Socket.
OK [1] Stopped dracut-pre-udev.service - dracut pre-udev hook.
OK [1] Stopped dracut-c cmdline.service - dracut cmdline hook.
Starting initrd-udevd-cleanup-db.service - Cleanup udev Database...
OK [1] Started systemd-tmpfiles-set-udev-dev.service - Create Static Device Nodes in /dev.
OK [1] Started systemd-tmpfiles-set-udev-var.service - Create Static Device Nodes in /var.
OK [1] Stopped systemd-tmpfiles-setup-dev-carl.service - Create Static Device Nodes in /dev gracefully.
OK [1] Stopped systemd-static-nodes.service - Create List of Static Device Nodes.
OK [1] Finished initrd-udevd-cleanup-db.service - Cleanup udev Database.
OK [1] Reached target initrd-switch-root.target - Switch Root.
OK [1] Finished plymouth-switch-root.service - Plymouth switch root service.
Starting initrd-switch-root.service - Switch Root...
```

Figure 7: Instalación de Rocky Linux culminada.

QEMU

Machine View

```
Rocky Linux 10.0 (Red Quartz)
Kernel 6.12.0-55.12.1.el110_0.x86_64 on x86_64

localhost login: lrodriguez
Password:
Login incorrect

localhost login: root
Password:
[root@localhost ~]# hostname
localhost.localdomain
[root@localhost ~]# ip addr show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback brd 00:00:00:00:00:00
    inet 127.0.0.1/8 brd 00:00:00:00:00:00 brd 00:00:00:00:00:00
        valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host noprefixroute
            valid_lft forever preferred_lft forever
2: ens3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 52:54:00:12:34:56 brd ff:ff:ff:ff:ff:ff
    altname enp3s0
    altname enps3
    altname enx525400123456
    broadcast ff:ff:ff:ff:ff:ff
    link-layer brd 00:00:00:00:00:00
    queueing discipline global dynamic noqueue
        valid_lft 8616sec preferred_lft 8616sec
        inet6 fe80::1fe12:3456:ff:ff/64 scope site dynamic noqueue
            valid_lft 8616sec preferred_lft 8616sec
        inet6 fe80::5954:1fe12:3456:ff/64 scope link noqueue
            valid_lft forever preferred_lft forever
[root@localhost ~]# ping -c 3 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=255 time=180 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=255 time=68.4 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=255 time=65.5 ms

--- 8.8.8.8 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 68.372/77.874/187.770/21.247 ms
[root@localhost ~]#
```

Figure 8: Visualización de Rocky Linux.

1.4 Contenedor S.O de Garuda (Dependencia Financiera)

```
laumarc@laumarc-IdeaPad-Slim-3-15AMN8:~$ sudo docker run -dit --name garuda-financiera archlinux:latest  
Unable to find image 'archlinux:latest' locally  
latest: Pulling from library/archlinux  
a59b1e251b85: Downloading [>] 1.601MB/165.3MB  
849b0775ea0f: Download complete  
[
```

Figure 9: Instalación Contenedor Garuda.

5210e86db9ba	alpine:latest	"/bin/sh"	2 minutes ago	Up 2 minutes	fedora-comercial
fd63a3518ece	alpine:latest	"/bin/sh"	2 minutes ago	Up 2 minutes	garuda-financiera

Figure 10: Visualización Contenedor Garuda

1.5 Contenedor S.O de Fedora(Dependencia Comercial y de Ventas)

```
laumarde@laumarde-IdeaPad-Slim-3-15AMN8: $ sudo docker run -dit --name garuda-financiera alpine:latest
sudo docker run -dit --name fedora-comercial alpine:latest
[sudo] contraseña para laumarde:
Unable to find image 'alpine:latest' locally
latest: Pulling from library/alpine
2d35ebdb57d9: Pull complete
Digest: sha256:ab7ce07002c69e8f3d704a9c5d6fd3053be500b7f1c69fc0d80990c2ad8dd412
Status: Downloaded newer image for alpine:latest
fd63a3518ece68f2718d99e1c5f5c43fe313191e682db9164be6c97b4378d75
5210e86db9ba0b5d7ba76b73c043ee8c1607fd316e123cff7ba9d47b3a503115
```

Figure 11: Instalación Contenedor Fedora.

5210e86db9ba	alpine:latest	"/bin/sh"	2 minutes ago	Up 2 minutes	fedora-comercial
fd63a3518ece	alpine:latest	"/bin/sh"	2 minutes ago	Up 2 minutes	garuda-financiera

Figure 12: Visualización Contenedor Fedora.

2 PUNTO 2

2.1 Instalación Máquina Virtual con S.O Manjaro

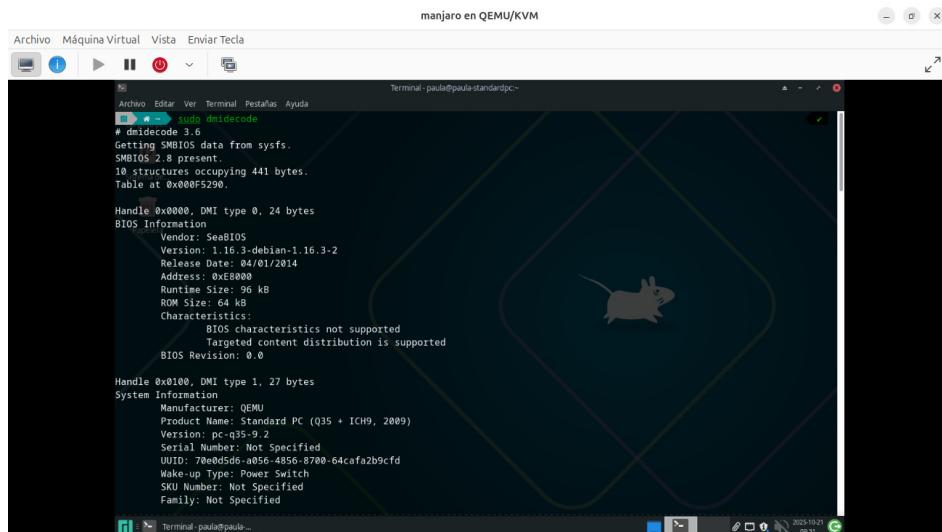


Figure 13: Instalación Máquina Virtual Manjaro.

2.2 Instalación Contenedor con S.O de Centos

2.3 Instalación Máquina Virtual con S.O de Kali Linux

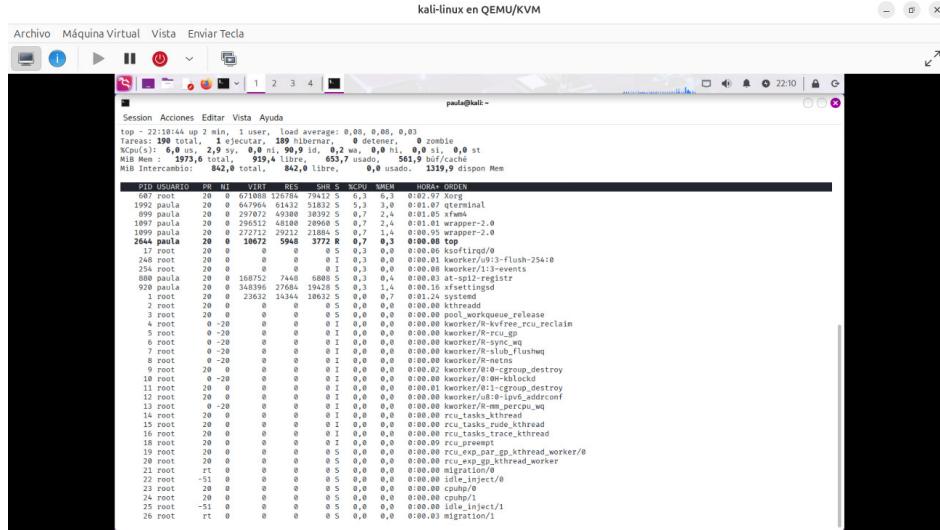


Figure 14: Instalación Máquina Virtual Kali Linux.

2.4 Instalación Máquina Virtual con S.O Linux Mint

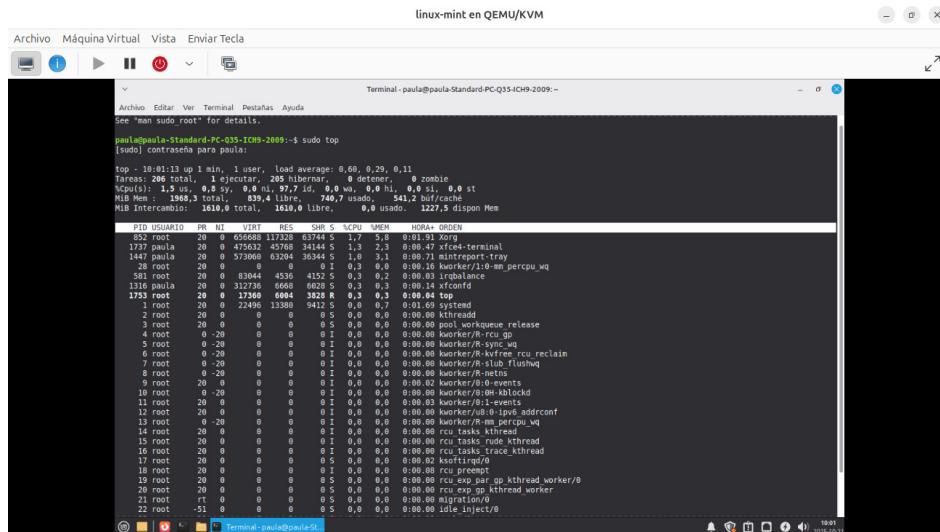


Figure 15: Instalación Máquina Virtual Linux Mint.

2.5 Instalación Contenedor con S.O de Ubuntu

```
laumarme@laumarme-IdeaPad-Slim-3-15AMNB: ~ sudo docker run -dit --name ubuntu-financiera alpine:latest
sudo docker run -dit --name alpine-financiera alpine:latest
sudo docker run -dit --name debian-comercial alpine:latest
c6c61cc68bd87309deb7e1f94c24647ccb559be39c7c125e3bfc3c19d8525c9f
76ce6f18815126d5176de8cb93bd09d3ffbc2f9aa10079a1e7631b3d20d6eb9c
ff1daa7c5a79682cbbeba2499702e181121c2f9ecf532c838bb2f800cbadb2a8
```

Figure 16: Contenedor de Ubuntu.

```
76ce6f188151  alpine:latest  "/bin/sh"          43 seconds ago  Up 42 seconds           alpine-financiera
c6c61cc68bd8  alpine:latest  "/bin/sh"          43 seconds ago  Up 42 seconds           ubuntu-financiera
```

Figure 17: Confirmación de Ubuntu funcionando.

2.6 Instalación Contenedor con S.O Alpine

```
laumarc@laumarc-IdeaPad-Slim-3-15AMNB: $ sudo docker run -dit --name ubuntu-financiera alpine:latest
sudo docker run -dit --name alpine-financiera alpine:latest
sudo docker run -dit --name debian-comercial alpine:latest
c6c61cc68bd87309deb7e1f94c24647ccb559be39c7c125e3bfc3c19d8525c9f
76ce6f18815126d5176de8cb93bd09dd3ffbc2f9aa10079a1e7631b3d20d9ebc
ff1daa7c5a79682cbbeba2499702e181121c2f9ecf532c838bb2f800cbadb2a8
```

Figure 18: Contenedor de Alpine.

```
76ce6f188151  alpine:latest  "/bin/sh"          43 seconds ago  Up 42 seconds           alpine-financiera
c6c61cc68bd8  alpine:latest  "/bin/sh"          43 seconds ago  Up 42 seconds           ubuntu-financiera
```

Figure 19: Confirmación de Alpine funcionando.

2.7 Instalación Máquina Virtual con S.O de Alma Linux

```
laumarc@laumarc-IdeaPad-Slim-3-15AMNB: $ qemu-img create -f qcow2 almalinux-vm.qcow2 1G 2>/dev/null
nohup qemu-system-x86_64 -name almalinux-comercial-vm -m 256 -hda almalinux-vm.qcow2 -nographic &
Formatting 'almalinux-vm.qcow2', fmt=qcow2 cluster_size=65536 extended_l1=off compression_type=zlib size=1073741824 lazy_refcounts=off refcount_bkts=16
[1] 12898
```

Figure 20: Creación de la Máquina Virtual de Alma Linux.

```
laumarc 12898 111 0.0 1288444 46928 pts/0  Rl  20:15  0:24 qemu-system-x86_64 -name almalinux-comercial-vm -m 256 -hda almalinux-vm.qcow2 -nographic
```

Figure 21: Confirmación de que la máquina virtual está funcionando.

2.8 Instalación Contenedor con S.O Linux Debian

3 PUNTO 3

3.1 Creación de Subredes

```
laumarc@laumarc-IdeaPad-Slim-3-15AMNB: $ sudo docker network create --subnet=172.20.0.0/16 red-financiera
192f6e994ca5118f2866d9a49909e2bfc5a42120afda637e1ec7dd82e0a0244a
```

Figure 22: Creación de una subred de la Dependencia Financiera.

```
laumarc@laumarc-IdeaPad-Slim-3-15AMNB: $ sudo docker network create --subnet=172.21.0.0/16 red-comercial
8aa4522b428dd96b1263fca8b0ef757aaeaceef8a4260e2a1396beff0551731
```

Figure 23: Creación de una subred para la Dependencia Comercial y Ventas.

```
laumarc@laumarc-IdeaPad-Slim-3-15AMNB: $ sudo docker network connect red-financiera garuda-financiera
sudo docker network connect red-financiera ubuntu-financiera
sudo docker network connect red-financiera alpine-financiera
```

Figure 24: Conexión de contenedores a la subred de la Dependencia Financiera

```
laumarc@laumarc-IdeaPad-Slim-3-15AMNB: $ sudo docker network connect red-comercial fedora-comercial
sudo docker network connect red-comercial debian-comercial
```

Figure 25: Conexión de contenedores a la subred de la Dependencia Comercial y Financiera

```
laumarc@laumarc-IdeaPad-Slim-3-15AMN8:~$ sudo docker network connect red-comercial fedora-comercial
sudo docker network connect red-comercial debian-comercial
```

Figure 26: Verificación de conexión de los contenedores a la subred observando su IP

3.2 Análisis de monitoreo de dispositivos y hardware con los comandos

3.2.1 Dependencia de Recursos Humanos

```
manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
[  ] Terminal - paula@paula-standardpc~
sudo dmidecode
Handle 0x0000, DMI type 0, 24 bytes
BIOS Information
    Vendor: Seabios
    Version: 1.10.3-debian-1.16.3-2
    Release Date: 04/01/2014
    Address: 0xE8000
    Runtime Size: 96 kB
    ROM Size: 64 kB
    Characteristics:
        BIOS characteristics not supported
        Targeted content distribution is supported
    BIOS Revision: 0.0

Handle 0x0100, DMI type 1, 27 bytes
System Information
    Manufacturer: QEMU
    Product Name: Standard PC (Q35 + ICH9, 2009)
    Version: pc-i35-9.2
    Serial Number: Not Specified
    UUID: 70e0d5d6-a056-4856-8700-64cafazb9cf
    Wake-up Type: Power Switch
    SKU Number: Not Specified
    Family: Not Specified
Terminal - paula@paula...
```

Figure 27: Aplicación del comando dmidecode (1).

```
manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
[  ] Terminal - paula@paula-standardpc~
Handle 0x0300, DMI type 3, 22 bytes
Chassis Information
    Manufacturer: QEMU
    Type: Other
    Location Present: Yes
    Version: pc-i35-9.2
    Serial Number: Not Specified
    Asset Tag: Not Specified
    Boot-up State: Safe
    Power Supply State: Safe
    Thermal State: Safe
    Security Status: Unknown
    OEM Information: 0x00000000
    Height: Unspecified
    Number Of Power Cords: Unspecified
    Contained Elements: 0
    SKU Number: Not Specified

Handle 0x0400, DMI type 4, 42 bytes
Processor Information
    Socket Designation: CPU 0
    Type: Central Processor
    Family: Other
    Manufacturer: QEMU
    ID: EB 06 08 00 FF FB 8B 0F
    Version: pc-i35-9.2
    Voltage: Unknown
    External Clock: Unknown
    Max Speed: 2000 MHz
    Current Speed: 2000 MHz
Terminal - paula@paula...
```

Figure 28: Aplicación del comando dmidecode (2).

```
manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal paula@paula-standardpc:~$ dmidecode
Handle 0x0401, DMI type 4, 42 bytes
Processor Information
  Socket Designation: CPU 1
  Type: Central Processor
  Family: Other
  Manufacturer: QEMU
  ID: EB 06 08 00 FF FB 8B 0F
  Version: pc-i35-9.2
  Voltage: Unknown
  External Clock: Unknown
  Max Speed: 2000 MHz
  Current Speed: 2000 MHz
  Status: Populated, Enabled
  Upgrade: Other
  L1 Cache Handle: Not Provided
  L2 Cache Handle: Not Provided
  L3 Cache Handle: Not Provided
  Serial Number: Not Specified
  Asset Tag: Not Specified
  Part Number: Not Specified
  Core Count: 1
  Core Enabled: 1
  Thread Count: 1
  Characteristics: None

Handle 0x0401, DMI type 4, 42 bytes
Processor Information
  Socket Designation: CPU 1
  Type: Central Processor
  Family: Other
  Manufacturer: QEMU
  ID: EB 06 08 00 FF FB 8B 0F
  Version: pc-i35-9.2
  Voltage: Unknown
  External Clock: Unknown
  Max Speed: 2000 MHz
  Current Speed: 2000 MHz
  Status: Populated, Enabled
  Upgrade: Other
  L1 Cache Handle: Not Provided
  L2 Cache Handle: Not Provided
  L3 Cache Handle: Not Provided
  Serial Number: Not Specified
  Asset Tag: Not Specified
  Part Number: Not Specified
  Core Count: 1
  Core Enabled: 1
  Thread Count: 1
  Characteristics: None

Handle 0x1000, DMI type 16, 23 bytes
Physical Memory Array
```

Figure 29: Aplicación del comando dmidecode (3).

```
manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal paula@paula-standardpc:~$ dmidecode
Handle 0x0401, DMI type 4, 42 bytes
Processor Information
  Core Enabled: 1
  Thread Count: 1
  Characteristics: None

Handle 0x0401, DMI type 4, 42 bytes
Processor Information
  Socket Designation: CPU 1
  Type: Central Processor
  Family: Other
  Manufacturer: QEMU
  ID: EB 06 08 00 FF FB 8B 0F
  Version: pc-i35-9.2
  Voltage: Unknown
  External Clock: Unknown
  Max Speed: 2000 MHz
  Current Speed: 2000 MHz
  Status: Populated, Enabled
  Upgrade: Other
  L1 Cache Handle: Not Provided
  L2 Cache Handle: Not Provided
  L3 Cache Handle: Not Provided
  Serial Number: Not Specified
  Asset Tag: Not Specified
  Part Number: Not Specified
  Core Count: 1
  Core Enabled: 1
  Thread Count: 1
  Characteristics: None

Handle 0x1000, DMI type 16, 23 bytes
Physical Memory Array
```

Figure 30: Aplicación del comando dmidecode (4).

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-standardpc:~-
Archivo Editar Ver Terminal Pestañas Ayuda
Memory Device
  Array Handle: 0x1008
    Error Information Handle: Not Provided
    Total Width: Unknown
    Data Width: Unknown
    Size: 2 GB
    Form Factor: DIMM
    Set: None
    Locator: DIMM 0
    Bank Locator: Not Specified
    Type: RAM
    Type Detail: Other
    Speed: Unknown
    Manufacturer: DELL
    Serial Number: Not Specified
    Asset Tag: Not Specified
    Part Number: Not Specified
    Rank: Unknown
    Configured Memory Speed: Unknown
    Minimum Voltage: Unknown
    Maximum Voltage: Unknown
    Configured Voltage: Unknown

Handle 0x1000, DMI type 19, 31 bytes
Memory Array Mapped Address
  Starting Address: 0x000000000000
  Ending Address: 0x0007FFFFFFFFFF
  Range Size: 2 GB
  Physical Array Handle: 0x1000
  Partition Width: 1

```

Figure 31: Aplicación del comando dmidecode (5).

```

Handle 0x2000, DMI type 32, 11 bytes
System Boot Information
Status: No errors detected

Handle 0x7F00, DMI type 127, 4 bytes
End Of Table

```

Figure 32: Aplicación del comando dmidecode (6).

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-standardpc:~-
sudo hwinfo
***** start debug info *****
libhd version 25.0 (x86_64) [7688]
using /var/lib/hardware
Kernel version: 6.12
  /proc/cmdline ...
  BOOT_IMAGE=/boot/vmlinuz-6.12-x86_64 root=UUID=dcebbef1-4f1f-eb0e0402765e rw rootflags=subvol=@ quiet splash apparmor1 security=apparmor udev.log.priority=3
  .... /proc/cmdline end ----
debug = 0xfffffff7
probe = 0x15938fcdaa17fcffff (+memory +pci +sasnp +net +floppy +misc +serial +misc_parallel +misc_floppy +serial +cpu +bios +monitor +mouse +scsi +usb +usb_mods +modem +modem_usb +parallel +parallel_lp +parallel_zip +isa +isa_isdn +isdn +kbd +iprom +sbus +in +braille +braille_alva +braille_fhp +braille_ht +ignx11 +sys +bios.vbe -no_remove +lbose.match +isapnp.mod +braille, baus -manual +fb +pppoe -scan +pmcia +fork +bios.1mm +390 +cpumcia +sysfs +s390disks +udev +block +block_cdrom +block_parallel +edd +edd_mod +bios.ddc +bios.fb +bios.mode +input +block.mods +bios.vesa -cpumcia.debug -scsi.noserial +wlan +bios.crc -hal +bios.vram +bios.api +bios.ddc.ports=0 +modules.pata +net.eeprom +x86emu.dump +max -lxrc)
shm: attached segment 62 at 0x7fe0e1050000
>> hal.1: read hal data
>> floppy.1: get nvram ...
  /proc/nvram ...
  Check nvram status: not valid
  # floppies : 0
  Floppy 0 type : none
  Floppy 1 type : none
  HD 0 type : none
  HD 1 type : none
  HD type 48 data: 0/0/0 C/H/S, precomp 0, lz 0
  HD type 49 data: 127/32/0 C/H/S, precomp 48, lz 0
  DOS base memory: 640 KB
  Extended memory: 65535 KB (configured), 65535 KB (tested)

```

Figure 33: Aplicación del comando hwinfo (1).

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-standardpc-
Archivo Editar Ver Terminal Pestañas Ayuda
----- SMBIOS Structure Table 0xf5290 - 0xf5448 -----
f5298 00 18 00 00 01 02 00 e8 03 00 08 00 00 00 00 00
f52a0 00 00 00 04 00 00 ff ff 53 65 61 42 49 4f 53 00
f52b0 31 2d 00 00 2e 33 00 00 62 69 66 6e 2d 31 20
f52c0 31 26 2a 33 00 00 52 30 34 00 00 00 00 00 00
f52d0 00 00 00 01 18 00 01 02 03 00 00 00 00 00 00 00
f52e0 x0 56 48 87 00 64 0a fa 2b 9c fd 06 00 00 00 00
f52f0 4d 55 00 53 74 61 6e 64 61 72 64 28 50 43 20 28
f5300 51 33 35 20 2b 20 49 43 48 39 2c 20 32 30 30 39
f5310 29 00 70 63 2d 71 33 35 2d 39 2e 32 00 00 03 16
f5320 00 03 01 01 02 00 00 03 03 02 00 00 00 00 00 00
f5330 00 00 00 00 51 45 4d 55 00 70 63 2d 71 33 35 2d
f5340 39 2a 32 00 00 04 2a 00 04 01 03 fe 02 eb 06 08
f5350 00 ff fb 8b 0f 03 00 00 00 d0 07 00 07 41 01 ff
f5360 ff ff ff ff ff ff 00 00 01 01 02 00 01 00 43
f5370 50 55 20 30 00 51 45 4d 55 00 70 63 2d 71 33 35
f5380 2d 39 2e 32 00 00 84 2a 01 04 01 03 fe 02 eb 00
f5390 00 00 00 00 ff ff ff 00 00 00 00 00 00 00 00 00 00
f53a0 ff ff
f53b0 00 00 00 00 50 55 20 31 00 51 45 4d 55 00 70 53 2d 71 33
f53c0 35 2d 39 2e 32 00 00 10 17 00 10 01 03 06 00 00
f53d0 20 00 fe ff 01 00 00 00 00 00 00 00 00 00 00 00 00
f53e0 11 28 00 11 00 10 fe ff ff ff ff ff ff ff ff ff ff
f53f0 01 00 07 02 00 00 02 00 00 00 00 00 00 00 00 00
f5400 00 00 00 00 00 00 00 00 44 49 4d 4d 20 30 00 51
f5410 45 4d 55 00 00 13 1f 00 13 00 00 00 00 ff ff 1f
f5420 00 00 10 01 00 00 00 00 00 00 00 00 00 00 00 00
f5430 00 00 00 00 00 00 20 0b 00 20 00 00 00 00 00 00
f5440 00 00 00 7f 04 00 7f 00 00 "....."
----- SMBIOS Structure Table end -----

```

Figure 34: Aplicación del comando hwinfo (2).

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-standardpc-
Archivo Editar Ver Terminal Pestañas Ayuda
Cache: 16384 kb
Config Status: cfg-new, avail=yes, need=no, active=unknown
56: None 00:0: 10700 Loopback
[Created at net 126]
Unique ID: ZsBS-GQNxL4uPNA
SysFS ID: /class/net/lo
Hardware Class: network interface
Model: "Loopback network interface"
Device File: lo
Link detected: yes
Config Status: cfg=new, avail=yes, need=no, active=unknown

57: None 00:0: 10701 Ethernet
[Created at net 126]
Unique ID: Q0GM-ndpeucaxdV1
Parent ID: g1fs-VlRhsc57kD0
SysFS ID: /class/net/ens1
HWECC Device Link: /devices/pci0000:00/0000:00:02.0/0000:01:00.0/virtio1
Hardware Class: network interface
Model: "Ethernet network interface"
Driver: "virtio_net"
Driver Modules: "virtio_net"
Device File: ens1
HW Address: 52:54:00:00:d8:d7:5a
Permanent HW Address: 52:54:00:00:d8:d7:5a
Link detected: yes
Config Status: cfg=new, avail=yes, need=no, active=unknown
Attached to: #37 (Ethernet controller)

```

Figure 35: Aplicación del comando hwinfo (3).

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-standardpc:~>

Archivo Editar Ver Terminal Pestañas Ayuda
E: USEC_INITIALIZED=6292185
E: ID_VENDOR_FROM_DATABASE=The Linux Foundation
P: /devices/LNXSYSTM:00/LNXSYBUS:00/PNP0C0F:0b
M: PNP0C0F:0b
J: +acpi/PNP0C0F:0b
U: acpi
E: DEVPATH=/devices/LNXSYSTM:00/LNXSYBUS:00/PNP0C0F:0b
E: SUBSYSTEM=acpi
E: MODALIAS=acpi:PNP0C0F:
E: USEC_INITIALIZED=6292164
E: ID_VENDOR_FROM_DATABASE=The Linux Foundation
P: /devices/LNXSYSTM:00/LNXSYBUS:00/PNP0C0F:0c
M: PNP0C0F:0c
J: +acpi/PNP0C0F:0c
U: acpi
E: DEVPATH=/devices/LNXSYSTM:00/LNXSYBUS:00/PNP0C0F:0c
E: SUBSYSTEM=acpi
E: MODALIAS=acpi:PNP0C0F:
E: USEC_INITIALIZED=6292214
E: ID_VENDOR_FROM_DATABASE=The Linux Foundation
P: /devices/LNXSYSTM:00/LNXSYBUS:00/PNP0C0F:0d
M: PNP0C0F:0d
J: +acpi/PNP0C0F:0d
U: acpi
E: DEVPATH=/devices/LNXSYSTM:00/LNXSYBUS:00/PNP0C0F:0d
E: SUBSYSTEM=acpi
E: MODALIAS=acpi:PNP0C0F:
E: USEC_INITIALIZED=6298577
E: ID_VENDOR_FROM_DATABASE=The Linux Foundation

```

Figure 36: Aplicación del comando hwinfo (4).

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-standardpc:~>

Archivo Editar Ver Terminal Pestañas Ayuda
[sudo] password: 
00:00.0 Host bridge: Intel Corporation 82G33/G31/735/P31 Express DRAM Controller
00:00.1 VGA compatible controller: Red Hat, Inc. Virtio 1.0 GPU (rev 01)
00:02.0 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:02.1 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:02.2 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:02.3 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:02.4 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:02.5 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:02.6 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:02.7 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:03.0 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:03.1 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:03.2 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:03.3 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:03.4 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:03.5 PCI bridge: Red Hat, Inc. QEMU PCIe Root port
00:04.0 SMBus: Intel Corporation 82801IR (ICH9) LPC Interface Controller (rev 02)
00:1f.0 ISA bridge: Intel Corporation 82801IR (ICH9) SMBus Controller (rev 02)
00:1f.2 SATA controller: Intel Corporation 82801IR/IO/IH (ICH9R/DO/DH) 6 port SATA Controller [AHCI mode] (rev 02)
00:1f.3 SMBus: Intel Corporation 82801I (ICH9) SMBus Controller (rev 02)
01:00.0 Ethernet controller: Red Hat, Inc. Virtio 1.0 network device (rev 01)
02:00.0 USB controller: Red Hat, Inc. QEMU XHCI Host Controller (rev 01)
03:00.0 Communication controller: Red Hat, Inc. Virtio 1.0 console (rev 01)
04:00.0 SCSI storage controller: Red Hat, Inc. Virtio 1.0 block device (rev 01)
05:00.0 Unclassified device [00ff]: Red Hat, Inc. Virtio 1.0 balloon (rev 01)
06:00.0 Unclassified device [00ff]: Red Hat, Inc. Virtio 1.0 RNG (rev 01)

```

Figure 37: Aplicación del comando lspci.

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-standardpc:~>

Archivo Editar Ver Terminal Pestañas Ayuda
[sudo] password: 
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 0627:0001 Adomax Technology Co., Ltd QEMU Tablet
Bus 002 Device 001: ID 1d6b:0003 Linux Foundation 3.0 root hub

```

Figure 38: Aplicación del comando lsusb.

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal paula@paula-standardpc:~$ dmesg
[    0.000000] Linux version 6.12.48-1-MANJARO (linux612@manjaro) (gcc (GCC) 15.2.1 20250813, GNU ld (GNU Binutils) 2.45.0) #1
[    0.000000] SMP PREEMPT_DYNAMIC Fri, 19 Sep 2025 16:11:04 +0000
[    0.000000] Command line: BOOT_IMAGE=/boot/vmlinuz-6.12-x86_64 root=UUID=dcebbef1-48fe-45f1-81f7-eb0e0402765e rw rootflag
[    0.000000] =subvol# quiet splash apparmor=1 security=apparmor udev.log.priority=3
[    0.000000] BIOS-provided physical RAM map:
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x000000000009ffff] usable
[    0.000000]   BIOS-e820: [mem 0x000000000009fc00-0x000000000009ffff] reserved
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
[    0.000000]   BIOS-e820: [mem 0x0000000000100000-0x0000000007ffff] usable
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x0000000007ffff] reserved
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
[    0.000000] NX (Execute Disable) protection active
[    0.000000] APIC: Static cache initialized
[    0.000000] SMBIOS 2.8 present.
[    0.000000] DMI: QEMU Standard PC (Q35 + ICH9, 2009), BIOS 1.16.3-debian-1.16.3-2 04/01/2014
[    0.000000] DMI: Memory slots populated: 1/1
[    0.000000] Hypervisor detected: KVM
[    0.000000] kvm-clock: Using msrs 4b564d01 and 4b564d00
[    0.000001] kvm-clock: using sched offset of 17347451962 cycles
[    0.000004] clocksource: kvm-clock: mask: 0xffffffffffffffffff max_cycles: 0x1cd42e4dfb, max_idle_ns: 881590591483 ns
[    0.000005] tsc: Detected 1800.003 MHz processor
[    0.001794] e820: update [mem 0x0000000000000000-0x00000000000ffff] usable ==> reserved
[    0.001795] e820: remove [mem 0x0000a0000-0x000ffff] usable
[    0.001796] last_tfn = 0x7fdc max_arch_pfn = 0x400000000
[    0.001869] MTRR map: 4 entries (3 fixed + 1 variable; max 19), built from 8 variable MTRRs
[    0.001872] VRD/DT Configuration f0:71: WR WC HC WR WP HC WT
[    0.001873] Terminal-paula@paula...

```

Figure 39: Aplicación del comando dmesg (1).

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
Terminal paula@paula-standardpc:~$ dmesg
[    0.000000] Linux version 6.12.48-1-MANJARO (linux612@manjaro) (gcc (GCC) 15.2.1 20250813, GNU ld (GNU Binutils) 2.45.0) #1
[    0.000000] SMP PREEMPT_DYNAMIC Fri, 19 Sep 2025 16:11:04 +0000
[    0.000000] Command line: BOOT_IMAGE=/boot/vmlinuz-6.12-x86_64 root=UUID=dcebbef1-48fe-45f1-81f7-eb0e0402765e rw rootflag
[    0.000000] =subvol# quiet splash apparmor=1 security=apparmor udev.log.priority=3
[    0.000000] BIOS-provided physical RAM map:
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x000000000009ffff] usable
[    0.000000]   BIOS-e820: [mem 0x000000000009fc00-0x000000000009ffff] reserved
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
[    0.000000]   BIOS-e820: [mem 0x0000000000100000-0x0000000007ffff] usable
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x0000000007ffff] reserved
[    0.000000]   BIOS-e820: [mem 0x0000000000000000-0x000000000000ffff] reserved
[    0.000000] NX (Execute Disable) protection active
[    0.000000] APIC: Static cache initialized
[    0.000000] SMBIOS 2.8 present.
[    0.000000] DMI: QEMU Standard PC (Q35 + ICH9, 2009), BIOS 1.16.3-debian-1.16.3-2 04/01/2014
[    0.000000] DMI: Memory slots populated: 1/1
[    0.000000] Hypervisor detected: KVM
[    0.000000] kvm-clock: Using msrs 4b564d01 and 4b564d00
[    0.000001] kvm-clock: using sched offset of 17347451962 cycles
[    0.000004] clocksource: kvm-clock: mask: 0xffffffffffffffffff max_cycles: 0x1cd42e4dfb, max_idle_ns: 881590591483 ns
[    0.000005] tsc: Detected 1800.003 MHz processor
[    0.001794] e820: update [mem 0x0000000000000000-0x00000000000ffff] usable ==> reserved
[    0.001795] e820: remove [mem 0x0000a0000-0x000ffff] usable
[    0.001796] last_tfn = 0x7fdc max_arch_pfn = 0x400000000
[    0.001869] MTRR map: 4 entries (3 fixed + 1 variable; max 19), built from 8 variable MTRRs
[    0.001872] VRD/DT Configuration f0:71: WR WC HC WR WP HC WT
[    0.001873] Terminal-paula@paula...

```

Figure 40: Aplicación del comando dmesg (2).

Figure 41: Aplicación del comando dmesg (3).

Figure 42: Aplicación del comando uname -a.

```
Archivo Editor Ver Terminal Pestañas Ayuda
[sudo] free -h
total      usado      libre  compartido   búf/caché disponible
Mem:    1.9Gi     746Mi   540Mi      14Mi    838Mi      1.2Gi
Inter:      0B       0B       0B
```

Figure 43: Aplicación del comando free -h.

```
terminal-paula@paula-standardpc:~$ Archivo Editar Ver Terminal Pestañas Ayuda
terminal-paula@paula-standardpc:~$ S.ficheros Tamaño Usados Disp Uso% Montado en
terminal-paula@paula-standardpc:~$ sudo df -h
terminal-paula@paula-standardpc:~$
```

Figure 44: Aplicación del comando df -h.

```
Terminal - paula@paula-standardpc:~  
Archivo Editar Ver Terminal Pestañas Ayuda  
[ ] ~ ~ sudo inxi  
CPU: 2x 1-core Intel Core i5-8265U (-SMP-) speed: 1800 MHz  
Kernel: 6.12.48-1-MANJARO x86_64 Up: 17m Mem: 792 MiB/1.92 GiB (40.3%)  
Storage: 15 GiB (31.6% used) Procs: 209 Shell: Sudo inxi: 3.3.39
```

Figure 45: Aplicación del comando inxi.

```
Terminal - paula@paula-standardpc:~  
Archivo Editar Ver Terminal Pestañas Ayuda  
[ ] ~ ~ sudo lsblk  
NAME MAJ:MIN RM SIZE RO TYPE MOUNTPOINTS  
sr0 11:0 1 1024M 0 rom  
vda 254:0 0 15G 0 disk  
└─vda1 254:1 0 15G 0 part /var/cache  
  └─System de...  
    /home  
    /var/log  
    /
```

Figure 46: Aplicación del comando lsblk.

```
Terminal - sudo udevadm monitor  
Archivo Editar Ver Terminal Pestañas Ayuda  
[ ] ~ ~ udevadm monitor  
monitor will print the received events for:  
UDEV - the event which udev sends out after rule processing  
KERNEL - the kernel uevent  
zsh: suspended udevadm monitor
```

Figure 47: Aplicación del comando udevadm.

```
Terminal - paula@paula-standardpc:~  
Archivo Editar Ver Terminal Pestañas Ayuda  
[ ] ~ ~ ss -tulnup  
Netid State Recv-Q Send-Q Local Address:Port Peer Address:Port Process  
  udp UNCONN 0 0 0.0.0.0:5353 0.0.0.0:*  
  udp UNCONN 0 0 [::]:5353 [::]:*  
  tcp LISTEN 0 4096 127.0.0.1:631 0.0.0.0:*  
  tcp LISTEN 0 4096 [::]:631 [::]:*
```

Figure 48: Aplicación del comando ss -tulnup.

```
Terminal - paula@paula-standardpc:~  
Archivo Editar Ver Terminal Pestañas Ayuda  
[ ] ~ ~ sudo nmcli device status  
DEVICE TYPE STATE CONNECTION  
enp1s0 ethernet conectado Conexión cableada 1  
lo loopback connected (externally) lo
```

Figure 49: Aplicación del comando nmcli.

```

manjaro en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
[...] Terminal - paula@paula-standardpc-
[...]
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
sys on /sys type sysfs (rw,nosuid,nodev,noexec,relatime)
dev on /dev type devtmpfs (rw,nosuid,relatime,size=990164k,nr_inodes=247541,mode=755,inode64)
run on /run type tmpfs (rw,nosuid,nodev,relatime,mode=755,inode64)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,gid=5,mode=628,ptmxmode=000)
/dev/vda1 on / type btrfs (rw,relatime,compress=zstd:1,discard(async,space_cache=2,subvol=256,subvol=@))
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,inode64)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,nsdelegate,memory_recursiveprot)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=40,pgrp=1,timeout=8,minproto=5,maxproto=5,direct,pipe_ino=19
53)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime)
queue on /dev/queue type queue (rw,nosuid,nodev,noexec,relatime)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime)
hugepages on /dev/hugepages type hugepages (rw,nosuid,nodev,relatime,pagesize=2M)
tmpfs on /tmp type tmpfs (rw,nosuid,nodev,nr_inodes=1048576,inode64)
tmpfs on /run/credentials type tmpfs (ro,nosuid,nodev,noexec,relatime,nosymfollow,size=1024k,nr_inode
s=1024,mode=700,inode64,noswap)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
configs on /sys/kernel/config type configs (rw,nosuid,nodev,noexec,relatime)
/dev/vda1 on /var/log type btrfs (rw,relatime,compress=zstd:1,discard=async,space_cache=v2,subvol=259,subvol=@log)
/dev/vda1 on /home type btrfs (rw,relatime,compress=zstd:1,discard=async,space_cache=v2,subvol=257,subvol=@home)
/dev/vda1 on /var/cache type btrfs (rw,relatime,compress=zstd:1,discard=async,space_cache=v2,subvol=258,subvol=@cache)
binfmt_misc on /proc/sys/fs/binfmt_misc type binfmt_misc (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=20142k,nr_inodes=50353,mode=700,uid=1000,gid=1000,inode64)
gvfsd-fuse on /run/user/1000/gvfs type fuse-gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
portal on /run/user/1000/doc type fuse-portal (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
[...]

```

Figure 50: Aplicación del comando mount.

3.2.2 Dependencia de Tecnología

```

linux-mint en QEMU/KVM
Archivo Máquina Virtual Vista Enviar Tecla
[...] Terminal - paula@paula-Standard-PC-Q35-ICH9-2009-
[...]
See "man sudo_root" for details.
paula@paula:~$ sudo top
[sudo] contraseña para paula:
top - 10:01:13 up 1 min, 1 user, load average: 0,68, 0,29, 0,11
Tareas: 206 total, 0 ejecutando, 205 hibernar, 0 detener, 0 noobis
Memoria: 4,8 Gb total, 4,0 libre, 740,7 usado, 541,2 búf/cache
Mib Intercambio: 1030,0 total, 1030,0 libre, 0,0 usado, 1227,5 dispon Mem
[...]
PID USUARIO PR NI VIRT RES SHR S %CPU %MEM HORA+ ORDEN
1752 root 20 0 656688 117328 63744 S 1,7 5,6 0:01:31 Xorg
1753 paula 20 0 22496 13380 9412 S 0,0 0,0 0:01:49 systemd
1447 paula 20 0 572600 63294 36344 S 1,0 3,1 0:00:51 minitopport-tray
1748 root 20 0 83960 4531 4112 S 0,0 0,0 0:00:16 kworker/1:0-mm_percpu_wq
1749 root 20 0 312736 6668 6628 S 0,3 0,0 0:00:00 kworker/0:0-rbalance
1316 paula 20 0 17760 6064 3828 R 0,3 0,3 0:00:04 top
1753 root 20 0 17760 6064 3828 R 0,3 0,3 0:00:04 top
1 root 20 0 22496 13380 9412 S 0,0 0,0 0:01:49 systemd
2 root 20 0 0 0 0 S 0,0 0,0 0:00:00 kworker/0:0-kblockd
3 root 20 0 0 0 0 S 0,0 0,0 0:00:00 pool.workqueue_releasse
4 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 kworker/R-rcu_gp
5 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 kworker/R-rcu_qs
6 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 kworker/R-kvfree rcu reclaim
7 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 kworker/R-slub flushq
8 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 kworker/R-kblockd
9 root 20 0 0 0 0 I 0,0 0,0 0:00:02 kworker/0:0-events
10 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 kworker/0:0-kblockd
11 root 20 0 0 0 0 I 0,0 0,0 0:00:00 kworker/0:0-kblockd
12 root 20 0 0 0 0 I 0,0 0,0 0:00:00 kworker/0:0-ip6_addrconf
13 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 kworker/R-mm_percpu_wq
14 root 20 0 0 0 0 I 0,0 0,0 0:00:00 rcu_tasks_kthread
15 root 20 0 0 0 0 I 0,0 0,0 0:00:00 rcu_tasks_trace_kthread
16 root 20 0 0 0 0 I 0,0 0,0 0:00:00 rcu_tasks_trace_kthread
17 root 20 0 0 0 0 I 0,0 0,0 0:00:02 ksoftirqd/0
18 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 rcu_exp_per_gp kthread worker/0
19 root 20 0 0 0 0 S 0,0 0,0 0:00:00 rcu_exp_per_gp kthread worker/0
20 root 20 0 0 0 0 S 0,0 0,0 0:00:00 rcu_exp_gp kthread worker
21 root 0 -20 0 0 0 I 0,0 0,0 0:00:00 migration/0
22 root -51 0 0 0 S 0,0 0,0 0:00:00 idle_inject/0
[...]

```

Figure 51: Aplicación del comando top.

```

root@paula:~$ ps aux
root 1 1.4 0.6 22496 13380 T 09:59 0:01 /sbin/init splash
root 2 0.0 0.0 0 0 0 S 09:59 0:00 [kthreadd]
root 3 0.0 0.0 0 0 0 S 09:59 0:00 [rcu_kworker/0-rcu_gp]
root 4 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-rcu_gp]
root 5 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-sync_mq]
root 6 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-kblock_rereclaim]
root 7 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-slub_flushhg]
root 8 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-netns]
root 9 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-async_mq]
root 10 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-hi-kblock]
root 11 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-events]
root 12 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-events_migrat]
root 13 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-events_percpu_wq]
root 14 0.0 0.0 0 0 0 I< 09:59 0:00 [rcu_tasks_kthread]
root 15 0.0 0.0 0 0 0 I< 09:59 0:00 [rcu_tasks_rude_kthread]
root 16 0.0 0.0 0 0 0 I< 09:59 0:00 [rcu_tasks_rude_kthread]
root 17 0.0 0.0 0 0 0 S 09:59 0:00 [ksoftirqd/0]
root 18 0.0 0.0 0 0 0 I< 09:59 0:00 [rcu preempt]
root 19 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-preempt_kthread_worker/0]
root 20 0.0 0.0 0 0 0 S 09:59 0:00 [rcu_exp_gq_kthread_worker]
root 21 0.0 0.0 0 0 0 S 09:59 0:00 [migration/0]
root 22 0.0 0.0 0 0 0 S 09:59 0:00 [migration/0-select/0]
root 23 0.0 0.0 0 0 0 S 09:59 0:00 [cpuhub/0]
root 24 0.0 0.0 0 0 0 S 09:59 0:00 [cpuhub/1]
root 25 0.0 0.0 0 0 0 S 09:59 0:00 [cpuhub/1-select/1]
root 26 0.0 0.0 0 0 0 S 09:59 0:00 [migration/1]
root 27 0.0 0.0 0 0 0 S 09:59 0:00 [ksoftirqd/1]
root 28 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-events]
root 29 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-100-events_highpri]
root 30 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-kvfree_rcu_reclaim]
root 31 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-0-async]
root 32 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-0-async_mq]
root 33 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-inet_frag_wq]
root 34 0.0 0.0 0 0 0 S 09:59 0:00 [kudltd]
root 35 0.0 0.0 0 0 0 S 09:59 0:00 [kudltd_kblock]
root 36 0.0 0.0 0 0 0 S 09:59 0:00 [com_reaper]
root 37 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-1-events_inbound]
root 38 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-writeback]
root 39 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-2-fush-253-0]

```

Figure 52: Aplicación del comando ps aux(1).

```

root@paula:~$ ps aux
root 39 0.0 0.0 0 0 0 I 09:59 0:00 [kworker/u9:2-flush-253-0]
root 40 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/u9:2-flush-253-0]
root 41 0.0 0.0 0 0 0 S 09:59 0:00 [kmem]
root 42 0.0 0.0 0 0 0 S 09:59 0:00 [khugepaged]
root 43 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/u9:3-integrityd]
root 44 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/u9:3-kblock]
root 45 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-blkcg_punt_bio]
root 46 0.0 0.0 0 0 0 S 09:59 0:00 [irq/9-expcl]
root 47 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/u9:1-cu_gp]
root 48 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-tpm_dev_wq]
root 49 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-rata_sfr]
root 50 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-0-aerdrv]
root 51 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-md_bitmap]
root 52 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-edac-poller]
root 53 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-devfreq_wq]
root 54 0.0 0.0 0 0 0 S 09:59 0:00 [watchdog]
root 55 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/u8:0-events_power_efficient]
root 56 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/u8:0-events]
root 57 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/u8:1-h-kblock]
root 58 0.0 0.0 0 0 0 S 09:59 0:00 [ecryptfs-kthread]
root 59 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-kthrottd]
root 60 0.0 0.0 0 0 0 S 09:59 0:00 [kworker/R-0-aerdrv]
root 61 0.0 0.0 0 0 0 S 09:59 0:00 [irq/25-aerdrv]
root 62 0.0 0.0 0 0 0 S 09:59 0:00 [irq/26-aerdrv]
root 63 0.0 0.0 0 0 0 S 09:59 0:00 [irq/27-aerdrv]
root 64 0.0 0.0 0 0 0 S 09:59 0:00 [irq/28-aerdrv]
root 65 0.0 0.0 0 0 0 S 09:59 0:00 [irq/29-aerdrv]
root 66 0.0 0.0 0 0 0 S 09:59 0:00 [irq/30-aerdrv]
root 67 0.0 0.0 0 0 0 S 09:59 0:00 [irq/31-aerdrv]
root 68 0.0 0.0 0 0 0 S 09:59 0:00 [irq/32-aerdrv]
root 69 0.0 0.0 0 0 0 S 09:59 0:00 [irq/33-aerdrv]
root 70 0.0 0.0 0 0 0 S 09:59 0:00 [irq/34-aerdrv]
root 71 0.0 0.0 0 0 0 S 09:59 0:00 [irq/35-aerdrv]
root 72 0.0 0.0 0 0 0 S 09:59 0:00 [irq/36-aerdrv]
root 73 0.0 0.0 0 0 0 S 09:59 0:00 [irq/37-aerdrv]
root 74 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-acpi_thermal_pm]
root 75 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]
root 76 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-addconf]
root 77 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-netns]
root 78 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-kstarp]
root 79 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]
root 80 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]
root 81 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]
root 82 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]
root 83 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]
root 84 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-kstarp]
root 85 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]
root 86 0.0 0.0 0 0 0 I< 09:59 0:00 [kworker/R-0-ah]

```

Figure 53: Aplicación del comando ps aux (2).

Figure 54: Aplicación del comando ps aux (3).

Figure 55: Aplicación del comando pstree -p (1).

```
Terminal - paula@paula-Standard-PC-Q35-ICH9-2009:~
```

```
Archivo Editar Ver Terminal Pestañas Ayuda
```

```
light-locker(1429) --> [ evolution-alarm(14669)  
  evolution-alarm(14618)  
  evolution-alarm(14626)  
  evolution-alarm(14634)  
  light-locker(1442)  
  light-locker(1443)  
  light-locker(1453)  
  nm-applet(1380)  
  nm-applet(1383)  
  nm-applet(1384)  
  nm-applet(1377)  
  polkit-gnome-au(1466) --> [ polkit-gnome-au(1338)  
    polkit-gnome-au(1339)  
    polkit-gnome-au(1340)  
    polkit-gnome-au(1345)  
  xfce4-panel(1356) --> [ panel-1-whisker(1368) --> [ panel-1-whisker(1371)  
    panel-1-whisker(1372)  
    panel-1-whisker(1373)  
    panel-1-whisker(1396)  
  panel-10-xapp-s(1376) --> [ panel-10-xapp-s(1387)  
    panel-10-xapp-s(1388)  
    panel-10-xapp-s(1389)  
    panel-10-xapp-s(1492)  
    panel-10-xapp-s(1494)  
  panel-11-power-(1378) --> [ panel-11-power-(1390)  
    panel-11-power-(1391)  
    panel-11-power-(1397)  
    panel-11-power-(1453)  
  panel-12-pulseo(1379) --> [ panel-12-pulseo(1393)  
    panel-12-pulseo(1395)  
    panel-12-pulseo(1396)  
    panel-12-pulseo(1417)  
  panel-8-systray(1369) --> [ panel-8-systray(1381)  
    panel-8-systray(1382)  
    panel-8-systray(1386)  
  panel-9-notific(1370) --> [ panel-9-notific(1382)  
    panel-9-notific(1383)  
    panel-9-notific(1384)  
    panel-9-notific(1468)  
  xfce4-terminal(1737) --> [ bash(1743) --> [ sudo(1751) --> [ sudo(1752) --> [ sudo(1760) --> [ sudo(1761) --> [ top(1752)  
    psTree(174)
```

Figure 56: Aplicación del comando pstree -p (2).

The screenshot shows a terminal window titled "Terminal - paula@paula-Standard-PC-Q35-ICH9-2009". The window displays a hierarchical tree of processes, likely generated by the "ps aux" command. The root node is the terminal session itself, labeled as xfce4-session(1291). Below it, the tree branches into various system services and daemons. Key nodes include:

- minitdms(1824), minitdms(1825), minitdms(1026)
- minitdms(1843), minitdms(1844), minitdms(1846)
- minitdms(1860), minitdms(1867), minitdms(1868), minitdms(1869), minitdms(1899), minitdms(1903), minitdms(1905), minitdms(1909)
- minreport-tray(1447), minreport-tray(1627), minreport-tray(1630), minreport-tray(1629), minreport-tray(1635)
- polkitd(601), polkitd(673), polkitd(675)
- power-profiles(604), power-profiles(615), power-profiles(616), power-profiles(618)
- rsyslogd(667), rsyslogd(747), rsyslogd(749), rsyslogd(749)
- rtkit-daemon(938), rtkit-daemon(943), rtkit-daemon(944)
- ssh-agent(1390)
- switcheroo-cont(609), switcheroo-cont(620), switcheroo-cont(621), switcheroo-cont(623)
- systemd(1033), systemd(1034), at-spi2-bus-launcher(1301), at-spi2-bus-launcher(1313), at-spi2-bus-launcher(1307), at-spi2-bus-launcher(1388), at-spi2-bus-launcher(1389), at-spi2-bus-launcher(1399), at-spi2-registr(11211), at-spi2-registr(1124), at-spi2-registr(1325), at-spi2-registr(1326)

Figure 57: Aplicación del comando pstree -p (3).

```
Archievo Máquina Virtual Vista Enviar Tecla
Terminal - paula@paula-Standard-PC-Q35-ICH9-2009: ~
Archivo Editor Ver Terminal Pestañas Ayuda


```
--obed(1682)
|-pipedwre(1844) --{[pipedwre](1059)
| |-[pipedwre](1062)
| |-[pipedwre](1060)
| |-[pipedwre](1063)
|-[pipedwre-pulse](1844) --{[pipedwre-pulse](1066)
| |-[pipedwre-pulse](1077)
|-tumblerd(1422) --{[tumblerd](1423)
| |-[tumblerd](1425)
| |-[tumblerd](1426)
| |-[tumblerd](1441)
| |-[tumblerd](1456)
| |-[tumblerd](1547)
| |-[tumblerd](1548)
|-wireslumber(1047) --{[wireslumber](1064)
| |-[wireslumber](1067)
| |-[wireslumber](1068)
| |-[wireslumber](1072)
| |-[wireslumber](1075)
|-xfce4-notifyd(1405) --{[xfc4-notifyd](1466)
| |-[xfc4-notifyd](1467)
| |-[xfc4-notifyd](1468)
|-xfconfd(1316) --{[xfconfd](1318)
| |-[xfconfd](1319)
|-systemd-journal(698)
|-system-logind(613)
|-system-resolve(454)
|-system-timesyn(462) --{[systemd-timesyn](501)
|-systemd-udevd(351)
|-udisksd(612)
| |-[udisksd](632)
| |-[udisksd](633)
| |-[udisksd](635)
| |-[udisksd](786)
| |-[udisksd](740)
|-upowerd(1005) --{[upowerd](1077)
| |-[upowerd](1088)
| |-[upowerd](1099)
|-wpa_supplicant(655)
```


paula@paula-Standard-PC-Q35-ICH9-2009: ~ $
```

Figure 58: Aplicación del comando pstree -p (4).

Figure 59: Aplicación del comando dstat.

```

Terminal - paula@paula-Standard-PC-Q33-ICH9-2009:~$ sudo systemctl list-units --type=service
   _source_
  _target_
  _load_
  _active_
  _sub_
  _description_
UNIT
accounts-daemon.service          loaded active running Accounts Service
alsa-restore.service              loaded active exited Save/Restore Sound Card State
alsa-set-defaults.service         loaded active running Set Default ALSA Device
apparmor.service                  loaded active exited Load AppArmor profiles
avahi-daemon.service              loaded active running Avahi mDNS/DNS-SD Stack
bluetooth-hciuart.service         loaded active running Bluetooth HCI Uart Services
casper-md5check.service           loaded failed failed casper-md5check Verify Live ISO checksums
colord.service                   loaded active running Manage, Install and Generate Color Profiles
cups-enumfont.service             loaded active running CUPS Font and Keyword Database
cron.service                      loaded active running Regular background program processing daemon
cups-browsed.service              loaded active running Make remote CUPS printers available locally
cups-service.service               loaded active running CUPS Scheduler
finaind.service                  loaded active exited Create final runtime dir for shutdown pivot root
getty@tty1.service                loaded active running Getty on tty1
getty@tty2.service                loaded active running Getty on tty2
kerneloops.service                loaded active running Tool to automatically collect and submit kernel crash signatures
keyboard-setup.service            loaded active exited Set the console keyboard layout
lightdm.service                   loaded active running Light Display Manager
lm-sensors.service                loaded active exited Initialize hardware monitoring sensors etc. using dmeventd or progress polling
ModemManager.service              loaded active running Modem Manager
NetworkManager-wait-online.service loaded active exited Network Manager Wait Online
nfslock.service                   loaded active running NFS Lock Daemon
openvpn.service                   loaded active running OpenVPN Service
packagekitd.service                loaded active running PackageKit Daemon
pcp-read-write.service            loaded active exited PCP Read/Write Initialization Helper Service
pm-powersave.service              loaded active exited Tell Plymouth To Write Out Runtime Data
plymouth-start.service             loaded active exited Show Plymouth Boot Screen
plymouth-udev.service              loaded active running Plymouth Udev Collector Daemon
pmlogger.service                  loaded active running pmlogger Farm service
pmlogger-farm.service              loaded active running pmlogger Farm service
power-profiles-daemon.service    loaded active running Power Profiles daemon
rsyslog.service                   loaded active running System Logging Service
rsyslogd.service                  loaded active running Rsyslogd scheduling Policy Service
setvtrgb.service                  loaded active exited Set console colors

```

Figure 60: Aplicación del comando `systemctl list-units --type=service`.

```

Terminal - paula@paula-Standard-PC-Q33-ICH9-2009:~$ systemd-cgtop
Tasks  %CPU  Memory  Input/s  Output/s
-----+-----+-----+-----+-----+
/Group
/dev-hugepages.mount
/sys-root.mount
/init.scope
proc-sys-fs-binfmt_misc.mount
/sys-remount-rootfs.mount
/sys-kernel-config.mount
/sys-kernel-debug.mount
/sys-kernel-tracing.mount
/sys.slice
system.slice/ModemManager.service
system.slice/NetworkManager.service
system.slice/NetworkManager-wait-online.service
system.slice/anacron.service
system.slice/avahi-daemon.service
system.slice/cupsd.service
system.slice/colord.service
system.slice/cron.service
system.slice/cups-browsed.service
system.slice/cupsd.service
system.slice/dbus.service
system.slice/hostname.service
system.slice/lightdm.service
system.slice/packagekit.service
system.slice/pulseaudio.service
system.slice/pmlogger.service
system.slice/pmlogger-farm.service
system.slice/power-profiles-daemon.service
system.slice/rsyslog.service
system.slice/rsyslogd.service
system.slice/swayidle.nwg
system.slice/swayerror-control.service
system.slice/system-getty.slice
system.slice/system-getty.slice/getty@tty1.service

```

Figure 61: Aplicación del comando `systemd-cgtop`.

Figure 62: Aplicación del comando `systemd-analyze blame`.

Figure 63: Aplicación del comando journalctl.

```
Terminal - paula@paula-Standard-PC-Q35-ICH9-2009:~ ~
```

Archivo	Editar	Ver	Terminal	Pestañas	Ayuda
paula@paula-Standard-PC-Q35-ICH9-2009:~	sudo ss -ltnp				
State	Recv-Q	Send-Q	Local Address:Port	Peer Address:Port	Process
LISTEN	0	4096	127.0.0.53:4333	0.0.0.0:*	users:(["systemd-resolve",pid=442,fd=15])
LISTEN	0	5	0.0.0.0:4330	0.0.0.0:*	users:(["pllogger",pid=1548,fd=7])
LISTEN	0	128	0.0.0.0:44323	0.0.0.0:*	users:(["pproxy",pid=899,fd=15])
LISTEN	0	128	0.0.0.0:44322	0.0.0.0:*	users:(["pproxy",pid=899,fd=13])
LISTEN	0	5	0.0.0.0:44321	0.0.0.0:*	users:(["pnmd",pid=880,fd=8])
LISTEN	0	4096	127.0.0.1:631	0.0.0.0:*	users:(["cupsd",pid=774,fd=7])
LISTEN	0	4096	127.0.0.54:53	0.0.0.0:*	users:(["systemd-resolve",pid=442,fd=17])
LISTEN	0	4096	[::]:1:631	[::]:*	users:(["cupsd",pid=774,fd=6])
LISTEN	0	5	[::]:4330	[::]:*	users:(["pllogger",pid=1548,fd=8])
LISTEN	0	128	[::]:44323	[::]:*	users:(["pproxy",pid=899,fd=16])
LISTEN	0	128	[::]:44322	[::]:*	users:(["pproxy",pid=899,fd=14])
LISTEN	0	5	[::]:44321	[::]:*	users:(["pnmd",pid=880,fd=3])

```
paula@paula-Standard-PC-Q35-ICH9-2009:~
```

Figure 64: Aplicación del comando ss-ltnp.

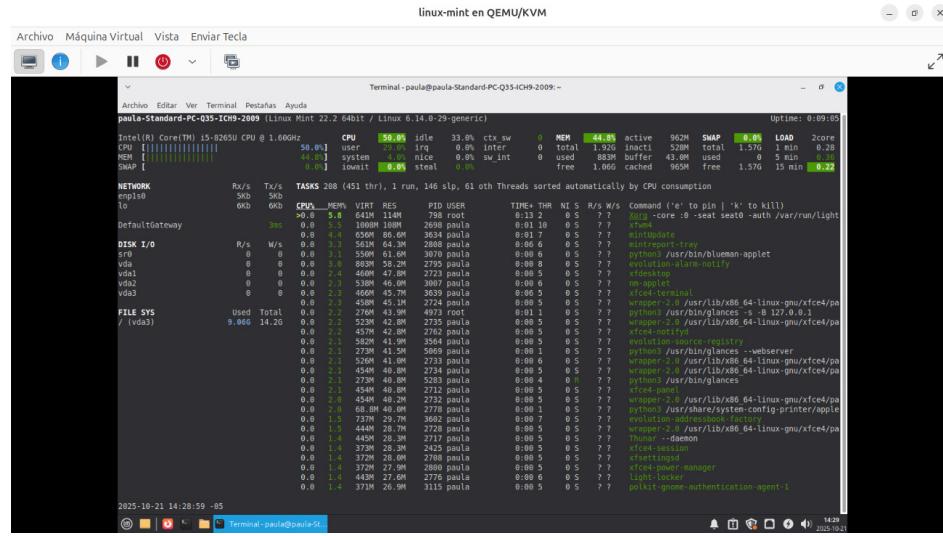


Figure 65: Aplicación del comando glances.

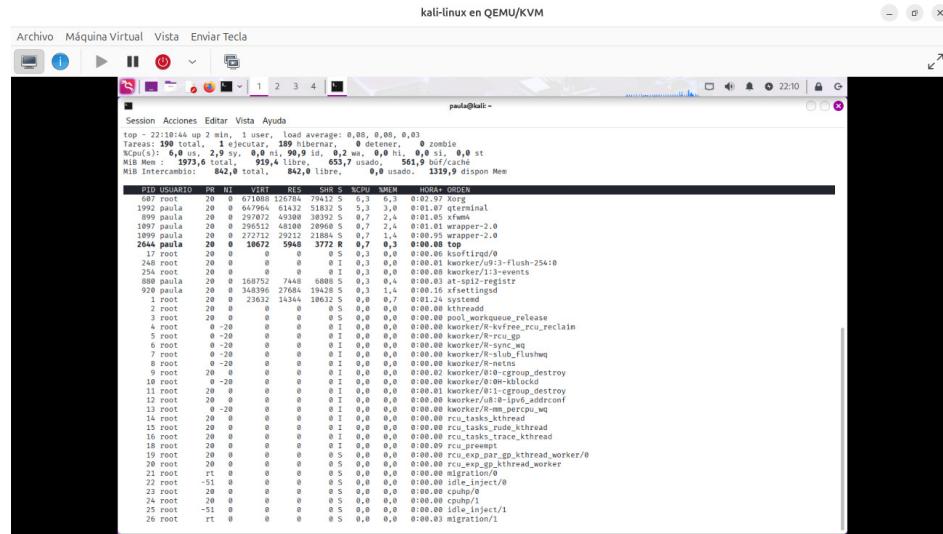


Figure 66: Comandos Kali Linux

kali-linux en QEMU/KVM

```
paula@kali:~$ ps aux
  PID %CPU SWSZ RSS TTY STAT START TIME COMMAND
root  2 0.0 0.7 23632 14344 Ss 22:07 0:01 /sbin/init splash
root  3 0.0 0.0 0 0 ? S 22:07 0:00 [kthread]
root  4 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-kblock-reclaim]
root  5 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-rcu_gp]
root  6 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-sync-worker]
root  7 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-flushsq]
root  8 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-netns]
root  9 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-alloc_destroy]
root 10 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-kblock-destroy]
root 11 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:1-events]
root 12 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:1-addrconf]
root 13 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:1-mm_percpu_wq]
root 14 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:1-kthread]
root 15 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:1-trace_kthread]
root 16 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:1-trace_kthread]
root 17 0.0 0.0 0 0 ? S 22:07 0:00 [ksoftirqd/0]
root 18 0.0 0.0 0 0 ? S 22:07 0:00 [ksoftirqd/1]
root 19 0.0 0.0 0 0 ? S 22:07 0:00 [rcu_exp_par_gp_kthread_worker/0]
root 20 0.0 0.0 0 0 ? S 22:07 0:00 [rcu_exp_gp_kthread_worker]
root 21 0.0 0.0 0 0 ? S 22:07 0:00 [rcu_exp_gp_kthread_worker]
root 22 0.0 0.0 0 0 ? S 22:07 0:00 [idle_inject/0]
root 23 0.0 0.0 0 0 ? S 22:07 0:00 [cpuhp/inject/1]
root 24 0.0 0.0 0 0 ? S 22:07 0:00 [idle_inject/1]
root 25 0.0 0.0 0 0 ? S 22:07 0:00 [idle_inject/1]
root 26 0.0 0.0 0 0 ? S 22:07 0:00 [idle_inject/1]
root 27 0.0 0.0 0 0 ? S 22:07 0:00 [ksoftirqd/1]
root 28 0.0 0.0 0 0 ? I 22:07 0:00 [kworker/0:0-events]
root 29 0.0 0.0 0 0 ? I 22:07 0:00 [kworker/0:0-highpri]
root 30 0.0 0.0 0 0 ? I 22:07 0:00 [kworker/0:0-async]
root 31 0.0 0.0 0 0 ? I 22:07 0:00 [kworker/0:0-events_unbound]
root 32 0.0 0.0 0 0 ? I 22:07 0:00 [kworker/0:0-flush-254k]
root 34 0.0 0.0 0 0 ? S 22:07 0:00 [kdevtmpfs]
root 35 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-net_frag_wq]
root 36 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-net_tx_wq]
root 37 0.0 0.0 0 0 ? S 22:07 0:00 [khungtaskd]
root 38 0.0 0.0 0 0 ? S 22:07 0:00 [oom_reaper]
root 39 0.0 0.0 0 0 ? S 22:07 0:00 [polkit-nate-auth-async]
root 40 0.0 0.0 0 0 ? Ic 22:07 0:00 [kworker/0:0-writeback]
```

Figure 67: Comandos Kali Linux

kali-linux en QEMU/KVM

```
paula@kali:~$ ptree -a
systemd(1) -- ModemManager(569) -- ModemManager(578)
-- NetworkManager(551) -- NetworkManager(573)
-- accounts-daemon(537) -- accounts-daemon(553)
-- accounts-daemon(554)
-- accounts-daemon(556)
-- getty(689)
-- colord(999) -- colord(1000)
-- cron(538)
-- dbus-daemon(539)
-- kaggle(597) -- Xorg(607) -- Xfce4-session(780)
-- lightdm(597) -- lightdm(730)
-- blueman-applet(961) -- blueman-applet(1127)
-- nm-applet(967) -- nm-applet(1005)
-- polkit-nate-auth(975) -- polkit-nate-auth(995)
-- xfce4-panel(929) -- wrapper-2.0(954)
-- wrapper-2.0(1097) -- wrapper-2.0(1104)
```

Figure 68: Comandos Kali Linux

```

xterm(2)---xfce4-panel(931)
|           |   xfce4-panel(932)
|           |   xfce4-panel(933)
|           |   xfce4-panel(934)
|           |
|           +--xfce4-power-man(959)
|                   |   xfce4-power-man(951)
|                   |   xfce4-power-man(962)
|                   |   xfce4-power-man(982)
|                   |   xfce4-power-man(985)
|           +--xfce4-screensav(998)
|                   |   xfce4-screensav(1001)
|                   |   xfce4-screensav(1002)
|                   |   xfce4-screensav(1003)
|           +--xfdesktop(948)
|                   |   xfdesktop(950)
|                   |   xfdesktop(951)
|                   |   xfdesktop(952)
|                   |   xfdesktop(953)
|           +--xfsettingsd(928)
|                   |   xfsettingsd(923)
|                   |   xfsettingsd(922)
|                   |   xfsettingsd(923)
|                   |   xfsettingsd(924)
|                   |   xfsettingsd(925)
|           +--xfwm4(899)
|                   |   xfwm4(900)
|                   |   xfwm4(902)
|                   |   xfwm4(903)
|           +--xiccd(970)
|                   |   xiccd(977)
|                   |   xiccd(978)
|                   |   xiccd(981)
|           +--xfce4-session(869)
|           +--xfce4-session(876)
|           +--xfce4-session(872)
|           +--xfconfd(872)
|                   |   xfconfd(875)
|                   |   xfconfd(876)
|
+--systemd-journal(362)
+--systemd-logind(43)
+--systemd-timesync(403)
+--systemd(415)
+--udisksd(1178)
+--upowerd(1054)
+--xcape(962)

```

Figure 69: Comandos Kali Linux

```

xdg(1988)---xdg-desktop-por(1991)
|           |   xdg-desktop-por(1994)
|           |   xdg-desktop-por(1995)
|           |   xdg-desktop-por(1996)
|           |   xdg-desktop-por(1997)
|           |   xdg-desktop-por(1998)
|           |   xdg-desktop-por(2024)
|           |   xdg-desktop-por(2025)
|           |   xdg-desktop-por(2026)
|           |   xdg-desktop-por(2027)
|           |   xdg-desktop-por(2029)
|           |
|           +--xdg-document-po(2808)
|                   |   xdg-document-po(2811)
|                   |   xdg-document-po(2814)
|                   |   xdg-document-po(2815)
|                   |   xdg-document-po(2917)
|                   |   xdg-document-po(2921)
|                   |   xdg-document-po(2922)
|           +--xdg-permission-(1997)
|                   |   xdg-permission-(1986)
|                   |   xdg-permission-(1987)
|                   |   xdg-permission-(1988)
|           +--xfce4-notifyd(1000)
|                   |   xfce4-notifyd(1014)
|                   |   xfce4-notifyd(1015)
|                   |   xfce4-notifyd(1016)
|                   |   xfce4-notifyd(1018)
|           +--xfconfd(872)
|                   |   xfconfd(875)
|                   |   xfconfd(876)
|
+--systemd-journal(362)
+--systemd-logind(43)
+--systemd-timesync(403)
+--systemd(415)
+--udisksd(1178)
+--upowerd(1054)
+--xcape(962)

```

Figure 70: Comandos Kali Linux

```

paula@kali:~$ sudo systemctl list-units --type=service
 _UNIT_
          LOAD   ACTIVE SUB-DESCRIPTION
  accounts-gaemon.service loaded active running Accounts Service
  binfmt-support.service loaded active exited Enable support for additional executable binary formats
  colord.service           loaded active running Manage, Install and Generate Color Profiles
  cron.service             loaded active running Regular background program processing daemon
  cronie.service           loaded active running D-Bus System Message Bus
  cryptsetup.service       loaded active running Entropy Daemon based on the HAVEGE algorithm
  dhcpcd.service           loaded active running Set up the dynamic host configuration for ifupdown
  dhcpcd5.service          loaded active running Set the dynamic host configuration for ifupdown
  havedged.service         loaded active running Entropy Daemon based on the HAVEGE algorithm
  keyboard-setup.service   loaded active exited Set the default keyboard layout
  kmod-static-nodes.service loaded active exited Create List of Static Device Nodes
  logind.service            loaded active running Logind Manager
  lightdm.service           loaded active running Light Display Manager
  ModemManager.service     loaded active running Modem Manager
  NetworkManager-wait-online.service loaded active exited Network Manager Wait Online
  NetworkManager.service   loaded active running Network Manager
  NetworkManager-wait-online.service loaded active running Network Manager
  plymouth-read-write.service loaded active exited Tell Plymouth To Write Out Runtime Data
  plymouth-start.service   loaded active exited Show Plymouth Boot Screen
  pulseaudio.service        loaded active running PulseAudio Sound Server
  qemu-guest-agent.service loaded active running QEMU Guest Agent
  pm-standby.notify.service loaded active exited Notify NMI post of a restart
  rtkit-daemon.service     loaded active running Real Time Kernel Task Scheduling Policy Service
  systemd-binfmt.service   loaded active exited Set Up Additional Binary Formats
  systemd-boot-efi-verity-update.service loaded active exited Verify boot loader signatures
  systemd-journal.service  loaded active running Journal Service
  systemd-logind.service   loaded active running User Session Management
  systemd-modules-load.service loaded active exited Load Kernel Modules
  systemd-random-seed.service loaded active exited Load/Save OS Random Seed
  systemd-reboot.service   loaded active running Reboot System File Systems
  systemd-svcctl.service   loaded active exited Apply Kernel Variables
  systemd-sysusers.service loaded active exited Create System Users
  systemd-tmpfiles-setup.service loaded active exited Create temporary file synchronization
  systemd-tmpfiles-setup-dev-early.service loaded active exited Create Static Device Nodes in /dev gracefully
  systemd-tmpfiles-setup-dev.service loaded active exited Create Static Device Nodes in /dev
  systemd-udevd.service    loaded active exited Loadudev Rules from Credentials

```

Figure 71: Comandos Kali Linux

Tasks	Time	CPU	Memory	Input/s	Output/s
239	11.1	0.0	532.9M	-	-
238	11.0	0.0	567.0M	-	-
122	11.0	0.0	385.2M	-	-
393	10.9	0.0	533.5M	-	-
51	1.3	0.0	287M	-	-
6	1.3	0.0	146.7M	-	-
4	0.9	0.0	146M	-	-
116	0.0	182.0M	-	-	-
1	0.0	3.7M	-	-	-
-	-	2200	-	-	-
-	-	4K	-	-	-
1	-	3.0M	-	-	-
-	-	80	-	-	-
-	-	8K	-	-	-
-	-	4K	-	-	-
-	-	4K	-	-	-
4	-	8.2M	-	-	-
4	-	15.9M	-	-	-
4	-	3.5M	-	-	-
4	-	23.1M	-	-	-
1	-	476K	-	-	-
1	-	4.4M	-	-	-
-	-	314K	-	-	-
2	-	1.5M	-	-	-
3	-	680K	-	-	-
-	-	4K	-	-	-
-	-	16K	-	-	-
1	-	744K	-	-	-
1	-	732K	-	-	-
-	-	132K	-	-	-
1	-	11.2M	-	-	-
1	-	2.1M	-	-	-
2	-	1.8M	-	-	-
1	-	17.7M	-	-	-
-	-	4K	-	-	-
7	-	6M	-	-	-
4	-	2.0M	-	-	-

Figure 72: Comandos Kali Linux



paula@tali: ~

```
Session Acciones Editar Vista Ayuda
57ms dev-vdai.device
259ms phpsessioncloud.service
260ms phpmyadmin-cloud-service.service
280ms networking.service
308ms NetworkManager-wait-online.service
308ms NetworkManager-wireless-manager.service
178ms user@1000.service
178ms user@1000.service
178ms u-power.service
159ms run-rpc_pipefs.mount
159ms run-rpc_pipefs.mount
141ms lddconfig.service
138ms systemd-logind.service
138ms systemd-journal-flush.service
117ms ModemManager.service
108ms dev-queuefs.mount
108ms dev-loopbackfs.mount
98ms sys-kernel-tracing.mount
95ms run-localhost.mount
94ms sys-kernel-debug.service
93ms sys-kernel-debug.mount
93ms systemd-blifmt.service
72ms dhclient.service
86ms keyboard-setup.service
86ms keyboard-setup-nodes.service
81ms colord.service
78ms lightdm.service
78ms plymouth-quit-wait.service
78ms systemd-tmpfiles-setup-dev-early.service
78ms systemd-tmpfiles-setup-dev.service
67ms systemd-symlink.service
64ms systemd-timesyncd.service
63ms systemd-timesyncd.service
62ms modprobe@configfs.service
61ms sys-fs-fuse-connections.mount
60ms sys-fs-fuse-connections.mount
58ms sys-kernel-config.mount
57ms modprobe@drm.service
56ms modprobe@vulkan.service
56ms modprobe@use.service
54ms systemd-journal-catalog-update.service
[1/1] [ 1%]
```

Figure 73: Comandos Kali Linux

Figure 74: Comandos Kali Linux

A screenshot of a terminal window titled "Navegue por la web". The window shows the command "ss -lntp" being run, which lists listening network ports. The output includes columns for State, Recv-Q, Send-Q, Local Address:Port, Peer Address:Port, and Process. One entry is shown for port 80, which is associated with the "/var/www/html" directory.

Figure 75: Comandos Kali Linux

3.2.3 Dependencia Financiera

```
laumarc@laumarc-IdeaPad-Slim-3-15AMN8:~$ sudo docker exec -it garuda-financiera sh
/ # 1. Análisis de archivos y discos
/ # df -h
Filesystem      Size   Used Available Use% Mounted on
overlay        66.3G  46.7G    16.2G  74% /
tmpfs          64.0M     0    64.0M  0% /dev
shm             64.0M     0    64.0M  0% /dev/shm
/dev/nvme0n1p6  66.3G  46.7G    16.2G  74% /etc/resolv.conf
/dev/nvme0n1p6  66.3G  46.7G    16.2G  74% /etc/hostname
/dev/nvme0n1p6  66.3G  46.7G    16.2G  74% /etc/hosts
tmpfs           2.6G     0    2.6G  0% /proc/asound
tmpfs           2.6G     0    2.6G  0% /proc/acpi
tmpfs           64.0M     0   64.0M  0% /proc/interrupts
tmpfs           64.0M     0   64.0M  0% /proc/kcore
tmpfs           64.0M     0   64.0M  0% /proc/keys
tmpfs           64.0M     0   64.0M  0% /proc/latency_stats
tmpfs           64.0M     0   64.0M  0% /proc/timer_list
tmpfs           2.6G     0    2.6G  0% /proc/scsi
tmpfs           2.6G     0    2.6G  0% /sys/firmware
tmpfs           2.6G     0    2.6G  0% /sys/devices/virtual/powercap
```

Figure 76: Análisis de archivos y discos con los comandos sugeridos (1)

```
críptis      27.0G  0  27.0G  0% /sys/devices/virtual/powercap
/ # du -sh /*
796.0K  /bin
0       /dev
548.0K  /etc
4.0K   /home
708.0K  /lib
16.0K   /media
4.0K   /mnt
4.0K   /opt
0       /proc
8.0K   /root
8.0K   /run
80.0K  /sbin
4.0K   /srv
0       /sys
4.0K   /tmp
6.4M   /usr
56.0K  /var
/ # ls -R / | head -20
/:
bin
dev
etc
home
lib
media
mnt
opt
proc
root
run
sbin
srv
sys
tmp
usr
var

/bin:
/ #
```

Figure 77: Análisis de archivos y discos con los comandos sugeridos(2)

```
/ # ls -lh /var/log 2>/dev/null || echo "Logs en ubicación diferente"
total 0
/ #
```

Figure 78: Desarrollo de la gestión de logs con los comandos sugeridos

```

/ # si ver conexiones de red
/ # ip addr show 2>/dev/null || ifconfig
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: eth0@if5: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqueue state UP
    link/ether 46:30:1a:81:5c:94 brd ff:ff:ff:ff:ff:ff
    inet 172.17.0.2/16 brd 172.17.255.255 scope global eth0
        valid_lft forever preferred_lft forever
3: eth1@if12: <BROADCAST,MULTICAST,UP,LOWER_UP,M-DOWN> mtu 1500 qdisc noqueue state UP
    link/ether 62:c9:f9:7c:82:6d brd ff:ff:ff:ff:ff:ff
    inet 172.20.0.2/16 brd 172.20.255.255 scope global eth1
        valid_lft forever preferred_lft forever
/ #

```

Figure 79: Visualización de la conexión de red con ip addr show

```

/ # netstat -tulpn 2>/dev/null || ss -tulpn
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address          Foreign Address        State
tcp     0      0 127.0.0.11:40815          0.0.0.0:*              LISTEN
udp     0      0 127.0.0.11:33054          0.0.0.0:*
/ #

```

Figure 80: Visualización de los puertos abiertos

```

/ # smartctl -a /dev/sdx
Main [1/10]
PID PPID NI VIRT RES SHR S %CPU %CPU TIME+ Command
1251 launarse 28 0 1259M 51164 5 12.5 5.2 10:02.71 /usr/bin/gnome-shell
1261 launarse 28 0 1259M 274M 68884 5 12.5 5.2 10:02.71 /usr/bin/gnome-shell
12986 launarse 28 0 1259M 51164 0 R 11.9 1.0 6:42.36 gnome-system-x64 64 -name almalinux-commercial-vn-n-256-hda almalinux-vn.qcow2 -nographic
8819 launarse 28 0 2910M 334M 183M 5 8.6 6.4 2:19.31 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
17743 launarse 28 0 18456 6788 3844 0 4.6 0.1 0:02.38 httpd
3226 launarse 28 0 1259M 983M 986 5 8.6 6.4 6:02.11 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
7828 launarse 28 0 781M 61388 43856 5 2.6 0.1 6:58.15 /usr/libexec/gnome-terminal-server
9535 launarse 28 0 2998M 327M 0 5 2.6 0.3 0:13.58 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
3310 launarse 5 -15 559M 274M 0 5 2.0 5.2 1:09.56 /usr/bin/gnome-shell
9536 launarse 28 0 2988M 327M 0 5 2.0 6.3 0:02.93 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
3326 launarse 28 0 2988M 327M 0 5 2.0 6.3 0:02.93 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
1 root 0 0 6348 16348 1812 5 0.7 0.3 0:07.59 /sbin/init splash
1082 messagebus 28 0 12332 7168 4344 5 0.7 0.1 0:06.66 @ibus-daemon --system --address=systemd: --nofork --nopidfile --systemd-activation --syslog-only
3279 launarse 28 0 559M 274M 0 5 0.7 0.2 0:00.45 /usr/bin/gnome-shell
3326 launarse 28 0 559M 274M 0 5 0.7 0.2 0:00.45 /usr/bin/gnome-shell
3403 launarse 28 0 11.7G 963M 772M 5 0.7 0.1 0:00.00 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBus -senon --panel disable
4193 launarse 28 0 11.7G 963M 772M 5 0.7 0.1 0:00.00 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBus -senon --panel disable
5038 launarse 28 0 2689M 241M 97.7M 0 0.7 4.6 0:48.36 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43265 -prefMapHandle 1:275862 -j
7289 launarse 28 0 3187M 470M 0 5 0.7 0.1 1:08.28 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
7210 launarse 28 0 3187M 470M 0 5 0.7 0.1 0:10.39 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
8831 launarse 28 0 2988M 327M 0 5 0.7 0.1 0:00.00 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
8837 launarse 28 0 2988M 327M 0 5 0.7 0.1 0:01.72 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -prefsHandle 0:43506 -prefMapHandle 1:275862 -j
17703 launarse 28 0 11.7G 552M 0 5 0.7 10.6 0:14.36 /snap/firefox/7824/usr/lib/firefox/firefox -contentproc -lsForBrowser -senon --panel disable
360 root 19 1 69552 24916 24276 5 0 0.7 0.1 0:01.13 /usr/lib/system/systemd-journald
376 systemd-udevd 28 0 7516 670M 0 0 0 0 0:03.82 /usr/lib/systemd/systemd-udevd
391 systemd-tmpfiles 28 0 1060 214 0 0 0 0 0:00.00 /usr/lib/systemd/tmpfilesd
494 root 28 0 18672 11548 7836 5 0.0 0.2 0:00.87 /usr/lib/systemd/systemd-udevd
410 systemd-ttl 28 0 29869 8128 0 0 0 0 0:00.00 /lib/systemd/systemd-ttl
430 systemd-re 28 0 23456 14184 11368 5 0.0 0.3 0:01.33 /usr/lib/systemd/systemd-resolved
1029 root 16 4 11448 2884 1956 0 0 0 0 0:00.12 /usr/sbin/autodt
1021 root 16 4 11448 2884 1956 0 0 0 0 0:00.12 /usr/sbin/autodt
1011 root 16 4 11448 2884 1956 0 0 0 0 0:00.12 /usr/sbin/autodt
1011 12 setup F3 setup 4 11448 2884 1956 0 0 0 0 0:00.12 /usr/sbin/autodt

```

Figure 81: Ejecución del comando smartctl -a /dev/sdx

3.2.4 Dependencia de Ventas y Comercio

```

/ # cat > app.py << 'EOF'
> import streamlit as st
>
> st.title("■ Empresa Tecnológica Innovatech")
> st.header("Soluciones Digitales Innovadoras")
>
> st.subheader("Sobre Nosotros")
> st.write("Innovatech es líder en desarrollo de software y consultoría tecnológica.")
>
> st.subheader("Nuestros Servicios")
> st.write("- Desarrollo Web")
> st.write("- Cloud Computing")
> st.write("- Inteligencia Artificial")
> st.write("- Ciberseguridad")
>
> st.success("Contacta con nosotros para transformar tu negocio!")
> EOF
/ #

```

Figure 82: Creación de una página web.

```

laumarce@laumarce-IdeaPad-Slim-3-15AMN8:~$ sudo docker exec -it fedora-comercial sh
[sudo] contraseña para laumarce:
[sudo] password for laumarce:
/ # ps aux | grep streamlit
  58 root      0:00 {streamlit} /usr/bin/python3 /usr/bin/streamlit run app.py --server.port 8501 --server.address 0.0.0.0
  72 root      0:00 grep streamlit
/ #
/ # Ver el puerto abierto
/ # netstat -tuln | grep 8501
tcp        0      0 0.0.0.0:8501          0.0.0.0:*                LISTEN
/ #
/ # Ver el log
/ # cat nohup.out
/ # cat nohup.out

Collecting usage statistics. To deactivate, set browser.gatherUsageStats to False.

You can now view your Streamlit app in your browser.

URL: http://0.0.0.0:8501

Collecting usage statistics. To deactivate, set browser.gatherUsageStats to False.

2025-10-23 03:36:01.446 Port 8501 is already in use
/ #

```

Figure 83: Link de la página web creada



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Figure 84: Visualización de la página web

```

laumarce@laumarce-IdeaPad-Slim-3-15AMN8:~$ # 2 Ver procesos de Streamlit
sudo docker exec fedora-web sh -c "ps aux | grep streamlit"
sudo docker exec fedora-web sh -c "top -bn1 | head -15"
  90 root      0:00 sh -c ps aux | grep streamlit
  97 root      0:00 grep streamlit
Mem: 4905656K used, 452112K free, 164792K shrd, 68088K buff, 1064940K cached
CPU:  2% usr 12% sys  0% nic 84% idle  0% io  0% irq  0% sirq
Load average: 1.52 1.64 1.63 2/1486 105
  PID  PPID USER      STAT   VSZ %VSZ CPU %CPU COMMAND
    1      0 root      S     1736  0%   4  0% /bin/sh
   98      0 root      S     1640  0%   7  0% sh -c top -bn1 | head -15
  104     98 root      R     1636  0%   5  0% top -bn1
  105     98 root      S     1624  0%   0  0% head -15

```

laumarce@laumarce-IdeaPad-Slim-3-15AMN8:~\$]

Figure 85: Visualización de los procesos que consume el streamlit (Página Web) en la MV.

```

sudo docker inspect -f '{{.Name}} - IP: {{range .NetworkSettings.Networks}}{{{.IPAddress}}}{{end}}' fedora-web debian-comercial
== REDES Y CONEXIONES ==
"Containers": {
    "a38a693824e631d15c8b93ba9af9e42481e29ed0880162d3e4898996e6812bc8": {
        "Name": "fedora-web",
        "EndpointID": "e8c8b169e0b514952a4eaf2e8670890e8525d3188653300c2f30becb7d361d2a",
        "MacAddress": "f6:bb:1b:fc:f2:44",
        "IPv4Address": "172.21.0.2/16",
        "IPv6Address": ""
    },
    "ff1daa7c5a79682cbbeba2499702e181121c2f9ecf532c838bb2f800cbadb2a8": {
        "Name": "debian-comercial",
        "EndpointID": "c8b1415195d3e41445df3e15a685448d8245ea56abf0ddac8922f0f2fc6d7b4e",
        "MacAddress": "92:27:dd:50:58:e3",
        "IPv4Address": "172.21.0.3/16",
        "IPv6Address": ""
    }
},
== IPs CONTENEDORES ==
/fedora-web - IP: 172.21.0.2
/debian-comercial - IP: 172.17.0.6172.21.0.3
laumarce@laumarce-IdeaPad-Slim-3-15AMNB: ~

```

Figure 86: Visualización conexión entre contenedor y MV.

```

sudo docker exec fedora-web sh -c "apk add nmap 2>/dev/null && nmap localhost"
sudo docker exec fedora-web sh -c "nmap debian-comercial 2>/dev/null"
(1/4) Installing lua5.4-libs (5.4.7-r0)
(2/4) Installing libpcap (1.10.5-r1)
(3/4) Installing libssh2 (1.11.1-r0)
(4/4) Installing nmap (7.97-r0)
Executing busybox-1.37.0-r19.trigger
OK: 79 MiB in 45 packages
Starting Nmap 7.97 ( https://nmap.org ) at 2025-10-23 04:01 +0000
Nmap scan report for localhost (127.0.0.1)
Host is up (0.000010s latency).
Other addresses for localhost (not scanned): ::1
All 1000 scanned ports on localhost (127.0.0.1) are in ignored states.
Not shown: 1000 closed tcp ports (reset)

Nmap done: 1 IP address (1 host up) scanned in 0.10 seconds
Starting Nmap 7.97 ( https://nmap.org ) at 2025-10-23 04:01 +0000
Nmap scan report for debian-comercial (172.21.0.3)
Host is up (0.000011s latency).
rDNS record for 172.21.0.3: debian-comercial.red-comercial
All 1000 scanned ports on debian-comercial (172.21.0.3) are in ignored states.
Not shown: 1000 closed tcp ports (reset)
MAC Address: 92:27:DD:50:58:E3 (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 0.18 seconds
laumarce@laumarce-IdeaPad-Slim-3-15AMNB: ~

```

Figure 87: Puertos de exploración

```

== AUDITORÍA INTERNA DEL SISTEMA ==
1. Usuarios del sistema:
sshd:x:22:22:sshd:/dev/null:/sbin/nologin
games:x:35:35:games:/usr/games:/sbin/nologin
httpx:123:123:NTP:/var/empty:/sbin/nologin
guest:x:495:100:guest:/dev/null:/sbin/nologin
nobody:x:65534:65534:nobody:/sbin/nologin

2. Procesos activos:
PID USER      TIME  COMMAND
 1 root      0:00 /bin/sh
 40 root      0:00 echo === AUDITORÍA INTERNA DEL SISTEMA === echo `1. Usuarios del sistema` cat /etc/psswd | tail -5 echo `2. Procesos activos` ps aux |
 57 root      0:00 ps aux
 58 root      0:00 head -10

3. Puertos abiertos:
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 127.0.0.11:39887       0.0.0.0:*
          0      0 127.0.0.11:59842       0.0.0.0:*
udp        0      0 127.0.0.11:59842       0.0.0.0:*

4. Uso de memoria:
              total        used        free     shared  buff/cache available
Mem:       5.1G       3.6G      324.7M     114.5M       1.2G      1.9G
Swap:      4.0G      797.6M       3.2G

5. Espacio en disco:
Filesystem      Size  Used Available Use% Mounted on
overlay       66.3G  48.8G   14.9G  76% /
tmpfs         64.0M    0     64.0M   0% /dev
shm           64.0M    0     64.0M   0% /dev/shm
/dev/nvme0n1p6 66.3G  48.8G   14.9G  76% /etc/hostname
/dev/nvme0n1p6 66.3G  48.8G   14.9G  76% /etc/hosts
tmpfs         2.6G    0     2.6G   0% /proc/asound
tmpfs         2.6G    0     2.6G   0% /proc/acpi
tmpfs         64.0M    0     64.0M   0% /proc/irq
tmpfs         64.0M    0     64.0M   0% /proc/kcore
tmpfs         64.0M    0     64.0M   0% /proc/keys
tmpfs         64.0M    0     64.0M   0% /proc/latency_stats
tmpfs         64.0M    0     64.0M   0% /proc/timer_list

```

Figure 88: Auditoría interna con Lynis

Se realizó auditoría interna utilizando comandos nativos del sistema:

- ps aux: Verificar procesos activos

- netstat/ss: Identificar puertos abiertos
- df -h: Revisar uso de disco
- free: Analizar memoria disponible
- /etc/passwd: Revisar usuarios del sistema
- Nota: Lynis no está disponible en Alpine Linux. Se usaron herramientas nativas del sistema operativo para auditoría de seguridad.

Los pasos para desplegar una página web desde un contenedor Docker:

1. Crear contenedor con puerto expuesto
2. Instalar el framework web(ejemplo:Streamlit)
3. Crear la aplicación web
4. Ejecutar el servidor web escuchando en todas las interfaces (0.0.0.0)

Los comandos para cada uno de los pasos serán mostrados a continuación:

1. sudo docker run -dit --name m1-web -p 8501:8501 alpine:latest

2. sudo docker exec -it m1-web sh

apk add python3 py3-pip

pip3 install streamlit

3. echo "import streamlit as st; st.title('Mi app')"\> app.py

4. streamlit run app.py --server.port 8501 --server.address 0.0.0.0

- **Concepto clave:** El contenedor debe exponer el puerto (-p) y el servidor debe escuchar en 0.0.0.0 para aceptar conexiones externas al contenedor.

4 PUNTO 4

```
laurarce@laurarce-IdeaPad-Slim-3-15AMH8:~ # Desde Garuda (financiera) hacer ping a Ubuntu (financiera)
sudo docker exec garuda-financiera ping -c 3 ubuntu-financiera

# Desde Fedora (comercial) hacer ping a Debian (comercial)
sudo docker exec fedora-comercial ping -c 3 debian-comercial
PING ubuntu-financiera (172.20.0.3) 56 data bytes
64 bytes from 172.20.0.3: seq=0 ttl=64 time=0.112 ms
64 bytes from 172.20.0.3: seq=1 ttl=64 time=0.096 ms
64 bytes from 172.20.0.3: seq=2 ttl=64 time=0.074 ms

... ubuntu-financiera ping statistics ...
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.074/0.094/0.112 ms
PING debian-comercial (172.21.0.3) 56 data bytes
64 bytes from 172.21.0.3: seq=0 ttl=64 time=0.110 ms
64 bytes from 172.21.0.3: seq=1 ttl=64 time=0.098 ms
64 bytes from 172.21.0.3: seq=2 ttl=64 time=0.100 ms

... debian-comercial ping statistics ...
3 packets transmitted, 3 packets received, 0% packet loss
round-trip min/avg/max = 0.098/0.102/0.110 ms
laurarce@laurarce-IdeaPad-Slim-3-15AMH8:~ [
```

Figure 89: Verificación de conexión entre dependencias