

Kubernetes Administration – Part 2

Course Outline

Overview:

The "Kubernetes Administration – Part 2" course is designed to build upon the foundational knowledge acquired in the first course of the series, "Kubernetes Administration – Part 1".

In this course, you'll learn how to install and configure a production-grade Kubernetes cluster, from network configuration to upgrades to making deployments available via services.

This course covers a comprehensive range of topics necessary for the installation, configuration, and management of a production-grade Kubernetes cluster. Participants will learn how to set up and manage high availability (HA) in Kubernetes, perform version upgrades using Kubeadm, and implement essential backup and restore procedures for etcd, the key-value store that holds all Kubernetes cluster data. The curriculum also delves into advanced networking concepts, such as network policies for isolating namespaces, which is crucial for enhancing security in multi-tenant environments.

Additionally, the course includes practical training on scaling applications with Horizontal Pod Autoscaler, creating and managing StatefulSets for stateful applications, and utilizing Helm for package management in Kubernetes. These advanced topics are integral for organizations looking to leverage Kubernetes effectively, enabling them to enhance operational efficiency and responsiveness to changing business demands.

The course does not focus on vendor-specific tools, instead employing kubeadm to deploy the cluster, ensuring that the knowledge gained is applicable across various Kubernetes environments. This approach not only broadens the scope of training but also prepares participants for real-world scenarios where flexibility and adaptability are key.

This course and "Kubernetes Administration – Part 1" course prepare the attendees for the **Certified Kubernetes Administrator (CKA)** certification, a globally recognized credential that validates their expertise in Kubernetes. This certification validates their expertise in managing Kubernetes clusters, positioning them as valuable assets to their organizations.

Prerequisites:

Participants should have:

- Completed "Kubernetes Administration – Part 1" course.
- An understanding of Linux administration skills, comfortable using the command line. Must be able to edit files using a command-line text editor.

Course Duration:

2 days

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- Setup and Manage HA in Kubernetes Cluster
- Perform a version upgrade on a Kubernetes cluster using Kubeadm
- Implement etcd backup and restore
- Setup Horizontal PodAutoscaler
- Create and manage Statefulset
- Understand Advance networking – network policy (Isolate Namespaces using Network Policy)
- Create and apply the secret – TLS
- Introduction to Scheduling
- Logging and Troubleshooting (Set up the popular EFK (Elasticsearch + Fluentd + Kibana))
- Custom Resource Definition
- Working with Helm and Charts

Other Follow-On Course for Continued Learning:

Upon completion of the “Kubernetes Administration – Part 1” course, participants can further enhance their skills and knowledge by enrolling in the following course:

[Managing Containers Images Lifecycle with Docker and CRI-O](#) (2 days)

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Exam Details:

Certified Kubernetes Administrator (CKA)

A certified K8s administrator has demonstrated the ability to do basic installation as well as configuring and managing production-grade Kubernetes clusters. They will have an understanding of key concepts such as Kubernetes networking, storage, security, maintenance, logging and monitoring, application lifecycle, troubleshooting, API object primitives and the ability to establish basic use-cases for end users.

The online exam consists of a set of performance-based items (problems) to be solved in a command line and candidates have 2 hours to complete the tasks.

The Certification focuses on the skills required to be a successful Kubernetes Administrator in industry today. This includes these general domains and their weights on the exam:

Domain	Weight
Cluster Architecture, Installation & Configuration <ul style="list-style-type: none"> • <i>Manage role based access control (RBAC)</i> • <i>Use Kubeadm to install a basic cluster</i> • <i>Manage a highly-available Kubernetes cluster</i> • <i>Provision underlying infrastructure to deploy a Kubernetes cluster</i> • <i>Perform a version upgrade on a Kubernetes cluster using Kubeadm</i> • <i>Implement etcd backup and restore</i> 	25%
Workloads & Scheduling <ul style="list-style-type: none"> • <i>Understand deployments and how to perform rolling update and rollbacks</i> • <i>Use ConfigMaps and Secrets to configure applications</i> • <i>Know how to scale applications</i> • <i>Understand the primitives used to create robust, self-healing, application deployments</i> • <i>Understand how resource limits can affect Pod scheduling</i> • <i>Awareness of manifest management and common templating tools</i> 	15%
Services & Networking <ul style="list-style-type: none"> • <i>Understand host networking configuration on the cluster nodes</i> • <i>Understand connectivity between Pods</i> • <i>Understand ClusterIP, NodePort, LoadBalancer service types and endpoints</i> • <i>Know how to use Ingress controllers and Ingress resources</i> • <i>Know how to configure and use CoreDNS</i> • <i>Choose an appropriate container network interface plugin</i> 	20%
Storage <ul style="list-style-type: none"> • <i>Understand storage classes, persistent volumes</i> • <i>Understand volume mode, access modes and reclaim policies for volumes</i> • <i>Understand persistent volume claims primitive</i> • <i>Know how to configure applications with persistent storage</i> 	10%

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Troubleshooting <ul style="list-style-type: none">• <i>Evaluate cluster and node logging</i>• <i>Understand how to monitor applications</i>• <i>Manage container stdout & stderr logs</i>• <i>Troubleshoot application failure</i>• <i>Troubleshoot cluster component failure</i>• <i>Troubleshoot networking</i>	30%
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The exam fee is USD395 and includes one free retake (Note: Course fee does not include exam fee).

- Duration of Exam 2 hours
- Certification Valid for 3 Years
- Includes 12 Month Exam Eligibility
- PDF Certificate and Digital Badge
- Performance-Based Exam
- Exam Simulator.