Oracle Linux 8: System Administration III

Infrastructure

DURATION	MODULES	COURSE CODE
5 Days	**1 Lectures**	**—**

Course Overview

This course teaches you how to administer and manage Oracle Linux 8: System Administration III. Gain hands-on experience with configuration, maintenance, and troubleshooting in Infrastructure environments.

What You Will Learn

Course Introduction

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

OCFS2 and Oracle Clusterware

- Objectives
- OCFS2: Introduction
- OCFS2 Features
- OCFS2 Maximum Size
- Using OCFS2
- Preparing for OCFS2
- OCFS2 Software
- Kernel Configuration
- Configuring Cluster Layout
- o2cb Utility
- OCFS2 Heartbeat
- O2CB Cluster Timeouts

- /sbin/o2cb.init Initialization Script
- mkfs.ocfs2 Utility
- Mounting OCFS2 Volumes
- OCFS2 Tuning and Debugging
- Quiz
- Oracle Clusterware: Introduction
- Oracle Clusterware: Hardware Requirements
- Oracle Clusterware Files
- Summary
- Practice 2: Overview

iSCSI and Multipathing

- Objectives
- Introduction to iSCSI
- Configuring an iSCSI Server
- targetcli Utility
- Backstores
- Creating an iSCSI Target
- Creating iSCSI LUNs
- Creating ACLs
- iSCSI Initiators
- Configuring an iSCSI Initiator
- iscsiadm Utility
- iSCSI Discovery
- iSCSI Initiator Sessions
- iSCSI Block Devices
- Quiz
- Device Mapper Multipathing
- DM-Multipath Files
- DM-Multipath Configuration File
- defaults Attributes in /etc/multipath.conf
- blacklist Section in /etc/multipath.conf
- multipaths Section in /etc/multipath.conf
- devices Section in /etc/multipath.conf
- Multipath Identifiers
- mpathconf Utility
- multipath Utility
- multipathd Daemon
- iSCSI Multipathing
- Quiz
- Summary
- Practice 3: Overview

Managing Resources with Control Groups

- Objectives

- Control Groups: Introduction
- Cgroup Subsystems (Resource Controllers)
- View Mounted Resource Controllers
- cgroup Subsystem Parameters
- cgroup Implementation in Oracle Linux 8
- cgroup Hierarchies
- /sys/fs/cgroup/systemd Directory
- systemd Slice Units
- systemd Scope Units
- systemd-cgls Utility
- Displaying the cgroup Tree of Specific Services and Scopes
- Viewing cgroup Resource Control Settings
- Controlling Access to System Resources
- Modifying Unit Configuration Files
- systemd-run Utility
- Cgroup V1 vs V2
- Additional Information
- Quiz
- Summary
- Practice 4: Overview

Virtualization with Linux

- Objectives
- Virtualization: Introduction
- Virtualization Concepts
- Virtualization Modes
- Linux and Xen Integration
- Running Linux in a Virtual Machine
- Oracle VM Server for X86
- Oracle VM Server for x86 Components
- Linux as a Guest OS with Oracle VM Server for X86
- Linux as a Guest OS with Oracle VM VirtualBox
- VMware vSphere
- Linux as a Guest OS with VMware vSphere
- Microsoft Hyper-V and Windows Azure
- Linux as a Guest OS with Microsoft Hyper-V and Windows Azure
- Linux as a Virtualization Provider
- libvirt Toolkit
- Installing KVM and libvirt
- Using virsh
- Using virt-install
- Getting Started with virt-manager: Connections
- Virtual Networks
- Working with Storage
- Creating Virtual Machines

- Managing the Life Cycle of a Virtual Machine
- Quiz
- Summary

Open Container Initiative & Podman

- Objectives
- Open Container Initiative (OCI): Introduction
- Oracle Container Runtime: Introduction
- OCI Images
- Container Images
- Oracle Container Registry
- Docker Hub
- Installing Open Container Initiative Tools
- podman Utility
- Installing Open Container Initiative Tools
- Searching the Registry for Images
- Downloading Images from a Registry
- Downloading Images from Registries such as Docker Hub and Oracle Container
- Registry
- Docker Hub: My Content
- Running an Application Inside a Container
- Running an Interactive Container
- Listing Containers and Viewing Container Logs
- Display All Information for a Container or an Image
- Creating a New Container
- Starting, Stopping, and Removing a Container
- Running Additional Commands in a Running Container
- Creating an Image from a Container
- buildah utility
- Creating Images from Dockerfiles with buildah
- Save and Load an Image or a Container
- podman container Utility
- podman network Utility
- Bridged Network Driver
- Slirp4netns Network Drivers
- Macvlan Network Driver
- Quiz
- Summary
- Practice 6: Overview

Oracle Linux Cloud Native Environment for Kubernetes

- Objectives
- Oracle Linux Cloud Native Environment (OLCNE): Introduction
- Oracle Linux Cloud Native Environment: Introduction
- Oracle Linux Cloud Native Environment: Purpose

- OLCNE: Components
- OLCNE: Architecture
- OLCNE: Environments
- OLCNE: Modules
- OLCNE: Network Planes
- OLCNE: Requirements for Kubernetes
- OLCNE: Requirements Firewall Rules
- OLCNE: Requirements Yum/DNF Repositories
- OLCNE and SELinux
- OLCNE: Installation
- OLCNE: Creating and Using Certificates Managed by Vault
- Creating a Kubernetes Cluster
- Creating a Kubernetes Cluster-Single Control Plane Node
- Validating Kubernetes Environment
- Installing a Kubernetes Module
- Modifying SELinux Settings for the Cluster
- Setting Up kubectl Utility on the Control Plane Node
- kubectl Utility
- Verifying kubectl on the Control Plane Node
- Setting Up kubectl on the Operator Node
- Using Kubernetes
- Scale Up the Control Plane Nodes
- Scale Up the Worker Nodes
- Scale Down the Control Plane and Worker Nodes
- Creating and Running Pods on Kubernetes
- Scaling a Pod Deployment
- Kubernetes Services
- Exposing a Service Object for an Application Pod
- Deleting a Service or Deployment
- Working with Namespaces
- Accessing Kubernetes Web Dashboard
- Kubernetes Dashboard
- Backing Up and Restoring a Kubernetes Cluster
- Additional Resources
- Quiz
- Summary

Security Enhanced Linux (SELinux)

- Objectives
- SELinux: Introduction
- SELinux: Process Flow
- SELinux Packages
- SELinux Administration GUI
- SELinux Administration Cockpit GUI
- SELinux Modes

- Setting a Mode
- SELinux Policies
- Targeted Policy
- SELinux Booleans
- getsebool and setsebool Utilities
- SELinux File Labeling
- SELinux Context
- SELinux User Mapping
- Changing the Context File Type
- Confined SELinux Users
- SELinux Utilities: Summary
- Quiz
- Summary
- Practice 8: Overview

OpenSCAP

- Objectives
- OpenSCAP: Introduction
- SCAP Standards
- Evaluating an OpenSCAP Security Compliance
- OpenSCAP Security Policies
- Installation Summary: Security Policy
- Security Policy
- SCAP Workbench
- OpenSCAP Security Guide
- Using the SCAP Workbench
- Completed Scan and Results
- OpenSCAP Evaluation Report
- Scan Result Details
- oscap Utility
- An oscap info Example
- An oscap xccdf eval Example
- OVAL Definitions for Errata on ULN
- An oscap oval eval Example
- OVAL Auditing Scan Results
- Additional SCAP Utilities
- Additional Resources
- Quiz
- Summary
- Practice 9: Overview

OpenSSL

- Objectives
- What Is OpenSSL?
- Secure Socket Layer (SSL)

- Transport Security Layer (TLS)
- OpenSSL Software Toolkit
- Installing OpenSSL Software Toolkit
- Basic OpenSSL Commands
- Symmetric Key Cryptography
- Encryption Ciphers and Commands
- Data Encryption Standard (DES) Algorithm
- Advanced Encryption Standard (AES)
- Blowfish (BF)
- Blowfish
- Asymmetrical Encryption (Public Key Encryption)
- Diffie-Helman (DH) Public Key Encryption
- Generating DH Parameters
- Rivest-Shamir-Adleman (RSA) Public Key Encryption
- Steps for RSA Encryption and Decryption
- RSA Encryption
- RSA Decryption
- Digital Certificates
- Preparing for a Self-Signed Root Certificate
- Preparing a Self-Signed Root Certificate
- Generating a Self-Signed Root Certificate
- Additional Resources
- Quiz
- Summary
- Practice 10: Overview

Introduction to Linux Internals

- Objectives
- High-Level Linux Architecture
- Kernel Mode and User Mode
- System Calls
- Linux Kernel Features
- Linux Kernel Subsystems
- Process Management
- Memory Management
- Memory Terms and Definitions
- What Is in a Page Table Entry (PTE)?
- How Linux Memory Works
- Virtual File System
- I/O Architecture and Device Drivers
- Network Stack
- Installing the Oracle Linux Kernel Source Code
- Directories in the Oracle Linux Kernel Source Tree
- Compiling C Programs
- Steps from Source to Executable

- Static Linking and Dynamic Linking
- Compilation Process: Examples of Output Produced
- Creating a Statically Linked Executable
- Creating a Dynamically Linked Executable
- Creating a Shared Library
- Using Your Shared Library
- Putting a Shared Library in the Standard Location
- Sharing the Shared Library
- Quiz
- Summary
- Practice 11: Overview

Linux Auditing System

- Objectives
- Linux Auditing System: Introduction
- Steps to Configure and Run the Audit Service
- Configuring the Audit Daemon
- Configuring Audit Rules
- Configuring Audit Control Rules
- Sample Control Rules
- Configuring File System Audit Rules
- Sample File System Rules
- Configuring System Call Audit Rules
- Sample System Call Rules
- Audit Rule Files Provided by the audit Package
- Using Audit Rule Files Provided by the audit Package
- Audit Log File
- Using the ausearch Utility
- Using the aureport Utility
- Quiz
- Additional Resources
- Summary
- Practice 12: Overview

Core Dump Analysis

- Objectives
- System Core Collection: Kexec and Kdump
- Kdump Configuration File
- Kdump Setup Configuration Cockpit Webpage
- Kernel Tuning Parameters
- Magic SysRq Keys
- crash Utility
- Downloading kernel-debuginfo RPM Packages
- Initial crash Output
- Using the crash Utility

- Symbolic Display crash Commands
- System State crash Commands
- Utility crash Commands
- Session Control crash Commands
- General Guidelines for Using crash
- Quiz
- Summary
- Practice 13: Overview

Performance Management Using TuneD

- Objectives
- What Is TuneD?
- TuneD: Introduction
- TuneD Profiles Available by Default
- Additional TuneD Profiles
- Installing TuneD
- Configuring TuneD
- Distribution and Custom TuneD Profiles
- Profile tuned.conf File
- tuned.conf File
- Profile tuned.conf File
- Profile tuned.conf Sections
- tuned-adm Utility
- Additional Resources
- Quiz
- Summary
- Practice 14: Overview

Using Gluster Storage

- Objectives
- GlusterFS Storage: Features
- Gluster Storage: Terminology
- Gluster Architecture and Components
- Gluster Storage Pre-Installation Tasks
- Installing Gluster Server Packages
- Gluster Volumes: Distributed Volume
- Gluster Volumes: Replicated Volume
- Gluster Volumes: Distributed Replicated Volume
- Gluster Volumes: Dispersed Volume
- Gluster Volumes: Distributed Dispersed Volume
- Creating a Gluster Trusted Storage Pool
- Starting Gluster Volumes
- Configuring a Gluster Native Client
- Additional Information
- Summary

- Practice 15: Overview