CSCI 2461, Computer Networking 3 - Linux

Week 01 (Rev. 0)

Wednesday, January 10, 2018

Introduction

Hello, 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.

Please introduce yourself.

CSCI 2461

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.

Modules

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

Certifications

- CompTIA Linux+ Powered by LPI
- Linux Professional Institute
- Red Hat Certified System Administrator

Review Course Objectives

In order to best prepare you for this class, let's review what the specific course objectives mean and how you'll learn them.

Automate tasks by creating shell scripts.

Everything is held together with shell scripts, from small website to international enterprise.

We'll explore BASH scripts as well as how to write POSIX compliant scripts that are portable.

Control, monitor, and schedule processes.

- Maintaining a Linux system, be it a workstation, a server, or a virtual system requires being able to control it.
- Monitoring systems, ensuring that they perform as expected, is necessary to prevent unintentional operations.
- Scheduling processes is the magic that allows systems administrators to automate their work.

Automate work in other program languages.

In addition to BASH and POSIX compliant scripts, we'll explore Python and Go.

Explain and configure network file systems.

There are a variety of network file systems, including NFS (Network File System) and a compatible version of SMB and CIFS called samba in addition to other file sharing methods.

Explain navigation, file attributes, mounting, and backups.

Everything in Linux is a file, and interacting efficiently with it requires the command line. We'll work both in a graphical user interface (GUI), the command line, and a web interface.

Explain the essential duties of a Linux system administrator.

In order for you to learn the essential duties of a Linux systems administrator, as a class project we're going to build a local network and you'll maintain it.

Explain the role of Linux in computer virtualization.

Virtualization is a powerful technology, we'll use a combination of VirtualBox and QEMU in order to apply computer virtualization.

Explain the Linux access control model and root privileges.

Ensuring proper separation of data storage, processing, and user interface requires understanding the various access control models that are available in Linux

Identify Linux security issues and techniques.

Linux security comes in various forms and from many contributors, the “thousand eyes” theory means someone is more likely to discover vulnerabilities and fix them.

Security comes in several forms, confidentiality, integrity and availability being the primary triad and is most often applied through configurations. Determining safe configurations can be accelerated through community scripts, and making your own.

Install software and manage packages.

Managing and updating software packages is the Linux version of "patching" or "applying updates."

We'll explore several package managers and you'll learn about dependencies and how to keep your system performing as expected.

Manage users, groups, and permissions.

Linux uses the “users, groups, and everyone else” model, each of those have three permissions read write and execute. We’ll learn how to apply those to files, executable code, and directories.

Perform common shell operations using commands, filters, & pipes.

The Linux command line is a powerful tool and includes a wide range of tools built in that allow you to operate on program output turning it into input for another program.

Setup and configure a database management system

Databases have become a daily stable for systems administrators. We'll create, deploy, and manage several database types.

Setup and configure web hosting

The World Wide Web is everywhere, many people confuse it for "the Internet." You'll learn how to deploy web hosts using modern and practical approaches that require little maintenance.

Setup, manage, and troubleshoot TCP/IP networking.

TCP/IP networking and the OSI model are all around us and are the reason the the Internet exists. You'll learn how to read network traffic so you can troubleshoot and learn how your system can be configured to best perform over the network.

Utilize common Linux tools

Linux comes with a massive catalog of tools, both built in and packages available to install through third parties. You'll learn to find the best tool for the job, and create it if it isn't avaialble.

Lab Time

Use the rest of the class time to:

- Prepare your workstations.
- Ask questions.
- Prepare your D2L introduction.

Travel Safely!