East West University

Project Report

PROJECT TITLE: Design a full-fledged network for an organization with multiple subnets.

COURSE CODE: CSE 405

SEC: 02

Prepared By

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Prepared for

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Problem specification:

University of Scholars, is an enterprise like East West University, owns many computers, with a complex network infrastructure. Apart from wired internet access to all the classrooms, labs, employee PCs, library and other administrative and academic wings, the university also provides wireless internet access for every campus. On top of that, the university runs a complex networked system to support several of its business processes like admissions, advising, results, e-tender, library management, accounts and so on. This complex network infrastructure is subnetted and switching/routing mechanisms are in practice.

Statements & Features:

Computer networks encompass multiple computer systems and various computing hardware devices that are interconnected to share data. To facilitate these connections, routers, switches, and hubs are commonly used. In this project, I have established a comprehensive network for an organization similar to East West University, known as the University of Scholars. This network comprises seven routers, each representing a distinct campus within the university. Additionally, I have integrated 2960 switches to link the computers, and for wireless connectivity, I've opted for the Router 2811. To manage the allocation of all IP addresses efficiently, a single DHCP server has been installed, connected to the switch under Campus 1. This server is responsible for configuring all Class A, B, and C IP addresses for the computers. Furthermore, it is equipped with a DNS server and a web server. I've configured the DNS server with the university's URL, "http://www.scholars.edu.bd," enabling users to access the university's website.

Components:

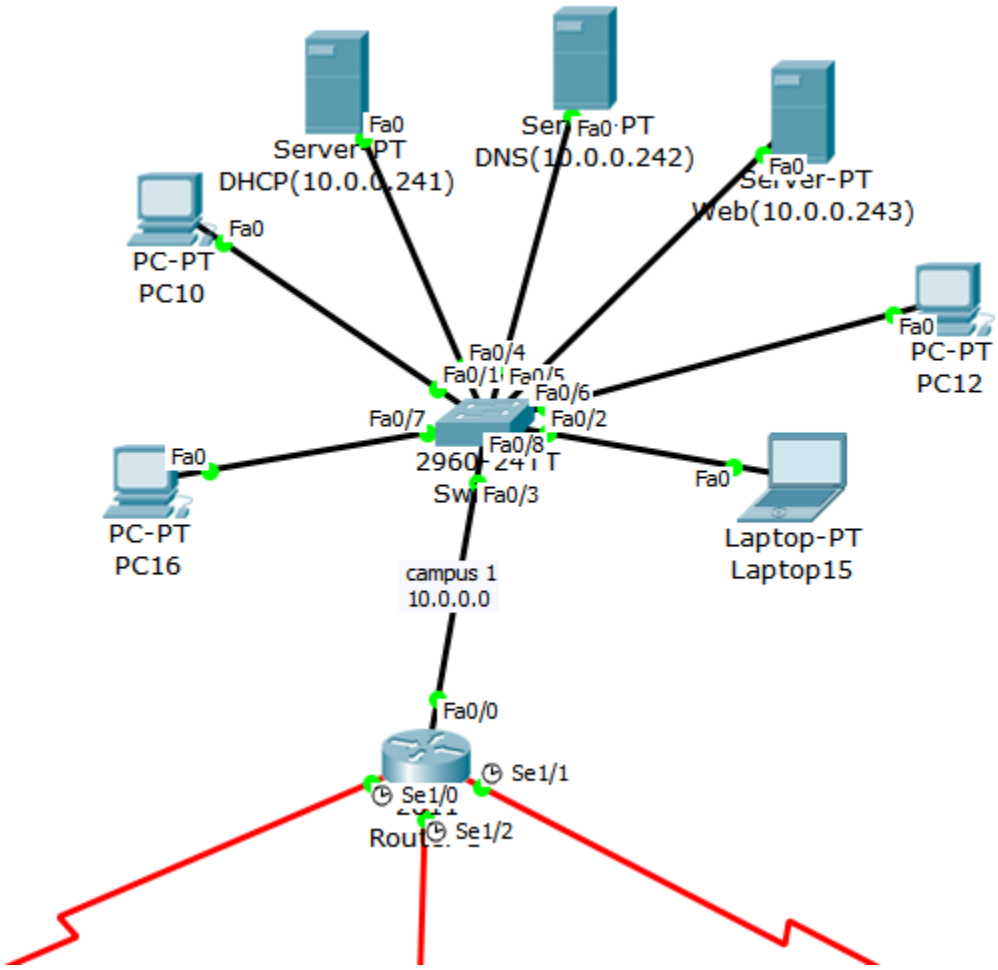
1. Cisco Packet Tracer

Packet Tracer:

1. Generic End Devices (PC-PT, Laptop-PT, Smartphone-PT, TabletPC-PT)
2. Routers (2811)
3. Server (DHCP, DNS, HTTP)
4. Switch (switch-Pt)
5. Wireless Device(Access Point-PT)
6. Connections (Copper Straight Through, Serial DCE with clock)

Implementation:

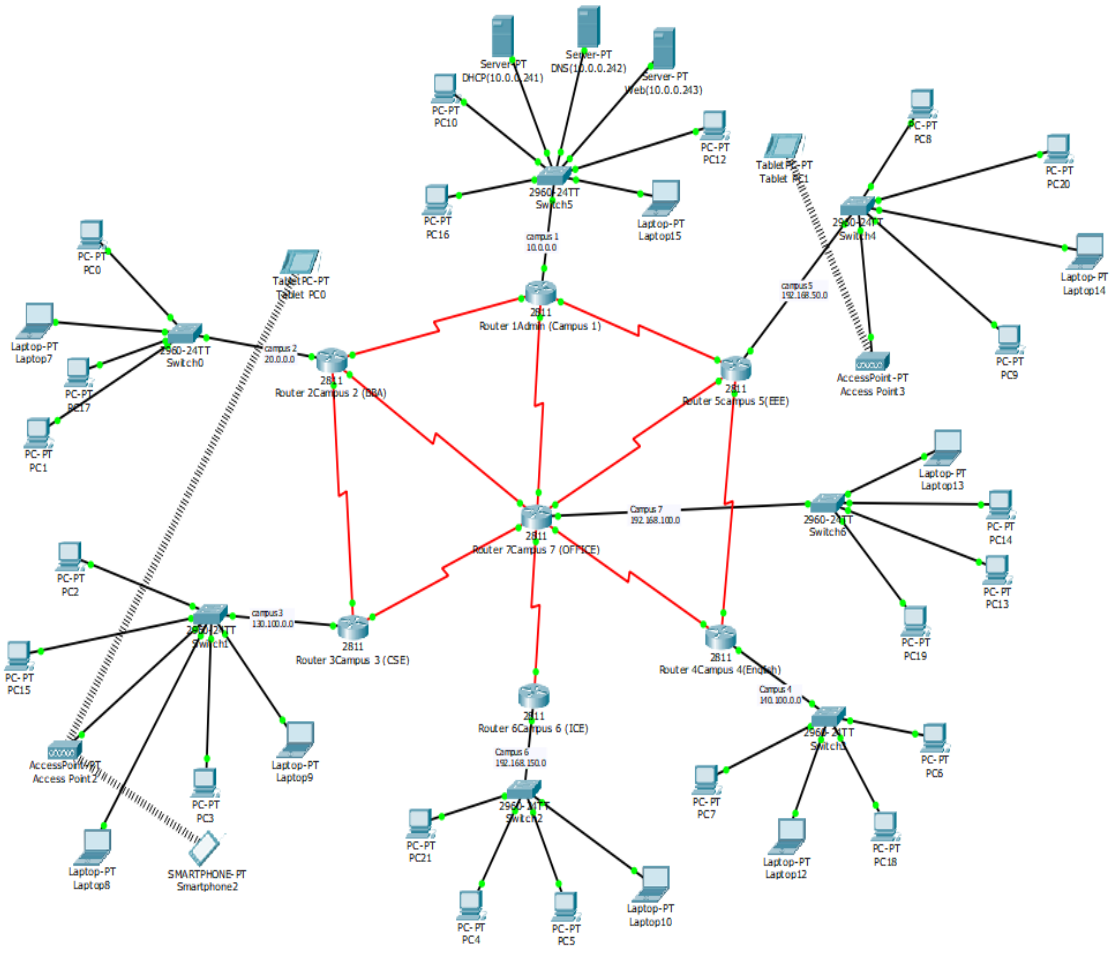
To create this network, I have taken DHCP server DNS server, and WEB server which is basically named Server PT-Server all of these servers are connected with the switches, and we set up the IP address for each of the servers and PC. I set up the DHCP IP 10.0.0.241 and DNS server IP address 10.0.0.242 address and also gave default GATEWAY 10.0.0.254. The DNS Server gives the link address and Web server mainly shows a web page. The IP of WEB server is 10.0.0.243



All the routers connect through serial DCE AND DTE. By connecting all the routers, I have assign the IP automatically by this 1 DHCP server to all the devices. here I use wireless router that has been used in the network.

After creating the network and connecting all I configured Routers and then applied OSPF Routing algorithm.

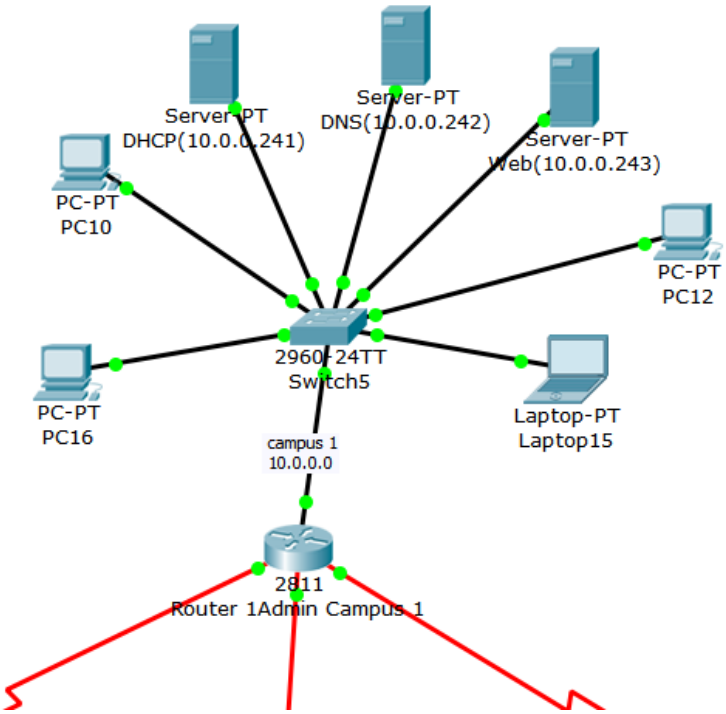
Complete Network Workspace:



Campus Router Interfaces & Diagram:

I've used IP classes A, B, and C for the whole network.

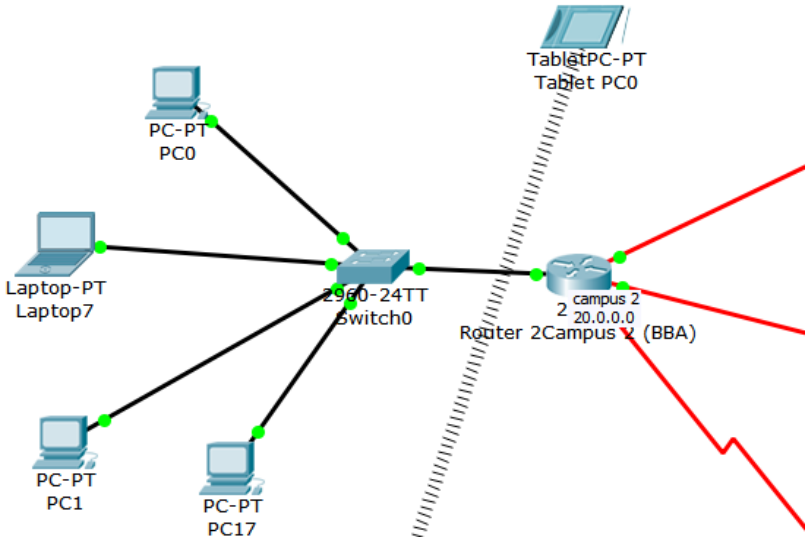
Router 1:



Router 1 is named as ADMIN Campus-l. It consists of ServerRoom and monitoring PC basically.

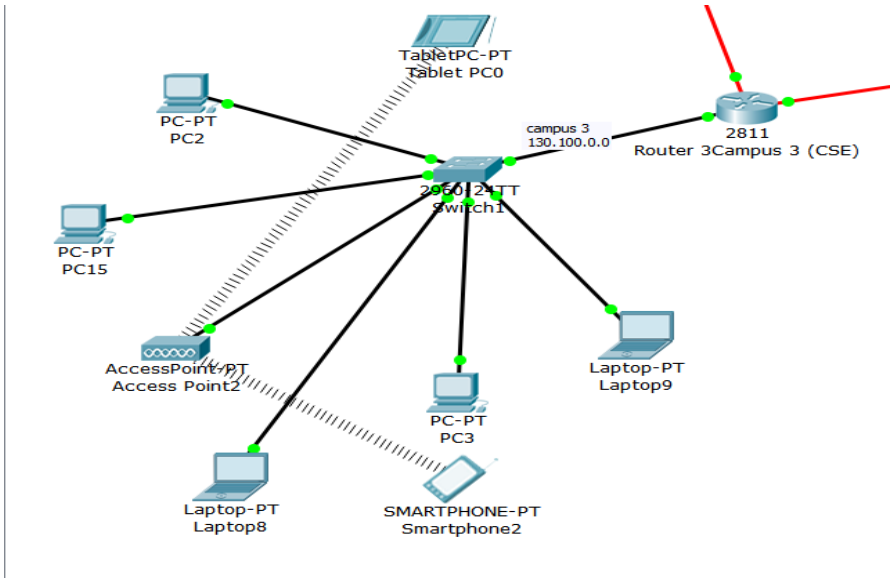
For campus-I, I have taken the IP from the A-Class. The network IP for Campus 1 is 10.0.0.0

Router 2:



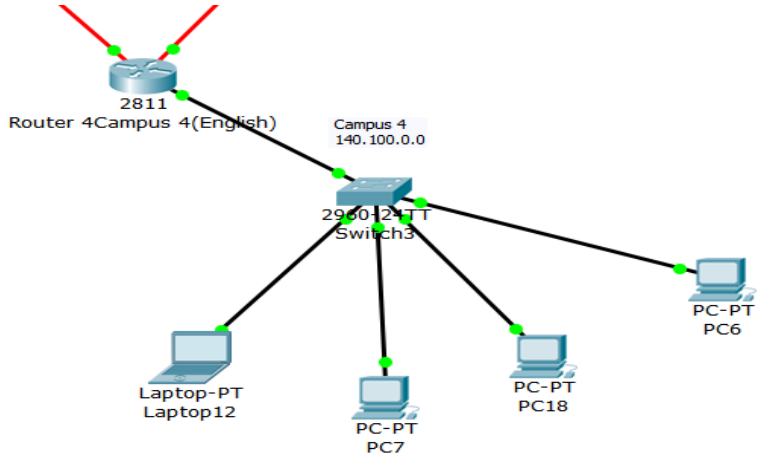
Router-2 is named as Campus 2(BBA). It consists of multiple PCs, and laptop. For campus 2, I have taken the IP from the A Class. The network IP for Campus-2 is 20.0.0.0

Router 3:



Router 3 is named as Campus 3 (CSE). It consists of multiple Pcs, laptops and wireless router for Smartphones and Tablets. For campus 3, I have taken the IP from the B Class. The network IP for Campus-2 is 130.100.0.0

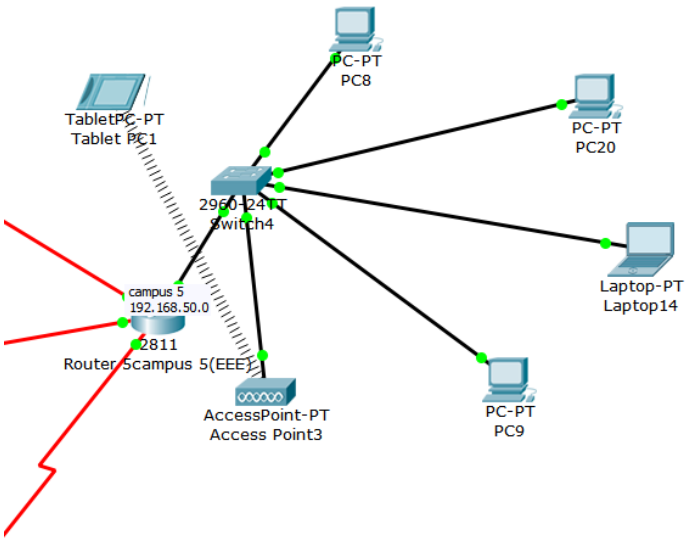
Router 4:



Router 4 is named as Campus 4(English). It consists of multiple PCs and Laptop.

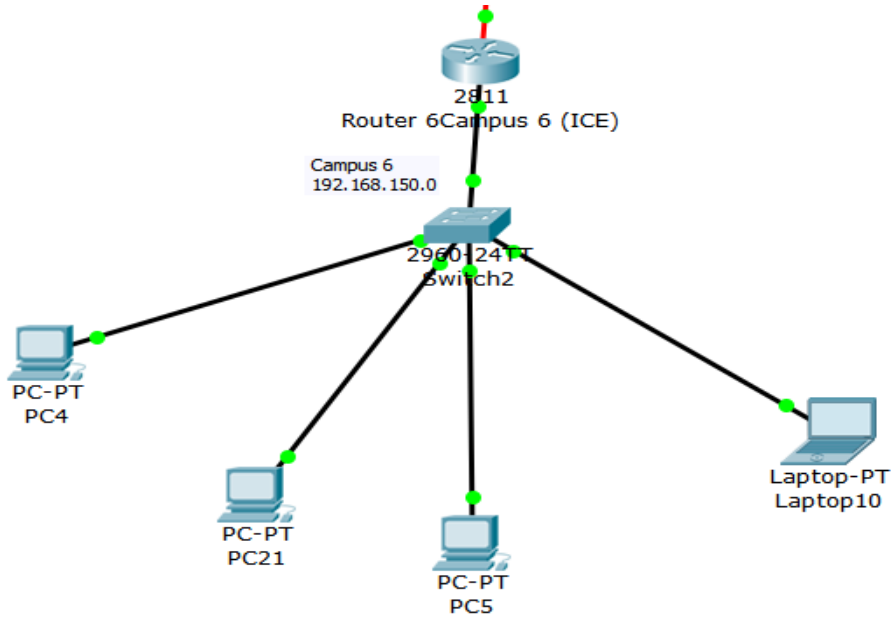
For campus 4, I have taken the IP from the A-Class. The network IP for Campus-I is 140.100.0.0

Router 5:



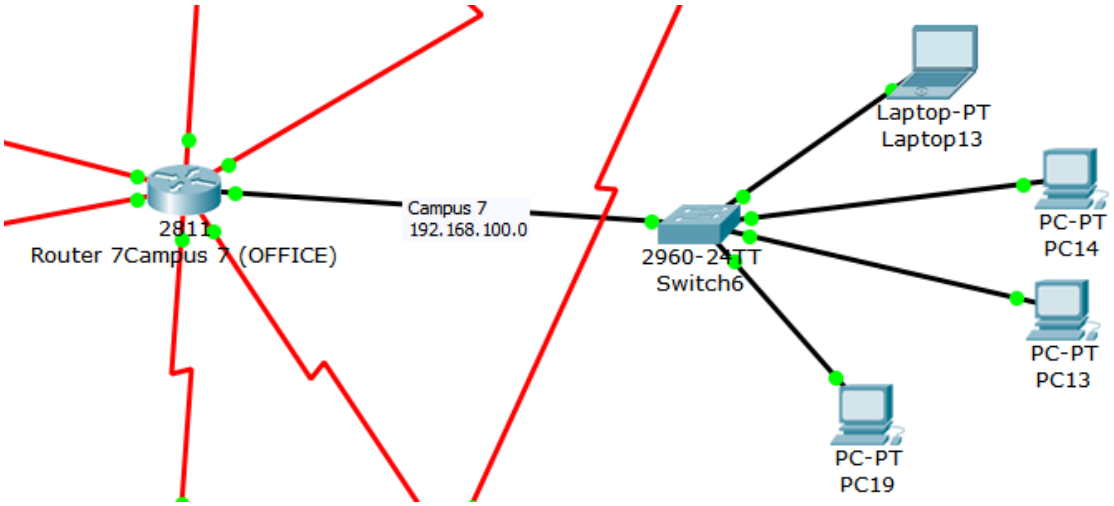
Router 5 is named as Campus 5(EEE) where there are multiple PCs, laptop, and wireless router for Smartphones and Tablets. . For campus 5, I have taken the IP from the B-Class. The network IP for Campus-I is 192.168.50.0

Router 6:

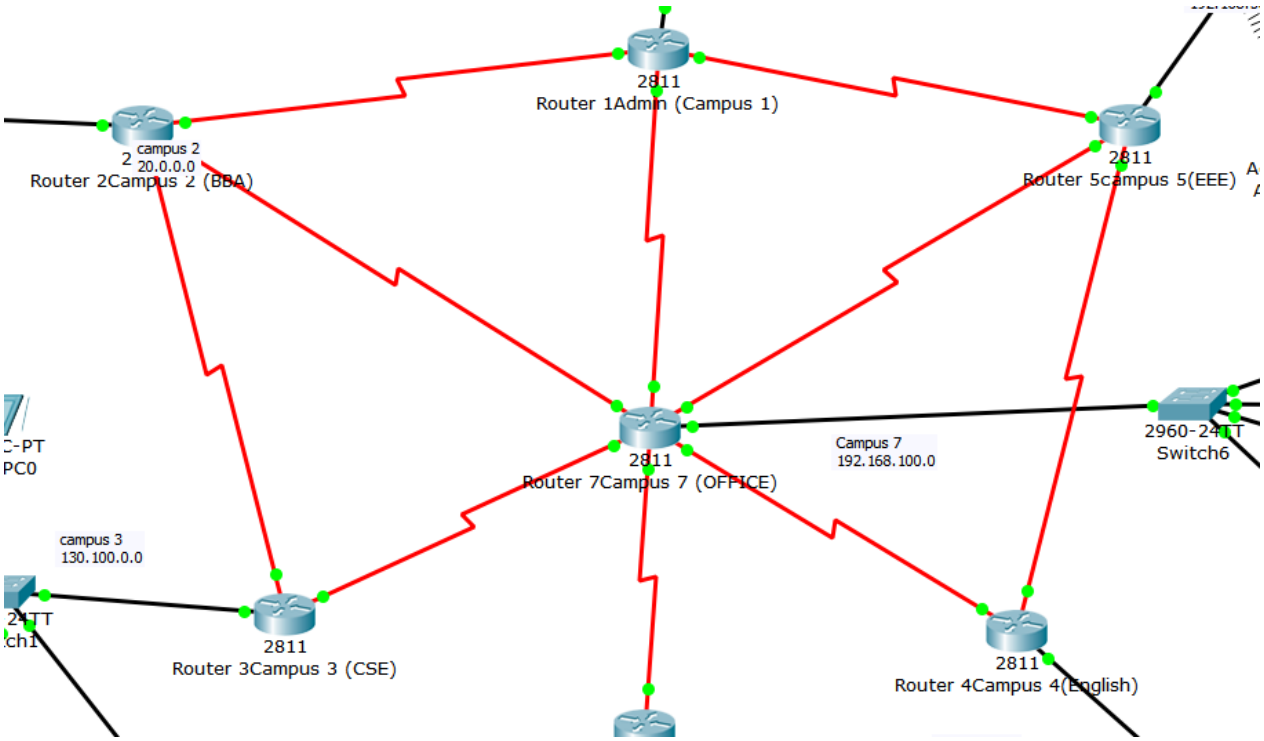


Router 6 is named as (ICE)Campus 6 where there are multiple PCs and Laptop. For campus 6, I have taken the IP from the C-Class. The network IP for Campus-I is 192.169.150.0

Router 7:



Router 7 is named as Campus-7 (OFFICE)where there are multiple PCs, and Laptop are connected. For campus 7, I have taken the IP from the C Class. The network IP for Campus-I is 192.169.100.0



Router Configuration & OSPF Routing Table:

Campus 1

interface fa0/0

ip address 10.0.0.254 255.0.0.0

no shut

do wr

exit

```
ip dhcp pool campus1

network 10.0.0.0 255.0.0.0
default-router 10.0.0.254
dns-server 10.0.0.242
exit
ip dhcp excluded-address 10.0.0.254

interface se1/0
ip address 192.169.10.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se1/2
ip address 192.169.30.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
```

interface se1/1

ip address 192.169.20.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

router ospf 1

network 10.0.0.0 0.255.255.255 area 1

network 192.169.10.0 0.0.0.255 area 1

network 192.169.30.0 0.0.0.255 area 1

network 192.169.20.0 0.0.0.255 area 1

exit

Campus 2

interface fa0/0

ip address 20.0.0.254 255.0.0.0

no shut

do wr

exit

```
ip dhcp pool campus2

network 20.0.0.0 255.0.0.0
default-router 20.0.0.254
dns-server 10.0.0.242
exit
ip dhcp excluded-address 20.0.0.254

interface se1/0
ip address 192.169.10.2 255.255.255.0
no shut
do wr
exit

interface se1/2
ip address 192.169.50.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se1/1
```

ip address 192.169.40.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

router ospf 2

network 20.0.0.0 0.255.255.255 area 1

network 192.169.10.0 0.0.0.255 area 1

network 192.169.50.0 0.0.0.255 area 1

network 192.169.40.0 0.0.0.255 area 1

exit

Campus 3

interface fa0/0

ip address 130.100.0.254 255.255.0.0

no shut

do wr

exit

```
ip dhcp pool campus3

network 130.100.0.0 255.255.0.0
default-router 130.100.0.254
dns-server 10.0.0.242
exit
ip dhcp excluded-address 130.100.0.254

interface se1/0
ip address 192.169.40.2 255.255.255.0
no shut
do wr
exit

interface se1/1
ip address 192.169.60.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

router ospf 3
```

network 130.100.0.0 0.0.255.255 area 1

network 192.169.40.0 0.0.0.255 area 1

network 192.169.60.0 0.0.0.255 area 1

exit

campus 4

interface fa0/0

ip address 140.100.0.254 255.255.0.0

no shut

do wr

exit

ip dhcp pool campus4

network 140.100.0.0 255.255.0.0

default-router 140.100.0.254

dns-server 10.0.0.242

exit

ip dhcp excluded-address 140.100.0.254

interface se1/0

ip address 192.169.90.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se1/1

ip address 192.169.100.2 255.255.255.0

no shut

do wr

exit

router ospf 4

network 140.100.0.0 0.0.255.255 area 1

network 192.169.90.0 0.0.0.255 area 1

network 192.169.100.0 0.0.0.255 area 1

exit

Campus 5

interface fa0/0

```
ip address 192.168.50.254 255.255.255.0
no shut
do wr
exit

ip dhcp pool campus5

network 192.168.50.0 255.255.255.0
default-router 192.168.50.254
dns-server 10.0.0.242
exit
ip dhcp excluded-address 192.168.50.254

interface se1/0
ip address 192.169.20.2 255.255.255.0
no shut
do wr
exit

interface se1/1
ip address 192.169.80.1 255.255.255.0
clock rate 64000
no shut
```

do wr

exit

interface se1/2

ip address 192.169.100.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

router ospf 5

network 192.168.50.0 0.0.0.255 area 1

network 192.169.20.0 0.0.0.255 area 1

network 192.169.80.0 0.0.0.255 area 1

network 192.169.100.0 0.0.0.255 area 1

exit

campus 6

interface fa0/0

ip address 192.168.150.254 255.255.255.0

```
no shut
do wr
exit

ip dhcp pool campus6

network 192.168.150.0 255.255.255.0
default-router 192.168.150.254
dns-server 10.0.0.242
exit
ip dhcp excluded-address 192.168.150.254

interface se1/0
ip address 192.169.70.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

router ospf 6

network 192.168.150.0 0.0.0.255 area 1
network 192.169.70.0 0.0.0.255 area 1
```

exit

campus 7

interface fa0/0

ip address 192.168.100.254 255.255.255.0
no shut
do wr
exit

ip dhcp pool campus7

network 192.168.100.0 255.255.255.0
default-router 192.168.100.254
dns-server 10.0.0.242
exit
ip dhcp excluded-address 192.168.100.254

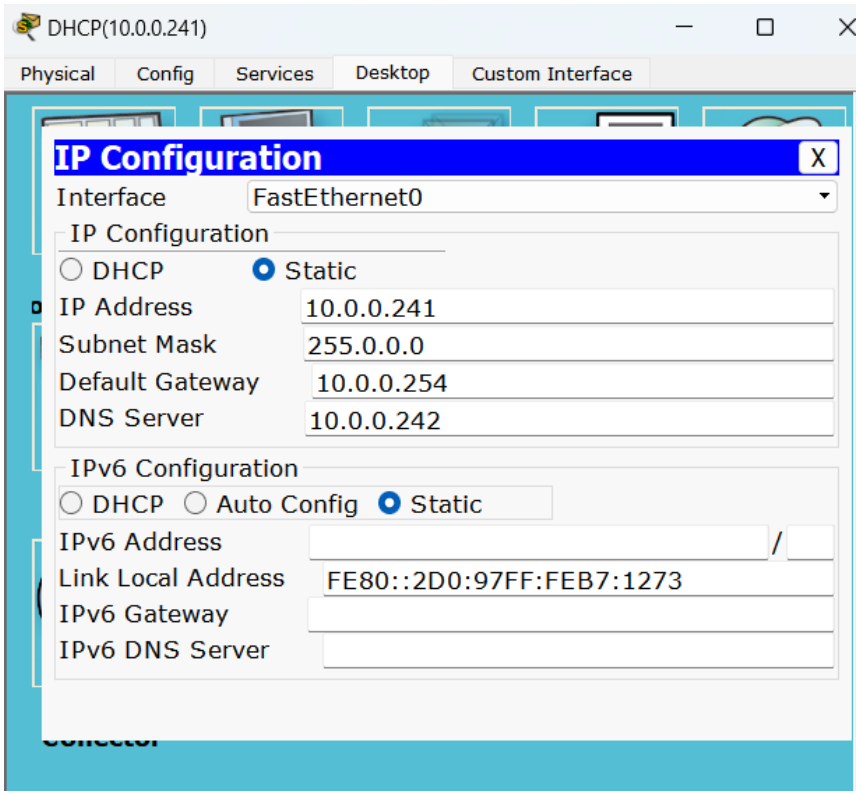
interface se1/0
ip address 192.169.30.2 255.255.255.0
no shut
do wr

```
exit

interface se1/1
ip address 192.169.50.2 255.255.255.0
no shut
do wr
exit

interface se1/2
ip address 192.169.60.2 255.255.255.0
no shut
do wr
exit

interface se1/5
ip address 192.169.90.2 255.255.255.0
no shut
do wr
exit

interface se1/4
ip address 192.169.80.2 255.255.255.0
no shut
```

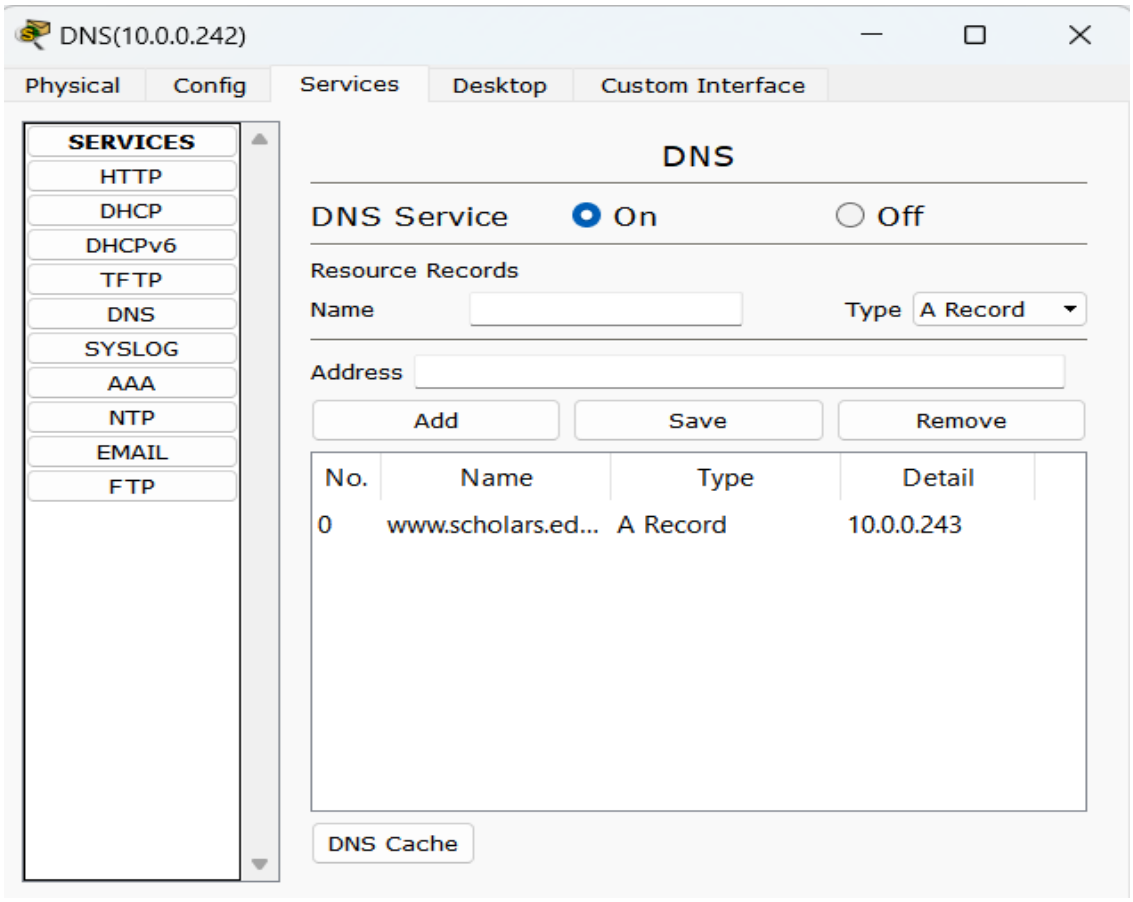
```
do wr
exit

interface se1/3
ip address 192.169.70.2 255.255.255.0
no shut
do wr
exit

router ospf 7
network 192.168.100.0 0.0.0.255 area 1
network 192.169.30.0 0.0.0.255 area 1
network 192.169.50.0 0.0.0.255 area 1
network 192.169.60.0 0.0.0.255 area 1
network 192.169.90.0 0.0.0.255 area 1
network 192.169.80.0 0.0.0.255 area 1
network 192.169.70.0 0.0.0.255 area 1
exit
```

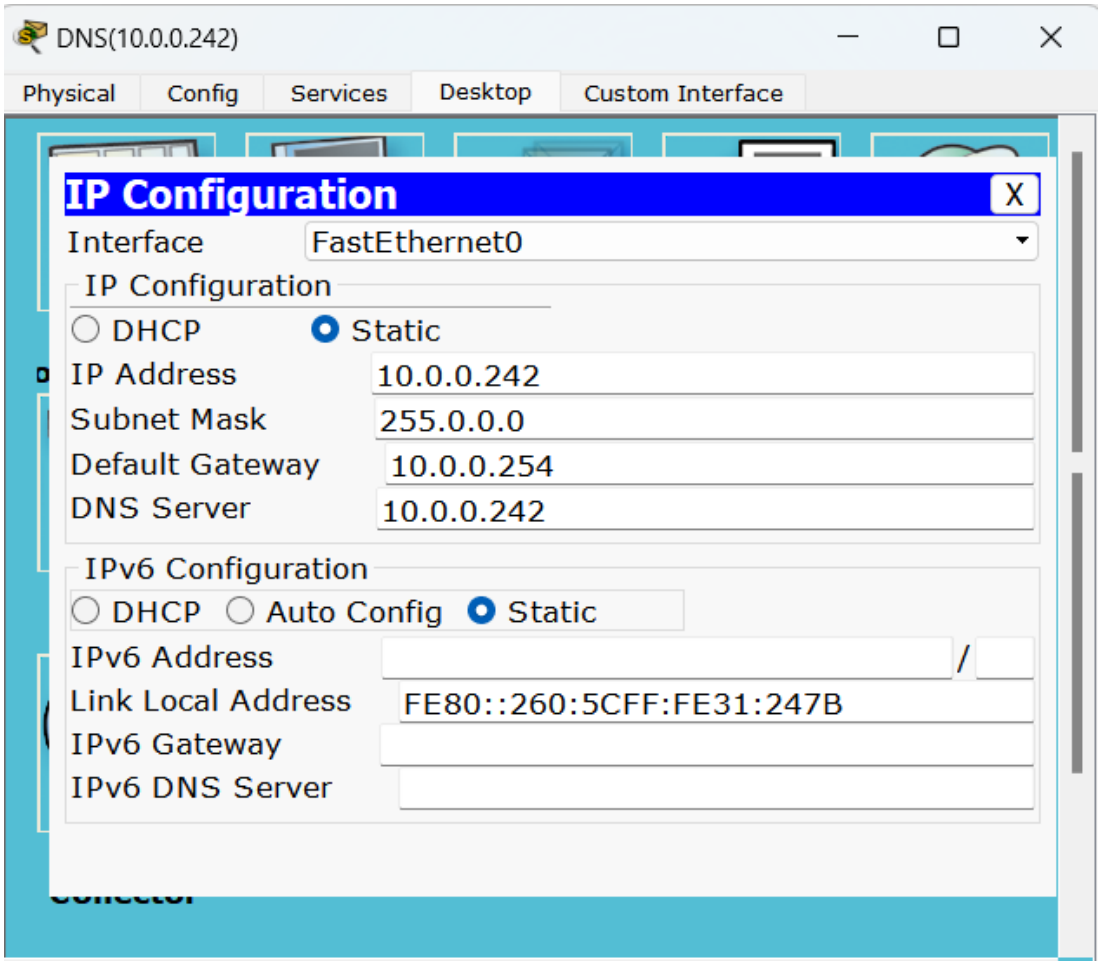
Servers Setup:

DHCP:

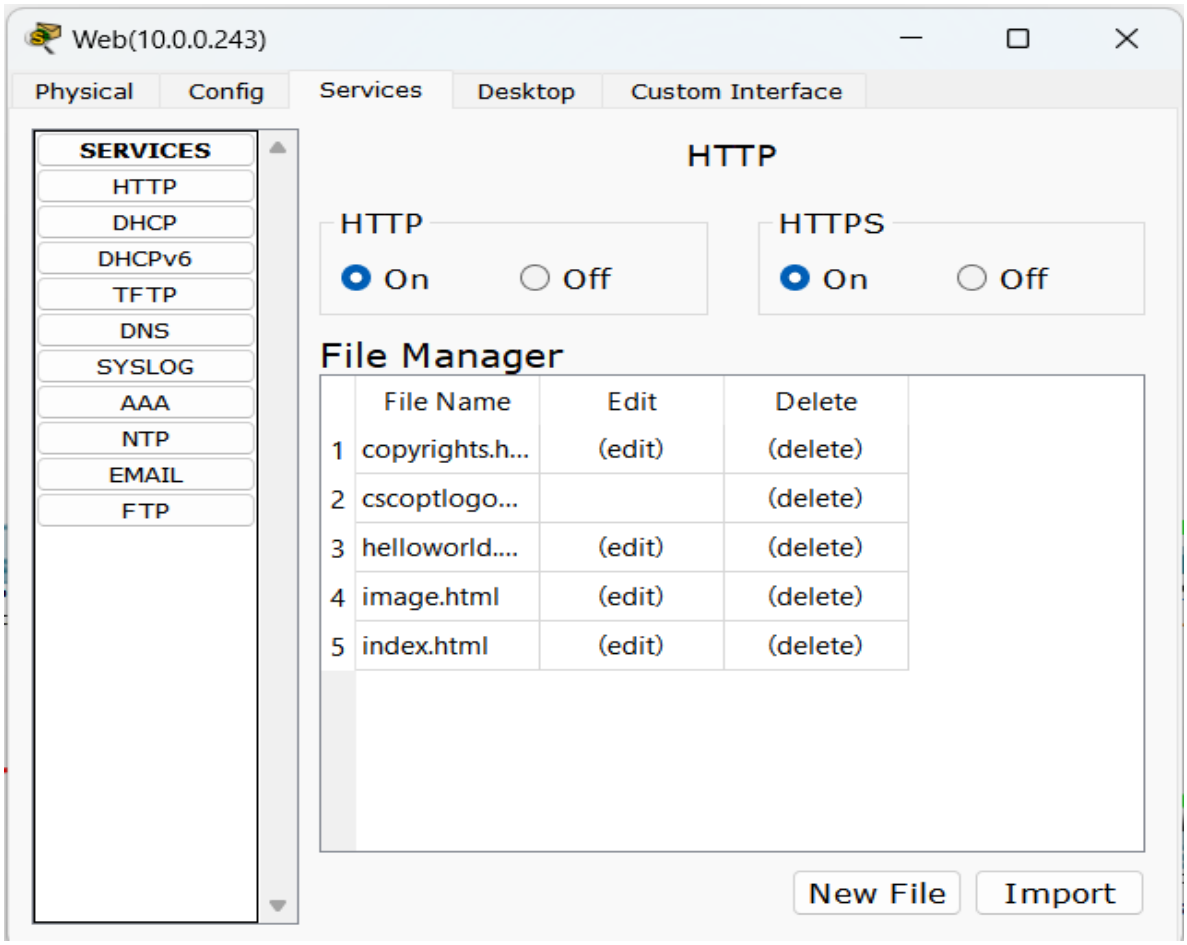


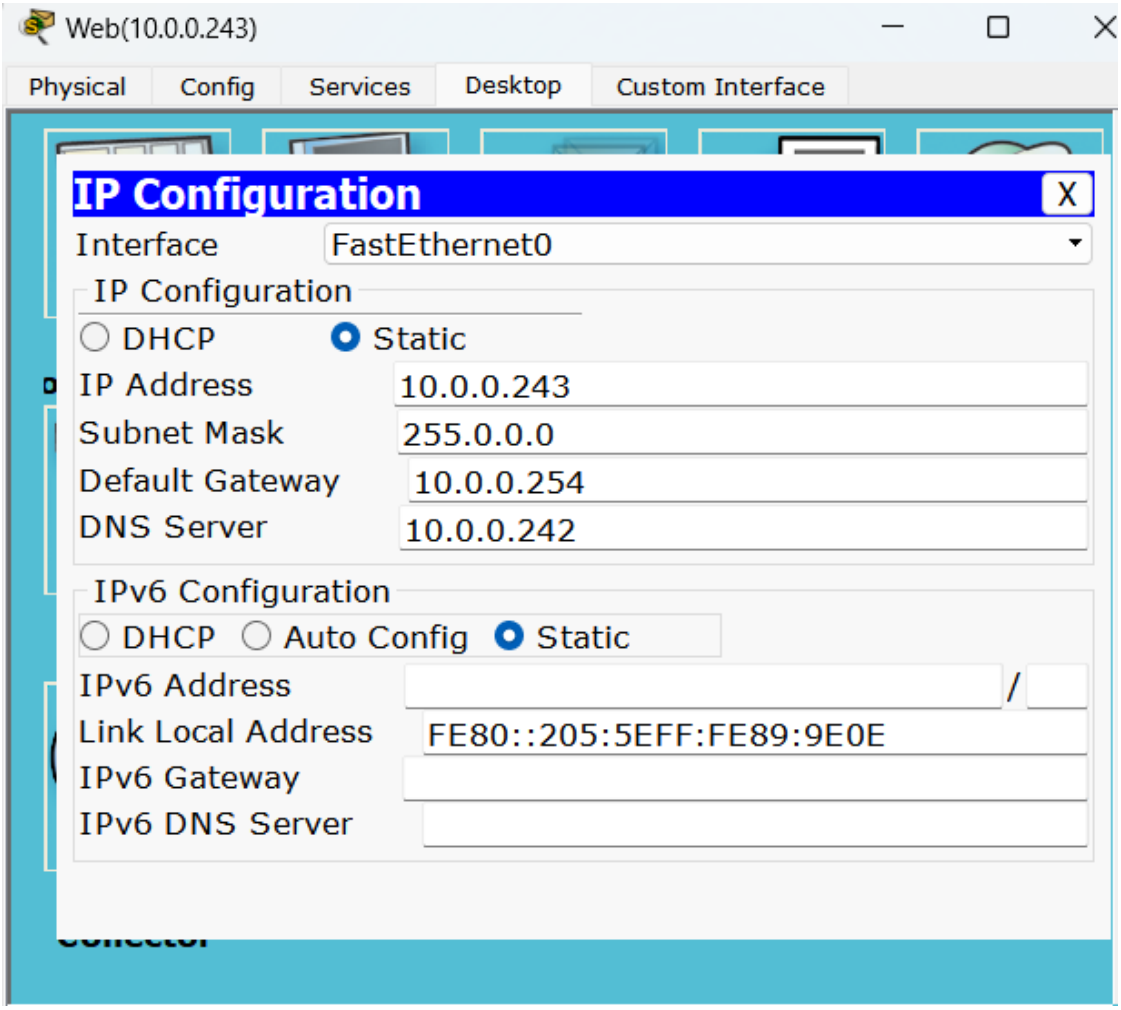
DNS :

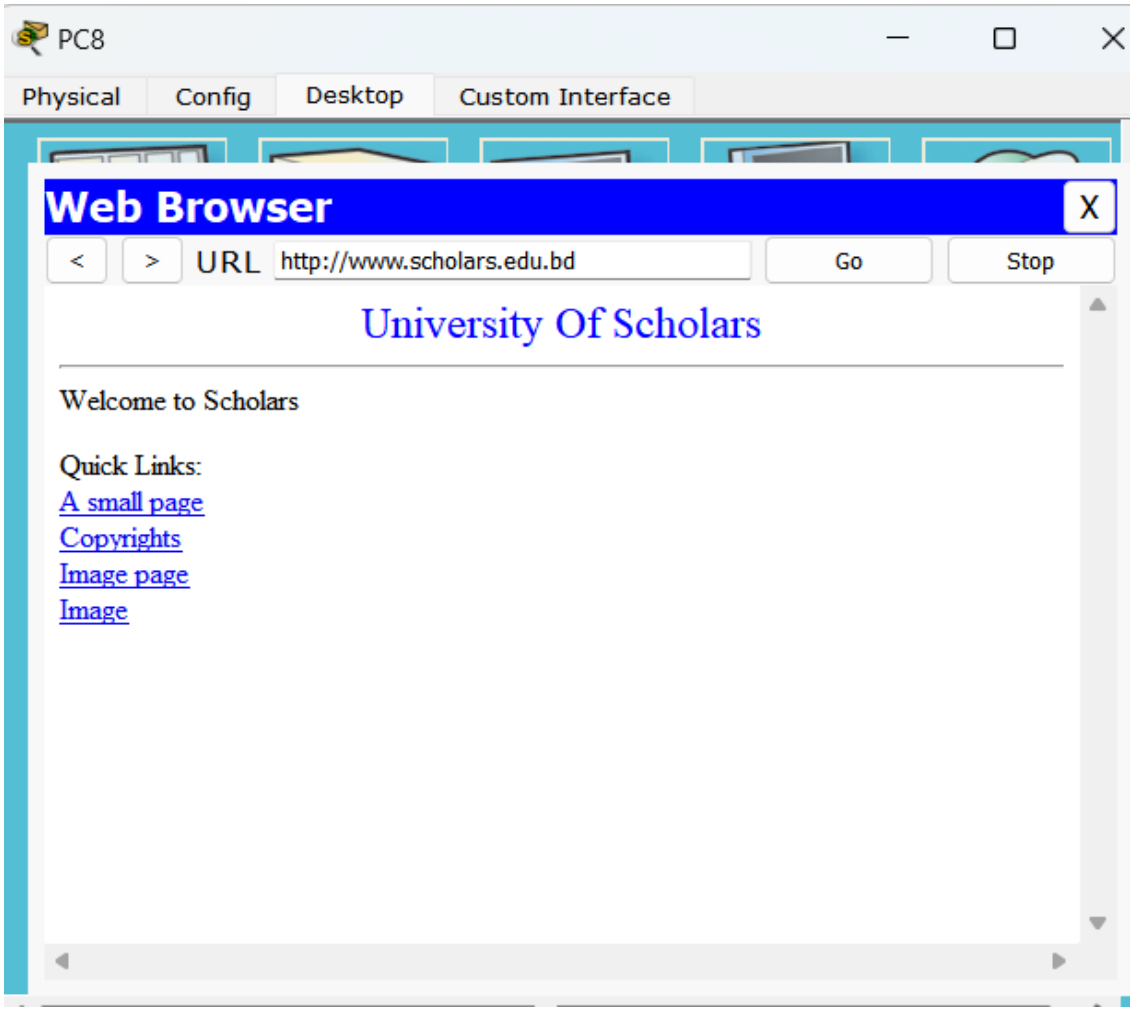

DNS(10.0.0.242)
Physical
Config
Services
Desktop
Custom Interface
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
DNS
DNS Service
On
Off
Resource Records
Name
Type
A Record
Address
Add
Save
Remove
No.
Name
Type
Detail
0
www.scholars.ed...
A Record
10.0.0.243
DNS Cache


DNS(10.0.0.242)
Physical
Config
Services
Desktop
Custom Interface
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.0.0.242
Subnet Mask
255.0.0.0
Default Gateway
10.0.0.254
DNS Server
10.0.0.242
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::260:5CFF:FE31:247B
IPv6 Gateway
IPv6 DNS Server

WEB:


Web(10.0.0.243)
Physical
Config
Services
Desktop
Custom Interface
SERVICES
HTTP
DHCP
DHCPv6
TFTP
DNS
SYSLOG
AAA
NTP
EMAIL
FTP
HTTP
HTTP
On
Off
HTTPS
On
Off
File Manager
File Name
Edit
Delete
1 copyrights.h... (edit) (delete)
2 cscoptlogo... (delete)
3 helloworld.... (edit) (delete)
4 image.html (edit) (delete)
5 index.html (edit) (delete)
New File
Import

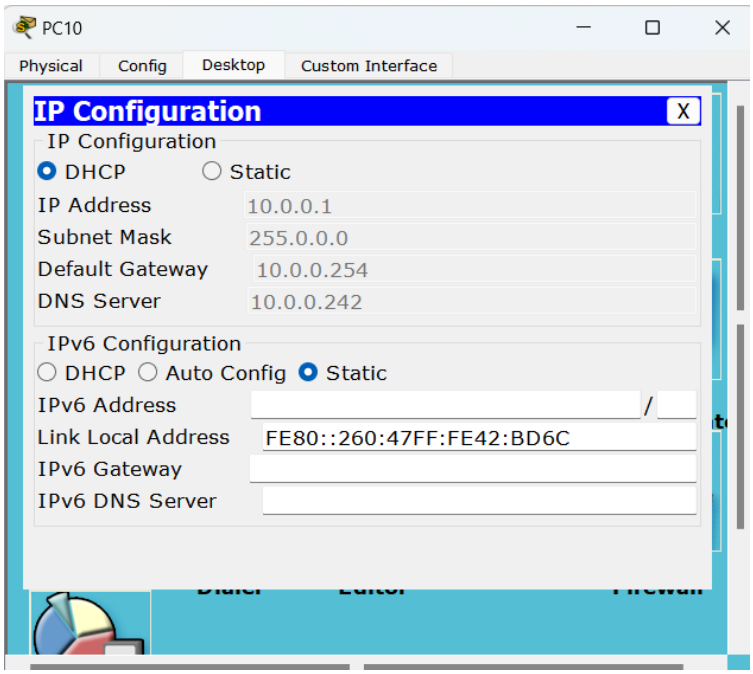

Web(10.0.0.243)
Physical
Config
Services
Desktop
Custom Interface
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
10.0.0.243
Subnet Mask
255.0.0.0
Default Gateway
10.0.0.254
DNS Server
10.0.0.242
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::205:5EFF:FE89:9E0E
IPv6 Gateway
IPv6 DNS Server



I created A webpage named University of Scholars accessible from any PC or any network in this university. Web address: www.scholars.edu.bd IP against web address:10.0.0.243 by using DNS server.

PC Configuration:

PC is configured dynamically by DHCP server.



PDU:

Fire	Last Status	Source	Destination	Type	Color	Time(se	Periodic	Num	Edit	Delete
	Successful	PC20	Laptop13	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC20	PC0	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC10	PC9	ICMP		0.000	N	2	(edit)	(delete)

Limitation:

In this project, I did not include subnets to provide additional network capabilities. Instead, I designed the entire network in a way that allows automatic IP assignment for hosts across different campuses through a single DHCP server. I use Class A, B, and C IP addresses in this project. This approach ensures the efficient functioning of the project. Additionally, having more ports and hosts available will enhance the network's scalability.

Conclusion:

Throughout my challenge, I won treasured insights into building a community using CISCO Packet Tracer. While I faced certain challenges in the network setup system, I made an effort to create a complicated community encompassing diverse forms of devices. I carried out a single DHCP server to serve all magnificence networks and applied Class A, B, and C IP addresses inside the venture. The web server became answerable for producing a website that represented the university's profile. In conclusion, the knowledge and revel in I obtained at the same time as working on this project will show fine in my future endeavors.