

Sistema Operativo: Ubuntu 16.04 LTS

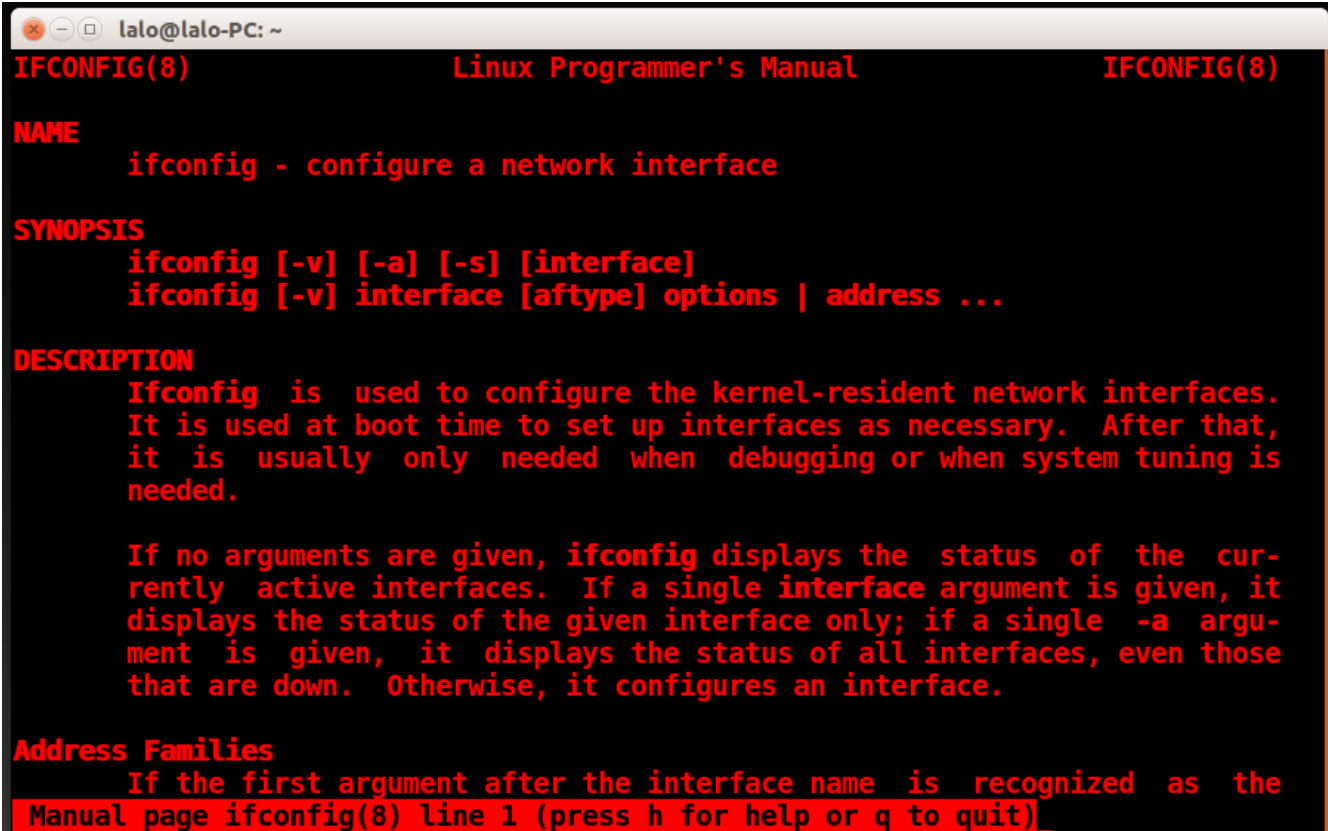
¿Qué programa utilicé para obtener la traza?: lalo@lalo-PC:~\$ strace ifconfig -a

¿Qué programa objetivo tracé?: ifconfig -a

¿Por qué elegí este programa?:

Quiero saber de manera un poco más detallada qué es lo que realiza el programa 'ifconfig' dentro de Linux. Sé que tiene algunas similitudes con el 'ipconfig/all' dentro de los sistemas operativos Windows con la parte de conexión de redes, por ejemplo, mostrarme la dirección IP de un PC, su dirección MAC, qué dispositivos de red (alámbrica e inalámbrica) posee dicho PC, pero quiero saber cómo trata el sistema operativo esa llamada al sistema.

Acudiendo a 'man ifconfig' pude ver que hay una opción adicional que justamente me indica las interfaces de redes activas de mi PC, y es la de 'ifconfig -a'



```
lalo@lalo-PC: ~  
IFCONFIG(8)                                Linux Programmer's Manual                                IFCONFIG(8)  
  
NAME  
    ifconfig - configure a network interface  
  
SYNOPSIS  
    ifconfig [-v] [-a] [-s] [interface]  
    ifconfig [-v] interface [aftype] options | address ...  
  
DESCRIPTION  
    Ifconfig is used to configure the kernel-resident network interfaces.  
    It is used at boot time to set up interfaces as necessary. After that,  
    it is usually only needed when debugging or when system tuning is  
    needed.  
  
    If no arguments are given, ifconfig displays the status of the cur-  
    rently active interfaces. If a single interface argument is given, it  
    displays the status of the given interface only; if a single -a argu-  
    ment is given, it displays the status of all interfaces, even those  
    that are down. Otherwise, it configures an interface.  
  
Address Families  
    If the first argument after the interface name is recognized as the  
    Manual page ifconfig(8) line 1 (press h for help or q to quit)
```

```
lalo@lalo-PC:~$ strace ifconfig -a
execve("/sbin/ifconfig", ["ifconfig", "-a"], [/ 69 vars *]) = 0
brk(NULL) = 0x89b6000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
mmap2(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0xb7729000
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
open("/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat64(3, {st_mode=S_IFREG|0644, st_size=85165, ...}) = 0
mmap2(NULL, 85165, PROT_READ, MAP_PRIVATE, 3, 0) = 0xb7714000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/i386-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
read(3, "\177ELF\1\1\1\3\0\0\0\0\0\0\0\3\0\3\0\1\0\0\0\320\207\1\0004\0\0\0"..
., 512) = 512
fstat64(3, {st_mode=S_IFREG|0755, st_size=1786484, ...}) = 0
mmap2(NULL, 1792540, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) = 0xb755e000
mmap2(0xb770e000, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_DENYWRITE, 3, 0x1af000) = 0xb770e000
mmap2(0xb7711000, 10780, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|MAP_ANONYMOUS, -1, 0) = 0xb7711000
close(3) = 0
mmap2(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0xb7
```

A continuación muestro el sustracto completo de ‘strace ifconfig -a’ obtenido desde mi terminal en Ubuntu:

---

```
lalo@lalo-PC:~$ strace ifconfig -a
execve("/sbin/ifconfig", ["ifconfig", "-a"], [/ 69 vars *]) = 0
*execve ejecuta el programa indicado, en este caso ifconfig
brk(NULL) = 0x89b6000
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
mmap2(NULL, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) = 0xb7729000
*mmap considero que reserva un espacio de memoria para el programa en ejecución ifconfig
access("/etc/ld.so.preload", R_OK) = -1 ENOENT (No such file or directory)
open("/etc/ld.so.cache", O_RDONLY|O_CLOEXEC) = 3
fstat64(3, {st_mode=S_IFREG|0644, st_size=85165, ...}) = 0
mmap2(NULL, 85165, PROT_READ, MAP_PRIVATE, 3, 0) = 0xb7714000
close(3) = 0
access("/etc/ld.so.nohwcap", F_OK) = -1 ENOENT (No such file or directory)
open("/lib/i386-linux-gnu/libc.so.6", O_RDONLY|O_CLOEXEC) = 3
*open tal vez este intentando abrir una biblioteca de linux en modo sólo lectura y después la cerrará
read(3, "\177ELF\1\1\1\3\0\0\0\0\0\0\0\3\0\3\0\1\0\0\0\320\207\1\0004\0\0\0"..., 512) = 512
fstat64(3, {st_mode=S_IFREG|0755, st_size=1786484, ...}) = 0
```

```

mmap2(NULL, 1792540, PROT_READ|PROT_EXEC, MAP_PRIVATE|MAP_DENYWRITE, 3, 0) =
0xb755e000
mmap2(0xb770e000, 12288, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_DENYWRITE, 3, 0x1af000) = 0xb770e000
mmap2(0xb7711000, 10780, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_FIXED|
MAP_ANONYMOUS, -1, 0) = 0xb7711000
close(3) = 0
mmap2(NULL, 4096, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANONYMOUS, -1, 0) =
0xb7750000
set_thread_area({entry_number:-1, base_addr:0xb7750940, limit:1048575, seg_32bit:1, contents:0,
read_exec_only:0, limit_in_pages:1, seg_not_present:0, useable:1}) = 0 (entry_number:6)
mprotect(0xb770e000, 8192, PROT_READ) = 0
mprotect(0x8058000, 4096, PROT_READ) = 0
mprotect(0xb7751000, 4096, PROT_READ) = 0
*mprotect considero que me indica que en las direcciones de memoria indicadas no se puede
ejecutar el programa ifconfig
munmap(0xb7714000, 85165) = 0
brk(NULL) = 0x89b6000
brk(0x89d7000) = 0x89d7000
*brk posiblemente me este indicando que sólo ese espacio de memoria puede ocupar el programa
ifconfig
open("/usr/lib/locale/locale-archive", O_RDONLY|O_LARGEFILE|O_CLOEXEC) = 3
fstat64(3, {st_mode=S_IFREG|0644, st_size=5557808, ...}) = 0
mmap2(NULL, 2097152, PROT_READ, MAP_PRIVATE, 3, 0) = 0xb735e000
mmap2(NULL, 1249280, PROT_READ, MAP_PRIVATE, 3, 0x2d7000) = 0xb722d000
mmap2(NULL, 4096, PROT_READ, MAP_PRIVATE, 3, 0x543000) = 0xb7728000
close(3) = 0
open("/usr/lib/locale/locale-archive", O_RDONLY|O_LARGEFILE|O_CLOEXEC) = 3
fstat64(3, {st_mode=S_IFREG|0644, st_size=5557808, ...}) = 0
mmap2(NULL, 4096, PROT_READ, MAP_PRIVATE, 3, 0x540000) = 0xb7727000
close(3) = 0
uname({sysname="Linux", nodename="lalo-PC", ...}) = 0
*uname infiero que mediante sysname identifica que sistema operativo estoy utilizando y con
nodename me da el nombre del equipo con que se identifica en la red
access("/proc/net", R_OK) = 0
access("/proc/net/unix", R_OK) = 0
socket(PF_LOCAL, SOCK_DGRAM, 0) = 3
socket(PF_INET, SOCK_DGRAM, IPPROTO_IP) = 4
access("/proc/net/if_inet6", R_OK) = 0
socket(PF_INET6, SOCK_DGRAM, IPPROTO_IP) = 5
access("/proc/net/ax25", R_OK) = -1 ENOENT (No such file or directory)
access("/proc/net/nr", R_OK) = -1 ENOENT (No such file or directory)
access("/proc/net/rose", R_OK) = -1 ENOENT (No such file or directory)
access("/proc/net/ipx", R_OK) = -1 ENOENT (No such file or directory)
access("/proc/net/appletalk", R_OK) = -1 ENOENT (No such file or directory)
access("/proc/sys/net/econet", R_OK) = -1 ENOENT (No such file or directory)
access("/proc/sys/net/ash", R_OK) = -1 ENOENT (No such file or directory)
access("/proc/net/x25", R_OK) = -1 ENOENT (No such file or directory)
open("/proc/net/dev", O_RDONLY) = 6

```

**\*access** posiblemente intente ejecutar un proceso relacionado con la conectividad y **\*socket** trata de establecer una conexión en la red

```
fstat64(6, {st_mode=S_IFREG|0444, st_size=0, ...}) = 0
read(6, "Inter-| Receive      ", 1024) = 569
read(6, "", 1024) = 0
close(6) = 0
open("/usr/share/locale/locale.alias", O_RDONLY|O_CLOEXEC) = 6
fstat64(6, {st_mode=S_IFREG|0644, st_size=2995, ...}) = 0
read(6, "# Locale name alias data base.\n#", 4096) = 2995
read(6, "", 4096) = 0
close(6) = 0
open("/usr/share/locale/es/LC_MESSAGES/net-tools.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
open("/usr/share/locale-langpack/es/LC_MESSAGES/net-tools.mo", O_RDONLY) = 6
fstat64(6, {st_mode=S_IFREG|0644, st_size=58432, ...}) = 0
mmap2(NULL, 58432, PROT_READ, MAP_PRIVATE, 6, 0) = 0xb7718000
close(6) = 0
open("/usr/lib/i386-linux-gnu/gconv/gconv-modules.cache", O_RDONLY) = 6
fstat64(6, {st_mode=S_IFREG|0644, st_size=26256, ...}) = 0
mmap2(NULL, 26256, PROT_READ, MAP_SHARED, 6, 0) = 0xb7226000
close(6) = 0
ioctl(4, SIOCGIFCONF, {30 * sizeof(struct ifreq) => 2 * sizeof(struct ifreq), [{ifr_name="lo", ifr_addr={AF_INET, inet_addr("127.0.0.1")}}, {ifr_name="wlp2s0", ifr_addr={AF_INET, inet_addr("192.168.0.8")}]}}) = 0
```

**\*posiblemente con ioctl** esté identificando mi dispositivo de red inalámbrico (wlp2s0)

```
ioctl(5, SIOCGIFFLAGS, {ifr_name="enp6s0", ifr_flags=IFF_UP|IFF_BROADCAST|IFF_MULTICAST}) = 0
ioctl(5, SIOCGIFHWADDR, {ifr_name="enp6s0", ifr_hwaddr=10:ef:d3:8a:38:77}) = 0
ioctl(5, SIOCGIFMETRIC, {ifr_name="enp6s0", ifr_metric=0}) = 0
ioctl(5, SIOCGIFMTU, {ifr_name="enp6s0", ifr_mtu=1500}) = 0
ioctl(5, SIOCGIFMAP, {ifr_name="enp6s0", ifr_map={mem_start=0, mem_end=0, base_addr=0, irq=0, dma=0, port=0}}) = 0
ioctl(5, SIOCGIFMAP, {ifr_name="enp6s0", ifr_map={mem_start=0, mem_end=0, base_addr=0, irq=0, dma=0, port=0}}) = 0
ioctl(5, SIOCGIFTXQLEN, {ifr_name="enp6s0", ifr_qlen=1000}) = 0
ioctl(4, SIOCGIFADDR, {ifr_name="enp6s0"}) = -1 EADDRNOTAVAIL (Cannot assign requested address)
```

**\*y aquí ioctl** tal vez identifica mi dispositivo de red alámbrico (enp6s0)

```
open("/usr/share/locale/en/LC_MESSAGES/net-tools.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
open("/usr/share/locale-langpack/en/LC_MESSAGES/net-tools.mo", O_RDONLY) = -1 ENOENT (No such file or directory)
fstat64(1, {st_mode=S_IFCHR|0620, st_rdev=makedev(136, 4), ...}) = 0
write(1, "enp6s0 Link encap:Ethernet d", 64)
enp6s0 Link encap:Ethernet direcciónHW
10:ef:d3:8a:38:77
```

**\*write** muestra la dirección MAC de mi dispositivo de red alámbrico

```
) = 64
open("/proc/net/if_inet6", O_RDONLY) = 6
fstat64(6, {st_mode=S_IFREG|0444, st_size=0, ...}) = 0
```

```

read(6, "00000000000000000000000000000001"..., 1024) = 108
read(6, "", 1024) = 0
read(6, "", 1024) = 0
close(6) = 0
write(1, "    ACTIVO DIFUSI\303\223N MULTI"..., 59    ACTIVO DIFUSIÓN MULTICAST
MTU:1500 Métrica:1
) = 59
write(1, "    Paquetes RX:0 errores:"..., 64    Paquetes RX:0 errores:0 perdidos:0 overruns:0
frame:0
) = 64
write(1, "    Paquetes TX:0 errores:"..., 66    Paquetes TX:0 errores:0 perdidos:0 overruns:0
carrier:0
) = 66
write(1, "    colisiones:0 long cola"..., 41    colisiones:0 long colaTX:1000
) = 41
write(1, "    Bytes RX:0 (0.0 B) TX"..., 49    Bytes RX:0 (0.0 B) TX bytes:0 (0.0 B)
) = 49
write(1, "\n", 1
) = 1
*write muestra detalles de mi red alámbrica cuando establece una conexión (envío de paquetes,
colisiones, etc). Aquí se ve que no hay ninguna conexión de mi red alámbrica
ioctl(5, SIOCGIFFLAGS, {ifr_name="lo", ifr_flags=IFF_UP|IFF_LOOPBACK|IFF_RUNNING}) = 0
ioctl(5, SIOCGIFHWADDR, {ifr_name="lo", ifr_hwaddr=00:00:00:00:00:00}) = 0
ioctl(5, SIOCGIFMETRIC, {ifr_name="lo", ifr_metric=0}) = 0
ioctl(5, SIOCGIFMTU, {ifr_name="lo", ifr_mtu=65536}) = 0
ioctl(5, SIOCGIFMAP, {ifr_name="lo", ifr_map={mem_start=0, mem_end=0, base_addr=0, irq=0,
dma=0, port=0}}) = 0
ioctl(5, SIOCGIFMAP, {ifr_name="lo", ifr_map={mem_start=0, mem_end=0, base_addr=0, irq=0,
dma=0, port=0}}) = 0
ioctl(5, SIOCGIFTXQLEN, {ifr_name="lo", ifr_qlen=1}) = 0
ioctl(4, SIOCGIFADDR, {ifr_name="lo", ifr_addr={AF_INET, inet_addr("127.0.0.1")}}) = 0
ioctl(4, SIOCGIFDSTADDR, {ifr_name="lo", ifr_dstaddr={AF_INET, inet_addr("127.0.0.1")}}) = 0
ioctl(4, SIOCGIFBRDADDR, {ifr_name="lo", ifr_broadaddr={AF_INET, inet_addr("0.0.0.0")}}) = 0
ioctl(4, SIOCGIFNETMASK, {ifr_name="lo", ifr_netmask={AF_INET, inet_addr("255.0.0.0")}}) = 0
write(1, "lo    Link encap:Bucle local"..., 35lo    Link encap:Bucle local
) = 35
write(1, "    Direc. inet:127.0.0.1 "..., 49    Direc. inet:127.0.0.1 Másc:255.0.0.0
) = 49
open("/proc/net/if_inet6", O_RDONLY) = 6
fstat64(6, {st_mode=S_IFREG|0444, st_size=0, ...}) = 0
read(6, "00000000000000000000000000000001"..., 1024) = 108
write(1, "    Direcci\303\263n inet6: ::1/"..., 55    Dirección inet6: ::1/128 Alcance:Anfitrión
) = 55
read(6, "", 1024) = 0
read(6, "", 1024) = 0
close(6) = 0
write(1, "    ACTIVO BUCLE FUNCIONAN"..., 58    ACTIVO BUCLE FUNCIONANDO
MTU:65536 Métrica:1
) = 58

```

```

write(1, "      Paquetes RX:569 errore"..., 66      Paquetes RX:569 errores:0 perdidos:0 overruns:0
frame:0
) = 66
write(1, "      Paquetes TX:569 errore"..., 68      Paquetes TX:569 errores:0 perdidos:0 overruns:0
carrier:0
) = 68
write(1, "      colisiones:0 long.cola"..., 38      colisiones:0 long.colaTX:1
) = 38
write(1, "      Bytes RX:59722 (59.7 K"..., 61      Bytes RX:59722 (59.7 KB) TX bytes:59722
(59.7 KB)
) = 61
write(1, "\n", 1
) = 1

```

**\*write sigue mostrando más detalles de mi red inalámbrica cuando establece una conexión. Aquí si existe una conexión activa.**

```

ioctl(5, SIOCGIFFLAGS, {ifr_name="wlp2s0", ifr_flags=IFF_UP|IFF_BROADCAST|
IFF_RUNNING|IFF_MULTICAST}) = 0
ioctl(5, SIOCGIFHWADDR, {ifr_name="wlp2s0", ifr_hwaddr=07:4c:2e:83:04:15}) = 0
ioctl(5, SIOCGIFMETRIC, {ifr_name="wlp2s0", ifr_metric=0}) = 0
ioctl(5, SIOCGIFMTU, {ifr_name="wlp2s0", ifr_mtu=1500}) = 0
ioctl(5, SIOCGIFMAP, {ifr_name="wlp2s0", ifr_map={mem_start=0, mem_end=0, base_addr=0,
irq=0, dma=0, port=0}}) = 0
ioctl(5, SIOCGIFMAP, {ifr_name="wlp2s0", ifr_map={mem_start=0, mem_end=0, base_addr=0,
irq=0, dma=0, port=0}}) = 0
ioctl(5, SIOCGIFTXQLEN, {ifr_name="wlp2s0", ifr_qlen=1000}) = 0
ioctl(4, SIOCGIFADDR, {ifr_name="wlp2s0", ifr_addr={AF_INET, inet_addr("192.168.0.8")}}) = 0
ioctl(4, SIOCGIFDSTADDR, {ifr_name="wlp2s0", ifr_dstaddr={AF_INET,
inet_addr("192.168.0.8")}}) = 0
ioctl(4, SIOCGIFBRDADDR, {ifr_name="wlp2s0", ifr_broadaddr={AF_INET,
inet_addr("192.168.0.255")}}) = 0
ioctl(4, SIOCGIFNETMASK, {ifr_name="wlp2s0", ifr_netmask={AF_INET,
inet_addr("255.255.255.0")}}) = 0
write(1, "wlp2s0  Link encap:Ethernet d"..., 64wlp2s0  Link encap:Ethernet direcciónHW
07:4c:2e:83:04:15

```

**\*write muestra la dirección MAC de mi dispositivo de red inalámbrica cuando establece una conexión**

```

) = 64
write(1, "      Direc. inet:192.168.0."..., 77      Direc. inet:192.168.0.8 Difus.:192.168.0.255
Másc:255.255.255.0

```

**\*write muestra la dirección IP de mi dispositivo de red inalámbrica y la máscara de subred cuando establece una conexión**

```

) = 77
open("/proc/net/if_inet6", O_RDONLY) = 6
fstat64(6, {st_mode=S_IFREG|0444, st_size=0, ...}) = 0
read(6, "00000000000000000000000000000001"..., 1024) = 108
read(6, "", 1024) = 0
write(1, "      Direcci\303\263n inet6: fe80"..., 72      Dirección inet6:
fe80::579d:9684:39c0:fd1a/64 Alcance:Enlace
) = 72

```

```

read(6, "", 1024)          = 0
close(6)                   = 0
write(1, "    ACTIVO DIFUSI\303\223N FUNCIONANDO MULTICAST MTU:1500 Métrica:1", 71)
) = 71
write(1, "    Paquetes RX:9154 error"..., 67)    Paquetes RX:9154 errores:0 perdidos:0 overruns:0
frame:0
) = 67
write(1, "    Paquetes TX:8349 error"..., 69)    Paquetes TX:8349 errores:0 perdidos:0 overruns:0
carrier:0
) = 69
write(1, "    colisiones:0 long.cola"..., 41)    colisiones:0 long.colaTX:1000
) = 41
write(1, "    Bytes RX:8573901 (8.5 "..., 63)    Bytes RX:8573901 (8.5 MB) TX bytes:1121333
(1.1 MB)
) = 63
write(1, "\n", 1
) = 1
*write indica que existe una conexión activa a internet desde mi dispositivo de red inalámbrica
close(5)                   = 0
exit_group(0)              = ?
+++ exited with 0 +++

```

---