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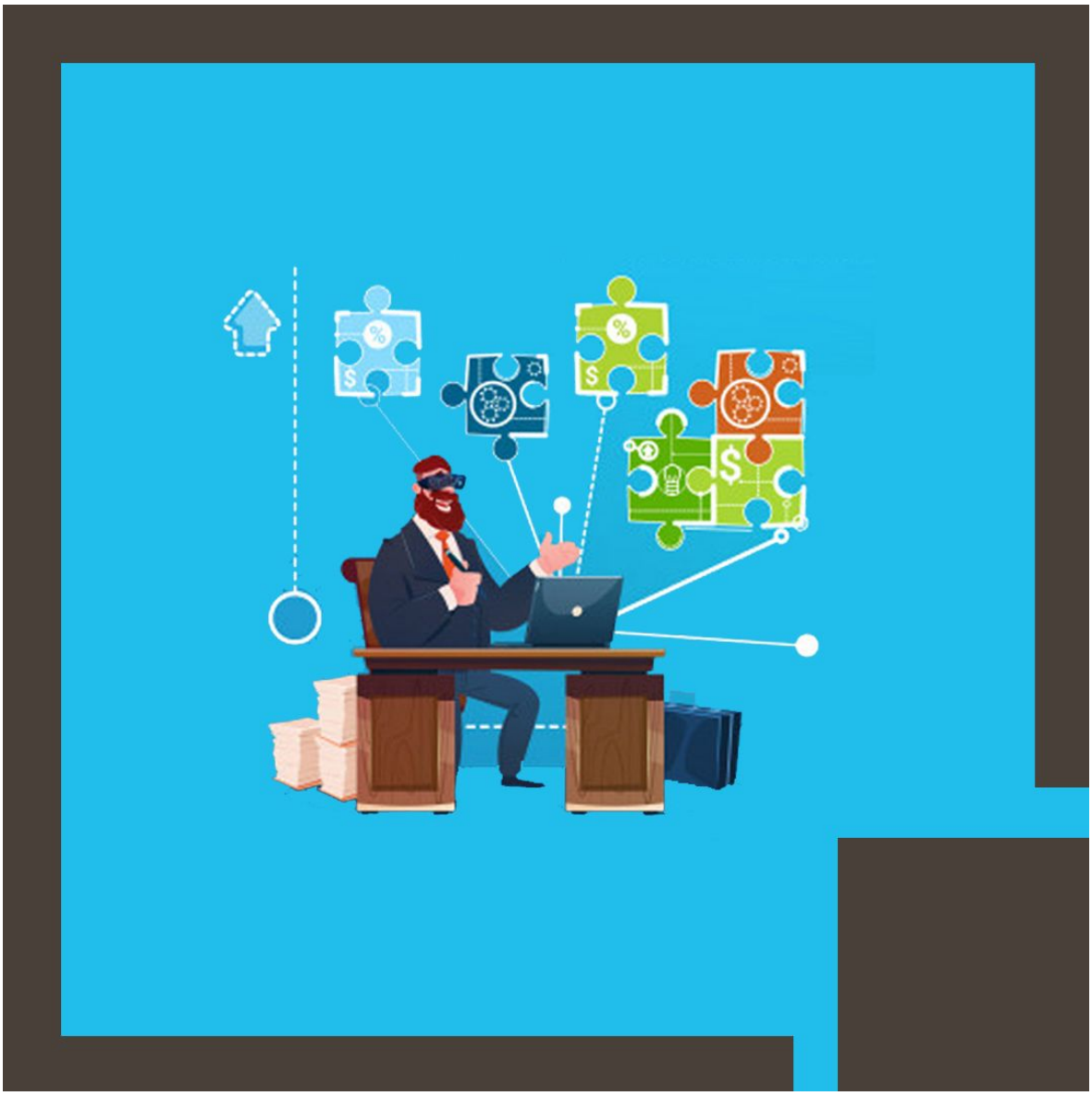
Learning Style: Virtual Classroom

Technology: Linux Foundation

Difficulty: Intermediate

Course Duration: 4 Days

Open Source Virtualization (LFS462)



About this course:

Learn KVM from the ground up with a focus on QEMU and libvirt, as well as Xen. By the end of this course, you will understand how these and other related open source components can be assembled to create a virtual IT infrastructure. There is a focus on practical deployment skills, securing the virtual infrastructure, and administering solutions. There will also be detailed material about using containers. There are low-level lab exercises focused on virtual images and snapshots, deployment, VM creation and maintenance, integration with networking infrastructure, device pass-through and more.

Open Source Virtualization takes a deep dive into KVM (Kernel-based Virtual Machine) and Xen, the most popular hypervisor virtualization technologies in the open source ecosystem, as well as the deployment and use of containers. Built by experts in the field of virtualization, this course provides the technical background to understand the components required to build and administer a modern virtual IT infrastructure.

Course Objective:

This course is focused on problems typically faced in the enterprise world. The lectures are filled with examples of how KVM, Xen and containers can be used in business environments as well as practical lab sessions that let participants gain a real-world perspective of common virtualization problems and how to address them.

At the end of the training, attendees will have acquired the skills needed to:

- Understand the role KVM and Xen play in the virtualization ecosystem
- Know how to assemble KVM and other components into a robust and efficient virtual IT infrastructure

This course is designed to work with a wide range of Linux distributions, so you will be able to apply these concepts regardless of your distro.

Prerequisite:

This course is for technical IT professionals interested in building a reliable, efficient and open virtualization infrastructure with KVM. Students are expected to have mastered the skills covered in the lower level Linux Foundation System Administration courses. Students are expected to be well versed in Linux command line usage, shell scripting and text file editing.

Course Outline:

1. Introduction
    - Linux Foundation
    - Linux Foundation Training
    - Laboratory Exercises, Solutions and Resources
    - Distribution Details
    - Registration
    - Labs

2. Virtualization Overview
    - Virtualization Terminology
    - Host versus Guest
    - Virtual Machine Monitor
    - Emulation
    - Software versus Hardware Virtualization
    - Hypervisor Types
    - Instruction Translation and Caching
    - Paravirtualization
    - Virtual Machine Image File
    - Linux Containers
    - Xen Hypervisor
    - Labs
3. KVM Quick-Start
    - Verifying your Linux Kernel has KVM
    - Validating your Hardware for KVM
    - Obtaining and Installing KVM and QEMU
    - Verifying libvirt installation
    - Building Upstream QEMU
    - libvirt
    - qemu-img and Virtual Disk Files
    - virt-install
    - Pausing and Restoring the Guest
    - Managing VMs with GUIs
    - The QEMU Command Line
    - The QEMU Monitor
    - virt-manager
    - Labs
4. KVM Architecture and Relationship with Linux
    - Brief History of KVM
    - Controlling KVM Using Linux Commands
    - Obtaining KVM
    - Labs
5. Running KVM Using QEMU
    - What is QEMU?
    - Running KVM Using QEMU
    - Machine Commands
    - Starting Guest Networking
    - Dumping Network Traffic with QEMU
    - Guest-to-Host Communication using Virtio
    - QEMU Tracing
    - Managing Storage With QEMU
    - Managing Virtual Storage with libguestfs
    - Using Host Physical Storage
    - Using Host Physical Networking
    - Graphics
    - BIOS
    - USB Pass-through
    - Labs
6. libvirt

    - Architecture
    - libvirt Access Control
    - virsh
    - libvirt XML
    - Open vSwitch
    - Labs
7. Hardware Support
    - I/O Provisioning
    - Labs
8. Tuning for Performance
    - Measuring Performance
    - netperf
    - fio
    - Memory Testing with Stream
    - SPECVirt Tuning
    - Labs
9. KVM Security
    - Review – libvirt Access Control
    - Host Security Concerns
    - libvirt-sandbox
    - sVirt
    - Security Updates
    - Labs
10. Xen Hypervisor Architecture
    - Domain Types
    - Toolstack Choices
    - Virtualization Modes
    - Labs
11. Installing and Configuring Xen
    - Preparing the Host
    - Getting the Software
    - Verifying dom0
    - Toolstack Selection
    - Installing domU
    - Persistent Xen Configuration
    - Connections to domU
    - Labs
12. Administration of Xen domains
    - Debugging Xen Issues
    - Backup and Restore
    - Live Migration
    - NUMA Features
    - PCI Pass-through
    - USB Device Pass-through
    - Troubleshooting
    - Labs
13. Xen Performance and Tuning
    - Domain Resource Usage
    - Xen Scheduler Options
    - I/O Benchmark Testing

- Boot Options for dom0
- Labs

14. Xen Security
    - Domain Type Considerations
    - Xen Security Modules
    - FLASK
    - Virtual Trusted Platform Module
    - pvgrub
    - Network Security
    - Labs
15. Working with Linux Containers
    - Container Basics
    - Docker
    - Rocket
    - Kubernetes
    - LXD Container Hypervisor
    - OCI
    - lxc command line tools
    - Labs

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