

## **KBS-405: Docker & Kubernetes Admin with CKA & CKAD exam.prep.**

**Course Length:** 2 days Docker + 3 Days Kubernetes, 5 days altogether

### **Course Description:**

Linux containers are changing the way companies think about service development and deployment. Containers play a vital role in the modern data-center, and Docker is leading the way. And Kubernetes is the leading open-source system for automating deployment, scaling and management of containerized applications.

This course first introduces students to the concepts of Docker. covers all the core features of Docker including: installing and basic management of containers, managing images and using Dockerfile to create and manage custom images.

The second part of the course introduces participants to the basic concepts and architecture of Kubernetes, its initial install, setup and access control, Kubernetes Pods and Workloads, Scheduling and node management, Accessing the applications, Persistent storage in Kubernetes and finally its Logging, Monitoring and Troubleshooting facilities.

This course doesn't only prepare delegates for the daily administration of Docker & Kubernetes systems but also for the official [Certified Kubernetes Administrator \(CKA\)](#) and [Certified Kubernetes Application Developer \(CKAD\) exams](#) of the [Cloud Native Computing Foundation \(CNCF\)](#).

**Structure:** 50% theory 50% hands on lab exercises

**Target audience:** System administrators, developers and DevOps who want to understand and use Docker and Kubernetes in enterprise and cloud environments.

**Prerequisites:** Proficiency with the Linux CLI. A broad understanding of Linux system administration. Basic knowledge of Linux containers, e.g. Docker.

### **Detailed Course Outline**

#### **PART I. DCK-102 Docker administration**

##### **Module 1: INTRODUCTION TO CLOUD AND CONTAINERS**

- Cloud computing in general
- Cloud types
- Cloud native computing
- Application containers
- Containers on linux
- Container runtime
- Docker
- Docker Ecosystem
- Docker Ecosystem
- Lab 1

## **Module 2: INSTALLING DOCKER**

- Distribution Packages
- Packages from Docker
- Docker-machine
- Docker Daemon Configuration
- Lab 2

## **Module 3: MANAGING CONTAINERS**

- Docker - container run
- Docker – container ps
- Docker – container attach
- Docker – container signal
- Docker - accessing container FS
- Lab 3

## **Module 4: DOCKER NETWORK - PORT PUBLISHING**

- Port publishing
- Lab 4

## **Module 5: DOCKER STORAGE - IMAGES**

- Docker storage
- Docker storage - overlay FS
- Docker storage - image layers
- Docker images - commit
- Docker images - cli
- Docker images - work with images
- Lab 5

## **Module 6: BUILDING IMAGES**

- Docker images - Dockerfile
- Docker images - Dockerfile syntax
- Docker images - Dockerfile syntax
- Docker images - Dockerfile syntax
- Lab 6

## **Module 7: DOCKER REGISTRY**

- Docker registry
- Docker registry CLI
- Docker local registry setup
- Lab 7

## **Module 8: INTEGRATING DOCKER INTO ECLIPSE IDE**

- Eclipse IDE for Developers
- Creating sample code - java
- Building and Testing
- Lab 8

## **Module 9: DOCKER STORAGE - VOLUME**

- Docker storage - volume
- Docker storage - volume management
- Docker storage - shared volume
- Docker storage - shared volume examples
- Lab 9

## **Module 10: CONNECTING CONTAINERS**

- Connecting Containers
- Lab 10

## **PART II. KBS-103 Kubernetes administration with CKA & CKAD exam.prep.**

### **Module 1: Introduction**

- Cloud computing in general
- Cloud types
- Cloud native computing
- Application containers
- Containers on Linux
- Container runtime
- Container orchestration
- Kubernetes
- Kubernetes concepts
- Kubernetes objects categories
- Kubernetes architecture
- Kubernetes master
- Kubernetes node
- Lab 1

### **Module 2: Installing Kubernetes**

- Picking the right solution.
- One node Kubernetes install
- Kubernetes universal installer
- Install using kubeadm on CentOS
- Kubernetes Networking
- Lab 2

### **Module 3: Configuration**

- Understand Config Maps
- Understand Security Contexts
- Define an application's resource requirements
- Create & consume Secrets
- Understand Service Accounts
- Lab 3

### **Module 4: Accessing Kubernetes**

- Accessing the Kubernetes cluster
- Controlling access to the API
- Authorization
- Role Based Access Control
- Roles and ClusterRoles
- Role bindings
- Lab 4

## **Module 5: Multi-Container Pods**

- Understand Multi-Container Pod design patterns
  - (e.g. ambassador, adapter, sidecare)
- Lab 5

## **Module 6: Observability**

- Understand Liveness Probes and Readiness Probes
- Understand container logging
- Understand how to monitor applications in Kubernetes
- Understand debugging in Kubernetes
- Lab 6

## **Module 7: Pod design**

- Understand how to use Labels, Selectors and Annotations
- Understand Deployments and how to perform rolling updates
- Understand Deployments and how to perform rollbacks
- Understand Jobs and CronJobs
- Lab 7

## **Module 8: Services & Networking**

- Understand Services
- Demonstrate basic understanding of Network Policies
- Lab 8

## **Module 9: Persistent storage in Kubernetes**

- Volumes
- Volume types
- Persistent Volumes
- Secrets
- Using Secrets as environmental variables
- Using Secrets as volumes
- ConfigMaps
- Lab 9