

Course duration

- 5 days

Course Benefits

- Learn Docker and Kubernetes Administration fundamentals in this combined course.

Course Outline

1. Container Technology Overview
 1. Instructor – Docker Demo
 2. Application Management Landscape
 3. Application Isolation
 4. Resource Measurement and Control
 5. Container Security
 6. OverlayFS Overview
 7. Container Security
 8. Open Container Initiative
 9. Docker Alternatives
 10. Docker Ecosystem
 11. Docker Ecosystem (cont.)
 12. Lab Tasks
 1. Container Concepts runC
 2. Container Concepts Systemd
2. Installing Docker
 1. Installing Docker
 2. Docker Architecture
 3. Starting the Docker Daemon
 4. Docker Daemon Configuration
 5. Docker Control Socket
 6. Enabling TLS for Docker
 7. Validating Docker Install
 8. Lab Tasks
 1. Installing Docker
 2. Protecting Docker with TLS
3. Managing Containers
 1. Creating a New Container
 2. Listing Containers
 3. Managing Container Resources
 4. Running Commands in an Existing Container
 5. Interacting with a Running Container

6. Stopping, Starting, and Removing Containers
7. Copying files in/out of Containers
8. Inspecting and Updating Containers
9. Docker Output Filtering and Formatting
10. Lab Tasks
 1. Managing Containers
 2. Configure a docker container to start at boot
4. Managing Images
 1. Docker Images
 2. Listing and Removing Images
 3. Searching for Images
 4. Downloading Images
 5. Uploading Images
 6. Export/Import Images
 7. Save/Load Images
 8. Committing Changes
 9. Lab Tasks
 1. Docker Images
 2. Docker Platform Images
5. Creating Images with Dockerfile
 1. Dockerfile
 2. Caching
 3. docker image build
 4. Dockerfile Instructions
 5. ENV and WORKDIR
 6. Running Commands
 7. Getting Files into the Image
 8. Defining Container Executable
 9. HEALTHCHECK
 10. Best Practices
 11. Multi-Stage builds with Dockerfile
 12. Lab Tasks
 1. Dockerfile Fundamentals
 2. Optimizing Image Build Size
 3. Image Builds and Caching
6. Docker Volumes
 1. Volume Concepts
 2. The docker volume Command
 3. Creating and Using Internal Volumes
 4. Internal Volume Drivers
 5. Removing Volumes
 6. Creating and Using External Volumes
 7. SELinux Considerations
 8. Mapping Devices
 9. Lab Tasks
 1. Docker Internal Volumes
 2. Docker External Volumes

- 7. Docker Compose/Swarm
 - 1. Writing YAML Files
 - 2. Concepts
 - 3. Compose CLI
 - 4. Defining a Service Set
 - 5. Compose Versions
 - 6. Docker Engine Swarm Mode
 - 7. Docker Swarm Terms
 - 8. Docker Swarm Command Overview
 - 9. Creating a Swarm
 - 10. Creating Services
 - 11. Creating Secrets
 - 12. Stack Files
 - 13. Stack Command
 - 14. Swarm Placements
 - 15. Swarm Resource Limits and Reservations
 - 16. Swarm Networking
 - 17. Swarm Networking Troubleshooting
 - 18. Lab Tasks
 - 1. Docker Compose
 - 2. Docker Engine Swarm Mode
- 8. Docker Networking
 - 1. Overview
 - 2. Data-Link Layer Details
 - 3. Network Layer Details
 - 4. Hostnames and DNS
 - 5. Service Reachability
 - 6. Container to Container Communication
 - 7. Container to Container: Links (deprecated)
 - 8. Container to Container: Private Network
 - 9. Managing Private Networks
 - 10. Remote Host to Container
 - 11. Lab Tasks
 - 1. Docker Networking
 - 2. Exposing Ports
 - 3. Docker Networking
- 9. Docker Logging
 - 1. Docker Logging
 - 2. Docker Logging with json-file and journald
 - 3. Docker Logging with syslog
 - 4. Docker Logging with Graylog or Logstash
 - 5. Docker Logging with Fluentd
 - 6. Docker Logging with Amazon or Google
 - 7. Docker Logging with Splunk
 - 8. Lab Tasks
 - 1. Logging to syslog
- 10. Kubernetes Core Concepts

1. CKA Objectives Covered
 2. Kubernetes Architecture
 3. Cluster Communication
 4. Objects
 5. Object Properties
 6. Labels and Selectors
 7. Annotations
 8. Object Management
 9. Object Management (cont.)
 10. Image Fundamentals
 11. Container Fundamentals
 12. Pod Fundamentals
 13. Working with Pods
 14. Lab Tasks
 1. Container and Pod Fundamentals
 2. Single Node Install
 3. Pod Fundamentals
11. Installation
 1. CKA Objectives Covered
 2. Installing HA Control Plane (DEMO)
 3. Lab Tasks
 1. Kubernetes HA Masters Install
 2. Kubernetes Install
 3. Joining Worker Nodes
12. Application Lifecycle Management
 1. CKA Objectives Covered
 2. Pod Lifecycle
 3. Container Lifecycle
 4. Init Containers
 5. Container: command and args
 6. Container: Defining Environment
 7. ReplicaSet
 8. Deployments
 9. Working with Deployments
 10. Deployment Rollouts
 11. Lab Tasks
 1. Pod Lifecycle
 2. Init Containers
 3. Deployments
13. Networking
 1. CKA Objectives Covered
 2. Network Overview
 3. Service Discovery and CoreDNS
 4. Container Network Interface (CNI)
 5. Services
 6. Ingress Objects
 7. Lab Tasks

1. Ingress Controller
2. Port-Forwarding
3. Services
4. Ingress

14. Storage

1. CKA Objectives Covered
2. Storage
3. Volume Types
4. Volume Types
5. Static Volumes (DEMO)
6. ConfigMaps
7. ConfigMaps
8. Secrets
9. Lab Tasks
 1. (DEMO) Static Volumes
 2. (DEMO) ConfigMaps and Secrets
 3. Static Volume Provisioning
 4. ConfigMaps and Secrets

15. Scheduling

1. CKA Objectives Covered
2. Controlling and Tracking Resources
3. Scheduler Operation
4. DaemonSet
5. Node Affinity and Anti-affinity
6. Pod Affinity and Anti-affinity
7. Taints and Tolerations
8. Lab Tasks
 1. (DEMO) Affinity and Taints
 2. Pod Resources and Scheduling
 3. Static Scheduling and Daemonsets
 4. Pod and Node Affinities

Class Materials

Each student will receive a comprehensive set of materials, including course notes and all the class examples.