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DOE300 - Kubernetes: Container Orchestration

Présentation

Objectives: Learn container orchestration with Kubernetes.

Who can benefit: Linux Technicians and Administrators.

Prerequisites: Taken the **DOE100 - Docker: Implementation** and **DOE200 - Docker: Administration** courses or possess equivalent skills.

Learning technique: Clear, theoretical course content divided into lessons and extensive LABS.

Student Progression: Student progression is monitored both in terms of effective course duration and in terms comprehension using self-assessment tests.

Duration: 2 days (14 hours).

Prerequisites

Hardware

- A computer running MacOS, Linux, Windows™ or Solaris™,
- AZERTY FR or QWERTY US keyboard,
- Minimum 4 GB of RAM,
- Minimum dual-core processor,
- Headphones/Earphones,
- A microphone (optional).

Software

- If Windows™ - Putty and WinSCP,
- Chrome or Firefox web browser.

Internet

- A fast Internet connection (4G minimum) and **no** proxy,
- Unhindered access to the following domains : <https://my-short.link>, <https://ittraining.center>, <https://ittraining.io>, <https://ittraining.institute>, <https://ittraining.support>.

Curriculum

Day #1

- **DOE300 - Kubernetes: container orchestration** - 2 hours.

- Prerequisites
 - Hardware
 - Software
 - Internet
- Using the Infrastructure
 - Connecting to the Cloud Server
 - Linux, MacOS and Windows 10 with a built-in ssh client
 - Windows 7 and Windows 10 without a built-in ssh client
 - Creating the Host-Only Network 192.168.56.0/24
 - Changing the kubemaster virtual machine's RAM
 - Starting the Virtual Machines
 - Connecting to the Virtual Machines
 - Checking the /etc/hosts files
- Course Curriculum

- **DOE301 - Creating a Kubernetes cluster** - 2 hours.

- What is container orchestration?
- What is Kubernetes (k8s)?
 - Master
 - Nodes (Minions)
- LAB #1 - Creating a Kubernetes cluster
 - 1.1 - Testing the network
 - 1.2 - Initialising the cluster Master
 - 1.3 - Installing a network add-on for inter-POD communications
 - 1.4 - Connecting the nodes to the Master

- **DOE302 - PODs, Replication Controllers, ReplicaSets and Deployments** - 3 hours.

- LAB #1 - Creating a POD
 - 1.1 - What is a POD?
 - 1.2 - Manually creating a POD
 - 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
 - What is a Replication Controller?
 - Implementation
 - 2.2 - ReplicaSets
 - What is a ReplicaSet?
 - Implementation
- LAB #3 - Using Deployments
 - 3.1 - What is a Deployment?

- 3.2 - Implementation
 - Rollouts
 - Rolling Updates
 - Rollbacks

Day #2

- **DOE303 - Managing the network, services and a microservices architecture** - 3 hours.
 - LAB #1 - Managing the network and services
 - 1.1 - Presentation
 - 1.2 - NodePort
 - 1.3 - ClusterIP
 - LAB #2 - Managing a microservices architecture
 - 2.1 - Presentation
 - 2.2 - Creating Deployments
 - 2.3 - Creating Services
 - 2.4 - Deploying the application
 - 2.5 - Testing the application
 - 2.6 - Scaling Up
- **DOE304 - Securing Kubernetes** - 3 hours.
 - LAB #1 - Role Based Access Control and TLS certificates
 - 1.1 - Presentation
 - 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 - Implementing POD security
 - 2.1 - Presentation
 - 2.2 - Kubernetes Security Context
 - ReadOnlyRootFilesystem
 - drop
 - 2.3 - Kubernetes Pod Security Policy
 - 2.4 - Kubernetes Network Policies
 - 2.5 - Kubernetes Resource Allocation Management
 - LAB #3 - Securing Kubernetes' components
 - 3.1 - Kubelet API access
 - 3.2 - Kubelet and Kubernetes API access
 - 3.3 - Securing etcd
- **DOE305 - Course completion** - 1 hour.
 - What's next?
 - Training materials
 - What you need
 - Hardware
 - Software
 - Virtual Machine
 - What we covered
 - Day #1
 - Day #2
 - Resetting the course infrastructure

- Evaluate the training session
- Thanks

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