Announcements

- Homework 2
- Midterm
- Homework 3: Deadline TONIGHT (Midnight)
- Feedback form (coming soon)
- Changes on schedule
  - From today to next Tuesday (tentative): Kernel
  - Following Thursday: TBD (More kernel?, kernel modules or ptrace)

Linux Kernel
First Steps
Agenda

- March 06 (Today)
  - First steps: getting source, environment, configuring, building
- March 08 (Thursday)
  - Installing (grub), patching
  - Create a system call (tentative)
- March 13 (next Tuesday)
  - Create a system call

What is it?

- Difference between kernel and distro
Where is it installed?

- `/boot`
  - `config`: configuration used for compiling
  - `System.map`: symbol table
  - `vmlinuz`: the actual kernel image
  - `grub/`: directory containing boot loader config
  - others...

How do I get it?

- Option 1: Get from your distro
  - E.g., on Ubuntu/Mint: `apt-get install linux-source`
- Option 2: GIT repository
  - E.g.: `git clone git://kernel.ubuntu.com/ubuntu/ubuntu-karmic.git source`
- Option 3: Get from kernel.org
  - Choose your version and download (3.0.23)
Preparing the environment

- Required packages:
  - Gnu C 3.2
  - Gnu Make 3.80
  - binutils 2.12
  - … (See Documentation/Changes)
- Suggested Directories:
  - pristine source, e.g., linux-3.0.23-pristine ($PRISTINE)
  - work source, e.g., linux-3.0.23-work ($WORK)
    - Suggestion: one directory per homework assignment
  - build (binaries output), e.g., built-3.0.23-daniel ($BUILD)
  - unpatched (extra copy as needed for testing), e.g., linux-3.0.23-unpatched

Let’s start!

- Create and access your “main” directory, e.g., “mkdir kernel”
- Get a kernel version
- Uncompress the “tarball” (create pristine source)
  - tar -jxvf linux-...
- Copy the pristine directory to a work directory
- Create your build (output) directory
Configuring

- Changing version information ($WORK/Makefile)
  - VERSION = 3
  - PATCHLEVEL = 0
  - SUBLEVEL = 23
  - EXTRAVERSION = TEST1
  - NAME = CPSC 457 Testing

- Choosing destination
  - make O=$BUILD ...
Configuring

- Configuring your kernel
  - make config
  - make xconfig
  - make menuconfig
    - Requires ncurses-dev package
    - Executing “make menuconfig”...

- Using your distro config
  - Better compatibility (devices, processor support, etc)
  - make oldconfig

Compiling

- Creating image:
  - make mrproper  Cleans the work directory
  - make O=$BUILD oldconfig
  - make O=$BUILD
  - Note: previous versions used
    make bzimage

- Creating modules
  - make O=$BUILD modules
Practicing

- Access your work directory (e.g., linux-3.0.23-work)
- Modify the version of your kernel
  - e.g., EXTRAVERSION=457, Name=Your name
- Create configuration based on current version
- Compile your kernel and modules
  - (Or start compiling... )
- Please, let it finish before next tutorial!

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