

GL120 - Linux Fundamentals

The GL120 is a challenging course that focuses on the fundamental tools and concepts of Linux and Unix. The course's focus on proficient use of the command line benefits all skill levels. 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 filesystem 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.

Prerequisites:

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

Supported Distributions:

SUSE Linux Enterprise 11
Red Hat Enterprise Linux 5 Update 3
Ubuntu 8.04 LTS

Recommended Class Length:

4 days

Detailed Course Outline:

1. What is Linux?
 1. UNIX Origins, Design Principles, Time line
 2. FSF and GNU
 3. GPL - General Public License
 4. The Linux Kernel
 5. Linux Features
 6. Popular Uses of Linux
 7. What is a Distribution?
 8. Components of Distributions
 9. Slackware and Mandriva
 10. Red Hat
 11. SUSE Linux Products
 12. Debian and Ubuntu
 13. Specialized Distributions
 14. Standardization

2. Multi-User Concepts
 1. got root?
 2. Logging In
 3. Switching User Contexts
 4. Gathering Login Session and System Info
 5. Getting Help with man & info
 6. \$MANPATH, whatis and apropos

7. Help from Commands and Documentation

Lab Tasks

8. Login and Discovery
9. Help with Commands
10. Switching Users With su

3. The Linux Filesystem

1. Filesystem Support
2. UNIX/Linux Filesystem Features
3. Filesystem Hierarchy Standard
4. Navigating the Filesystem
5. Displaying Directory Contents
6. Determining Disk Usage
7. Disk Usage with Quotas
8. File Ownership
9. Default Group Ownership
10. File and Directory Permissions
11. File Creation Permissions
12. Changing File Permissions
13. SUID and SGID on files
14. SGID and Sticky Bit on Directories
15. User Private Group Scheme

Lab Tasks

16. Files and Directories
17. Disk and Filesystem Usage
18. File and Directory Ownership and Permissions

4. Manipulating Files

1. Directory Manipulation
2. File Manipulation
3. Deleting and Creating Files
4. Physical Unix File Structure
5. Filesystem Links
6. File Extensions and Content
7. Displaying Files
8. Previewing Files
9. Displaying Binary Files
10. Searching the Filesystem
11. Alternate Search Method
12. Producing File Statistics

Lab Tasks

13. File and Directory Manipulation Commands
14. File Examination & Search Commands

5. Text Processing

1. Searching Inside Files
2. The Streaming Editor
3. Text Processing with awk
4. Replacing Text Characters
5. Text Sorting
6. Duplicate Removal Utility
7. Extracting Columns of Text
8. Merging Multiple Files

Lab Tasks

9. Text Processing

6. Shell Basics

1. Role of Command Shell
2. Communication Channels
3. File Redirection
4. Piping Commands Together
5. Filename Matching
6. File Globbing and Wildcard Patterns
7. Brace Expansion
8. Shell/Environment Variables
9. Key Environment Variables
10. General Quoting Rules
11. Nesting Commands
12. Multiple and Multi-line Commands

Lab Tasks

13. Connecting Commands
14. Wildcard File Matching
15. Shell Variables
16. Shell Meta-Characters
17. Command Substitution

7. Regular Expressions

1. Regular Expressions
2. RE Character Classes
3. RE Quantifiers
4. RE Parenthesis

Lab Tasks

5. Pattern Matching with Regular Expressions
6. Extended Regular Expressions
7. Using Regular Expressions With sed

8. Archiving and Compression

1. Archive with tar and cpio
2. The gzip Compression Utility
3. The bzip2 Compression Utility
4. The Zip Archiving/Compression format

Lab Tasks

5. Archiving and Compression

9. Text Editing

1. Text Editing
2. Pico/GNU Nano
3. Pico/Nano Interface and Shortcuts
4. Vi and Vim
5. Basic Vi
6. Learning Vi
7. Intermediate Vi

Lab Tasks

8. Text Editing with Nano
9. Text Editing with Vim
10. Text Editing with Emacs

10. Command Shells

1. Shells
2. Identifying the Shell
3. Changing the Shell
4. sh: Configuration Files
5. sh: Script Execution
6. sh: Prompts
7. bash: Bourne Again Shell
8. bash: Configuration Files
9. bash: Command Line History
10. bash: Command Editing
11. bash: Command Completion
12. bash: shortcuts
13. bash: prompt

Lab Tasks

14. Linux Shells
15. Bash History
16. Aliases
17. Bash Login Scripts
18. The Z Shell

11. Introduction to Shell Scripting

1. Shell Scripting
2. Example Shell Script
3. Positional Parameters
4. Input & Output
5. Doing Math
6. Comparisons with test
7. Conditional Statements
8. Flow Control: case
9. The for Loop
10. The while Loop

Lab Tasks

11. Writing a Shell Script

12. Process Management and Job Control

1. What is a Process?
2. Process Creation
3. Process States
4. Viewing Processes
5. Signals
6. Tools to Send Signals
7. Job Control Basics
8. Jobs
9. screen
10. Using screen
11. Advanced Screen

Lab Tasks

12. Job Control Basics
13. Process Management and Job Control Basics
14. Screen Basics
15. Using Screen Regions

13. The Secure Shell (SSH)

1. Secure Shell
2. ssh and sshd Configuration
3. Accessing Remote Shells
4. Transferring Files
5. Alternative sftp Clients
6. SSH Key Management
7. ssh-agent

Lab Tasks

8. Introduction to ssh and scp
9. SSH Key-based User Authentication

10. Using ssh-agent

14. Managing Software

1. Downloading Software
2. FTP
3. lftp
4. wget, lynx & links
5. Installing Software
6. Installing Binary Packages - RPM
7. Querying and Verifying with RPM
8. Compiling/Installing from Source
9. Installing Source RPM Packages

Lab Tasks

10. Command Line File Transfers
11. Querying the RPM Database
12. Installing Software via RPM & Source and Rebuilding SRPMs

15. Mounting Filesystems & Managing Removable Media

1. Filesystems Concept Review
2. Mounting Filesystems
3. NFS
4. SMB
5. Filesystem Table
6. Automating Mounts
7. Removable Media
8. Preparing Floppy Diskettes
9. The mtools Package
10. mtools Commands

Lab Tasks

11. Managing floppy disks
12. Using Mtools with FAT/FAT32 formatted media
13. Accessing NFS Shares
14. On-demand filesystem mounting with AutoFS