

Linux Shell Scripting

Course Summary

Description

The course is designed to provide the skills necessary to automate tasks on a Unix or Linux system. Systems Administrators and Developers alike can avoid errors, save time and money by replacing repetitive work patterns with shell scripts. Care has been taken to present the class in a format that benefits all students, with or without previous programming experience. Early labs present the scripting process step by step, while later labs are presented in a challenge format. While official solutions to each lab task are provided, students are encouraged to create their own before examining the solution. In this way, more experienced students are challenged without overwhelming the less experienced.

Topics

- Introduction to the Shell
- Shell Scripting Basics
- Working with Files
- Regular Expressions
- Branching and Looping
- Data Munging
- Security, Whitespace and Other Gotchas
- Challenge
- EMACS
- The Secure Shell (SSH)

Prerequisites

Participants must have a solid understanding of UNIX-based systems and proficiency on the UNIX or Linux command line.

Duration

Two days

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Course Outline

- I. INTRODUCTION TO THE SHELL**
 - A. Shell Script Strengths and Weaknesses
 - B. Shells
 - C. Switching User Contexts
 - D. Example Shell Script
 - E. Shell and Environment Variables
 - F. Key Environment Variables
 - G. General Quoting Rules
 - H. Nesting Commands
 - I. Help from Commands and Documentation
 - J. Getting Help within the Graphical Desktop
 - K. Getting Help with man & info
 - LAB TASKS
 - 1. Shell Variables
 - 2. Shell Meta-Characters
 - 3. Command Substitution
- II. SHELL SCRIPTING BASICS**
 - A. Positional Parameters
 - B. Input & Output
 - C. printf
 - D. alias
 - E. Functions
 - F. Colors in Scripts
 - G. Custom Bash Prompts
 - LAB TASKS
 - 1. Aliases
 - 2. Bash Login Scripts
 - 3. Create "userinfo" and "sysinfo" functions
- III. WORKING WITH FILES**
 - A. Communication Channels
 - B. File Redirection
 - C. Piping Commands Together
 - D. Doing Math
 - E. Filesystem Structures
 - F. Determining Disk Usage With df and du
 - G. cron
 - H. The crontab Command
 - I. crontab Format
 - J. /etc/cron.*/ Directories
 - K. Sending Email with mail
 - LAB TASKS
 - 1. Disk and Filesystem Usage
 - 2. Connecting Commands
- IV. REGULAR EXPRESSIONS**
 - A. Searching Inside Files
 - B. Regular Expression Overview
 - C. Regular Expressions
 - D. RE Character Classes
 - E. RE Quantifiers
 - F. RE Parenthesis
 - G. The Streaming Editor
 - LAB TASKS
 - 1. Pattern Matching with Regular Expressions
 - 2. Extended Regular Expressions
 - 3. Using Regular Expressions With sed
- V. BRANCHING AND LOOPING**
 - A. Exit Status
 - B. Comparisons with test
 - C. Conditional Statements
 - D. Flow Control: case
 - E. Flow Control: while and until Loops
 - F. The for Loop
 - G. Flow Control: select
 - LAB TASKS
 - 1. Reporting User Statistics
 - 2. Monitoring Filesystem Usage
- VI. DATA MUNGING**
 - A. Text Processing with Awk
 - B. Text Sorting
 - C. Duplicate Removal Utility
 - D. Extracting Columns of Text
 - LAB TASKS
 - 1. Create "rmhost" function
 - 2. Create "showenv" function
 - 3. Parsing Mail Server Logs
 - 4. Fixing Incorrect Files
- VII. SECURITY, WHITESPACE AND OTHER GOTCHAS**
 - A. Gotchas: Maximum Command Length
 - B. Gotcha: Whitespace in for Loops
 - C. Reading Files with while
 - D. Gotcha: \$IFS
 - E. Gotcha: Printing in .bashrc
 - F. Gotcha: Aliases
 - LAB TASKS
 - 1. Renaming MP3 Files
 - 2. Split and Display \$PATH
 - 3. A tar-based Backup

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Course Outline (con't)

VIII. CHALLENGE

- A. Apache Configuration Files
- B. httpd.conf – VirtualHost Configuration
 - LAB TASKS
 - 1. Automated Virtual Host Provisioning
 - 2. EMACS

IX. EMACS

- A. The EMACS Interface
- B. Basic EMACS
- C. More EMACS Commands
 - LAB TASKS
 - 1. Text Editing with EMACS

X. THE SECURE SHELL (SSH)

- A. SSH and SSHD Configuration
- B. Accessing Remote Shells
- C. Transferring Files
- D. SSH Key Management