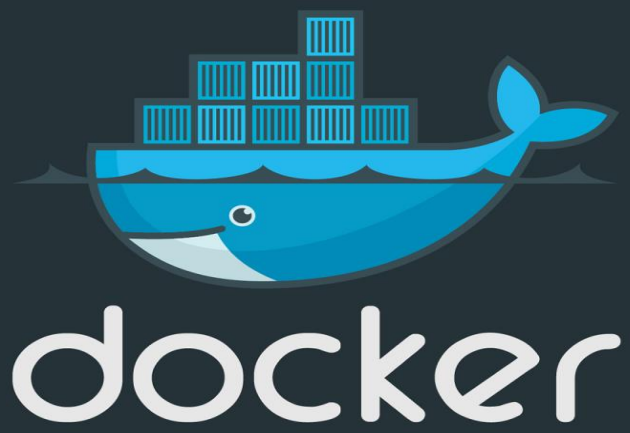
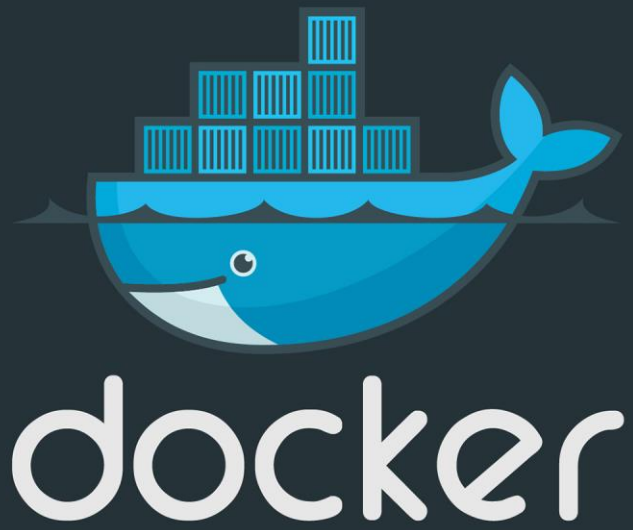


EXPLOITER LES CONTENEURS AVEC DOCKER

Pratique

Presenté par
ELJ Adel Architect JEE / Spring / Cloud / Devops

03/2020



SOMMAIRE J1

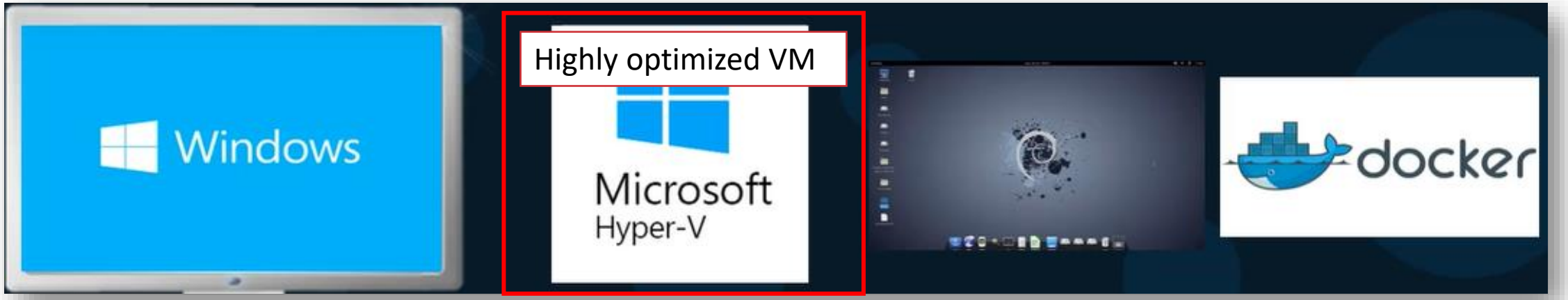
- Installation / Configuration
  - Windows
  - Linux
- Commandes simples
- docker run

INSTALLATION / CONFIGURATION

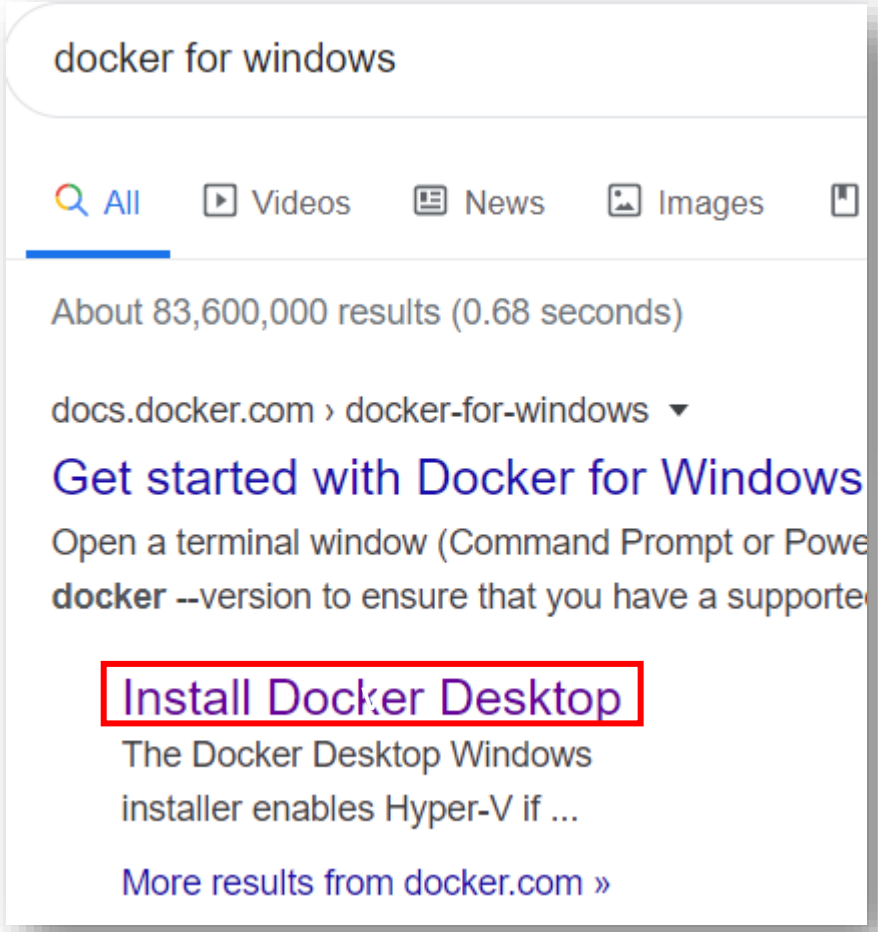
installation Docker pour Windows

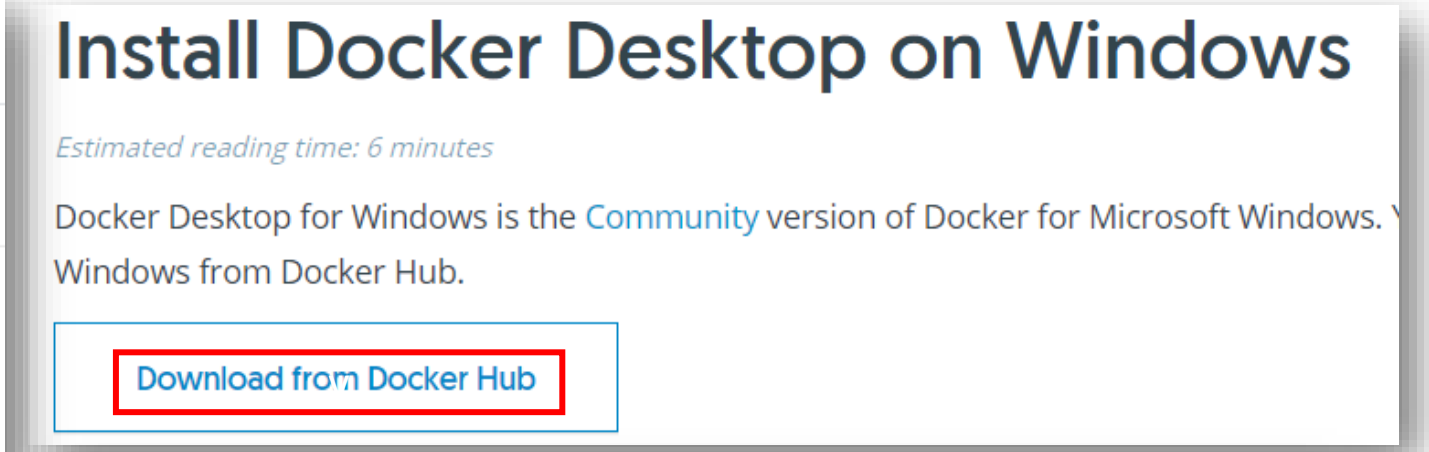
Docker ToolBox pour Windows < 10 pro

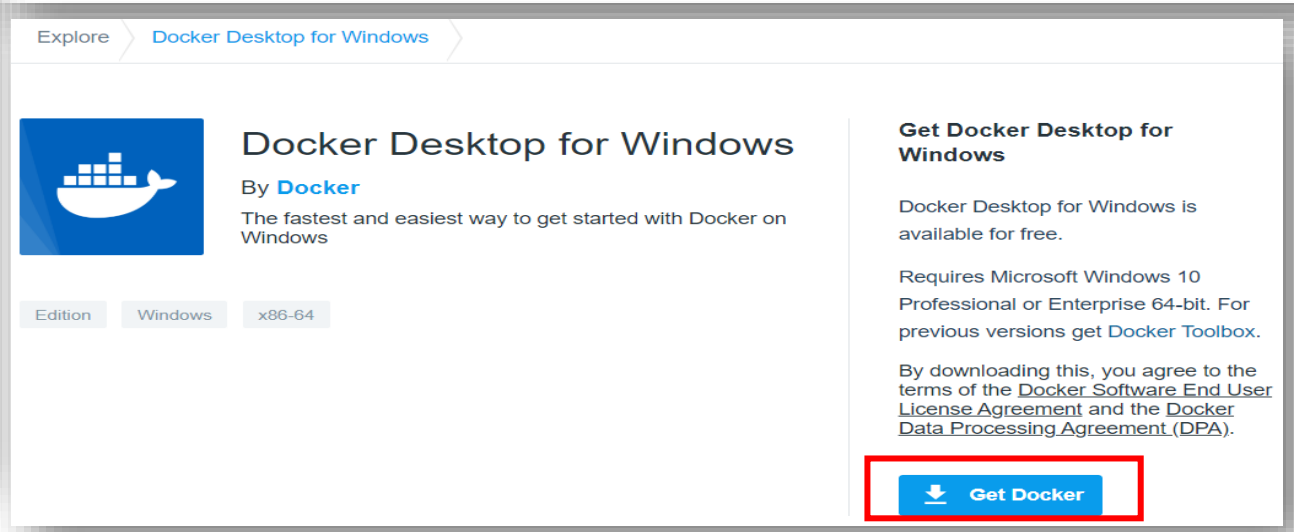
Docker Desktop pour Windows 10 pro



installation Docker Desktop pour Windows 10 Pro

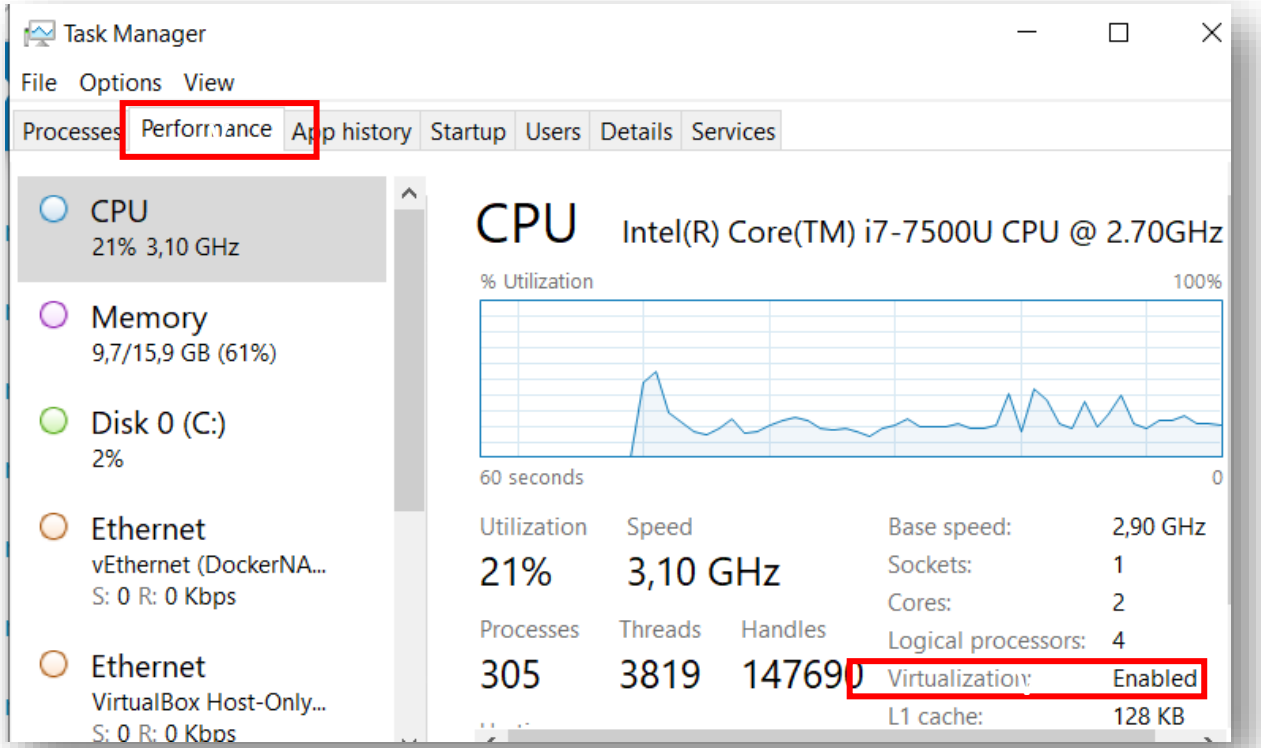


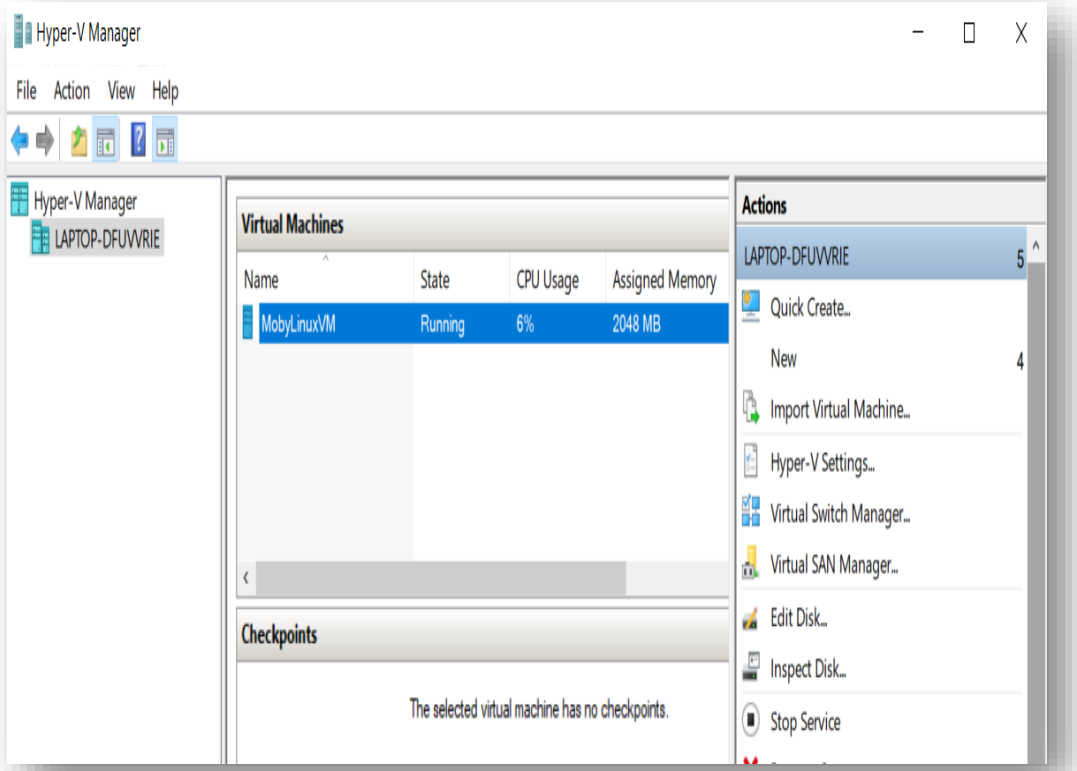


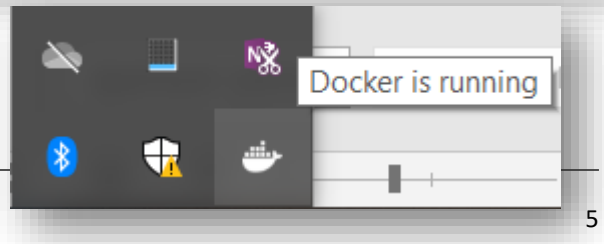


installation Docker Desktop pour Windows 10 Pro

Si problème voir : https://docs.docker.com/docker-for-windows/troubleshoot/#virtualization-must-be-enabled







Vérification installation / config

$ docker --version

```
C:\Users\adelelj>docker --version
Docker version 18.06.1-ce, build e68fc7a
```

$ docker info

```
C:\Users\adelelj>docker info
Containers: 88
 Running: 36
 Paused: 0
 Stopped: 52
Images: 35
Server Version: 18.06.1-ce
```

```
Operating System: Docker for Windows
OSType: linux
Architecture: x86_64
CPUs: 2
Total Memory: 1.952GiB
Name: linuxkit-00155d00c101
```

Vérification installation / config

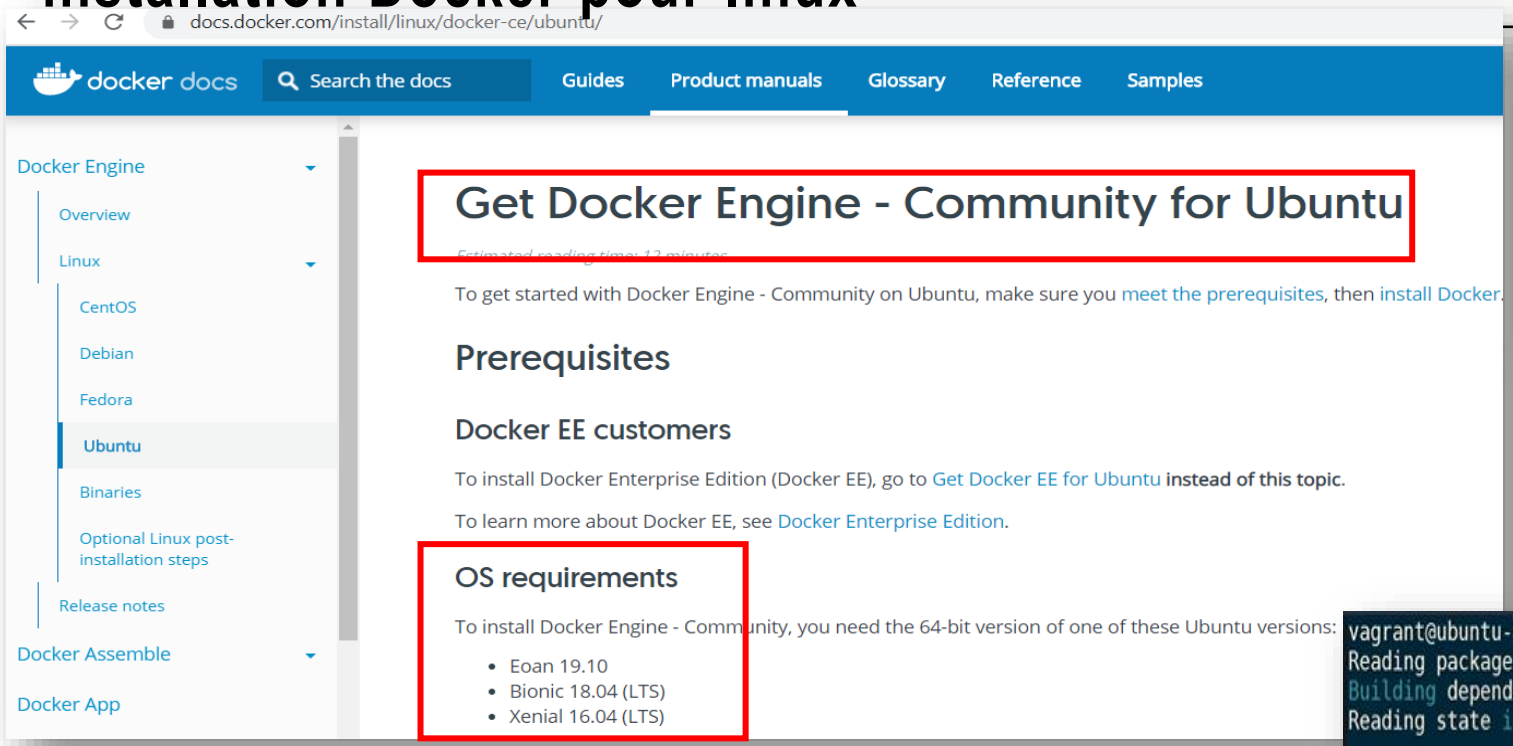
$ docker pull hello-world

```
Using default tag: latest
latest: Pulling from library/hello-world
Digest: sha256:fc6a51919cfeb2e6763f62b6d9e8815acbf7cd2e476ea353743570610737b752
Status: Image is up to date for hello-world:latest
```

$ docker run hello-world

```
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/
```

installation Docker pour linux




```
vagrant@ubuntu-bionic:~$ cat /etc/*release*
DISTRIB_ID=Ubuntu
DISTRIB_RELEASE=18.04
DISTRIB_CODENAME=bionic
DISTRIB_DESCRIPTION="Ubuntu 18.04.2 LTS"
NAME="Ubuntu"
VERSION="18.04.2 LTS (Bionic Beaver)"
ID=ubuntu
```

Uninstall old versions

Older versions of Docker were called `docker`, `docker.io`, or `docker-engine`.

```
$ sudo apt-get remove docker docker-engine docker.io containerd runc
```

```
vagrant@ubuntu-bionic:~$ sudo apt-get remove docker docker-engine docker.io containerd runc
Reading package lists... Done
Building dependency tree
Reading state information... Done

No apt package "docker", but there is a snap with that name.
Try "snap install docker"

E: Unable to locate package docker
E: Unable to locate package docker-engine
E: Unable to locate package docker.io
E: Couldn't find any package by glob 'docker.io'
E: Couldn't find any package by regex 'docker.io'
E: Unable to locate package containerd
E: Unable to locate package runc
```

installation Docker pour linux

Install using the convenience script

Docker provides convenience scripts at get.docker.com and te
Engine - Community into development environments quickly a
`docker-install` repository. **Using these scripts is not recomm**
the potential risks before you use them:

- The scripts require `root` or `sudo` privileges to run. Th
running them.
- The scripts attempt to detect your Linux distribution anc
In addition, the scripts do not allow you to customize an
configuration, either from Docker's point of view or from
- The scripts install all dependencies and recommendatio
may install a large number of packages, depending on th
- The script does not provide options to specify which ver
released in the "edge" channel.
- Do not use the convenience script if Docker has already

This example uses the script at get.docker.com to install the la
latest testing version, use test.docker.com instead. In each of t

> **Warning:**
>
> Always examine scripts downloaded from the internet bef

```
$ curl -fsSL https://get.docker.com -o get-docker.sh
$ sudo sh get-docker.sh
```

```
vagrant@ubuntu-bionic:~$ curl -fsSL https://get.docker.com -o get-docker.sh
vagrant@ubuntu-bionic:~$
vagrant@ubuntu-bionic:~$
vagrant@ubuntu-bionic:~$ ls
get-docker.sh
vagrant@ubuntu-bionic:~$
vagrant@ubuntu-bionic:~$
vagrant@ubuntu-bionic:~$ sudo sh get-docker.sh
# Executing docker install script, commit: 6bf300318ebaab958c4adc341a8c7bb9f3a54a1a
+ sh -c apt-get update -qq >/dev/null
+ sh -c apt-get install -y -qq apt-transport-https ca-certificates curl >/dev/null
+ sh -c curl -fsSL "https://download.docker.com/linux/ubuntu/gpg" | apt-key add -qq - >/dev/null
```

```
vagrant@ubuntu-bionic:~$ sudo docker version
Client: Docker Engine - Community
 Version:           19.03.1
 API version:       1.40
 Go version:        go1.12.5
 Git commit:        74b1e89
 Built:             Thu Jul 25 21:21:05 2019
 OS/Arch:           linux/amd64
 Experimental:      false
```

How to use this image

```
$ docker run docker/whalesay cowsay boo
```

hub.docker.com/search?q=whalesay&type=image

Try the two-

docker hub

whalesay

DOCKER EE

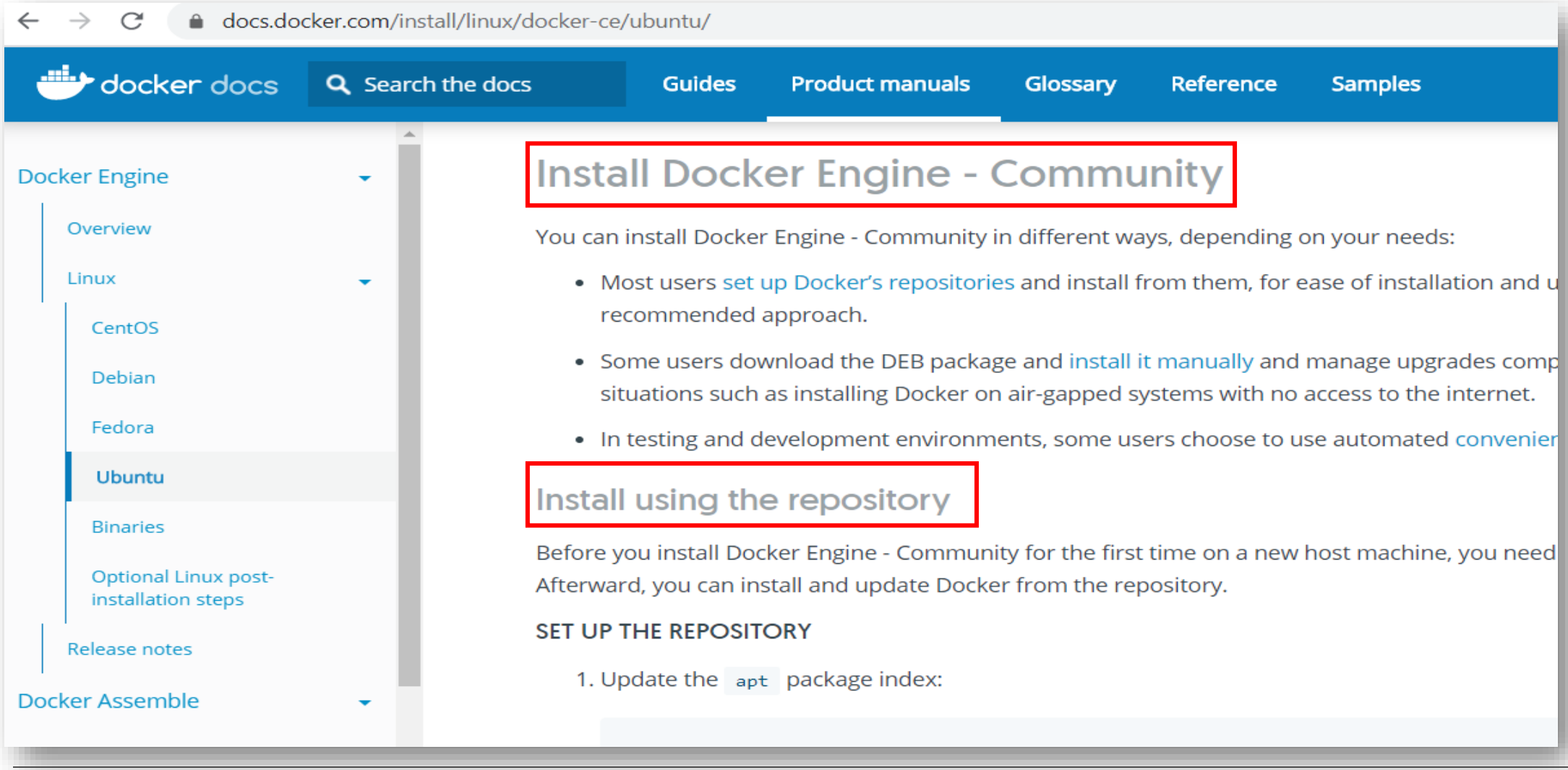
Community (1646)

docker/**whalesay**

ox0spy/**whalesay**-fortune

```
$ sudo docker run docker/whalesay cowsay Hello-World!
```

installation Docker pour linux



COMMANDES SIMPLES

docker run

```
$ docker run nginx
```

```
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
bc51dd8edc1b: Pull complete
66ba67045f57: Pull complete
bf317aa10aa5: Pull complete
Digest: sha256:ad5552c786f128e389a0263104ae39f3d3c7895579d45ae716f528185b36bc6f
Status: Downloaded newer image for nginx:latest
```

```
$ docker run redis
```

```
Unable to find image 'redis:latest' locally
latest: Pulling from library/redis
bc51dd8edc1b: Already exists
37d80eb324ee: Pull complete
392b7748dfaf: Pull complete
48df82c3534d: Pull complete
2ec2bb0b4b0e: Pull complete
1302bce0b2cb: Pull complete
Digest: sha256:7b84b346c01e5a8d204a5bb30d4521bcc3a8535bbf90c660b8595fad248eae82
Status: Downloaded newer image for redis:latest
1:C 25 Feb 2020 20:55:13.871 # oO0OoO0OoO0Oo Redis is starting oO0OoO0OoO0Oo
1:C 25 Feb 2020 20:55:13.871 # Redis version=5.0.7, bits=64, commit=00000000, modified=0, pid=1, just started
1:C 25 Feb 2020 20:55:13.871 # Warning: no config file specified, using the default config. In order to specify a config file use redis-server /path/to/redis.
conf
1:M 25 Feb 2020 20:55:13.873 * Running mode=standalone, port=6379.
1:M 25 Feb 2020 20:55:13.873 # WARNING: The TCP backlog setting of 511 cannot be enforced because /proc/sys/net/core/somaxconn is set to the lower value of 12
8.
1:M 25 Feb 2020 20:55:13.873 # Server initialized
1:M 25 Feb 2020 20:55:13.873 # WARNING you have Transparent Huge Pages (THP) support enabled in your kernel. This will create latency and memory usage issues
with Redis. To fix this issue run the command 'echo never > /sys/kernel/mm/transparent_hugepage/enabled' as root, and add it to your /etc/rc.local in order to
 retain the setting after a reboot. Redis must be restarted after THP is disabled.
```

ps – list containers

```
$ docker ps
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS               NAMES
59402985aedd        redis               "docker-entrypoint.s…"   About a minute ago  Up About a minute   6379/tcp            sharp_davinci
d46d396f1b48        nginx               "nginx -g 'daemon of…"   7 minutes ago       Up 7 minutes        80/tcp              sharp_curie
```

```
$ docker run ubuntu
```

```
$ docker ps
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS               NAMES
59402985aedd        redis               "docker-entrypoint.s…"   12 minutes ago      Up 12 minutes       6379/tcp            sharp_davinci
d46d396f1b48        nginx               "nginx -g 'daemon of…"   18 minutes ago      Up 18 minutes       80/tcp              sharp_curie
```

```
$ docker ps -a
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS                      PORTS               NAMES
bb0a8daedd1b        ubuntu              "/bin/bash"              7 minutes ago       Exited (0) 7 minutes ago                        determined_hawking
59402985aedd        redis               "docker-entrypoint.s…"   13 minutes ago      Up 13 minutes               6379/tcp            sharp_davinci
d46d396f1b48        nginx               "nginx -g 'daemon of…"   19 minutes ago      Up 19 minutes               80/tcp              sharp_curie
```

Option -it

$ docker run –name ubuntu-sans-it ubuntu

Le contenaire est inaccessible et en état inactif vu que la CMD dans l'image est "CMD bin/bash". Cette commande n'associe pas des STDIN/STDOUT aux canaux d'E/S du contenaire.

Pour pouvoir y accéder, il faut utiliser l'option -it qui établie cette association
(plus de detail après dans le cour)

$ docker ps -a

```
C:\Users\adelelj>docker ps -a
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS                      PORTS               NAMES
fadd7ee1af13        ubuntu              "/bin/bash"         6 seconds ago       Exited (0) 5 seconds ago                        ubuntu-sans-it
```

*$ docker run –name ubuntu-avec-it **-it** ubuntu*

```
C:\Users\adelelj>docker run --name ubuntu-avec-it -it ubuntu
root@e74e7f81e530:/# ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt
```

STOP – stoper un container

```
$ docker ps
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS               NAMES
59402985aedd        redis               "docker-entrypoint.s…"   14 minutes ago      Up 14 minutes       6379/tcp            sharp_davinci
d46d396f1b48        nginx               "nginx -g 'daemon of…"   20 minutes ago      Up 20 minutes       80/tcp              sharp_curie
```

```
$ docker stop sharp_davinci
```

```
sharp_davinci
```

```
$ docker ps
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS              PORTS               NAMES
d46d396f1b48        nginx               "nginx -g 'daemon of…"   23 minutes ago      Up 23 minutes       80/tcp              sharp_curie
```

```
$ docker ps -a
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS                      PORTS               NAMES
bb0a8daedd1b        ubuntu              "/bin/bash"              12 minutes ago      Exited (0) 12 minutes ago                       determined_hawking
59402985aedd        redis               "docker-entrypoint.s…"   19 minutes ago      Exited (0) 2 minutes ago                        sharp_davinci
d46d396f1b48        nginx               "nginx -g 'daemon of…"   25 minutes ago      Up 24 minutes               80/tcp              sharp_curie
```

Rm – supprimer (Remove) un container

```
$ docker ps -a
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS                      PORTS               NAMES
bb0a8daedd1b        ubuntu              "/bin/bash"              45 minutes ago      Exited (0) 45 minutes ago                       determined_hawking
59402985aedd        redis               "docker-entrypoint.s…"   About an hour ago   Exited (0) 34 minutes ago                       sharp_davinci
d46d396f1b48        nginx               "nginx -g 'daemon of…"   About an hour ago   Up About an hour            80/tcp              sharp_curie
```

```
$ docker rm sharp_davinci
```

```
sharp_davinci
```

```
$ docker ps -a
```

```
CONTAINER ID        IMAGE               COMMAND                  CREATED             STATUS                      PORTS               NAMES
bb0a8daedd1b        ubuntu              "/bin/bash"              About an hour ago   Exited (0) About an hour ago                    determined_hawking
d46d396f1b48        nginx               "nginx -g 'daemon of…"   About an hour ago   Up About an hour            80/tcp              sharp_curie
```

images – List images

```
$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
nginx	latest	2073e0bcb60e	3 weeks ago	127MB
redis	latest	44d36d2c2374	3 weeks ago	98.2MB
aelj/bonjourdocker	1.0	9174da1b2242	4 weeks ago	189MB
ubuntu	18.04	ccc6e87d482b	5 weeks ago	64.2MB
ubuntu	latest	ccc6e87d482b	5 weeks ago	64.2MB
alpine	3.5	f80194ae2e0c	13 months ago	4MB
hello-world	latest	fce289e99eb9	14 months ago	1.84kB
docker/kube-compose-controller	v0.3.9	16260a912a7b	20 months ago	29.9MB
docker/kube-compose-api-server	v0.3.9	8757267f7b06	20 months ago	42.5MB
k8s.gcr.io/kube-proxy-amd64	v1.10.3	4261d315109d	21 months ago	97.1MB
k8s.gcr.io/kube-scheduler-amd64	v1.10.3	353b8f1d102e	21 months ago	50.4MB

rmi – Remove images

```
$ docker rmi redis
```

```
Untagged: redis:latest
Untagged: redis@sha256:7b84b346c01e5a8d204a5bb30d4521bcc3a8535bbf90c660b8595fad248eae82
Deleted: sha256:44d36d2c2374b240abcf5da2130abf49938b8fb49446df6eec028718520332ef
Deleted: sha256:98085db137f7660420590b6a2cbf6214835a5ce192baa72c733de82302d717e4
Deleted: sha256:fb9fc76ceac433a87846595e2a45a3cca3e1dc281f9fc3e64c939e6fb7b440a1
Deleted: sha256:a89092719dcd0771b5e1c434f0cceaa803852a5d2f3eac5522301ad5a00f5a10
Deleted: sha256:f4cdcef89dce64d58cfb9a0cb544e5ada843c8b6d90d92f625675f1960e46d7b
Deleted: sha256:31a81e216e79c54ea97523674895bf12d76e1b8cbb20e2ca1ced60925744a161
```

```
$ docker images
```

REPOSITORY	TAG	IMAGE ID	CREATED	SIZE
nginx	latest	2073e0bcb60e	3 weeks ago	127MB
aelj/bonjourdocker	1.0	9174da1b2242	4 weeks ago	189MB
ubuntu	18.04	ccc6e87d482b	5 weeks ago	64.2MB
ubuntu	latest	ccc6e87d482b	5 weeks ago	64.2MB
alpine	3.5	f80194ae2e0c	13 months ago	4MB
hello-world	latest	fce289e99eb9	14 months ago	1.84kB
docker/kube-compose-controller	v0.3.9	16260a912a7b	20 months ago	29.9MB
docker/kube-compose-api-server	v0.3.9	8757267f7b06	20 months ago	42.5MB
k8s.gcr.io/kube-proxy-amd64	v1.10.3	4261d315109d	21 months ago	97.1MB
k8s.gcr.io/kube-controller-manager-amd64	v1.10.3	40c8d10b2d11	21 months ago	148MB
k8s.gcr.io/kube-apiserver-amd64	v1.10.3	e03746fe22c3	21 months ago	225MB

Pull – télécharger une image (toupdate)

$ docker run nginx

```
Unable to find image 'nginx:latest' locally
latest: Pulling from library/nginx
fc7181108d40: Already exists
d2e987ca2267: Pull complete
0b760b431b11: Pull complete
Digest:
sha256:96fb261b66270b900ea5a2c17a26abbfabe95506e73c3a3c65869a6dbe83223a
Status: Downloaded newer image for nginx:latest
```

$ docker pull nginx

```
Using default tag: latest
latest: Pulling from library/nginx
fc7181108d40: Pull complete
d2e987ca2267: Pull complete
0b760b431b11: Pull complete
Digest:
sha256:96fb261b66270b900ea5a2c17a26abbfabe95506e73c3a3c65869a6dbe83223a
Status: Downloaded newer image for nginx:latest
```

Ajouter une commande

```
$ docker run ubuntu sleep 5
```

```
$ docker ps -a
```

```
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS                      PORTS               NAMES
5f40387da806        ubuntu              "sleep 5"           9 seconds ago       Exited (0) 3 seconds ago                        elastic_banach
f2b198773c7d        ubuntu              "/bin/bash"         32 minutes ago      Exited (0) 32 minutes ago                       kind_noether
```

Run – attach and detach

```
$ docker run -d --name topdemo ubuntu /usr/bin/top -b
```

```
$ docker ps
```

```
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
306d207d6dfb        ubuntu              "/usr/bin/top -b"   21 seconds ago      Up 20 seconds                           topdemo
```

```
$ docker attach topdemo
```

```
top - 15:01:59 up 15:56,  0 users,  load average: 0.77, 0.58, 0.56
Tasks:   1 total,   1 running,   0 sleeping,   0 stopped,   0 zombie
%Cpu(s):  2.7 us,  2.5 sy,  0.0 ni, 93.2 id,  1.0 wa,  0.0 hi,  0.5 si,  0.0 st
KiB Mem :  2046812 total,   638084 free,   856304 used,   552424 buff/cache
KiB Swap:  1048572 total,   900740 free,   147832 used.  1037088 avail Mem

  PID USER      PR  NI    VIRT    RES    SHR S  %CPU %MEM     TIME+ COMMAND
    1 root      20   0   36480   3056   2700 R   0.0  0.1   0:00.06 top
```

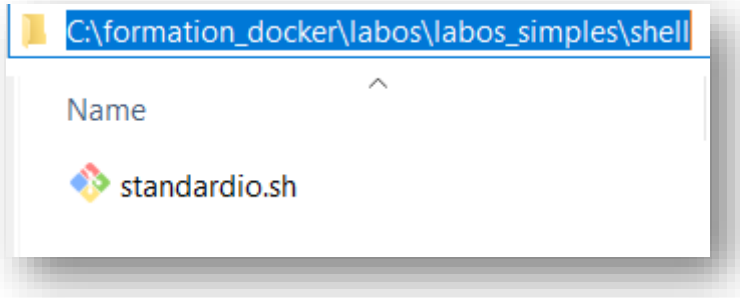
cp – copie de fichiers

HOST → Container

*$ docker **cp** PATH_IN_HOST CONTAINER_NAME:PATH_IN_CONTAINER*

$ docker cp c:/formation_docker/labos/labos_simples/shell/standardio.sh shell_simple_demo:/shell/standardio.sh

Host



Container

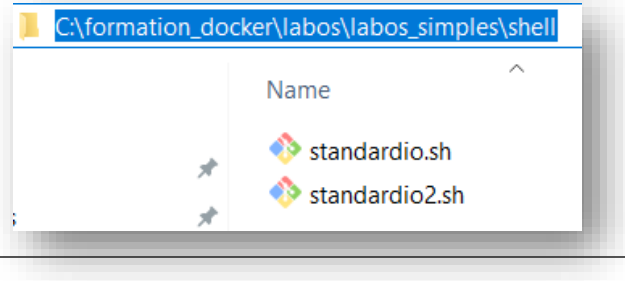
```
root@d2fc5a06da2a:/shell# ls .
standardio.sh
```

Container → Host

*$ docker **cp** CONTAINER_NAME:PATH_IN_CONTAINER PATH_IN_HOST*

$ docker cp shell_simple_demo:/shell/standardio.sh c:/formation_docker/labos/labos_simples/shell/standardio2.sh

Host



Exec – executer une commande

```
$ docker ps
```

```
CONTAINER ID        IMAGE               COMMAND             CREATED             STATUS              PORTS               NAMES
d2fc5a06da2a        ubuntu              "bash"              37 minutes ago      Up 37 minutes                           ubuntu_bash
```

```
$ docker exec ubuntu_bash cat /etc/hosts
```

```
127.0.0.1       localhost
::1     localhost ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters
172.17.0.2      d2fc5a06da2a
```

```
$ docker exec --workdir /usr/src ubuntu_last mkdir adel
```

```
$ docker exec ubuntu_bash rm -rf /shell/standardio.sh
```

docker run

RAPPEL : Workflow pour docker run