

This course gives an introduction to Linux, a versatile and stable operating system used in business and on many of the servers on the internet. The course is suitable as preparation for the CompTIA Linux+ examinations.

We concentrate on the command line rather than the graphical user interface (GUI) with the most commonly used commands and utilities described in detail as are the use of piping, redirection, wildcards and the vim editor.

The system is fairly easy to learn and use and we expect this course to be a fun and interesting way to master it.

Although based on Ubuntu, the commands and principles learnt may be applied to all other versions of Linux, including Red Hat, CentOS, SUSE and Arch and to all versions of Unix including Solaris and AIX.

The course takes the format of a workshop, with a mix of lecture, working examples and practical exercises. Although the content may be customised, at least 2 days are normally needed to cover the core elements.

Full course notes are provided along with sample files and free software tools for use in accessing a Linux server.

---

## Linux Fundamentals Overview

- Aims and Objectives, Schedule, Introductions, Pre-requisites, Responsibilities

## Accessing the System

### Objectives and Fundamentals

- What are Linux and Unix?
- Logging On
- Command Syntax:
  - Command Alone
  - Command With Options
  - Command With Filename

### Basic Commands

- `uname` - System Information
- `id` - Current User Identity
- `who` - Show Logged In Users
- `date` - Display Date/Time
- `cal` - Calendar Display
- `echo` - Display Messages

- Escape Character (\)
- figlet - ASCII Art Text

## System Navigation

- Arrow Keys
- man - Manual Pages
- Important Control Keys

## Account Management

- passwd - Change Password
- exit - Terminate Session

## Shell Information

- Advantages & Disadvantages
- Basic Structure
- ps - Process Status
- Shell Types:
  - Bourne Shell
  - C Shell
  - Korn Shell
  - Bash Shell
- Shell Selection

## Additional Materials

- Handouts
- Self Study
- History of Unix
- History of Linux

## Commands and Concepts

### Core Concepts

- Processes and Files
- Directory Operations:
  - root Directory
  - ls - List Directory Contents
  - Directory Structure

### File Operations

- cat - Concatenate Files
- less - File Viewer
- wc - Word Count
- nl - Number Lines
- file - Determine File Type

## I/O Operations

- Piping (|)
- Redirection (>, >>)
- tee - Redirect and Pipe
- Multiple Commands (;)

## Administrative Commands

- su - Switch User
- sudo - Superuser Do

## Additional Topics

- Process Execution
- File Types
- script - Record Terminal Session
- File Protection (noclobber)

## Directory Commands

### Directory Navigation

- \$HOME - Home Directory
- pwd - Print Working Directory
- cd - Change Directory

### Shell Configuration

- PS1 - Primary Prompt
- Secondary Prompt (>)
- Aliases
- Shell Customization
- . (dot) Command
- Command History
- Tab Completion

## Directory Management

- mkdir - Create Directory
- rmdir - Remove Directory
- Special Entries (. and ..)
- type - Command Type
- Path Names

## File Commands

### Basic File Operations

- cp - Copy Files
- cp -i - Interactive Copy
- mv - Move Files
- mv -i - Interactive Move
- Directory Operations
- touch - Create/Update Files
- rm - Remove Files
  - rm -i - Interactive Remove
  - rm -f - Force Remove
  - rm -r - Recursive Remove

### Wildcards

- \* - Match Any Characters
- ? - Match Single Character
- [] - Character Classes
- Wildcard Usage with cp, rm, ls

### Text Processing

- wc - Word Count
- Command Combinations
- Workshop (Optional)

## The vim Editor

### Editor Basics

- What is vi?
- What is vim?
- Basic Usage

### Operating Modes

- Command Mode (Cursor Movement)
- Input/Replace Mode
- Command-line Mode

## Text Operations

- Deletion
- Cut and Paste
- Yank and Put

## File Comparison

- cmp - Compare Files
- diff - Find Differences
- sdiff - Side-by-side Diff
- vimdiff - Vim Diff Mode

## Advanced Features

- Regular Expressions
- Global Commands
- Line Addressing
- Substitution
- Settings Configuration
- Syntax Highlighting

## Finding Files and Job Control

### File Search

- find - Search Files
- xargs - Build Command Lines

### I/O Redirection

- Error Redirection
- Input Redirection (<)
- Here Documents (<<)

### Process Control

- Foreground Jobs
- Background Jobs (&)
- kill - Terminate Processes

- jobs - List Jobs

## Job Scheduling

- crontab - Schedule Tasks
- at - One-time Job Schedule

## System Communication

- mail - Email
- write - Send Messages
- mesg - Message Permissions

## File Management

- Inodes
- ln - Create Links

## Print System

- pr, lp, lpstat, cancel
- lpr, lpq, lprm

## Process Priority

- nohup - No Hang Up
- nice - Adjust Priority

## Finding Text and Sorting

### Text Search

- grep - Pattern Search
- egrep - Extended Grep

### Text Processing

- sort - Sort Lines
- uniq - Remove Duplicates
- cut - Extract Fields
- tr - Translate Characters
- expand/unexpand - Tab Conversion
- join/paste - Combine Files
- split - Split Files

- `fmt` - Format Text
- `od` - Octal Dump

## Advanced Topics

- Regular Expressions
- Multiple File Editing

## Backup Commands

### Archive Operations

- `tar` - Tape Archive
- `gzip/gunzip` - Compression
- `cpio` - Copy I/O
- `dd` - Convert and Copy
- Backup Scripting

## File Permissions

### Permission Management

- File and Directory Permissions
- Permission Evaluation
- `chmod` - Change Permissions
- Octal Notation
- SUID Bit
- `umask` - Default Permissions

## Handouts

- Essential Commands
- `vim` Quick Reference
- `nano` Quick Reference