# Linux Fundamentals Training

Duration: **5 Day**

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## Overview

Many institutions have been adding Linux machines to their existing infrastructure: perhaps to give developers a platform of their choice, to provide an alternative to a network server, or perhaps to introduce an additional piece to the security jigsaw. Linux and Unix systems are also being introduced as part of virtualisation environments (for example, with the use of VMware or XEN, KVM or VPC), allowing access to a mixture of operating systems from a single workstation or server. This course will give the delegates the skill set preparing them for a successful future with Linux and Unix technology, by discussing a hybrid of topics that span user and administrator tasks and activities.

## Prerequisites

- Typically, delegate skills will include a good working knowledge of other contemporary operating system, and familiarity with working at the command line. This course is aimed at existing IT professionals with little UNIX or Linux experience, who require a quick start in a Linux environment, enabling them to control a Linux system swiftly and efficiently.
- Whilst no particular Linux knowledge is expected, without a doubt the best results are achieved if the delegates have experienced the system they will be expected to use or administer.

## Who Should Attend

The course is aimed at existing IT professionals with little or no UNIX/Linux experience, who require a quick start in Linux and Unix environments, enabling them to control a Linux and Unix based systems swiftly, efficiently and with full understanding of the underlying principles.

Typical delegates would be current users of Windows, Mac OS, or other professionals (such as software developers, system or network administrators) who need to gain a solid understanding of the environment of LInux and Unix and facilities provided by them.

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## What You Will Learn

At the end of this course you will be able to:

- work with Linux main shell:BASH
- navigate the filesystem and manage files and directories
- understand the client/server nature of X Window System and X applications
- edit files using vi and GUI editors
- manipulate data with a selection of filter tools
- use redirection and piping techniques
- perform basic administrative tasks, controlling processes, filesystems, job scheduling, and simple networking and backups
- reading and writing simple BASH scripts

## Outline

**1. 'Just For Fun'**

- Linux? Why?
- Hardware, software, operating system...
- UNIX Market and place for Linux within it
- OSS (Open Source Software) principles
- GNU GPL, Linux philosophy and distributors
- Linux for networking and developers
- Introduction to objectives and coverage

**2. Linux Session**

- Gaining access to the system
- Ordinary users vs. the superuser
- Login process, shells and line interpreters
- Command line structure, control and examples
- Simple system interrogation utilities
- Simple file reading utilities
- File system layout and navigation
- System and user directories
- Using filenames with absolute and relative pathnames
- Getting help

**3. Using Files and Directories**

- File system - the user's perspective
- Directory structure
- FSH standard
- File and directory manipulation commands
- Copy, move, remove, etc
- File system - the system's perspective
- I-nodes and file attributes
- Hard links and symbolic links

**4. Editing Text**

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- Operational modes of vi
- Command mode vs. Insert mode
- 'Colon', or 'ex' mode
- Useful vi commands
- Navigation and editing command
- Search and substitute
- Extended vi commands and vim configuration
- Alternative editors
- GUI and text choices

**5. BASH - Your Interpreter**

- Shell as Interpreter and command line scan
- Generating filenames with wildcards (globbing)
- Quoting (protecting special characters from the shell)
- Variable and command substitutions
- Protecting special characters for the shell
- Bash Command History
- Bash Command Line Editing

**6. BASH Environment**

- Shell definitions
- Creating, recalling and sharing shell variables
- Shell aliases and functions
- Character sets and localisation
- Bash variables to control these
- Controlling shell behaviour with set -o and shopt
- Interactive Start-up Files
- Start-up files for login and non-login shells

**7. Who is the Boss**

- The su command
- su interactive session
- Running one-off commands
- Checking who you are
- Understanding id and who am i tools
- The sudo tool
- Typical sudo session
- sudo configuration file

**8. Processes**

- What is a Process?
- How a process starts
- How a process ends
- The kill command and signals
- Command exit status
- Identifying Processes
- ps, top and GUI process monitors

**9. Job Control**

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- Background jobs
- One-off deferral with at
- Daemon and job manipulation
- User access configuration files
- Spool directory
- Scheduling repeated tasks with crontab
- The cron daemon and configuration tables
- User access configuration files

**10. Data Streams**

- Standard data streams
- Standard output stream (stdout)
- Standard error stream (stderr)
- Standard input (stdin)
- Redirecting streams
- Redirecting standard output, error and input
- Synchronising (merging) streams
- Other methods of handling data streams
- Collecting data with sub-shells
- Using command substitution

**11. Pipes and Filters**

- Sending stdout to a process
- Pipes
- Multistage Pipes
- Simple Filters
- Why Use Filters?
- Problem Solving Approach
- The cut, sort, uniq, grep and tr commands
- Filter Examples

**12. Basic Regular Expressions (and SED)**

- Regular expressions
- What is sed
- Specifying simple instructions
- Understanding sed addressing
- Using a sed command file
- More sed editing commands

**13. File Management Tools**

- Using PATH to identify command origins
- The which and type commands
- Locating files
- The locate command and mlocate database
- Identifying filenames with find
- Specifying search criteria and requesting actions
- Backups with cpio, and dd and tar
- Compression tools

**14. Filesystem Access**

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- Files, directories and filesystems
- File and directory access
- Read/write/execute permissions
- User types
- Additional permission bits
- Set user/group ID bits and sticky bit
- Using chmod, chown and chgrp to manipulate access attributes

**15. Working in a Network Environment**

- Basic network card configuration
- Using ifconfig tool
- GUI configuration programs exist
- Basic routing configuration
- Using route commands
- Network diagnostics
- With ping, traceroute and netstat
- Using ssh for remote shell logins

**16. X Window System**

- X Window System as Linux GUI Interface
- Origins and implementation
- X Window System Architecture
- Client-server communication
- Setting display access rights
- Selecting destination display
- Window managers / desktop systems
- Gnome, KDE and more...
- X Window resources
- Fonts, colours, geometry

**17. Writing Shell Scripts**

- Simple scripts
- Positional parameters
- Command exit status
- Selection commands
- Looping commands
- Interactive input