

# Linux System Administration in 21 Days

This course is focused on:

⇒ System Administration

## Course Duration:

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- **52 Hours**, 2 Hours per sessions (weekly 2 Days)
- **52 Hours**, 13 Classes, 4 Hours per class (weekly 1 Day)

### Day 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

### Day 2: Preparing RHEL 9 Installation & 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

### Day 3: RHEL 9 Installations & Basic Configure

- Introduction to VMware Workstation
- Introduction Virtualization Technology
- Create VM on VMware Workstation for RHEL 9
- Installation of RHEL on VMware Workstation
- Install RHEL 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

### Day 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

### Day 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

### Day 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

### Day 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

### Day 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

### Day 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
- Parent processes and child processes
- System process and user processes
- Details explain of "**TOP**" command
- Graphical process monitoring system
- Background and Foreground Processes
- Controlling jobs using '**bg**', '**fg**', '**ctrl+z**', '**ctrl+c**'
- Monitoring & Killing Process Activities
- Process priority and '**nice**' concepts
- Managing priority of Linux Process

### Day 10: RHEL 9 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

### Day 11: RHEL 9 LVM & Swap 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
- Why need swap partition
- Create additional '**swap**' space

## Day 12: RHEL 9 Network Management

- 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

## Day 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)

## Day 14: Configuring OpenSSH Service

- What is the Secure Shell (SSH)?
- How SSH (Secure Shell) works?
- SSH Host Keys (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'

## Day 15: Managing Network Security (Firewalld)

- 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'

## Day 16: RHEL 9 SELinux Security

- Introducing SELinux Security
- Explanation of SELinux Modes
- Set enforcing and permissive modes for SELinux
- List and identify SELinux file and process context
- Restore default file contexts
- Manage SELinux port Labels
- Working with SELinux Boolean
- Diagnose & address routine SELinux policy violations

## Day 17: Access NFS Share and Auto Mount

- Network File System (NFS) Introduction
- Install and Configure NFS Server
- Create Share for Public & Private Access
- Setup an NFS server and export directories
- Allow NFS Share through Firewalld
- Review /etc/exports parameters and options
- NFS Client Configuration to access NFS Share
- Mount and unmount network file systems using NFS
- Configure AutoFS

## Day 18: 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

## Day 19: Working with 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
- Manage tuning profiles

## Day 20: NTP Service & Scheduling Future Tasks

- Introduction to **Chrony** Suite
- Configure **Chrony** as a NTP Server
- Using Chronyc to control 'chronyd'
- Administer Local clocks and Time Zones
- Configure NTP client
- Verifying NTP client is synchronized
- Introduction to Linux Scheduling
- Schedule tasks using 'at' and 'cron'
- Explain Cron job file format
- Running commands at particular times
- Use shell script in cronjob

## Day 21: RHEL 9 Container Technology

- Introducing Container Technology
- Why Need Container Technology
- Limitation of Virtual Machines
- Virtualization vs Container Technology
- Different types of Container Technology
- RHEL Containerization using **Podman**
- Inspect container images
- Manage container registries
- Perform basic container management
- Run a service inside a container
- Build a container from a Container file
- Attach persistent storage to a container
- Configure a container to start automatically as a systemd service



