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UNIX and LINUX Systems Basics I

Course Summary

Description

This course is designed to help technical staff gain a mastery of UNIX and/or Linux operating systems. It builds a foundation of UNIX/Linux system structure and commands designed to develop the student's understanding of UNIX/Linux. Following the completion of this course, the student will have a proficiency in the basic commands necessary to exploit the power of the UNIX/Linux operating system.

Lab Environment
This course uses a continuous lab environment where the student stays logged on to both a Linux and a UNIX system, interacting with it constantly, in parallel with the lecture.

Objectives
By the end of this course, students will be able to:

- Understand why things work the way they do in UNIX
- Understand the differences between UNIX and Linux
- Understand the differences between Linux distributions
- Understand UNIX command syntax
- Understand the details of the UNIX file system
- Understand how security is implemented in UNIX
- Understand how the Korn and bash shells work
- Read and understand a shell script
- Use the vi and vim editors
- Understand how to use different UNIX utilities

Topics

- Introduction to UNIX and Linux
- Getting started
- Navigating UNIX File Systems
- File system security
- Additional UNIX commands
- Using the vi and vim editors
- Introduction to the UNIX shell and shell programming
- Introduction to UNIX Power Utilities
- Communicating with Other UNIX Users

Audience

This course is designed for system/application end-users who have little or no experience with the UNIX or Linux operating systems. This course provides a functional familiarity with basic system tools and commands to those individuals with other operating systems experience.

Prerequisites

There are no prerequisites for this course.

Duration

Three days

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Course Outline

I. Introduction to UNIX and Linux (2 hours)
- A. Introduction to UNIX and Linux
- B. Evolution of UNIX and Linux
- C. What is UNIX?
- D. Key UNIX Characteristics
- E. The UNIX Structure
- F. Practical Applications of UNIX
- G. UNIX System Administration
- H. Existing UNIX Variants
- I. Differences Between UNIX Variants
- J. UNIX vs. Linux
- K. What is Linux?
- L. Which Linux Distribution is better?
- M. RedHat Family
- N. Debian Family
- O. Other Linux Distributions
- P. UNIX Standards

II. Getting Started with UNIX & Linux (1/2 hour)
- A. Logging in using PuTTY
- B. Access Levels in UNIX
- C. Nested Login with su
- D. Switching shells, Logging Out
- E. Password Rules

III. Navigating UNIX File Systems (3 hours)
- A. Getting Some Files
- B. Getting help: the man cmd
- C. The Role of the File System
- D. File System Naming Guidelines
- E. Common Filename Extensions
- F. Absolute Pathnames
- G. Relative Pathnames
- H. Pathname Abbreviations
- I. File Tree Navigation Exercise
- J. System Directory Structure
- K. User Files & User Directories
- L. Default Directory
- M. /etc/passwd File Format
- N. /etc/group Format
- O. Default Group
- P. Command Syntax
- Q. Commands, Options, and Arguments
- R. Basic File Commands: pwd
- S. Basic File Commands: cd
- T. Basic File Commands: ls -l
- U. Lab: ls Command
- V. touch – change file timestamps
- W. mkdir Command
- X. rmdir Command
- Y. Basic File Commands: cat
- Z. Lab: cat
- AA. File Commands: more, less, pg
- BB. Basic File Commands: head
- CC. Basic File Commands: tail
- DD. Basic File Commands: cp
- EE. Basic File Commands: mv
- FF. Basic File Commands: rm
- GG. Hard and Symbolic Links
- HH. Hard Link Lab
- II. Soft Link Lab
- JJ. du Command
- KK. df Command
- LL. Lab: Directories

IV. UNIX File System Security (2 hours)
- A. Detailed Output of the ls Command
- B. UNIX File Security: Permissions
- C. Working with Permissions
- D. Changing Permissions
- E. Three chmod Examples, Same Result
- F. UNIX Directory Permissions
- G. Lab: chmod
- H. Lab: Permissions
- I. File/Dir Permissions - umask
- J. Lab: umask
- K. Changing File Ownership
- L. Switching Groups

V. Additional UNIX Commands (1 hour)
- A. who - query session information
- B. wc – word count
- C. date – Display formatted date/time
- D. file – Display File Type
- E. diff – Show difference between files
- F. diff: Example
- G. cmp - Compare Two Files
- H. cmp: Example
- I. whereis – Display cmd Location
- J. whence – Display cmd Location
- K. cal - Display calendar
- L. banner – display a large banner

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Course Outline (cont'd)

VI. Using the vi and vim Editors (2 hours)
- A. UNIX Text Editors
- B. Launching vi
- C. Basic vi Modes
- D. Switching to and from Input Mode
- E. Scrolling in Browse Mode
- F. vi File cmds
- G. vi: Lab 1
- H. Editing Files with vi - Repeat n
- I. Editing Files with vi - .exrc
- J. vi: Lab 2
- K. vi: Regular Expressions
- L. vi: Regular Expression Examples
- M. vi: Searching for Text
- N. vi: Search Lab
- O. Substitute command detail
- P. vi: Text Substitution Lab
- Q. Advanced vi Modes (optional)
- R. Edit Mode
- S. ex Mode
- T. Basic ex Commands
- U. vim Extensions

VII. Introduction to the Unix Shell (3 hours)
- A. Key Shell Features
- B. Different Shell Flavors
- C. The Shell Prompt
- D. Intro to Shell Variables
- E. Creating & Using Shell Variables
- F. The Environment & Shell Variables
- G. Exporting Shell Variables
- H. Useful Shell Variables
- I. Understanding Shell Quote Usage
- J. Command-line Editing
- K. Shell Initialization: Startup Scripts
- L. Shell Initialization Variables: Lab
- M. Bash Initialization: Startup Scripts
- N. Bash Initialization Variables: Lab
- O. Shell Scripts
- P. Shell Scripts - Example
- Q. Languages: Compiled vs. Scripting
- R. Viewing Exit Status in the Shell
- S. Using Exit Status in a Shell Script
- T. Shell: Redirection to & from Files
- U. Shell: Pipes
- V. Shell: Wildcards
- W. Shell: Command Alias
- X. UNIX Process Management
- Y. UNIX Process Mgmt: the ps cmd
- Z. UNIX Process Mgmt: Background
- AA. Shell Job Control Commands
- BB. UNIX Process Mgmt: Kill
- CC. UNIX Process Management Lab

VIII. Intro to UNIX Power Utilities (2 hours)
- A. UNIX Power Utilities
- B. UNIX Power Tools: sort
- C. Basic File Commands: find
- D. find Examples
- E. Relationship Between find and ls
- F. Lab: find
- G. grep Utility
- H. grep Utility Examples w/ Results
- I. grep Examples
- J. sed Editing Utility
- K. sed Editing Exercise
- L. awk Utility
- M. Metacharacters
- N. Power Utility Examples
- O. Additional UNIX Power Utilities
- P. Archiving Files
- Q. Compressing files

IX. Communicating with other UNIX Users (1 hour)
- A. E-mail and Messaging Differences
- B. The mail Command
- C. UNIX mail
- D. Sending Mail
- E. Mail Commands:
- F. Using write and wall
- G. Using who
- H. wall Command
- I. The mesg Command
- J. The finger and talk commands