

# ICT 1711 Assignment 2

## Cloud server project

- Global IP address: 20.206.205.14
- DNS: [www.myportfoliouae.com](http://www.myportfoliouae.com)

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## Project Overview

The project part I would take on would be building a (professional) portfolio website hosted on a cloud-based server. My skills and some of my projects will be presented in the portfolio, and it will be essential to satisfy some technical requirements such as server configuration, version control, and scripting. This project will demonstrate my capability of designing and setting up an infrastructure as a service (IaaS) solution and documenting the process, as well as handling server-related tasks efficiently.

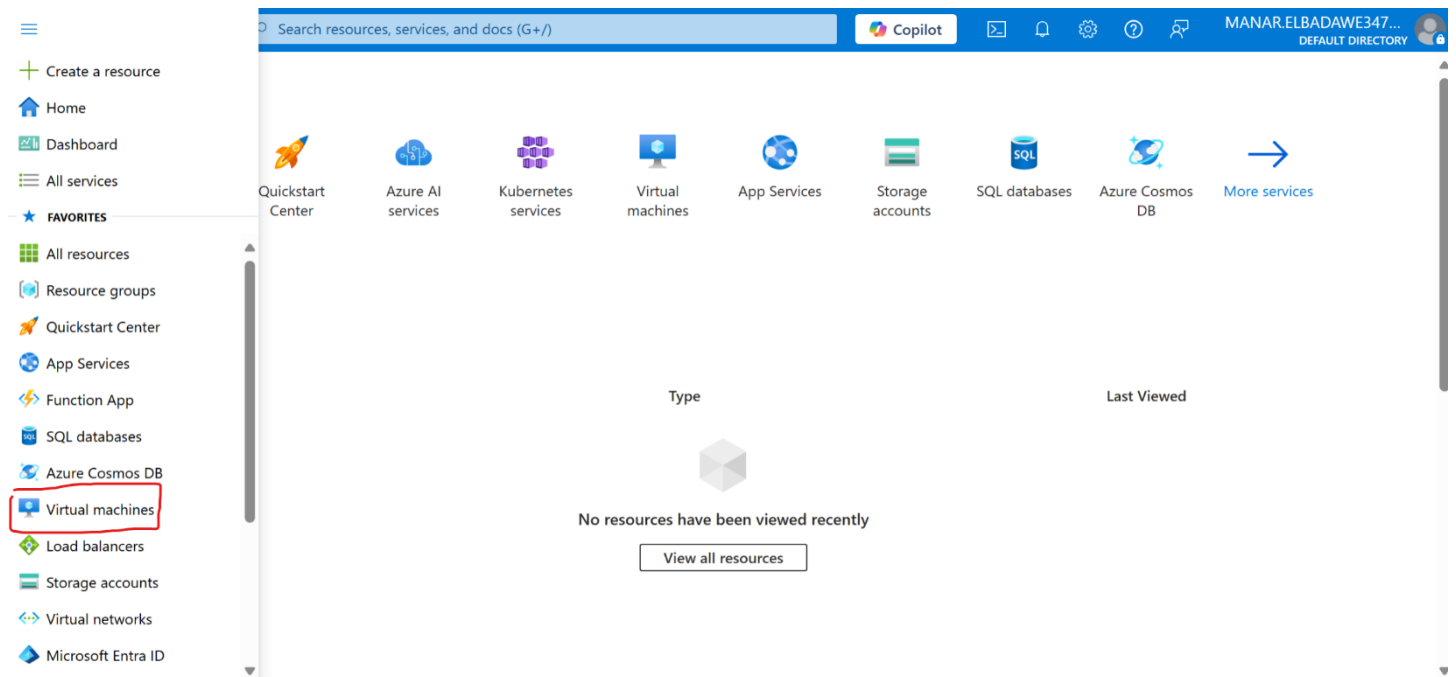
### Objectives:

- Create a killer portfolio website that will answer convincingly and on point.
- Deploy the portfolio on a cloud-based server, such as Microsoft Azure.
- Set up a Linux server, install and configure firewall rules, and enable SSH access.
- Use GitHub as a version control and project documentation.
- Use Python or Bash scripts to automate tasks.
- I will produce professional documentation like TCO and support tickets.

# Setup instruction

## 1. Setting up a server using Microsoft Azure:

In your Oracle virtualBox, after signing up ( using student email or your personal email ), the home page will be displayed, click on the three lines on the top left and click on the Virtual machines.



## 1. Using these settings to create the VM :

Configure basic settings:

- Subscription: Your subscription
- Resource group: Create new (e.g., "portfolio-rg")
- Virtual machine name: "portfolio-vm"
- Region: Choose closest (e.g., "Australia East")
- Image: "Ubuntu Server 22.04 LTS"
- Size: "Standard\_B1s" (Free tier eligible)

## 2. Authentication:

- Authentication type: "SSH public key"
- Username: "azureuser"
- SSH public key source: "Generate new key pair"
- Key pair name: "portfolio-key"

## 3. Networking:

- Allow selected ports: SSH (22), HTTP (80), HTTPS (443)

Then click review + create , then download the privet key when prompted

Furthermore, you should be able to access your VM home page, make sure that is running.

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

MANAR.ELBADAWE347...  
DEFAULT DIRECTORY

Home >

personal-portfolio

Virtual machine

» 

Help me copy this VM in any region

Connect

Start

Restart

Stop

Hibernate

Capture

Delete

Refresh

Open in mobile

Feedback

CLI / PS

^ Essentials

JSON View

Resource group (move) : Portfolio

Operating system : Linux (ubuntu 22.04)

Status : Running

Size : Standard B1s (1 vcpu, 1 GiB memory)

Location : Brazil South (Zone 1)

Public IP address : 20.206.205.14

Subscription (move) : Azure subscription 1

Virtual network/subnet : personal-portfolio-1-vnet/default

Subscription ID : 11d24732-b5c5-49d5-a24f-23fb76b5f231

DNS name : Not configured

Availability zone : 1

Health state : -

Time created : 3/31/2025, 10:38 PM UTC

Tags (edit) : Add tags

Properties

Monitoring

Capabilities (7)

Recommendations

Tutorials

Virtual machine

Computer name : personal-portfolio

Operating system : Linux (ubuntu 22.04)

VM generation : V2

Networking

Public IP address : 20.206.205.14 ( Network interface : personal-portfolio37\_z1 )

Public IP address (IPv6) : -

## 2. Connecting SSH to VM :

Using the Ubuntu terminal, check if ssh is installed in your VM

a. type in [ [sudo systemctl status ssh](#) ]

```
manar@manar-VirtualBox:~$ sudo systemctl status ssh
[sudo] password for manar:
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; vendor preset: enabled)
   Active: active (running) since Tue 2025-04-01 02:43:05 +04; 7min ago
     TriggeredBy: ● ssh.socket
    Docs: man:sshd(8)
          man:sshd_config(5)
   Process: 1152 ExecStartPre=/usr/sbin/sshd -t (code=0)
    Main PID: 1178 (sshd)
      Tasks: 1 (limit: 9212)
     Memory: 2.1M (peak: 2.4M)
        CPU: 52ms
    CGroup: /system.slice/ssh.service
            └─1178 "sshd: /usr/sbin/sshd -D [listener] 0 of 128..."

Apr 01 02:43:05 manar-VirtualBox systemd[1]: Starting OpenBSD Secure Shell server: sshd.
Apr 01 02:43:05 manar-VirtualBox sshd[1178]: Server listening on 0.0.0.0 port 22.
Apr 01 02:43:05 manar-VirtualBox systemd[1]: Started OpenBSD Secure Shell server: sshd.
lines 1-17/17 (END) ...skipping...
● ssh.service - OpenBSD Secure Shell server
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)
   Active: active (running) since Tue 2025-04-01 02:43:05 +04; 7min ago
     TriggeredBy: ● ssh.socket
```

Mine is active but if its not start with [ [sudo systemctl start ssh](#) ], then install it with [ [sudo apt update && sudo apt install openssh-server -y](#)

[sudo systemctl enable ssh](#)

[sudo systemctl start ssh](#) ]

## b. In your Azure VM home page press Connect, then native SSH

The screenshot shows the Microsoft Azure portal interface for a virtual machine named 'personal-portfolio'. The 'Connect' tab is active, displaying connection options. The 'Connecting using' dropdown is set to 'Public IP address | 20.206.205.14'. Below this, the 'Admin username' is 'azureuser' and the 'Port' is '22'. The 'Just-in-time policy' is 'Unsupported by plan'. In the 'Favorite connection' section, the 'Native SSH' option is selected, indicating that no additional software is needed and a private key is required for connection. The public IP address (20.206.205.14) is also listed.

## c. In the VM terminal type in `[ssh -I ~/.ssh/key-id.pem azureuser@your-ip ]`

```
azureuser@personal-portfolio: ~  
manar@manar-VirtualBox:~$ ssh -i ~/.ssh/personal-portfolio2.pem azureuser@20.206.205.14  
  
The authenticity of host '20.206.205.14 (20.206.205.14)' can't be established.  
ED25519 key fingerprint is SHA256:jG/6I8IdG9c0/994UFyZbE3oD3uh090uHCg3S4Tx91Q.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added '20.206.205.14' (ED25519) to the list of known hosts.  
Welcome to Ubuntu 22.04.5 LTS (GNU/Linux 6.8.0-1021-azure x86_64)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/pro  
  
System information as of Tue Apr 1 14:04:26 UTC 2025  
  
System load: 0.0          Processes:            107  
Usage of /:  6.0% of 28.89GB Users logged in:      0  
Memory usage: 32%        IPv4 address for eth0: 10.0.0.6  
Swap usage:  0%  
  
* Strictly confined Kubernetes makes edge and IoT secure. Learn how MicroK8s  
just raised the bar for easy, resilient and secure K8s cluster deployment.  
  
https://ubuntu.com/engage/secure-kubernetes-at-the-edge  
  
Expanded Security Maintenance for Applications is not enabled.
```

if you see this, then you're connected!!

### 3. Install & Configure a Web Server (

We'll install **Nginx** because it's lightweight and efficient for serving a portfolio website.

First, you have to transfer the SSH key from the Ubuntu VM to your laptop :

#### a. Locate your key on the Ubuntu VM

On your Ubuntu VM, check if the key exists [ `ls -la ~/.ssh` ], you should be able to see your key

```
manar@manar-VirtualBox: ~  
manar@manar-VirtualBox:~$ ls -la ~/.ssh  
total 20  
drwx----- 2 manar manar 4096 Apr  1 20:46 .  
drwxr-xr-x 15 manar manar 4096 Apr  1 20:46 ..  
-rw----- 1 manar manar   0 Jan 24 23:06 authorized_keys  
-rw----- 1 manar manar 2098 Apr  1 18:04 known_hosts  
-rw----- 1 manar manar 1262 Apr  1 18:04 known_hosts.old  
-r----- 1 manar manar 2494 Apr  1 17:27 personal-portfolio2.pem  
manar@manar-VirtualBox:~$
```

#### b. Copy the key to your laptop:

option 1: use SCP

you must connect to your Ubuntu VM using [ `ssh ubuntu-username@ubuntu-ip` ]

```

PS C:\Users\MANAR> ssh manar@192.168.1.27
The authenticity of host '192.168.1.27 (192.168.1.27)' can't be established.
ED25519 key fingerprint is SHA256:Kn30aLUkh2NCtQp49u1lMMGsHXBDAYyyDAjvQHoI4KU.
This host key is known by the following other names/addresses:
  C:\Users\MANAR/.ssh/known_hosts:1: [localhost]:2222
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.1.27' (ED25519) to the list of known hosts.
manar@192.168.1.27's password:
Welcome to Ubuntu 24.04.2 LTS (GNU/Linux 6.11.0-17-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

58 updates can be applied immediately.
14 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

```

If you see this, then you're connected!!

2. Run this command on your Ubuntu VM to copy the key to your laptop:  
in your laptop's PowerShell, run this code

[ `scp username@remote_host:/path/to/remote/file "C:\path\to\local\destination\"` ]

- scp → Secure copy command
- username@remote\_host → Your remote machine's username and IP address
- /path/to/remote/file → The absolute or relative path of the file on the remote machine
- "C:\path\to\local\destination\" → The target folder on your local Windows machine (use quotes if the path has spaces)



```
Administrator: X manar@mana X manar@mana X Administrator X + v
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\MANAR> scp manar@192.168.1.27:~/ .ssh/personal-portfolio2.pem C:\Users\MANAR\Down
loads\
manar@192.168.1.27's password:
personal-portfolio2.pem 100% 2494 811.8KB/s 00:00
PS C:\Users\MANAR> |
```

On your Ubuntu VM terminal, start with updating your package list [ [sudo apt update](#) ],

Then install Nginx [ [sudo apt install nginx](#) ]

Then start and enable nginx [ [sudo systemctl start nginx](#) ], and enable it with [ [sudo systemctl enable nginx](#) ]

```
manar@manar-VirtualBox:~$ sudo systemctl start nginx
manar@manar-VirtualBox:~$ sudo systemctl status nginx
● nginx.service - A high performance web server and a reverse proxy server
   Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: ena
   Active: active (running) since Thu 2025-04-03 23:06:41 +04; 36s ago
     Docs: man:nginx(8)
   Process: 11190 ExecStartPre=/usr/sbin/nginx -t -q -g daemon on; master_proce
   Process: 11192 ExecStart=/usr/sbin/nginx -g daemon on; master_process on; (s
   Main PID: 11194 (nginx)
    Tasks: 5 (limit: 9212)
   Memory: 3.7M (peak: 4.1M)
      CPU: 26ms
   CGroup: /system.slice/nginx.service
           └─11194 "nginx: master process /usr/sbin/nginx -g daemon on; maste
              └─11195 "nginx: worker process"
                 └─11196 "nginx: worker process"
                    └─11197 "nginx: worker process"
                       └─11198 "nginx: worker process"

Apr 03 23:06:41 manar-VirtualBox systemd[1]: Starting nginx.service - A high pe
Apr 03 23:06:41 manar-VirtualBox systemd[1]: Started nginx.service - A high per
lines 1-19/19 (END)
```

Lastly, verify the installation by navigating to your ubuntu's ip address in a web browser ,  
on your local machine try : [ <http://localhost> ]

---

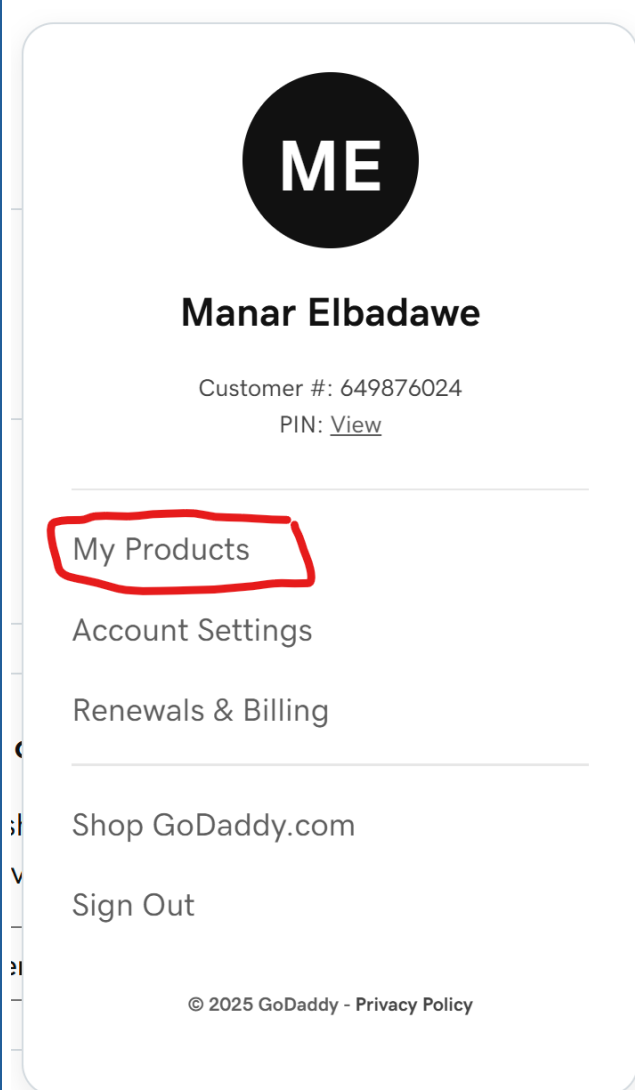
my first server ever

**welcome to my ubuntu server!**

If you see this, congrats its working

#### 4. get your DNS

got mine using GoDaddy, once you successfully buy your domain , go to you profile and click on My products to change your DNS



Once you click it , you should be able to see DNS on the side

Domains

Portfolio

DNS

Transfers

Services

Settings

Activity Log

# DNS Management

myportfoliouae.com

Domain Settings

Select a different domain

DNS Records

Forwarding

Nameservers

Premium DNS

Hostnames

DNSSEC

Crypto Wallet

Add a new record

DNS records

 define how your domain behaves, like showing your website content and delivering your email.

Add New Record

Easily verify domain ownership

Need to verify ownership of your domain to connect to an external service? We've made it easier than ever.

Verify Domain Ownership

Filters

Actions

Press “add a new record” and change it with the following settings:

- **Name:** @ (this represents myportfolio.com).
- **Type:** A.
- **Value:** Enter your **server's public IP address** here (the one you found in Step 1).
- **TTL:** Set it to the lowest available value, such as 600 then save it

A records

 use an IP address to connect your domain to a website. They're also used to 

create subdomains

 such as www or store, that point to an IP address.

Type

A

Name

myportfolio.com

Value

20.206.205.14

TTL

Custom

Seconds

600

Save

Close

Now, **Wait for DNS Propagation**

- DNS changes can take anywhere from a few minutes to 48 hours to propagate worldwide. You can check if your domain is pointing to the right IP address using a tool like [DNS Checker](#).

Inside the DNS checker web, navigate to DNS lookup, type in your domain, and choose type A (because it's connected to your server’s IP address)

# DNS Lookup

The DNS Lookup finds all DNS records of a given domain name. The DNS records include but are not limited to A, AAAA, CNAME, MX, NS, PTR, SRV, SOA, TXT, CAA, DS, and DNSKEY. Use this DNS lookup tool to view these DNS record types effortlessly. Enter the domain URL, select the desired DNS record type, or choose 'ALL' to fetch all DNS records.

Enter any Valid URL:

www.myportfoliouae.com

DNS Server



Google



Record Type:

ALL

A

AAAA

CNAME

MX

NS

PTR

SRV

SOA

TXT

CAA

DS

DNSKEY

You should be able to see your domain connected to your IP address

Result for: **WWW.MYPORTFOLIOUAE.COM**

Expand All

Download Records

A [SHOW RAW]

Type	Domain Name	TTL	Address
A	www.myportfoliouae.com	600	20.206.205.14   <a href="#">Check IP Blacklist</a> Owner: <a href="#">Microsoft Corporation</a>   <a href="#">WHOIS</a>   <a href="#">AS8075</a>

On your laptop, check if your domain name is connected to your IP address

Using [ [nslookup your domain.com](#) ]

```
PS C:\Users\MANAR> nslookup myportfoliouae.com
Server:  mygpon.ip
Address:  192.168.1.1

Non-authoritative answer:
Name:     myportfoliouae.com
Addresses:  13.248.243.5
           20.206.205.14
           76.223.105.230
```

My domain name is connected to 2 more IP addresses, and that's why it's not running correctly. To solve that, go back to your domain provider ( in my case, GoDaddy ) and go to the DNS settings and Delete the Conflicting "WebsiteBuilder Site" A Record

- Look for the **A record** with WebsiteBuilder Site.
- Click **Delete** on that row.
- Keep **only** the A record pointing to 20.206.205.14.

Now, look for your domain name in your browser.

 GoDaddy Create professional logos quickly with AI and no design skills needed.

[Start Creating](#)

MY PORTFOLIO UAE

Launching Soon

Contact Us

Drop us a line!



If you see your website page, well done!!

## 5. Build your website:

For this project, I will be using a free portfolio website template [start bootstrap]

### Template Information

- **Name:** Personal
- **Source:** [Start Bootstrap](#)
- **License:** MIT License (Allows free use with attribution)
- **Original Features:**
  - One-page layout
  - Smooth scrolling navigation
  - Responsive design
  - Sections for about, projects, and contact

### Changes and customization:

- **HTML:**
  - Updated <title> and meta tags
  - Added my own bio and project descriptions in [index.html](#)
- **CSS:**
  - Changed colours to match my brand
  - Adjusted font styles and sizes
- **Images:**
  - Replaced default images with my profile picture and project screenshots
- **Other:**
  - Removed unnecessary sections.
  - Updated the contact form to link to my real email or form handler

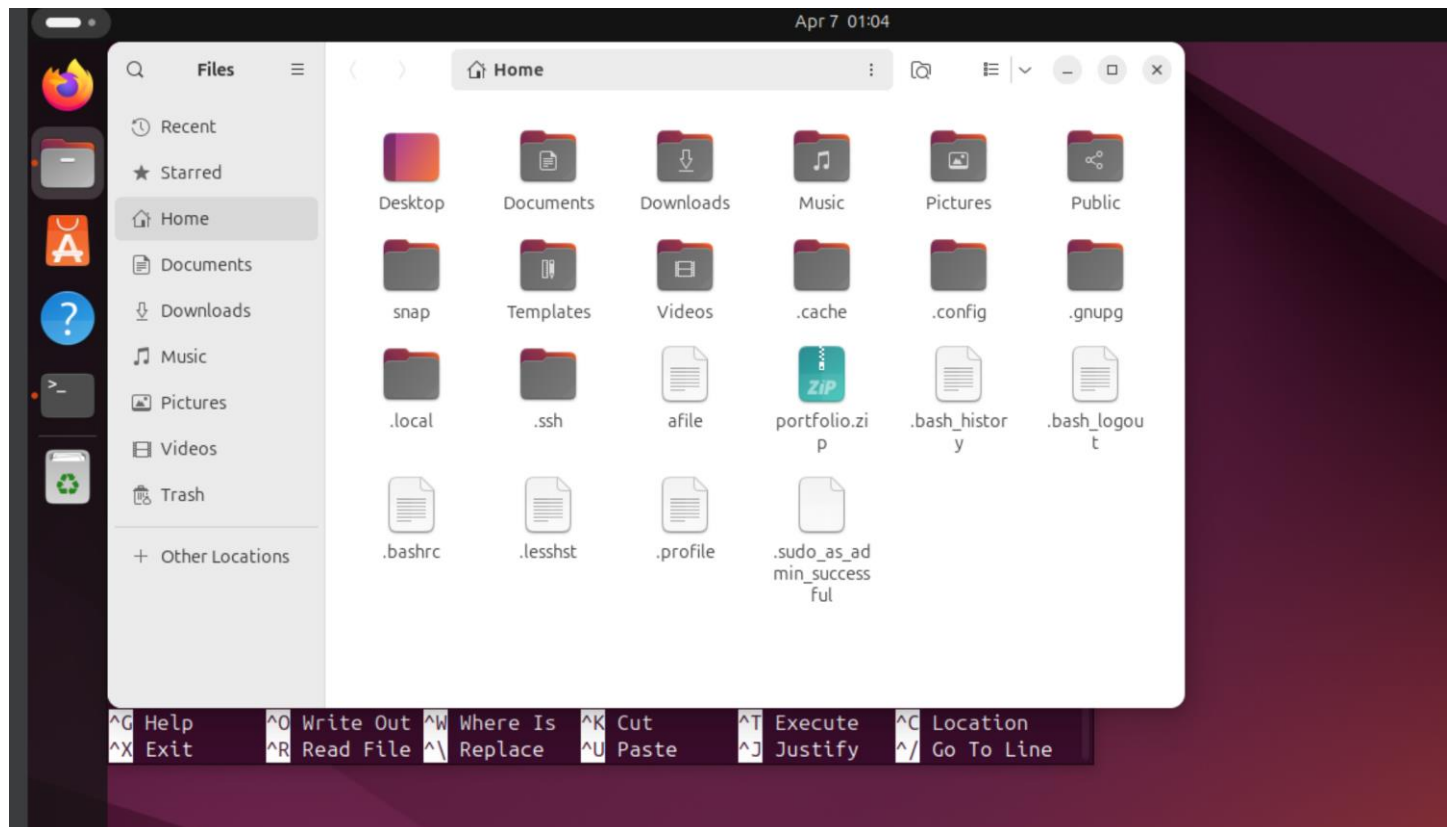
## 5. Setup your server to point to your domain name (website)

Since my domain website is saved on my laptop, I will zip the project file and move it to my Ubuntu VM

[ [scp path/to/yourprojectfile.zip yourusername@your-server-ip:~](#) ]

```
lio.zip": No such file or directory
PS C:\Users\MANAR> scp \Users\MANAR\OneDrive\Desktop\portfolio.
zip manar@192.168.1.27:~
manar@192.168.1.27's password:
portfolio.zip 100% 52KB 6.3MB/s 00:00
PS C:\Users\MANAR>
```

Open your file app on your Ubuntu VM and your file should be there. Then unzip the folder



Move it to the proper place

```
[ sudo mv filename /var/www/yourdomain.com ]
```

And fix permissions

```
[ sudo chown -R www-data:www-data /var/www/yourdomain.com ]
```

Since im using Nginx,

I'll start **by installing Nginx** in my Ubuntu server,

```
[ sudo apt update  
sudo apt install nginx ]
```

Create the directory

```
[ sudo mkdir -p /etc/nginx/sites-available ]
```

Check if its been created

[ [ls /etc/nginx/sites-available/](#) ]

```
ls: cannot access '/etc/nginx/sites-available/': No such file or directory
manar@manar-VirtualBox:~$ sudo mkdir -p /etc/nginx/sites-available
[sudo] password for manar:
manar@manar-VirtualBox:~$ ls /etc/nginx/sites-available/
default  myportfoliouae.com
manar@manar-VirtualBox:~$
```

Then **create a new server block configuration file** for my domain

[ [sudo nano /etc/nginx/sites-available/yourdomain.com](#) ]

and add the following configuration:

```
[
server {
    listen 80;

    server_name yourdomain.com www.yourdomain.com;

    root /var/www/html/yourwebsite;


    index index.html index.htm;


    access_log /var/log/nginx/yourdomain.com.access.log;
    error_log /var/log/nginx/yourdomain.com.error.log;


    location / {
        try_files $uri $uri/ =404;
    }
}
]
```



```
GNU nano 7.2 /etc/nginx/sites-available/myportfoliouae.com *
server{
    listen 80;
    server_name myportfoliouae.com www.myportfoliouae.com;
    root/var/www/html/portfolio;

    index index.html.index.htm;

    access_log /var/log/nginx/www.myportfoliouae.com.access.log;
    error_log /var/log/nginx/www.myportfoliouae.com.error.log;

location/{
    try_files $uri $uri/=404;

    }
}
```

Now, create the sites-enabled link

[ [sudo ln -s /etc/nginx/sites-available/yourdomain.com /etc/nginx/sites-enabled/](#) ]

### Test the config

[ [sudo nginx -t](#) ]

```
manar@manar-VirtualBox:~$ sudo nginx -t
2025/04/07 18:02:07 [warn] 5168#5168: conflicting server name "www.myportfoliouae.com" on 0.0.0.0:80, ignored
nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
nginx: configuration file /etc/nginx/nginx.conf test is successful
```

## 6. Open port 80 in Azure

Go to the Azure portal: <https://portal.azure.com>

Navigate to "Virtual Machines" and select your VM.

In the **left-hand menu**, scroll down to "Networking" under the "Settings" section.

Under "Inbound Port Rules", click "Add inbound port rule".

Fill in the fields:

- **Source:** Any
- **Source port ranges:** \*
- **Destination:** Any
- **Destination port ranges:** 80
- **Protocol:** TCP
- **Action:** Allow
- **Priority:** (keep default unless it conflicts)
- **Name:** Allow-HTTP

Click "Add"

This is a new experience. [Please provide feedback](#)

✓ Network security group **personal-portfolio-nsg** (attached to networkInterface: **personal-portfolio37\_z1**)  
Impacts 0 subnets, 1 network interfaces

Create port rule

Source == all   Destination == all   Protocol == all   Action == all

Priority ↑	Name	Port	Protocol
▼ Inbound port rules (7)			
300	SSH	22	TCP
320	HTTPS	443	TCP
340	HTTP	80	TCP
350	Allow-HTTP	80	TCP
65000	AllowVnetInBound ⓘ	Any	Any
65001	AllowAzureLoadBalancerInBound ⓘ	Any	Any
65500	DenyAllInBound ⓘ	Any	Any
> Outbound port rules (3)			

Give it a minute, then try opening your site

## 7. Set up HTTPS (SSL certificate)

It will give the secure lock icon to your web and remove the “not secure” warning

On VM run

```
[ sudo apt install certbot python3-certbot-nginx ]
```

Then request the SSL certificate

```
[ sudo certbot --nginx -d domainname.com -d www.domainname.com ]
```

Test auto-renewal

```
[ sudo certbot renew --dry-run ]
```

Now your web is working via https ://yourdomainname.com