EAST WEST UNIVERSITY

Department of CSE

Course name: Computer Networks

Course Code: CSE405

Section: 02

Project Report on

Designing a full-fledged network for an organization with multiple subnets

Submitted By:

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Submitted To:

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Problem Statement:

In an increasingly interconnected world, modern organizations depend on robust and efficient network infrastructures to support their operations. This project aims to address the complex networking needs of a dynamic organization with multiple departments, remote locations, and diverse user requirements.

Description:

I would like to express my sincere gratitude to our esteemed faculty, Dr. Anisur Rahman, for providing me with the opportunity to work on this important project. My experience and knowledge gained during this project will certainly serve me well in my career in the future. The aim of this project is to develop a network complex, and this project has also given me the knowledge on how to effectively implement a well-thought-out network design. University of Scholars is an enterprise similar to East West University. It owns many computers and has a well-developed network infrastructure. In addition to wired internet access for all the classrooms and labs, the employee PCs, the library, and other admin and academic wings of the university, wireless internet access is provided for each campus. Furthermore, the university has well-developed networked systems that support various business processes such as admissions, advice, results, electronic tender, library administration, accounts, etc. This well-developed network is subnetted and switches and routing mechanisms are in place.

Objective:

Our aim is to build a comprehensive model of a comprehensive network by understanding the interconnectedness of the systems and the subnetworks. The structure and facilities of the University will be reflected in the characteristics of the network. The characteristics of the network will include:

- The University's web page will reflect the University of Professionals' web page.

- A single DNS server needs to be installed to locate the web server - meaning people will browse the University's website with the following address:- http://www.scholars.edu.bd
- Configure the whole network in such a way that IP for the hosts of different campuses will be automatically allocated by a single DHCP server.
- Make sure to add some wireless hosts to the network in addition to the wired hosts.
- The University has a complete network covering its seven (07) campuses with seven (07) routers. All the hosts in the network will be connected.

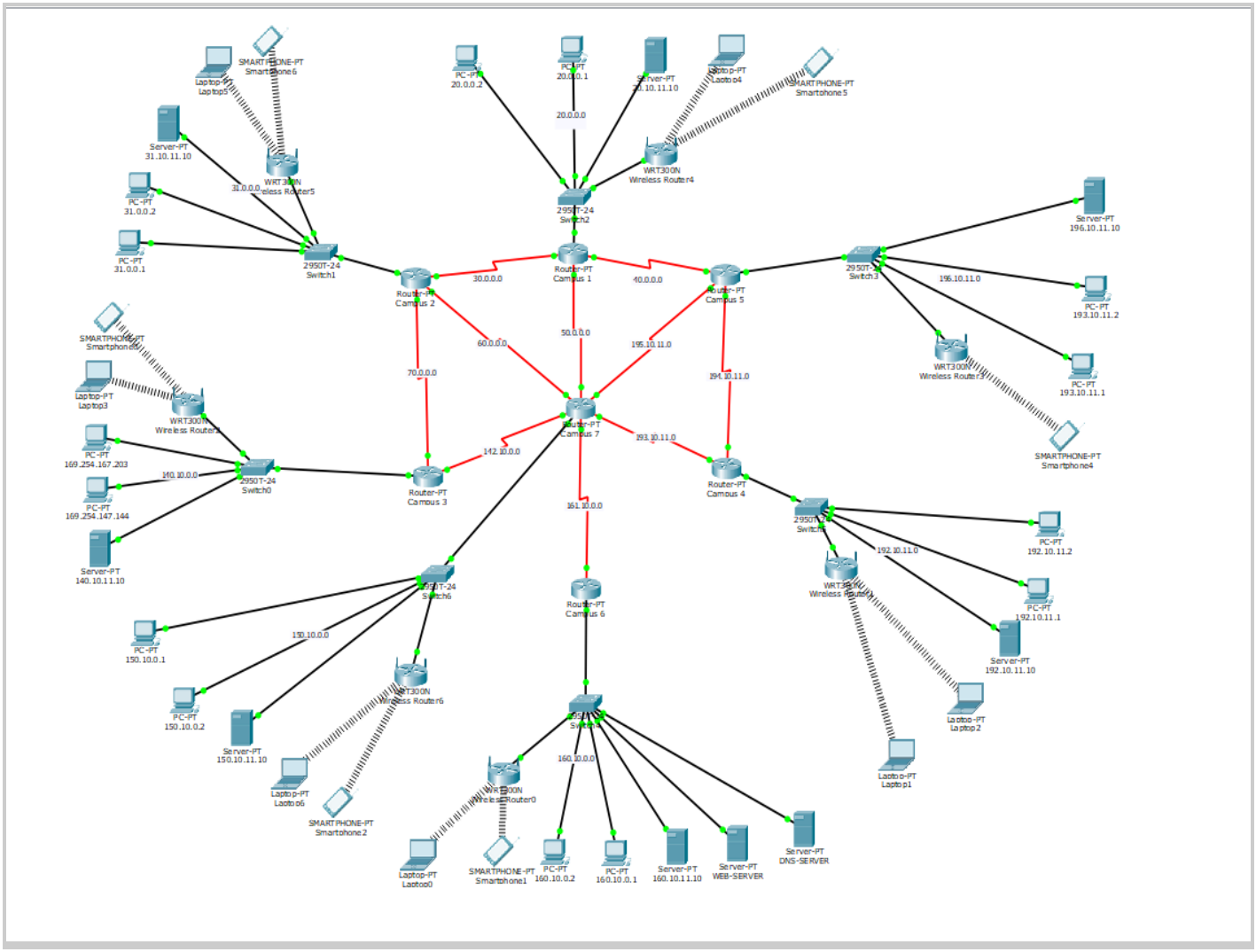
Requirements:

- Seven (07) routers
- Seven (07) switches
- PCs
- Laptops
- DHCP Server (Dynamic Host Configuration Protocol)
- DNS Server (Domain name System)
- WEB Server
- Straight Through Cable
- Serial DCE Cable
- Smartphones.

Features:

- Network addresses will be from all three (03) classes.
- Incorporation of different subnets.

Diagram:



University of Scholars Network

Number of Hosts: 27

Number of networks: 17

Class A Ip Address network IP used are in the University of Scholars Network : -

- 20.0.0.0
- 30.0.0.0
- 31.0.0.0
- 40.0.0.0
- 50.0.0.0
- 60.0.0.0
- 70.0.0.0

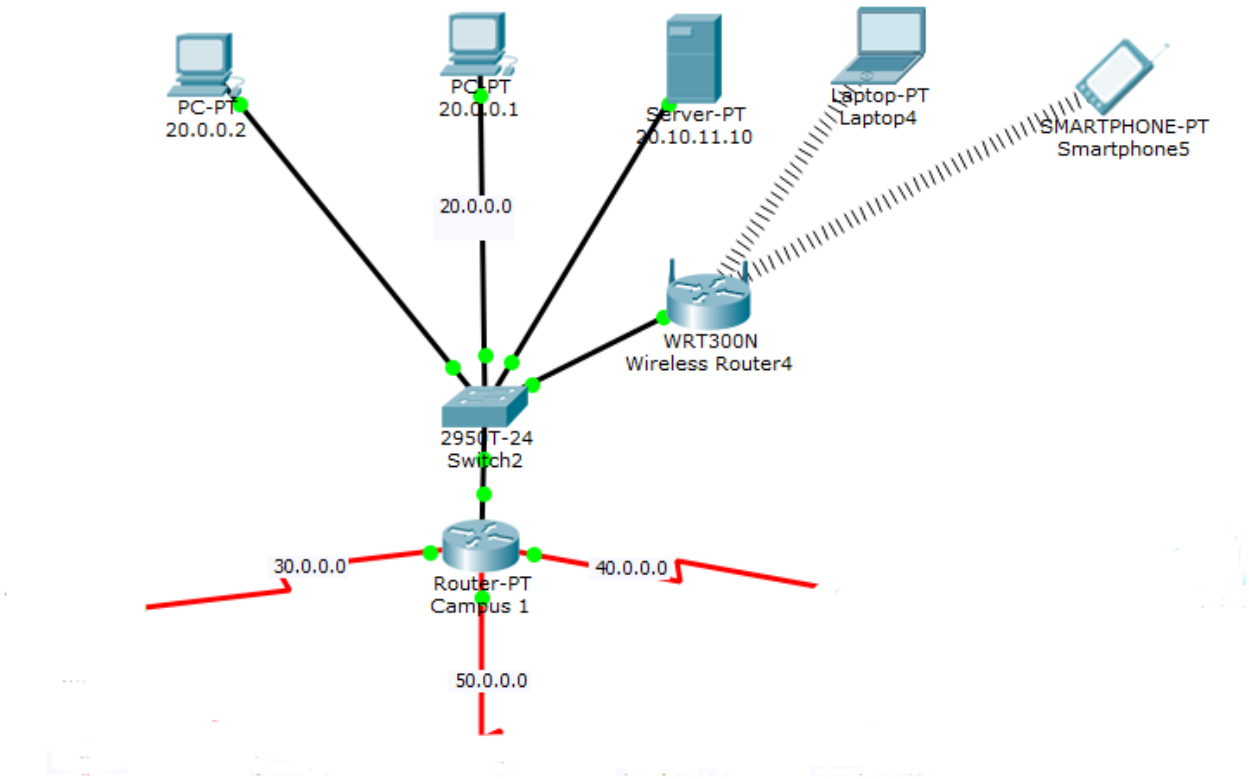
Class B Ip Address network IP used are in the University of Scholars Network : -

- 140.10.0.0
- 142.10.0.0
- 150.10.0.0
- 160.10.0.0
- 161.10.0.0

Class C Ip Address network IP used are in the University of Scholars Network : -

- 192.10.11.0
- 193.10.11.0
- 194.10.11.0
- 195.10.11.0
- 196.10.11.0

Campus Design, Configuration and routing table:



Campus 1

We can see here that I used four (04) Network IP Addresses. 20.0.0.0 , 30.0.0.0 , 40.0.0.0 and 50.0.0.0 and the host of numbers are four (04). One DHCP server.

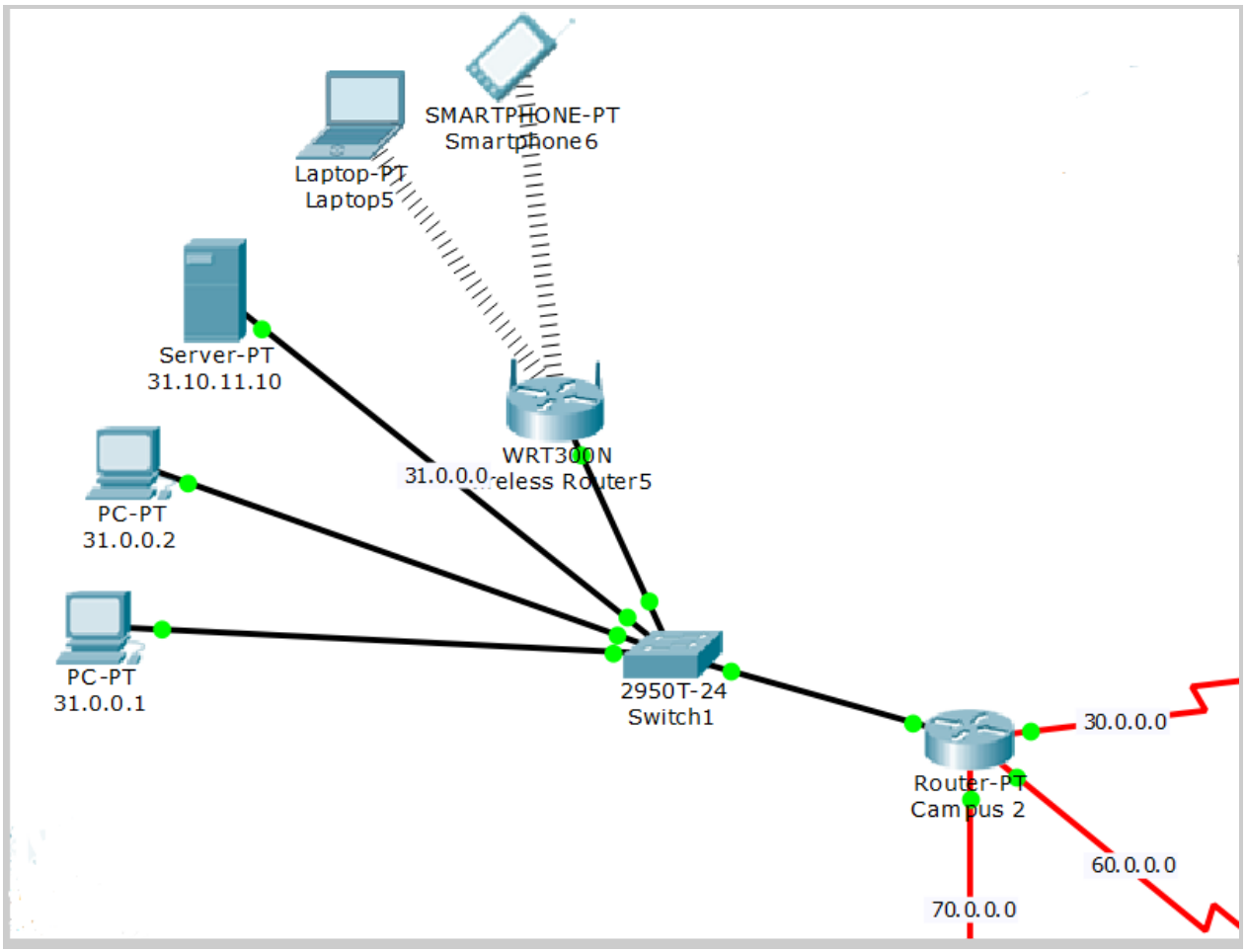
Configuration of Campus 1:-

```
interface fa0/0
ip address 20.10.11.254 255.0.0.0
no shut
do wr
exit

interface se2/0
ip address 30.10.20.1 255.0.0.0
clock rate 6400
no shut
do wr
exit

interface se3/0
ip address 40.20.30.1 255.0.0.0
no shut
do wr
exit
```

```
interface se6/0
ip address 50.30.40.1 255.0.0.0
clock rate 6400
no shut
do wr
exit
```

Routing table of Campus 1:-

```
router ospf 1
network 20.0.0.0 255.0.0.0 area 1
network 30.0.0.0 255.0.0.0 area 1
network 40.0.0.0 255.0.0.0 area 1
network 50.0.0.0 255.0.0.0 area 1
exit
```



Campus 2

We can see here that I used four (04) Network IP Addresses. 30.0.0.0 , 31.0.0.0 , 60.0.0.0 and 70.0.0.0 and the host of numbers are four (04). One DHCP server.

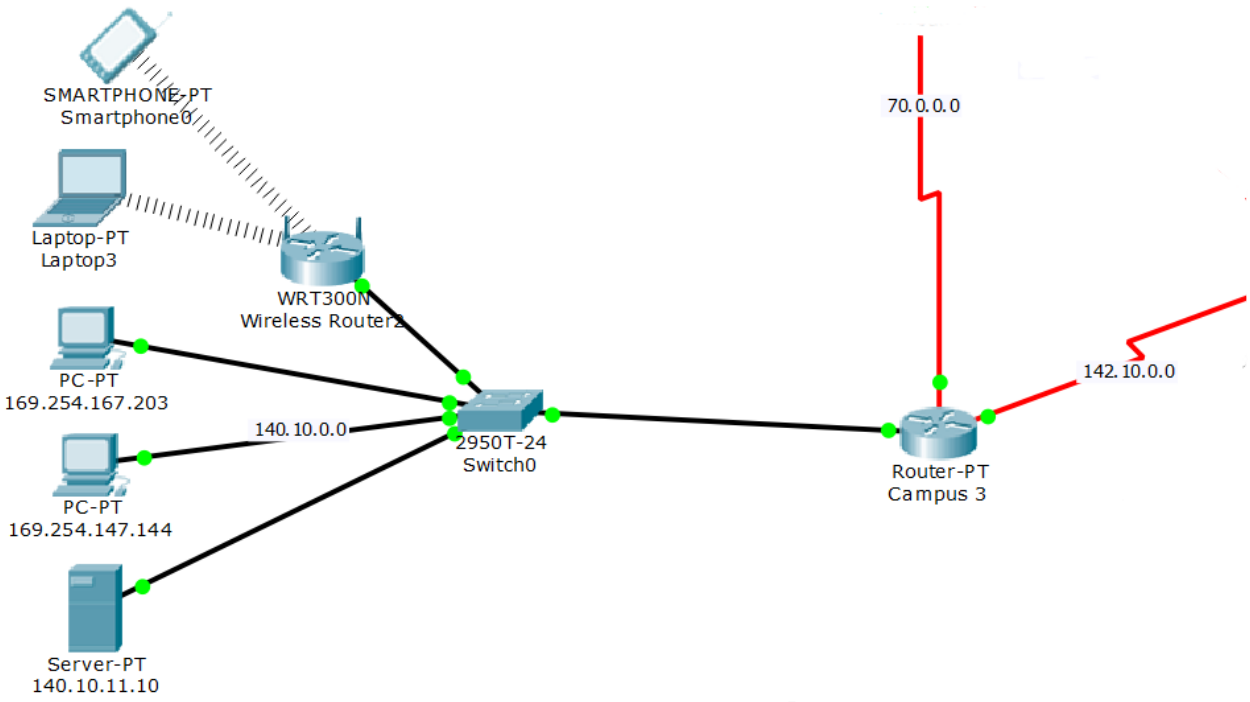
Configuration of Campus 2:-

```
interface fa0/0
ip address 31.10.11.254 255.0.0.0
no shut
do wr
exit

interface se3/0
ip address 30.10.20.2 255.0.0.0
no shut
do wr
exit

interface se2/0
ip address 70.10.11.1 255.0.0.0
clock rate 6400
no shut
do wr
exit
```

```
interface se6/0
ip address 60.10.11.1 255.0.0.0
clock rate 6400
no shut
do wr
exit
```

Routing table of Campus 2:-

```
router ospf 2
network 31.0.0.0 255.0.0.0 area 1
network 30.0.0.0 255.0.0.0 area 1
network 60.0.0.0 255.0.0.0 area 1
network 70.0.0.0 255.0.0.0 area 1
exit
```



Campus 3

We can see here that I used three (03) Network IP Addresses. 140.10.0.0 , 142.10.0.0 and 70.0.0.0 and the host of numbers are four (04). One DHCP server.

Configuration of Campus 3:-

```
interface fa0/0
ip address 140.10.11.254 255.255.0.0
no shut
do wr
exit

interface se2/0
ip address 70.10.11.2 255.0.0.0
no shut
do wr
exit

interface se3/0
ip address 142.10.11.1 255.255.0.0
clock rate 6400
no shut
do wr
exit
```

Routing table of Campus 3:-

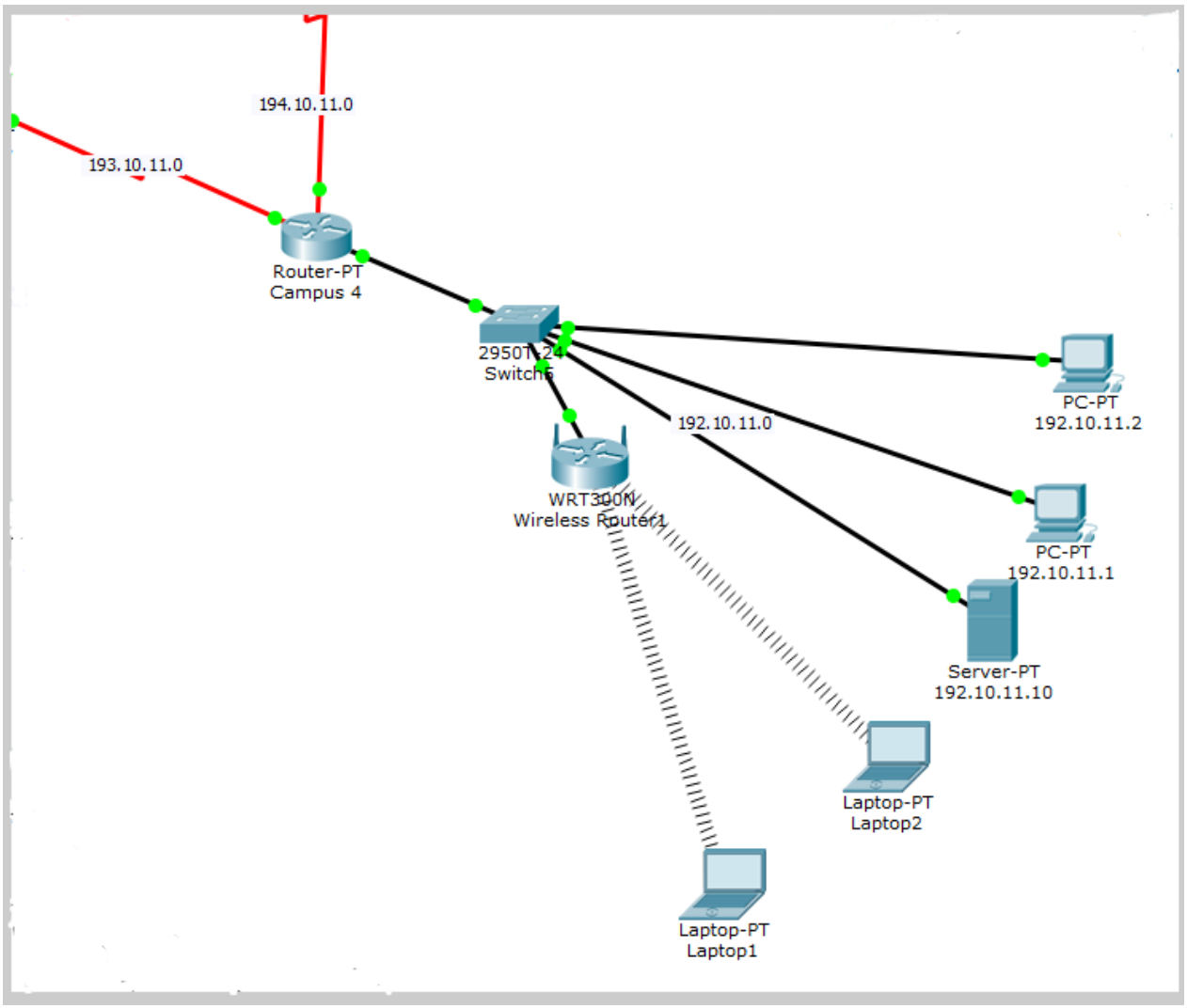
router ospf 3

network 70.0.0.0 255.0.0.0 area 1

network 140.10.0.0 255.255.0.0 area 1

network 142.10.0.0 255.255.0.0 area 1

exit



Campus 4

We can see here that I used three (03) Network IP Addresses. 192.10.11.0 , 193.10.11.0 and 194.10.11.0 and the host of numbers are four (04). One DHCP server.

Configuration of Campus 4:-

interface fa0/0

ip address 192.10.11.254 255.255.255.0

no shut

do wr

exit

interface se3/0

ip address 193.10.11.1 255.255.255.0

clock rate 6400

no shut

do wr

exit

interface se2/0

ip address 194.10.11.1 255.255.255.0

no shut

do wr

exit

Routing table of Campus 4:-

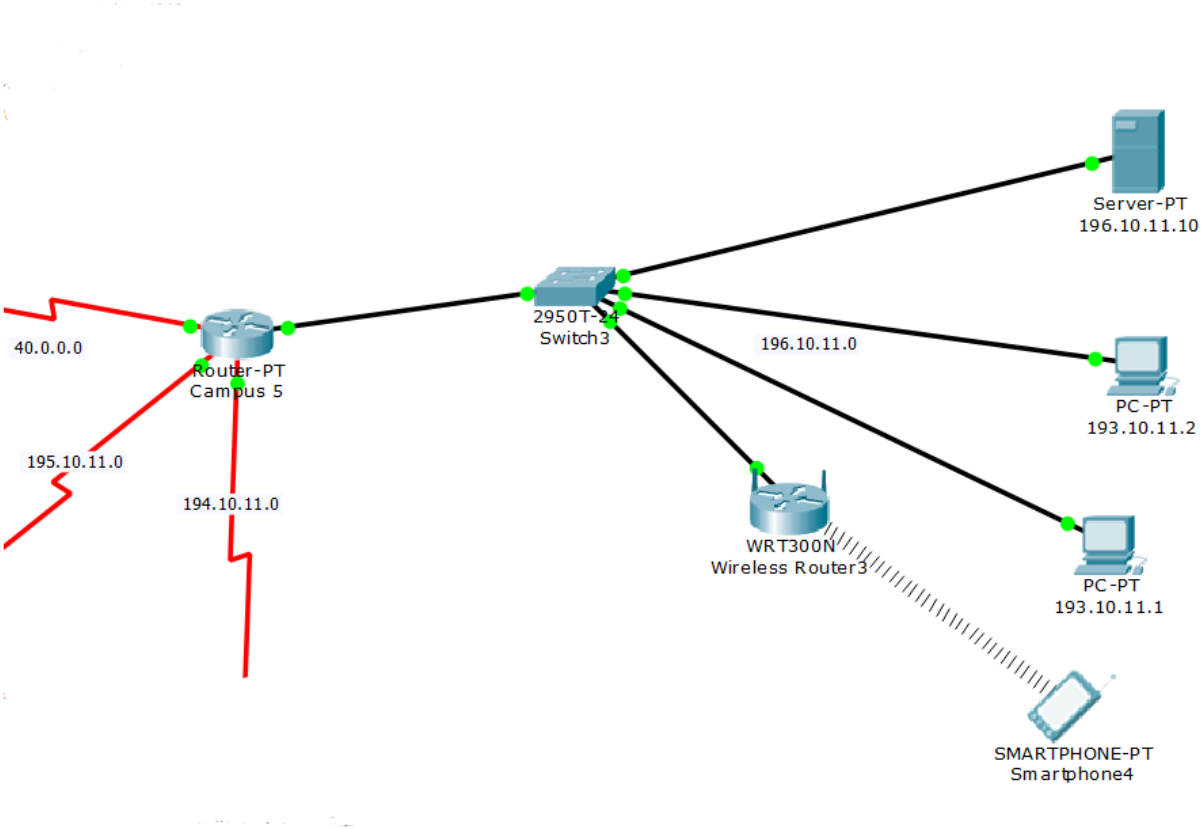
router ospf 4

network 192.10.11.0 255.255.255.0 area 1

network 193.10.11.0 255.255.255.0 area 1

network 194.10.11.0 255.255.255.0 area 1

exit



Campus 5

We can see here that I used four (04) Network IP Addresses. 40.0.0.0 , 194.10.11.0 195.10.11.0 and 196.10.11.0 and the host of numbers are three (03). One DHCP server.

Configuration of Campus 5:-

```
interface fa0/0
ip address 196.10.11.254 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 40.20.30.2 255.0.0.0
no shut
do wr
exit

interface se3/0
ip address 194.10.11.2 255.255.255.0
clock rate 6400
no shut
do wr
exit
```

interface se6/0

ip address 195.10.11.1 255.255.255.0

clock rate 6400

no shut

do wr

exit

Routing table of Campus 5:-

router ospf 5

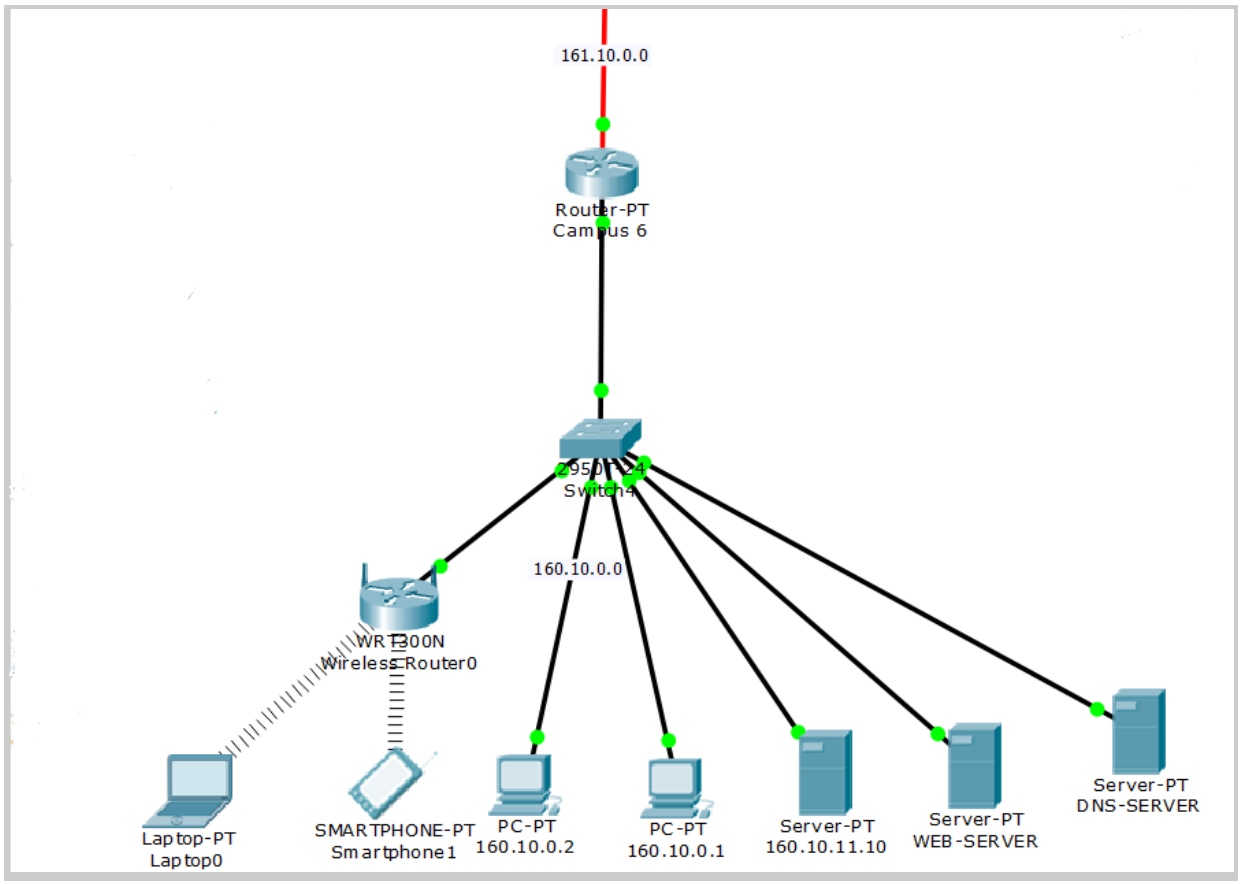
network 40.0.0.0 255.0.0.0 area 1

network 194.10.11.0 255.255.255.0 area 1

network 195.10.11.0 255.255.255.0 area 1

network 196.10.11.0 255.255.255.0 area 1

exit



Campus 6

We can see here that I used two (02) Network IP Addresses. 160.10.0.0 and 161.10.0.0 and the host of numbers are four (04). One DHCP server. One WEB-SERVER and DNS-SERVER.

Configuration of Campus 6:-

interface fa0/0

ip address 160.10.11.254 255.255.0.0

no shut

do wr

exit

interface se2/0

ip address 161.10.11.1 255.255.0.0

clock rate 6400

no shut

do wr

exit

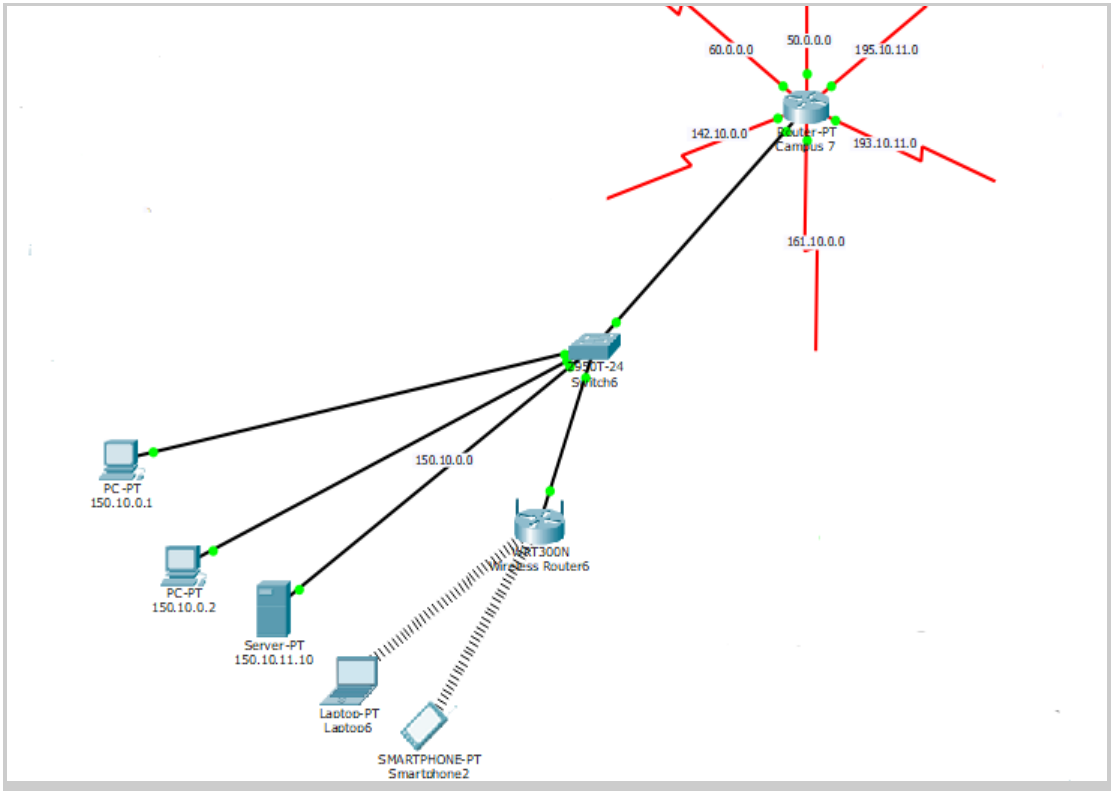
Routing table of Campus 6:-

router ospf 6

network 160.10.0.0 255.255.0.0 area 1

network 161.10.0.0 255.255.0.0 area 1

exit



Campus 7

We can see here that I used seven (07) Network IP Addresses. 150.10.0.0 , 142.10.0.0 , 60.0.0.0 , 50.0.0.0 , 195.10.11.0 ,193.10.11.0 and 161.10.0.0 and the host of numbers are four (04). One DHCP server.

Configuration of Campus 7:-

interface fa0/0

ip address 150.10.11.254 255.255.0.0

no shut

do wr

exit

interface se7/0

ip address 142.10.11.2 255.255.0.0

no shut

do wr

exit

interface se6/0

ip address 50.30.40.2 255.0.0.0

no shut

do wr

exit

```
interface se2/0
ip address 193.10.11.2 255.255.255.0
no shut
do wr
exit

interface se9/0
ip address 161.10.11.2 255.255.0.0
no shut
do wr
exit

interface se3/0
ip address 195.10.11.2 255.255.255.0
no shut
do wr
exit
```

interface se8/0

ip address 60.10.11.2 255.0.0.0

no shut

do wr

exit

Routing table of Campus 7:-

router ospf 7

network 50.0.0.0 255.0.0.0 area 1

network 60.0.0.0 255.0.0.0 area 1

network 142.10.0.0 255.255.0.0 area 1

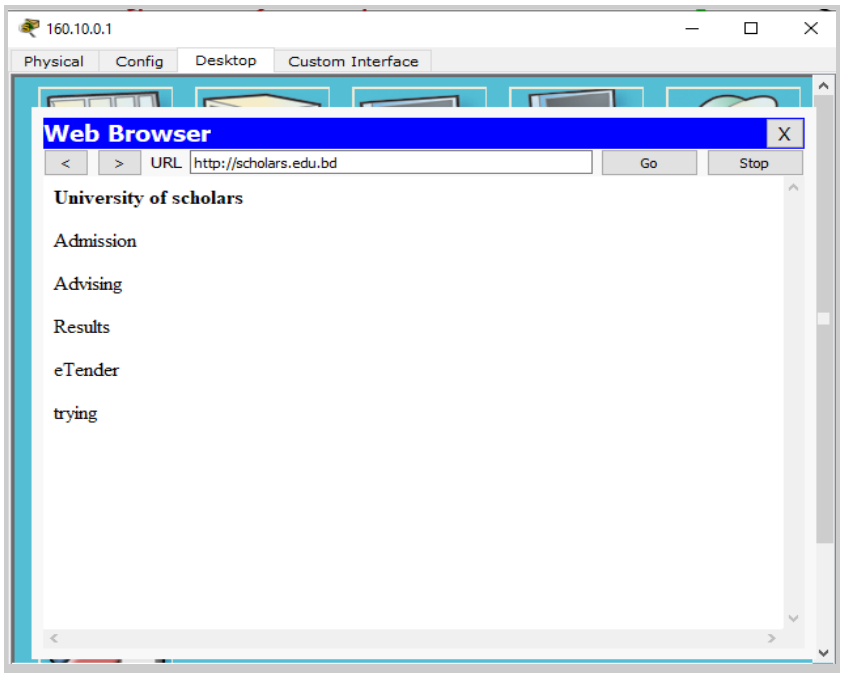
network 150.10.50.0 255.255.0.0 area 1

network 161.10.0.0 255.255.0.0 area 1

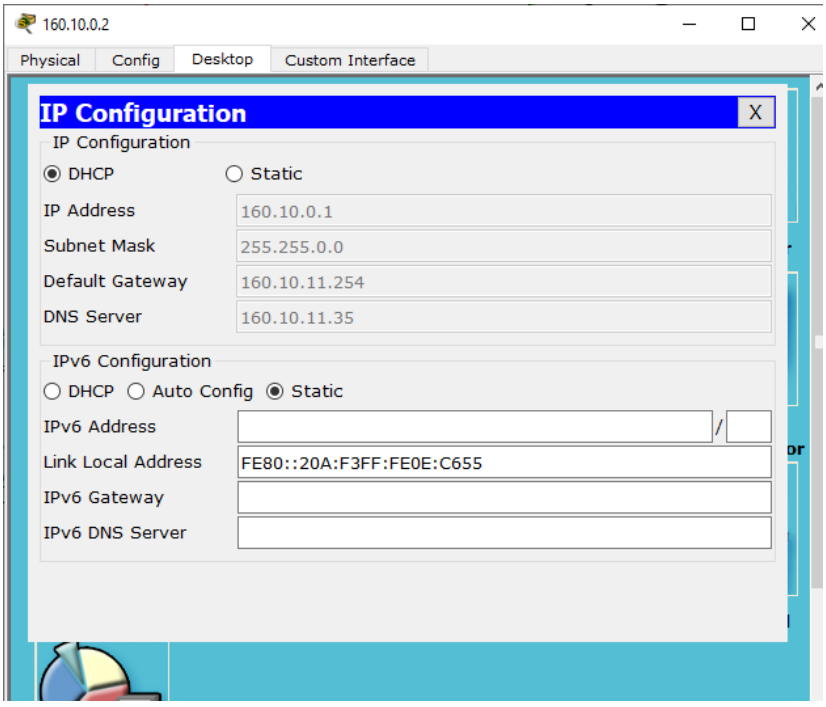
network 193.10.11.0 255.255.255.0 area 1

network 195.10.11.0 255.255.255.0 area 1

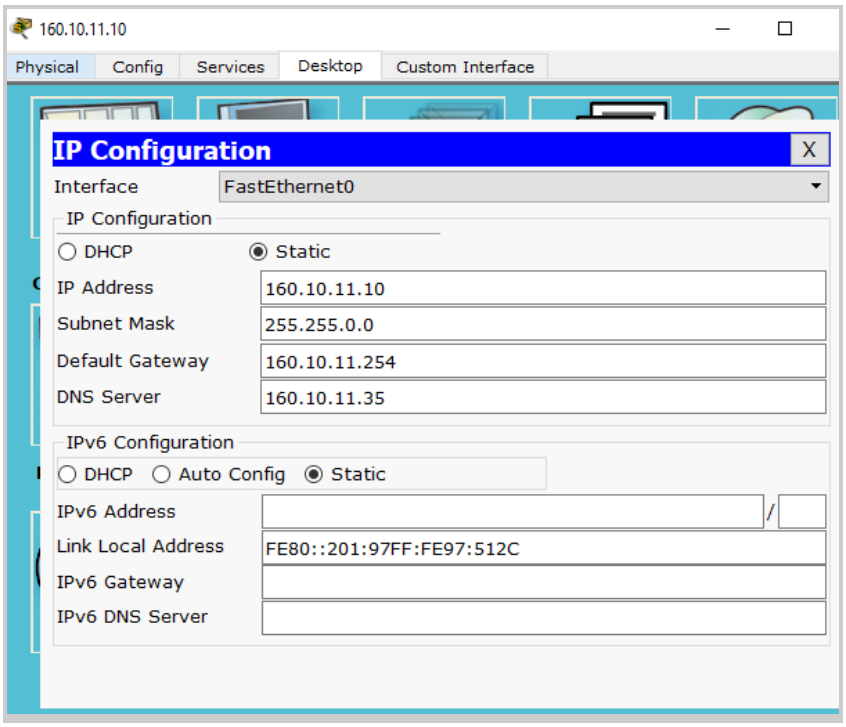
exit



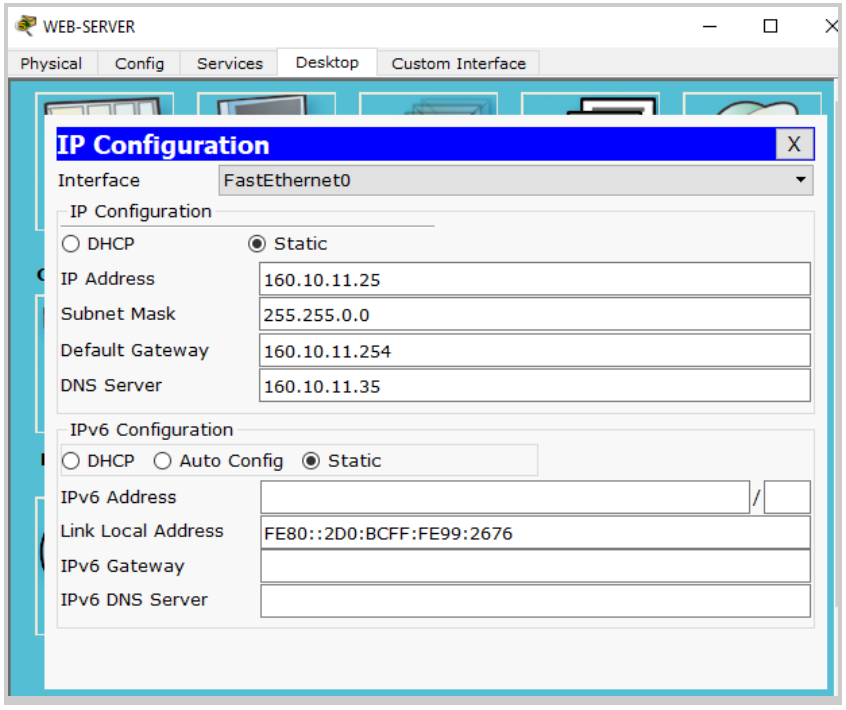
Web-Page of University of Scholars Network



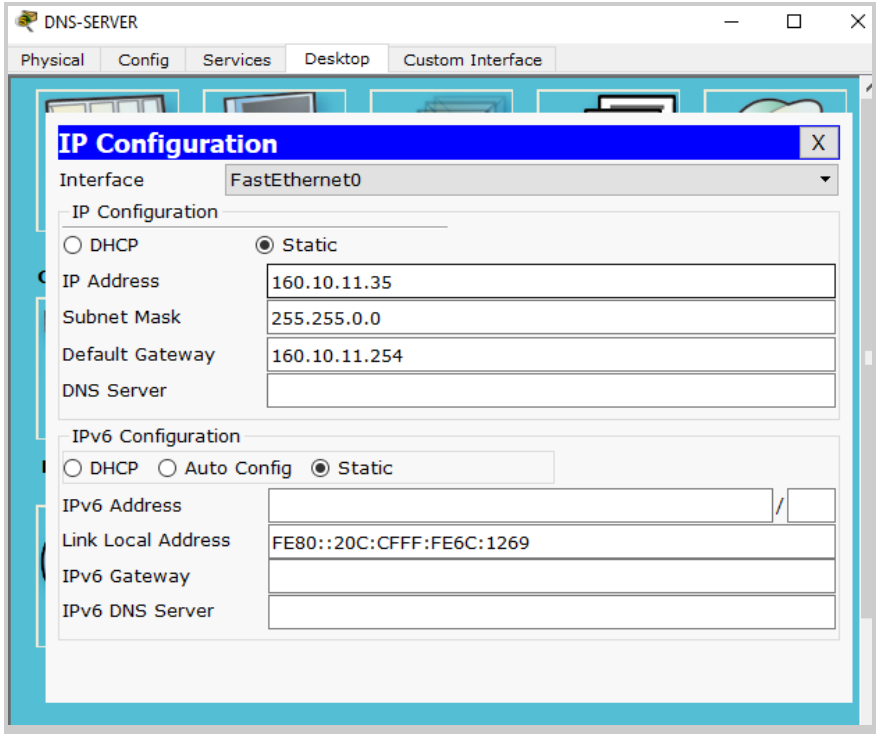
PC Ip-config of 160.10.0.1 Network of 160.10.0.0



DHCP-SERVER of the IP is 160.10.11.10



WEB-SERVER of 160.10.11.25 Network of 160.10.0.0



DNS-SERVER of 160.10.11.35 Network of 160.10.0.0

Result:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	193.10...	169.254.167....	ICMP		0.000	N	0	(edit)	(delete)
	Successful	20.0.0.2	193.10.11.1	ICMP		0.000	N	1	(edit)	(delete)
	Successful	31.0.0.2	193.10.11.1	ICMP		0.000	N	2	(edit)	(delete)
	Successful	31.0.0.1	169.254.147....	ICMP		0.000	N	3	(edit)	(delete)

Activate Windows
Go to Settings to activate Windows.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	192.10...	150.10.0.2	ICMP		0.000	N	0	(edit)	(delete)
	Successful	20.0.0.1	160.10.0.2	ICMP		0.000	N	1	(edit)	(delete)
	Successful	192.10...	160.10.0.1	ICMP		0.000	N	2	(edit)	(delete)

Activate Windows
Go to Settings to activate Windows.

All networks are ping successfully.

Conclusion:

Basically, university network systems are really important for keeping modern educational institutions running smoothly. They're designed so that all campuses can access the same information and resources, like class schedules, online courses, and email. Plus, they help everyone in the university community communicate and collaborate and make it easier to do administrative stuff like grading and keeping track of records. All in all, a good network system is key for any school to be successful and efficient.

Overall, a well-designed and properly maintained university network system is essential for the success and efficiency of any educational institution.

THE END ..... THANK YOU FOR READING