East West University

Project Report
[Fall 2020]

Course Name : Computer Networks

Course Code and Section: CSE405(3)

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

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Introduction : A computer network is a group of computers that use a set of common communication protocols over digital interconnections for the purpose of sharing resources located on or provided by the network nodes. The interconnections between nodes are formed from a broad spectrum of telecommunication network technologies, based on physically wired, optical, and wireless radio-frequency methods that may be arranged in a variety of network topologies. Geometric representation of how the computers are connected to each other is known as topology[1] .

There are five types of topology –

1.Mesh topology,
2.Star topology,
3.Bus topology,
4.Ring topology and
5.Hybrid topology.

Project Details: I create a complete model of a complex network by discovering the interconnectivity of the systems and subnetworks. For which to do this project I use a complex computer network topology is called Mesh topology/network.

A mesh topology is a network setup where each computer and network device is interconnected with one another and transfer hosts data in a short path. This topology setup allows for most transmissions to be distributed even if one of the connections goes down. It is a topology commonly used for wireless networks.

Equipment:

1. Packet Tracer Software
2. PT Router
3. Switch 2960
4. PC-PT
5. Laptop-PT
6. Server-PT For Web
7. Server-PT For DNS
8. Server-PT For DHCP
9. WRT300N For Wireless Router
10. Connection
    - Automatically Choose Connection Type
    - Copper-Straight-Through Cable
    - Serial DCE Cable

Equipment Set-Up Details:

1. **Router :** In this project, am mainly use PT Router. PT Router has already installed four Fast Ethernet Ports and Two serial ports but this project has six router and all are connected with mesh network. So, We need more serial port.

    - ❖ First open router settings, select Physical, turn off switch, then drag and drop PT-ROUTER-NM-1S(Same way input 4 serial port) and Finally turn on the router switch.

    - ❖ PT Router has four Fast Ethernet port but two are for different works that's why I can change also Fast Ethernet port, turn off router switch again, then remove PT-ROUTER-NM-1FFE and drag and drop PT-ROUTER-NM-1CFE(Same way input another Ethernet port) and Finally turn on the router switch.

2. **Switch:** Switch-2960(Total 6 switch) uses in this project. This switch has total 24 Fast Ethernet port and two Gigabit Ethernet port.

3. **Host/ User Device :** In this project uses mainly two types of user device one is PC-PT, another one is Laptop-PT. Total 7 pcs and 8 laptops uses this project.
    - **PC :** Configuring a pc, First goto Server settings →Select Desktop → Ip Configuration → Static → Config Ip Address, Subnet Mask,Gateway,DNS server (if has any)→ Exit

    - **Laptop :** Configuring a Laptop, First goto Server settings Select Desktop → Ip Configuration → Static → Config Ip Address, Subnet Mask, Gateway, DNS server (if has any)→ Exit

4. **DHCP Server :** Here uses only one DHCP server. But we can use many number of DHCP server for the whole network and DHCP Server install process completely same. First goto Server settings Select Desktop → Ip Configuration → Static → Config Ip Address, Subnet Mask,Gateway,DNS server → go to Services → HTTP→ HTTP and HTTPS Turn On→ if we config or import or delete any html file then → go to edit/ delete → Save→ Exit.

5. **WEB Server:** Here uses only one WEB server. But we can use many number of WEB server for the whole network and WEB Server install process completely same. First got to Server settings Select Desktop → Ip Configuration → Static → Config Ip Address, Subnet Mask, Gateway → go to Services →

6. **DNS Server :** Here uses only one DNS Server. But we can use many number of DNS Server for the whole network and DNS Server install process completely same. First goto Server settings Select Desktop → Ip Configuration → Static → Config Ip Address, Subnet Mask,Gateway,DNS server → go to Services →DNS → Turn on DNS→Put your WEB address in name box→ WEB address ip in Address box →Add →Exit.

7. **Wireless Router :** In this Project am just install one wireless router.

   - **Router:** First open router settings → Config → Internet → Select Static → Gateway →Config→Lan→Ip Address, Subnet Mask→Config→Wireless→ Select WEP →Edit SSID(name of this router)→WEP Key(Password of this router) →Exit

   - **PC :** PC has mainly Fast Ethernet port but we need to connect wireless port so, I change Ethernet port, First open router settings, select Physical then turn off router switch, then remove PT-HOST-NM-1CFE and drag and drop WMP300N(Same way input another Wireless port) and Finally turn on the PC switch.

   - **Laptop:** Laptop has also Fast Ethernet port but we need to connect wireless port so, I change Ethernet port, First open router settings →select Physical then turn off router switch→ remove PT-HOST-NM-1CFE and drag and drop WMP300N(Same way input another Wireless port) and Finally turn on the Laptop switch.

Assign Ip and Gateway: I use here six router and assign. All are given Below.

- **Router to Switch**

Router Name	IP	Gateway
R1→	192.168.10.0	192.168.10.254
R2→	192.168.20.0	192.168.20.254
R3→	192.168.30.0	192.168.30.254
R4→	192.168.40.0	192.168.40.254
R5→	192.168.50.0	192.168.50.254
R6→	192.168.60.0	192.168.60.254

- **Router to Router**

Se	Assign Name	Router (R1 to Others)	IP
2	A0	R2	192.168.70.1
3	A1	R3	192.168.71.1
6	A2	R4	192.168.72.1
7	A3	R6	192.168.73.1
8	A4	R5	192.168.74.1

Se	Assign Name	Router (R2 to Others)	IP
Back		R1	192.168.70.2
3	B0	R3	192.168.80.1
6	B1	R4	192.168.81.1
7	B2	R6	192.168.82.1
8	B3	R5	192.168.83.1

Se	Assign Name	Router (R3 to Others)	IP
Back		R1	192.168.71.2
Back		R2	192.168.80.2
6	C0	R4	192.168.90.1
7	C1	R6	192.168.91.1
8	C2	R5	192.168.92.1

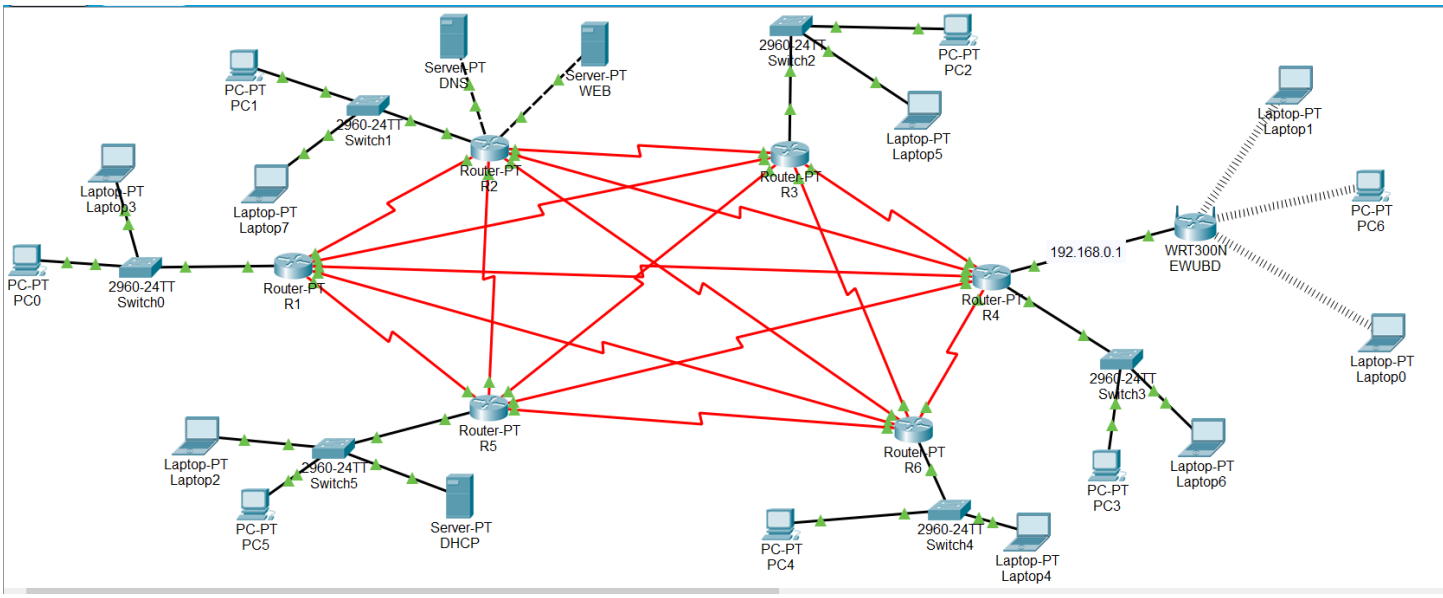
Se	Assign Name	Router (R4 to Others)	IP
Back		R1	192.168.72.2
Back		R2	192.168.81.2
Back		R3	192.168.90.2
7	D0	R6	192.168.100.1
8	D1	R5	192.168.101.1

Se	Assign Name	Router (R6 to Others)	IP
Back		R1	192.168.73.2
Back		R2	192.168.82.2
Back		R3	192.168.91.2
Back		R4	192.168.100.2
8	F0	R5	192.168.110.1

Se	Assign Name	Router (R5 to Others)	IP
Back		R1	192.168.74.2
Back		R2	192.168.83.2
Back		R3	192.168.92.2
Back		R4	192.168.101.2
Back		R6	192.168.110.2

- **Web Server:**
  IP Address -192.168.2.1
  Gateway -192.168.20.254
- **DNS Server:**
  IP Address -192.168.1.1
  Gateway -192.168.20.254
- **Wireless Router:**
  IP Address -192.168.0.1
  Lan IP: -192.168.0.2

Physical Design:



Route Table: A routing table is a set of rules, often viewed in table format, that is used to determine where data packets traveling over an Internet Protocol (IP) network will be directed. All IP-enabled devices, including routers and switches, use routing tables[2].

*****R1

enable
config
route ospf 1
network 192.168.10.0 0.0.0.255 area 1
network 192.168.70.0 0.0.0.255 area 1
network 192.168.71.0 0.0.0.255 area 1
network 192.168.72.0 0.0.0.255 area 1
network 192.168.73.0 0.0.0.255 area 1
network 192.168.74.0 0.0.0.255 area 1
exit

*****R2

enable
config
route ospf 2
network 192.168.20.0 0.0.0.255 area 1
network 192.168.70.0 0.0.0.255 area 1
network 192.168.80.0 0.0.0.255 area 1
network 192.168.81.0 0.0.0.255 area 1
network 192.168.82.0 0.0.0.255 area 1
network 192.168.83.0 0.0.0.255 area 1
exit

*****R3

```
enable
config
route ospf 3
network 192.168.30.0 0.0.0.255 area 1
network 192.168.71.0 0.0.0.255 area 1
network 192.168.80.0 0.0.0.255 area 1
network 192.168.90.0 0.0.0.255 area 1
network 192.168.91.0 0.0.0.255 area 1
network 192.168.92.0 0.0.0.255 area 1
exit
```

*****R4

```
enable
config
route ospf 4
network 192.168.40.0 0.0.0.255 area 1
network 192.168.72.0 0.0.0.255 area 1
network 192.168.81.0 0.0.0.255 area 1
network 192.168.90.0 0.0.0.255 area 1
network 192.168.100.0 0.0.0.255 area 1
network 192.168.101.0 0.0.0.255 area 1
exit
```

*****R5

```
enable
config
route ospf 5
network 192.168.50.0 0.0.0.255 area 1
network 192.168.74.0 0.0.0.255 area 1
network 192.168.83.0 0.0.0.255 area 1
network 192.168.92.0 0.0.0.255 area 1
network 192.168.101.0 0.0.0.255 area 1
network 192.168.110.0 0.0.0.255 area 1
exit
```

*****R6

```
enable
config
route ospf 6
network 192.168.60.0 0.0.0.255 area 1
network 192.168.73.0 0.0.0.255 area 1
network 192.168.82.0 0.0.0.255 area 1
network 192.168.91.0 0.0.0.255 area 1
network 192.168.100.0 0.0.0.255 area 1
network 192.168.110.0 0.0.0.255 area 1
exit
```

Limitation:

- ✓ Sometime Needs 3 ping one node to another nodes.
- ✓ Wireless Router area Nodes can't find Web Page(ewubd) but R4 routers device can ping wireless nodes.
- ✓ Naturally Mesh network is so complex if change any router ip then need to change all routers routing table.

Conclusion: It's really a complex network and work. To be very honest, I have a lot of work to do until I submit my Project file and final report. Although I faced some difficulties but I hope I will solve them very soon. But in a nutshell, knowing and getting Packet Tracer has been interesting. Finally, I am interested to do something with Computer Networking System.

Source[1][2] : WWW.Google.Com.