

CompTIA Linux+ System Administration 1

Course Summary

Length: 5 Days

Prerequisite: No prerequisites

Recommendation Statement:

There are no prerequisites for this class other than basic computer skills.

Course Description:

This course teaches the introductory topics required to administer a Red Hat® Enterprise Linux 7 system. Topics in this course also apply to the CentOS and Debian distributions. Students will learn essential Linux commands, shell features, and how to install, configure and administer a Linux enterprise system.

This course prepares the student for the CompTIA Linux+ Certification LX0-103 and the LPIC-1 certification exams.

Upon completion of this course, you should be able to:

- Introduction to the Linux OS
- The command line vs. the desktop environments
- Understand Bash shell features using the command line interface
- Use the Linux commands from the command line interface (CLI)
- Process text streams and use filters
- Perform file management
- Use streams, pipes and redirects
- System Architecture
- System bootup and shutdown
- Change run levels, boot targets
- Create, manage, monitor and kill processes
- Manage process priorities
- Search text files using regular expressions
- Edit files using the command line editors (vi, vim and nano)
- Determine and configure fundamental system hardware
- Install and Update the OS
- Administer users and groups
- Linux installation and package management
- Install a boot manager
- Manage share libraries
- Use Debian, RPM and YUM package management
- Understand Devices, file systems and filesystem hierarchy standards
- Mount and unmount file systems
- Manage disk quotas
- Manage file permissions and ownership
- Understand symbolic and hard links
- Find files using Linux command line utilities
- Configure and Administer the network and firewall
- Administer system log files
- How to setup your own virtual lab environment using VirtualBox

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Detailed Course Outline

Linux Essentials- Commands and Utilities

- 1) GNU and Unix Commands**
 - a) Use bash shell commands and command strings to perform basic tasks on the command line
 - b) Modify the bash shell environment: define, display environment variables.
 - c) Understand local vs exported shell environment variables
 - d) Use and edit command history
 - e) Use the command help facility
- 2) Process text streams using filters**
 - a) Use filters on text files and output streams to modify the output
- 3) Perform basic file management**
 - a) Copy, move and delete files and directories
 - b) Copy multiple files and directories recursively
 - c) Remove files and directories recursively
 - d) Use wildcard specifications
 - e) Use the find utility to locate and perform actions on files based on type, size, or time
 - f) Use of tar, cpio and dd
- 4) Use streams, pipes and redirects**
 - a) Redirect standard input, standard output and standard error
 - b) Pipe the output of one command to the input of another command
 - c) Use the output of one command and as an argument to another command
 - d) Redirect output to both stdout and a file
- 5) Create, monitor and kill processes**
 - a) Run jobs in the foreground and background using at and bg
 - b) Signal a program to continue running after logout
 - c) Monitor active processes
 - d) Select and sort processes for display
 - e) Send signals to processes
- 6) Modify process execution priorities**
 - a) Understand the default priority of a job; change the priority of a process
 - b) Run a program with higher or lower priority than the default
- 7) Search text files using regular expressions**
 - a) Use regular expression tools to perform searches through a filesystem or file content
- 8) Perform basic file editing operations using vi**
 - a) Navigate a document using vi, vim and nano
 - b) Use basic vi modes
 - c) Insert, edit, delete, copy and find text
- 9) Devices, Linux Filesystems, Filesystem Hierarchy Standard**
 - a) Manage MBR partition tables
 - b) Use various mkfs commands to create various filesystems such as ext2/ext3/ext4/XFS/VFAT
 - c) Compare conventional filesystem with ReiserFS and Btrfs
 - d) Basic knowledge of fdisk, gdisk and parted with GPT
- 10) Manage file permissions and ownership**
 - a) Manage access permissions on regular and special files as well as directories
 - b) Understand access modes such as suid, sgid and the sticky bit to maintain security
 - c) Understand why and how to change the file creation mask
 - d) Use the group field to grant file access to group members
- 11) Create and change hard and symbolic links**
 - a) Create links
 - b) Identify hard and/or soft links
 - c) Copy versus link on files
 - d) Use links to facilitate system administration tasks
- 12) Find system files and place files in the correct location**
 - a) Understand the correct locations of files under the File System Hierarchy Standard (FHS)
 - b) Find files and commands on a Linux system
 - c) Know the location and purpose of important file and directories as defined in the FHS

System Administration Topics

- 13) Understand the Boot Process**
 - a) Use commands to the boot loader and options to the kernel at boot time
 - b) Understand the boot sequence from BIOS to boot completion
 - c) Understanding of SysVinit and systemd
 - d) Awareness of Upstart
 - e) Display boot events and understand location of system related log files

- 14) Determine and configure hardware settings**
 - a) Use command line utilities to list various hardware information (e.g. lsusb, lspci, etc.)
 - b) Tools and utilities to manipulate USB devices
 - c) Understand sysfs, udev, dbus
- 15) Manage runlevels / boot targets and shutdown or reboot system**
 - a) Set the default runlevel or boot target
 - b) Switch a running system between runlevels / boot targets including single user mode
 - c) Shutdown and reboot from the command line
 - d) Alert users before switching runlevels or other major system events
 - e) Understand methods used to kill and terminate processes
- 16) Monitor and Manage System Logs**
 - a) Understand where system log files are located
 - b) Configure system logs- local and remote
- 17) User and Group Administration**
 - a) User and Group Concepts
 - b) User Administration
 - c) Modifying Accounts
 - d) Group Administration
 - e) Default User Files
- 18) Administer File Systems**
 - a) Understand the types of file systems and file system structures
 - b) Create file systems
 - c) Mount / Unmount file systems automatically and manually
 - d) Understand and Manage XFS file systems
- 19) Manage the file system table (fstab)**
 - a) Knowledge of basic features of Logical Volume Manager (LVM)
 - b) Logical Volume Management
 - c) Implementing LVM
 - d) Creating Logical Volumes
- 20) Maintain the integrity of filesystems**
 - a) Verify the integrity of filesystems
 - b) Monitor free space and inodes
 - c) Repair filesystems
- 21) Mount and unmount filesystems**
 - a) Manually mount and unmount filesystems
 - b) Configure filesystem mounting on bootup
 - c) Configure user mountable removable filesystems
- 22) Manage disk quotas**
 - a) Set up a disk quota for a filesystem
 - b) Edit, check and generate user quota reports
- 23) Linux Installation and Package Management**
 - a) Allocate filesystems and swap space to separate partitions or disks
 - b) Tailor the design to the intended use of the system
 - c) Ensure the /boot partition conforms to the hardware architecture requirements for booting
- 24) Install a boot manager**
 - a) Providing alternative boot locations and backup boot options
 - b) Install and configure a boot loader such as GRUB Legacy
 - c) Perform basic configuration changes for GRUB 2
 - d) Interact with the boot loader
- 25) Manage shared libraries**
 - a) Identify shared libraries
 - b) Identify the typical locations of system libraries
 - c) Load shared libraries
- 26) Use Debian package management**
 - a) Install, upgrade and uninstall Debian binary packages
 - b) Find packages containing specific files or libraries which may or may not be installed
 - c) Obtain package information like version, content, dependencies, package integrity and installation status (whether or not the package is installed)
- 27) Use RPM and YUM package management**
 - a) Install, re-install, upgrade and remove packages using RPM and YUM
 - b) Obtain information on RPM packages such as version, status, dependencies, integrity and signatures
 - c) Determine what files a package provides, as well as find which package a specific file comes from
- 28) Configure and secure OpenSSH**
 - a) Access remote systems through OpenSSH
 - b) Control remote access through OpenSSH
- 29) Manage Network Components**
 - a) Configure the network interfaces
 - b) Configure network services (DNS, DHCP, routing)

- c) Perform routine network diagnostics
 - d) Understand netfilter and the firewalld service, how to configure firewalld and packet filtering.
- 30) **Setup a Virtual Lab Environment using VirtualBox**
- a) Setup a virtual lab environment to practice on after class is complete. Because Linux is a continuous learning experience, you'll be able to use this virtual lab to continually improve your skills.

Lab Exercises

- b) Hands on lab exercises will be provided at the completion of each section