



Licenciatura en Sistemas Sistemas Operativos y Redes 2

2do Cuatrimestre 2020

Informe de Trabajo Práctico 0 Actividad Drivers

Docentes:

- Pedro Gutierrez
- Agustin Alexander

Alumno:

- Jonatan Diaz

1. Usando los archivos miModulo.c y Makefile (del repositorio <https://github.com/agusalex/sor2-tp0>), procedemos a realizar la compilación con el comando “make” (imagen 1), obteniendo los diferentes archivos miModulo (.o, .mod.o, .ko) (imagen 2).

Luego revisamos con los comandos lsmod (imagen 3) los modulos que estan cargados y con dmesg (imagen 4) revisamos el log de kernel. con el fin de compararlo luego de cargar miModulo.

Procedemos a cargar “miModulo.ko” con el comando “insmod”, luego revisamos con lsmod (imagen 5) cómo aparece miModulo en el listado de módulos y con dmesg revisamos que se registró el driver en el log del kernel (imagen 6).

```
alumno@alumno-virtualbox:~/Desktop/tp0/sor2-tp0$ make
make -C /lib/modules/5.4.0-48-generic/build M=/home/alumno/Desktop/tp0/sor2-tp0 modules
make[1]: se entra en el directorio '/usr/src/linux-headers-5.4.0-48-generic'
CC [M] /home/alumno/Desktop/tp0/sor2-tp0/miModulo.o
Building modules, stage 2.
MODPOST 1 modules
CC [M] /home/alumno/Desktop/tp0/sor2-tp0/miModulo.mod.o
LD [M] /home/alumno/Desktop/tp0/sor2-tp0/miModulo.ko
make[1]: se sale del directorio '/usr/src/linux-headers-5.4.0-48-generic'
alumno@alumno-virtualbox:~/Desktop/tp0/sor2-tp0$
```

imagen 1. compilación con make.



imagen 2. archivos.

```
alumno@alumno-virtualbox: ~/Desktop/tp0/sor2-tp0
alumno@alumno-virtualbox:~/Desktop/tp0/sor2-tp0$ lsmod
Module                  Size  Used by
nls_utf8                16384  1
iso9660                49152  1
snd_intel8x0            45056  2
joydev                 24576  0
snd_ac97_codec          131072 1 snd_intel8x0
ac97_bus                16384  1 snd_ac97_codec
snd_pcm                 106496 2 snd_intel8x0,snd_ac97_codec
snd_seq_midi            20480  0
vboxsf                  81920  0
snd_seq_midi_event      16384  1 snd_seq_midi
snd_rawmidi             36864  1 snd_seq_midi
snd_seq                 69632  2 snd_seq_midi,snd_seq_midi_event
snd_seq_device          16384  3 snd_seq,snd_seq_midi,snd_rawmidi
snd_timer               36864  2 snd_seq,snd_pcm
snd                     90112 11 snd_seq,snd_seq_device,snd_intel8x0,snd_timer,snd_ac97_codec,snd_p
cm,snd_rawmidi
soundcore               16384  1 snd
input_leds              16384  0
mac_hid                 16384  0
vboxguest               348160 5 vboxsf
serio_raw               20480  0
binfmt_misc             24576  1
sch_fq_codel            20480  2
parport_pc              40960  0
ppdev                   24576  0
lp                       20480  0
parport                 53248  3 parport_pc,lp,ppdev
ip_tables               32768  0
x_tables                40960  1 ip_tables
autofs4                 45056  2
```

imagen 3. lista de modulos.

```
alumno@alumno-virtualbox: ~/Desktop/tp0/sor2-tp0
[ 14.846084] vboxsf: Successfully loaded version 6.1.10_Ubuntu on 5.4.0-48-generic SMP mod_unload
(LINUX_VERSION_CODE=0x5043c)
[ 16.163583] snd_intel8x0 0000:00:05.0: intel8x0_measure_ac97_clock: measured 54708 usecs (10624
samples)
[ 16.163585] snd_intel8x0 0000:00:05.0: measured clock 194194 rejected
[ 16.551073] snd_intel8x0 0000:00:05.0: intel8x0_measure_ac97_clock: measured 58740 usecs (10864
samples)
[ 16.551075] snd_intel8x0 0000:00:05.0: measured clock 184950 rejected
[ 16.934728] snd_intel8x0 0000:00:05.0: intel8x0_measure_ac97_clock: measured 58984 usecs (10864
samples)
[ 16.934730] snd_intel8x0 0000:00:05.0: measured clock 184185 rejected
[ 16.934731] snd_intel8x0 0000:00:05.0: clocking to 48000
[ 21.522809] kauditd_printk_skb: 16 callbacks suppressed
[ 21.522811] audit: type=1400 audit(1601920703.252:28): apparmor="DENIED" operation="capable" pro
file="/usr/sbin/cups-browsed" pid=632 comm="cups-browsed" capability=23 capname="sys_nice"
[ 21.899356] VBoxService 5.2.12 r122591 (verbosity: 0) linux.amd64 (May 9 2018 12:07:53) release
Log
00:00:00.069110 main Log opened 2020-10-05T17:58:23.631953000Z
[ 21.899399] 00:00:00.069196 main OS Product: Linux
[ 21.899419] 00:00:00.069220 main OS Release: 5.4.0-48-generic
[ 21.899437] 00:00:00.069239 main OS Version: #52-Ubuntu SMP Thu Sep 10 10:58:49 UTC 2020
[ 21.899464] 00:00:00.069257 main Executable: /opt/VBoxGuestAdditions-5.2.12/sbin/VBoxService
00:00:00.069258 main Process ID: 660
00:00:00.069258 main Package type: LINUX_64BITS_GENERIC
00:00:00.070036 main 5.2.12 r122591 started. Verbose level = 0
[ 21.900260] 00:00:00.070036 main
[ 23.087134] e1000: enp0s3 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: RX
[ 23.087382] IPv6: ADDRCONF(NETDEV_CHANGE): enp0s3: link becomes ready
[ 29.356234] systemd-journald[293]: File /var/log/journal/780ad83456e8403fb439ccc57fb98afb/user-1
000.journal corrupted or uncleanly shut down, renaming and replacing.
[ 43.228821] ISO 9660 Extensions: Microsoft Joliet Level 3
[ 43.357499] ISO 9660 Extensions: RRIP_1991A
alumno@alumno-virtualbox:~/Desktop/tp0/sor2-tp0$
```

imagen 4. log del kernel.

```
alumno@alumno-virtualbox: ~/Desktop/tp0/sor2-tp0
alumno@alumno-virtualbox:~/Desktop/tp0/sor2-tp0$ lsmod
Module                  Size  Used by
miModulo                16384  0
nls_utf8                16384  1
iso9660                49152  1
snd_intel8x0            45056  2
joydev                 24576  0
snd_ac97_codec          131072 1 snd_intel8x0
ac97_bus                16384  1 snd_ac97_codec
snd_pcm                 106496 2 snd_intel8x0,snd_ac97_codec
snd_seq_midi            20480  0
vboxsf                  81920  0
snd_seq_midi_event      16384  1 snd_seq_midi
snd_rawmidi             36864  1 snd_seq_midi
snd_seq                 69632  2 snd_seq_midi,snd_seq_midi_event
snd_seq_device          16384  3 snd_seq,snd_seq_midi,snd_rawmidi
snd_timer               36864  2 snd_seq,snd_pcm
snd                     90112 11 snd_seq,snd_seq_device,snd_intel8x0,snd_timer,snd_ac97_codec,snd_p
cm,snd_rawmidi
soundcore               16384  1 snd
input_leds              16384  0
mac_hid                 16384  0
vboxguest               348160 5 vboxsf
serio_raw               20480  0
binfmt_misc             24576  1
sch_fq_codel            20480  2
parport_pc              40960  0
ppdev                   24576  0
lp                       20480  0
parport                 53248  3 parport_pc,lp,ppdev
ip_tables               32768  0
x_tables                40960  1 ip_tables
autofs4                 45056  2
```

imagen 5. lista de módulos con miModulo cargado.

```
alumno@alumno-virtualbox: ~/Desktop/tp0/sor2-tp0
samples)
[ 16.163585] snd_intel8x0 0000:00:05.0: measured clock 194194 rejected
[ 16.551073] snd_intel8x0 0000:00:05.0: intel8x0_measure_ac97_clock: measured 58740 usecs (10864
samples)
[ 16.551075] snd_intel8x0 0000:00:05.0: measured clock 184950 rejected
[ 16.934728] snd_intel8x0 0000:00:05.0: intel8x0_measure_ac97_clock: measured 58984 usecs (10864
samples)
[ 16.934730] snd_intel8x0 0000:00:05.0: measured clock 184185 rejected
[ 16.934731] snd_intel8x0 0000:00:05.0: clocking to 48000
[ 21.522809] kauditd_printk_skb: 16 callbacks suppressed
[ 21.522811] audit: type=1400 audit(1601920703.252:28): apparmor="DENIED" operation="capable" pro
file="/usr/sbin/cups-browsed" pid=632 comm="cups-browsed" capability=23 capname="sys_nice"
[ 21.899356] VBoxService 5.2.12 r122591 (verbosity: 0) linux.amd64 (May 9 2018 12:07:53) release
Log
[ 21.899399] 00:00:00.069110 main Log opened 2020-10-05T17:58:23.631953000Z
[ 21.899419] 00:00:00.069220 main OS Product: Linux
[ 21.899437] 00:00:00.069239 main OS Release: 5.4.0-48-generic
[ 21.899464] 00:00:00.069257 main OS Version: #52-Ubuntu SMP Thu Sep 10 10:58:49 UTC 2020
[ 21.899464] 00:00:00.069257 main Executable: /opt/VBoxGuestAdditions-5.2.12/sbin/VBoxService
[ 21.899464] 00:00:00.069258 main Process ID: 660
[ 21.899464] 00:00:00.069258 main Package type: LINUX_64BITS_GENERIC
[ 21.900260] 00:00:00.070036 main 5.2.12 r122591 started. Verbose level = 0
[ 23.087134] e1000: enp0s3 NIC Link is Up 1000 Mbps Full Duplex, Flow Control: RX
[ 23.087382] IPv6: ADDRCONF(NETDEV_CHANGE): enp0s3: link becomes ready
[ 29.356234] systemd-journald[293]: File /var/log/journal/780ad83456e8403fb439ccc57fb98afb/user-1
000.journal corrupted or uncleanly shut down, renaming and replacing.
[ 43.228821] ISO 9660 Extensions: Microsoft Joliet Level 3
[ 43.357499] ISO 9660 Extensions: RRIP_1991A
[ 1358.143671] miModulo: module verification failed: signature and/or required key missing - tainti
ng kernel
[ 1358.143863] UNGS : Driver registrado
alumno@alumno-virtualbox: ~/Desktop/tp0/sor2-tp0$
```

imagen 6. log del kernel con miMódulo cargado.