

## **KBS-505: Kubernetes, Helm and Istio Admin. With CKA & CKAD exam.prep.**

**Course Length:** 3 days Kubernetes + 1 day Helm + 1 day Istio, 5 days altogether

### **Course Description:**

Kubernetes is the leading open-source system for automating deployment, scaling and management of containerized applications.

This course introduces participants to the basic concepts and architecture of Kubernetes, its Initial install, configuration and access control, Multi-Container Pods, Observability, Pod Design, Services and Networking, and Persistent Storage in Kubernetes.

The second part deals with Helm, the Kubernetes Package Manager.

The third and final part deals with Istio a hot new technology, a service mesh useful at microservices running over Kubernetes.

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. Kubernetes Basics and 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, sidecar)
- 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

## **PART II. Helm Package Manager**

### **Module 1: Introduction to Helm**

- What is helm?
- Main Helm Concepts
- Helm Components
- Helm Implementation

### **Module 2: Installing and securing Helm and Tiller**

- Installing Helm client
- Installing Tiller
- Upgrading Tiller
- Deleting or Reinstalling Tiller
- Using RBAC to restrict Helm's scope
- Using TLS/SSL to secure Helm

### **Module 3: Using Helm**

- Generic options
- Working with repositories
- Finding charts
- Installing a release
- Upgrading a release and rollback
- Deleting a release

### **Module 4: Helm Charts**

- Intro to charts
- Chart lifecycle hooks
- Managing charts with Helm

## **Module 5: Chart Templates**

- Getting started
- Templates and Values
- Dependencies and Values
- Functions and Pipelines
- Flow Control
- Variables
- Named Templates

## **Module 6: Helm plugins**

- Overview
- Installing a Plugin
- Building Plugins

## **PART III: Istio Service Mesh**

### **Module 1: Introduction to Istio**

- What is a service mesh?
- The architecture of Istio
- Istio components

### **Module 2: Installing Istio in Kubernetes**

- Prepare the installation
- Quick start with Istio
- Customizing the installation using Helm
- Installing the Istio Sidecar
- Lab 1

### **Module 3: Istio Traffic Management**

- Traffic management concepts
- Request routing
- Handling failures
- Rule configuration
- Lab 2

### **Module 4: Security**

- Security needs
- Authentication
- Authorization
- Configuring security
- Lab 3

## **Module 5: Policies and telemetry**

- Policy types
- Platform support
- Concepts
- Configuration
- Lab 4