ComponentSoft
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KBS-103: Kubernetes Administration with CKA & CKAD exam prep.

Course Length: 3 days

Course Description:

Kubernetes is the de-facto system for container orchestration, e.g. automating the deployment, scaling and management of microservices-based, containerized applications.

This training 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 as well as its Logging, Monitoring and Troubleshooting facilities.

This course doesn't only prepare delegates for the daily administration of 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 Kubernetes in cloud and data center 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

Module 1: Kubernetes introduction

- Cloud computing in general
- Cloud types
- Cloud native computing
- Container orchestration
- Kubernetes
- Kubernetes concepts
- Kubernetes objects categories
- Custom resource definitions
- Kubernetes architecture
- Kubernetes master
- Kubernetes node
- Kubernetes Lab: Health check

Module 2: Accessing Kubernetes

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

Module 3: Kubernetes Workloads

- The pod
- Our first Pod
- Operations on pods
- Pod Status and Lifecycle Pod Status and Lifecycle (cont)
- Pod probe examples
- RestartPolicy examples
- InitContainers Pod resource management
- Pod security context
- Patterns for Composite Containers
- ReplicationController and ReplicaSet
- Working with ReplicationController, ReplicaSet
- Deployments
- Working with Deployments
- Kubernetes Lab: Workloads

Module 4: Scheduling and node management

- The Kubernetes Scheduler
- Pod priorities and preemption
- Assigning Pods to Nodes
- Assigning Pods to Nodes – Node affinities Assigning Pods to Nodes – Pod affinities
- Taints and tolerations
- Managing nodes
- Kubernetes Lab: Scheduling

Module 5: Accessing the applications

- Services
- Service types
- Working with Services
- Working with Services
- Ingress
- Ingress definition
- Working with Ingress
- Network Policies
- Network Policy example
- Kubernetes Lab: Accessing Applications

Module 6: Persistent storage in Kubernetes

- Volumes Volume example Volume types
- Persistent Volumes
- Persistent Volume example
- Dynamic PVC provisioning
- Secrets
- Using Secrets as environmental variables
- Using Secrets as volumes
- ConfigMaps
- Kubernetes Lab: Persistent Storage

Module 7: Kubernetes Special Workloads

- StatefulSets StatefulSets - Limitations
- StatefulSet example
- StatefulSet example with PVC
- Jobs, CronJobs
- Jobs example
- CronJobs example
- DaemonSets
- Kubernetes Lab: Special workloads

Module 8: Logging, monitoring and troubleshooting

- Logging architecture
- Monitoring
- Troubleshooting
- Kubernetes Lab: Logging and Monitoring

Module 9: Installing and upgrading Kubernetes

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

Appendix: Application containers

- Application containers
- Containers on Linux
- Container runtime