Linux Academy

Course Notes

System Architecture and Management

Contents

Video One: /dev, /proc, /var and /sys

- **`/dev`**
  - Everything in Linux is a file or directory, even if they are unusual
  - /dev is a directory of special 'device' files that refer to the various components that are installed (and have an associated kernel module or native support) or could be installed (no module or built in kernel support for)
  - Commands can be piped to or take input from some special device files
    - **`cat somefilename.txt > /dev/null`** • Copies the file contents to the void
    - **`cat /dev/random > somefile.txt`** • Copies randomly generated content (using entropy) to the file named somefile.txt
    - **`cat somesnd.wav /dev/snd/mixer`** • Plays sound file, unbuffered, directly to the current sound card
- **`/var`**
  - The place to look for various system items
    - cache
    - logs
    - mysql
    - libraries
    - default website install location
- **`/proc`**
  - Lists information on various system components and configurations
    - **`/proc/cpuinfo`** • Information about CPU
    - **`/proc/meminfo`** • Memory information
    - **`/proc/loadavg`** • Average system load
    - **`/proc/version`** • Current Linux version
  - Numbered subdirectories correspond to the PID of running processes
    - **`ps aux | grep command`** • Gives you PID of command
    - **`/proc/1234`** • Contains information for process 1234
      - **`cwd`** • Links the current working directory of the process

    - **`exe`** • Links to the executable
    - **`environ`** • Environment variables
- **`/sys`**
    - Directory of normal and special files that contains the kernel, firmware and other related files
    - Sometimes referred to as a virtual filesystem that is used to export data from the kernel to 'userspace' applications – recently added functionality
    - References multiple system configuration files, devices and special configurations related to your system

Video Two: lsmod

- Simple utility that lists all the currently enabled modules on your system
- Basically formats the contents of the `/proc/modules` filesystem so that it is easier to read
- Similar to modprobe –l but only listing actively loaded modules

Video Three: lspci and lsusb

- More specific utilities that list both the existing PCI and USB components on a system
- **`lspci`**
    - **`-v`**, **`-vv`**, **`-vvv`** • Various levels of verbosity in reporting the devices in this system
    - **`-n`** • Shows the PCI vendor and device codes as numbers, does not look up the values in the configuration listing
    - **`-x`**, **`-xxx`**, **`-xxxx`** • Shows increasing levels of hexadecimal information regarding the device in the PCI, PCI-X and PCI-X 2.0 standards
    - **`-b`** • Shows a 'bus centric' view, including IRQ information and addresses as found
    - **`-t`** • Tree diagram by bus and type of all devices
    - **`-i filename`** • Default file of `/usr/share/hwdata/pci.ids` is normally used to look up vendor:deviceid values and assign them a name, passing this parameter and a different file can override that information
    - **`m`** • Dumps the information in 'machine readable' format, each field enclosed in quotes, for easy parsing via scripts or inserts into database
- **`lsusb`**
    - **`-v`** • Verbose output

- **`t`** • Tree diagram by bus and type, useful to display which USB devices are connected to which USB root or extended hubs
- **`-d vendor:product`** • Shows devices with the vendor and product ID specified, shown in hexadecimal only

Video Four: modprobe

- **`modprobe -l`** • Lists all 'available' modules on a system, not necessarily active
- **`modprobe modulename`** • Installs a new module
  - **`-v`** • Verbose output
- **`lsmod`** • Confirms that loaded module above is now active
- **`modprove -r modulename`** • Removes a module