

# Linux System Administration (Ubuntu & Red Hat)

This course is focused on:

⇒ System Administration

## Course Duration:

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- **40 Hours**, 20 Sessions, 02 Hours per session (Online)
- **40 Hours**, 10 Sessions, 04 Hours per Session (Offline)

### Module 1: Introduction to UNIX & LINUX

- Introduction to Operating Systems
- Parts of Operating System
- Kernel, Shell & File
- History of UNIX and LINUX
- Linux and GNU Project
- Basic Concepts of Linux
- Identification of various Linux distributors
- Working with RHEL/CentOS Distributions

### Module 2: Preparing Linux Home Lab Setup

- Planning a RHEL/CentOS Stream 9 Installation
- System Requirements & Capabilities
- Download RHEL/CentOS Stream 9 OS
- Preparing Installation Media (DVD/ISO/USB)
- RHEL 9 Installation Method (MBR & GPT)
- Required Partitions for RHEL 9 Installation
- Linux Lab Setup Concept (Virtual & Physical)
- Building home Lab using VMware Workstation

### Module 3: Linux Installation & Basic Configure

- Introduction to VMware Workstation
- Introduction Virtualization Technology
- Create VM on VMware Workstation for RHEL 9
- Installation of RHEL on VMware Workstation
- Install Linux instance of AWS cloud
- Configure BIOS/UEFI options for OS booting
- Details discussion about OS booting options
- Details discussion about Installation Summary
- Linux Installation Method (MBR and GPT)
- Configure Post installation on RHEL 9

### Module 04: Getting started with Linux

- The GNOME Desktop Environment
- Working with terminal and command console
- Introduction to Linux shells and terminal
- Linux Virtual Console/Terminal
- Logging remote system through SSH
- Logging web interface using cockpit
- Linux Command Syntax, Options, Argument
- Examples of Simple Commands
- Powering Off, Reboot and Logout System
- Linux Directory & File System introduction
- Navigating Linux Directory Paths
- Command-line File & Directory Management
- Files & Directory handling commands

### Module 05: Linux Text Processing Tools

- Standard Input, Output and Error Concept
- Redirecting Output to a File
- Constructing and Using Pipelines
- Working with tail, head, cat, less, wc, echo
- Working with Regular Expressions 'grep'
- Familiar with Linux 'find', ' ' and 'locate'
- Documentation for Commands

### Module 06: Linux Text Editors

- Why need text editor
- Different types of text editors
- Introduction to 'vi/vim' and 'gedit'
- Linux Text Editor Utilities (vim, gedit, nano)
- Working with Different 'vi/vim' Modes
- Editing, Replacing, Searching with 'vi/vim'
- Working with '**vim**' advanced features

### Module 07: User and Group Administration

- Users and Groups Introduction
- Linux User Types and Database
- Primary Groups and Supplementary Groups
- Gaining Super user Access
- Running commands as root with SUDO
- Managing Local User Accounts
- Managing Local Group Accounts
- Managing User Passwords
- Managing User's Password Aging

### Module 08: Linux File Permissions and ACL

- Explore Linux File & Directory Types
- Linux standard file permissions
- Hard Link and Soft Link concepts
- Viewing File/Directory Permission and Ownership
- Linux User, Group and Other permission Concept
- Set permission using read, write and execute
- Linux Special Permissions SUID, SGID, Sticky bit
- Securing Files with ACLs
- Creating, modifying and deleting ACL's

### Module 09: Linux Boot, Process and Services

- Step by step Linux booting procedures
- Explain and Controlling the Boot Process
- Working with GRUB2 Boot loader
- Working with Linux Kernel (CentOS)
- Update Linux Kernel (CentOS)
- Introducing RHEL Systemd
- Controlling RHEL daemon & Services
- Enabling/Disabling System Daemons at boot
- Recovering Root Password
- Linux process management introduction
- System process and user processes
- Details explain of "**TOP**" command
- Background and Foreground Processes
- Controlling jobs using '**bg**', '**fg**', '**ctrl+z**', '**ctrl+c**'
- Monitoring & Killing Process Activities

### Module 10: Linux File Systems Management

- Identifying File Systems and Devices
- Understanding Linux file systems
- Managing MBR Partitions with '**fdisk**'
- Managing GPT Partitions with '**gdisk**'
- Creating File System (xfs, ext4, swap)
- Mount Points and '**/etc/fstab**' - Details
- Mounting and Un-mounting File Systems
- Working with USB, DVD, ISO Devices
- Why need swap partition
- Create additional '**swap**' space

### Module 11: Linux LVM Management

- Limitation of Standard Partitions
- Importance of Logical Volume Management (LVM)
- Preparing storage partitions for LVM
- Creating Physical volumes (PV)
- Creating Volume Group (VG)
- Creating Logical Volume (LV)
- Extend Volume Group (VG)
- Extend Logical Volumes
- Resizing Logical Volumes
- Remove Logical Volumes

#### Module 12: RHEL 9 Network Management (IPv4)

- Describing Networking Concepts
- Describe Network Interface Names
- Validate Network Configuration
- Working with **NetworkManager** Services
- Introducing Network Manager tools (nmcli & nmtui)
- Configure Static and dynamic IP
- Configure Networking using **'nmcli'** & **'nmtui'**
- Edit Network Configuration Files
- Configuring Host Name and Name Resolution
- Managing Networking Environment

#### Module 13: Linux Package Management System

- The Linux Package Management system
- Register system with RHEL Portal
- Explain and Investigate RPM Packages
- RPM Install, Queries and verifying
- Dependency problems and Resolution
- Concept of RPM Repositories
- Configure DVD/ISO Local repository
- Packages Install and Remove using DNF
- Use CentOS public repositories
- Enable Third-party Software Repositories (EPEL)

#### Module 14: Configuring OpenSSH Service

- What is the Secure Shell (SSH)?
- How SSH (Secure Shell) works?
- SSH Host Keyes (Public and Private)
- Configuring SSH Key-based Authentication
- Password less SSH Login
- Customizing SSH Service Configuration
- Restricting SSH Logins (root)
- Putty and Open SSH Clients
- Secure Copy Through **'scp'**

#### Module 15: Linux Scheduling Tasks

- Introduction to Linux Scheduling
- Schedule tasks using **'cron'**
- Explain Cron job file format
- Syntax for the crontab command
- Running commands at particular times
- Use shell script in cronjob
- Working with **'cron'** log

#### Module 16: Linux Backup, Archive, Log Files

- Why need backup & Archives?
- Different types of Backup method
- Working with Compressed **'tar'** Archive
- Compress and De-compress using **'gz, bz2, xz'**
- Transfer Files Between Systems Securely (**SCP**)
- Synchronize Files Between Systems (**Rsync**)
- Describe System Log Architecture
- Review Syslog Files & Facility
- Review System Journal Entries
- Preserve the System Journal

#### Module 17: Linux Scripting with Bash

- Introduction to Shell Scripting
- Creating and Executing First Shell Script
- Working with Shell Variables
- Passing Arguments to the Bash Script
- Executing Shell Commands with Bash
- Reading User Input in Bash Shell
- Working with Bash Statement
- Bash Conditional and Control Structures
- Working with Login and Non-Login shells
- Creating user using Shell Script

#### Module 18: Managing Linux Security

- Introduction to Firewall Technologies
- Firewall Architecture Concepts
- Network based and Host based firewall
- Introducing RHEL 9 **'firewalld'**
- Working with **'firewalld'** zones
- Managing & configure **'firewalld'** service
- IP, ICMP, Port, Service Filtering using **'firewalld'**
- Introducing SELinux Security
- Explanation of SELinux Modes
- Set enforcing and permissive modes for SELinux



