CSE493:LINUX SYSTEM ADMINISTRATION

L:3 T:0 P:2 Credits:4

Course Outcomes: Through this course students should be able to

CO1 :: understand fundamental Linux concepts and help documentation tools to effectively navigate and manage the Linux environment.

CO2 :: apply Linux command-line tools to manage files, users, permissions, processes, and services securely and efficiently

CO3 :: analyze logs, processes, networking, and package management to diagnose system issues and performance

CO4 :: establish networking, SSH security, scheduled tasks, and services for reliable remote and automated operations

CO5 :: apply secure storage techniques using logical volumes, ACLs, SELinux, compression, deduplication, and NFS.

CO6 :: demonstrate Linux system installation, boot management, and troubleshooting using automation tools.

Unit I

Accessing the command line : Accessing command line using local console, Accessing command line using desktop, Executing commands using bash shell

Managing Files From the Command Line : The Linux File System Hierarchy, Locating Files by Name, Managing Files Using Command-Line Tools, Matching File Names Using Path Name Expansion, Managing Files with Shell Expansion

Getting Help in Red Hat Enterprise Linux : Reading Documentation Using man Command, Reading Documentation Using pinfo Command, Reading Documentation in /usr/share/doc, Getting Help From Red Hat

Creating, Viewing, and Editing Text Files : Redirecting Output to a File or Program, Editing Text Files from the Shell Prompt, Editing Text Files with a Graphical Editor

Managing Local Linux Users and Groups : Users and Groups, Gaining Superuser Access, Managing Local User Accounts, Managing Local Group Accounts, Managing User Passwords

Unit II

Controlling Access to Files with Linux File System Permissions : Linux File System Permissions, Managing File System Permissions from the Command Line, Managing Default Permissions and File Access

Monitoring and Managing Linux Processes : Processes, Controlling Jobs, Killing Processes, Monitoring Process Activity

Controlling Services and Daemons : Identifying Automatically Started System Processes, Controlling System Services

Configuring and Securing OpenSSH Service : Accessing the Remote Command Line with SSH, Configuring SSH Key-based Authentication, Customizing SSH Service Configuration

Analyzing and Storing Logs : System Log Architecture, Reviewing Sys log Files, Reviewing systemd Journal Entries, Preserving the systemd Journal, Maintaining Accurate Time

Unit III

Managing Red Hat Enterprise Linux Networking : Networking Concepts, Validating Network Configuration, Configuring Networking with nmcli, Editing Network Configuration Files, Configuring Host Names and Name Resolution

Archiving and Copying Files Between Systems : Managing Compressed tar Archives, Copying Files Between Systems Securely, Synchronizing Files Between Systems Securely

Installing and Updating Software Packages : Managing Software Updates with yum, Enabling yum Software Repositories, Examining RPM Package Files, Attaching Systems to Subscriptions for Software Updates, RPM Software Packages and Yum

Accessing Linux File Systems : Identifying File Systems and Devices, Mounting and Unmounting File Systems, Making Links Between Files Locating Files on the System

Using Virtualized Systems : Managing a Local Virtualization Host, Installing a New Virtual Machine

Unit IV

Improving Command-line productivity : Writing Simple Bash Scripts, Running commands More Efficiently Using Loops, Matching Text in Command Output with Regular Expressions

Unit IV

Scheduling Future Tasks : Scheduling a Deferred User Job, Scheduling Recurring System Jobs, Managing Temporary Files

Tuning System Performance : Adjusting Tuning Profiles, Influencing Process Scheduling

Controlling Access to Files with ACLs : Interpreting File ACLs, Securing Files with ACLs

Unit V

Managing SELinux Security : Changing the SELinux Enforcement Mode, Controlling SELinux File Contexts, Controlling SELinux File Contexts, Adjusting SELinux Policy with Booleans, Investing and Resolving SELinux Issues

Managing Basic Storage and Logical Volumes : Adding Partitions, File Systems, and Persistent Mounts, Managing Swap Space, Creating Logical Volumes, Extended Logical Volumes

Implementing Advanced Storage Features : Managing Layered Storage with Stratis, Compressing and Deduplicating Storage with VDO

Unit VI

Accessing Network-Attached Storage : Mounting Network-Attached Storage with NFS, Automounting Network-Attached Storage

Controlling the Boot Process : Selecting the Boot Target, Resetting the Root Password, Repairing File System Issues at Boot

Managing Network Security : Managing Server Firewalls, Controlling SeLinux Port Labeling

Installing Red Hat Enterprise Linux : Installing RedHat EnterpriseLinux, Automating Installation with Kickstart, Installing and Configuring Virtual Machines

List of Practicals / Experiments:

List of Practical's

- Executing commands using bash shell
- Locating Files by Name
- Editing Text Files from the Shell Prompt
- Managing Local User Accounts and Group Accounts
- Managing File System Permissions from the Command Line
- Killing and Monitoring Process Activity
- Configuring SSH Key-based Authentication
- Validating Network Configuration and Configuring Networking with nmcli
- Installing a New Virtual Machine
- Matching Text in Command Output with Regular Expressions
- Interpreting and Securing Files with ACLs
- Compressing and Deduplicating Storage with VDO
- Mounting Network-Attached Storage with NFS
- Managing Server Firewalls and Controlling SeLinux Port Labeling

Text Books:

1. RHCSA/RHCE RED HAT LINUX CERTIFICATION STUDY GUIDE, SEVENTH EDITION (EXAMS EX200 & EX300) (RHCSA/RHCE RED HAT ENTERPRISE LINUX CERTIFICATION STUDY GUIDE) by MICHAEL JANG, ALESSANDRO ORSARIA, Tata McGraw Hill, India

References:

1. RHCSA & RHCE RED HAT ENTERPRISE LINUX 7: TRAINING AND EXAM PREPARATION GUIDE (EX200 AND EX300) by ASGHAR GHORI, LIGHTNING SOURCE INCORPORATED