Version : **2024.01**

Dernière mise-à-jour : 2024/02/21 16:02

DOF602 - Démarrer avec Docker

Contenu du Module

Présentation de Docker

Virtualisation et Containérisation

La virtualisation classique nécessite l'utilisation d'un hyperviseur :

Docker est une application de virtualisation légère lancé en 2013 qui utilise des **images** et des **conteneurs**.

Docker est composé de trois éléments : un serveur, un client et un ou plusieurs Repositories ou Dépôts :

Une **image** est un paquet exécutable contenant tout ce qu'il est nécessaire afin d'exécuter un logiciel donné, incluant :

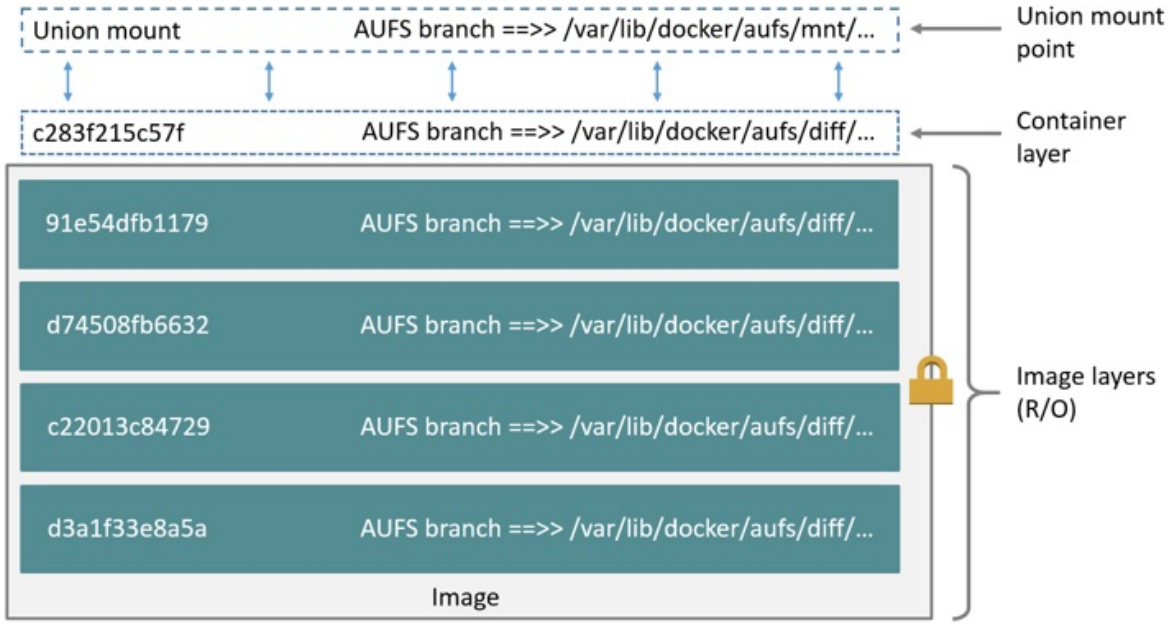
- le code
- un runtime
- des bibliothèques,
- des variables d'environnement
- des fichiers de configuration

Un **conteneur** est une instance de l'image en cours d'exécution en mémoire. Elle est isolée de l'environnement de l'hôte par défaut mais peut accéder à des fichiers et de ports de l'hôte selon la configuration.

Les conteneurs exécutent des applications nativement en utilisant le noyau de la machine hôte. De ce fait les performances d'un conteneur sont supérieures à celles d'une machine virtuelle qui doit passer par un hyperviseur pour accéder aux ressources de la machine hôte.

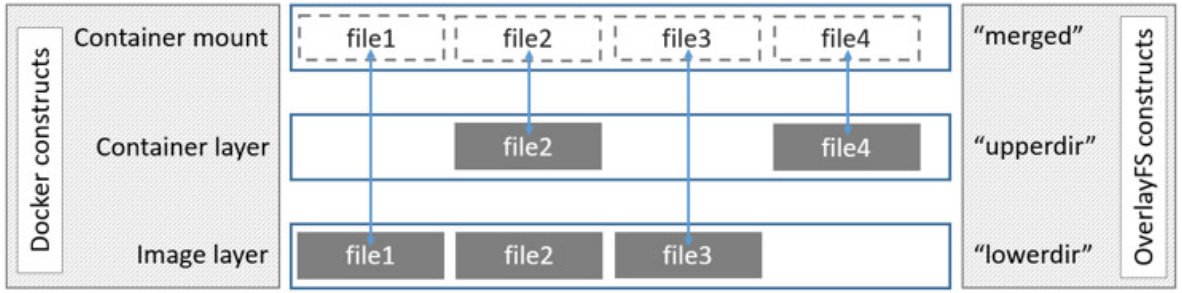
Le Système de Fichier AUFS

Pour gérer le système de fichiers du conteneur, Docker utilisait au départ le filesystem AUFS. AUFS est un système de fichiers de la famille UnionFS. Un système de fichier de type UnionFS assemble des repertoires multiples les uns sur les autres pour ensuite les présenter sous forme d'un repertoire unique contenant les objets les plus récents grâce à un union mount. Les repertoires sous AUFS sont appelés des **branches** et se trouvent dans **/var/lib/docker/aufs** :



OverlayFS et Overlay2

Le système de fichiers AUFS a été ensuite remplacé dans Docker par le système de fichiers **OverlayFS**. Ce système de fichiers combine deux répertoires appelés **Layers**. Le layer inférieur porte le nom **lowerdir** tandis que le niveau au dessus est appelé le **upperdir**. La vue unifiée porte le nom **merged**. Dans le cas où les layers de conteneur et de l'image contiennent le même objet, le conteneur “gagne” et cache l'objet dans l'image :



Le système de fichiers OverlayFS ne sait gérer que deux niveaux. Ceci implique une utilisation excessive d'inodes dans la cas d'une image à de niveaux multiples car chaque image doit résider dans son propre repertoire qui se situe dans **/var/lib/docker/overlay**. Des liens physiques sont ensuite utilisés pour référencer des données dans les niveaux inférieurs.

Cette limitation a donné lieu à l'introduction du système de fichiers **Overlay2** actuellement utilisé par Docker. Overlay2 est capable de gérer 128 layers.

> **Important** - Notez que Docker peut aussi utiliser le système de fichiers BTRFS.

Docker Daemon et Docker Engine

Le Docker Daemon, appelé **dockerd**, accompagné du REST API et du Docker CLI s'appellent collectivement le **Docker Engine** :

- Le Docker Daemon est le serveur,
- Le Docker CLI est le client,
- Le REST API permet la communication entre le serveur et le client.

Le Docker Engine peut utiliser des **plugins**. Ces plugins, disponibles pour téléchargement à partir du **Docker Registry** public, appelé le **Docker Hub**, ajoutent des fonctionnalités supplémentaires au Docker Engine. Actuellement, des plugins existent pour :

- Volumes (le partage et la réutilisation de volumes entre conteneurs, des sauvegardes et de la migration),
- Network
- Authorization
- Cloud (AWS, GCP et Azure)
- Jenkins

Il est aussi possible de créer son propre plugin.

Docker CE et Docker EE

Docker CE

Docker existe en deux versions **Docker CE** (Docker Community Edition) et **Docker EE** (Docker Enterprise Edition).

Docker CE est :

- un logiciel libre,
- gratuit.

Docker CE vient en deux sous-versions :

- **Stable** - mis à jour tous les trois mois. La stabilité est garantie,
- **Edge** - mis à jour tous les mois et contient des nouvelles fonctionnalités mais parfois au prix de la stabilité.

Docker EE

Docker EE est :

- plus puissant que la version Docker CE,
- disponible pour des processeurs différents (x86-64, ARM, IBM Z, s390x IBM Z).

Docker EE comprend :

- Docker Engine Enterprise,
    - le Docker Engine qui bénéficie de support commercial. Il permet de créer de images et des conteneurs,
- Docker Universal Control Plane (UCP),
    - est diviser en deux composants : UCP Worker et UCP Manager,
    - permet le déploiement des applications et et conçu pour la haute disponibilité,
    - permet de lier plusieurs noeuds de type UCP Manager en tant que cluster,
- Docker Trusted Registry (DTR),
    - une solution de stockage sécurisée des images,

    - est conçu pour une scalabilité horizontale,
- Docker Desktop Enterprise (DDE),
    - une application Windows et Mac permettant la construction locale d'images Docker, le support de multiples IDE et l'intégration native de Docker avec l'OS.

Docker EE est disponible en trois sous-versions, appelées des **Tiers** :

- **Basic** - (support Docker officiel (J) et des conteneurs et plugins certifiés),
    - $1 500 par noeud par an (2022),
- **Standard** - (Basic + la gestion avancée des images et des conteneurs, le support de l'authentification des utilisateurs via LDAP/AD, le RBAC),
    - $3 000 par noeud par an (2022),
- **Advanced** - (Standard + l'analyse de sécurité et la surveillance continue des vulnérabilités),
    - $3 500 par noeud par an (2022).

Pour consulter les différences entre les deux versions, consultez le lien **https://docs.docker.com/engine/installation/**.

Docker et Mirantis

Docker EE a été acquis par la société **Mirantis** en novembre 2019.

De ce fait Miratis a renommé certains composants de Docker EE :

- Docker Enterprise/UCP –> Mirantis Kubernetes Engine (MKE),
- Docker Trusted Registry (DTR) –> Mirantis Secure Registry (MSR),
- Docker Engine Enterprise –> Mirantis container Runtime,
- Docker Enterprise Container Cloud –> Mirantis Container Cloud.

LAB #1 - Travailler avec Docker

Docker est disponible pour Windows™ et Mac en tant que binaire :

Platform	x86_64 / amd64
Docker Desktop for macOS	pkg
Docker Desktop for Windows™	exe ou msi

Docker est disponible pour Linux en tant que paquet rpm ou deb :

Platform	x86_64 / amd64	ARM	ARM64 / AARCH64
CentOS	rpm		rpm
Fedora	rpm		rpm
Debian	deb	deb	deb
Ubuntu	deb	deb	deb
Raspian		deb	deb

Les paquets sont disponibles soit à partir du dépôt Docker soit dans le gestionnaire des paquets de l'OS. Docker peut aussi être installé en utilisant des scripts automatisés fournis par Docker.

Veuillez noter que depuis le changement de noms des paquets Docker, il convient de désinstaller toute version antérieure de Docker avant de procéder à l'installation de la version courante :

Par exemple sous Debian et Ubuntu :

```
# apt-get remove docker docker-engine docker.io containerd runc
```

Sous CentOS et Fedora :

```
# yum remove docker docker-client docker-client-latest docker-latest docker-common docker-engine docker-logrotate
docker-latest-logrotate
```

Docker est disponible dans trois canaux :

- **Stable**,
  - La dernière version GA (General Availability),
- **Test**,
  - La version en pre-release,

- **Nightly**,
  - Une version instable de travaux en cours.

1.1 - Installer docker sous Linux

1.1.1 - Debian 11

Docker n'est pas dans le dépôts de Debian. Afin de l'installer il convient d'ajouter le dépôt de docker. Premièrement, il est nécessaire d'installer les paquets permettant à Debian d'utiliser un dépôt en https :

```
root@debian11:~# apt-get update
...
root@debian11:~# apt-get install apt-transport-https ca-certificates curl gnupg2 software-properties-common
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ca-certificates is already the newest version (20210119).
gnupg2 is already the newest version (2.2.27-2+deb11u2).
The following packages were automatically installed and are no longer required:
  libopengl0 linux-headers-5.10.0-15-amd64 linux-headers-5.10.0-15-common
Use 'apt autoremove' to remove them.
The following additional packages will be installed:
  python3-distro-info python3-software-properties unattended-upgrades
Suggested packages:
  bsd-mailx default-mta | mail-transport-agent needrestart powermgmt-base
The following NEW packages will be installed:
  apt-transport-https curl python3-distro-info python3-software-properties
  software-properties-common unattended-upgrades
0 upgraded, 6 newly installed, 0 to remove and 0 not upgraded.
Need to get 661 kB of archives.
After this operation, 1,567 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Téléchargez la clef GPG officielle de docker :

```
root@debian11:~# curl -fsSL https://download.docker.com/linux/debian/gpg | apt-key add -
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
OK
```

Vérifiez que l'ID de la clef est **9DC8 5822 9FC7 DD38 854A E2D8 8D81 803C 0EBF CD88** :

```
root@debian11:~# apt-key fingerprint 0EBFCD88
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
pub   rsa4096 2017-02-22 [SCEA]
      9DC8 5822 9FC7 DD38 854A  E2D8 8D81 803C 0EBF CD88
uid           [ unknown] Docker Release (CE deb) <docker@docker.com>
sub   rsa4096 2017-02-22 [S]
```

Ajoutez le dépôt **stable** de docker :

```
root@debian11:~# add-apt-repository "deb [arch=amd64] https://download.docker.com/linux/debian $(lsb_release -cs)
stable"
```

> **Important** - Notez que la commande **lsb_release -cs** retourne le nom de la distribution Debian, à savoir dans ce cas **stretch**.

Installez maintenant le paquet **docker-ce** :

```
root@debian11docker:~# apt-get update
...
root@debian11:~# apt-get install docker-ce
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
```

```
The following packages were automatically installed and are no longer required:
  libopengl0 linux-headers-5.10.0-15-amd64 linux-headers-5.10.0-15-common
Use 'apt autoremove' to remove them.
The following additional packages will be installed:
  containerd.io docker-buildx-plugin docker-ce-cli docker-ce-rootless-extras
  docker-compose-plugin git git-man liberror-perl libslirp0 pigz slirp4netns
Suggested packages:
  aufs-tools cgroupfs-mount | cgroup-lite git-daemon-run | git-daemon-sysvinit
  git-doc git-el git-email git-gui gitk gitweb git-cvs git-mediawiki git-svn
The following NEW packages will be installed:
  containerd.io docker-buildx-plugin docker-ce docker-ce-cli
  docker-ce-rootless-extras docker-compose-plugin git git-man liberror-perl
  libslirp0 pigz slirp4netns
0 upgraded, 12 newly installed, 0 to remove and 0 not upgraded.
Need to get 121 MB of archives.
After this operation, 452 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Dernièrement, vérifiez la version de Docker client et serveur :

```
root@debian11:~# docker version
Client: Docker Engine - Community
 Version:           24.0.5
 API version:       1.43
 Go version:        go1.20.6
 Git commit:        ced0996
 Built:             Fri Jul 21 20:35:45 2023
 OS/Arch:           linux/amd64
 Context:           default

Server: Docker Engine - Community
 Engine:
  Version:          24.0.5
  API version:      1.43 (minimum version 1.12)
```

```
 Go version:       go1.20.6
 Git commit:       a61e2b4
 Built:            Fri Jul 21 20:35:45 2023
 OS/Arch:          linux/amd64
 Experimental:     false
containerd:
 Version:          1.6.22
 GitCommit:        8165feabfdfe38c65b599c4993d227328c231fca
runc:
 Version:          1.1.8
 GitCommit:        v1.1.8-0-g82f18fe
docker-init:
 Version:          0.19.0
 GitCommit:        de40ad0
```

Important - Notez que le paquet docker-ce a besoin des paquets **containerd.io** et **docker-ce-cli**. Notez aussi que la procédure ci-dessus installe la version la plus récente de Docker.

Dans le cas où vous souhaitez installer une version différente, il convient d'abord de constater les versions disponibles :

```
root@debian11:~# apt-cache madison docker-ce
 docker-ce | 5:24.0.5-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:24.0.4-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:24.0.3-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:24.0.2-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:24.0.1-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
```

```
Packages
 docker-ce | 5:24.0.0-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:23.0.6-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:23.0.5-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:23.0.4-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:23.0.3-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:23.0.2-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:23.0.1-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:23.0.0-1~debian.11~bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.24~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.23~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.22~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.21~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.20~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.19~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.18~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.17~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.16~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
```

```
Packages
 docker-ce | 5:20.10.15~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.14~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.13~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.12~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.11~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.10~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.9~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.8~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.7~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
 docker-ce | 5:20.10.6~3-0~debian-bullseye | https://download.docker.com/linux/debian bullseye/stable amd64
Packages
```

Dans le cas où vous souhaiteriez installer la version **24.0.1** de Docker, la commande d'installation deviendrait :

```
# apt-get install docker-ce=5:24.0.1-1~debian.11~bullseye docker-ce-cli=5:24.0.1-1~debian.11~bullseye
containerd.io
```

Si vous préférez utiliser le script d'installation de Docker, il convient d'abord de le télécharger :

> **Important** - Notez que ces scripts ne doivent pas être utilisés dans un environnement de production.

```
root@debian11:~# curl -fsSL https://get.docker.com -o get-docker.sh

root@debian11:~# ls
get-docker.sh
```

Ensuite, il convient d'exécuter le script :

```
root@debian11:~# chmod +x get-docker.sh

root@debian11:~# ./get-docker.sh
# Executing docker install script, commit: c2de0811708b6d9015ed1a2c80f02c9b70c8ce7b
Warning: the "docker" command appears to already exist on this system.

If you already have Docker installed, this script can cause trouble, which is
why we're displaying this warning and provide the opportunity to cancel the
installation.

If you installed the current Docker package using this script and are using it
again to update Docker, you can safely ignore this message.

You may press Ctrl+C now to abort this script.
+ sleep 20
^C
```

> **Important** - Notez l'utilisation de **^C** pour ne PAS continuer l'exécution du script.

Démarrez un conteneur de l'image hello-world :

```
root@debian11:~# docker run hello-world
Unable to find image 'hello-world:latest' locally
```

```
latest: Pulling from library/hello-world
719385e32844: Pull complete
Digest: sha256:dcba6daec718f547568c562956fa47e1b03673dd010fe6ee58ca806767031d1c
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/
```

Important - Notez que si l'image servant à générer le conteneur n'est pas présente sur le système hôte, celle-ci est téléchargée automatiquement depuis un dépôt (par défaut le dépôt **docker.io**) en utilisant la commande **docker pull**.

1.1.2 - CentOS 8

Connectez-vous à votre VM **CentOS_10.0.3.45_SSH** à partir de votre VM **Debian_10.0.3.46_SSH** :

```
root@debian11:~# ssh -l trainee 10.0.3.45
The authenticity of host '10.0.3.45 (10.0.3.45)' can't be established.
ECDSA key fingerprint is SHA256:Q7T/CP0SLiMbMAIgVzTuEHegYS/spPE5zzQchCHD5Vw.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.3.45' (ECDSA) to the list of known hosts.
trainee@10.0.3.45's password: trainee
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Wed Nov 15 05:24:16 2023 from 10.0.3.1
[trainee@centos8 ~]$
```

Devenez root :

```
[trainee@centos8 ~]$ su -
Password: fenestros
[root@centos8 ~]#
```

Ajouter le dépôt de docker :

```
[root@centos8 ~]# yum install -y yum-utils
Last metadata expiration check: 0:05:37 ago on Fri 18 Aug 2023 15:53:49 CEST.
Package yum-utils-4.0.21-3.el8.noarch is already installed.
Dependencies resolved.
Nothing to do.
Complete!

[root@centos8 ~]# yum-config-manager --add-repo https://download.docker.com/linux/centos/docker-ce.repo
Adding repo from: https://download.docker.com/linux/centos/docker-ce.repo
```

Supprimez le paquet **podman** et installez **Docker** :

```
[root@centos8 ~]# yum remove podman
Dependencies resolved.
================================================================================
 Package           Arch    Version                                  Repository   Size
================================================================================
Removing:
 podman            x86_64  3.3.1-9.module_el8.5.0+988+b1f0b741      @appstream   48 M
Removing dependent packages:
 cockpit-podman    noarch  33-1.module_el8.5.0+890+6b136101         @appstream  438 k
Removing unused dependencies:
 conmon            x86_64  2:2.0.29-1.module_el8.5.0+890+6b136101   @appstream  164 k
 podman-catatonit  x86_64  3.3.1-9.module_el8.5.0+988+b1f0b741      @appstream  760 k

Transaction Summary
================================================================================
Remove  4 Packages

Freed space: 49 M
Is this ok [y/N]: y
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :                                                        1/1
  Running scriptlet: cockpit-podman-33-1.module_el8.5.0+890+6b136101.noarch       1/1
  Erasing          : cockpit-podman-33-1.module_el8.5.0+890+6b136101.noarch       1/4
  Erasing          : podman-3.3.1-9.module_el8.5.0+988+b1f0b741.x86_64            2/4
  Running scriptlet: podman-3.3.1-9.module_el8.5.0+988+b1f0b741.x86_64            2/4
  Erasing          : podman-catatonit-3.3.1-9.module_el8.5.0+988+b1f0b741.x86_6   3/4
  Erasing          : conmon-2:2.0.29-1.module_el8.5.0+890+6b136101.x86_64         4/4
  Running scriptlet: conmon-2:2.0.29-1.module_el8.5.0+890+6b136101.x86_64         4/4
```

```
  Verifying        : cockpit-podman-33-1.module_el8.5.0+890+6b136101.noarch       1/4
  Verifying        : conmon-2:2.0.29-1.module_el8.5.0+890+6b136101.x86_64         2/4
  Verifying        : podman-3.3.1-9.module_el8.5.0+988+b1f0b741.x86_64            3/4
  Verifying        : podman-catatonit-3.3.1-9.module_el8.5.0+988+b1f0b741.x86_6   4/4
Installed products updated.

Removed:
  cockpit-podman-33-1.module_el8.5.0+890+6b136101.noarch
  conmon-2:2.0.29-1.module_el8.5.0+890+6b136101.x86_64
  podman-3.3.1-9.module_el8.5.0+988+b1f0b741.x86_64
  podman-catatonit-3.3.1-9.module_el8.5.0+988+b1f0b741.x86_64

Complete!

[root@centos8 ~]# yum install docker-ce docker-ce-cli containerd.io --allowerasing
Last metadata expiration check: 0:05:43 ago on Fri 18 Aug 2023 16:04:20 CEST.
Dependencies resolved.
================================================================================
 Package                    Arch   Version                        Repository        Size
================================================================================
Installing:
 containerd.io              x86_64 1.6.22-3.1.el8                 docker-ce-stable  34 M
     replacing  runc.x86_64 1.0.2-1.module_el8.5.0+911+f19012f9
 docker-ce                  x86_64 3:24.0.5-1.el8                 docker-ce-stable  24 M
 docker-ce-cli              x86_64 1:24.0.5-1.el8                 docker-ce-stable 7.2 M
Installing dependencies:
 docker-ce-rootless-extras x86_64 24.0.5-1.el8                    docker-ce-stable 4.9 M
 libcgroup                  x86_64 0.41-19.el8                    baseos            70 k
Installing weak dependencies:
 docker-buildx-plugin       x86_64 0.11.2-1.el8                   docker-ce-stable  13 M
 docker-compose-plugin      x86_64 2.20.2-1.el8                   docker-ce-stable  13 M
Removing dependent packages:
 buildah                    x86_64 1.22.3-2.module_el8.5.0+911+f19012f9
                                                                  @appstream        28 M
```

```
 containers-common         noarch 2:1-2.module_el8.5.0+890+6b136101
                                                              @appstream       236 k

Transaction Summary
================================================================================
Install  7 Packages
Remove   2 Packages

Total download size: 96 M
Is this ok [y/N]: y

Transaction Summary
================================================================================
Install  7 Packages
Remove   2 Packages

Total download size: 96 M
Is this ok [y/N]: y
Downloading Packages:
(1/7): libcgroup-0.41-19.el8.x86_64.rpm               279 kB/s |  70 kB     00:00
(2/7): docker-buildx-plugin-0.11.2-1.el8.x86_64.rpm   3.2 MB/s |  13 MB     00:04
(3/7): docker-ce-cli-24.0.5-1.el8.x86_64.rpm          3.1 MB/s | 7.2 MB     00:02
(4/7): docker-ce-24.0.5-1.el8.x86_64.rpm              2.0 MB/s |  24 MB     00:11
(5/7): containerd.io-1.6.22-3.1.el8.x86_64.rpm        1.6 MB/s |  34 MB     00:20
(6/7): docker-ce-rootless-extras-24.0.5-1.el8.x86_64. 322 kB/s | 4.9 MB     00:15
(7/7): docker-compose-plugin-2.20.2-1.el8.x86_64.rpm  961 kB/s |  13 MB     00:13
--------------------------------------------------------------------------------
Total                                                 3.7 MB/s |  96 MB     00:25
Docker CE Stable - x86_64                              67 kB/s | 1.6 kB     00:00
Importing GPG key 0x621E9F35:
 Userid     : "Docker Release (CE rpm) <docker@docker.com>"
 Fingerprint: 060A 61C5 1B55 8A7F 742B 77AA C52F EB6B 621E 9F35
 From       : https://download.docker.com/linux/centos/gpg
Is this ok [y/N]: y
```

```
Key imported successfully
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :                                                        1/1
  Installing       : docker-compose-plugin-2.20.2-1.el8.x86_64              1/10
  Running scriptlet: docker-compose-plugin-2.20.2-1.el8.x86_64              1/10
  Installing       : docker-buildx-plugin-0.11.2-1.el8.x86_64               2/10
  Running scriptlet: docker-buildx-plugin-0.11.2-1.el8.x86_64               2/10
  Installing       : docker-ce-cli-1:24.0.5-1.el8.x86_64                    3/10
  Running scriptlet: docker-ce-cli-1:24.0.5-1.el8.x86_64                    3/10
  Installing       : containerd.io-1.6.22-3.1.el8.x86_64                    4/10
  Running scriptlet: containerd.io-1.6.22-3.1.el8.x86_64                    4/10
  Running scriptlet: libcgroup-0.41-19.el8.x86_64                           5/10
  Installing       : libcgroup-0.41-19.el8.x86_64                           5/10
  Running scriptlet: libcgroup-0.41-19.el8.x86_64                           5/10
  Installing       : docker-ce-rootless-extras-24.0.5-1.el8.x86_64          6/10
  Running scriptlet: docker-ce-rootless-extras-24.0.5-1.el8.x86_64          6/10
  Installing       : docker-ce-3:24.0.5-1.el8.x86_64                        7/10
  Running scriptlet: docker-ce-3:24.0.5-1.el8.x86_64                        7/10
  Erasing          : buildah-1.22.3-2.module_el8.5.0+911+f19012f9.x86_64    8/10
  Erasing          : containers-common-2:1-2.module_el8.5.0+890+6b136101.noar    9/10
  Obsoleting       : runc-1.0.2-1.module_el8.5.0+911+f19012f9.x86_64       10/10
  Running scriptlet: runc-1.0.2-1.module_el8.5.0+911+f19012f9.x86_64       10/10
  Verifying        : libcgroup-0.41-19.el8.x86_64                           1/10
  Verifying        : containerd.io-1.6.22-3.1.el8.x86_64                    2/10
  Verifying        : runc-1.0.2-1.module_el8.5.0+911+f19012f9.x86_64        3/10
  Verifying        : docker-buildx-plugin-0.11.2-1.el8.x86_64               4/10
  Verifying        : docker-ce-3:24.0.5-1.el8.x86_64                        5/10
  Verifying        : docker-ce-cli-1:24.0.5-1.el8.x86_64                    6/10
  Verifying        : docker-ce-rootless-extras-24.0.5-1.el8.x86_64          7/10
  Verifying        : docker-compose-plugin-2.20.2-1.el8.x86_64              8/10
```

```
  Verifying        : buildah-1.22.3-2.module_el8.5.0+911+f19012f9.x86_64         9/10
  Verifying        : containers-common-2:1-2.module_el8.5.0+890+6b136101.noar   10/10
Installed products updated.

Installed:
  containerd.io-1.6.22-3.1.el8.x86_64
  docker-buildx-plugin-0.11.2-1.el8.x86_64
  docker-ce-3:24.0.5-1.el8.x86_64
  docker-ce-cli-1:24.0.5-1.el8.x86_64
  docker-ce-rootless-extras-24.0.5-1.el8.x86_64
  docker-compose-plugin-2.20.2-1.el8.x86_64
  libcgroup-0.41-19.el8.x86_64
Removed:
  buildah-1.22.3-2.module_el8.5.0+911+f19012f9.x86_64
  containers-common-2:1-2.module_el8.5.0+890+6b136101.noarch

Complete!
```

Démarrez ensuite le service docker :

```
[root@centos8 ~]# systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: d>
   Active: inactive (dead)
     Docs: https://docs.docker.com
[q] <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<Appuyez sur la touche q

[root@centos8 ~]# systemctl start docker

[root@centos8 ~]# systemctl status docker
● docker.service - Docker Application Container Engine
   Loaded: loaded (/usr/lib/systemd/system/docker.service; disabled; vendor preset: d>
   Active: active (running) since Fri 2023-08-18 16:19:35 CEST; 3s ago
     Docs: https://docs.docker.com
```

```
 Main PID: 49974 (dockerd)
    Tasks: 13
   Memory: 32.1M
   CGroup: /system.slice/docker.service
           └─49974 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/containerd.>

Aug 18 16:19:33 centos8.ittraining.loc systemd[1]: Starting Docker Application Contai>
Aug 18 16:19:33 centos8.ittraining.loc dockerd[49974]: time="2023-08-18T16:19:33.5501>
Aug 18 16:19:33 centos8.ittraining.loc dockerd[49974]: time="2023-08-18T16:19:33.8396>
Aug 18 16:19:34 centos8.ittraining.loc dockerd[49974]: time="2023-08-18T16:19:34.9656>
Aug 18 16:19:35 centos8.ittraining.loc dockerd[49974]: time="2023-08-18T16:19:35.1732>
Aug 18 16:19:35 centos8.ittraining.loc dockerd[49974]: time="2023-08-18T16:19:35.2581>
Aug 18 16:19:35 centos8.ittraining.loc dockerd[49974]: time="2023-08-18T16:19:35.2583>
Aug 18 16:19:35 centos8.ittraining.loc dockerd[49974]: time="2023-08-18T16:19:35.6677>
Aug 18 16:19:35 centos8.ittraining.loc systemd[1]: Started Docker Application Contain>
[q] <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<Appuyez sur la touche q
[root@centos8 ~]#
```

Dans le cas où vous souhaitez installer une version différente, il convient d'abord de constater les versions disponibles :

```
[root@centos8 ~]# yum list docker-ce --showduplicates | sort -r
Last metadata expiration check: 0:03:42 ago on Fri 18 Aug 2023 16:11:47 CEST.
Installed Packages
docker-ce.x86_64 3:24.0.5-1.el8 docker-ce-stable
docker-ce.x86_64 3:24.0.5-1.el8 @docker-ce-stable
docker-ce.x86_64 3:24.0.4-1.el8 docker-ce-stable
docker-ce.x86_64 3:24.0.3-1.el8 docker-ce-stable
docker-ce.x86_64 3:24.0.2-1.el8 docker-ce-stable
docker-ce.x86_64 3:24.0.1-1.el8 docker-ce-stable
docker-ce.x86_64 3:24.0.0-1.el8 docker-ce-stable
docker-ce.x86_64 3:23.0.6-1.el8 docker-ce-stable
docker-ce.x86_64 3:23.0.5-1.el8 docker-ce-stable
docker-ce.x86_64 3:23.0.4-1.el8 docker-ce-stable
docker-ce.x86_64 3:23.0.3-1.el8 docker-ce-stable
```

```
docker-ce.x86_64 3:23.0.2-1.el8 docker-ce-stable
docker-ce.x86_64 3:23.0.1-1.el8 docker-ce-stable
docker-ce.x86_64 3:23.0.0-1.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.9-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.8-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.7-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.6-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.5-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.4-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.3-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.24-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.2-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.23-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.22-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.21-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.20-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.19-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.18-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.17-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.16-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.15-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.14-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.1-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.13-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.12-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.11-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.10-3.el8 docker-ce-stable
docker-ce.x86_64 3:20.10.0-3.el8 docker-ce-stable
docker-ce.x86_64 3:19.03.15-3.el8 docker-ce-stable
docker-ce.x86_64 3:19.03.14-3.el8 docker-ce-stable
docker-ce.x86_64 3:19.03.13-3.el8 docker-ce-stable
Available Packages

[root@centos8 ~]# yum list docker-ce-cli --showduplicates | sort -r
```

```
Last metadata expiration check: 0:08:33 ago on Thu 14 Dec 2023 09:52:33 EST.
docker-ce-cli.x86_64              1:24.0.7-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:24.0.6-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:24.0.5-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:24.0.4-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:24.0.3-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:24.0.2-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:24.0.1-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:24.0.0-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:23.0.6-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:23.0.5-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:23.0.4-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:23.0.3-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:23.0.2-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:23.0.1-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:23.0.0-1.el8               docker-ce-stable
docker-ce-cli.x86_64              1:20.10.9-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.8-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.7-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.6-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.5-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.4-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.3-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.24-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.2-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.23-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.22-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.21-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.20-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.19-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.18-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.17-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.16-3.el8             docker-ce-stable
docker-ce-cli.x86_64              1:20.10.15-3.el8             docker-ce-stable
```

```
docker-ce-cli.x86_64              1:20.10.14-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.1-3.el8               docker-ce-stable
docker-ce-cli.x86_64              1:20.10.13-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.12-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.11-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.10-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:20.10.0-3.el8               docker-ce-stable
docker-ce-cli.x86_64              1:19.03.15-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:19.03.14-3.el8              docker-ce-stable
docker-ce-cli.x86_64              1:19.03.13-3.el8              docker-ce-stable
Available Packages
```

Dans le cas où vous souhaiteriez installer la version **24.0.4** de Docker, la commande d'installation deviendrait :

```
# yum install docker-ce-3:24.0.4-1.el8  docker-ce-cli-1:24.0.4-1.el8  containerd.io
```

Si vous préférez utiliser le script d'installation de Docker, il convient d'abord de le télécharger :

> **Important** - Notez que ces scripts ne doivent pas être utilisés dans un environnement de production.

```
[root@centos8 ~]# curl -fsSL https://get.docker.com -o get-docker.sh

[root@centos8 ~]# ls
anaconda-ks.cfg                 Downloads             Music      Videos
CentOS-8.1.1911-x86_64-boot.iso  get-docker.sh         Pictures
Desktop                         home                  Public
Documents                       initial-setup-ks.cfg  Templates
```

Ensuite, il convient d'exécuter le script :

```
[root@centos8 ~]# chmod +x get-docker.sh

[root@centos8 ~]# ./get-docker.sh
# Executing docker install script, commit: c2de0811708b6d9015ed1a2c80f02c9b70c8ce7b
Warning: the "docker" command appears to already exist on this system.

If you already have Docker installed, this script can cause trouble, which is
why we're displaying this warning and provide the opportunity to cancel the
installation.

If you installed the current Docker package using this script and are using it
again to update Docker, you can safely ignore this message.

You may press Ctrl+C now to abort this script.
+ sleep 20
^C
```

Important - Notez l'utilisation de **^C** pour ne PAS continuer l'exécution du script.

Démarrez un conteneur de l'image hello-world :

```
[root@centos8 ~]# docker run hello-world
Unable to find image 'hello-world:latest' locally
latest: Pulling from library/hello-world
719385e32844: Pull complete
Digest: sha256:dcba6daec718f547568c562956fa47e1b03673dd010fe6ee58ca806767031d1c
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/
```

Important - Notez que si l'image servant à générer le conteneur n'est pas présente sur le système hôte, celle-ci est téléchargée automatiquement depuis un dépôt (par défaut le dépôt **docker.io**) en utilisant la commande **docker pull**.

1.2 - Démarrer un Conteneur

Démarrez un conteneur de l'image ubuntu:latest en mode interactif grâce à l'utilisation des options **-i** et **-t** en lui passant en argument **bash** pour que celui-ci soient lancé au démarrage du conteneur :

```
root@debian11:~# docker run -it ubuntu bash
Unable to find image 'ubuntu:latest' locally
```

```
latest: Pulling from library/ubuntu
b237fe92c417: Pull complete
Digest: sha256:ec050c32e4a6085b423d36ecd025c0d3ff00c38ab93a3d71a460ff1c44fa6d77
Status: Downloaded newer image for ubuntu:latest

root@83b0d8979a33:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr
var

root@83b0d8979a33:/# cat /etc/lsb-release
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=22.04
DISTRIB_CODENAME=jammy
DISTRIB_DESCRIPTION="Ubuntu 22.04.3 LTS"
```

Important - Notez que dans ce cas le conteneur est lancé avec comme argument **bash** qui lancera /bin/bash dans le conteneur.

Consulter la liste des paquets installés dans le conteneur ubuntu :

```
root@83b0d8979a33:/# dpkg -l
Desired=Unknown/Install/Remove/Purge/Hold
| Status=Not/Inst/Conf-files/Unpacked/halF-conf/Half-inst/trig-aWait/Trig-pend
|/ Err?=(none)/Reinst-required (Status,Err: uppercase=bad)
||/ Name                  Version                                 Architecture Description
+++-=====================-=======================================-============-
==============================================================
ii  adduser               3.118ubuntu5                            all          add and remove users and groups
ii  apt                   2.4.9                                   amd64        commandline package manager
ii  base-files            12ubuntu4.4                             amd64        Debian base system miscellaneous
files
```

```
ii  base-passwd             3.5.52build1                            amd64        Debian base system master
password and group files
ii  bash                    5.1-6ubuntu1                            amd64        GNU Bourne Again SHell
ii  bsdutils                1:2.37.2-4ubuntu3                       amd64        basic utilities from 4.4BSD-Lite
ii  coreutils               8.32-4.1ubuntu1                         amd64        GNU core utilities
ii  dash                    0.5.11+git20210903+057cd650a4ed-3build1 amd64        POSIX-compliant shell
ii  debconf                 1.5.79ubuntu1                           all          Debian configuration management
system
ii  debianutils             5.5-1ubuntu2                            amd64        Miscellaneous utilities specific
to Debian
ii  diffutils               1:3.8-0ubuntu2                          amd64        File comparison utilities
ii  dpkg                    1.21.1ubuntu2.2                         amd64        Debian package management system
ii  e2fsprogs               1.46.5-2ubuntu1.1                       amd64        ext2/ext3/ext4 file system
utilities
ii  findutils               4.8.0-1ubuntu3                          amd64        utilities for finding files--
find, xargs
ii  gcc-12-base:amd64       12.3.0-1ubuntu1~22.04                   amd64        GCC, the GNU Compiler Collection
(base package)
ii  gpgv                    2.2.27-3ubuntu2.1                       amd64        GNU privacy guard - signature
verification tool
ii  grep                    3.7-1build1                             amd64        GNU grep, egrep and fgrep
ii  gzip                    1.10-4ubuntu4.1                         amd64        GNU compression utilities
ii  hostname                3.23ubuntu2                             amd64        utility to set/show the host
name or domain name
ii  init-system-helpers     1.62                                    all          helper tools for all init
systems
ii  libacl1:amd64           2.3.1-1                                 amd64        access control list - shared
library
ii  libapt-pkg6.0:amd64     2.4.9                                   amd64        package management runtime
library
ii  libattr1:amd64          1:2.5.1-1build1                         amd64        extended attribute handling -
shared library
ii  libaudit-common         1:3.0.7-1build1                         all          Dynamic library for security
auditing - common files
```

```
ii  libaudit1:amd64         1:3.0.7-1build1                         amd64        Dynamic library for security
auditing
ii  libblkid1:amd64         2.37.2-4ubuntu3                         amd64        block device ID library
ii  libbz2-1.0:amd64        1.0.8-5build1                           amd64        high-quality block-sorting file
compressor library - runtime
ii  libc-bin                2.35-0ubuntu3.1                         amd64        GNU C Library: Binaries
ii  libc6:amd64             2.35-0ubuntu3.1                         amd64        GNU C Library: Shared libraries
ii  libcap-ng0:amd64        0.7.9-2.2build3                         amd64        An alternate POSIX capabilities
library
ii  libcap2:amd64           1:2.44-1ubuntu0.22.04.1                 amd64        POSIX 1003.1e capabilities
(library)
ii  libcom-err2:amd64       1.46.5-2ubuntu1.1                       amd64        common error description library
ii  libcrypt1:amd64         1:4.4.27-1                              amd64        libcrypt shared library
ii  libdb5.3:amd64          5.3.28+dfsg1-0.8ubuntu3                 amd64        Berkeley v5.3 Database Libraries
[runtime]
ii  libdebconfclient0:amd64 0.261ubuntu1                            amd64        Debian Configuration Management
System (C-implementation library)
ii  libext2fs2:amd64        1.46.5-2ubuntu1.1                       amd64        ext2/ext3/ext4 file system
libraries
ii  libffi8:amd64           3.4.2-4                                 amd64        Foreign Function Interface
library runtime
ii  libgcc-s1:amd64         12.3.0-1ubuntu1~22.04                   amd64        GCC support library
ii  libgcrypt20:amd64       1.9.4-3ubuntu3                          amd64        LGPL Crypto library - runtime
library
ii  libgmp10:amd64          2:6.2.1+dfsg-3ubuntu1                   amd64        Multiprecision arithmetic
library
ii  libgnutls30:amd64       3.7.3-4ubuntu1.2                        amd64        GNU TLS library - main runtime
library
ii  libgpg-error0:amd64     1.43-3                                  amd64        GnuPG development runtime
library
ii  libgssapi-krb5-2:amd64  1.19.2-2ubuntu0.2                       amd64        MIT Kerberos runtime libraries -
krb5 GSS-API Mechanism
ii  libhogweed6:amd64       3.7.3-1build2                           amd64        low level cryptographic library
(public-key cryptos)
```

```
ii  libidn2-0:amd64         2.3.2-2build1                          amd64        Internationalized domain names
(IDNA2008/TR46) library
ii  libk5crypto3:amd64      1.19.2-2ubuntu0.2                      amd64        MIT Kerberos runtime libraries -
Crypto Library
ii  libkeyutils1:amd64      1.6.1-2ubuntu3                         amd64        Linux Key Management Utilities
(library)
ii  libkrb5-3:amd64         1.19.2-2ubuntu0.2                      amd64        MIT Kerberos runtime libraries
ii  libkrb5support0:amd64   1.19.2-2ubuntu0.2                      amd64        MIT Kerberos runtime libraries -
Support library
ii  liblz4-1:amd64          1.9.3-2build2                          amd64        Fast LZ compression algorithm
library - runtime
ii  liblzma5:amd64          5.2.5-2ubuntu1                         amd64        XZ-format compression library
ii  libmount1:amd64         2.37.2-4ubuntu3                        amd64        device mounting library
ii  libncurses6:amd64       6.3-2ubuntu0.1                         amd64        shared libraries for terminal
handling
ii  libncursesw6:amd64      6.3-2ubuntu0.1                         amd64        shared libraries for terminal
handling (wide character support)
ii  libnettle8:amd64        3.7.3-1build2                          amd64        low level cryptographic library
(symmetric and one-way cryptos)
ii  libnsl2:amd64           1.3.0-2build2                          amd64        Public client interface for
NIS(YP) and NIS+
ii  libp11-kit0:amd64       0.24.0-6build1                         amd64        library for loading and
coordinating access to PKCS#11 modules - runtime
ii  libpam-modules:amd64    1.4.0-11ubuntu2.3                      amd64        Pluggable Authentication Modules
for PAM
ii  libpam-modules-bin      1.4.0-11ubuntu2.3                      amd64        Pluggable Authentication Modules
for PAM - helper binaries
ii  libpam-runtime          1.4.0-11ubuntu2.3                      all          Runtime support for the PAM
library
ii  libpam0g:amd64          1.4.0-11ubuntu2.3                      amd64        Pluggable Authentication Modules
library
ii  libpcre2-8-0:amd64      10.39-3ubuntu0.1                       amd64        New Perl Compatible Regular
Expression Library- 8 bit runtime files
ii  libpcre3:amd64          2:8.39-13ubuntu0.22.04.1               amd64        Old Perl 5 Compatible Regular
```

```
Expression Library - runtime files
ii  libprocps8:amd64        2:3.3.17-6ubuntu2                       amd64        library for accessing process
information from /proc
ii  libseccomp2:amd64       2.5.3-2ubuntu2                          amd64        high level interface to Linux
seccomp filter
ii  libselinux1:amd64       3.3-1build2                             amd64        SELinux runtime shared libraries
ii  libsemanage-common      3.3-1build2                             all          Common files for SELinux policy
management libraries
ii  libsemanage2:amd64      3.3-1build2                             amd64        SELinux policy management
library
ii  libsepol2:amd64         3.3-1build1                             amd64        SELinux library for manipulating
binary security policies
ii  libsmartcols1:amd64     2.37.2-4ubuntu3                         amd64        smart column output alignment
library
ii  libss2:amd64            1.46.5-2ubuntu1.1                       amd64        command-line interface parsing
library
ii  libssl3:amd64           3.0.2-0ubuntu1.10                       amd64        Secure Sockets Layer toolkit -
shared libraries
ii  libstdc++6:amd64        12.3.0-1ubuntu1~22.04                   amd64        GNU Standard C++ Library v3
ii  libsystemd0:amd64       249.11-0ubuntu3.9                       amd64        systemd utility library
ii  libtasn1-6:amd64        4.18.0-4build1                          amd64        Manage ASN.1 structures
(runtime)
ii  libtinfo6:amd64         6.3-2ubuntu0.1                          amd64        shared low-level terminfo
library for terminal handling
ii  libtirpc-common         1.3.2-2ubuntu0.1                        all          transport-independent RPC
library - common files
ii  libtirpc3:amd64         1.3.2-2ubuntu0.1                        amd64        transport-independent RPC
library
ii  libudev1:amd64          249.11-0ubuntu3.9                       amd64        libudev shared library
ii  libunistring2:amd64     1.0-1                                   amd64        Unicode string library for C
ii  libuuid1:amd64          2.37.2-4ubuntu3                         amd64        Universally Unique ID library
ii  libxxhash0:amd64        0.8.1-1                                 amd64        shared library for xxhash
ii  libzstd1:amd64          1.4.8+dfsg-3build1                      amd64        fast lossless compression
algorithm
```

```
ii  login                    1:4.8.1-2ubuntu2.1                  amd64        system login tools
ii  logsave                  1.46.5-2ubuntu1.1                   amd64        save the output of a command in
a log file
ii  lsb-base                 11.1.0ubuntu4                       all          Linux Standard Base init script
functionality
ii  mawk                     1.3.4.20200120-3                    amd64        Pattern scanning and text
processing language
ii  mount                    2.37.2-4ubuntu3                     amd64        tools for mounting and
manipulating filesystems
ii  ncurses-base             6.3-2ubuntu0.1                      all          basic terminal type definitions
ii  ncurses-bin              6.3-2ubuntu0.1                      amd64        terminal-related programs and
man pages
ii  passwd                   1:4.8.1-2ubuntu2.1                  amd64        change and administer password
and group data
ii  perl-base                5.34.0-3ubuntu1.2                   amd64        minimal Perl system
ii  procps                   2:3.3.17-6ubuntu2                   amd64        /proc file system utilities
ii  sed                      4.8-1ubuntu2                        amd64        GNU stream editor for
filtering/transforming text
ii  sensible-utils           0.0.17                              all          Utilities for sensible
alternative selection
ii  sysvinit-utils           3.01-1ubuntu1                       amd64        System-V-like utilities
ii  tar                      1.34+dfsg-1ubuntu0.1.22.04.1        amd64        GNU version of the tar archiving
utility
ii  ubuntu-keyring           2021.03.26                          all          GnuPG keys of the Ubuntu archive
ii  usrmerge                 25ubuntu2                           all          Convert the system to the merged
/usr directories scheme
ii  util-linux               2.37.2-4ubuntu3                     amd64        miscellaneous system utilities
ii  zlib1g:amd64             1:1.2.11.dfsg-2ubuntu9.2            amd64        compression library - runtime
root@83b0d8979a33:/# exit
exit
root@debian11:~#
```

Les options de la commande docker run peuvent être visualisées avec la commande :

```
root@debian11:~# docker run --help

Usage:  docker run [OPTIONS] IMAGE [COMMAND] [ARG...]

Create and run a new container from an image

Aliases:
  docker container run, docker run

Options:
      --add-host list                  Add a custom host-to-IP mapping (host:ip)
      --annotation map                 Add an annotation to the container (passed through to the OCI runtime)
(default map[])
  -a, --attach list                    Attach to STDIN, STDOUT or STDERR
      --blkio-weight uint16            Block IO (relative weight), between 10 and 1000, or 0 to disable (default
0)
      --blkio-weight-device list       Block IO weight (relative device weight) (default [])
      --cap-add list                   Add Linux capabilities
      --cap-drop list                  Drop Linux capabilities
      --cgroup-parent string           Optional parent cgroup for the container
      --cgroupns string                Cgroup namespace to use (host|private)
                                       'host':    Run the container in the Docker host's cgroup namespace
                                       'private': Run the container in its own private cgroup namespace
                                       '':        Use the cgroup namespace as configured by the
                                                  default-cgroupns-mode option on the daemon (default)
      --cidfile string                 Write the container ID to the file
      --cpu-period int                 Limit CPU CFS (Completely Fair Scheduler) period
      --cpu-quota int                  Limit CPU CFS (Completely Fair Scheduler) quota
      --cpu-rt-period int              Limit CPU real-time period in microseconds
      --cpu-rt-runtime int             Limit CPU real-time runtime in microseconds
  -c, --cpu-shares int                 CPU shares (relative weight)
      --cpus decimal                   Number of CPUs
      --cpuset-cpus string             CPUs in which to allow execution (0-3, 0,1)
      --cpuset-mems string             MEMs in which to allow execution (0-3, 0,1)
```

```
  -d, --detach                         Run container in background and print container ID
      --detach-keys string             Override the key sequence for detaching a container
      --device list                    Add a host device to the container
      --device-cgroup-rule list        Add a rule to the cgroup allowed devices list
      --device-read-bps list           Limit read rate (bytes per second) from a device (default [])
      --device-read-iops list          Limit read rate (IO per second) from a device (default [])
      --device-write-bps list          Limit write rate (bytes per second) to a device (default [])
      --device-write-iops list         Limit write rate (IO per second) to a device (default [])
      --disable-content-trust          Skip image verification (default true)
      --dns list                       Set custom DNS servers
      --dns-option list                Set DNS options
      --dns-search list                Set custom DNS search domains
      --domainname string              Container NIS domain name
      --entrypoint string              Overwrite the default ENTRYPOINT of the image
  -e, --env list                       Set environment variables
      --env-file list                  Read in a file of environment variables
      --expose list                    Expose a port or a range of ports
      --gpus gpu-request               GPU devices to add to the container ('all' to pass all GPUs)
      --group-add list                 Add additional groups to join
      --health-cmd string              Command to run to check health
      --health-interval duration       Time between running the check (ms|s|m|h) (default 0s)
      --health-retries int             Consecutive failures needed to report unhealthy
      --health-start-period duration   Start period for the container to initialize before starting health-
retries countdown (ms|s|m|h) (default 0s)
      --health-timeout duration        Maximum time to allow one check to run (ms|s|m|h) (default 0s)
      --help                           Print usage
  -h, --hostname string                Container host name
      --init                           Run an init inside the container that forwards signals and reaps processes
  -i, --interactive                    Keep STDIN open even if not attached
      --ip string                      IPv4 address (e.g., 172.30.100.104)
      --ip6 string                     IPv6 address (e.g., 2001:db8::33)
      --ipc string                     IPC mode to use
      --isolation string               Container isolation technology
      --kernel-memory bytes            Kernel memory limit
```

```
  -l, --label list                    Set meta data on a container
      --label-file list               Read in a line delimited file of labels
      --link list                     Add link to another container
      --link-local-ip list            Container IPv4/IPv6 link-local addresses
      --log-driver string             Logging driver for the container
      --log-opt list                  Log driver options
      --mac-address string            Container MAC address (e.g., 92:d0:c6:0a:29:33)
  -m, --memory bytes                  Memory limit
      --memory-reservation bytes      Memory soft limit
      --memory-swap bytes             Swap limit equal to memory plus swap: '-1' to enable unlimited swap
      --memory-swappiness int         Tune container memory swappiness (0 to 100) (default -1)
      --mount mount                   Attach a filesystem mount to the container
      --name string                   Assign a name to the container
      --network network               Connect a container to a network
      --network-alias list            Add network-scoped alias for the container
      --no-healthcheck                Disable any container-specified HEALTHCHECK
      --oom-kill-disable              Disable OOM Killer
      --oom-score-adj int             Tune host's OOM preferences (-1000 to 1000)
      --pid string                    PID namespace to use
      --pids-limit int                Tune container pids limit (set -1 for unlimited)
      --platform string               Set platform if server is multi-platform capable
      --privileged                    Give extended privileges to this container
  -p, --publish list                  Publish a container's port(s) to the host
  -P, --publish-all                   Publish all exposed ports to random ports
      --pull string                   Pull image before running ("always", "missing", "never") (default
"missing")
  -q, --quiet                         Suppress the pull output
      --read-only                     Mount the container's root filesystem as read only
      --restart string                Restart policy to apply when a container exits (default "no")
      --rm                            Automatically remove the container when it exits
      --runtime string                Runtime to use for this container
      --security-opt list             Security Options
      --shm-size bytes                Size of /dev/shm
      --sig-proxy                     Proxy received signals to the process (default true)
```

```
      --stop-signal string             Signal to stop the container
      --stop-timeout int               Timeout (in seconds) to stop a container
      --storage-opt list               Storage driver options for the container
      --sysctl map                     Sysctl options (default map[])
      --tmpfs list                     Mount a tmpfs directory
  -t, --tty                            Allocate a pseudo-TTY
      --ulimit ulimit                  Ulimit options (default [])
  -u, --user string                    Username or UID (format: <name|uid>[:<group|gid>])
      --userns string                  User namespace to use
      --uts string                     UTS namespace to use
  -v, --volume list                    Bind mount a volume
      --volume-driver string           Optional volume driver for the container
      --volumes-from list              Mount volumes from the specified container(s)
  -w, --workdir string                 Working directory inside the container
```

1.3 - Consulter la Liste des Conteneurs et Images

Pour consulter tous les conteneurs, utilisez la commande **docker ps** avec l'option **-a** :

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE         COMMAND    CREATED         STATUS                     PORTS     NAMES
83b0d8979a33   ubuntu        "bash"     4 minutes ago   Exited (0) 2 minutes ago             upbeat_diffie
5d17db3bbb20   hello-world   "/hello"   16 hours ago    Exited (0) 16 hours ago              charming_hoover
```

Important - Notez que chaque conteneur peut être référencé par son **CONTAINER ID** ou par son **NAME**.

Pour consulter la liste des images, utilisez la commande **docker images** :

```
root@debian11:~# docker images
```

```
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        latest    01f29b872827   2 weeks ago    77.8MB
hello-world   latest    9c7a54a9a43c   3 months ago   13.3kB
```

Important - Notez que chaque image est référencée par son IMAGE ID.

1.4 - Rechercher une Image dans un Dépôt

Pour rechercher une image docker dans le dépôt par défaut, utilisez la commande **docker search** :

```
root@debian11:~# docker search --filter=stars=5 centos
NAME                      DESCRIPTION                                     STARS     OFFICIAL   AUTOMATED
centos                    DEPRECATED; The official build of CentOS.       7627      [OK]
kasmweb/centos-7-desktop  CentOS 7 desktop for Kasm Workspaces            40
couchbase/centos7-systemd centos7-systemd images with additional debug…  8                    [OK]
dokken/centos-7           CentOS 7 image for kitchen-dokken               5
eclipse/centos_jdk8       CentOS, JDK8, Maven 3, git, curl, nmap, mc, …   5                    [OK]
dokken/centos-stream-9                                                    6
```

Important - Notez que chaque image est référencée par la colonne NAME. Le NAME est sous le format **repository/mainteneur/nom** sauf dans le cas où il s'agit de l'image “officielle” de l'éditeur au quel cas le format est simplement **repository/nom**. La notion de STARS (étoiles) vient de Docker Hub et est une indication de la satisfaction de la communauté.

1.5 - Supprimer un Conteneur d'une Image

Pour supprimer un conteneur d'une image, il convient d'utiliser la commande **docker rm** en référencant le conteneur soit par son **NAME** soit par son CONTAINER ID :

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE         COMMAND    CREATED         STATUS                      PORTS     NAMES
83b0d8979a33   ubuntu        "bash"     5 minutes ago   Exited (0) 4 minutes ago              upbeat_diffie
5d17db3bbb20   hello-world   "/hello"   16 hours ago    Exited (0) 16 hours ago               charming_hoover

root@debian11:~# docker rm upbeat_diffie
upbeat_diffie

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE         COMMAND    CREATED         STATUS                      PORTS     NAMES
5d17db3bbb20   hello-world   "/hello"   16 hours ago    Exited (0) 16 hours ago               charming_hoover

root@debian11:~# docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        latest    01f29b872827   2 weeks ago    77.8MB
hello-world   latest    9c7a54a9a43c   3 months ago   13.3kB
```

Important - Notez que dans le cas de l'utilisation du CONTAINER ID, il n'est pas necéssaire d'utiliser la totalité de l'ID. Par exemple, dans le cas ci-dessus, le CONTAINER ID du conteneur **upbeat_diffie** était **83b0d8979a33**. La commande de suppression aurait pu utilisé **83b0d8979a33**, **83b0d8** ou même **83b**.

1.6 -Créer une Image à partir d'un Conteneur Modifié

Modifier un conteneur d'une image :

```
root@debian11:~# docker run -it ubuntu

root@4377355f88c2:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr
var

root@4377355f88c2:/# rm -rf /home

root@4377355f88c2:/# ls
bin  boot  dev  etc  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var

root@4377355f88c2:/# exit
exit
root@debian11:~#
```

Important - Notez ici la suppression du répertoire **home** dans le conteneur **4377355f88c2**.

Consultez la différence entre le conteneur et l'image de base :

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE         COMMAND       CREATED              STATUS                          PORTS     NAMES
4377355f88c2   ubuntu        "/bin/bash"   About a minute ago   Exited (0) About a minute ago
romantic_northcutt
5d17db3bbb20   hello-world   "/hello"      16 hours ago         Exited (0) 16 hours ago
charming_hoover
```

```
root@debian11:~# docker diff romantic_northcutt
C /root
A /root/.bash_history
D /home
```

Important - La sortie de la commande **docker diff** comporte des lettres dont les significations sont les suivantes : C = Create, D = Delete, A = Add.

Créez un autre conteneur à partir de l'image de base :

```
root@debian11:~# docker run -it ubuntu

root@e4caf92a5ceb:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr
var

root@e4caf92a5ceb:/# exit
exit

root@debian11:~#
```

Important - Dans ce nouveau conteneur, le répertoire **/home** est présent compte tenu du fait qu'il a été généré à partir de l'image d'origine, inchangée depuis sa compilation.

Créez maintenant l'image **ubuntu_1** à partir du premier conteneur ubuntu (dans le cas ci-dessous - **romantic_northcutt**) en utilisant la commande **docker commit** :

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE         COMMAND       CREATED          STATUS                      PORTS     NAMES
e4caf92a5ceb   ubuntu        "/bin/bash"   44 seconds ago   Exited (0) 32 seconds ago             
affectionate_ishizaka
4377355f88c2   ubuntu        "/bin/bash"   6 hours ago      Exited (0) 6 hours ago                
romantic_northcutt
5d17db3bbb20   hello-world   "/hello"      22 hours ago     Exited (0) 22 hours ago               charming_hoover

root@debian11:~# docker commit romantic_northcutt ubuntu_1
sha256:50d66f88b992b65d0a38c4b662fbdcc906477916240a90d214b35a42b939ea5f

root@debian11:~# docker images
REPOSITORY    TAG       IMAGE ID       CREATED          SIZE
ubuntu_1      latest    50d66f88b992   13 seconds ago   77.8MB
ubuntu        latest    01f29b872827   2 weeks ago      77.8MB
hello-world   latest    9c7a54a9a43c   3 months ago     13.3kB

root@debian11:~#
```

1.7 - Supprimer une Image

Créez maintenant un conteneur à partir de la nouvelle image **ubuntu_1** :

```
root@debian11:~# docker run -it ubuntu_1

root@86e777ebaf2b:/# ls
bin  boot  dev  etc  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var

root@86e777ebaf2b:/# exit
exit

root@debian11:~#
```

Important - Notez l'absence du répertoire **home** dans le conteneur **904215fb79b4**.

Essayez de supprimer l'image **ubuntu_1** :

```
root@debian11:~# docker rmi ubuntu_1
Error response from daemon: conflict: unable to remove repository reference "ubuntu_1" (must force) - container
86e777ebaf2b is using its referenced image 50d66f88b992

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE         COMMAND       CREATED              STATUS                          PORTS     NAMES
86e777ebaf2b   ubuntu_1      "/bin/bash"   About a minute ago   Exited (0) About a minute ago
focused_colden
e4caf92a5ceb   ubuntu        "/bin/bash"   7 minutes ago        Exited (0) 7 minutes ago
affectionate_ishizaka
4377355f88c2   ubuntu        "/bin/bash"   6 hours ago          Exited (0) 6 hours ago
romantic_northcutt
5d17db3bbb20   hello-world   "/hello"      22 hours ago         Exited (0) 22 hours ago
charming_hoover
```

Important - Notez qu'il n'est pas possible de supprimer l'image **ubuntu_1** tant que le conteneur **86e777ebaf2b** soit actif.

Supprimez donc le conteneur identifié par le message d'erreur (dans le cas ci-dessus - **focused_colden**) ainsi que l'image **ubuntu_1** :

```
root@debian11:~# docker rm focused_colden
focused_colden
```

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE         COMMAND       CREATED          STATUS                      PORTS     NAMES
e4caf92a5ceb   ubuntu        "/bin/bash"   10 minutes ago   Exited (0) 9 minutes ago              
affectionate_ishizaka
4377355f88c2   ubuntu        "/bin/bash"   6 hours ago      Exited (0) 6 hours ago                
romantic_northcutt
5d17db3bbb20   hello-world   "/hello"      22 hours ago     Exited (0) 22 hours ago               charming_hoover

root@debian11:~# docker rmi ubuntu_1
Untagged: ubuntu_1:latest
Deleted: sha256:50d66f88b992b65d0a38c4b662fbdcc906477916240a90d214b35a42b939ea5f
Deleted: sha256:c5fdbe1dd17356fd868456c44949e0ca50c78a610a8917d7ad6ab372aeebce20

root@debian11:~# docker images
REPOSITORY    TAG       IMAGE ID       CREATED        SIZE
ubuntu        latest    01f29b872827   2 weeks ago    77.8MB
hello-world   latest    9c7a54a9a43c   3 months ago   13.3kB
```

Pour pouvoir supprimer tous les conteneurs, listez-les par leur **Container ID** :

```
root@debian11:~# docker ps -aq
e4caf92a5ceb
4377355f88c2
5d17db3bbb20
```

Supprimer toutes les conteneurs :

```
root@debian11:~# docker rm `docker ps -aq`
e4caf92a5ceb
4377355f88c2
5d17db3bbb20

root@debian11:~# docker ps -aq
```

```
root@debian11:~#
```

Pour supprimer un conteneur dès la fin de son exécution, utilisez l'option **–rm** :

```
root@debian11:~# docker run -it --rm ubuntu

root@3b3d4d7be82b:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr
var

root@3b3d4d7be82b:/# exit
exit

root@debian11:~# docker ps -aq

root@debian11:~#
```

1.8 - Créer un Conteneur avec un Nom Spécifique

Créez maintenant un conteneur avec un nom spécifique :

```
root@debian11:~# docker run -it --name=ittraining ubuntu

root@d838ea83033e:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr
var

root@d838ea83033e:/# exit
exit

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND       CREATED          STATUS                      PORTS     NAMES
```

```
d838ea83033e   ubuntu    "/bin/bash"   12 seconds ago   Exited (0) 4 seconds ago             ittraining
```

Pour obtenir de l'information concernant un conteneur, utilisez la commande **docker inspect** :

```
root@debian11:~# docker inspect ittraining
[
    {
        "Id": "d838ea83033e6a5b324676ed6734e7ff9c69084dd453c52eedd367f31bcb83f3",
        "Created": "2023-08-19T11:47:56.464134219Z",
        "Path": "/bin/bash",
        "Args": [],
        "State": {
            "Status": "exited",
            "Running": false,
            "Paused": false,
            "Restarting": false,
            "OOMKilled": false,
            "Dead": false,
            "Pid": 0,
            "ExitCode": 0,
            "Error": "",
            "StartedAt": "2023-08-19T11:47:57.979606971Z",
            "FinishedAt": "2023-08-19T11:48:04.066624168Z"
        },
        "Image": "sha256:01f29b872827fa6f9aed0ea0b2ede53aea4ad9d66c7920e81a8db6d1fd9ab7f9",
        "ResolvConfPath":
"/var/lib/docker/containers/d838ea83033e6a5b324676ed6734e7ff9c69084dd453c52eedd367f31bcb83f3/resolv.conf",
        "HostnamePath":
"/var/lib/docker/containers/d838ea83033e6a5b324676ed6734e7ff9c69084dd453c52eedd367f31bcb83f3/hostname",
        "HostsPath":
"/var/lib/docker/containers/d838ea83033e6a5b324676ed6734e7ff9c69084dd453c52eedd367f31bcb83f3/hosts",
        "LogPath":
"/var/lib/docker/containers/d838ea83033e6a5b324676ed6734e7ff9c69084dd453c52eedd367f31bcb83f3/d838ea83033e6a5b3246
76ed6734e7ff9c69084dd453c52eedd367f31bcb83f3-json.log",
```

```
        "Name": "/ittraining",
        "RestartCount": 0,
        "Driver": "overlay2",
        "Platform": "linux",
        "MountLabel": "",
        "ProcessLabel": "",
        "AppArmorProfile": "docker-default",
        "ExecIDs": null,
        "HostConfig": {
            "Binds": null,
            "ContainerIDFile": "",
            "LogConfig": {
                "Type": "json-file",
                "Config": {}
            },
            "NetworkMode": "default",
            "PortBindings": {},
            "RestartPolicy": {
                "Name": "no",
                "MaximumRetryCount": 0
            },
            "AutoRemove": false,
            "VolumeDriver": "",
            "VolumesFrom": null,
            "ConsoleSize": [
                59,
                210
            ],
            "CapAdd": null,
            "CapDrop": null,
            "CgroupnsMode": "private",
            "Dns": [],
            "DnsOptions": [],
            "DnsSearch": [],
```

```
            "ExtraHosts": null,
            "GroupAdd": null,
            "IpcMode": "private",
            "Cgroup": "",
            "Links": null,
            "OomScoreAdj": 0,
            "PidMode": "",
            "Privileged": false,
            "PublishAllPorts": false,
            "ReadonlyRootfs": false,
            "SecurityOpt": null,
            "UTSMode": "",
            "UsernsMode": "",
            "ShmSize": 67108864,
            "Runtime": "runc",
            "Isolation": "",
            "CpuShares": 0,
            "Memory": 0,
            "NanoCpus": 0,
            "CgroupParent": "",
            "BlkioWeight": 0,
            "BlkioWeightDevice": [],
            "BlkioDeviceReadBps": [],
            "BlkioDeviceWriteBps": [],
            "BlkioDeviceReadIOps": [],
            "BlkioDeviceWriteIOps": [],
            "CpuPeriod": 0,
            "CpuQuota": 0,
            "CpuRealtimePeriod": 0,
            "CpuRealtimeRuntime": 0,
            "CpusetCpus": "",
            "CpusetMems": "",
            "Devices": [],
            "DeviceCgroupRules": null,
```

```
            "DeviceRequests": null,
            "MemoryReservation": 0,
            "MemorySwap": 0,
            "MemorySwappiness": null,
            "OomKillDisable": null,
            "PidsLimit": null,
            "Ulimits": null,
            "CpuCount": 0,
            "CpuPercent": 0,
            "IOMaximumIOps": 0,
            "IOMaximumBandwidth": 0,
            "MaskedPaths": [
                "/proc/asound",
                "/proc/acpi",
                "/proc/kcore",
                "/proc/keys",
                "/proc/latency_stats",
                "/proc/timer_list",
                "/proc/timer_stats",
                "/proc/sched_debug",
                "/proc/scsi",
                "/sys/firmware"
            ],
            "ReadonlyPaths": [
                "/proc/bus",
                "/proc/fs",
                "/proc/irq",
                "/proc/sys",
                "/proc/sysrq-trigger"
            ]
        },
        "GraphDriver": {
            "Data": {
                "LowerDir":
```

```
"/var/lib/docker/overlay2/b8f594ac72f3c9a57be0645a8d5686259ff8799d341626458808d999e35fbf8f-
init/diff:/var/lib/docker/overlay2/f932b6b3764a556a570060fd607da5e9082eb6d816e3568574a6104ebc80df5e/diff",
                "MergedDir":
"/var/lib/docker/overlay2/b8f594ac72f3c9a57be0645a8d5686259ff8799d341626458808d999e35fbf8f/merged",
                "UpperDir":
"/var/lib/docker/overlay2/b8f594ac72f3c9a57be0645a8d5686259ff8799d341626458808d999e35fbf8f/diff",
                "WorkDir":
"/var/lib/docker/overlay2/b8f594ac72f3c9a57be0645a8d5686259ff8799d341626458808d999e35fbf8f/work"
            },
            "Name": "overlay2"
        },
        "Mounts": [],
        "Config": {
            "Hostname": "d838ea83033e",
            "Domainname": "",
            "User": "",
            "AttachStdin": true,
            "AttachStdout": true,
            "AttachStderr": true,
            "Tty": true,
            "OpenStdin": true,
            "StdinOnce": true,
            "Env": [
                "PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin"
            ],
            "Cmd": [
                "/bin/bash"
            ],
            "Image": "ubuntu",
            "Volumes": null,
            "WorkingDir": "",
            "Entrypoint": null,
            "OnBuild": null,
            "Labels": {
```

```
                "org.opencontainers.image.ref.name": "ubuntu",
                "org.opencontainers.image.version": "22.04"
            }
        },
        "NetworkSettings": {
            "Bridge": "",
            "SandboxID": "8896374679af4eed6bc5825722ef4f1d802910fba2d12cd87c777fad1338ebac",
            "HairpinMode": false,
            "LinkLocalIPv6Address": "",
            "LinkLocalIPv6PrefixLen": 0,
            "Ports": {},
            "SandboxKey": "/var/run/docker/netns/8896374679af",
            "SecondaryIPAddresses": null,
            "SecondaryIPv6Addresses": null,
            "EndpointID": "",
            "Gateway": "",
            "GlobalIPv6Address": "",
            "GlobalIPv6PrefixLen": 0,
            "IPAddress": "",
            "IPPrefixLen": 0,
            "IPv6Gateway": "",
            "MacAddress": "",
            "Networks": {
                "bridge": {
                    "IPAMConfig": null,
                    "Links": null,
                    "Aliases": null,
                    "NetworkID": "33b1d61a638b6114462bd420314077791ed32b132a4536ad7725420a58e11d3f",
                    "EndpointID": "",
                    "Gateway": "",
                    "IPAddress": "",
                    "IPPrefixLen": 0,
                    "IPv6Gateway": "",
                    "GlobalIPv6Address": "",
```

```
                    "GlobalIPv6PrefixLen": 0,
                    "MacAddress": "",
                    "DriverOpts": null
                }
            }
        }
    }
]
```

1.9 - Exécuter une Commande dans un Conteneur

Pour exécuter une commande spécifique dans un conteneur, passez la commande en argument :

```
root@debian11:~# docker run --rm ubuntu env
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=9b7b7547c023
HOME=/root

root@debian11:~#
```

1.10 - Injecter des Variables d'Environnement dans un Conteneur

Pour injecter une ou des variables d'environnement dans un conteneur, utilisez un fichier pré-établi :

```
root@debian11:~# vi env.list

root@debian11:~# cat env.list
EDITOR=vim
HOSTNAME=ubuntudocker
```

```
root@debian11:~# docker run --rm --env-file=env.list ubuntu env
```

```
PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin
HOSTNAME=ubuntudocker
EDITOR=vim
HOME=/root

root@debian11:~#
```

1.11 - Modifier le Nom d'Hôte d'un Conteneur

Pour modifier le nom d'hôte d'un conteneur, utilisez l'option **-h** :

```
root@debian11:~# docker run -it --rm -h ubuntudocker ubuntu

root@ubuntudocker:/# hostname
ubuntudocker

root@ubuntudocker:/# exit
exit
```

1.12 - Mapper des Ports d'un Conteneur

Démarrer un conteneur de nginx sur le port localhost 81 :

```
root@debian11:~# docker run -it -p 81:80 nginx
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
52d2b7f179e3: Pull complete
fd9f026c6310: Pull complete
055fa98b4363: Pull complete
96576293dd29: Pull complete
a7c4092be904: Pull complete
```

```
e3b6889c8954: Pull complete
da761d9a302b: Pull complete
Digest: sha256:104c7c5c54f2685f0f46f3be607ce60da7085da3eaa5ad22d3d9f01594295e9c
Status: Downloaded newer image for nginx:latest

^C

root@debian11:~#
```

Notez que c'est bloquant. Le fait d'avoir utiliser ^C a interrompu le processus du conteneur :

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS                      PORTS     NAMES
37cb0af1e97f   nginx     "/docker-entrypoint.…"   46 seconds ago   Created                               
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              5 minutes ago    Exited (0) 5 minutes ago              
ittraining
```

1.13 - Démarrer un Conteneur en mode Détaché

Démarrez maintenant le conteneur de nginx en mode détaché grâce à l'utilisation de l'option **-d** :

```
root@debian11:~# docker run -d -p 81:80 nginx
5c2fe852965f700fff2d11baff034557c4956a7cd5eb54c51967d362415a76b4

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED              STATUS                      PORTS                                   
NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   8 seconds ago        Up 6 seconds                0.0.0.0:81->80/tcp, :::81->80/tcp   priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   About a minute ago   Created                                                         
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              5 minutes ago        Exited (0) 5 minutes ago                                        
```

```
ittraining
```

1.14 - Accèder aux Services d'un Conteneur de l'Extérieur

Installez le navigateur texte **lynx** :

```
root@debian11:~# apt-get install lynx
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libopengl0 linux-headers-5.10.0-15-amd64 linux-headers-5.10.0-15-common
Use 'apt autoremove' to remove them.
The following additional packages will be installed:
  lynx-common
The following NEW packages will be installed:
  lynx lynx-common
0 upgraded, 2 newly installed, 0 to remove and 0 not upgraded.
Need to get 1,844 kB of archives.
After this operation, 5,768 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

Vérifiez que nginx répond aux requetes :

```
root@debian11:~# lynx --dump http://localhost:81
                              Welcome to nginx!

   If you see this page, the nginx web server is successfully installed
   and working. Further configuration is required.

   For online documentation and support please refer to [1]nginx.org.
   Commercial support is available at [2]nginx.com.
```

```
   Thank you for using nginx.

References

   1. http://nginx.org/
   2. http://nginx.com/

root@debian11:~#
```

1.15 - Arrêter et Démarrer un Conteneur

Arrêtez le conteneur nginx :

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED         STATUS                     PORTS
NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   2 minutes ago   Up 2 minutes               0.0.0.0:81->80/tcp,
:::81->80/tcp   priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   3 minutes ago   Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              8 minutes ago   Exited (0) 8 minutes ago
                                 ittraining
root@debian11:~# docker stop 5c2f
5c2f

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED         STATUS                     PORTS     NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   3 minutes ago   Exited (0) 5 seconds ago
priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   4 minutes ago   Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              8 minutes ago   Exited (0) 8 minutes ago             ittraining
```

Démarrez de nouveau le conteneur de nginx :

```
root@debian11:~# docker start 5c2f
5c2f

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED         STATUS                     PORTS
NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   3 minutes ago   Up 2 seconds               0.0.0.0:81->80/tcp,
:::81->80/tcp   priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   4 minutes ago   Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              9 minutes ago   Exited (0) 9 minutes ago
ittraining
```

1.16 - Utiliser des Signaux avec un Conteneur

Utilisez un signal pour tuer le processus du conteneur de nginx :

```
root@debian11:~# docker kill -s 9 5c2f
5c2f

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS                         PORTS     NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   5 minutes ago    Exited (137) 5 seconds ago
priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   6 minutes ago    Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              11 minutes ago   Exited (0) 11 minutes ago
ittraining
```

Redémarrez le conteneur :

```
root@debian11:~# docker start 5c2f
5c2f

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS                       PORTS
NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   6 minutes ago    Up 2 seconds
0.0.0.0:81->80/tcp, :::81->80/tcp   priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   7 minutes ago    Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              11 minutes ago   Exited (0) 11 minutes ago
ittraining

root@debian11:~# docker restart 5c2f
5c2f

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS                       PORTS
NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   6 minutes ago    Up 2 seconds
0.0.0.0:81->80/tcp, :::81->80/tcp   priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   7 minutes ago    Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              12 minutes ago   Exited (0) 12 minutes ago
ittraining
```

1.17 - Forcer la Suppression d'un Conteneur en cours d'Exécution

Supprimez un conteneur en cours d'exécution :

```
root@debian11:~# docker rm 5c2f
Error response from daemon: You cannot remove a running container
```

```
5c2fe852965f700fff2d11baff034557c4956a7cd5eb54c51967d362415a76b4. Stop the container before attempting removal or
force remove

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS                       PORTS
NAMES
5c2fe852965f   nginx     "/docker-entrypoint.…"   7 minutes ago    Up 58 seconds
0.0.0.0:81->80/tcp, :::81->80/tcp   priceless_yonath
37cb0af1e97f   nginx     "/docker-entrypoint.…"   8 minutes ago    Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              13 minutes ago   Exited (0) 12 minutes ago
ittraining

root@debian11:~# docker rm -f 5c2f
5c2f

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS                       PORTS     NAMES
37cb0af1e97f   nginx     "/docker-entrypoint.…"   8 minutes ago    Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              13 minutes ago   Exited (0) 13 minutes ago
ittraining
```

1.18 - Utilisation Simple d'un Volume

Créez le fichier index.html et placez-le dans le répertoire /root/www :

```
root@debian11:~# vi index.html

root@debian11:~# cat index.html
<html>
<body>
<center>Accueil du site nginx</center>
```

```
</body>
</html>

root@debian11:~# mv index.html www/

root@debian11:~#
```

Indiquez au conteneur que son répertoire **/usr/share/nginx/html/** est remplacé par le répertoire **/root/www/** de la machine hôte :

```
root@debian11:~# docker run -d -p 81:80 -v /root/www:/usr/share/nginx/html:ro nginx
5bec576b4b69b3dbd4cb58305a80d5ac94d42312b486e99dac94f82ba6541e3c

root@debian11:~# lynx --dump http://localhost:81
                           Accueil du site nginx

root@debian11:~#
```

Important - Notez ici l'utilisation de **ro** - lecture seule.

1.19 - Télécharger une image sans créer un conteneur

Téléchargez l'image de centos sans créer un conteneur :

```
root@debian11:~# docker pull centos
Using default tag: latest
latest: Pulling from library/centos
a1d0c7532777: Pull complete
Digest: sha256:a27fd8080b517143cbbbab9dfb7c8571c40d67d534bbdee55bd6c473f432b177
Status: Downloaded newer image for centos:latest
```

```
docker.io/library/centos:latest
```

Vérifiez le contenu de l'image en créant un conteneur :

```
root@debian11:~# docker run -it centos bash

[root@b45b7b136f06 /]# cat /etc/redhat-release
CentOS Linux release 8.4.2105

[root@b45b7b136f06 /]# rpm -qa | more
crypto-policies-20210209-1.gitbfb6bed.el8_3.noarch
python3-pip-wheel-9.0.3-19.el8.noarch
ncurses-base-6.1-7.20180224.el8.noarch
dnf-data-4.4.2-11.el8.noarch
dhcp-common-4.3.6-44.0.1.el8.noarch
centos-gpg-keys-8-2.el8.noarch
centos-linux-repos-8-2.el8.noarch
filesystem-3.8-3.el8.x86_64
pcre2-10.32-2.el8.x86_64
ncurses-libs-6.1-7.20180224.el8.x86_64
glibc-common-2.28-151.el8.x86_64
bash-4.4.19-14.el8.x86_64
zlib-1.2.11-17.el8.x86_64
bzip2-libs-1.0.6-26.el8.x86_64
libgpg-error-1.31-1.el8.x86_64
elfutils-libelf-0.182-3.el8.x86_64
libcom_err-1.45.6-1.el8.x86_64
libxml2-2.9.7-9.el8.x86_64
expat-2.2.5-4.el8.x86_64
libuuid-2.32.1-27.el8.x86_64
chkconfig-1.13-2.el8.x86_64
gmp-6.1.2-10.el8.x86_64
libattr-2.4.48-3.el8.x86_64
coreutils-single-8.30-8.el8.x86_64
```

```
sed-4.5-2.el8.x86_64
libcap-ng-0.7.9-5.el8.x86_64
libsmartcols-2.32.1-27.el8.x86_64
lz4-libs-1.8.3-2.el8.x86_64
file-libs-5.33-16.el8_3.1.x86_64
p11-kit-0.23.22-1.el8.x86_64
cracklib-2.9.6-15.el8.x86_64
libunistring-0.9.9-3.el8.x86_64
libassuan-2.5.1-3.el8.x86_64
keyutils-libs-1.5.10-6.el8.x86_64
libnl3-3.5.0-1.el8.x86_64
p11-kit-trust-0.23.22-1.el8.x86_64
pcre-8.42-4.el8.x86_64
systemd-libs-239-45.el8.x86_64
dbus-tools-1.12.8-12.el8.x86_64
libusbx-1.0.23-4.el8.x86_64
ca-certificates-2020.2.41-80.0.el8_2.noarch
libdb-5.3.28-40.el8.x86_64
iproute-5.9.0-4.el8.x86_64
libdb-utils-5.3.28-40.el8.x86_64
tpm2-tss-2.3.2-3.el8.x86_64
xz-5.2.4-3.el8.x86_64
ethtool-5.8-5.el8.x86_64
libsemanage-2.9-6.el8.x86_64
dbus-daemon-1.12.8-12.el8.x86_64
libfdisk-2.32.1-27.el8.x86_64
mpfr-3.1.6-1.el8.x86_64
gnutls-3.6.14-7.el8_3.x86_64
snappy-1.1.8-3.el8.x86_64
libmetalink-0.1.3-7.el8.x86_64
libksba-1.3.5-7.el8.x86_64
ipcalc-0.2.4-4.el8.x86_64
libseccomp-2.5.1-1.el8.x86_64
gawk-4.2.1-2.el8.x86_64
```

```
--More--
[q]
[root@b45b7b136f06 /]#
```

1.20 - S'attacher à un conteneur en cours d'exécution

Arretez le conteneur. Démarrez le conteneur puis rattachez-vous au conteneur :

```
[root@b45b7b136f06 /]# exit
exit

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED          STATUS                       PORTS
NAMES
b45b7b136f06   centos    "bash"                   3 minutes ago    Exited (0) 8 seconds ago
quizzical_cray
5bec576b4b69   nginx     "/docker-entrypoint.…"   4 minutes ago    Up 4 minutes
0.0.0.0:81->80/tcp, :::81->80/tcp   elegant_shockley
37cb0af1e97f   nginx     "/docker-entrypoint.…"   27 minutes ago   Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              32 minutes ago   Exited (0) 31 minutes ago
ittraining

root@debian11:~# docker start b45b
b45b

root@debian11:~# docker attach b45b

[root@b45b7b136f06 /]# ls
bin  dev  etc  home  lib  lib64  lost+found  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var

[root@b45b7b136f06 /]#
```

1.21 - Installer un logiciel dans le conteneur

Réparez les dépôts de CentOS 8 :

```
[root@b45b7b136f06 /]# sed -i 's/mirrorlist/#mirrorlist/g' /etc/yum.repos.d/CentOS-Linux-*

[root@b45b7b136f06 /]# sed -i 's|#baseurl=http://mirror.centos.org|baseurl=http://vault.centos.org|g'
/etc/yum.repos.d/CentOS-Linux-*

[root@b45b7b136f06 /]# yum upgrade -y
...
```

Créez le fichier **/etc/yum.repos.d/mongodb-org-4.2.repo** :

```
[root@b45b7b136f06 /]# vi /etc/yum.repos.d/mongodb-org-4.2.repo

[root@b45b7b136f06 /]# cat /etc/yum.repos.d/mongodb-org-4.2.repo
[mongodb-org-4.2]
name=MongoDB Repository
baseurl=https://repo.mongodb.org/yum/redhat/$releasever/mongodb-org/4.2/x86_64/
gpgcheck=1
enabled=1
gpgkey=https://www.mongodb.org/static/pgp/server-4.2.as[mongodb-org-4.2]
name=MongoDB Repository
baseurl=https://repo.mongodb.org/yum/redhat/$releasever/mongodb-org/4.2/x86_64/
gpgcheck=1
enabled=1
gpgkey=https://www.mongodb.org/static/pgp/server-4.2.asc
```

Installez mongo :

```
[root@b45b7b136f06 /]# yum install -y mongodb-org
...
```

Démarrez mongod :

```
[root@b45b7b136f06 /]# mongod --config /etc/mongod.conf &
[1] 440

[root@b45b7b136f06 /]# about to fork child process, waiting until server is ready for connections.
forked process: 442
[Enter] <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  Appuyer sur la touche Entrée
[root@b45b7b136f06 /]# child process started successfully, parent exiting
[Enter] <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  Appuyer sur la touche Entrée
[1]+  Done                    mongod --config /etc/mongod.conf
```

Vérifiez que mongod est démarré :

```
[root@b45b7b136f06 /]# ps aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0  12156  3324 pts/0    Ss   12:20   0:00 bash
root         442  0.5  0.6 1525168 111704 ?      Sl   13:53   0:00 mongod --config /etc/mongod.conf
root         475  0.0  0.0  47604  3668 pts/0    R+   13:55   0:00 ps aux
```

Utilisez le client mongo pour se connecter au serveur :

```
[root@b45b7b136f06 /]# mongo
MongoDB shell version v4.2.24
connecting to: mongodb://127.0.0.1:27017/?compressors=disabled&gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("b864990d-ab42-45cc-b9e3-0935f566a41a") }
MongoDB server version: 4.2.24
Welcome to the MongoDB shell.
For interactive help, type "help".
For more comprehensive documentation, see
        https://docs.mongodb.com/
Questions? Try the MongoDB Developer Community Forums
        https://community.mongodb.com
Server has startup warnings:
```

```
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten]
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the
database.
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten] **          Read and write access to data and
configuration is unrestricted.
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten] ** WARNING: You are running this process as the root
user, which is not recommended.
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten]
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten]
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten] ** WARNING: /sys/kernel/mm/transparent_hugepage/enabled
is 'always'.
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten] **        We suggest setting it to 'never'
2023-08-19T13:53:35.327+0000 I  CONTROL  [initandlisten]
---
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---

>
```

Sortez de mongo et du conteneur :

```
> exit
bye
[root@b45b7b136f06 /]# exit
exit
```

```
root@debian11:~#
```

1.22 - Utilisation de la commande docker commit

Créez maintenant une nouvelle image à partir de votre conteneur :

```
root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED       STATUS                       PORTS
NAMES
b45b7b136f06   centos    "bash"                   2 hours ago   Exited (0) 31 seconds ago
quizzical_cray
5bec576b4b69   nginx     "/docker-entrypoint.…"   2 hours ago   Up 2 hours                   0.0.0.0:81->80/tcp,
:::81->80/tcp   elegant_shockley
37cb0af1e97f   nginx     "/docker-entrypoint.…"   2 hours ago   Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              2 hours ago   Exited (0) 2 hours ago
ittraining

root@debian11:~# docker commit b45b ittraining/mongodb
sha256:0ebd6759e69e3c345087dea3c9743a9d0fad81ca750842f1ff0004cbffabd8ae

root@debian11:~#
```

Supprimez le conteneur utilisé pour créer l'image :

```
root@debian11:~# docker rm b45b
b45b

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED       STATUS                   PORTS
NAMES
5bec576b4b69   nginx     "/docker-entrypoint.…"   2 hours ago   Up 2 hours               0.0.0.0:81->80/tcp,
:::81->80/tcp   elegant_shockley
```

```
37cb0af1e97f   nginx     "/docker-entrypoint.…"   2 hours ago   Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              2 hours ago   Exited (0) 2 hours ago
ittraining
```

Utilisez la nouvelle image pour lancer un conteneur nommé **mongo** :

```
root@debian11:~# docker run -it --name mongo ittraining/mongodb

[root@0c597fe7b628 /]# ls  /usr/bin/mongo*
/usr/bin/mongo  /usr/bin/mongod  /usr/bin/mongodump  /usr/bin/mongoexport  /usr/bin/mongofiles
/usr/bin/mongoimport  /usr/bin/mongorestore  /usr/bin/mongos  /usr/bin/mongostat  /usr/bin/mongotop

[root@0c597fe7b628 /]# ps aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0  15100  3704 pts/0    Ss   14:01   0:00 bash
root          18  0.0  0.0  47604  3696 pts/0    R+   14:01   0:00 ps aux
```

Editez le fichier /etc/bashrc :

```
[root@0c597fe7b628 /]# echo "/usr/bin/mongod --config /etc/mongod.conf &" >> /etc/bashrc

[root@0c597fe7b628 /]# tail /etc/bashrc
        fi
    done

    unset i
    unset -f pathmunge
  fi

fi
# vim:ts=4:sw=4
/usr/bin/mongod --config /etc/mongod.conf &
```

```
[root@0c597fe7b628 /]#
```

Consultez la liste des conteneurs et relevez le CONTAINER ID du conteneur **mongo** :

```
[root@0c597fe7b628 /]# exit
exit

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE                COMMAND                  CREATED              STATUS
PORTS                                NAMES
0c597fe7b628   ittraining/mongodb   "bash"                   About a minute ago   Exited (0) 7 seconds ago
mongo
5bec576b4b69   nginx                "/docker-entrypoint.…"   2 hours ago          Up 2 hours
0.0.0.0:81->80/tcp, :::81->80/tcp   elegant_shockley
37cb0af1e97f   nginx                "/docker-entrypoint.…"   2 hours ago          Created
intelligent_fermi
d838ea83033e   ubuntu               "/bin/bash"              2 hours ago          Exited (0) 2 hours ago
ittraining

root@debian11:~#
```

Utilisez la commande commit pour “sauvegarder” la modification dans l'image :

```
root@debian11:~# docker commit 0c59 ittraining/mongodb
sha256:3daa95515db6c3f1bd7e30a29c52d3bd5ea14207c05d9401bc2da91d54adbb3f
```

Démarrez de nouveau le conteneur pour vérifier que mongod fonctionne :

```
root@debian11:~# docker rm 0c59
0c59

root@debian11:~# docker ps -a
CONTAINER ID   IMAGE     COMMAND                  CREATED       STATUS                     PORTS
NAMES
```

```
5bec576b4b69   nginx     "/docker-entrypoint.…"   2 hours ago   Up 2 hours              0.0.0.0:81->80/tcp,
:::81->80/tcp   elegant_shockley
37cb0af1e97f   nginx     "/docker-entrypoint.…"   2 hours ago   Created
intelligent_fermi
d838ea83033e   ubuntu    "/bin/bash"              2 hours ago   Exited (0) 2 hours ago
ittraining

root@debian11:~# docker run -it --name mongo ittraining/mongodb
about to fork child process, waiting until server is ready for connections.
forked process: 19
[root@4e8fc8b07afe /]# child process started successfully, parent exiting
[Enter] <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  Appuyer sur la touche Entrée
[1]+  Done                    /usr/bin/mongod --config /etc/mongod.conf

[root@4e8fc8b07afe /]# ps aux
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0  14980  3592 pts/0    Ss   14:05   0:00 bash
root          19  3.5  0.6 1534072 105260 ?      Sl   14:05   0:00 /usr/bin/mongod --config /etc/mongod.conf
root          56  0.0  0.0  47604  3672 pts/0    R+   14:05   0:00 ps aux

[root@4e8fc8b07afe /]#
```

1.23 - Se connecter au serveur du conteneur de l'extérieur

Pour pouvoir se connecter à mongodb depuis la machine hôte, il convient d'éditer le fichier /etc/mongod.conf :

```
[root@4e8fc8b07afe /]# vi /etc/mongod.conf

[root@4e8fc8b07afe /]# cat /etc/mongod.conf | grep bindIp
  bindIp: 0.0.0.0  # Enter 0.0.0.0,:: to bind to all IPv4 and IPv6 addresses or, alternatively, use the
net.bindIpAll setting.
```

Sortez du conteneur, re-créez une image, supprimez le conteneur utilisé et relancez de nouveau le conteneur :

```
[root@4e8fc8b07afe /]# exit
exit

root@debian11:~# docker commit mongo ittraining/mongodb
sha256:eaf8432e4d74fbc4c1f805279fc7d62cb927c5c60010f1ef33f099cc483a9471

root@debian11:~# docker rm mongo
mongo

root@debian11:~# docker run -it --name mongo ittraining/mongodb
about to fork child process, waiting until server is ready for connections.
forked process: 19
[root@e2ace1b2a6a2 /]# child process started successfully, parent exiting
[Enter] <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  Appuyer sur la touche Entrée
[1]+  Done                    /usr/bin/mongod --config /etc/mongod.conf

[root@e2ace1b2a6a2 /]#
```

Dans votre machine hôte, configurez le dépôt de mongodb :

```
[root@e2ace1b2a6a2 /]# exit
exit
root@debian11:~#

root@debian11:~# apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv
9DA31620334BD75D9DCB49F368818C72E52529D4
Warning: apt-key is deprecated. Manage keyring files in trusted.gpg.d instead (see apt-key(8)).
Executing: /tmp/apt-key-gpghome.f5dbDP3oUn/gpg.1.sh --keyserver hkp://keyserver.ubuntu.com:80 --recv
9DA31620334BD75D9DCB49F368818C72E52529D4
gpg: key 68818C72E52529D4: public key "MongoDB 4.0 Release Signing Key <packaging@mongodb.com>" imported
gpg: Total number processed: 1
gpg:               imported: 1

root@debian11:~# echo "deb [trusted=yes] http://repo.mongodb.org/apt/debian stretch/mongodb-org/4.0 main" | tee
```

```
/etc/apt/sources.list.d/mongodb-org-4.0.list
deb [trusted=yes] http://repo.mongodb.org/apt/debian stretch/mongodb-org/4.0 main

root@debian11:~# apt-get update
...
```

Cette fois, installez uniquement le client de mongodb :

```
root@debian11:~# apt-get install mongodb-org-shell
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libopengl0 linux-headers-5.10.0-15-amd64 linux-headers-5.10.0-15-common
Use 'apt autoremove' to remove them.
The following NEW packages will be installed:
  mongodb-org-shell
0 upgraded, 1 newly installed, 0 to remove and 5 not upgraded.
Need to get 9,970 kB of archives.
After this operation, 40.3 MB of additional disk space will be used.
Get:1 http://repo.mongodb.org/apt/debian stretch/mongodb-org/4.0/main amd64 mongodb-org-shell amd64 4.0.28 [9,970
kB]
Fetched 9,970 kB in 1s (10.8 MB/s)
Selecting previously unselected package mongodb-org-shell.
(Reading database ... 166761 files and directories currently installed.)
Preparing to unpack .../mongodb-org-shell_4.0.28_amd64.deb ...
Unpacking mongodb-org-shell (4.0.28) ...
Setting up mongodb-org-shell (4.0.28) ...
Processing triggers for man-db (2.9.4-2) ...
```

Notez qu'à ce stade le conteneur ne possède pas d'adresse IP car il n'est pas démarré :

```
root@debian11:~# docker inspect mongo | grep IP
            "LinkLocalIPv6Address": "",
```

```
            "LinkLocalIPv6PrefixLen": 0,
            "SecondaryIPAddresses": null,
            "SecondaryIPv6Addresses": null,
            "GlobalIPv6Address": "",
            "GlobalIPv6PrefixLen": 0,
            "IPAddress": "",
            "IPPrefixLen": 0,
            "IPv6Gateway": "",
                    "IPAMConfig": null,
                    "IPAddress": "",
                    "IPPrefixLen": 0,
                    "IPv6Gateway": "",
                    "GlobalIPv6Address": "",
                    "GlobalIPv6PrefixLen": 0,
```

Démarrez donc le conteneur et cherchez l'adresse IP de celui-ci :

```
root@debian11:~# docker start mongo
mongo

root@debian11:~# docker inspect mongo | grep IP
            "LinkLocalIPv6Address": "",
            "LinkLocalIPv6PrefixLen": 0,
            "SecondaryIPAddresses": null,
            "SecondaryIPv6Addresses": null,
            "GlobalIPv6Address": "",
            "GlobalIPv6PrefixLen": 0,
            "IPAddress": "172.17.0.3",
            "IPPrefixLen": 16,
            "IPv6Gateway": "",
                    "IPAMConfig": null,
                    "IPAddress": "172.17.0.3",
                    "IPPrefixLen": 16,
                    "IPv6Gateway": "",
```

```
                    "GlobalIPv6Address": "",
                    "GlobalIPv6PrefixLen": 0,

root@debian11:~#
```

Connectez-vous maintenant à votre mongodb à partir de la machine hôte :

```
root@debian11:~# mongo --host 172.17.0.3
MongoDB shell version v4.0.28
connecting to: mongodb://172.17.0.3:27017/?gssapiServiceName=mongodb
Implicit session: session { "id" : UUID("c1fadd17-a76c-4ca2-aa0e-b06498c55ba5") }
MongoDB server version: 4.2.24
WARNING: shell and server versions do not match
Welcome to the MongoDB shell.
For interactive help, type "help".
For more comprehensive documentation, see
        http://docs.mongodb.org/
Questions? Try the support group
        http://groups.google.com/group/mongodb-user
Server has startup warnings:
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten]
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten] ** WARNING: Access control is not enabled for the
database.
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten] **          Read and write access to data and
configuration is unrestricted.
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten] ** WARNING: You are running this process as the root
user, which is not recommended.
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten]
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten]
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten] ** WARNING: /sys/kernel/mm/transparent_hugepage/enabled
is 'always'.
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten] **        We suggest setting it to 'never'
2023-08-19T14:43:49.070+0000 I  CONTROL  [initandlisten]
---
```

```
Enable MongoDB's free cloud-based monitoring service, which will then receive and display
metrics about your deployment (disk utilization, CPU, operation statistics, etc).

The monitoring data will be available on a MongoDB website with a unique URL accessible to you
and anyone you share the URL with. MongoDB may use this information to make product
improvements and to suggest MongoDB products and deployment options to you.

To enable free monitoring, run the following command: db.enableFreeMonitoring()
To permanently disable this reminder, run the following command: db.disableFreeMonitoring()
---

> exit
bye
root@debian11:~#
```
