uCertify

Course Outline

UNIX and Linux System Administration Handbook

19 May 2024

1. 📖 Course Objective

Gain a solid understanding of the fundamental principles of UNIX and Linux systems. This course is designed to provide you with practical knowledge and hands-on experience in managing UNIX and Linux systems. By the end of this course, you'll be equipped with the skills and confidence to effectively manage UNIX and Linux systems, troubleshoot issues and implement best practices in system administration.

2. ≔ Pre-Assessment

Pre-Assessment lets you identify the areas for improvement before you start your prep. It determines what students know about a topic before it is taught and identifies areas for improvement with question assessment before beginning the course.

3. ⊕ Exercises

There is no limit to the number of times learners can attempt these. Exercises come with detailed remediation, which ensures that learners are confident on the topic before proceeding.

90

EXERCISES

4. ⏱ Quiz

Quizzes test your knowledge on the topics of the exam when you go through the course material. There is no limit to the number of times you can attempt it.

405
QUIZ

5. ⚡ flashcards

Flashcards are effective memory-aiding tools that help you learn complex topics easily. The flashcard will help you in memorizing definitions, terminologies, key concepts, and more. There is no limit to the number of times learners can attempt these. Flashcards help master the key concepts.

195
FLASHCARDS

6. 📖 Glossary of terms

uCertify provides detailed explanations of concepts relevant to the course through Glossary. It contains a list of frequently used terminologies along with its detailed explanation. Glossary defines the key terms.

195
GLOSSARY OF TERMS

7. Expert Instructor-Led Training

uCertify uses the content from the finest publishers and only the IT industry's finest instructors. They have a minimum of 15 years real-world experience and are subject matter experts in their fields. Unlike a live class, you can study at your own pace. This creates a personal learning experience and gives you all the benefit of hands-on training with the flexibility of doing it around your schedule 24/7.

8. ADA Compliant & JAWS Compatible Platform

uCertify course and labs are ADA (Americans with Disability Act) compliant. It is now more accessible to students with features such as:

- Change the font, size, and color of the content of the course
- Text-to-speech, reads the text into spoken words
- Interactive videos, how-tos videos come with transcripts and voice-over
- Interactive transcripts, each word is clickable. Students can clip a specific part of the video by clicking on a word or a portion of the text.

JAWS (Job Access with Speech) is a computer screen reader program for Microsoft Windows that reads the screen either with a text-to-speech output or by a Refreshable Braille display. Student can easily navigate uCertify course using JAWS shortcut keys.

9. State of the Art Educator Tools

uCertify knows the importance of instructors and provide tools to help them do their job effectively. Instructors are able to clone and customize course. Do ability grouping. Create sections. Design grade scale and grade formula. Create and schedule assessments. Educators can also move a student from self-paced to mentor-guided to instructor-led mode in three clicks.

10. Award Winning Learning Platform (LMS)

uCertify has developed an award winning, highly interactive yet simple to use platform. The SIIA CODiE Awards is the only peer-reviewed program to showcase business and education technology's finest products and services. Since 1986, thousands of products, services and solutions have been

recognized for achieving excellence. uCertify has won CODiE awards consecutively for last 7 years:

- **2014**
    1. Best Postsecondary Learning Solution

- **2015**
    1. Best Education Solution
    2. Best Virtual Learning Solution
    3. Best Student Assessment Solution
    4. Best Postsecondary Learning Solution
    5. Best Career and Workforce Readiness Solution
    6. Best Instructional Solution in Other Curriculum Areas
    7. Best Corporate Learning/Workforce Development Solution

- **2016**
    1. Best Virtual Learning Solution
    2. Best Education Cloud-based Solution
    3. Best College and Career Readiness Solution
    4. Best Corporate / Workforce Learning Solution
    5. Best Postsecondary Learning Content Solution
    6. Best Postsecondary LMS or Learning Platform
    7. Best Learning Relationship Management Solution

- **2017**
    1. Best Overall Education Solution
    2. Best Student Assessment Solution
    3. Best Corporate/Workforce Learning Solution
    4. Best Higher Education LMS or Learning Platform

- **2018**
    1. Best Higher Education LMS or Learning Platform

2. Best Instructional Solution in Other Curriculum Areas

3. Best Learning Relationship Management Solution

- **2019**
    1. Best Virtual Learning Solution
    2. Best Content Authoring Development or Curation Solution
    3. Best Higher Education Learning Management Solution (LMS)

- **2020**
    1. Best College and Career Readiness Solution
    2. Best Cross-Curricular Solution
    3. Best Virtual Learning Solution

11. Chapter & Lessons

uCertify brings these textbooks to life. It is full of interactive activities that keeps the learner engaged. uCertify brings all available learning resources for a topic in one place so that the learner can efficiently learn without going to multiple places. Challenge questions are also embedded in the chapters so learners can attempt those while they are learning about that particular topic. This helps them grasp the concepts better because they can go over it again right away which improves learning.

Learners can do Flashcards, Exercises, Quizzes and Labs related to each chapter. At the end of every lesson, uCertify courses guide the learners on the path they should follow.

Syllabus

Chapter 1: Introduction

- The Organization of this course

Chapter 2: Where to Start

- Essential duties of a system administrator

- Suggested background

- Linux distributions

- Example systems used in this course

- Notation and typographical conventions

- Units

- Man pages and other on-line documentation

- Other authoritative documentation

- Other sources of information

- Ways to find and install software

- Where to host

- Specialization and adjacent disciplines

- Recommended reading

Chapter 3: Booting and System Management Daemons

- Boot process overview

- System firmware

- Boot loaders

- Interactive monitoring with top

- nice and renice: influence scheduling priority

- The /proc filesystem

- strace and truss: trace signals and system calls

- Runaway processes

- Periodic processes

Chapter 6: The Filesystem

- Pathnames

- Filesystem mounting and unmounting

- Organization of the file tree

- File types

- File attributes

- Access control lists

Chapter 7: Software Installation and Management

- Operating system installation

- Managing packages

- Linux package management systems

- High-level Linux package management systems

- FreeBSD software management

- Software localization and configuration

- Recommended reading

Chapter 8: Scripting and the Shell

- Scripting philosophy

- Shell basics

- sh scripting

- Regular expressions

- Python programming

- Ruby programming

- Library and environment management for Python and Ruby

- Revision control with Git

- Recommended reading

Chapter 9: User Management

- Account mechanics

- The /etc/passwd file

- The Linux /etc/shadow file

- FreeBSD's /etc/master.passwd and /etc/login.conf files

- The /etc/group file

- Manual steps for adding users

- Scripts for adding users: useradd, adduser, and newusers

- Safe removal of a user's account and files

- User login lockout

- Risk reduction with PAM

- Centralized account management

Chapter 10: Cloud Computing

- The cloud in context

- Cloud platform choices

- Cloud service fundamentals

- Clouds: VPS quick start by platform

- Cost control

- Recommended Reading

Chapter 11: Logging

- Log locations

- The systemd journal

- Syslog

- Kernel and boot-time logging

- Management and rotation of log files

- Management of logs at scale

- Logging policies

Chapter 12: Drivers and the Kernel

- Kernel chores for system administrators

- Kernel version numbering

- Devices and their drivers

- Linux kernel configuration

- FreeBSD kernel configuration

- Loadable kernel modules

- Booting

- Booting alternate kernels in the cloud

- Kernel errors

- Recommended reading

Chapter 13: Printing

- CUPS printing

- CUPS server administration

- Troubleshooting tips

- Recommended reading

Chapter 14: TCP/IP Networking

- TCP/IP and its relationship to the Internet

- Networking basics

- Packet addressing

- IP addresses: the gory details

- Routing

- IPv4 ARP and IPv6 neighbor discovery

- DHCP: the Dynamic Host Configuration Protocol

- Security issues

- Basic network configuration

- Linux networking

- FreeBSD networking

- Network troubleshooting

- Network monitoring

- Firewalls and NAT

- Cloud networking

- Recommended reading

Chapter 15: Physical Networking

- Ethernet: the Swiss Army knife of networking

- Wireless: Ethernet for nomads

- SDN: software-defined networking

- Network testing and debugging

- Building wiring

- Network design issues

- Management issues

- Recommended vendors

- Recommended reading

Chapter 16: IP Routing

- Packet forwarding: a closer look

- Routing daemons and routing protocols

- Protocols on parade

- Routing protocol multicast coordination

- Routing strategy selection criteria

- Routing daemons

- Cisco routers

- Recommended reading

Chapter 17: DNS: The Domain Name System

- DNS architecture

- DNS for lookups

- The DNS namespace

- How DNS works

- The DNS database

- The BIND software

- Split DNS and the view statement

- BIND configuration examples

- Zone file updating

- DNS security issues

- BIND debugging

- Recommended reading

Chapter 18: Single Sign-On

- Core SSO elements

- LDAP: "lightweight" directory services

- Using directory services for login

- Alternative approaches

- Recommended reading

Chapter 19: Electronic Mail

- Mail system architecture

- Anatomy of a mail message

- The SMTP protocol

- Spam and malware

- Message privacy and encryption

- Mail aliases

- Email configuration

- sendmail

- Exim

- Postfix

- Recommended reading

Chapter 20: Web Hosting

- HTTP: the Hypertext Transfer Protocol

- Web software basics

- Web hosting in the cloud

- Apache httpd

- NGINX

- HAProxy

- Recommended reading

Chapter 21: Storage

- I just want to add a disk!

- Storage hardware

- Storage hardware interfaces

- Attachment and low-level management of drives

- The software side of storage: peeling the onion

- Disk partitioning

- Logical volume management

- RAID: redundant arrays of inexpensive disks

- Filesystems

- Traditional filesystems: UFS, ext4, and XFS

- Next-generation filesystems: ZFS and Btrfs

- ZFS: all your storage problems solved

- Btrfs: "ZFS lite" for Linux

- Data backup strategy

- Recommended reading

Chapter 22: The Network File System

- Meet network file services

- Configuration management in a nutshell

- Dangers of configuration management

- Elements of configuration management

- Popular CM systems compared

- Introduction to Ansible

- Introduction to Salt

- Ansible and Salt compared

- Best practices

- Recommended reading

Chapter 25: Virtualization

- Virtual vernacular

- Virtualization with Linux

- FreeBSD bhyve

- VMware

- VirtualBox

- Packer

- Vagrant

- Racks

- Power

- Cooling and environment

- Data center reliability tiers

- Data center security

- Tools

- Recommended reading

Chapter 32: Methodology, Policy, and Politics

- The grand unified theory: DevOps

- Ticketing and task management systems

- Local documentation maintenance

- Environment separation

- Disaster management

- IT policies and procedures

- Service level agreements

- Compliance: regulations and standards

- Legal issues

- Organizations, conferences, and other resources

- Recommended reading

12. ⊚ Practice Test

Here's what you get

Features

Each question comes with detailed remediation explaining not only why an answer option is correct but also why it is incorrect.

Unlimited Practice

Each test can be taken unlimited number of times until the learner feels they are prepared. Learner can review the test and read detailed remediation. Detailed test history is also available.

Each test set comes with learn, test and review modes. In learn mode, learners will attempt a question and will get immediate feedback and complete remediation as they move on to the next question. In test mode, learners can take a timed test simulating the actual exam conditions. In review mode, learners can read through one item at a time without attempting it.

13. ⊛ Live Labs

The benefits of live-labs are:

- Exam based practical tasks
- Real equipment, absolutely no simulations
- Access to the latest industry technologies
- Available anytime, anywhere on any device
- Break and Reset functionality
- No hardware costs

Lab Tasks

Where to Start

- Building Software from Source Code

Booting and System Management Daemons

- Using systemd Commands

Process Control

- Using ps Commands
- Creating a cron Job

The Filesystem

- Using the chmod Command

Scripting and the Shell

- Working with Arithmetic Operations and Loops
- Executing the sh Script

Cloud Computing

- Creating an Instance in GCP

- Creating an EC2 Auto Scaling Group

Logging

- Using journalctl Commands

TCP/IP Networking

- Obtaining the IP Route Information from the IP Routing Table
- Capturing Network Packets Using tcpdump
- Capturing a Packet Using tshark
- Creating a VPC

Physical Networking

- Using Commands for Wireless Connectivity

IP Routing

- Configuring OSPF
- Configuring BGP Redistribution
- Configuring EIGRP

DNS: The Domain Name System

- Performing Zone Transfer Using dig
- Signing a Zone

Single Sign-On

- Examining Kerberos Settings

Web Hosting

- Using the curl Command
- Creating a Load Balancer in GCP

Storage

- Partitioning a Disk

The Network File System

- Configuring NFS Server

SMB

- Configuring Samba
- Creating an SMB File Share

Configuration Management

- Using the Ansible Tool
- Using Ansible Vault
- Creating Ansible Roles
- Creating an Ansible Configuration File

Virtualization

- Checking Hyper-V Compatibility

Containers

- Running Docker daemon Commands
- Using Docker

Security

- Using Social Engineering Techniques to Plan an Attack
- Simulating the DDoS Attack
- Performing Nmap Port Scanning
- Cracking a Linux Password Using John the Ripper
- Generating a Symmetric Key
- Generating an Asymmetric Key
- Examining Asymmetric Encryption
- Performing Symmetric Encryption

Performance Analysis

- Using Performance Analysis Commands

Here's what you get

43	43	01:09
LIVE LABS	VIDEO TUTORIALS	HOURS

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