



Configuration and Building the Linux Kernel

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Download and Setup

Download latest kernel image from <https://kernel.org>
for example: linux-4.11.tar.xz and untar in /usr/src/

Steps:

```
$ sudo su
# cd /usr/src/
# tar -xvJf ~/Downloads/linux-4.11.tar.xz
    x – extract, v – verbose, j – bz2, J – xz, f – archive file
# cd linux-4.11
..4.11# mkdir build logs
..4.11# cd logs
..4.11/logs# touch bzImage modules modules_install install
..4.11/logs# cd ..
```

Steps to configure and build Linux kernel

1. ...4.11# make O=build menuconfig

configure the kernel through UI

O=build to tell make to place all the configuration files and the output of the make target in build folder

pre-requisite – ncurses library, to install in Ubuntu

...4.11# sudo apt-get install libncurses-dev

Output:

saved configuration file .config in build folder.

Steps to configure and build Linux kernel contd..

2. **..4.11# make O=build bzImage**

to compile the base kernel and compress in bzip format
pre-requisite – opensslv.h, to install in Ubuntu

```
...4.11# sudo apt-get install libssl-dev
```

Terminal 1:

```
...4.11# time make O=build bzImage >& logs/bzImage
```

Terminal 2:

```
..4.11# cd logs
```

```
..4.11/logs# tail -f bzImage
```

Output: bzImage in ./arch/i386/boot/bzImage and ./arch/x86/boot/bzImage
build# find . -name 'bzImage'

Steps to configure and build Linux kernel contd..

3. **..4.11# make O=build modules** to compile the kernel modules

Terminal 1:

```
..4.11# time make O=build modules >& logs/modules
```

Terminal 2:

```
..4.11# cd logs
```

```
..4.11/logs# tail -f modules
```

Output:

files with .ko extension, check using
build# find . -name '*.ko' | less

Steps to configure and build Linux kernel contd..

4. **..4.11# make O=build modules_install**

to install kernel modules in a standard folder, usually in
/lib/modules/<version-no>

Terminal 1:

```
...4.11# time make O=build modules_install >& logs/modules_install
```

Terminal 2:

```
..4.11# cd logs
```

```
..4.11/logs# tail -f modules_install
```

Output: files in /lib/modules/4.11.0

Steps to configure and build Linux kernel contd..

5. **..4.11# make O=build install**

to install the base kernel (vmlinuz), initramfs, config and System.map files in /boot folder.

Terminal 1:

```
...4.11# time make O=build install >& logs/install
```

Terminal 2:

```
..4.11# cd logs
```

```
..4.11/logs# tail -f install
```

Output: files in /boot directory

initrd.img-4.11.0, config-4.11.0, System.map-4.11.0 and vmlinuz-4.11.0

Steps to configure and build Linux kernel contd..

Conclusion:

An entry is made in grub config file to list the latest kernel on the grub boot menu. Check using

```
#cat /boot/grub/grub.cfg | less
```


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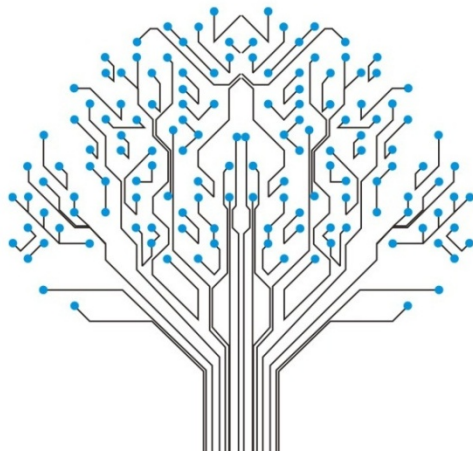
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