2.Common commands

2.Common commands

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2.1、do not use the sudo command

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

```
sudo docker version
```

But after adding the docker user group, you don't need to add the sudo prefix. How to add a docker user group (run commands 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 automatically resolve 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 you can already use the sudo command. If the following error is reported:

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

Run the following command on the host to solve the problem:

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

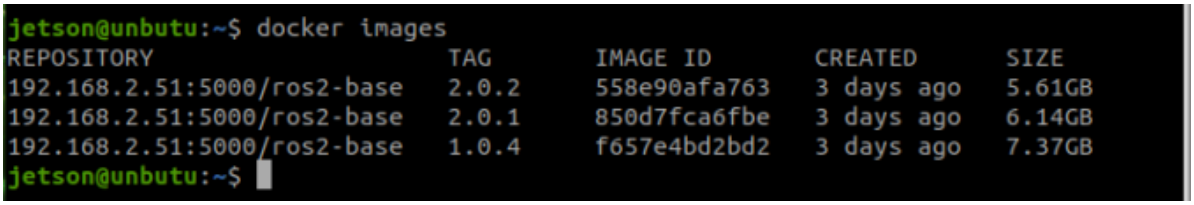
After updating the docker user group, a new terminal may still show an error of insufficient permissions, just restart the board can sovle it

2.2、help commands

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

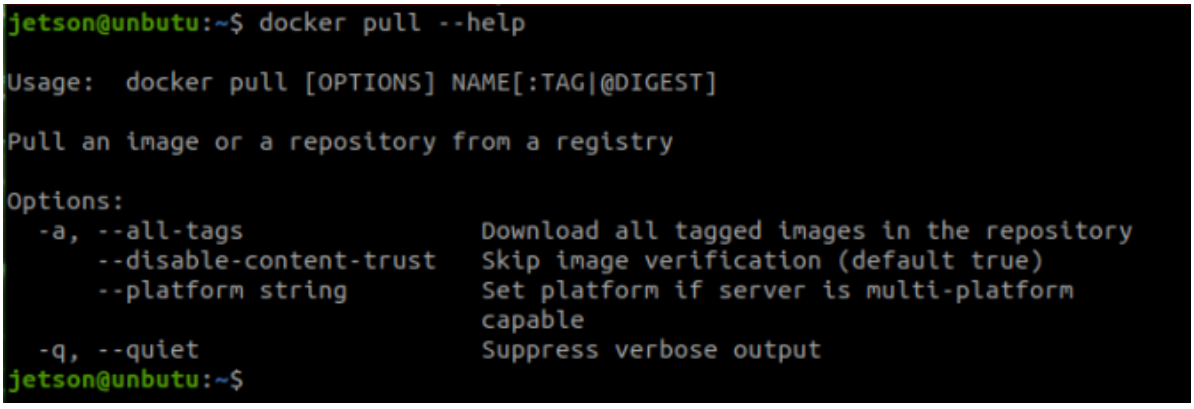
2.3、image command

1、docker images (lists the images)



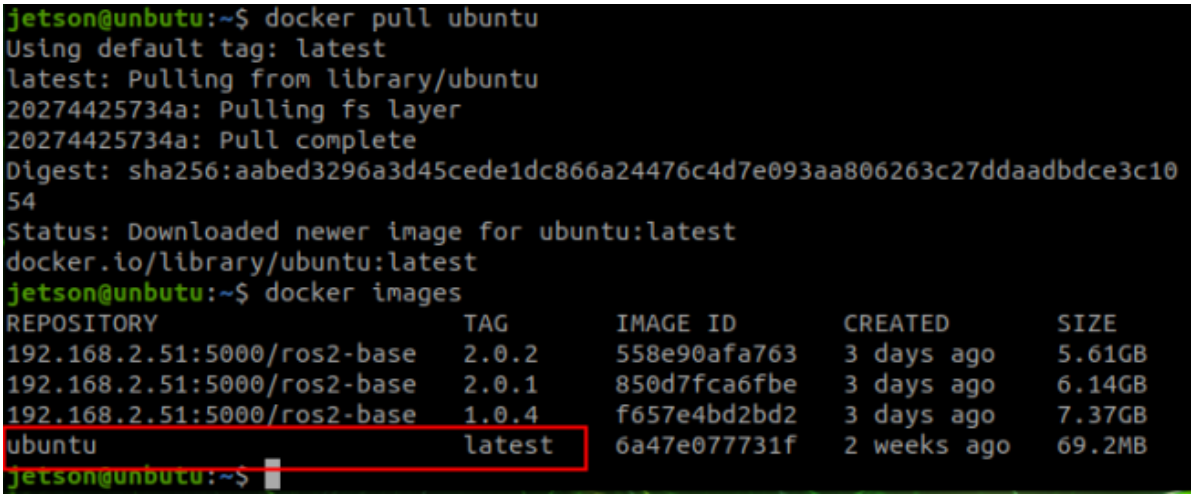

```
# interpretation
REPOSITORY:  The repository source of the mirror
TAG:  The label of the image
IMAGE ID:  ID The ID of the image
CREATED:  Image creation time
SIZE:  Image size

# 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
lastest images by default!

# Optional
-a:  Lists all local images
-q:  Only the image ID is displayed
--digests:  Displays the summary information of the image
```

2、docker pull (download image)




```
#Usage method
docker pull [image warehouse address/image name: tag]
example:  docker pull yahboomtechnology/ros-foxy:1.0.0
```

```
# Such as download ubuntu image
jetson@ubuntu:~$ docker pull ubuntu
Using default tag: latest           # Do not write 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
```



You can see that an new ubuntu image in here than before

3、docker search

```
# Search for images
jetson@ubuntu:~$ 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

uobflightlabstarling/starling-mavros2           ROS2 version of MAVROS

# docker search The name of an image corresponds to the image in the DockerHub
repository
# Optional
--filter=stars=50 :  Lists images with a collection of no less than the specified
value.
```

4、docker rmi (delete the image)

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

2.4、container commands

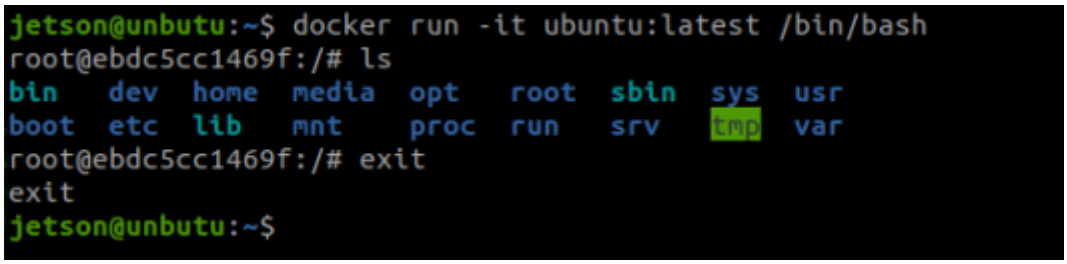
To create a container with an image, we use the image of ubuntu here to test and download the image:

```
docker pull ubuntu
```

1、docker run

```
# command
docker run [OPTIONS] IMAGE [COMMAND][ARG...]
# Description of common parameters
--name="Name" # Specify a name for the container
-d # runs the container in background mode and returns the ID of the container!
-i # runs the container in interactive mode by using it with -t
-t # reassigns a terminal to the container, usually used with -i
-P # random port mapping (uppercase)
-p # specifies the port mapping (summary), which can generally be written in four ways
ip:hostPort:containerPort
ip::containerPort
hostPort:containerPort (commonly used)
containerPort

# test
jetson@ubuntu:~$ docker images
REPOSITORY                  TAG       IMAGE ID       CREATED         SIZE
ubuntu                      latest    bab8ce5c00ca   6 weeks ago     69.2MB

# Use ubuntu to start the container in interactive mode and execute the /bin/bash command inside the container!
jetson@ubuntu:~$ docker run -it ubuntu:latest /bin/bash
# Enter exit
```

Example:



2、docker ps

```
# command
docker ps [OPTIONS]
# Description of common parameters
-a # lists all currently running containers + historically run containers
-l # displays the most recently created container
-n=? # Displays the last n created containers
-q # silent mode, only the container number is displayed.
```

Example:

```
jetson@unbutu:~$ docker ps -a
CONTAINER ID   IMAGE                                 COMMAND       CREATED         STATUS
ebdc5cc1469f   ubuntu:latest                         "/bin/bash"   6 minutes ago   Exited (0) 6 minutes ago
a28343337ad3   ubuntu:latest                         "/bin/bash"   7 minutes ago   Exited (0) 6 minutes ago
281c97fb9c60   192.168.2.51:5000/ros2-base:2.0.2     "/bin/bash"   3 days ago      Exited (0) 3 days ago
jetson@unbutu:~$
```

3、Exit the container

```
exit        # The container stops exiting
ctrl+P+Q    # container does not stop exiting
```

4、Multiple terminals enter a running container

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

# test
jetson@ubuntu:~$ 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

jetson@ubuntu:~$ docker exec -it c54b /bin/bash     # The ID of the container can
be abbreviated, as long as it uniquely identifies the container
root@c54bf9efae47:/#
```

```
# command 2
docker attach [container id]

# test
jetson@ubuntu:~$ 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

jetson@ubuntu:~$ docker attach c54b           # The ID of the container can be
abbreviated, as long as it uniquely identifies the container
root@c54bf9efae47:/#
```

Difference:

exec is to open a new terminal in the container and a new process can be started, this method is generally used to enter the container

attach goes directly to the terminal of the container startup command and does not start a new process

5、Start and stop the container

```
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] # Forces the container to stop
```

6、Delete the container

```
docker rm [container id]                # Deletes 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、common other commands

1、View the process information running in the container and support ps command parameters.

```
# command
docker top [container id]

# test
jetson@ubuntu:~$ 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
jetson@ubuntu:~$ docker top c54b
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 viewing container metadata
jetson@ubuntu:~$ 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
jetson@ubuntu:~$ docker inspect c54bf9efae47
[
    {
        # The complete id, the container ID above here, is the first few digits
of this ID that were intercepted
        "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 viewing image metadata
jetson@ubuntu:~$ 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
jetson@ubuntu:~$ 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