
Mini Project

on

"A full-fledged network for an organization with multiple subnets."

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Course Title: Computer Networks

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## Abstract:

University of Professionals, is a University like East West university The university owns a large amount of computers, labs, classrooms. Here, we are designing a full-fledged network for University of Professionals, where the network covers all six of the university's campuses. All the campuses and different academic wings and this institute's website is connected under a large network.

There is also a Web site which will be hosted in a web server with a DNS server that will locate the web server for people that will browse the University's website with the following address**: http://www.professionals.edu**

## Tools:

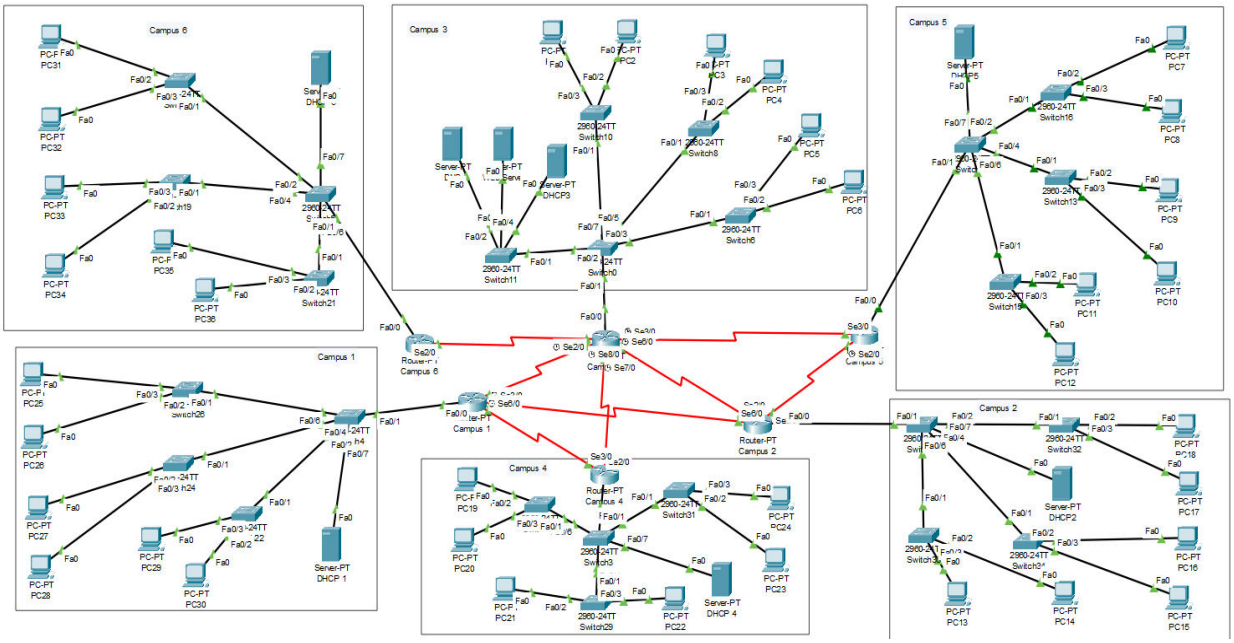
### 1) Software Used:

- Cisco_Packet_Tracer_820_Windows_64bit_1048513af2

### 2)Component Used

1. PC's
2. Switches(Model-2960)
3. Copper Straight through cable
4. Serial DEC cable
5. Routers (Model-RouterPT)
6. DNS server
7. DHCP servers
8. Web Servers

# Logical Diagram:




## Design Details:

The design is very simple where each campus is associated with a router which is connected to other routers of other campuses. Each campus is under different subnets. For each Campus only C Class network has been used to create these subnets.

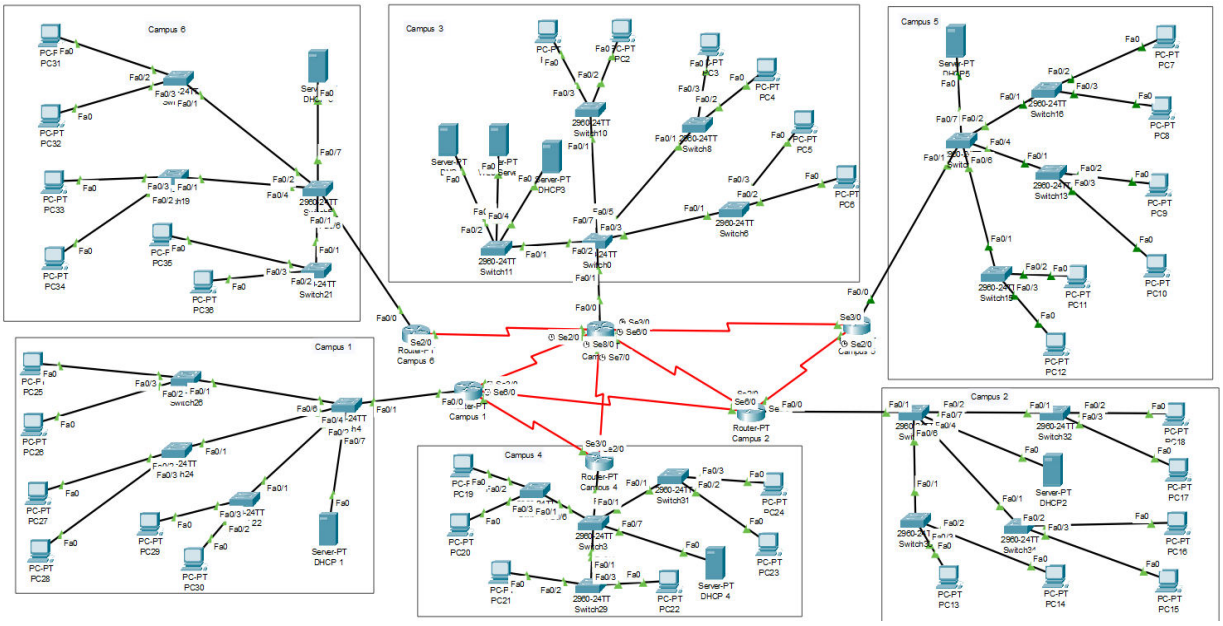
The main server room is within campus 3 where there is a Web server to host the institute's
official website, a DNS server. All campuses have a DHCP server which will give all the PCs in that campus an IP address, gateway IP and DNS IP.

The design is very flexible and if needed more PCs and academic wings can be added as well to this network. Since we are using multiple switches, we can expand the network if necessary.

# Network connection analysis:

## Campuses:

Each Campus has their own network:




| Campus | IP Address | Ip Type |
|---|---|---|
| Campus 6 | 192.168.6.0 | Class C |
| Campus 3 | 192.168.3.0 | Class C |
| Campus 5 | 192.168.5.0 | Class C |
| Campus 1 | 192.168.1.0 | Class C |
| Campus 4 | 192.168.4.0 | Class C |
| Campus 2 | 192.168.2.0 | Class C |

## Algorithms:

For this routing setup we used the OSPF algorithm with multiple routers. The CLI commands are given below.

CLI codes for routing and routing table:

## Router 1:

```
enable
config
interface fa0/0
ip address 192.168.1.254 255.255.255.0
no shut
do wr
exit

interface se3/0
ip address 192.168.10.1 255.255.255.0
clock rate
64000 no shut
do wr
exit

interface se6/0
ip address 192.168.20.1 255.255.255.0
clock rate
64000 no shut
do wr
exit

interface se2/0
ip address 192.168.30.1 255.255.255.0
no shut
do wr
exit
```

## Router 2:

```
enable
config

interface fa0/0
ip address 192.168.2.254 255.255.255.0
no shut
```

do wr
exit

interface se6/0
ip address 192.168.10.2 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 192.168.50.1 255.255.255.0
no shut
do wr
exit

interface se3/0
ip address 192.168.40.1 255.255.255.0
no shut
do wr
exit

## Router 3:

enable
config

interface fa0/0
ip address 192.168.3.254 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 192.168.70.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se3/0
ip address 192.168.60.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se8/0
ip address 192.168.30.2 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se6/0
ip address 192.168.50.2 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se7/0
ip address 192.168.80.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

## Router 4:

enable
config

interface fa0/0
ip address 192.168.4.254 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 192.168.80.2 255.255.255.0
no shut
do wr
exit

interface se3/0
ip address 192.168.20.2 255.255.255.0
no shut
do wr
exit

## Router 5:

enable
config

interface fa0/0
ip address 192.168.5.254 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 192.168.40.2 255.255.255.0
clock rate
64000 no shut
do wr
exit

interface se3/0
ip address 192.168.60.2 255.255.255.0
no shut
do wr
exit

## Router 6:

enable
config

interface fa0/0
ip address 192.168.6.254 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 192.168.70.2 255.255.255.0
no shut
do wr
exit

## Routing Table

router-1:
enable
configure terminal
router OSPF 1
network 192.168.1.0 0.0.0.255 area 1
network 192.168.20.0 0.0.0.255 area 1
network 192.168.10.0 0.0.0.255 area 1
network 192.168.30.0 0.0.0.255 area 1
exit

router-2:
enable
configure terminal
router OSPF 2
network 192.168.2.0 0.0.0.255 area 1
network 192.168.10.0 0.0.0.255 area 1
network 192.168.50.0 0.0.0.255 area 1
network 192.168.40.0 0.0.0.255 area 1
exit

router-3:
enable
configure terminal
router OSPF 3
network 192.168.3.0 0.0.0.255 area 1
network 192.168.60.0 0.0.0.255 area 1
network 192.168.50.0 0.0.0.255 area 1
network 192.168.80.0 0.0.0.255 area 1
network 192.168.30.0 0.0.0.255 area 1
network 192.168.70.0 0.0.0.255 area 1 exit

router-4:
enable
configure terminal
router OSPF 4
network 192.168.80.0 0.0.0.255 area 1
network 192.168.20.0 0.0.0.255 area 1
network 192.168.4.0 0.0.0.255 area 1
exit

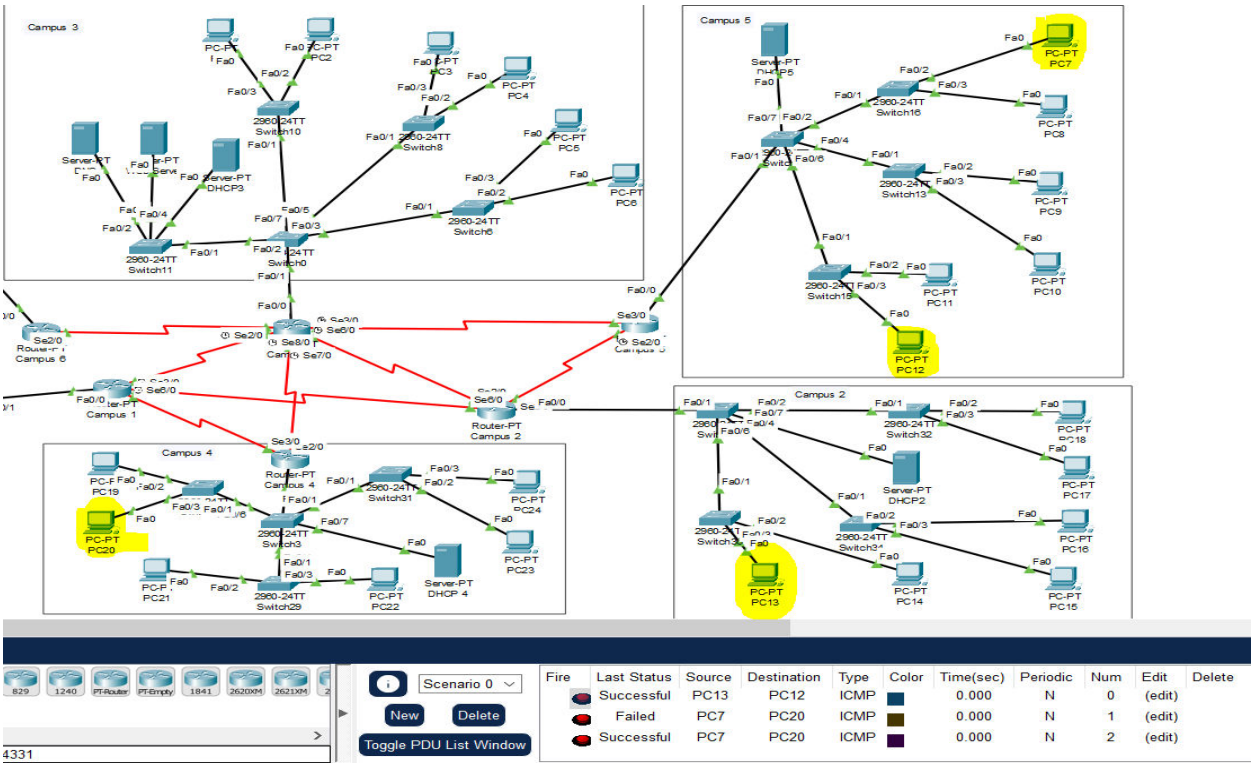
router-5:
enable
configure terminal

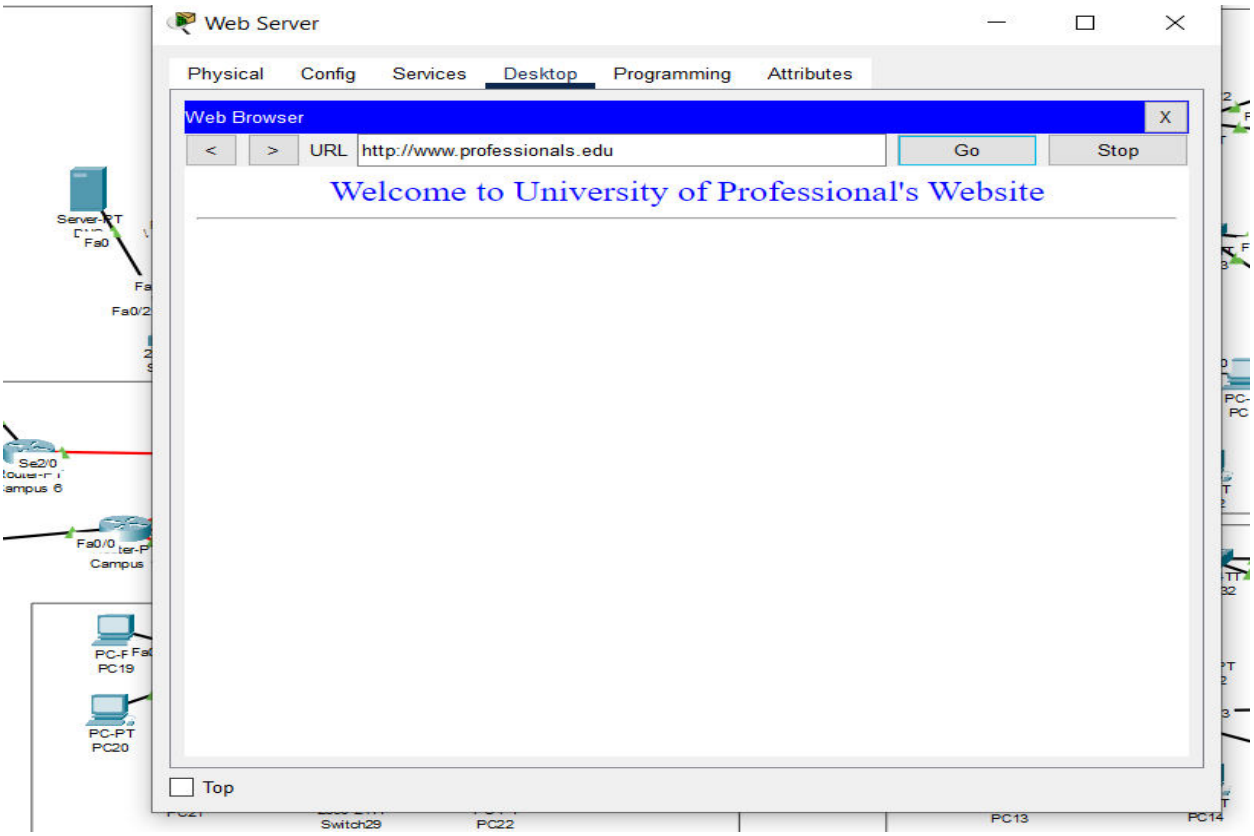
router OSPF 5
network 192.168.5.0 0.0.0.255 area 1
network 192.168.40.0 0.0.0.255 area 1
network 192.168.60.0 0.0.0.255 area 1
exit

router-6:
enable
configure terminal

router OSPF 6
network 192.168.6.0 0.0.0.255 area 1
network 192.168.70.0 0.0.0.255 area 1
exit

# Simulation Results:



## Limitations:

Since we are using only one DNS server in the main campus, if multiple hosts try to connect to the web server, then the DNS server will be under a lot of pressure. For better result we can add a DNS server in each campus.