



UNIVERSIDAD NACIONAL AUTÓNOMA DE MÉXICO

FACULTAD DE CIENCIAS

Práctica 5 - Compilar un Kernel

ASIGNATURA

Administración de Sistemas Unix/Linux

ALUMNO

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1. Instalar las dependencias necesarias: Abre una terminal en tu Debian y ejecuta los siguientes comandos para instalar las herramientas esenciales:

```
sudo apt update && sudo apt install build-essential libncurses-dev  
bison flex libssl-dev libelf-dev bc dwarves-y
```

```
ratateam@debian: $ sudo apt update && sudo apt install build-essential libncurses-dev bison flex libssl-dev libelf-dev -y  
[sudo] password for ratateam:  
Hit:1 http://deb.debian.org/debian bookworm InRelease  
Hit:2 http://security.debian.org/debian-security bookworm-security InRelease  
Hit:3 http://deb.debian.org/debian bookworm-updates InRelease  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
All packages are up to date.  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following additional packages will be installed:
```

2. Descargar el código fuente del kernel:

```
wget https://mirrors.edge.kernel.org/pub/linux/kernel/v6.x  
/linux-6.11.3.tar.gz
```

3. Extraer el archivo descargado

```
tar -xvf linux-6.11.3.tar.gz
```

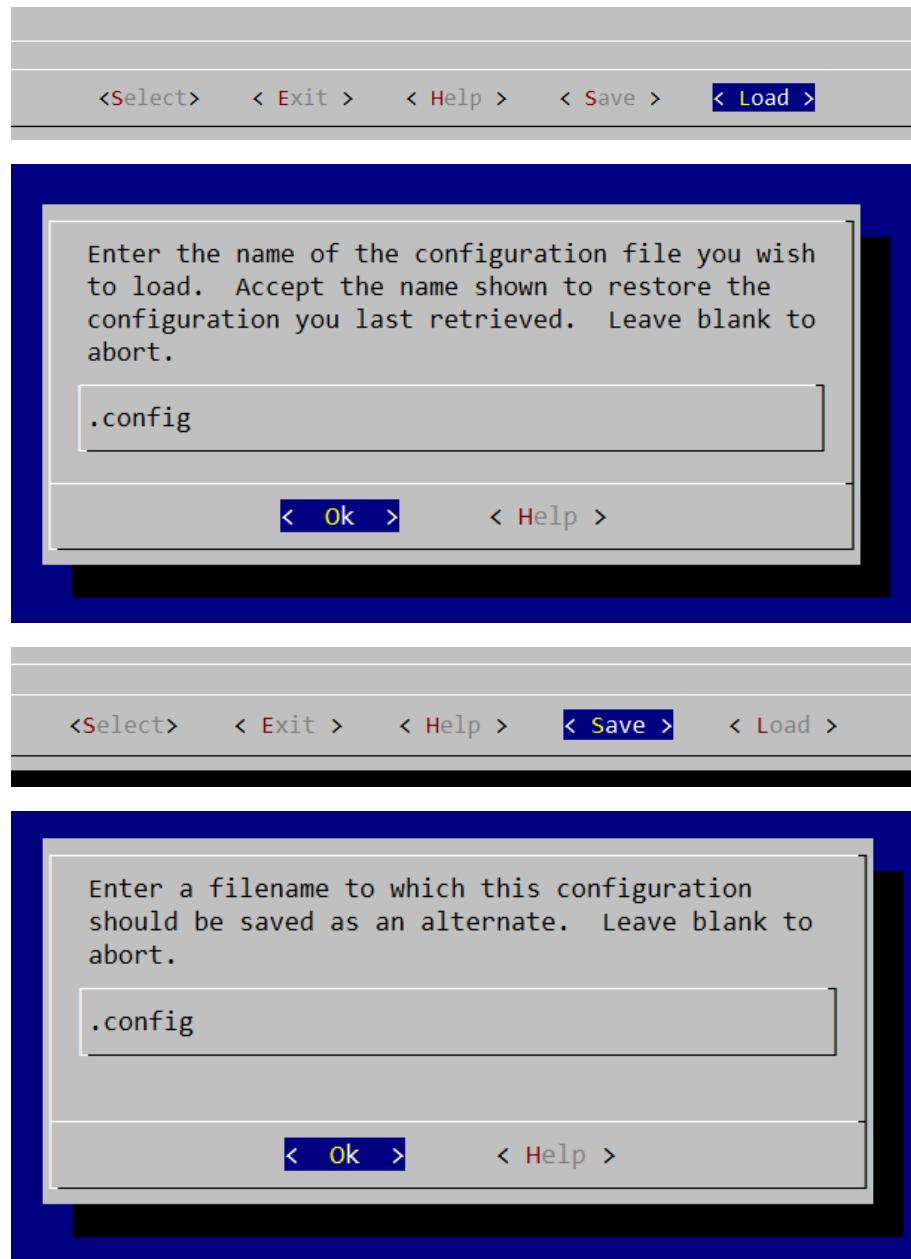
```
- 2024-12-03 04:11:14 -- https://mirrors.edge.kernel.org/pub/linux/kernel/v6.x/linux-6.11.3.tar.gz  
Resolving mirrors.edge.kernel.org (mirrors.edge.kernel.org)... 147.75.199.223, 2604:1380:45d1:ec00::1  
Connecting to mirrors.edge.kernel.org (mirrors.edge.kernel.org)|147.75.199.223|:443... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 238379402 (22M) [application/x-gzip]  
Saving to: 'linux-6.11.3.tar.gz'  
  
linux-6.11.3.tar.gz          100%[=====] 227.34M  1.35MB/s   in 3m 7s  
  
2024-12-03 04:14:22 (1.22 MB/s) - 'linux-6.11.3.tar.gz' saved [238379402/238379402]  
  
ratateam@debian: $ ls  
linux-6.11.3.tar.gz  v6.x  
ratateam@debian: $ tar -xvf linux-6.11.3.tar.gz
```

```
cd linux-6.11.3
```

4. Configurar el Kernel

```
cp /boot/config-$(uname -r) .config  
make menuconfig
```

```
linux-6.11.3/virt/lib/Makefile  
linux-6.11.3/virt/lib/irqbypass.c  
ratateam@debian: $ cd linux-6.11.3  
ratateam@debian:~/linux-6.11.3$ cp /boot/config-$(uname -r) .config  
ratateam@debian:~/linux-6.11.3$ make menuconfig  
HOSTCC scripts/basic/fixed  
HOSTCC scripts/kconfig/mconf.o  
HOSTCC scripts/kconfig/lxdialog/checklist.o  
HOSTCC scripts/kconfig/lxdialog/inputbox.o  
HOSTCC scripts/kconfig/lxdialog/menubox.o  
HOSTCC scripts/kconfig/lxdialog/textbox.o  
HOSTCC scripts/kconfig/lxdialog/util.o  
HOSTCC scripts/kconfig/lxdialog/yesno.o  
HOSTCC scripts/kconfig/mnconf-common.o  
HOSTCC scripts/kconfig/confdata.o  
HOSTCC scripts/kconfig/expr.o  
LEX scripts/kconfig/lexer.lex.c  
YACC scripts/kconfig/parser.tab.[ch]  
HOSTCC scripts/kconfig/lexer.lex.o  
HOSTCC scripts/kconfig/menu.o  
HOSTCC scripts/kconfig/parser.tab.o  
HOSTCC scripts/kconfig/preprocess.o  
HOSTCC scripts/kconfig/symbol.o  
HOSTCC scripts/kconfig/util.o  
HOSTLD scripts/kconfig/mconf  
.config:887:warning: symbol value 'o' invalid for BASE_SMALL  
.config:8020:warning: symbol value 'm' invalid for VFIO_VIROFD  
.config:9250:warning: symbol value 'm' invalid for ANDROID_BINDER_IPC  
.config:9410:warning: symbol value 'm' invalid for FSCACHE  
  
*** End of the configuration.  
*** Execute 'make' to start the build or try 'make help'.
```



5. Compilar el Kernel

```
make -j$(nproc)
```

```
RataTeam@Debian: /home/ratateam/linux-6.11.3$ sudo make -j$(nproc)
mkdir -p /home/ratateam/linux-6.11.3/tools/objtool && make o=/home/ratateam/linux-6.11.3 subdir=tools/objtool --no-print-directory -C objtool
mkdir -p /home/ratateam/linux-6.11.3/tools/bpf/resolve_btfids && make o=/home/ratateam/linux-6.11.3 subdir=tools/bpf/resolve_btfids --no-print-directory -C bpf/resolve_btfids
UPD include/generated/timeconst.h
CHKSHAI include/linux/atomic/atomic-arch-fallback.h
CHKSHAI include/linux/atomic/atomic-instrumented.h
CHKSHAI include/linux/atomic/atomic-long.h
CC arch/x86/kernel/asm-offsets.s
INSTALL libsubcmd headers
INSTALL libsubcmd headers
UPD include/generated/asm-offsets.h
CALL scripts/checksyscalls.sh
LDS scripts/module.lds
HOSTCC usr/gen_init_cpio
CC init/main.o
CC arch/x86/coco/sev/core.o
CC kernel/sched/core.o
GEN usr/initramfs_data.cpio
COPY usr/initramfs_inc data
```

6. Instalar los módulos

```
sudo make modules_install
```

```
ratateam@debian:~/linux-6.11$ sudo make modules_install
[sudo] password for ratateam:
SYMLINK /lib/modules/6.11.3/build
INSTALL /lib/modules/6.11.3/modules.order
INSTALL /lib/modules/6.11.3/modules.builtin
INSTALL /lib/modules/6.11.3/modules.builtin.modinfo
```

7. Instalar el Kernel

```
sudo make install
```

8. Actualizar el cargador de arranque y reiniciar

```
sudo update-grub
```

```
sudo reboot
```

```
INSTALL /lib/modules/6.11.3/kernel/net/qtr/qtr-mhi.ko
SIGN /lib/modules/6.11.3/kernel/net/qtr/qtr-mhi.ko
DEPMOD /lib/modules/6.11.3
ratateam@debian:~/linux-6.11$ sudo make install
INSTALL /boot
run-parts: executing /etc/kernel/postinst.d/initramfs-tools 6.11.3 /boot/vmlinuz-6.11.3
update-initramfs: Generating /boot/initrd.img-6.11.3
run-parts: executing /etc/kernel/postinst.d/zz-update-grub 6.11.3 /boot/vmlinuz-6.11.3
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-6.11.3
Found initrd image: /boot/initrd.img-6.11.3
Found linux image: /boot/vmlinuz-6.1.0-28-amd64
Found initrd image: /boot/initrd.img-6.1.0-28-amd64
Found linux image: /boot/vmlinuz-6.1.0-27-amd64
Found initrd image: /boot/initrd.img-6.1.0-27-amd64
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
done
ratateam@debian:~/linux-6.11$ sudo update-grub
Generating grub configuration file ...
Found linux image: /boot/vmlinuz-6.11.3
Found initrd image: /boot/initrd.img-6.11.3
Found linux image: /boot/vmlinuz-6.1.0-28-amd64
Found initrd image: /boot/initrd.img-6.1.0-28-amd64
Found linux image: /boot/vmlinuz-6.1.0-27-amd64
Found initrd image: /boot/initrd.img-6.1.0-27-amd64
Warning: os-prober will not be executed to detect other bootable partitions.
Systems on them will not be added to the GRUB boot configuration.
Check GRUB_DISABLE_OS_PROBER documentation entry.
done
ratateam@debian:~/linux-6.11$ sudo reboot
Broadcast message from root@debian on pts/1 (Tue 2024-12-03 22:20:39 CST):
```

9. Verificar la instalación

```
uname -r
```

```
ratateam@debian: $ uname -r
6.11.3
ratateam@debian: $
```