

BSCS 31052

Systems and Network Administration

Assignment 3

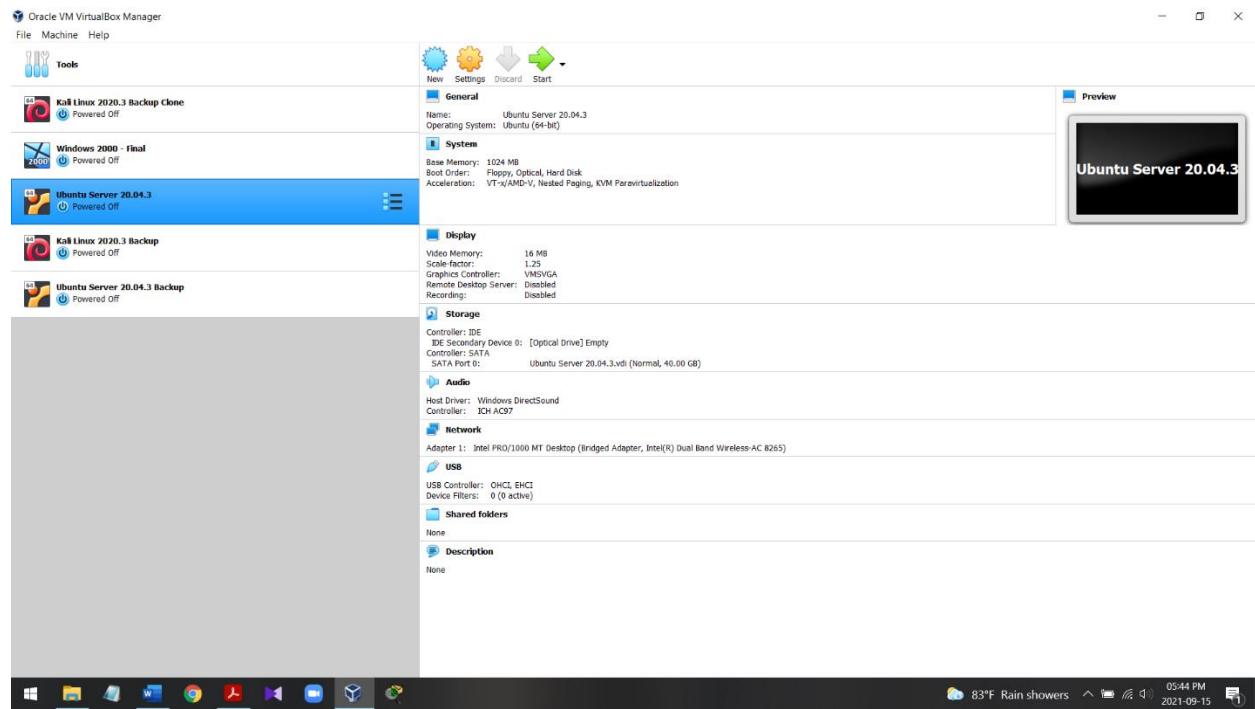
CS/2017/047

P. L. I. Umayanga

How To Set Up a Website for Company/Institute

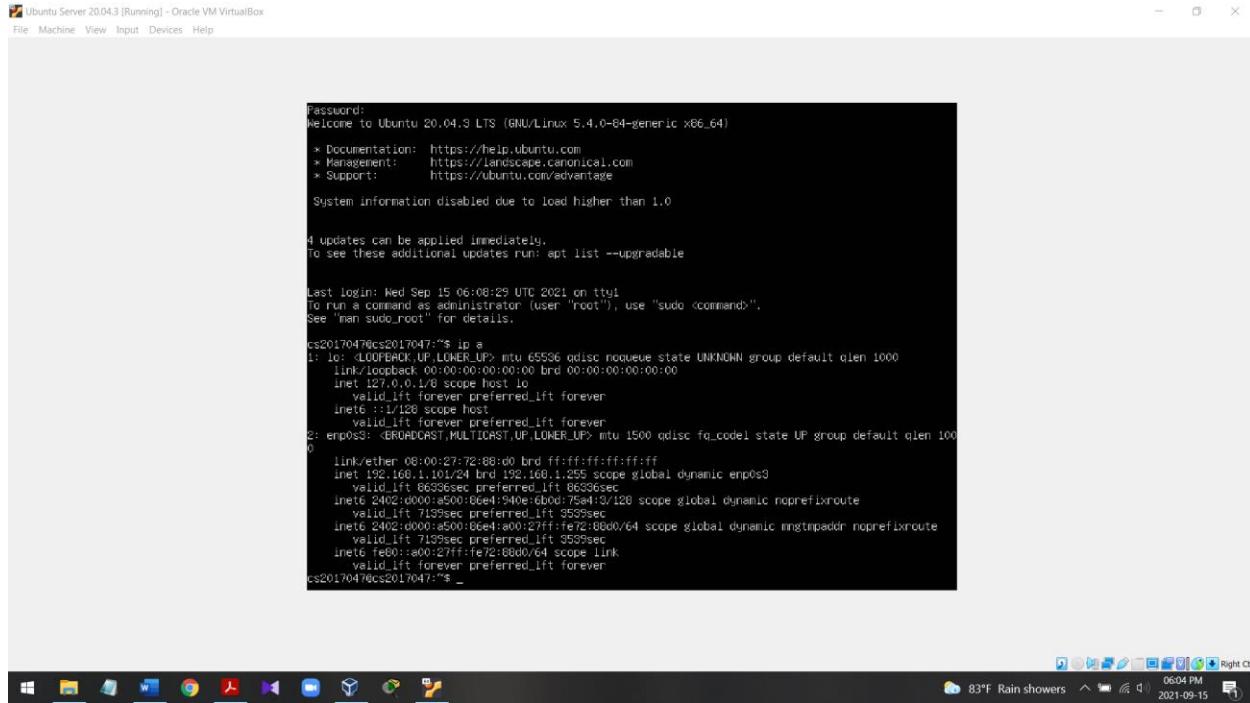
1. Basic Configurations

I used Oracle VM VirtualBox to install the Linux environment. I used ubuntu server version 20.04.3 as my server machine.



I used 1024 MB of base memory, and approximately 40 GB of secondary storage, Bridged adapter for configure the networks. I used **cs2017047** as the host name.

The ip address of my virtual machine is **192.168.1.101/24**.



```
Ubuntu Server 20.04.3 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Password:
Welcome to Ubuntu 20.04.3 LTS (GNU/Linux 5.4.0-64-generic x86_64)

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

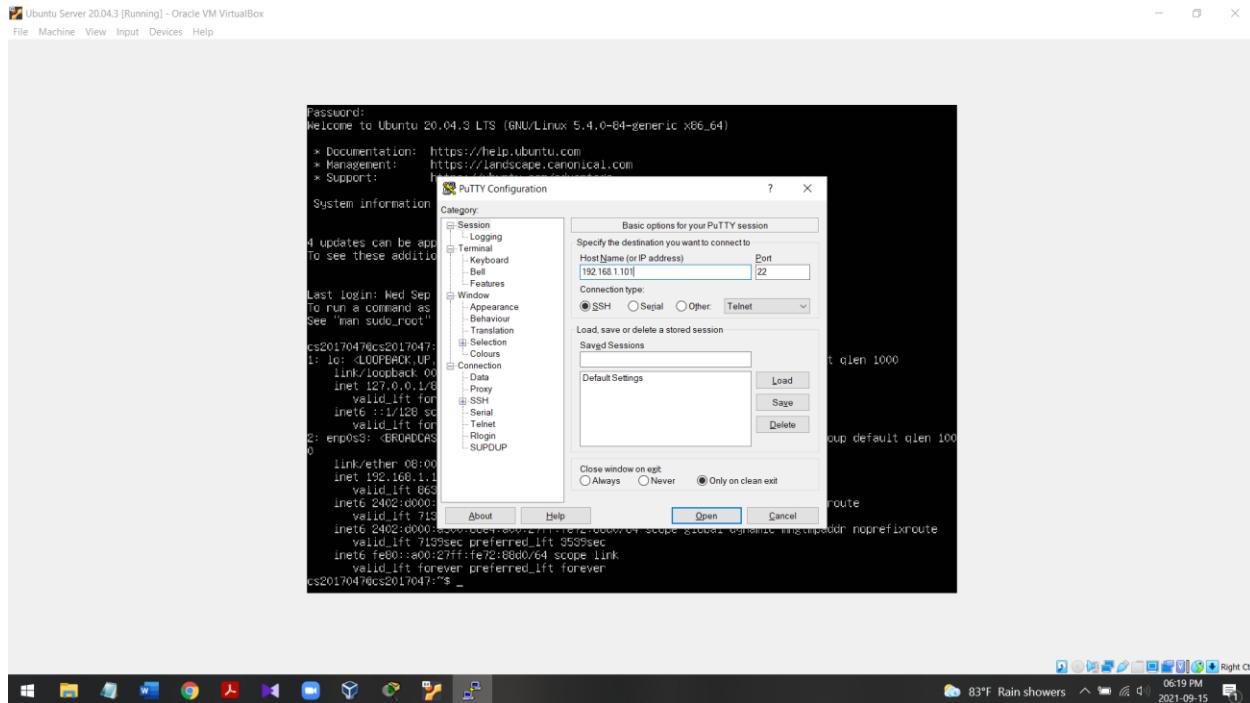
System information disabled due to load higher than 1.0

4 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Last login: Wed Sep 15 06:08:29 UTC 2021 on ttys0
To run a command as administrator (user "root"), use "sudo command".
See "man sudo_root" for details.

cs2017047@cs2017047:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 brd 127.255.255.255 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: enp0s: <NO-CARRIER,BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:72:88:00 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.101/24 brd 192.168.1.255 scope global dynamic enp0s3
        valid_lft 1739sec preferred_lft 9559sec
    inet6 2402:1000:800:1001:5408:6b0d:75e4:13/64 scope global dynamic noprefixroute
        valid_lft 1739sec preferred_lft 9559sec
    inet6 2402:1000:800:1001:8001:27ff:fe72:8800/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 1739sec preferred_lft 9559sec
    inet6 fe80::a00:27ff:fe72:8800/64 scope link
        valid_lft forever preferred_lft forever
cs2017047@cs2017047:~$ _
```

I used my ip address to log into the SSH and telnet client called Putty. Its SSH provides secure, encrypted connection to the remote system.



```
Ubuntu Server 20.04.3 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

PUTTY Configuration

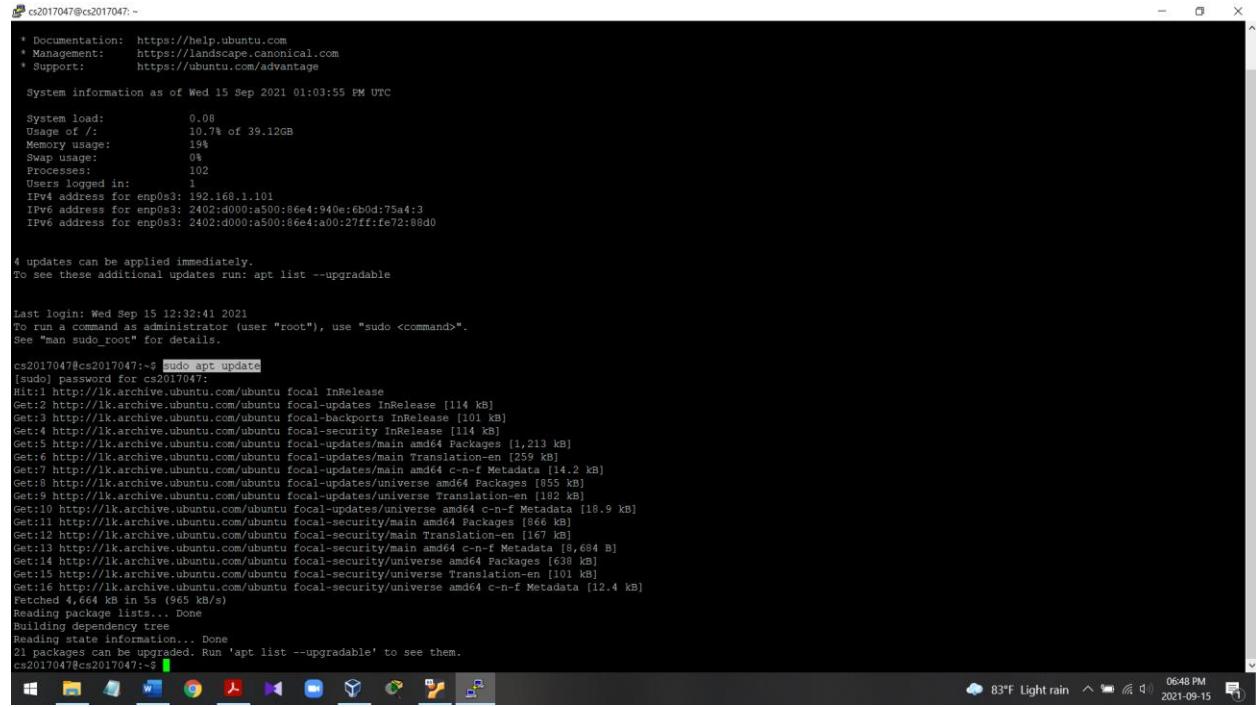
Category: Session
Session
  Basic options for your PuTTY session
  Specify the destination you want to connect to
  HostName (or IP address): 192.168.1.101
  Port: 22
  Connection type: SSH
  Load, save or delete a stored session
  Saved Sessions
  Default Settings
  Load
  Save
  Delete
  Close window on exit:
  Always (radio button selected)
  Never
  Only on clean exit

Last login: Wed Sep 15 06:08:29 UTC 2021 on ttys0
To run a command as administrator (user "root"), use "sudo command".
See "man sudo_root" for details.

cs2017047@cs2017047:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
        inet 127.0.0.1/8 brd 127.255.255.255 scope host lo
            valid_lft forever preferred_lft forever
        inet6 ::1/128 scope host
            valid_lft forever preferred_lft forever
2: enp0s: <NO-CARRIER,BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 08:00:27:72:88:00 brd ff:ff:ff:ff:ff:ff
    inet 192.168.1.101/24 brd 192.168.1.255 scope global dynamic enp0s3
        valid_lft 1739sec preferred_lft 9559sec
    inet6 2402:1000:800:1001:5408:6b0d:75e4:13/64 scope global dynamic noprefixroute
        valid_lft 1739sec preferred_lft 9559sec
    inet6 2402:1000:800:1001:8001:27ff:fe72:8800/64 scope global dynamic mngtmpaddr noprefixroute
        valid_lft 1739sec preferred_lft 9559sec
    inet6 fe80::a00:27ff:fe72:8800/64 scope link
        valid_lft forever preferred_lft forever
cs2017047@cs2017047:~$ _
```

I logged into the Putty using my username and password of ubuntu server.

After I used bellow commands.



cs2017047@cs2017047: ~

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

System information as of Wed 15 Sep 2021 01:03:55 PM UTC

System load: 0.08
Usage of '/': 10.7% of 39.12GB
Memory usage: 19%
Swap usage: 0%
Processes: 102
Users logged in: 1
IPv4 address for enp0s3: 192.168.1.101
IPv6 address for enp0s3: 2402:0000:a500:86e4:a00:27ff:fe72:88d0
IPv6 address for enp0s3: 2402:0000:a500:86e4:a00:27ff:fe72:88d0

4 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Last login: Wed Sep 15 12:32:41 2021
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

cs2017047@cs2017047: ~$ sudo apt update
[sudo] password for cs2017047:
Hit:1 http://lk.archive.ubuntu.com/ubuntu focal InRelease [114 kB]
Get:2 http://lk.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://lk.archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:4 http://lk.archive.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,213 kB]
Get:6 http://lk.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [259 kB]
Get:7 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [14.2 kB]
Get:8 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [855 kB]
Get:9 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [182 kB]
Get:10 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [18.9 kB]
Get:11 http://lk.archive.ubuntu.com/ubuntu focal-security/main amd64 Packages [866 kB]
Get:12 http://lk.archive.ubuntu.com/ubuntu focal-security/main Translation-en [167 kB]
Get:13 http://lk.archive.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [8,684 B]
Get:14 http://lk.archive.ubuntu.com/ubuntu focal-security/universe amd64 Packages [638 kB]
Get:15 http://lk.archive.ubuntu.com/ubuntu focal-security/universe Translation-en [101 kB]
Get:16 http://lk.archive.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [12.4 kB]
Fetched 4,664 kB in 5s (965 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
0 packages can be upgraded. Run 'apt list --upgradable' to see them.
cs2017047@cs2017047: ~$
```

The screenshot shows a terminal window with a black background and white text. It displays system information, a list of updates available for download, and the output of the 'apt update' command. The terminal window has a title bar and a status bar at the bottom showing the date and time. Below the terminal is a standard Windows-style taskbar with icons for various applications like File Explorer, Google Chrome, and others. The desktop environment includes a weather widget in the bottom right corner.

In this command,

sudo – super user(root)

apt – advanced package tool

This command is used to update ubuntu machine as super user.

```
cs2017047@cs2017047: ~
System load:          0.08
Usage of /:           10.7% of 39.12GB
Memory usage:        19%
Swap usage:          0%
Processes:           102
Users logged in:    1
IPv4 address for enp0s3: 192.168.1.101
IPv6 address for enp0s3: 2402:0000:a500:86e4:940e:6b0d:75a4:3
IPv6 address for enp0s3: 2402:0000:a500:86e4:a00:27ff:fe72:88d0

4 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Last login: Wed Sep 15 12:32:41 2021
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

cs2017047@cs2017047: ~$ sudo apt update
[sudo] password for cs2017047:
Hit:1 http://lk.archive.ubuntu.com/ubuntu focal InRelease [114 kB]
Get:2 http://lk.archive.ubuntu.com/ubuntu focal-updates InRelease [101 kB]
Get:3 http://lk.archive.ubuntu.com/ubuntu focal-backports InRelease [114 kB]
Get:4 http://lk.archive.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,213 kB]
Get:6 http://lk.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [259 kB]
Get:7 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [14.2 kB]
Get:8 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [855 kB]
Get:9 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [102 kB]
Get:10 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [18.9 kB]
Get:11 http://lk.archive.ubuntu.com/ubuntu focal-security/main amd64 Packages [866 kB]
Get:12 http://lk.archive.ubuntu.com/ubuntu focal-security/main Translation-en [167 kB]
Get:13 http://lk.archive.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [8,684 B]
Get:14 http://lk.archive.ubuntu.com/ubuntu focal-security/universe amd64 Packages [638 kB]
Get:15 http://lk.archive.ubuntu.com/ubuntu focal-security/universe Translation-en [101 kB]
Get:16 http://lk.archive.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [12.4 kB]
Fetched 4,664 kB in 5s (965 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
31 packages can be upgraded. Run 'apt list --upgradable' to see them.
cs2017047@cs2017047: ~$ sudo dpkg-reconfigure tzdata
Current default time zone: 'Asia/Colombo'
Local time is now:   Wed Sep 15 19:02:49 +0530 2021.
Universal Time is now: Wed Sep 15 13:32:49 UTC 2021.

cs2017047@cs2017047: ~$
```

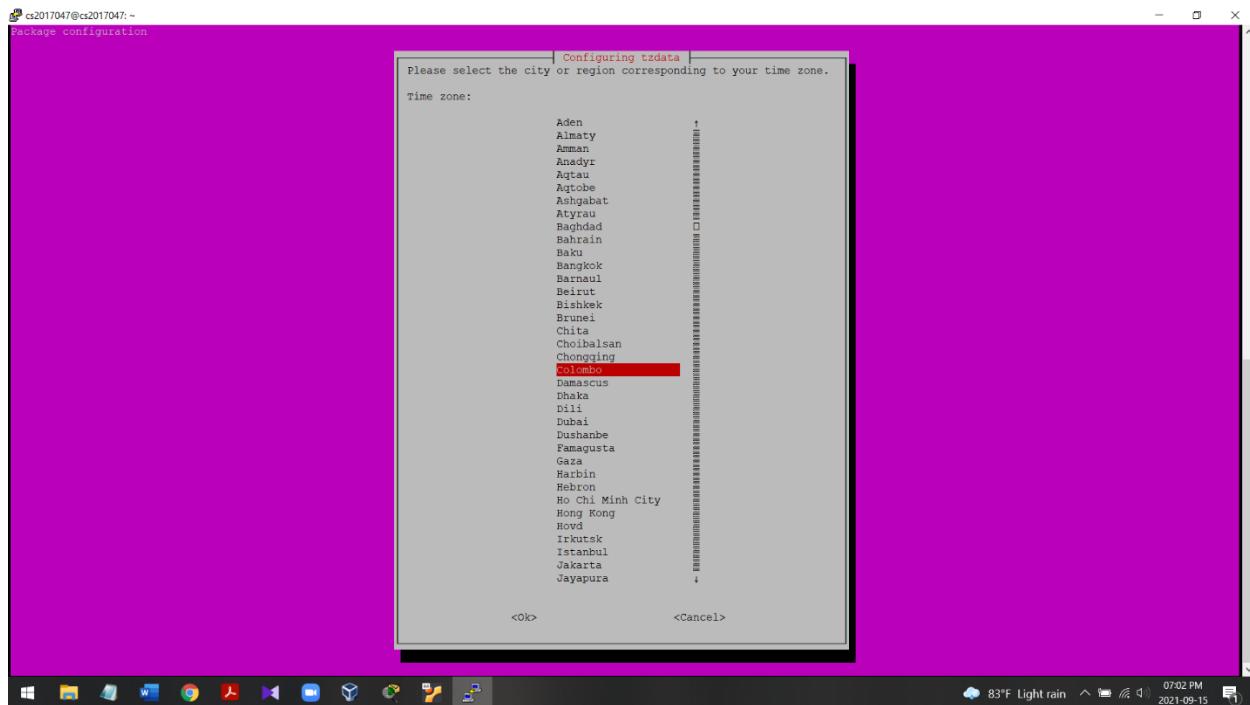
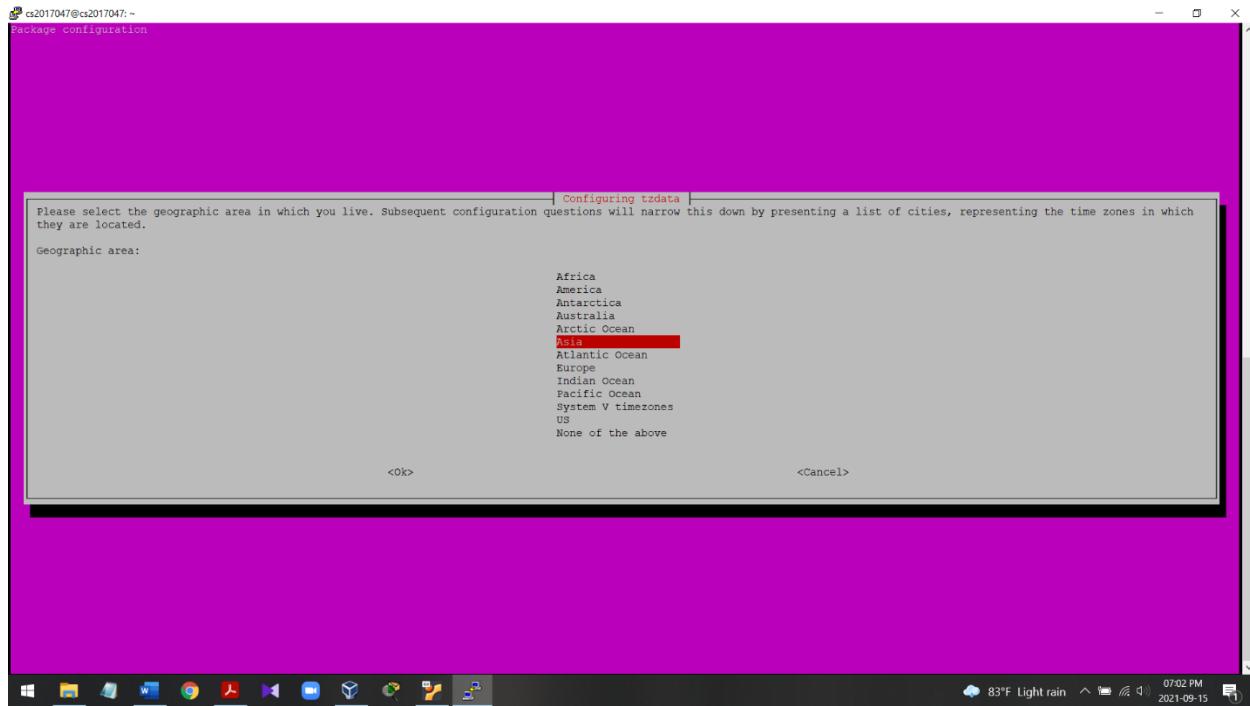


In this command,

sudo – super user(root)

dpkg-reconfigure – reconfigure an already installed package

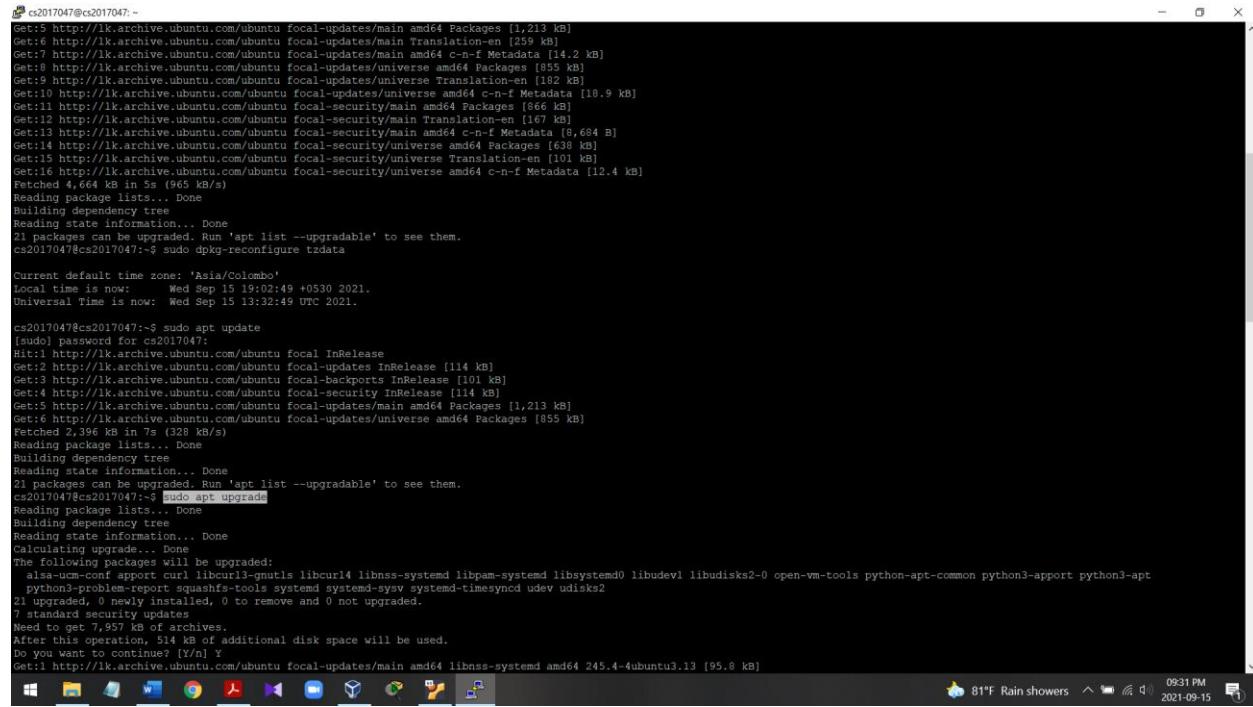
tzdata – time zone data



I chose **Asia** as the Geographic area and **Colombo** as the time zone.

2. LAMP Configuration

Before the LAMP configuration, we have to update and install the Linux environment, Apache server, MySQL database and PHP.



The screenshot shows a terminal window on a Windows desktop. The terminal is running on a Linux system (Ubuntu) with the command prompt cs2017047@cs2017047 ~. It displays the output of several apt commands:

- `Get: 5 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,213 kB]`
- `Get: 6 http://lk.archive.ubuntu.com/ubuntu focal-updates/main Translation-en [259 kB]`
- `Get: 7 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 c-n-f Metadata [10.2 kB]`
- `Get: 8 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [885 kB]`
- `Get: 9 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe Translation-en [182 kB]`
- `Get: 10 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe amd64 c-n-f Metadata [18.9 kB]`
- `Get: 11 http://lk.archive.ubuntu.com/ubuntu focal-security/main amd64 Packages [866 kB]`
- `Get: 12 http://lk.archive.ubuntu.com/ubuntu focal-security/main Translation-en [167 kB]`
- `Get: 13 http://lk.archive.ubuntu.com/ubuntu focal-security/main amd64 c-n-f Metadata [8,684 B]`
- `Get: 14 http://lk.archive.ubuntu.com/ubuntu focal-security/universe amd64 Packages [638 kB]`
- `Get: 15 http://lk.archive.ubuntu.com/ubuntu focal-security/universe Translation-en [101 kB]`
- `Get: 16 http://lk.archive.ubuntu.com/ubuntu focal-security/universe amd64 c-n-f Metadata [12.4 kB]`

Fetched 4,664 kB in 5s (965 kB/s)

Reading package lists... Done

Building dependency tree

Reading state information... Done

21 packages can be upgraded. Run 'apt list --upgradable' to see them.

cs2017047@cs2017047:~\$ sudo dpkg-reconfigure tzdata

Current default time zone: 'Asia/Colombo'
Local time is now: Wed Sep 15 19:02:49 +0530 2021.
Universal Time is now: Wed Sep 15 13:32:49 UTC 2021.

cs2017047@cs2017047:~\$ sudo apt update
[sudo] password for cs2017047:
Hit:1 http://lk.archive.ubuntu.com/ubuntu focal InRelease
Get:2 http://lk.archive.ubuntu.com/ubuntu focal-updates InRelease [114 kB]
Get:3 http://lk.archive.ubuntu.com/ubuntu focal-backports InRelease [101 kB]
Get:4 http://lk.archive.ubuntu.com/ubuntu focal-security InRelease [114 kB]
Get:5 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [1,213 kB]
Get:6 http://lk.archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [855 kB]

Fetched 2,396 kB in 7s (328 kB/s)

Reading package lists... Done

Building dependency tree

Reading state information... Done

Calculating upgrade... Done

The following packages will be upgraded:

alsa-ucm-common apport curl libcurl4-openssl-dev libgnutls28 libnss-systemd libpam-systemd libsystemd0 libubidev libubidisks2-0 open-vm-tools python-apt-common python3-apport python3-apt

python3-aptproblem-reporter libgnutls28-tools systemd systemd-sysv systemd-timesyncd udev udisks2

21 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.

7 standard security updates

Need to get 7,957 kB of archives.

After this operation, 514 kB of additional disk space will be used.

Do you want to continue? [Y/n] Y

Get:1 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 libnss-systemd amd64 245.4-4ubuntu3.13 [95.8 kB]

At the bottom of the terminal window, the taskbar shows various icons for Microsoft Office applications like Word, Excel, and PowerPoint, along with a weather widget showing 81°F Rain showers and a date/time stamp of 2021-09-15 09:31 PM.

In these commands,

`sudo` – super user(root)

`apt` - advanced package tool

These commands are used to update and upgrade the Ubuntu environment as a super user.

```

cs2017047@cs2017047: ~
Setting up curl (7.68.0~ubuntu2.7) ...
Setting up libudisks2-0:amd64 (2.8.4~ubuntu2) ...
Setting up python3-apt (2.0.0ubuntu0.20.04.6) ...
Setting up python3-apport (2.20.11~ubuntu27.20) ...
Setting up apport (2.20.11~ubuntu27.20) ...
apport-autoreport.service is a disabled or a static unit, not starting it.
Setting up systemd (245.4~ubuntu3.13) ...
Installing new version of config file /etc/dhcp/dhclient-enter-hooks.d/resolved ...
Setting up systemd-timesyncd (245.4~ubuntu3.13) ...
Setting up systemd-sysctl (245.4~ubuntu3.13) ...
Setting up libcapnproto0:amd64 (245.4~ubuntu3.13) ...
Setting up libpmem-pmem:amd64 (245.4~ubuntu3.13) ...
Setting up udisk2 (2.8.4~ubuntu2) ...
Processing triggers for libc-bin (2.31~ubuntu9.2) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for dbus (1.12.16-2ubuntu2.1) ...
Processing triggers for initramfs-tools (0.136ubuntu6.6) ...
update-initramfs: Generating /boot/initrd.img-5.4.0-64-generic
[sudo] password for cs2017047:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libaprutil libaprutil1-dbd-sqlite3 libaprutil1-ldap libjansson4 liblua5.2-0 ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser openssl-blacklist
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils libapr libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap libjansson4 liblua5.2-0 ssl-cert
0 upgraded, 11 newly installed, 0 to remove and 0 not upgraded.
Need to get 1,065 kB of archives.
After this operation, 8,083 kB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libapr1 amd64 1.6.5-lubuntul [91.4 kB]
Get:2 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libaprutil1 amd64 1.6.1-4ubuntu2 [54.3 kB]
Get:3 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.1-4ubuntu2 [10.5 kB]
Get:4 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libaprutil1-ldap amd64 1.6.1-4ubuntu2 [8.736 kB]
Get:5 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libjansson4 amd64 2.12-1ubuntul [28.9 kB]
Get:6 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 liblua5.2-0 amd64 5.2.4-1.1ubuntul [106 kB]
Get:7 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 apache2-bin amd64 2.4.41-4ubuntu3.4 [1,180 kB]
Get:8 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 apache2-data all 2.4.41-4ubuntu3.4 [159 kB]
Get:9 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 apache2-utils amd64 2.4.41-4ubuntu3.4 [84.0 kB]
Get:10 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 apache2 amd64 2.4.41-4ubuntu3.4 [95.5 kB]
Get:11 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 ssl-cert all 1.0.39 [17.0 kB]
Fetched 1,065 kB in 4s (463 kB/s)
Preconfiguring packages...
Selecting previously unselected package libapr1:amd64.
(Reading database ... 71476 files and directories currently installed.)
Preparing to unpack .../00-libapr1_1.6.5-lubuntul_amd64.deb ...
Unpacking libapr1:amd64 (1.6.5-lubuntul) ...

```

In this command,

sudo – super user(root)

apt - advanced package tool

This command is used to install the Apache web server on ubuntu machine as super user.

```

cs2017047@cs2017047: ~
Enabling module negotiation.
Enabling module actions.
Enabling module envvars.
Enabling module filter.
Enabling module deflate.
Enabling module status.
Enabling module reqtimeout.
Enabling conf charset.
Enabling conf localized-error-pages.
Enabling conf other-vhhosts-access-log.
Enabling conf security.
Enabling conf serve-cgi-bin.
Enabling site 000-default.
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheclean.service → /lib/systemd/system/apache-htcacheclean.service.
Processing triggers for systemd (245.4~ubuntu3.13) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libpc-bin (2.31~ubuntu9.2) ...
cs2017047@cs2017047: ~$ sudo apt install mysql-server
[sudo] password for cs2017047:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libfcgi-fast-perl libfcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl liblhttp-tagset-perl libhtml-template-perl
  libhttp-date-perl libhttp-message-perl libio-html-perl liblwp-mediatypes-perl libmecab2 libtimestate-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-common mysql-server mysql-server-8.0 mysql-server-core-8.0
Suggested packages:
  libdata-cmp-perl libipc-sharedcache-perl libwww-perl mailx tinyca
The following NEW packages will be installed:
  libfcgi-fast-perl libfcgi-pm-perl libencode-locale-perl libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl liblhttp-tagset-perl libhtml-template-perl
  libhttp-date-perl libhttp-message-perl libio-html-perl liblwp-mediatypes-perl libmecab2 libtimestate-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
  mysql-client-core-8.0 mysql-common mysql-server mysql-server-8.0 mysql-server-core-8.0
0 upgraded, 25 newly installed, 0 to remove and 0 not upgraded.
Need to get 31.7 MB of archives.
After this operation, 262 MB of additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 mysql-common all 5.8+1.0.5ubuntul [7,496 B]
Get:2 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-client-core-8.0 amd64 8.0.26-0ubuntu0.20.04.2 [4,222 kB]
Get:3 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-client-8.0 amd64 8.0.26-0ubuntu0.20.04.2 [22.0 kB]
Get:4 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libevent-core-2.1-7 libevent-pthreads-2.1-7 libfcgi-perl libhtml-parser-perl liblhttp-tagset-perl libhtml-template-perl
Get:5 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libfcgi-pm-perl libhttp-date-perl libhttp-message-perl libio-html-perl liblwp-mediatypes-perl libmecab2 libtimestate-perl liburi-perl mecab-ipadic mecab-ipadic-utf8 mecab-utils mysql-client-8.0
Get:6 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libmecab2 amd64 0.996-10ubuntul [233 kB]
Get:7 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-server-core-8.0 amd64 8.0.26-0ubuntu0.20.04.2 [18.5 MB]
Get:8 http://lk.archive.ubuntu.com/ubuntu focal-updates/main amd64 mysql-server-8.0 amd64 8.0.26-0ubuntu0.20.04.2 [1,329 kB]
Get:9 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libhtml-tagset-perl all 3.20-4 [12.5 kB]
Get:10 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 liburi-perl all 1.76-2 [77.5 kB]
Get:11 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libhtml-parser-perl amd64 3.72-5 [186.3 kB]
Get:12 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libfcgi-pm-perl all 4.46-1 [186 kB]
Get:13 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 libfcgi-perl amd64 0.79-1 [33.1 kB]

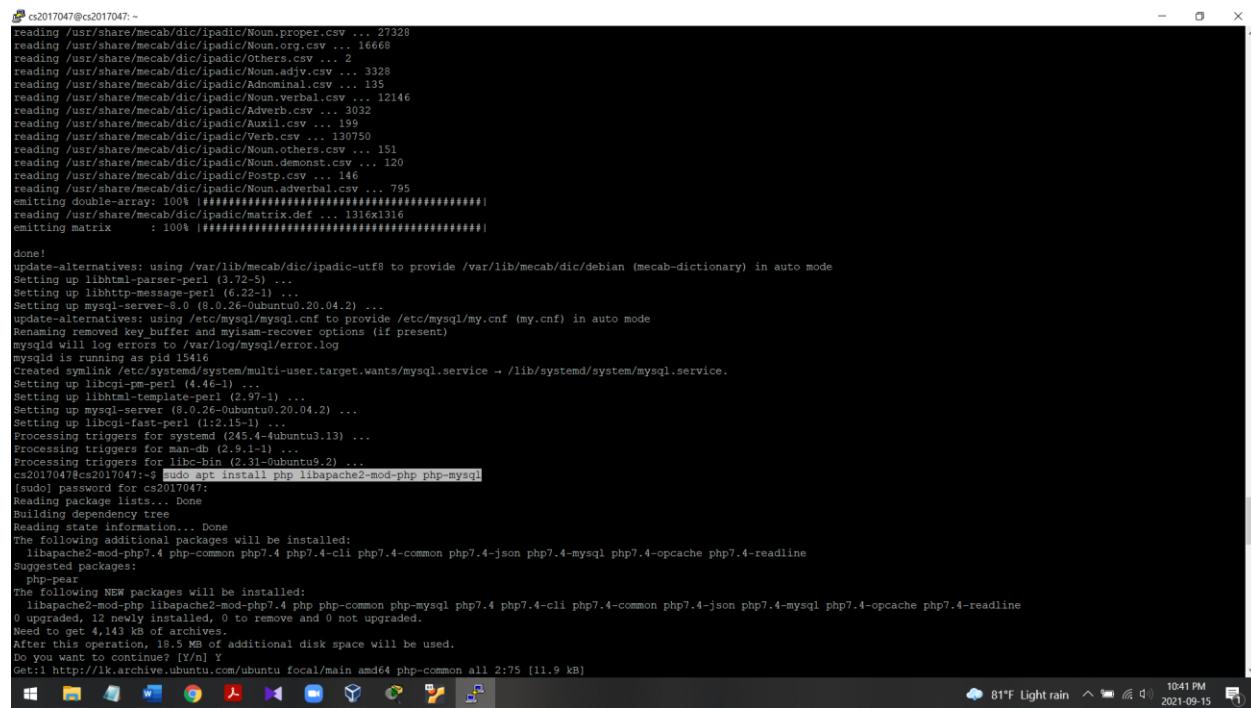
```

In this command,

sudo – super user(root)

apt - advanced package tool

This command is used to install the MySQL database as a super user on the ubuntu machine.



```
cs2017047@cs2017047: ~
reading /usr/share/mecab/dic/ipadic/Noun.proper.csv ... 27328
reading /usr/share/mecab/dic/ipadic/Noun.org.csv ... 16668
reading /usr/share/mecab/dic/ipadic/Others.csv ... 2
reading /usr/share/mecab/dic/ipadic/Noun.adjv.csv ... 3328
reading /usr/share/mecab/dic/ipadic/Adnominal.csv ... 135
reading /usr/share/mecab/dic/ipadic/Noun.verbal.csv ... 12146
reading /usr/share/mecab/dic/ipadic/Advverb.csv ... 3032
reading /usr/share/mecab/dic/ipadic/Verb.csv ... 198
reading /usr/share/mecab/dic/ipadic/Other.csv ... 130750
reading /usr/share/mecab/dic/ipadic/Noun.others.csv ... 151
reading /usr/share/mecab/dic/ipadic/Noun.demonst.csv ... 120
reading /usr/share/mecab/dic/ipadic/Postp.csv ... 146
reading /usr/share/mecab/dic/ipadic/Noun.adverbial.csv ... 795
emitting double-array: 100% #####|#####
reading /usr/share/mecab/dic/ipadic/matrix.def ... 1316x316
emitting matrix : 100% #####|#####
done!
update-alternatives: using /var/lib/mecab/dic/ipadic-utf8 to provide /var/lib/mecab/dic.debian (mecab-dictionary) in auto mode
Setting up libhtml-parser-perl (3.22-5) ...
Setting up libhttp-message-perl (6.22-1) ...
Setting up libio-socket-ip-perl (0.26-1ubuntu0.20.04.2) ...
update-alternatives: using /etc/mysql/mysql.cnf to provide /etc/mysql/my.cnf (my.cnf) in auto mode
Renaming removed key_buffer and myisam-recover options (if present)
mysqld will log errors to /var/log/mysql/error.log
mysqld is running as pid 15416
Created symlink /etc/systemd/system/multi-user.target.wants/mysql.service → /lib/systemd/system/mysql.service.
Setting up libcgipm-perl (4.46-1) ...
Setting up libhtml-template-perl (2.97-1) ...
Setting up mysql-server (8.0.26-0ubuntu0.20.04.2) ...
Setting up libcgifast-perl (1:2.15-1) ...
Processing triggers for systemd (245.4-4ubuntu3.13) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for libtcl8.4-bin (2.31-0ubuntu9.2) ...
lsb@lsb-OptiPlex-5070: ~$ sudo apt install php libapache2-mod-php php-mysql
[sudo] password for lsb:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libapache2-mod-php7.4 php-common php7.4-cli php7.4-common php7.4-json php7.4-mysql php7.4-opcache php7.4-readline
Suggested packages:
  php-pear
The following NEW packages will be installed:
  libapache2-mod-php libapache2-mod-php7.4 php php-common php-mysql php7.4 php7.4-common php7.4-json php7.4-mysql php7.4-opcache php7.4-readline
0 upgraded, 12 newly installed, 0 to remove and 0 not upgraded.
Need to get 4,143 kB of archives.
After this operation, 5,970 kB additional disk space will be used.
Do you want to continue? [Y/n] Y
Get:1 http://lk.archive.ubuntu.com/ubuntu focal/main amd64 php-common all 2:75 [11.9 kB]
lsb@lsb-OptiPlex-5070: ~$
```

In this command,

sudo – super user(root)

apt – advanced package tool

libapache2-mod-php – This package provides the PHP for the Apache 2 webserver

php-mysql –

This command is used to install php plugins in ubuntu server as a super user.

```
cs2017047@cs2017047:~$ Creating config file /etc/php/7.4/mods-available/shmop.ini with new version
Creating config file /etc/php/7.4/mods-available/sockets.ini with new version
Creating config file /etc/php/7.4/mods-available/sysvmsg.ini with new version
Creating config file /etc/php/7.4/mods-available/sysvsem.ini with new version
Creating config file /etc/php/7.4/mods-available/sysvshm.ini with new version
Creating config file /etc/php/7.4/mods-available/tokenizer.ini with new version
Setting up php7.4-mysql (7.4.3-4ubuntu2.6) ...
Creating config file /etc/php/7.4/mods-available/mysqlnd.ini with new version
Creating config file /etc/php/7.4/mods-available/mysql.ini with new version
Creating config file /etc/php/7.4/mods-available/pdo_mysql.ini with new version
Setting up php7.4-readline (7.4.3-4ubuntu2.6) ...
Creating config file /etc/php/7.4/mods-available/readline.ini with new version
Setting up php7.4-opcache (7.4.3-4ubuntu2.6) ...
Creating config file /etc/php/7.4/mods-available/opcache.ini with new version
Setting up php7.4-json (7.4.3-4ubuntu2.6) ...
Creating config file /etc/php/7.4/mods-available/json.ini with new version
Setting up php-mysql (2:7.4+75) ...
Setting up php7.4-cli (7.4.3-4ubuntu2.6) ...
update-alternatives: using /usr/bin/php7.4 to provide /usr/bin/php (php) in auto mode
update-alternatives: using /usr/bin/phar7.4 to provide /usr/bin/phar (phar) in auto mode
update-alternatives: using /usr/bin/phar.phar7.4 to provide /usr/bin/phar.phar (phar.phar) in auto mode
Creating config file /etc/php/7.4/cli/php.ini with new version
Setting up libapache2-mod-php7.4 (7.4.3-4ubuntu2.6) ...
Creating config file /etc/php/7.4/apache2/php.ini with new version
Module mpm_event disabled.
Enabling module mpm_prefork.
apache2_gnutls: Set to prefork
apache2_invoke: Enable module php7.4
Setting up php7.4 (7.4.3-4ubuntu2.6) ...
Setting up libapache2-mod-php (2:7.4+75) ...
Setting up php (2:7.4+75) ...
Processing triggers for man-db (2.9.1-1) ...
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.6) ...
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.6) ...
cs2017047@cs2017047:~$ sudo service apache2 restart
[sudo] password for cs2017047:
[sudo] password for cs2017047: ~
```

In this command,

sudo – super user(root)

This command is used to restart the Apache services to make changes that we did before.

Next, we have to do some LAMP configurations to install the WordPress.

First, we must set up a new MySQL database and user for WordPress.

```
Processing triggers for libapache2-mod-php7.4 (7.4.3-4ubuntu2.6) ...
cs2017047@cs2017047:~$ sudo service apache2 restart
[sudo] password for cs2017047:
[sudo] password for cs2017047: ~$ sudo mysql -u root -p
[sudo] password for cs2017047:
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.26-0ubuntu0.20.04.2 (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> ~
```

In this command,

sudo – super user(root)

-u – username

-p – password

This command is used to log into the MySQL database as a super user.

```
Copyright (c) 2000, 2021, Oracle and/or its affiliates.  
Oracle is a registered trademark of Oracle Corporation and/or its  
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> CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;  
Query OK, 1 row affected, 2 warnings (0.03 sec)  
mysql>
```

In this command,

utf8 – This is a variable with character encoding which is used for electronic communication and defined with Unicode standard.

utf8_unicode_ci – This is a legacy collation which does not support contractions, expansions, or ignorable characters.

This command is used to create a database to control the WordPress. I used ‘**wordpress**’ as the name of this database.

```
*Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
mysql> CREATE DATABASE wordpress DEFAULT CHARACTER SET utf8 COLLATE utf8_unicode_ci;  
Query OK, 1 row affected, 2 warnings (0.03 sec)  
mysql> CREATE USER 'pliu'@'localhost' IDENTIFIED BY '123';  
Query OK, 0 rows affected (0.06 sec)  
mysql>
```

This command is used to create a user for this database. I used ‘**pliu**’ as user name and ‘**123**’ as the password for the user.

```
mysql> CREATE USER 'pliu'@'localhost' IDENTIFIED BY '123';
Query OK, 0 rows affected (0.06 sec)

mysql> GRANT ALL ON wordpress.* TO 'pliu'@'localhost';
Query OK, 0 rows affected (0.01 sec)

mysql> █
```

This command is used to grant all privileges on the **wordpress** database to this user.

Once user granted the permissions then we must adjust login method to `mysql_native_password`. `mysql_native_password` is the traditional method to authentication process.

For this use the below command.

```
mysql> GRANT ALL ON wordpress.* TO 'pliu'@'localhost';
Query OK, 0 rows affected (0.01 sec)

mysql> ALTER USER 'pliu'@'localhost' IDENTIFIED WITH mysql_native_password BY '123';
Query OK, 0 rows affected (0.01 sec)

mysql> █
```

The command ‘FLUSH PRIVILEGES’ is used to effect these changes very quickly.

```
mysql> ALTER USER 'pliu'@'localhost' IDENTIFIED WITH mysql_native_password BY '123';
Query OK, 0 rows affected (0.01 sec)

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.01 sec)

mysql> █
```

Enter the exit command to exit in MySQL prompt.

We successfully set up the MySQL Database and User for WordPress.

```
mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.01 sec)

mysql> exit;
Bye
cs2017047@cs2017047:~$ █
```

We must configure PHP to work with WordPress plugins. In this task, we must install some Php extensions first. We use following command for this.

```
mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.01 sec)

mysql> exit;
Bye
cs2017047@cs2017047:~$ sudo apt install php-curl php-gd php-mbstring php-xml php-xmlrpc php-soap php-intl php-zip
[sudo] password for cs2017047:
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 libonig5 libtiff5 libwebp6 libxmlrpc-epi0 libxpm4 libzip5 php7.4-curl php7.4-gd php7.4-intl
  php7.4-mbstring php7.4-soap php7.4-xml php7.4-xmlrpc php7.4-zip
Suggested packages:
  libgd-tools
The following NEW packages will be installed:
  fontconfig-config fonts-dejavu-core libfontconfig1 libgd3 libjbig0 libjpeg-turbo8 libjpeg8 libonig5 libtiff5 libwebp6 libxmlrpc-epi0 libxpm4 libzip5 php-curl php-gd php-intl
  php-mbstring php-soap php-xml php-xmlrpc php-zip php7.4-curl php7.4-gd php7.4-intl php7.4-mbstring php7.4-soap php7.4-xml php7.4-xmlrpc php7.4-zip
0 upgraded, 29 newly installed, 0 to remove and 0 not upgraded.
```

In this command,

sudo – Super user(root)

apt – Advances Package Tool

php-curl – This is php library and most powerful extension of PHP

php-gd – This is an open-source code library for the dynamic image crearions.

php-mbstring – This is an extension of php which is used to manage the non-ASCII strings

php-xml – php-xml is used to store, structure and transport data from one system to another system.

php-xmlrpc – This is an extension of php used for server and client features in php.

php-soap – This extension is used to provide and consume web services.

php-intl – php-intl enables php programmers to perform the USA-confoment collation and date/time/number/currency formatting in their scripts.

php-zip – This one is an archive file format which supports lossless data pressure.

Restart the apache server to work these extensions. Use the below command.

```
Processing triggers for php7.4-cli (7.4.3-4ubuntu2.6) ...
cs2017047@cs2017047:~$ sudo systemctl restart apache2
[sudo] password for cs2017047:
cs2017047@cs2017047:~$
```

In this command,

sudo – Super user(root)

systemctl – This is a utility that is responsible for examining and controlling the systemd system and service manager.

The php configuring is over.

Then we must consider about configuring the Apache's .htaccess to handle override and rewrite rules.

.htaccess files are in root directory of a website. They contain rules which apache uses to direct requests in a manner. So, WordPress uses its .htaccess to manipulate how Apache serves files from its root directory and subsequent subdirectories. In this segment we use a virtual host to host our web site. The config files of this virtual hosts are stored in /etc/apache2/sites-available/ directory. The '000-default.conf' comes with the Apache's installation. This directory can only host one site. In default, the .htaccess directory override is disabled. For WordPress activities we must enable this directory overrides. We use virtual host files to do this.

We can use below command for this.

```
cs2017047@cs2017047:~$ sudo nano /etc/apache2/sites-available/000-default.conf
```

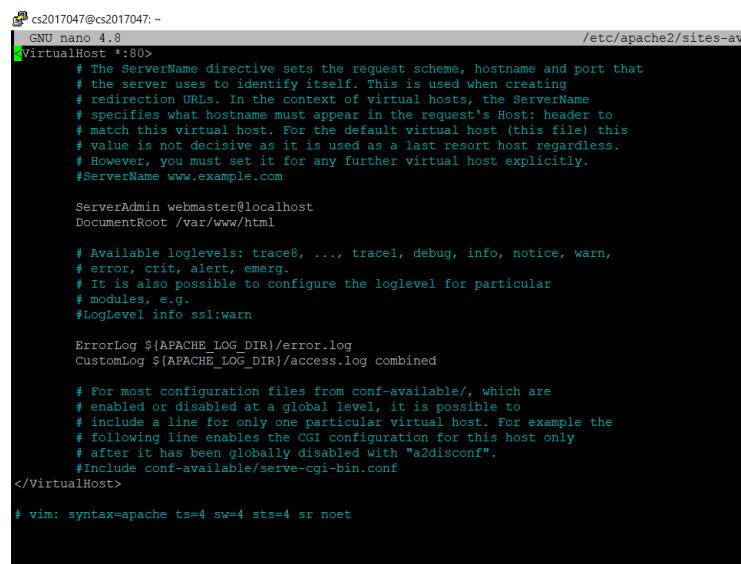
In this command,

sudo – Super user(root)

nano – command line text editor

After entering this path you may see below like figure.

```
cs2017047@cs2017047:~$ sudo nano /etc/apache2/sites-available/000-default.conf
[sudo] password for cs2017047:
cs2017047@cs2017047:~$
```



```
# The ServerName directive sets the request scheme, hostname and port that
# the server uses to identify itself. This is used when creating
# redirection URLs. In the context of virtual hosts, the ServerName
# specifies what hostname must appear in the request's Host: header to
# match this virtual host. For the default virtual host (this file) this
# value is not decisive as it is used as a last resort host regardless.
# However, you must set it for any further virtual host explicitly.
#ServerName www.example.com

ServerAdmin webmaster@localhost
DocumentRoot /var/www/html

# Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
# error, crit, alert, emerg.
# It is also possible to configure the loglevel for particular
# modules, e.g.
#LogLevel info ssl:warn

ErrorLog ${APACHE_LOG_DIR}/error.log
CustomLog ${APACHE_LOG_DIR}/access.log combined

# For most configuration files from conf-available/, which are
# enabled or disabled at a global level, it is possible to
# include a line for only one particular virtual host. For example the
# following line enables the CGI configuration for this host only
# after it has been globally disabled with "a2disconf".
#Include conf-available/serve-cgi-bin.conf
</VirtualHost>

# vim: syntax=apache ts=4 sw=4 sts=4 sr noet
```

We should include following things to create virtual host.

```
cs2017047@cs2017047:~$ nano 4.8 /etc/apache2/sites-available/000-default.conf
GNU nano 4.8
<VirtualHost *:80>
    # The ServerName directive sets the request scheme, hostname and port that
    # the server uses to identify itself. This is used when creating
    # redirection URLs. In the context of virtual hosts, the ServerName
    # specifies what hostname must appear in the request's Host: header to
    # match this virtual host. For the default virtual host (this file) this
    # value is not decisive as it is used as a last resort host regardless.
    # However, you must set it for any further virtual host explicitly.
    #ServerName www.example.com

    ServerAdmin webmaster@pliu.tk
    DocumentRoot /var/www/html
    ServerName pliu.tk
    ServerAlias www.pliu.tk

    # Available loglevels: trace8, ..., trace1, debug, info, notice, warn,
    # error, crit, alert, emerg.
    # It is also possible to configure the loglevel for particular
    # modules, e.g.
    #LogLevel info ssl:warn

    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined

    # For most configuration files from conf-available/, which are
    # enabled or disabled at a global level, it is possible to
    # include a line for only one particular virtual host. For example the
    # following line enables the CGI configuration for this host only
    # after it has been globally disabled with "a2disconf".
    #Include conf-available/serve-cgi-bin.conf
    <Directory /var/www/html>
        AllowOverride All
    </Directory>
</VirtualHost>

# vim: syntax=apache ts=4 sw=4 sts=4 sr noet
```

This must include the localhost as domain name of the website and server name and server alias and also AllowOverride directive is added within the directory block pointing to the webserver's document root. Include the directory block and update the document root.

Give CTRL + O to save these things and CTRL + X to exit the editor.

WordPress comes with a permalink feature that ensures great search engine optimized URLs. They depend on an Apache module called mod_rewrite. We can enable the rewrite module using the following command.

```
Last login: Wed Sep 15 19:33:56 2021 from 192.168.1.100
cs2017047@cs2017047:~$ sudo nano /etc/apache2/sites-available/000-default.conf
[sudo] password for cs2017047:
cs2017047@cs2017047:~$ sudo a2enmod rewrite
[sudo] password for cs2017047:
Enabling module rewrite.
To activate the new configuration, you need to run:
    systemctl restart apache2
cs2017047@cs2017047:~$
```

In this command,

sudo – Super user (root)

a2enmod – This is a script which enables the specified module within the apache2 configuration.

To test these changes work in properly we need to enter the following command.

```
Enabling module rewrite.
To activate the new configuration, you need to run:
    systemctl restart apache2
cs2017047@cs2017047:~$ sudo apache2ctl configtest
AH00558: apache2: Could not reliably determine the server's fully qualified domain name, using 127.0.1.1. Set the 'ServerName' directive globally to suppress this message
Syntax OK
cs2017047@cs2017047:~$
```

In this command,

sudo – Super user(root)

apache2ctl – This is a front end to the Apache Hyper Text Transfer Protocol server which is designed to help to the administrator to control the functionality of the Apache httpd daemon.

configtest – This checks the configuration files.

This displays an error message. Using following command, we can fix this error.

```
Syntax OK
cs2017047@cs2017047:~$ sudo nano /etc/apache2/apache2.conf
```

In this command,

sudo – Super user(root)

nano – command line text editor

To fix this issue, we must go to this path and add server name as following figure.

```
cs2017047@cs2017047:~$ nano /etc/apache2/apache2.conf
GNU nano 4.8
# configuration directives that give the server its instructions.
# See http://httpd.apache.org/docs/2.4/ for detailed information about
# the directives and /usr/share/doc/apache2/README.Debian about Debian specific
# hints.
#
#
# Summary of how the Apache 2 configuration works in Debian:
# The Apache 2 web server configuration in Debian is quite different to
# upstream's suggested way to configure the web server. This is because Debian's
# default Apache2 installation attempts to make adding and removing modules,
# virtual hosts, and extra configuration directives as flexible as possible, in
# order to make automating the changes and administering the server as easy as
# possible.
#
# It is split into several files forming the configuration hierarchy outlined
# below, all located in the /etc/apache2/ directory:
#
#      /etc/apache2/
#      |-- apache2.conf
#          |-- ports.conf
#          |-- mods-enabled
#              |-- *.load
#              `-- *.conf
#          |-- conf-enabled
#              '-- *.conf
#      '-- sites-enabled
#          '-- *.conf
#
#
# * apache2.conf is the main configuration file (this file). It puts the pieces
# together by including all remaining configuration files when starting up the
# web server.
#
# * ports.conf is always included from the main configuration file. It is
# supposed to determine listening ports for incoming connections which can be
# customized anytime.
#
# * Configuration files in the mods-enabled/, conf-enabled/ and sites-enabled/
# directories contain particular configuration snippets which manage modules,
# global configuration fragments, or virtual host configurations,
# respectively.
#
# They are activated by symlinking available configuration files from their
# respective *.available/ counterparts. These should be managed by using our
# helpers a2enmod/a2dismod, a2ensite/a2dissite and a2enconf/a2disconf. See
ServerName 127.0.0.1

^C Get Help      ^O Write Out      ^W Where Is      ^K Cut Text      ^J Justify      ^C Cur Pos
```

After that the output be like the following figure.

```
cs2017047@cs2017047:~$ sudo nano /etc/apache2/apache2.conf
cs2017047@cs2017047:~$ sudo apache2ctl configtest
[sudo] password for cs2017047:
Syntax OK
cs2017047@cs2017047:~$
```

To enable new changes, enter the following command.

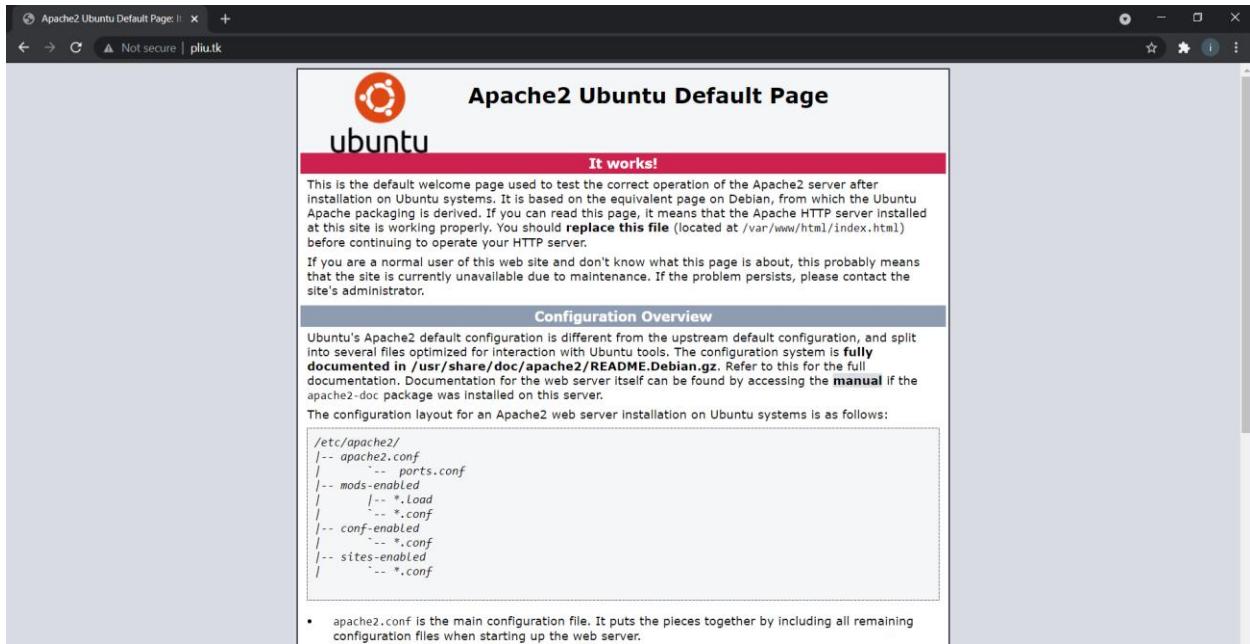
```
[sudo] password for cs2017047:
Syntax OK
cs2017047@cs2017047:~$ sudo systemctl restart apache2
cs2017047@cs2017047:~$
```

In this command,

sudo – Super user(root)

systemctl – This is a utility that is responsible for examining and controlling the systemd system and service manager.

Then you can check the server hosts your web server like following figure. To do this I entered my URL as '<http://pliu.tk>'.

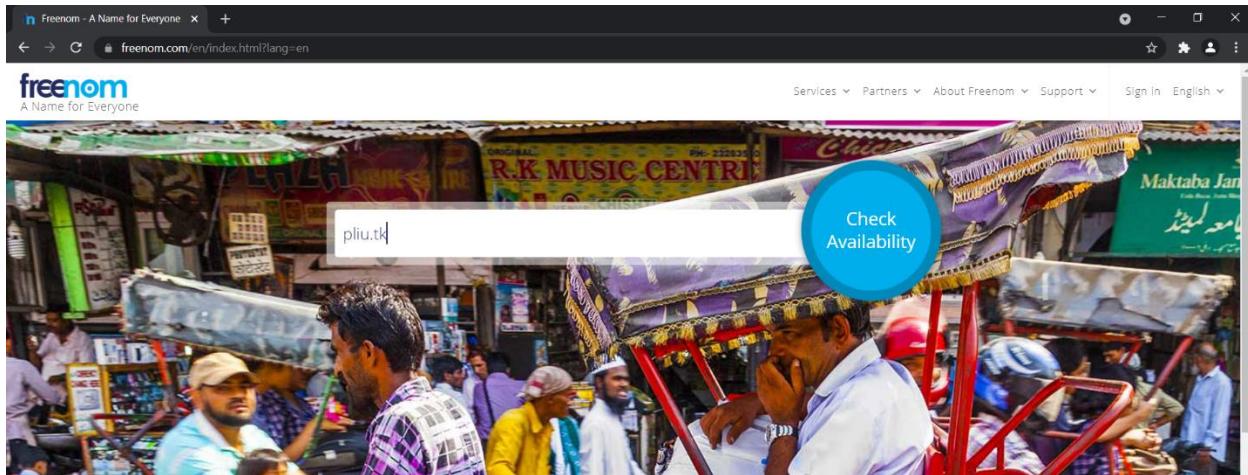


3. Getting a Domain Name

I used '**freenom**' website to get the domain name. The process is shown in the below.

First, we must visit to the '**freenom**' web site using our web browser.

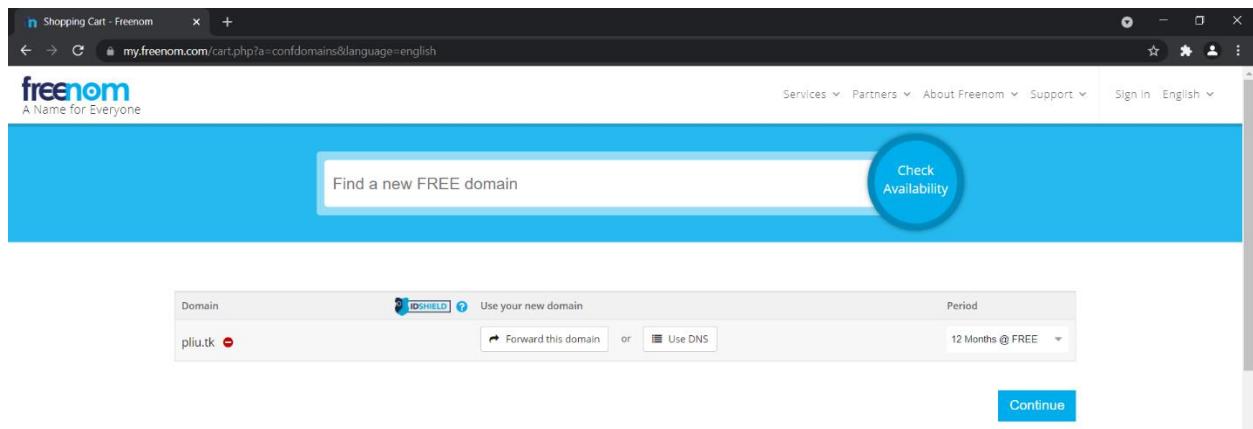
Then you should enter the domain name as you like and then click on 'Check Availability'.



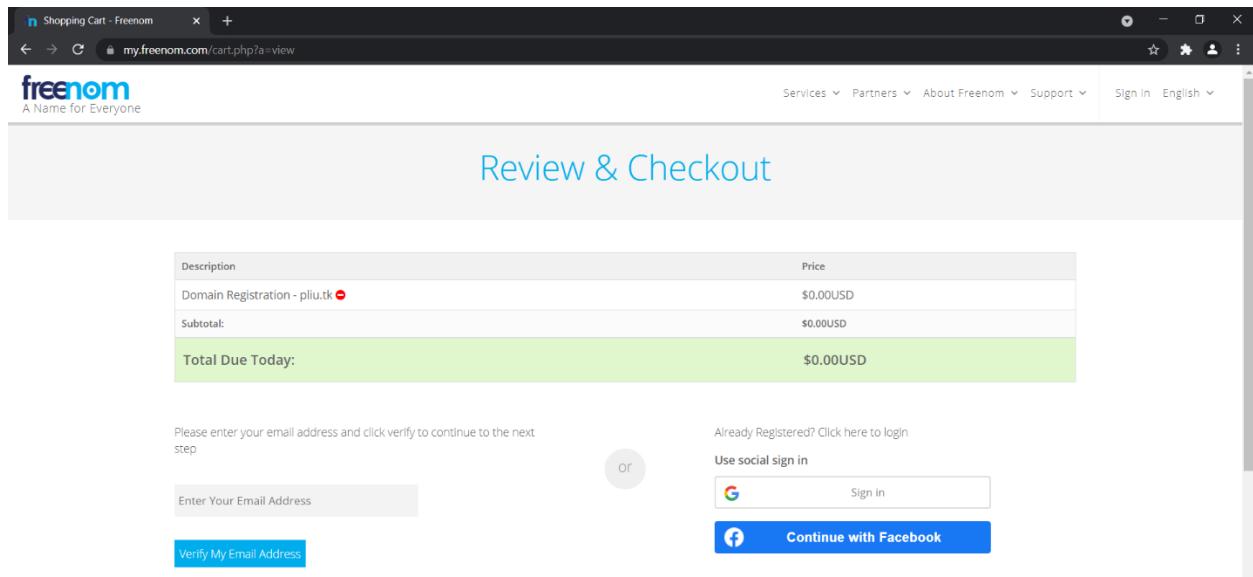
After following figure will display on your browser.

A screenshot of the freenom website showing the results for the domain 'pliu.tk'. The top part of the page is identical to the previous screenshot, showing the search bar and the 'Check Availability' button. Below this, a large green banner displays the message 'Yes pliu.tk is available!' in white text. To the right of the banner, it says '1 domain in cart' and has a 'Checkout' button. The main content area shows the domain 'pliu.tk' with a green 'FREE' badge next to it. It also shows the price as 'USD 0.00' and a green 'Selected' button with a checkmark. At the bottom of the page, there is a link that says 'Get one of these domains. They are free!'

Then click on checkout button and then you will display below like figure.



Then select 12 months @ FREE as period and click on continue. You will display below like figure.

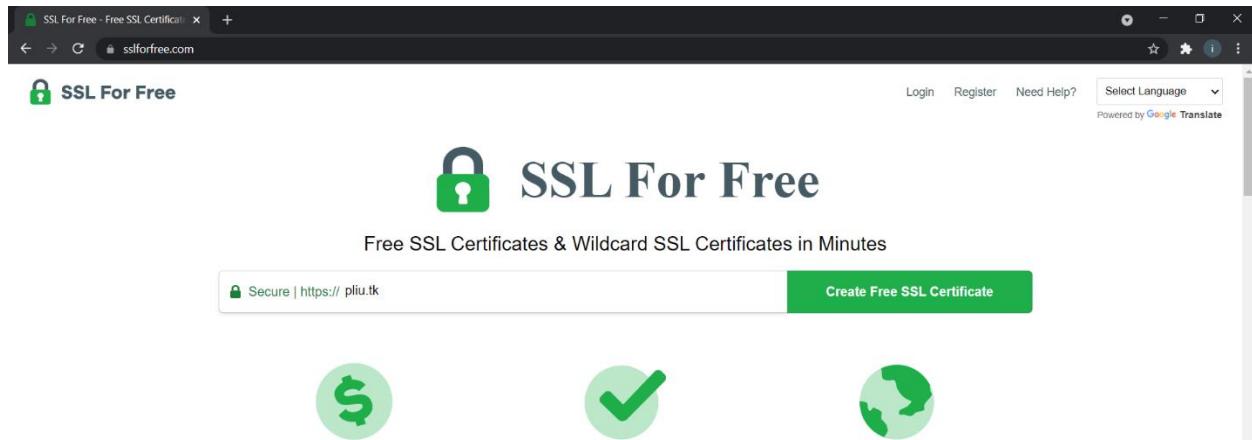


Then enter your email address and then click on 'Verify My Email Address'. After that verify the domain name using your email.

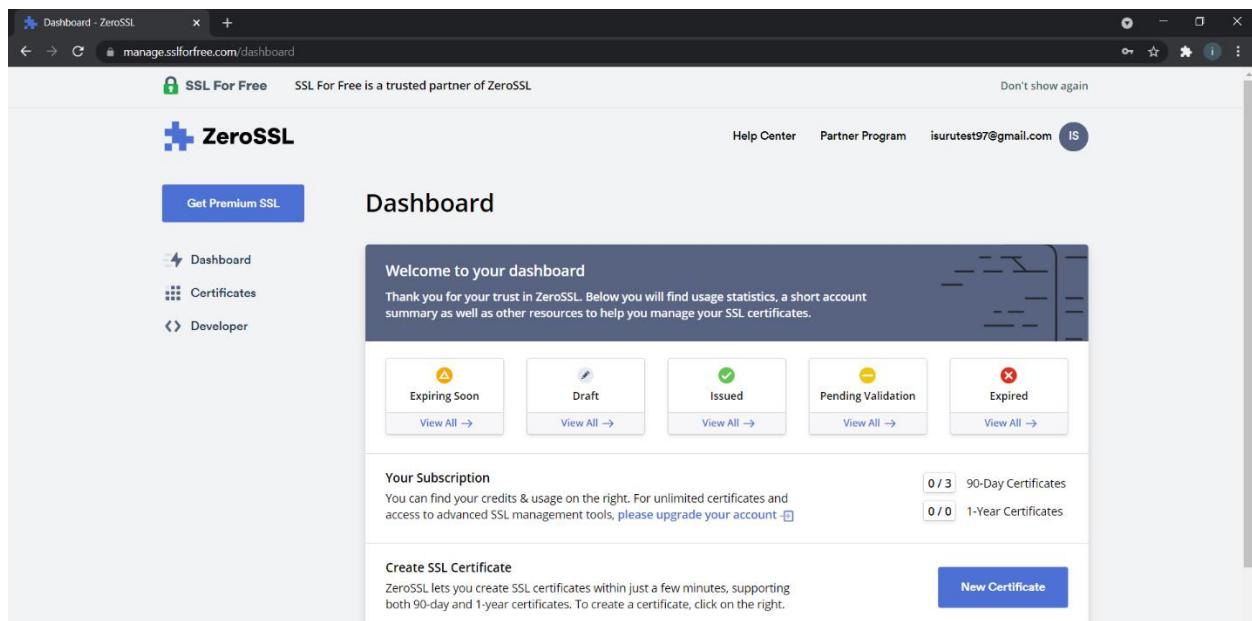
4. Getting an SSL Certificate and Configuration

I used ‘SSL For Free’ web site for get the ssl certificate. The process is shown in the below.

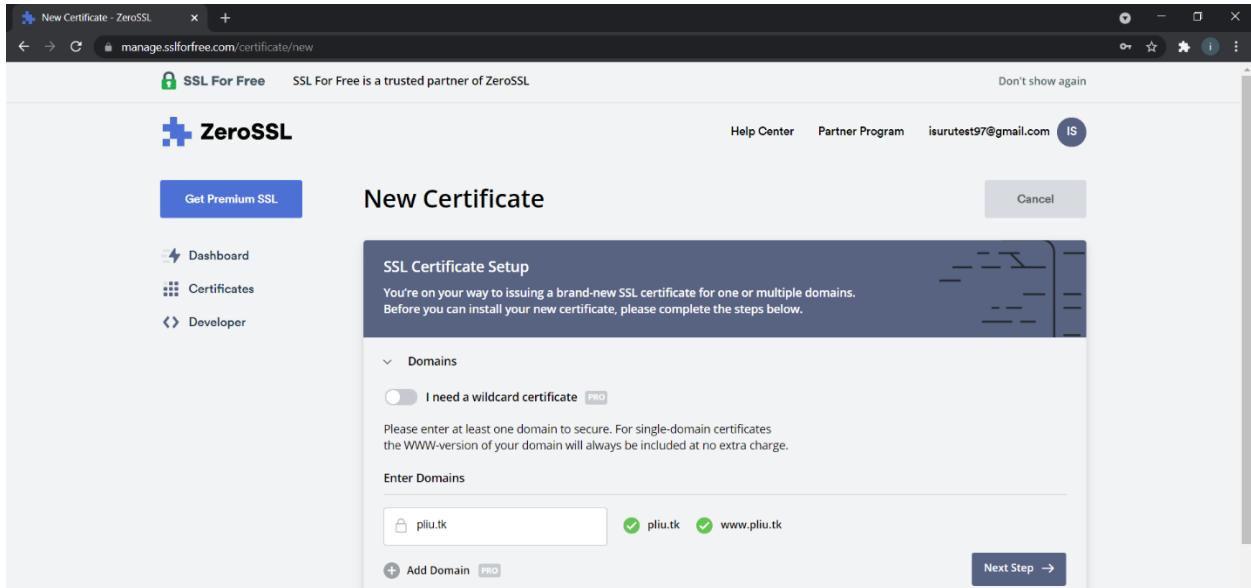
First, we must visit to the ‘SSL For Free’ web site using our web browser. You will display below like figure.



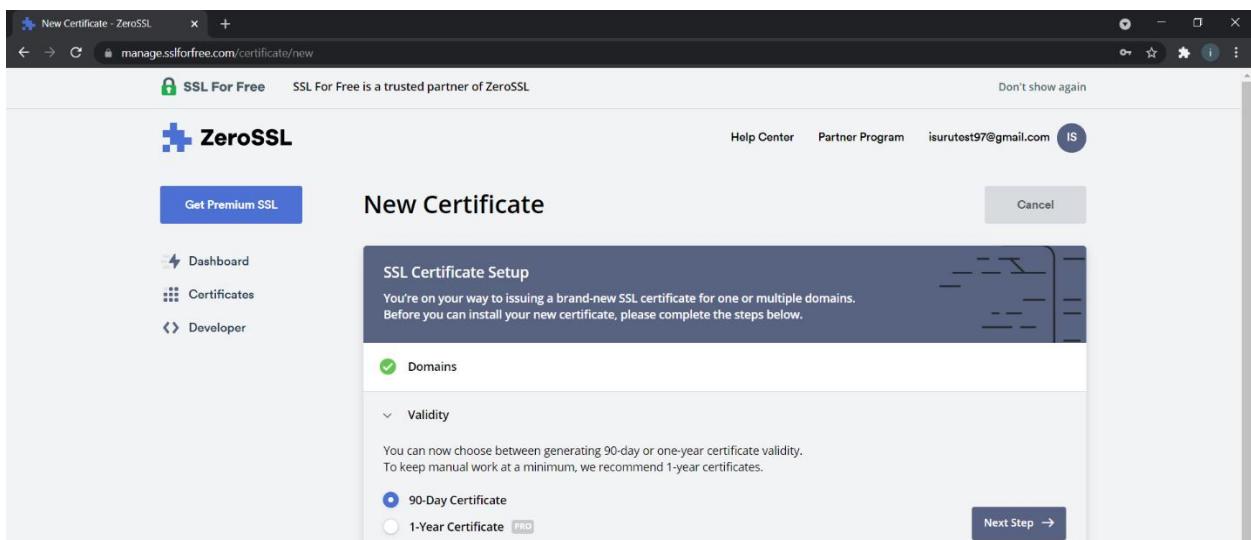
Then you enter your domain name and then click on ‘Create Free SSL Certificate’ button. After that you will see below like figure.



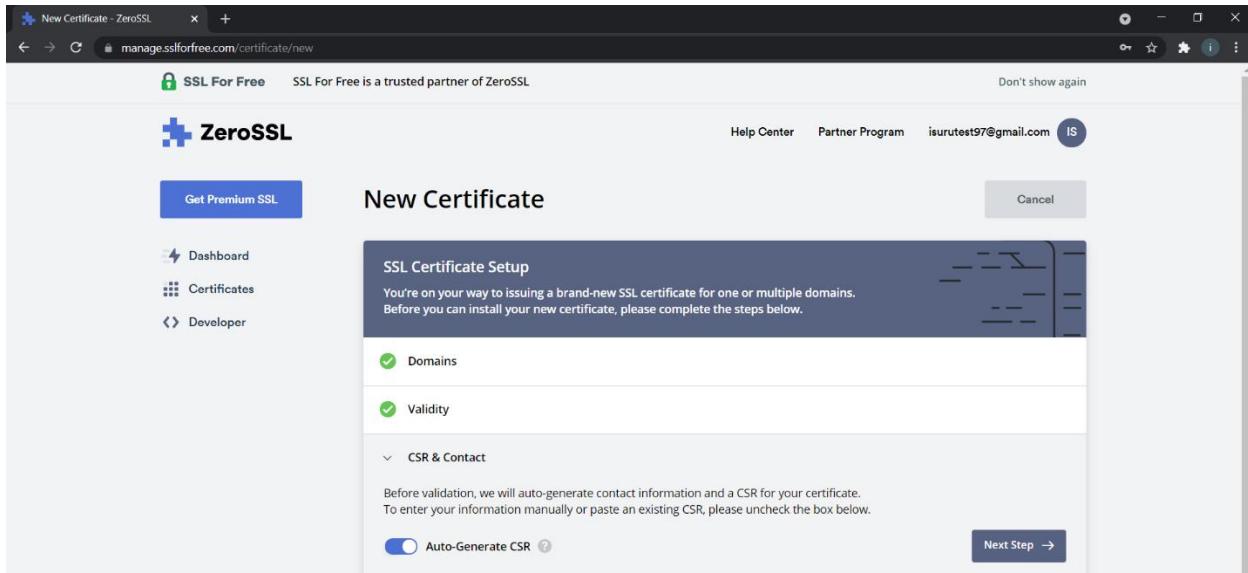
Then click on ‘New Certificate’ Button. You can see below like figure.



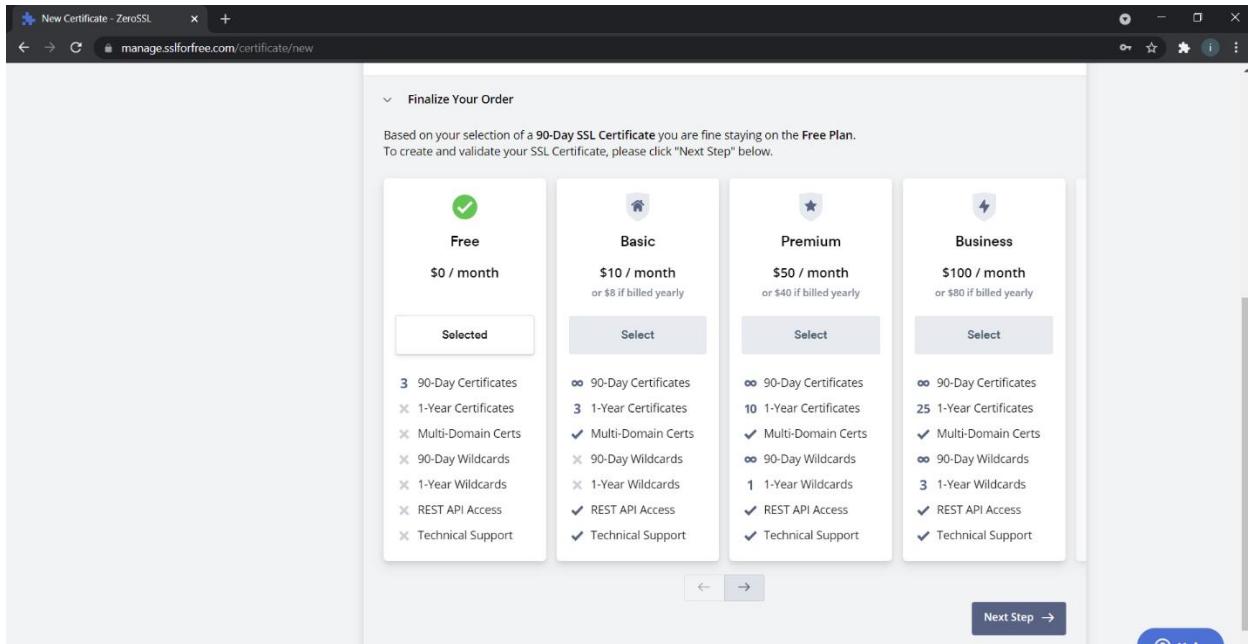
Then enter your domain name and then click on 'Next Step' button. After that you can see below like figure.



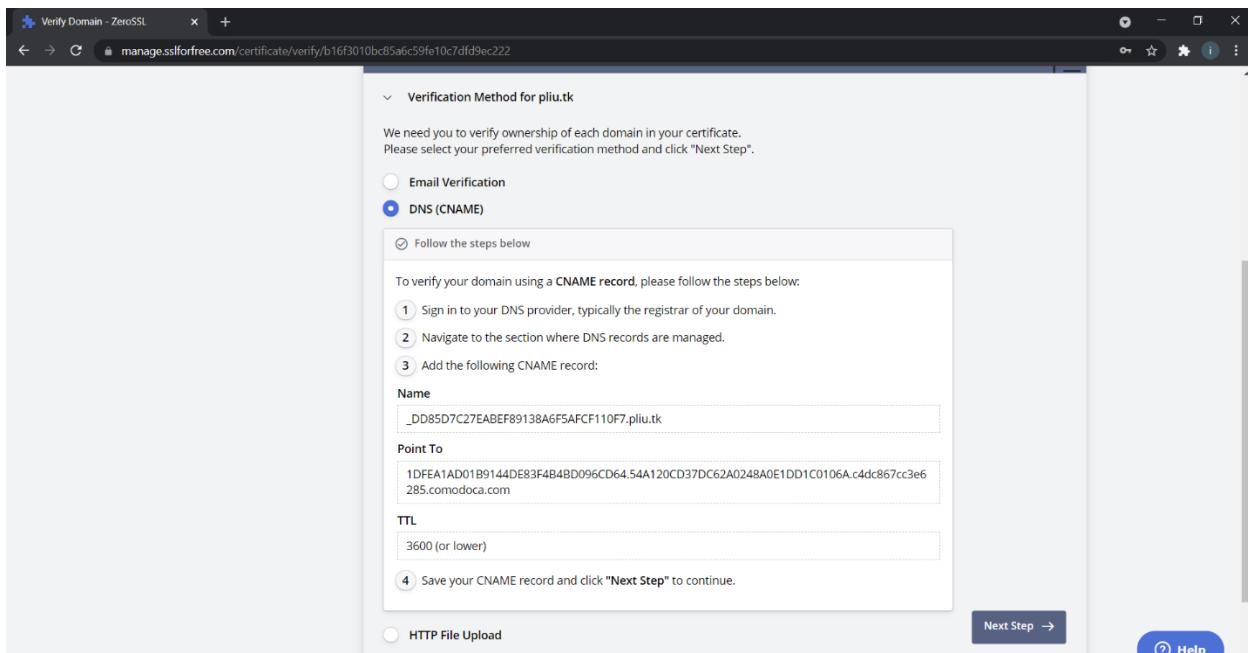
As a normal user I chose 90-day certificate. Then click on 'Next Step'. After that you will see below like figure.



Then activate the 'Auto-Generate CSR' and then click on 'Next Step'. You can see below like figure.



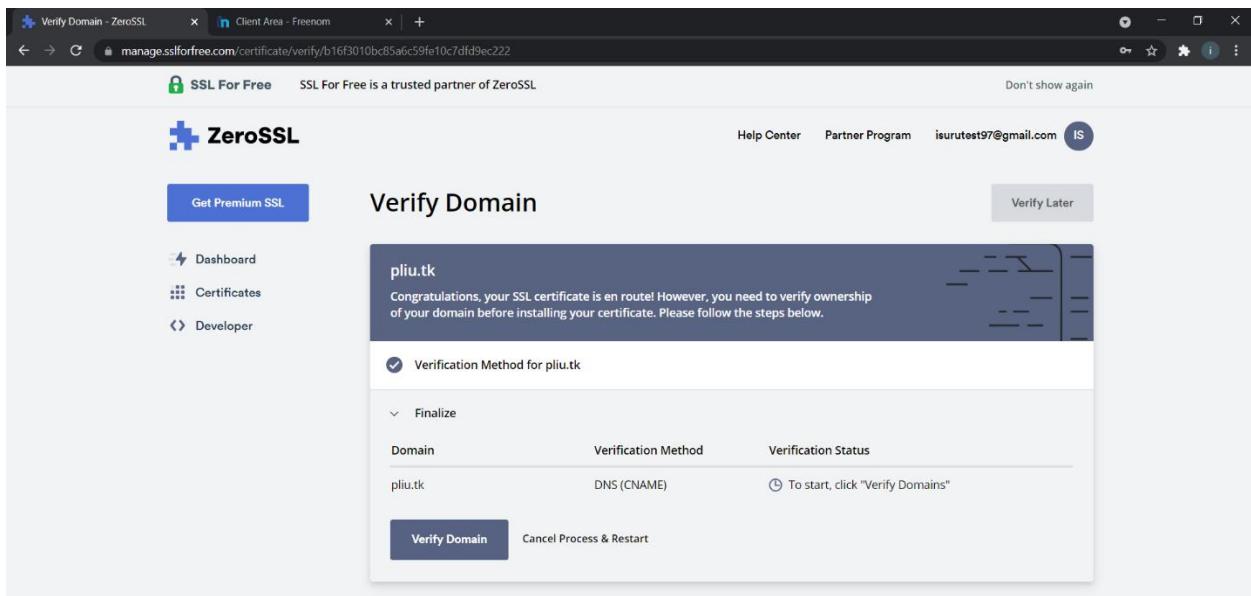
Then select your certification plan and click on 'Next Step'. After that you can see below like figure.



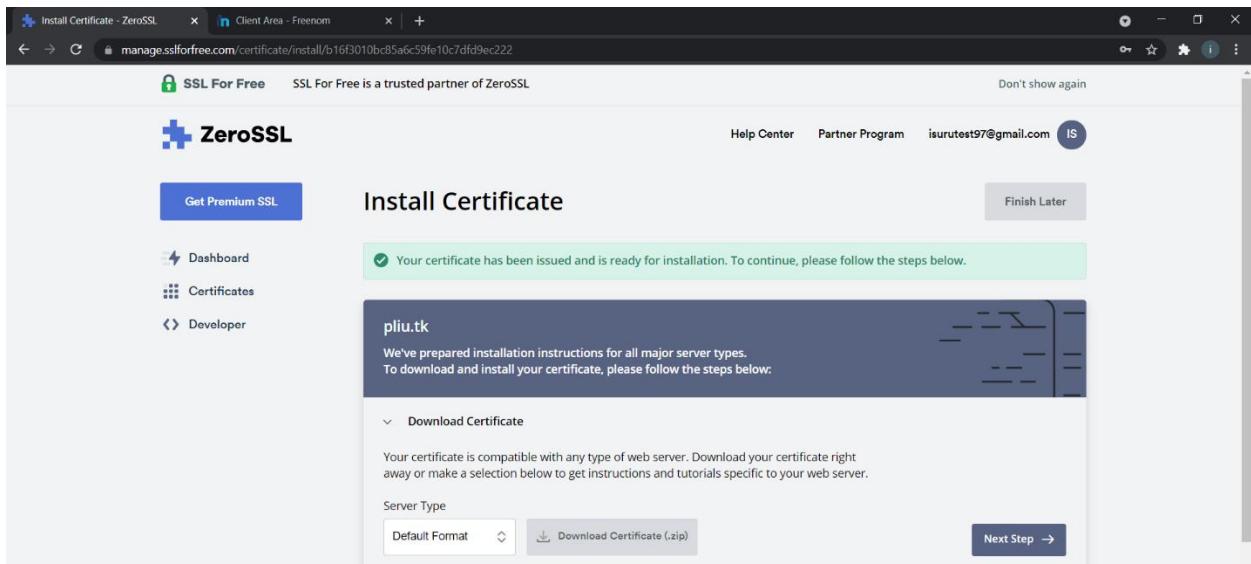
As the verification method for your domain name server ‘freenom’ only provides DNS method. So, we must copy these fields and paste in ‘freenom’ account ‘DNS records’ section to verify your domain name and get the SSL certificate. The below figure is shown that.

Name	Type	TTL	Target
_DD85D7C27EABEF89138A6F5AFCF110F7.pliu.tk	CNAME	3600	1DDEA1AD01B9144DE83F4B4BD096CD64.54A120CD37DC62A0248A0E1DD1C0106A.c4dc867cc3e6285.comodoca.com

After that click on save changes and then go to the ‘SSL For Free’ site to verify the domain.

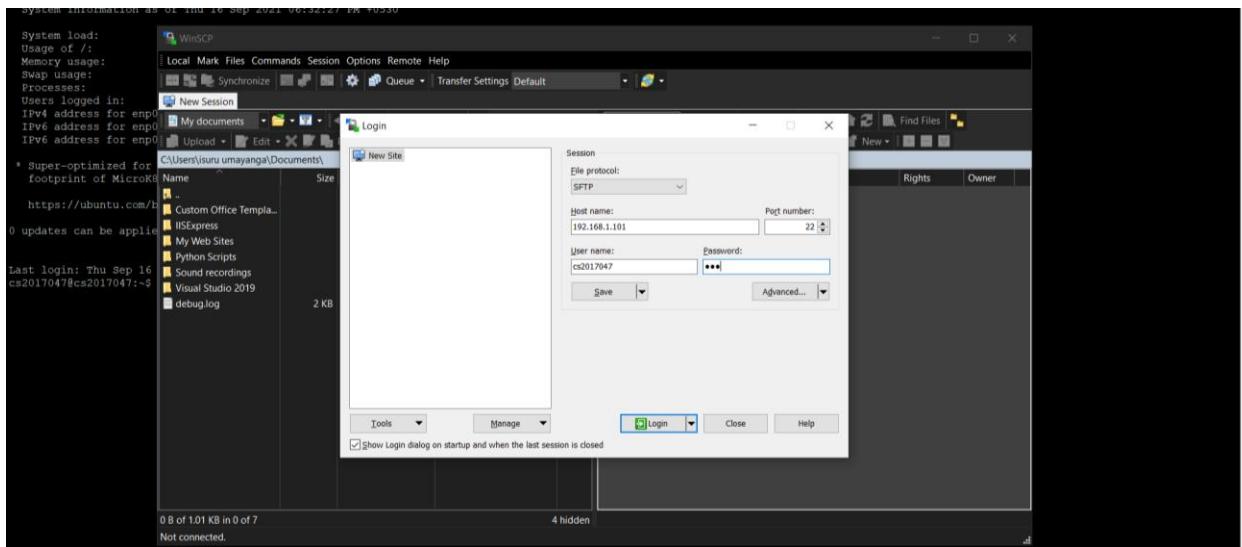


Then click on 'Verify Domain' to verify the domain. So, it will take some time. After that you will see below like figure.

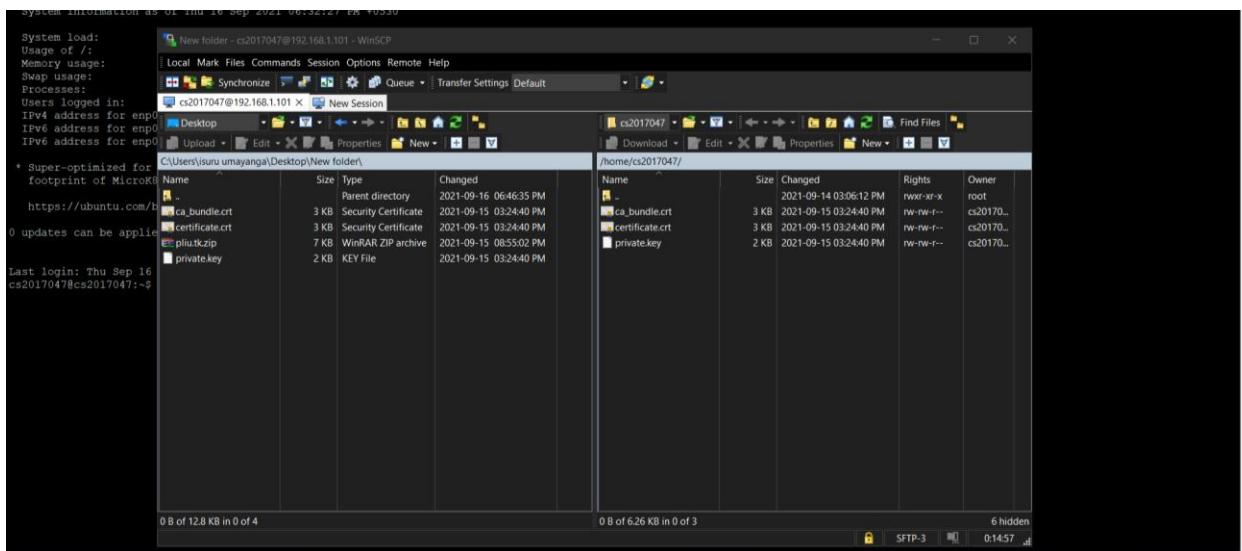


Then click on 'Download Certificate' button to download your certificate.

Using 'WinSCP' application you can send this certificate to ubuntu server. The below figure is shown that.



Enter your host's ip address as host name and username and password of your host machine and after that click on the 'Login' button. Then you will see below like figure.



Drag and drop your certificate file to insert your certificate to your server. After that you should change the directory of these files to ubuntu certs and private key directories. Because these are the directories ubuntu server normally stores its certificates. The following figure is shown it.

```
Last login: Thu Sep 16 18:31:07 2021
cs2017047@cs2017047:~$ sudo cp /home/cs2017047/certificate.crt /etc/ssl/certs/certificate.crt
[sudo] password for cs2017047:
cs2017047@cs2017047:~$ sudo cp /home/cs2017047/ca_bundle.crt /etc/ssl/certs/ca_bundle.crt
cs2017047@cs2017047:~$ sudo cp /home/cs2017047/private.key /etc/ssl/private/private.key
cs2017047@cs2017047:~$
```

In these commands,

sudo – Super user(root)

cp – copy

Copy these files using the command prompt because ‘WinSCP’ cannot have permission to copy these files in these directories.

Then we need to do some changes in ‘default-ssl.conf’ file. We should enter the following command to go to that file.

```
[sudo] password for cs2017047:  
cs2017047@cs2017047:~$ sudo cp /home/cs2017047/ca_bundle.crt /etc/ssl/certs/ca_bundle.crt  
cs2017047@cs2017047:~$ sudo cp /home/cs2017047/private.key /etc/ssl/private/private.key  
cs2017047@cs2017047:~$ sudo nano /etc/apache2/sites-available/default-ssl.conf  
[sudo] password for cs2017047:  
cs2017047@cs2017047:~$
```

The following figure is shown those changes we have done to that file.

```
cs2017047@cs2017047:~$  
GNU nano 4.8  
<IfModule mod_ssl.c>  
    <VirtualHost _default_:443>  
        ServerAdmin webmaster@pliu.tk  
        ServerName pliu.tk  
        ServerAlias www.pliu.tk  
  
        DocumentRoot /var/www/html
```

```
# the ssl-cert package. See  
# /usr/share/doc/apache2/README.Debian.gz for more info.  
# If both key and certificate are stored in the same file, only the  
# SSLCertificateFile directive is needed.  
SSLCertificateFile /etc/ssl/certs/certificate.crt  
SSLCertificateKeyFile /etc/ssl/private/private.key  
  
# Server Certificate Chain:  
# Point SSLCertificateChainFile at a file containing the  
# concatenation of PEM encoded CA certificates which form the  
# certificate chain for the server certificate. Alternatively  
# the referenced file can be the same as SSLCertificateFile  
# when the CA certificates are directly appended to the server  
# certificate for convinience.  
SSLCertificateChainFile /etc/ssl/certs/ca_bundle.crt
```

```
#           nokeepalive ssl-unclean-shutdown \  
#           downgrade-1.0 force-response-1.0  
    <Directory /var/www/html>  
        AllowOverride All  
    </Directory>  
    </VirtualHost>  
</IfModule>
```

Then, we should restart the apache server to make these changes and enable the ‘default-ssl.conf’ site using the following command.

```
cs2017047@cs2017047:~$ sudo nano /etc/apache2/sites-available/default-ssl.conf
[sudo] password for cs2017047:
cs2017047@cs2017047:~$ sudo a2ensite default-ssl.conf
[sudo] password for cs2017047:
Enabling site default-ssl.
To activate the new configuration, you need to run:
  systemctl reload apache2
cs2017047@cs2017047:~$
```

In this command,

sudo – Super user(root)

a2ensite – This is a script which enables the specified site.

Again, you should restart the apache server to make these changes. After that you should make to redirect http to https. To full fill this task you should add commands to ‘apache2.conf’ file. First visit this directory, using the following command.

```
systemctl reload apache2
cs2017047@cs2017047:~$ sudo systemctl reload apache2
cs2017047@cs2017047:~$ sudo nano /etc/apache2/apache2.conf
```

Then you should add the following command lines to this file.

```
# vim: syntax=apache ts=4 sw=4 sts=4 sr noet
#HTTP to HTTPS redirect
RewriteEngine On
RewriteCond %{HTTPS} !=on
RewriteRule ^/(.*) https://{$SERVER_NAME}/$1 [R,L]
```

Again, you should restart the apache server to make these changes and then enable the ssl certificate using the below command.

```
cs2017047@cs2017047:~$ sudo systemctl reload apache2
[sudo] password for cs2017047:
cs2017047@cs2017047:~$ sudo a2enmod ssl
Considering dependency setenvif for ssl:
Module setenvif already enabled
Considering dependency mime for ssl:
Module mime already enabled
Considering dependency socache_shmcb for ssl:
Enabling module socache_shmcb.
Enabling module ssl.
See /usr/share/doc/apache2/README.Debian.gz on how to configure SSL and create self-signed certificates.
To activate the new configuration, you need to run:
  systemctl restart apache2
cs2017047@cs2017047:~$ █
```

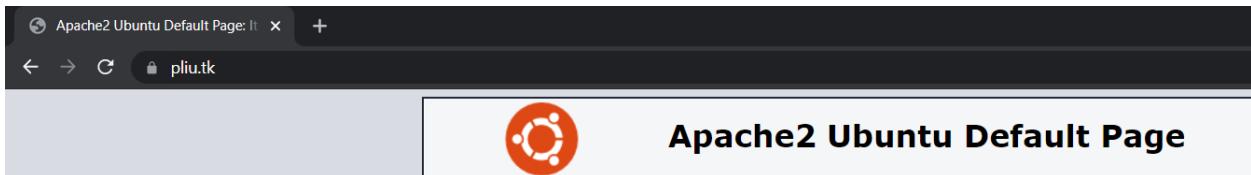
In this command,

sudo – Super user(root)

a2enmod – This is a script which enables the specified module within the apache2 configuration.

Again, you should restart the apache server to apply these changes in web server.

After that go to your browser and give the domain with ‘https’. In my case, I gave that as ‘<https://pliu.tk>’. Then you will see the verified domain as below like figure.



So, now we have successfully configured the SSL certificate to the ubuntu server. So, our next task is to installation of WordPress in our web server.

5. Wordpress Installation

Now we have to install the wordpress to open in our web server. Our site document root is in /var/www/html directory. We should replace the apache welcome page. First, we should download the WordPress to our server.

At first, we need to change the directory of our server to tmp using the below command.

```
Last login: Fri Sep 17 13:22:49 2021  
cs2017047@cs2017047:~$ cd /tmp  
cs2017047@cs2017047:/tmp$
```

In this command,

cd – Change directory.

After changing the directory, download the WordPress compressed file using below command.

```
Last login: Fri Sep 17 13:22:49 2021  
cs2017047@cs2017047:~$ cd /tmp  
cs2017047@cs2017047:/tmp$ curl -O https://wordpress.org/latest.tar.gz  
% Total    % Received % Xferd  Average Speed   Time     Time      Current  
          Dload  Upload Total   Spent   Left  Speed  
100 14.3M  100 14.3M    0     0  677k      0  0:00:21  0:00:21  ---:--- 276k  
cs2017047@cs2017047:/tmp$
```

In this command,

curl – This is a command line tool to transfer data to or from server.

-O – Output

Enter the following command to extract the compressed file.

```
cs2017047@cs2017047:/tmp$ tar xzvf latest.tar.gz
```

In this command,

tar – Used to extract the file.

These files will go to the /tmp/wordpress directory. Now, create a .htaccess file which is used by WordPress using below command.

```
wordpress/wp-trackback.php  
wordpress/wp-comments-post.php  
cs2017047@cs2017047:/tmp$ touch /tmp/wordpress/.htaccess  
cs2017047@cs2017047:/tmp$
```

In this command,

touch – creates empty files or change files timestamps.

WordPress configurations are saved in the wp-config.php file. Then, a new WordPress installation comes with a sample config file which can copy to the wp-config.php file. We can do this copy using the below command.

```
cs2017047@cs2017047:/tmp$ touch /tmp/wordpress/.htaccess  
cs2017047@cs2017047:/tmp$ cp /tmp/wordpress/wp-config-sample.php /tmp/wordpress/wp-config.php  
cs2017047@cs2017047:/tmp$
```

In this command,

cp – copy

WordPress sends upgrades or security patches after they discovered a vulnerability. They are handled initially by upgrades directory. So, you should create a directory to prevent WordPress from running into the permission issues. The following figure shows this creating of this directory.

```
cs2017047@cs2017047:/tmp$ touch /tmp/wordpress/.htaccess  
cs2017047@cs2017047:/tmp$ cp /tmp/wordpress/wp-config-sample.php /tmp/wordpress/wp-config.php  
cs2017047@cs2017047:/tmp$ mkdir /tmp/wordpress/wp-content/upgrade  
cs2017047@cs2017047:/tmp$
```

In this command,

mkdir – make directory

After that the contents of /tmp/wordpress directory need to be moved into the /var/www/html directory. First, we should identify files in that directory using below command.

```
cs2017047@cs2017047:/tmp$ mkdir /tmp/wordpress/wp-content/upgrade  
cs2017047@cs2017047:/tmp$ ls /var/www/html/index.html  
/var/www/html/index.html  
cs2017047@cs2017047:/tmp$
```

In this command,

ls – list

There is a file called ‘index.html’ there. So, we must remove this file from this directory because server can host only one page at a time. To remove, you can use the below command.

```
/var/www/html/index.html  
cs2017047@cs2017047:/tmp$ sudo rm /var/www/html/index.html  
[sudo] password for cs2017047:  
cs2017047@cs2017047:/tmp$
```

In this command,

sudo – Super user(root)

rm – remove files

Then, we should copy the extracted WordPress files from the /tmp directory using the following command.

```
[sudo] password for cs2017047:  
cs2017047@cs2017047:/tmp$ sudo cp -a /tmp/wordpress/. /var/www/html  
cs2017047@cs2017047:/tmp$
```

In this command,

sudo – Super user(root)

cp – copy files

. – Ensures every content of the directory is copied.

/tmp/wordpress/ - Source directory

/var/www/html - destination directory

If you change the directory into /var/www/html directory and list of contents, then you can see the WordPress files like below figure.

```
cs2017047@cs2017047:/tmp$ ls  
latest.tar.gz  systemd-private-bb826fe089584c6b9b4eae774c9f0f10-apache2.service-sLxCvi      systemd-private-bb826fe089584c6b9b4eae774c9f0f10-systemd-resolved.service-1Fj2mi  wordpress  
snap.lxd      systemd-private-bb826fe089584c6b9b4eae774c9f0f10-systemd-logind.service-taPonj  systemd-private-bb826fe089584c6b9b4eae774c9f0f10-systemd-timesyncd.service-MRLuuuj  
cs2017047@cs2017047:/tmp$
```

Next, we should set up user permissions and database credentials in the WordPress directory. The ownership of the WordPress directory currently available for sudo user. So, we should change the ownership to the www-data user and group. That uses the apache web server. This ownership change allows WordPress to read and write files. Use below command to do this task.

```
snap.1xu      systemd-private-0b0201e009304c0b9b4eaef74c910110-systemd-logind.serv
cs2017047@cs2017047:/tmp$ sudo chown -R www-data:www-data /var/www/html
cs2017047@cs2017047:/tmp$
```

In this command,

sudo – Super user(root)

chown – This allows to change the user and group ownership of a given directory or file.

All of subdirectories of WordPress installation need the right permissions. We can change their permissions using the below commands.

```
cs2017047@cs2017047:/tmp$ sudo chown -R www-data:www-data /var/www/html
cs2017047@cs2017047:/tmp$ sudo find /var/www/html/ -type d -exec chmod 750 {} \;
cs2017047@cs2017047:/tmp$ sudo find /var/www/html/ -type f -exec chmod 640 {} \;
cs2017047@cs2017047:/tmp$
```

In these commands,

sudo – Super user(root)

find – Search for files in a directory hierarchy in a database or not.

chmod – This allows to change the permissions on a file using a symbolic or numeric mode or a reference file.

After that we need to update the WordPress configuration file. First, we need to change the secret keys to improve the security of the installation. So, the WordPress offers a secret key generator utility, we can use this to get some very high secure keys. The command and output are shown below.

```
cs2017047@cs2017047:/tmp$ sudo find /var/www/html/ -type f -exec chmod 640 {} \;
cs2017047@cs2017047:/tmp$ curl -s https://api.wordpress.org/secret-key/1.1/salt/
define('AUTH_KEY',          'rl<-):U[e=YrE/8-Q3a2`tys13Q+>ypeB?*|}S~>b;XvW~``E6xmHKe@%?}m*e9U');
define('SECURE_AUTH_KEY',    'Tv{10930]PfFv9:|cR Rgt|[KtqJoT<96>uq.H- y|WvDg/1~c8w@oL)2P=1@;^');
define('LOGGED_IN_KEY',      '@0cz>3Xi/wW-=]gmwoJfMdb,n?EjAFUFj[<coF^]k tjhUL;<78?|<Po7rF`~CH');
define('NONCE_KEY',          'urN(4P=#42[B9+F0KQ_zj4.o~p0xRos5svt@mYh]-Qqfoe^+[0bBg@_zK7YcupS');
define('AUTH_SALT',          'T,+1m<YU+v35G2OUq/q6Uq8XLgal]M).q{mp?D%!XO>tn[&YrowErJK}|%8_LH6;');
define('SECURE_AUTH_SALT',   'BU,6;##*l3bP9|Sc.=IDmBB W>%+IW>-[C8q;Z/N/WOF-Tr-Yqd2s4<1Jg6'V8a[');
define('LOGGED_IN_SALT',     'KTUD2SiPvI+A:hL4x-+QG~ +~P/{5OU&A|J9m~+v>jqMtjmFf`ZI}/vS2H.+n*q');
define('NONCE_SALT',         '^>4j@v/*=:^?iz`D_gO=[C~TOci^Il%+.3 ;EP~OKH.yHF;|kb*@sO-H?BGAz) F');
cs2017047@cs2017047:/tmp$
```

In this command,

curl – This is a command line tool to transfer data to or from a server.

We should copy these keys and paste in the wp-config.php file. Open the wp-config.php file using the following command.

```
cs2017047@cs2017047:/tmp$ ^C  
cs2017047@cs2017047:/tmp$ sudo nano /var/www/html/wp-config.php
```

You can paste them like in below figure.

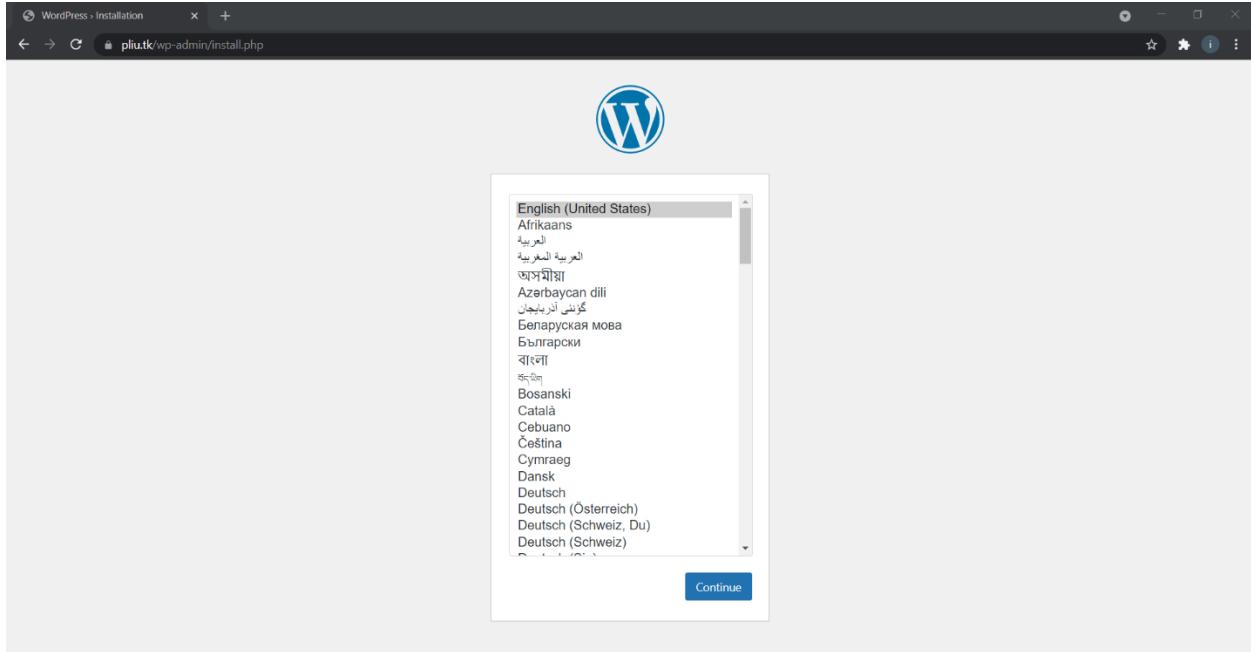
```
* @since 2.6.0  
*/  
define( 'AUTH_KEY', 'rl<-):U[e=YrE/8-Q3a2'tys13Q+>ypeB?*|)S~>b;XvW~` `E6xmHKe@%?}m*e9U' );  
define( 'SECURE_AUTH_KEY', 'Tv{10930]ffFv9:[CR Rg+) [KtqJotA96>uq.H- y|WvDg/1~c8w@o!o) 2P=1@;^' );  
define( 'LOGGED_IN_KEY', '@0cz>3Xi/wW-.=]gmwoJfMdb,n?EjAFJFj[<coF^]k tjhUL;<78?|<Po7rF`~CH' );  
define( 'NONCE_KEY', 'urN(4p=#42[B9+F0KQ_zj4.0~p0Xros5svt@mYh]-qgf0e^+[0bbg@_zK7YcupS' );  
define( 'AUTH_SALT', 'T,+1m<YU+v35G2OUq/q6Uq8XLgal]M).q{mp?D!Xo>tn[&YrowErJK] |%8_LH6;' );  
define( 'SECURE_AUTH_SALT', 'BU,6;#*l3bF9|Sc=IdmBB W>%+IW>~{C8q;Z/N/WOF-Tr-Yqd2s4<1jg6`V8a[*' );  
define( 'LOGGED_IN_SALT', 'KTUDZSiPvI+A:hL4x+QG~ +~P/{(5OU&A|J9m-+v>jqMtjmFF`ZI)/vs2H.+n*q' );  
define( 'NONCE_SALT', '^>4j@v/*:=^?8iz`D_gO=[C~ToCi^Il%.+ . ;EP~OKH.yHF;|kb*@sO-H?BGaZ)F' );  
/**#@-*/
```

MySQL settings section should fill using your previously given information about the MySQL database like in below figure.

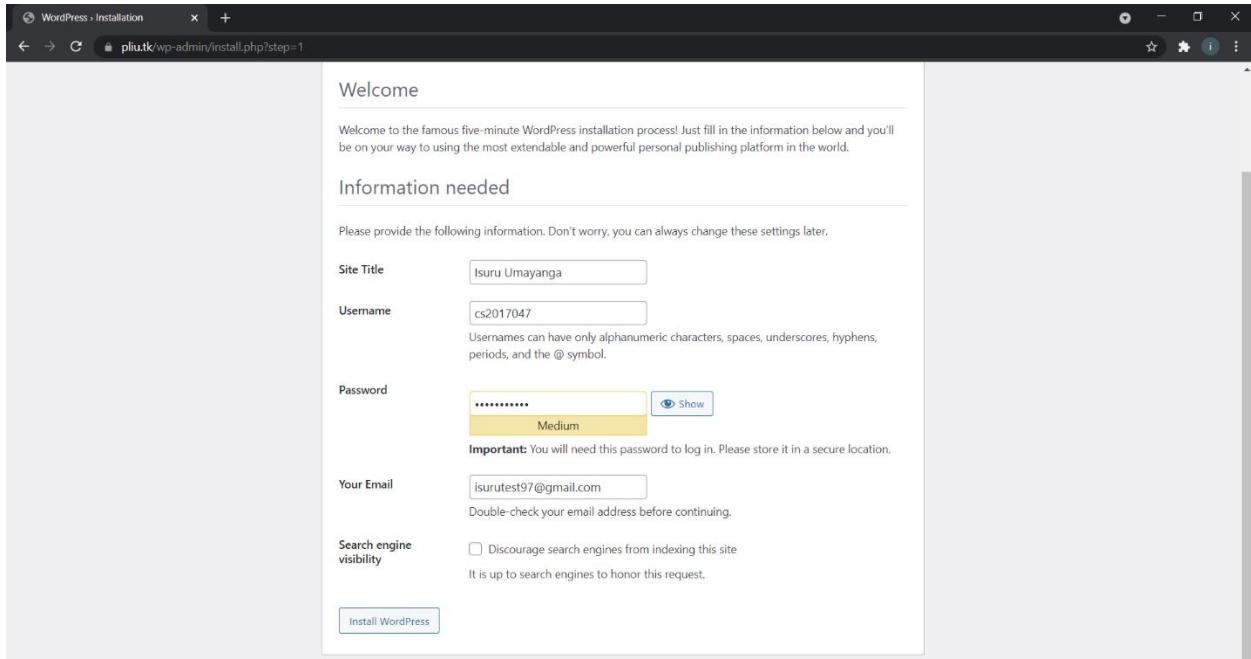
```
// ** MySQL settings - You can get this info from your web host ** //  
/** The name of the database for WordPress */  
define( 'DB_NAME', 'wordpress' );  
  
/** MySQL database username */  
define( 'DB_USER', 'pliu' );  
  
/** MySQL database password */  
define( 'DB_PASSWORD', '123' );  
  
/** MySQL hostname */  
define( 'DB_HOST', 'localhost' );  
  
/** Database charset to use in creating database tables. */  
define( 'DB_CHARSET', 'utf8' );  
  
/** The database collate type. Don't change this if in doubt. */  
define( 'DB_COLLATE', '' );  
  
define('FS_METHOD', 'direct');  
/**#@+
```

Change DB_NAME, DB_USER and password as your credentials. Then you need to define a method that WordPress use to write on the file system. The Apache server has the right permissions to access all of directories in the WordPress installation directory, you can set the file system access method to direct. 'define('FS_METHOD', 'direct')' is that method. Then save the changes and exit from the wp-config file.

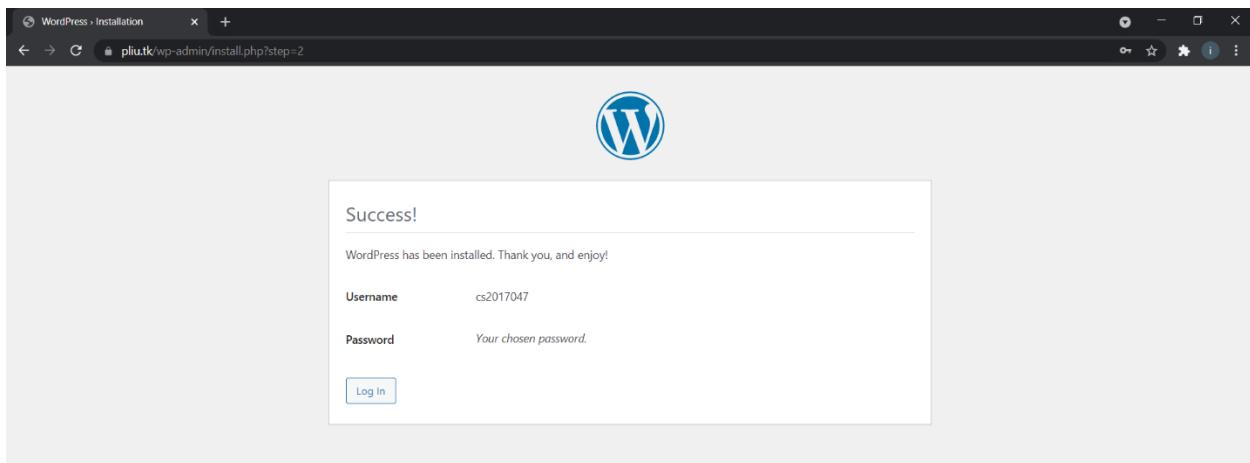
After that you can finalize your installation through your website. At the beginning you can see below like figure in your website.



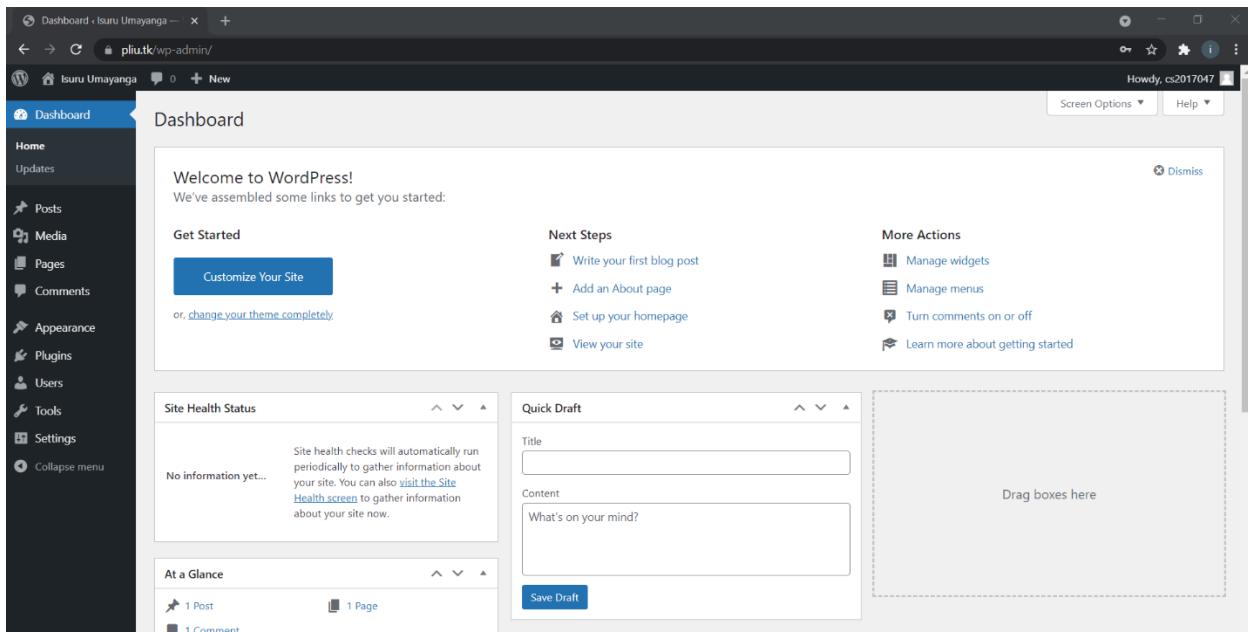
Select your language from the list and then click on continue button. After that you will see a below like figure.



After that you should fill those fields. Then click on 'Install WordPress'. After, you will see a below like figure.



Then click on Log In button. Next log into the WordPress using your username and password. After that you can see the below figure.



After that you can create your own web site.

