Docker in a nutshell
Agenda

- What is Docker?
- Advantage over classical virtualization
- How to install Docker
- Exercise: How to use Docker
What is Docker?

- **Docker** allows to package an application into a standardized unit for software development:
  - The Docker Container

- A **Docker Container** wraps a piece of software in a complete filesystem which contains all needed resources

- A Docker Container runs on Linux, Windows, macOS, and most Cloud infrastructures

Image source: [https://www.docker.com](https://www.docker.com)
Docker promise: Build, Ship, Run!

- **Build**: Develop an app using Docker containers with any language and any toolchain.
- **Ship**: Ship the “Dockerized” app and dependencies anywhere - to QA, teammates, or the cloud - without breaking anything.
- **Run**: Scale to 1000s of nodes, move between data centers and clouds, update with zero downtime and more.

- Docker enables reliable deployments
  - *Build here, run there*
Advantage over classical virtualization

Setting up a Virtual Machine requires additional tools for provisioning such as **Puppet, Chef, Ansible, Vagrant**, shell scripts and more ...
- Tools such as **Packer** do support builder and provisioners

But ...
- Docker comes with template **Docker images** hosted at hub.docker.com
- Easy to extend with custom software, libraries, files defined in a single **Dockerfile**
- **Images** are version controlled and lightweight
- Supports the Dev&Ops paradigm **Infrastructure-as-Code**
Exercise: How to install Docker

- There are official installation guides available for various operating systems.
  - https://docs.docker.com/engine/installation/
- As installation guides are self-explanatory and Docker is pre-installed on all working stations, we can skip to the next chapter.
Exercise: How to use Docker

- Check if correct Docker version is installed:
  docker version
- Run first Docker container:
  docker run hello-world
- First, Docker Image is searched locally, when **not** found
- Then, Docker Image is pulled from DockerHub.
- Split up command:
  docker pull hello-world
  docker run hello-world
Exercise: How to use Docker

- States of a Docker application:
  - Dockerfile
    - Configuration to create a Docker Image.
  - Docker Image
    - Image can be loaded by Docker and is used to create Docker Container.
  - Docker Container
    - Instance of a Docker Image.
- Dockerfile
  - Build a Docker Image from Dockerfile with:
    
    ```bash
    docker build -t username/imagename .
    ```

Dockerfile is located here!
Exercise: How to use Docker

**Docker Image**
- List all Docker Images:
  docker images
- Remove Docker Image with name 'imagename':
  docker rmi imagename

**Docker Container**
- List all Docker Containers with size:
  docker ps -as
- Remove Docker Container 'containernname':
  docker rm containernname
Exercise: How to use Docker

- Remove the Docker Container and Docker Image of the hello-world application.
- Then pull the image (with the pull command) and run it again.
Exercise: How to use Docker

• Other useful Docker commands:
  - docker create imagnename
  - docker start containernname
  - docker stop containernname
  - docker restart containernname
  - docker kill containernname

• The „httpd“ Docker Image can be used to test above documented commands.
What we have learned

- You are familiar with basic usage and commands of Docker.
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