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DOE200 - Docker: Administration

Presentation

Objectives: Master the administration of Operating-system-level virtualization with Docker.
Who can benefit: Linux Technicians and Administrators.
Prerequisites: Taken the **DOE100 - Docker: Implementation** course 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 attendance and in terms of 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

- **DOE200 - Docker: Administration** - 1 hour.
    - 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
        - Starting the Virtual Machine
        - Connecting to the Virtual Machine
    - Course Curriculum

- **DOE201 - Creating an image registry** - 3 hours.
    - LAB #1 - Installing a private registry
        - Installing Docker
        - Preparation
        - 1.1 - Creating a local registry,
        - 1.2 - Installing a registry on a dedicated server

- **DOE202 - Docker Compose, Docker Machine and Docker Swarm** - 3 hours.
    - LAB #1 - Docker Compose
        - 1.1 - Installation
        - 1.2 - Using docker-compose
    - LAB #2 - Docker Machine
        - 2.1 - Presentation
        - 2.2 - Preparation
            - Docker-CE
                - Mac
                - Linux
                - Windows
            - VirtualBox
        - 2.3 - Installation
            - Mac
            - Linux
            - Windows
        - 2.4 - Creating Docker virtual machines
        - 2.5 - List the Docker virtual machines
        - 2.6 - Obtaining the virtual machine IP address
        - 2.7 - Connecting to the virtual machine
    - LAB #3 - Docker Swarm
        - 3.1 - Presentation
        - 3.2 - Initialising Docker Swarm
        - 3.3 - The Leader
        - 3.4 - Joining the Swarm
        - 3.5 - Getting Swarm information
        - 3.6 - Starting a service
        - 3.7 - Scaling up and scaling down a service
        - 3.8 - Getting node information

        - 3.9 - High availability
        - 3.10 - Deleting a service

Jour #2

- **DOE203 - Managing a network within Swarm** - 3 hours.
    - Networking and Docker
    - LAB #1 - Preparation
        - 1.1 - Importing the virtual machines
        - 1.2 - Connecting to the virtual machines
    - LAB #2 - Managing an Overlay network
        - 2.1 - Creating an Overlay network
        - 2.2 - Creating a service
        - 2.3 - Moving a service to another Overlay network
        - 2.4 - DNS container discovery
        - 2.5 - Creating a personalised Overlay network
    - LAB #3 - Managing microservices
        - 3.1 - Using a Bridge network and links
        - 3.2 - Using an Overlay network and Docker Swarm

- **DOF204 - Managing Docker's Security** - 3 heures.
    - LAB #1 - Creating a standard user to manage the Docker daemon
    - LAB #2 - The docker-bench-security.sh script
    - LAB #3 - Securing and configuring the Docker host
        - 3.1 - [WARN] 1.2.1 - Ensure a separate partition for containers has been created
        - 3.2 - [WARN] 1.2.3 - Ensure auditing is configured for the Docker daemon
    - LAB #4 - Securing and configuring the Docker daemon
        - 4.1 - [WARN] 2.1 - Ensure network traffic is restricted between containers on the default bridge
        - 4.2 - [WARN] 2.8 - Enable user namespace support
        - 4.3 - [WARN] 2.11 - Ensure that authorization for Docker client commands is enabled
        - 4.4 - [WARN] 2.12 - Ensure centralized and remote logging is configured
        - 4.5 - [WARN] 2.14 - Ensure Userland Proxy is Disabled
        - 4.6 - [WARN] 2.17 - Ensure containers are restricted from acquiring new privileges
        - 4.7 - The /etc/docker/daemon.json file
    - LAB #5 - Securing images and image construction files
        - 5.1 - [WARN] 4.1 - Ensure a user for the container has been created
        - 5.2 - [WARN] 4.5 - Ensure Content trust for Docker is Enabled
        - 5.3 - [WARN] 4.6 - Ensure that HEALTHCHECK instructions have been added to container images
    - LAB #6 - Securing the Container Runtime
        - 6.1 - [WARN] 5.1 - Ensure AppArmor Profile is Enabled
        - 6.2 - [WARN] 5.2 - Ensure SELinux security options are set, if applicable
        - 6.3 - [WARN] 5.10 - Ensure memory usage for container is limited
        - 6.4 - [WARN] 5.11 - Ensure CPU priority is set appropriately on the container
        - 6.5 - [WARN] 5.12 - Ensure the container's root filesystem is mounted as read only
        - 6.6 - [WARN] 5.14 - Ensure 'on-failure' container restart policy is set to '5'
        - 6.7 - [WARN] 5.25 - Ensure the container is restricted from acquiring additional privileges

    - 6.8 - [WARN] 5.26 - Ensure container health is checked at runtime
    - 6.9 - [WARN] 5.28 - Ensure PIDs cgroup limit is used
  - LAB #7 - Docker Content Trust (DCT)
    - 7.1 - The DOCKER_CONTENT_TRUST variable
    - 7.2 - DCT and the docker pull command
      - The disable-content-trust option
    - 7.3 - DCT and the docker push command
    - 7.4 - DCT and the docker build command
      - Creating a second repositry
      - Deleting a signature
  - LAB #8 - Securing the Docker daemon socket
    - 8.1 - Creating a Certification Authority certificate
    - 8.2 - Creating the Docker daemon's server certificate
    - 8.3 - Creating the client certificate
    - 8.4 - Starting the Docker daemon
    - 8.5 - Configuring the client

- **DOE205 - 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
