

VERSION

2

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SR. CODE

EAPL/PROF/PRTC22

COURSE CODE

EAPL

SUB CATEGORY

CYBER SECURITY AND NETWORKING



TOTAL DURATION
90
HOURS



THEORY TAKEN
15
HOURS



PRACTICAL TAKEN
75
HOURS

COURSE DESCRIPTION



The Linux course is designed to provide a comprehensive understanding of the Linux operating system, covering topics such as file system management, user administration, networking, security, and shell scripting.

COURSE GOALS



By completion, students will proficiently navigate Linux environments, execute commands, configure network services, and automate tasks using shell scripts. They will develop the skills necessary to deploy and maintain Linux servers, ensuring optimal performance, security, and reliability.

FUTURE SCOPE



Graduates of the Linux course will find diverse career opportunities as Linux system administrators, DevOps engineers, cybersecurity specialists, and cloud architects. With the increasing adoption of Linux in enterprise environments and cloud computing platforms, demand for Linux professionals continues to grow, offering promising career

01

CHAPTER

INTRODUCTION TO LINUX

1. What Is Operating System?
2. What is Linux OS?
3. History of Linux
4. Linux vs. Unix
5. Linux Flavors / Distributions
6. Linux Users
7. Linux vs. Windows



01
HRS



00
HRS

02

CHAPTER

DOWNLOAD, INSTALL & CONFIGURE

1. What is Virtual Box?
2. Downloading and installing Oracle Virtual-Box
3. Ubuntu Server vs. Ubuntu Desktop
4. Creating VM in Virtual-Box
5. Download and install Linux (Ubuntu / CentOS server)
6. Download and Install Linux (Ubuntu / CentOS Desktop)



01
HRS



04
HRS

03

CHAPTER

SYSTEM ACCESS & FILE SYSTEM

01. Real time Access Linux System:

1. Installing Putty or any Other SSH Client
2. Comparison of other OS Clients



02
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04
HRS

O2.Linux Command Prompts & Getting Prompts Back

O3. Introduction to Linux File System:

1. What is File System?
2. Different Type of File System
3. How to find file system type in Linux and Windows

O4.File System Structure & Description

O5.File System Navigation Commands (CD,LS and PWD)

1. Cd
2. Pwd
3. Ls

O6. Linux File or Directory Properties

O7. Linux File Types

1. Regular Files ('-')
2. Directory Files ('d')
3. Special Files (Actually, this one has 5 types in it.)
 - a. Block File('b')
 - b. Character Device File ('c')
 - c. Names pipe file or just a pipe file ('p')
 - d. Symbolic link file ('l')
 - e. Socket file('s')

O8. What is Root?

1. What is root user / super user
2. What is root / directory
3. What is /root home directory

09.Change Password in Linux

1. Change Password for Root User
2. Change password for Standard User

10.Absolute and Relative Paths

1. Absolute path
2. Relative Path
3. Navigating to File system Using Both Paths

11.Creating Files and Directories

- a.Touch
- b.Cp
- c.Vi
- d.mkdir

12.Copying Directories

13.Finding Files and Directories (Find , Locate)

14.Difference Between Find and Locate Commands

15.Linux Wild Cards Commands (* , ? , ^ , [])

16.Soft and Hard Links (ln) in Linux

04

CHAPTER

LINUX FUNDAMENTALS:

**O1.Linux Command Syntax
(Command, Options, Argument)**

**O2.Files and Directory Permissions
(Chmod)**

1. -=First dash or bit identifies the file type
2. ---= 2nd 3 bits defines the permission for user (file or dir owner)
3. ---= 3rd 3 bits defines the permission for group
4. ---= 4th 3 bits defines the permission for everyone else
- 5.File Permissions Using Numeric Mode (Chmod 777 file)
- 6.File Ownership Commands (Chown , chgrp)

O3.Linux Access Control List (ACL)

O4.Help Commands in Linux

1. Man
2. Whatis
- 3.Command --help

**O5. TAB Completion and Up Arrow
Keys in Linux**

O6. Adding Text to Files

1. Echo
- 2.Redirects > and >>
- 3.vi

**O7.Input and Output Redirects
(>, >>, < , stdin ,Stdout and stderr)**

**O8.Standard Output to a File
(tee command) in Linux**



04
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04
HRS

09.Linux Pipes (I)

10.File Maintenance Commands

1. Cp
2. Rm
3. Mv
4. Mkdir
5. Rmdir or rm -f
6. Chgrp
7. chown

11.Files Display commands

- 1.Cat
2. More
3. Less
4. Head
5. Tail
6. vi

12.Filters / Text Processing Commands

1. Cut – Text Processors Commands
2. Awk - Text Processors Commands
3. Grep and egrep – Text Processors Commands
4. Sort / Uniq – Text Processors Commands
5. Wc – Text Processors Commands

13.Compare Files (Diff and cmp)

14.Compress and uncompress (tar , gzip , gunzip)

15.Truncate File Size (truncate)

16.Combining and Splitting Files

17.Linux Vs. Windows Commands

05

CHAPTER

SYSTEM ADMINISTRATION IN LINUX



04
HRS



11
HRS

O1. Linux File Editor (vi)

1. Vi
2. I= Insert mode
3. a= Insert and move cursor
4. zz or :wq! = save file and quit vi editor
5. :q! = quit vi editor without saving
6. Up , down, left and right keys = to navigate within vi editor
7. O= to start inserting form a new line
8. Shift g= Takes you to the end of a file while in vi
9. / = searches fr a pattern while in vi mode

O2. Different between vi and vim editor

O3. "sed" Command

O4. User Account Management

1. Useradd
2. Userdel
3. Groupdel
4. Usermod
 - 4.1. User Files
 - a) /etc/passwd
 - b) /etc/shadow
 - c) /etc/group

O5. Enable Password Aging

O6.Switch Users and sudo Access

1. Su or su –
2. Sudo commands

O7.Monitor User

1. Who
2. Last
3. W
4. id

O8.Talking to Users

1. Users
2. Wall
3. Write

O9.Linux Directory Service – Account Authentication

10.Difference between Active Directory, LDAP, IDM, WinBIND, OpenLDAP etc.

11.System Utility Commands in linux

1. Date
2. Uptime
3. Hostname
4. Uname
5. Which
6. Cal
7. Cal
8. bc

12.Processes, Jobs and Scheduling

13.Systemctl command

14.Ps command

15.Top command

16.Kill command

17.Crontab command

18.At command

**19.Additional cronjobs (Hourly, daily,
Weekly, monthly)**

20.Process Management (bg, fg, nice)

**21.System Monitoring Commands in
Linux:**

1. Top

2.Df

3.Dmesg

4. Ioststat

5.Netstat

6.Free

7. Cat/proc/cpuinfo

8. Cat/proc/meminfo

22.System Logs Monitor in Linux:

1. /var/log

2. /var/log/message

3.Dmseg

4.mail

23. System Maintenance Commands in Linux:

1. Shutdown
2. Reboot
3. Init 0-6
4. halt

24. Changing System Hostname (hostnamectl)

25. Finding System Information in Linux

1. Uname
2. Cat/etc/redhat – release
3. Cat/etc/*rel*
4. dmidecode

26. Finding System Architecture in Linux (arch)

27. Terminal Control Keys

28. Terminal Commands (Clear , exit , script)

29. Recover Root Password In Linux:

1. Restart the system or type reboot
2. Catch the grub screen
3. Stop at your kernel line and press "e" to enter the editing mode
4. Find the line that starts with Linux and go to the end of the line and type
5. rd.read
6. Press ctrl+x to enter into the rescue mode
7. #mount –o remount, rw /sysroot

8. #chroot /sysroot

9. #passwd

10. #touch /.autorelabel

11. #exit

12. #exit

30.SOS Report

**31.Special Permissions with setuid,
setgid and sticky bit**

06

CHAPTER

SHELL SCRIPTING IN LINUX

O1.Linux Kernel

O2. What is Shell?

O3.Types of Shells

O4.Shell Scripting

O5.Basic Shell Scripts in Linux

```
#!/bin/bash
```

```
Echo "Hello Elysium"
```

O6.Input and Output of Script

O7.If-then Scripts in Linux

```
#!/bin/bash
```

```
if [ -e /home/iafzal/veronica ]
```

```
then
```

```
echo "File exist"
```

```
else
```

```
echo "File does not exist"
```

```
fi
```



O8.For Loop Scripts in Linux

```
#!/bin/bash
if [ -e /home/iafzal/check ]
then
echo "File exist"
else
echo "File does not exist"
fi
```

O9.Linux do-while Scripts:

```
#!/bin/bash
count=0
num=10
while [ $count -lt 10 ]
do
echo
echo $num seconds left to stop this process $1
echo
sleep 1

num=`expr $num - 1`
count=`expr $count + 1`
done
echo
echo $1 process is stopped!!!
echo
```

10. Case Statement Scripts

Linux case Statement Scripts:

```
#!/bin/bash
echo Please enter the letter next to the
command that you want to select:
echo 'a date'
echo 'b ls'
echo 'c who'
echo 'd hostname'
    read choice
        case $choice in
a) date;;
b) ls;;
c) who;;
d) hostname;;
*) echo Invalid choice - Bye.
        esac
```

11. Check Remote Servers Connectivity

12. Setting up Aliases (alias) in Linux

13. User and Global Aliases

14. Shell History in Linux

07

CHAPTER

NETWORKING , SERVICES, & SYSTEM UPDATES



08
HRS



14
HRS

O1.Enable Internet on Linux VM:

1. Open Virtualbox Manager
2. Select the machine you cannot get internet on in the left pane
3. Click the Settings button in the top menu
4. Click Network in the left pane in the settings window
5. Switched to Bridged Adaptor in the Attached to drop-down menu
6. Hit OK to save your changes
7. Start your VM

O2.Network Components

1. IP
2. Subnet mask
3. Gateway
4. Static vs. DHCP
5. Interface
6. Interface MAC

O3.Network Files and Commands

Network Files and Commands in Linux: Interface configuration files

1. /etc/hosts
2. Verion 6 = /etc/sysconfig/network
3. Version 7 = /etc/hostname
4. /etc/sysconfig/network-scripts/ifcfg-nic

5. /etc/resolv.conf
6. /etc/nsswitch.conf
7. Network Commands
8. ping
9. ifconfig
10. ifup or ifdown
11. netstat
12. tcpdump

O4. NIC Information (ethtool) in Linux

O5. NIC or Port Bonding

O6. New Network Utilities (nmtui, nmcli, nm-connection – editor and GNOME Settings)

O7. Downloading Files or Apps (wget) in Linux

O8. Curl and ping commands in Linux

O9. FTP – File Transfer Protocol

10. SCP – Secure Copy Protocol

11. rsync – Remote Synchronization

12. System Updates and Repos

1. rpm
2. yum

13. System Upgrade and Patch Management

14. Create Local Repository from CD/DVD/USB in Linux

15. Advance Package Management

16.Rollback Patches and Updates in Linux

17.SSH and Telnet

1. SSH and Telnet in Linux
2. SSH Vs. Telnet in Linux

18.DNS- Download, Install and Configure (Domain Name System) in Linux

19. Hostname or IP Lookup (nslookup and dig) in Linux

20.Network Time Protocol

1. Linux Network Time Protocol
2. Linux chronyd (New Version of NTP)
3. New System Utility Command (timedatectl)

21.Linux Sendmail

22.Web Server (Apache – HTTP)

```
<!DOCTYPE html>
<html>
<body style="background-color:lightgrey;">
<br>
<h1 style="text-align:center;">Welcome to My
First Page</h1>
<h4 style="text-align:center;">My name is
Imran Afzal</h4>
<br>
<br>
<br>
</body>
</html>
```

- 23. Central Logger (rsyslog)**
- 24. Securing Linux Machine (OS Hardening)**
- 25. Open LDAP Installation**
- 26. Tracing Network Traffic (traceoute)**
- 27. Configure and Secure SSH**
- 28. SSH – Keys – Access Remote Server without Password**
- 29. Linux Web-Based Administration (cockpit)**
- 30. Firewall**
- 31. Tune System Performance (tuned, nice and renice)**
- 32. Run Containers – dockers and podman**
- 33. Kickstart (Automate Linux Installation)**
- 34. DHCP Server**

08

CHAPTER

DISK MANAGEMENT AND RUN LEVELS

- O1. System Run Levels
- O2. Computer Boot Process
- O3. Linux Boot Process
- O4. Message of the Day
- O5. Customize Message of the Day
- O6. Storage
- O7. Disk Partition (df , fdisk)
- O8. Add Disk and Create Standard Partition
- O9. Logical Volume Management
- 10. LVM Configuration During Installation
- 11. Add Disk Create New LVM Partition (pvcreate, vgcreate, lvcreate)
- 12. Extend Disk using LVM
- 13. Adding Swap Space
- 14. Advance Storage Management with Stratis
- 15. RAID (Redundant Array of Independent Disks)
- 16. File System Check (fsck and xfs_repair)
- 17. System Backup (dd Command)
- 18. Installation and Configuration of Network File System(NFS)


06
HRS


10
HRS

**19. Samba Installation and
Configuration**
20. NAS Drive for NFS or Samba
21. SATA and SAS

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