ITNT-2380: LINUX ADMINISTRATION

Cuyahoga Community College

Viewing: ITNT-2380 : Linux Administration
Board of Trustees:
2011-12-01

Academic Term:
Fall 2018

Subject Code
ITNT - Info Tech-Networking Software

Course Number:
2380

Title:
Linux Administration

Catalog Description:
Linux is used as a platform for many server applications including the dominant Web server. Cost and licensing advantages have made it a network operating system that is in widespread use. The essentials of installing, configuring, maintaining, administering, and troubleshooting the Linux Operating System will be covered.

Credit Hour(s):
3

Lecture Hour(s):
2
Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
ITNT-2300 Network Fundamentals or concurrent enrollment; or departmental approval: equivalent skills.

Outcomes
Course Outcome(s):
Collect and document hardware and networking information needed to install and configure Linux

Objective(s):
1. Describe the Linux operating system model and list its strengths and weaknesses.
2. Discuss the historical background associated with the development of Linux and UNIX.
3. List the principles of the GNU Public License (GPL) and recognize the implications of using open source software licenses.
4. Identify the version numbering systems of the Linux kernel and Linux commercial distributions.
5. Find and use Linux internal documentation especially man and info commands and the information in /usr/doc/HOWTO.
6. Find and use Linux documentation at sources on the Internet such as the Linux Documentation Project, Linux Online, vendor and other websites.

Course Outcome(s):
Install and configure the Linux Operting system from a CD or DVD-based distribution. The system may be installed onto a removable hard drive or in a virtual environment.

Objective(s):
1. Configure the X Window System graphical user interface.
2. Configure the Linux boot up process (GRUB and/or LILO).
3. Properly boot up, reboot, and shut down a computer running Linux.
4. Discuss the seven possible Linux system run-levels.
5. Configure the network interface card (NIC).

6. Partition a hard disk appropriately for installation of Linux using appropriate tools such as G-Parted, FIPS or fdisk.
7. Use the KDE and GNOME desktop environments.

Course Outcome(s):

Maintain, administer, and troubleshoot the Linux opertaing system.

Objective(s):

1. Use basic Linux/Unix shell commands including: ls, cd, cp, mv, rm, mkdir, pwd, file, more, less, cat, and grep.
2. Use streams, pipes, and redirects with shell commands.
3. Explain how processes use system resources and commands that manage processes and their priorities.
4. Install and configure the Linux operating system from a CD or DVD-based distribution. The system may be installed onto a removable a hard drive or in a virtual environment.
5. Install Linux applications using an integrated GUI package manager such as YaST or yum.
6. Install Linux applications using a command based package manager such as rpm or dpkg.
7. Install Linux applications that are manually compiled from the source code.
8. Customize the shell environment and write simple scripts.
9. Use Linux file editors (including vi).
10. Control file system mounting and unmounting.
11. Configure the network file systems, including interfaces with Windows systems using Samba.
12. Manage file ownership and permissions.
13. Monitor user file space usage.
14. Create, modify, and delete user accounts and groups.
15. Manage user passwords.
16. Explain the powers of the root user.
17. Recognize the responsibilities of a system administrator and use basic Linux system administration commands.
18. Plan for fault tolerance and disaster recovery on a Linux system.
19. Use utilities to monitor system performance including CPU time and system memory in order to locate and alleviate bottlenecks.
20. Use, configure, and maintain system logs for troubleshooting and system security.
21. Setup, configure, and manage printing on a Linux computer.
22. Prepare a backup plan for a Linux system.
23. Use utilities to backup and restore data.

Methods of Evaluation:

1. Exams
2. Quizzes
3. Hands-on lab assignments

Course Content Outline:

1. Introduction to the Linux operating system
    a. Linux/UNIX history and background
    b. Linux core versions and Linux distributions
    c. Open Source software licensing
2. Planning a Linux installation
    a. Needs assessment
    b. Hardware selection
    c. Distribution selection and verification of hardware compatibility
    d. Planning and configuring file system partitions
        i. Selection of partitions and their size, minimally, swap, /, and /home
        ii. Selection of file system type for each partition
        iii. Partitioning the hard disk
            1. Using installation program
            2. G-Parted
            3. FIPS
            4. fdisk
    e. The installation process
        i. Install from media (CD or DVD)
        ii. Install from network server (HTTP, FTP, NFS, or SMB protocol)
        iii. Remote install using a Virtual Network Connection
3. Configuring a Linux server

      a. Configuring the X Window environment
      b. Linux GUI desktops (KDE and Gnu)
      c. Configuring network hardware (NIC)
      d. Configuring network services
          i. Configuring NFS
          ii. Configuring SAMBA (interoperability with Windows Systems)
          iii. Configuring DHCP
          iv. Configuring DNS
          v. Configuring the Appache Web Server
      e. Configuring printers
      f. Configuring other hardware
          i. Drivers
          ii. Kernel modules
      g. Configuring Linux security
          i. Control root access using su
          ii. Extending limited root privilege using sudo
          iii. Password policies
          iv. Defense against network attack
          v. Detecting intrusions

4. Managing the Linux boot process
      a. Phases of the boot process
      b. Bootloaders
          i. GRUB
          ii. LILO
      c. Managing system run-levels

5. Getting help in the Linux system
      a. Use the main pages
      b. Use the info system
      c. README files
      d. Web-based resources

6. Basic Linux console commands
      a. Linux Command Line Interface (Shells: bash, sh, csh, tsch, or zsh)
      b. Common commands for navigation
          i. cat
          ii. cd
          iii. find
          iv. grep
          v. less
          vi. locate
          vii. ls
          viii. pwd
          ix. who
      c. Command line streams, redirection, and piping
      d. File management commands
          i. cp
          ii. fsck
          iii. ln
          iv. mkfs
          v. mkdir
          vi. rm
          vii. rmdir
      e. File system mounting commands
          i. mount
          ii. umount

7. Using Linux Text Editors
      a. Non-graphical text editor
          i. vi
          ii. Emacs
      b. Graphical text editors

8. Administering users, groups, resources, and permissions
    a. Setting up user accounts
    b. Setting up groups
    c. Managing file system permissions
    d. Managing disk quotas
    e. Managing fault tolerance
9. Installing and supporting applications
    a. Package managers
        i. GUI
            1. YaST
            2. Yum
        ii. Command based package manager
            1. rpm
            2. dpkg
    b. Compiling from source code using the GNU C/C++ compiler
10. Managing processes and services
    a. Starting system and user processes
    b. Viewing running processes
    c. Managing process priorities
    d. Managing foreground and background processes
    e. Killing processes
    f. Scheduling jobs
        i. The at daemon
        ii. The cron daemon

Resources

Eckert, Jason and Novell. *Getting Started with Linux: Novell's Guide to CompTIA's Linux+ (Course 3060).* Course Technology, 2007.

Hein, Jochen. *The Linux Companion for System Administrators.* Addison-Wesley, 2001.

Nemeth, Snyder, and Hein. *Linux Administration Handbook.* Prentice-Hall, 2002.

Petersen, Richard. *Linux: The Complete Reference.* 6th ed. McGraw-Hill, 2008.

Smith, Roderick. *Linux Administrator Street Smarts: A Real World Guide to Linux Certification Skills.* Wiley Publishing, Inc, 2007.

Soyinka, Wale. *Linux Administration: A Beginner's Guide.* 5th ed. McGraw-Hill, 2009.

Tracy, Robb. *CompTIA Linux+ Certification Study Guide.* McGraw-Hill, 2008.

Wells, Nicholas. *Guide to Linux Installation and Administration.* 2nd ed. Course Technology, 2003.

Eckert, Jason W. *Linux+ guides to Linux certification.* 3rd ed. Cengage, 2012.

Smith, Roderick. *CompTIA Linux+ Complete Study Guide: Exams Lx0-101 and LX0-102.* Wiley Publishing, Inc., 2010.

Rankin, Kyle and Benjamin Mako Hall. *The Official Ubuntu Server Book.* 2nd ed. Prentice-Hall, 2010.

Resources Other

1. Linux HQ. http://www.linuxhq.com (http://www.linuxhq.com/)
2. Linux Online! http://www.linux.org (http://www.linux.org/).
3. openSUSE. http://www.opensuse.org (http://www.opensuse.org/)

4. The Fedora Project. http://fedoraproject.org (http://fedoraproject.org/)
5. The Linux Documentation Project. http://www.tldp.org (http://www.tldp.org/)
6. The Linux Foundation. http://www.linuxfoundation.org (http://www.linuxfoundation.org/)

Top of page
Key: 2573