Accelerated Kubernetes & Docker Bootcamp **KD250**

Accelerated Kubernetes training for professionals

The Accelerated Kubernetes and Docker Bootcamp (KD250) is a consolidation of our famous Kubernetes and Docker Bootcamp I (KD100) and Kubernetes and Docker Bootcamp II (KD200) with added content to prepare the student for the Certified Kubernetes Administrator (CKA) exam and still fit into a single week session.

This course requires students to be very familiar with the Linux command line. It is broken up into a number of sections, each section typically includes an instructor-led presentation outlining theory followed by hands-on labs that put that theory into practice.

**Bundle the CKA with our KD250**

The Certified Kubernetes Administrator (CKA) program was created by the Cloud Native Computing Foundation (CNCF), in collaboration with The Linux Foundation, to help develop the Kubernetes ecosystem. As a Kubernetes Certified Service Provider, Mirantis offers a bundle with our KD250 for the CKA which will save you $50 off the total exam price ($300). If you'd like to bundle the exam with our class, please email us at training@mirantis.com after you've purchased your KD250 seat.

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**Course Details**

- Duration: 4 Days
- Hours: 9:00 a.m. - 5:00 p.m.
- Price: $ 3595.00 USD

**Lab Requirements**

- Laptop with WiFi connectivity
- Web browser supporting HTML5
- SSH Client

**Prerequisites**

- Strong Linux command line skills
- Basic understanding of JSON and YAML
- Basic understanding of distributed application development and deployment
- Basic understanding of Virtualization and Linux execution environment, processes
- Basic understanding of L2, L3, networking and network namespaces
- Basic understanding of Network Attached Storage (NAS)

**Target Audience**

- Developers and system administrators who want to deploy and manage Kubernetes and prepare for the CKA exam

**Course Objectives**

- Preparation for the Certified Kubernetes Administrator (CKA) exam

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**Outline**

**Theory**

- What is a container
- What is microservice design pattern
- What is container orchestration

**Docker**

- Install Docker
- Use Docker to run and manage containers
- Docker images, image registry, image management
- Docker volumes and networks

**Kubernetes**

- Install Kubernetes
- Kubernetes building blocks (pods, deployments, jobs, daemonSets, namespaces, quotas, secrets, configMaps)

**Kubernetes Continued**

- Kubernetes services, service discovery, ingress to connect to containers
- Kubernetes labels, selectors, annotations, liveness and readiness probes
- Kubernetes pod scheduling, anti/affinity, taints and tolerations
- Kubernetes architecture, installation, high availability and security principles
- Kubernetes application troubleshooting, logging, and monitoring
- Kubernetes addons

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# Day 1

## MODULE 1
**INTRODUCTION**

**Theory**
- Course introduction
- Containers, containerized applications

**Workshops**
- Explore the class environment

## MODULE 2
**INTRODUCTION TO DOCKER**

**Theory**
- Docker overview
- Images, containers, volumes, networks

**Workshops**
- Running a container
- Building an image

## MODULE 3
**DOCKER BEST PRACTICES**

**Theory**
- Image management, Docker Hub and Docker Registry
- Handling graceful termination and exit status

**Workshops**
- Image management

## MODULE 4
**DOCKER COMPOSE**

**Theory**
- Introduction to docker-compose
- Introduction to microservices design pattern

**Workshops**
- Build a multi-container application

## MODULE 5
**CONTAINER ORCHESTRATION**

**Theory**
- Introduction to container orchestration
- Introduction to Kubernetes
- Kubernetes installation methods

**Workshops**
- Kubernetes Installation using kubeadm

# Day 2

## MODULE 6
**KUBERNETES INTRODUCTION AND CONCEPTS**

**Theory**
- Main Kubernetes building blocks (API Resources)
- Kubernetes API, kubectl options/shortcuts, accessing API using curl

**Workshops**
- Pods, volumes, labels, annotations
- Deployments, services
- Namespaces, quotas
- Kubernetes jobs, cronjobs, daemonSets
- Kubernetes statefulSets, init-containers
- kubectl shortcuts, display options
- kubectl proxy
- kubectl port-forward
- Using curl to access Kubernetes API
MODULE 7
KUBERNETES IN PRODUCTION

Theory
• Cohesive Application Deployment

Workshops
• Creating, configuring, and deploying a multi-tier application

MODULE 8
KUBERNETES ADDONS

Theory
• Kubernetes addons
• Kubernetes ingress/ingress controller
• Kubernetes ClusterDNS, dashboard, ingress

Workshops
• Kubernetes ClusterDNS, dashboard, ingress

Day 3

MODULE 9
KUBERNETES BEST PRACTICES

Theory
• Working with Kubernetes in production
• Private container repository
• Namespaces, quotas
• Multi-container pods, communications between containers in a pod
• Multi-tier applications
• Pods auto-healing
• Workload release and update strategies
• Pods auto-scaling

Workshops
• Multi-container applications
• Multi-container pods
• Pods auto-healing

MODULE 10
KUBERNETES TROUBLESHOOTING

Theory
• Kubernetes Troubleshooting

Workshops
• Cluster Monitoring And Horizontal Autoscaling

MODULE 11
KUBERNETES ARCHITECTURE

Theory
• Kubernetes architecture, components and addons
• Kubernetes components: etcd, kube-proxy
• Pods scheduling
• Kubernetes High Availability (HA)

Workshops
• Static pods
• Node selector
• Taints and tolerations
• Node affinity/anti-affinity
• Pod affinity/anti-affinity
• Custom scheduler
### Day 4

#### MODULE 12
**KUBERNETES SECURITY**

<table>
<thead>
<tr>
<th>Theory</th>
<th>Workshops</th>
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</thead>
<tbody>
<tr>
<td>• Security goals, roles</td>
<td>• User Authentication and Authorization</td>
</tr>
<tr>
<td>• Access to the Kubernetes API, authentication, RBAC</td>
<td>• Cluster Auditing</td>
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<tr>
<td>• Auditing, logging and security event management</td>
<td>• Network Policy and Traffic Isolation</td>
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<tr>
<td>• Pods security and isolation</td>
<td></td>
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<tr>
<td>• Storage security</td>
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<tr>
<td>• Traffic isolation and security</td>
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<td>• Image security</td>
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#### MODULE 13
**KUBERNETES NETWORKING DEEPDIVE**

<table>
<thead>
<tr>
<th>Theory</th>
<th>Workshops</th>
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</thead>
<tbody>
<tr>
<td>• Kubernetes networking overview</td>
<td>• Tear down the cluster</td>
</tr>
<tr>
<td></td>
<td>• Install a Cluster with Calico</td>
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<td>• Install a Cluster with Flannel</td>
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#### MODULE 14
**KUBERNETES COMPREHENSIVE PRACTICE**

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<thead>
<tr>
<th>Workshops</th>
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<tbody>
<tr>
<td>• Comprehensive Practice</td>
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