

**BITS Pilani - Hyderabad Campus**  
**CS F303 (Computer Networks)**  
**Second Semester 2023-24, Lab Sheet 3**  
**Application Layer Protocols with Cisco Packet Tracer**

## **1. Overview**

In this lab, we will see the implementation and understanding of two application layer protocols (DNS and FTP) with simulation tools Cisco Packet Tracer. The two application layer protocols are as follows:

**DNS:** The Domain Name System (DNS) is the phonebook of the Internet. When users type domain names such as 'google.com' or 'nytimes.com' into web browsers, DNS is responsible for finding the correct IP address for those sites. Browsers then use those addresses to communicate with origin servers to access website information. This all happens thanks to DNS servers: machines dedicated to answering DNS queries.

**FTP:** File transfer protocol (FTP) is a way to download, upload, and transfer files from one location to another on the Internet and between computer systems. FTP enables the transfer of files back and forth between computers or through the cloud.

## **2. Introduction to Cisco Packet Tracer**

**Cisco Packet Tracer** is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

## **3. Installation of Cisco Packet Tracer**

Go through the following steps to install Cisco packet tracer:

- Create an account on Cisco Network Academy <https://www.netacad.com/>
- Activate your account
- Go on resource table and download the packet tracer
- After Download
  - Go to the downloaded directory
  - Sudo apt update -y
  - sudo apt install ./CiscoPacketTracer\_821\_Ubuntu\_64bit.deb
  - Say yes to all the pop-ups
- Figure 1 shows the instance of installing Cisco Packet Tracer

```
Activities Terminal Jan 27 12:51
rajib@rajib-HP-Slim-Desktop-S01-pF1xxx: ~/Downloads
Reading state information... Done
125 packages can be upgraded. Run 'apt list --upgradable' to see them.
rajib@rajib-HP-Slim-Desktop-S01-pF1xxx:~/Downloads$ sudo apt install ./CiscoPacketTracer_821_Ubuntu_64bit.deb
Reading package lists... Done
Building dependency tree
Reading state information... Done
Note, selecting 'packettracer' instead of './CiscoPacketTracer_821_Ubuntu_64bit.deb'
The following packages were automatically installed and are no longer required:
chromium-codecs-ffmpeg-extra gstreamer1.0-vaapi
libgstreamer-plugins-bad1.0-0 libvo-wayland2
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  dialog libgl1-mesa-glx libxcb-xinerama0-dev
The following NEW packages will be installed:
  dialog libgl1-mesa-glx libxcb-xinerama0-dev packettracer
0 upgraded, 4 newly installed, 0 to remove and 125 not upgraded.
Need to get 243 kB/323 MB of archives.
After this operation, 1,347 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu focal/universe amd64 dialog amd64 1.3-20190808-1 [231 kB]
Get:2 /home/rajib/Downloads/CiscoPacketTracer_821_Ubuntu_64bit.deb packettracer amd64 8.2.1 [323 MB]
Get:3 http://in.archive.ubuntu.com/ubuntu focal-updates/main amd64 libgl1-mesa-glx amd64 21.2.6-0ubuntu0.1~20.04.2 [5,536 B]
Get:4 http://in.archive.ubuntu.com/ubuntu focal/main amd64 libxcb-xinerama0-dev amd64 1.14-2 [5,972 B]
Fetched 243 kB in 3s (79.1 kB/s)
Preconfiguring packages ...
Selecting previously unselected package dialog.
(Reading database ... 198381 files and directories currently installed.)
Preparing to unpack .../dialog_1.3-20190808-1_amd64.deb ...
Unpacking dialog (1.3-20190808-1) ...
Selecting previously unselected package libgl1-mesa-glx:amd64.
Preparing to unpack .../libgl1-mesa-glx_21.2.6-0ubuntu0.1~20.04.2_amd64.deb ...
Unpacking libgl1-mesa-glx:amd64 (21.2.6-0ubuntu0.1~20.04.2) ...
Selecting previously unselected package libxcb-xinerama0-dev:amd64.
Preparing to unpack .../libxcb-xinerama0-dev_1.14-2_amd64.deb ...
Unpacking libxcb-xinerama0-dev:amd64 (1.14-2) ...
Selecting previously unselected package packettracer.
Preparing to unpack .../CiscoPacketTracer_821_Ubuntu_64bit.deb ...
Unpacking packettracer (8.2.1) ...
```

Figure 1 Installing Cisco Packet Tracer

## 4. Implementation of DNS Server using Cisco Packet Tracer

Create a DNS server and connect it with a generic PC using switch. Show how you will configure your own domain name ([www.myweb.com](http://www.myweb.com)) using DNS Server configuration. Go through the following steps:

- Step 1: Create the topology and configure the DNS server with an IP address say, 192.168.0.10. Assign IPv4 address and DNS server IP address to a same IP address 192.168.0.10 as shown in Figure 2.

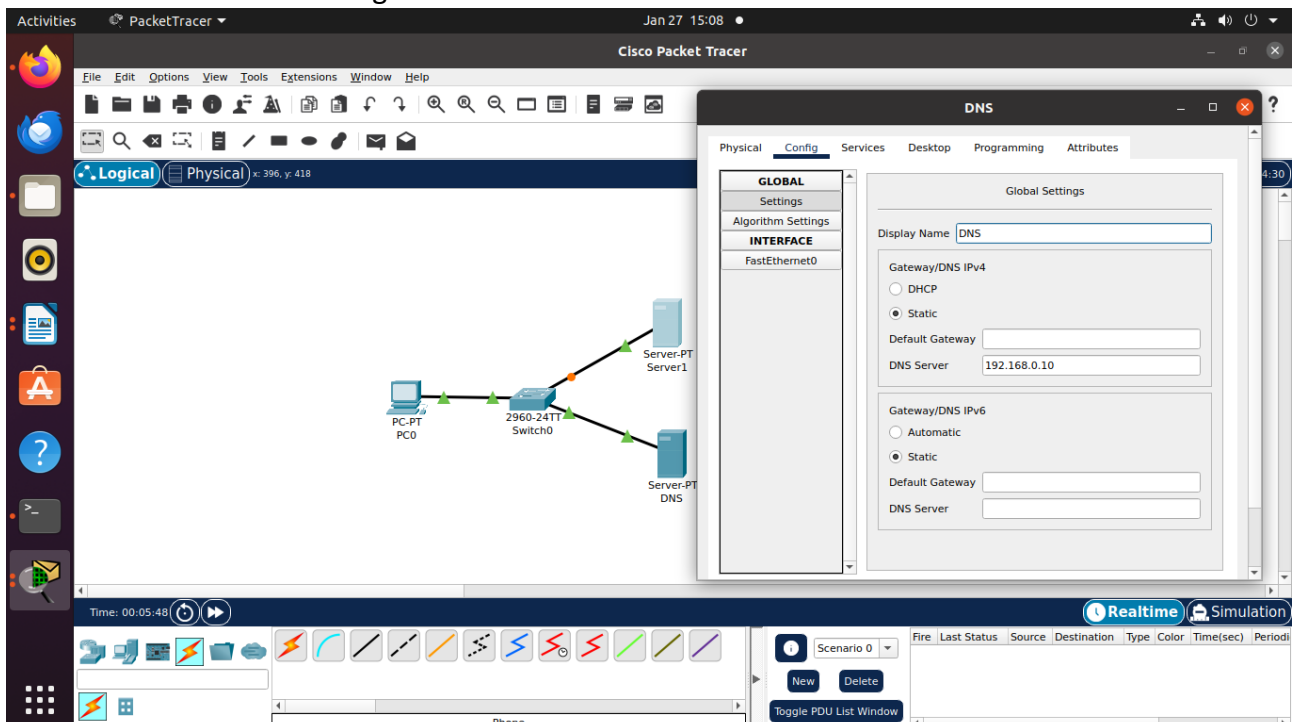


Figure 2: Setting up DNS Server

- **Step 2:** Configure PC, assign IP address as 192.168.0.1. Also, provide the IP address of DNS server (i.e., 192.168.0.10) in this PC as shown in Figures 3 and 4.

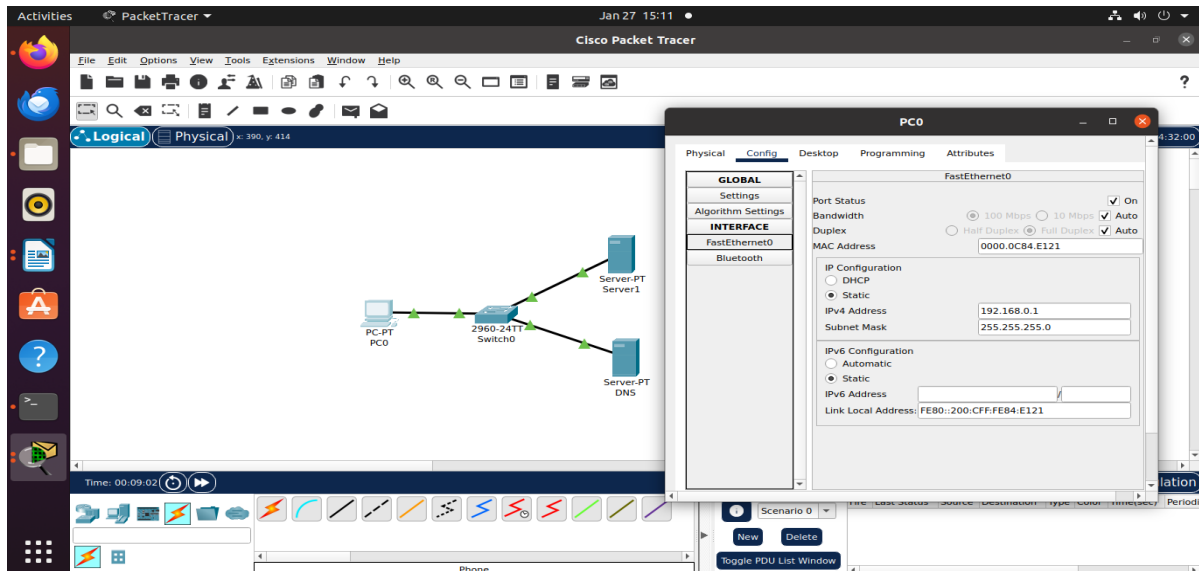


Figure 3: Setting up PC with IP address

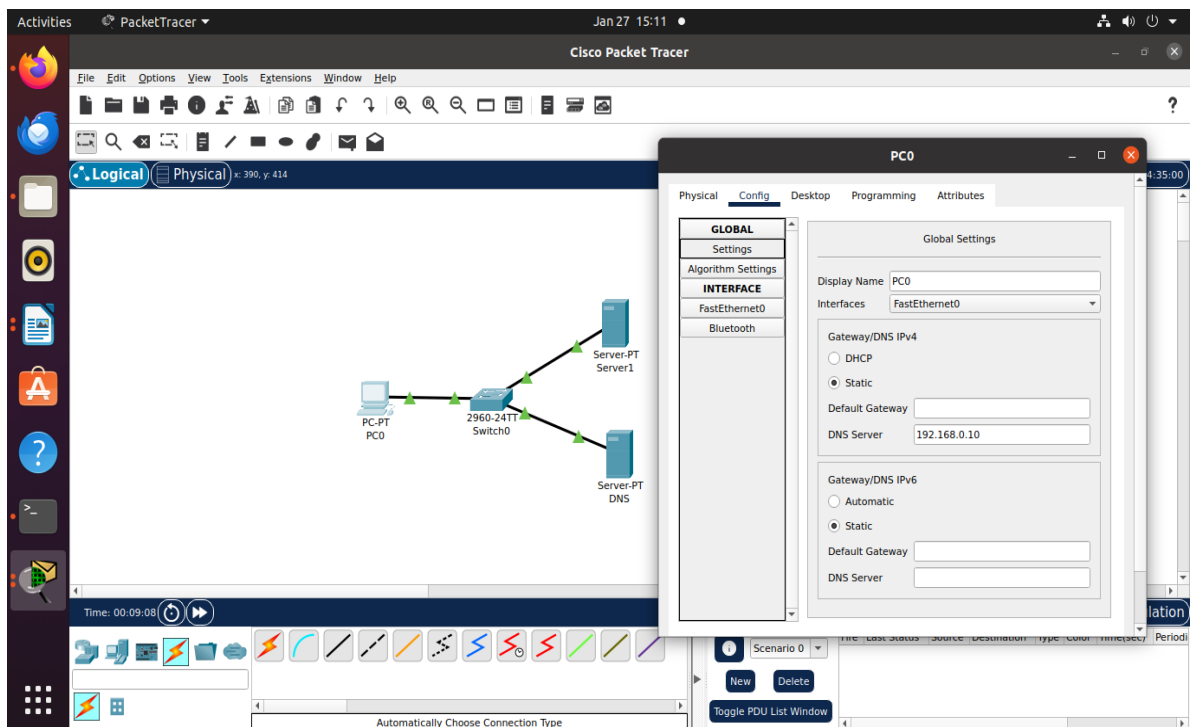


Figure 4: Setting up PC with DNS server

- **Step 3:** Get the terminal of the PC and ping the DNS server as follows: ping 192.168.0.10. If fails for the first time, then issue the command for the second time as shown in Figure 5.

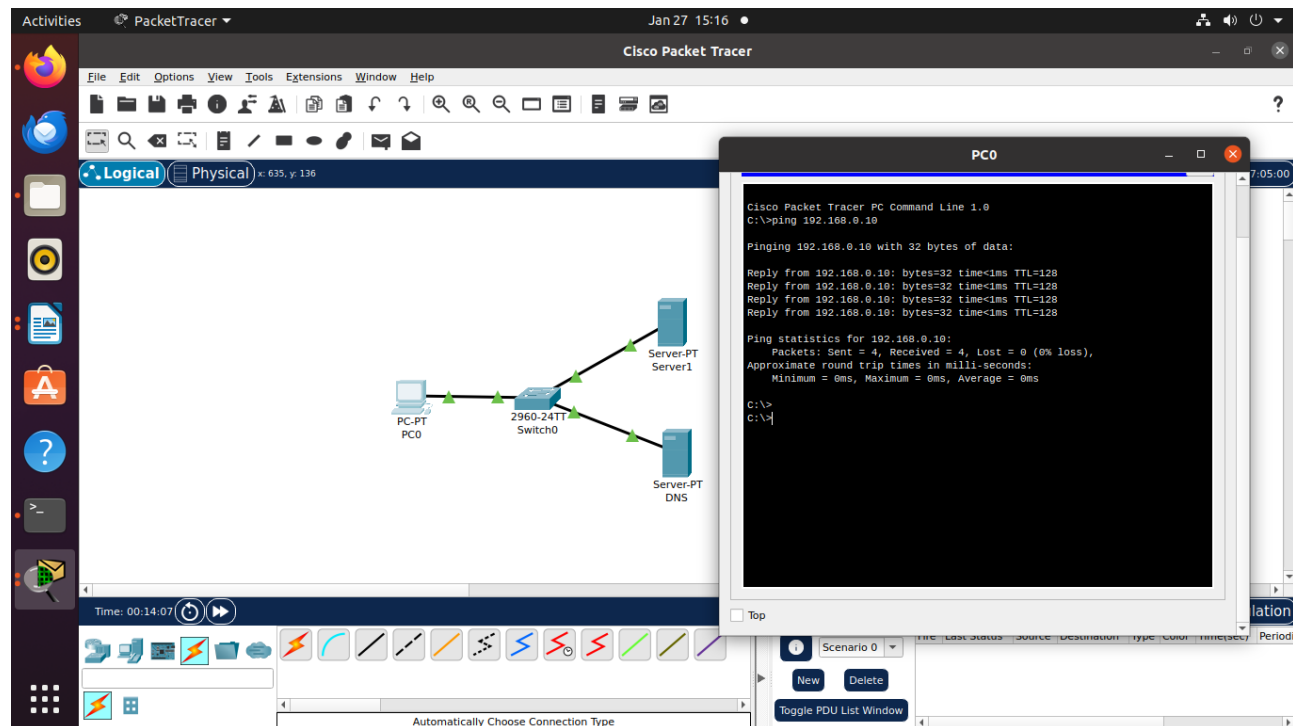


Figure 5: Ping DNS server from PC

- **Step 4:** Configure the DNS names in the DNS server. Go to Services->DNS. Switch On the DNS service and create a resource record as name = [www.myweb.com](http://www.myweb.com), type = A Record, address = 192.168.0.11. Click “add” to save the record, as shown in Figure 6.

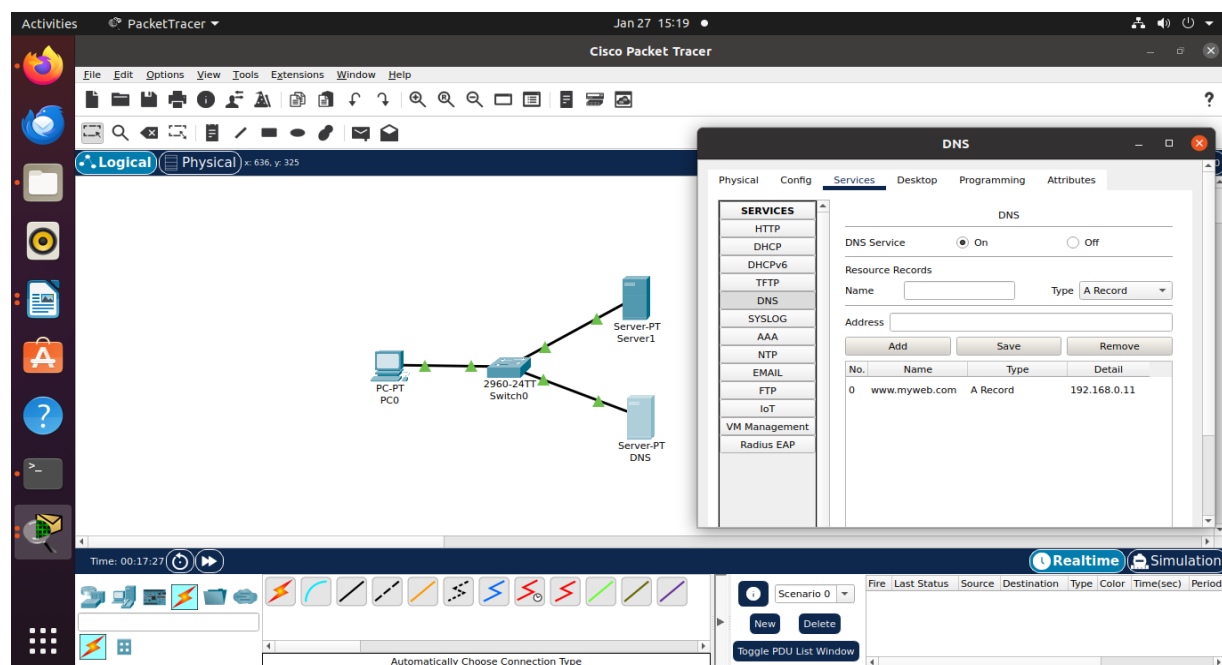


Figure 6: Setting up the DNS record

- **Step 5:** Configure the webserver with domain name as [www.myweb.com](http://www.myweb.com), assign IP address as 192.168.0.11 to this server. Go to Services->HTTP: File name is default to “index.html”, please do not change the name of this file. You may edit the content of this “index.html”, as shown in Figure 6.

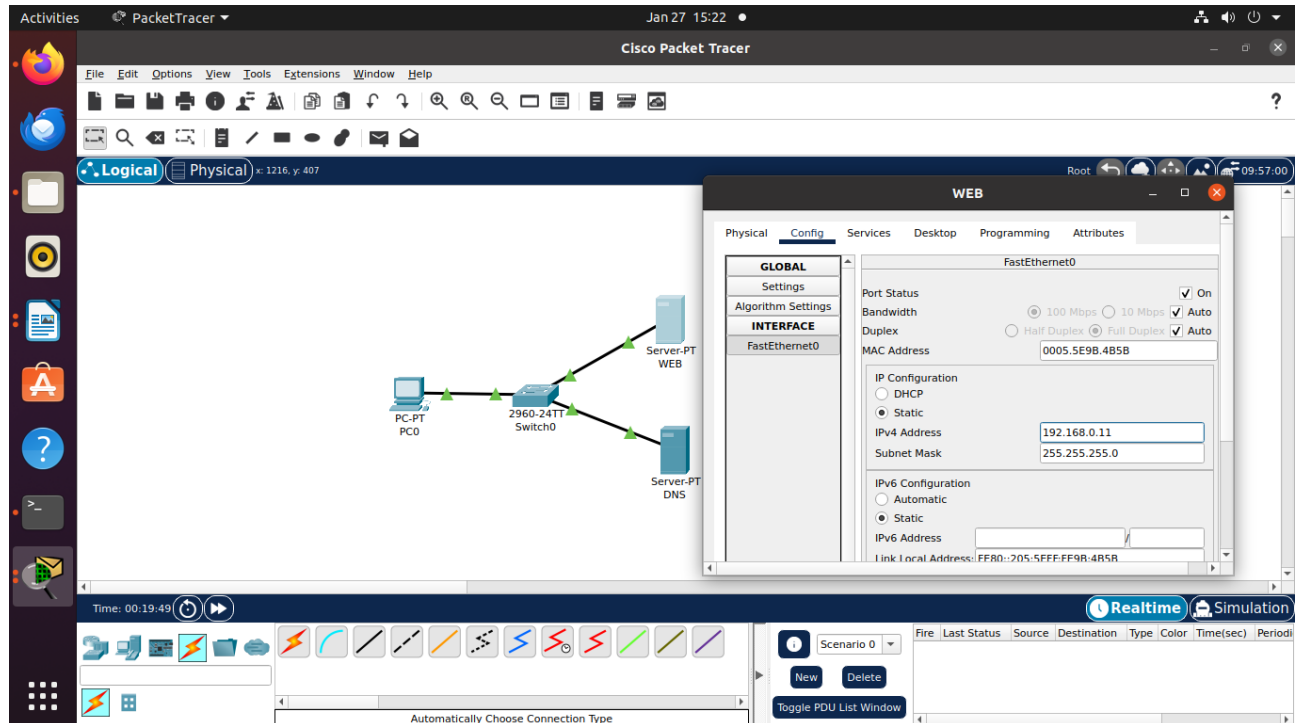


Figure 6: Setting up the WEB server

- **Step 6:** Go to PC and go to Desktop->Web Browser->put [www.myweb.com](http://www.myweb.com) in the address bar. A successful experiment will show the html page in the browser, the content is what is mentioned in the “index.html”, as shown in Figure 7 and 8.

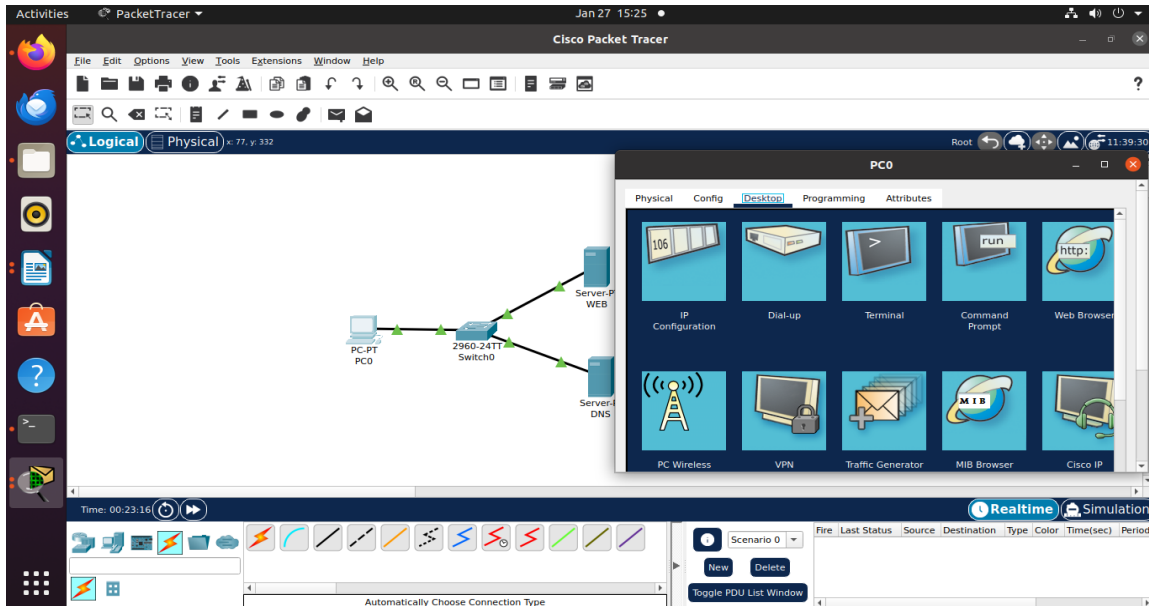


Figure7 Setting up the webpage

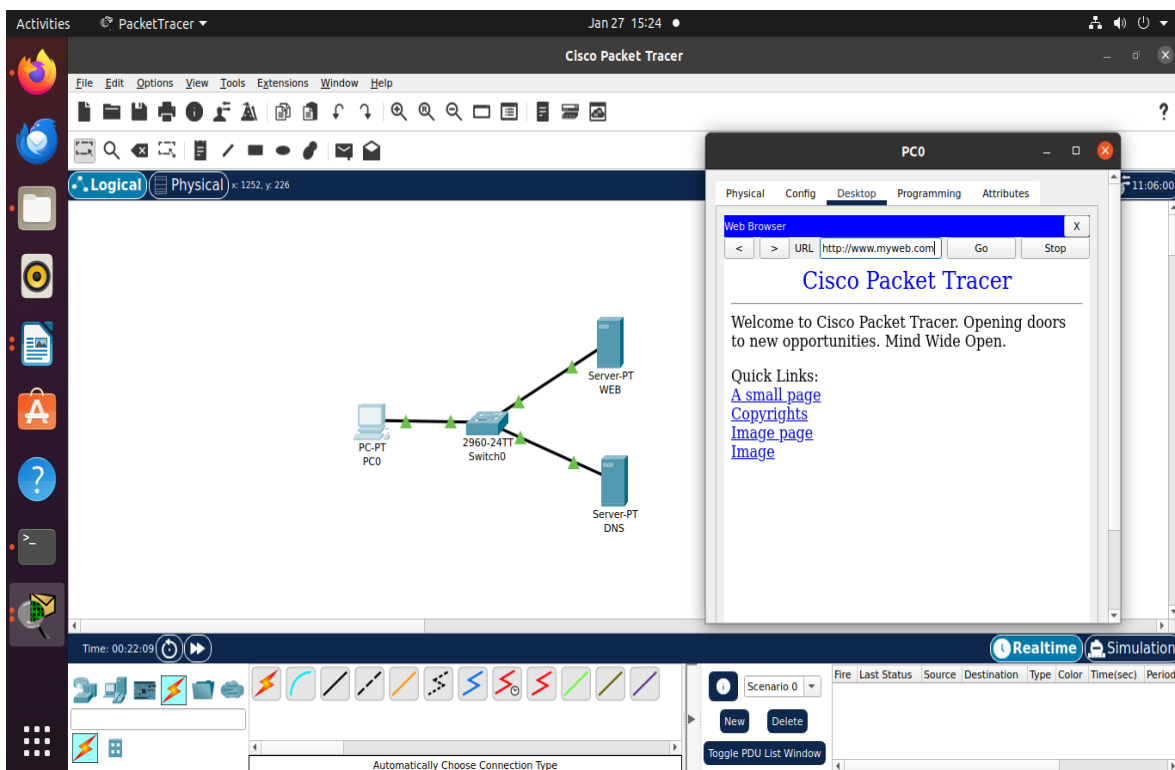


Figure8 : Go to URL

## 5. Implementation of FTP Server using Cisco Packet Tracer

Create a FTP server and connect it with a generic PCs. Create username and password for FTP server. Show how you will access FTP server from PC. Follow these steps:

- **Step 1:** Create the following topology using one FTP server, two PCs and one switch, as shown in Figure 9.

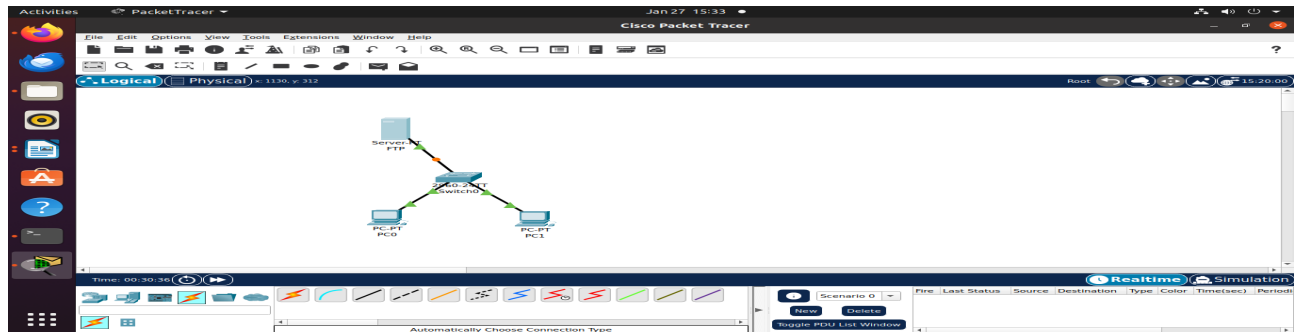


Figure9: Topology for FTP server setup

- **Step 2:** Configure PC0 to have an ip address as 192.168.0.1 having default to 192.168.0.10. Go to Desktop -> Interface, as shown in Figure 10 and 11.

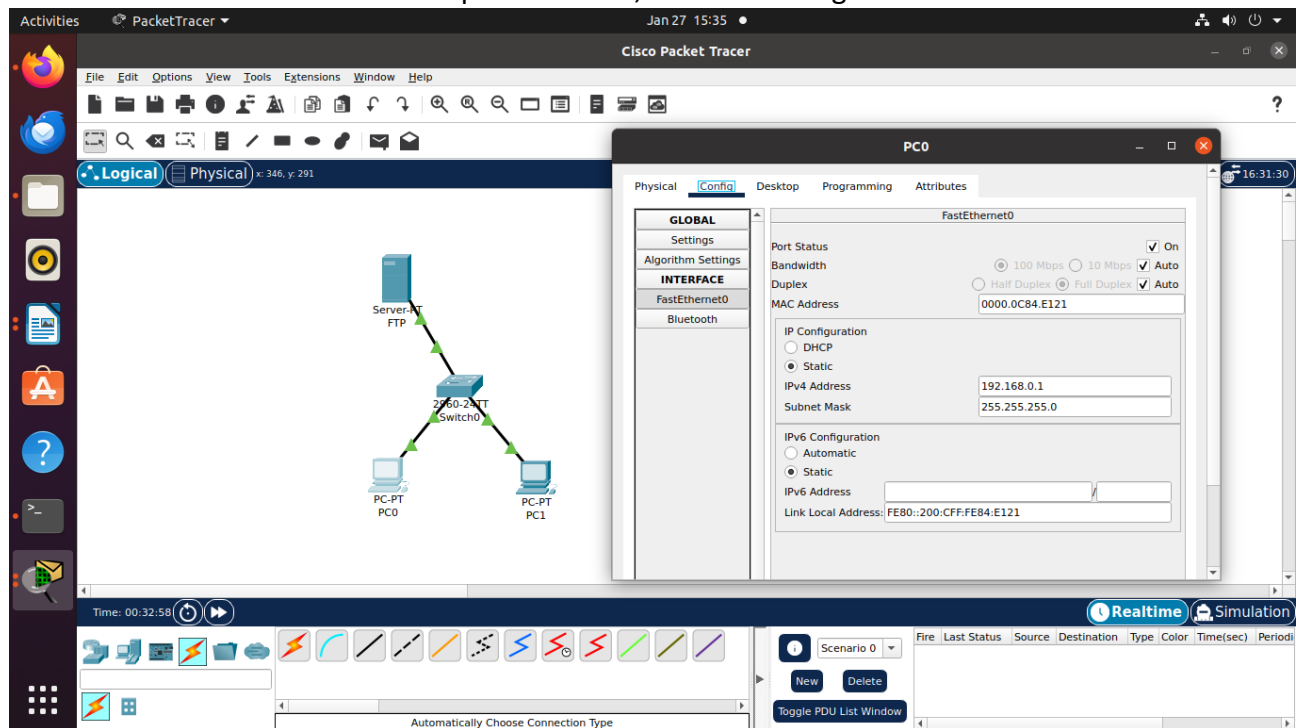


Figure10: Setting ip address for PC0

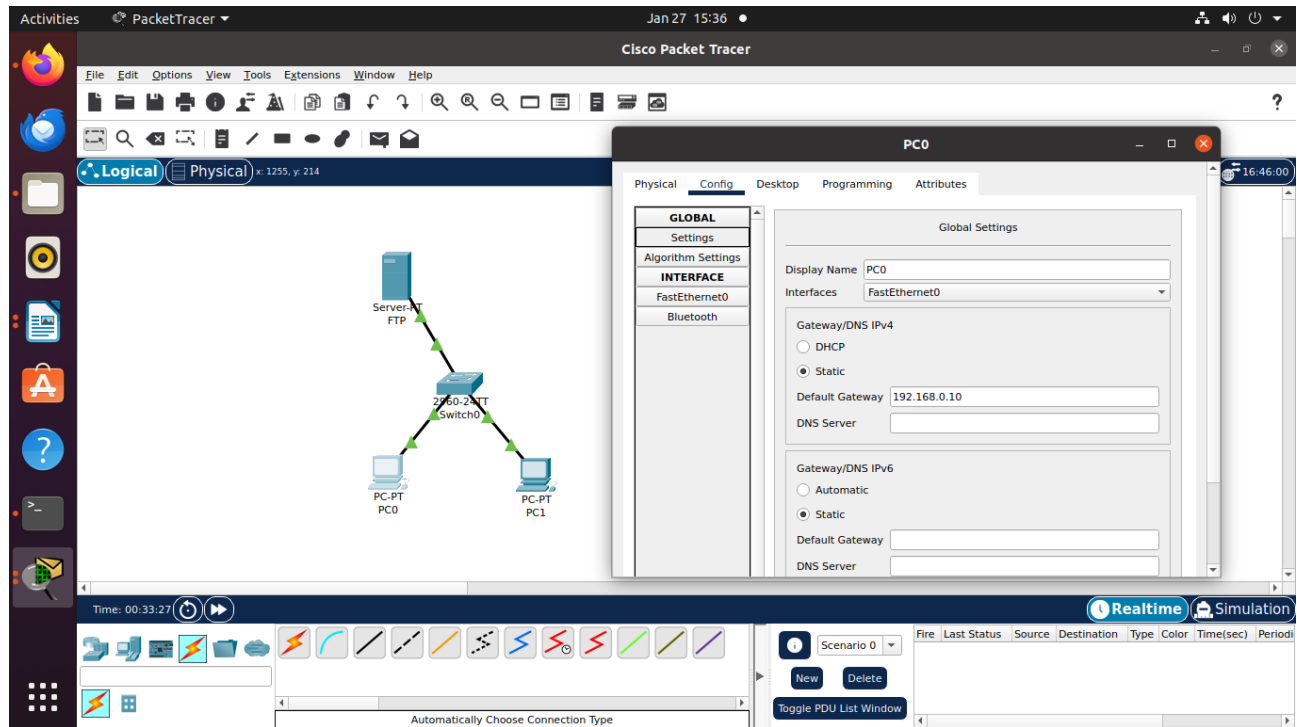


Figure10: Default gateway for PC0

- **Step 3:** configure PC1 with ip address 192.168.0.2 and default gateway as 192.168.0.10. **Similar to Figure 10 and 11.**
- **Step 4:** Configure the server with IP address as 192.168.0.10 and default gateway as 192.168.0.10. Go to Desktop -> IP configuration -> select "Static", as shown in Figure 12.



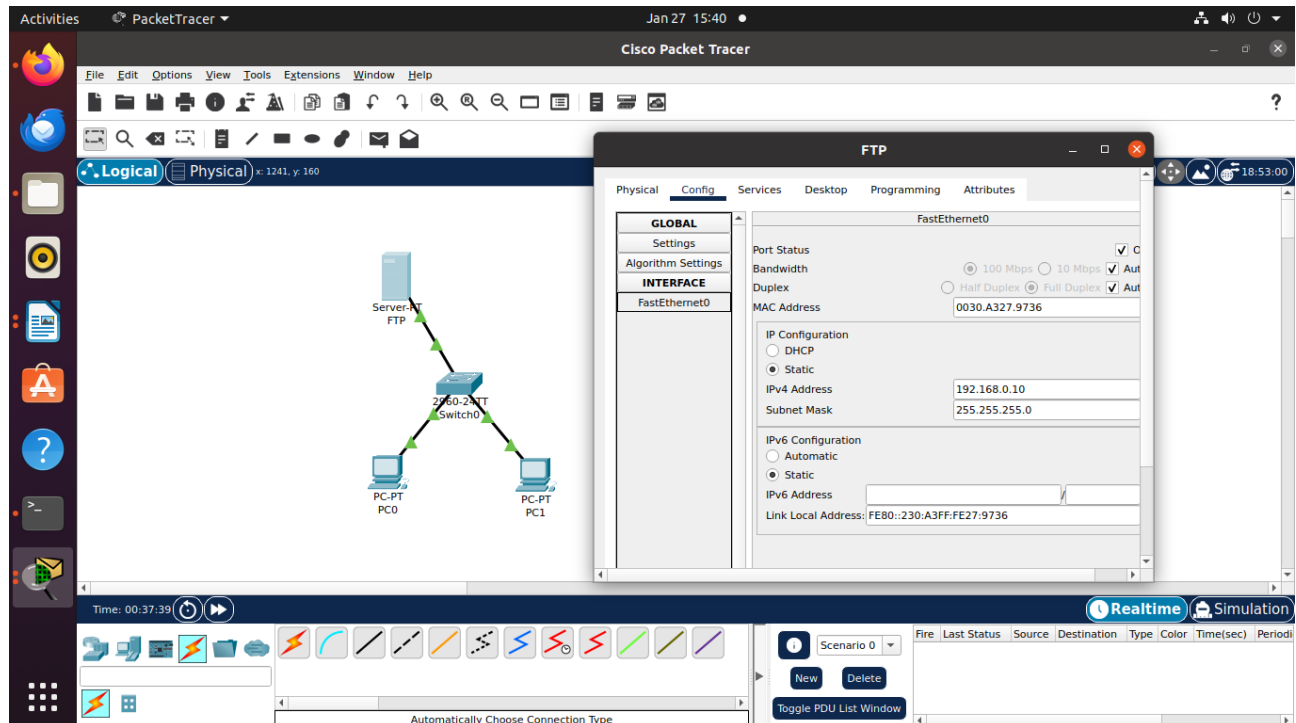


Figure12: Setting ip address to FTP server

- **Step 5:** Enable services in server. Go to Services -> FTP. Services = On, User Setup: username as "bits" and password as "bits" for example. Enable all the permissions : write, read, delete, rename and list. Click add as shown in Figure 13.

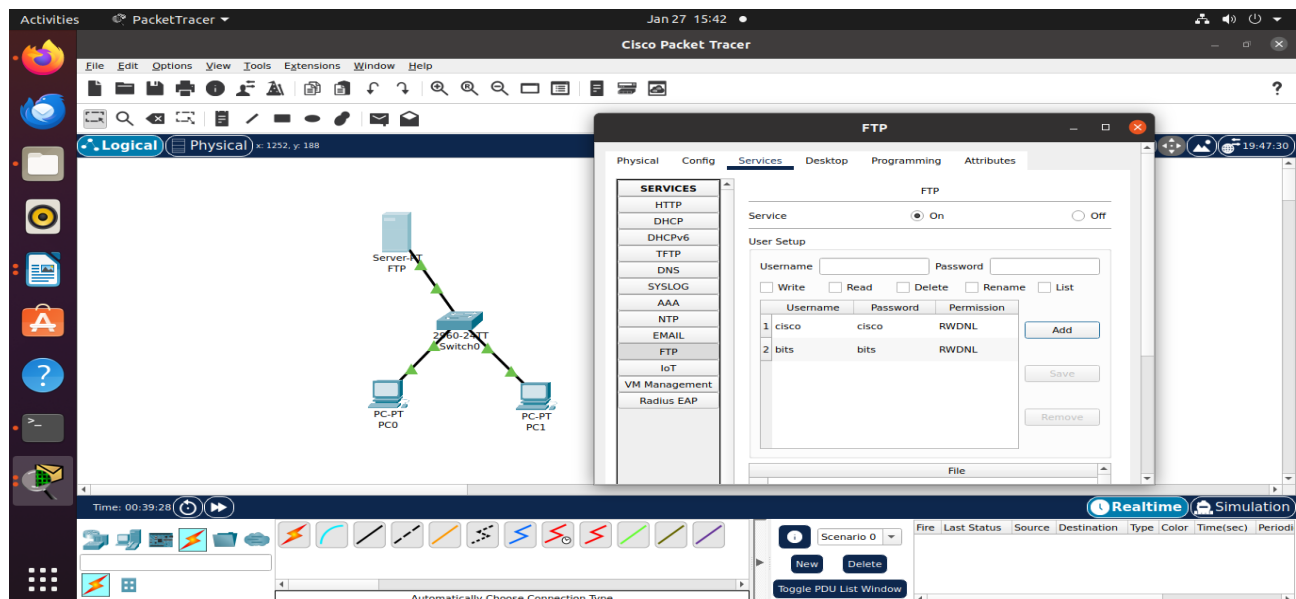


Figure13: Setting up FTP service

- **Step 6:** Go to PC1 -> Desktop -> command prompt, as shown in Figure 14 and 15. Commands:
  - ping 192.168.0.10
  - [ftp 192.168.0.10](#)

- Username: bits
- Password: bits
- Use ftp commands like “dir” and rename a file

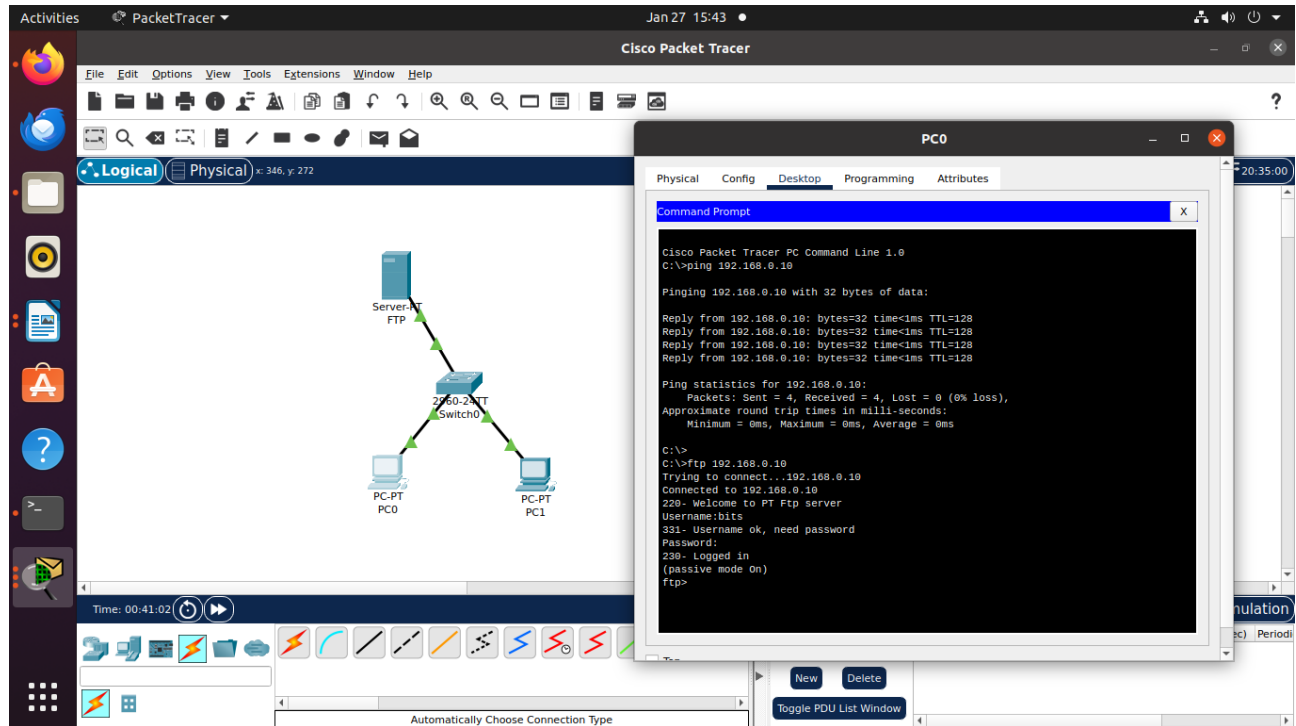


Figure14: Connect to FTP

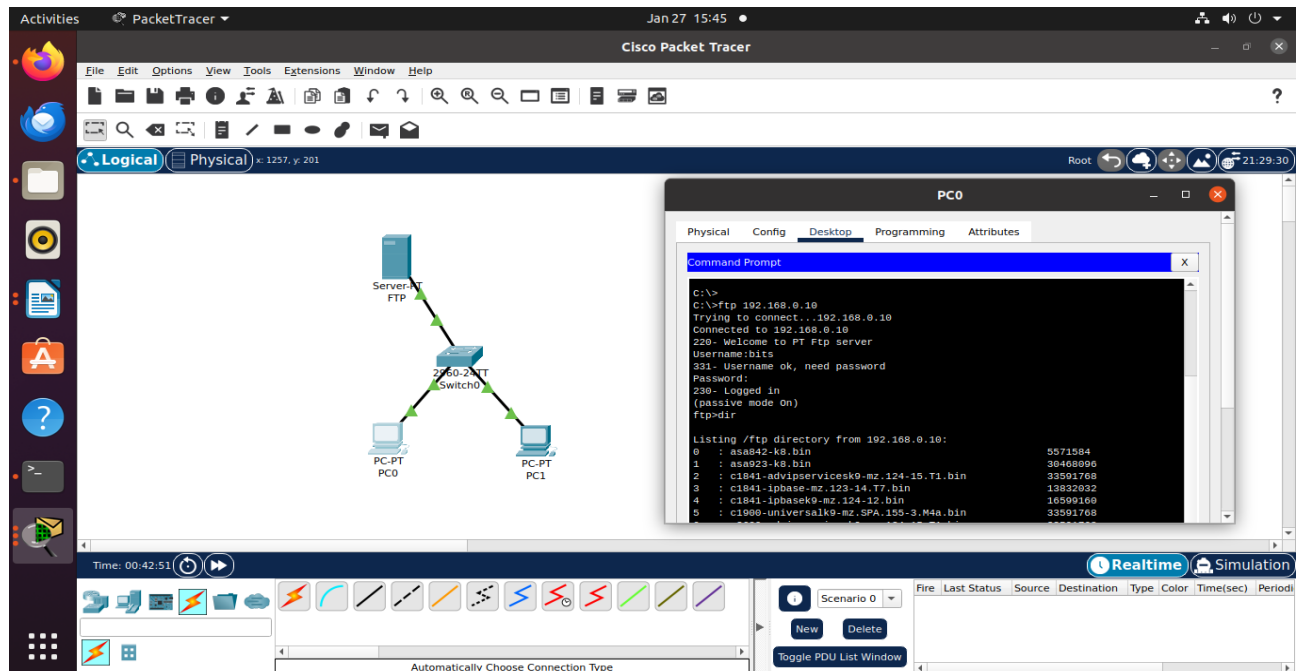


Figure15: listing the directories

## 6. Lab Exercise

Create a below topology. It contains 1 PC, 2 FTP servers, 1 DNS sever. Connection as shown in below Figure 16.

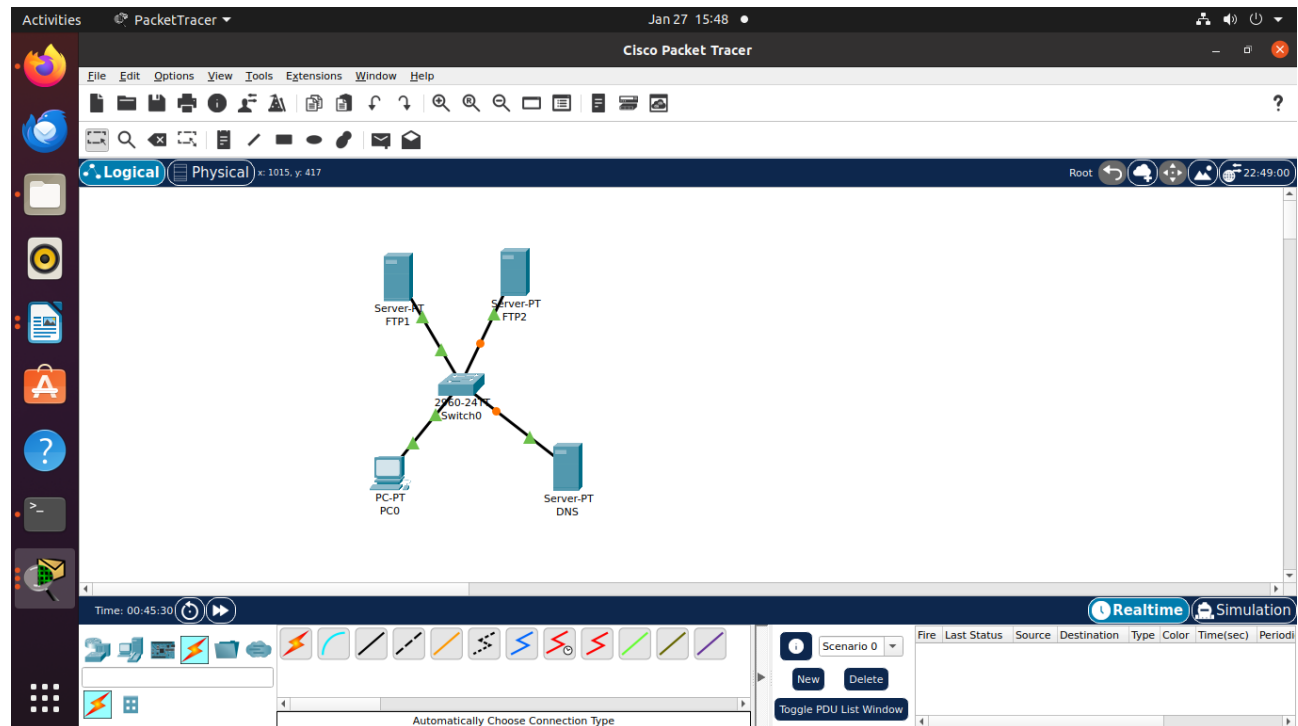


Figure16: Topology for the exercise

Now create two users (U0, U1) on each FTP server ([www.myftp1.com](http://www.myftp1.com), [www.myftp2.com](http://www.myftp2.com)) such that:

- On [www.myftp1.com](http://www.myftp1.com), U0 has permissions like write, delete and list and U1 has the permissions like read and rename.
- On [www.myftp2.com](http://www.myftp2.com), U0 has permissions like write, read and list. U1 has the permissions like delete, rename and list.

Now understand and analyse the outputs using the following:

- Apply list command after connecting with [www.myftp1.com](http://www.myftp1.com) from PC0 for U0.
- Apply read command after connecting with [www.myftp1.com](http://www.myftp1.com) from PC0 for U1.
- Apply write command after connecting with [www.myftp2.com](http://www.myftp2.com) from PC0 for U0.
- Apply rename command after connecting with [www.myftp2.com](http://www.myftp2.com) from PC0 for U0.