



CSCI-3753: Operating Systems

Fall 2018

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PA 1 – Notes

B. Download Linux Source Code

Step 4:

- CU CS Virtual Machine - Fall 2018 Edition

sudo apt-get source linux-source-4.15.0

- CU CS Virtual Machine - Old Edition

sudo apt-get source linux-image-\$(uname -r)

- NOTE: The name of downloaded kernel should be

linux-hwe-4.15.0

C. Compile the Kernel

Step 2:

- CU CS Virtual Machine - Fall 2018 Edition → **SKIP**

Step 3:

- CU CS Virtual Machine - Fall 2018 Edition

`sudo cp /boot/config-$(uname -r) .config`

- CU CS Virtual Machine - Old Edition

`sudo make localmodconfig`

Week 2: Loadable Kernel Module (LKM)

How to Add a code to a Linux Kernel

- Method 1:
 - Step 1: Add source files to the Linux kernel source tree
 - Step 2: Recompile the kernel

→ PA1

→ It takes a long time to compile the kernel source code (2-3 hours) !!!

- Method 2: Add code to the Linux kernel while it is running

Loadable Kernel Module (LKM)

Loadable Kernel Module (LKM)

- LKM is a *chunk of code* that we add to the Linux kernel while it is running.
- Typical modules
 - Device drivers
 - Filesystem drivers
 - System calls

Loadable Kernel Module (LKM)

- LKMs (when loaded) are very much part of the kernel.
 - Part of the kernel that is bound into the image that you boot is “*base kernel*”.
- LKMs communicate with the base kernel.

LKM Advantages

- DON'T have to rebuild the kernel
- Help diagnose system problems
 - A bug in a device driver which is bound into the kernel can stop the system from booting at all.
- Save memory
 - Have them loaded only when we are actually using them
- Be MUCH faster to maintain and debug

LKM Utilities

- ***insmod***: Insert an LKM into the kernel.
- ***rmmmod***: Remove an LKM from the kernel.
- ***depmod***: Determine interdependencies between LKMs.
- ***kerneld***: Kernel daemon program
- ***ksyms***: Display symbols that are exported by the kernel for use by new LKMs.
- ***lsmod***: List currently loaded LKMs.
- ***modinfo***: Display contents of .modinfo section in an LKM object file.
- ***modprobe***: Insert/remove an LKM or set of LKMs intelligently. e.g., if you must load A before loading B, modprobe will automatically load A when you tell it to load B.

Week 2 – Checklist

- Notice changes in PA1
- Compile a kernel
- Read more about LKM