

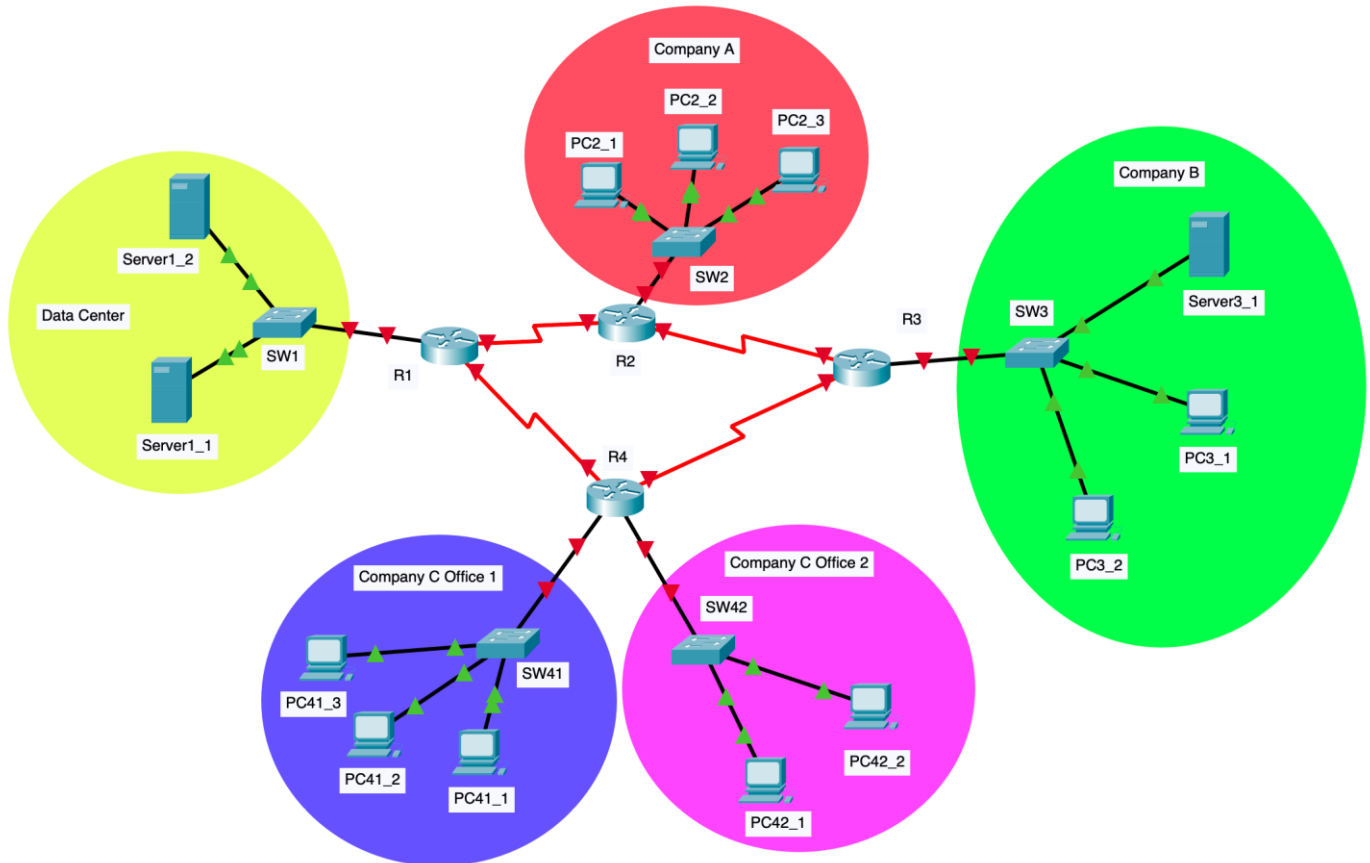
Lab #8 : Network Layer (Addressing + Routing)

Communication Networks
Prof. SAYAD Lamri

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Duration : 2 sessions

Objectives: - Configure Routers
- Perform static routing.

Topology : Consider the following topology



The topology illustrated in in this figure contains the following devices:

- 4 Routers (**Router-PT**)
- 5 Switches (**Switch-PT**)
- 3 Servers (**Server-PT**)
- 10 PCs (**PC-PT**)

The number of devices in each subnetwork is :

- Data center : 2-servers and 1-switch.
- Company 1 : 3-PCs and 1-switch.
- Company 2 : 2-PCs, 1 server, and 1-switch.
- Company 3 Office 1 : 3-PCs and 1-switch.
- Company 3 Office 2 : 2-PCs and 1-switch.
- Core: 4-routers.

Part 1: IP assignment

1. Create the network illustrated in this topology (use FastEthernet interface to connect routers to LANs, and use Serial interface to connect between routers).
2. Assign the IP addresses to PCs, servers and routers fastEthernet interfaces according to the following Subnets :
 - Company A : **200.4.10.0/27**
 - Company B : **200.4.10.32/27**
 - Company C office 1 : **200.4.10.64/28**
 - Company C office 2 : **200.4.10.80/28**
 - Data Center : **200.4.10.96/29**

Lab #8 : Network Layer (Addressing + Routing)

Hint : FastEthernet interfaces on all routers are configured according to the local network to which they are connected.

To configure the interface FastEthernet0/0 of the router R1, enter to the CLI router command prompt of R1 and perform the following commands (this is just an example of assigning the ip : 200.4.10.97/29 to the interface FastEthernet0/0 of the router R1) :

```
R1>en
R1# config t
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)# interface FastEthernet0/0
R1(config-if)# ip address 200.4.10.97 255.255.255.248
R1(config-if)# no shutdown
R1(config-if)# exit
```

3. Do the same thing to all connected FastEthernet interfaces of every router.

4. Assign the Default Gateway of all PCs and Servers.

Hint : The default gateway of a host is the IP address of the attached FastEthernet router interface.

5. Assign the IP addresses to the routers serial interfaces according to the following Subnets :

- R1-R2 : 200.4.10.104/30 (assign 200.4.10.105 to R2 and 200.4.10.106 to R3)
- R2-R3 : 200.4.10.108/30
- R3-R4 : 200.4.10.112/30
- R1-R4 : 200.4.10.116/30

To configure the interface Serial0/0 of the router R1, enter to the CLI router command prompt of R1 and perform the following commands (this is just an example of assigning the ip : 200.4.10.105/30 to the interface Serial0/0 of the router R1) :

```
R1# conf t
R1(config)# interface Serial0/0
R1(config-if)# ip address 200.4.10.105 255.255.255.252
R1(config-if)# no shutdown
R1(config-if)# exit
```

6. Do the same thing to all connected serial interfaces of every router.

7. Using a command, test the connectivity from PC2_1 to PC2_2

8. Using a command, test the connectivity from PC2_1 to PC3_1

9. Explain the reported results and their reasons.

Part 2: Static routing

10. To allow routers to recognize networks on the other side, static routing configuration should be added on each router using the format:

ip route [network] [subnet mask] [next hop/gateway]

11. So, to allow packets sent from PC2_1 reach PC3_1, the following command needs to be executed in the CLI of R2:

ip route 200.4.10.32 255.255.255.224 200.4.10.106

12. Now, test again the connectivity from PC2_1 to PC3_1.

13. Explain the reported results :

14. Using a command, test the connectivity from PC3_1 to PC2_1.

15. Report the result :

16. Explain the reported results :

17. Add the required configuration to solve this issue.