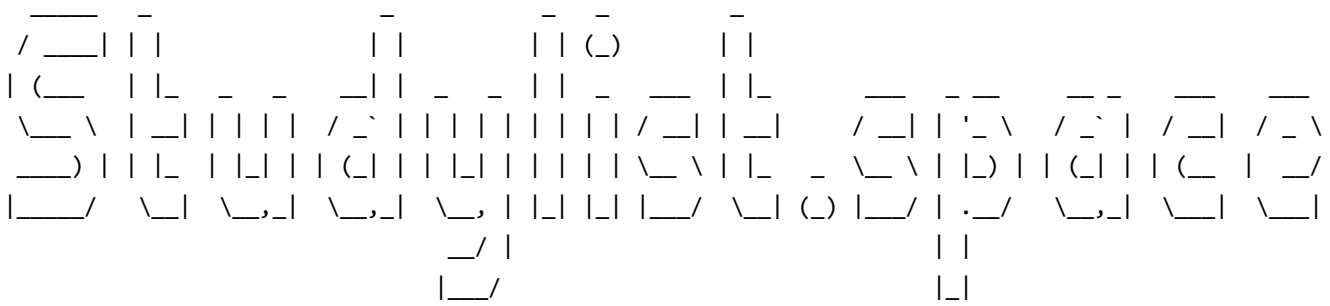


Assignment 2 - Cloud Server Project Documentation

Created by Tom Dutch 34089911 for ICT171 Assignment 2: Cloud Server Project

This documentation will contain a list of steps taken to deploy the cloud server, along with the development of the script on the website.

Website located at studylist.space

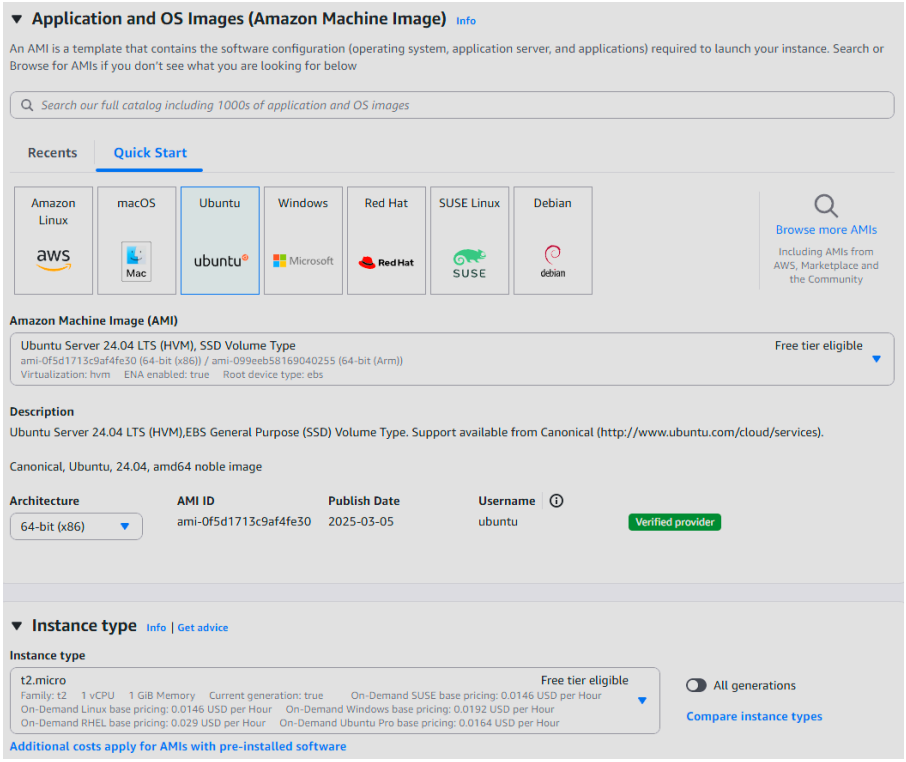
Deploying an Amazon Web Services EC2 Instance

The first step required is the launching of a new Amazon EC2 Ubuntu instance.
Go to AWS EC2 Console and log in using your existing account.
From the EC2 Console, in the navigation pane, click on "Instances" and then "Launch Instances" on the top right.

Launching an Instance

Follow the steps below for launching a Ubuntu free tier instance:

- Name the instance accordingly - *Studylist.space web server*
- Pick the Linux Distribution as Ubuntu and select **Ubuntu Server 24.04 LTS (HVM)**
  - Version 24.04 LTS is used instead of 22.04 LTS as it has improved security and better long-term support.
- Choose the *t2.micro* instance type - ensure settings match the image below.



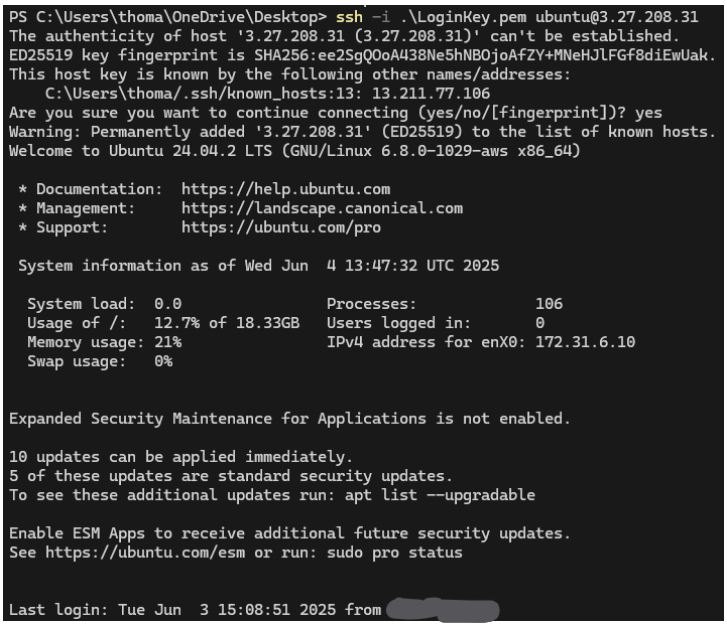
- Create a new Key Pair - name it LoginKey and click "Create key pair" - download the Key Pair.
- Click "Create Security Group" and select the following:
  - Allow SSH traffic from - set IP Address to Anywhere (0.0.0.0/0).
  - Allow HTTPS traffic from the internet.
  - Allow HTTP traffic from the internet.
- Configure storage as `1x 30GiB gp3 Root volume, 3000 IOPS, Not encyrpted` .
- Once the above steps are complete, click "Launch Instance".
- Once done, click "View All Instances" and check the instance's state shows "Running".
  - To preserve free tier hours, stop the instance until ready to proceed to the next step.
  - To stop: Select the instance, click instance state and 'Stop Instance'.

Accessing the Instance

On the Amazon EC2 Instances page, in the list of instances, select the web server and in the bottom pop up, note down the Public IPv4 Address for later use.
To access the instance via terminal access, use SSH via Windows PowerShell.
Go to the directory containing 'LoginKey.pem' and in the directory bar type in 'powershell' to launch Windows PowerShell.
Paste the below command, replacing <IP_ADDRESS> with the one gathered earlier.

```
ssh -i ./LoginKey.pem ubuntu@<IP_ADDRESS>
```

When prompted with "Are you sure you want to continue connecting (yes/no/[fingerprint])?", type `yes` and hit enter.
Your CLI output should match below if successfully connected.



Misc Configuration

Updating Packages

For good practice, upgrade all system packages using the following commands:

```
sudo apt update
```

Then:

```
sudo apt upgrade -y
```

Once complete, all system packages should be up to date.

Enabling Ubuntu Firewall

For security, it's a good idea to enable Ubuntu Firewall to minimise vulnerability.
Run the following commands:

```
sudo ufw allow ssh
```

Then:

```
sudo ufw allow http
```

Then:

```
sudo ufw allow https
```

Finally:

```
sudo ufw enable
```

Verify the correct setup of ubuntu firewall by running the below command:

```
sudo ufw status
```

The output of this command should match the below.

```
ubuntu@ip-172-31-6-10:~$ sudo ufw status
Status: active

To                         Action      From
--                         ------      ----
22/tcp                     ALLOW       Anywhere
80/tcp                     ALLOW       Anywhere
443                        ALLOW       Anywhere
22/tcp (v6)                ALLOW       Anywhere (v6)
80/tcp (v6)                ALLOW       Anywhere (v6)
443 (v6)                   ALLOW       Anywhere (v6)
```

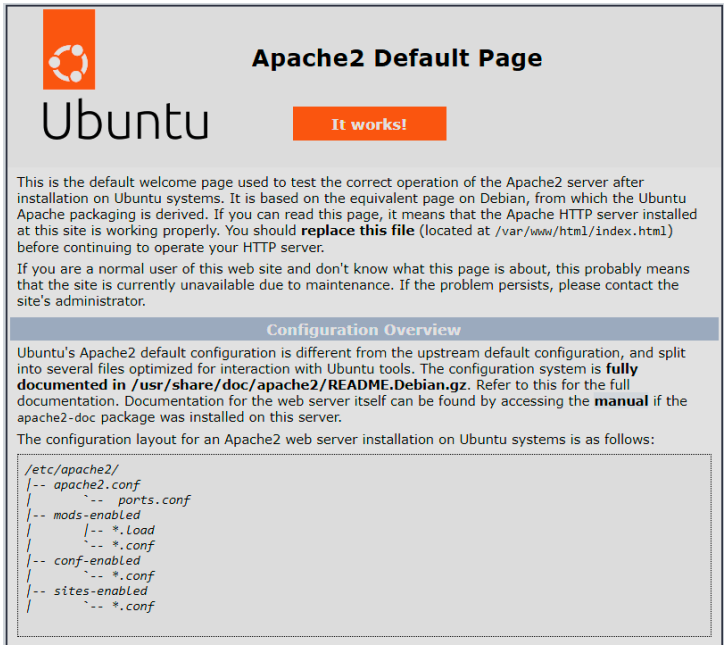
Installing Apache Web Server

Apache web server is required to host the web page and can be installed by the following steps.

```
sudo apt install apache2 -y
```

To verify installation, in your own internet browser, navigate to `http://<IP_ADDRESS>/`

This should load the Apache2 Default Page shown below.



Setting up DNS Record

Log into Namecheap open the 'Dashboard' tab when hovering over the username.
Next to the domain name 'studylist.space', click 'MANAGE'. Navigate to the 'Advanced DNS' Tab.
Under 'Host Records' create the following records:

Type	Host	Value	TTL
A Record	www	<IP_ADDRESS>	Automatic
CNAME Record	@	www.studylist.space	Automatic

Setting up HTTPS

HTTPS must be set up for secure connection to the website. This will be set up using the free service called Let's Encrypt.
Run the following commands once logged into server via SSH.

Install Certbot to set up SSL/TLS certificate.

```
sudo snap install --classic certbot
```

This command will take several minutes due to the limited bandwidth of the t2.micro instance.
Once complete, you should see the image below as output.

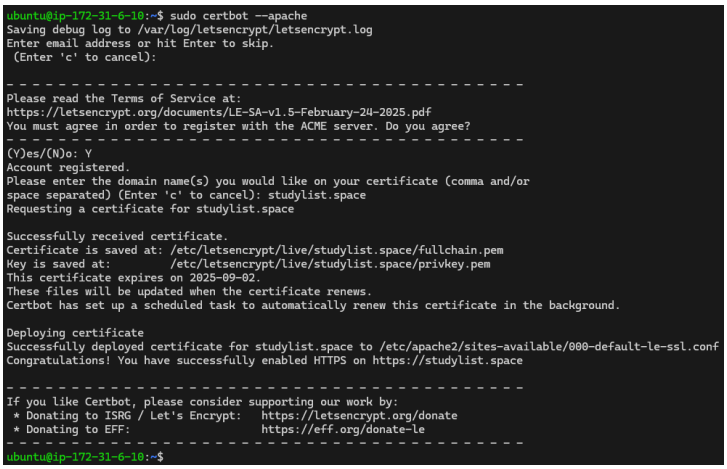
Then run the below command to allow certbot to be run:

```
sudo ln -s /snap/bin/certbot /usr/bin/certbot
```

To set up certbot, run:

```
sudo certbot --apache
```

When prompted for an email, hit 'Enter' and enter the domain name `studylist.space` .
The following output should be displayed.



Once complete, SSL should be set up and HTTPS should work. Navigate to https://studylist.space to verify the operation of a HTTPS connection.

That is the setup complete