CASE STUDY - CONTAINERIZATION USING DOCKER II

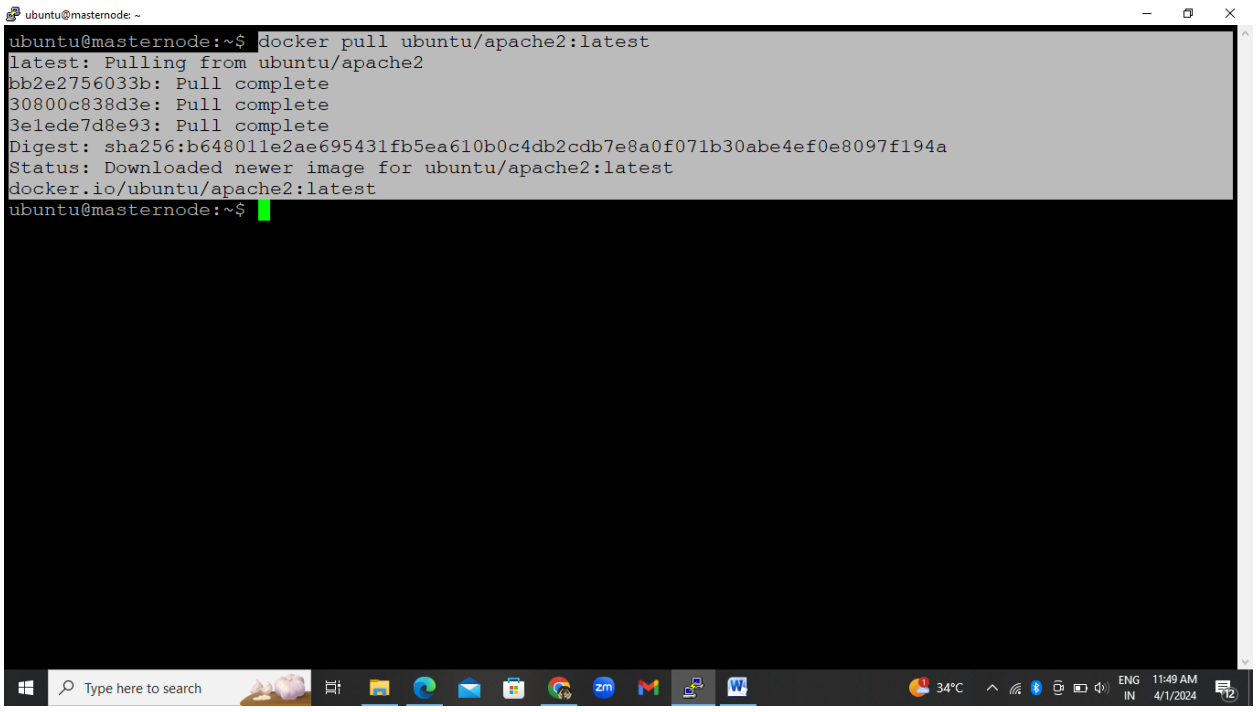
Problem Statements:
You have been hired as a Devops Engineer in GrapeVine Pvt. Ltd. You have been asked to improve the way the company is managing their Docker containers.

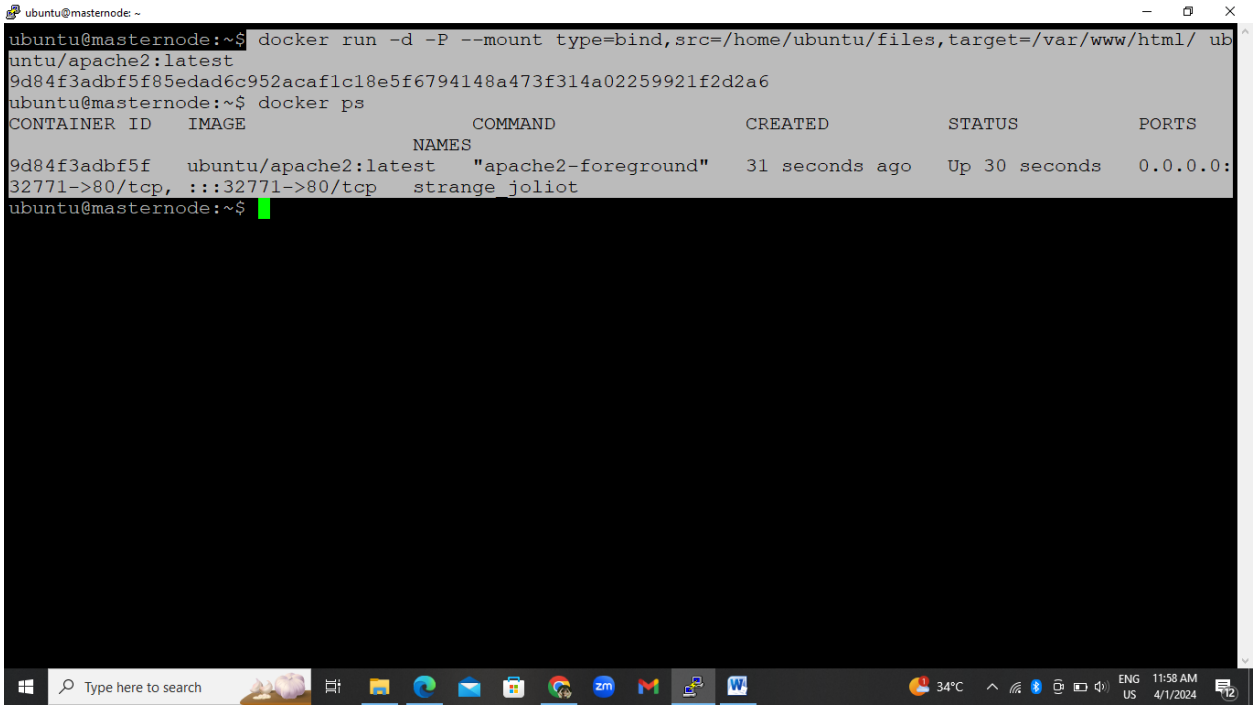
Following tasks have been assigned:

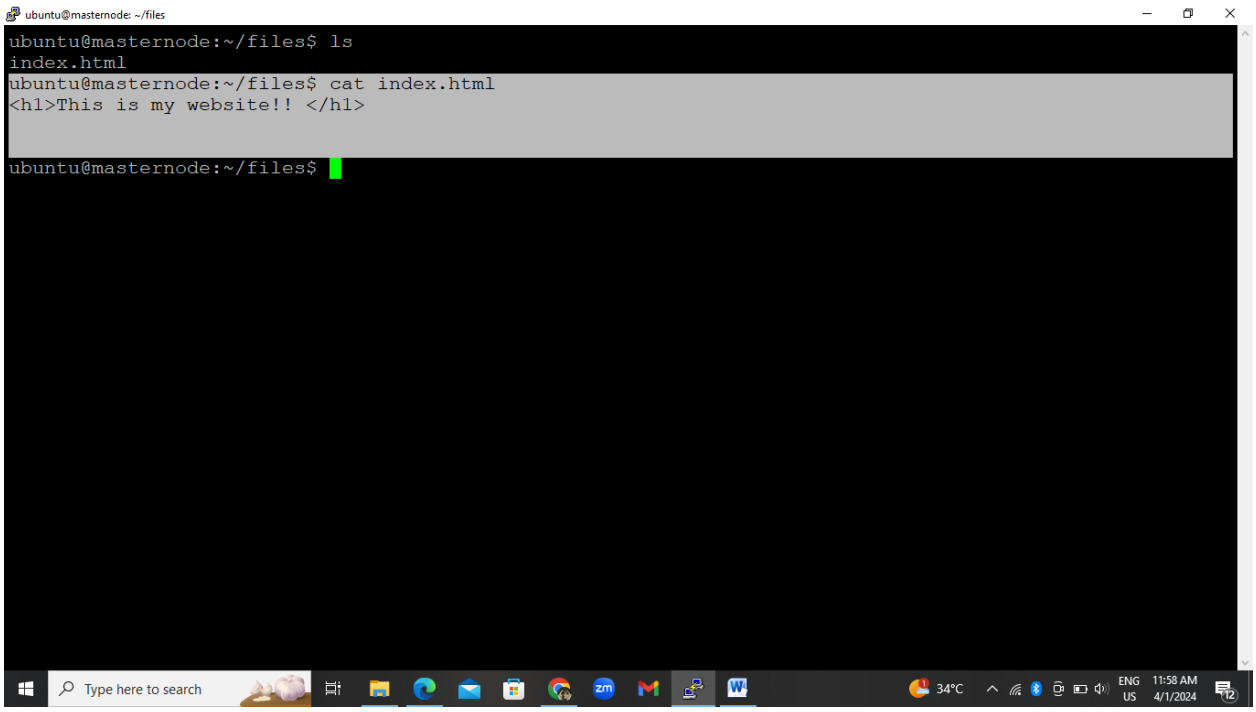
1. Deploy a sample HTML website in any apache container, and demonstrate how we can dynamically change content in the container by making changes on the host machine (Bind Mounts)

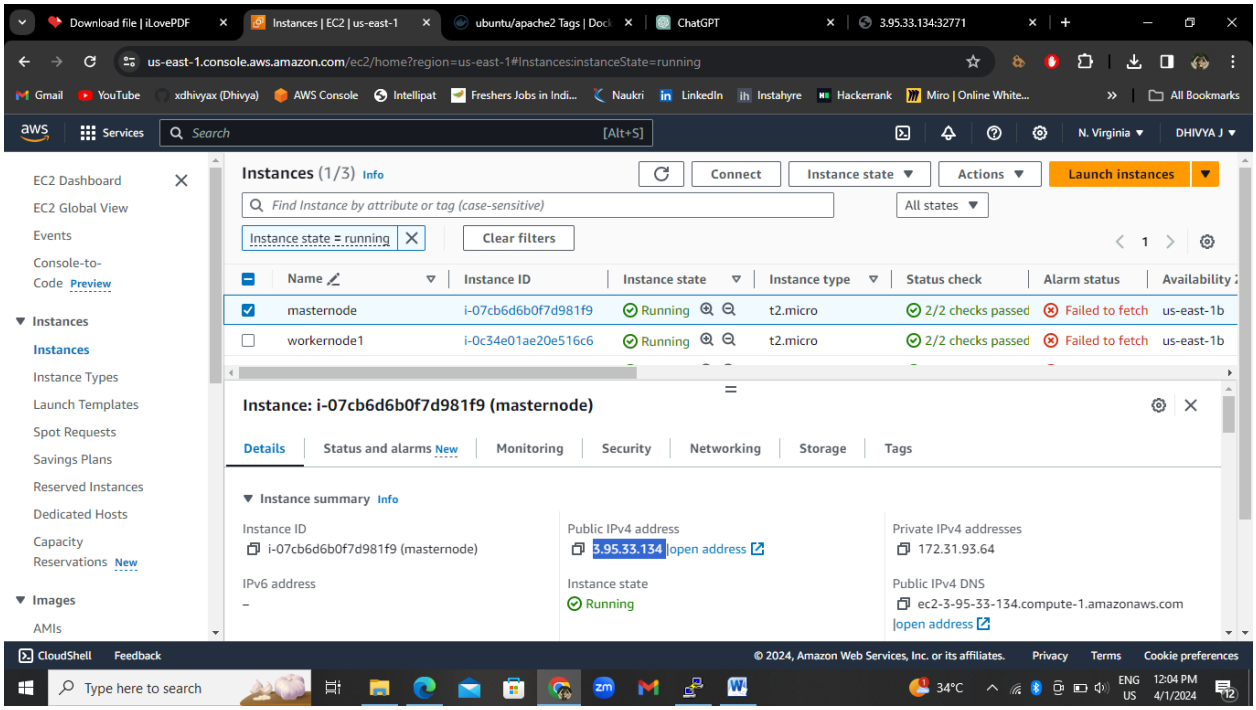
2. Deploy apache and nginx containers using Docker Compose, Apache should be exposed on Port 91 and nginx on port 92

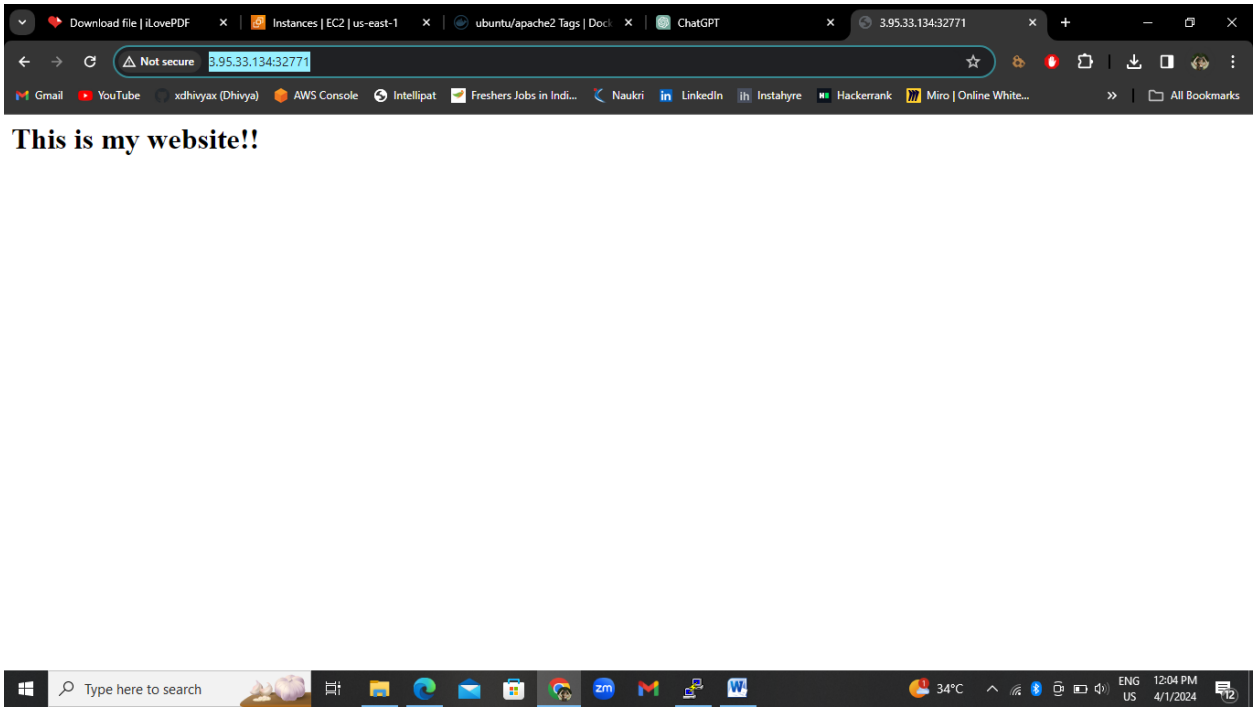
3. Initialize a Docker Swarm Cluster, and deploy two ubuntu containers in a overlaynetwork. Demonstrate they can communicate with each other, by pinging them

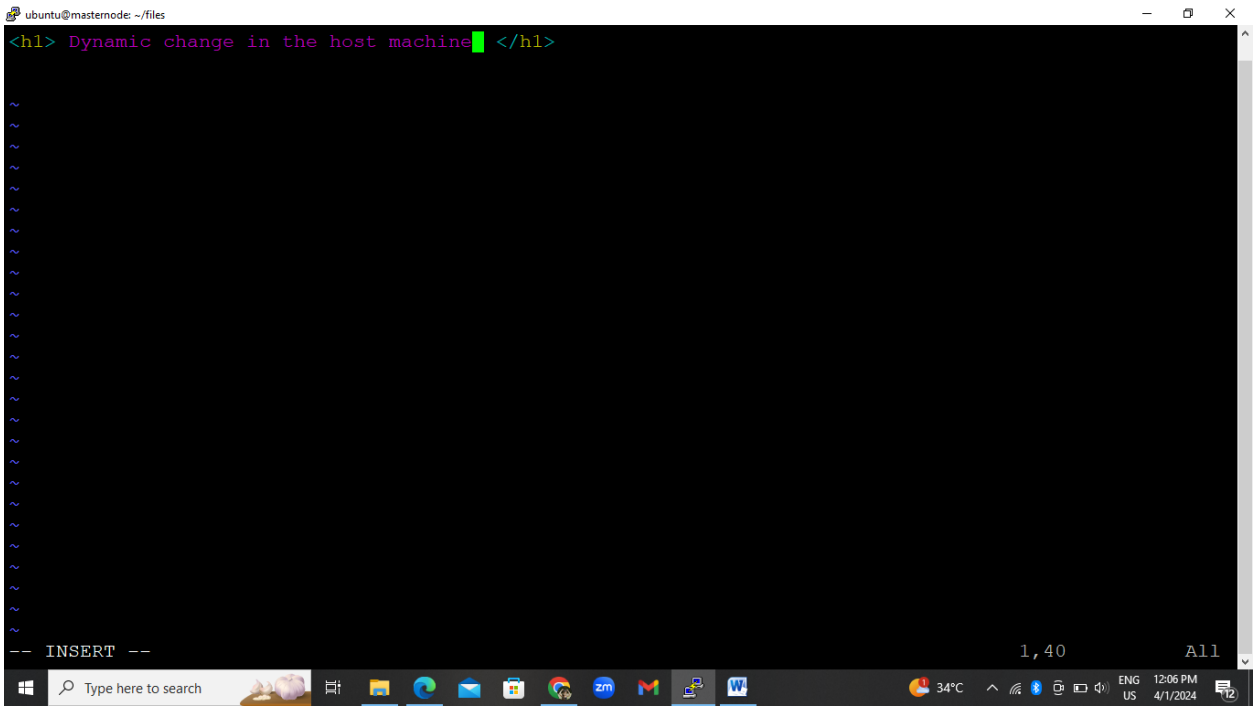


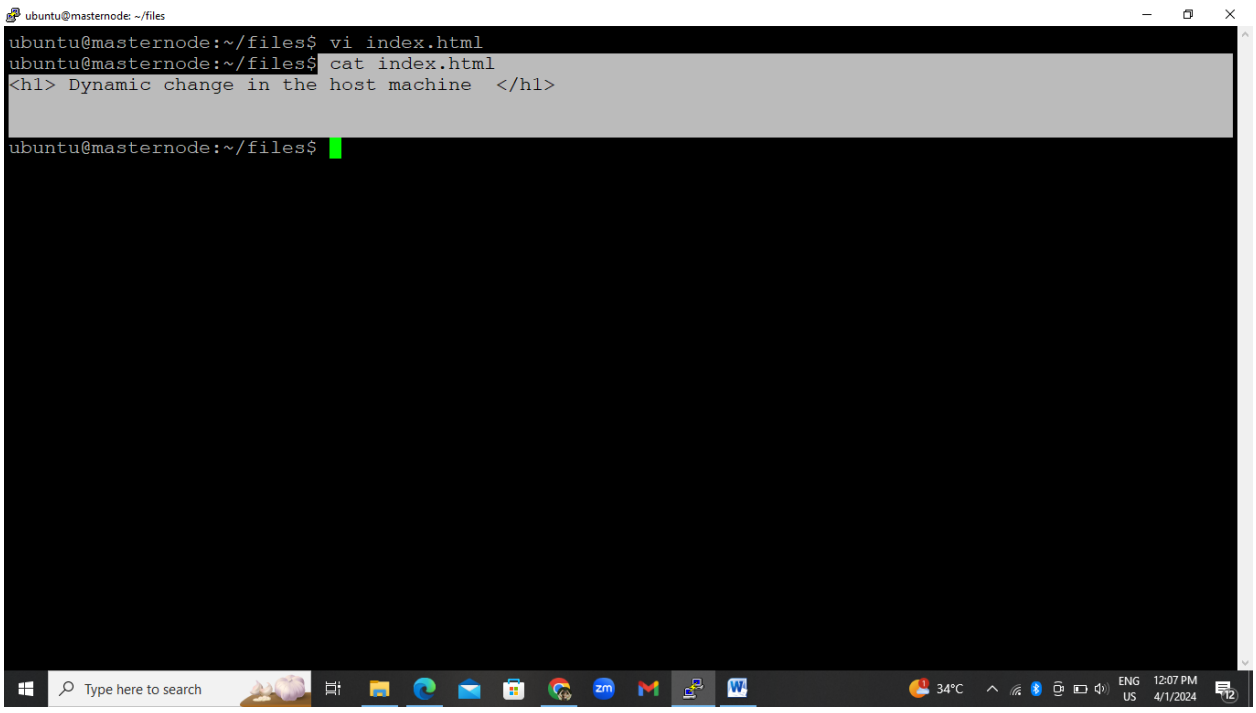

ubuntu@masternode: ~
ubuntu@masternode:~$ docker run -d -P --mount type=bind,src=/home/ubuntu/files,target=/var/www/html/ ubuntu/apache2:latest
9d84f3adbf5f85edad6c952acaf1c18e5f6794148a473f314a02259921f2d2a6
ubuntu@masternode:~$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
9d84f3adbf5f ubuntu/apache2:latest "apache2-foreground" 31 seconds ago Up 30 seconds 0.0.0.0:32771->80/tcp, :::32771->80/tcp strange_joliot
ubuntu@masternode:~$
Type here to search
34°C
ENG US
11:58 AM 4/1/2024

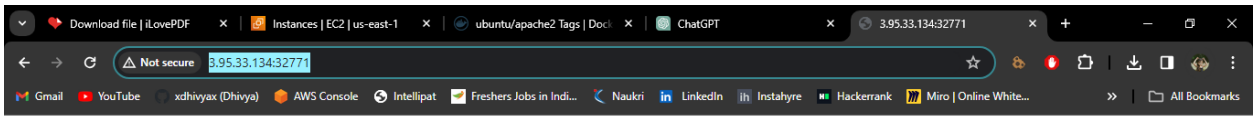

ubuntu@masternode: ~/files
ubuntu@masternode:~/files$ ls
index.html
ubuntu@masternode:~/files$ cat index.html
<h1>This is my website!! </h1>
ubuntu@masternode:~/files$
Type here to search
34°C
ENG US
11:58 AM 4/1/2024


Download file | iLovePDF
Instances | EC2 | us-east-1
ubuntu/apache2 Tags | Dock
ChatGPT
3.95.33.134:32771
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:instanceState=running
Gmail
YouTube
xdhivyax (Dhivya)
AWS Console
Intellipat
Freshers Jobs in Indi...
Naukri
LinkedIn
Instahyre
Hackerrank
Miro | Online White...
All Bookmarks
Services
Search
[Alt+S]
N. Virginia
DHIVYA J
EC2 Dashboard
EC2 Global View
Events
Console-to-Code Preview
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations New
Images
AMIs
Instances (1/3) Info
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
All states
Instance state = running
Clear filters
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability
masternode
i-07cb6d6b0f7d981f9
Running
t2.micro
2/2 checks passed
Failed to fetch
us-east-1b
workernode1
i-0c34e01ae20e516c6
Running
t2.micro
2/2 checks passed
Failed to fetch
us-east-1b
Instance: i-07cb6d6b0f7d981f9 (masternode)
Details
Status and alarms New
Monitoring
Security
Networking
Storage
Tags
Instance summary Info
Instance ID
i-07cb6d6b0f7d981f9 (masternode)
Public IPv4 address
3.95.33.134 |open address
Private IPv4 addresses
172.31.93.64
IPv6 address
–
Instance state
Running
Public IPv4 DNS
ec2-3-95-33-134.compute-1.amazonaws.com |open address
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
Type here to search
34°C
ENG US
12:04 PM 4/1/2024

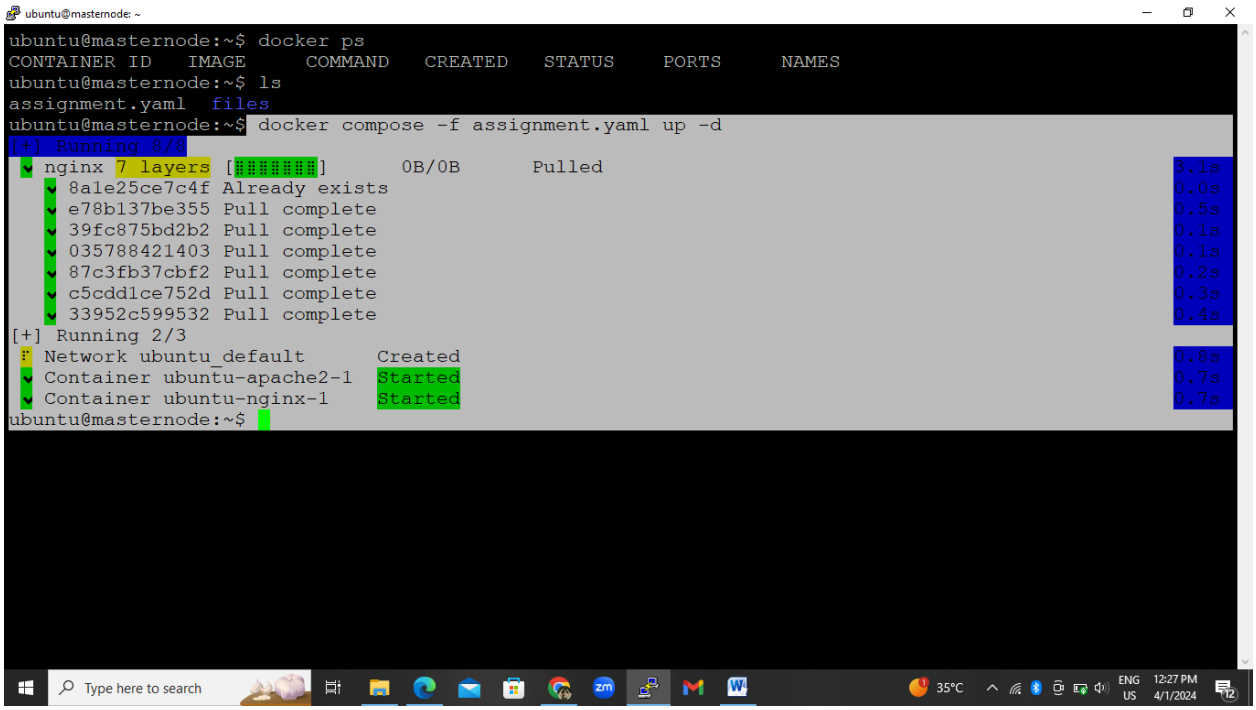

Download file | iLovePDF
Instances | EC2 | us-east-1
ubuntu/apache2 Tags | Dock
ChatGPT
3.95.33.134:32771
Not secure
3.95.33.134:32771
Gmail
YouTube
xdhivyax (Dhivya)
AWS Console
Intellipat
Freshers Jobs in Indi...
Naukri
LinkedIn
Instahyre
Hackerrank
Miro | Online White...
All Bookmarks
This is my website!!
Type here to search
34°C
ENG US
12:04 PM 4/1/2024

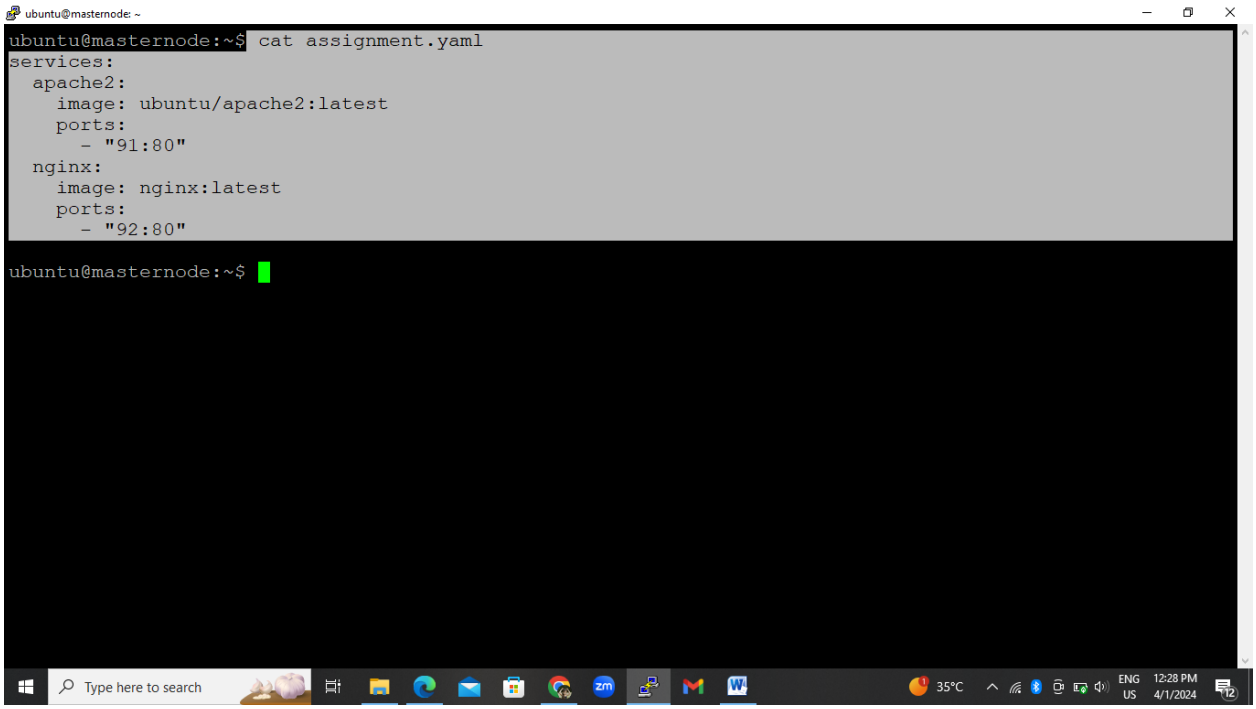

ubuntu@masternode: ~/files
<h1> Dynamic change in the host machine </h1>
-- INSERT --
1,40
All
Type here to search
34°C
ENG
US
12:06 PM
4/1/2024


ubuntu@masternode: ~/files
ubuntu@masternode:~/files$ vi index.html
ubuntu@masternode:~/files$ cat index.html
<h1> Dynamic change in the host machine </h1>
ubuntu@masternode:~/files$
Type here to search
34°C
ENG
US
12:07 PM
4/1/2024

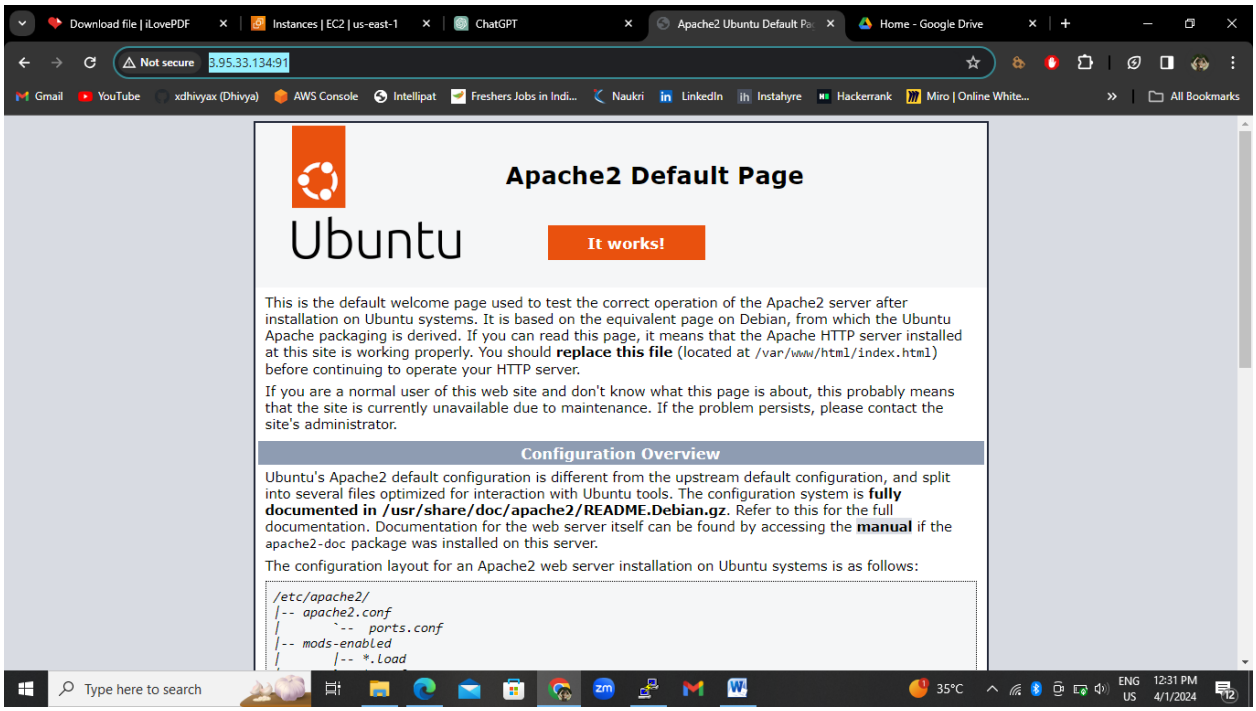


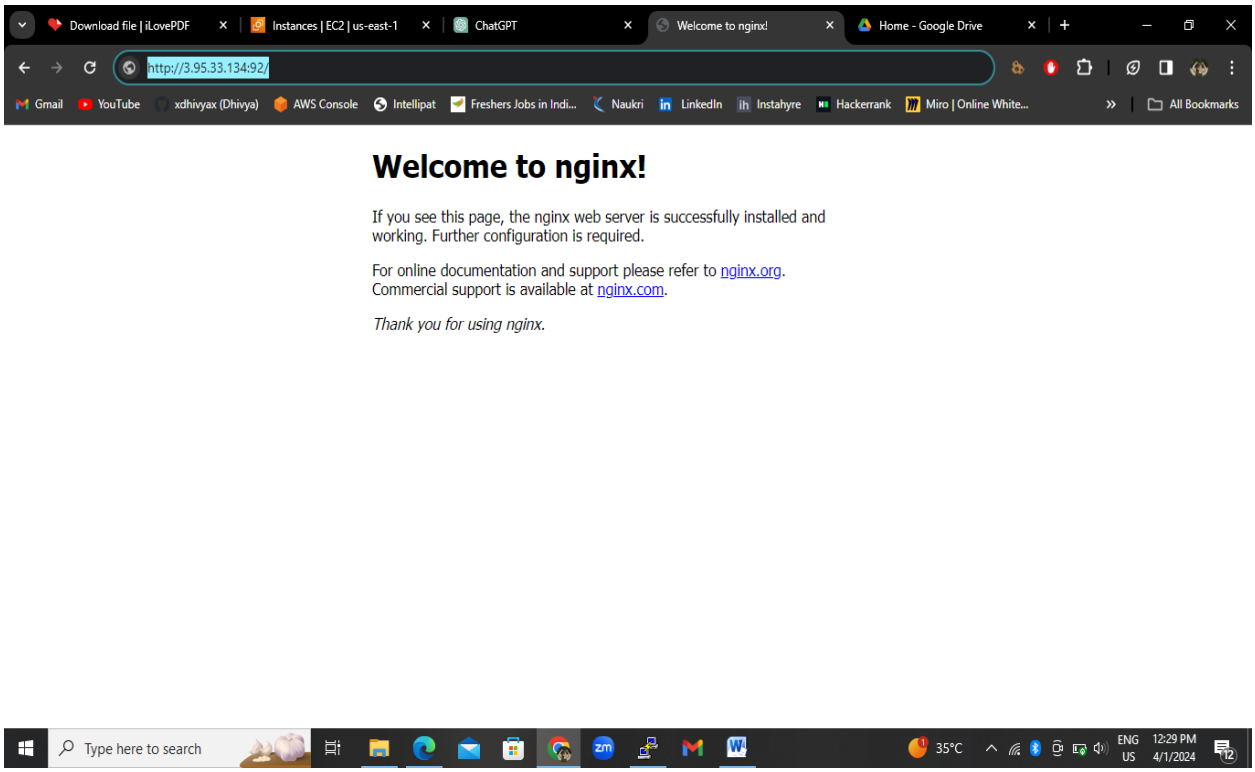
Dynamic change in the host machine

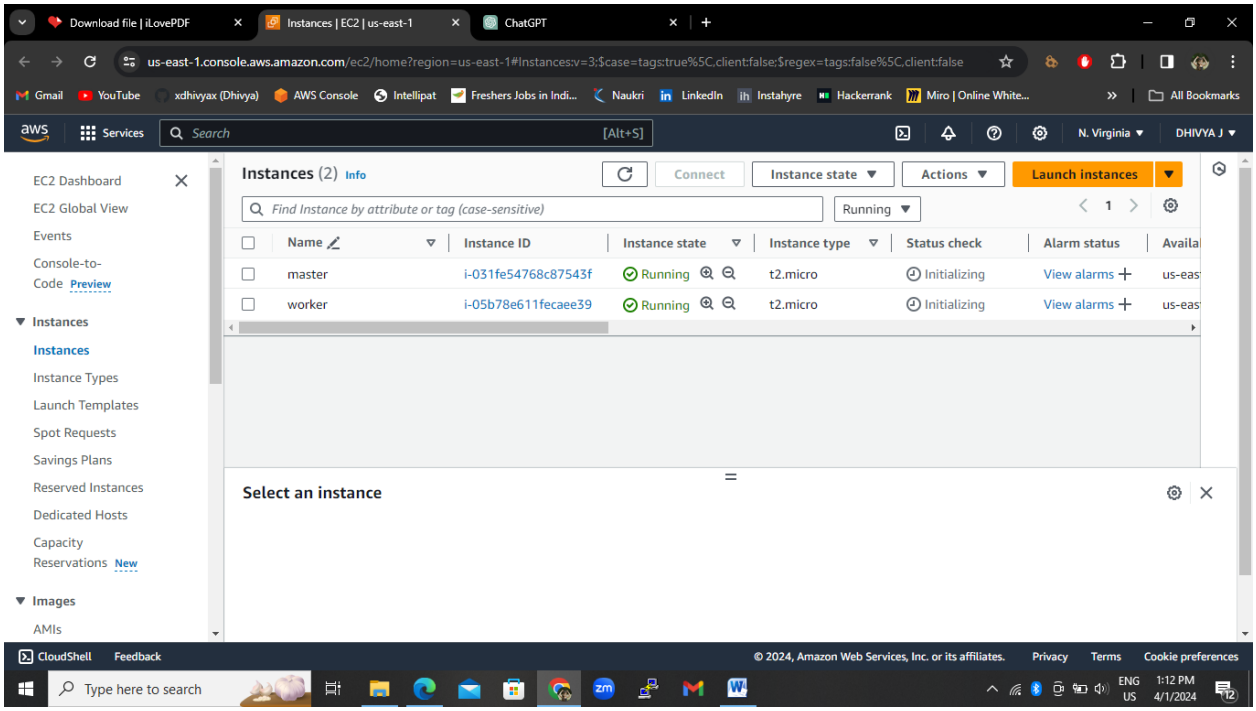


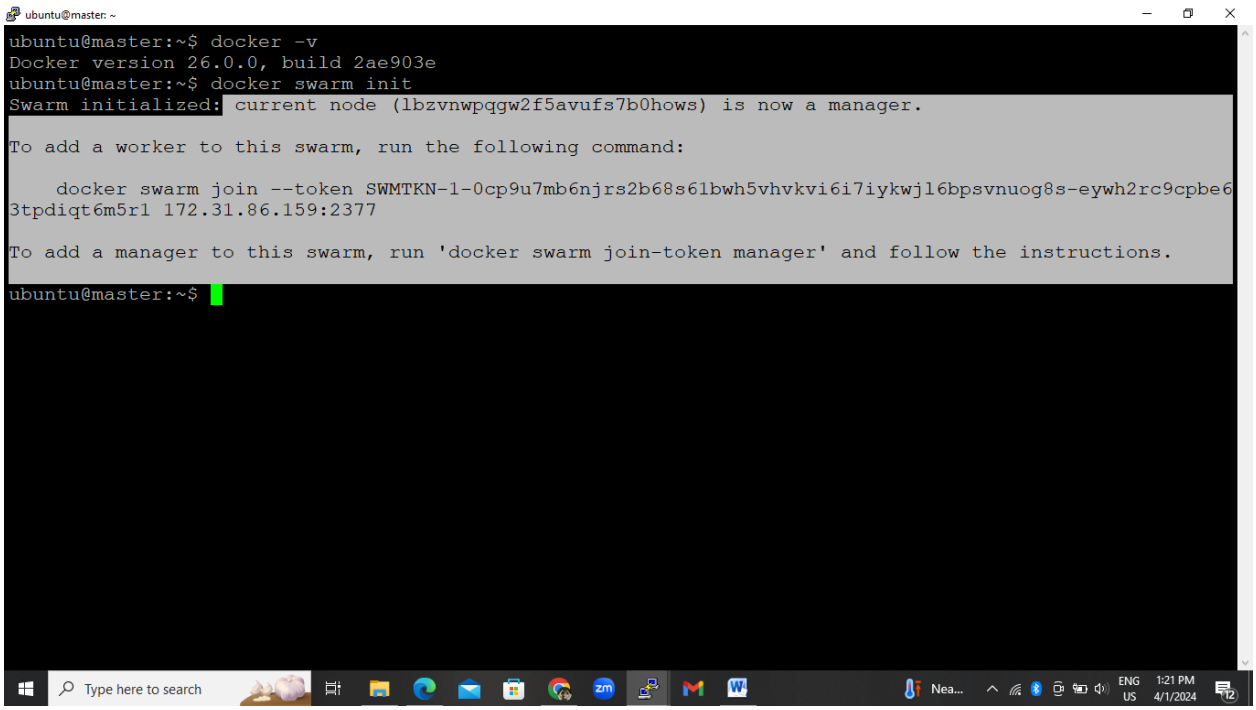

ubuntu@masternode: ~
ubuntu@masternode:~$ cat assignment.yaml
services:
apache2:
image: ubuntu/apache2:latest
ports:
- "91:80"
nginx:
image: nginx:latest
ports:
- "92:80"
ubuntu@masternode:~$
Type here to search
35°C
ENG
US
12:28 PM
4/1/2024

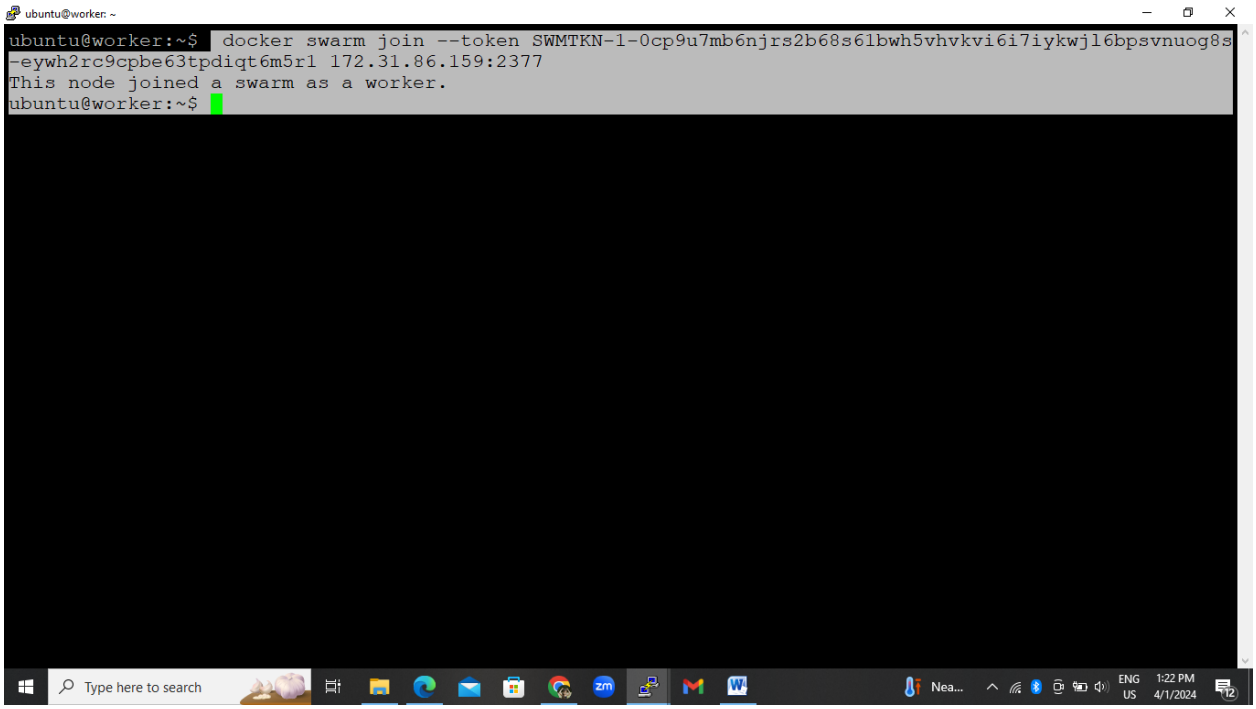
ubuntu@masternode: ~
ubuntu@masternode:~$ cat assignment.yaml
services:
apache2:
image: ubuntu/apache2:latest
ports:
- "91:80"
nginx:
image: nginx:latest
ports:
- "92:80"
ubuntu@masternode:~$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS
NAMES
caa2bc5d9501 nginx:latest "/docker-entrypoint.…" 2 minutes ago Up 2 minutes 0.0.0.0:
92->80/tcp, :::92->80/tcp ubuntu-nginx-1
eb09aad4fdf6 ubuntu/apache2:latest "apache2-foreground" 2 minutes ago Up 2 minutes 0.0.0.0:
91->80/tcp, :::91->80/tcp ubuntu-apache2-1
ubuntu@masternode:~$
Type here to search
35°C
ENG
US
12:30 PM
4/1/2024

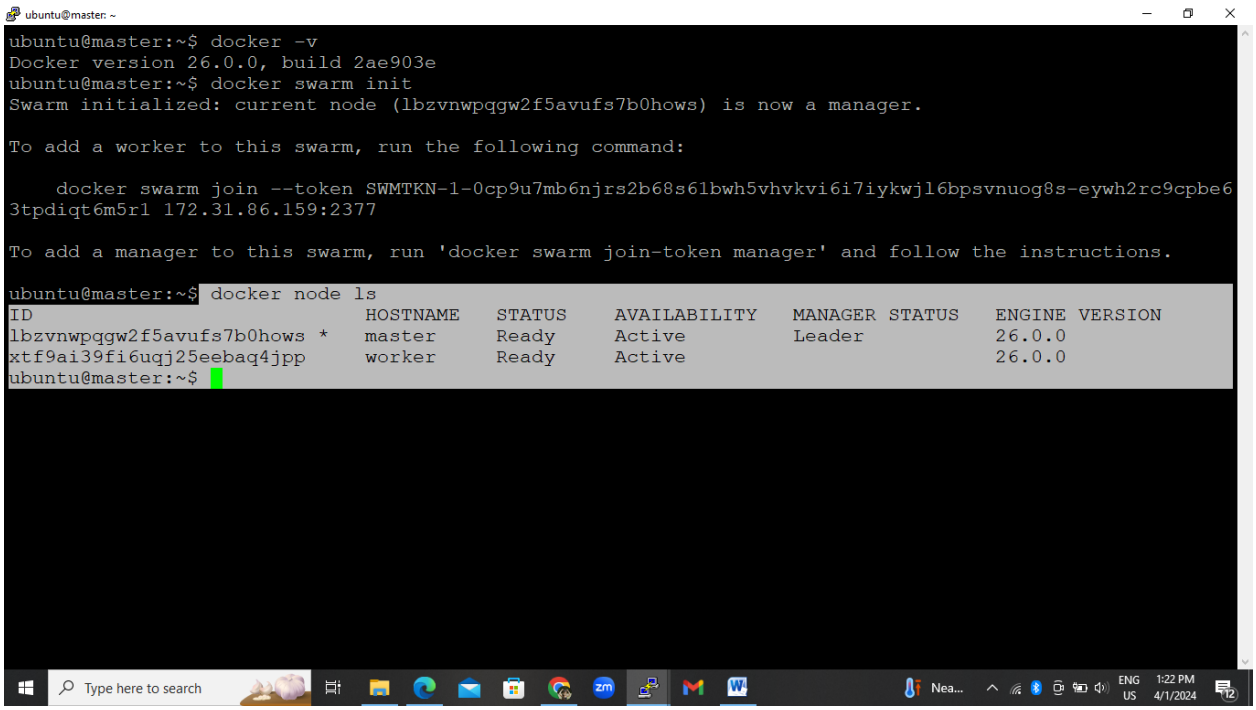

Download file | iLovePDF
Instances | EC2 | us-east-1
ChatGPT
Apache2 Ubuntu Default Pa
Home - Google Drive
Not secure
3.95.33.134:91
Gmail
YouTube
xdhivyax (Dhivya)
AWS Console
Intellipat
Freshers Jobs in Indi...
Naukri
LinkedIn
Instahyre
Hackerrank
Miro | Online White...
All Bookmarks
Apache2 Default Page
Ubuntu
It works!
This is the default welcome page used to test the correct operation of the Apache2 server after installation on Ubuntu systems. It is based on the equivalent page on Debian, from which the Ubuntu Apache packaging is derived. If you can read this page, it means that the Apache HTTP server installed at this site is working properly. You should replace this file (located at /var/www/html/index.html) before continuing to operate your HTTP server.
If you are a normal user of this web site and don't know what this page is about, this probably means that the site is currently unavailable due to maintenance. If the problem persists, please contact the site's administrator.
Configuration Overview
Ubuntu's Apache2 default configuration is different from the upstream default configuration, and split into several files optimized for interaction with Ubuntu tools. The configuration system is fully documented in /usr/share/doc/apache2/README.Debian.gz. Refer to this for the full documentation. Documentation for the web server itself can be found by accessing the manual if the apache2-doc package was installed on this server.
The configuration layout for an Apache2 web server installation on Ubuntu systems is as follows:
/etc/apache2/
|-- apache2.conf
| `-- ports.conf
|-- mods-enabled
| |-- *.load
Type here to search
35°C
ENG
US
12:31 PM
4/1/2024

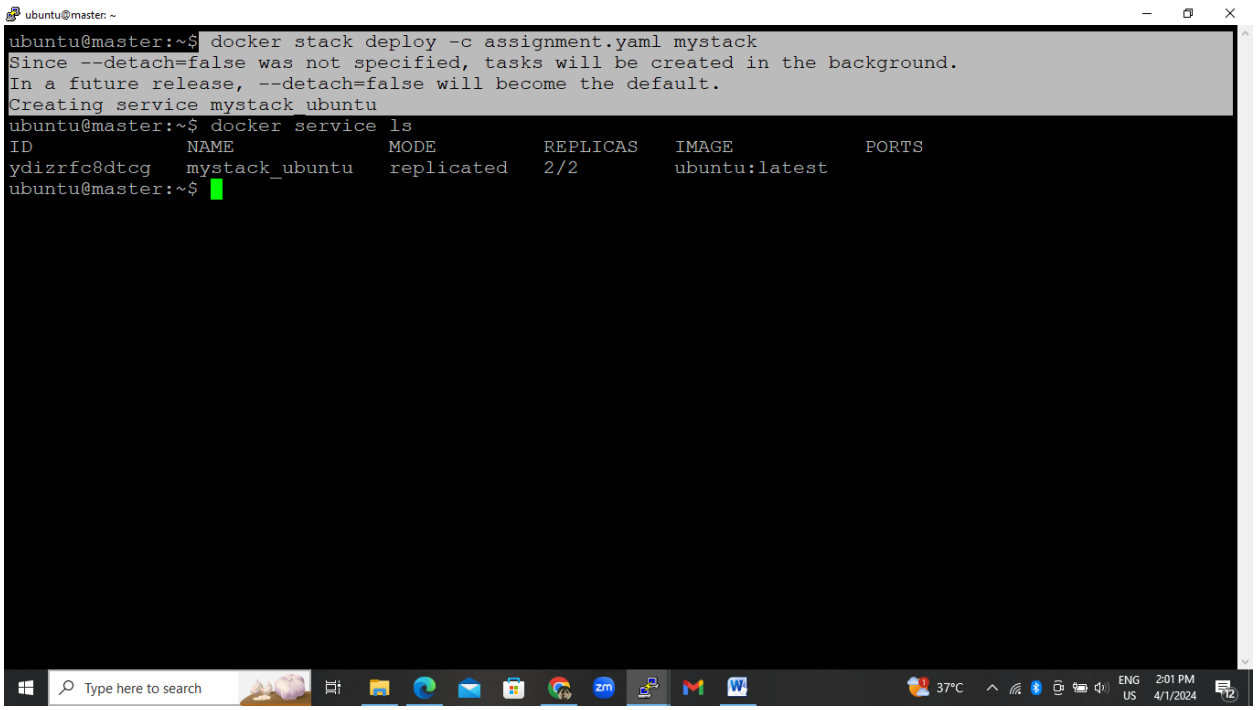

Download file | iLovePDF
Instances | EC2 | us-east-1
ChatGPT
Welcome to nginx!
Home - Google Drive
http://3.95.33.134:92/
Gmail
YouTube
xdhivyax (Dhivya)
AWS Console
Intellipat
Freshers Jobs in Indi...
Naukri
LinkedIn
Instahyre
Hackerrank
Miro | Online White...
All Bookmarks
Welcome to nginx!
If you see this page, the nginx web server is successfully installed and working. Further configuration is required.
For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.
Thank you for using nginx.
Type here to search
35°C
ENG
US
12:29 PM
4/1/2024

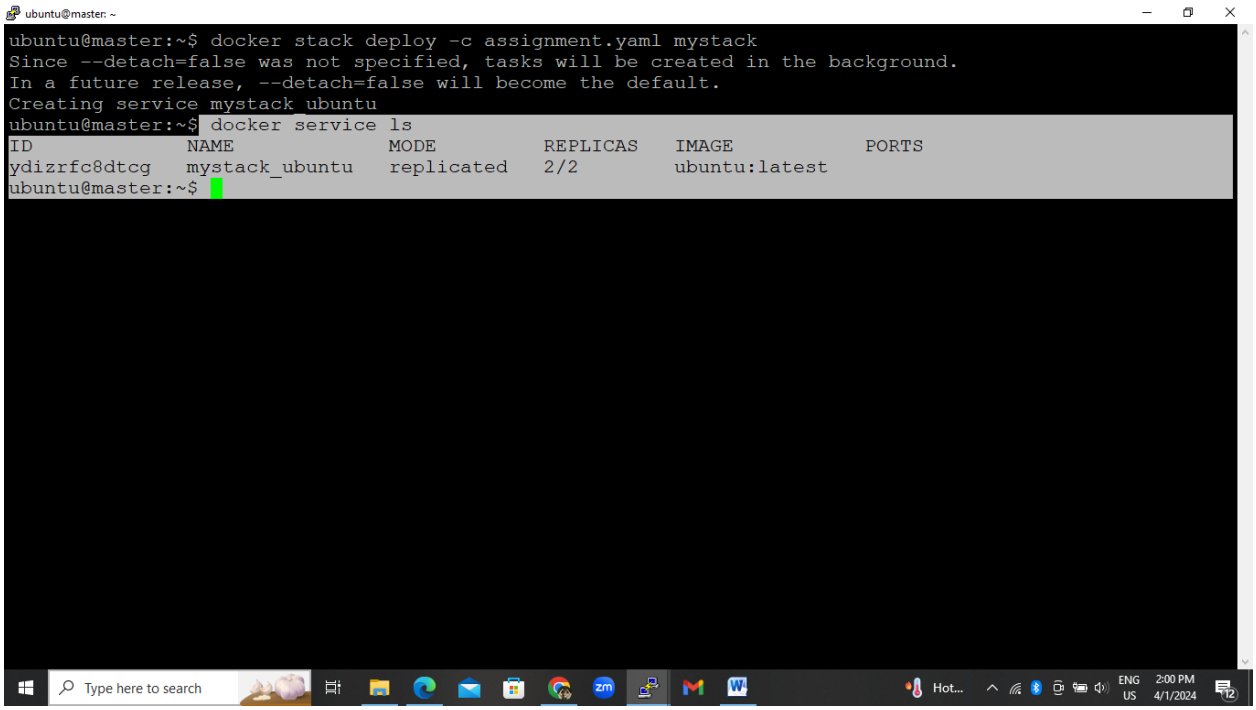

Download file | iLovePDF
Instances | EC2 | us-east-1
ChatGPT
us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:v=3;$case=tags:true%5C,client:false;$regex=tags:false%5C,client:false
Gmail
YouTube
xdhivyax (Dhivya)
AWS Console
Intellipat
Freshers Jobs in Indi...
Naukri
LinkedIn
Instahyre
Hackerrank
Miro | Online White...
All Bookmarks
aws
Services
Search
[Alt+S]
N. Virginia
DHIVYA J
EC2 Dashboard
EC2 Global View
Events
Console-to-Code Preview
Instances
Instances
Instance Types
Launch Templates
Spot Requests
Savings Plans
Reserved Instances
Dedicated Hosts
Capacity Reservations New
Images
AMIs
Instances (2) Info
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
Running
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
master
i-031fe54768c87543f
Running
t2.micro
Initializing
View alarms
worker
i-05b78e611fecaee39
Running
t2.micro
Initializing
View alarms
Select an instance
CloudShell
Feedback
© 2024, Amazon Web Services, Inc. or its affiliates.
Privacy
Terms
Cookie preferences
Type here to search
ENG US
1:12 PM
4/1/2024

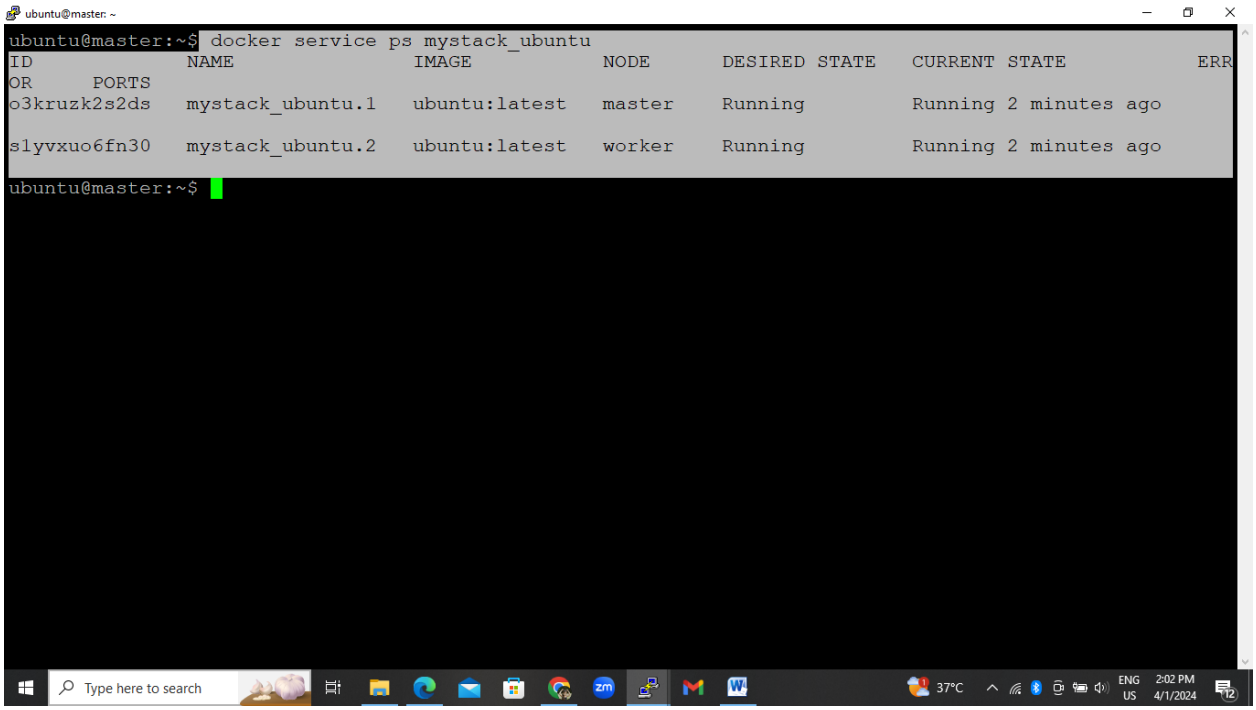

ubuntu@master: ~
ubuntu@master:~$ docker -v
Docker version 26.0.0, build 2ae903e
ubuntu@master:~$ docker swarm init
Swarm initialized: current node (lbzvnwpqgw2f5avufs7b0hows) is now a manager.
To add a worker to this swarm, run the following command:
docker swarm join --token SWMTKN-1-0cp9u7mb6njrs2b68s61bwh5vhvkvi6i7iykwjl6bpsvnuog8s-eywh2rc9cpbe6
3tpdiqt6m5r1 172.31.86.159:2377
To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.
ubuntu@master:~$
Type here to search
Nea...
ENG US
1:21 PM
4/1/2024

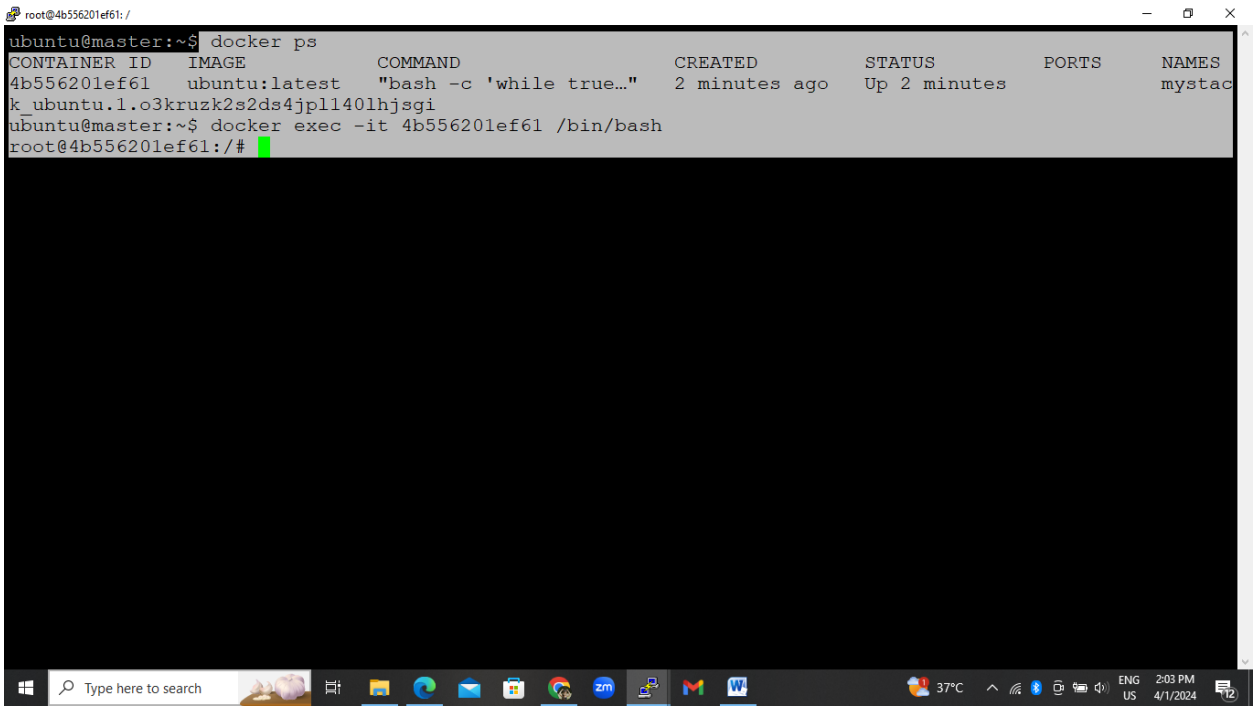

ubuntu@worker: ~
ubuntu@worker:~$ docker swarm join --token SWMTKN-1-0cp9u7mb6njrs2b68s61bwh5vhvkvi6i7iykwjl6bpsvnuog8s-eywh2rc9cpbe63tpdiqt6m5r1 172.31.86.159:2377
This node joined a swarm as a worker.
ubuntu@worker:~$
Type here to search
Nea...
ENG US
1:22 PM 4/1/2024

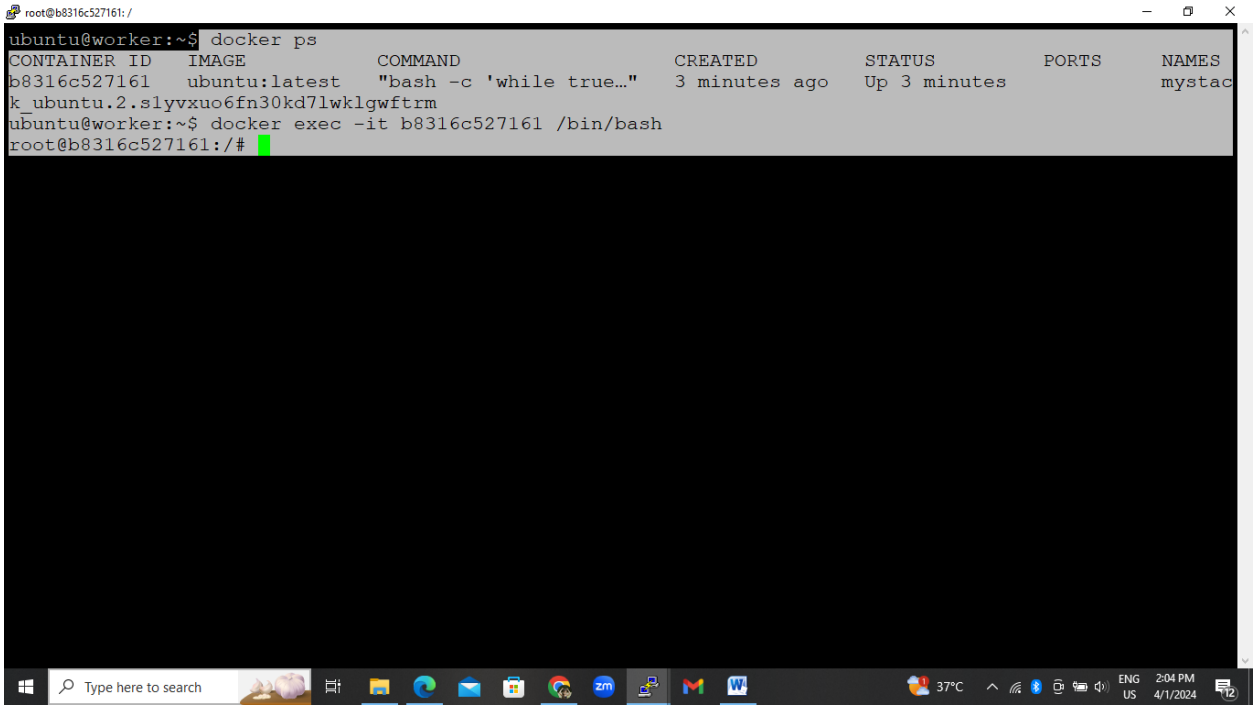

ubuntu@master: ~
ubuntu@master:~$ docker -v
Docker version 26.0.0, build 2ae903e
ubuntu@master:~$ docker swarm init
Swarm initialized: current node (lbzvnwpqgw2f5avufs7b0hows) is now a manager.
To add a worker to this swarm, run the following command:
docker swarm join --token SWMTKN-1-0cp9u7mb6njrs2b68s61bwh5vhvkvi6i7iykwjl6bpsvnuog8s-eywh2rc9cpbe63tpdiqt6m5r1 172.31.86.159:2377
To add a manager to this swarm, run 'docker swarm join-token manager' and follow the instructions.
ubuntu@master:~$ docker node ls
ID HOSTNAME STATUS AVAILABILITY MANAGER STATUS ENGINE VERSION
lbzvnwpqgw2f5avufs7b0hows * master Ready Active Leader 26.0.0
xtf9ai39fi6uqj25eebaq4jpp worker Ready Active 26.0.0
ubuntu@master:~$
Type here to search
Nea...
ENG US
1:22 PM 4/1/2024

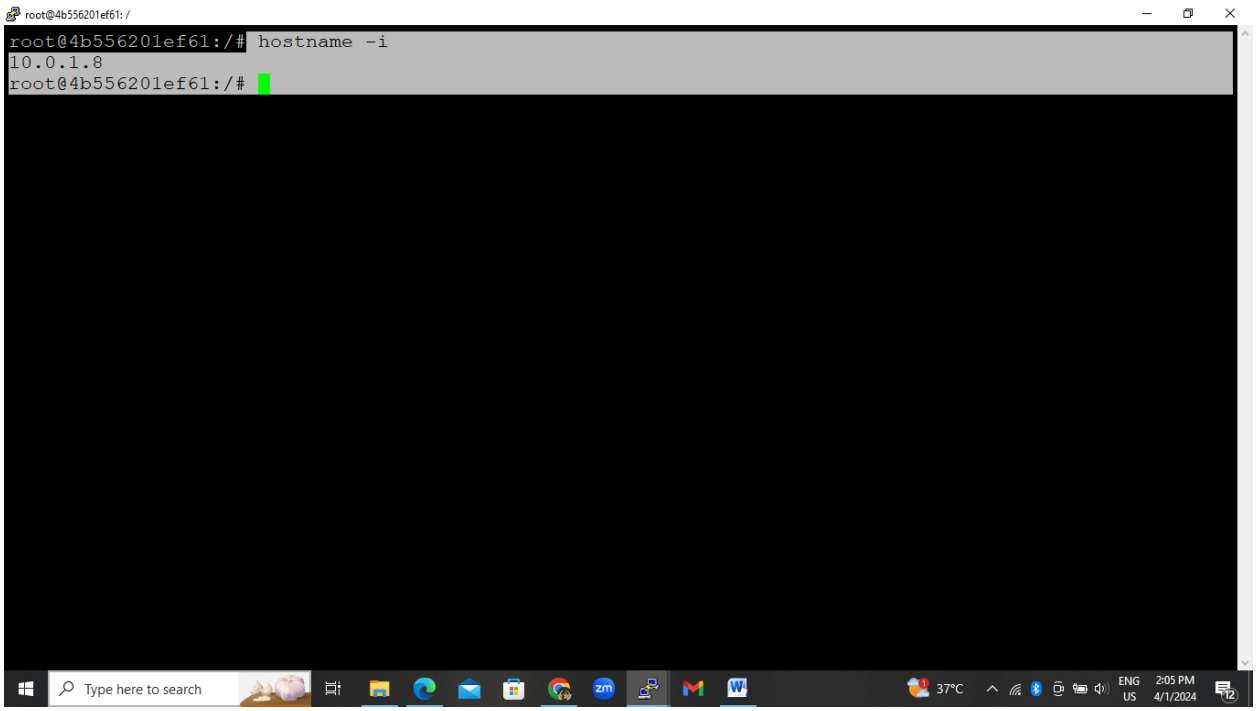

ubuntu@master: ~
ubuntu@master:~$ docker stack deploy -c assignment.yaml mystack
Since --detach=false was not specified, tasks will be created in the background.
In a future release, --detach=false will become the default.
Creating service mystack_ubuntu
ubuntu@master:~$ docker service ls
ID NAME MODE REPLICAS IMAGE PORTS
ydizrfc8dtcg mystack_ubuntu replicated 2/2 ubuntu:latest
ubuntu@master:~$
Type here to search
37°C
ENG US
2:01 PM 4/1/2024

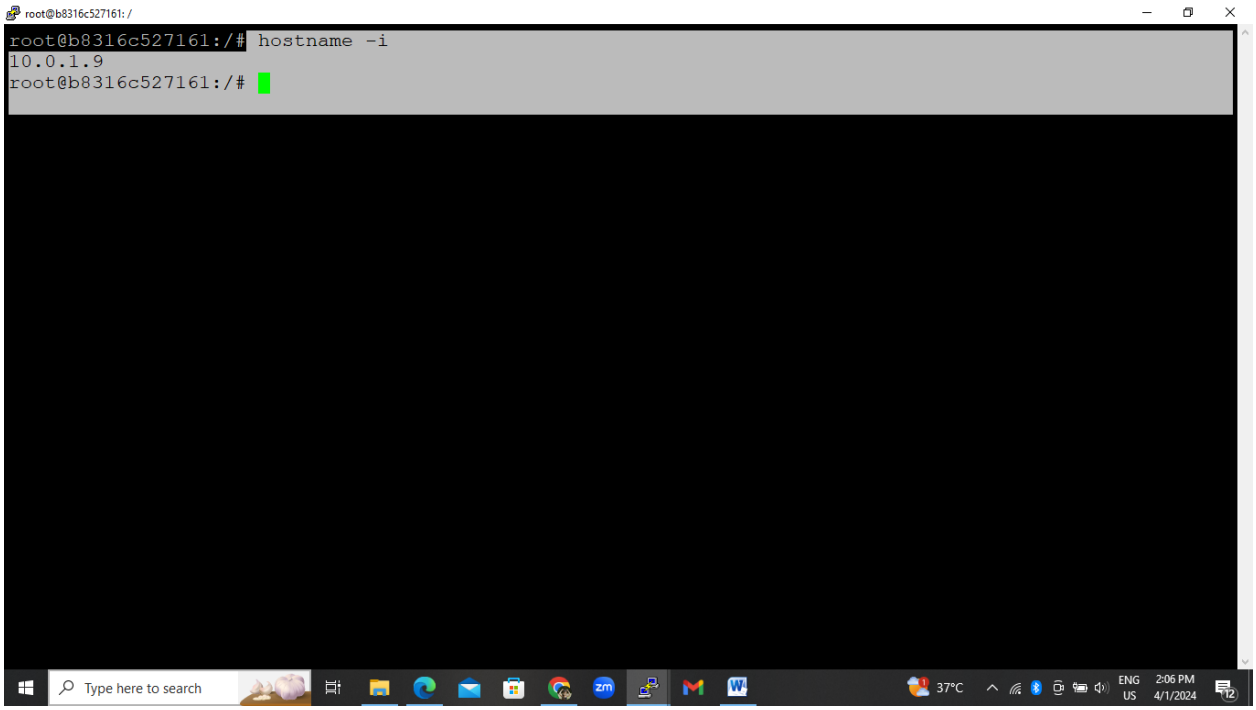

ubuntu@master: ~
ubuntu@master:~$ docker stack deploy -c assignment.yaml mystack
Since --detach=false was not specified, tasks will be created in the background.
In a future release, --detach=false will become the default.
Creating service mystack_ubuntu
ubuntu@master:~$ docker service ls
ID NAME MODE REPLICAS IMAGE PORTS
ydizrfc8dtcg mystack_ubuntu replicated 2/2 ubuntu:latest
ubuntu@master:~$
Type here to search
Hot...
ENG US
2:00 PM 4/1/2024

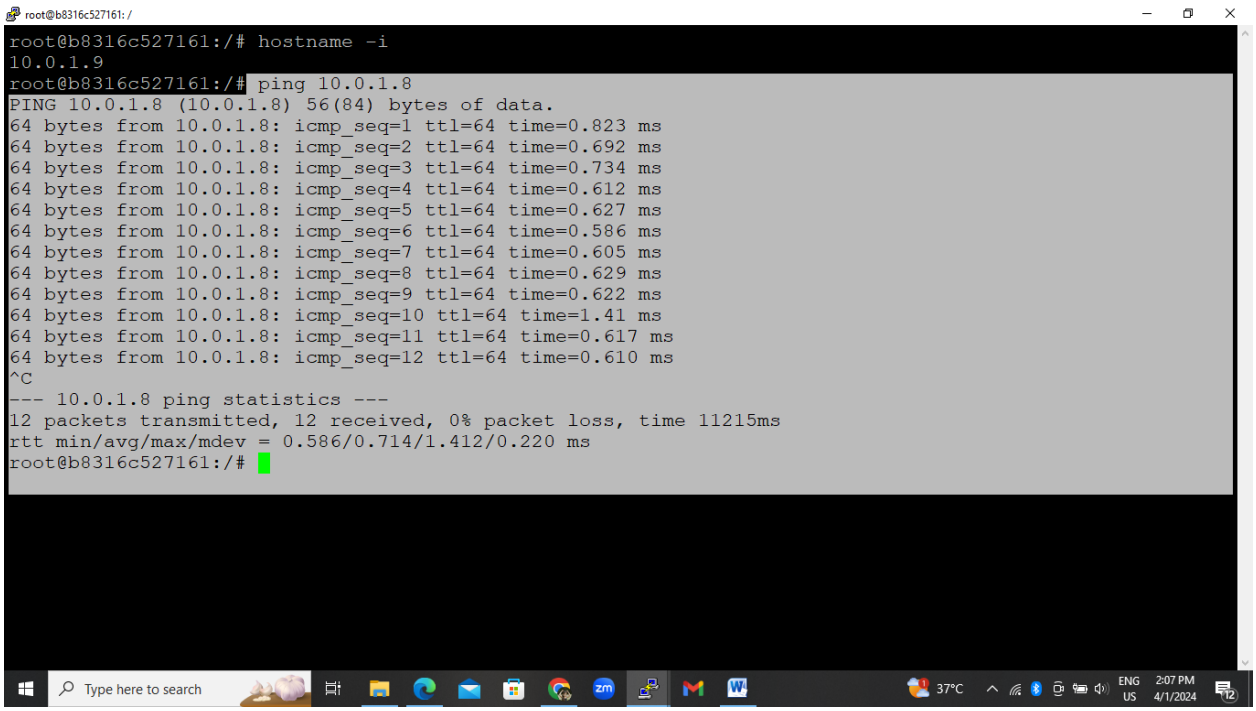

ubuntu@master: ~
ubuntu@master:~$ docker service ps mystack_ubuntu
ID NAME IMAGE NODE DESIRED STATE CURRENT STATE ERR
OR PORTS
o3kruzk2s2ds mystack_ubuntu.1 ubuntu:latest master Running Running 2 minutes ago
s1yvxuo6fn30 mystack_ubuntu.2 ubuntu:latest worker Running Running 2 minutes ago
ubuntu@master:~$
Type here to search
37°C
ENG US
2:02 PM 4/1/2024

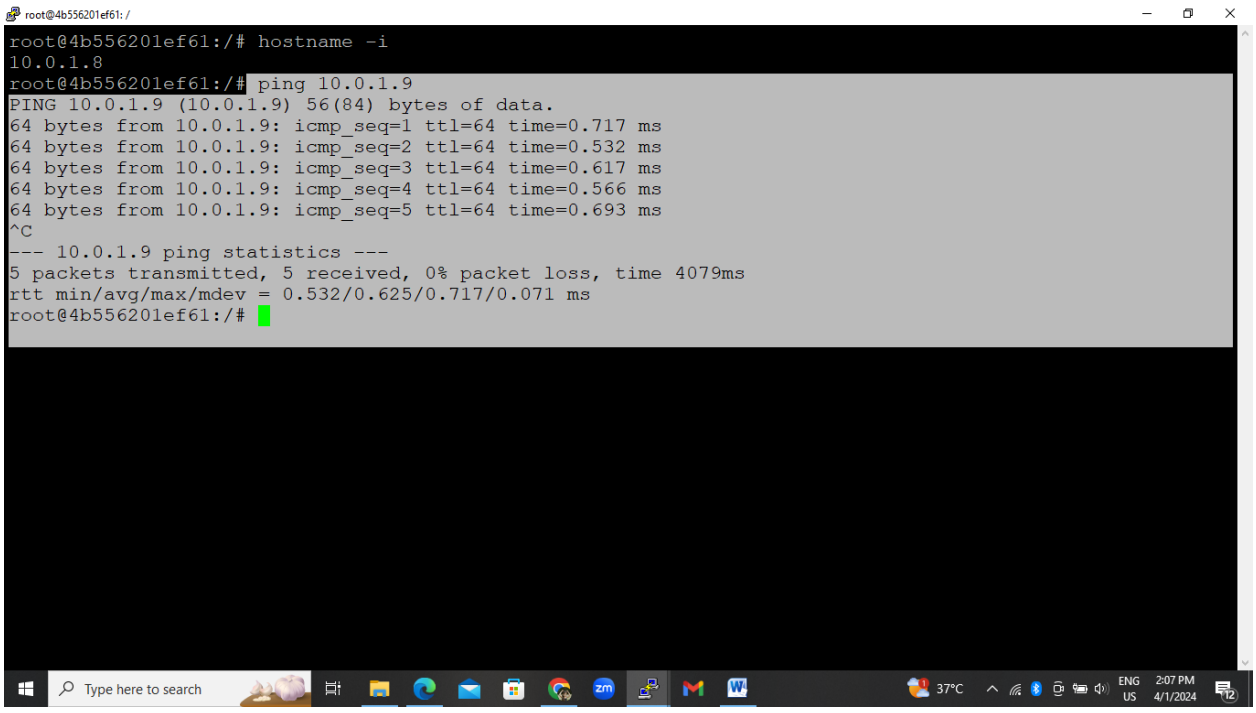

root@4b556201ef61: /
ubuntu@master:~$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
4b556201ef61 ubuntu:latest "bash -c 'while true…" 2 minutes ago Up 2 minutes mystac
k_ubuntu.1.o3kruzk2s2ds4jpl140lhjsgi
ubuntu@master:~$ docker exec -it 4b556201ef61 /bin/bash
root@4b556201ef61:/#
Type here to search
37°C
ENG US
2:03 PM 4/1/2024

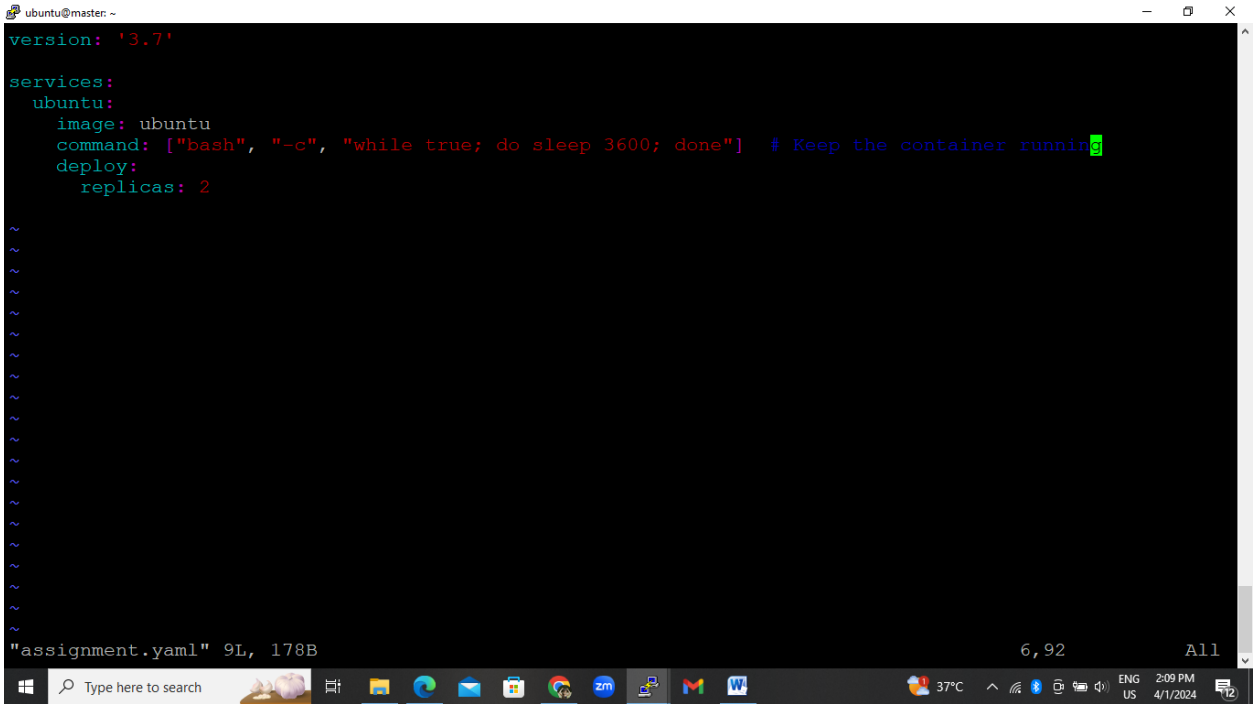

root@b8316c527161: /
ubuntu@worker:~$ docker ps
CONTAINER ID IMAGE COMMAND CREATED STATUS PORTS NAMES
b8316c527161 ubuntu:latest "bash -c 'while true…" 3 minutes ago Up 3 minutes mystac
k_ubuntu.2.s1yvxuo6fn30kd7lwklgwftrm
ubuntu@worker:~$ docker exec -it b8316c527161 /bin/bash
root@b8316c527161:/#
Type here to search
37°C
ENG
US
2:04 PM
4/1/2024


root@4b556201ef61: /
root@4b556201ef61:/# hostname -i
10.0.1.8
root@4b556201ef61:/#
Type here to search
37°C
ENG
US
2:05 PM
4/1/2024


root@b8316c527161: /
root@b8316c527161:/# hostname -i
10.0.1.9
root@b8316c527161:/#
Type here to search
37°C
ENG
US
2:06 PM
4/1/2024


root@b8316c527161: /
root@b8316c527161:/# hostname -i
10.0.1.9
root@b8316c527161:/# ping 10.0.1.8
PING 10.0.1.8 (10.0.1.8) 56(84) bytes of data.
64 bytes from 10.0.1.8: icmp_seq=1 ttl=64 time=0.823 ms
64 bytes from 10.0.1.8: icmp_seq=2 ttl=64 time=0.692 ms
64 bytes from 10.0.1.8: icmp_seq=3 ttl=64 time=0.734 ms
64 bytes from 10.0.1.8: icmp_seq=4 ttl=64 time=0.612 ms
64 bytes from 10.0.1.8: icmp_seq=5 ttl=64 time=0.627 ms
64 bytes from 10.0.1.8: icmp_seq=6 ttl=64 time=0.586 ms
64 bytes from 10.0.1.8: icmp_seq=7 ttl=64 time=0.605 ms
64 bytes from 10.0.1.8: icmp_seq=8 ttl=64 time=0.629 ms
64 bytes from 10.0.1.8: icmp_seq=9 ttl=64 time=0.622 ms
64 bytes from 10.0.1.8: icmp_seq=10 ttl=64 time=1.41 ms
64 bytes from 10.0.1.8: icmp_seq=11 ttl=64 time=0.617 ms
64 bytes from 10.0.1.8: icmp_seq=12 ttl=64 time=0.610 ms
^C
--- 10.0.1.8 ping statistics ---
12 packets transmitted, 12 received, 0% packet loss, time 11215ms
rtt min/avg/max/mdev = 0.586/0.714/1.412/0.220 ms
root@b8316c527161:/#
Type here to search
37°C
ENG
US
2:07 PM
4/1/2024


root@4b556201ef61: /
root@4b556201ef61:/# hostname -i
10.0.1.8
root@4b556201ef61:/# ping 10.0.1.9
PING 10.0.1.9 (10.0.1.9) 56(84) bytes of data.
64 bytes from 10.0.1.9: icmp_seq=1 ttl=64 time=0.717 ms
64 bytes from 10.0.1.9: icmp_seq=2 ttl=64 time=0.532 ms
64 bytes from 10.0.1.9: icmp_seq=3 ttl=64 time=0.617 ms
64 bytes from 10.0.1.9: icmp_seq=4 ttl=64 time=0.566 ms
64 bytes from 10.0.1.9: icmp_seq=5 ttl=64 time=0.693 ms
^C
--- 10.0.1.9 ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4079ms
rtt min/avg/max/mdev = 0.532/0.625/0.717/0.071 ms
root@4b556201ef61:/#
Type here to search
37°C
ENG
US
2:07 PM
4/1/2024


ubuntu@master: ~
version: '3.7'
services:
ubuntu:
image: ubuntu
command: ["bash", "-c", "while true; do sleep 3600; done"] # Keep the container running
deploy:
replicas: 2
"assignment.yaml" 9L, 178B
6,92
All
Type here to search
37°C
ENG
US
2:09 PM
4/1/2024