Programming Assignment

2021

Questions:

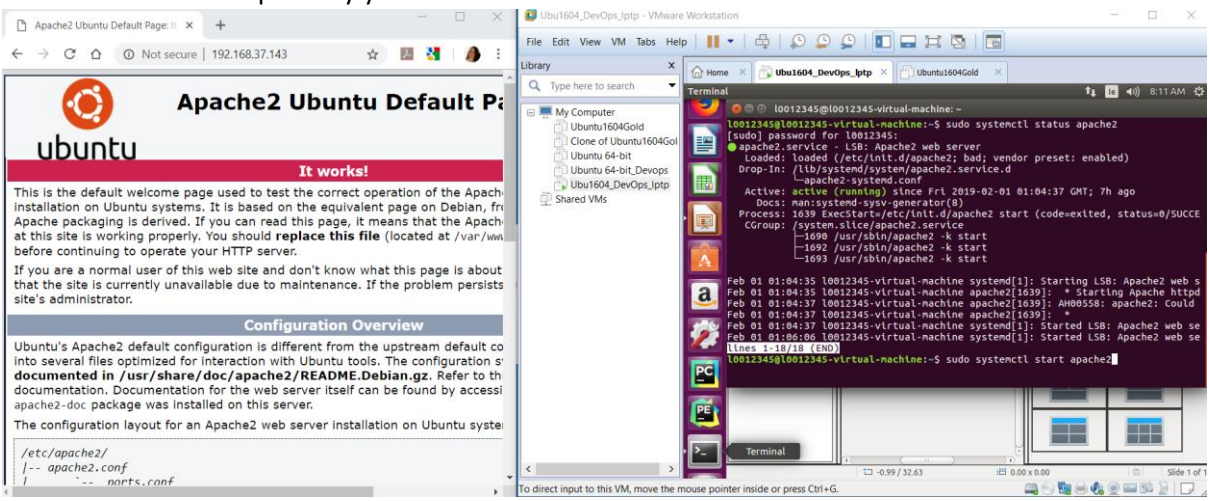
At all times code should be pushed to GitHub. Multiple pushes to Github should be demonstrated.

1. (Preparation: Not code) Install apache2 on the vm. **5 marks**

   The first command installs the web server. The second allows the server through the firewall – if this was a production machine I would not do it this way! The next command reboots the vm to allow the changes to take effect. Next, start the server and then test that it is running.

   sudo apt-get install apache2
   sudo ufw allow 'Apache Full'
   sudo init 6
   sudo systemctl start apache2
   sudo systemctl status apache2

   Open a browser on your own host machine (not the vm) and point it to the ip address of the vm. It should show a default web page. Use screenshots to demonstrate that this worked. Save them to a file named L0012345_Q1_File_1 where L0012345 is replace by your own L number.



2. Code: Using Python on your host (windows) pc scrape the Apache 2 page you just created (or LYIT web page) and parse it <u>minimally</u> for later processing. For example:
   a. What are the headings?
   b. How many times does the word Apache2 appear ?
      Think of searching for an event id or user id that is in your system.
   c. Any other item

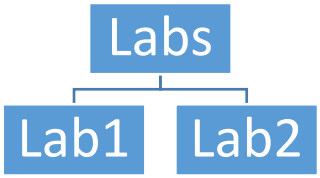
Use BeautifulSoup or any other parser that you have never used before for this task. https://pypi.org/project/beautifulsoup4/ The purpose of this task is both to install software and to use an api you have not seen before to carry out a minimal task.
If apache is properly installed it should be visible from the host by typing in the ip address in your browser. See below.
ip addr show
Use screenshots to demonstrate that this worked. Save them to a file named L0012345_Q2_File_1 where L0012345 is replace by your own L number. Save the script as L0012345_Q2_File_2 **10 marks**

3. Connect to the virtual machine using a python script using the ssh port via modifying a previous script from the 'Networking Labs'. Establish that the connection was successful. Use screenshots to demonstrate that this worked. Save them to a file named L0012345_Q3_File_1 where L0012345 is replaced by your own L number. **5 marks**

4. Write a Python script to determine which ports are open and display the information in a tidy format. Where port 22 is shown as open display the word "SSH" where port 80 is shown as open display the word "HTTP". Take screenshots of the code running on your system. Save them to a file named L0012345_Q4_File_1 where L0012345 is replace by your own L number. Save the script as L0012345_Q4_File_2

10 marks

5. Manipulate/Complete the following code to : **5 marks**
   a. install curl,
   b. Create a directory structure Labs with subfolders lab1 and lab2



   c. From your home directory find out when files were last accessed.
   ls -l --time=atime

   Take screenshots of the code running on your system. Save them to a file named L0012345_Q5_File_1 where L0012345 is replace by your own L number. Save the script as L0012345_Q5_File_2

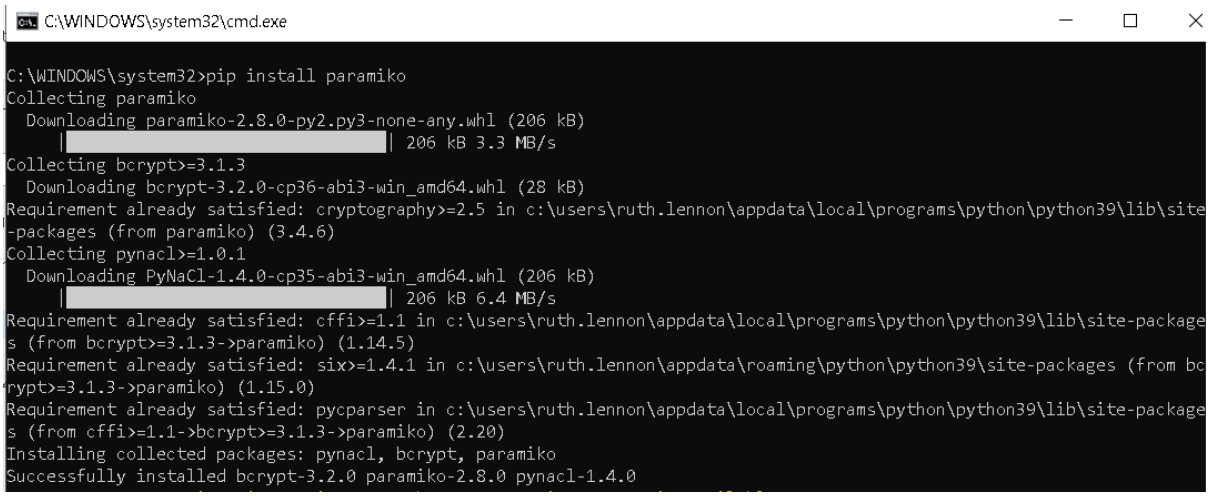
6. Write a Terraform Script to create a sample infrastructure in the public cloud on AWS. Follow the diagram provided on BB. Upload the script to your Repo. 5 marks

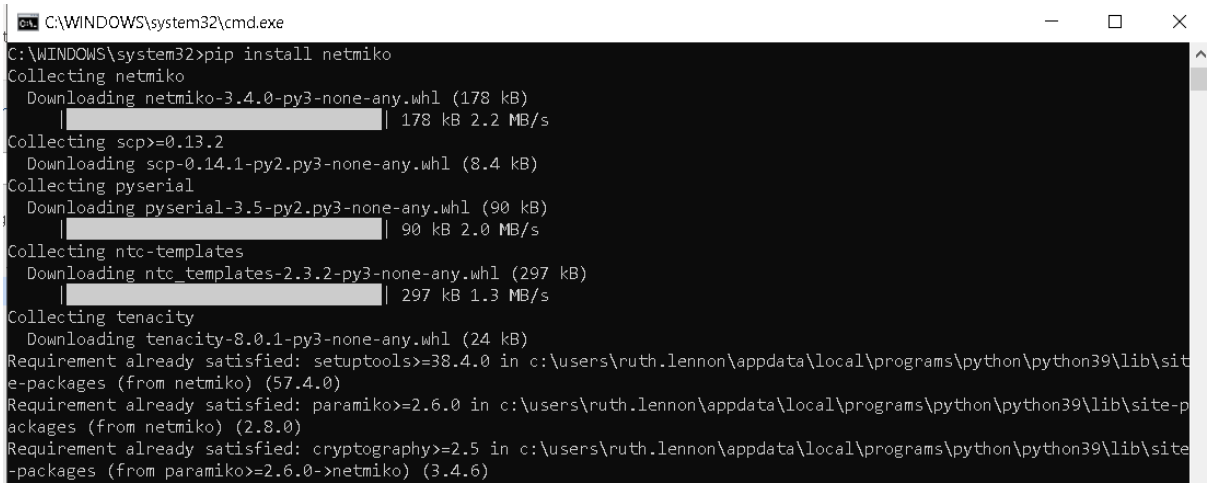
7. Written 1 page Conclusion 10 marks

Netmiko and Paramiko

Install Paramiko package for Python to help with network programming.

pip install paramiko





Putty

Putty allows us to remotely connect to the virtual machine using the command prompt. It is a very helpful networking tool and may be used elsewhere in the course. I would like it to show as one of the open ports on the VM. Putty can be downloaded here:

https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

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Download PuTTY: latest release (0.76)

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Download: **Stable** · Snapshot | Docs | Changes | Wishlist

This page contains download links for the latest released version of PuTTY. Currently this is 0.76, released on 2021-07-17.

When new releases come out, this page will update to contain the latest, so this is a good page to bookmark or link to. Alternatively, here is a permanent link to the 0.76 release.

Release versions of PuTTY are versions we think are reasonably likely to work well. However, they are often not the most up-to-date version of the code available. If you have a problem with this release, then it might be worth trying out the development snapshots, to see if the problem has already been fixed in those versions.

Package files

You probably want one of these. They include versions of all the PuTTY utilities.

(Not sure whether you want the 32-bit or the 64-bit version? Read the FAQ entry.)

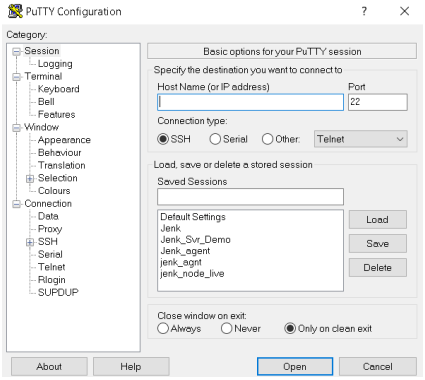
MSI ('Windows Installer')

64-bit x86:	putty-64bit-0.76-installer.msi	(or by FTP)	(signature)
64-bit Arm:	putty-arm64-0.76-installer.msi	(or by FTP)	(signature)
32-bit x86:	putty-0.76-installer.msi	(or by FTP)	(signature)

Unix source archive

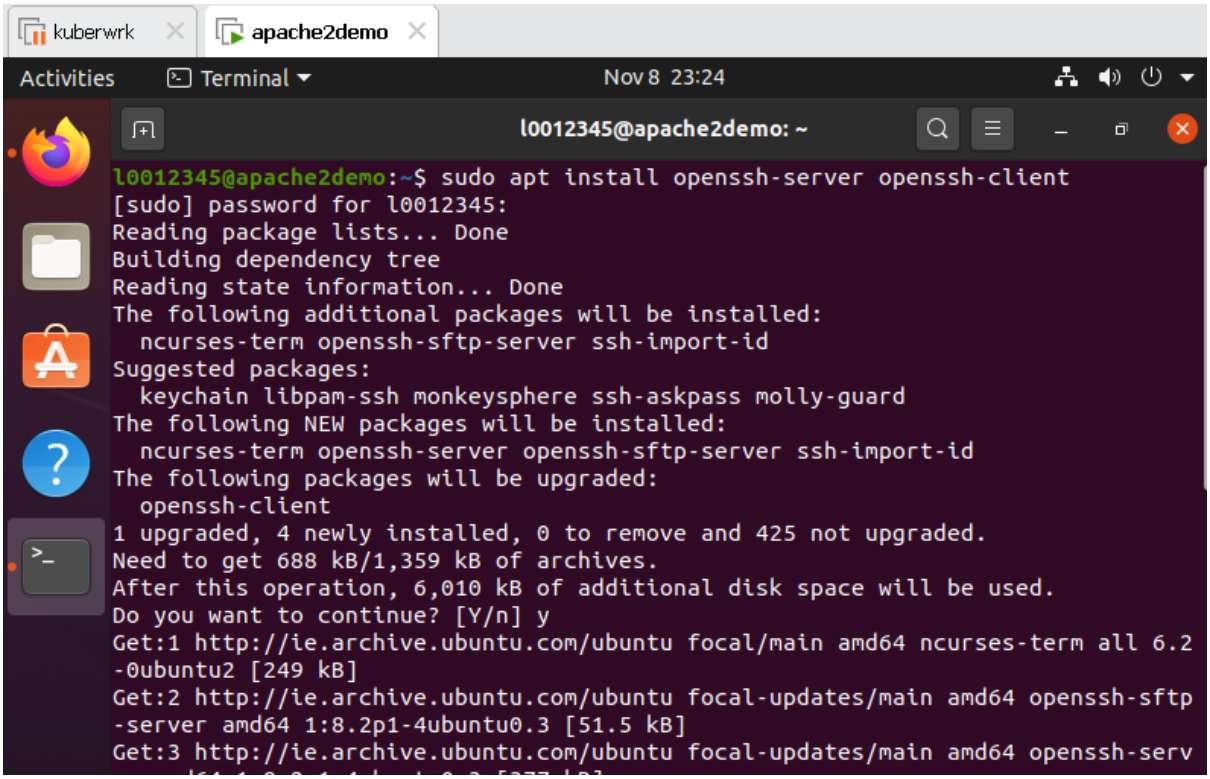
.tar.gz:	putty-0.76.tar.gz	(or by FTP)	(signature)

When installed and running correctly it should show a screen as shown below.



Once putty is installed ensure that the ssh sever is also installed on the Ubuntu server. Type:

sudo apt-get install openssh-server

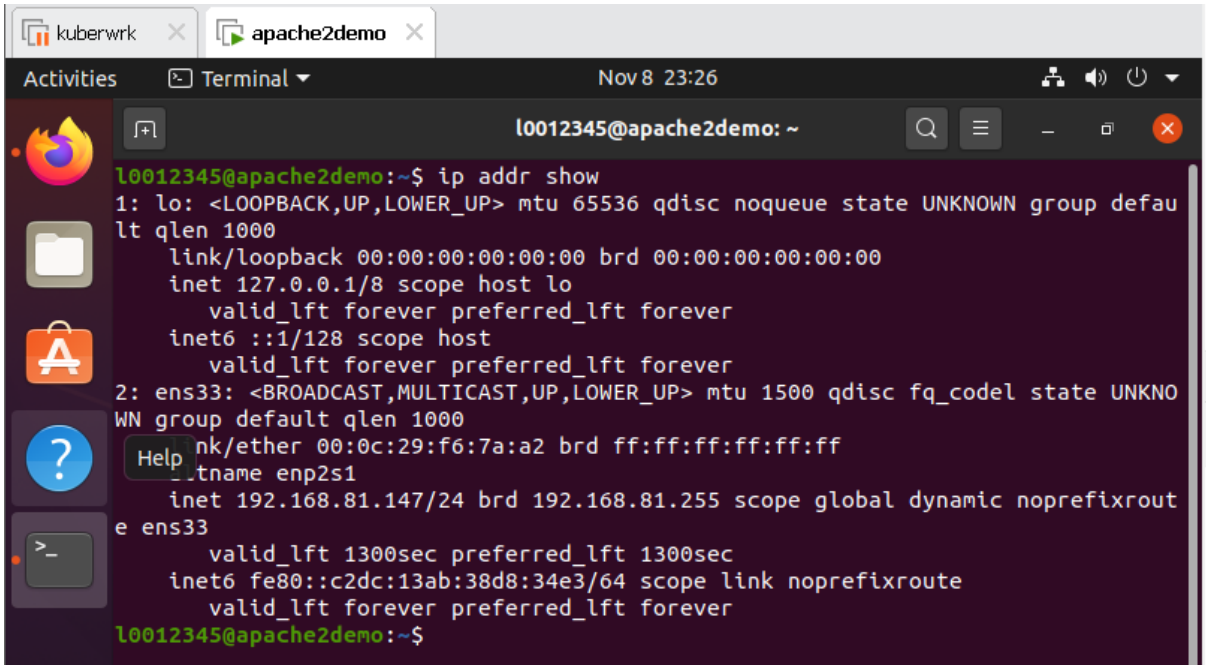


Once putty is open you are required to enter an ip address of a machine to connect to and the port to connect on.

Using the virtual machine in VMWare or Virtualbox open a command prompt referred to as a terminal. Type in the command

ip addr show

This will show the ipaddress of the virtual machine. For example, the ipaddress is 192.168.81.147. The port number is 22 for the ssh program.



Once we press open in Putty you are requested for a username and password. This is the username and password of the virtual machine. In my case that is the student number l0012345.

You know that you are logged into the virtual machine based on the prompt but you can check the ipaddress using the ifconfig command again. The ipaddress of the ssh connection should match that shown in the virtual machine.

Now that we know we have an appropriate environment configured a script can be written to test the environment.

Sample Code:

You may find the following code helpful during this assignment. Remember to change the IP address, username and password to those that you used in your machine.

```
import paramiko
import time

def ssh_connection():
    global user_file
    global cmd_file

    try:
        #selected_user_file = open(user_file,
'r')
        ip = "192.168.81.147"
        user_name="l0012345".rstrip("\n")
        user_password="l0012345".rstrip("\n")
        session = paramiko.SSHClient()

session.set_missing_host_key_policy(paramiko.Auto
AddPolicy)
        session.connect(ip.rstrip("\n"),
username=user_name, password=user_password)
        connection = session.invoke_shell()
        session.exec_command("mkdir This\n")
```