PEARSON IT CERTIFICATION



Cert Guide

Advance your IT career with hands-on learning















Red Hat RHCSA[™] 9 Cert Guide

EX200

Sander van Vugt



Red Hat RHCSA 9 Cert Guide: EX200

Table of Contents

Cover

Title Page

Copyright Page

Contents at a Glance

Table of Contents

Introduction

Part I: Performing Basic System Management Tasks

Chapter 1: Installing Red Hat Enterprise Linux

Do I Know This Already? Quiz

Foundation Topics

Preparing to Install Red Hat Enterprise Linux

What Is Red Hat Enterprise Linux 9 Server?

Getting the Software

Using Red Hat Enterprise Linux

Using CentOS Stream

Other Distributions

Understanding Access to Repositories

Setup Requirements

Cert Guide Environment Description

Performing an Installation

Summary

Exam Preparation Tasks

Review All Key Topics

Define Key Terms

Review Questions



End-of-Chapter Lab

Lab 1.1

Chapter 2: Using Essential Tools

Do I Know This Already? Quiz

Foundation Topics

Basic Shell Skills

Understanding Commands

Executing Commands

I/O Redirection

Using Pipes

History

Bash Completion

Editing Files with vim

Understanding the Shell Environment

Understanding Variables

Recognizing Environment Configuration Files

Using /etc/motd and /etc/issue

Finding Help

Using --help

Using man

Finding the Right man Page

Updating mandb

Using info

Using /usr/share/doc Documentation Files

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab



Lab 2.1

Chapter 3: Essential File Management Tools

Do I Know This Already? Quiz

Foundation Topics

Working with the File System Hierarchy

Defining the File System Hierarchy

Understanding Mounts

Managing Files

Working with Wildcards

Managing and Working with Directories

Working with Absolute and Relative Pathnames

Listing Files and Directories

Copying Files and Directories

Moving Files and Directories

Deleting Files and Directories

Using Links

Understanding Hard Links

Understanding Symbolic Links

Creating Links

Removing Links

Working with Archives and Compressed Files

Managing Archives with tar

Creating Archives with tar

Monitoring and Extracting tar Files

Using Compression

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab



Lab 3.1

Chapter 4: Working with Text Files

Do I Know This Already? Quiz

Foundation Topics

Using Common Text FileRelated Tools

Doing More with less

Showing File Contents with cat

Displaying the First or Last Lines of a File with head and tail

Filtering Specific Columns with cut

Sorting File Contents and Output with sort

Counting Lines, Words, and Characters with wc

A Primer to Using Regular Expressions

Using Line Anchors

Using Escaping in Regular Expressions

Using Wildcards and Multipliers

Using Extended Regular Expressions

Using grep to Analyze Text

Working with Other Useful Text Processing Utilities

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 4.1

Chapter 5: Connecting to Red Hat Enterprise Linux 9

Do I Know This Already? Quiz

Foundation Topics

Working on Local Consoles

Logging In to a Local Console



Switching Between Terminals in a Graphical Environment

Working with Multiple Terminals in a Nongraphical Environment

Understanding Pseudo Terminal Devices

Booting, Rebooting, and Shutting Down Systems

Using SSH and Related Utilities

Accessing Remote Systems Using SSH

Using Graphical Applications in an SSH Environment

Securely Transferring Files Between Systems

Using scp to Securely Copy Files

Using sftp to Securely Transfer Files

Using rsync to Synchronize Files

Configuring Key-Based Authentication for SSH

Using Passphrases or Not?

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Labs

Lab 5.1

Lab 5.2

Chapter 6: User and Group Management

Do I Know This Already? Quiz

Foundation Topics

Understanding Different User Types

Users on Linux

Working as Root

Using su

sudo

PolicyKit

Creating and Managing User Accounts



System Accounts and Normal Accounts

Creating Users

Modifying the Configuration Files

Using useradd

Home Directories

Default Shell

Managing User Properties

Configuration Files for User Management Defaults

Managing Password Properties

Creating a User Environment

Creating and Managing Group Accounts

Understanding Linux Groups

Creating Groups

Creating Groups with vigr

Using groupadd to Create Groups

Managing Group Properties

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Labs

Lab 6.1

Lab 6.2

Chapter 7: Permissions Management

Do I Know This Already? Quiz

Foundation Topics

Managing File Ownership

Displaying Ownership

Changing User Ownership

Changing Group Ownership



Understanding Default Ownership

Managing Basic Permissions

Understanding Read, Write, and Execute Permissions

Applying Read, Write, and Execute Permissions

Managing Advanced Permissions

Understanding Advanced Permissions

Applying Advanced Permissions

Setting Default Permissions with umask

Working with User-Extended Attributes

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 7.1

Chapter 8: Configuring Networking

Do I Know This Already? Quiz

Foundation Topics

Networking Fundamentals

IP Addresses

IPv6 Addresses

IPv4 Network Masks

Binary Notation

MAC Addresses

Protocol and Ports

Managing Network Addresses and Interfaces

Validating Network Configuration

Validating Network Address Configuration

Validating Routing



Validating the Availability of Ports and Services

Managing Network Configuration with nmtui and nmcli

Required Permissions to Change Network Configuration

Configuring the Network with nmcli

Configuring the Network with nmtui

Working on Network Configuration Files

Setting Up Hostname and Name Resolution

Hostnames

DNS Name Resolution

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 8.1

Part II: Operating Running Systems

Chapter 9: Managing Software

Do I Know This Already? Quiz

Foundation Topics

Managing Software Packages with dnf

Understanding the Role of Repositories

Registering Red Hat Enterprise Linux for Support

Managing Subscriptions

Specifying Which Repository to Use

Understanding Repository Security

Creating Your Own Repository

Using dnf

Using dnf to Find Software Packages

Getting More Information About Packages



Installing and Removing Software Packages

Showing Lists of Packages

Updating Packages

Working with dnf Package Groups

Using dnf History

Managing Package Modules

Understanding dnf Modules

Managing Modules

Managing Software Packages with rpm

Understanding RPM Filenames

Querying the RPM Database

Querying RPM Package Files

Using repoquery

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Labs

Lab 9.1

Chapter 10: Managing Processes

Do I Know This Already? Quiz

Foundation Topics

Introduction to Process Management

Managing Shell Jobs

Running Jobs in the Foreground and Background

Managing Shell Jobs

Understanding ParentChild Relations

Using Common Command-Line Tools for Process Management

Understanding Processes and Threads



Using ps to Get Process Information

Understanding Process Priorities

Exploring Relations Between Slices

Managing Process Priorities

Sending Signals to Processes with kill, killall, and pkill

Killing Zombies

Using top to Manage Processes

Using tuned to Optimize Performance

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 10.1

Chapter 11: Working with Systemd

Do I Know This Already? Quiz

Foundation Topics

Understanding Systemd

Understanding Systemd Unit Locations

Understanding Systemd Service Units

Understanding Systemd Mount Units

Understanding Systemd Socket Units

Understanding Systemd Target Units

Managing Units Through Systemd

Managing Dependencies

Managing Unit Options

Summary

Exam Preparation Tasks

Review All Key Topics



Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 11.1

Chapter 12: Scheduling Tasks

Do I Know This Already? Quiz

Foundation Topics

Understanding Task Scheduling Options in RHEL

Using Systemd Timers

Configuring cron to Automate Recurring Tasks

Managing the crond Service

Understanding cron Timing

Managing cron Configuration Files

Understanding the Purpose of anacron

Managing cron Security

Configuring at to Schedule Future Tasks

Summary

Exam Preparation Tasks

Review All Key Topics

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 12.1

Chapter 13: Configuring Logging

Do I Know This Already? Quiz

Foundation Topics

Understanding System Logging

Understanding the Role of systemd-journald and rsyslogd

Reading Log Files



Understanding Log File Contents

Live Log File Monitoring

Using logger

Working with systemd-journald

Using journalctl to Find Events

Preserving the Systemd Journal

Configuring rsyslogd

Understanding rsyslogd Configuration Files

Understanding rsyslog.conf Sections

Understanding Facilities, Priorities, and Log Destinations

Rotating Log Files

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 13.1

Chapter 14: Managing Storage

Do I Know This Already? Quiz

Foundation Topics

Understanding MBR and GPT Partitions

Understanding the MBR Partitioning Scheme

Understanding the Need for GPT Partitioning

Understanding Storage Measurement Units

Managing Partitions and File Systems

Creating MBR Partitions with fdisk

Using Extended and Logical Partitions on MBR

Creating GPT Partitions with gdisk

Creating GPT Partitions with parted



Creating File Systems

Changing File System Properties

Managing Ext4 File System Properties

Managing XFS File System Properties

Adding Swap Partitions

Adding Swap Files

Mounting File Systems

Manually Mounting File Systems

Using Device Names, UUIDs, or Disk Labels

Automating File System Mounts Through /etc/fstab

Using Systemd Mounts

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 14.1

Chapter 15: Managing Advanced Storage

Do I Know This Already? Quiz

Foundation Topics

Understanding LVM

LVM Architecture

LVM Features

Creating LVM Logical Volumes

Creating the Physical Volumes

Creating the Volume Groups

Creating the Logical Volumes and File Systems

Understanding LVM Device Naming

Resizing LVM Logical Volumes



Resizing Volume Groups

Resizing Logical Volumes and File Systems

Reducing Volume Groups

Configuring Stratis

Understanding Stratis Architecture

Creating Stratis Storage

Managing Stratis

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Labs

Lab 15.1

Lab 15.2

Part III: Performing Advanced System Administration Tasks

Chapter 16: Basic Kernel Management

Do I Know This Already? Quiz

Foundation Topics

Understanding the Role of the Linux Kernel

Understanding the Use of Kernel Threads and Drivers

Analyzing What the Kernel Is Doing

Working with Kernel Modules

Understanding Hardware Initialization

Managing Kernel Modules

Checking Driver Availability for Hardware Devices

Managing Kernel Module Parameters

Upgrading the Linux Kernel

Summary

Exam Preparation Tasks



Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 16.1

Chapter 17: Managing and Understanding the Boot Procedure

Do I Know This Already? Quiz

Foundation Topics

Managing Systemd Targets

Understanding Systemd Targets

Working with Targets

Understanding Target Units

Understanding Wants

Managing Systemd Targets

Isolating Targets

Setting the Default Target

Working with GRUB 2

Understanding GRUB 2

Understanding GRUB 2 Configuration Files

Modifying Default GRUB 2 Boot Options

Summary

Exam Preparation Tasks

Review All Key Topics

Define Key Terms

Review Questions

End-of-Chapter Labs

Lab 17.1

Lab 17.2

Chapter 18: Essential Troubleshooting Skills



Do I Know This Already? Quiz

Foundation Topics

Understanding the RHEL 9 Boot Procedure

Passing Kernel Boot Arguments

Accessing the Boot Prompt

Starting a Troubleshooting Target

Using a Rescue Disk

Restoring System Access Using a Rescue Disk

Reinstalling GRUB Using a Rescue Disk

Re-creating the Initramfs Using a Rescue Disk

Fixing Common Issues

Reinstalling GRUB 2

Fixing the Initramfs

Recovering from File System Issues

Resetting the Root Password

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 18.1

Chapter 19: An Introduction to Automation with Bash Shell Scripting

Do I Know This Already? Quiz

Foundation Topics

Understanding Shell Scripting Core Elements

Using Variables and Input

Using Positional Parameters

Working with Variables

Using Conditional Loops



Working with if then else

Using || and &&

Applying for

Understanding while and until

Understanding case

Bash Shell Script Debugging

Summary

Exam Preparation Tasks

Review All Key Topics

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 19.1

Part IV: Managing Network Services

Chapter 20: Configuring SSH

Do I Know This Already? Quiz

Foundation Topics

Hardening the SSH Server

Limiting Root Access

Configuring Alternative Ports

Modifying SELinux to Allow for Port Changes

Limiting User Access

Using Other Useful sshd Options

Session Options

Connection Keepalive Options

Configuring Key-Based Authentication with Passphrases

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms



Review Questions

End-of-Chapter Lab

Lab 20.1

Chapter 21: Managing Apache HTTP Services

Do I Know This Already? Quiz

Foundation Topics

Configuring a Basic Apache Server

Installing the Required Software

Identifying the Main Configuration File

Creating Web Server Content

Understanding Apache Configuration Files

Creating Apache Virtual Hosts

Summary

Exam Preparation Tasks

Review All Key Topics

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 21.1

Chapter 22: Managing SELinux

Do I Know This Already? Quiz

Foundation Topics

Understanding SELinux Working Modes

Understanding Context Settings and the Policy

Monitoring Current Context Labels

Setting Context Types

Finding the Context Type You Need

Restoring Default File Contexts

Managing Port Access

Using Boolean Settings to Modify SELinux Settings



Diagnosing and Addressing SELinux Policy Violations

Making SELinux Analyzing Easier

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 22.1

Chapter 23: Configuring a Firewall

Do I Know This Already? Quiz

Foundation Topics

Understanding Linux Firewalling

Understanding Previous Solutions

Understanding Firewalld

Understanding Firewalld Zones

Understanding Firewalld Services

Working with Firewalld

Summary

Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 23.1

Chapter 24: Accessing Network Storage

Do I Know This Already? Quiz

Foundation Topics



Using NFS Services

Understanding NFS Security

RHEL NFS Versions

Setting Up NFS

Mounting the NFS Share

Mounting Remote File Systems Through fstab

Mounting NFS Shares Through fstab

Using Automount to Mount Remote File Systems

Understanding Automount

Defining Mounts in Automount

Configuring Automount for NFS

Using Wildcards in Automount

Summary

Exam Preparation Tasks

Review All Key Topics

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 24.1

Chapter 25: Configuring Time Services

Do I Know This Already? Quiz

Foundation Topics

Understanding Local Time

Using Network Time Protocol

Managing Time on Red Hat Enterprise Linux

Using date

Using hwclock

Using timedatectl

Managing Time Zone Settings

Configuring Time Service Clients

Summary



Exam Preparation Tasks

Review All Key Topics

Complete Tables and Lists from Memory

Define Key Terms

Review Questions

End-of-Chapter Lab

Lab 25.1

Chapter 26: Managing Containers

Do I Know This Already? Quiz

Foundation Topics

Understanding Containers

Container Host Requirements

Containers on RHEL 9

Container Orchestration

Running a Container

Working with Container Images

Using Registries

Finding Images

Inspecting Images

Performing Image Housekeeping

Building Images from a Containerfile

Managing Containers

Managing Container Status

Running Commands in a Container

Managing Container Ports

Managing Container Environment Variables

Managing Container Storage

Running Containers as Systemd Services

Summary

Exam Preparation Tasks

Review All Key Topics



```
Complete Tables and Lists from Memory
       Define Key Terms
       Review Questions
       End-of-Chapter Lab
       Lab 26.1
   Chapter 27: Final Preparation
       General Tips
           Verifying Your Readiness
           Registering for the Exam
           On Exam Day
           During the Exam
           The Nondisclosure Agreement
   Chapter 28: Theoretical Pre-Assessment Exam
Part V: RHCSA 9 Practice Exams
   RHCSA Practice Exam A
   RHCSA Practice Exam B
Appendix A: Answers to the Do I Know This Already?
       Quizzes and Review Questions
Appendix B: Red Hat RHCSA 9 Cert Guide: EX200 Exam Updates
Glossary
   Α
   В
   D
   F
   F
   G
   Н
```



I J Κ Μ Ν O Р Q R S Т U V W Χ Υ Ζ Index Online Elements: RHCSA Practice Exam C RHCSA Practice Exam D Appendix C: Memory Tables Appendix D: Memory Tables Answer Key Appendix E: Study Planner



Glossary

Α

В

С

D

Ε

F

G

Н

L

J

Κ

L

Μ

Ν

0

Ρ

Q

R

S

Т

U

٧

W

Χ

Υ

Ζ