This doc is example study Docker. It is include:

- Install Docker on Ubuntu server 20.04 LTS
- Pull "Hello world" images and run it
- Run "httpd" docker image with simple web page for test
- Operations with images
- Create and upload images in Amazon Elastic Container Registry (ECR)

Install Docker. Install Docker Engine on Ubuntu. Install Docker Engine, containerd, and Docker Compose

sudo apt-get update

sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin

```
rvv@usrv1:~$ sudo apt-get update
Hit:1 http://ua.archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://ua.archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:3 http://ua.archive.ubuntu.com/ubuntu focal-backports InRelease
Hit:4 http://ua.archive.ubuntu.com/ubuntu focal-security InRelease
Hit:5 https://download.docker.com/linux/ubuntu focal InRelease
Ign:6 https://pkg.jenkins.io/debian binary/ InRelease
Hit:7 https://pkg.jenkins.io/debian binary/ Release
Reading package lists... Done
rvv@usrv1:~$ sudo apt-get install docker-ce docker-ce-cli containerd.io docker-compose-plugin
Reading package lists... Done
Building dependency tree
Reading state information... Done
Suggested packages:
  aufs-tools cgroupfs-mount | cgroup-lite
The following NEW packages will be installed:
  containerd.io docker-ce docker-ce-cli docker-compose-plugin
0 upgraded, 4 newly installed, 0 to remove and 21 not upgraded.
Need to get 99.3 MB of archives.
After this operation, 396 MB of additional disk space will be used.
Get:1 https://download.docker.com/linux/ubuntu focal/stable amd64 containerd.io amd64 1.6.12-1 [27.7 MB]
Get:2 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce-cli amd64 5:20.10.21~3-0~ubuntu-focal [41.5 MB]
Get:3 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-ce amd64 5:20.10.21~3-0~ubuntu-focal [20.5 MB]
Get:4 https://download.docker.com/linux/ubuntu focal/stable amd64 docker-compose-plugin amd64 2.12.2~ubuntu-focal [9,567 kB]
Fetched 99.3 MB in 11s (8,869 kB/s)
Selecting previously unselected package containerd.io.
(Reading database ... 119902 files and directories currently installed.)
Preparing to unpack .../containerd.io_1.6.12-1_amd64.deb ...
Unpacking containerd.io (1.6.12-1) ...
Selecting previously unselected package docker-ce-cli.
Preparing to unpack .../docker-ce-cli_5%3a20.10.21~3-0~ubuntu-focal_amd64.deb ...
Unpacking docker-ce-cli (5:20.10.21~3-0~ubuntu-focal) ...
Selecting previously unselected package docker-ce.
Preparing to unpack .../docker-ce_5%3a20.10.21~3-0~ubuntu-focal_amd64.deb ...
Unpacking docker-ce (5:20.10.21~3-0~ubuntu-focal) ...
Selecting previously unselected package docker-compose-plugin.
Preparing to unpack .../docker-compose-plugin_2.12.2~ubuntu-focal_amd64.deb ...
Unpacking docker-compose-plugin (2.12.2~ubuntu-focal) ...
Setting up containerd.io (1.6.12-1) ...
Setting up docker-compose-plugin (2.12.2~ubuntu-focal) ...
Setting up docker-ce-cli (5:20.10.21~3-0~ubuntu-focal) ...
Setting up docker-ce (5:20.10.21~3-0~ubuntu-focal) ...
```

```
rvv@usrv1:~$ docker -v
Docker version 20.10.21, build baeda1f
```

Test by "Hello world" image

sudo docker run hello-world

```
rvv@usrv1:~$ sudo docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
2db29710123e: Pull complete
Digest: sha256:faa03e786c97f07ef34423fcccceeec2398ec8a5759259f94d99078f264e9d7af
Status: Downloaded newer image for hello-world:latest

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

To generate this message, Docker took the following steps:
 1. The Docker client contacted the Docker daemon.
 2. The Docker daemon pulled the "hello-world" image from the Docker Hub.
    (amd64)
 3. The Docker daemon created a new container from that image which runs the
    executable that produces the output you are currently reading.
 4. The Docker daemon streamed that output to the Docker client, which sent it
    to your terminal.

To try something more ambitious, you can run an Ubuntu container with:
 $ docker run -it ubuntu bash

Share images, automate workflows, and more with a free Docker ID:
 https://hub.docker.com/

For more examples and ideas, visit:
 https://docs.docker.com/get-started/

rvv@usrv1:~$
```
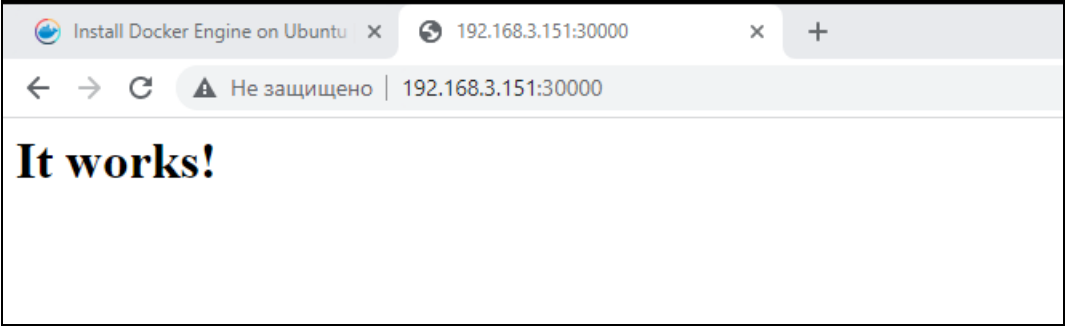
List images, running containers and search "httpd" container

```
rvv@usrv1:~$ docker ps
CONTAINER ID    IMAGE       COMMAND     CREATED     STATUS      PORTS       NAMES
rvv@usrv1:~$ docker ps -a
CONTAINER ID    IMAGE           COMMAND     CREATED         STATUS                      PORTS       NAMES
8e0ee68f378e    hello-world     "/hello"    2 minutes ago   Exited (0) 2 minutes ago                mystifying_benz
rvv@usrv1:~$ docker images
REPOSITORY      TAG         IMAGE ID        CREATED         SIZE
hello-world     latest      feb5d9fea6a5    14 months ago   13.3kB
rvv@usrv1:~$ docker search httpd
NAME                                DESCRIPTION                                     STARS   OFFICIAL    AUTOMATED
httpd  ←                            The Apache HTTP Server Project                  4263    [OK]
centos/httpd-24-centos7             Platform for running Apache httpd 2.4 or bui…   44
centos/httpd                                                                        36                  [OK]
clearlinux/httpd                    httpd HyperText Transfer Protocol (HTTP) ser…   2
hypoport/httpd-cgi                  httpd-cgi                                       2                   [OK]
solsson/httpd-openidc               mod_auth_openidc on official httpd image, ve…   2                   [OK]
manageiq/httpd                      Container with httpd, built on CentOS for Ma…   1                   [OK]
dockerpinata/httpd                                                                  1
dariko/httpd-rproxy-ldap            Apache httpd reverse proxy with LDAP authent…   1                   [OK]
inanimate/httpd-ssl                 A play container with httpd, ssl enabled, an…   1                   [OK]
publici/httpd                       httpd:latest                                    1                   [OK]
lead4good/httpd-fpm                 httpd server which connects via fcgi proxy h…   1                   [OK]
centos/httpd-24-centos8                                                             1
nnasaki/httpd-ssi                   SSI enabled Apache 2.4 on Alpine Linux          1
httpdocker/kubia                                                                    0
manasip/httpd                                                                       0
patrickha/httpd-err                                                                 0
paketobuildpacks/httpd                                                              0
httpdss/archerysec                  ArcherySec repository                           0                   [OK]
manageiq/httpd_configmap_generator  Httpd Configmap Generator                       0                   [OK]
amd64/httpd                         The Apache HTTP Server Project                  0
19022021/httpd-connection_test      This httpd image will test the connectivity …   0
betterweb/httpd                                                                     0
avenga/httpd-static                                                                 0
e2eteam/httpd                                                                       0
```

Pull this container and run it

```
rvv@usrv1:~$ docker pull httpd
Using default tag: latest
latest: Pulling from library/httpd
025c56f98b67: Pull complete
94efcc2978ca: Pull complete
f06194b937dc: Pull complete
e8f73658d652: Pull complete
0a22f1af035b: Pull complete
Digest: sha256:550274cfad1e6ab57cd5009b22a2d97946bdae50989db350a222dae93babc723
Status: Downloaded newer image for httpd:latest
docker.io/library/httpd:latest
rvv@usrv1:~$ docker images
REPOSITORY      TAG         IMAGE ID        CREATED         SIZE
httpd           latest      157dcdf23d6c    5 days ago      145MB
hello-world     latest      feb5d9fea6a5    14 months ago   13.3kB
rvv@usrv1:~$ docker run -d -p 30000:80 httpd
faa034e70635c9bf37e4817ebec37e67a881bc88b8fc22a3d92385f76267479f
rvv@usrv1:~$
```


It works!

Get list of dir httpd in running container

```
rvv@usrv1:~/docker$ docker ps
CONTAINER ID   IMAGE     COMMAND             CREATED          STATUS         PORTS                                           NAMES
faa034e70635   httpd     "httpd-foreground"  20 minutes ago   Up 20 minutes  0.0.0.0:30000→80/tcp, :::30000→80/tcp          great_swirles
rvv@usrv1:~/docker$ docker exec -it faa034e70635 /bin/bash
root@faa034e70635:/usr/local/apache2# ls -la
total 56
drwxr-xr-x 1 www-data www-data 4096 Dec  6 08:36 .
drwxr-xr-x 1 root     root     4096 Dec  6 08:34 ..
drwxr-xr-x 2 root     root     4096 Dec  6 08:36 bin
drwxr-xr-x 2 root     root     4096 Dec  6 08:36 build
drwxr-xr-x 2 root     root     4096 Dec  6 08:36 cgi-bin
drwxr-xr-x 4 root     root     4096 Dec  6 08:36 conf
drwxr-xr-x 3 root     root     4096 Dec  6 08:36 error
drwxr-xr-x 2 root     root     4096 Dec  6 08:36 htdocs
drwxr-xr-x 3 root     root     4096 Dec  6 08:36 icons
drwxr-xr-x 2 root     root     4096 Dec  6 08:36 include
drwxr-xr-x 1 root     root     4096 Dec 11 20:40 logs
drwxr-xr-x 2 root     root     4096 Dec  6 08:36 modules
root@faa034e70635:/usr/local/apache2# ls -la htdocs
total 16
drwxr-xr-x 2 root     root     4096 Dec  6 08:36 .
drwxr-xr-x 1 www-data www-data 4096 Dec  6 08:36 ..
-rw-r--r-- 1     504 staff       45 Jun 11 2007 index.html
root@faa034e70635:/usr/local/apache2# exit
exit
rvv@usrv1:~/docker$
```

Create our dir "docker" and put "mysite" in it. Create dockerfile:

/home/rvv/docker/mysite/

▼ Name
- ..
- error.html
- iam.JPG
- index.html

```
  GNU nano 4.8                                                    dockerfile
FROM httpd:latest
COPY ./mysite/ /usr/local/apache2/htdocs/

CMD ["/usr/local/apache2/bin/httpd", "-D", "FOREGROUND"]

EXPOSE 80
```

```
rvv@usrv1:~/docker$ docker build -t httpd-mysite:v3 .
Sending build context to Docker daemon  303.6kB
Step 1/4 : FROM httpd:latest
 ---> 157dcdf23d6c
Step 2/4 : COPY ./mysite/ /usr/local/apache2/htdocs/
 ---> Using cache
 ---> 6b704fcfdba8
Step 3/4 : CMD ["/usr/local/apache2/bin/httpd", "-D", "FOREGROUND"]
 ---> Running in 7027c1fee096
Removing intermediate container 7027c1fee096
 ---> 8d128e68d3f9
Step 4/4 : EXPOSE 80
 ---> Running in a012a09d9149
Removing intermediate container a012a09d9149
 ---> 144f259f9807
Successfully built 144f259f9807
Successfully tagged httpd-mysite:v3
rvv@usrv1:~/docker$ docker run -d -p 30001:80 httpd-mysite:v3
c3222190b905f064f7b6718f5a1407fc51a0347462fb7cb75d2cd2b7659b5de6
```

```
rvv@usrv1:~/docker$ docker images
REPOSITORY     TAG       IMAGE ID       CREATED         SIZE
httpd-mysite   v3        144f259f9807   2 minutes ago   145MB
httpd-mysite   v2        e48afadce405   4 minutes ago   145MB
httpd-mysite   v1        6bc099e3caff   14 minutes ago  145MB
httpd          latest    157dcdf23d6c   5 days ago      145MB
hello-world    latest    feb5d9fea6a5   14 months ago   13.3kB
rvv@usrv1:~/docker$ docker ps
CONTAINER ID   IMAGE            COMMAND              CREATED         STATUS         PORTS                                           NAMES
c3222190b905   httpd-mysite:v3  "/usr/local/apache2/…"  2 minutes ago  Up 2 minutes  0.0.0.0:30001→80/tcp, :::30001→80/tcp          loving_mendel
faa034e70635   httpd            "httpd-foreground"   42 minutes ago  Up 42 minutes  0.0.0.0:30000→80/tcp, :::30000→80/tcp          great_swirles
```
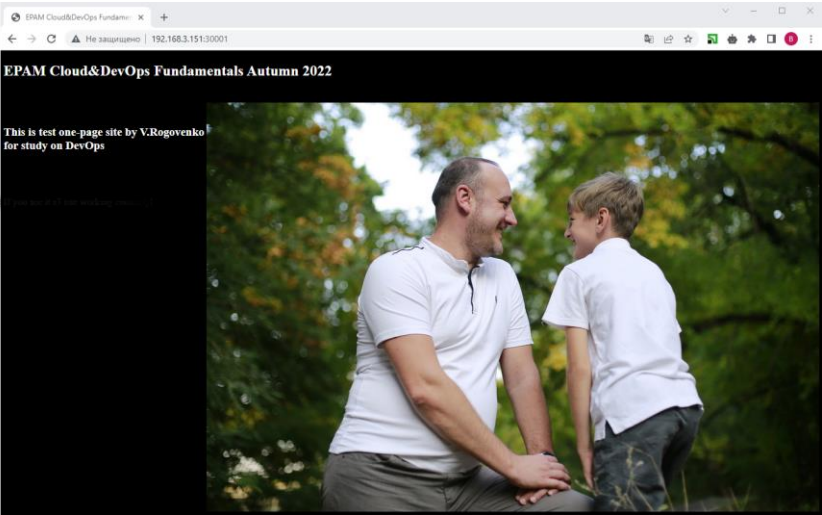
```
rvv@usrv1:~/docker$ docker ps
CONTAINER ID   IMAGE            COMMAND                CREATED          STATUS          PORTS                                             NAMES
c3222190b905   httpd-mysite:v3  "/usr/local/apache2/…" 9 minutes ago    Up 9 minutes    0.0.0.0:30001→80/tcp, :::30001→80/tcp             loving_mendel
faa034e70635   httpd            "httpd-foreground"     48 minutes ago   Up 48 minutes   0.0.0.0:30000→80/tcp, :::30000→80/tcp             great_swirles
rvv@usrv1:~/docker$ docker stop c3222190b905
c3222190b905
rvv@usrv1:~/docker$ docker ps
CONTAINER ID   IMAGE   COMMAND                CREATED          STATUS          PORTS                                             NAMES
faa034e70635   httpd   "httpd-foreground"     49 minutes ago   Up 49 minutes   0.0.0.0:30000→80/tcp, :::30000→80/tcp             great_swirles
rvv@usrv1:~/docker$
```

```
rvv@usrv1:~/docker$ docker rmi httpd-mysite:v1 -f
Untagged: httpd-mysite:v1
Deleted: sha256:6bc099e3caffc44888b47660e621229c090e0f77a9c7608f9f57dbae19ca5007
Deleted: sha256:c0195909c78518c7e6da8c18ec1e03cc5d55df5ea42962c4143470f15925e972
rvv@usrv1:~/docker$ docker rmi httpd-mysite:v2 -f
Untagged: httpd-mysite:v2
Deleted: sha256:e48afadce40594ab704b0dd5dc24ce72d8e6726185ed72e031ab634c4fc437af
Deleted: sha256:8ee9dc83dc3270f05d797db81e268a3365df110a2b3e0e2f46dc64b15803bac4
rvv@usrv1:~/docker$ docker images
REPOSITORY      TAG      IMAGE ID       CREATED          SIZE
httpd-mysite    v3       144f259f9807   12 minutes ago   145MB
httpd           latest   157dcdf23d6c   5 days ago       145MB
hello-world     latest   feb5d9fea6a5   14 months ago    13.3kB
rvv@usrv1:~/docker$
```

Remove unused containers manually

```
_ellis
73078fc58106   6bc099e3caff   "/bin/sh -c '["/usr/…"   21 minutes ago    Exited (127) 21 minutes ago                                               jovial
_proskuriakova
9ff21cb914d9   6bc099e3caff   "/bin/sh -c '["/usr/…"   21 minutes ago    Exited (127) 21 minutes ago                                               gallan
t_allen
404f9ac38477   6bc099e3caff   "/bin/sh -c '["/usr/…"   23 minutes ago    Exited (127) 23 minutes ago                                               jovial
_poitras
faa034e70635   httpd          "httpd-foreground"       54 minutes ago    Up 54 minutes               0.0.0.0:30000→80/tcp, :::30000→80/tcp         great_
swirles
8e0ee68f378e   hello-world    "/hello"                 About an hour ago Exited (0) About an hour ago                                              mystif
ying_benz
rvv@usrv1:~/docker$ docker rm 73078fc58106
73078fc58106
rvv@usrv1:~/docker$ docker rm 9ff21cb914d9
9ff21cb914d9
rvv@usrv1:~/docker$ docker rm 404f9ac38477
404f9ac38477
rvv@usrv1:~/docker$ docker rm 8e0ee68f378e
8e0ee68f378e
rvv@usrv1:~/docker$ docker ps -a
CONTAINER ID   IMAGE            COMMAND                CREATED          STATUS                   PORTS                                          NAMES
c3222190b905   httpd-mysite:v3  "/usr/local/apache2/…" 16 minutes ago   Exited (0) 6 minutes ago                                                loving_mendel
25f2ad93696d   e48afadce405     "/usr/sbin/httpd -D …" 18 minutes ago   Created                  0.0.0.0:30001→80/tcp, :::30001→80/tcp          clever_ellis
faa034e70635   httpd            "httpd-foreground"     55 minutes ago   Up 55 minutes            0.0.0.0:30000→80/tcp, :::30000→80/tcp          great_swirles
rvv@usrv1:~/docker$ docker images
REPOSITORY      TAG      IMAGE ID       CREATED          SIZE
httpd-mysite    v3       144f259f9807   16 minutes ago   145MB
httpd           latest   157dcdf23d6c   5 days ago       145MB
hello-world     latest   feb5d9fea6a5   14 months ago    13.3kB
rvv@usrv1:~/docker$ docker rm 25f2ad93696d
25f2ad93696d
rvv@usrv1:~/docker$ docker rm faa034e70635
Error response from daemon: You cannot remove a running container faa034e70635c9bf37e4817ebec37e67a881bc88b8fc22a3d92385f76267479f. Stop the container before
 attempting removal or force remove
rvv@usrv1:~/docker$ docker stop faa034e70635
faa034e70635
rvv@usrv1:~/docker$ docker rm faa034e70635
faa034e70635
rvv@usrv1:~/docker$ docker ps -a
CONTAINER ID   IMAGE            COMMAND                CREATED          STATUS                   PORTS          NAMES
c3222190b905   httpd-mysite:v3  "/usr/local/apache2/…" 18 minutes ago   Exited (0) 8 minutes ago                loving_mendel
rvv@usrv1:~/docker$
```

Amazon Elastic Container Registry

Create repo1 repository with aws web interface. Use next commands for create new tag and Pull on ECS

```
rvv@usrv1:~/docker$ aws ecr get-login-password --region eu-west-3 | docker login --username AWS --password-stdin 221071014691.dkr.ecr.eu-west-3.amazonaws.com
WARNING! Your password will be stored unencrypted in /home/rvv/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
rvv@usrv1:~/docker$ docker tag httpd-mysite:v3 221071014691.dkr.ecr.eu-west-3.amazonaws.com/repo1:mysite-v3
rvv@usrv1:~/docker$ docker push 221071014691.dkr.ecr.eu-west-3.amazonaws.com/repo1:mysite-v3
The push refers to repository [221071014691.dkr.ecr.eu-west-3.amazonaws.com/repo1]
9d9c29f4af5d: Pushed
df40ccf15557: Pushed
10d8cd84bc49: Pushed
8bb2d8abcb18: Pushed
2bccf7e3b941: Pushed
b5ebffba54d3: Pushed
mysite-v3: digest: sha256:060b4a50cd2d7df0d0f87867b0276b511cbec654f4928f31b6f95b335a802d93 size: 1576
rvv@usrv1:~/docker$
```

So, check it in aws