

## 2.Common commands

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### 2.Common commands

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### 2.1、 do not use the sudo command

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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 solve it

### 2.2、 help commands

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```
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)

```
jetson@unbutu:~$ docker images
REPOSITORY          TAG                 IMAGE ID            CREATED             SIZE
192.168.2.51:5000/ros2-base  2.0.2             558e90afa763       3 days ago         5.61GB
192.168.2.51:5000/ros2-base  2.0.1             850d7fca6fbe       3 days ago         6.14GB
192.168.2.51:5000/ros2-base  1.0.4             f657e4bd2bd2       3 days ago         7.37GB
jetson@unbutu:~$
```

# 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 latest 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)

```
jetson@unbutu:~$ docker pull --help
Usage:  docker pull [OPTIONS] NAME[:TAG|@DIGEST]

Pull an image or a repository from a registry

Options:
  -a, --all-tags           Download all tagged images in the repository
  --disable-content-trust  Skip image verification (default true)
  --platform string       Set platform if server is multi-platform
                           capable
  -q, --quiet              Suppress verbose output
jetson@unbutu:~$
```

#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
```

```
jetson@ubuntu:~$ docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
20274425734a: Pulling fs layer
20274425734a: Pull complete
Digest: sha256:aabed3296a3d45ceded1dc866a24476c4d7e093aa806263c27ddaadbdc3c1054
Status: Downloaded newer image for ubuntu:latest
docker.io/library/ubuntu:latest
jetson@ubuntu:~$ docker images
REPOSITORY          TAG          IMAGE ID          CREATED          SIZE
192.168.2.51:5000/ros2-base  2.0.2       558e90afa763     3 days ago     5.61GB
192.168.2.51:5000/ros2-base  2.0.1       850d7fca6fbe     3 days ago     6.14GB
192.168.2.51:5000/ros2-base  1.0.4       f657e4bd2bd2     3 days ago     7.37GB
ubuntu               latest       6a47e077731f     2 weeks ago     69.2MB
jetson@ubuntu:~$
```

You can see that a new ubuntu image is 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

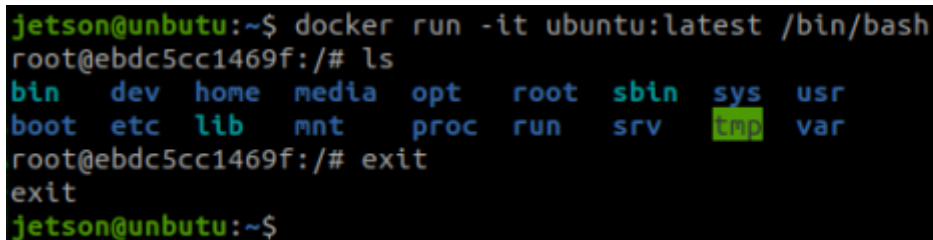
```
# command
docker run [OPTIONS] IMAGE [COMMAND][ARG...]

# 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:



```
jetson@unbutu:~$ docker run -it ubuntu:latest /bin/bash
root@ebdc5cc1469f:/# ls
bin  dev  home  media  opt  root  sbin  sys  usr
boot  etc  lib  mnt  proc  run  srv  tmp  var
root@ebdc5cc1469f:/# exit
exit
jetson@unbutu:~$
```

### 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@ubuntu:~$ docker ps -a
CONTAINER ID   IMAGE                COMMAND                  CREATED        STATUS              PORTS
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@ubuntu:~$
```

### 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 |
|--------------|---------------|-------------|-------------|------------------------|-------|
| 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 |
|--------------|---------------|-------------|-------------|------------------------|-------|
| 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@sha256:67211c14fa74f070d27cc59d69a7fa9aeff8e28ea118ef3babcb295a0428a6d21"
    ],
    "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

