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Docker lecture #1

Введение в Docker

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2023

План лекций

Docker

1. Docker intro. How docker works?
2. What do we have: containers, images, volumes, networks, registries
3. Run simple images/ using CLI and extensions
4. Using docker for easy database access
5. Volumes and connecting them - run with nginx
6. Write simple Dockerfile for python backend. Port binding
7. Write Dockerfile for frontend (build step and run container).
8. Write docker-compose to start whole app (talking about network inside docker)

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3 MAIN TOPIC

Контейнер для приложений

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- Изолированное окружение (файловая система, процессы, сеть)
- Конфигурационные файлы
- Зависимости
- Стартовый скрипт

docker

Docker Inc.

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2013 — Опубликован код Docker под открытой лицензией Apache 2.0

(Community Edition)

Enterprise Edition — Проприетарная лицензия Docker Inc.

Контейнерная изоляция

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Open Container Initiative (OCI)

Solaris Containers

Linux Containers (LXC)

FreeBSD jail

Виртуализация

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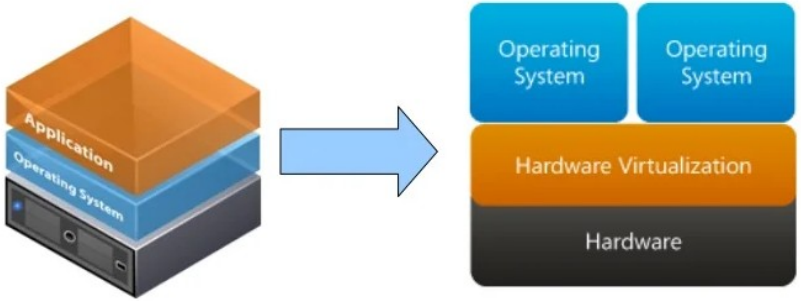

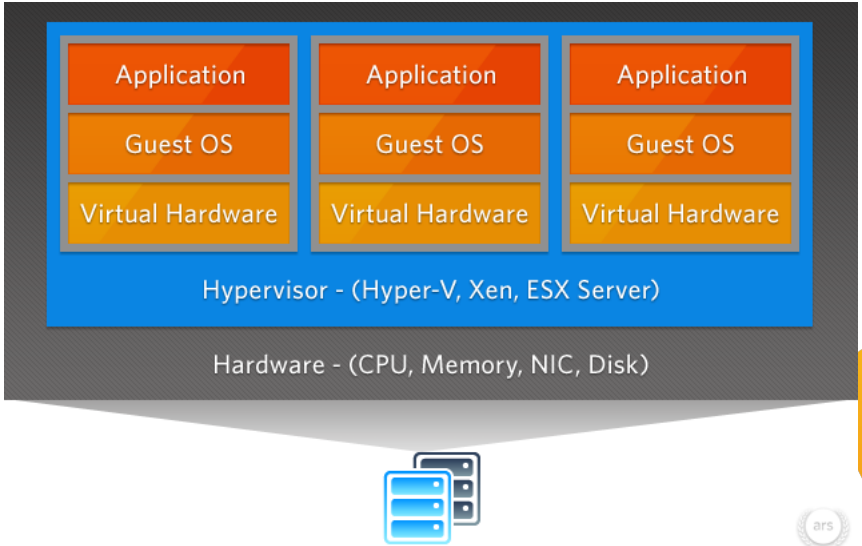

- VMware ESXi
- Microsoft Hyper-V
- Linux KVM
- XEN

Контейнерная изоляция

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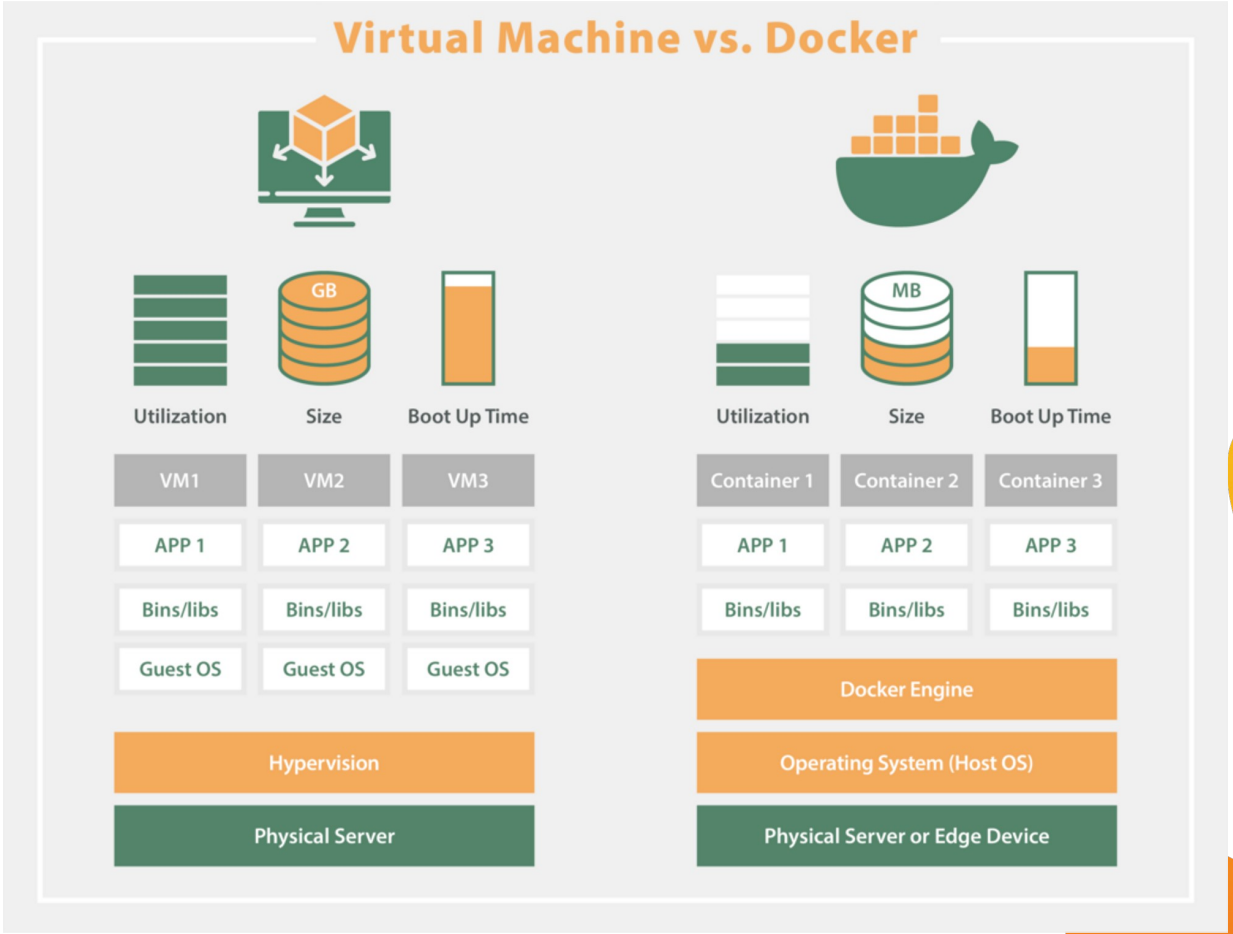

Kubernetes architecture

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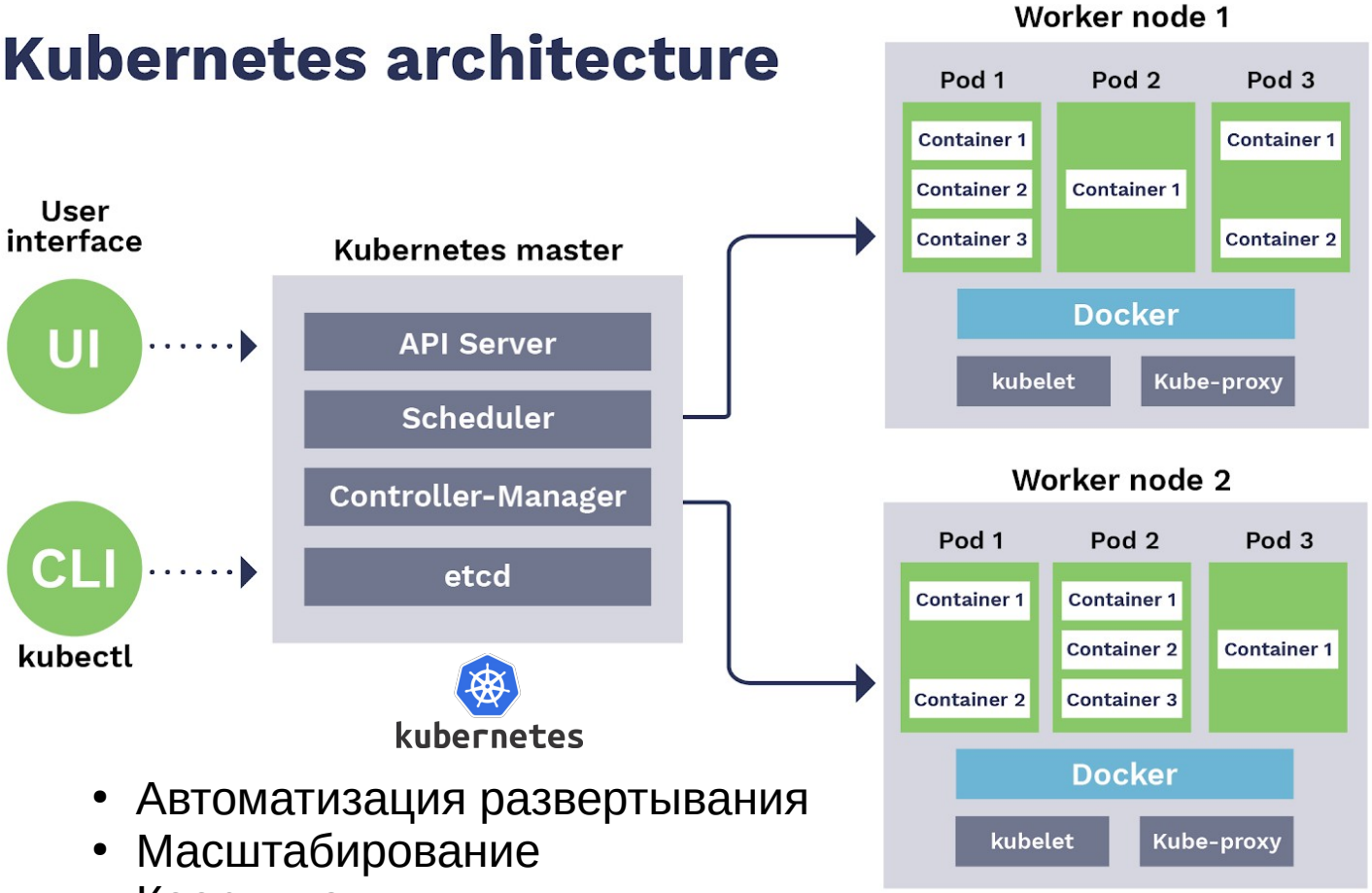

- Автоматизация развертывания
- Масштабирование
- Координация

Docker architecture

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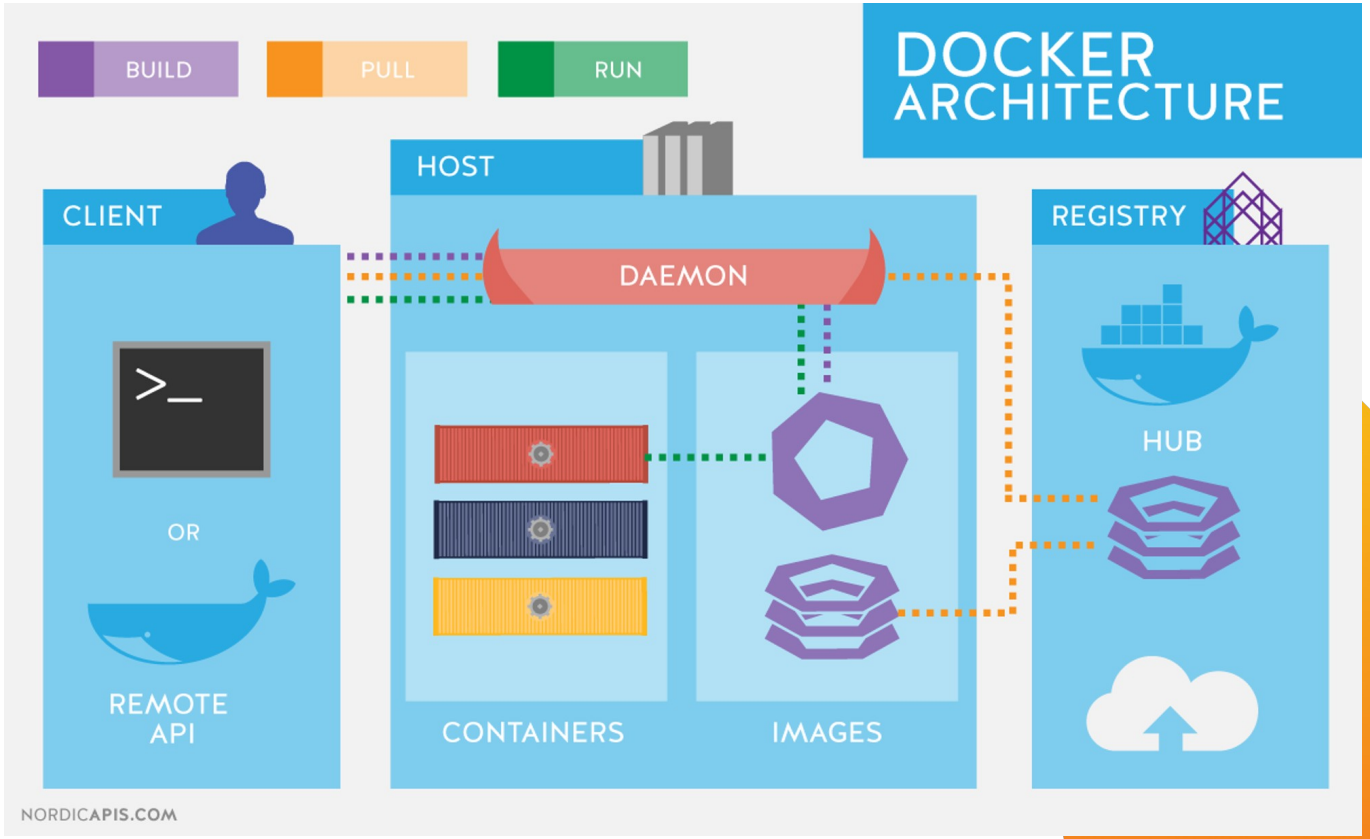

Архитектура Docker

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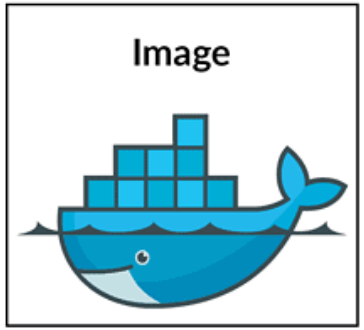
Инструкция для создания образа

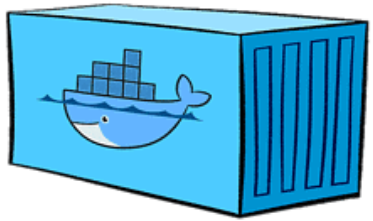
Шаблон для создания контейнеров

Экземпляр образа на котором выполняются процессы

Dockerfile



Docker Image



Docker Container

Docker architecture

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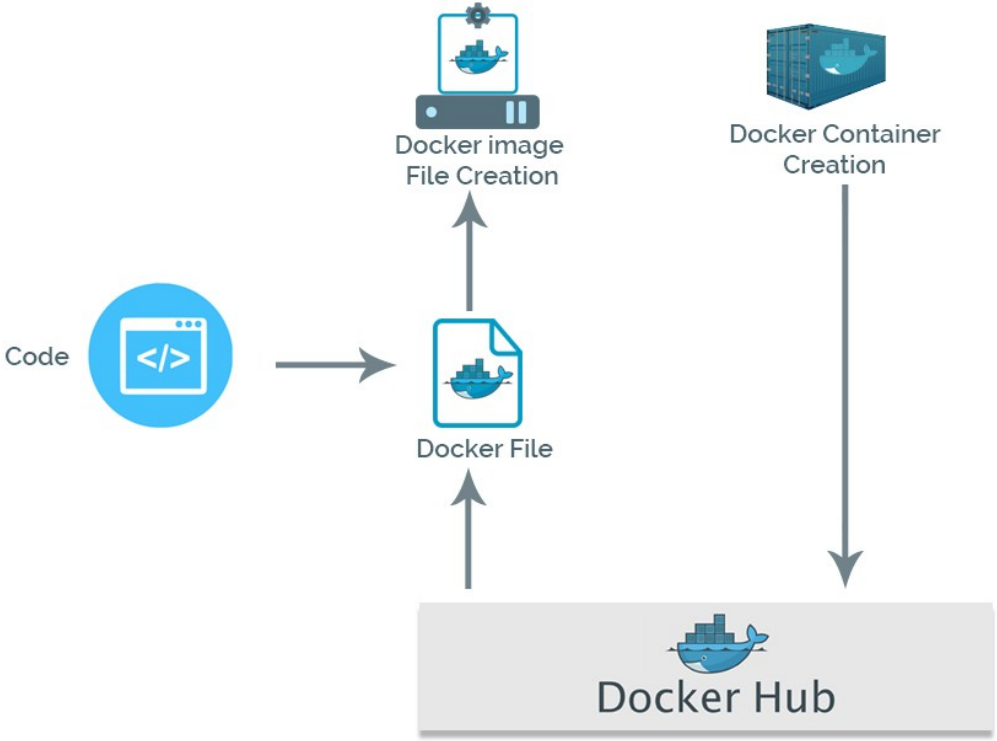

Container layers

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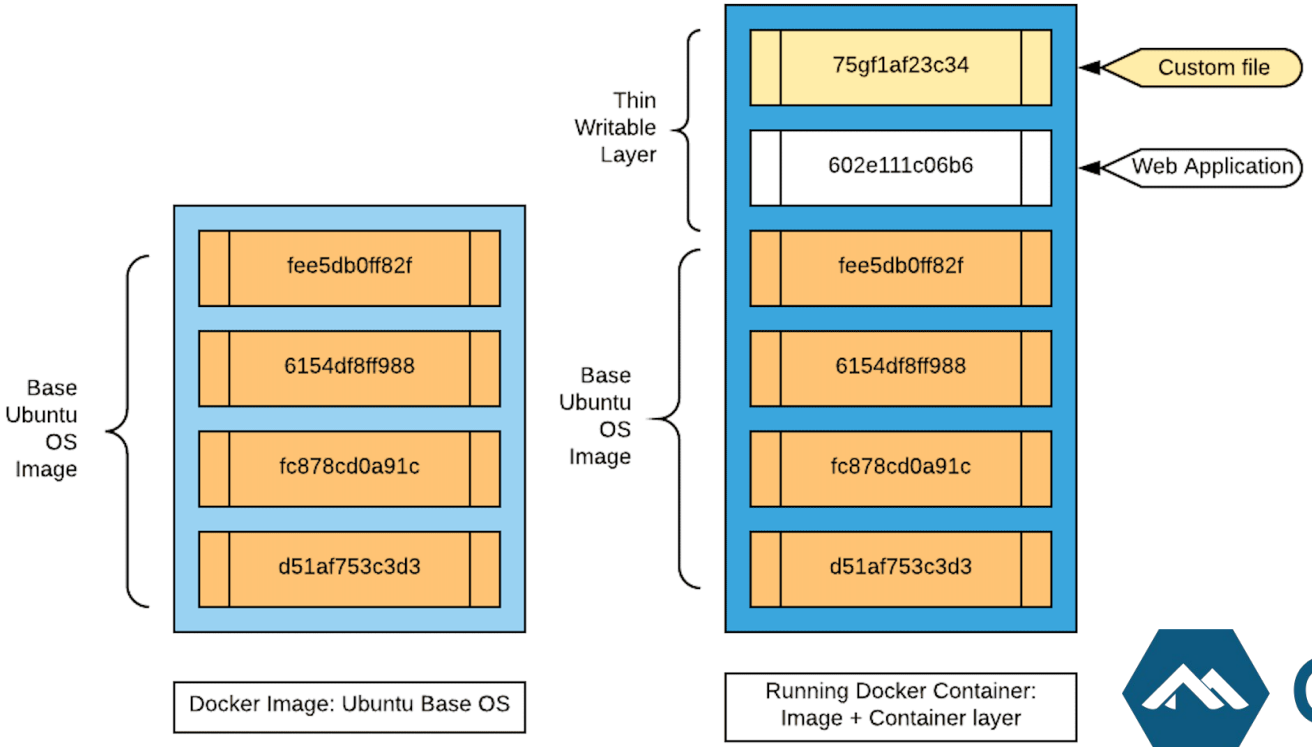

Docker Hub

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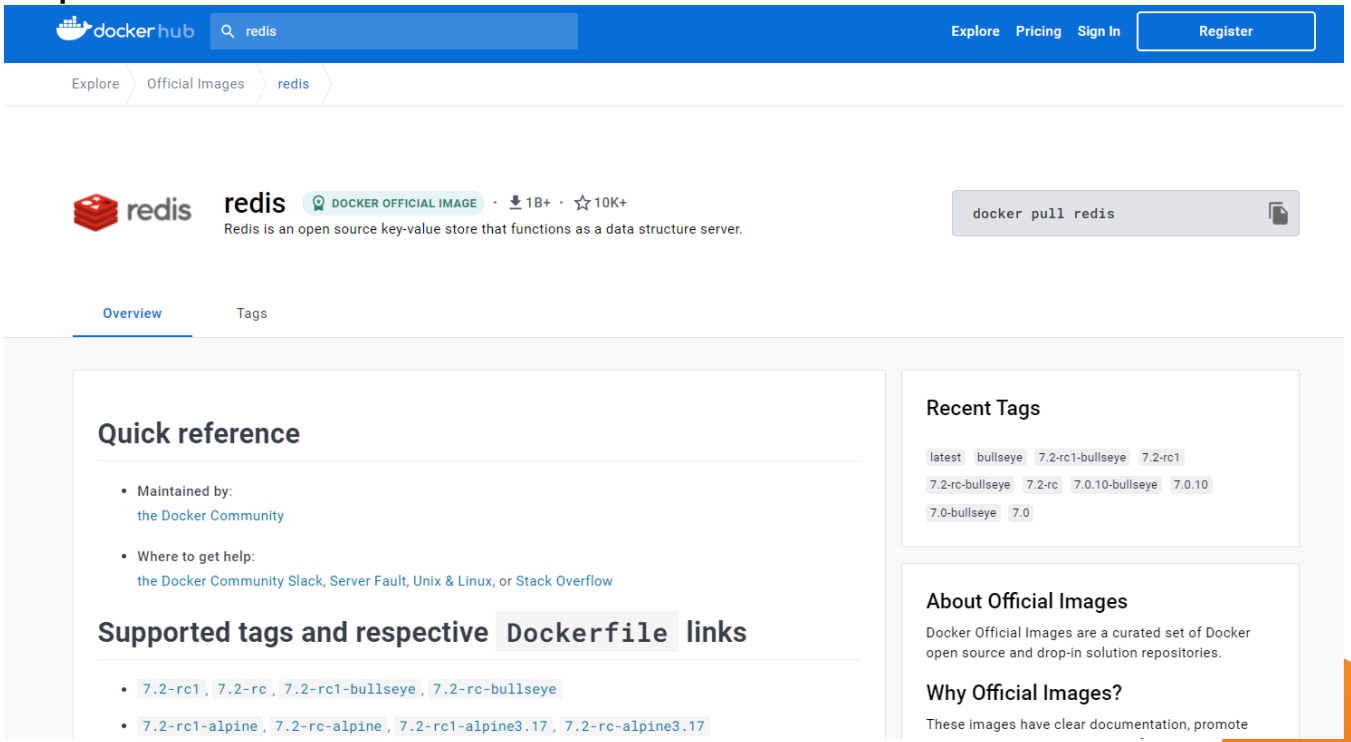
https://hub.docker.com/



Жизненный цикл контейнера

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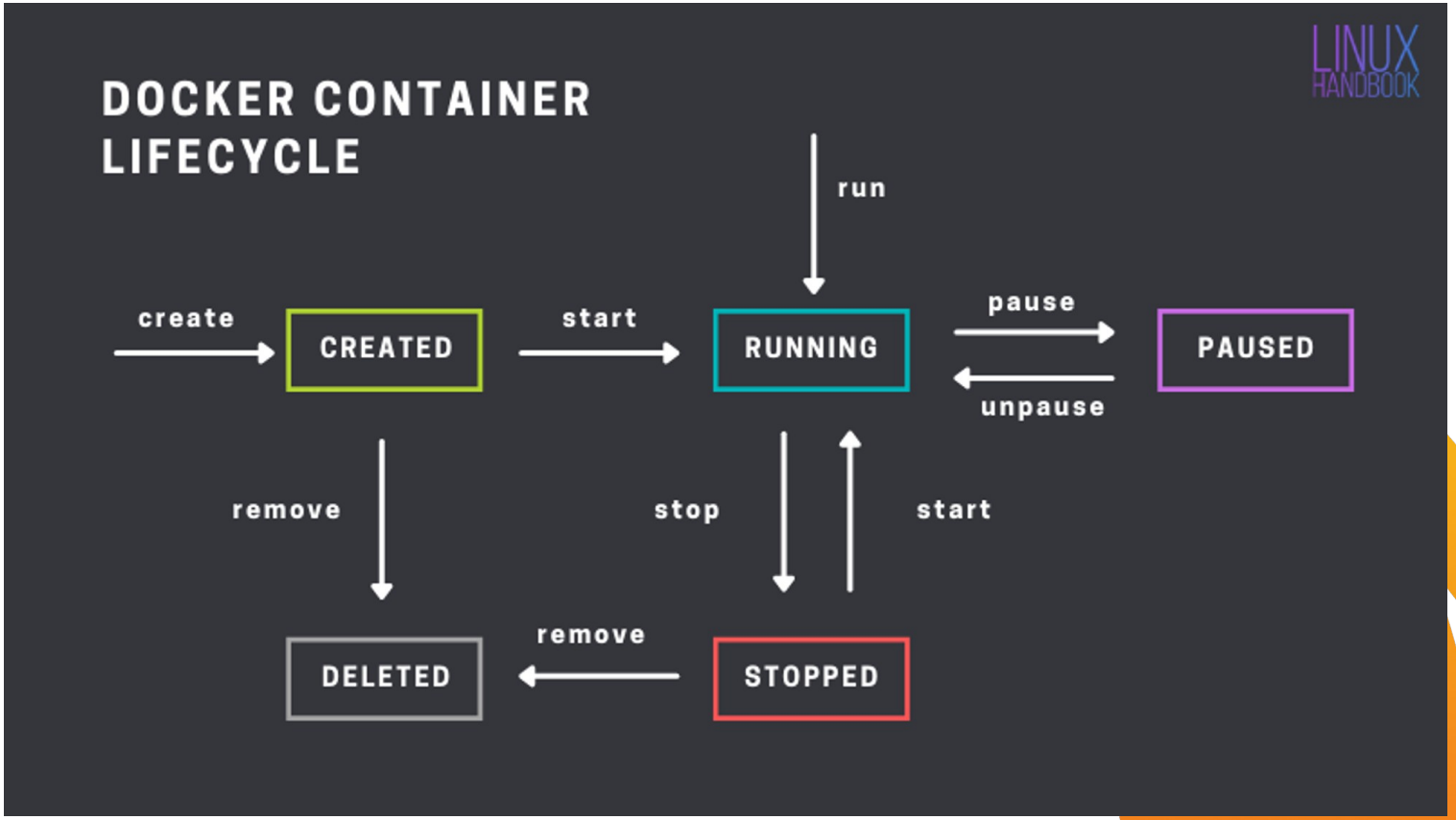

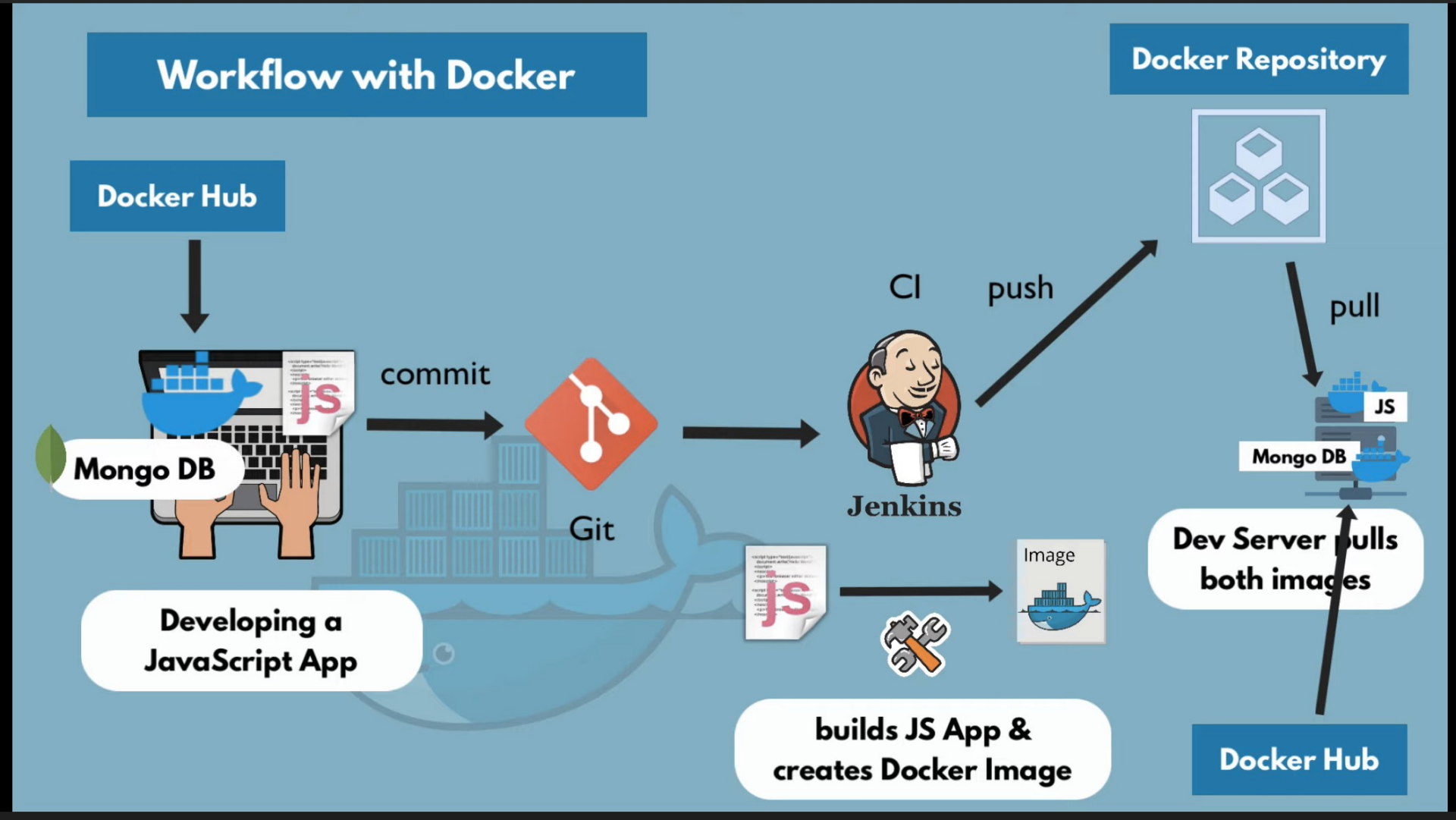
Workflow with Docker
Docker Repository
Docker Hub
CI
push
pull
commit
Mongo DB
JS
Git
Jenkins
Developing a JavaScript App
Image
Dev Server pulls both images
builds JS App & creates Docker Image
Docker Hub

Тест

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В чем преимущество контейнеров Docker перед виртуальной машиной?

1. Контейнер меньше «весит»
2. Контейнер быстрее запускается
3. Контейнер требует меньше ресурсов
4. Все пункты 1-3 верны

Answer

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4. Все пункты 1-3 верны

Установка Docker Desktop

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https://docs.docker.com/desktop/

1. Double-click Docker Desktop Installer.exe to run the installer.

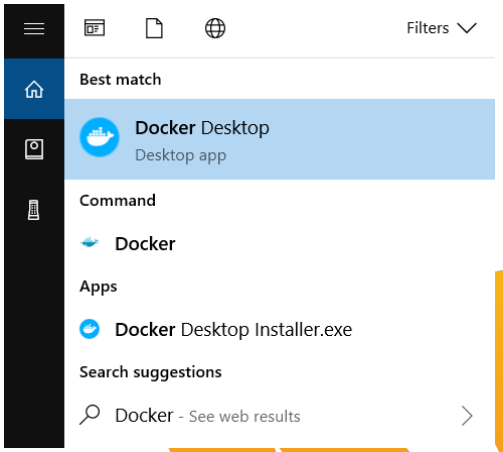
If you haven’t already downloaded the installer (Docker Desktop Installer.exe), you can get it from Docker Hub. It typically downloads to your Downloads folder, or you can run it from the recent downloads bar at the bottom of your web browser.

2. When prompted, ensure the **Use WSL 2 instead of Hyper-V** option on the Configuration page is selected or not depending on your choice of backend.

If your system only supports one of the two options, you will not be able to select which backend to use.

3. Follow the instructions on the installation wizard to authorize the installer and proceed with the install.

4. When the installation is successful, click Close to complete the installation process.



Windows virtualization support

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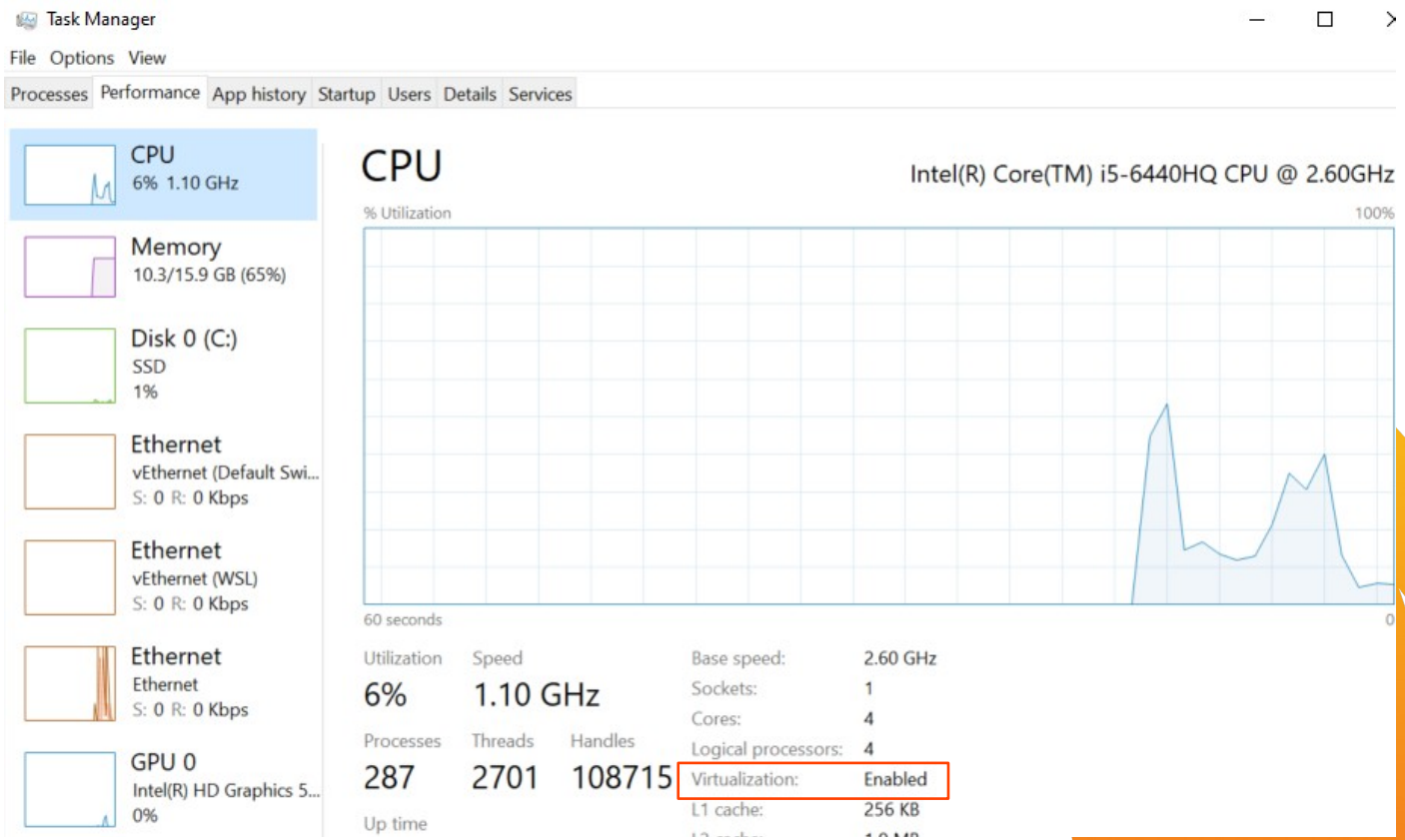

docker run hello-world

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```
$ docker -v
Docker version 20.10.24, build 297e128
```

```
$ docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:4e83453afed1b4fa1a3500525091dbfca6ce1e66903fd4c01ff015dbcb1ba33e
Status: Downloaded newer image for hello-world:latest

Hello from Docker!
This message shows that your installation appears to be working correctly.
```

Pull images from Docker Hub

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https://hub.docker.com/

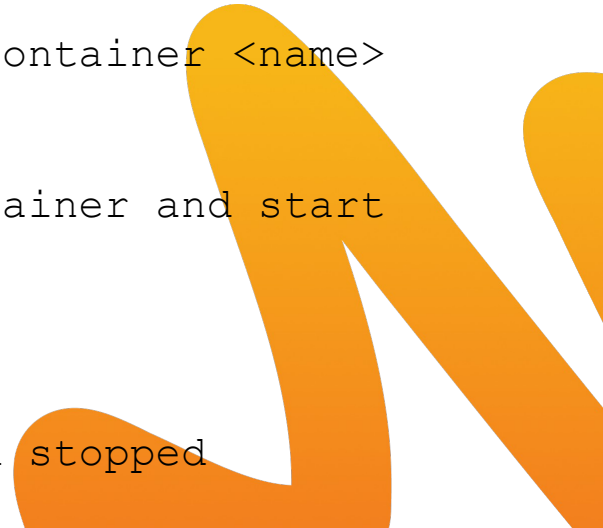
```
docker pull <image>          # pull image from docker hub
docker pull image:version

docker images                # list local images

docker create --name <name> <image>  # create container <name>
docker start <name>

docker run <image>           # pull, create container and start
docker run -d <image>        # detached mode
docker run -d --rm <image>   # remove after stop

docker ps      # running containers
docker ps -a   # list all containers running and stopped
```



Создание и запуск контейнера

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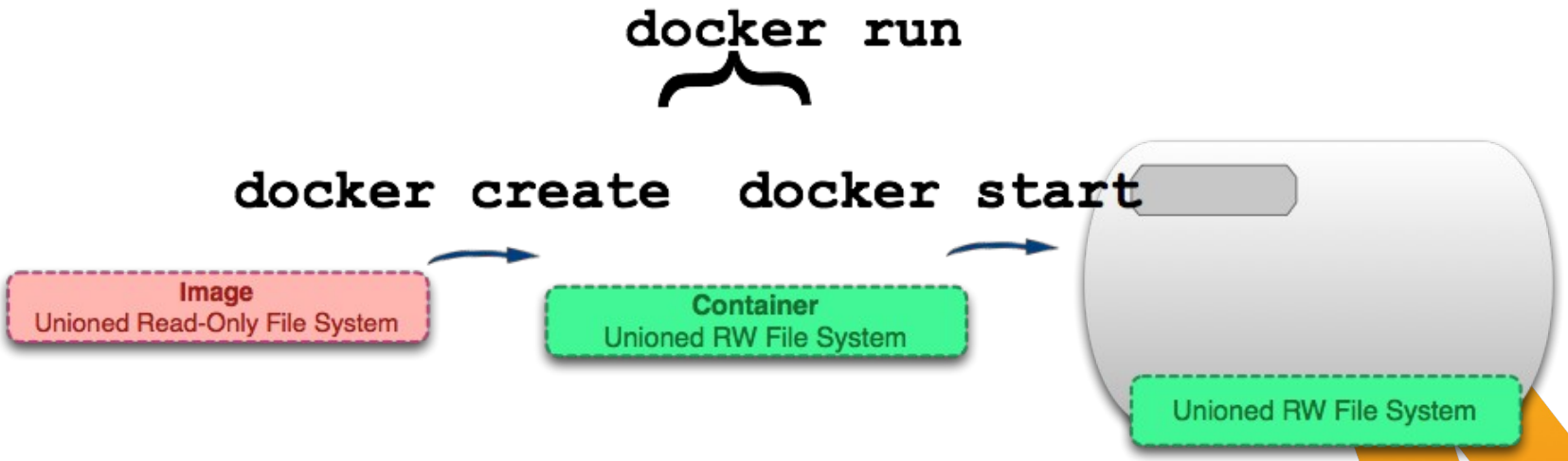

Run containers


```
docker stop <container id>           # or container name
docker start <container id>


docker logs <container id> | <container name>
docker logs <container id> -f        # log stream
```

```
docker rmi <image id>          # remove image

docker rm <container id>       # remove container
docker rm -f <container id>    # kill and remove

docker container prune         # remove all stopped containers
```

Docker Desktop

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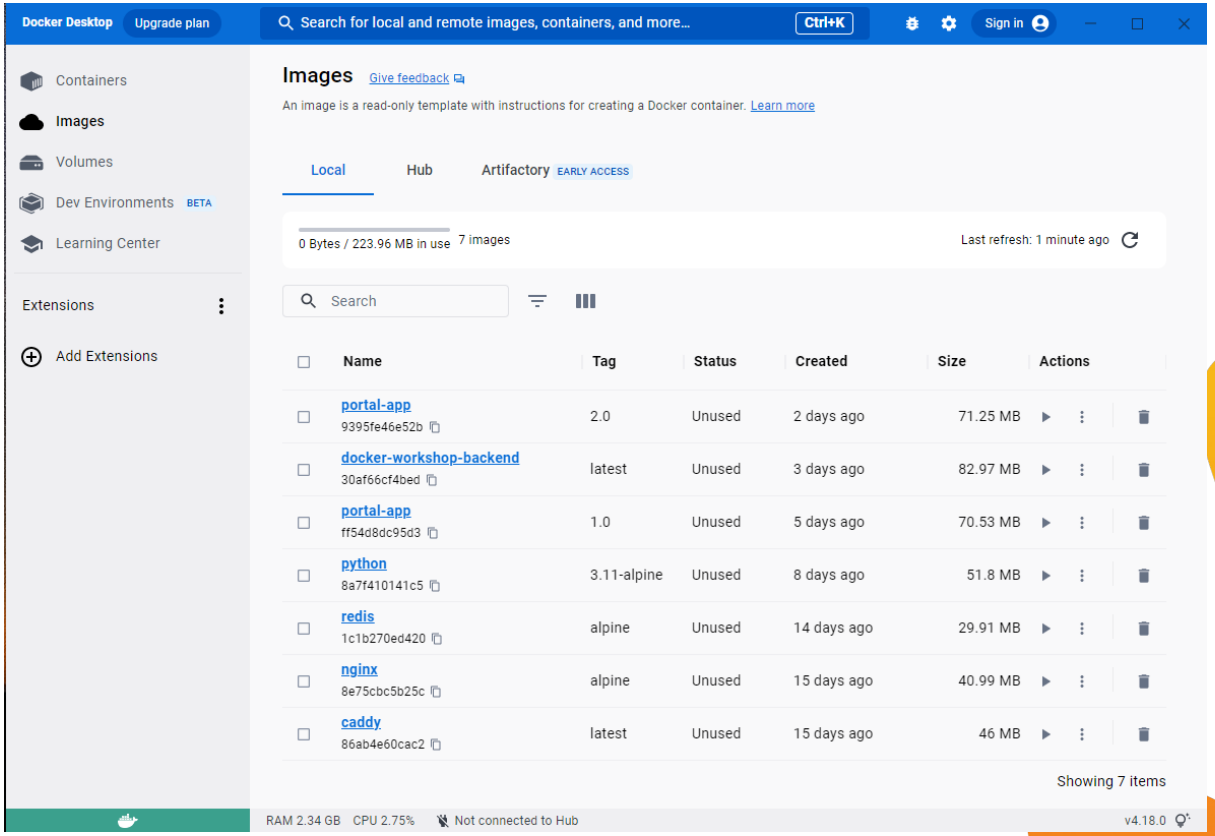

VSCode Docker extension

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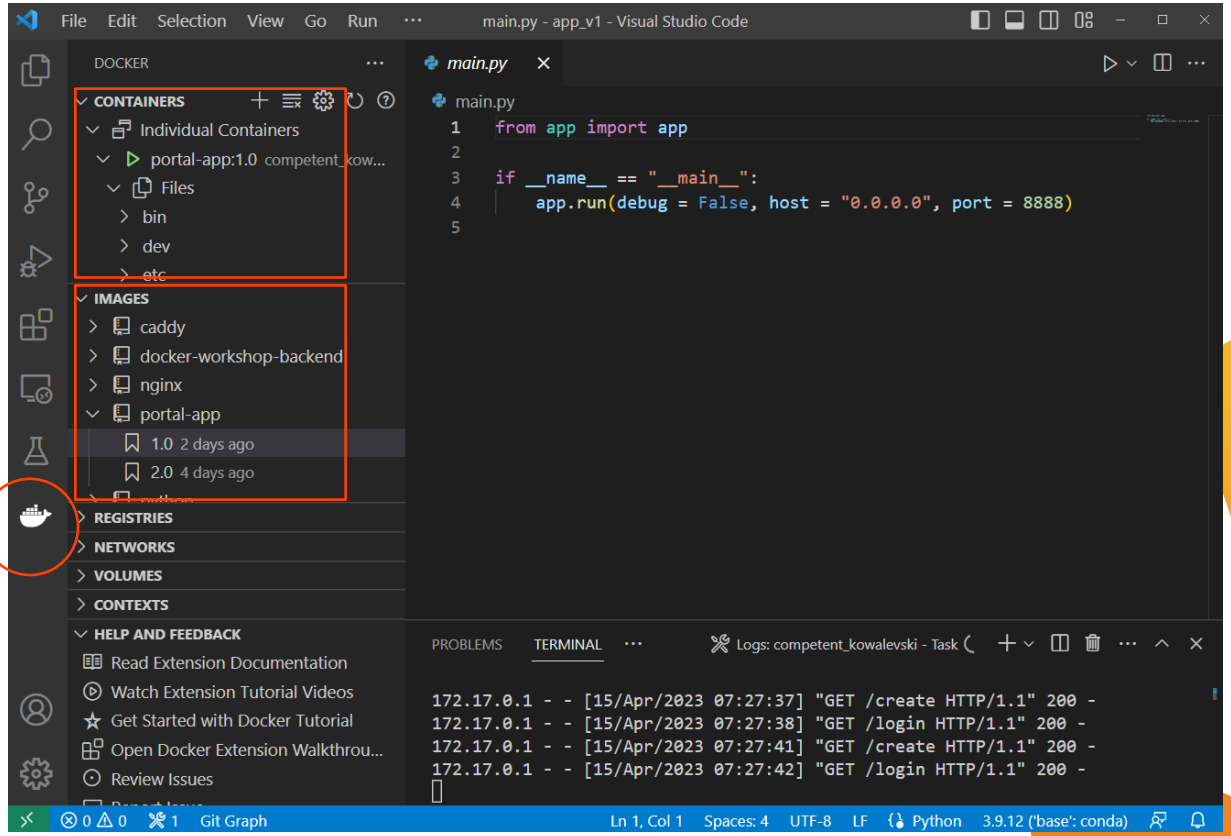

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3 MAIN TOPIC QUESTIONS

Домашнее задание #1

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1. Установить docker на ваш ПК

https://docs.docker.com/desktop/

Установка и обновление WSL2:
https://learn.microsoft.com/en-us/windows/wsl/install-manual

Включение функций виртуализации:
https://docs.docker.com/desktop/troubleshoot/topics/#virtualization

Включение виртуализации в BIOS:
https://bce.berkeley.edu/enabling-virtualization-in-your-pc-bios.html

2. Запустить в консоли команду:

```
docker run hello-world
```

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6 QUESTIONS

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Спасибо!

Оставьте отзыв