El kernel

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El documento tiene version .html, y .pdf, cambiando en el navegador la parte final podrás acceder a ambos.

Realizado con: LaTeX

Índice

1. Introducción

El núcleo o kernel es el corazón de linux.

Recomendable leer el Kernel Como:
`http://es.tldp.org/COMO-INSFLUG/COMOs/Kernel-Como/Kernel-Como.html`

2. Funciones

Las funciones mas importantes del mismo, aunque no las unicas, son:

1. Administracion de la memoria, para todos los programas en ejecucion.
2. Administracion del tiempo de procesador, que estos programas en ejecucion utilizan.
3. Es el encargado de que podamos acceder a los perifericos/elementos de nuestro ordenador de una manera comoda.

3. Compilación

Estos pasos son indicados en el fichero REAME del kernel q nos bajamos, el cual se puede leer una vez descomprimido.

Los pasos son:

1. Bajarse el nucleo
   Se puede bajar el último nucleo desde:
   `http://www.linux-es.com/kernel.php`
   `http://www.kernel.org`
   Actualmente la última versión estabale es el 2.4.20, aunque debian woody traer la 2.4.18

   Nota: En el aula podemos cogerlo desde donde diga el profesor y guardarlo en la carpeta del usuario.

2. Descomprimirlo
   Movemos el fichero a la carpeta /usr/src/:

   #mv /home/usuario/linux-2.4.20.tar.bz2 /usr/src/

   Nos cambiamos a la carpeta /usr/src/:

   #cd /usr/src/

3. Instalar bzip2, para descomprimir:

   #apt-get install bzip2

4. Descomprimimos:

   #tar jxvf linux-2.4.20.tar.bz2

5. Para poder ejecutar make menuconfig, hay q instalar los paquetes:
   #apt-get install make gcc ncurses-bin libncurses5-dev

   Para poder ejecutar make xconfig (qt interface), hay q instalar:
   #apt-get install libqt3-dev make gcc bin86 libc6-dev kernel-package module-init-tools

   Para poder ejecutar make gconfig (gtk interface de gnome), hay q instalar:
   # apt-get install libglade2-dev make gcc bin86 libc6-dev kernel-package module-init-tools

6. Pasarse a la carpeta /usr/src/linux-2.4.20/
   # cd /usr/src/linux-2.4.20/

7. Coger la configuración del nucleo antigua:

   # make oldconfig

   Al salir nos crea un fichero .config

   Al terminar haremos una copia para no perderla:
   cp .config .config-oldconfig

8. Configurar el núcleo
   # make menuconfig
   Al salir guardando nos crea un fichero .config

9. Compilarlo (esta versión para el kernel con módulos)
   #make dep
   #make bzImage
   #make modules
   #make modules_install

10. Ponemos el núcleo bzImage en /boot/
    #cp /usr/src/linux-2.4.20/arch/i386/boot/bzImage /boot/linux2420

11. Cambiar el lilo
    #nano /etc/lilo.conf

    Anadir esto:

    image=/boot/linux2420
    label=Linux2420
    read-only

12. Actualizar el arranque
    #lilo -v

13. Reiniciar el ordenador

14. Ejecutar para resolver las dependencias: #depmod -a

4. Configurar el kernel: Make menuconfig

Permite sacar un menu con todas las opciones del kernel que queremos.
Es equivalente poner:
make config

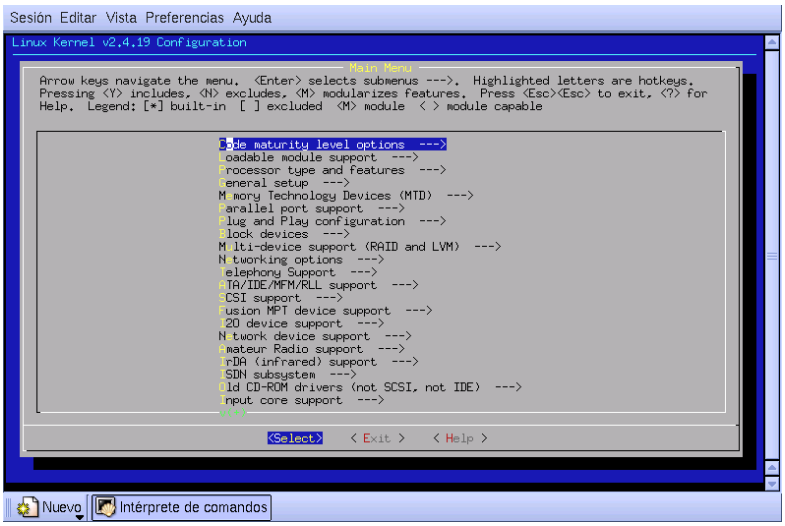

Figura 1: Make menuconfig

make menuconfig
make xconfig

Make menuconfig es el recomendable, y para poder usarlo hay q instalar los paquetes:
make gcc, ncurses-bin libncurses5-dev
Empecemos el proceso.

Ir a la carpeta donde esta el núcleo descomprimido
#cd /usr/src/linux-2.4.20

Leer la ayuda q viene:
#less README

Leer mas documentación:
#ll /usr/src/linux-2.4.19/Documentation/

Ejecutarlo:
make menuconfig

Es importante coger la cpu q tenermos en la opción: Processor Type

Nos genera un fichero llamado .config, donde se guarda lo que hayamos introducido Es bueno hacer una copoia de este fichero por si tenemos q volver

a la situación anterior.

5. Ver el log del kernel

dmesg Nos informa de las opciones cargadas

6. Mas documentación

Hacer make psdocs o make pdfdocs o make htmldocs y mira en el directorio Documentation

7. Otra forma de compilar

Ahi una manera la mar de facil para recompilar el kernel en debian,
————Copipasteo de una receta de la espiral ————

```
1° Instalar:
kernel-package kernel-source-2.4.3
kernel-doc-2.4.3 fakeroot tcl8.2-dev tk8.2-dev.

2° Desempaquetamos:

 /usr/src/
tar xvIf /usr/src/kernel-source-2.4.3.tar.bz2
ln -s kernel-source-2.4.3 linux
cd linux/

3 Arrancamos la herramienta gráfica de configuración:

make xconfig

Recuerdo que es mejor entrar como superusuario con

ssh root@localhost

4 Compilamos:

make-kpkg cleantime make-kpkg --revision=mio1 kernel_image
```

```
5  Instalamos:

dpkg --install /usr/src/kernel-image-2.4.3_mio1_i386.deb

6  Ajustamos el arranque para permitir el arranque de los dos kernel:
el antiguo por si hay problemas, y el nuevo. El /etc/lilo.conf debería parecerse

boot=/dev/hda
compact
vga=ext
prompt
timeout=300
default=linux

image=/vmlinuz
    root=/dev/hda2
    label=linux
    read-only

image=/boot/vmlinuz-2.2.19pre17
    root=/dev/hda2
    label=linux-old
    read-only

other=/dev/hda1
    label=win

7 Ejecutamos:

lilo

y reiniciamos con el nuevo kernel.
```

8. Otra forma de tener el nuevo kernel

Teniendo debian 3.o y no me iba el sonido. El soporte para AC97 lo puedes tener de la siguiente forma. Lo primero es bajarte el ultimo kernel ya compilado para debian.

#apt get install kernel-image-2.4.18-686 (en el caso de que tengas un 686)

#apt get install kernel-headers-2.4.18-686 (lo mismo de antes)

luego te vas a /usr/src y haces un enlace simbólico a la carpeta /usr/src/linux (si no la tienes la creas)

#ln -s /usr/src/kernel-headers-2.4.18-686 /usr/src/linux

Una vez hecho eso y configurado el lilo para que te cargue ese kernel (si no sabes cómo dimelo y te lo explico). Una vez arrancado el nuevo kernel (compruebalo con uname -a) haces

#modconf

y alli ya encontrarás para cargar en el kernel el módulo de la ac97

9. Hacer que ordenador se apage

```
General setup
<*>   Advanced Power Management BIOS support
Ignore USER SUSPEND
[*]     Enable PM at boot time
Make CPU Idle calls when idle
Enable console blanking using APM
RTC stores time in GMT
[*]     Allow interrupts during APM BIOS calls
[*]     Use real mode APM BIOS call to power off
```

Notas:

1. Fijate bien las especificaciones de tu placa. Si es ACPI compila el kernel con soporte para acpi y NO para apm.
2. Si no se apaga añadir en /etc/lilo.conf

   ```
   append="apm=power-off"
   ```

10. Configurar el kernel para que soporte iptables

Ejemplo para 2.4.20 kernel

```
Code maturity level options  --->
     [*] Prompt for development and/or incomplete code/drivers
```

```
Networking options --->
     [*] Network packets filtering (replace ipchains)
```

```
Networking options --->
     IP: Netfilter Configuration --->
          <M> Connection tracking (required for masq/NAT)
          <M>   FTP protocol support
          <M>   IRC protocol support
          <M> IP tables support (required for filtering/masq/NAT)
          <M>   limit match support
          <M>   MAC address match support
          <M>   Packet type match support
          <M>   netfilter MARK match support
          <M>   Multiple port match support
          <M>   TOS match support
          <M>   LENGTH match support
          <M>   TTL match support
          <M>   tcpmss match support
          <M>   Connection state match support
          <M>   Connection tracking match support
          <M>   Unclean match support (EXPERIMENTAL)
          <M>   Packet filtering
          <M>     REJECT target support
          <M>   Full NAT
          <M>     MASQUERADE target support
          <M>     REDIRECT target support
          <M>   Packet mangling
          <M>     TOS target support
          <M>     MARK target support
          <M>   LOG target support
          <M>   TCPMSS target support
```

11. Conficurar el kernel para grabadora pci

```
IDE, ATA and ATAPI Block devices
<*> Enhanced IDE/MFM/RLL disk/cdrom/tape/floppy support
<*>   SCSI emulation support
< >   Include IDE/ATAPI CDROM support
```

```
<*>   SCSI emulation support

SCSI support
<*> SCSI support
<*>   SCSI CD-ROM support
   [*]     Enable vendor-specific extensions (for SCSI CDROM) (NEW)
<*>   SCSI generic support

Block devices
<M> Loopback device support
```

Más información en: `grabadora.html`

12. Configuración de mi kernel

Vamos a ver q eligo con make menuconfig con kernel 2.4.20:

12.1. Code maturity level options

```
Prompt for development and/or incomplete code/drivers
```

12.2. Loadable module support

```
[*] Enable loadable module support
[*]   Set version information on all module symbols
[*]   Kernel module loader
```

12.3. Processor type and features

```
(K6/K6-II/K6-III) Processor family
[*] Machine Check Exception
< > Toshiba Laptop support
< > Dell laptop support
< > /dev/cpu/microcode - Intel IA32 CPU microcode support
<M> /dev/cpu/*/msr - Model-specific register support
<M> /dev/cpu/*/cpuid - CPU information support
(off) High Memory Support
Math emulation
MTRR (Memory Type Range Register) support
```

```
Symmetric multi-processing support
[*] Local APIC support on uniprocessors
IO-APIC support on uniprocessors
Unsynced TSC support
```

12.4. General setup

```
[*] Networking support
[*] PCI support
(Any)   PCI access mode
ISA bus support
[*] PCI device name database
EISA support
MCA support
[*] Support for hot-pluggable devices
PCMCIA/CardBus support  --->
PCI Hotplug Support  --->
[*] System V IPC
 BSD Process Accounting
[*] Sysctl support
(ELF) Kernel core (/proc/kcore) format
<*> Kernel support for a.out binaries
<*> Kernel support for ELF binaries
<*> Kernel support for MISC binaries
[*] Power Management support
<*>   Advanced Power Management BIOS support
[ ] Ignore USER SUSPEND
[*]    Enable PM at boot time
[ ] Make CPU Idle calls when idle
[ ] Enable console blanking using APM
[ ] RTC stores time in GMT
[*]     Allow interrupts during APM BIOS calls
[*]     Use real mode APM BIOS call to power off
```

12.5. Memory Technology Devices (MTD)

```
< > Memory Technology Device (MTD) support
```

12.6. Paralle Parallel port support

```
<M>   PC-style hardware
```

```
<M>     Multi-IO cards (parallel and serial)
< >     Support for PCMCIA management for PC-style ports
[ ] Support foreign hardware
[*]   IEEE 1284 transfer modesl port support
```

12.7. Plug and Play configuration

```
<*> Plug and Play support
<*>   ISA Plug and Play support
```

12.8. Block devices

```
<*> Normal floppy disk support
< > Parallel port IDE device support
< > Compaq SMART2 support
< > Compaq Smart Array 5xxx support
< > Mylex DAC960/DAC1100 PCI RAID Controller support
<M> Loopback device support
<M> Network block device support
<M> RAM disk support
(4096)   Default RAM disk size
 Per partition statistics in /proc/partitions
```

12.9. Multi-device support (RAID and LVM)

```
 Multiple devices driver support (RAID and LVM)
```

12.10. Networking options

```
<*> Packet socket
[ ] Packet socket: mmapped IO
<M> Netlink device emulation
[*] Network packet filtering (replaces ipchains)
[*]   Network packet filtering debugging
[*] Socket Filtering
<M> Unix domain sockets
[*] TCP/IP networking
[*]   IP: multicasting
[*]   IP: advanced router
[*]     IP: policy routing
[*]       IP: use netfilter MARK value as routing key
```

```
[*]       IP: fast network address translation
[*]     IP: equal cost multipath
[*]     IP: use TOS value as routing key
[*]     IP: verbose route monitoring
[*]     IP: large routing tables
[ ] IP: kernel level autoconfiguration
< >   IP: tunneling
<M>   IP: GRE tunnels over IP
[*]     IP: broadcast GRE over IP
[ ] IP: multicast routing
[*]   IP: TCP Explicit Congestion Notification support
[*]   IP: TCP syncookie support (disabled per default)
IP: Netfilter Configuration  --->
< > 802.1Q VLAN Support
---
< > The IPX protocol
< > Appletalk protocol support
Appletalk devices  --->
< > DECnet Support
< > 802.1d Ethernet Bridging
QoS and/or fair queueing  --->
Network testing  --->

IP: Netfilter Configuration
 <*> Connection tracking (required for masq/NAT)
<*>   FTP protocol support
<*>   IRC protocol support
<*> IP tables support (required for filtering/masq/NAT)
<*>   limit match support
<*>   MAC address match support
<*>   Packet type match support
<*>   netfilter MARK match support
<*>   Multiple port match support
<*>   TOS match support
<*>   ECN match support
<*>   DSCP match support
<*>   AH/ESP match support
<*>   LENGTH match support
<*>   TTL match support
<*>   tcpmss match support
<*>   Helper match support
```

```
<*>   Connection state match support
<*>   Connection tracking match support
<*>   Packet filtering
<*>     REJECT target support
<*>   Full NAT
<*>     MASQUERADE target support
<*>     REDIRECT target support
[*]     NAT of local connections (READ HELP)
<*>   Packet mangling
<*>     TOS target support
```

12.11. Character devices

```
[*] Virtual terminal
[*]   Support for console on virtual terminal
<*> Standard/generic (8250/16550 and compatible UARTs) serial support
[*]   Support for console on serial port
[ ] Extended dumb serial driver options
[ ] Non-standard serial port support
[*] Unix98 PTY support
(256) Maximum number of Unix98 PTYs in use (0-2048)
<M> Parallel printer support
[*]   Support for console on line printer
<M> Support for user-space parallel port device drivers

I2C support  --->
Mice  --->
Joysticks  --->
< > QIC-02 tape support

Watchdog Cards  --->
< > AMD 768 Random Number Generator support
< > Intel i8x0 Random Number Generator support
< > AMD 76x native power management (Experimental)
< > /dev/nvram support
< > Enhanced Real Time Clock Support
< > Double Talk PC internal speech card support
< > Siemens R3964 line discipline
< > Applicom intelligent fieldbus card support
Ftape, the floppy tape device driver  --->
<*> /dev/agpgart (AGP Support)
```

```
[ ] Intel 440LX/BX/GX and I815/I820/I830M/I830MP/I840/I845/I850/I860 support
[ ] Intel I810/I815/I830M (on-board) support
[*]   VIA chipset support
[ ] MD Irongate, 761, and 762 support
[ ] AMD 8151 support
[ ] Generic SiS support
[ ] ALI chipset support
[ ] Serverworks LE/HE support
[*] Direct Rendering Manager (XFree86 DRI support)
[*]   Build drivers for old (XFree 4.0) DRM
--- DRM 4.0 drivers
<*>   3dfx Banshee/Voodoo3+
< >   3dlabs GMX 2000
< >   ATI Rage 128
< >   ATI Radeon
< >   Intel I810
< >   Matrox G200/G400/G450

PCMCIA character devices  --->
< > ACP Modem (Mwave) support
```

12.12. Multimedia devices

```
<M> Video For Linux
Video For Linux  --->
Radio Adapters  --->

Video For Linux
[*]   V4L information in proc filesystem
< >   I2C on parallel port
--- Video Adapters
< >   Mediavision Pro Movie Studio Video For Linux
< >   Quickcam BW Video For Linux
< >   W9966CF Webcam (FlyCam Supra and others) Video For Linux
< >   CPiA Video For Linux
< >   SAA5249 Teletext processor
< >   SAB3036 tuner
< >   Zoran ZR36057/36060 Video For Linux
< >   Zoran ZR36120/36125 Video For Linux
```

13. File systems

```
[*] Quota support
<*> Kernel automounter support
<*> Kernel automounter version 4 support (also supports v3)
< > Reiserfs support
<*> Ext3 journalling file system support
[*]   JBD (ext3) debugging support
<*> DOS FAT fs support
<*> MSDOS fs support
< >  UMSDOS: Unix-like file system on top of standard MSDOS fs
<M> VFAT (Windows-95) fs support
<M> Compressed ROM file system support
[*] Virtual memory file system support (former shm fs)
<M> ISO 9660 CDROM file system support
[*]   Microsoft Joliet CDROM extensions
[*]   Transparent decompression extension
< > JFS filesystem support
< > Minix fs support
< > FreeVxFS file system support (VERITAS VxFS(TM) compatible)
< > NTFS file system support (read only)
< > OS/2 HPFS file system support
[*] /proc file system support
[*] /dev/pts file system for Unix98 PTYs
< > QNX4 file system support (read only)
<M> ROM file system support
<*> Second extended fs support
< > System V/Xenix/V7/Coherent file system support
< > UDF file system support (read only)
< > UFS file system support (read only)
Network File Systems  --->
Partition Types  --->
Native Language Support  --->
```

14. Native Language Support

```
<*> Codepage 437 (United States, Canada)
<*> NLS ISO 8859-1  (Latin 1; Western European Languages)
<*> NLS ISO 8859-15 (Latin 9; Western European Languages with Euro)
```