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**Learning Style: Virtual Classroom**

**Provider: Linux Foundation**

**Difficulty: Beginner**

**Course Duration: 4 Days**

## Linux System Administration (LFS307)



## About this course:

Linux system administration is one of the most in-demand skills in IT. Whether you're looking for expert prep for the Linux Foundation Certified System Administration certification, need training to help start a new Linux IT career, transition to Linux from another platform, or you're just brushing up on your sysadmin skills, this course will teach you what you need to know.

This course is excellent preparation for the Linux Foundation Certified System Administration (LFCS) exam.

This course gives you the skills and information you need to pass the LFCS exam and work as a professional Linux system administrator.

The average salary of a Linux System Administrator is **\$100,022** per year.

## Course Objective:

In this course you'll learn:

- How to administer, configure and upgrade Linux systems running one of the three major Linux distribution families: Red Hat, SUSE, Debian/Ubuntu.
- How to master the tools and concepts you'll need to efficiently build and manage an enterprise Linux infrastructure.
- How to use state-of-the-art system administration techniques in real-life scenarios via practical labs.
- And more.

## Audience:

- Linux System Administrators

## Prerequisite:

- 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.

## Course Outline:

### Introduction

- Linux Foundation
- Linux Foundation Training
- Linux Foundation Certifications
- Laboratory Exercises, Solutions and Resources
- E-Learning Course: LFS201
- Distribution Details

- Labs

## **Linux Filesystem Tree Layout**

- One Big Filesystem
- Data Distinctions
- FHS Linux Standard Directory Tree
- root (/) directory
- /bin
- /boot
- /dev
- /etc
- /home
- /lib and /lib64
- /media
- /mnt
- /opt
- /proc
- /sys
- /root
- /sbin
- /srv
- /tmp
- /usr
- /var
- /run
- Labs

## **Processes**

- Programs and Processes
- Process Limits
- Creating Processes
- Process States
- Execution Modes
- Daemons
- niceness
- Libraries
- Labs

## **Signals**

- Signals
- Types of Signals
- kill
- killall and pkill
- Labs

## **Package Management Systems**

- Software Packaging Concepts
- Why Use Packages?
- 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

## **RPM**

- RPM (Red Hat Package Manager)
- Package File Names
- RPM Database and Helper Programs
- Queries
- Verifying Packages
- Installing and Removing Packages
- Updating, Upgrading and Freshening RPM Packages
- Upgrading the Linux Kernel
- rpm2cpio
- Labs

## **dpkg**

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

## **yum**

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

## **zypper**

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

- Labs

## **APT**

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

## **System Monitoring**

- System Monitoring
- sar \*\*
- Network Monitoring
- System Log Files
- Labs

## **Process Monitoring**

- Process Monitoring
- ps
- pstree
- top
- Labs

## **Memory Monitoring and Usage**

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

## **I/O Monitoring and Tuning**

- I/O Monitoring
- iostat
- iotop
- ionice
- Labs

## **I/O Scheduling \*\***

- I/O Scheduling
- I/O Scheduler Choices
- Labs

## **Linux Filesystems and the VFS**

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

## **Disk Partitioning**

- Common Disk Types
- Disk Geometry
- Partitioning
- Partition Tables
- Naming Disk Devices
- SCSI Device Names
- blkid and lsblk
- Sizing up partitions
- Backing Up and Restoring Partition Tables
- Partition table editors
- fdisk
- Labs

## **Filesystem Features: Attributes, Creating, Checking, Mounting**

- Extended Attributes
- Creating and formatting filesystems
- Checking and Repairing Filesystems
- Mounting filesystems
- NFS
- Mounting at Boot and /etc/fstab
- automount
- Labs

## **Filesystem Features: Swap, Quotas, Usage**

- Swap
- Filesystem Quotas \*\*
- Filesystem Usage
- Disk Usage
- Labs

## **The Ext2/Ext3/Ext4 Filesystems**

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

## **The XFS and BTRFS Filesystems \*\***

- XFS
- btrfs
- Labs

## **Encrypting Disks**

- Filesystem Encryption
- LUKS
- cryptsetup
- Using an Encrypted Partition
- Mounting at Boot
- Labs

## **Logical Volume Management (LVM)**

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

## **RAID \*\***

- RAID
- RAID Levels
- Software RAID Configuration
- Monitoring RAIDs
- RAID Hot Spares
- Labs

## **Kernel Services and Configuration**

- Kernel Overview
- Kernel Configuration
- Kernel Boot Parameters
- sysctl
- Labs

## **Kernel Modules**

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

## **Devices and udev**

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

## **Virtualization Overview**

- Introduction to Virtualization
- Hosts and Guests
- Emulation
- Hypervisors
- libvirt
- QEMU
- KVM
- Labs

## **Containers Overview**

- Containers
- Application Virtualization
- Containers vs Virtual Machines
- Docker
- Docker Commands
- Labs

## **User Account Management**

- User Accounts
- Management of User Accounts
- Locked Accounts
- Passwords
- /etc/shadow
- Password Management
- Password Aging
- Restricted Shells and Accounts \*\*
- The root Account
- SSH
- Labs

## **Group Management**

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

## **File Permissions and Ownership**

- File Permissions and Ownership



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

## **Pluggable Authentication Modules (PAM)**

- PAM (Pluggable Authentication Modules)
- Authentication Process
- Configuring PAM
- LDAP Authentication \*\*
- Labs

## **Network Addresses**

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

## **Network Devices and Configuration**

- Network Devices
- ip
- ifconfig
- Predictable Network Interface Device Names
- Network Configuration Files
- Network Manager
- Routing
- DNS and Name Resolution
- Network Diagnostics
- Labs

## **Firewalls**

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

## **System Startup and Shutdown**

- Understanding the Boot Sequence

- Boot Loaders
- System Configuration Files in /etc
- Shutting Down and Rebooting
- Labs

## **GRUB**

- The Grand Unified Boot Loader (GRUB)
- Interactive Selections with GRUB at Boot
- Installing GRUB
- Customizing the GRUB Configuration
- Labs

## **Init, SystemV, Upstart, systemd**

- The init Process
- Startup Alternatives
- systemd
- systemctl
- SysVinit Startup \*\*
- chkconfig and service \*\*
- Upstart \*\*
- Labs

## **Backup and Recovery Methods**

- Backup Basics
- Backup vs Archive
- Backup Methods and Strategies
- tar
- Compression: gzip, bzip2 and xz and Backups
- dd
- rsync
- cpio \*\*
- dump and restore \*\*
- mt \*\*
- Backup Programs \*\*
- Labs

## **Linux Security Modules**

- Linux Security Modules
- SELinux
- AppArmor
- Labs

## **Local System Security**

- Local System Security
- Creating a Security Policy

- Updates and Security
- Physical Security
- BIOS
- Bootloader
- Filesystem Security
- setuid/setgid bits
- Labs

## Basic Troubleshooting

- Troubleshooting Levels
- Troubleshooting Techniques
- Things to Check: Networking
- Things to Check: File Integrity
- Boot Process Failures
- Filesystem Corruption and Recovery
- Virtual Consoles
- Labs

## 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
- Labs

## Credly Badge:



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