

L-120 Linux Fundamentals

Duration: 5 Days (8 Hrs/Day)

Prerequisites: Basic knowledge of Computers

Course Objective: Embark on a comprehensive Linux journey, starting with the basics like "What is Linux?" and Multi-User Concepts. Gain proficiency in The Linux Filesystem, File Management, Text Processing, and Shell Basics. Explore Regular Expressions, Archiving, Compression, and Text Editing. Master various Command Shells, delve into Shell Scripting, and understand Process Management. Learn about Messaging, Secure Shell (SSH), and software management to enhance your Linux expertise. Join us in simplifying complex concepts and acquiring practical Linux skills.

Operating System: CentOS 7

Lab Requirement: Koenig-DC

Module 1 - What is Linux?

UNIX Origins, Design Principles and Timeline

FSF, GNU, and GPL - General Public License

The Linux Kernel and Linux Features

What is a Distribution?

SLS, Slackware, Mandriva, and Debian

SUSE Linux Products

Role Specific Distros

Standardisation

Module 2 - Multi-User Concepts

Multi-User Concepts

Root user

Switching User Contexts

Gathering Login Session Info

Getting Help

Lab: Login to the workstation using a virtual console and GUI interface.

Lab: Use commands to gather information about the current login and the other users on the system.

Lab: Use a variety of help tools to discover more information about the commands.

Lab: Use and explore the use of the su command.

Lab: Observe the operation differences between su and su -.

Module 3 - The Linux Filesystem

LINUX Filesystem Features

Filesystem Hierarchy Standard

Navigating the Filesystem

Displaying Directory Contents

Determining Disk Usage

Disk Usage with Quotas

File Ownership

File and Directory Permissions

File Creation Permissions

Changing File Permissions

SUID and SGID on files

SGID and Sticky Bit - Directories

User Private Group Scheme

Lab: Use the various commands to navigate the directories on the workstation

Lab: Display the characteristics of some files and directories.

Lab: Use df to see how much hard drive space is being used by the filesystem(s)

Lab: Use du to show disk usage of all files in a certain directory

Lab: Display, then change , the ownership of some of the files and directories on the workstation

Lab: Use commands to display, change, and set permissions for the different files and directories on the workstation

Module 4 - Manipulating Files

Directory Manipulation

File Manipulation

File Creation and Removal

Physical Unix File Structure

Filesystem Links

File extensions and content

Displaying Files

Previewing Files

Searching the filesystem



Alternate Search Method

Producing File Statistics

Lab: Explore commands that are useful when doing file and directory management.

Lab: Use commands to display the contents of text files

Lab: Use find and locate to search for files.

Module 5 - Text Processing

Searching Inside Files

The Streaming Editor

Text Processing with Awk

Replacing Text characters

Text Sorting

Duplicate Removal Utility

Extracting Columns of Text

Merging Multiple Files

Lab: Using standard UNIX filters to modify and sort text

Module 6 - Shell Basics

Role of Command Shell

Communication Channels

File Redirection

Piping Commands Together

Filename Matching

Wildcard Patterns/Globbing

Brace Expansion

Shell/Environment Variables

Environment Variables

General Quoting Rules

Nesting Commands

Lab: Use I/O redirection commands

Lab: Use | (pipe) to chain commands

Lab: Glob using wildcard patterns

Lab: Configure a shell variable

Lab: Use the export command to create an environment variable

Lab: Escaping shell meta-characters

Lab: Command substitution using backquotes and the \$(command) form

Module 7 - Regular Expressions

Regular Expression Overview

Lab: Use regular expressions with grep to search for character patterns

Lab: Practice some advanced RegEx's with egrep

Lab: Use sed to perform text editing on a file using regular expressions

Module 8 - Archiving and Compression

Directory Archive with tar and cpio

The compress utility

The gzip and bzip2 compression utilities

Lab: Use archiving and compression commands

Module 9 - Text Editing

Text editing

Pico/GNU Nano

Pico/Nano Interface and Commands

Vi: Basic and Advanced Vi

Advanced Vi Commands

Emacs and Emacs Interface

Basic and Advanced Emacs Commands

Lab: Use the pico or nano editor to create and efficiently modify text files

Lab: Use the vim editor: motion, editing

Lab: Use the Emacs editor: motions, kill, yank, undo, search and search-query commands

Module 10 - Command Shells

Shells

Identifying and Changing the Shell

sh: Configuration Files

sh: Script Execution

sh: Prompts

bash: Bourne Again Shell

bash: Configuration Files

bash: Command Line History, Editing and Completion

Bash: "shortcuts"

bash: prompt

Lab: Identify the current shell

Lab: Examine symbolic links of listed shells

Lab: Invoke shell directly and change login shell

Lab: Explore the functions available through command line history

Lab: Display all aliases, create a new alias, and remove an alias

Lab: Add aliases to .bashrc file to make aliases persistent across login shells and system reboots

Lab: Customise the bash shell

Lab: Run the Z shell

Lab: Explore prompt options including a right hand prompt

Module 11 - Shell Scripting

Shell Scripting

Example Shell Script

Positional Parameters

Input & Output

Doing Math

Comparisons with test

Conditional Statements

The for Loop

The while Loop

Lab: Create a shell script to permit "safe" deletion of files

Lab: Install new shell script

Module 12 - Process Management and Job Control

What is a Process?

Process Creation and States

Viewing Processes

Signals

Tools to Send Signals

Job Control Basics

Jobs

Screen

Using screen

Advanced Screen

Lab: Create several jobs to multi-task at the shell prompt

Lab: Job control

Lab: Use a "fork bomb" to create additional processes

Lab: Use process management tools to examine the current state of the system

Lab: Clean up using kill, killall, pgrep and pkill on the command line and KDE System Guard and the Gnome System Monitor GUI programs

Lab: Create a screen session

Lab: Detach from your session and re-attach to your neighbour's screen session

Lab: Create a split screen session

Module 13 - Messaging

Command Line Messaging

write, talk, and ytalk

The mesg utility

Internet Relay Chat

Instant Messenger Clients

Electronic Mail

Sending Mail with sendmail

Sending Email with mail

Overview of PINE

Sending Email with Pine

Evolution

Lab: Use mesg, write, and talk to communicate between users.

Lab: Send mail using mail and pine.

Module 14 - The Secure Shell (SSH)

Secure Shell

Accessing Remote Shells

Transferring Files

Alternative sftp Clients

SSH Key Management

ssh-agent

Lab: Establish a secure session to a remote host using ssh

Lab: Copy files securely from one host to another using scp

Lab: Generate and use RSA and DSA user keys

Lab: Use ssh-agent to cache the decrypted private key

Module 15 - Managing Software

Downloading Software

FTP, NcFTP, and lftp

wget, lynx, and links



Installing Software

Installing Binary Packages - rpm

Querying and Verifying with rpm

Installing Debian Packages

Compiling / Installing from Source

Installing Source RPM Packages

Lab: Practice using the ftp, ncftp, and wget commands to download software