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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://itraining.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 Acces 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
