

# Oracle Linux 8: System Administration II

Infrastructure

DURATION

**5 Days**

MODULES

**18 Lectures**

COURSE CODE

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## Course Overview

The Oracle Linux 8: System Administration II course is designed to give you hands-on experience in performing advanced system administration tasks.

## What You Will Learn

### Course Introduction

- Course Goals
- Schedule
- Objectives
- Virtualization with Oracle VM Server for x86
- Classroom System Configuration
- Local DNF/Yum Repository
- Summary
- Practice 1: Overview

### IPv6

- Objectives
- IPv6: Overview
- IPv6: Features
- Dual-Stack
- IPv6 Addresses
- IPv6 Address Representation
- IPv6 Address Types
- High-Order Bits Specified for Address Types
- Prefix Notation
- Unicast Addressing
- Link-Local Unicast Address Layout
- Global Unicast Address Layout

- Multicast Addressing
- Multicast Address Layout
- Anycast Addressing
- Neighbor Discovery Protocol (NDP)
- Obtaining IPv6 Addresses
- Special IPv6 Addresses
- Stateless Address Autoconfiguration (SLAAC)
- The SLAAC Process
- Interface ID: Modified EUI-64 Format Created from MAC Addresses
- Interface Identifier Creation: Modified EUI-64 Format
- Stateless DHCPv6 Autoconfiguration
- Stateful DHCPv6 Autoconfiguration
- Other Address Types
- Using IPv6 with Oracle Linux
- IPv6 Settings for Specific Interfaces
- IPv6 Kernal Setting
- IPv6 Static Configuration Using nmcli
- IPv6 Static Configuration Using Cockpit
- Some IPv6 Commands
- Quiz
- Summary
- Practices for Lesson 2: Overview

## Network Addressing

- Objectives
- Introduction to DHCP
- Configuring a DHCP Server
- Additional DHCP Server Declarations
- Starting and Stopping a DHCP Server
- Specifying Command-Line Arguments
- Configuring a DHCP Client
- DHCP Resources
- Summary
- Practice 3: Overview

## Name Services

- Objectives
- Introduction to DNS
- Nameserver Types
- DNS Query Types
- Basic Recursive Query Process
- BIND
- Starting a DNS Cache-Only Nameserver
- Configuring an Authoritative Nameserver
- Zone Files

- The /etc/named.conf File
- The /etc/named.rfc1912.zones File
- Reverse Name Resolution
- rndc Utility
- Multicast DNS (mDNS) Protocol
- Installing mDNS
- Configuring mDNS
- host and dig Utilities
- Additional Resources
- Quiz
- Summary
- Practice 4: Overview

## PAM, SSSD, and System Authentication

- Objectives
- Introduction to PAM
- PAM Configuration Files
- PAM Authentication Modules
- PAM Module Types
- PAM Control Flags
- PAM: Example 1
- PAM: Example #2
- Name Service Switch (NSS) Configuration File
- Sample /etc/nsswitch.conf Configuration File
- System Security Services Daemon
- Configuring SSSD Services
- Configuring SSSD Domains
- Selecting Authentication Methods
- authselect Overview
- authselect Profiles
- Enabling and Disabling Profiles
- Profile Feature Options Supported by sssd Profile
- Quiz
- Introduction to SELinux
- Summary
- Practice 5: Overview

## Web and Email Services

- Objectives
- Apache HTTP Server
- Configuring Apache
- Testing Apache
- Apache Containers
- Apache Virtual Hosts
- Introduction to NGINX

- Configuring NGINX
- Configuring NGINX Server Blocks
- Controlling NGINX
- Testing NGINX
- Quiz
- Email Program Classifications
- Email Protocols
- Dovecot
- Postfix SMTP Server
- Configure Postfix for STARTTLS
- Sendmail SMTP Server
- Configuring Sendmail on a Client
- Quiz
- Summary
- Practice 6: Overview

## Installing Oracle Linux by Using PXE and Kickstart

- Objectives
- Kickstart Installation Method
- Kickstart File
- Verifying the Kickstart File
- Setting Up a Preboot Execution Environment (PXE) Server
- What is PXE?
- PXE Execution Process
- PXE Pre-Installation Steps
- PXE Pre-Installation
- Configuring DHCP and TFTP Services
- Configuring TFTP Services
- Beginning a Kickstart Installation
- Quiz
- Summary
- Practice 7: Overview

## Advanced Software Package Management

- Objectives
- Software Management with RPM and DNF
- RPM Packages
- The Binary RPM Build Process
- BUILD Directory Structure
- spec File to Build a Binary RPM Package
- spec File: Example
- Managing RPM-Based Software with DNF
- DNF Cache
- DNF History
- Extending DNF Functionality with Plug-Ins

- Popular DNF Plug-Ins
- Using dnf config-manager
- Managing DNF Repositories
- Managing Errata
- Important Resources for Errata Information
- Software Management Tools
- Using Cockpit PackageKit
- Using PackageKit CLI
- Using gnome-software Interface
- Using Gnome-Software
- Gnome Software Explore Options
- Gnome Software Installed Options
- Software Updates
- Quiz
- Summary
- Practice 8: Overview

## NFS and Autofs

- Objectives
- Introduction to NFS
- The NFS Server and RPC Processes
- NFS Server Configuration
- Starting the NFS Service
- The exportfs Utility
- NFS Client Configuration
- Automounting File Systems
- Direct Maps
- Indirect Maps
- Host Maps
- Using Cockpit to Manage NFS Client
- Quiz
- Summary
- Practice 9: Overview

## Samba Services

- Objectives
- Samba: Introduction
- Samba Daemons and Services
- Installing Samba
- Samba Server Configuration
- Samba Server
- Samba Server Types
- Accessing Linux Shares from Windows
- Accessing Windows Shares from Linux
- Samba Utilities

- Quiz
- Summary
- Practice 10: Overview

## Network Tools & Tuning

- Objectives
- Network Analysis
- ip command
- ss command
- sar Command
- vnstat Command
- vnstat Examples
- tcpdump Command
- Wireshark
- Capturing Packets with Wireshark
- Analyzing Packets with Wireshark
- tshark
- Network Performance Tuning
- vmstat Virtual Memory Statistics
- top Command
- glances Command
- glances Example:
- ping Command
- mtr Command
- mtr Example:
- List Open Files (lsof)
- Summary
- Practice 11: Overview

## Advanced Networking

- Objectives
- Network Bonding: Introduction
- Network Bonding: Configuration
- Using the NetworkManager TUI to Configure Network Bonding
- Network Bonding Modes
- Network Bonding Link Monitoring
- Using the nmcli Utility to Configure Network Bonding
- Using the nmcli Utility to Add the Slaves to the Bond
- Activate the Bond
- Viewing Network Bonding Information
- 802.3ad LAG (Link Aggregation Group)
- Link Aggregation Control Protocol (LACP)
- Virtual Local Area Networks: Introduction
- Using the nm-connection-editor GUI to Configure 802.1Q VLAN Tagging
- Using cockpit to Configure 802.1Q VLAN Tagging

- Using cockpit to Manage 802.1Q VLAN Tagging
- Using the nmcli Utility to Configure VLAN Tagging
- Viewing VLAN Information
- Internet Protocol Security (IPSec)
- The libreswan RPM Package
- Virtual Private Networks: Introduction
- Site-to-Site VPN
- Site-to-Site VPN: Configuration
- Example: “sitetosite” Connection
- Multifactor Authentication
- Two-Factor Authentication (2FA)
- Pluggable Authentication Modules (PAM)
- Stacking Multiple Modules
- 2FA PAM and Smart Cards
- Port Address Translation (PAT)
- IPSec with Port Address Translation
- IPSec VPN Connection to On-Premises Network
- Quiz
- Summary
- Practice 12: Overview

## Implementing the XFS File System

- Objectives
- XFS File System
- Basic Layout of the XFS File System
- Creating an XFS File System
- xfs\_growfs Utility
- xfs\_admin Utility
- Enabling Disk Quotas on an XFS File System
- xfs\_quota Utility
- Setting Project Quotas
- Backing Up and Restoring XFS File Systems
- XFS File System Maintenance
- Quiz
- Summary
- Practice 13: Overview

## Implementing the Btrfs File System

- Objectives
- Btrfs: Introduction
- Btrfs with Oracle Linux
- Creating a Btrfs File System
- The btrfs Utility
- The btrfs Utility Subcommands
- Btrfs Subvolumes

- btrfs Subvolume Utilities
- Btrfs Snapshots
- Taking a Snapshot of a File
- Mounting a Subvolume or Snapshot
- btrfs filesystem Utilities
- The btrfs filesystem df Utility
- btrfs filesystem show|sync Utilities
- The btrfs filesystem defragment Utility
- The btrfs filesystem resize Utility
- btrfs device Utilities
- The btrfs device Utility: Examples
- btrfs scrub Utilities
- btrfs check Utility
- The btrfs scrub Utility: Examples
- Converting Ext File Systems to Btrfs
- Quiz
- Summary
- Practice 14: Overview

## Storage Volume Administration

- Objectives
- Logical Volume Manager (LVM)
- LVM Configuration: Example
- Physical Volume Utilities
- Volume Group Utilities
- Logical Volume Utilities
- Making Logical Volumes Usable
- Backing Up and Restoring Volume Group Metadata
- LVM Thin Provisioning
- Snapper
- Redundant Array of Independent Disks (RAID)
- The mdadm Utility
- Making RAID Devices Usable
- Quiz
- Summary
- Practice 15: Overview

## Advanced Storage Administration

- Objectives
- Disk Quotas
- Enabling Disk Quotas
- Summary of Quota Commands
- Encrypted Block Devices
- cryptsetup Utility
- Making an Encrypted Device Usable

- kpartx Utility
- Quiz
- Summary
- Practice 16: Overview

## Kerberos

- Objectives
- The Kerberos Protocol
- The Kerberos Protocol Process Flow
- Installing Kerberos Server
- Configuring a Key Distribution Center
- Creating the Kerberos Database
- The kadmin.local command
- Starting and Enabling Kerberos Services
- Configuring Kerberos Authentication
- Summary
- Practice 17: Overview

## IPA Services

- Objectives
- Problems Dealing with Identity Management
- IDM/IPA Identity Management
- Installing IDM/IPA Server with DNS
- Installing IPA Server with DNS
- Installing IPA Client
- IPA Client Discovery
- Quiz
- Summary
- Practice 18: Overview