



East West University

Project Report

Computer Networks

Course Code: CSE 405

Sec: 02

Prepared for

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Introduction:

Background:

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 systems to support several of its business process like admissions, advising, results, eTender, library management, accounts and so on.

Statements & Features:

Computer Networks consists of multiple computer systems and other computing hardware devices that are interconnected to share information. In order to facilitate the connections, routers, switches, and hubs are often employed.

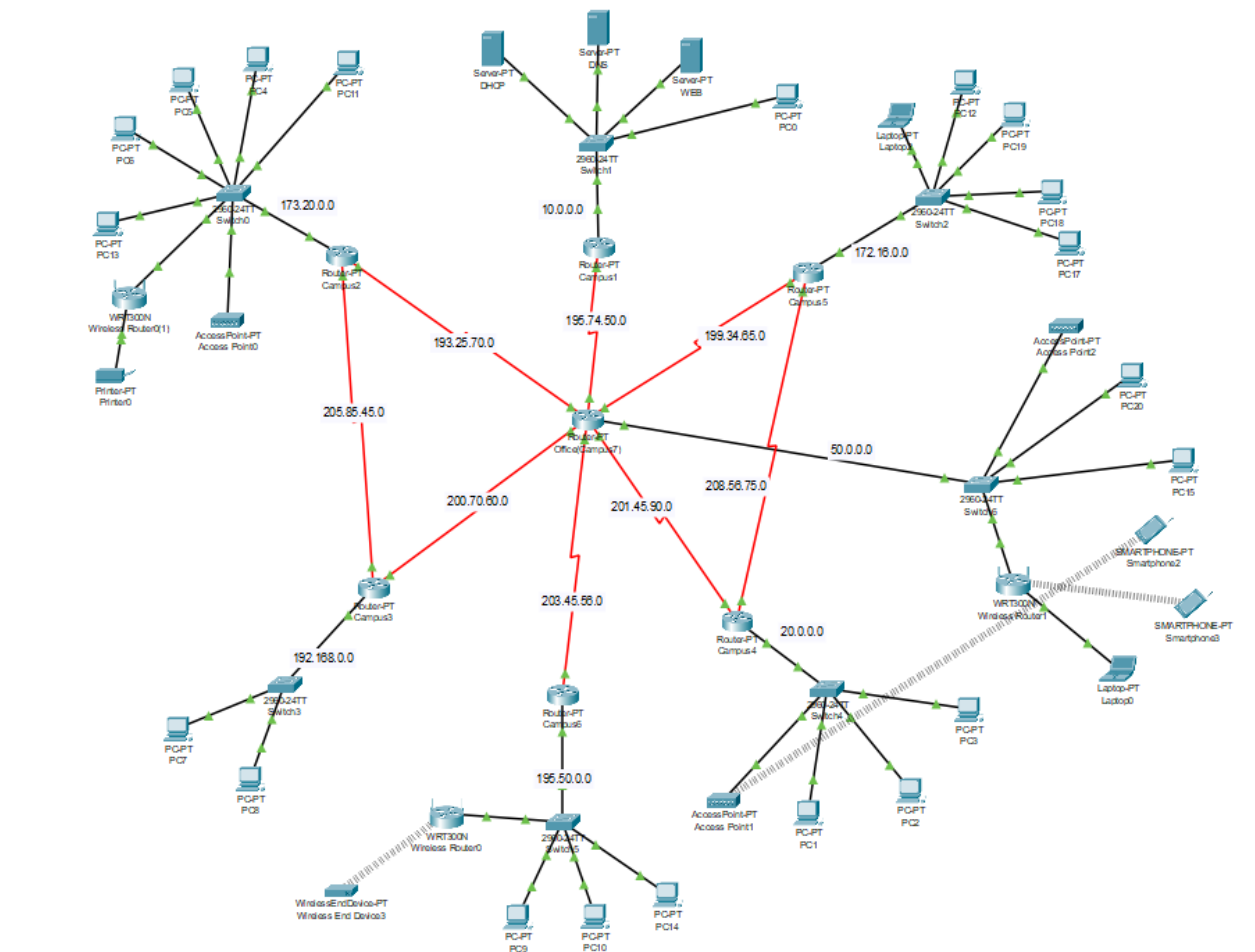
In this particular project, I have implemented a comprehensive network for University of Scholars, an enterprise like East West University. The network comprises seven routers, each representing a different campus. Additionally, I have included 2960 switches to connect the computers, and for wireless connectivity, I have chosen the WRT300N router. To manage all IP address allocation, Single DHCP server is connected to switch under Campus 1 to configure all the class A,B,C Ip assignment for the PC's. Also 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 browse the university's website.

Tools & Components Used:

- Cisco Packet Tracer
- DHCP Server
- DNS Server
- WEB Server
- Generic End Devices (for pc)

- Routers (PT Router)
- WRT300N (Wireless device)
- Switch (2960)
- Laptop
- Wireless Smartphone
- Wireless End Device
- Connectors (Serial DCE with clock, Copper Straight Through)

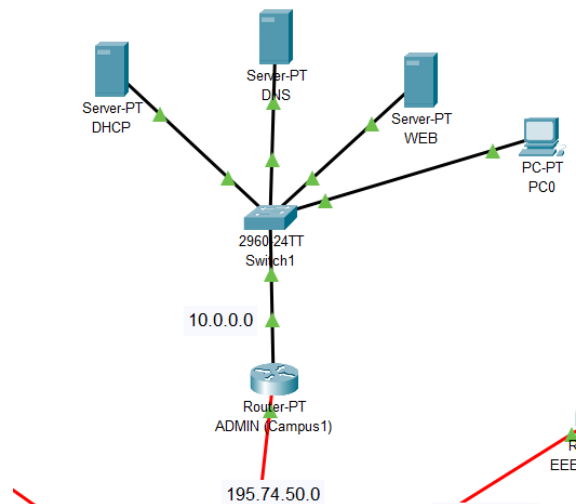
Complete Network Workspace:



Campus Router Interfaces & Diagram:

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

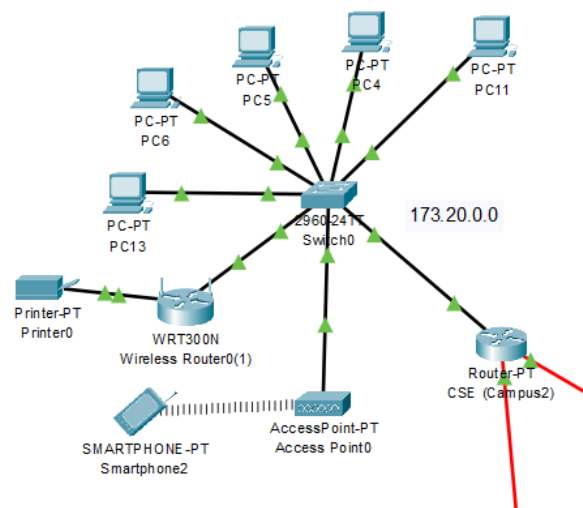
Router 1:



Router-1 is named as (ADMIN)Campus-1. It consists ServerRoom and monitoring Pc basically.

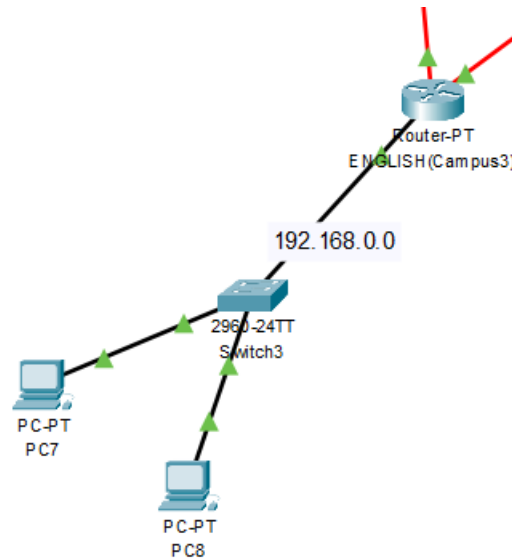
For campus-1, I have taken the IP from the A-Class. The network IP for Campus-1 is 10.0.0.0

Router 2:



Router-2 is named as (CSE)Campus-2. It consists multiple Pcs, printer and wireless router for wireless connection. For campus-2, I have taken the IP from the B-Class. The network IP for Campus-2 is 173.20.0.0

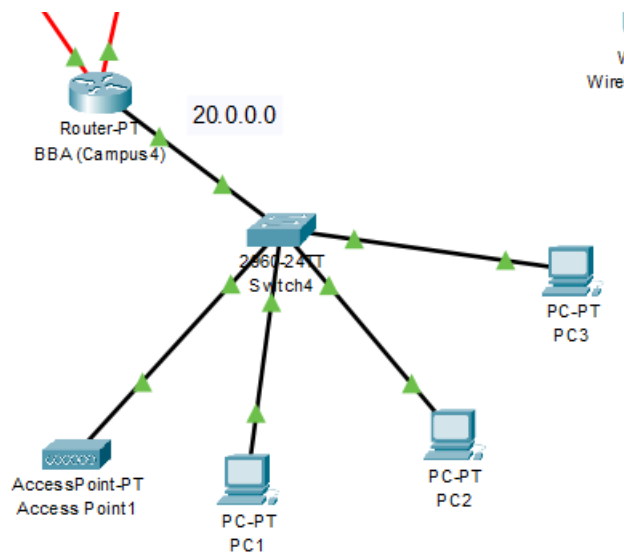
Router 3:



Router-3 is named as (ENGLISH)Campus-3. It consists OF two Pc basically connected with a switch

For campus-3, I have taken the IP from the C-Class. The network IP for Campus-I is 192.168.0.0

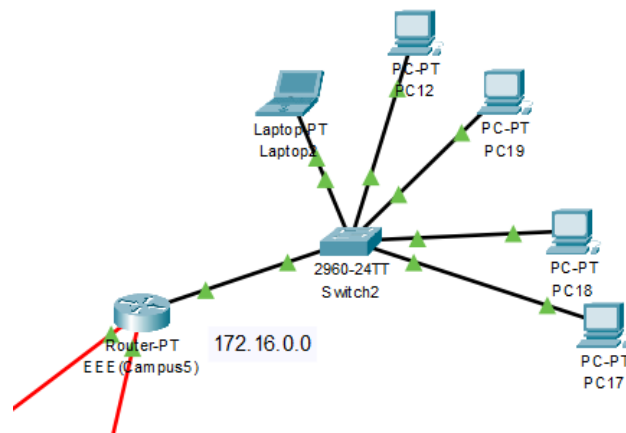
Router 4:



Router-4 is named as (BBA)Campus-4. It consists of multiple Pc's and access point.

For campus-4, I have taken the IP from the A-Class. The network IP for Campus-I is 20.0.0.0

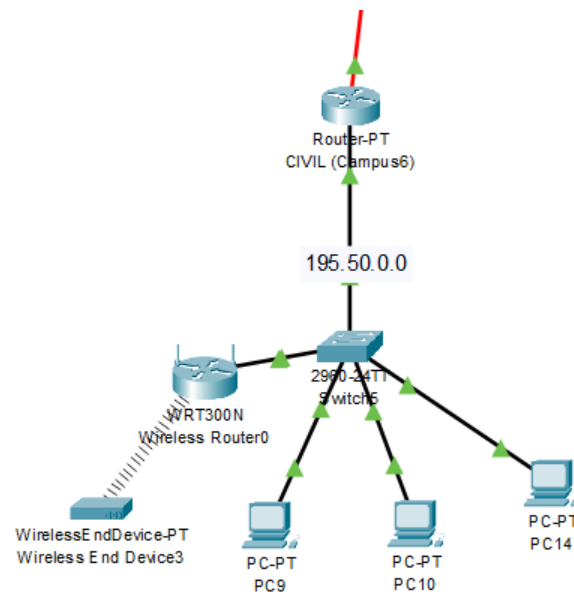
Router 5:



Router-5 is named as (EEE)Campus-5 where there are multiple PC and laptop connected for lab or other operations.

For campus-5, I have taken the IP from the B-Class. The network IP for Campus-I is 172.16.0.0

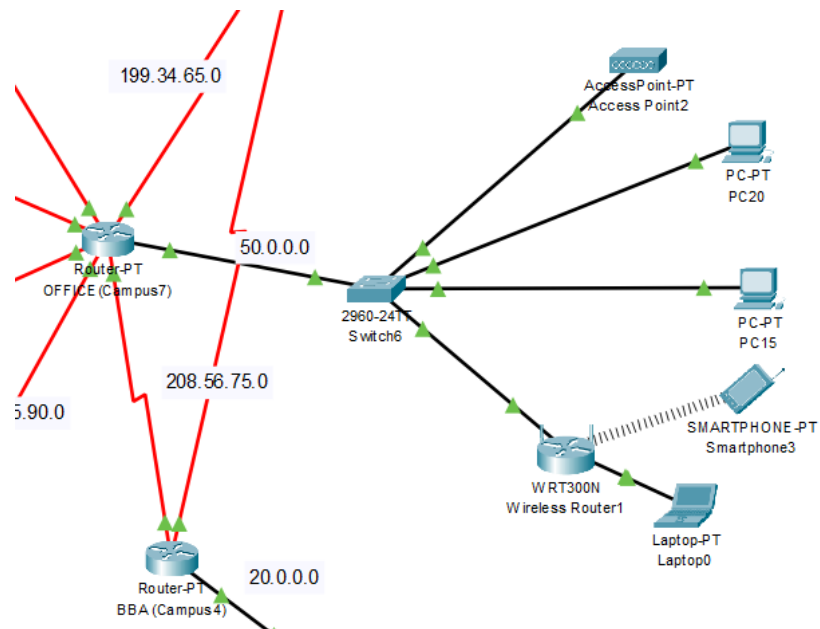
Router 6:



Router-5 is named as (CIVIL)Campus-5 where there are multiple PC Wireless end device and wireless router are connected for wireless and wired connection as well.

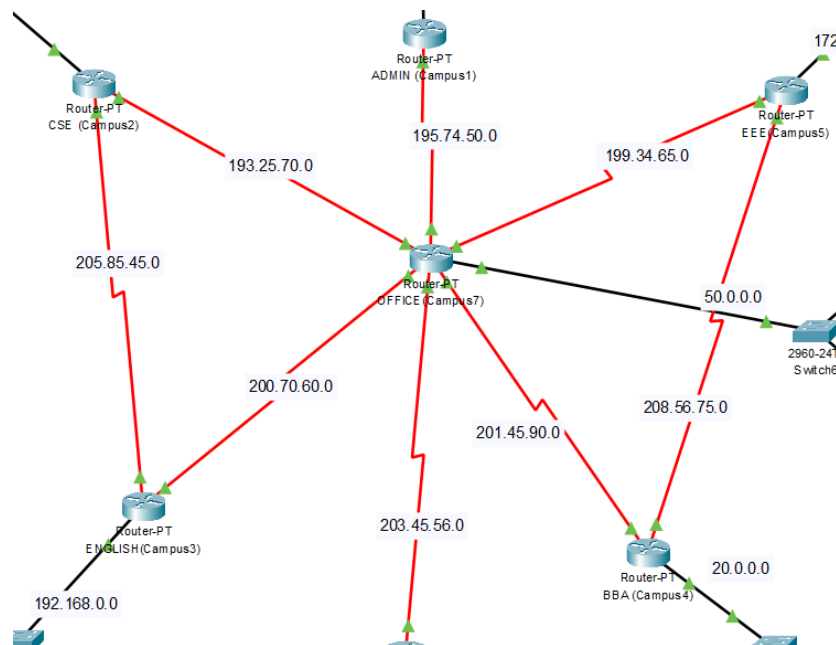
For campus-6, I have taken the IP from the C-Class. The network IP for Campus-I is 195.50.0.0

Router 7:



Router-7 is named as (OFFICE)Campus-7 where there are multiple PC, wireless router and wireless devices -laptop, smartphone are connected.

For campus-7, I have taken the IP from the A-Class. The network IP for Campus-1 is 50.0.0.0



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
```

```
interface se2/0
```

```
ip address 195.74.50.1 255.255.255.0
```

```
no shut
```

```
do wr
```

```
exit
```

```
router ospf 1
```

```
network 10.0.0.0 0.255.255.255 area 1
```

```
network 195.74.50.0 0.0.0.255 area 1
```

```
exit
```

Campus 2

```
interface fa0/0
```

```
ip address 173.20.0.254 255.255.0.0
```

```
no shut
```

```
do wr
```


exit

interface se2/0

ip address 193.25.70.1 255.255.255.0

no shut

do wr

exit

interface se7/0

ip address 205.85.45.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

router ospf 2

network 173.20.0.0 0.0.255.255 area 1

network 193.25.70.0 0.0.0.255 area 1

network 205.85.45.0 0.0.0.255 area 1

exit

Campus 3

interface fa0/0

ip address 192.168.0.254 255.255.255.0

no shut

```
do wr
```

```
exit
```

```
interface se2/0
```

```
ip address 205.85.45.2 255.255.255.0
```

```
no shut
```

```
do wr
```

```
exit
```

```
interface se6/0
```

```
ip address 200.70.60.1 255.255.255.0
```

```
no shut
```

```
do wr
```

```
exit
```

```
router ospf 3
```

```
network 192.168.0.0 0.0.0.255 area 1
```

```
network 205.85.45.0 0.0.0.255 area 1
```

```
network 200.70.60.0 0.0.0.255 area 1
```

```
exit
```

Campus 4

```
interface fa0/0
```

```
ip address 20.0.0.254 255.0.0.0
```

```
no shut
```

```
do wr
exit
```

```
interface se2/0
ip address 201.45.90.1 255.255.255.0
no shut
do wr
exit
```

```
interface se3/0
ip address 208.56.75.1 255.255.255.0
no shut
do wr
exit
```

```
router ospf 4
network 20.0.0.0 0.255.255.255 area 1
network 201.45.90.0 0.0.0.255 area 1
network 208.56.75.0 0.0.0.255 area 1
exit
```

Campus 5

```
interface fa0/0
ip address 172.16.0.254 255.255.0.0
no shut
```

```
do wr
```

```
exit
```

```
interface se2/0
```

```
ip address 199.34.65.1 255.255.255.0
```

```
no shut
```

```
do wr
```

```
exit
```

```
interface se3/0
```

```
ip address 208.56.75.2 255.255.255.0
```

```
clock rate 64000
```

```
no shut
```

```
do wr
```

```
exit
```

```
router ospf 5
```

```
network 172.16.0.0 0.0.255.255 area 1
```

```
network 199.34.65.0 0.0.0.255 area 1
```

```
network 208.56.75.0 0.0.0.255 area 1
```

```
exit
```

Campus 6

```
interface fa0/0
```

```
ip address 195.50.0.254 255.255.255.0
```

no shut

do wr

exit

interface se2/0

ip address 203.45.56.1 255.255.255.0

no shut

do wr

exit

router ospf 6

network 195.50.0.0 0.0.0.255 area 1

network 203.45.56.0 0.0.0.255 area 1

exit

Campus 7

interface fa0/0

ip address 50.0.0.254 255.0.0.0

no shut

do wr

exit

interface se2/0

ip address 199.34.65.2 255.255.255.0

```
clock rate 64000
```

```
no shut
```

```
do wr
```

```
exit
```

```
interface se3/0
```

```
ip address 195.74.50.2 255.255.255.0
```

```
clock rate 64000
```

```
no shut
```

```
do wr
```

```
exit
```

```
interface se6/0
```

```
ip address 193.25.70.2 255.255.255.0
```

```
clock rate 64000
```

```
no shut
```

```
do wr
```

```
exit
```

```
interface se7/0
```

```
ip address 200.70.60.2 255.255.255.0
```

```
clock rate 64000
```

```
no shut
```

```
do wr
```

```
exit
```

```
interface se8/0
ip address 201.45.90.2 255.255.255.0
clock rate 64000
no shut
do wr
exit
```

```
interface se9/0
ip address 203.45.56.2 255.255.255.0
clock rate 64000
no shut
do wr
exit
```

```
router ospf 7
network 50.0.0.0 0.255.255.255 area 1
network 199.34.65.0 0.255.255.255 area 1
network 195.74.50.0 0.255.255.255 area 1
network 193.25.70.0 0.255.255.255 area 1
network 200.70.60.0 0.255.255.255 area 1
network 201.45.90.0 0.255.255.255 area 1
network 203.45.56.0 0.255.255.255 area 1
exit
```

Assigning Ip helper

For each campus connected to fa0/0 interface ip helper is assigned to get IP from DHCP server

en

config

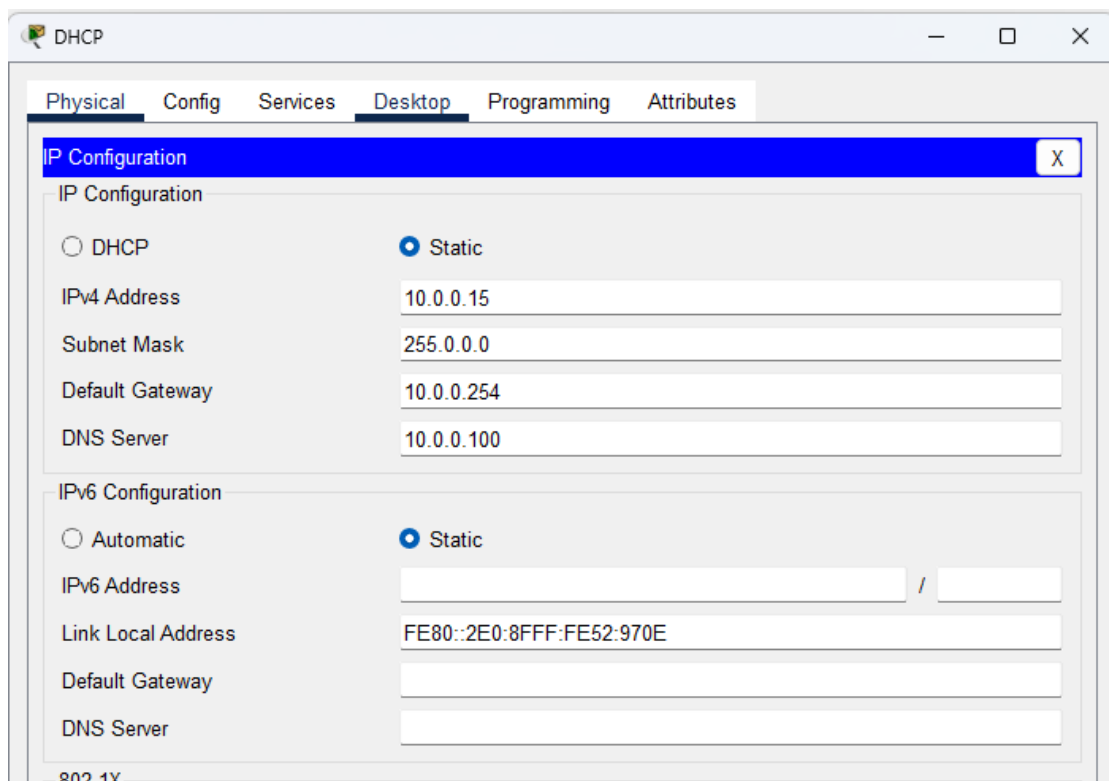
interface fa0/0

ip helper-address 10.0.0.15

exit

Servers Setup:

DHCP:



The screenshot shows a window titled "DHCP" with a tabbed interface. The "Desktop" tab is selected. Under the "IP Configuration" section, the "Static" radio button is selected. The fields are filled with the following values:

Field	Value
IPv4 Address	10.0.0.15
Subnet Mask	255.0.0.0
Default Gateway	10.0.0.254
DNS Server	10.0.0.100

Below this, the "IPv6 Configuration" section has the "Static" radio button selected. The fields are filled with the following values:

Field	Value
IPv6 Address	
Link Local Address	FE80::2E0:8FFF:FE52:970E
Default Gateway	
DNS Server	

Figure: DHCP Server IP Config

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DHCP

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 10.0.0.254

DNS Server: 10.0.0.100

Start IP Address: 10 0 0 1

Subnet Mask: 255 0 0 0

Maximum Number of Users: 512

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
Campus_4	20.0.0.254	10.0.0.100	20.0.0.1	255.0.0.0	512	0.0.0.0	0.0.0.0
Campus_6	195.50.0.254	10.0.0.100	195.50.0.5	255.255.255.0	251	0.0.0.0	0.0.0.0
Campus_2	173.20.0.254	10.0.0.100	173.20.0.5	255.255.0.0	512	0.0.0.0	0.0.0.0
Campus_7	50.0.0.254	10.0.0.100	50.0.0.5	255.0.0.0	512	0.0.0.0	0.0.0.0
Campus_5	172.16.0.254	10.0.0.100	172.16.0.5	255.255.0.0	251	0.0.0.0	0.0.0.0
Campus_3	192.168.0.254	10.0.0.100	192.168.0.5	255.255.255.0	251	0.0.0.0	0.0.0.0
serverPool	10.0.0.254	10.0.0.100	10.0.0.1	255.0.0.0	512	0.0.0.0	0.0.0.0

☐ Top

Figure: Server Pool for All Different IP Config

DNS:

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS**
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

DNS

DNS Service: ☒ On ☐ Off

Resource Records

Name: Address: Type: A Record

Add Save Remove

No.	Name	Type	Detail
0	www.scholars.edu.bd	A Record	10.0.0.120

Figure: DNS Server Record Config

The screenshot shows a window titled "DNS" with tabs for Physical, Config, Services, Desktop (selected), Programming, and Attributes. The "IP Configuration" section is active, showing options for DHCP and Static IP. The Static IP is selected with the following values: IPv4 Address: 10.0.0.100, Subnet Mask: 255.0.0.0, Default Gateway: 10.0.0.254, and DNS Server: 10.0.0.100. The "IPv6 Configuration" section is also visible, with Automatic and Static options. The Static option is selected, showing an IPv6 Address field, a Link Local Address of FE80::2E0:F9FF:FE96:4AB, and empty fields for Default Gateway and DNS Server.

Configuration Type	Option	Value
IP Configuration	DHCP	<input type="radio"/>
	Static	<input checked="" type="radio"/>
	IPv4 Address	10.0.0.100
	Subnet Mask	255.0.0.0
IP Configuration	Default Gateway	10.0.0.254
	DNS Server	10.0.0.100
	IPv6 Configuration	
	Automatic	<input type="radio"/>
IPv6 Configuration	Static	<input checked="" type="radio"/>
	IPv6 Address	
	Link Local Address	FE80::2E0:F9FF:FE96:4AB
	Default Gateway	
	DNS Server	

Figure: DNS Server IP Config

WEB:

The screenshot shows a window titled "WEB" with tabs for Physical, Config, Services, Desktop (selected), Programming, and Attributes. The "IP Configuration" section is active, showing options for DHCP and Static IP. The Static IP is selected with the following values: IPv4 Address: 10.0.0.120, Subnet Mask: 255.0.0.0, Default Gateway: 10.0.0.254, and DNS Server: 10.0.0.100. The "IPv6 Configuration" section is also visible, with Automatic and Static options. The Static option is selected, showing an IPv6 Address field, a Link Local Address of FE80::201:63FF:FE0A:B9B, and empty fields for Default Gateway and DNS Server.

Configuration Type	Option	Value
IP Configuration	DHCP	<input type="radio"/>
	Static	<input checked="" type="radio"/>
	IPv4 Address	10.0.0.120
	Subnet Mask	255.0.0.0
IP Configuration	Default Gateway	10.0.0.254
	DNS Server	10.0.0.100
	IPv6 Configuration	
	Automatic	<input type="radio"/>
IPv6 Configuration	Static	<input checked="" type="radio"/>
	IPv6 Address	
	Link Local Address	FE80::201:63FF:FE0A:B9B
	Default Gateway	
	DNS Server	

Figure: WEB Server Record Config

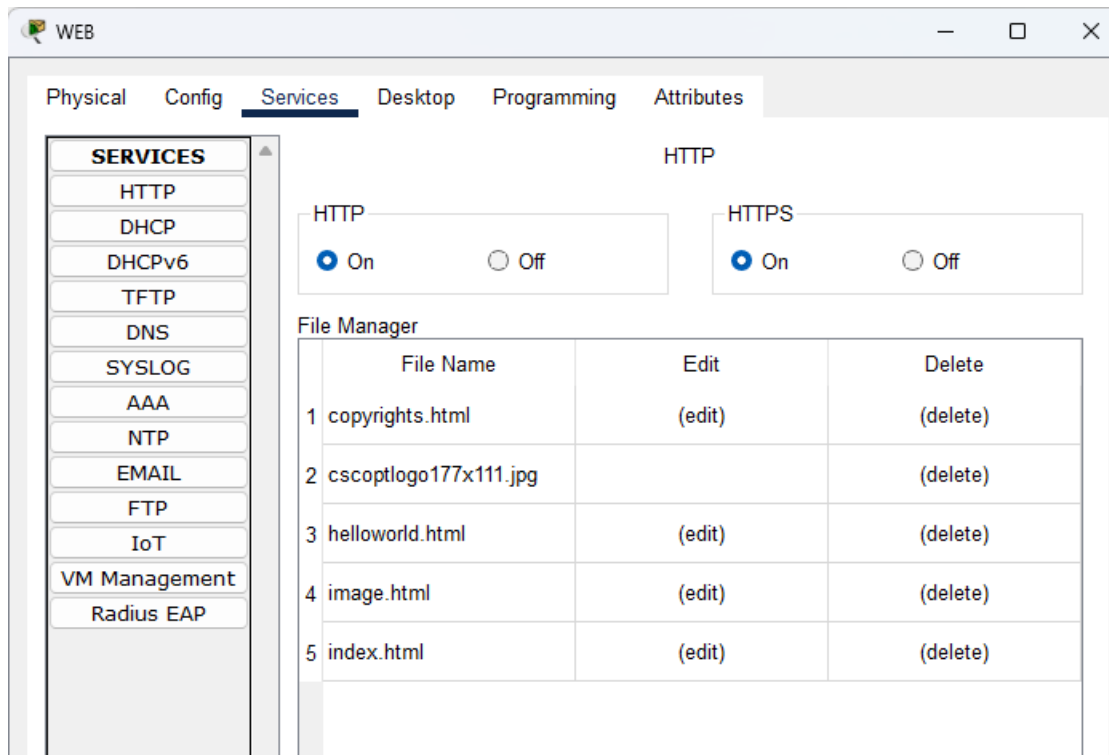


Figure: WEB Server On Status

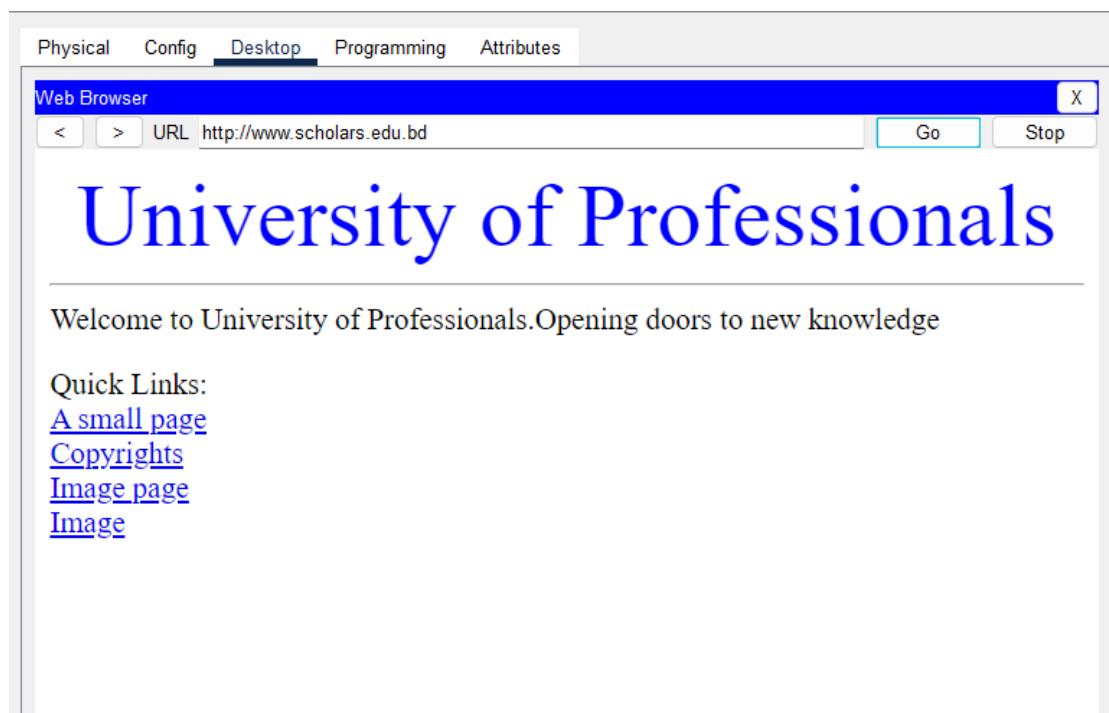


Figure: WEB Page Accessing with URL instead of IP Address

I create A webpage of Scholars University accessible form any pc or any network in this university. Web address : www.scholars.edu.bd Ip against web address :10.0.0,100 by using DNS server.

PC Configuration:

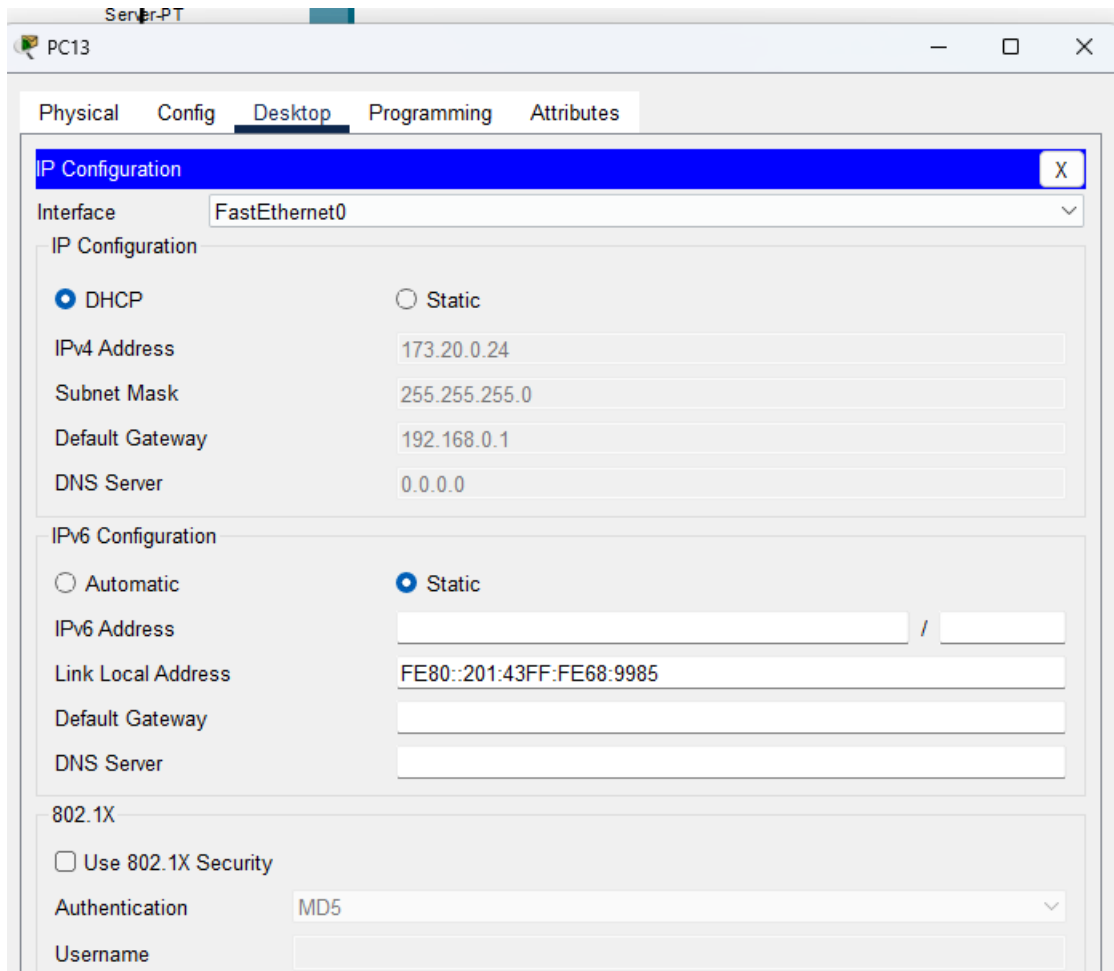


Figure: DHCP IP Assignment for PC

PDU:

Realtime Simulation										
Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC6	PC9	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC4	PC1	ICMP		0.000	N	1	(edit)	(delete)
	Failed	PC0	PC15	ICMP		0.000	N	2	(edit)	(delete)
	Successful	PC0	PC15	ICMP		0.000	N	3	(edit)	(delete)

Figure: Successful Packet Transmission between PC's

Limitation:

In this project, I haven't incorporated subnets which could give some extra network facility in that network. I configured the whole network in such a way that IP for the hosts of different campuses will be automatically assigned by a single DHCP server. By following this process, this University of Professionals network can operate their task properly. Also, increased number of ports and host will help to remain the network more scalable

Conclusion:

In my project, I learned about building a project using CISCO Packet Tracer. Despite some difficulties encountered while setting up the network, I have tried to build a complex network where there are most kind of possible devices are incorporated. I use single DHCP server for all class networks. I use the class A,B,C Ip address in this project. The web server generates the web page reflecting the university's profile. Overall, with the knowledge gained & experience earned doing the project will be beneficial in future projects.