Compiling the Kernel

Linux Open Heart Surgery
Compiling the Linux Kernel

- Why would I want to?
  - Get new features
  - Patch for vulnerabilities
  - Support new hardware
  - Optimize performance

- Do I have to?
  - Almost never
First thing: What kernel are you running?
- `uname -r`
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- Check to see if you have sources installed
Let's take a closer look at the directories.

Note the symbolic link: linux-2.4 and linux-2.4.20-20.8 are the same directory
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- Next Step: Download source
- Where from?
  - Kernel.org
- Untar into directory (usually /usr/src)
- File is compressed using bzip
  - Better compression
  - Slower
Next, check for the configuration file for the kernel you are using:

```
[root@localhost kernel_source]# bzip2 -cd linux-2.6.6.tar.bz2 | tar xf -
[root@localhost kernel_source]# ls /boot/config-2.6.5-1.358 -alh
-rw-r--r-- 1 root root 46K May 8 08:21 /boot/config-2.6.5-1.358
[root@localhost kernel_source]#  
```
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- Download source: Here is example screenshot where I created a directory and downloaded the kernel.
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- Here is a quick look at what is in the configuration file for the kernel

```bash
# Automatically generated make config: don't edit
#
CONFIG_X86=y
CONFIG_MPU=y
CONFIG_UID16=y
CONFIG_GENERIC_ISA_DMA=y
#
# Code maturity level options
#
CONFIG_EXPERIMENTAL=y
CONFIG_CLEAN_COMPILE=y
CONFIG_STANDALONE=y
CONFIG_BROKEN_ON_SMP=y
#
/boot/config-2.6.5-1.358
```
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- In this screen I have copied over the existing configuration file

```
[root@localhost kernel_source]# ls
linux-2.6.6  linux-2.6.6.tar.bz2
[root@localhost kernel_source]# cd linux-2.6.6
[root@localhost linux-2.6.6]# ls
arch  Documentation  init  MAINTAINERS  README  sound
COPYING  drivers  ipc  Makefile  REPORTING-BUGS  usr
CREDITS  fs  kernel  mm  scripts
crypto  include  lib  net  security
[root@localhost linux-2.6.6]# cp /boot/config-2.6.5-1.358 .
[root@localhost linux-2.6.6]#
```
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- Copy your starter config file to the hidden file .config in your kernel source directory
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Once you have your starter config file, you can begin the reconfiguration process.

```
[root@localhost kernel_source]# ls
linux-2.6.6  linux-2.6.6.tar.bz2
[root@localhost kernel_source]# cd linux-2.6.6
[root@localhost linux-2.6.6]# ls
arch  Documentation  init  MAINTAINERS  README  sound
COPYING  drivers  ipc  Makefile  REPORTING-BUGS  usr
CREDITS  fs  kernel  mm  scripts
crypto  include  lib  net  security
[root@localhost linux-2.6.6]# cp /boot/config-2.6.5-1.358 .
[root@localhost linux-2.6.6]# make menuconf
```
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This is how it starts:

```
[root@localhost linux-2.6.6]# make menuconfig
HOSTCC  scripts/basic/tixdep
HOSTCC  scripts/basic/split-include
HOSTCC  scripts/basic/docproc
```
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- You should quickly get the configuration menu
An important option is to be able to save your configuration file out to an alternate name/location.
Once you have saved your configuration, you should see something like the following:

```
$ make all && make modules_install && make install
PATH:  include/linux/version.h
PATH:  include/linux/version.h
SYMLINK:  include/asm-32/include/asm-i386
SYMLINK:  include/linux/autoconf.h -> include/config/*
```

*** End of Linux kernel configuration.
*** Execute 'make' to build the kernel or try 'make help'.

```
$ make all && make modules_install && make install
PATH:  include/linux/version.h
PATH:  include/linux/version.h
SYMLINK:  include/asm-32/include/asm-i386
SYMLINK:  include/linux/autoconf.h -> include/config/*
```
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  - A good reference on the steps necessary from the command line for kernel compiling