CSCI 2461, Computer Networking 3 - Linux
Week 02 (Rev. 0)

Wednesday, January 17, 2018

Introduction

Hello again, as a brief introduction for those who missed the first class, I'm Matthew J. Harmon.

- First Linux kernel compilation in 1992
- Systems Administrator to Standards Development
- Technical Auditor turned Penetration Tester then Forensics
- "Security Consultant and Researcher"
- I like to build stuff, break it, and rebuild it better
- There is no single path.
- This is a hands-on the keyboard building things kind of class.

If you missed the first class, please introduce yourself so I know a bit about you.

CSCI 2461

Again, to briefly cover our Learning Objectives

1. Automate tasks by creating bash scripts.
2. Control, monitor, and schedule processes.
3. Create shell scripts in other program languages.
4. Explain and configure network file systems.
5. Explain navigation, file attributes, mounting, and backups.
6. Explain the essential duties of a Linux system administrator.
7. Explain the role of Linux in computer virtualization.
8. Explain the Linux access control model and root privileges.
9. Identify Linux security issues and techniques.
10. Install software and manage packages.

CSCI 2461 (Cont.)

Learning Objectives

11. Manage users, groups, and permissions.
12. Common shell operations using commands, filters, & pipes.
13. Setup and configure a database management system
14. Setup and configure web hosting using Apache.
15. Setup, manage, and troubleshoot TCP/IP networking.
16. Utilize common Linux tools

Class Materials

Textbook

- How Linux Works, 2nd Edition by Brian Ward
  - ISBN-13: 978-1-59327-567-9 November 2014
  - Get 35% off the paper & eBook by using the code "35HARMON"

Weekly Required Readings

- Each week required readings and labs will be assigned.
- We'll discuss the required readings in class

Modules

- I'll prepare a slide deck for each weeks lesson plan.
- Use it to work through the lab exercises.

Hardware and Software Requirements

For discussion, addition of RaspberryPi 3. Recommended high speed USB Sandisk Extreme (32Gb should be fine)

- A computer with at least 40 GB of hard disk space free and 4 GB of RAM
- A modern web browser (such as Firefox, Google Chrome, Chromium) with features such as NoScript and AdBlock disabled
- A virtualization platform such as VirtualBox or VMware
- Virtual machines created for this class.
- A high speed USB storage drive only for use in this class.
- (Optional?) RaspberryPi 3 (CanaKit includes, power, SD card, etc)

Due Homework

How far did you get with your homework?

- Install and configure VirtualBox and install Debian Linux,
- Get HowLinuxWorks, read Chapter 1
- Start to review Chapter 2 and apply commands,
- Sign up for a github.com account,
- Send your Instructor your Github username,
- Complete Github training.

Download, install and configure VirtualBox

Install VirtualBox on your home workstation.

- Download via your web browser from VirtualBox.org
- Run the downloaded binary, check your downloads window

Install Debian in VirualBox

In this class we'll be using the Debian Linux distribution, and variants of it. For your class labs, you'll need to use the tools that are available from Debian.

- Download Debian image for your processor type. For most students it will be the "amd64" CD image.
- If you receive an error about "32-bit" or "not 64-bit" during your install/boot download the "i386" version.

How Linux Works, Chapter 1

Let's review and discuss some of the material from Chapter 1.

To start, questions?

How Linux Works, Chapter 1 (Kernel & User)

- What is the difference between Kernel and User space?
- How is data stored in memory?
- What is the Kernel?

How Linux Works, Chapter 1 (Memory & Context)

- What is context switching?
- How is memory managed?
- What are page tables? (Week 2 Reading, How Cache Works)

How Linux Works, Chapter 1 (System Calls)

- What are system calls?
- What is the difference between fork() and exec()

How Linux Works, Chapter 1 (Users)

- Explain the concept of a user, why do they exist?
- How does Linux handle users?
- What is the difference between a user and a userid?

How Linux Works, Chapter 2 (Basic Shell Commands)

- echo, cat
- ls, cp, mv, touch
- echo "Hello World" > hello.txt
- cat hello.txt

How Linux Works, Chapter 2 (Directories)

- cd, mkdir, rmdir
- Globbing (*)

How Linux Works, Chapter 2 (Files)

- grep, less, pwd
- diff, file, locate
- head, tail, sort
- dot files

How Linux Works, Chapter 2 (Environment Variables)

- echo $PATH
- STUFF=blah; export STUFF; echo $STUFF
- set
- set STUFF2=blaher; echo $STUFF2

How Linux Works, Chapter 2 (Special Characters, pg23)

- man bash
- search for "control operators"
  - /control

How Linux Works, Chapter 2 (Intermediate)

- Text Editors (vi, nano)
- man pages
- man -k *keyword*
- man 5 passwd
- info

Lab: Linux Command.org

- In your browser, open Linux Command.org and navigate to "Learning the Shell"
- Work through as many of the exercises under "Contents" as you in the remaining time.

GitHub Introduction

In this class we'll be using GitHub later on, to familiarize you with what GitHub is, we're going to go through a quick Github tutorial.

- Complete Github "try" training. & https://services.github.com/on-demand/intro-to-github/
- Complete Introduction to Github

Lab Time

Use the rest of the class time to:

- Work through LinuxCommand.org
- Ask questions.
- Prepare your first shell scripts to Upload to D2L

Homework

Lab

- Write an executable shell script applying How Linux Works Chapter 2 material, submit to Discussion on D2L
- Read and apply LinuxCommand.org's Writing Shell Scripts
- Review a peers shell script

Reading

- Hack-a-Day, How Cache Works
  - How Cache Works
- How Linux Works, Chapter 2
  - Read and apply the commands discussed

Submit

- Lab to Discussions including review of a peers script

Travel Safely!