1. This command tests the network connectivity to the domain by sending packets and measuring the response time. It displays information about packet transfer and receive.

```
Fusion@DESKTOP-3UI71BF MINGW64 ~
$ ping google.com

Pinging google.com [142.250.194.238] with 32 bytes of data:
Reply from 142.250.194.238: bytes=32 time=48ms TTL=115
Reply from 142.250.194.238: bytes=32 time=42ms TTL=115
Reply from 142.250.194.238: bytes=32 time=48ms TTL=115
Reply from 142.250.194.238: bytes=32 time=41ms TTL=115

Ping statistics for 142.250.194.238:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 41ms, Maximum = 48ms, Average = 44ms

Fusion@DESKTOP-3UI71BF MINGW64 ~
```

2. We can use 'ipconfig' command on CMD . the IP shows after 'Default Gateway' is the ip address which is assigned by ISP.

3. We can use 'ipconfig' command on CMD . the IP shows after 'IPv4 Address' is the private ip address of the host machine.
in ubuntu machine the command is: ip addr show
In the provided network configuration, the private IP address is the one listed under interface enp0s3.

4.

5. The command netstat -tuln will show the port type and active ports

```
zubair@ubuntu22-04-test:~$ netstat -tuln
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 127.0.0.1:33060         0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:80              0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
tcp        0      0 0.0.0.0:3306            0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp6       0      0 :::80                   :::*                    LISTEN
tcp6       0      0 :::22                   :::*                    LISTEN
udp        0      0 127.0.0.53:53           0.0.0.0:*
udp        0      0 10.0.2.15:68            0.0.0.0:*
```

6. the command “sudo ufw allow 80” and “sudo ufw allow 3306” will open the port 80 and 3306. User can check the port status by using the command “sudo ufw status”. If the command is inactive, use the following command and check again: sudo ufw enable.

```
root@ubuntu-focal:~# sudo ufw allow 80
Rule added
Rule added (v6)
```

```
root@ubuntu-focal:~# sudo ufw allow 3306
Rule added
Rule added (v6)
root@ubuntu-focal:~# sudo ufw status
Status: active

To                         Action      From
--                         ------      ----
80                         ALLOW       Anywhere
3306                       ALLOW       Anywhere
80 (v6)                    ALLOW       Anywhere (v6)
3306 (v6)                  ALLOW       Anywhere (v6)
```

7. wget command help to download file from web. But first, user needs to install wget. The installation command should look like this: sudo apt install wget.
To download file, user will need the download link. The command will be:
“wget downloadlink “

```
root@ubuntu-focal:~# sudo apt install wget
Reading package lists... Done
Building dependency tree
Reading state information... Done
wget is already the newest version (1.20.3-1ubuntu2).
wget set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 43 not upgraded.
root@ubuntu-focal:~# wget https://www.tooplate.com/zip-templates/2137_barista_cafe.zip
--2023-10-21 09:29:57--  https://www.tooplate.com/zip-templates/2137_barista_cafe.zip
Resolving www.tooplate.com (www.tooplate.com)... 72.52.176.250, 64:ff9b::4834:b0fa
Connecting to www.tooplate.com (www.tooplate.com)|72.52.176.250|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 4679329 (4.5M) [application/zip]
Saving to: '2137_barista_cafe.zip'

2137_barista_cafe.zip                19%[=====>                                ] 906.09K   118KB/s    eta 45s
```

8. The following command will retrieve the web page content from the URL and display it in Terminal:

```
root@ubuntu-focal:~# curl google.com
<HTML><HEAD><meta http-equiv="content-type" content="text/html;charset=utf-8">
<TITLE>301 Moved</TITLE></HEAD><BODY>
<H1>301 Moved</H1>
The document has moved
<A HREF="http://www.google.com/">here</A>.
</BODY></HTML>
root@ubuntu-focal:~#
```

9. First we need to update all the packages to install nginx properly

```
user01@ubuntu22:~$ sudo apt update
Hit:1 http://us.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://us.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Get:4 http://us.archive.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:5 http://us.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1,1
04 kB]
Get:6 http://us.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [240
 kB]
Get:7 http://us.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Package
```

The command “sudo install nginx” will install the nginx

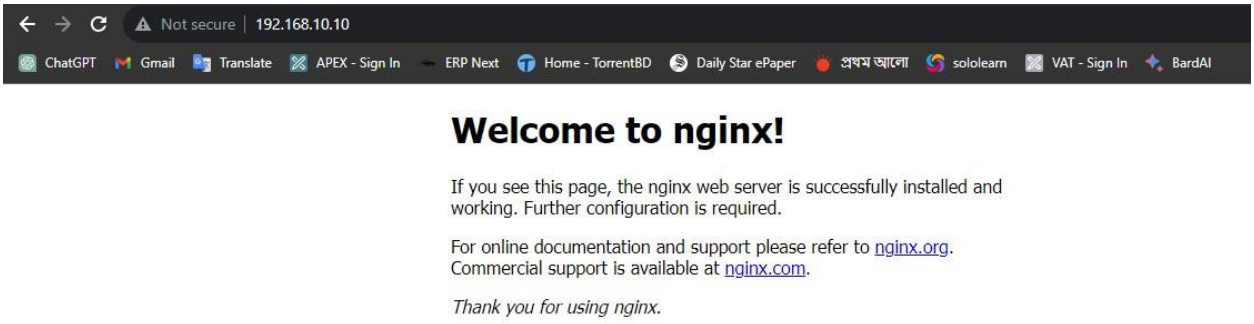
```
user01@ubuntu22:~$ sudo apt install nginx
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  fontconfig-config fonts-dejavu-core libdeflate0 libfontconfig1 libgd3
```

To make it active and running, these two following commands should be applied:

```
user01@ubuntu22:~$ sudo systemctl start nginx
user01@ubuntu22:~$ sudo systemctl enable nginx
Synchronizing state of nginx.service with SysV service script with /lib/systemd/systemd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nginx
user01@ubuntu22:~$ 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 Fri 2023-10-27 14:47:28 UTC; 1min 45s ago
       Docs: man:nginx(8)
   Main PID: 3591 (nginx)
      Tasks: 3 (limit: 4557)
     Memory: 4.7M
        CPU: 47ms
     CGroup: /system.slice/nginx.service
             ├─3591 "nginx: master process /usr/sbin/nginx -g daemon on; master_process on;"
             ├─3594 "nginx: worker process" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "">
             └─3595 "nginx: worker process" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "" "">

Oct 27 14:47:28 ubuntu22 systemd[1]: Starting A high performance web server and a reverse proxy server...
Oct 27 14:47:28 ubuntu22 systemd[1]: Started A high performance web server and a reverse proxy server.
lines 1-15/15 (END)
```

Now if we browse the ip from the browser, we will get the “Welcome to nginx” page:



10. To install mysql: sudo apt install mysql-server.

>> sudo nano /etc/mysql/mysql.conf.d/mysqld.cnf

*Find the line ‘bind-address’ in that file and change it to the VM's IP address or set it to 0.0.0.0 (to allow connections from any IP).

>>>bind-address = 0.0.0.0

* Go to root user: sudo mysql -u root -p

*To create user: CREATE USER 'zubair'@'%' IDENTIFIED BY '123';

- here, zubair is the user and password is 123. % is used to grant permission to access from all host

To connect from host machine: mysql -h 192.168.56.10 -P 3306 -u zubair -p

```
C:\Users\Fusion>mysql -h 192.168.56.10 -P 3306 -u zubair -p
Enter password: ***
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.34-0ubuntu0.22.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

Here, 192.168.56.10 is the vm’s ip, 3306 is the port where running the mysql, followed by -p, zubair is the username followed by -u and -p means the password.

11. Go to the directory /var/www/html

```
zubair@ubuntu22-04-test:~$ cd /var/www/html
zubair@ubuntu22-04-test:/var/www/html$ ls
```

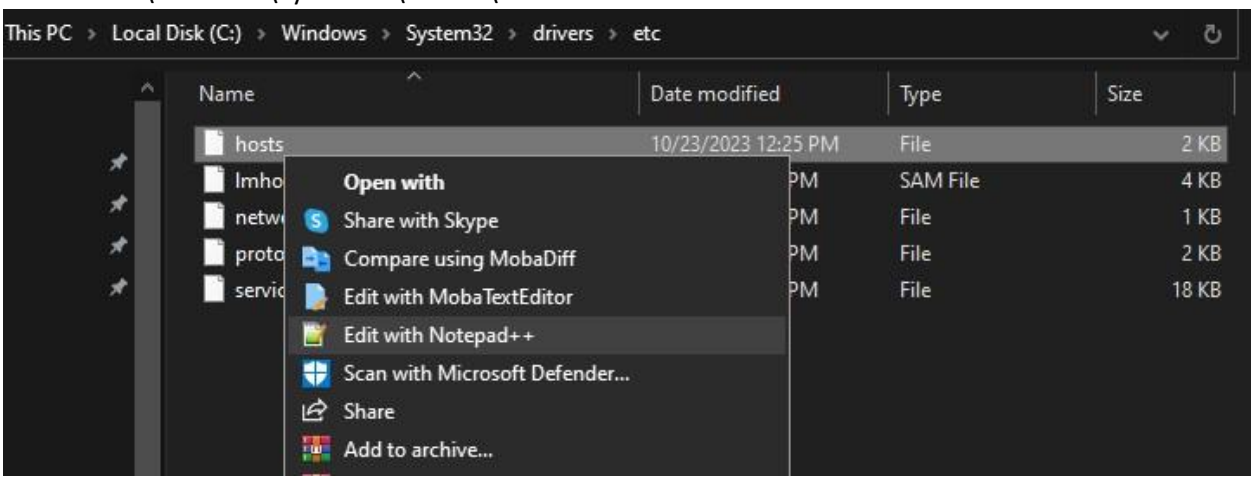
```
zubair@ubuntu22-04-test:/var/www/html$ sudo vi index.html
zubair@ubuntu22-04-test:/var/www/html$ sudo systemctl restart nginx
zubair@ubuntu22-04-test:/var/www/html$
```

*edit the index.html file

```
<!DOCTYPE html>
<html>
<head>
    <title>Welcome to My Page</title>
</head>
<body>
    <h1>This is my page</h1>
</body>
</html>
```

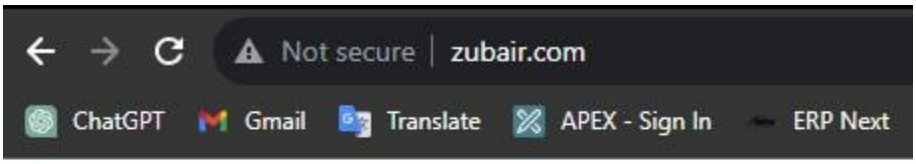
*restart the nginx by using this command: “sudo systemctl restart nginx”.

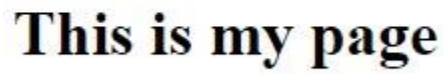
12. Go to C:\Windows\System32\drivers\etc and find the hosts file:



*Add the ip and add a suitable domain you want to create:

*Now use the browser and search for created domain:





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