This hands-on 4-day Linux System Administration course teaches attendees how to administer, configure and upgrade Linux systems running one of the three major Linux distribution families (Red Hat, SUSE, Debian/Ubuntu). Focused on enterprise environments, it provides Linux system administrators with all the tools and concepts needed to efficiently build and manage a production Linux infrastructure. This course presents state-of-the-art techniques used in the industry and applies them in the context of practical labs.

Who Should Attend

This course is intended for System administrators and users who already have at least some basic exposure to Linux or another UNIX-based operating system constitute the target audience for this class. Anyone who is looking to acquire practical knowledge in the field of system administration in enterprise environments will save significant time by attending this course. It should also be considered a necessary step to be taken by anyone considering more advanced classes in our System Administration curriculum track. The concepts covered provide important building blocks for anyone looking to attend more advanced classes, in particular LFS311: Linux Network Management.

Course Objectives

After completing this course, students will be able to:
- Perform essential Linux commands such as installation, searches and manipulating files.
- Operate running Linux systems by managing the boot process, scheduling jobs, updating the system, monitoring system performance and managing security.
- Manage users and groups by adding/deleting/modifying, configuring LDAP and PAM, modifying user processes and resources.
- Ensure network performance via configuration, monitoring, tunnelling and routing of traffic.
- Configure services such as DNS, shares, SSH and SELinux/AppArmor as well as servers for DHCP and HTTP.
- Manage system storage by using partitions, logical volumes, physical volumes, ACLs, quotas and clustering.

Course Outline

1. Introduction
   - Linux Foundation
   - Linux Foundation Training
   - Linux Foundation Certifications
   - Laboratory Exercises, Solutions and Resources
   - E-Learning Course: LFS201
   - Distribution Details
2 Linux Filesystem Tree Layout

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

3 Processes

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

4 Package Management Systems

Software Packaging Concepts
RPM (Red Hat Package Manager)
DPKG (Debian Package)
Revision Control Systems

5 Package Installers

Package Installers
yum
zypper
APT
6 System Monitoring

System Monitoring
Process Monitoring
Memory Monitoring and Tuning
Network Monitoring
I/O Monitoring
I/O Scheduling **
System Log Files

sar **

7 Linux Filesystems

Filesystem Basics
Virtual Filesystem (VFS)
Available Filesystems
Filesystem Concepts
Disk and Filesystem Usage
Extended Attributes
ext4
XFS **
btrfs **

8 Partitioning and Formatting Disks

Common Disk Types
Disk Geometry
Partitioning
Naming Disk Devices
Sizing up partitions
Partition table editors

9 More on Linux Filesystems

Creating and formatting filesystems
Checking and Repairing Filesystems
Mounting filesystems
automount
Swap
Filesystem Quotas **

10 Encrypting Disks

Filesystem Encryption
LUKS
Using an Encrypted Partition

11 LVM and RAID

Logical Volume Management (LVM)
Volumes and Volume Groups
Working with Logical Volumes
Resizing Logical Volumes
LVM Snapshots **
RAID **
RAID Levels **
Software RAID Configuration **
55187 Linux System Administration

12 Kernel Services and Configuration
Kernel Overview
Kernel Configuration
sysctl
Kernel Modules
Module Utilities
Module Configuration
udev and Device Management

13 Virtualization Overview
Introduction to Virtualization
Emulation
Hypervisors
libvirt
QEMU
KVM

14 Containers Overview
Containers
Docker
Docker Commands

15 User and Group Account Management
User Accounts
Management
Passwords
Restricted Shells and Accounts **
The root Account
Group Management
SSH
PAM (Pluggable Authentication Modules)
Authentication Process
Configuring PAM
LDAP Authentication **
File Permissions and Ownership

16 Networking
IP Addresses
Hostnames
Network Devices
ip and ifconfig
Network Configuration Files
Network Manager
Routing
DNS and Hostname Resolution
Network Diagnostics
17 Firewalls
Firewalls
Interfaces
firewalld
Zones
Source Management
Service and Port Management

18 System Startup and Shutdown
Understanding the Boot Sequence
System Configuration Files in /etc
Shutting down/Rebooting the System
The Grand Unified Boot Loader
GRUB Configuration Files
The init Process
systemd
SysVinit Startup **
chkconfig and service **
Upstart **

19 Backup and Recovery Methods
ackup Basics
cpio **
tar
Compression: gzip, bzip2 and xz and Backups
dd
rsync
dump and restore **
mt **
Backup Programs **

20 Linux Security Modules
Linux Security Modules
SELinux
AppArmor

21 Local System Security
Local System Security
Creating a Security Policy
Updates and Security
Physical Security
Filesystem Security

22 Basic Troubleshooting and System Rescue
Troubleshooting Overview
Things to Check: Networking
Boot Process Failures
Filesystem Corruption and Recovery
Virtual Consoles
Rescue Media and Troubleshooting
System Rescue and Recovery