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DOE600 - Course Presentation

Content

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://www.ittraining.team **and its sub-domains**.

Curriculum

- **DOE600 - Course Presentation**
  - Prerequisites
    - Hardware
    - Software
    - Internet
  - Use of the Infrastructure
  - Curriculum
- **DOE601 - Virtualisation by Isolation**
  - Presentation of Virtualisation by Isolation
    - History
  - Presentation of Namespaces
  - Presentation of CGroups
    - LAB #1 - cgroups v1
      - 1.1 - Preparation
      - 1.2 - Presentation
      - 1.3 - Memory Limitation
      - 1.4 - The cgcreate command
      - 1.5 - The cgexec command

        - 1.6 - The cgdelete command
        - 1.7 - The /etc/cgconfig.conf file
        - 1.8 - The cgconfigparser command
      - LAB #2 - cgroups v2
        - 2.1 - Preparation
        - 2.2 - Overview
        - 2.3 - Limiting CPU Resources
        - 2.4 - The systemctl set-property command
    - Introducing Linux Containers
      - LAB #3 - Working with LXC
        - 3.1 - Installation
        - 3.2 - Creating a Simple Container
        - 3.3 - Starting a Simple Container
        - 3.4 - Attaching to a Simple Container
        - 3.5 - Basic LXC Commands
          - The lxc-console Command
          - The lxc-stop Command
          - The lxc-execute Command
          - The lxc-info Command
          - The lxc-freeze Command
          - The lxc-unfreeze Command
          - Other Commands
        - 3.6 - Creating an Ephemeral Container
          - The lxc-copy Command
        - 3.7 - Saving Containers
          - The lxc-snapshot Command

- **DOE602 - Getting started with Docker**
  - Introduction to Docker
    - Virtualisation and Containerisation
    - The AUFS File System
    - OverlayFS and Overlay2
    - Docker Daemon and Docker Engine
    - Docker CE and Docker EE

        - Docker CE
        - Docker EE
    - Docker and Mirantis
  - LAB #1 - Working with Docker
    - 1.1 - Installing docker on Linux
      - Debian 11
      - CentOS 8
    - 1.2 - Starting a Container
    - 1.3 - Viewing the list of Containers and Images
    - 1.4 - Searching for an Image in a Repository
    - 1.5 - Deleting a Container from an Image
    - 1.6 - Creating an Image from a Modified Container
    - 1.7 - Deleting an Image
    - 1.8 - Creating a Container with a Specific Name
    - 1.9 - Executing a Command in a Container
    - 1.10 - Injecting Environment Variables into a Container
    - 1.11 - Modifying a Container Host Name
    - 1.12 - Mapping Container Ports
    - 1.13 - Starting a Container in Detached mode
    - 1.14 - Accessing Container Services from the Outside
    - 1.15 - Stopping and Starting a Container
    - 1.16 - Using Signals with a Container
    - 1.17 - Forcing the deletion of a running Container
    - 1.18 - Simply using a Volume
    - 1.19 - Downloading an image without creating a Container
    - 1.20 - Attaching to a running Container
    - 1.21 - Installing software in a Container
    - 1.22 - Using the docker commit command
    - 1.23 - Connecting to the container from the outside

- **DOE603 - Managing and Storing Docker Images**
  - LAB #1 - Re-creating an official docker image
    - 1.1 - Using a Dockerfile
    - 1.2 - FROM

        - 1.3 - RUN
        - 1.4 - ENV
        - 1.5 - VOLUME
        - 1.6 - COPY
        - 1.7 - ENTRYPOINT
        - 1.8 - EXPOSE
        - 1.9 - CMD
        - 1.10 - Other commands
    - LAB #2 - Creating a Dockerfile
        - 2.1 - Creating and testing the script
        - 2.2 - Good Cache Practices
    - LAB #3 - Installing a Private Registry
        - 3.1 - Creating a Local Registry,
        - 3.2 - Creating a Dedicated Registry Server
            - Configuring the Client

- **DOE604 - Volume, Network and Resource Management**
    - LAB #1 - Volume Management
        - 1.1 - Automatic management using Docker
        - 1.2 - Manual Volume Management
        - 1.3 - Manual management of a Bindmount
    - LAB #2 - Network Management
        - 2.1 - The Docker Network Approach
            - Bridge
            - Host
            - None
            - Links
        - 2.2 - Running Wordpress in a container
        - 2.3 - Managing a Microservices Architecture
    - LAB #3 - Monitoring Containers
        - 3.1 - Logs
        - 3.2 - Processes
        - 3.3 - Continuous Activity

- **DOE605 - Docker Compose, Docker Machine and Docker Swarm**

- LAB #1 - Docker Compose
  - 1.1 - Installation
  - 1.2 - Installing Wordpress with Docker Compose
- LAB #2 - Docker Machine
  - 2.1 - Introduction
  - 2.2 - Creating Docker Virtual Machines
  - 2.3 - Listing Docker VMs
  - 2.4 - Obtaining VM IP addresses
  - 2.5 - Connecting to a Docker VM
- LAB #3 - Docker Swarm
  - 3.1 - Overview
  - 3.2 - Initializing Docker Swarm
  - 3.3 - Leader status
  - 3.4 - Joining the Swarm
  - 3.5 - Viewing Swarm Information
  - 3.6 - Starting a Service
  - 3.7 - Scaling Up and Scaling Down a Service
  - 3.8 - Checking Node Status
  - 3.9 - High Availability
  - 3.10 - Deleting a Service
  - 3.11 - Backing up Docker Swarm
  - 3.12 - Restoring Docker Swarm

- **DOE606 - Overlay Network Management with Docker in Swarm mode**
  - The Docker Network Model
  - LAB #1 - Overlay Network Management
    - 1.1 - Creating a network overlay
    - 1.2 - Creating a Service
    - 1.3 - Moving the Service to another Overlay Network
    - 1.4 - DNS container discovery
    - 1.5 - Creating a Custom Overlay Network
  - LAB #2 - Microservices Architecture Management
    - 2.1 - Implementing Docker Swarm with overlay networks

- **DOE607 - Docker Security Management**

- LAB #1 - Using Docker Secrets
- LAB #2 - Creating a Trusted User to Control the Docker Daemon
- LAB #3 - The docker-bench-security.sh script
- LAB #4 - Securing the Docker Host Configuration
  - 4.1 - [WARN] 1.2.1 - Ensure a separate partition for containers has been created
  - 4.2 - [WARN] 1.2.3 - Ensure auditing is configured for the Docker daemon
- LAB #5 - Securing the Docker daemon configuration
  - 5.1 - [WARN] 2.1 - Ensure network traffic is restricted between containers on the default bridge
  - 5.2 - [WARN] 2.8 - Enable user namespace support
  - 5.3 - [WARN] 2.11 - Ensure that authorization for Docker client commands is enabled
  - 5.4 - [WARN] 2.12 - Ensure centralized and remote logging is configured
  - 5.5 - [WARN] 2.14 - Ensure Userland Proxy is Disabled
  - 5.6 - [WARN] 2.17 - Ensure containers are restricted from acquiring new privileges
  - 5.7 - The /etc/docker/daemon.json file
- LAB #6 - Securing Images and Build Files
  - 6.1 - [WARN] 4.1 - Ensure a user for the container has been created
  - 6.2 - [WARN] 4.5 - Ensure Content trust for Docker is Enabled
  - 6.3 - [WARN] 4.6 - Ensure that HEALTHCHECK instructions have been added to container images
- LAB #7 - Securing the Container Runtime
  - 7.1 - [WARN] 5.1 - Ensure AppArmor Profile is Enabled
  - 7.2 - [WARN] 5.2 - Ensure SELinux security options are set, if applicable
  - 7.3 - [WARN] 5.10 - Ensure memory usage for container is limited
  - 7.4 - [WARN] 5.11 - Ensure CPU priority is set appropriately on the container
  - 7.5 - [WARN] 5.12 - Ensure the container's root filesystem is mounted as read only
  - 7.6 - [WARN] 5.14 - Ensure 'on-failure' container restart policy is set to '5'
  - 7.7 - [WARN] 5.25 - Ensure the container is restricted from acquiring additional privileges
  - 7.8 - [WARN] 5.26 - Ensure container health is checked at runtime
  - 7.9 - [WARN] 5.28 - Ensure PIDs cgroup limit is used
- LAB #8 - Securing Images with Docker Content Trust
  - 8.1 - DOCKER_CONTENT_TRUST
  - 8.2 - DCT and the docker pull command
    - The disable-content-trust option
  - 8.3 - DCT and the docker push command
  - 8.4 - DCT and the docker build command

        - Creating a second Repositry
        - Deleting a signature
    - LAB #9 - Securing the Docker daemon socket
        - 9.1 - Creating the Certificate Authority Certificate
        - 9.2 - Creating the Docker Daemon Host Server Certificate
        - 9.3 - Creating the Client Certificate
        - 9.4 - Starting the Docker Daemon with a Direct Invocation
        - 9.5 - Configuring the Client

- **DOE608 - Course Validation**
    - Course Materials
    - What this course covered
    - Validation of acquired knowledge
    - Course Evaluation
