

L-120 Linux Fundamentals

Duration: 40 Hours (5 Days)

Overview

The L-120 Linux Fundamentals course is an extensive training program designed to equip learners with the core knowledge and skills necessary to navigate and utilize the Linux operating system effectively. The course covers the history and development of Linux, its filesystem, and how to manipulate files and processes within the Linux environment. It delves into text processing, shell basics, regular expressions, archiving, compression, and text editing with tools like Vi and Emacs. More advanced topics include command shells, shell scripting, process management, job control, messaging, secure shell (SSH), and managing software. Through this Linux fundamentals training, participants will gain practical experience and an understanding of Linux distributions, multi-user concepts, and the command line interface, which are crucial for IT professionals. By the end of the course, learners will be well-prepared to work with Linux in various roles and can confidently manage and operate Linux-based systems.

Audience Profile

The L-120 Linux Fundamentals course is designed for IT professionals seeking comprehensive knowledge of Linux operating system basics.

- System Administrators
- Network Administrators
- Technical Support Specialists
- IT Professionals looking to enhance their Linux skills
- Developers who need to understand Linux environment
- Aspiring Linux professionals
- Computer Science and Information Technology students
- DevOps Engineers
- Security Professionals and Ethical Hackers
- Database Administrators working on Linux-based systems
- Open-Source Enthusiasts

Course Syllabus

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 Distro
- 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/Globbering
- 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