

# Linux Introduction

UNIX300

This course provides users of all Linux systems with a basic introduction to the Linux operating system environment and its use, including the features of its user command interface, the shell. In addition, the course provides an introduction to the most important Linux user utilities, including utilities for text and data manipulation; file and directory access control, as well as more advanced features of the Linux shell, including an introduction to Linux shell programming (or scripting). The course also discusses the use of Linux network communication commands; methods for customizing the user environment; and Linux job scheduling features. Optionally, this course also provides an overview of the widely-implemented Network File System (NFS); and an introduction to the *Perl* programming language.

## Audience

- Anyone who is or will be a Linux system user. This course also provides a foundation for further study of Linux shell programming, Linux system administration, and application development in a Linux environment. System administrators

## Prerequisites

- Familiarity with computers (at the user level), including keyboard familiarity. This course, in turn, is a prerequisite for more advanced Linux courses, including *UNIX/Linux Shell Programming*.

## Course Length

- Five days

## Learning Objectives

- Linux concepts and basic commands
- On-line Linux documentation, Linux filesystem and commands
- The Linux screen editor, shell and Linux processes
- Customizing your Linux environment
- Finding files using the Linux *find* command
- Linux commands for text, data, and file manipulation
- File access permissions, and the *chmod* and *umask* commands
- Customizing your Linux environment
- TCP/IP Utilities in Linux
- Job scheduling using *at* and *cron*
- An introduction to the *Perl* programming Language
- An overview of NFS – the Network File System

## Course Outline

CA10

<p><b>The Linux Environment</b></p> <ul style="list-style-type: none"> <li>What is Linux</li> <li>UNIX and Linux</li> <li>A Short History of Linux</li> <li>The Linux Software Model</li> <li>What Is the "Shell"?</li> <li>Linux Today</li> </ul> <p><b>Logging-In and Executing Commands</b></p> <ul style="list-style-type: none"> <li>The Linux Computing Environment</li> <li>Basic commands (cat, more, pg, and more)</li> <li>Communicating with Linux : The ASCII Character Set</li> <li>Special Keys and Characters</li> <li>Virtual Terminals</li> <li>Logging-In: Text and Graphical Modes</li> <li>The Linux Shell Command Line</li> <li>The Command History File</li> <li>The <i>history</i> and <i>fc</i> Commands</li> <li>Some Basic Commands: <i>date</i>, <i>who</i>, <i>whoami</i>, <i>tty</i></li> <li>Displaying file contents with <i>cat</i>, <i>more</i> and <i>less</i></li> <li>Two Useful Features: <i>&gt;</i> (redirection) and <i> </i> (pipe)</li> <li>Selecting Input with <i>grep</i></li> <li>Sorting Input with <i>sort</i></li> <li>Printing Files and Jobs with <i>lp</i> and <i>lpr</i></li> <li>The Online Documentation: <i>man</i>, <i>info</i>, and <i>--help</i></li> <li>Changing Your Password: The <i>passwd</i> Command</li> <li>Logging-Off</li> </ul> <p><b>The Linux File System</b></p> <ul style="list-style-type: none"> <li>The Linux File System</li> <li>Ordinary Files</li> <li>Directory Files ("Directories")</li> <li>Directories, inumbers, inodes</li> <li>File/Directory Access in Linux</li> <li>"Special Files," Symbolic Links, Sockets</li> <li>Rules for Naming Files</li> <li>. and ..</li> <li>Referencing Files &amp; Directories: Pathnames</li> <li>Linux File System Organization</li> <li>The login, <i>HOME</i>, and Current Directories</li> <li>The <i>cd</i> and <i>pwd</i> Commands</li> <li>File System Information: The <i>ls</i> Command</li> <li>The <i>file</i> Command</li> <li>Managing Directories: <i>mkdir</i> and <i>rmdir</i></li> <li>Copying Files: <i>cp</i></li> <li>Renaming and Moving Files: <i>mv</i></li> <li>Linking File Names: <i>ln</i></li> <li>Removing Files: <i>rm</i></li> <li>Shell File Name Generation</li> </ul> <p><b>The Linux Screen Editor</b></p> <ul style="list-style-type: none"> <li>Creating Small Files Using <i>echo</i> and <i>cat</i></li> <li>The <i>vim</i> Full Screen Editor</li> <li>Three <i>vim</i> Modes</li> </ul>	<ul style="list-style-type: none"> <li>Starting <i>vim</i></li> <li>Input Mode Commands: <i>i</i>, <i>I a</i>, <i>A</i>, <i>o</i>, <i>O</i>, <i>R</i></li> <li>Movement Commands: Cursor Movement</li> <li>Moving Through the Buffer</li> <li>Editing: Deleting Text</li> <li>Editing: Changing Text</li> <li>Text Searching with <i>/</i> and <i>?</i></li> <li><i>Line editor search-and-substitute</i></li> <li>Saving and Quitting <i>vim</i></li> <li><i>Additional buffer I/O : r and e</i></li> <li>"Cutting," Pasting, and Copying Lines</li> <li>Undo, Repeat, Redraw</li> <li><i>vim</i> Options</li> </ul> <p><b>Linux Shell Features</b></p> <p>Evolution of the Linux Shells</p> <p>Shell as a Command Interpreter</p> <p>Input / Output Management in Shell</p> <p>Standard I/O Connections</p> <p>Redirecting Standard Output: <i>&gt;</i> and <i>&gt;&gt;</i></p> <p>Redirecting Diagnostic Output: <i>2&gt;</i> and <i>2&gt;&gt;</i></p> <p>Redirecting Standard and Diagnostic Output</p> <p>Preventing Accidental Overwriting: <i>noclobber</i> Protection</p> <p>Pipeline Commands ("Piping")</p> <p>Shell Variables</p> <p>Shell Variable Scope and the <i>export</i> Command</p> <p>Command Substitution: <i>` `</i> and <i>\$( )</i></p> <p>Sequential Command Lines</p> <p>Asynchronous ("Background") Command Execution: <i>&amp;</i></p> <p>Quoting in Shell: <i>\ ' ' and " "</i></p> <p><b>Managing Linux Processes</b></p> <p>Linux Processes</p> <p>How Shell Executes Commands</p> <p>Monitoring Processes with <i>ps</i></p> <p>Signaling Processes: <i>INT</i>, <i>QUIT</i>, and <i>kill</i></p> <p>Running a Command Immune to Hangup: <i>nohup</i></p> <p>Shell Job Control</p> <p><b>Customizing Your Linux Environment</b></p> <p>How Shell Starts-Up</p> <p>Shell "Special" Variables</p> <p>Command Aliases: The <i>alias</i> Command</p> <p>Customizing Your Shell Environment: <i>.bash_profile</i> and the <i>BASH_ENV</i> File</p> <p><b>Finding Files with find</b></p> <p>The <i>find</i> Command</p> <p><i>find</i> Examples</p> <p><b>Advanced Linux Tools</b></p> <p>Selected Display with <i>head</i> and <i>tail</i></p> <p>Selecting Input with <i>grep</i></p> <p><i>grep</i> Option Examples</p> <p>Regular Expressions</p> <p>Extensions to <i>grep</i>: <i>egrep</i> and <i>fgrep</i></p> <p>The Stream Editor: <i>sed</i></p>	<p>Using <i>sed</i>: Substitution, Deletion, Selective Printing</p> <p>Processing Records with <i>awk</i></p> <p>Selecting Columns of Input with <i>cut</i></p> <p><i>paste</i>, <i>tr</i>, <i>od</i>, and <i>cmp</i></p> <p>Sorting Input with <i>sort</i></p> <p>Modifying the Sort Sequence: Sort Keys</p> <p>Additional Features of <i>find</i></p> <p><i>find</i> Actions and Examples</p> <p>Archiving Files and Applications with <i>tar</i> and <i>gzip</i></p> <p><b>File Access Permissions</b></p> <p>Access Control in Linux</p> <p>Linux File Access</p> <p>Linux Directory Access</p> <p>"X" Permission for Directories</p> <p>Changing File Access Permissions with <i>chmod</i></p> <p>Using <i>chmod</i> with "Absolute" (Octal) Notation</p> <p>Default Access Permissions and the <i>umask</i> Command</p> <p><b>Additional Linux Shell Features</b></p> <p>Evolution of the Linux Shells</p> <p>The Shell as a Command Interpreter</p> <p>Shell Command Grouping: <i>( )</i></p> <p>Conditional Execution: <i>&amp;&amp;</i> and <i>  </i></p> <p>Creating Shell Programs</p> <p>A Simple Shell Program</p> <p>Shell Programming Features</p> <p>Shell Logical Programming Constructs</p> <p><b>Customizing Your Shell Environment</b></p> <p>How the Shell Starts-Up</p> <p>Shell "Special" Variables</p> <p>The <i>~</i> ("Tilde") Operator</p> <p>Shell Options and the <i>set</i> Command</p> <p>Terminal Interface Control: <i>stty</i></p> <p>Command Aliases: The <i>alias</i> Command</p> <p>Customizing Your Shell Environment: <i>.bash_profile</i> and the <i>BASH_ENV</i> File</p> <p><b>Using TCP/IP Utilities in Linux</b></p> <p><i>hostname</i> and <i>uname</i>:</p> <p>The <i>telnet</i> and <i>rlogin</i> Commands</p> <p>Interactive Remote File Transfer: The <i>ftp</i> File Transfer Program</p> <p>Secure File Transfer with Secure Copy</p> <p>Tracing Network Problems with <i>ping</i> and <i>traceroute</i></p> <p><b>Linux Job Scheduling Using at and cron</b></p> <p><b>(Optional) Appendix A - The Perl Programming Language</b></p> <p><b>(Optional) Appendix B - NFS – Network File Systems</b></p>
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