LINUX FUNDAMENTALS (5 Day)

This 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. 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:

Experience in the following *is required* for this Linux class:

- Basic knowledge of computer hardware, software, and operating systems.
- No familiarity with Linux or other Unix operating systems is required.

Course Outline:

WHAT IS LINUX?

- Unix and its Design Principles
- FSF and GNU
- GPL â€“ 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
- Mandriva

LOGIN AND EXPLORATION

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

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

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

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

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

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

REGULAR EXPRESSIONS

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

TEXT EDITING

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

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

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

INTRODUCTION TO SHELL SCRIPTING

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

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
- Using screen
- Advanced Screen

AT AND CRON

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

MANAGING SOFTWARE

- Downloading with FTP
- FTP
- lftp
- Command Line Internet â€“ Non-interactive
- Command Line Internet â€“ 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

THE SECURE SHELL (SSH)

- Secure Shell
- OpenSSH Client & Server Configuration
- Accessing Remote Shells
- Transferring Files
- Alternative sftp Clients
- SSH Key Management
- ssh-agent

MOUNTING FILESYSTEMS & MANAGING REMOVABLE MEDIA

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

PRINTING

- Legacy Print Systems
- Common UNIX Printing System
- Defining a Printer
- Standard Print Commands
- Format Conversion Utilities
- enscript and mpage