

Version : **2025.01**

Last update: 2025/01/19 14:39

# DOE311 - Exam - Acquired knowledge

## The Infrastructure Used

VM	FQDN	IP	OS	Version	vCPUs	RAM (MB)	HDD (GB)	User	PW	root PW
Gateway_10.0.2.40	gateway.ittraining.loc	10.0.2.40	Debian	11.8	4	4096	32 / 4 / 64	trainee	trainee	fenestros
CentOS_10.0.2.45	centos8.ittraining.loc	10.0.2.45	CentOS	8.5.2111	4	4096	500 / 4 / 64 / 32	trainee	trainee	fenestros
Kubemaster_10.0.2.65	kubemaster.ittraining.loc	192.168.56.2	Debian	9.13	4	4096	20	trainee	trainee	fenestros
Kubenode01_10.0.2.66	kubenode01.ittraining.loc	192.168.56.3	Debian	9.13	4	4096	20	trainee	trainee	fenestros
Kubenode02_10.0.2.67	kubenode02.ittraining.loc	192.168.56.4	Debian	9.13	4	4096	20	trainee	trainee	fenestros

In your VirtualBox you **must** create a **private host network** called **vboxnet0** with address **192.168.56.1/24**.

Pre-configured **VirtualBox** VMs can be downloaded free of charge here:

- [Gateway\\_10.0.2.40](#),
- [CentOS\\_10.0.2.45](#),
- [Kubemaster\\_10.0.2.65](#),
- [Kubenode01\\_10.0.2.66](#),
- [Kubenode02\\_10.0.2.67](#).

## Reminder of the Training Content

- **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 - StatefulSets, Advanced StorageClass Usage, Creating a Helm Chart and Monitoring**

- StatefulSets
  - Overview
  - LAB #1 - Setting up a simple StatefulSet
    - 1.1 - Service and StatefulSet creation
    - 1.2 - Scaling Up a StatefulSet
    - 1.3 - Scaling Down a StatefulSet
    - 1.4 - Deleting a StatefulSet
- Advanced StorageClass Usage
  - LAB #2 - Dynamic NFS provisioning
    - 2.1 - NFS Server Configuration
    - 2.2 - NFS Client Configuration
    - 2.3 - Configuring K8s
    - 2.4 - Creating a PersistentVolumeClaim
    - 2.5 - Using the PersistentVolumeClaim with a Pod
    - 2.6 - Creating a Second PersistentVolumeClaim
    - 2.7 - Deleting the PersistentVolumeClaims
- Creating a Helm Chart
  - Overview
  - LAB #3 - Creating a Simple Helm Package
    - 3.1 - The values.yaml File
    - 3.2 - Templates
    - 3.3 - Installation and Removal
- Monitoring
  - Overview
  - LAB #4 - Implementing a Prometheus Solution
    - 4.1 - Stack Deployment with Helm
    - 4.2 - Viewing Data with Grafana

- 4.3 - Viewing Alerts with the Prometheus Web UI
- **DOE311 - Exam - Acquired knowledge**
  - 60 questions from a pool of 104 questions

## Training Evaluation and Acquired Knowledge Assessment

To validate your training, please complete the Training Evaluation and Acquired Knowledge Assessment.

---

Copyright © 2025 Hugh Norris - Non-contractual document. Curriculum subject to change without notice.

From:  
<https://ittraining.team/> - **www.ittraining.team**

Permanent link:  
[https://ittraining.team/doku.php?id=elearning:workbooks:kubernetes\\_en:k8s10](https://ittraining.team/doku.php?id=elearning:workbooks:kubernetes_en:k8s10)

Last update: **2025/01/19 14:39**

