

# Ch6 Build Kernel Code



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# Agenda

- Ch6-1 Why?
- Ch6-2 Preparation
- Ch6-3 Config Makefile
- Ch6-4 Build your kernel
- Ch6-5 Tips of Tracing Kernel

# Why?

1. Learn Linux Kernel
2. Optimize your Linux Kernel
3. Add your own patch

# Preparation

- Debian.iso
- Real Machine or Virtual Machine
- Install related package
  - # apt-get install build-essential fakeroot libncurses5-dev kernel-package
  - # apt-get build-dep linux
- Get source code from repository
  - # apt-get source linux-source-"version number"

# Config Makefile

- Old config: /boot/config-[Kernel version]-[CPU type]
- Copy oldconfig to [kernel source code director]/.config
- # make oldconfig
- # make menuconfig

# Build your custom kernel

- Build new kernel
  - export CONCURRENCY\_LEVEL="Core Number +1": how much jobs you can assign
  - # make-kpkg clean
  - # fakeroot make-kpkg --initrd --append-to-version="name" kernel\_image kernel\_headers
  - Tip for reduce compiling time: ramdisk
- Install new kernel
  - # dpkg -i linux-image-"New Kernel Name".deb
  - # dpkg -i linux-headers-"New Kernel Name".deb

# New Kernel

GNU GRUB version 1.99-27+deb7u2

```
Debian GNU/Linux, with Linux 3.2.51-custom
Debian GNU/Linux, with Linux 3.2.51-custom (recovery mode)
Debian GNU/Linux, with Linux 3.2.0-4-amd64
Debian GNU/Linux, with Linux 3.2.0-4-amd64 (recovery mode)
```

Use the ↑ and ↓ keys to select which entry is highlighted.  
Press enter to boot the selected OS, 'e' to edit the commands  
before booting or 'c' for a command-line.  
The highlighted entry will be executed automatically in 1s.

# Tip of Traceing Linux Kernel

- User Space: printf
- Kernel Space:
  - printk: add “**#include <linux/kernel.h>**” to the file you want to print
    - Predefine Marco: `printk(“%s, %d, %s, %s\n”, __FILE__, __LINE__, __FUNCTION__, __TIME__);`
  - # dmesg

```
[ 52.323551] Jimin, File = drivers/net/ethernet/intel/e1000/e1000_main.c Line = 3760, Function = e1000_receive_skb, Time = 11:35:59
[ 52.323934] Jimin, File = drivers/net/ethernet/intel/e1000/e1000_main.c, Line = 3760 Function = e1000_receive_skb, Time = 11:35:59
[ 52.482443] Jimin, File = drivers/net/ethernet/intel/e1000/e1000_main.c, Line = 3760, Function = e1000_receive_skb, Time = 11:35:59
[ 52.483077] Jimin, File = drivers/net/ethernet/intel/e1000/e1000_main.c, Line = 3760, Function = e1000_receive_skb, Time = 11:35:59
```