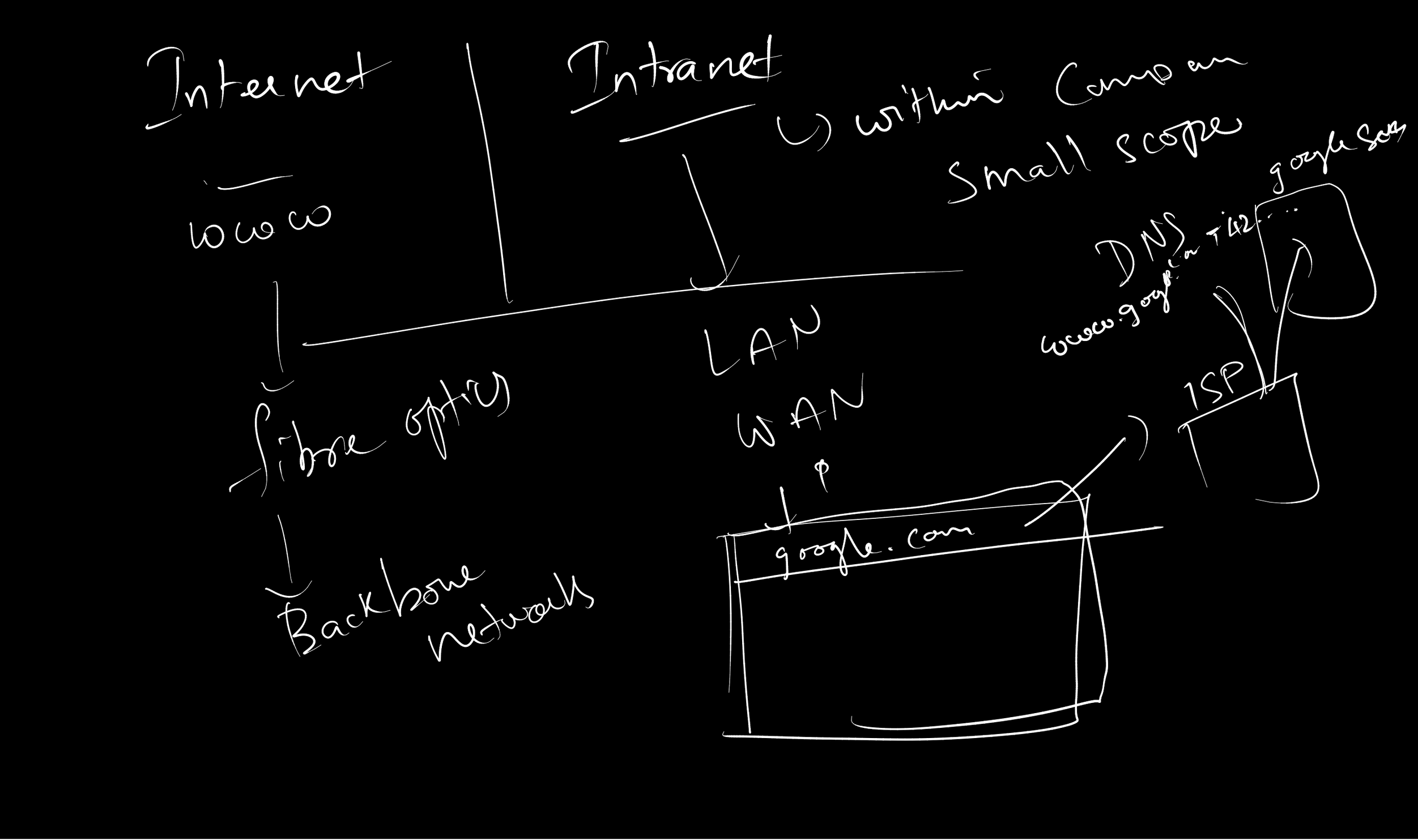
Web Server [NGINX]

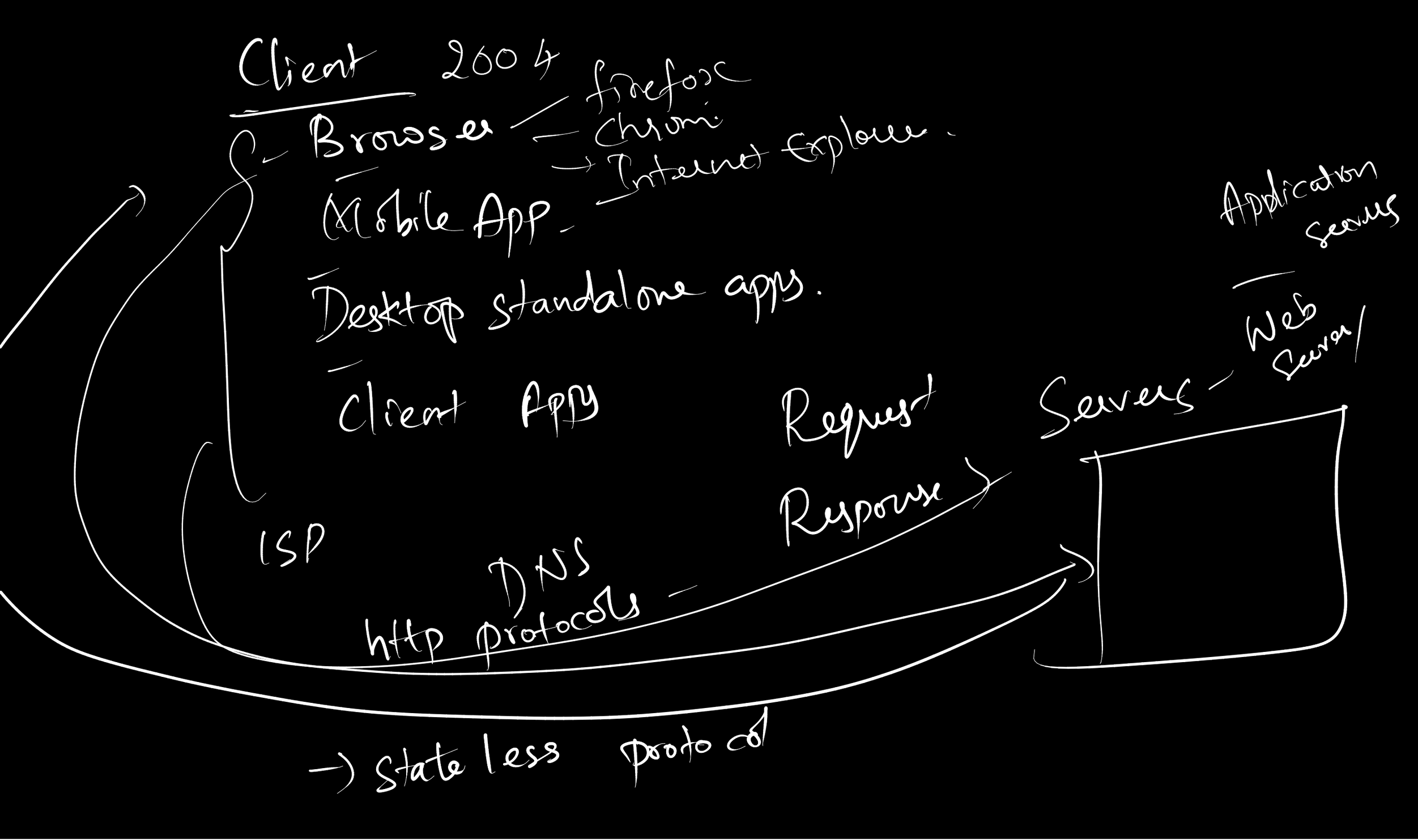
Class Notes

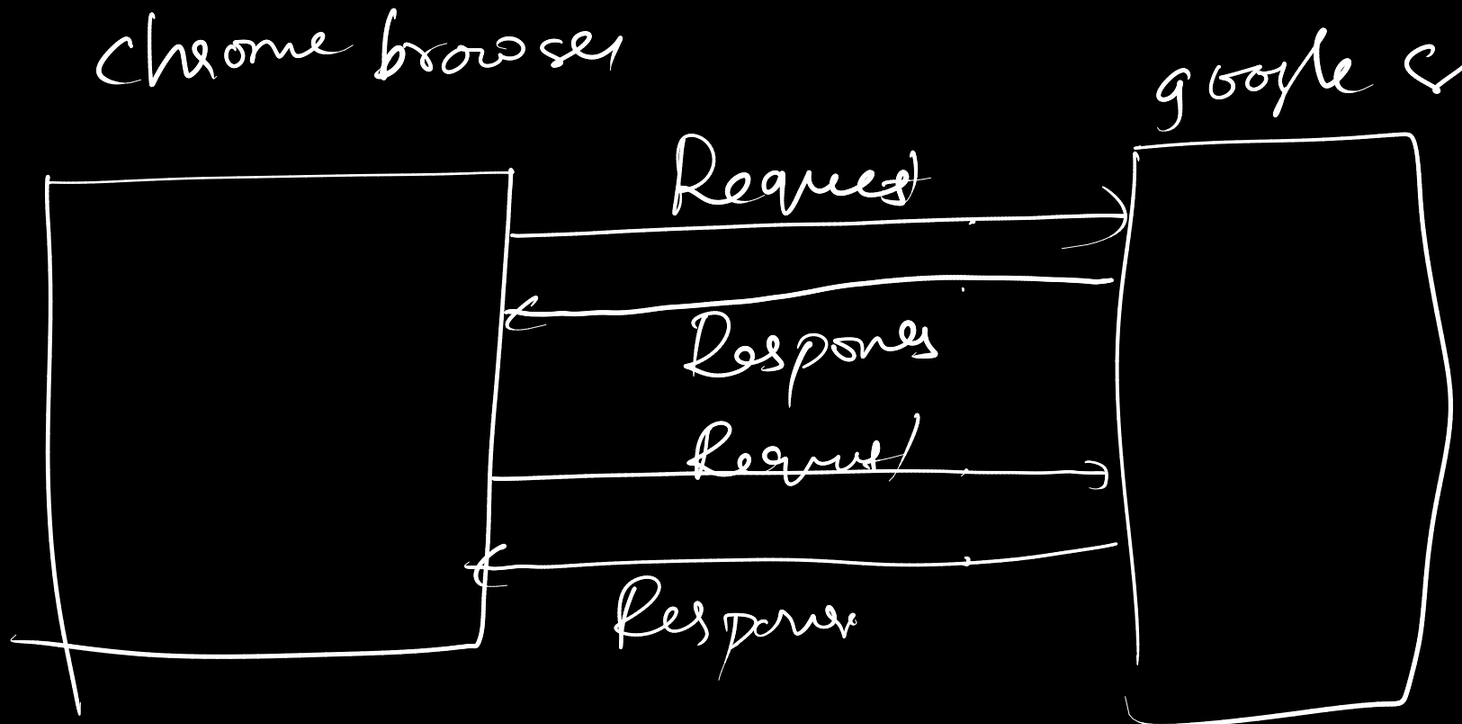
Date: March 5, 2022

By

Amarnath, Ph.D


Internet
Intranet
within Campus
Small scope
www
Fibre optic
LAN
WAN
IP
Backbone networks
DNS
www.google.com
ISP
google.com
google.com


Client
Browser
Mobile App
Desktop standalone apps.
Client Apps
ISP
DNS
http protocols
Request
Response
Servers
Application servers
Web servers
→ stateless protocol



Independent Request & Responses.

↳ http

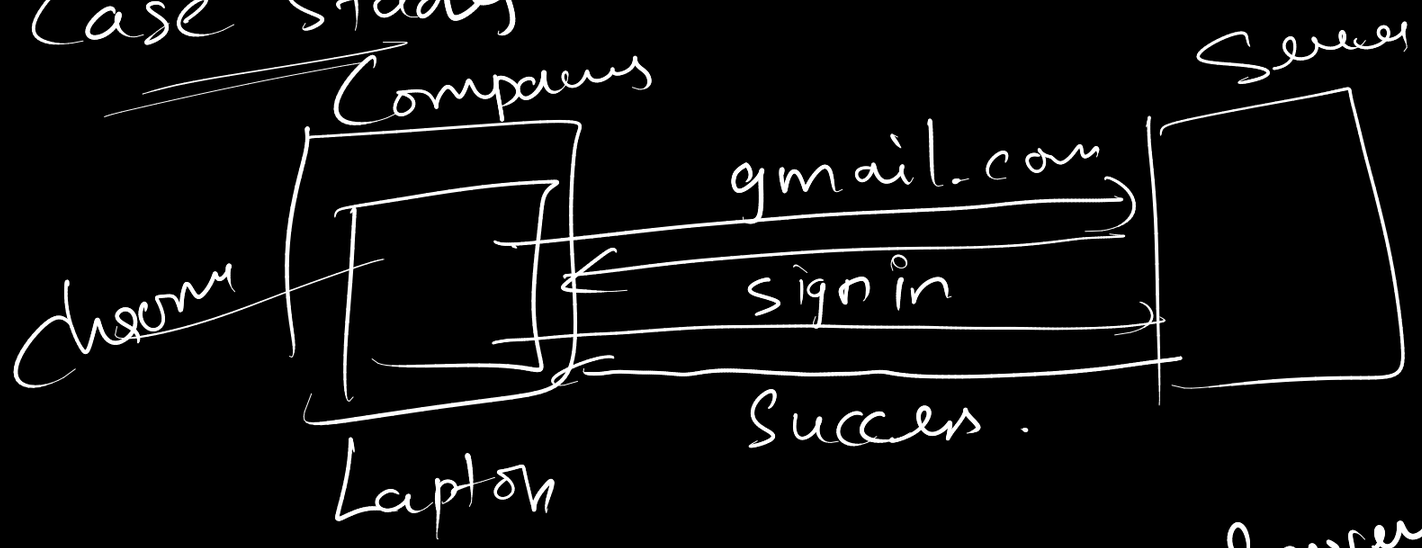
200 - success

404 - Page Not found.

apache.org

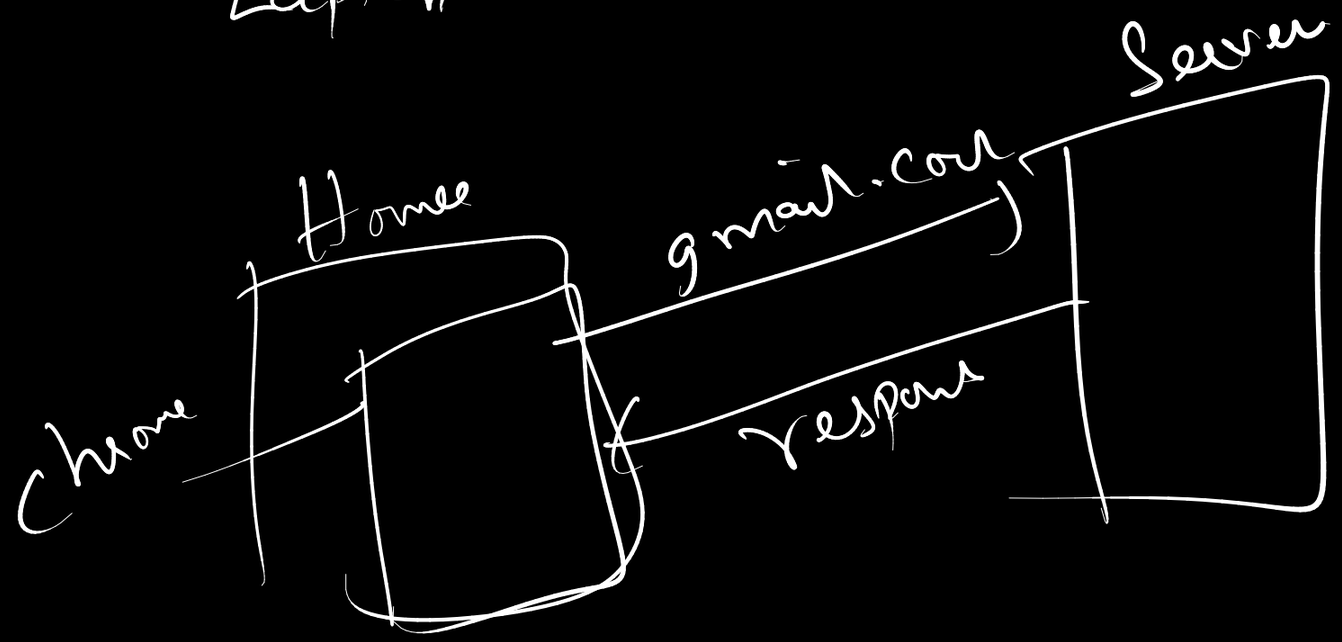
16 request & response

Case Study



1. Cache files
2. Sessions
3. Cookies

Never Ask for password.



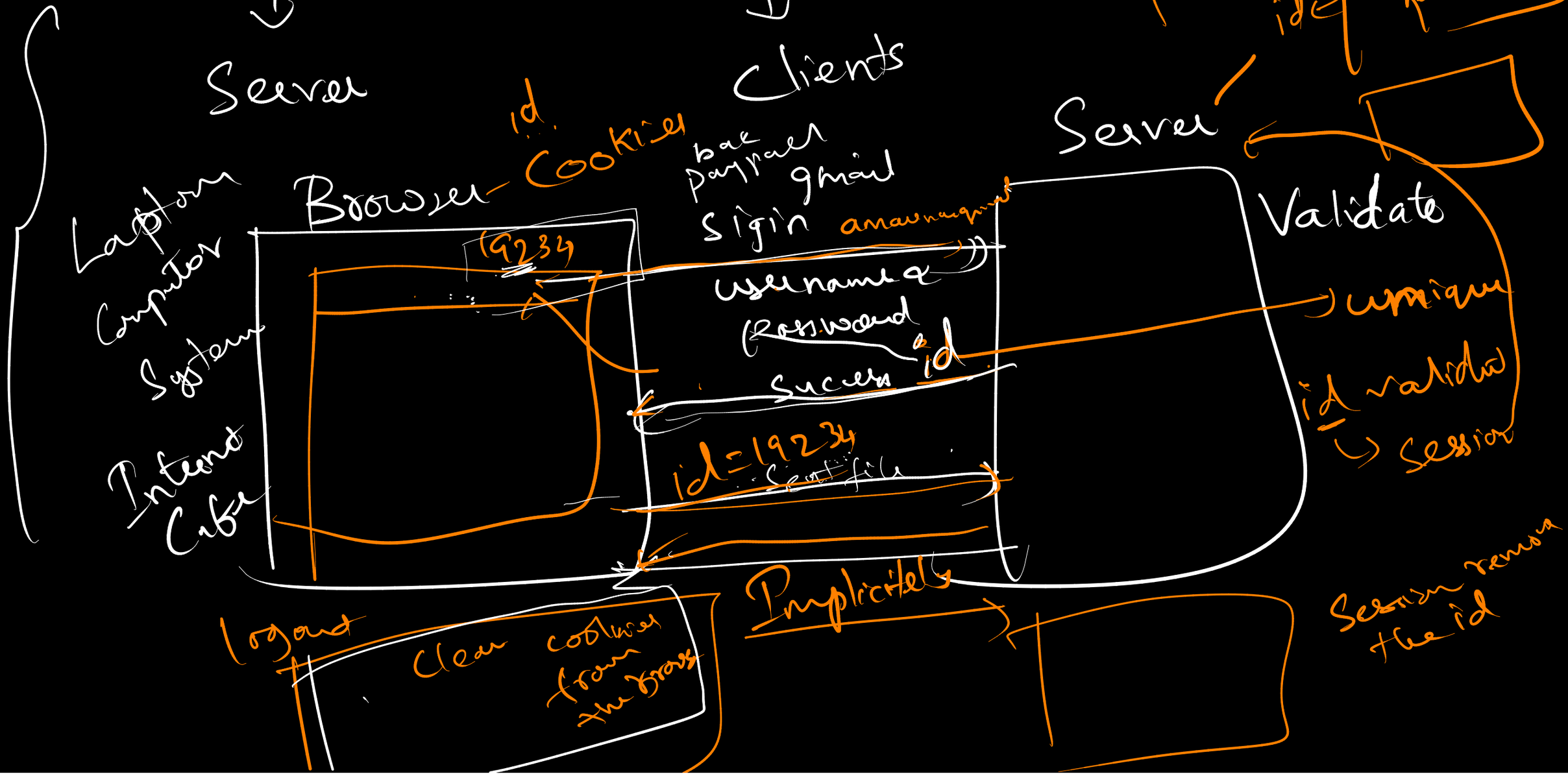
Session & Cookies

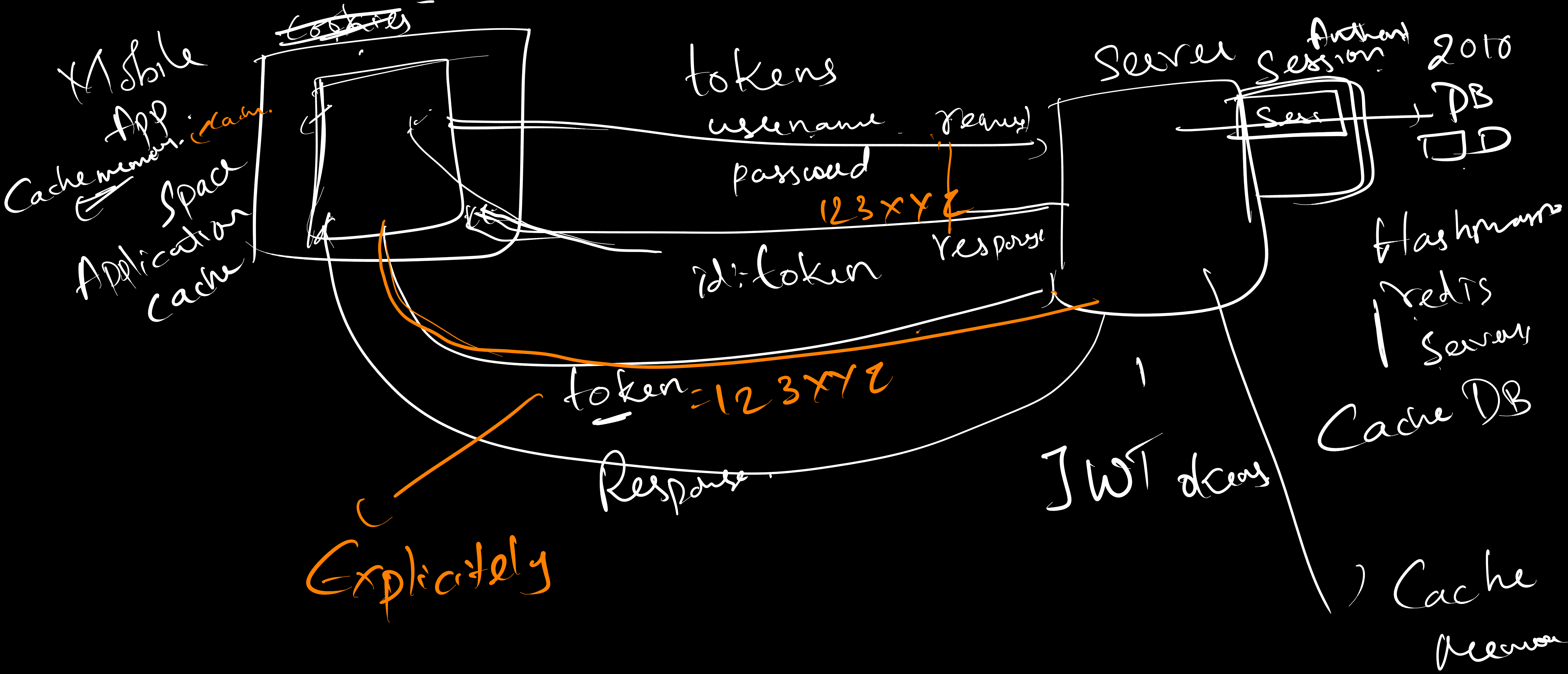
Session

Cookies

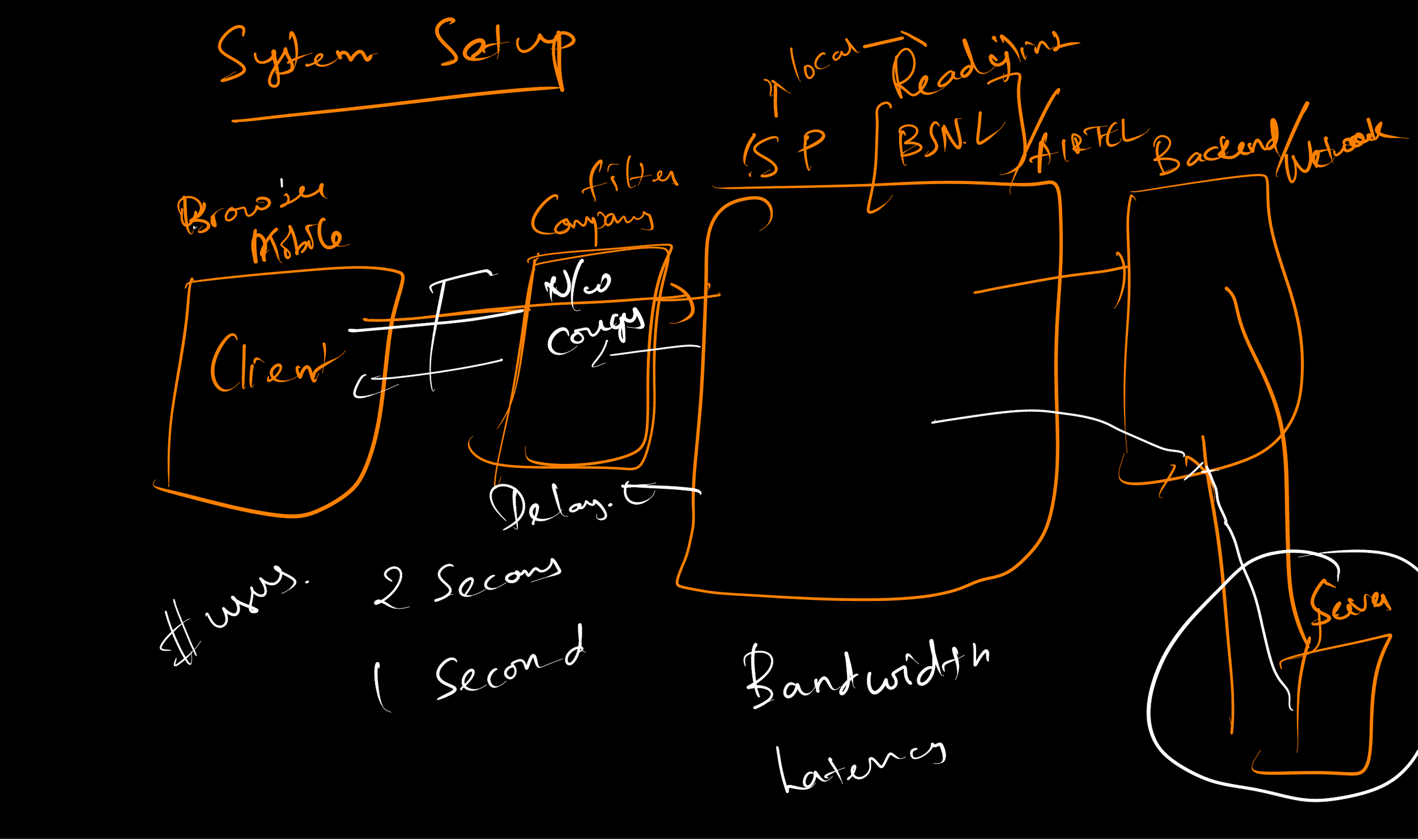
Server

Clients





Mobile App
Cache memory
Space
Application cache
tokens
username
password
request
123XYZ
id: token
response
token = 123XYZ
Response
Explicitely
Server
Session
2010
DB
ID
Hashmap
redis
Server
Cache DB
JWT
Cache


System Setup
Browser
Mobile
Client
filter
Company
N/w
configs
Delay.
ISP
local
Ready line
BSNL
AIRTEL
Backend/Network
Server
users.
2 Seconds
1 Second
Bandwidth
Latency

Servers

→ Response to the client

→ html

→ image

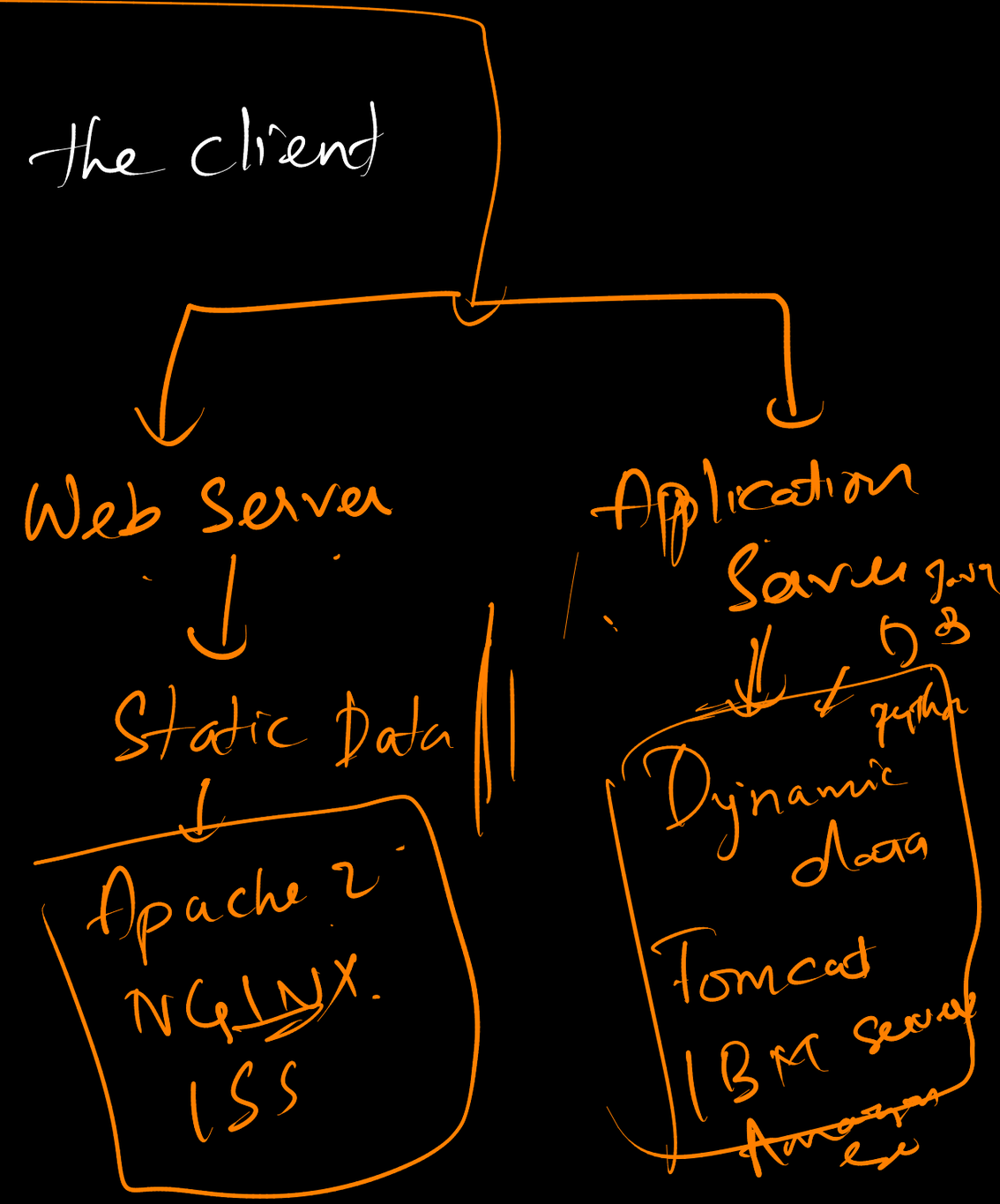
→ pdf

→ document

resp

→ xml

→ Json



Web Server

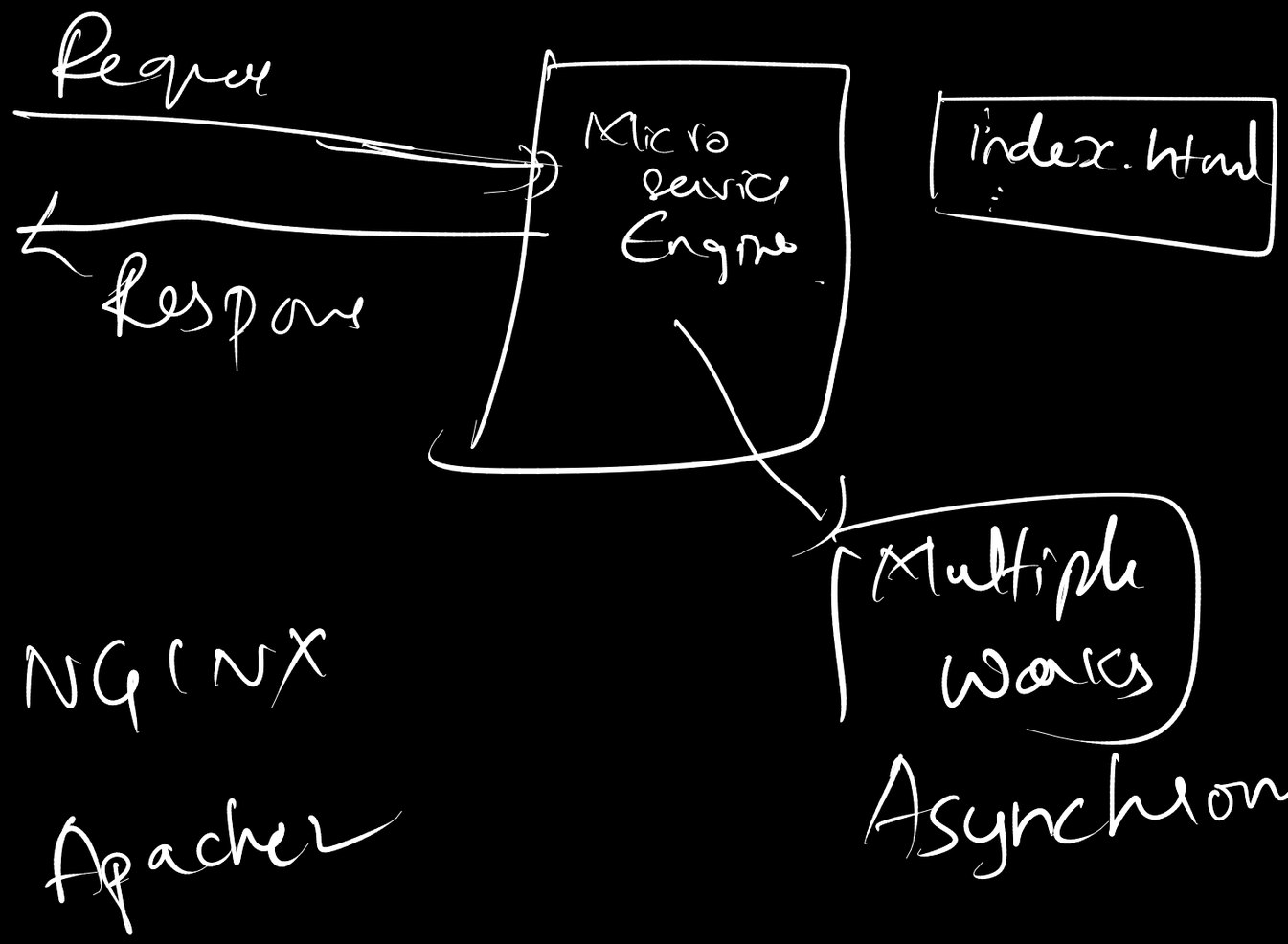
Apache2

NGINX

Application serv.

Dynamic respons

Webserver


Request
Micro service Engine
index.html
Response
Multiple workers
NGINX
Apache
Asynchronously

→ VM → Ubuntu

→ Amazon AWS → EC2 → Launch Instance

↓

ubuntu

↳ pem key.

→ Permission 400.

→ Open Run Command.

ssh -i epam2.pem ubuntu@ 13.233.106.73

→ sudo apt update

sudo apt install nginx

getting inside

$cd /etc/nginx/conf.d/

create a new configuation file

$ sudo nano amar.local.conf

```
server{
        listen 8000 default_server;
        index index.html;
        server_name amar.local;
        root /var/www/amar.local;
}
```

create a folder.

$cd /var/www

$ sudo mkdir amar.local

To check the configuation file is corred

$sudo nginx -t

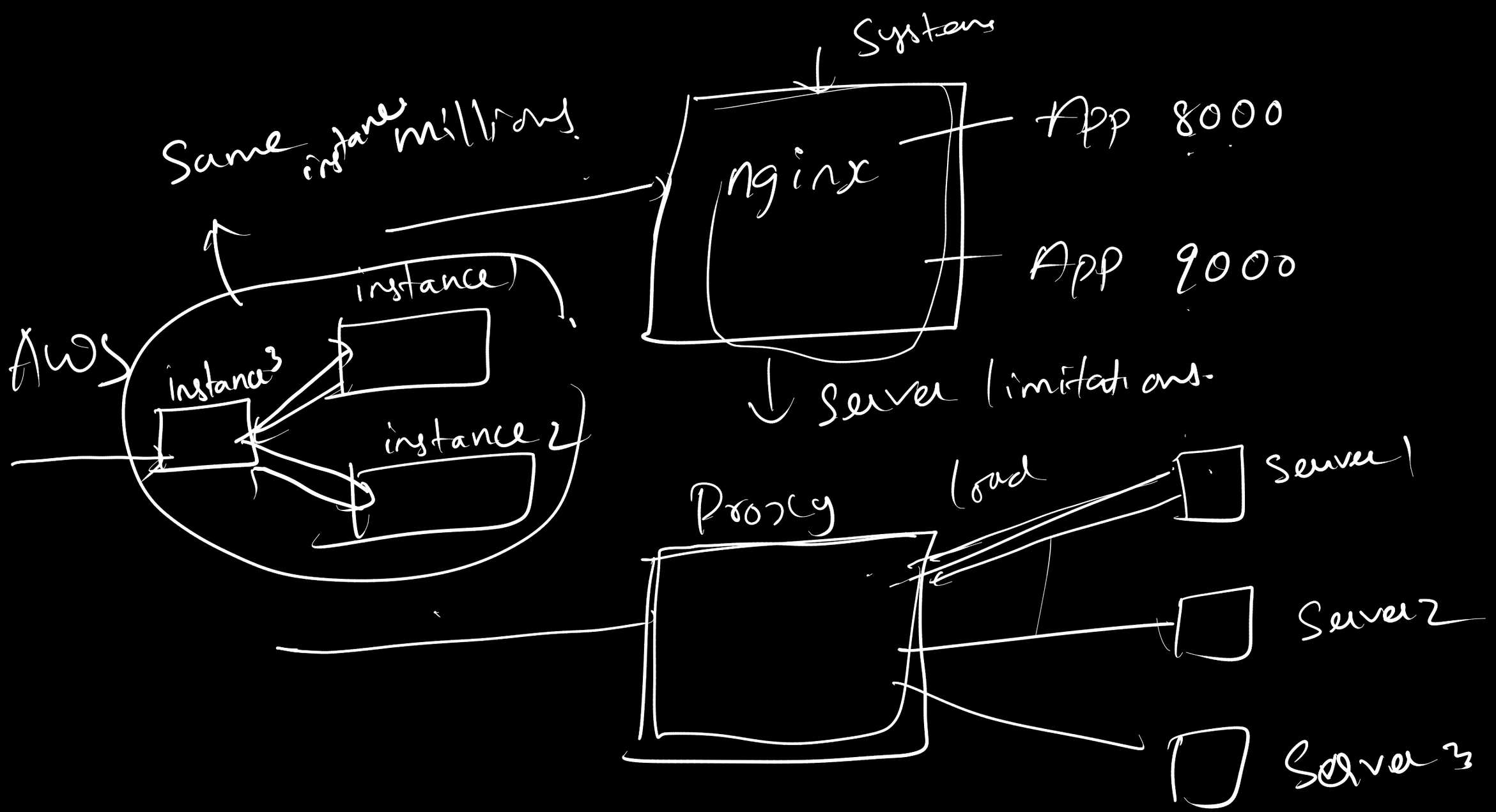
navigate inside the folder

sudo nano index.html

$ sudo systemctl restart nginx

open the browser

http://public ip

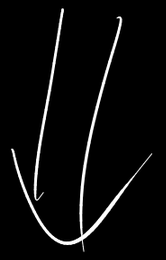

Same instance Millions
AWS
instance1
instance3
instance2
System
nginx
App 8000
App 9000
Server limitations.
Proxy
load
Server1
Server2
Server3

```
sudo apt install nginx
cd /etc/nginx/conf.d/
sudo nano amar.local.conf

Past:

server{
        listen 8000 default_server;
        index index.html;
        server_name amar.local;
        root /var/www/amar.local;
}

ctl+x (save and exit)


cd /var/www/
        mkdir amar.local

        cd amar.local

        sudo nano index.hmtl

        Type hello world

        ctl+x (save and exit)

        sudo nginx -t

        sudo systemctl restart nginx


        cd /etc/nginx/sites-available/

        sudo cp default default.bak
```

```
sudo nano default

comment all the lines

Paste below:


upstream backend{
        server ip_address:port;
        server ip_address:port;
}
server{

        listen:80;
        location / {
                proxy_pass http://backend;
        }
}

sudo systemctl restart nginx
```

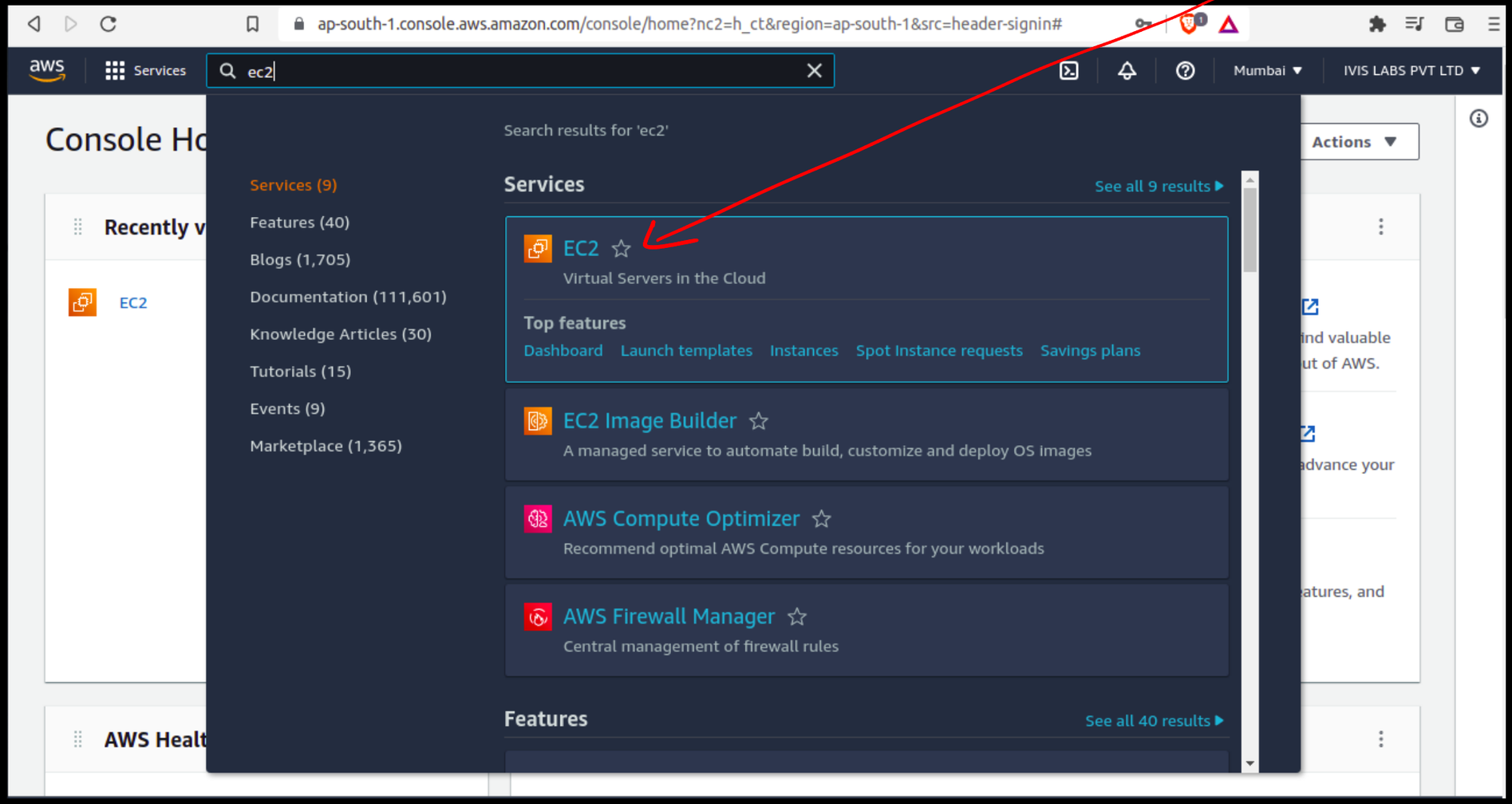
Web Server

NGINX DEMO



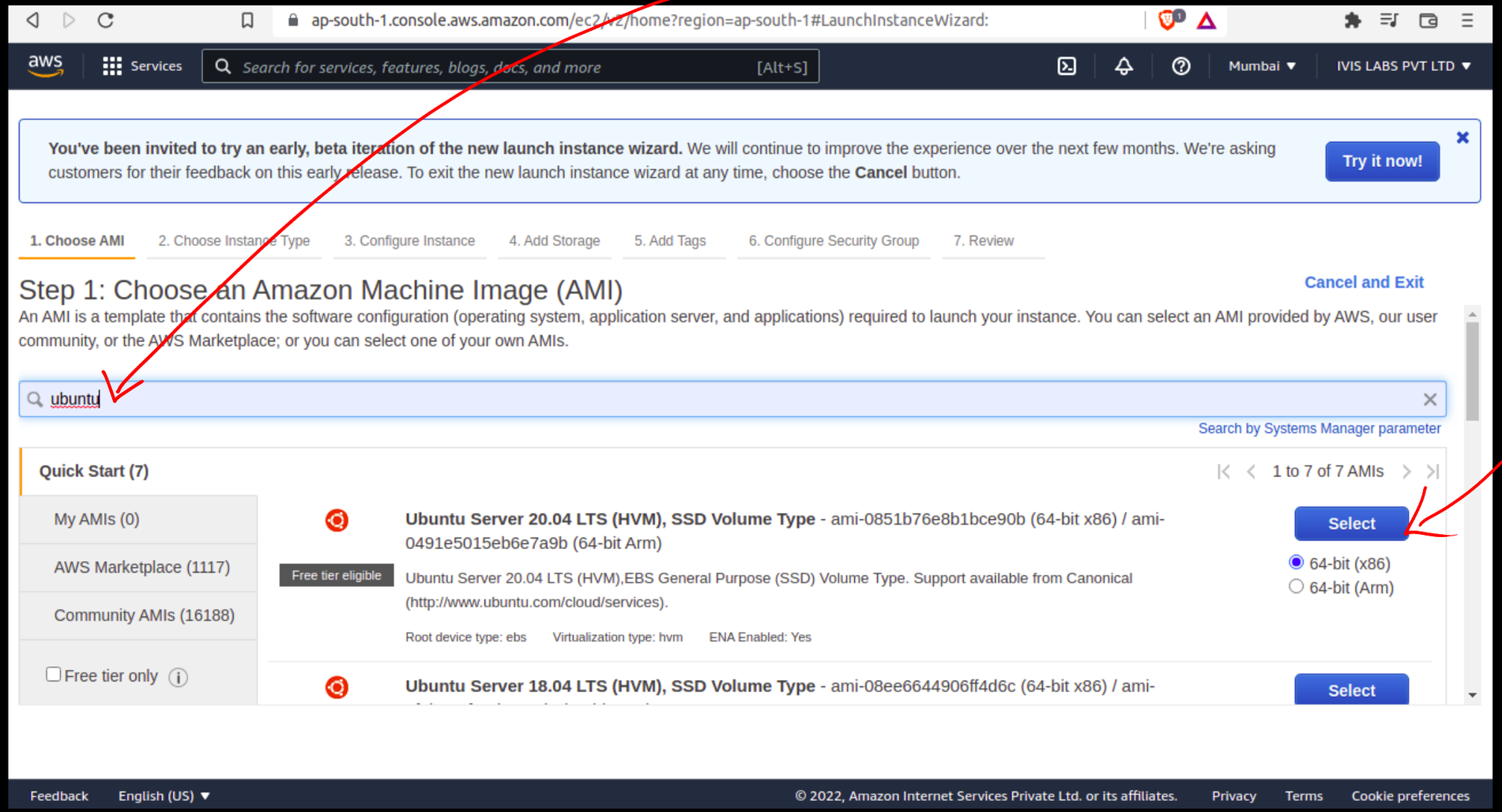
Screen shots

Login → AWS console → Search → EC2 → Click

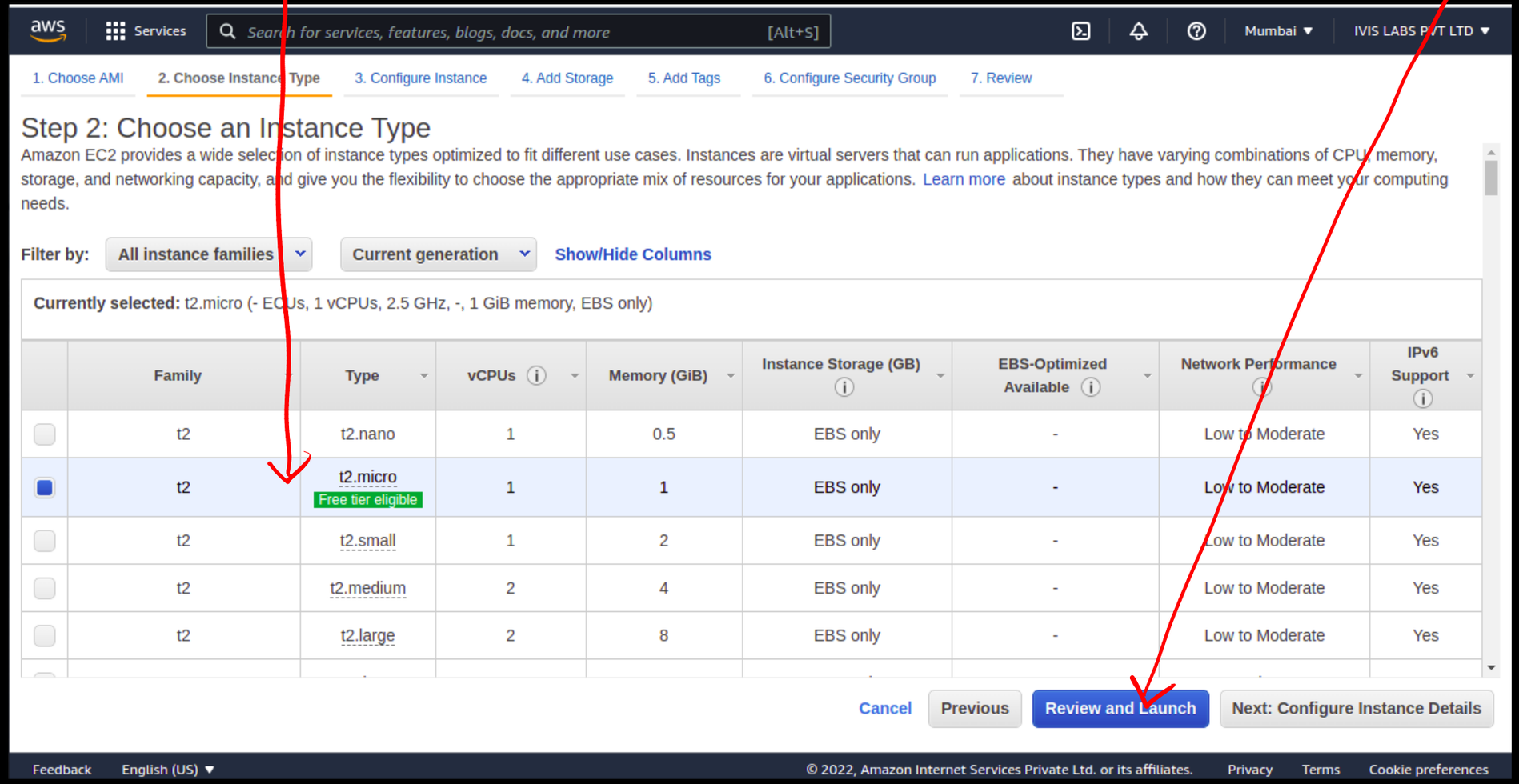


Launch EC2 Instance & Search Ubuntu

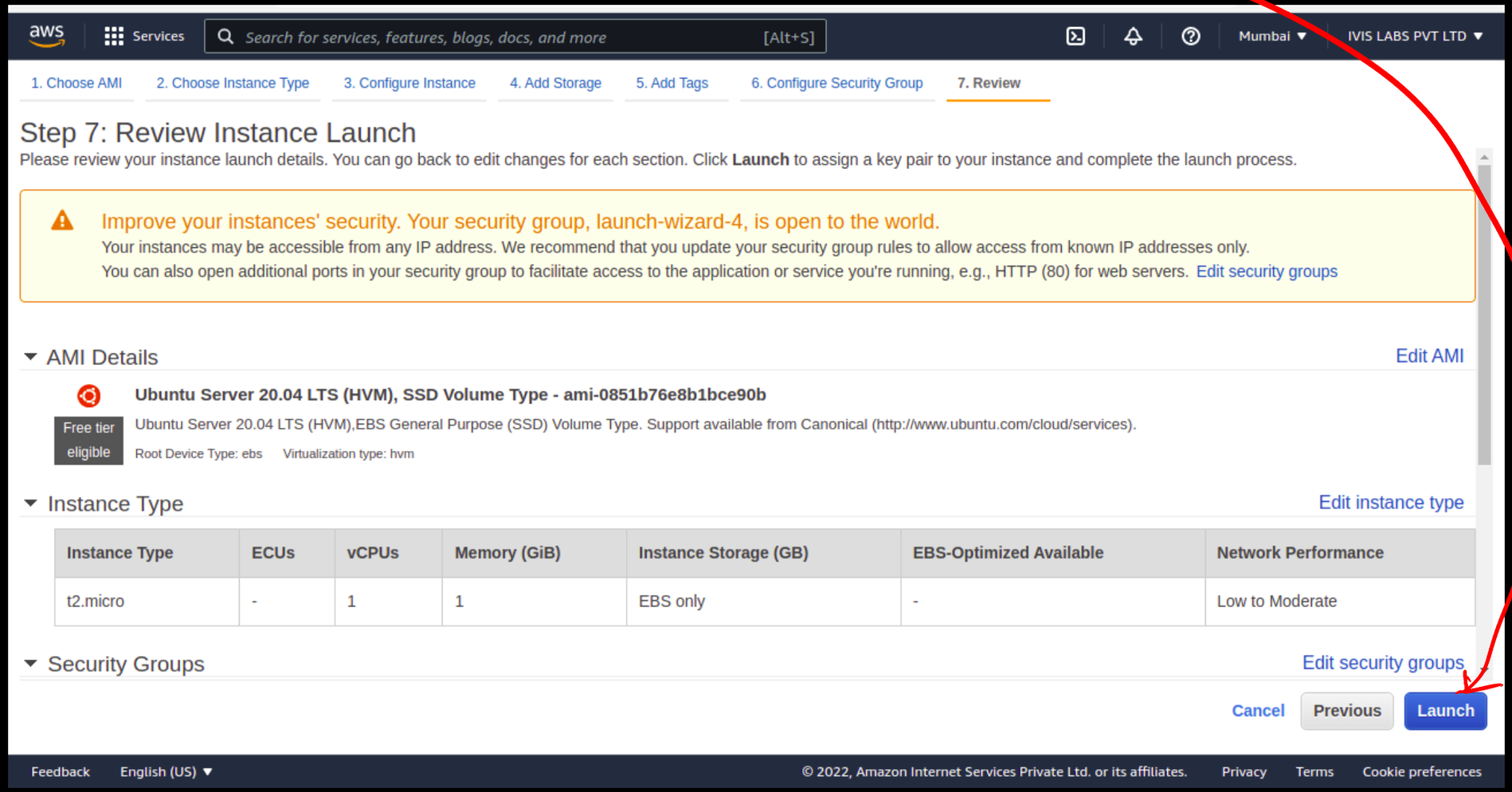
Select



Choose t2.micro [free tier] & Review & Launch

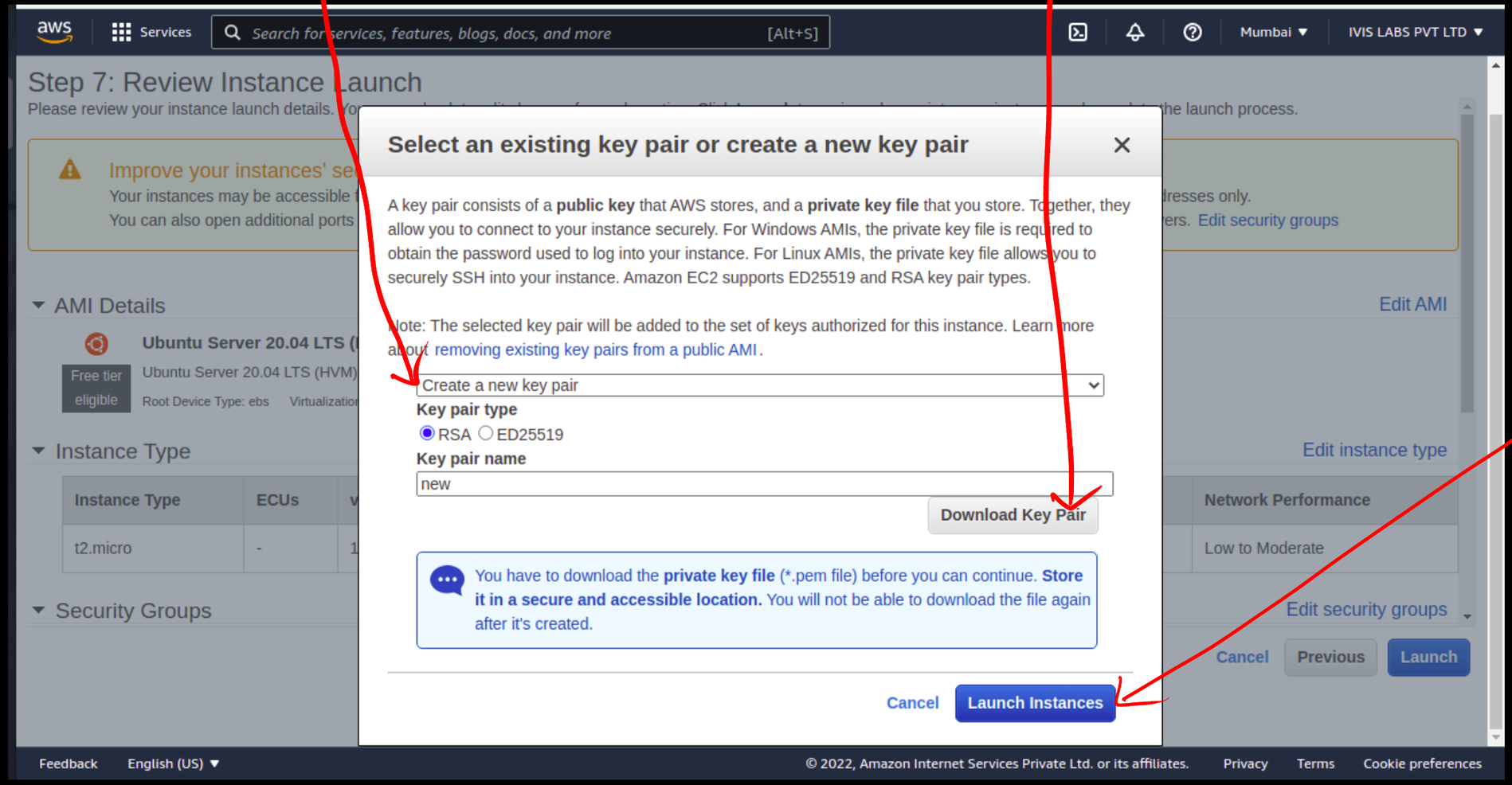


Launch


aws
Services
Search for services, features, blogs, docs, and more
[Alt+S]
Mumbai
IVIS LABS PVT LTD
1. Choose AMI
2. Choose Instance Type
3. Configure Instance
4. Add Storage
5. Add Tags
6. Configure Security Group
7. Review
Step 7: Review Instance Launch
Please review your instance launch details. You can go back to edit changes for each section. Click Launch to assign a key pair to your instance and complete the launch process.
Improve your instances' security. Your security group, launch-wizard-4, is open to the world.
Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only.
You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. Edit security groups
AMI Details
Edit AMI
Ubuntu Server 20.04 LTS (HVM), SSD Volume Type - ami-0851b76e8b1bce90b
Free tier eligible
Ubuntu Server 20.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).
Root Device Type: ebs
Virtualization type: hvm
Instance Type
Edit instance type
Instance Type
ECUs
vCPUs
Memory (GiB)
Instance Storage (GB)
EBS-Optimized Available
Network Performance
t2.micro
-
1
1
EBS only
-
Low to Moderate
Security Groups
Edit security groups
Cancel
Previous
Launch
Feedback
English (US)
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences

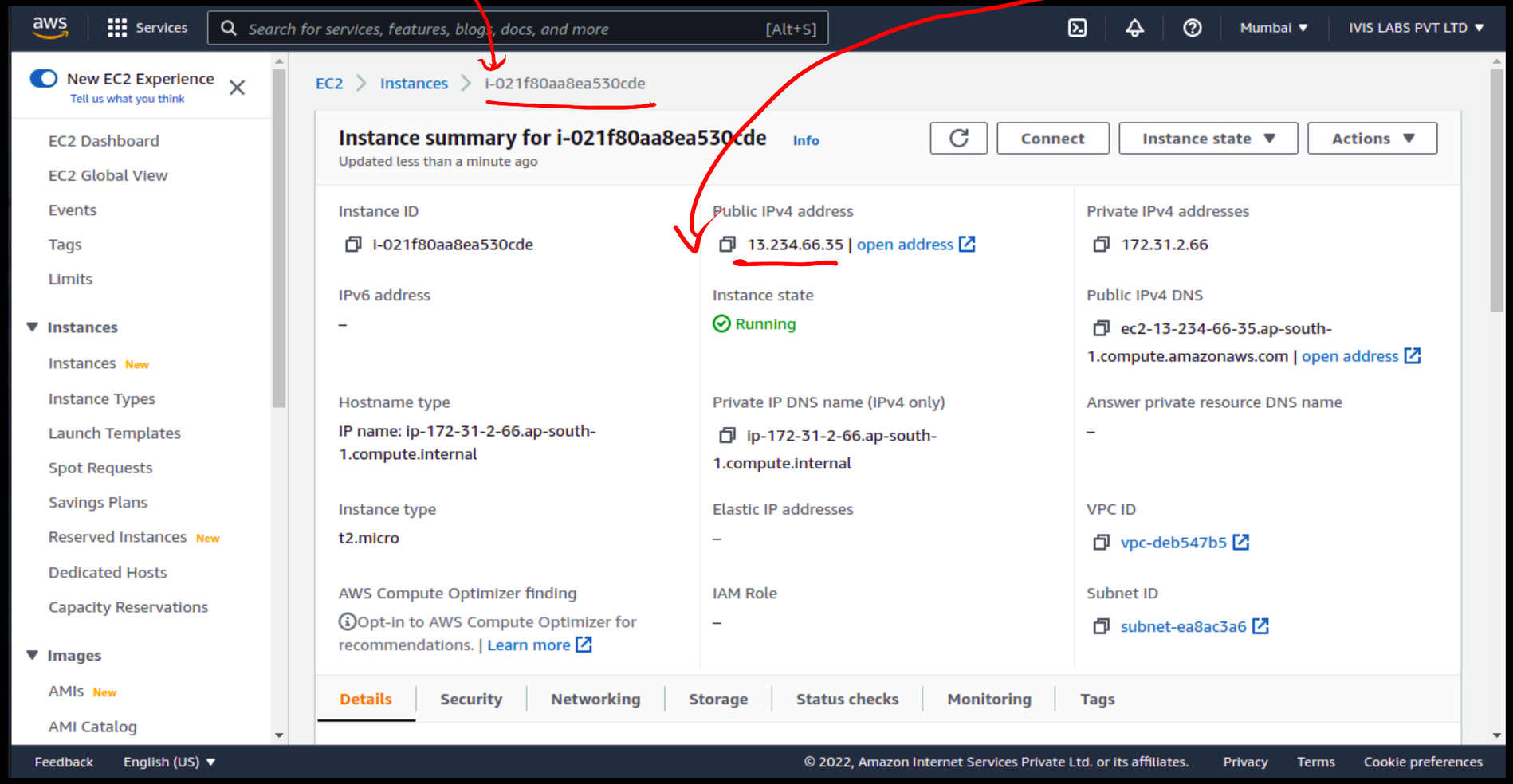
Create a new key pair & Download [Keep it Safe]

& Lanch Instance

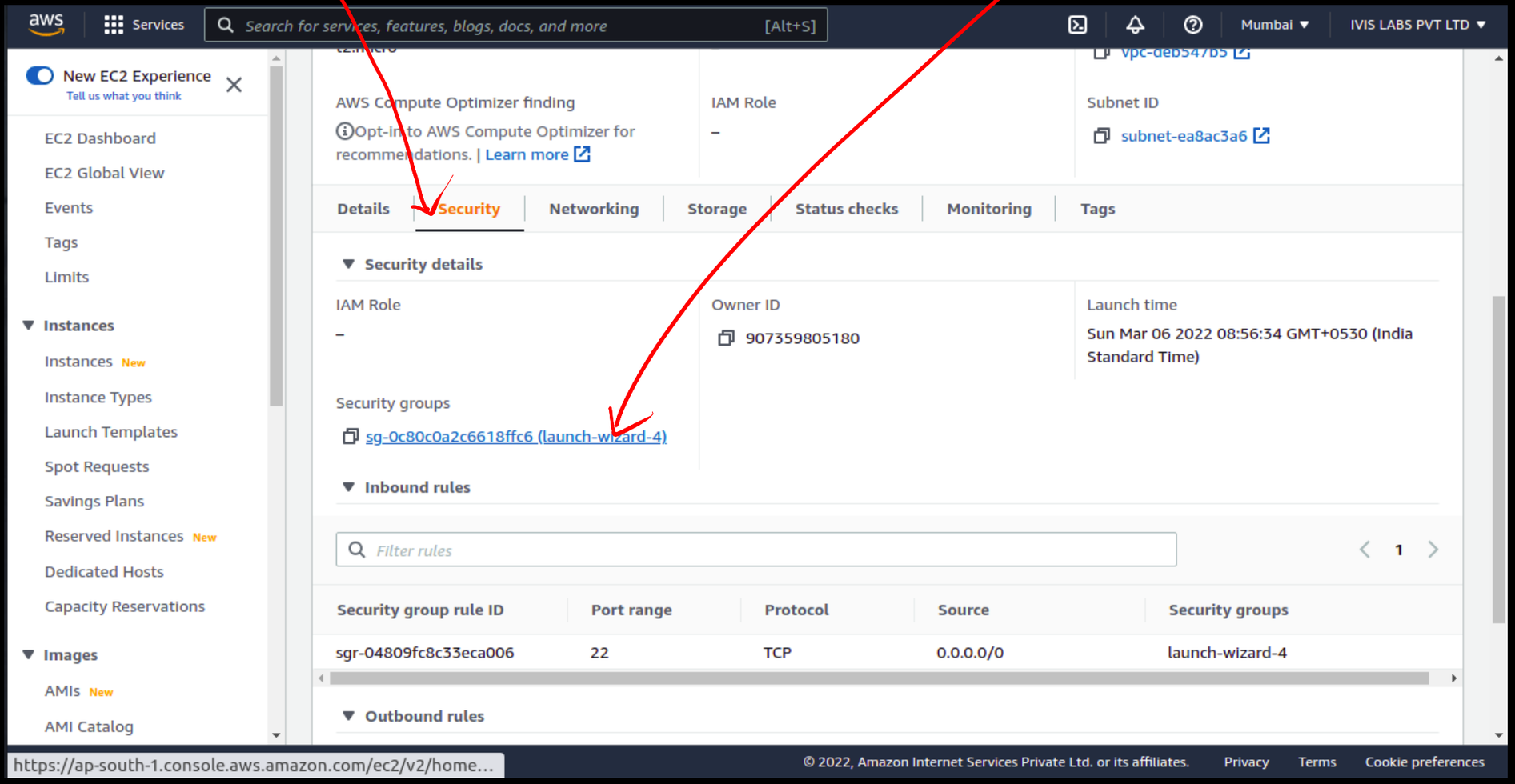


Instance started : You will get a public IP

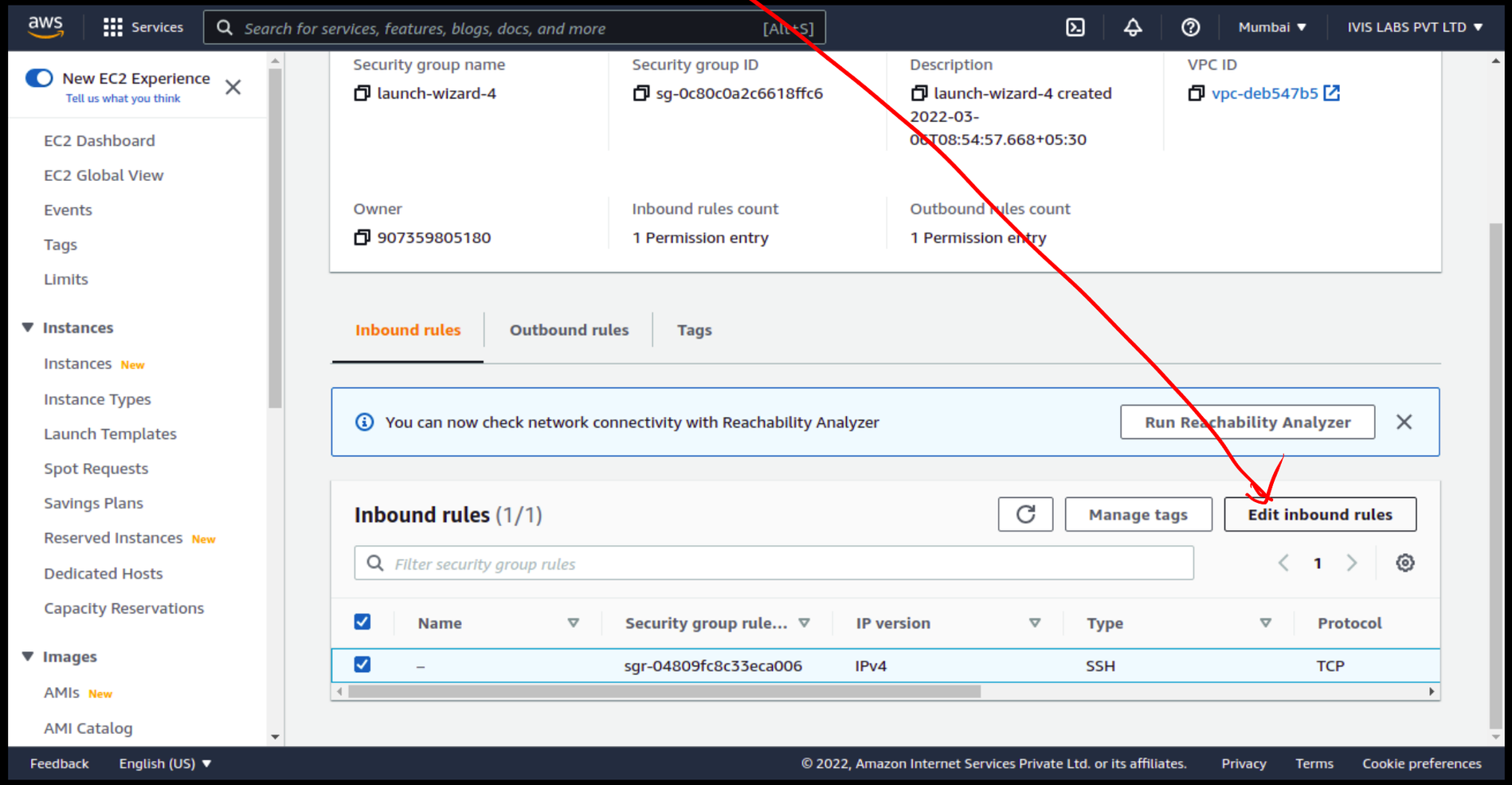
New instance id



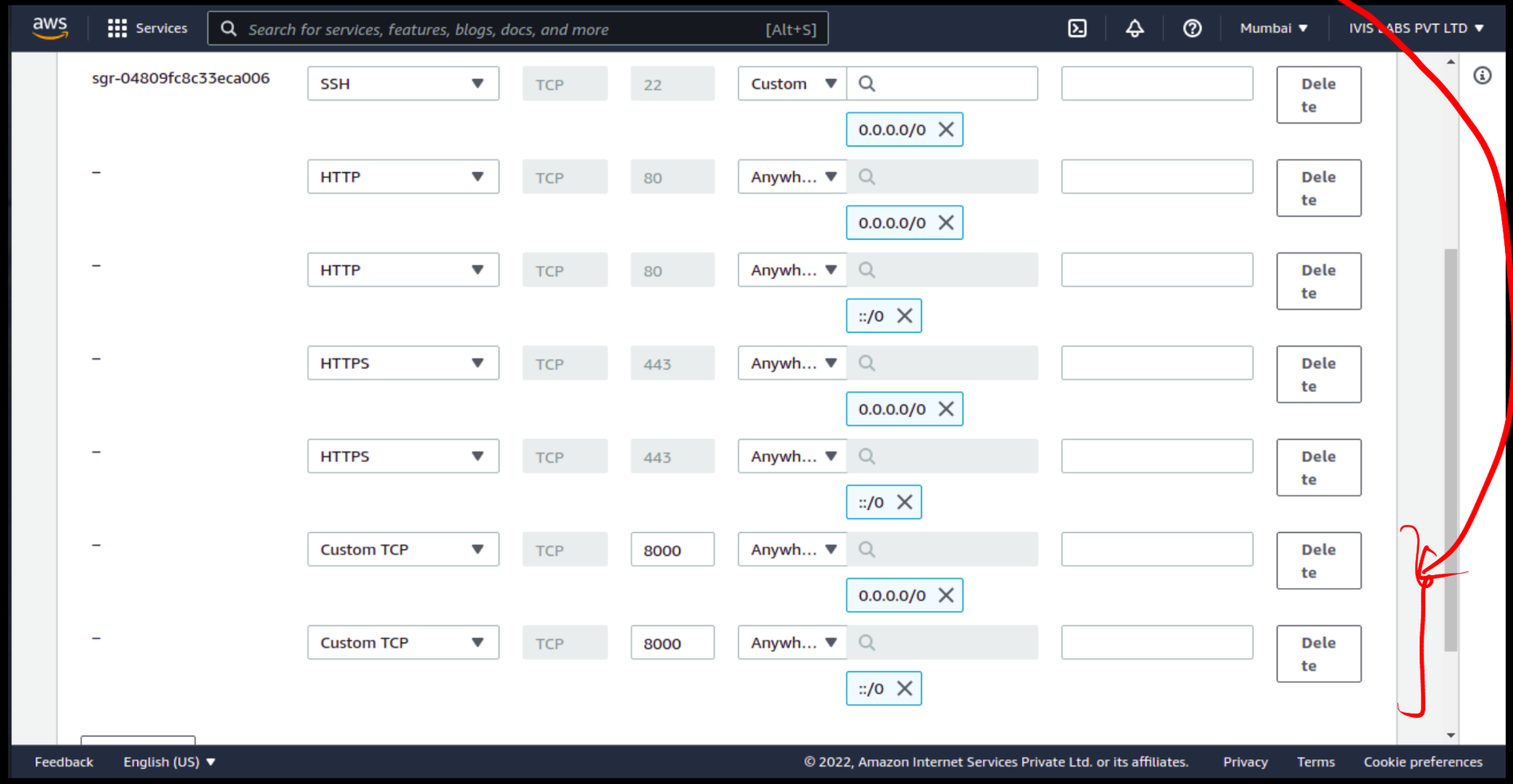
Select Security tab & Click the Security group link



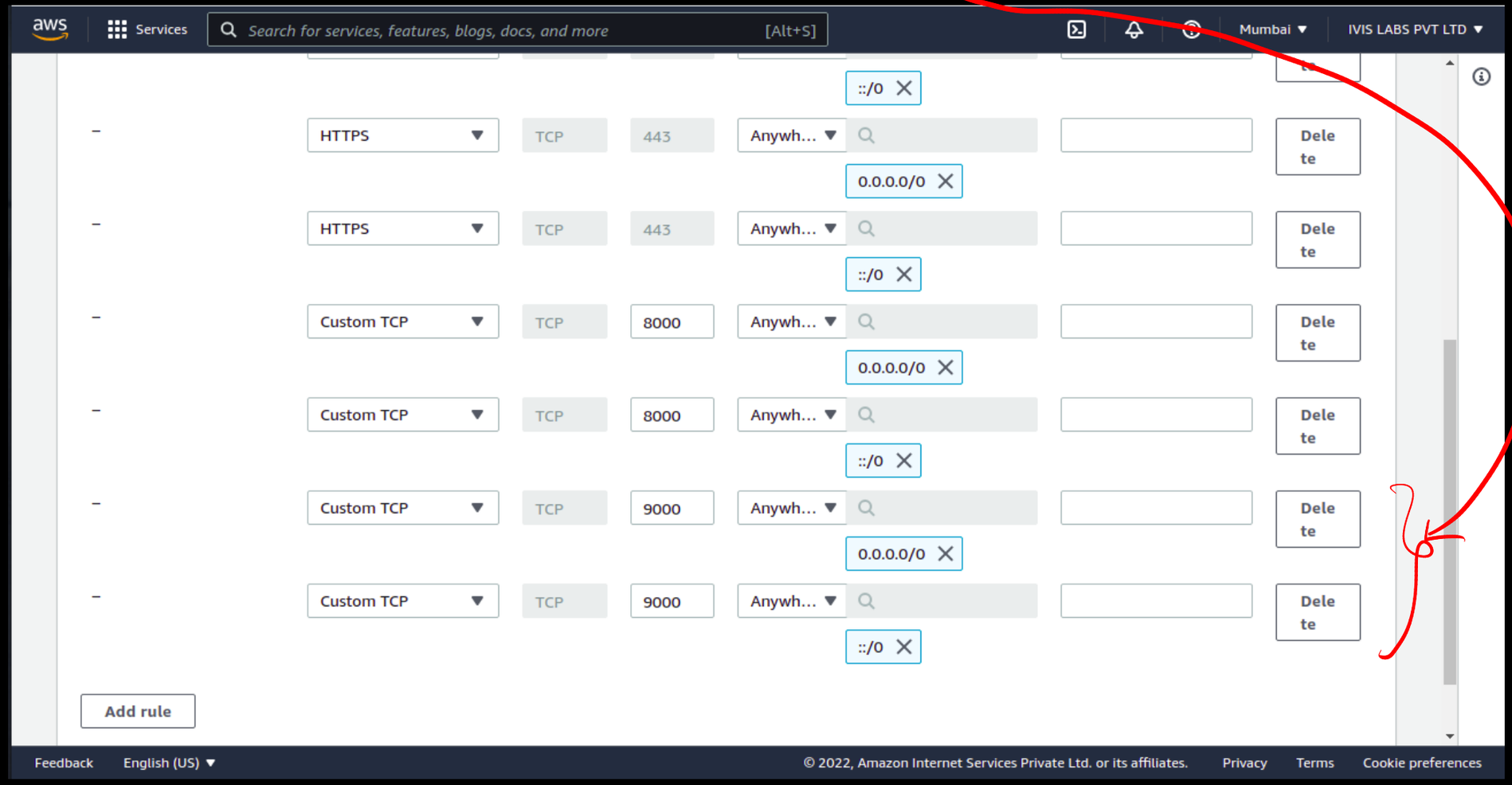
Edit Inbound Rules



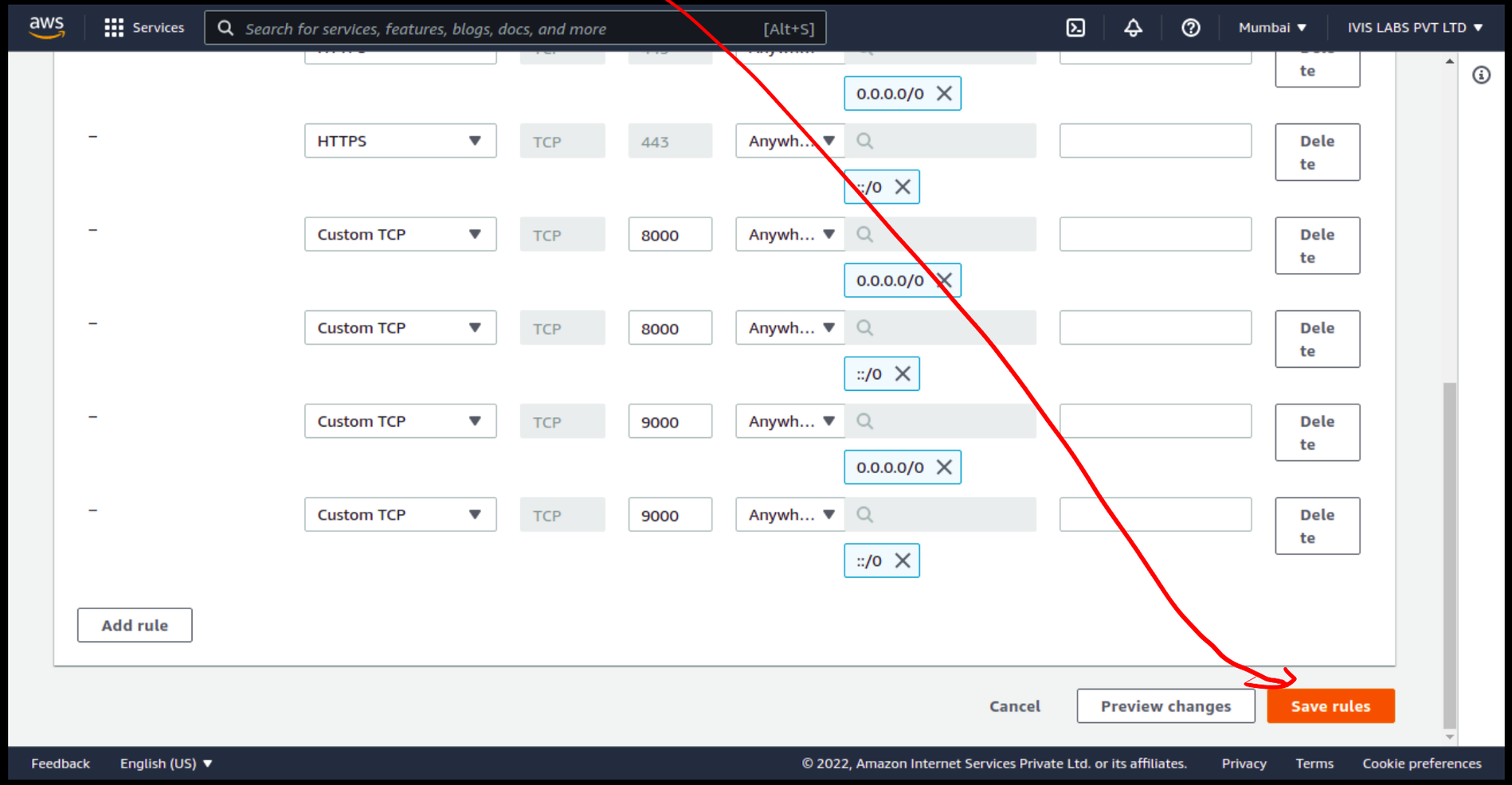
Add Rules [Note: adding 8000 & 9000]



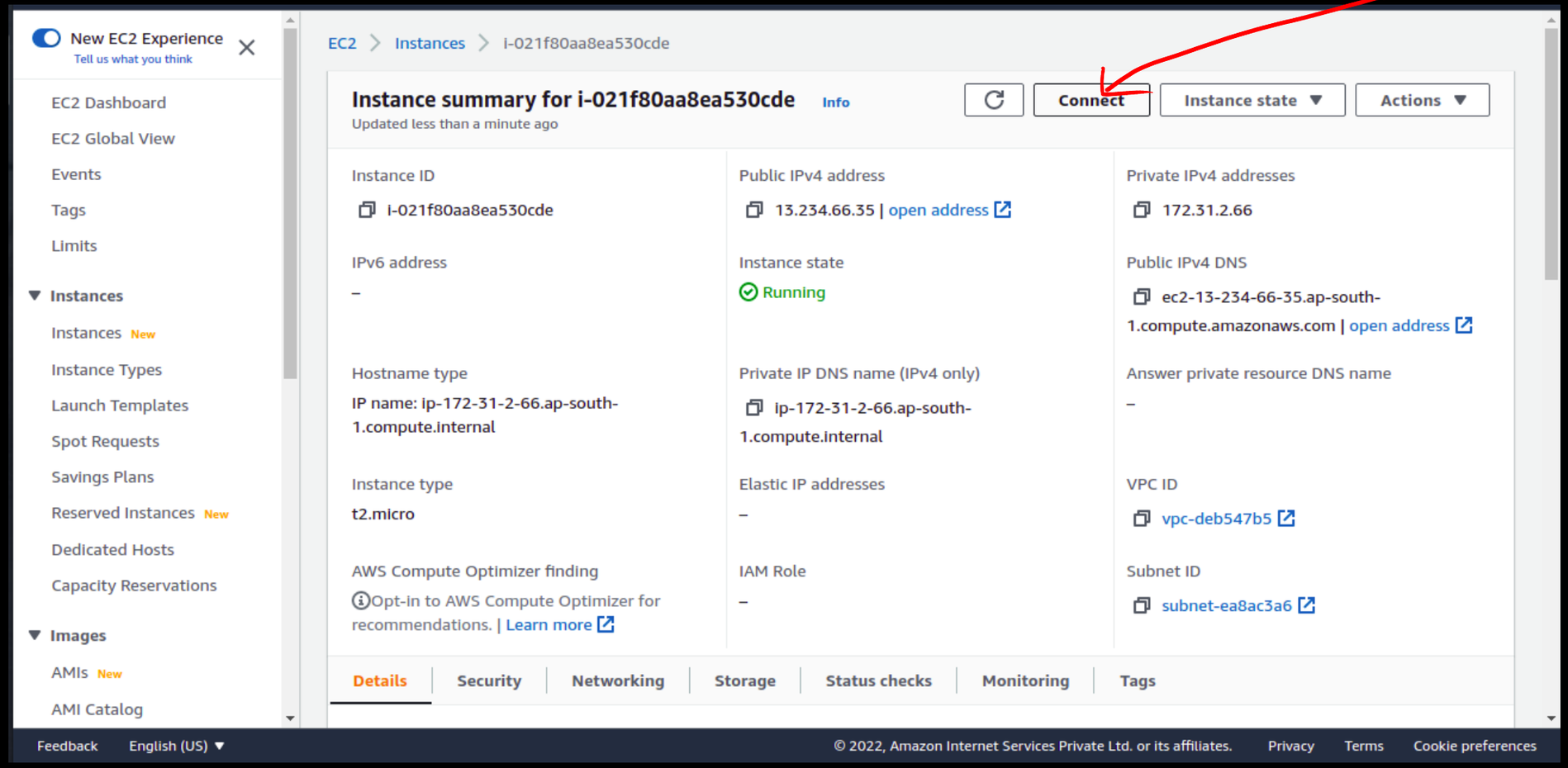
Adding 9000 port



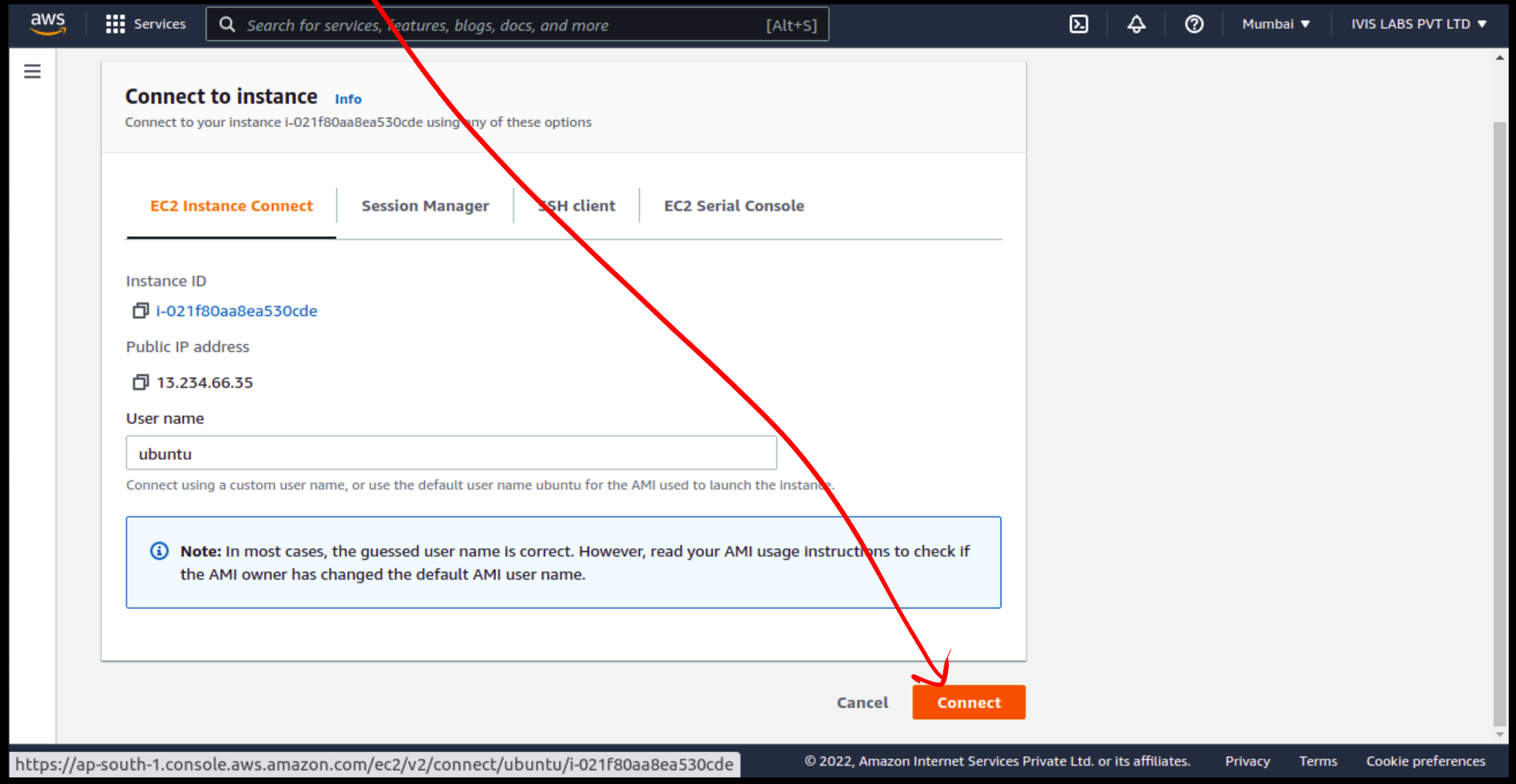
Save rules


aws
Services
Search for services, features, blogs, docs, and more
[Alt+S]
Mumbai
IVIS LABS PVT LTD
0.0.0.0/0
HTTPS
TCP
443
Anywh...
::/0
Custom TCP
8000
9000
Delete
Add rule
Cancel
Preview changes
Save rules
Feedback
English (US)
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences

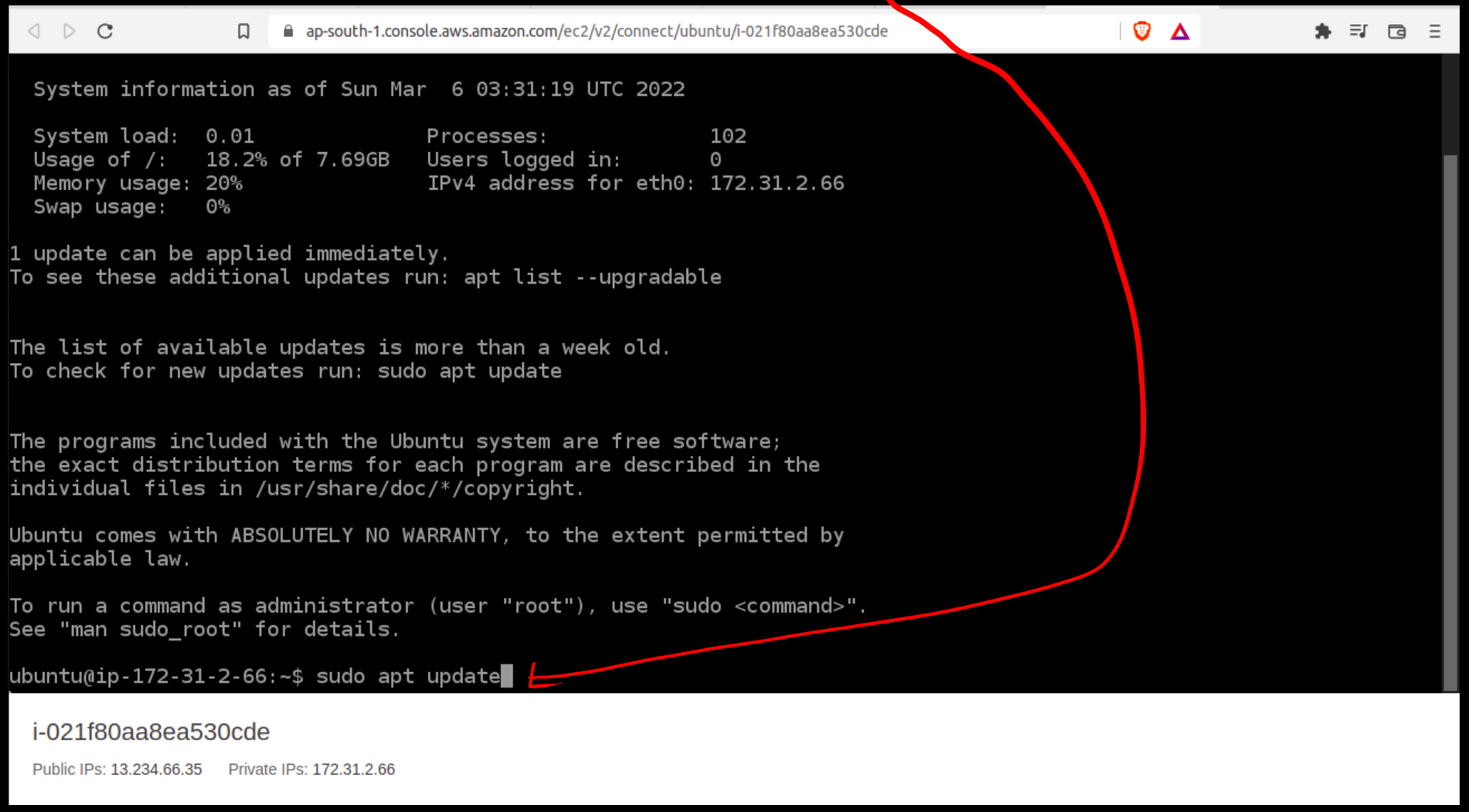
Come back to Instance & You can connect using SSH PEM key [which you have downloaded] OR Connect via browser



Connect


aws
Services
Search for services, features, blogs, docs, and more [Alt+S]
Mumbai
IVIS LABS PVT LTD
Connect to instance Info
Connect to your instance i-021f80aa8ea530cde using any of these options
EC2 Instance Connect
Session Manager
SSH client
EC2 Serial Console
Instance ID
i-021f80aa8ea530cde
Public IP address
13.234.66.35
User name
ubuntu
Connect using a custom user name, or use the default user name ubuntu for the AMI used to launch the instance.
Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.
Cancel
Connect
https://ap-south-1.console.aws.amazon.com/ec2/v2/connect/ubuntu/i-021f80aa8ea530cde
© 2022, Amazon Internet Services Private Ltd. or its affiliates.
Privacy
Terms
Cookie preferences

You have entered into the console
↳ Update the Ubuntu OS



1 Check nginx installed?

1

2 — check apache2 installed?

2

```
ubuntu@ip-172-31-2-66:~$ sudo systemctl status nginx
Unit nginx.service could not be found.
ubuntu@ip-172-31-2-66:~$ sudo systemctl status apache2
Unit apache2.service could not be found.
ubuntu@ip-172-31-2-66:~$ sudo systemctl status nginx
Unit nginx.service could not be found.
ubuntu@ip-172-31-2-66:~$
```

You will get not found msg

i-021f80aa8ea530cde

Public IPs: 13.234.66.35 Private IPs: 172.31.2.66

① Install nginx

```
ubuntu@ip-172-31-2-66:~$ sudo apt install nginx
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  fontconfig-config fonts-dejavu-core libfontconfig1 libgd3 libjbig0 libjpeg-turbo8 libjpeg8
  libnginx-mod-http-image-filter libnginx-mod-http-xslt-filter libnginx-mod-mail libnginx-mod-stream libtiff5
  libwebp6 libxpm4 nginx-common nginx-core
Suggested packages:
  libgd-tools fcgiwrap nginx-doc ssl-cert
The following NEW packages will be installed:
  fontconfig-config fonts-dejavu-core libfontconfig1 libgd3 libjbig0 libjpeg-turbo8 libjpeg8
  libnginx-mod-http-image-filter libnginx-mod-http-xslt-filter libnginx-mod-mail libnginx-mod-stream libtiff5
  libwebp6 libxpm4 nginx nginx-common nginx-core
0 upgraded, 17 newly installed, 0 to remove and 78 not upgraded.
Need to get 2432 kB of archives.
After this operation, 7891 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
```

② Continue type 'Y'

i-021f80aa8ea530cde

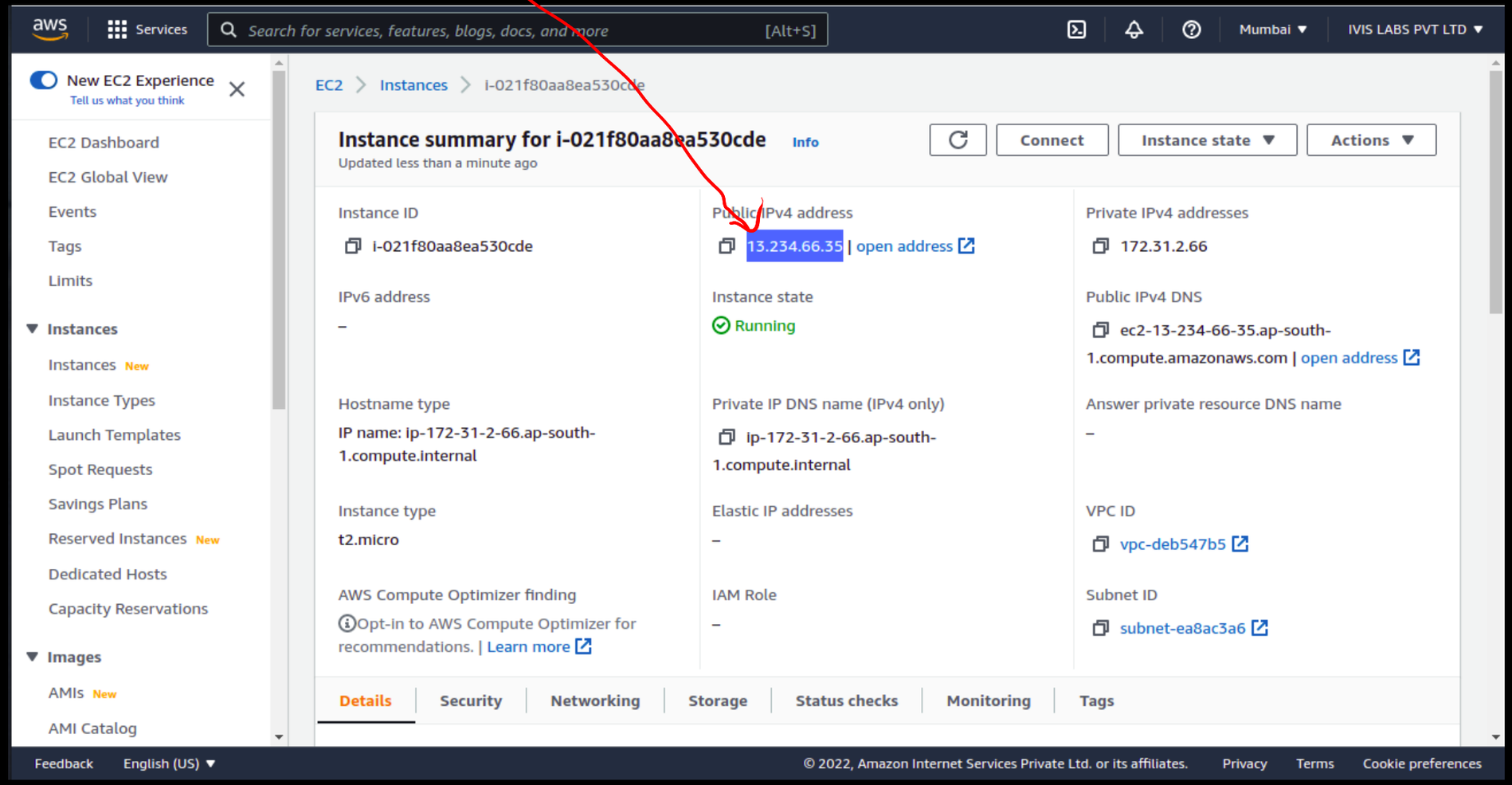
Public IPs: 13.234.66.35 Private IPs: 172.31.2.66

① Check nginx installed?

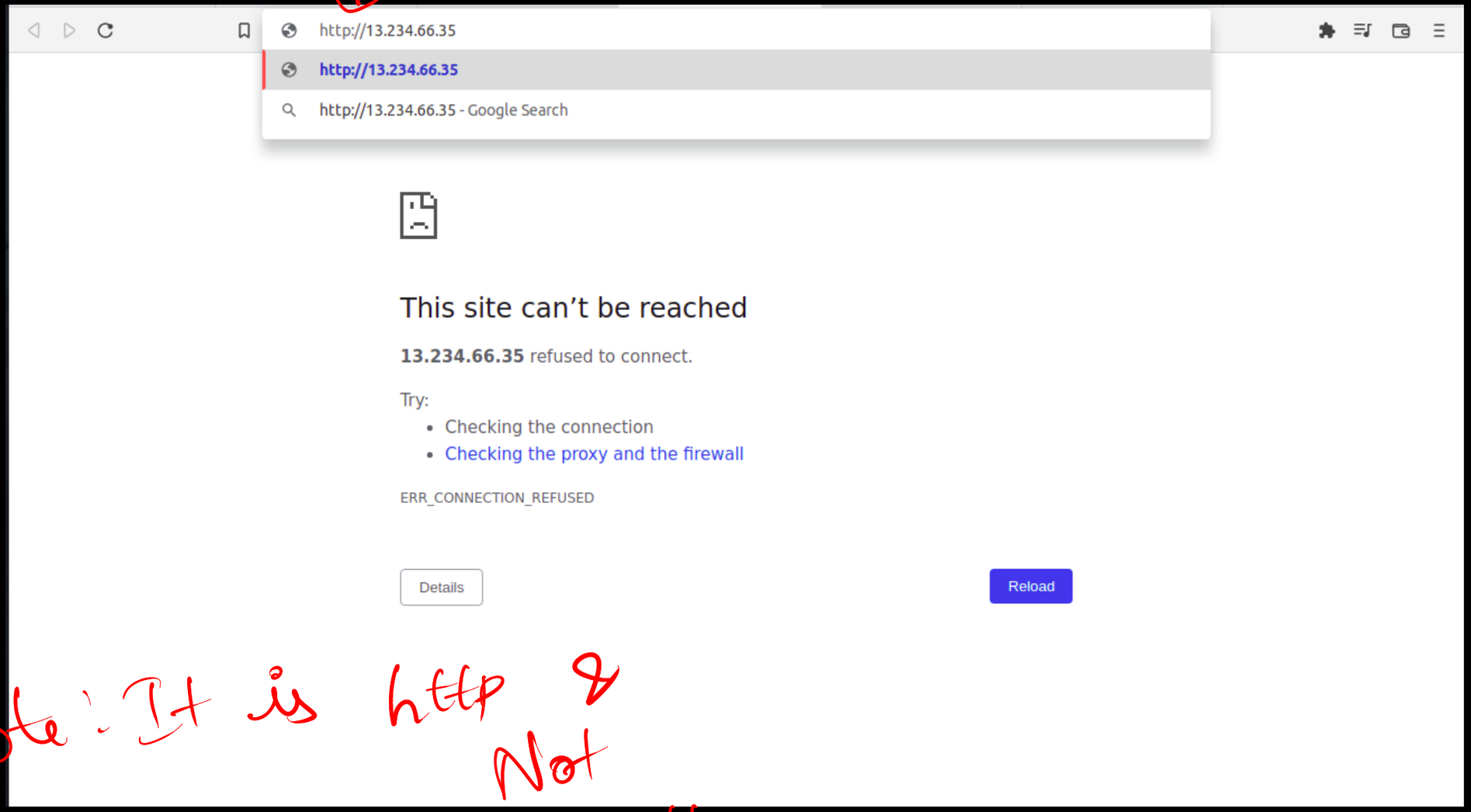
```
Setting up fontconfig-config (2.13.1-2ubuntu3) ...
Setting up libnginx-mod-stream (1.18.0-0ubuntu1.2) ...
Setting up libtiff5:amd64 (4.1.0+git191117-2ubuntu0.20.04.2) ...
Setting up libfontconfig1:amd64 (2.13.1-2ubuntu3) ...
Setting up libgd3:amd64 (2.2.5-5.2ubuntu2.1) ...
Setting up libnginx-mod-http-image-filter (1.18.0-0ubuntu1.2) ...
Setting up nginx-core (1.18.0-0ubuntu1.2) ...
Setting up nginx (1.18.0-0ubuntu1.2) ...
Processing triggers for ufw (0.36-6ubuntu1) ...
Processing triggers for systemd (245.4-4ubuntu3.13) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libc-bin (2.31-0ubuntu9.2) ...
ubuntu@ip-172-31-2-66:~$ sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
     Loaded: loaded (/lib/systemd/system/nginx.service; enabled; vendor preset: enabled)
     Active: active (running) since Sun 2022-03-06 03:33:42 UTC; 10s ago
       Docs: man:nginx(8)
   Main PID: 2373 (nginx)
      Tasks: 2 (limit: 1147)
     Memory: 4.9M
     CGroup: /system.slice/nginx.service
             ├─2373 nginx: master process /usr/sbin/nginx -g daemon on; master_process on;
             └─2374 nginx: worker process

Mar 06 03:33:42 ip-172-31-2-66 systemd[1]: Starting A high performance web server and a reverse proxy server...
Mar 06 03:33:42 ip-172-31-2-66 systemd[1]: Started A high performance web server and a reverse proxy server.
ubuntu@ip-172-31-2-66:~$
```

Message

Copy public ip from Aws instance

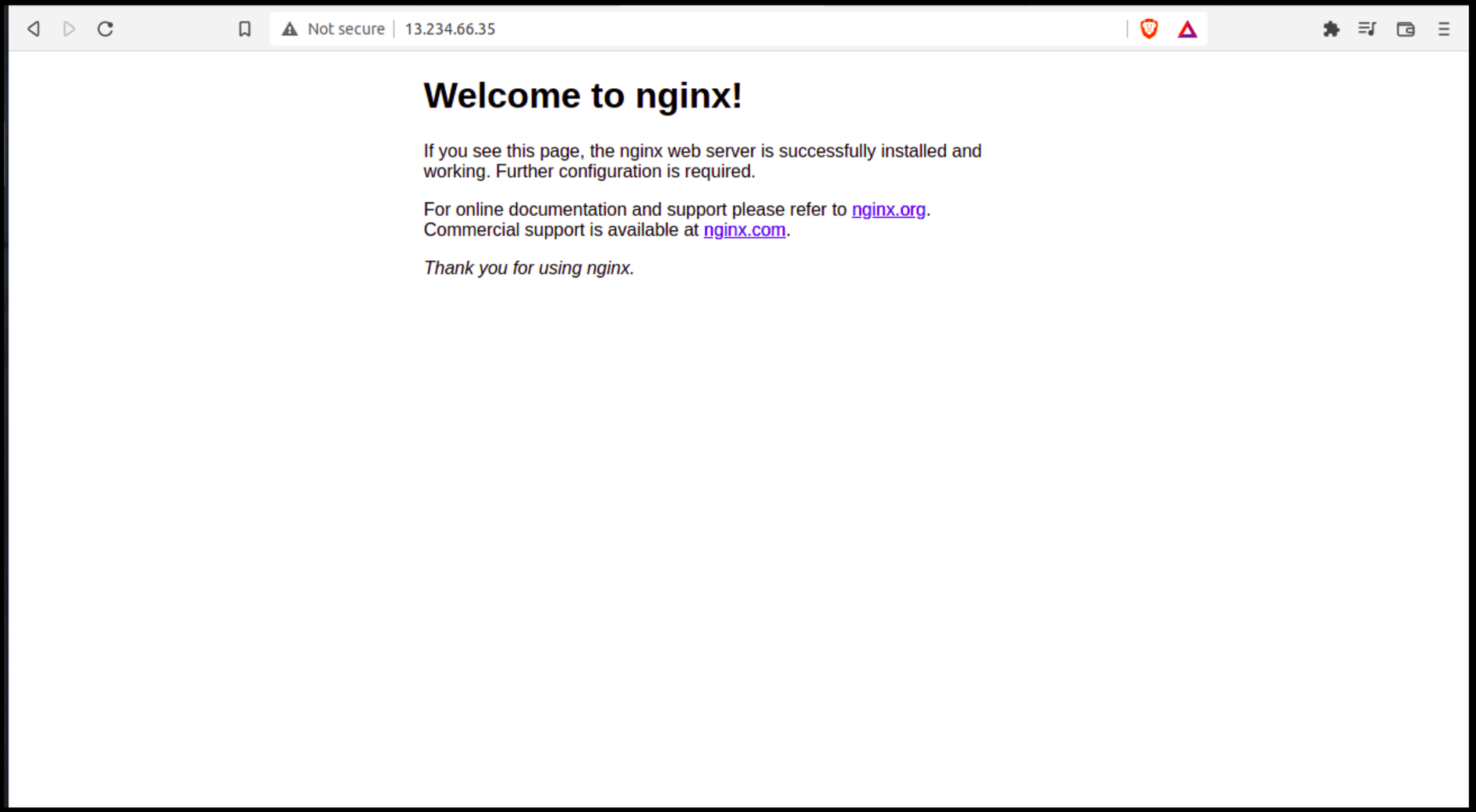


New Tab : http://public_ip & Enter



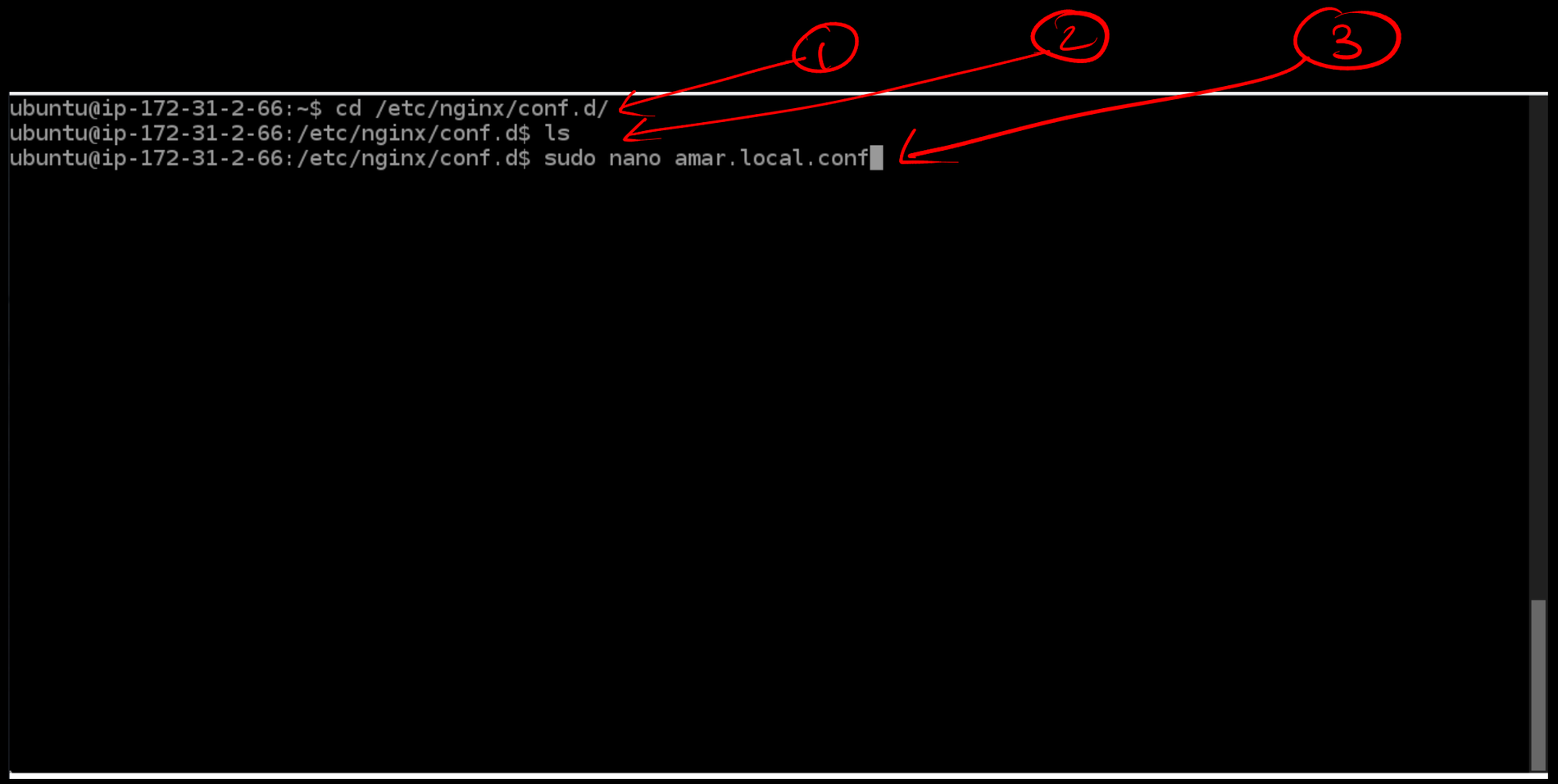
Note : It is http & Not https

You will get default nginx page

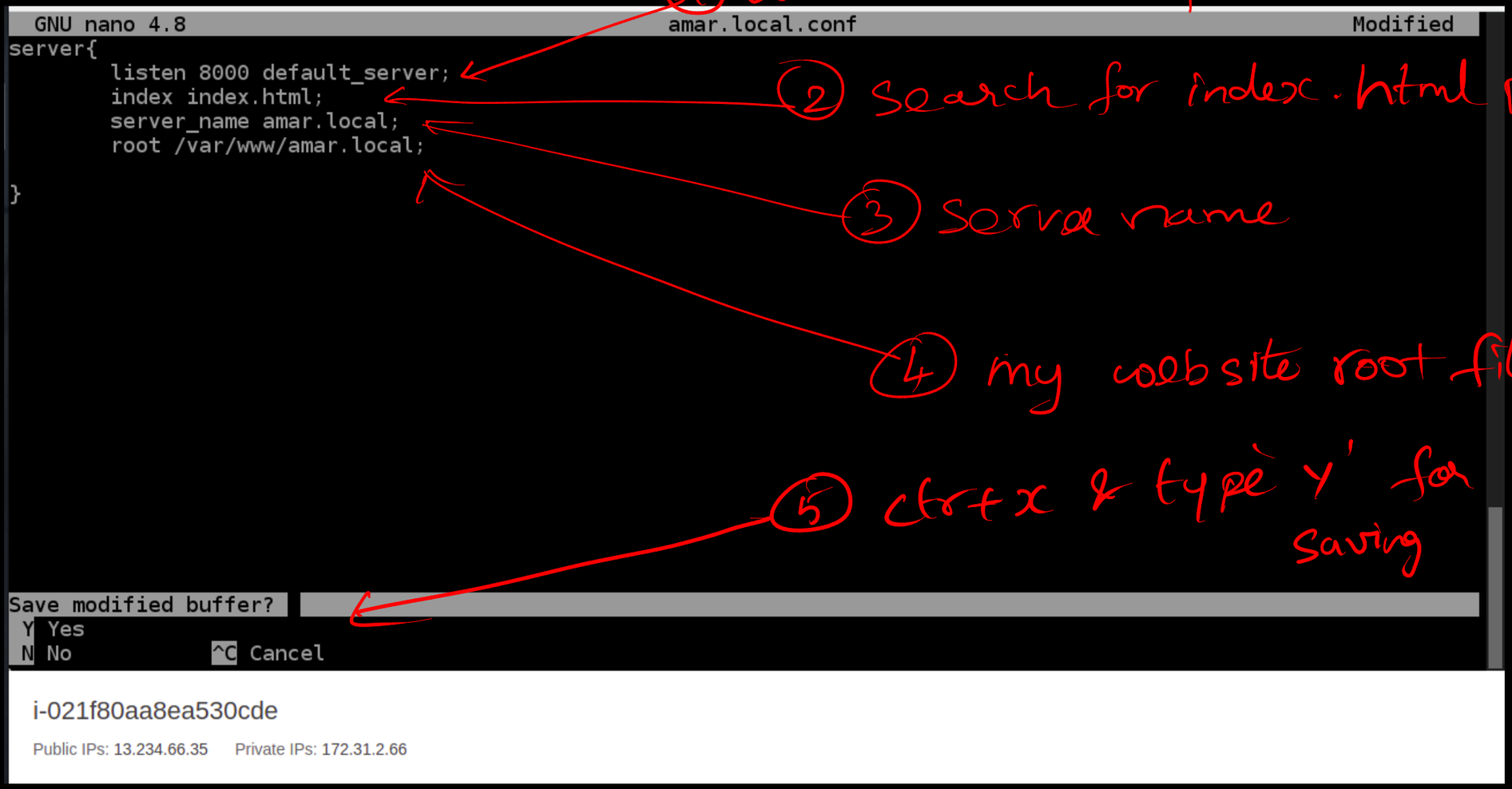


✗ Host a static website & listen at 8000 port

↳ Create a configuration file [amar.local.conf]



Configuration Content [Note: check syntax & spaces]



① Listen to 8000 port

② Search for index.html page

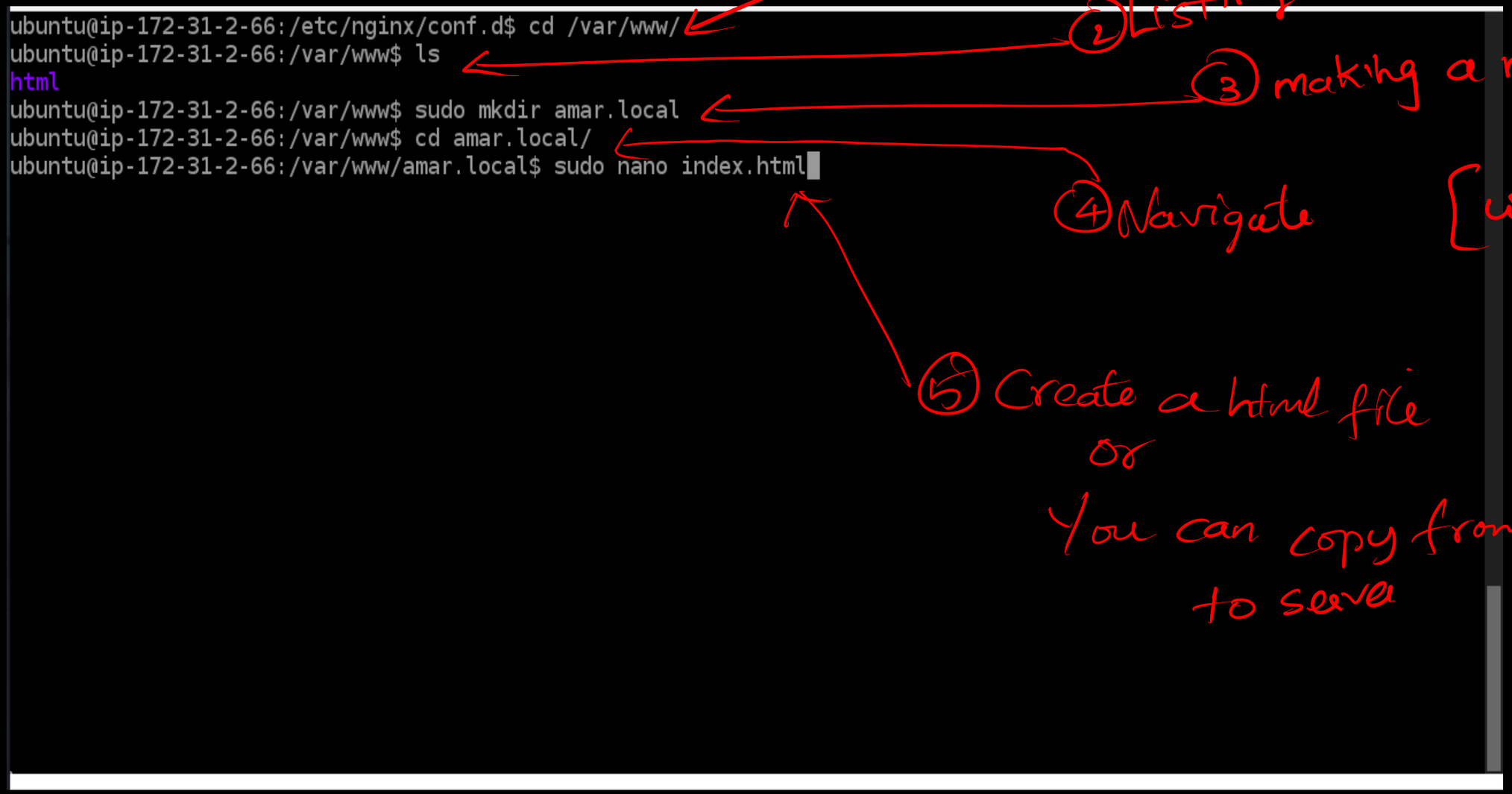
③ Server name

④ my website root file directory

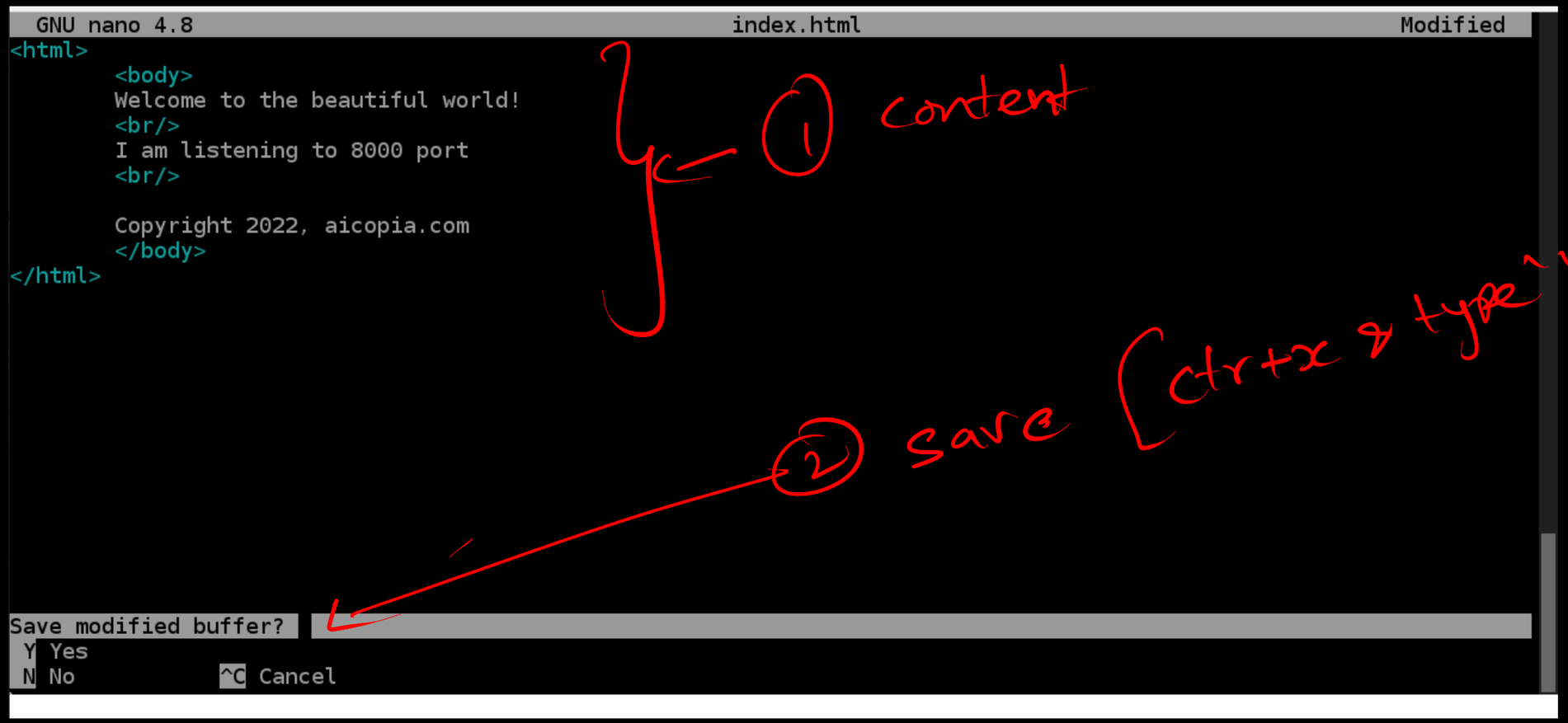
⑤ ctrl+x & type 'Y' for saving

Check configuration file status

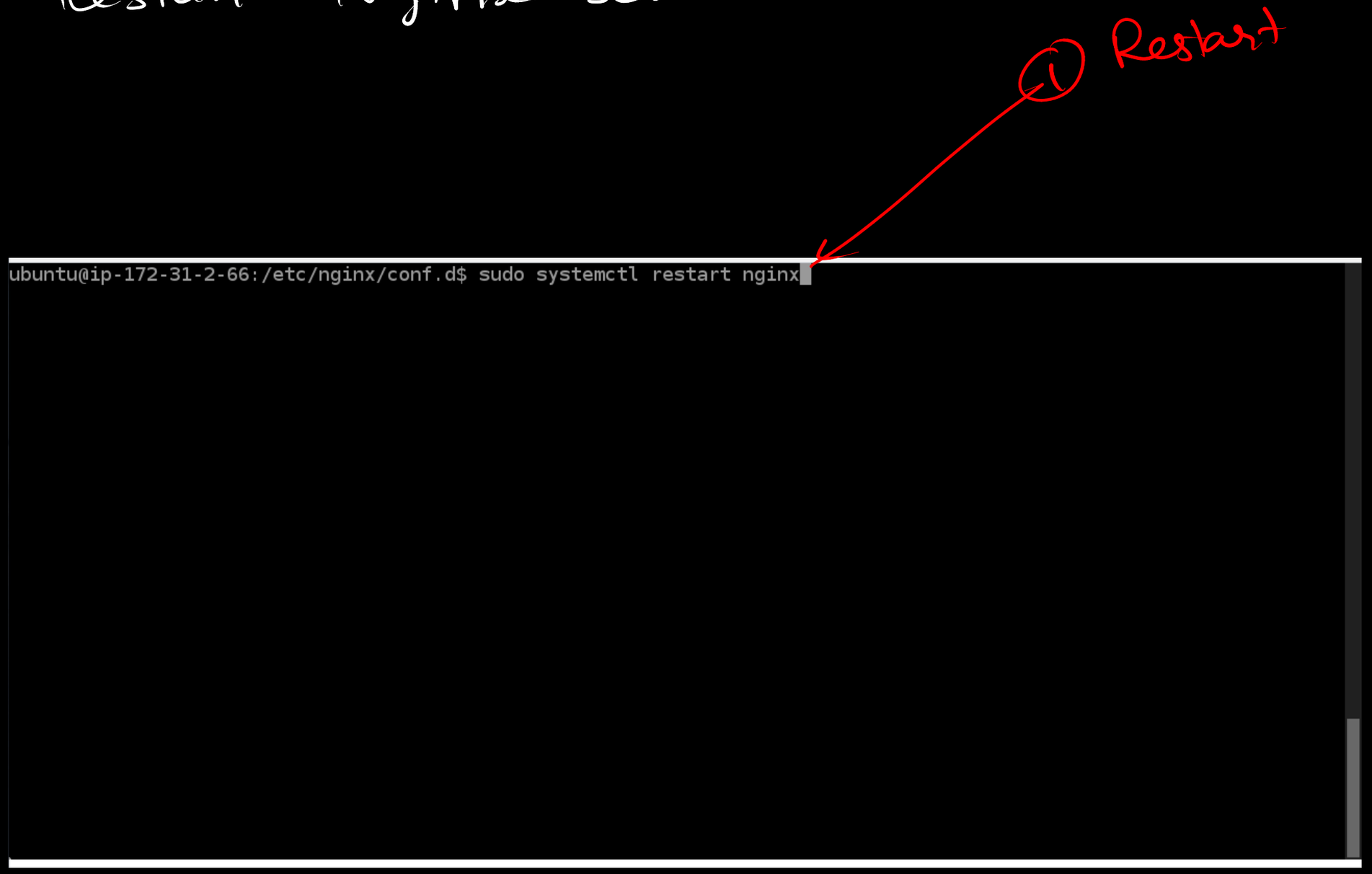
* Create a directory * create a html file



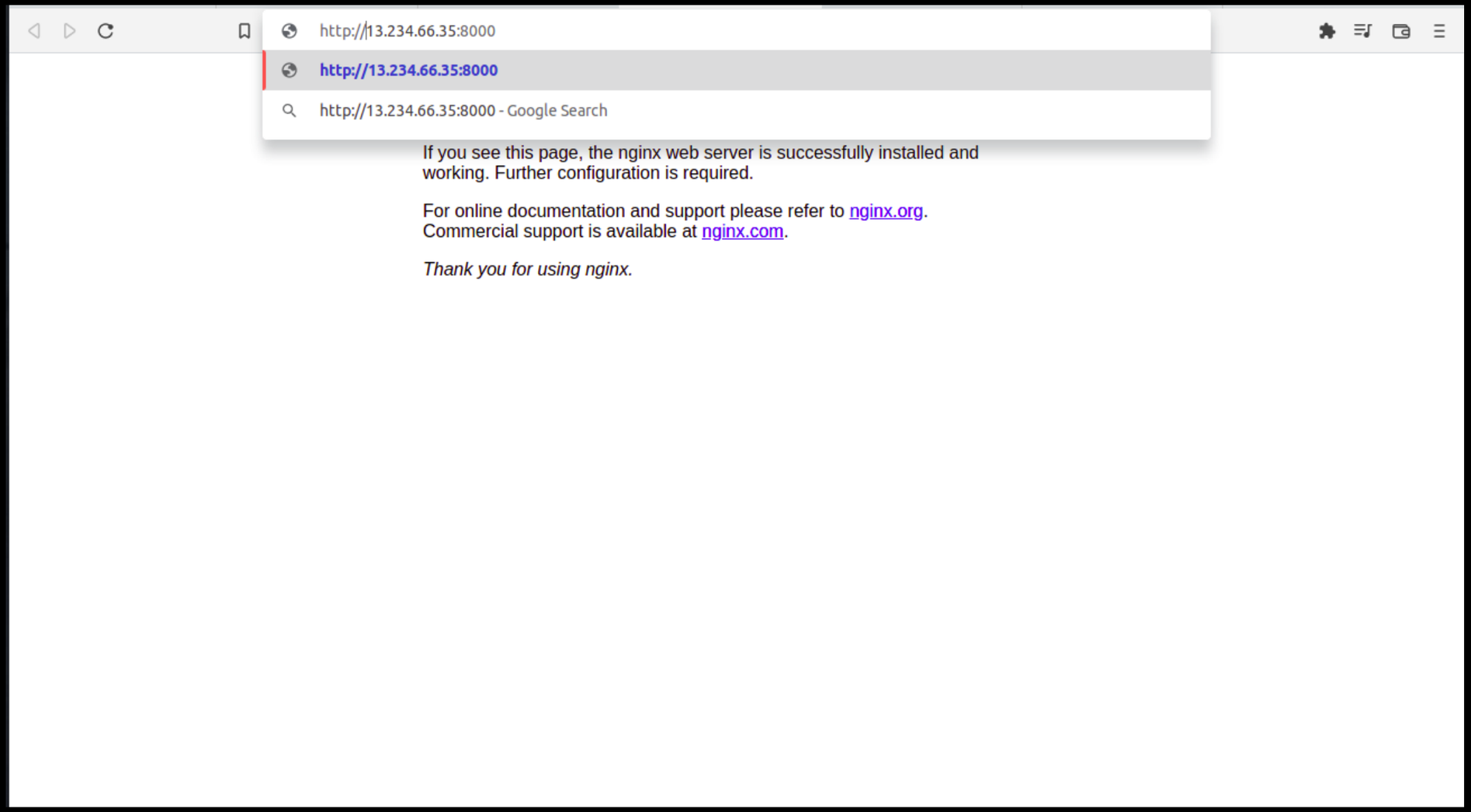
* Write html content & save



Restart Nginx server

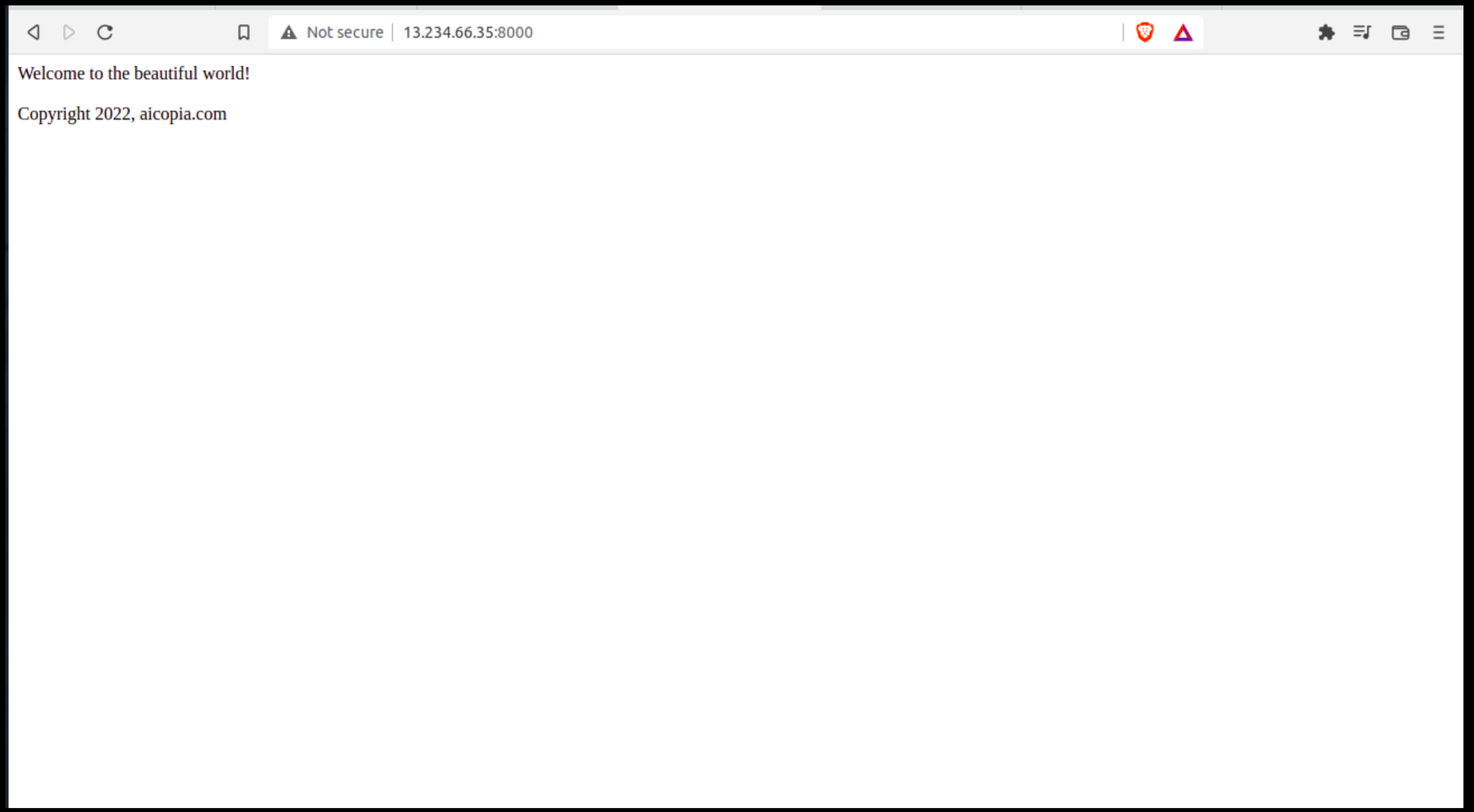


Open new tab & type http://public_ip:8000

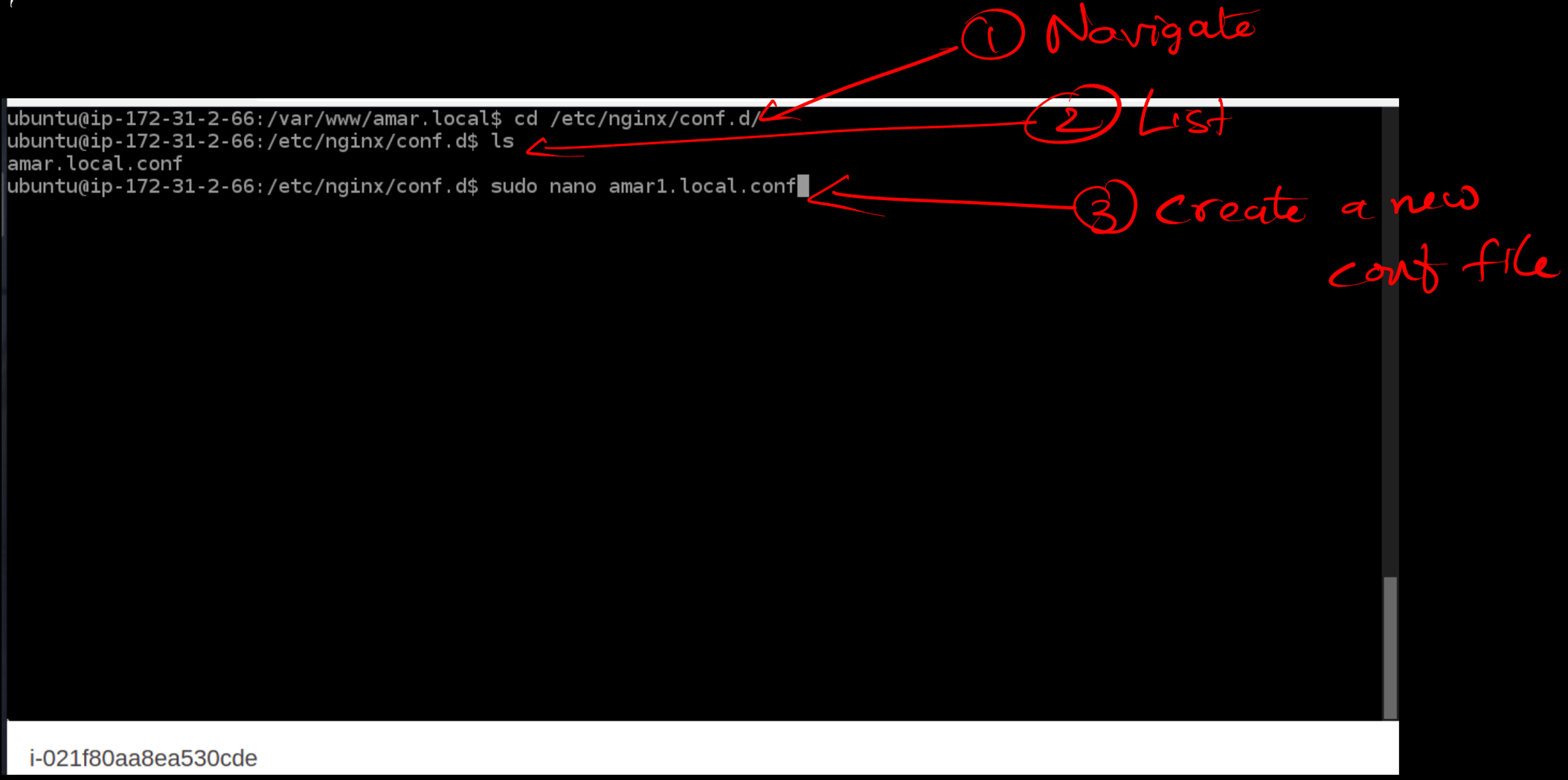


Bingo! You should able to see your html page

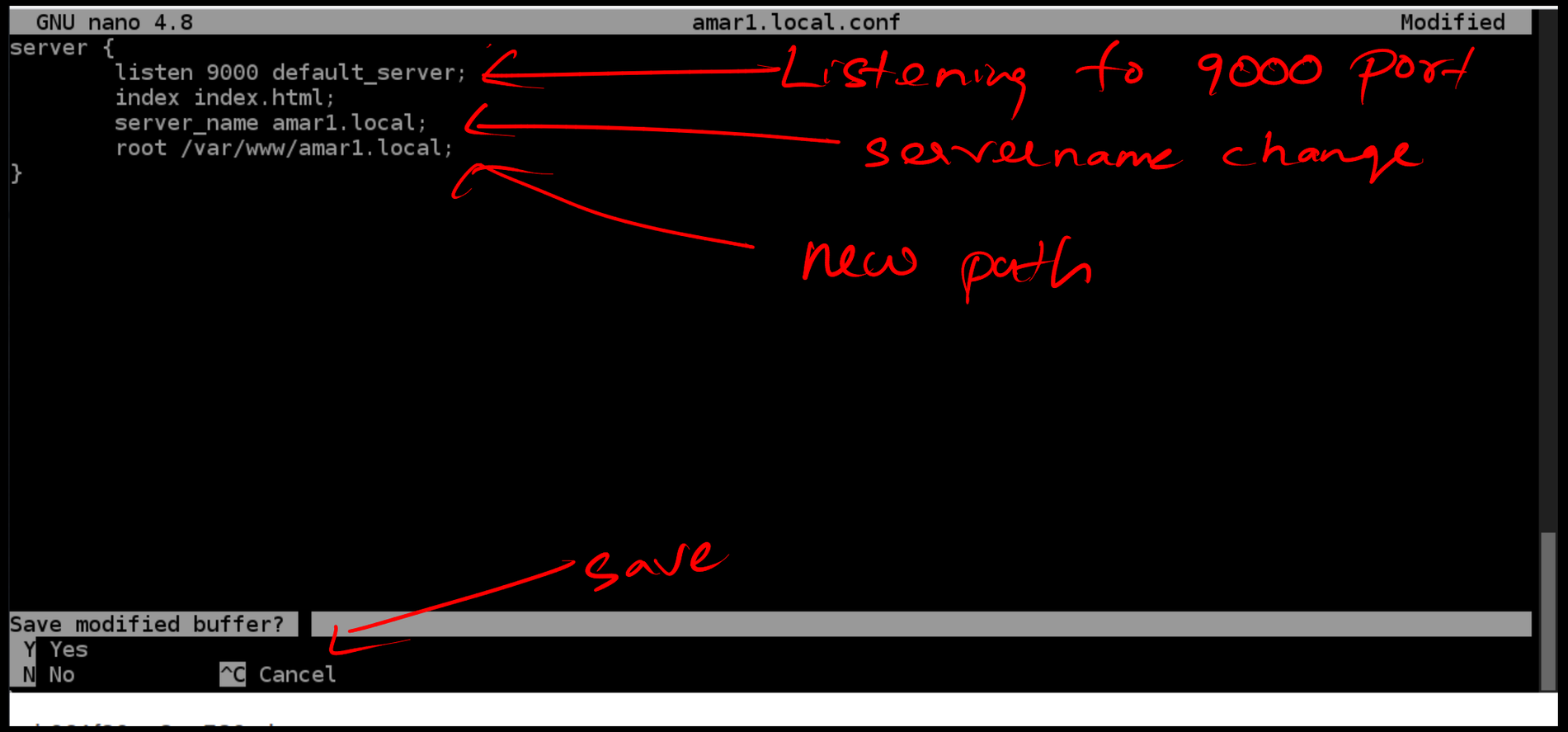
Note: It is http, but not https



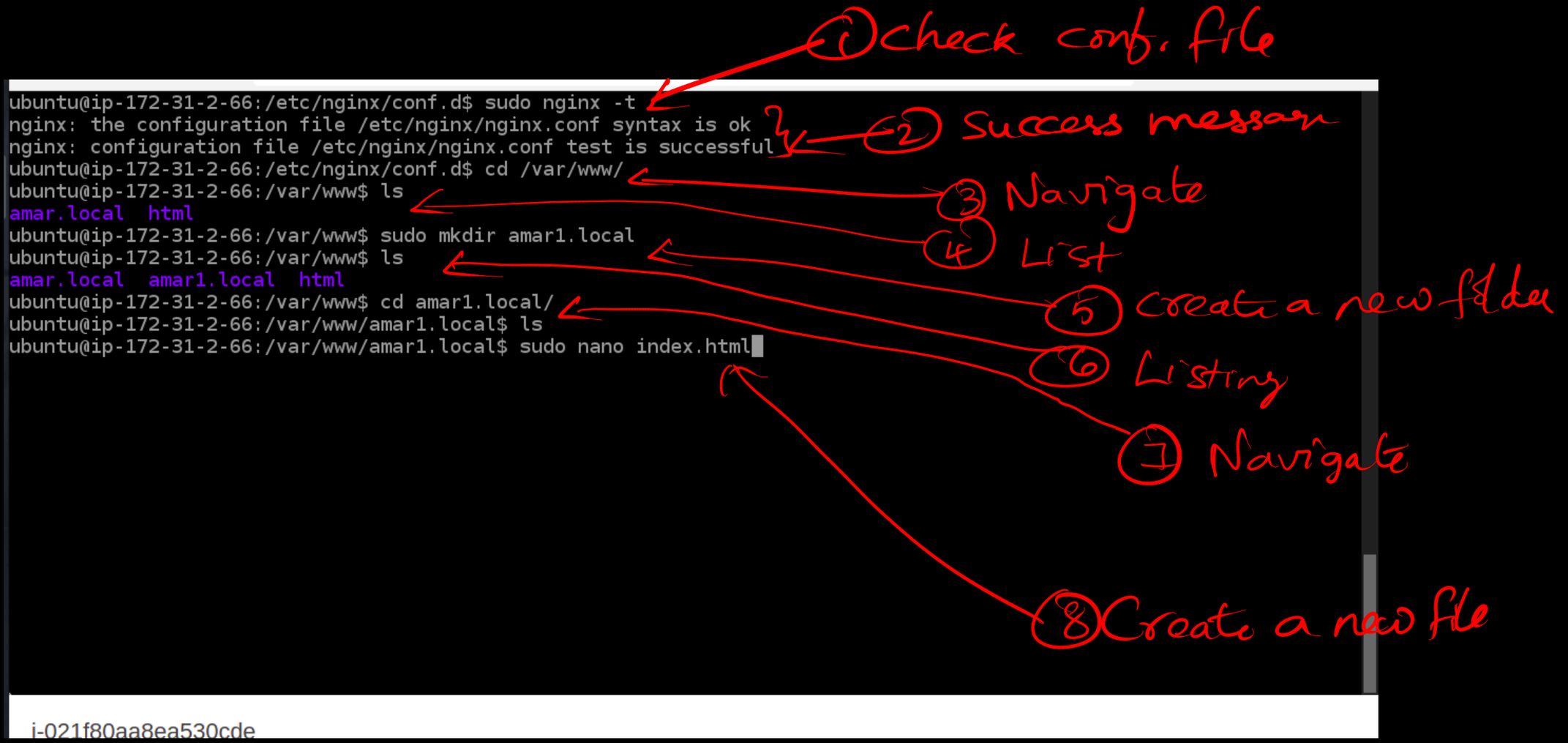
* Let us repeate the same process listening at 9000 port



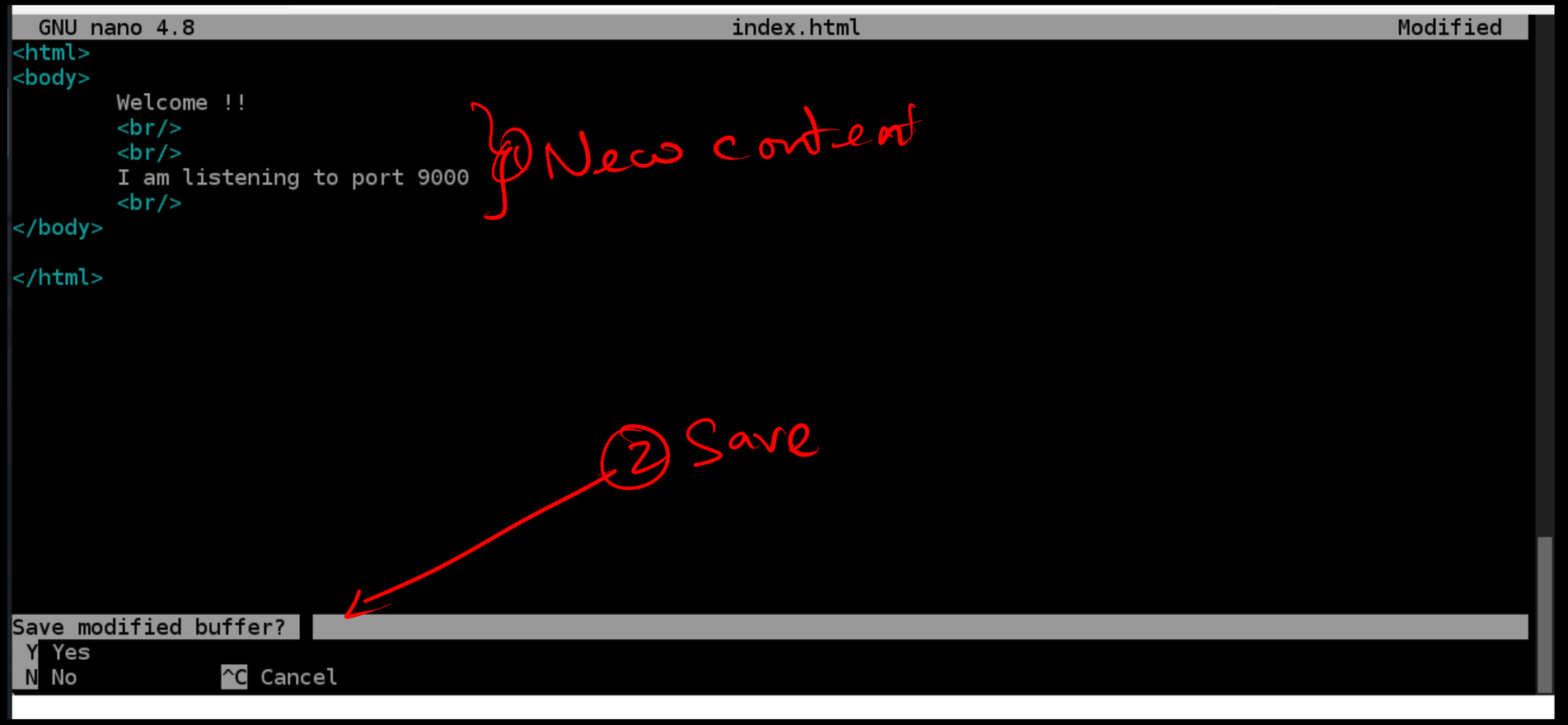
Create the configuration setup



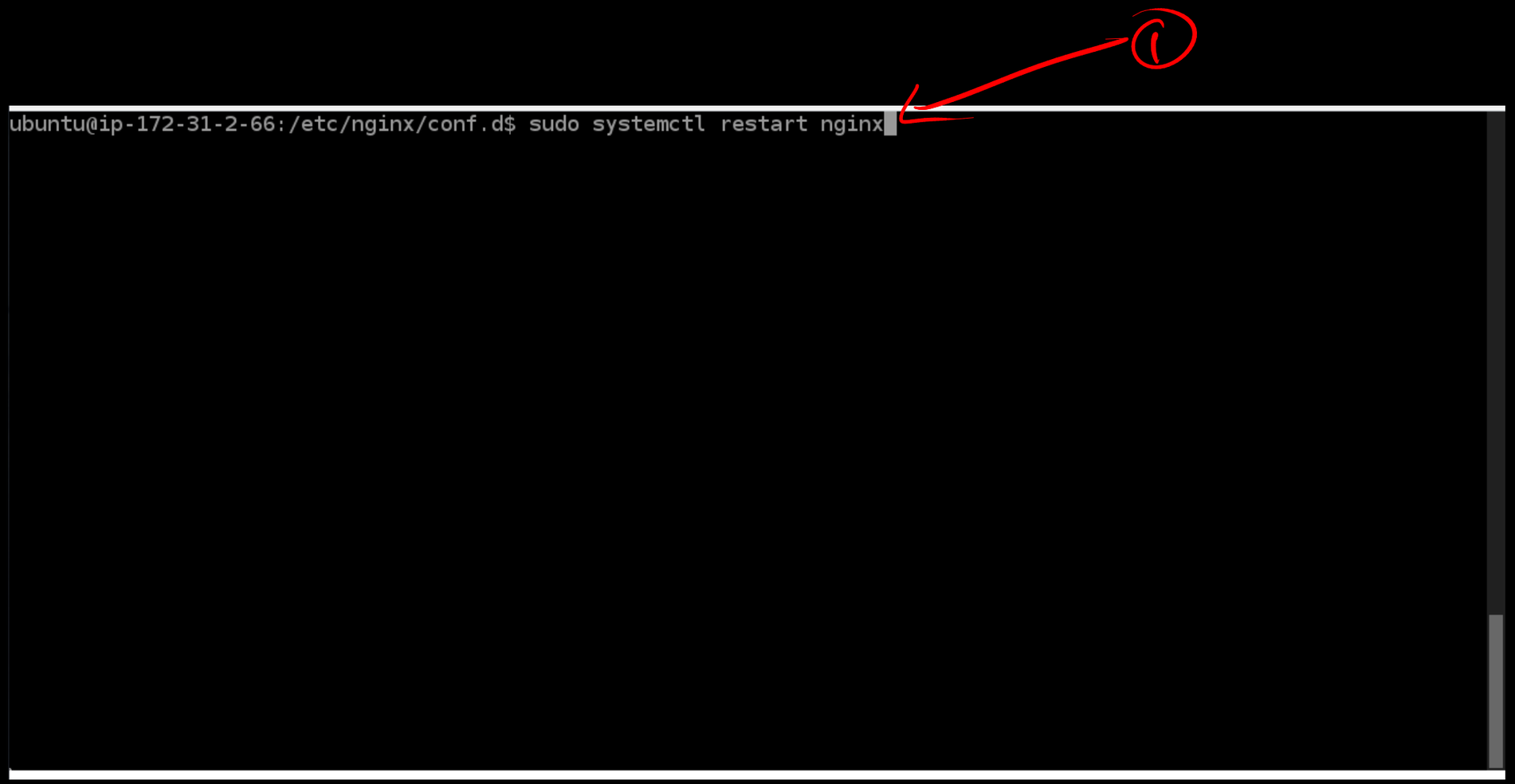
Check configuration & create a new page in new directory



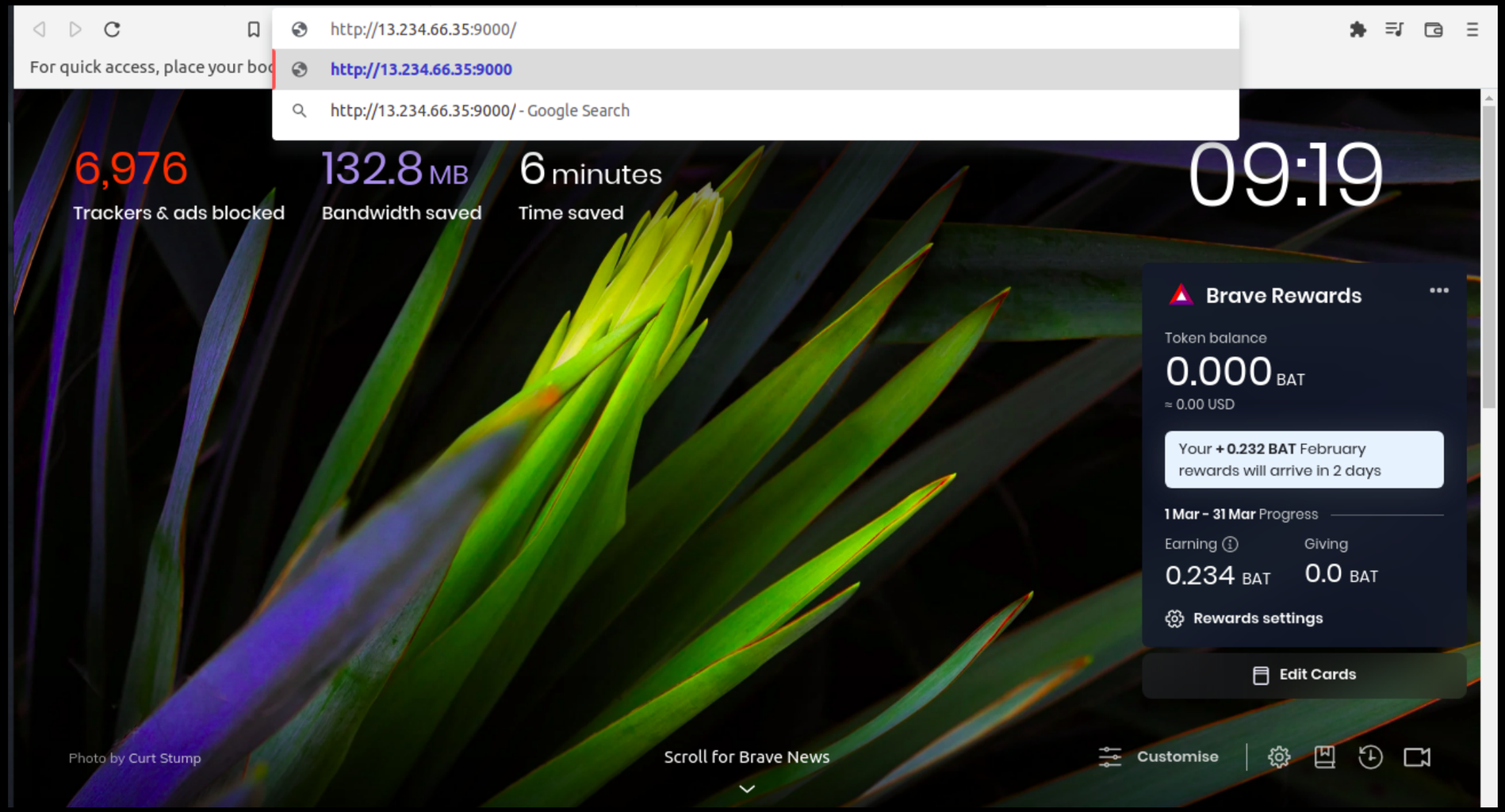
Add the below content



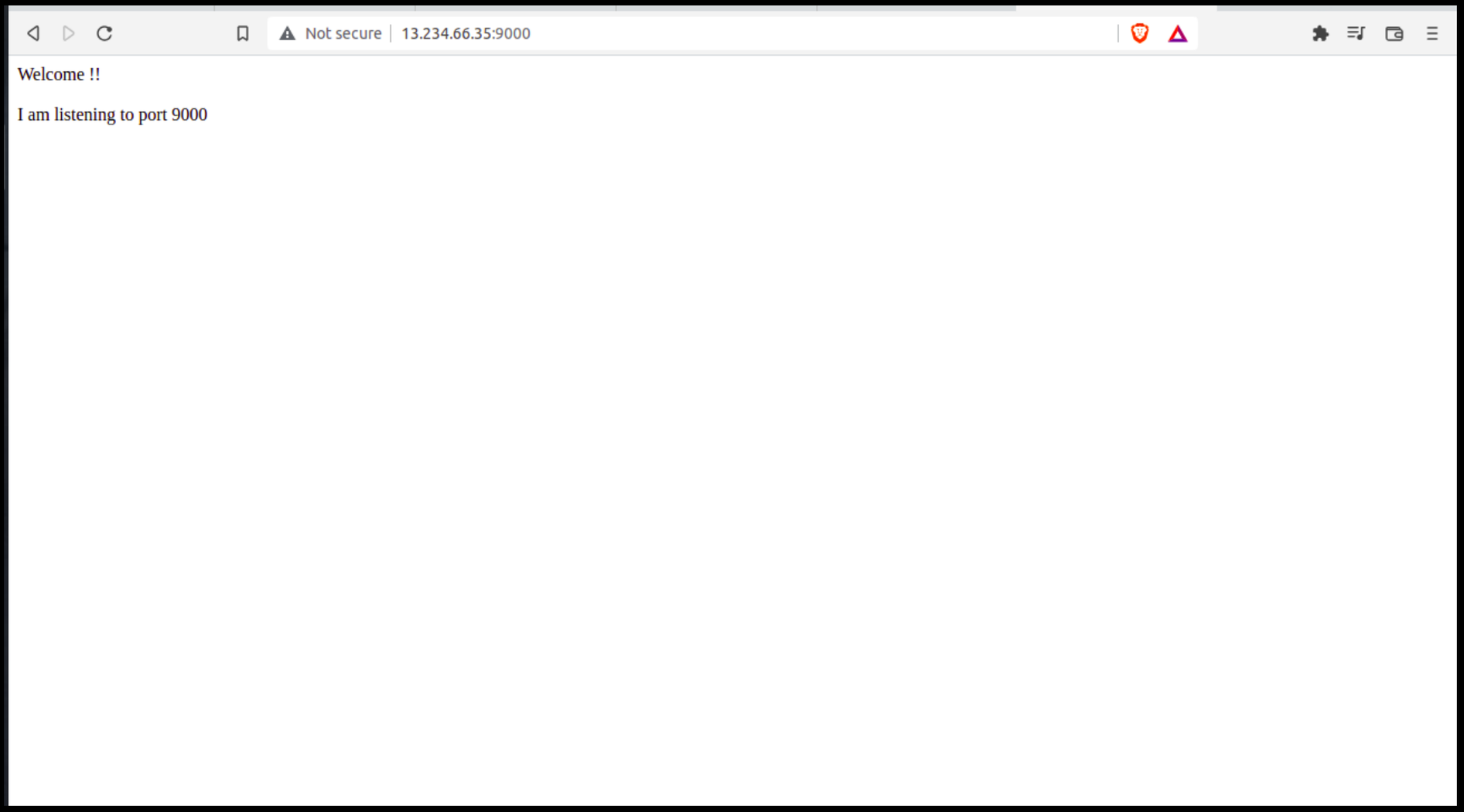
Restart the server



Open New tap: http://public_ip:9000



Bingo! You will see your web page



CREATING A PROXY SERVER

① → We have two ports

http://public_ip:8000 [/var/www/amar.local/index.html]

http://public_ip:9000 [/var/www/amar.local/index.html]

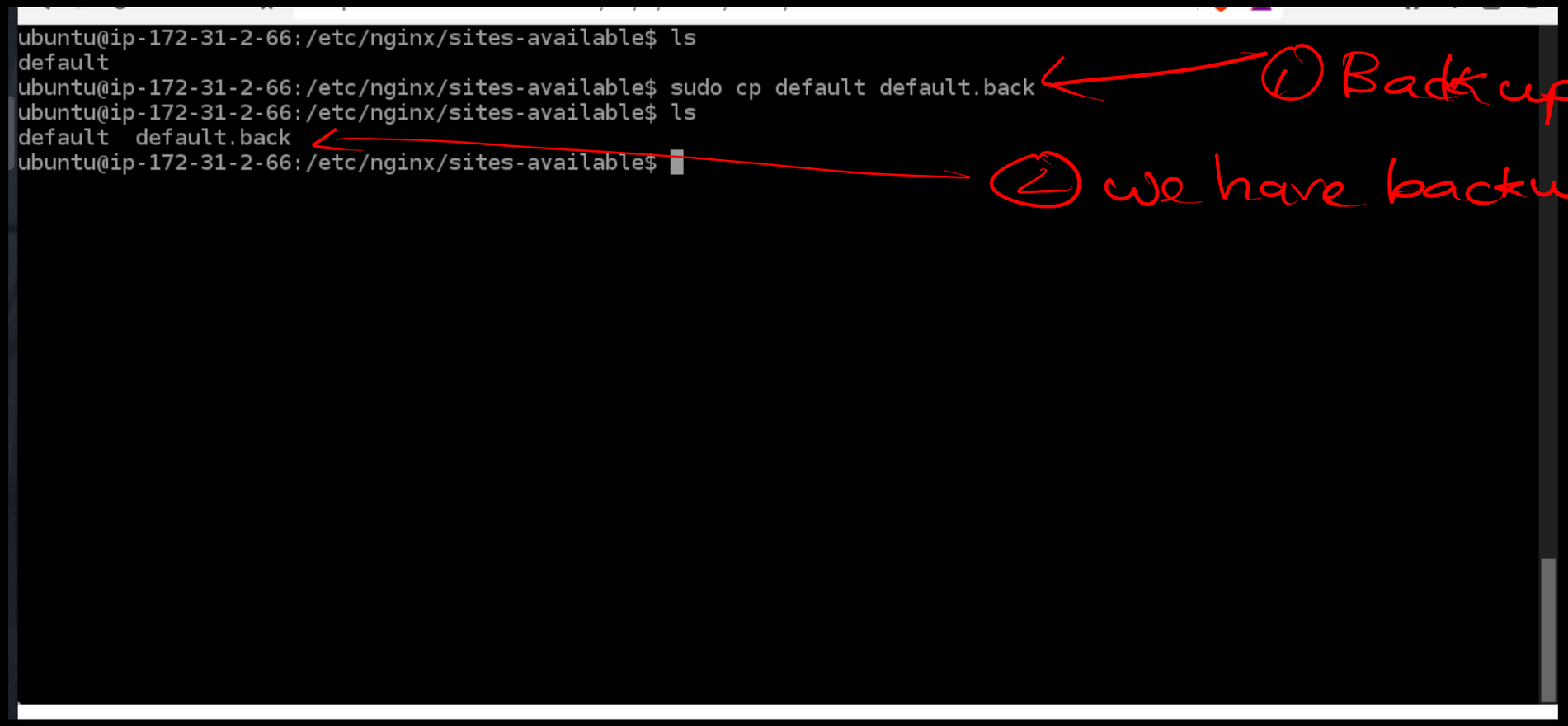
② The Default

http://public_ip [Default port is 80]

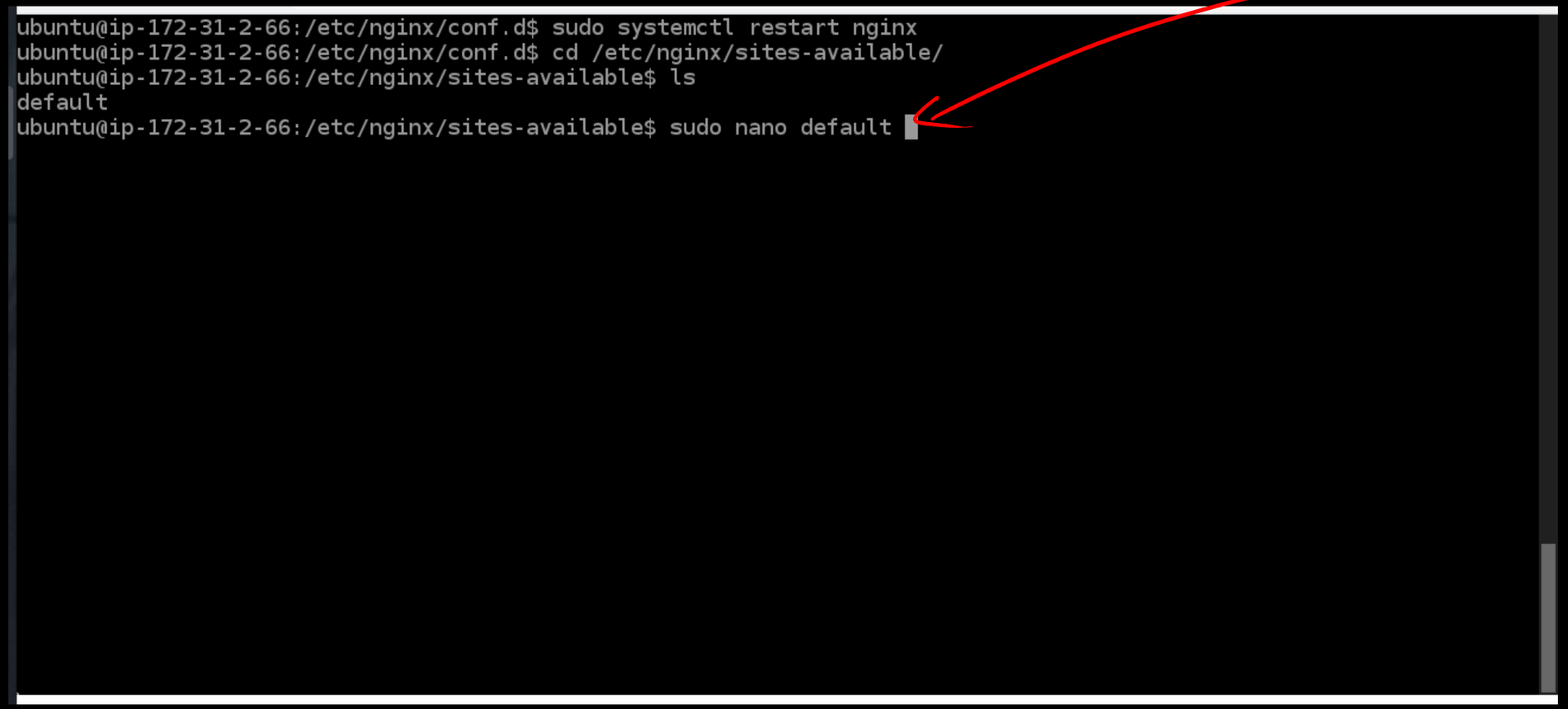
* Let us make this is a proxy server

Change the default configuration file

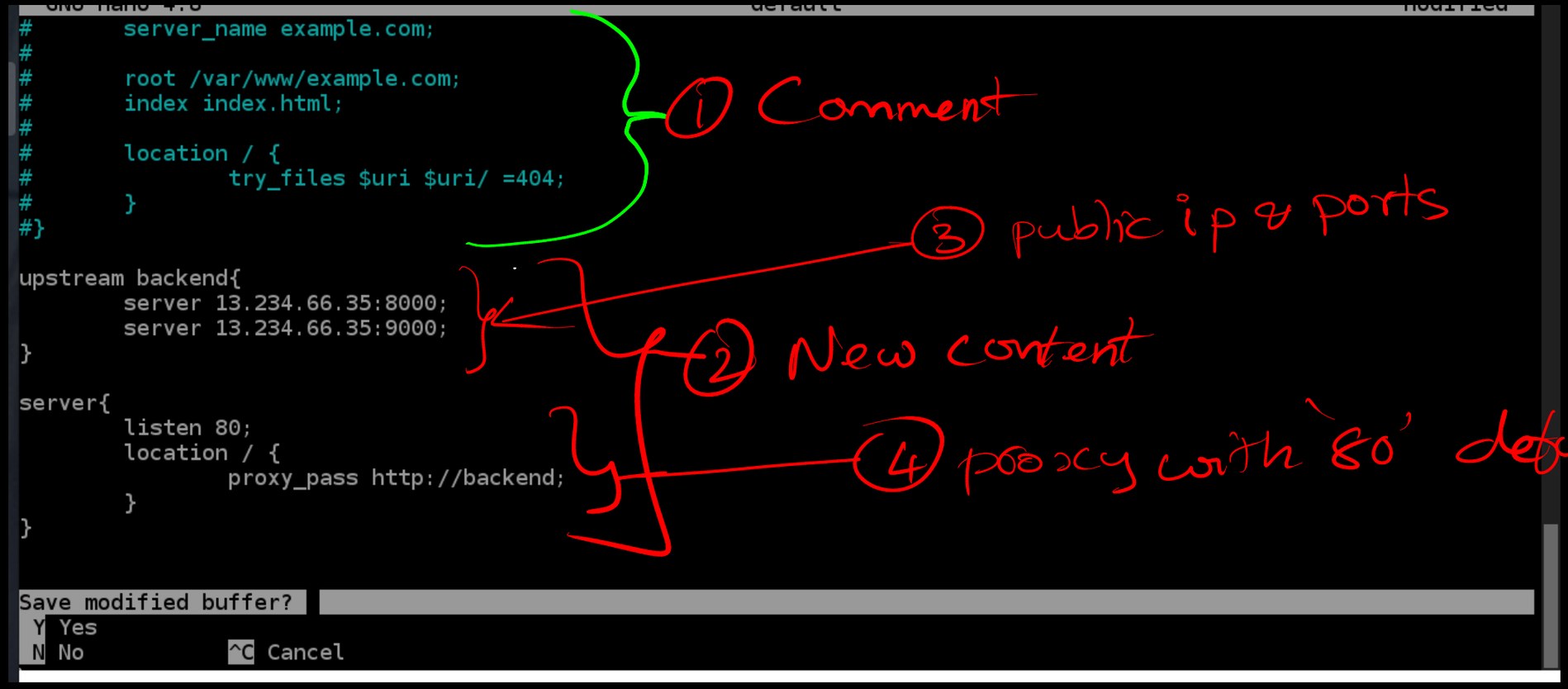
Take a backup of default config because we are making changes



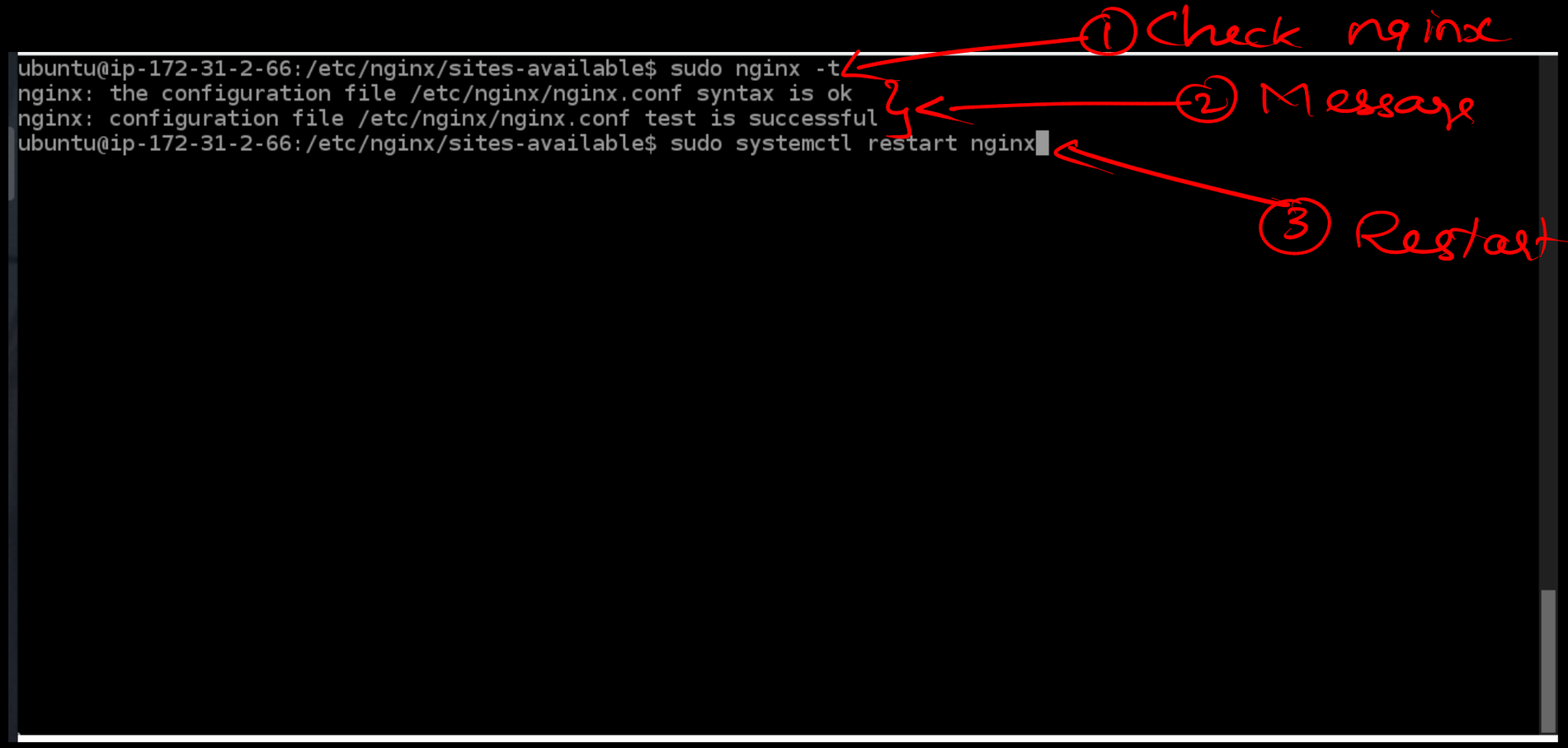
Edit Default configuration file



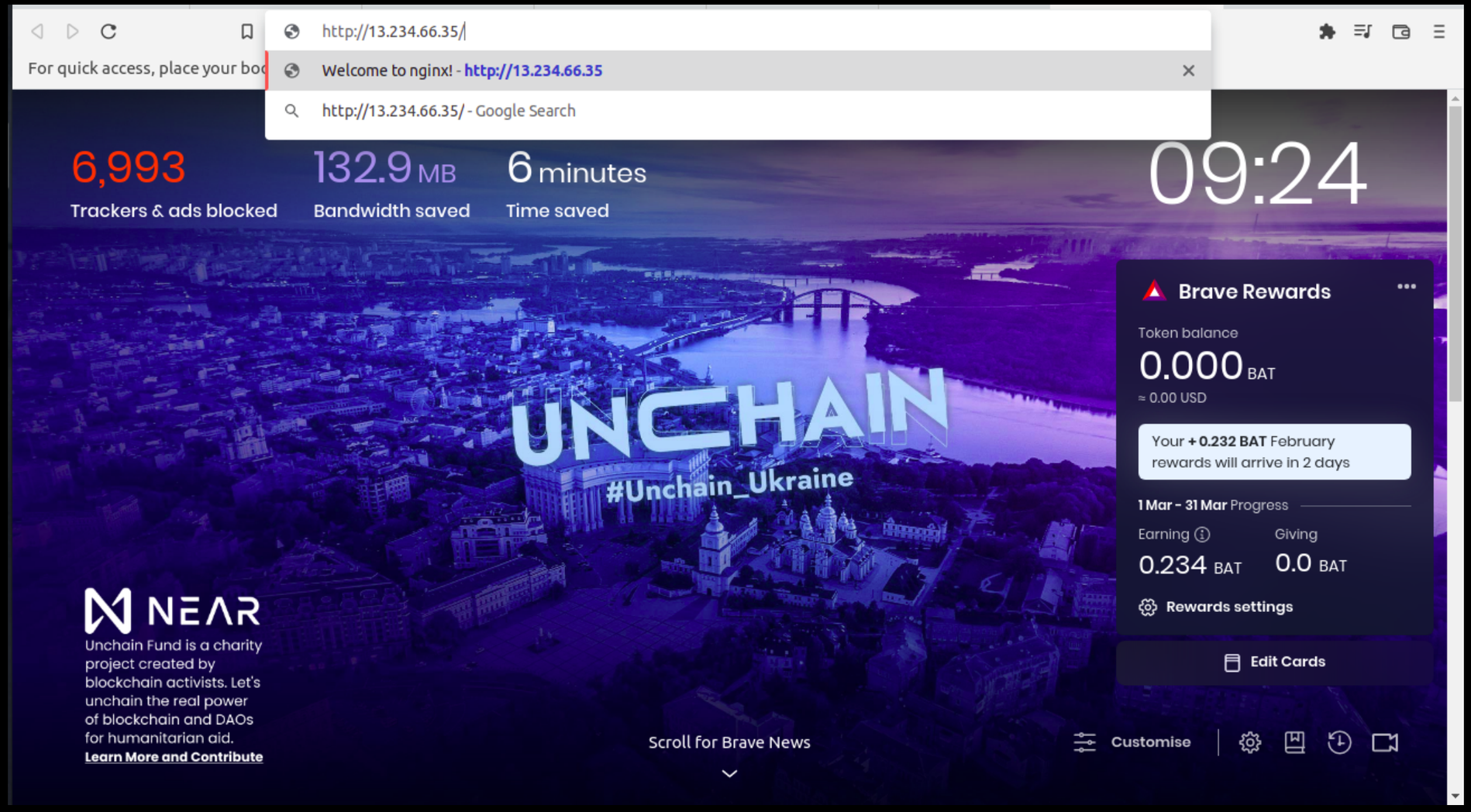
Comment all the lines using '#' symbol before the line
&
Add new content



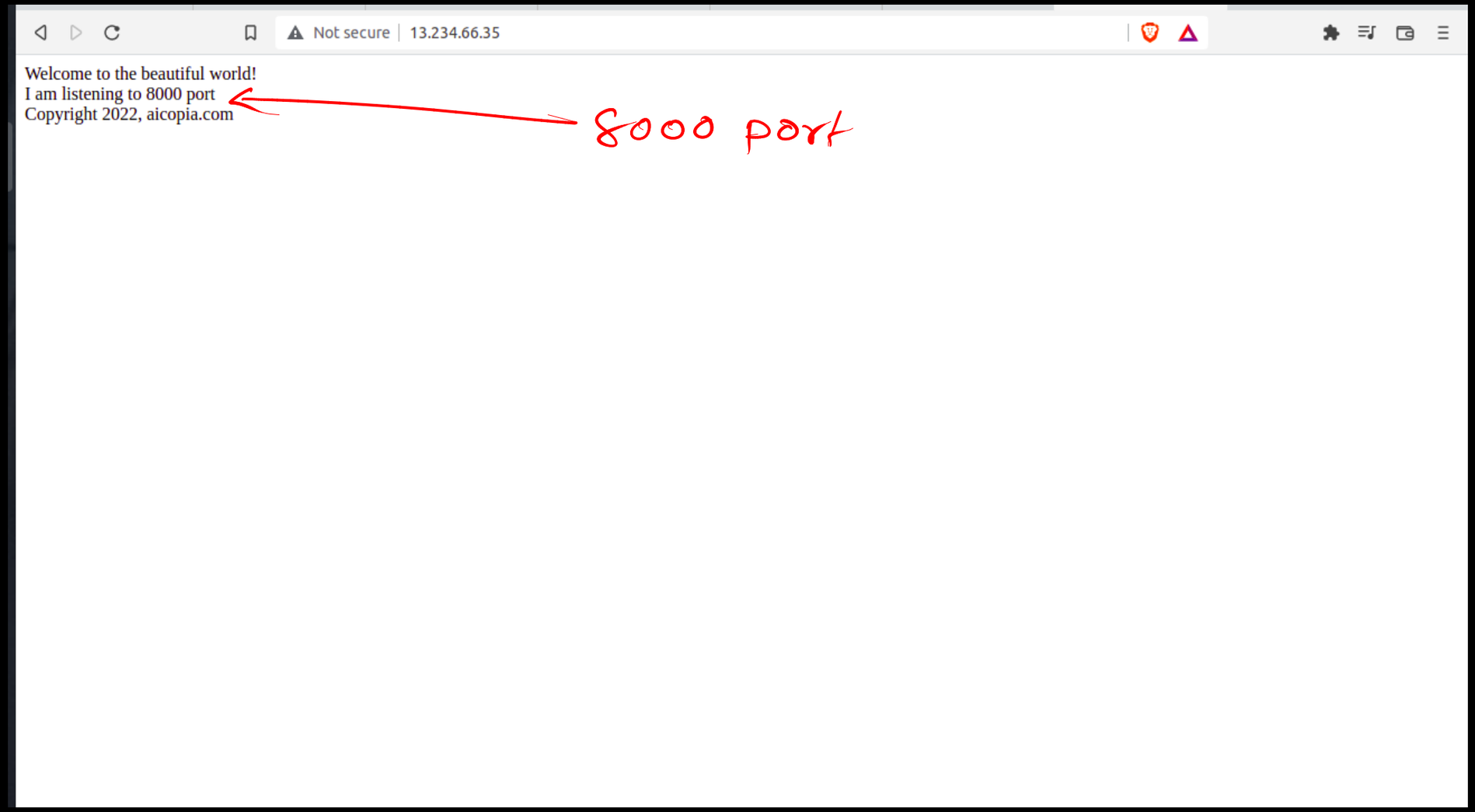
* Check your configuration file & Restart the nginx Server



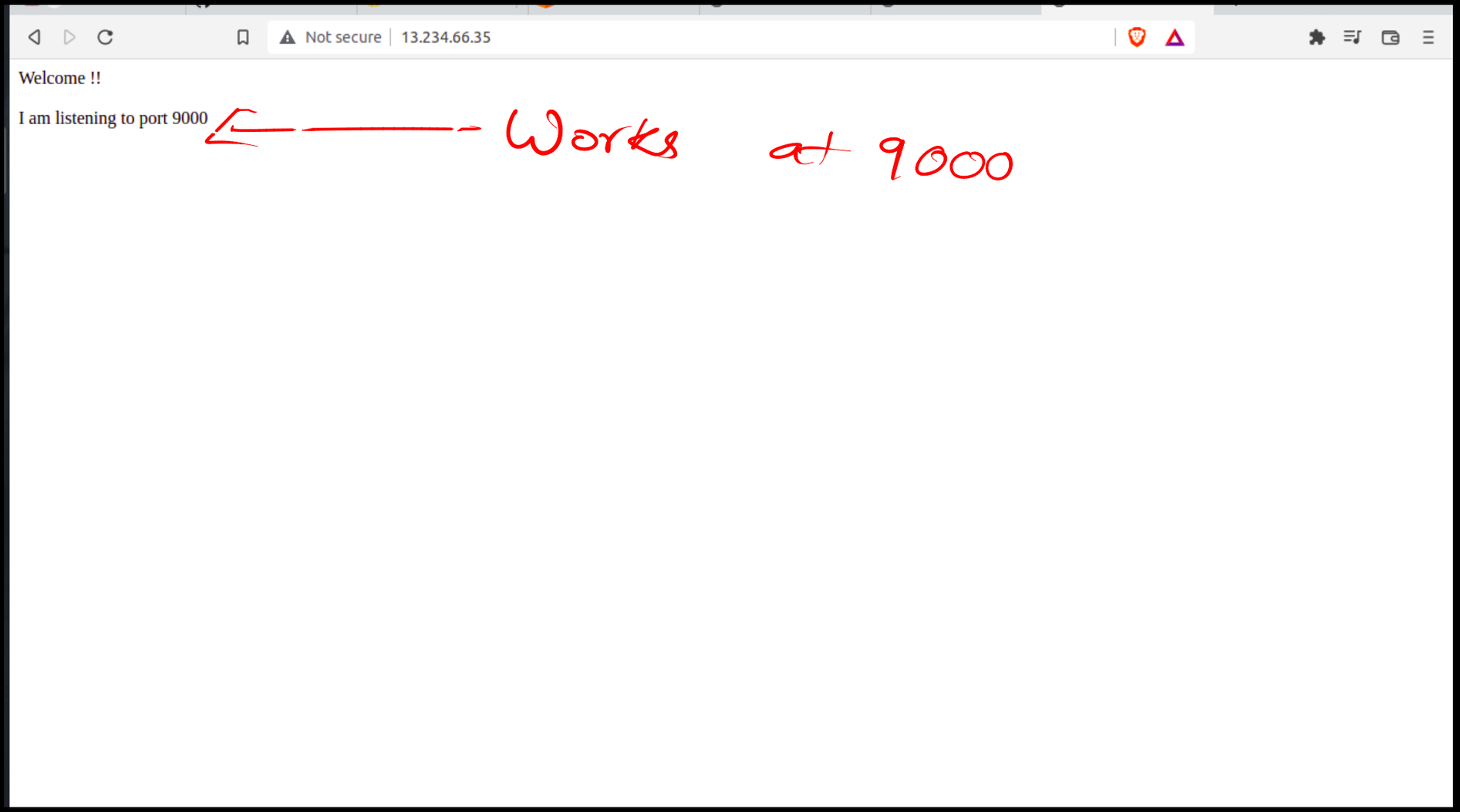
* Open a new tab : http://public_ip



Bingo! Proxy works & Refresh it changes the Content



Proxy [Refresh the page



We have experimented

① Proxy

② 8000

③ 9000

in the same instance (1 instance)

We can also explore having 3 different instances.

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