Communications & Network Fundamentals
CIS 315
Academic Year (2022-2021) – First Semester

BY

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Smart Library using Packet Tracer

Project Goals:

A smart library can be defined as libraries that use technology to become more operationally efficient, improve management, enhance innovation, protect visitors and employees, improve productivity, and reduce their environmental impact. As health and security protection is important in the library because it aims to protect people from accidents that may cause injuries or damage to property.

For example, providing a secured network in the library that allows visitors to search for the information they want through protected servers, Also, when people want to share information from one device to another, we ensure that it does not go to the wrong device. Finally, our library model depends on technology, where all the scientific resources that a person wants will be available on the devices, and there are also some robots that will help visitors.

Problem Statement:

Some libraries face challenges in the design of the network in terms of data loss or lack of access, so the visitor is always looking for security from a technical point of view to ensure that he is not spying and stealing his information, and backups to avoid losing his information. It also faces insecurity in terms of not having a fire alarm. Also, pressure on the libraries sometimes may lead to the lack of full access to the information due to the weakness of the network.

ABSTRACT:

We'll demonstrate a library network setup using mesh topology, which has the advantage of providing each system with a dedicated point-to-point connection to every other device. This helps us preserve patients' privacy by ensuring that only the intended receiver sees each communication as it travels down a dedicated line, reducing traffic congestion. Mesh is resilient because if one link fails, the system as a whole is not affected..

Topology.
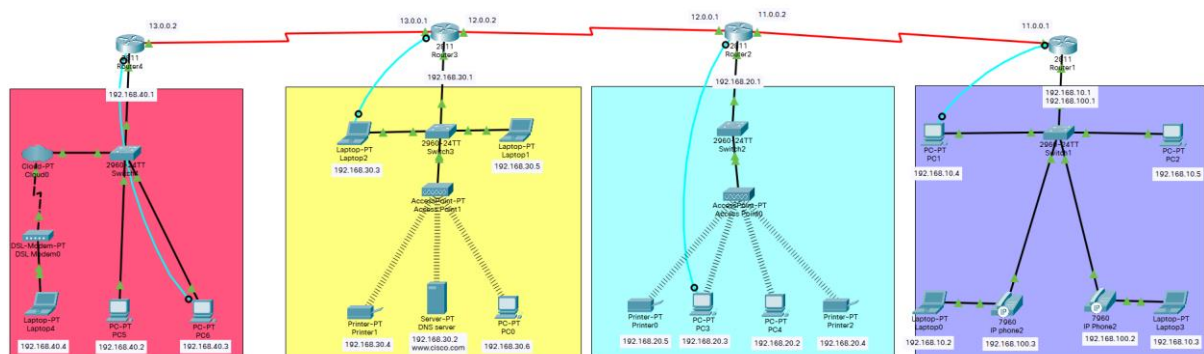
1- Topology Requirements

Device	Quantity
Laptop	5
printer	3
Access point	1
PC	7
Switches	4
Routers	4
Serial cables	3
Straight-through cables	13
IP Phone	2
Phone cable	1
Consul cable	2
Server	1
DSL modem	1
Cloud	1

2- Addressing table:

We began by configuring our equipment to fit the topology of our network. After that, we completed the network's addressing table. Following the completion of the addressing table, we began configuring our routers and other devices in accordance with it.

Device	Interface	IP Address	Subnet Mask	Default Gateway
Router1	Serial 1/0	11.0.0.1	255.255.255.0	-
Router1	F0/0.10	192.168.10.1	255.255.255.0	-
Router1	F0/0.100	192.168.100.1	255.255.255.0	-
Router2	Serial 1/0	11.0.0.2	255.255.255.0	-
Router2	Serial 1/1	12.0.0.1	255.255.255.0	-
Router2	F0/0.20	192.168.20.1	255.255.255.0	-
Router3	Serial 1/0	12.0.0.2	255.255.255.0	-
Router3	F0/0.30	192.168.30.1	255.255.255.0	-
Router3	Serial 1/1	13.0.0.1	255.255.255.0	-
Router4	Serial 1/0	13.0.0.2	255.255.255.0	
Router4	F1/0	192.168.40.12	255.255.255.0	-
PC0	F0	192.168.30.6	255.255.255.0	192.168.30.1
PC1	F0	192.168.10.4	255.255.255.0	192.168.10.1
PC2	F0	192.168.10.5	255.255.255.0	192.168.10.1
PC3	Wireless	192.168.20.3	255.255.255.0	192.168.20.1
PC4	Wireless	192.168.20.2	255.255.255.0	192.168.20.1
PC5	F0	192.168.40.2	255.255.255.0	192.168.40.1
PC6	F0	192.168.40.3	255.255.255.0	192.168.40.1
Laptop0	F0	192.168.10.2	255.255.255.0	192.168.10.1
Laptop1	F0	192.168.30.5	255.255.255.0	192.168.30.1
Laptop2	F0	192.168.30.3	255.255.255.0	192.168.30.1
Laptop3	F0	192.168.10.3	255.255.255.0	192.168.10.1
Printer0	Wireless	192.168.20.5	255.255.255.0	192.168.20.1
Printer1	F0	192.168.30.4	255.255.255.0	192.168.30.1
Printer2	Wireless	192.168.20.4	255.255.255.0	192.168.20.1
DNS server	F0	192.168.30.2	255.255.255.0	192.168.30.1
IP phone1	Switch	192.168.100.2	-	192.168.100.1
IP phone2	Switch	192.168.100.3	-	192.168.100.1

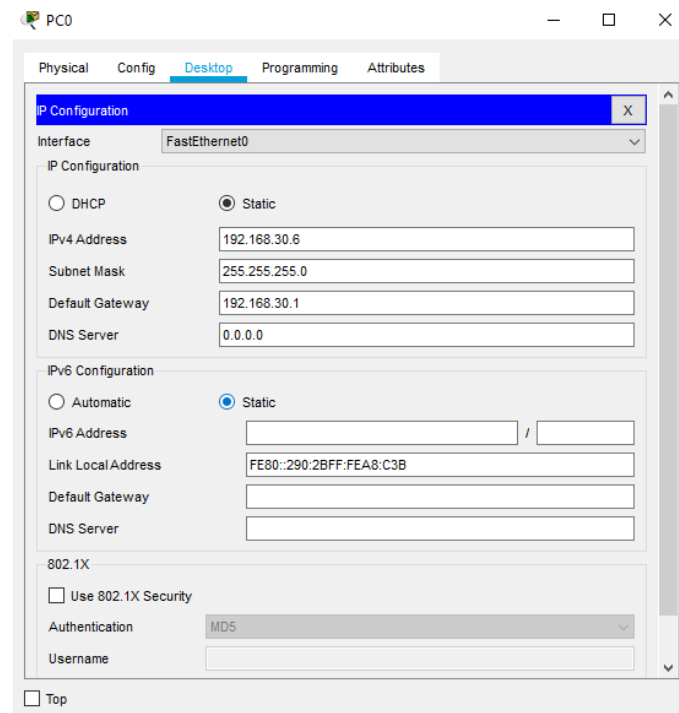## 3- **Assign static IP Address to the PC's.**

Configure the IP Address Subnet mask and Default gateway setting on PC's:

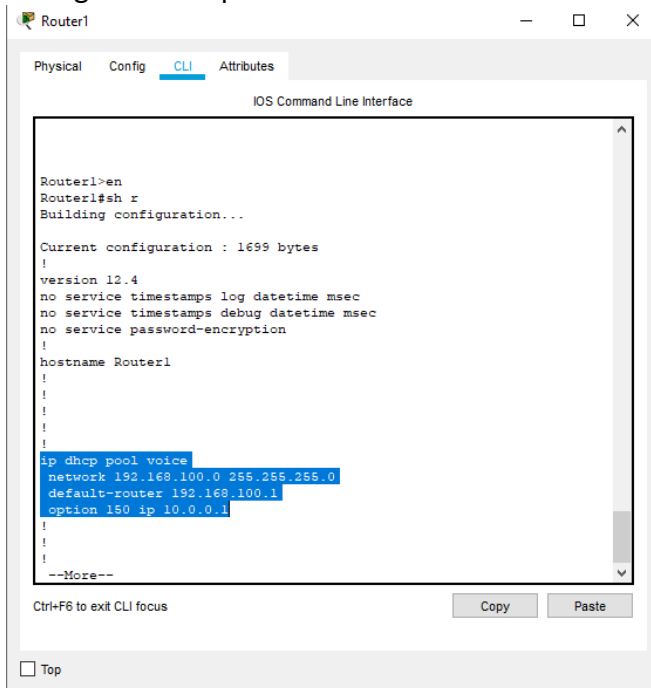Open the PC

And click IP configuration
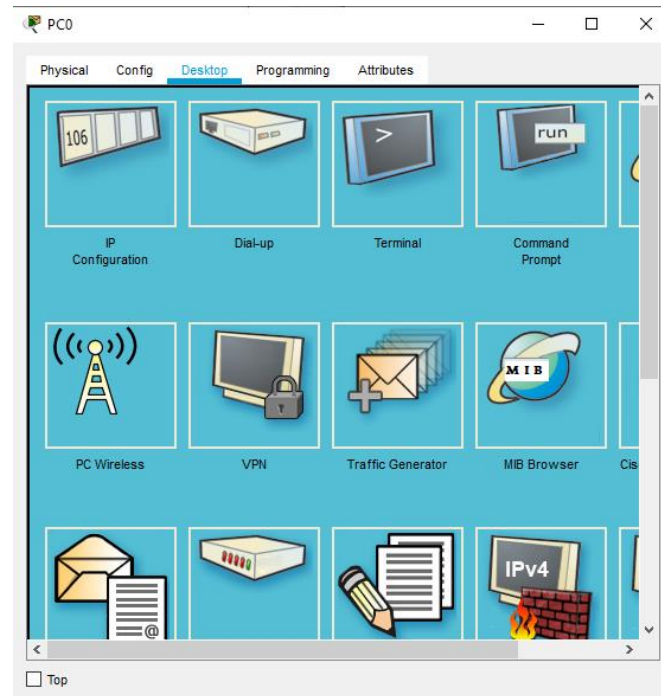
Set the IP address, subnet mask and gateway.

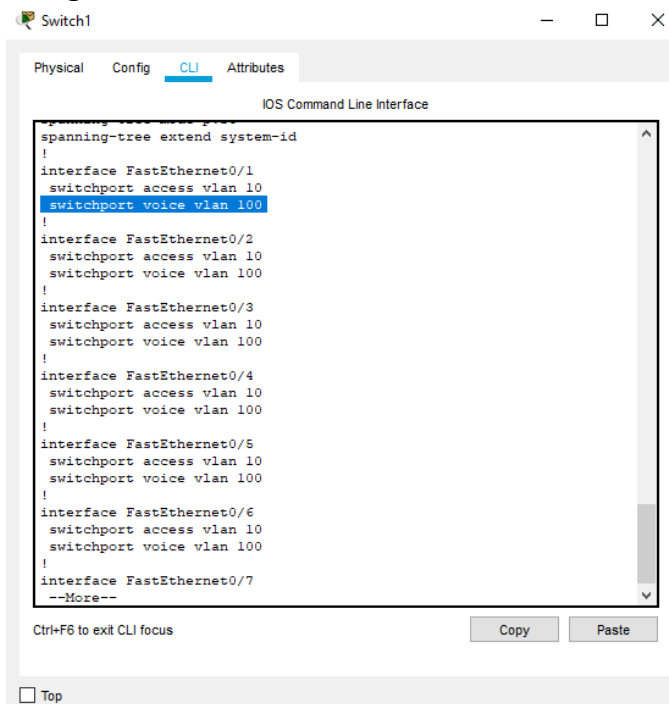## 4- Creating the VOIP

Configure DHCP pool on Router1

Assign Voice VLAN in switch1:

Configure the Call Manager on Router3.
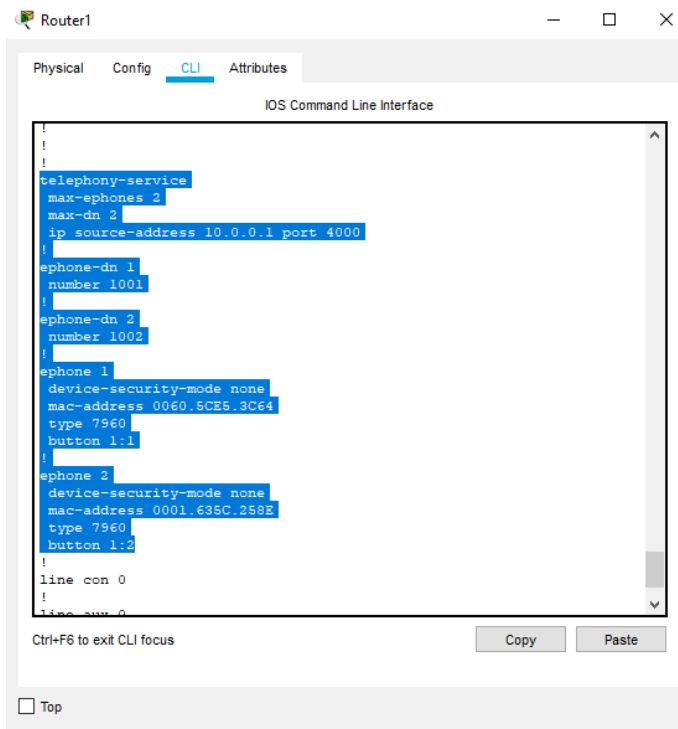
Sample Call
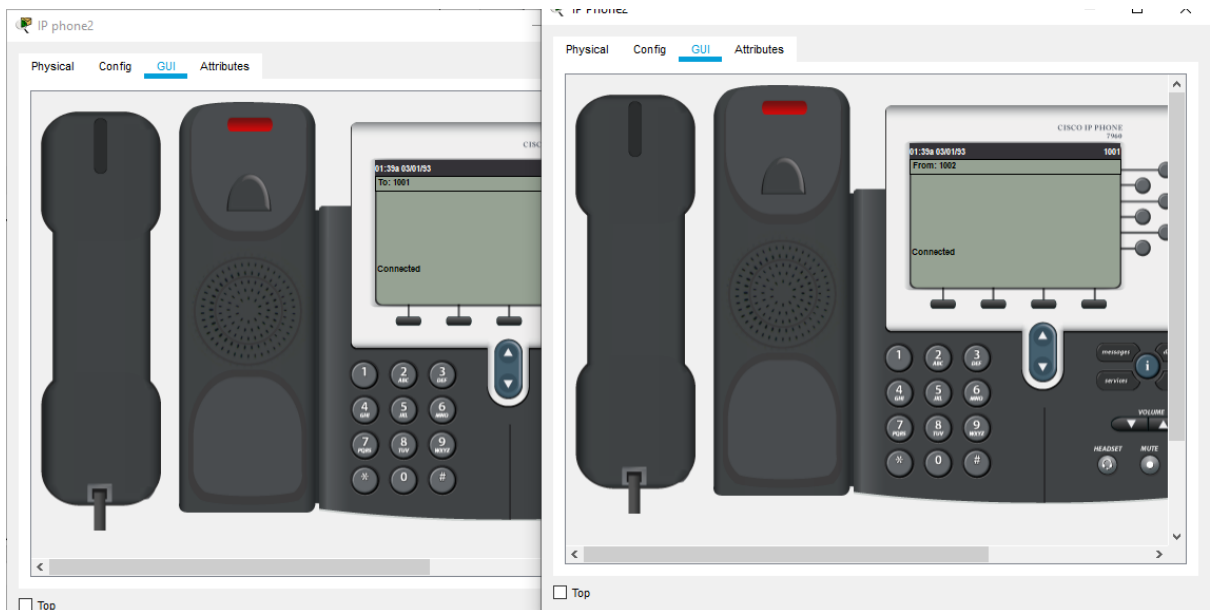
5- Configure Static Routes

Router1:

Using Static route:

```
Router1(config)#ip route 192.168.20.0 255.255.255.0 11.0.0.2
Router1(config)#ip route 192.168.30.0 255.255.255.0 11.0.0.2
Router1(config)#ip route 192.168.40.0 255.255.255.0 11.0.0.2
```

Router2:

```
Router2(config)#ip route 192.168.10.0 255.255.255.0 11.0.0.1
Router2(config)#ip route 192.168.30.0 255.255.255.0 12.0.0.2
Router2(config)#ip route 192.168.40.0 255.255.255.0 12.0.0.2
Router2(config)#ip route 192.168.100.0 255.255.255.0 12.0.0.2
```

Router3:

```
Router3(config)#ip route 192.168.10.0 255.255.255.0 12.0.0.1
Router3(config)#ip route 192.168.100.0 255.255.255.0 12.0.0.1
Router3(config)#ip route 192.168.20.0 255.255.255.0 12.0.0.1
Router3(config)#ip route 192.168.40.0 255.255.255.0 13.0.0.2
```

Router4:

```
Router4(config)#ip route 192.168.30.0 255.255.255.0 13.0.0.1
Router4(config)#ip route 192.168.20.0 255.255.255.0 13.0.0.1
Router4(config)#ip route 192.168.10.0 255.255.255.0 13.0.0.1
Router4(config)#ip route 192.168.100.0 255.255.255.0 13.0.0.1
```

Show routing table for router1:

We will do the same for router 2 ,3and4

Test connection:

Ping laptop3 with IP 192.168.10.3 and PC5 with IP 192.168.20.3

Laptop3   —   □   X

Physical   Config   Desktop   Programming   Attributes

Command Prompt   X

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.20.3

Pinging 192.168.20.3 with 32 bytes of data:

Reply from 192.168.20.3: bytes=32 time=26ms TTL=126
Reply from 192.168.20.3: bytes=32 time=11ms TTL=126
Reply from 192.168.20.3: bytes=32 time=15ms TTL=126
Reply from 192.168.20.3: bytes=32 time=11ms TTL=126

Ping statistics for 192.168.20.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 11ms, Maximum = 26ms, Average = 15ms

C:\>
```

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6- Configure Access point

assign the SSID name and password:
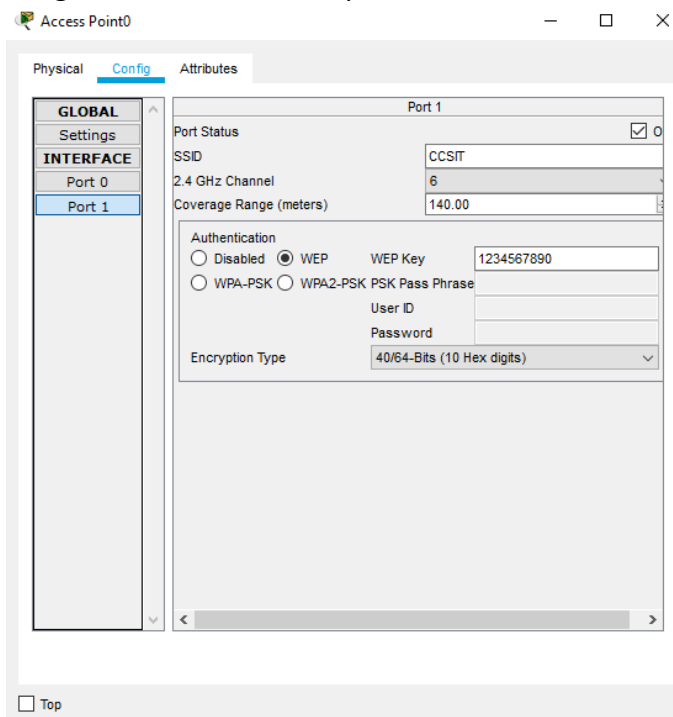
Open the PC and click wireless

Enter the SSID name and password:
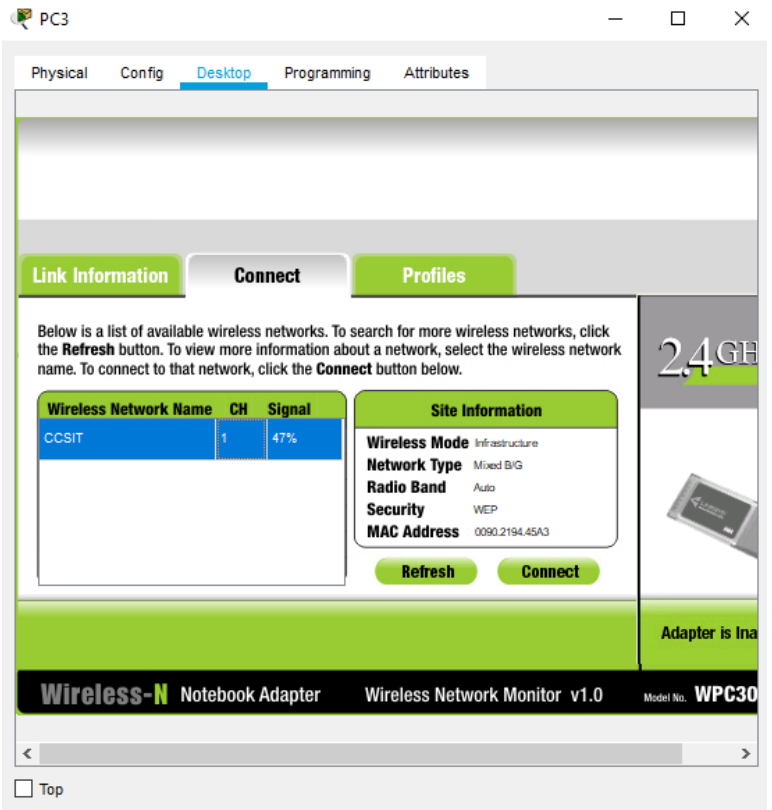
7- Configure DNS server

Click services and choose DNS:
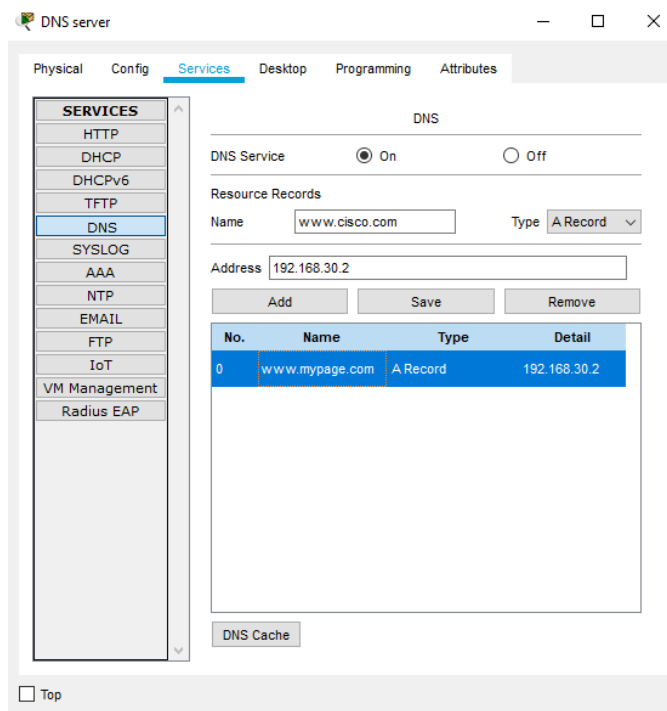
Add the name for the DNS
Set the IP address
And click add then click on
Open the Browser
And type http://192.168.30.2
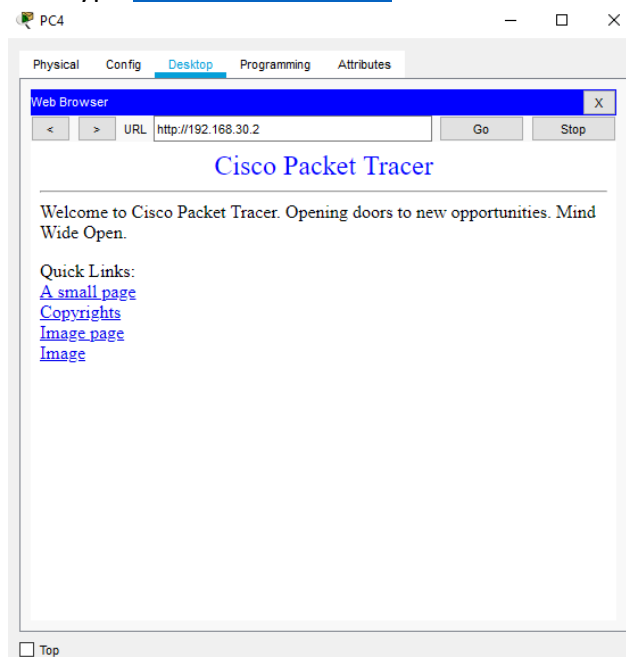
the web site its work.

8- Configure DSL modem

First connect the cloud to the switch
Next connect the DSL modem to the cloud

And connect any device to the DSL modem

Open the cloud

Cloud-PT
Cloud0

SL-Modem-PT
DSL Modem0

Laptop-PT
Laptop4

192.168.40.4

Cloud0   —   □   ✕

Physical   Config   Attributes

GLOBAL	
Settings	
TV Settings	
CONNECTIONS	
Frame Relay	
DSL	
Cable	
INTERFACE	
Serial0	
Serial1	
Serial2	
Serial3	
Modem4	
Modem5	
Ethernet6	
Coaxial7	

DSL

Modem4 ⌄   <->   Ethernet6 ⌄
Port   Port

From Port	To Port
Modem4	Ethernet6

Add   Remove

☐ Top
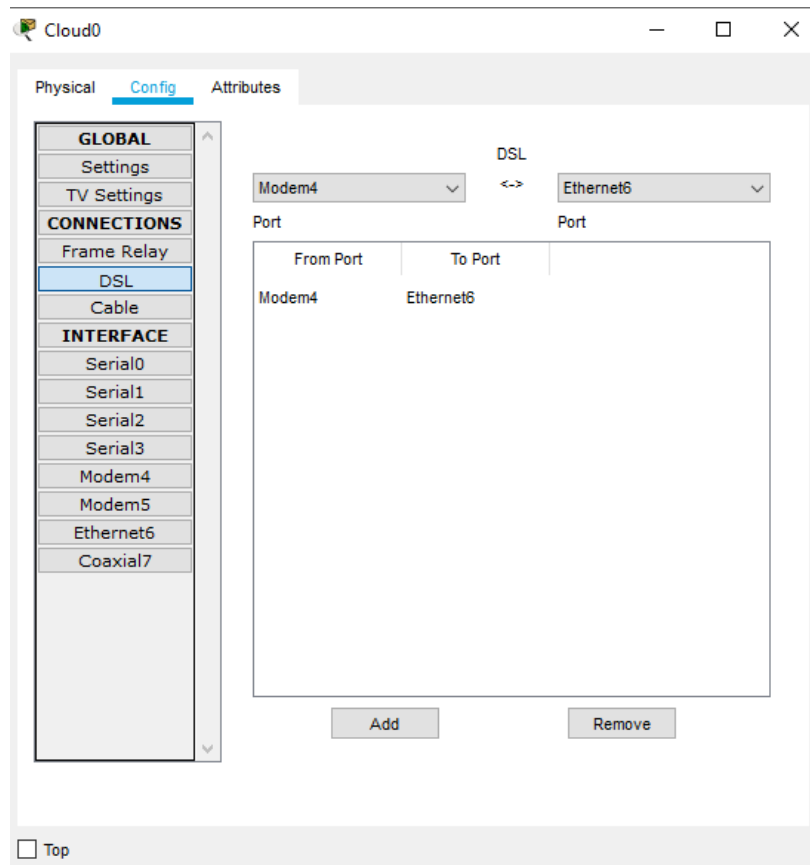
Click on DSL and click add

Now the DSL modem work

9- capture

ip address sender : 192.168.20.2
ip address receiver : 192.168.20.3