Linux Build Infrastructure

ECE 373

You want to build a kernel...

- First you need one...
- What is upstream? What is distro?
- Useful to tune for different installations
- Include your driver in the build

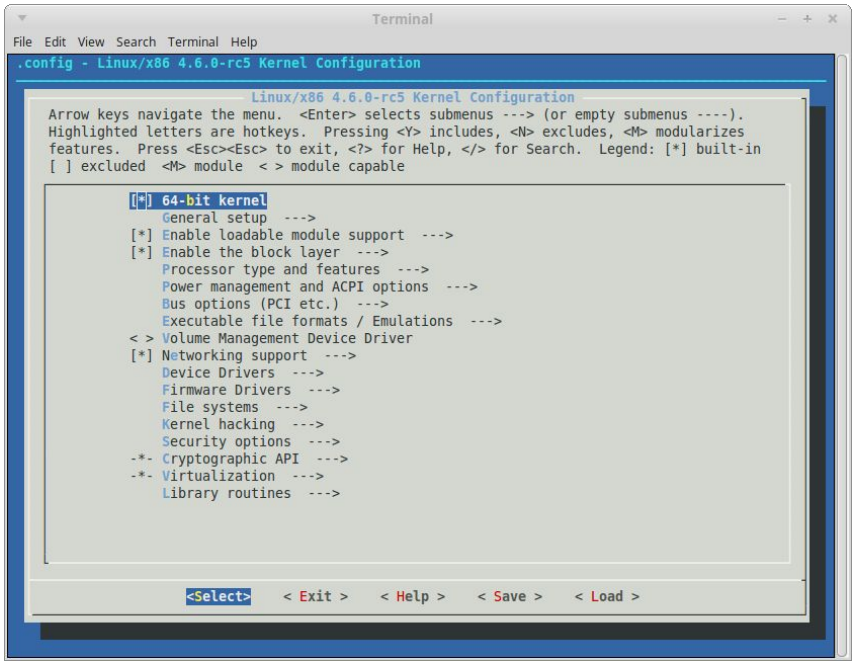
Prep the machine

- Download code
  - http://kernel.org and unpack the kernel code archive
    - or
  - git https://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/
    - or
  - apt-get source linux-image-($uname -r)
- Get distro build headers
  - Ubuntu: apt-get install linux-headers-generic libssl-dev
  - Fedora/RedHat/Centos yum install kernel-headers kernel-devel openssl-devel
- Start with distro config for most likely success
  - Copy from /boot/config… to .config
  - Make olddefconfig

- https://fedoraproject.org/wiki/Building_a_custom_kernel
- https://wiki.ubuntu.com/Kernel/BuildYourOwnKernel

How to configure a kernel

- Start with an existing .config that you know works
  - /boot/config-3.13.0-37-generic or
  - /usr/src/linux-headers-3.13.0-37-generic/.config
  - 'make olddefconfig' to update it



- Tweak the config for your needs
  - Interactive terminal 'make config'
  - Curses-based 'make menuconfig'
  - GUI-based 'make gconfig'
- Or just edit .config directly

- Where does this all come from?

The Kconfig framework

- Infrastructure to enable/disable kernel features
- Source directory structure
- Used to manipulate makefiles
- Layered, like an onion (and stinky too!)
- Can implement multiple dependencies

Building and booting a kernel

- make, make modules_install, make install
- GRUB, various bootloaders
- vmlinuz and vmlinux images
- Modules installation
- Initial RAM disks (initrd)

- Debian pkgs for other machine
  - make deb-pkg

Add your own code!

- New driver directory – where?
- Editing/adding Kconfig for inclusion
- Creating your makefile

Wrap-up

- Practice makes perfect
- Trimming the fat for embedded
- Dealing with the bootloader
- Dropping code into the kernel