EAST WEST UNIVERSITY

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

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Course Title: Computer Networks
Course Code: CSE 405
Section no: 01

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Preface: Apex university, is an enterprise like East West University, owns a large number of 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 everyone. On top of that the university runs several complex networked systems to support several of its business process like admissions, advising, results, eTender, library management, accounts and so on. So, here a complex network must create so that everyone can communicate with each other.

Tools:

1) Software Used:

- Cisco Packet Tracer version 6.2.0

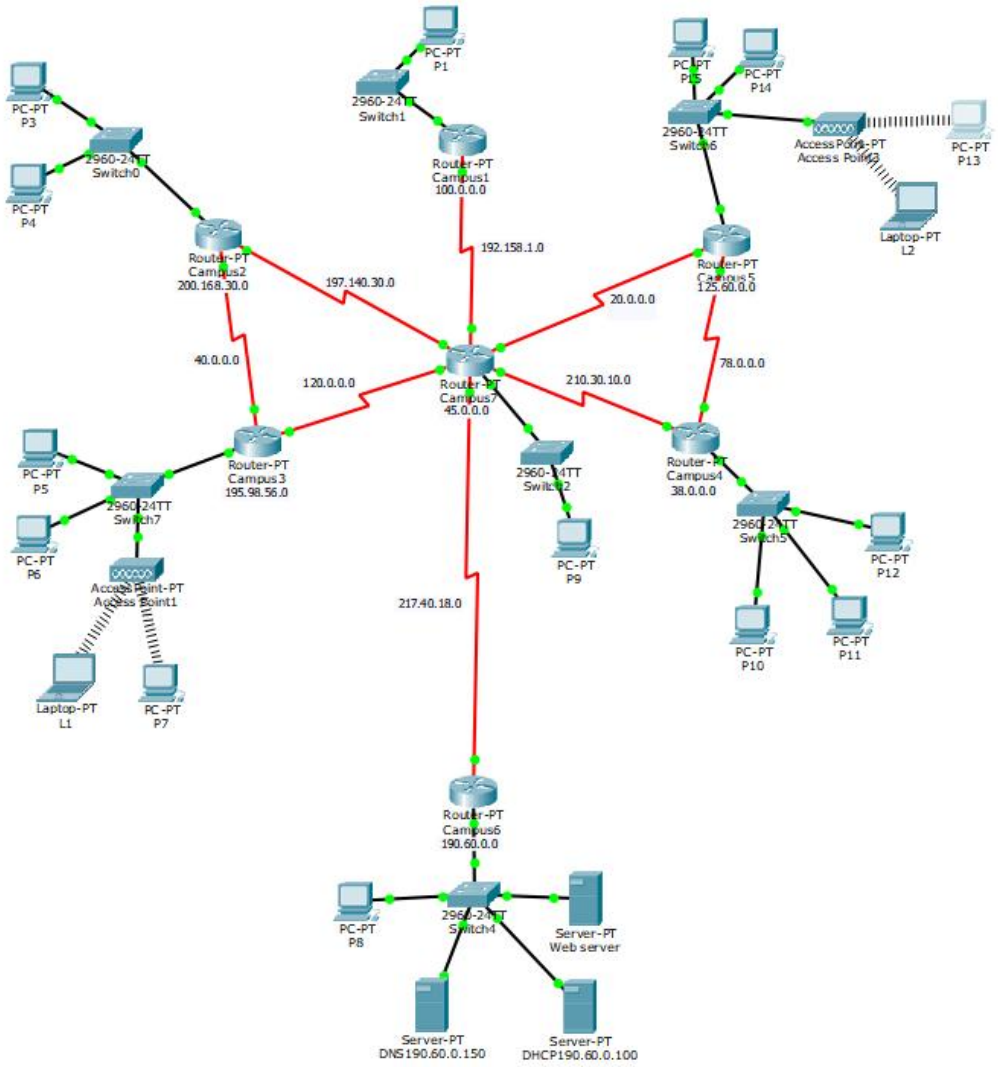
2) Components Used:

- Access Point PT
- Wireless Routers
- Straight Through Cable
- Serial DCE cables
- 2960 Switches
- PC as end devices
- DNS Server
- Web Server
- DHCP server

Logical Diagram:

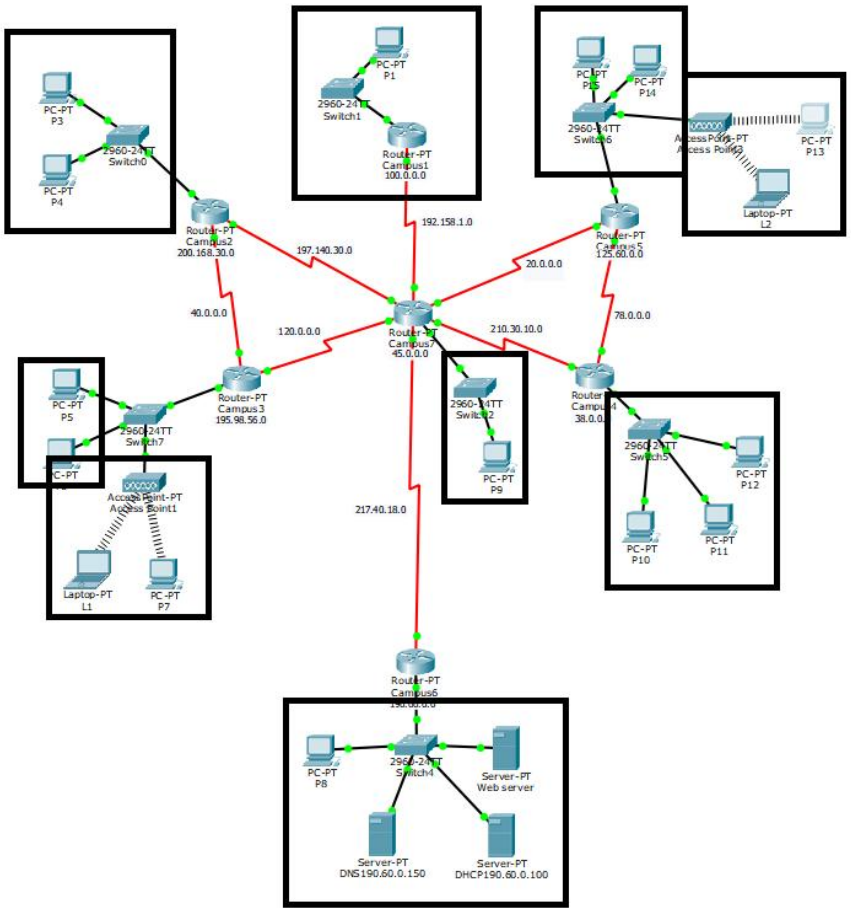
Network Summary:

- There is total 7 campuses. Each Campuses has their IP address. Every device is connected to connected to each other.
- 3 types of IP address are used across all over the 7 campuses



- Web Server is incorporated to access university website
- Every device can request for IP from DHCP server.

Network Connections Analysis
Campuses:



Each Campus network has their own unique network IP address

Campus	IP Address	Ip Type
Campus 1	100.0.0.0	Class A
Campus 2	200.168.30.0	Class C
Campus 3	195.98.56.0	Class C
Campus 4	38.0.0.0	Class A
Campus 5	125.60.0.0	Class B
Campus 6	190.60.0.0	Class B
Campus 7	45.0.0.0	Class A

Servers:

There are total 3 servers implemented across the university network

Server	**Server IP**
DHCP	190.60.0.100
DNS	190.60.0.150
Web	190.60.0.200

Router to Router Network:

Routers	Network IP
Router 1 to Router 7	192.158.1.0
Router 2 to Router 3	40.0.0.0
Router 2 to Router 7	197.140.30.0
Router 3 to Router 2	40.0.0.0
Router 3 to Router 7	120.0.0.0
Router 4 to Router 7	210.30.10.0
Router 4 to Router 5	78.0.0.0
Router 5 to Router 4	78.0.0.0
Router 5 to Router 7	20.0.0.0
Router 6 to Router 7	217.40.18.0
Router 7 to Router 1	192.158.1.0
Router 7 to Router 2	197.140.30.0
Router 7 to Router 3	120.0.0.0
Router 7 to Router 4	210.30.10.0
Router 7 to Router 5	20.0.0.0
Router 7 to Router 6	217.40.18.0

Server Configuration Analysis:
DHCP Server:

DHCP can serve IP across network. There are total 7 campus networks. When requested DHCP server can serve unique IP address to each device according to their
Campus network. That's why there are total 7 pool names in DHCP server configuration.

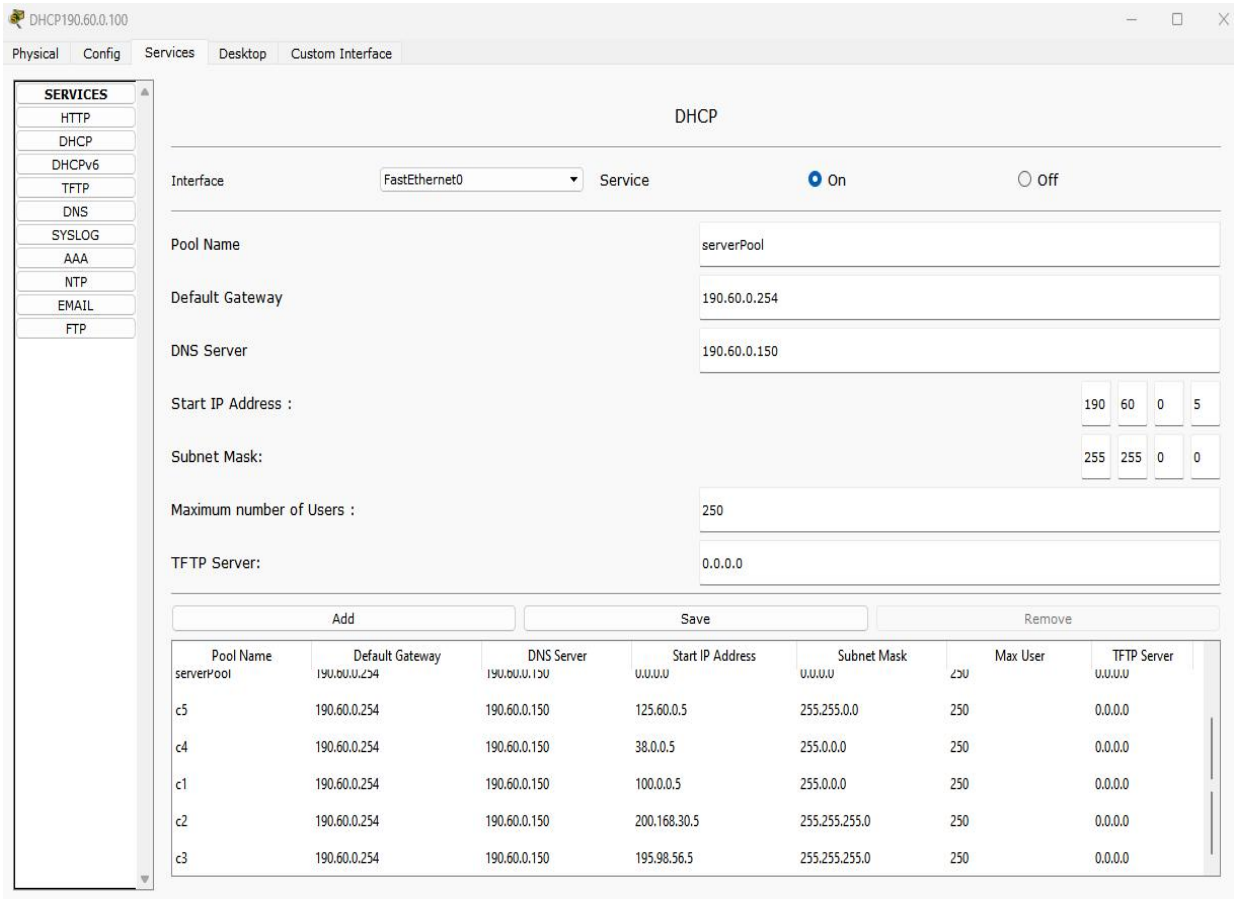


Fig: DHCP Server

Web Server:

Apex University' Web Page can be accessed from anywhere in the University Network.

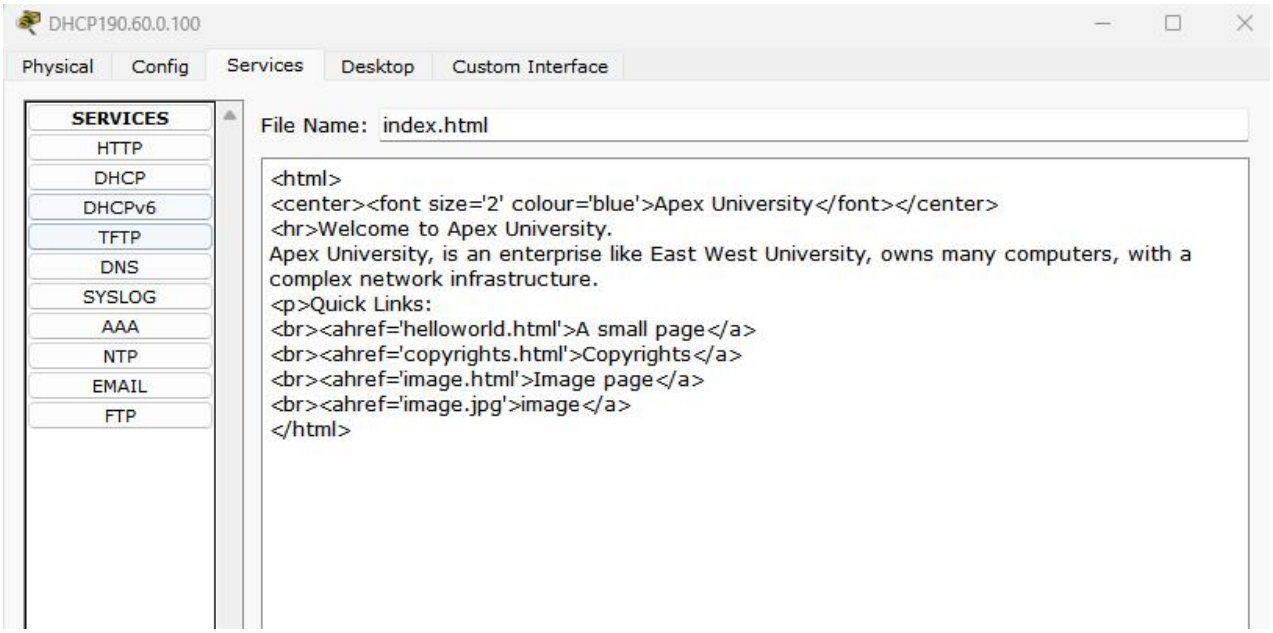


Fig: Web Server

DNS Server:

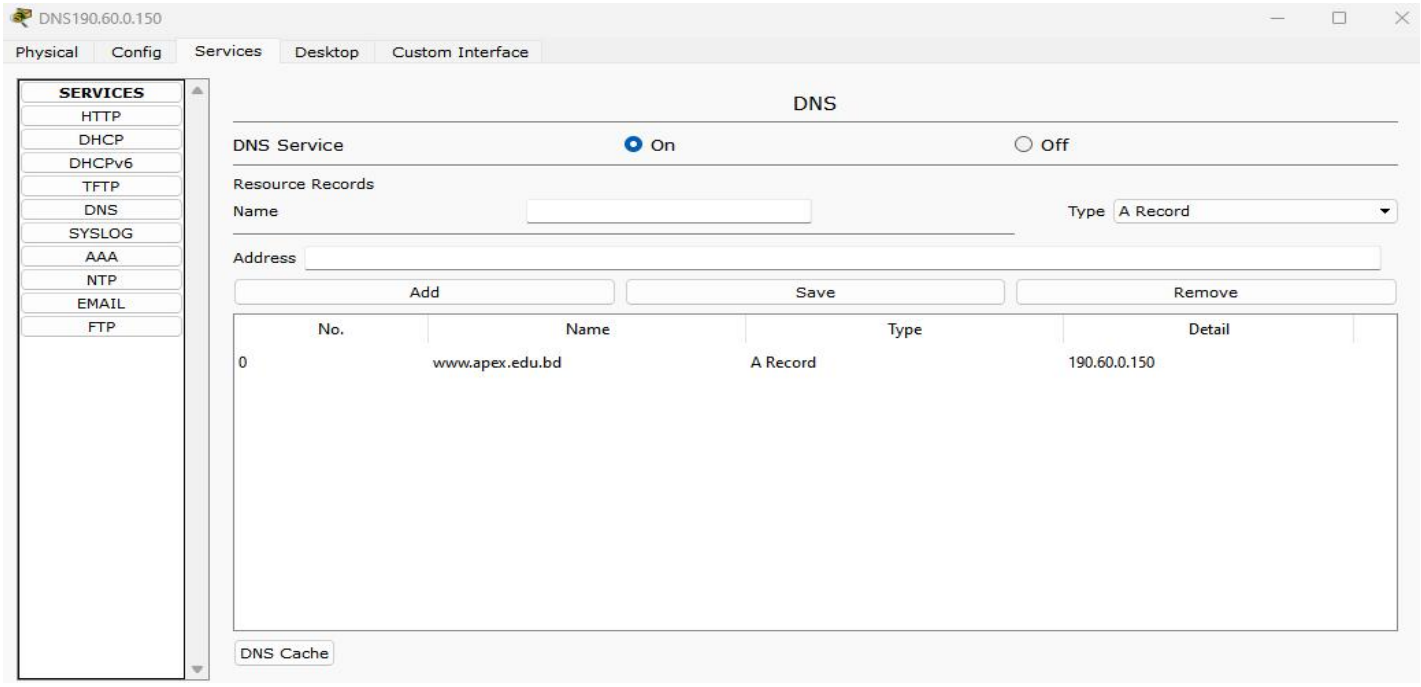
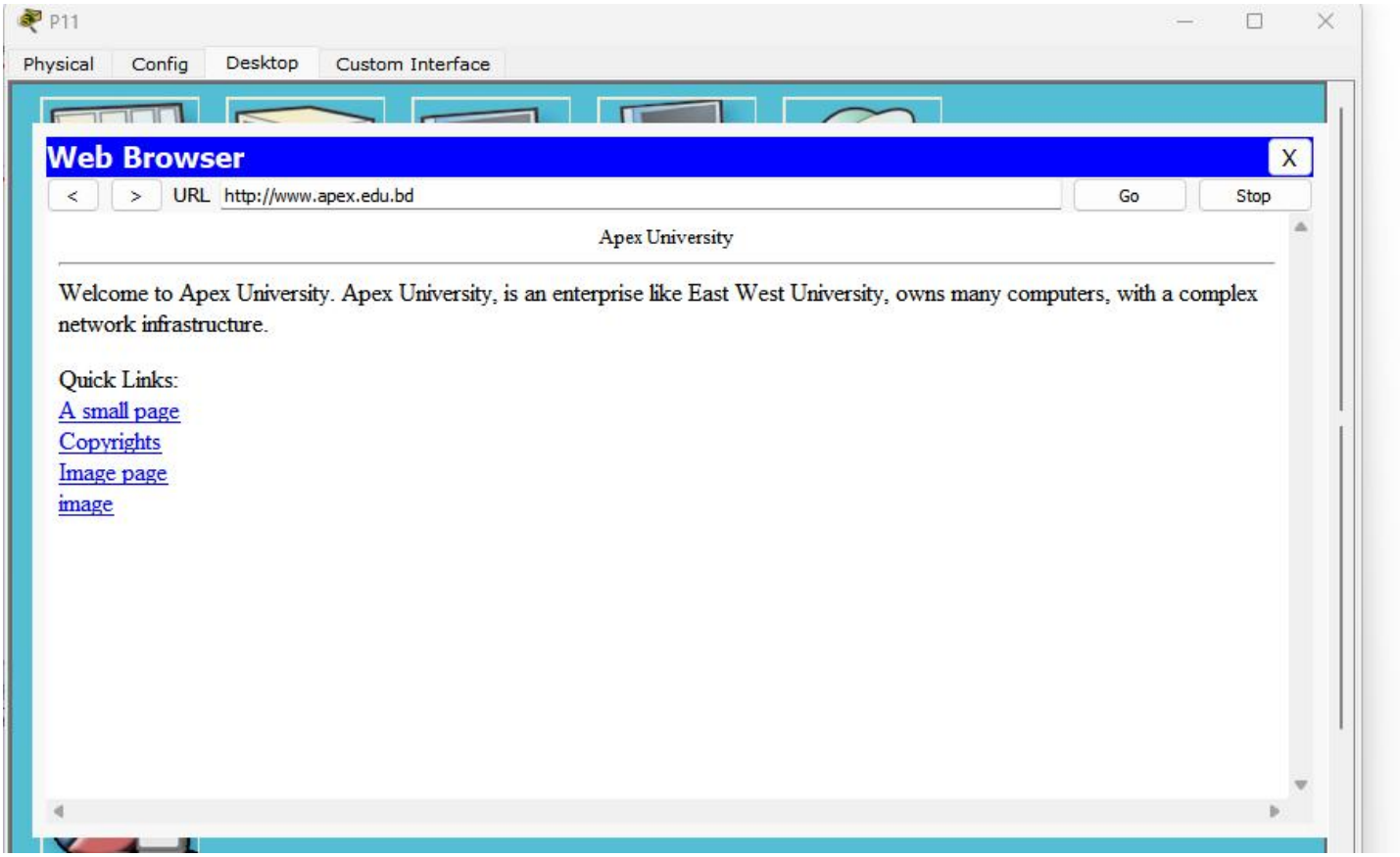


Fig: DNS Server

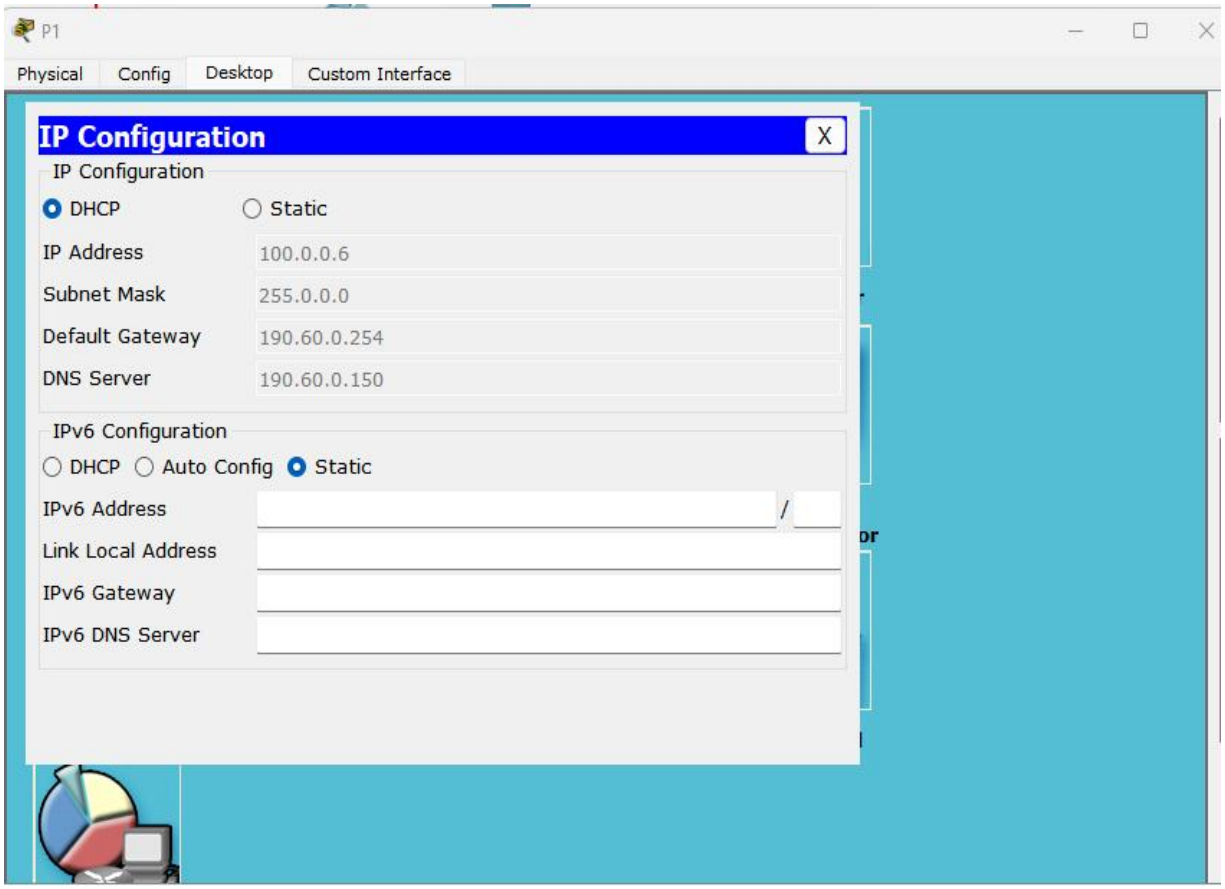
Simulations

University's Homepage Access:

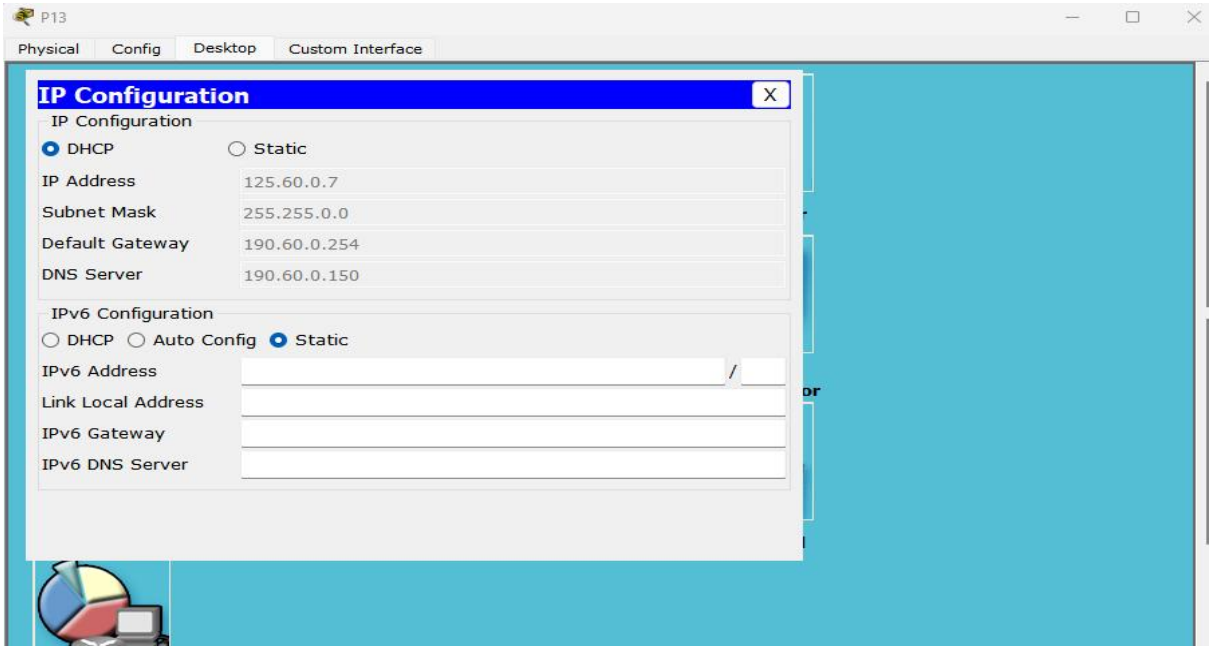


Pc no 11 Browsing University's web site with the following address:
http://www.apex.edu.bd

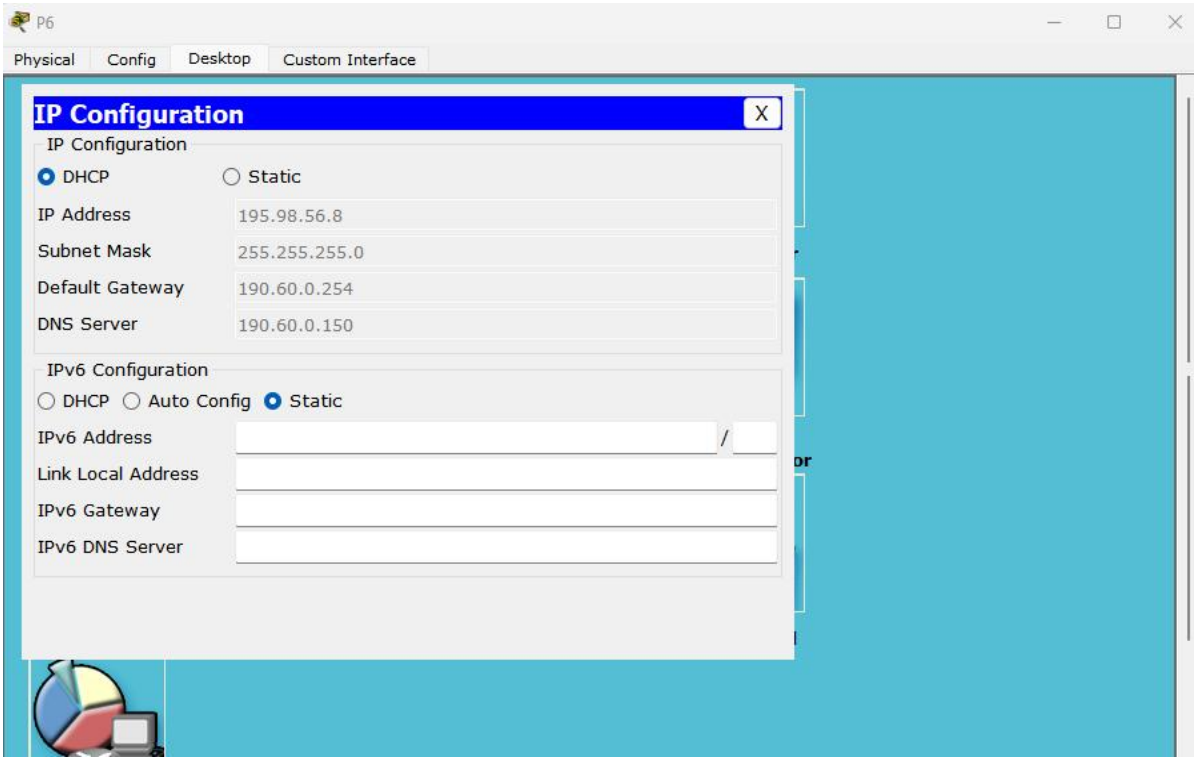
DHCP request from two different Campus network:



This Campus network uses class A IP

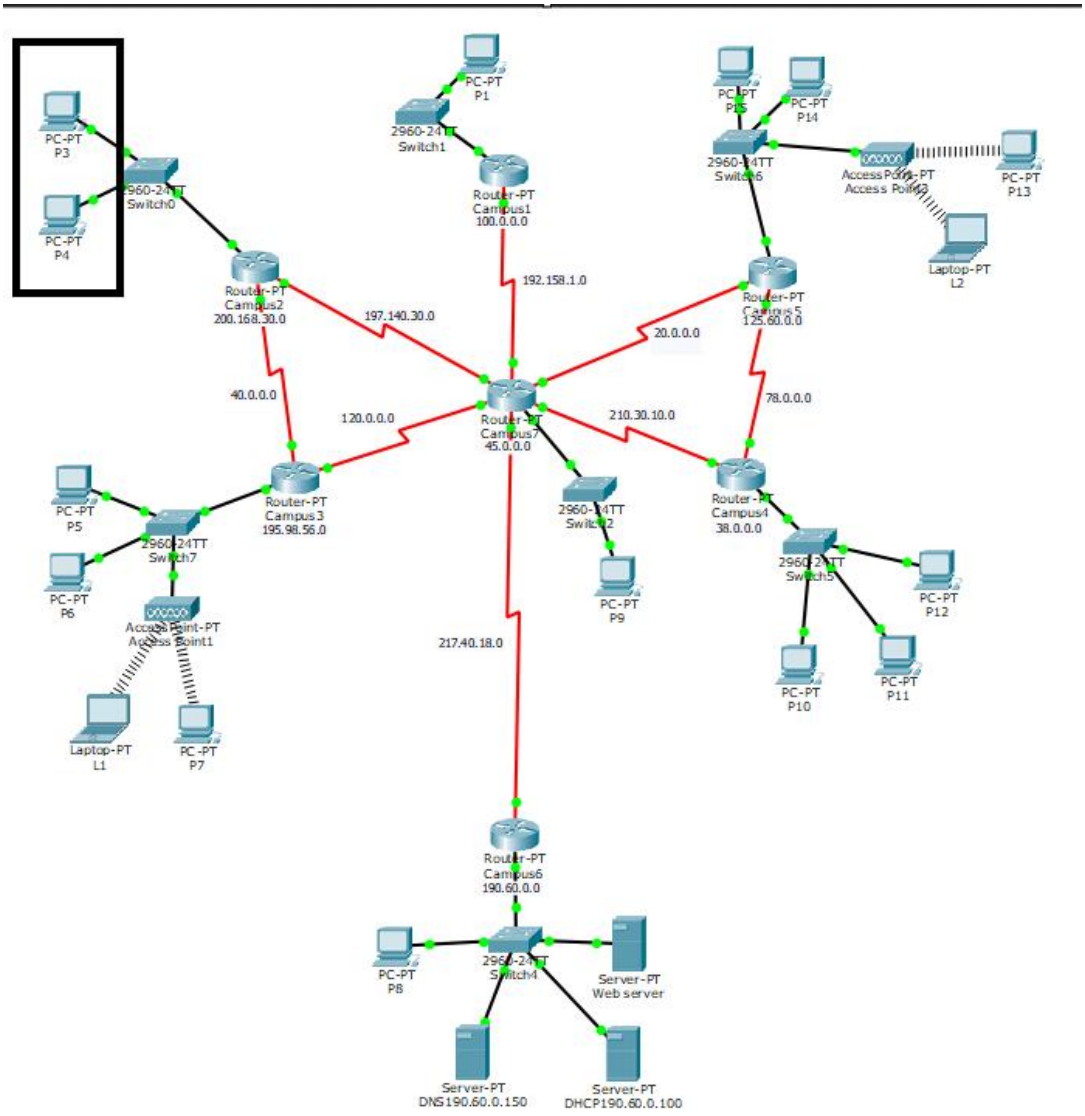


This Campus network uses class B IP



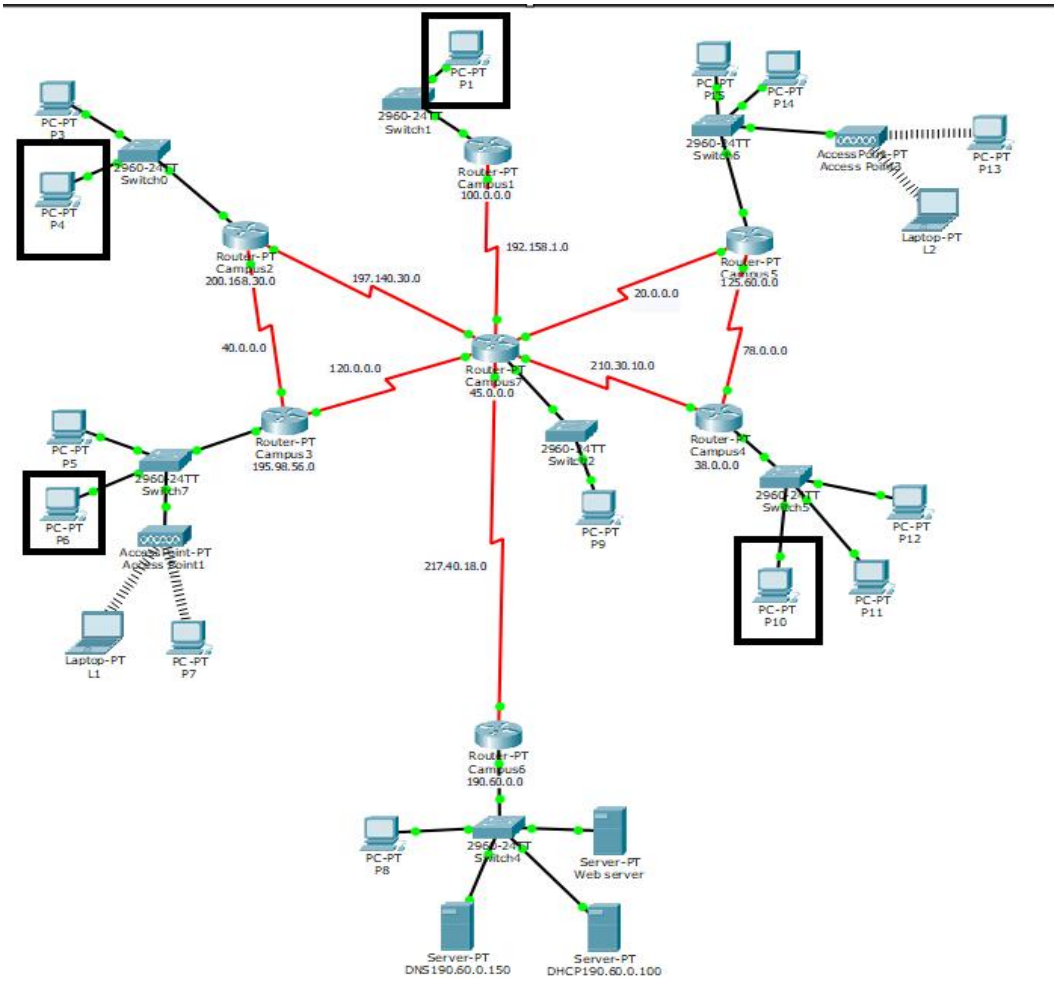
This Campus network uses class C IP

Ping from a pc to another pc (Same network):



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	P3	P4	ICMP		0.000	N	0	(edit)	(delete)

Ping from a pc to another pc (Different Network):



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
●	Successful	PC4	PC10	ICMP		0.000	N	0	(edit)	(delete)
●	Successful	PC1	PC6	ICMP		0.000	N	1	(edit)	(delete)

Routing Configuration:

Router-1	**Router-2**
interface fa0/0 ip address 100.0.0.254 255.0.0.0 no shut do wr exit interface se3/0 ip address 166.120.0.1 255.255.0.0 no shut do wr exit interface se6/0 ip address 196.160.50.1 255.255.255.0 no shut do wr exit interface se2/0 ip address 192.158.1.1 255.255.255.0 clock rate 64000 no shut do wr exit	interface fa0/0 ip address 200.168.30.254 255.255.255.0 no shut do wr exit interface se2/0 ip address 197.140.30.1 255.255.255.0 clock rate 64000 no shut do wr exit interface se3/0 ip address 166.120.0.2 255.255.0.0 clock rate 64000 no shut do wr exit interface se6/0 ip address 40.0.0.1 255.0.0.0 clock rate 64000 no shut do wr exit

Router-3

```
interface fa0/0
ip address 195.98.56.254 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 120.0.0.1 255.0.0.0
no shut
do wr
exit

interface se3/0
ip address 40.0.0.2 255.0.0.0
no shut
do wr
exit
```

Router-4

```
interface fa0/0
ip address 38.0.0.254 255.0.0.0
no shut
do wr
exit

interface se3/0
ip address 78.0.0.1 255.0.0.0
no shut
do wr
exit

interface se2/0
ip address 210.30.10.1
255.255.255.0
no shut
do wr
exit
```

Router-5

```
interface fa0/0
ip address 125.60.0.254 255.255.0.0
no shut
do wr
exit

interface se2/0
ip address 20.0.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit

interface se6/0
ip address 78.0.0.2 255.0.0.0
no shut
do wr
exit

interface se3/0
ip address 196.160.50.2 255.255.255.0
```

Router-6

```
interface fa0/0
ip address 197.30.20.254
255.255.255.0
no shut
do wr
exit

interface fa1/0
ip address 190.60.0.254
255.255.0.0
no shut
do wr
exit

interface se2/0
ip address 217.40.18.1
255.255.255.0
no shut
do wr
exit
```

clock rate 64000 no shut do wr exit	

Router-7

```
interface se2/0
ip address 192.158.1.2 255.255.255.0
no shut
do wr
exit

interface se3/0
ip address 197.140.30.2 255.255.255.0
no shut
do wr
exit

interface se6/0
ip address 20.0.0.1 255.0.0.0
no shut
do wr
exit

interface se7/0
ip address 210.30.10.2 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se8/0
ip address 217.40.18.2 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se9/0
ip address 120.0.0.2 255.0.0.0
clock rate 64000
no shut
do wr
```

```
exit

interface fa0/0
ip address 45.0.0.1 255.0.0.0
no shut
do wr
exit
```

Routing Table:

Router-1

```
router ospf 1
network 100.0.0.0 0.255.255.255 area 1
network 166.120.0.0 0.0.255.255 area 1
network 196.160.50.0 0.0.0.255 area 1
network 192.158.1.0 0.0.0.255 area 1
exit
```

Router-2

```
router ospf 2
network 200.168.30.0 0.0.0.255 area 1
network 40.0.0.0 0.255.255.255 area 1
network 197.140.30.0 0.0.0.255 area 1
network 166.120.0.0 0.0.255.255 area 1
exit
```

Router-3

```
router ospf 3
network 40.0.0.0 0.255.255.255 area 1
network 195.98.56.0 0.0.0.255 area 1
network 120.0.0.0 0.255.255.255 area 1
exit
```

Router-4

```
router ospf 4
network 210.30.10.0 0.0.0.255 area 1
network 78.0.0.0 0.255.255.255 area 1
network 38.0.0.0 0.255.255.255 area 1
exit
```

Router-5

```
router ospf 5
network 196.160.50.0 0.0.0.255 area 1
network 20.0.0.0 0.255.255.255 area 1
network 125.60.0.0 0.0.255.255 area 1
network 78.0.0.0 0.255.255.255 area 1
exit
```

Router-6

```
router ospf 6
network 217.40.18.0 0.0.0.255 area 1
network 190.60.0.0 0.0.255.255 area 1
exit
```

Router-7

```
router ospf 7
network 192.158.1.0 0.0.0.255 area 1
network 197.140.30.0 0.0.0.255 area 1
network 120.0.0.0 0.255.255.255 area 1
network 217.40.18.0 0.0.0.255 area 1
network 210.30.10.0 0.0.0.255 area 1
network 20.0.0.0 0.255.255.255 area 1
network 45.0.0.0 0.255.255.255 area 1
exit
```

Conclusion:

The complex network is completed. Routers, Switches, and wireless routers were used to create this network. Communication between all devices all over the network was established. A webserver was configured to display Apex University's Websites web page. DHCP server was incorporated to serve IP when requested and DNS server was also incorporated.