



Linux System Administration

Course LFS307 Four Days Instructor-led Hands-on

Introduction

Linux dominates web servers, the cloud & smartphones. Ensure your long-term career prospects by learning high-demand Linux skills including how to administer, configure & upgrade Linux systems & the tools & concepts you need to build & manage an enterprise Linux infrastructure.

In this live, instructor-led course you will learn with a cohort of fellow IT professionals while gaining key knowledge & skills related to the Linux Foundation Certified System Administration (LFCS) exam.

At Course Completion

Upon successful completion of this course, students will gain the following skills and knowledge as you deploy, test, secure, manage, optimize, and troubleshoot a cloud solution.

- Preliminaries
- How to Work in OSS Projects
- Compilers
- Libraries
- Make
- Source Control
- Debugging and Core Dumps
- Debugging Tools
- System Calls
- Files and Filesystems in Linux
- File I/O
- Advanced File Operations
- Processes I
- Processes II
- Pipes and Fifos
- Asynchronous I/O
- Signals I
- Signals II
- POSIX Threads I
- POSIX Threads II
- Networking and Sockets
- Sockets Addresses and Hosts
- Sockets Ports and Protocols
- Sockets Clients

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- Sockets Servers
- Sockets Input/Output Operations
- Sockets Options
- Netlink Sockets
- Sockets Multiplexing and Concurrent Servers
- Inter Process Communication
- Shared Memory
- Semaphores
- Message Queues

Prerequisites

This course is designed to provide students with the necessary skills and abilities to work as a professional Linux system administrator. Students should have basic knowledge of Linux and its most common utilities and text editors.

Student Materials

The student kit includes the following:

- Comprehensive digital workbook

Course Outline

Module 1: Introduction

- The Linux Foundation
- The Linux Foundation Training
- The Linux Foundation Certifications
- The Linux Foundation Digital Badges
- Laboratory Exercises, Solutions and Resources
- Things Change in Linux and Open Source Projects
- E-Learning Course: LF207
- Distribution Details
- Labs

Module 2: Linux Filesystem Tree Layout

- One Big Filesystem
- Data Distinctions
- FHS Linux Standard Directory Tree
- root (/) directory
- /bin
- /boot
- /dev
- /etc

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- /home
- /lib and /lib64
- /media
- /mnt
- /opt
- /proc
- /sys
- /root
- /sbin
- /srv
- /tmp
- /usr
- /var
- /run
- Labs

Module 3: User Environment

- Environment Variables
- Command History
- Command Aliases
- Labs

Module 4: User Account Management

- User Accounts
- Shell Startup Files
- Management of User Accounts
- Locked Accounts
- Passwords
- /etc/shadow
- Password Management
- Password Aging
- The root Account
- SSH
- Labs

Module 5: Group Management

- Groups
- Group Membership
- Group Management
- User Private Groups
- Labs

Module 6: File Permissions and Ownership

- File Permissions and Ownership
- File Access Rights
- chmod, chown and chgrp
- umask
- Filesystem ACLs
- Labs

Module 7: Package Management Systems

- Why Use Packages?
- Software Packaging Concepts
- Package Types
- Available Package Management Systems
- Packaging Tool Levels and Varieties
- Package Sources
- Creating Software Packages
- Revision Control Systems
- Available Source Control Systems
- The Linux Kernel and git
- Labs

Module 8: dpkg

- DPKG (Debian Package)
- Package File Names and Source
- DPKG Queries
- Installing/Upgrading/Uninstalling
- Labs

Module 9: APT

- APT
- APT Utilities
- Queries
- Installing/Removing/Upgrading Packages
- Cleaning Up
- Labs

Module 10: RPM

- RPM (Red Hat Package Manager)
- Package File Names
- RPM Database and Helper Programs
- Queries
- Verifying Packages

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- Installing and Removing Packages
- Updating, Upgrading and Freshening RPM Packages
- Upgrading the Linux Kernel
- rpm2archive and rpm2cpio
- Labs

Module 11: dnf and yum

- dnf
- yum
- Queries
- Installing/Removing/Upgrading Packages
- Additional dnf Commands
- Labs

Module 12: zypper

- zypper
- Queries
- Installing/Removing/Upgrading Packages
- Additional zypper Commands
- Labs

Module 13: GIT Fundamentals

- Revision Control
- Basic Commands
- Try some git commands
- Get Software with Git
- Labs

Module 14: Processes

- Programs and Processes
- Process Limits
- Creating Processes
- Process Control
- Starting Processes in the Future
- Process States
- Execution Modes
- Daemons
- niceness
- Labs

Module 15: Process Monitoring

- Process Monitoring

- Troubleshooting
- ps
- pstree
- top
- Labs

Module 16: Memory Monitoring, Usage and Configuring Swap

- Memory Monitoring and Tuning
- /proc/sys/vm
- vmstat
- Swap
- Out of Memory Killer (OOM)
- Labs

Module 17: I/O Monitoring

- I/O Monitoring
- iostat
- iotop
- Labs

Module 18: Containers Overview

- Containers
- Containers vs Virtual Machines
- Docker
- Cowsay Example
- Reproducible Builds
- Labs

Module 19: Linux Filesystems and the VFS

- Filesystem Basics
- Filesystem Concepts
- Virtual Filesystem (VFS)
- Available Filesystems
- Journalling Filesystems
- Special Filesystems
- Labs

Module 20: Disk Partitioning

- Common Disk Types
- Disk Geometry
- Partitioning
- Partition Tables

- Naming Disk Devices
- blkid and lsblk
- Sizing up partitions
- Backing Up and Restoring Partition Tables
- Partition table editors
- fdisk
- Labs

Module 21: Filesystem Features: Attributes, Creating, Checking, Usage, Mounting

- Extended Attributes
- Creating and formatting filesystems
- Troubleshooting Filesystems
- Checking and Repairing Filesystems
- Filesystem Usage
- Disk Usage
- Mounting filesystems
- NFS
- Mounting at Boot and /etc/fstab
- automount
- Network Block Devices
- Labs

Module 22: The Ext4 Filesystems

- ext4 Features
- ext4 Layout and Superblock and Block Groups
- dumpe2fs
- tune2fs
- Labs

Module 23: Logical Volume Management (LVM)

- Logical Volume Management (LVM)
- Volumes and Volume Groups
- Working with Logical Volumes
- Resizing Logical Volumes
- LVM Snapshots
- Labs

Module 24: Kernel Services and Configuration

- Kernel Overview
- Kernel Boot Parameters
- Kernel Command Line

- Boot Process Failures
- sysctl
- Labs

Module 25: Kernel Modules

- Kernel Modules
- Module Utilities
- modinfo
- Module Configuration
- Labs

Module 26: Devices and udev

- udev and Device Management
- Device Nodes
- Rules
- Labs

Module 27: Network Addresses

- IP Addresses
- IPv4 Address Types
- IPv6 Address Types
- IP Address Classes
- Netmasks
- Hostnames
- NTP
- Labs

Module 28: Network Devices and Configuration

- Network Devices
- Predictable Network Interface Device Names
- Network Configuration Files
- Network Manager
- Routing
- Virtual Network Interfaces
- DNS and Name Resolution
- Network Troubleshooting
- Network Diagnostics
- Labs

Module 29: LDAP

- LDAP Authentication
- Labs

Module 30: Firewalls

- Firewalls
- Interfaces
- firewalld
- Zones
- Source Management
- Service and Port Management
- Port Redirection
- Labs

Module 31: System Init: systemd history and customization

- The init Process
- Startup Alternatives
- systemd
- systemctl
- Labs

Module 32: Backup and Recovery Methods

- Backup Basics
- Backup vs Archive
- Backup Methods and Strategies
- tar
- Compression: gzip, bzip2 and xz and Backups
- dd
- rsync
- Backup Programs
- Labs

Module 33: Linux Security Modules

- Linux Security Modules
- SELinux
- AppArmor
- Labs

Module 34: System Rescue

- Rescue Media and Troubleshooting
- Using Rescue/Recovery Media
- System Rescue and Recovery
- Emergency Boot Media
- Using Rescue Media
- Emergency Mode
- Single User Mode

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