2. Common commands for docker image containers

2.1. Do not use sudo command

Usually, you need to add the prefix sudo to operate the docker command, as follows:

```
sudo docker version
```

However, after adding the docker user group, you do not need to add the sudo prefix. How to add the docker user group (run the command in the host running docker):

```
sudo groupadd docker # Add docker user group
sudo gpasswd -a $USER docker # Add the current user to the docker user group,
where $USER can be automatically resolved to the currently logged in user
newgrp docker # Update the docker user group
```

After adding the above command, use the [docker images] command to test. If there is no error, it means that the sudo command can no longer be used. If the following error is reported:

```
pi@yahboom:~$ docker images
WARNING: Error loading config file: /home/pi/.docker/config.json: open
/home/pi/.docker/config.json: permission denied
```

Then execute the following command in the host to solve it:

```
sudo chown "$USER":"$USER" /home/"$USER"/.docker -R
sudo chmod g+rwx "/home/$USER/.docker" -R
```

2.2, Help command

```
docker info # Display Docker system information, including the number of images
and containers. 。
docker --help # Help
```

2.3, Image command

1, docker pull download image

```
# Download image
pi@yahboom:~$ docker pull ubuntu
Using default tag: latest # No tag, default is latest
latest: Pulling from library/ubuntu
cd741b12a7ea: Pull complete # Layered download
Digest: sha256:67211c14fa74f070d27cc59d69a7fa9aeff8e28ea118ef3babc295a0428a6d21
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest # Real location
```

2, docker images list images

```
# List the images on the local host pi@yahboom:~$ docker images REPOSITORY TAG
IMAGE ID CREATED SIZE yahboomtechnology/ros-foxy 3.4.0 49581aa78b6b About an hour
ago 24.3GB yahboomtechnology/ros-foxy 3.3.9 cefb5ac2ca02 3 days ago 20.5GB
yahboomtechnology/ros-f oxy 3.3.8 49996806c64a 4 days ago 20.5GB
yahboomtechnology/ros-foxy 3.3.7 8989b8860d17 4 days ago 17.1GB
yahboomtechnology/ros-foxy 3.3.6 326531363d6e 5 days ago 16.1GB hello-world
latest 46331d942d63 13 months ago 9.14kB

# Explanation
REPOSITORY The repository source of the image
TAG The tag of the image
IMAGE ID The ID of the image
CREATED The image creation time
SIZE The image size

# The same repository source can have multiple TAGs, representing different
versions of this repository source. We use REPOSITORY: TAG to define different
images. If you do not define the tag version of the image, docker will use the
lastest image by default!

# Optional
-a: List all local images
-q: Display image ID only
--digests: Display image summary information
```

3. docker search Search image

```
# Search image
pi@yahboom:~$ docker search ros2
NAME DESCRIPTION STARS OFFICIAL AUTOMATED
osrf/ros2 **Experimental** Docker Images for ROS2 deve… 60 [OK]
tiryoh/ros2-desktop-vnc A Docker image to provide HTML5 VNC interfac… 11
althack/ros2 An assortment of development containers for … 7
tiryoh/ros2 unofficial ROS2 image 6
athackst/ros2 [Deprecated-> use althack/ros2] 5
uobflightlabstarling/starling-mavros2 ROS2 version of MAVROS 2
theosakamg7/ros2_java_docker Image base 1 [OK]

# docker search The name of a certain image corresponds to the image in the
DockerHub repository
```

```
# Optional
--filter=stars=50: List images with a collection count not less than the
specified value.
```

4. docker rmi delete image

```
# Delete image
docker rmi -f image id # Delete a single
docker rmi -f image name: tag image name: tag # Delete multiple
docker rmi -f $(docker images -qa) # Delete all
```

2.4. Container command

1. docker run runs the image to start the container

```
# Command
docker run [OPTIONS] IMAGE [COMMAND][ARG...]
# Common parameter description
--name="Name" # Assign a name to the container
-d # Run the container in the background and return the container id!
-i # Run the container in interactive mode, used with -t
-t # Reassign a terminal to the container, usually used with -i
-P # Random port mapping (uppercase)
-p # Specify port mapping (summary), generally there are four ways to write
ip:hostPort:containerPort
ip::containerPort
hostPort:containerPort (common)
containerPort

#test
pi@yahboom:~$ docker images
REPOSITORY TAG IMAGE ID CREATED SIZE
yahboomtechnology/ros-foxy 3.4.0 49581aa78b6b 2 hours ago 24.3GB
yahboomtechnology/ros-foxy 3.3.9 cefb5ac2ca02 3 days ago 20.5GB
yahboomtechnology/ros-foxy 3.3.8 49996806c64a 4 days ago 20.5GB
yahboomtechnology/ros-foxy 3.3.7 8989b8860d17 4 days ago 17.1GB
yahboomtechnology/ros-foxy 3.3.6 326531363d6e 5 days ago 16.1GB
ubuntu latest bab8ce5c00ca 6 weeks ago 69.2MB
hello-world latest 46331d942d63 13 months ago 9.14kB

#Use ubuntu to start the container in interactive mode and execute the /bin/bash
command in the container!
pi@yahboom:~$ docker run -it ubuntu:latest /bin/bash
root@c54bf9efae47:/# ls
bin boot dev etc home lib media mnt opt proc root run sbin srv sys tmp usr var
root@c54bf9efae47:/# exit # Use exit to exit the container and return to the
host
exit
pi@yahboom:~$
```

2. docker ps lists all running containers

```
# Command
docker ps [OPTIONS]
# Common parameter description
-a # List all currently running containers + historically run containers
-l # Display the most recently created container
-n=? # Display the most recently created n containers
-q # Silent mode, only display the container number.

#Test
pi@yahboom:~$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
c54bf9efae47 ubuntu:latest "/bin/bash" 2 hours ago Up 4 seconds funny_hugle
3b9c01839579 hello-world "/hello" 3 hours ago Exited (0) 3 hours ago
jovial_brown
```

3. Exit the container

```
exit # Stop the container and exit
ctrl+P+Q # Do not stop the container and exit
```

4. Enter the running container from multiple terminals

```
# Command 1
docker exec -it container id bashShell

# Test
pi@yahboom:~$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
c54bf9efae47 ubuntu:latest "/bin/bash" 2 hours ago Up 4 seconds funny_hugle
3b9c01839579 hello-world "/hello" 3 hours ago Exited (0) 3 hours ago
jovial_brown
pi@yahboom:~$ docker exec -it c5 /bin/bash # The container ID can be abbreviated
as long as it can uniquely identify the container
root@c54bf9efae47:/#

# Command 2
docker attach container ID

# Test
pi@yahboom:~$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
c54bf9efae47 ubuntu:latest "/bin/bash" 2 hours ago Up 35 seconds funny_hugle
3b9c01839579 hello-world "/hello" 3 hours ago Exited (0) 3 hours ago
jovial_brown
pi@yahboom:~$ docker attach c5 # The container ID can be abbreviated as long as
it can uniquely identify the container
root@c54bf9efae47:/#

# Difference
# exec opens a new terminal in the container and can start a new process
# attach directly enters the terminal of the container start command and does not
start a new process
```

5. Start and stop containers

```
docker start (container id or container name) # Start the container
docker restart (container id or container name) # Restart the container
docker stop (container id or container name) # Stop the container
docker kill (container id or container name) # Force stop the container
```

6. Delete the container

```
docker rm container id # Delete the specified container
docker rm -f $(docker ps -a -q) # Delete all containers
docker ps -a -q|xargs docker rm # Delete all containers
```

2.5, other commonly used commands

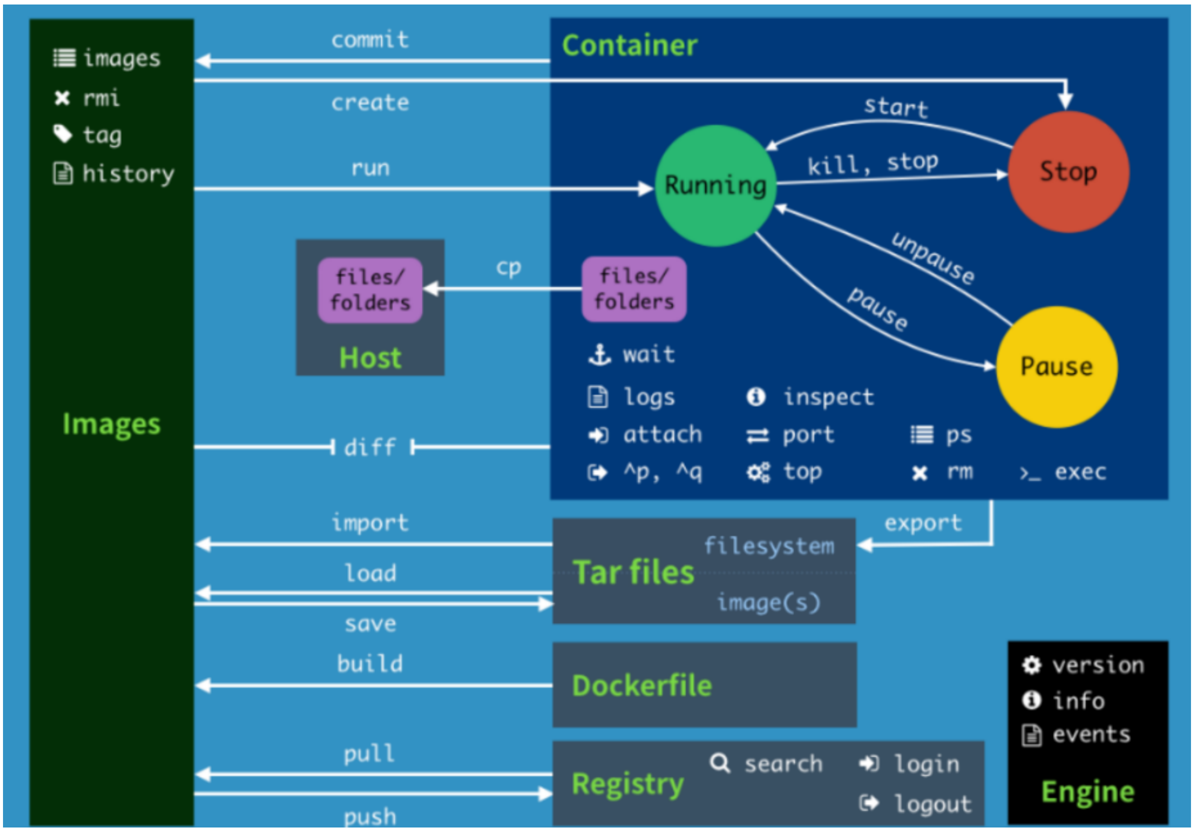
1. View the process information running in the container, supporting ps command parameters.

```
# Command
docker top container id

# Test
pi@yahboom:~$ docker ps -a
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
c54bf9efae47 ubuntu:latest "/bin/bash" 2 hours ago Up 2 minutes funny_hugle
3b9c01839579 hello-world "/hello" 3 hours ago Exited (0) 3 hours ago
jovial_brown
pi@yahboom:~$ docker top c5
UID PID PPID C STIME TTY TIME CMD
root 9667 9647 0 14:20 pts/0 00:00:00 /bin/bash
```

2. View the metadata of the container/image

```
# command
docker inspect Container id

# Test to view container metadata
pi@yahboom:~$ docker ps -a
CONTAINER ID   IMAGE           COMMAND       CREATED       STATUS
  PORTS     NAMES
c54bf9efae47   ubuntu:latest   "/bin/bash"   2 hours ago   Up 4 minutes
            funny_hugle
3b9c01839579   hello-world     "/hello"      3 hours ago   Exited (0) 3 hours ago
            jovial_brown
pi@yahboom:~$ docker inspect c54bf9efae47
[
    {
        # The complete ID, the container ID above, is the first few digits of
the intercepted ID
        "Id":
"c54bf9efae471071391202a8718b346d9af76cb1ff17741e206280603d6f0056",
        "Created": "2023-04-24T04:19:46.232822024Z",
        "Path": "/bin/bash",
        "Args": [],
        "State": {
            "Status": "running",
            "Running": true,
            "Paused": false,
            "Restarting": false,
            "OOMKilled": false,
            "Dead": false,
            "Pid": 9667,
            "ExitCode": 0,
            "Error": "",
            "StartedAt": "2023-04-24T06:20:58.508213216Z",
            "FinishedAt": "2023-04-24T06:19:45.096483592Z"
        },
    。。。。


# Test and view image metadata
pi@yahboom:~$ docker images
REPOSITORY                   TAG       IMAGE ID       CREATED         SIZE
ubuntu                       latest    bab8ce5c00ca   6 weeks ago     69.2MB
hello-world                  latest    46331d942d63   13 months ago   9.14kB
pi@yahboom:~$ docker inspect bab8ce5c00ca
[
    {
        "Id":
"sha256:bab8ce5c00ca3ef91e0d3eb4c6e6d6ec7cffa9574c447fd8d54a8d96e7c1c80e",
        "RepoTags": [
            "ubuntu:latest"
        ],
        "RepoDigests": [

"ubuntu@sha256:67211c14fa74f070d27cc59d69a7fa9aeff8e28ea118ef3babc295a0428a6d21"
        ],
        "Parent": "",
        "Comment": "",
        "Created": "2023-03-08T04:32:41.063980445Z",
        "Container":
"094fd0c521be8c84d81524e4a5e814e88a2839899c56f654484d32d171c7195b",
        "ContainerConfig": {
            "Hostname": "094fd0c521be",
            .............
            "Labels": {
                "org.opencontainers.image.ref.name": "ubuntu",
                "org.opencontainers.image.version": "22.04"
            }
        },
        "DockerVersion": "20.10.12",
        "Author": "",
        "Config": {
            "Hostname": "",
            .........
            "Labels": {
                "org.opencontainers.image.ref.name": "ubuntu",
                "org.opencontainers.image.version": "22.04"
            }
        },
        "Architecture": "arm64",
        "Variant": "v8",
        "Os": "linux",
        "Size": 69212233,
        "VirtualSize": 69212233,
        "GraphDriver": {
            "Data": {
                "MergedDir":
"/var/lib/docker/overlay2/8418b919a02d38a64ab86060969b37b435977e9bbdeb6b0840d4eb
698280e796/merged",
                "UpperDir":
"/var/lib/docker/overlay2/8418b919a02d38a64ab86060969b37b435977e9bbdeb6b0840d4eb
698280e796/diff",
                "WorkDir":
"/var/lib/docker/overlay2/8418b919a02d38a64ab86060969b37b435977e9bbdeb6b0840d4eb
698280e796/work"
            },
            "Name": "overlay2"
        },
        "RootFS": {
            "Type": "layers",
            "Layers": [

"sha256:874b048c963ab55b06939c39d59303fb975d323822a4ea48a02ac8dc635ea371"
            ]
        },
        "Metadata": {
            "LastTagTime": "0001-01-01T00:00:00Z"
        }
    }
]
```

2.6 Command Summary


images
rmi
tag
history
Images
commit
create
run
cp
diff
Container
start
Running
kill, stop
Stop
unpause
pause
Pause
files/folders
Host
files/folders
wait
logs
inspect
attach
port
ps
^p, ^q
top
rm
>_ exec
import
load
save
build
pull
push
export
Tar files
filesystem
image(s)
Dockerfile
Registry
search
login
logout
version
info
events
Engine