



Linux Administration Fundamentals

Course GL120

5 Days

Instructor-Led, Hands On

Introduction

This course is a challenging course that focuses on the fundamental tools and concepts of Linux and Unix. Students gain proficiency using the command line. Beginners develop a solid foundation in Unix, while advanced users discover patterns and fill in gaps in their knowledge. Like all Guru Labs courses, the course material is designed to provide extensive hands-on experience. Topics include: basic file manipulation; basic and advanced file system features; I/O redirection and pipes; text manipulation and regular expressions; managing jobs and processes; vi, the standard Unix editor; automating tasks with shell scripts; managing software; secure remote administration; and more

Supported Distributions:

- Red Hat Enterprise Linux 8
- SUSE Linux Enterprise 15
- Ubuntu 18.04 LTS

Prerequisites

Students should be comfortable with computers. No familiarity with Linux or other Unix operating systems is required.

Course Outline

Module 1: What is Linux?

- Unix and its Design Principles
- FSF and GNU
- GPL - General Public License
- The Linux Kernel
- Linux Kernel and Versioning
- Components of a Distribution
- Slackware
- SUSE Linux Products
- Debian
- Ubuntu
- Red Hat Linux Products
- Oracle Linux

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Module 2: Login and Exploration

- Logging In
- Running Programs
- Interacting with Command Line
- Desktop Environments
- GNOME
- Starting X
- Gathering Login Session Info
- Gathering System Info
- Uptime & w
- got root?
- Switching User Contexts
- sudo
- Help from Commands and Documentation
- Whereis
- Getting Help Within the Graphical Desktop
- Getting Help with man & info

Lab Tasks

- Login and Discovery
- Help with Commands
- Switching Users With su

Module 3: The Linux Filesystem

- Filesystem Support
- Unix/Linux Filesystem Features
- Filesystem Hierarchy Standard
- Navigating the Filesystem
- Displaying Directory Contents
- Filesystem Structures
- Determining Disk Usage With df and du
- Determining Disk Usage (GUI)
- Disk Usage with Quotas
- File Ownership
- Default Group Ownership
- File and Directory Permissions
- File Creation Permissions with umask
- SUID and SGID on files
- SGID and Sticky Bit on Directories
- Changing File Permissions
- User Private Group Scheme

Lab Tasks

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- Navigating Directories and Listing Files
- Disk and Filesystem Usage
- File and Directory Ownership and Permissions
- Introduction to Troubleshooting Labs
- Troubleshooting Practice: Filesystem

Module 4: Manipulating Files

- Directory Manipulation
- File Manipulation
- Deleting and Creating Files
- Managing Files Graphically
- Drag and drop with Nautilus
- Physical Unix File Structure
- Filesystem Links
- File Extensions and Content
- Displaying Files
- Previewing Files
- Producing File Statistics
- Displaying Binary Files
- Searching the Filesystem
- Alternate Search Method

Lab Tasks

- Manipulating Files and Directories
- File Examination & Search Commands

Module 5: Shell Basics

- Role of Command Shell
- Communication Channels
- File Redirection
- Piping Commands Together
- Filename Matching
- File Globbing and Wildcard Patterns
- Brace Expansion
- Shell and Environment Variables
- Key Environment Variables
- Which and Type
- General Quoting Rules
- Nesting Commands

Lab Tasks

- Redirection and Pipes
- Wildcard File Matching

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- Shell Variables
- Shell Meta-Characters
- Command Substitution

Module 6: Archiving and Compression

- Archives with tar
- Archives with cpio
- The gzip Compression Utility
- The bzip2 Compression Utility
- The XZ Compression Utility
- The PKZIP Archiving/Compression format
- GNOME File Roller

Lab Tasks

- Archiving and Compression

Module 7: Text Processing

- Searching Inside Files
- The Streaming Editor
- Text Processing with awk
- Replacing Text Characters
- Text Sorting
- Duplicate Removal Utility
- Extracting Columns of Text
- Combining Files and Merging Text
- Comparing File Changes

Lab Tasks

- Processing Text Streams
- Text Processing

Module 8: Regular Expressions

- Regular Expression Overview
- Regular Expressions
- RE Character Classes
- RE Quantifiers
- RE Parenthesis

Lab Tasks

- Pattern Matching with Regular Expressions
- Extended Regular Expressions
- Using Regular Expressions With sed

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Module 9: Text Editing

- Text Editing
- Pico/GNU Nano
- Pico/Nano Interface
- Nano configuration
- Pico/Nano Shortcuts
- vi and Vim
- Learning vim
- Basic vi
- Intermediate vi

Lab Tasks

- Text Editing with Nano
- Text Editing with Vim

Module 10: Messaging

- System Messaging Commands
- Controlling System Messaging
- Internet Relay Chat
- Instant Messenger Clients
- Electronic Mail
- Sending Email with sendmail
- Sending and Receiving Email with mailx
- Sending and Receiving Email with mutt
- Sending Email with Pine
- Evolution

Lab Tasks

- Command Line Messaging
- Messaging with talkd
- Command Line Email
- Alpine

Module 11: Command Shells

- Shells
- Identifying the Shell
- Changing the Shell
- Configuration Files
- Script Execution
- Shell Prompts
- Bash: Bourne-Again Shell
- Bash: Configuration Files

- Bash: Command Line History
- Bash: Command Editing
- Bash: Command Completion
- Bash: "shortcuts"
- Bash: prompt
- Setting Resource Limits via ulimit

Lab Tasks

- Linux Shells
- Bash History
- Aliases
- Bash Login Scripts
- The Z Shell

Module 12: Introduction to Shell Scripting

- Shell Script Strengths and Weaknesses
- Example Shell Script
- Positional Parameters
- Input & Output
- Doing Math
- Comparisons with test
- Exit Status
- Conditional Statements
- Flow Control: case
- The for Loop
- The while and until Loops

Lab Tasks

- Writing a Shell Script

Module 13: Process Management and Job Control

- What is a Process?
- Process Lifecycle
- Process States
- Viewing Processes
- Signals
- Tools to Send Signals
- nohup and disown
- Managing Processes
- Tuning Process Scheduling
- Job Control Overview
- Job Control Commands
- Persistent Shell Sessions with Screen

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- Using screen
- Advanced Screen

Lab Tasks

- Job Control Basics
- Process Management Basics
- Screen Basics
- Using Screen Regions
- Troubleshooting Practice: Process Management

Module 14: AT and CRON

- Automating Tasks
- at/batch
- cron
- The crontab Command
- crontab Format
- /etc/cron.* / Directories
- Anacron

Lab Tasks

- Creating and Managing User Cron Jobs
- Adding System cron Jobs
- Troubleshooting Practice: Automating Tasks

Module 15: Managing Software

- Downloading with FTP
- FTP
- lftp
- Command Line Internet Non-interactive
- Command Line Internet Interactive
- Managing Software Dependencies
- Using the Yum command
- Using Yum history
- YUM package groups
- Configuring Yum
- yumdownloader
- Popular Yum Repositories
- Using the Zypper command
- Zypper Services and Catalogs
- The dselect & APT Frontends to dpkg
- Aptitude
- Configuring APT

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Lab Tasks

- Command Line File Transfers
- Using Yum
- Using Zypper
- Managing Yum Repositories
- Managing Zypper Repositories
- Using APT
- Adding an APT repository

Module 16: The Secure Shell (SSH)

- Secure Shell
- ssh and sshd Configuration
- Accessing Remote Shells
- Transferring Files
- Alternative sftp Clients
- SSH Key Management
- ssh-agent

Lab Tasks

- Introduction to ssh and scp
- SSH Key-based User Authentication
- Using ssh-agent

Module 17: Mounting Filesystems & Managing Removable Media

- Filesystems Concept Review
- Mounting Filesystems
- NFS
- SMB
- Filesystem Table (/etc/fstab)
- AutoFS
- Removable Media

Lab Tasks

- Accessing NFS Shares
- On-demand filesystem mounting with AutoFS

Module 18: Printing

- Legacy Print Systems
- Common UNIX Printing System
- Defining a Printer
- Standard Print Commands

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- Format Conversion Utilities
- enscript and mpage

Lab Tasks

- Printing
- Configuring Print Queues