EAST WEST UNIVERSITY

Mini Project Report

Course Code: CSE405

Course Title: Computer Networks

Section: 02

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Submitted To:
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Project Title: Design a full-fledged network for an organization with multiple subnets.

Preface:

This project is developed to show a complex network infrastructure of an enterprise, University of Professionals. This project simulates the network and its connectivity which is developed to maintain communication between all 6 campuses of the University. The report contains the explanation and design methods of the project, as well as the pictures of the design.

Introduction:

Network is a vital medium in the communication system. It is the connection between several nodes, where they can communicate with each other by following the connection. If we connect two or more computers with each other by any transmission media, it will create a network and the computers can share data with each other.

An educational institution has to maintain a lot of things within a big area, so a fast and secure communication is mandatory. Without a proper network it will fail to maintain its quality of service. Thus, for an educational institution, like University of Professionals, it is necessary to create a complex network infrastructure to maintain communication to function properly.

Requirements:

As the background of this project stated that University of Professionals has large number of computers and 6 campuses, where each and every computers or other communication devices must be able to communicate with each other to support its business process. The design requires:

1. Each campus will have a network, in total six networks.
2. Each of the six campuses will have a router.
3. All six routers will maintain a complex or mesh connectivity.
4. All the hosts within the campus has to be connected in the network, and be able to communicate with each other.
5. All hosts must be able to access the University's web page by the address: http://www.professionals.edu, so DNS server is required to locate the webserver.
6. All hosts has to have wireless connectivity to the network.

Design Specification:

The network is designed by using the software 'Packet Tracer (7.2.1)'. This design contains:

1. 12 Computers connected by wire and 1 computer connected wirelessly.
2. 5 laptops, 6 wireless tablets, 6 smart phones connected wirelessly to the network.
3. 6 switches (1 in each campus) to connect the hosts and servers.

4. 6 routers (1 in each campus), connected with each other, creating a mesh network.
5. 6 access points (1 in each campus) to ensure wireless communication among the hosts.
6. 1 DHCP (Dynamic Host Configuration Protocol) server to provide IP addresses to the connected hosts.
7. 1 Web Server.
8. 1 DNS (Domain Name System) Server.
9. 6 different networks (1 in each campus) from classes ‘A’ and ‘C’.
10. 8 different networks from class ‘B’ for the connection of the routers.
11. The routers follow OSPF (Open Shortest Path First) algorithm to communicate faster.

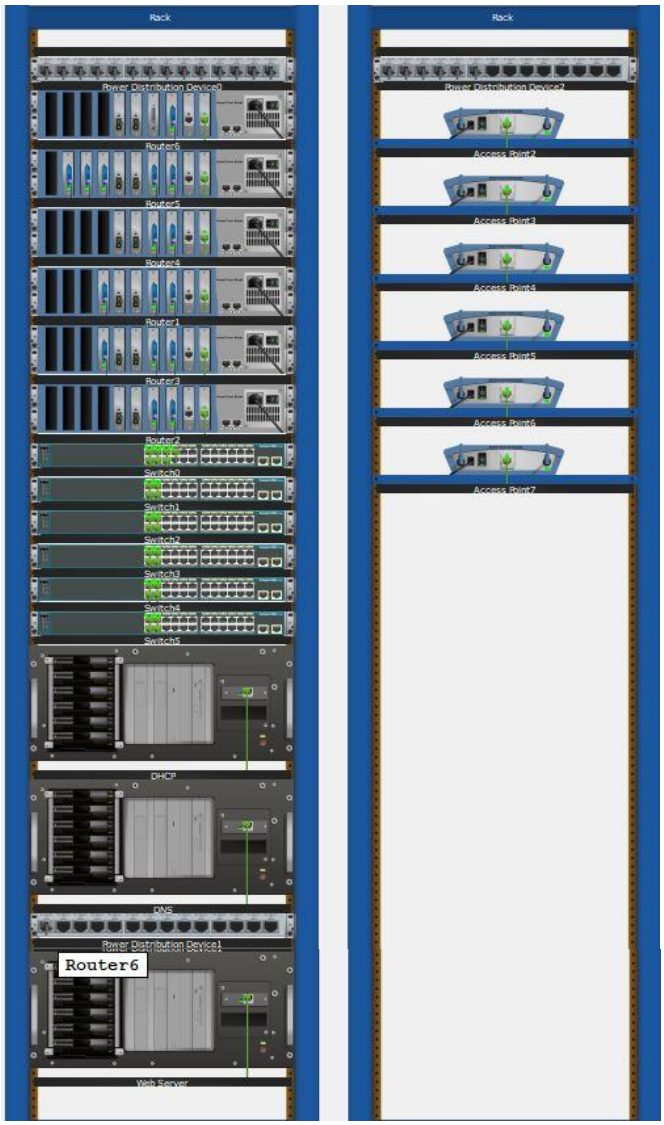

Figure: Physical Diagram

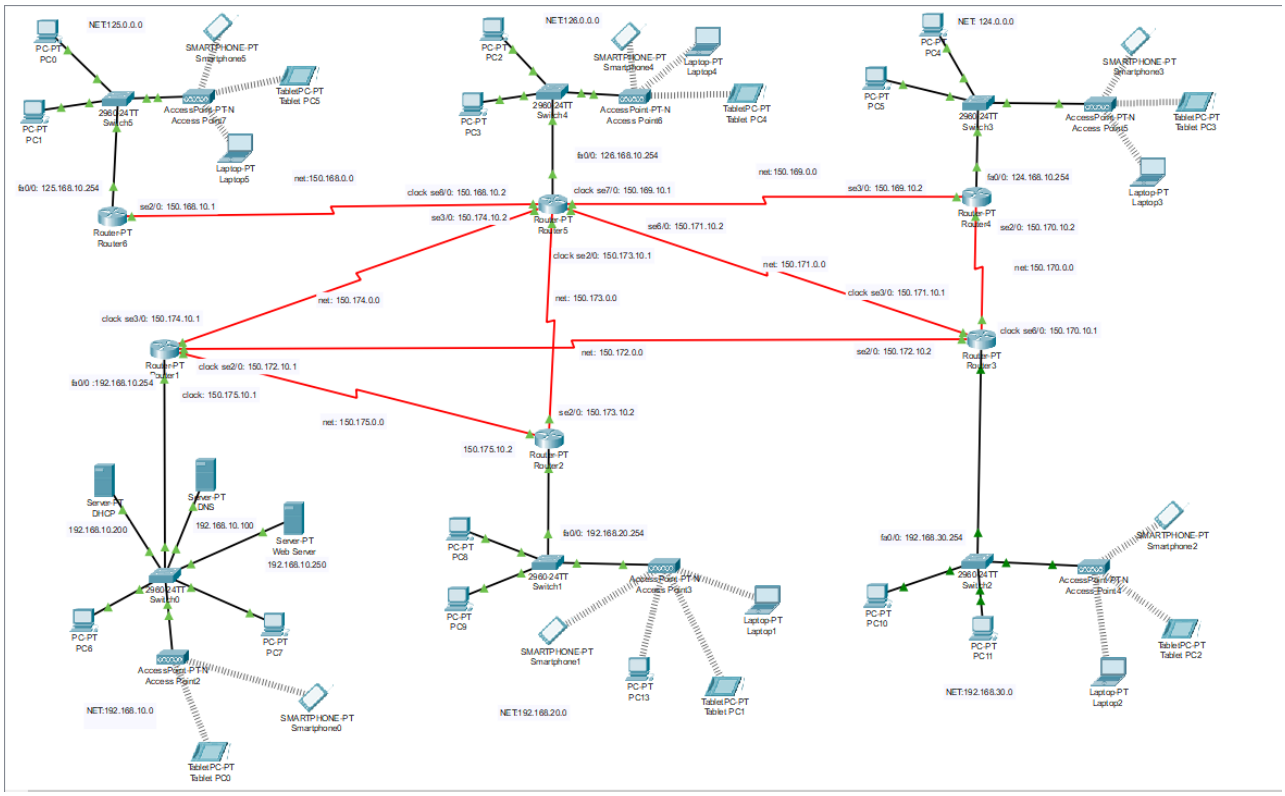

Figure: Logical Diagram

Codes to configure the routers:

Router 1:

```
enable
config t
interface fa0/0
ip address 192.168.10.254 255.255.255.0
ip helper-address 192.168.10.200
no shut
do wr
exit

interface se2/0
ip address 150.172.10.1 255.255.0.0
clock rate 64000
no shut
do wr
exit


interface se3/0
ip address 150.174.10.1 255.255.0.0
```

clock rate 64000
no shut
do wr
exit

interface se6/0
ip address 150.175.10.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

config
router ospf 1
network 192.168.10.0 0.0.0.255 area 1
network 150.174.0.0 0.0.255.255 area 1
network 150.172.0.0 0.0.255.255 area 1
network 150.175.0.0 0.0.255.255 area 1
exit

Router 2:
enable
config t
interface fa0/0
ip address 192.168.20.254 255.255.255.0
ip helper-address 192.168.10.200
no shut
do wr
exit

interface se2/0
ip address 150.173.10.2 255.255.0.0
no shut
do wr
exit

interface se3/0
ip address 150.175.10.2 255.255.0.0
no shut
do wr
exit

config
router ospf 1
network 192.168.20.0 0.0.0.255 area 1
network 150.173.0.0 0.0.255.255 area 1
network 150.175.0.0 0.0.255.255 area 1
exit

Router 3:

```
enable
config t
interface fa0/0
ip address 192.168.30.254 255.255.255.0
ip helper-address 192.168.10.200
no shut
do wr
exit

interface se2/0
ip address 150.172.10.2 255.255.0.0
no shut
do wr
exit

interface se3/0
ip address 150.171.10.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

interface se6/0
ip address 150.170.10.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

config
router ospf 1
network 192.168.30.0 0.0.0.255 area 1
network 150.172.0.0 0.0.255.255 area 1
network 150.171.0.0 0.0.255.255 area 1
network 150.170.0.0 0.0.255.255 area 1
exit
```

Router 4:

```
enable
config t
interface fa0/0
ip address 124.168.10.254 255.0.0.0
ip helper-address 192.168.10.200
no shut
do wr
exit
```

interface se2/0
ip address 150.170.10.2 255.255.0.0
no shut
do wr
exit

interface se3/0
ip address 150.169.10.2 255.255.0.0
no shut
do wr
exit

config
router ospf 1
network 124.0.0.0 0.255.255.255 area 1
network 150.169.0.0 0.0.255.255 area 1
network 150.170.0.0 0.0.255.255 area 1
exit

Router 5:
enable
config t
interface fa0/0
ip address 126.168.10.254 255.0.0.0
ip helper-address 192.168.10.200
no shut
do wr
exit

interface se2/0
ip address 150.173.10.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

interface se3/0
ip address 150.174.10.2 255.255.0.0
no shut
do wr
exit

interface se6/0
ip address 150.171.10.2 255.255.0.0
no shut
do wr
exit

interface se7/0
ip address 150.169.10.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

interface se8/0
ip address 150.168.10.2 255.255.0.0
clock rate 64000
no shut
do wr
exit

config
router ospf 1
network 126.0.0.0 0.255.255.255 area 1
network 150.168.0.0 0.0.255.255 area 1
network 150.169.0.0 0.0.255.255 area 1
network 150.171.0.0 0.0.255.255 area 1
network 150.173.0.0 0.0.255.255 area 1
network 150.174.0.0 0.0.255.255 area 1
exit

Router 6:
enable
config t
interface fa0/0
ip address 125.168.10.254 255.0.0.0
ip helper-address 192.168.10.200
no shut
do wr
exit

interface se2/0
ip address 150.168.10.1 255.255.0.0
no shut
do wr
exit

config
router ospf 1
network 125.0.0.0 0.255.255.255 area 1
network 150.168.0.0 0.0.255.255 area 1
exit

Limitations:

1. No subnets are used in this design.
2. The ports of the routers and switches are limited, large amount of connection is not possible.