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# Preparing for the CKA (Certified Kubernetes Administrator) Certification

## Prerequisites

### Hardware

- One computer (MacOS, Linux, Windows™ or Solaris™),
- AZERTY FR or QWERTY US keyboard,
- 4 GB RAM minimum,
- 2-core processor minimum,
- Headphones or earphones,
- A microphone (optional).

### Software

- Web Chrome version 72+ or
- Microsoft Edge version 79+ or
- Firefox version 65+.

### Internet

- **Fast** Internet access (4G minimum) **WITHOUT** using a proxy,
- **Unblocked** access to ports 80 and 443 at: <https://ittraining.trainercentralsite.com/#/home> and \*.ittraining.team.

# Curriculum

- **DOE301 - Creating Kubernetes clusters**

- Container Orchestration
- Introduction to Kubernetes (k8s)
  - Control Plane
  - Controller
  - Nodes (Minions)
- LAB #1 - Creating a Kubernetes cluster with Virtual Machines
  - 1.1 - Overview
  - 1.2 - Connecting to the kubemaster
  - 1.3 - Testing the network
  - 1.4 - Initializing the Cluster Controller
  - 1.5 - Installing a Network Extension for communication between PODs
  - 1.6 - Connecting workers to the Controller
  - 1.7 - K8s and High Availability
- LAB #2 - Creating a Kubernetes cluster with Minikube
  - 2.1 - Introducing Minikube
  - 2.2 - Installing Minikube
  - 2.3 - Configuring Minikube
  - 2.4 - Installing Docker
  - 2.5 - Installing kubectl
  - 2.6 - The minikube addons command
  - 2.7 - The minikube dashboard addon

- **DOE302 - Managing Pods, Replication Controllers, ReplicaSets, Deployments, Maintenance and Cluster Updates**

- LAB #1 - Creating a pod
  - 1.1 - Introducing a pod
  - 1.2 - Manual pod creation
  - 1.3 - Creating a pod using a YAML file
    - apiVersion
    - kind
    - metadata

- spec
- Using the YAML file
- LAB #2 - Using Replication Controllers and ReplicaSets
  - 2.1 - Replication Controllers
    - Overview
    - Implementation
  - 2.2 - ReplicaSets
    - Overview
    - Implementation
- LAB #3 - Deployment management
  - 3.1 - Overview
  - 3.2 - Implementation
    - Rollouts
    - Rolling Updates
    - Rollbacks
- LAB #4 - Maintenance
  - 4.1 - The drain command
  - 4.2 - The uncordon command
- LAB #5 - Managing Cluster Updates
  - 5.1 - Updating kubeadm
  - 5.2 - Updating Workers

- **DOE303 - The kubectl, krew and kustomize commands**

- LAB #1 - Using the kubectl command
  - 1.1 - Getting help with kubectl commands
  - 1.2 - Obtaining information about the Cluster
    - The version command
    - The cluster-info command
    - The api-versions command
    - The api-resources command
  - 1.3 - Obtaining information about nodes
    - The describe node command
    - The top command
  - 1.4 - Obtaining information about Pods

- The describe pod command
- The top command
- 1.5 - Working with the kubectl command
  - The apply command
  - The create command
  - The get command
  - Using Options
  - The exec command
  - Imperative commands
- LAB #2 - Managing kubectl plugins with the krew command
  - 2.1 - Installing krew
  - 2.2 - Viewing the list of plugins
  - 2.3 - Installing and using plugins
  - 2.4 - Updating and deleting plugins
- LAB #3 - Managing patches with the kustomize command

- **DOE304 - Working with Pods and Containers**

- LAB #1 - Application Configuration
  - 1.1 - Overview
  - 1.2 - Creating a ConfigMap
  - 1.3 - Creating a Secret
  - 1.4 - Using ConfigMaps and Secrets
    - Using Environment variables
    - Using Configuration Volumes
- LAB #2 - Container Resource Management
  - 2.1 - Overview
  - 2.2 - Resource Requests
  - 2.3 - Resource Limits
- LAB #3 - Container supervision
  - 3.1 - Overview
  - 3.2 - Liveness Probes
    - The exec Probe
    - The httpGet Probe
  - 3.3 - Startup Probes

- 3.4 - Readiness Probes
- LAB #4 - Restart Policy Management
  - 4.1 - Overview
  - 4.2 - Always
  - 4.3 - OnFailure
  - 4.4 - Never
- LAB #5 - Creating Multi-container Pods
  - 5.1 - Overview
  - 5.2 - Implementation
- LAB #6 - Init containers
  - 6.1 - Overview
  - 6.2 - Implementation
- LAB #7 - Scheduling
  - 7.1 - Overview
  - 7.2 - Implementation
- LAB #8 - DaemonSets
  - 8.1 - Overview
  - 8.2 - Implementation
- LAB #9 - Static Pods
  - 9.1 - Overview
  - 9.2 - Implementation

- **DOE305 - Network, Service and Microservices Architecture Management**

- LAB #1 - Network and Service Management
  - 1.1 - Overview of Network Extensions
  - 1.2 - DNS K8s
    - Overview
    - Implementation
  - 1.3 - Network Policies
    - Overview
    - Implementation
  - 1.4 - Services
    - Overview
    - Implementation

- The NodePort service
- The ClusterIP service
- 1.5 - Services and the K8s DNS
  - Overview
  - Implementation
- 1.6 - K8s Ingress management
  - Overview
  - Implementation
- LAB #2 - Microservices Architecture Management
  - 2.1 - Overview
  - 2.2 - Creating Deployments
  - 2.3 - Creating Services
  - 2.4 - Deploying the Application
  - 2.5 - Scaling Up

- **DOE306 - Managing Volumes with Kubernetes**

- Overview
  - Volumes
  - Persistent Volumes
  - Volume Types
- LAB #1 - Using K8s Volumes
  - 1.1 - Volumes and volumeMounts
  - 1.2 - Sharing volumes between containers
- LAB #2 - Persistent Volumes
  - 2.1 - Storage Classes
  - 2.2 - Persistent Volumes
  - 2.3 - Persistent Volume Claims
  - 2.4 - Using a PersistentVolumeClaim in a pod
  - 2.5 - Resizing a PersistentVolumeClaim

- **DOE307 - Troubleshooting K8s**

- LAB #1 - The API Server
  - 1.1 - Connection Refused
  - 1.2 - System Pod Logs
- LAB #2 - The Nodes

- 2.1 - NotReady Status
- LAB #3 - Pods
  - 3.1 - The ImagePullBackOff Error
  - 3.2 - The CrashLoopBackOff Error
- LAB #4 - Containers
  - 4.1 - The exec Command
- LAB #5 - Networking
  - 5.1 - kube-proxy and DNS
  - 5.2 - The netshoot Container

- **DOE308 - Introduction to Securing K8s**

- LAB #1 - Role Based Access Control and TLS Certificates
  - 1.1 - Overview
  - 1.2 - The /etc/kubernetes/manifests/kube-apiserver.yaml File
  - 1.3 - Creating a serviceAccount
  - 1.4 - Creating a User
  - 1.5 - TLS Certificates
- LAB #2 - Pod Security Implementation
  - 2.1 - Overview
  - 2.2 - Kubernetes Security Context
  - 2.3 - Kubernetes Network Policies
  - 2.4 - Kubernetes Resource Allocation Management

- **DOE309 - Package Management for Kubernetes with Helm**

- Overview
- LAB #1 - Working with Helm
  - 1.1 - Installing Helm
  - 1.2 - The helm search hub Command
  - 1.3 - Searching the Artifact Hub
  - 1.4 - Adding and Deleting a Repository
  - 1.5 - The helm search repo Command
  - 1.6 - The helm show Command
  - 1.7 - Installing a Chart
  - 1.8 - The helm get Command
  - 1.9 - Using NOTES

- 1.10 - The helm upgrade Command
- 1.11 - The helm history Command
- 1.12 - The helm rollback Command
- 1.13 - The helm uninstall Command
- LAB #2 - Monitoring Kubernetes with the EFK Stack
  - 2.1 - Overview
  - 2.2 - Installing the elasticsearch Chart
  - 2.3 - Installing fluentd-elasticsearch Chart
  - 2.4 - Installing the kibana Chart
  - 2.5 - Generating Logs in Kubernetes
  - 2.6 - Visualizing Data with Kibana

- **DOE310 - Exam - Acquired knowledge**

- 60 questions from a pool of 104 questions

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