

# Table of Contents

## RH033 Red Hat Linux Essentials

### Section 1: A Tour of Red Hat Enterprise Linux

#### UNIT 1 — Overview

Objectives	1-2
Agenda	1-3
UNIX History	1-4
UNIX Principles	1-5
GNU Project / FSF	1-6
GPL - GNU General Public License	1-7
Linux Origins	1-8
Why Linux?	1-9
Red Hat Enterprise Linux	1-10
Recommended Hardware Specifications	1-11
Local Logins	1-12
Virtual Consoles	1-13
The Xorg GUI Framework	1-14
Xorg Graphical Environments	1-15
Starting Xorg	1-16
Changing Your Password	1-17
End of Unit 1	1-18

#### UNIT 2 – Running Commands and Getting Help

Objectives	2-2
Agenda	2-3
Running Commands	2-4
Some Simple Commands	2-5
Getting Help	2-6
The <code>what is</code> Command	2-7
The <code>--help</code> Option	2-8
Reading Usage Summaries	2-9
The <code>man</code> Command	2-10
Navigating <code>man</code> Pages	2-11
The <code>info</code> Command	2-12
Navigating <code>info</code> Pages	2-13
Extended Documentation	2-14
Red Hat Documentation	2-15
End of Unit 2	2-16
<b>Lab: Getting Help with Commands</b>	

## UNIT 3 — Browsing the Filesystem

Objectives	3-2
Agenda	3-3
Linux File Hierarchy Concepts	3-4
Some Important Directories	3-5
Other Important Directories	3-6
Current Working Directory	3-7
File and Directory Names	3-8
Absolute Pathnames	3-9
Relative Pathnames	3-10
Changing Directories	3-11
Listing Directory Contents	3-12
Copying Files and Directories	3-13
Copying Files and Directories: The Destination	3-14
Moving and Renaming Files and Directories	3-15
Moving and Renaming Files and Directories: The Destination	3-16
Creating and Removing Files	3-17
Creating and Removing Directories	3-18
Using Nautilus	3-19
Moving and Copying in Nautilus	3-20
Determining File Content	3-21
Viewing an Entire Text File	3-22
Viewing Text Page by Page	3-23
End of Unit 3	3-24
<b>Lab: Browsing the Filesystem</b>	

## UNIT 4 — The `bash` Shell

Objectives	4-2
Agenda	4-3
<code>bash</code> Introduction	4-4
<code>bash</code> Heritage and Features	4-5
Command Line Shortcuts: File Globbing	4-6
Command Line Shortcuts: The Tab Key	4-7
Command Line Shortcuts: <code>history</code>	4-8
Command Line Expansion: Tilde	4-9
Command Line Expansion: Variable and String	4-10
Command Line Expansion: Command and Math	4-11
Protecting from Expansion: Backslash	4-12
Protecting from Expansion: Quotes	4-13
History Tricks	4-14

Command Editing Tricks	4-15
Command Editing Tricks: Editing Modes	4-16
<code>gnome-terminal</code>	4-17
End of Unit 4	4-18
<b>Lab: Exploring the <code>bash</code> Shell</b>	
<b>UNIT 5 — Standard I/O and Pipes</b>	
Objectives	5-2
Agenda	5-3
Standard Input and Output	5-4
Redirecting Input and Output	5-5
Redirecting Output	5-6
Redirecting Standard Output	5-7
Overwriting or Appending	5-8
Redirecting Standard Error	5-9
Redirecting Both Standard Output and Error	5-10
Redirecting Input	5-11
Using Pipes to Connect Processes	5-12
Useful Pipe Targets	5-13
<code>tee</code>	5-14
End of Unit 5	5-15
<b>Lab: Standard I/O and Pipes</b>	
<b>UNIT 6 — Users, Groups, and Permissions</b>	
Objectives	6-2
Agenda	6-3
The Linux Security Model	6-4
Users	6-5
Groups	6-6
The <code>root</code> User	6-7
Linux File Security	6-8
Permission Types	6-9
Examining Permissions	6-10
Interpreting Permissions	6-11
Examining Directories	6-12
Linux Process Security	6-13
Changing Permissions- Symbolic Method	6-14
Changing Permissions- Numeric Method	6-15
Changing Permissions- Nautilus	6-16
End of Unit 6	6-17
<b>Lab: File Permissions</b>	

## UNIT 7 — `vi` and `vim` Editor Basics and Printing

Objectives	7-2
Agenda	7-3
Overview of <code>vi</code> and <code>vim</code>	7-4
Starting <code>vi</code> and <code>vim</code>	7-5
Three Modes of <code>vi</code> and <code>vim</code>	7-6
Cursor Movement	7-7
Entering Insert Mode	7-8
Leaving Insert Mode: <code>&lt;Esc&gt;</code>	7-9
Change, Delete, and Yank	7-10
Put (paste)	7-11
Undoing Changes	7-12
Searching for Text	7-13
Command-Mode Tricks	7-14
Saving and Exiting: <code>ex</code> mode	7-15
Printing in Linux	7-16
Printing Commands	7-17
Printing Utilities	7-18
End of Unit 7	7-19
<b>Lab: <code>vi</code> and <code>vim</code> Editor Basics</b>	

## Section 2:

### Red Hat Enterprise Linux: A Deeper View

## UNIT 8 — The Linux Filesystem In-Depth

Objectives	8-2
Agenda	8-3
Partitions and Filesystems	8-4
Inodes	8-5
Directories	8-6
Inodes and Directories	8-7
<code>cp</code> and Inodes	8-8
<code>mv</code> and Inodes	8-9
<code>rm</code> and Inodes	8-10
Symbolic (or Soft) Links	8-11
Hard Links	8-12
The Seven Fundamental Filetypes	8-13

Checking Free Space	8-14
Removable Media	8-15
Mounting CDs and DVDs	8-16
Mounting USB Media	8-17
Mounting Floppy Disks	8-18
Formatting Floppy Disks	8-19
Why Archive Files?	8-20
Creating an Archive	8-21
Inspecting Archives	8-22
Extracting an Archive	8-23
Why Use File Compression?	8-24
Compression Utilities	8-25
Using Compression	8-26
Compressing Archives	8-27
<code>tar</code> to Unformatted Floppies	8-28
End of Unit 8	8-29
<b>Lab: The Linux Filesystem</b>	

## UNIT 9 — Configuring the `bash` Shell

Objectives	9-2
Agenda	9-3
Configuring the <code>bash</code> Shell	9-4
Variables	9-5
Configuring the Shell: Local Variables	9-6
Common Local Variables	9-7
The <code>PS1</code> Local Variable	9-8
Aliases	9-9
Other Shell Configuration Methods	9-10
Configuring Commands: Environment Variables	9-11
Common Environment Variables	9-12
The <code>TERM</code> Environment Variable	9-13
The <code>PATH</code> Environment Variable	9-14
How the Shell Expands the Command Line	9-15
Shell Startup Scripts	9-16
Login Shells	9-17
Startup Scripts: Order of Execution	9-18
<code>/etc/profile</code>	9-19
<code>/etc/profile.d</code>	9-20
<code>~/.bash_profile</code> and <code>~/.bashrc</code>	9-21
<code>~/.bash_logout</code>	9-22
End of Unit 9	9-23
<b>Lab: Configuring the <code>bash</code> Shell</b>	

## UNIT 10— Advanced Topics in Users, Groups, and Permissions

Objectives	10-2
Agenda	10-3
User and Group ID Numbers	10-4
<code>/etc/passwd</code> , <code>/etc/shadow</code> , and <code>/etc/group</code> Files	10-5
System Users and Groups	10-6
Changing Your Identity	10-7
User Information Commands	10-8
Default Permissions	10-9
Special Permissions	10-10
Special Permissions for Executables	10-10
Special Permissions for Directories	10-12
End of Unit 10	10-13
<b>Lab: Switching Users and Setting a <code>umask</code></b>	

## UNIT 11— Advanced Uses of the `vi` and `vim` Editors

Objectives	11-2
Agenda	11-3
File Repositioning	11-4
Screen Repositioning	11-5
Filtering	11-6
ex mode: Search and Replace	11-7
Visual Mode	11-8
Advanced Reading and Saving	11-9
Configuring <code>vi</code> and <code>vim</code>	11-10
Expanding your Vocabulary	11-11
A Peek at the Appendix	11-11
End of Unit 11	11-13
<b>Lab: Advanced Uses of the <code>vi</code> and <code>vim</code> Editors</b>	

# Section 3: Red Hat Enterprise Linux Power Tools

## UNIT 12 — Introduction to String Processing

Objectives	12-2
Agenda	12-3
<code>head</code>	12-4
<code>tail</code>	12-5
<code>tail</code> - continued	12-6

<code>wc</code>	12-7
<code>sort</code>	12-8
<code>uniq</code>	12-9
<code>cut</code>	12-10
Other String Processing Tools	12-11
Version Comparison with <code>diff</code>	12-12
Spell Checking with <code>aspell</code>	12-12
Formatting Tools	12-14
End of Unit 12	12-15
<b>Lab: Introduction to String Processing</b>	

### UNIT 13 — String Processing with Regular Expressions

Objectives	13-2
Agenda	13-3
Pattern Matching with Regular Expressions	13-4
Wildcard Characters	13-5
Modifiers	13-6
Anchors	13-7
regex Combinations	13-8
Regular Expressions - Examples	13-9
Quote your regex's!	13-10
<code>grep</code>	13-11
<code>sed</code>	13-12
Using <code>sed</code>	13-13
<code>less</code> and <code>slocate</code>	13-13
Regular Expressions in <code>vi</code> and <code>vim</code>	13-15
Extended Regular Expressions	13-16
Extended regex Syntax	13-17
<code>awk</code>	13-18
Using <code>awk</code>	13-19
End of Unit 13	13-20
<b>Lab: String Processing with Regular Expressions</b>	

### UNIT 14 – Finding and Processing Files

Objectives	14-2
Agenda	14-3
<code>slocate</code>	14-4
<code>slocate</code> Examples	14-5
<code>find</code>	14-6
Basic <code>find</code> Examples	14-7
<code>find</code> and Logical Operators	14-8
<code>find</code> and Permissions	14-9
<code>find</code> and Numeric Criteria	14-10

find and Access Times	14-11
Executing Commands with find	14-12
find Execution Examples	14-13
The Gnome Search Tool	14-14
End of Unit 14	14-14
<b>Lab: Finding and Processing Files</b>	

## UNIT 15 — Investigating and Managing Processes

Objectives	15-2
Agenda	15-3
What is a Process?	15-4
How Processes Are Created	15-5
Process Ancestry	15-6
Process States	15-7
Viewing Processes	15-8
Sending Signals to Processes	15-9
Terminating Processes	15-10
Altering Process Scheduling Priority	15-11
Altering Process Scheduling Priority- continued	15-12
Interactive Process Management Tools	15-13
Running a Process in the Foreground	15-14
Running a Process in the Background	15-15
Suspending a Process	15-15
Listing Background and Suspended Jobs	15-17
Resuming Suspended Jobs	15-18
Compound Commands	15-19
Scheduling a Process to Execute Later	15-20
Scheduling Periodic Processes	15-21
Using cron	15-22
Crontab File Format	15-23
End of Unit 15	15-24
<b>Lab: Process Control</b>	

## UNIT 16 — Network Clients

Objectives	16-2
Agenda	16-3
Web Clients	16-4
Firefox	16-5
Other GUI Web Browsers	16-6
Non-GUI Web Browsers	16-7
wget	16-8
Email and Messaging	16-9
Evolution	16-10

Configuring Evolution	16-11
Evolution and GnuPG	16-12
Other GUI Mail Clients	16-13
Non-GUI Mail Clients	16-14
Gaim	16-15
Remote Access and File Transfer	16-16
ssh: Secure Shell	16-16
scp: Secure Copy	16-18
telnet and the “r” Services	16-19
<b>rsync</b>	16-20
<b>lftp</b>	16-21
<b>gFTP</b>	16-22
smbclient	16-23
File Transfer with Nautilus	16-24
Xorg Clients	16-25
Network Diagnostic Tools	16-26
End of Unit 16	16-27
<b>Lab: Network Clients</b>	

## UNIT 17 — **bash** Shell Scripting

Objectives	17-2
Agenda	17-3
Scripting Basics	17-4
Creating Shell Scripts	17-5
Creating Shell Scripts- Continued	17-6
Generating Output	17-7
Handling Input	17-8
Exit Status	17-9
Control Structures	17-10
Conditional Execution	17-11
Selection Structures: Using the <b>if</b> Statement	17-12
File Tests	17-13
String Tests	17-14
Selection Structures: Using <b>if</b> / <b>else</b> Statements	17-15
Selection Structures: Using the <b>case</b> Statement	17-16
Repetition Structures: The <b>for</b> loop	17-17
<b>for</b> and sequences	17-17
Selection Structures: The <b>while</b> loop	17-19
<b>continue</b> and <b>break</b>	17-20
Using Positional Parameters	17-21
Handling Parameters with Spaces	17-22
Handling Filenames with Spaces	17-23
Using Functions in Shell Scripts	17-24
Using Functions - continued	17-25

Scripting at the Command Line	17-26
Shell Script Debugging	17-27
End of Unit 17	17-28
<b>Lab: bash Shell Scripting</b>	

## **UNIT 18 — So... What now?**

Objectives	18-2
Agenda	18-3
Some Areas to Explore	18-4
Development	18-5
Red Hat Development Classes	18-6
System Administrator Duties	18-7
RHCE/RHCT Skills Courses	18-8
RHCA Skills Courses	18-9
The Linux Community	18-10
End of Unit 18	

## **Appendix – Advanced Features of the vi and vim Editors**

### **Appendix -- Configuring Gnome**

### **Appendix – vi / vim Quick Reference**

### **Appendix – Bash Quick Reference**