Lab Manual- Container Based App Deployment using Docker

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1 OBJECTIVE

Deploying your software becomes a lot easier after Docker where you don’t have to worry about missing a system configuration or a prerequisite. In This Lab will cover the basics of running, starting, stopping, and removing Docker containers.

- Create an Account in Docker HUB
- Install the Docker Tool Box on windows
- Use Docker Playground for Labs
- Perform the Basic Management

2 PRE-REQUISISTE

- Accounts in Azure
- A local Computer with 4 CPU, 16 GB RAM, 200 GB disk space

3 What is Docker and How it is different from Virtual Machine

The main difference between them is that Docker is an **isolated process** that runs in your native OS while the virtual machine is a **complete isolated OS** that runs on top of your host OS which takes more time to load. So, Docker has benefits over virtual machines such as:

- Loading speed
- Small hardware resources required, unlike virtual machines.
- Running multiple Docker containers at the same time on the same OS.
- You can modify your container and deploy it or give the Docker file definition to a friend to start working on the same environment.

Actually, Docker is not a replacement for virtual machines, it comes to solve specific problems.

Suppose that your application needs 3 or more services which run on different operating systems so instead of running 3 virtual machines on the same host, you can run 3 containers smoothly on the same host. Sounds great!

4 What is Docker Container ?

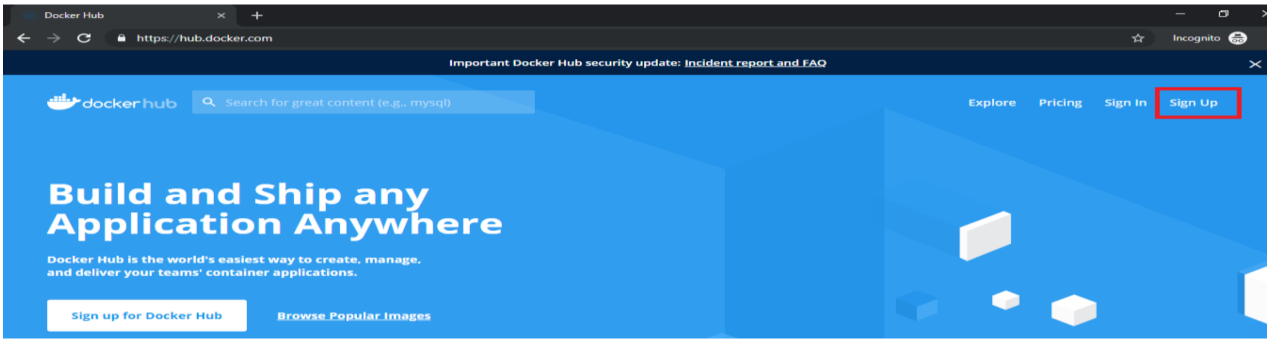
Containers offer a logical packaging mechanism in which applications can be abstracted from the environment in which they actually run. This decoupling allows container-based applications to be deployed easily and consistently, regardless of whether the target environment is a private data center, the public cloud, or even a developer’s personal laptop. This gives developers the ability to create predictable environments that are isolated from rest of the applications and can be run anywhere.

5 Setup Up Docker

5.1 Create a Docker Account

Steps 1: Open the below URL to sign up the docker

https://hub.docker.com/

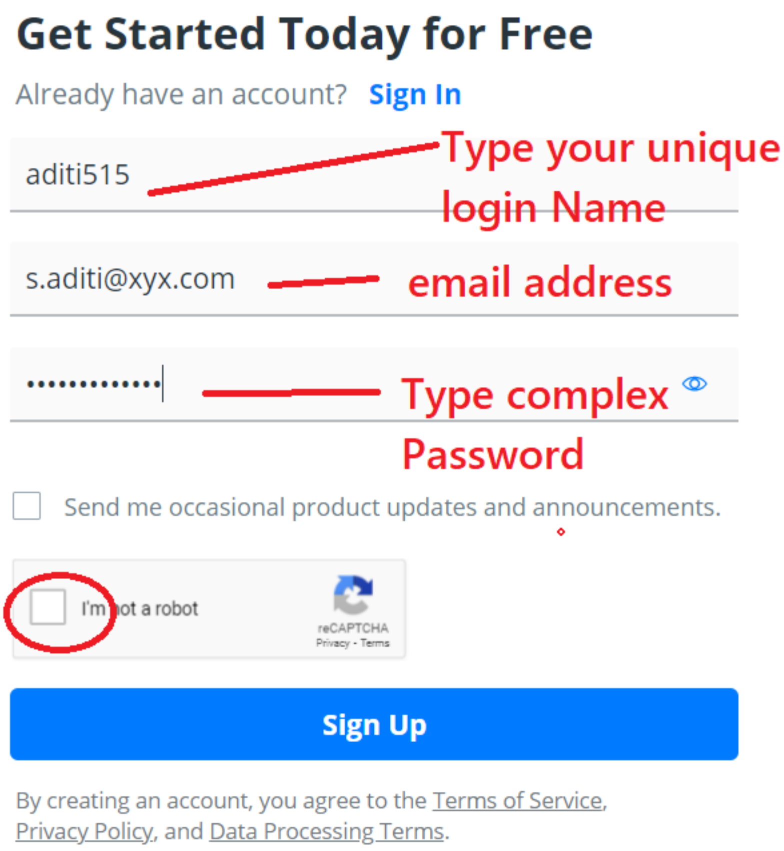


Important Docker Hub security update: Incident report and FAQ

Build and Ship any Application Anywhere

Docker Hub is the world's easiest way to create, manage, and deliver your teams' container applications.

Steps 2: Follow the Process of Signup as shown below



Get Started Today for Free

Already have an account? Sign In

aditi515

s.aditi@xyx.com

•••••••••••••

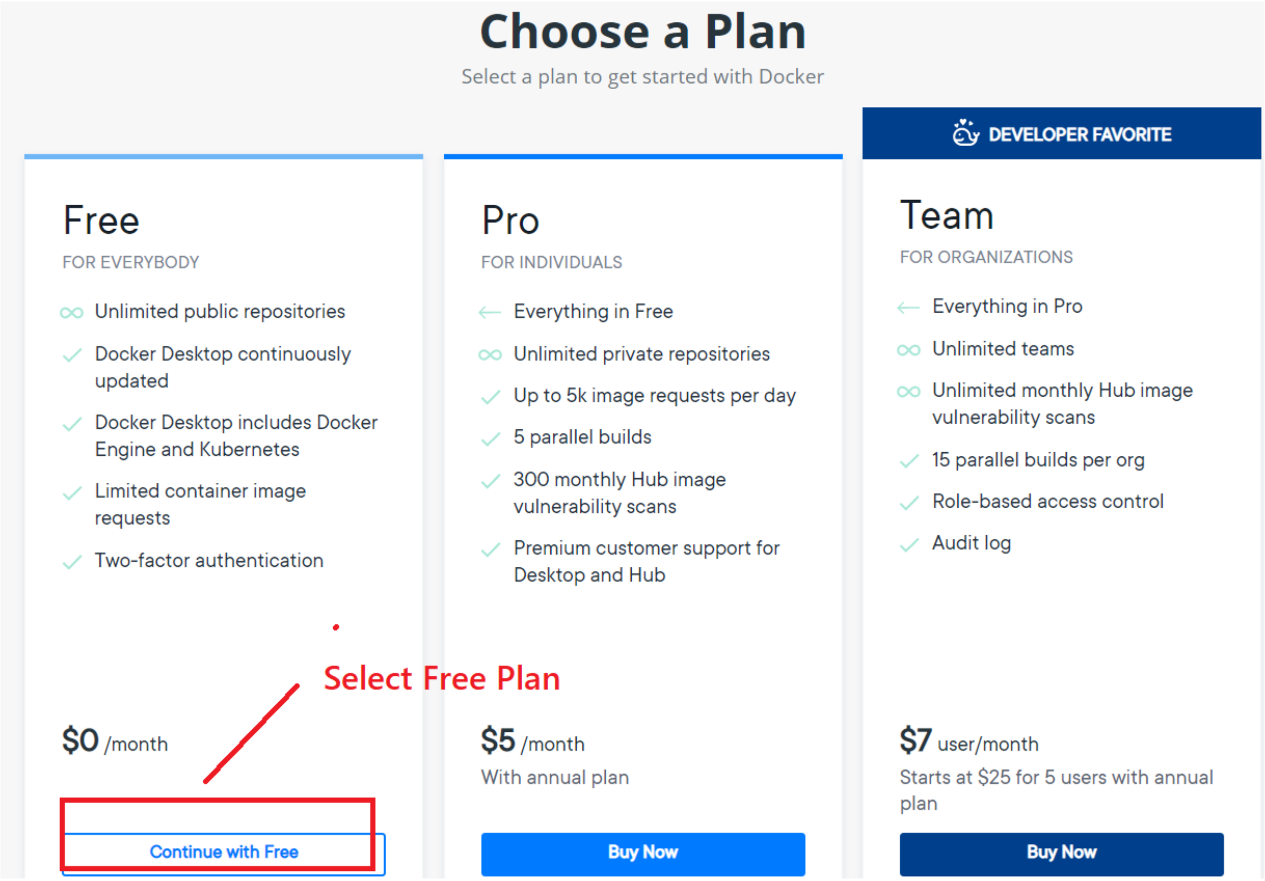
□ Send me occasional product updates and announcements.

□ I'm not a robot

Sign Up

By creating an account, you agree to the Terms of Service, Privacy Policy, and Data Processing Terms.

Steps 3: Once you click signup you will present with screen similar to below Select free plan



Choose a Plan

Select a plan to get started with Docker

Free

FOR EVERYBODY

- Unlimited public repositories
- Docker Desktop continuously updated
- Docker Desktop includes Docker Engine and Kubernetes
- Limited container image requests
- Two-factor authentication

$0 /month

Pro

FOR INDIVIDUALS

- Everything in Free
- Unlimited private repositories
- Up to 5k image requests per day
- 5 parallel builds
- 300 monthly Hub image vulnerability scans
- Premium customer support for Desktop and Hub

$5 /month

With annual plan

Team

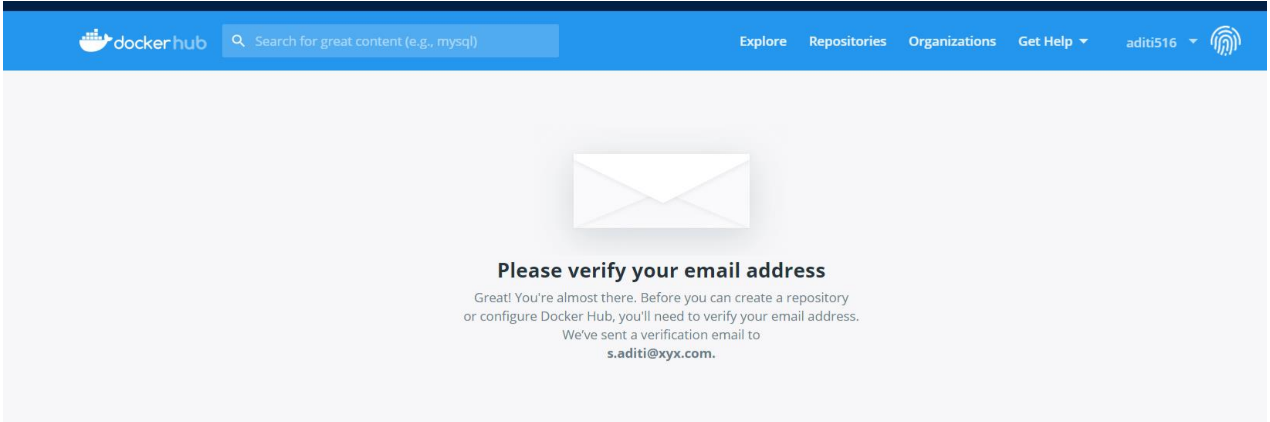
FOR ORGANIZATIONS

- Everything in Pro
- Unlimited teams
- Unlimited monthly Hub image vulnerability scans
- 15 parallel builds per org
- Role-based access control
- Audit log

$7 user/month

Starts at $25 for 5 users with annual plan

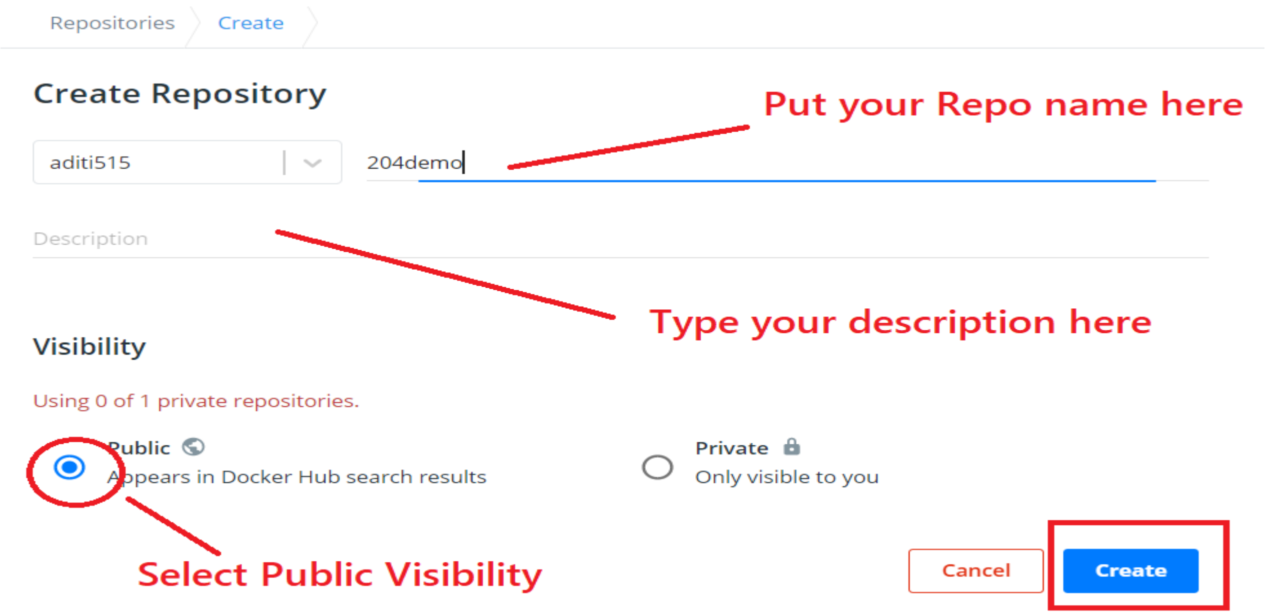
Steps 4: Next Screen is to verify the email , go to your email and verify



Please verify your email address

Great! You're almost there. Before you can create a repository or configure Docker Hub, you'll need to verify your email address. We've sent a verification email to **s.aditi@xyx.com.**

Steps 5: Once you verify the email, you will present the screen to create a Repository. Type **Repositories name** / **description** and **Scope** (Public /Private) and click **Create**



Create Repository

aditi515 / 204demo

Description

Visibility

Using 0 of 1 private repositories.

● Public — Appears in Docker Hub search results

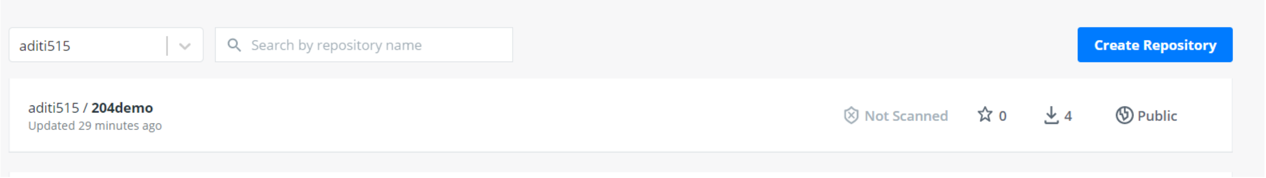
○ Private — Only visible to you

Put your Repo name here

Type your description here

Select Public Visibility

Steps 7: Now your Repository should be available as shown in below



aditi515 / **204demo**
Updated 29 minutes ago

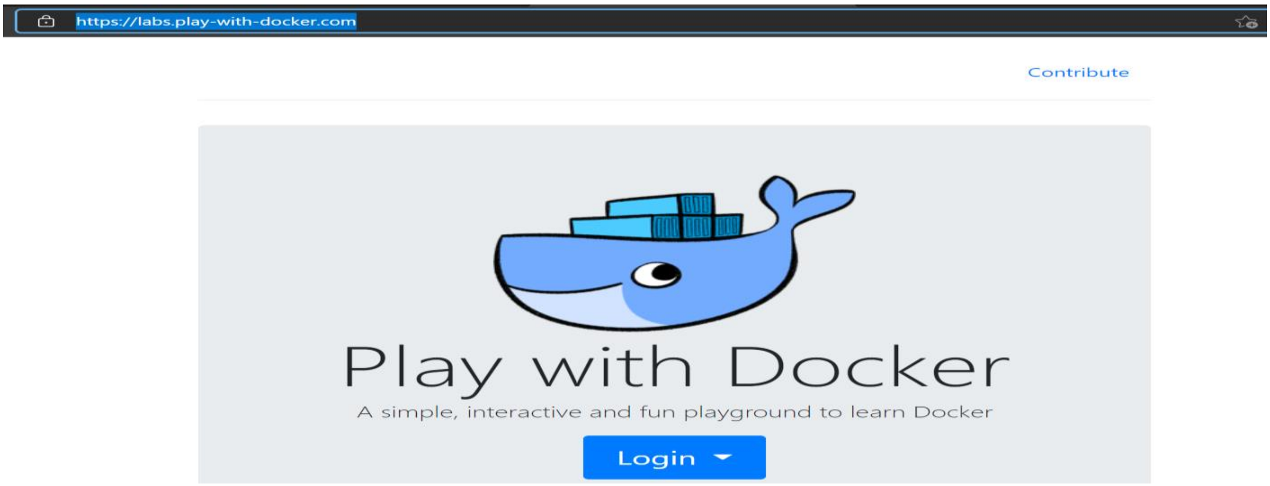
Not Scanned | ☆ 0 | 4 | Public

6 Connect to Docker Playground

Playground provides a personalised sandboxed environment for you to learn and explore Docker.

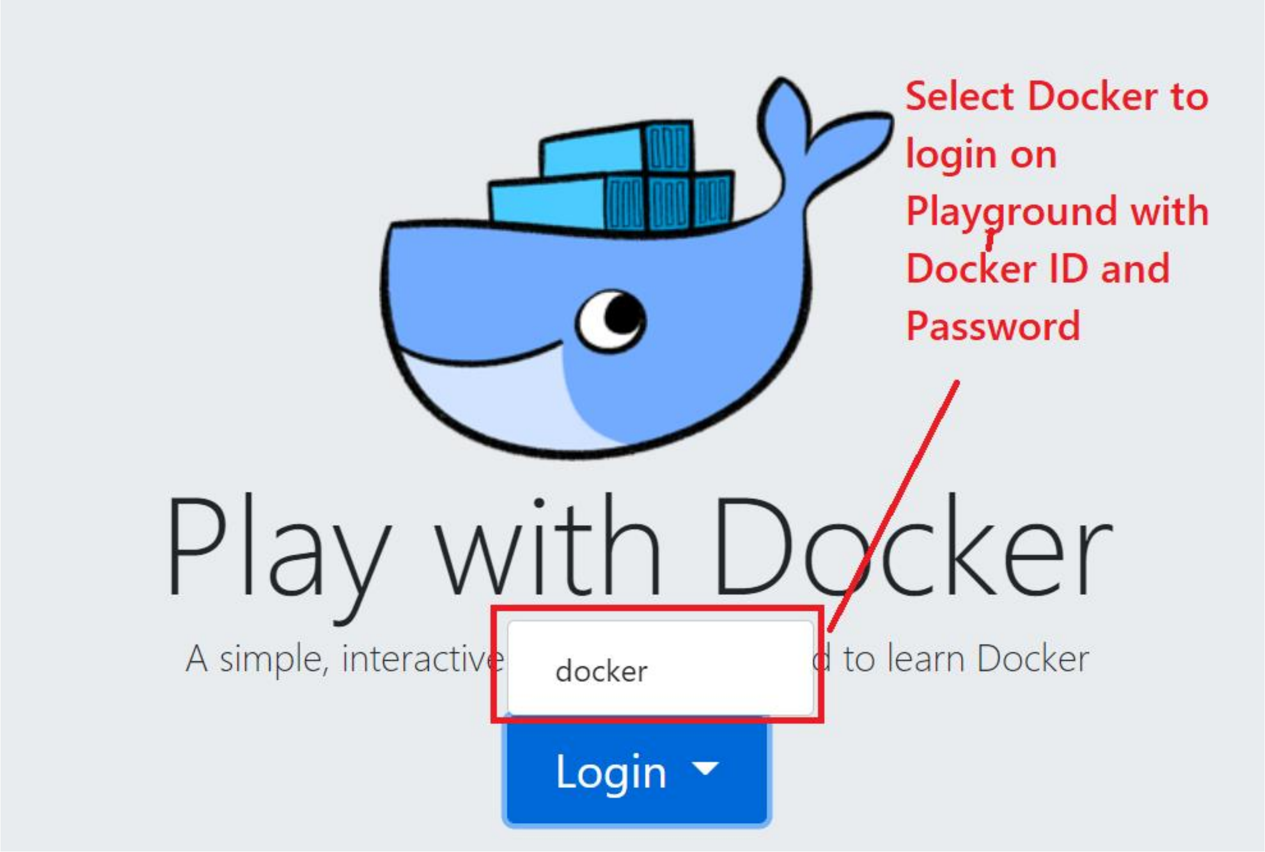
Steps 1: Open the Below URL in browser

https://labs.play-with-docker.com/



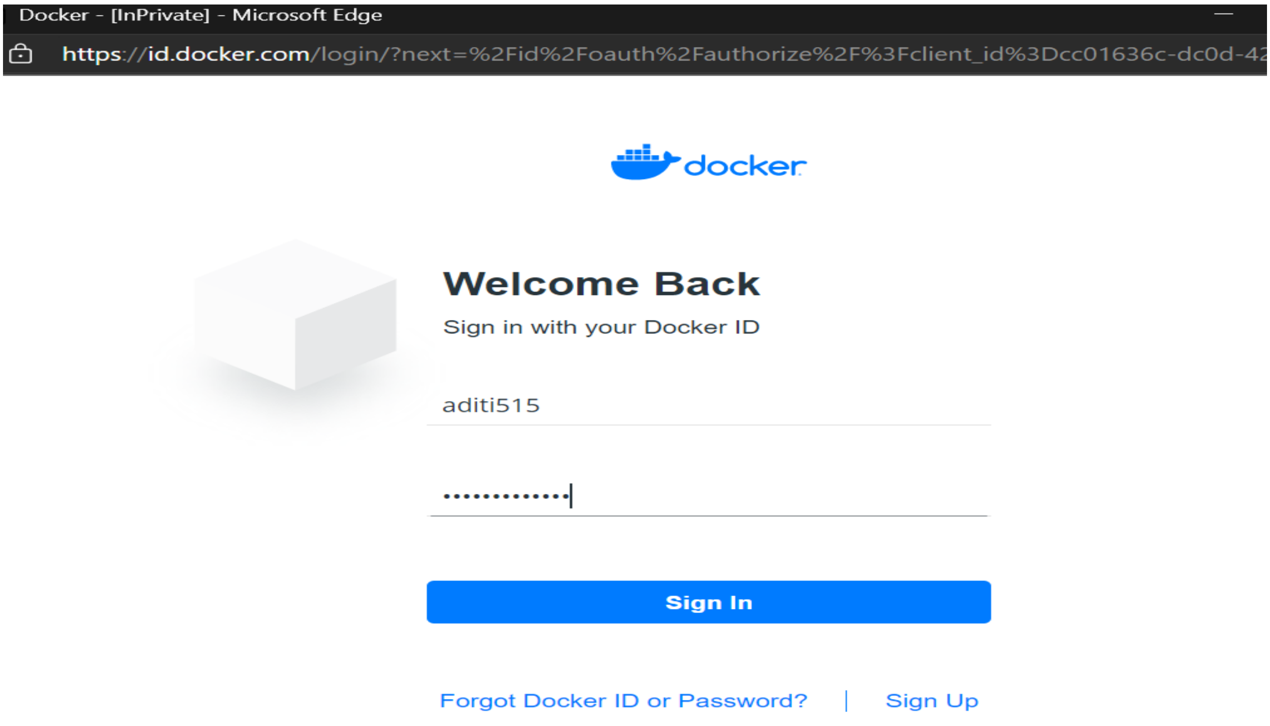
https://labs.play-with-docker.com

Steps 2: Click the Login Button and select Docker



Select Docker to login on Playground with Docker ID and Password

Steps 3: Use your login and password you use to create Docker ID and click sign-in


Docker - [InPrivate] - Microsoft Edge
https://id.docker.com/login/?next=%2Fid%2Foauth%2Fauthorize%2F%3Fclient_id%3Dcc01636c-dc0d-42
docker
Sign In
Forgot Docker ID or Password?
Sign Up

Welcome Back

Sign in with your Docker ID

aditi515

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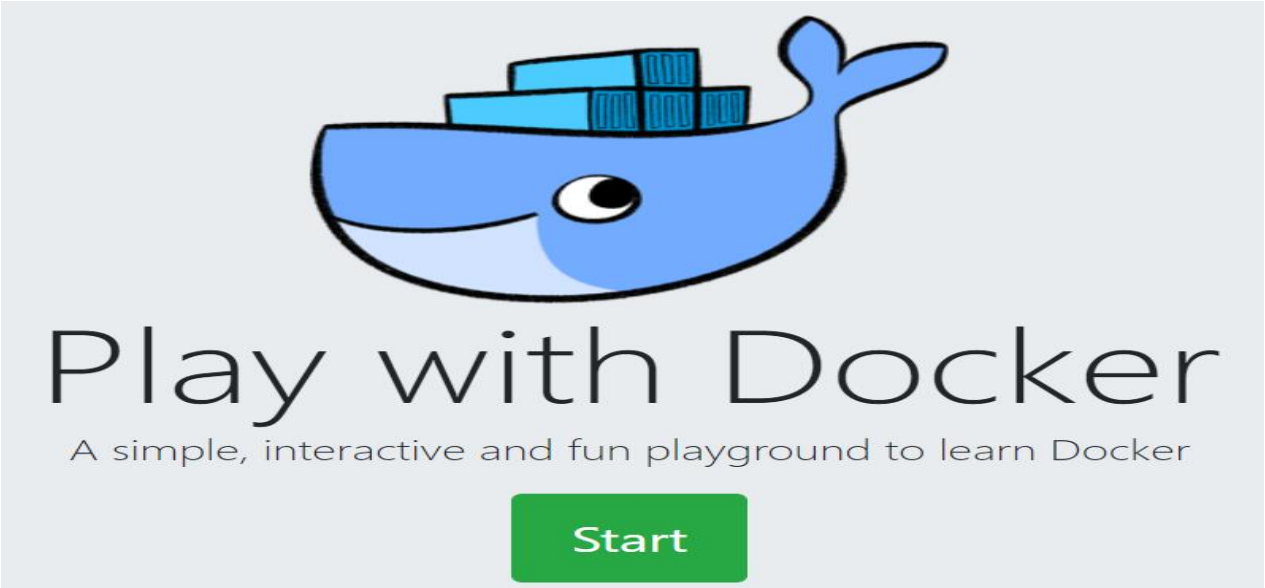
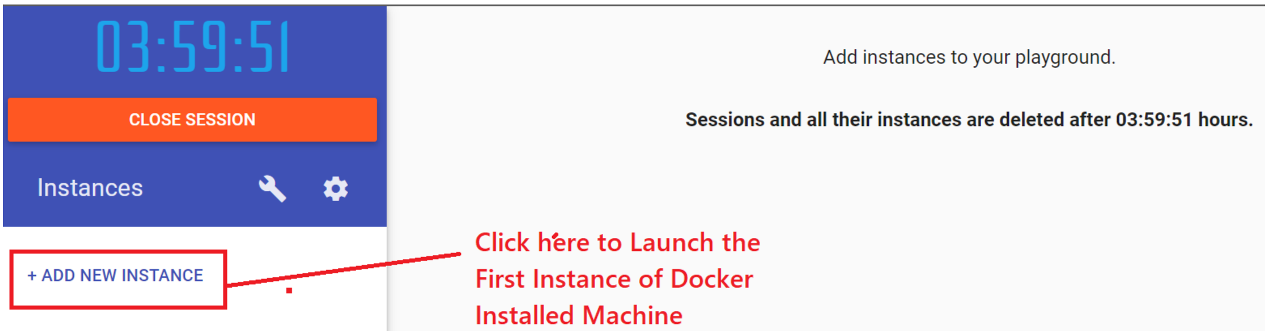
Steps 4: Now Click Start to Launch the Docker Playground



Play with Docker

A simple, interactive and fun playground to learn Docker

Steps 5: On Left side of Panel there is Add New Instance

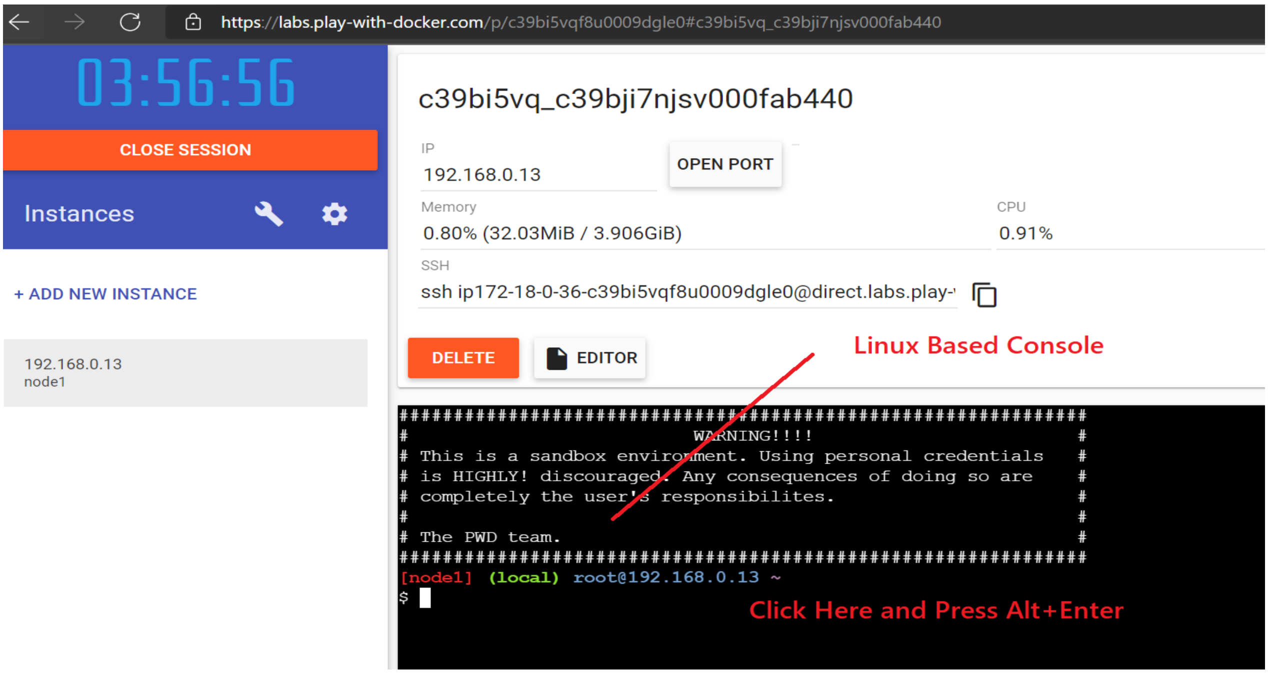


Add instances to your playground.

Sessions and all their instances are deleted after 03:59:51 hours.

Click here to Launch the First Instance of Docker Installed Machine

Steps 6: Now new Black and white screen appear. Click inside and press **ALT + Enter.** It will launch the console in Full screen.



https://labs.play-with-docker.com/p/c39bi5vqf8u0009dgle0#c39bi5vq_c39bji7njsv000fab440
03:56:56
CLOSE SESSION
Instances
+ ADD NEW INSTANCE
192.168.0.13
node1
OPEN PORT
DELETE
EDITOR

c39bi5vq_c39bji7njsv000fab440

IP: 192.168.0.13

Memory: 0.80% (32.03MiB / 3.906GiB)

CPU: 0.91%

SSH: ssh ip172-18-0-36-c39bi5vqf8u0009dgle0@direct.labs.play-

Linux Based Console

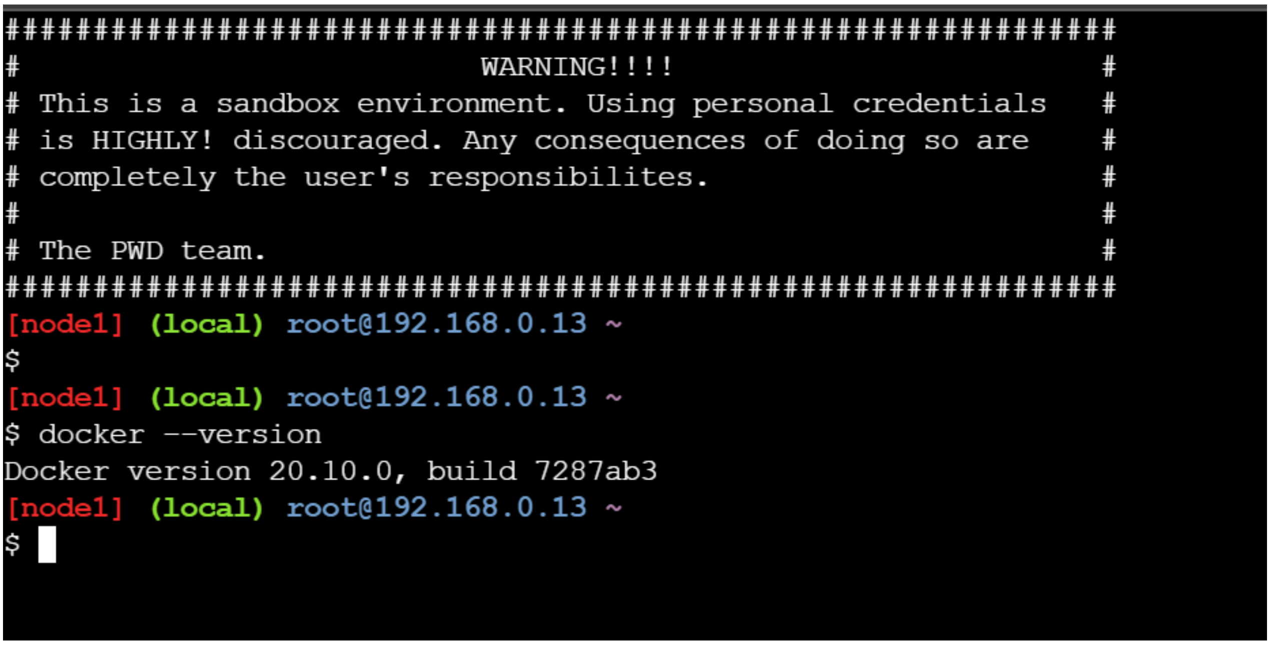
```
###############################################################
#                          WARNING!!!!                        #
# This is a sandbox environment. Using personal credentials   #
# is HIGHLY! discouraged. Any consequences of doing so are    #
# completely the user's responsibilites.                      #
#                                                             #
# The PWD team.                                               #
###############################################################
[node1] (local) root@192.168.0.13 ~
$
```

Click Here and Press Alt+Enter

Steps 7: Now Your console launch in full screen .If you want to increase the font Size just press CTRL and + .

Steps 8: Now Type below command as below to check the version

docker --version

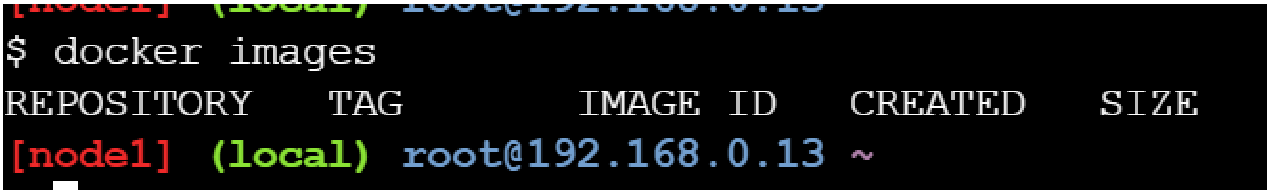


```
###############################################################
#                          WARNING!!!!                        #
# This is a sandbox environment. Using personal credentials   #
# is HIGHLY! discouraged. Any consequences of doing so are    #
# completely the user's responsibilites.                      #
#                                                             #
# The PWD team.                                               #
###############################################################
[node1] (local) root@192.168.0.13 ~
$
[node1] (local) root@192.168.0.13 ~
$ docker --version
Docker version 20.10.0, build 7287ab3
[node1] (local) root@192.168.0.13 ~
$
```

Now you are ready to play with all docker command

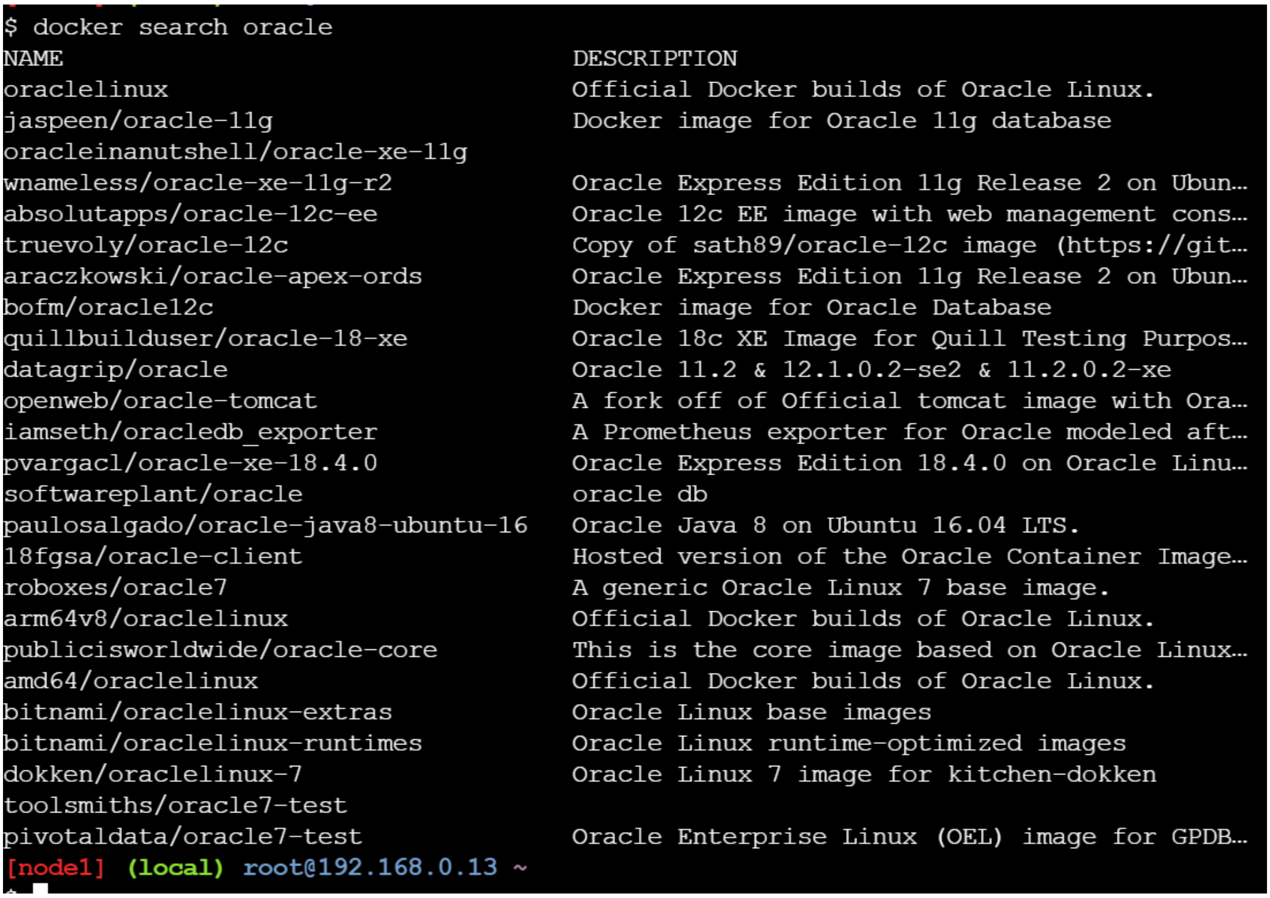
7 Pull Images , Create Container , Install App in Container and Create the Image from Container and Push to Docker Repo

docker images



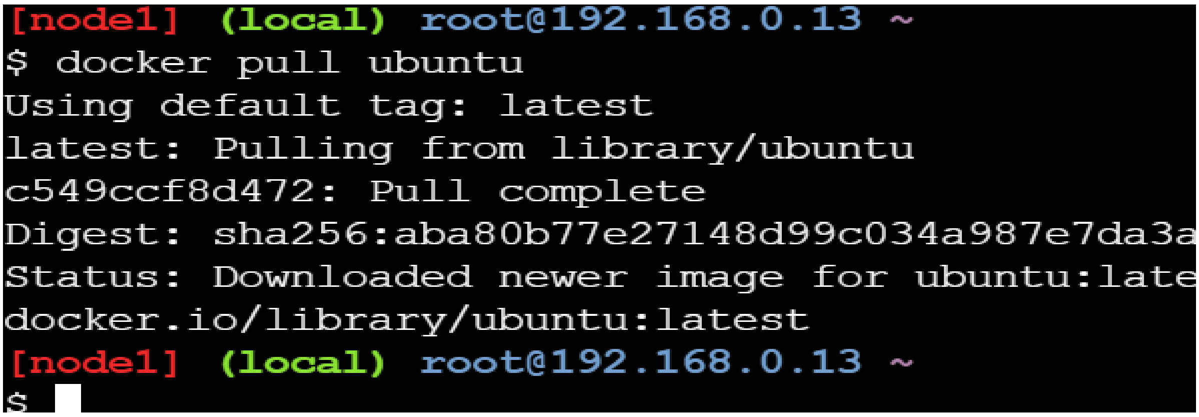
```
[node1] (local) root@192.168.0.13
$ docker images
REPOSITORY    TAG         IMAGE ID    CREATED    SIZE
[node1] (local) root@192.168.0.13 ~
```

docker search oracle



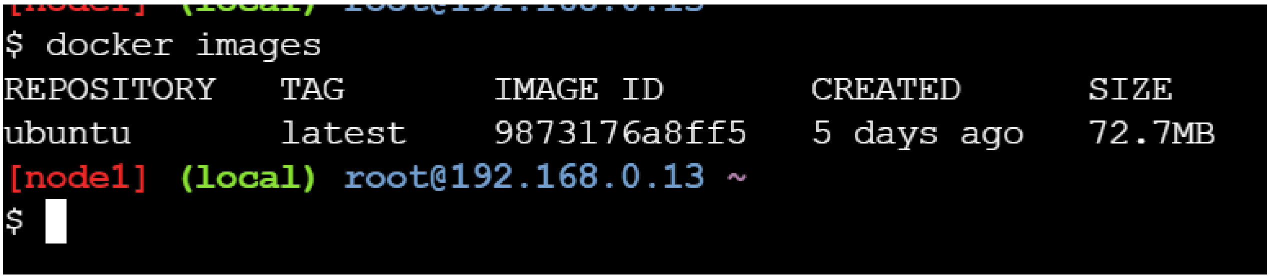
```
$ docker search oracle
NAME                                DESCRIPTION
oraclelinux                         Official Docker builds of Oracle Linux.
jaspeen/oracle-11g                  Docker image for Oracle 11g database
oracleinanutshell/oracle-xe-11g
wnameless/oracle-xe-11g-r2          Oracle Express Edition 11g Release 2 on Ubun…
absolutapps/oracle-12c-ee           Oracle 12c EE image with web management cons…
truevoly/oracle-12c                 Copy of sath89/oracle-12c image (https://git…
araczkowski/oracle-apex-ords        Oracle Express Edition 11g Release 2 on Ubun…
bofm/oracle12c                      Docker image for Oracle Database
quillbuilduser/oracle-18-xe         Oracle 18c XE Image for Quill Testing Purpos…
datagrip/oracle                     Oracle 11.2 & 12.1.0.2-se2 & 11.2.0.2-xe
openweb/oracle-tomcat               A fork off of Official tomcat image with Ora…
iamseth/oracledb_exporter           A Prometheus exporter for Oracle modeled aft…
pvargacl/oracle-xe-18.4.0           Oracle Express Edition 18.4.0 on Oracle Linu…
softwareplant/oracle                oracle db
paulosalgado/oracle-java8-ubuntu-16 Oracle Java 8 on Ubuntu 16.04 LTS.
18fgsa/oracle-client                Hosted version of the Oracle Container Image…
roboxes/oracle7                     A generic Oracle Linux 7 base image.
arm64v8/oraclelinux                 Official Docker builds of Oracle Linux.
publicisworldwide/oracle-core       This is the core image based on Oracle Linux…
amd64/oraclelinux                   Official Docker builds of Oracle Linux.
bitnami/oraclelinux-extras          Oracle Linux base images
bitnami/oraclelinux-runtimes        Oracle Linux runtime-optimized images
dokken/oraclelinux-7                Oracle Linux 7 image for kitchen-dokken
toolsmiths/oracle7-test
pivotaldata/oracle7-test            Oracle Enterprise Linux (OEL) image for GPDB…
[node1] (local) root@192.168.0.13 ~
```

docker pull ubuntu



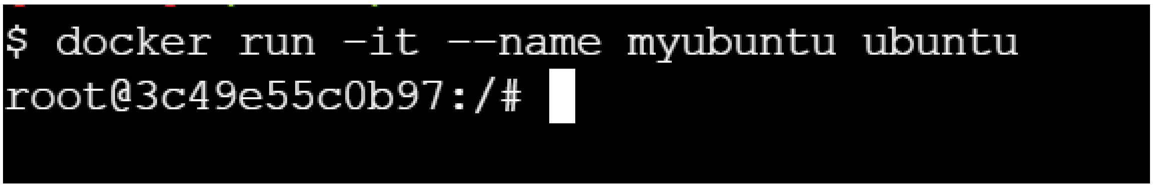
```
[node1] (local) root@192.168.0.13 ~
$ docker pull ubuntu
Using default tag: latest
latest: Pulling from library/ubuntu
c549ccf8d472: Pull complete
Digest: sha256:aba80b77e27148d99c034a987e7da3a
Status: Downloaded newer image for ubuntu:late
docker.io/library/ubuntu:latest
[node1] (local) root@192.168.0.13 ~
$
```

docker images



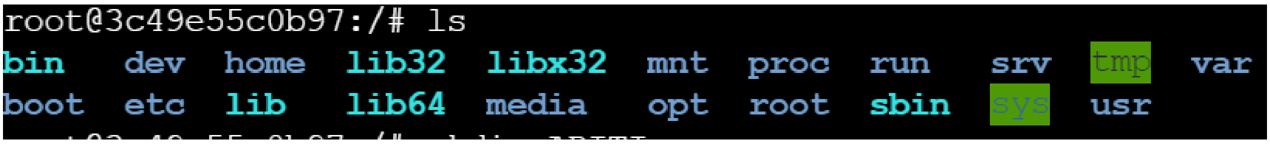
```
$ docker images
REPOSITORY    TAG       IMAGE ID       CREATED       SIZE
ubuntu        latest    9873176a8ff5   5 days ago    72.7MB
[node1] (local) root@192.168.0.13 ~
$
```

docker run -it –name myubuntu ubuntu



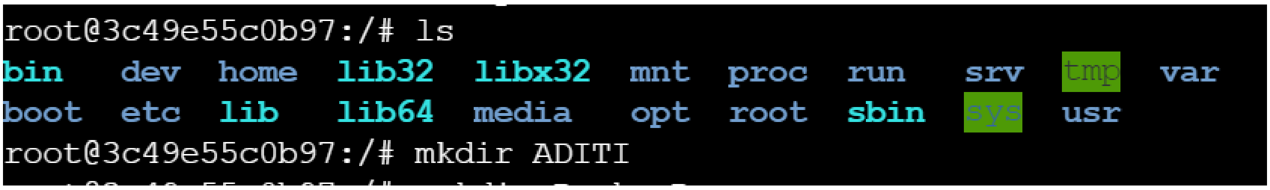
```
$ docker run -it --name myubuntu ubuntu
root@3c49e55c0b97:/# 
```

ls



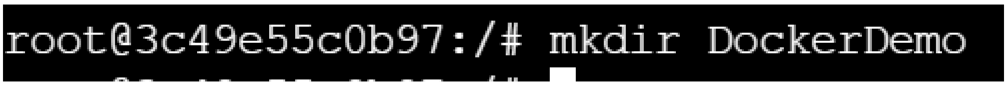
```
root@3c49e55c0b97:/# ls
bin   dev  home  lib32  libx32  mnt  proc  run   srv  tmp  var
boot  etc  lib   lib64  media   opt  root  sbin  sys  usr
```

mkdir ADITI



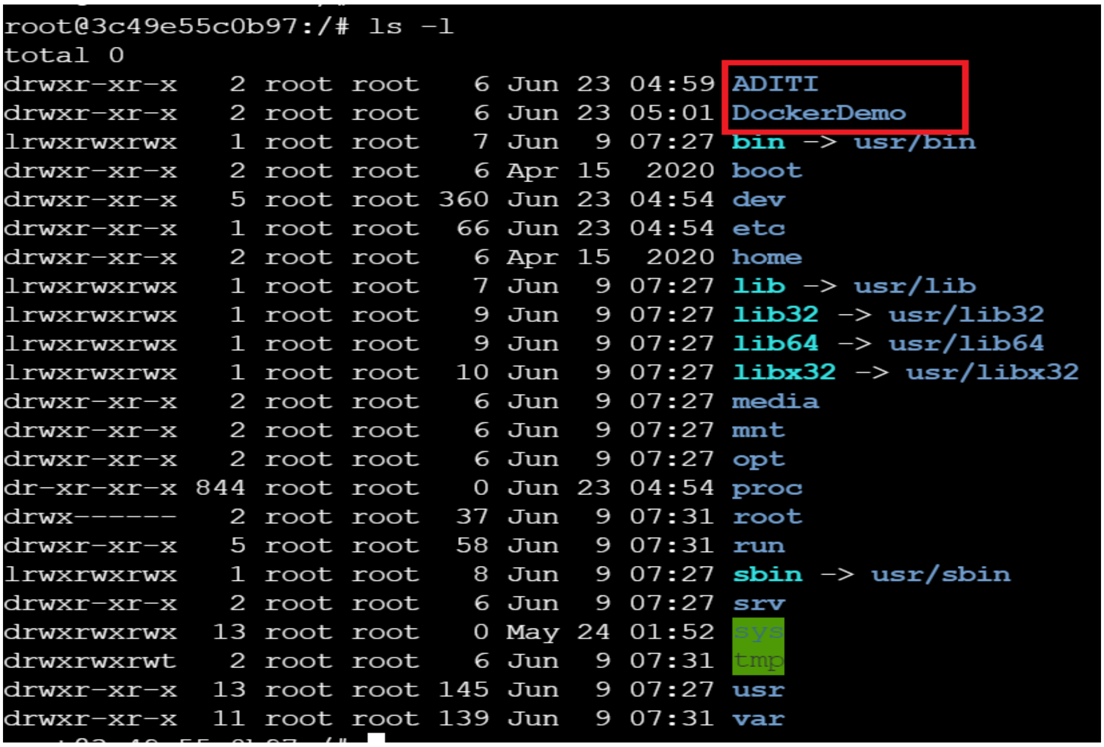
```
root@3c49e55c0b97:/# ls
bin   dev  home  lib32  libx32  mnt  proc  run   srv  tmp  var
boot  etc  lib   lib64  media   opt  root  sbin  sys  usr
root@3c49e55c0b97:/# mkdir ADITI
```

mkdir Docker-Demo



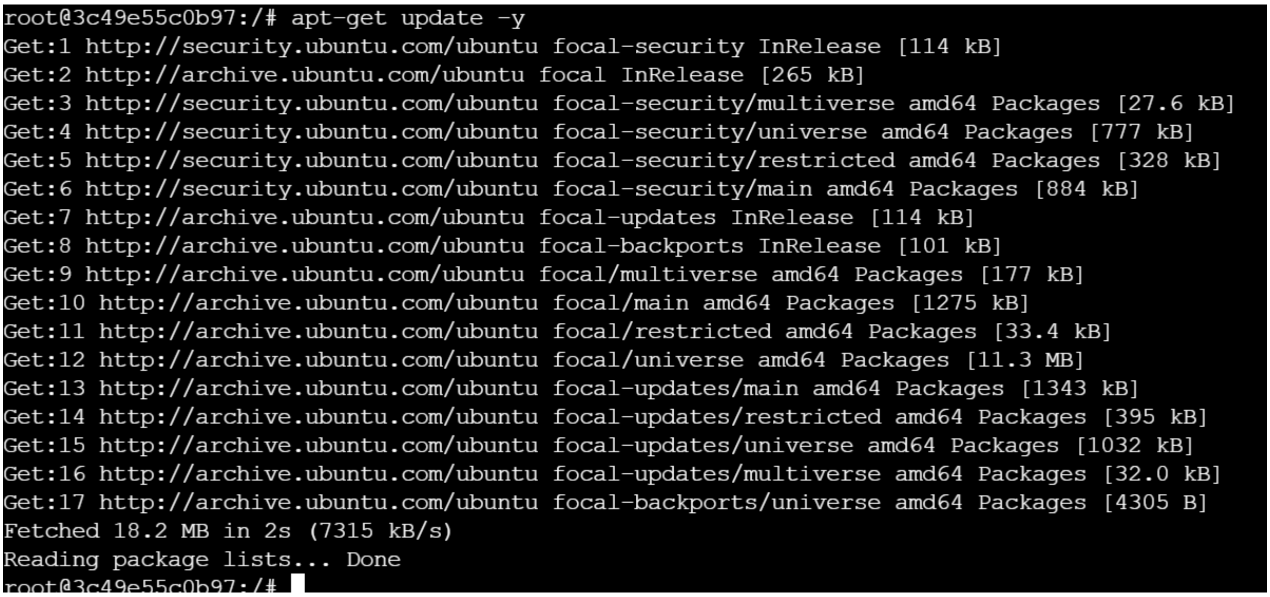
```
root@3c49e55c0b97:/# mkdir DockerDemo
```

ls -l



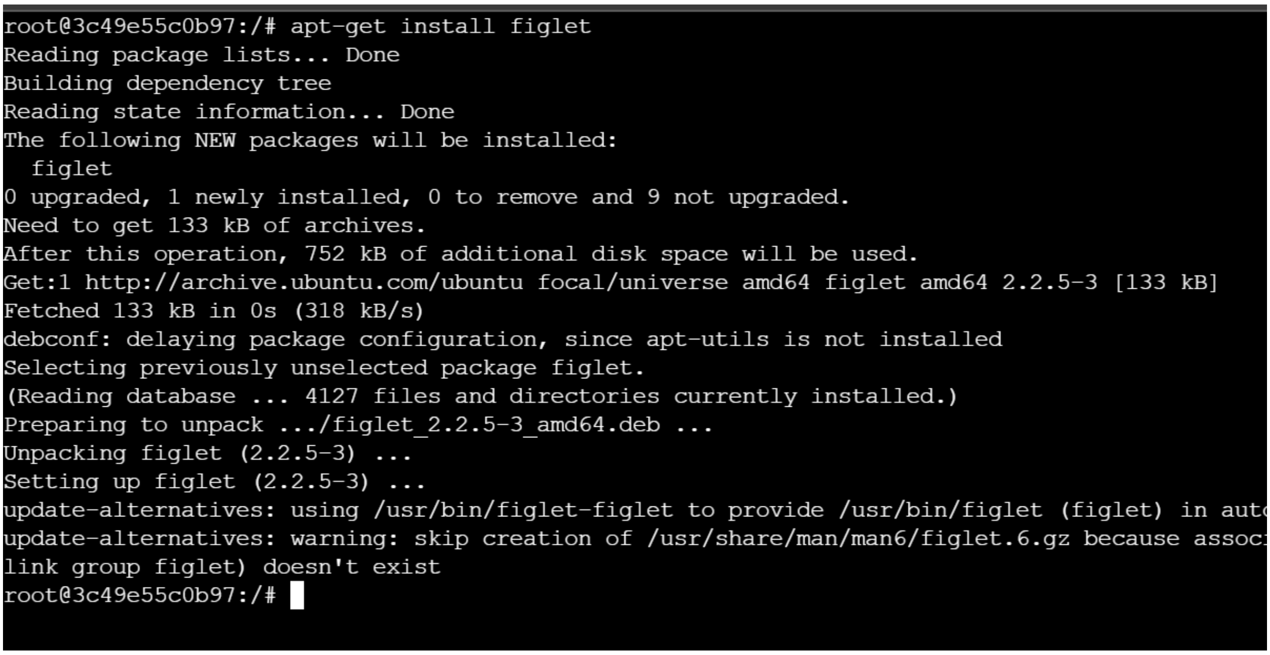
```
root@3c49e55c0b97:/# ls -l
total 0
drwxr-xr-x   2 root root   6 Jun 23 04:59 ADITI
drwxr-xr-x   2 root root   6 Jun 23 05:01 DockerDemo
lrwxrwxrwx   1 root root   7 Jun  9 07:27 bin -> usr/bin
drwxr-xr-x   2 root root   6 Apr 15  2020 boot
drwxr-xr-x   5 root root 360 Jun 23 04:54 dev
drwxr-xr-x   1 root root  66 Jun 23 04:54 etc
drwxr-xr-x   2 root root   6 Apr 15  2020 home
lrwxrwxrwx   1 root root   7 Jun  9 07:27 lib -> usr/lib
lrwxrwxrwx   1 root root   9 Jun  9 07:27 lib32 -> usr/lib32
lrwxrwxrwx   1 root root   9 Jun  9 07:27 lib64 -> usr/lib64
lrwxrwxrwx   1 root root  10 Jun  9 07:27 libx32 -> usr/libx32
drwxr-xr-x   2 root root   6 Jun  9 07:27 media
drwxr-xr-x   2 root root   6 Jun  9 07:27 mnt
drwxr-xr-x   2 root root   6 Jun  9 07:27 opt
dr-xr-xr-x 844 root root   0 Jun 23 04:54 proc
drwx------   2 root root  37 Jun  9 07:31 root
drwxr-xr-x   5 root root  58 Jun  9 07:31 run
lrwxrwxrwx   1 root root   8 Jun  9 07:27 sbin -> usr/sbin
drwxr-xr-x   2 root root   6 Jun  9 07:27 srv
drwxrwxrwx  13 root root   0 May 24 01:52 sys
drwxrwxrwt   2 root root   6 Jun  9 07:31 tmp
drwxr-xr-x  13 root root 145 Jun  9 07:27 usr
drwxr-xr-x  11 root root 139 Jun  9 07:31 var
```

apt-get update -y



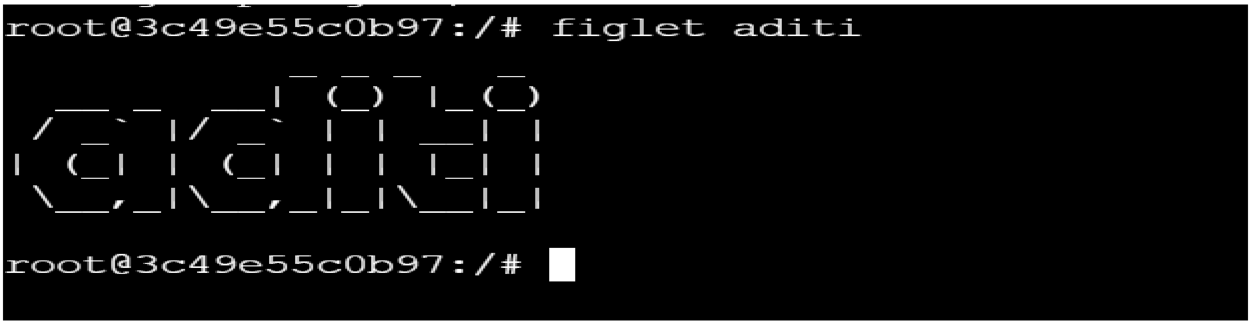
```
root@3c49e55c0b97:/# apt-get update -y
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 Packages [27.6 kB]
Get:4 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [777 kB]
Get:5 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [328 kB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [884 kB]
Get:7 http://archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:8 http://archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:9 http://archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [177 kB]
Get:10 http://archive.ubuntu.com/ubuntu focal/main amd64 Packages [1275 kB]
Get:11 http://archive.ubuntu.com/ubuntu focal/restricted amd64 Packages [33.4 kB]
Get:12 http://archive.ubuntu.com/ubuntu focal/universe amd64 Packages [11.3 MB]
Get:13 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1343 kB]
Get:14 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [395 kB]
Get:15 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1032 kB]
Get:16 http://archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 Packages [32.0 kB]
Get:17 http://archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [4305 B]
Fetched 18.2 MB in 2s (7315 kB/s)
Reading package lists... Done
root@3c49e55c0b97:/#
```

apt-get install figlet



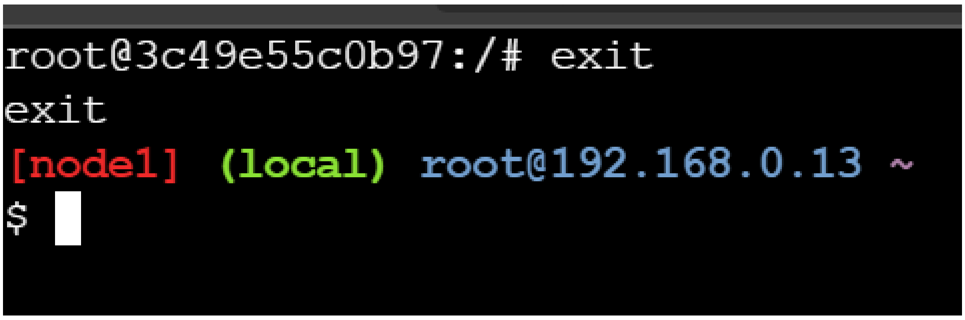
```
root@3c49e55c0b97:/# apt-get install figlet
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  figlet
0 upgraded, 1 newly installed, 0 to remove and 9 not upgraded.
Need to get 133 kB of archives.
After this operation, 752 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal/universe amd64 figlet amd64 2.2.5-3 [133 kB]
Fetched 133 kB in 0s (318 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package figlet.
(Reading database ... 4127 files and directories currently installed.)
Preparing to unpack .../figlet_2.2.5-3_amd64.deb ...
Unpacking figlet (2.2.5-3) ...
Setting up figlet (2.2.5-3) ...
update-alternatives: using /usr/bin/figlet-figlet to provide /usr/bin/figlet (figlet) in aut
update-alternatives: warning: skip creation of /usr/share/man/man6/figlet.6.gz because assoc
link group figlet) doesn't exist
root@3c49e55c0b97:/#
```

figlet Aditi



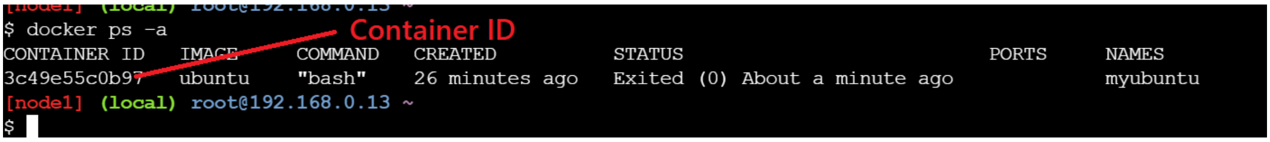
```
root@3c49e55c0b97:/# figlet aditi
           _ _ _   _
  __ _  __| (_) |_(_)
 / _` |/ _` | | __| |
| (_| | (_| | | |_| |
 \__,_|\__,_|_|\__|_|

root@3c49e55c0b97:/#
```

exit



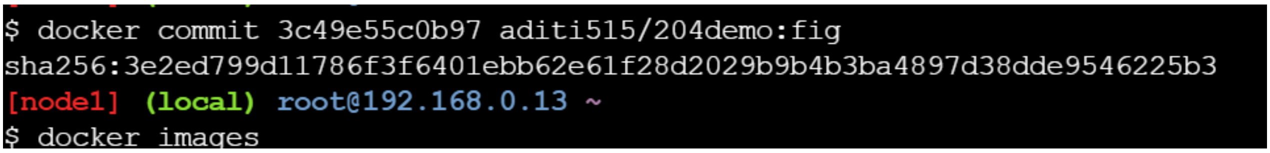
```
root@3c49e55c0b97:/# exit
exit
[node1] (local) root@192.168.0.13 ~
$ █
```

docker ps -a



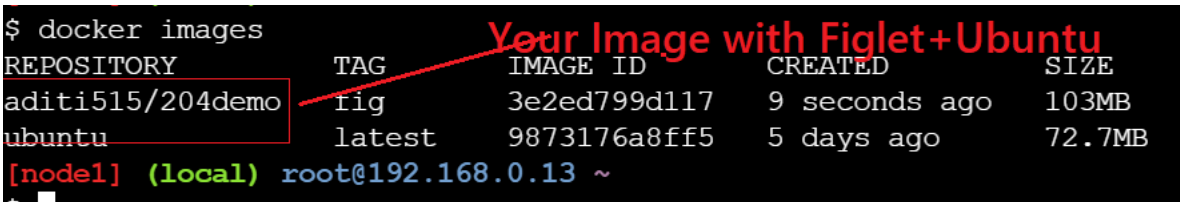
```
[node1] (local) root@192.168.0.13 ~
$ docker ps -a
CONTAINER ID   IMAGE    COMMAND   CREATED          STATUS                          PORTS    NAMES
3c49e55c0b97   ubuntu   "bash"    26 minutes ago   Exited (0) About a minute ago            myubuntu
[node1] (local) root@192.168.0.13 ~
$ █
```

docker commit 3c49e55c0b97 aditi515/204demo:fig



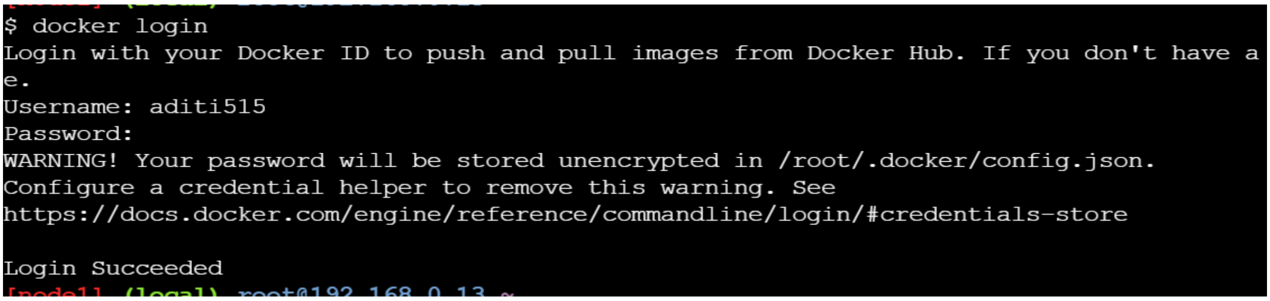
```
$ docker commit 3c49e55c0b97 aditi515/204demo:fig
sha256:3e2ed799d11786f3f6401ebb62e61f28d2029b9b4b3ba4897d38dde9546225b3
[node1] (local) root@192.168.0.13 ~
$ docker images
```

docker images



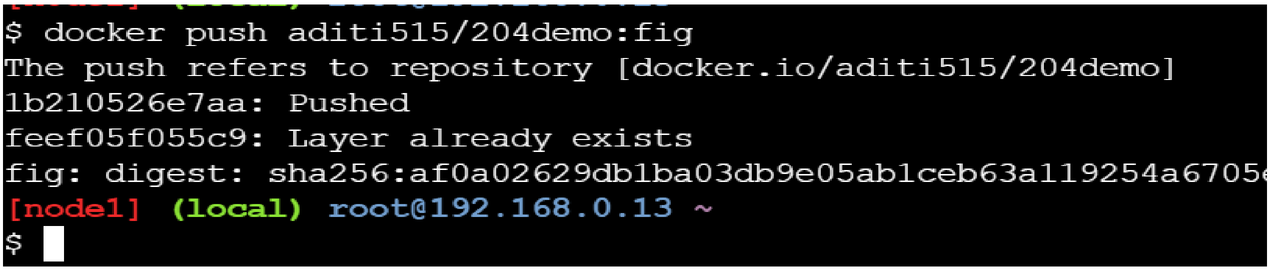
```
$ docker images
REPOSITORY         TAG      IMAGE ID       CREATED          SIZE
aditi515/204demo   fig      3e2ed799d117   9 seconds ago    103MB
ubuntu             latest   9873176a8ff5   5 days ago       72.7MB
[node1] (local) root@192.168.0.13 ~
```

docker login



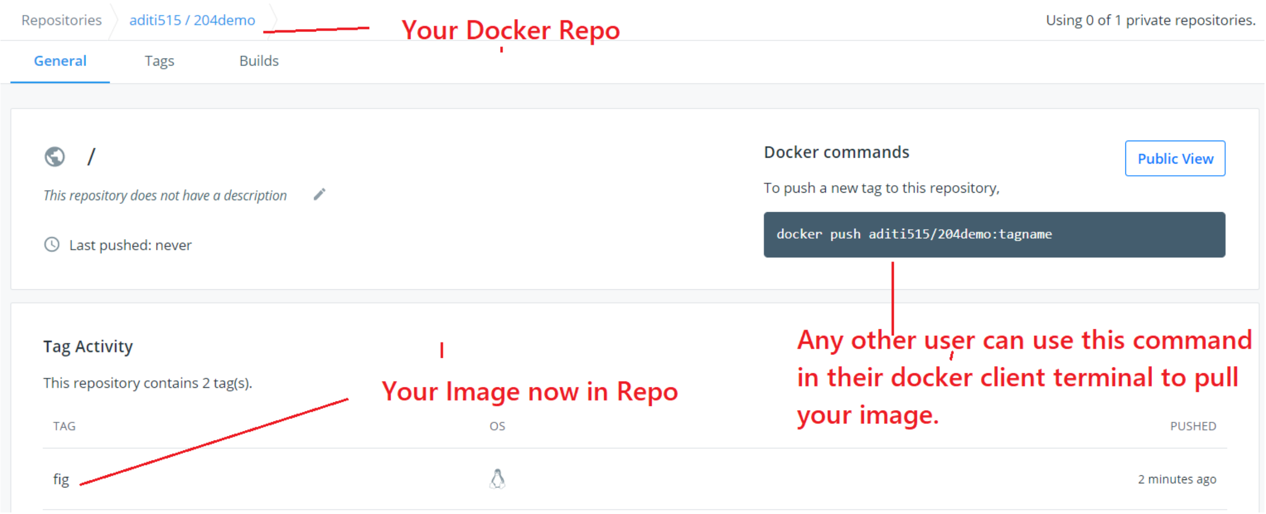
```
$ docker login
Login with your Docker ID to push and pull images from Docker Hub. If you don't have a
e.
Username: aditi515
Password:
WARNING! Your password will be stored unencrypted in /root/.docker/config.json.
Configure a credential helper to remove this warning. See
https://docs.docker.com/engine/reference/commandline/login/#credentials-store

Login Succeeded
[node1] (local) root@192.168.0.13 ~
```

docker psuh aditi515/204demo:fig



```
$ docker push aditi515/204demo:fig
The push refers to repository [docker.io/aditi515/204demo]
1b210526e7aa: Pushed
feef05f055c9: Layer already exists
fig: digest: sha256:af0a02629db1ba03db9e05ab1ceb63a119254a6705
[node1] (local) root@192.168.0.13 ~
$ █
```

Now you can go to Docker Hub and Check you will have your own customer Image which contain **Ubuntu OS + Figlet App**



Repositories aditi515 / 204demo

Your Docker Repo

Using 0 of 1 private repositories.

/

This repository does not have a description

Last pushed: never

Docker commands

To push a new tag to this repository,

```
docker push aditi515/204demo:tagname
```

Any other user can use this command in their docker client terminal to pull your image.

Tag Activity

This repository contains 2 tag(s).

Your Image now in Repo

TAG	OS	PUSHED
fig	🐧	2 minutes ago