Serviços de Rede 1 –
Lesson 2 - Practices

2019-2020

Instituto Politécnico de Coimbra
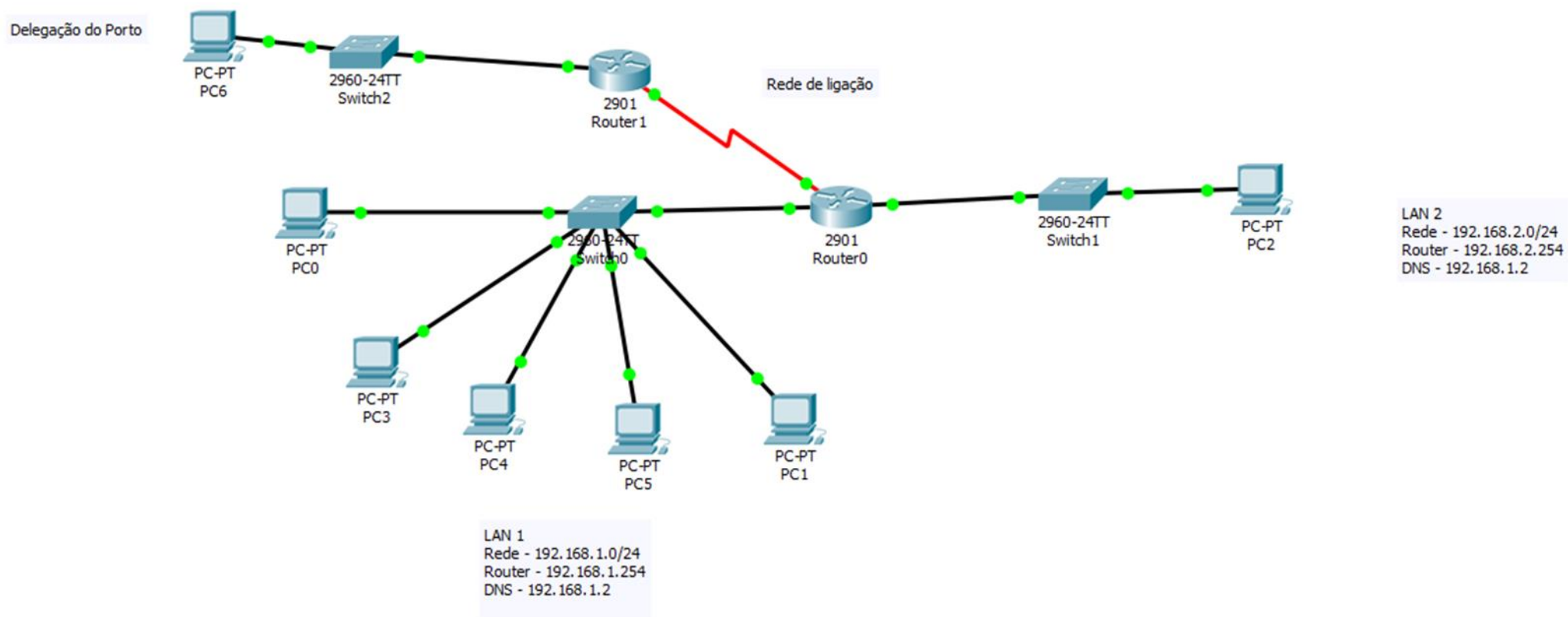
Departamento de Engenharia Informática

Pre - Requirements
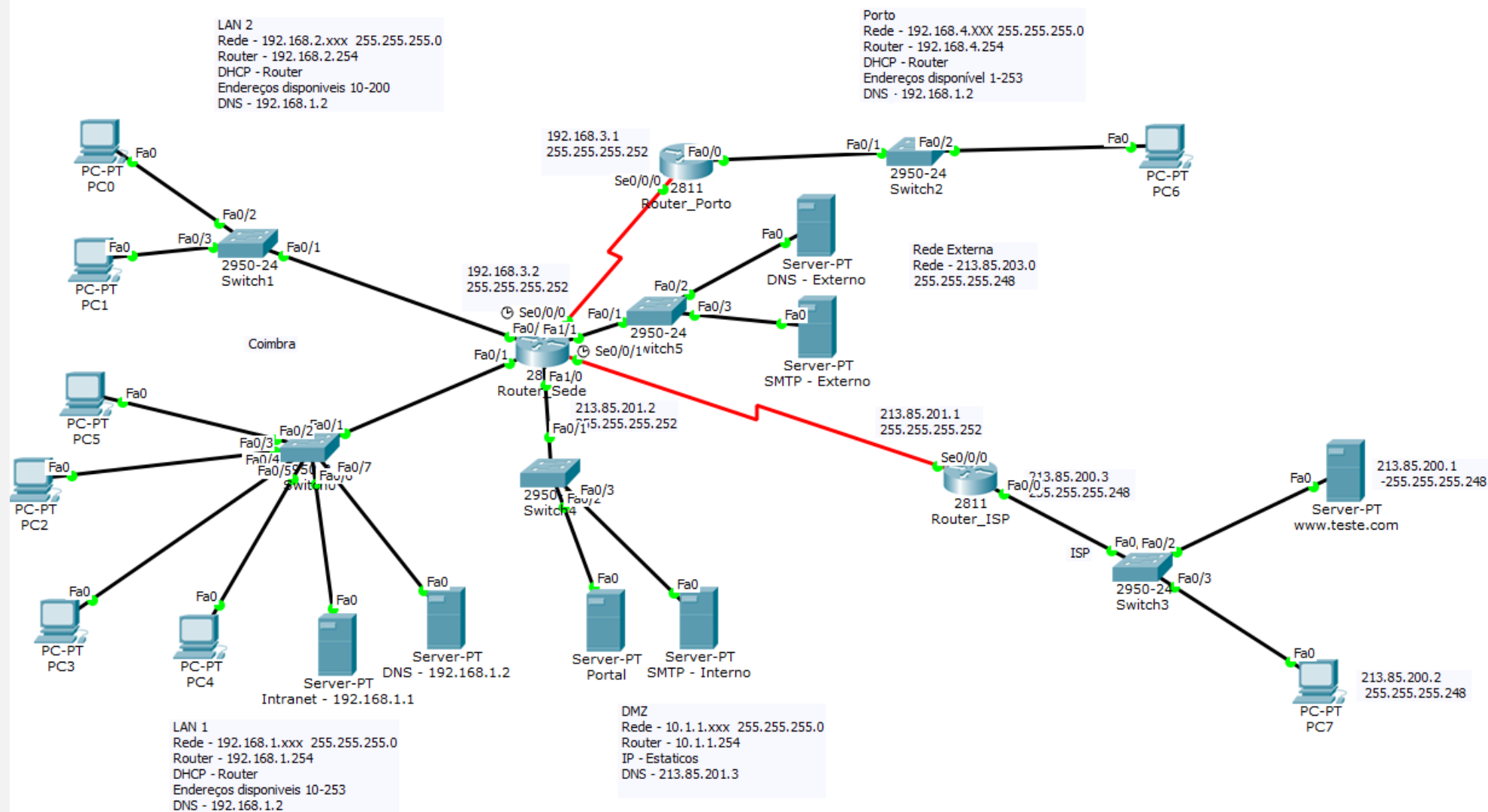
- You have installed the Cisco Packet Tracer version 7.1

Pre - Requirements

- Have the network of the previous class functional.

Exercise 1 - Configure a WAN

Exercise 1

LAN 2
Rede - 192.168.2.xxx 255.255.255.0
Router - 192.168.2.254
DHCP - Router
Endereços disponiveis 10-200
DNS - 192.168.1.2

Porto
Rede - 192.168.4.XXX 255.255.255.0
Router - 192.168.4.254
DHCP - Router
Endereços disponível 1-253
DNS - 192.168.1.2

PC-PT
PC0
Fa0

Fa0/2

Fa0
PC-PT
PC1
Fa0/3   Fa0/1

2950-24
Switch1

Coimbra

192.168.3.1
255.255.255.252

Fa0/0

Se0/0/0   2811
Router_Porto

Fa0/1   Fa0/2

2950-24
Switch2

Fa0
PC-PT
PC6

Fa0
Server-PT
DNS - Externo

Rede Externa
Rede - 213.85.203.0
255.255.255.248

192.168.3.2
255.255.255.252

Se0/0/0   Fa0/1
Fa0/ Fa1/1

Fa0/2

Fa0/3

Fa0

Fa0/1   2950-24
Switch5

Fa0/1

Server-PT
SMTP - Externo

PC-PT
PC5
Fa0

Fa0/3 Fa0/2 Fa0/1
Fa0/4
Fa0/5 950 Fa0/7
Switch0

28 Fa1/0
Router_Sede

Se0/0/1

213.85.201.2
Fa0/1 255.255.255.252

213.85.201.1
255.255.255.252

Fa0
PC-PT
PC2

Fa0

2950 Fa0/3
Switch4 Fa0/2

Se0/0/0
2811
Router_ISP

Fa0/0
213.85.200.3
255.255.255.248

Fa0
Server-PT
www.teste.com

213.85.200.1
-255.255.255.248

Fa0
PC-PT
PC3

Fa0
PC-PT
PC4

Fa0
Server-PT
Intranet - 192.168.1.1

Fa0
Server-PT
DNS - 192.168.1.2

Fa0
Server-PT
Portal

Fa0
Server-PT
SMTP - Interno

ISP

Fa0, Fa0/2

2950-24
Switch3

Fa0/3

Fa0
PC-PT
PC7

213.85.200.2
255.255.255.248

LAN 1
Rede - 192.168.1.xxx 255.255.255.0
Router - 192.168.1.254
DHCP - Router
Endereços disponiveis 10-253
DNS - 192.168.1.2

DMZ
Rede - 10.1.1.xxx 255.255.255.0
Router - 10.1.1.254
IP - Estaticos
DNS - 213.85.201.3

Exercise 1

- The company SR1 SA has a network with the topology indicated in the previous figure.

- At headquarters there are two LANs (LAN1 and LAN2), one DMZ and one outside area.
  - The addresses of the networks are as follows:
    - LAN 1 - 192.168.1.0 - 255.255.255.0
    - LAN 2 - 192.168.2.0 - 255.255.255.0
    - DMZ - 10.1.1.0 - 255.255.255.0
    - External zone - 213.85.203.0 - 255.255.255.248
    - LAN 1 and 2 have the IPs provided by DHCP on the router.
    - In the DMZ and outside zone the IPs are fixed.

- There is a delegation in Porto with the network 192.168.4.0 - 255.255.255.0. The IPs are provided by DHCP on the router of the headquarters.

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  The network of the ISP is 213.85.200.0 - 255.255.255.248 and the IP is fixed.

- The WAN:
  - Headquarters - Porto -> 192.168.3.1 - 255.255.255.252
  - Porto - Headquarters - -> 192.168.3.2 - 255.255.255.252
  - Headquarters - Internet -> 213.85.201.1 -255.255.255.252
  - Internet - Headquarters -> 213.85.201.2 -255.255.255.252

- Ensure that your network is functional and that all PCs (headquarters and Port) access the internal network and DMZ configuring their simulation equal to the previous image following all the conditions there indicated.

Exercise 1(cont.)

- he company opened a new delegation in Lisbon. All the services will be centered in Coimbra, that is, there will only be jobs in the new delegation.
  - LAN IP - 192.168.5.0
  - Router IP - 192.168.5.254
  - DNS - 192.168.1.2

- You should:
  - Link this new delegation to Coimbra using a Serial link.
  - Configure a pair of IP addresses for this connection. Use the network next to the one used for the connection to Porto.
  - Put 4 PCs. Give a static IP to one of them, make the necessary changes on the network and test if everything works.

- Place a DHCP server at the headquarters in Coimbra with the address 192.168.1.3. This server should have the following characteristics
  - Pool of Lisbon - Home 192.168.5.10 - Maximum 250 users
  - Pool do Porto - Home 192.168.4.10 - Maximum of users 50
  - Do not forget the gateway and DNS information (192.168.1.2)
  - Delete the DHCP for Coimbra and Porto on the headquarters router.
  - Ensure that both the PCs in Lisbon and Porto have "data" addresses by the DHCP server that is on the network. The Ips of the headquarters networks continue to be given by the central router.

- Test the entire network and verify that everything is working properly.

- Enter simulation mode and "follow" the process of assigning an IP per DHCP. See the format of the packages that are exchanged between the terminals and the server.

How To

Configuring an Ethernet Interface

R1(config)#interface fastethernet 0/0
R1(config-if)#ip address 172.16.1.254 255.255.255.0
R1(config-if)#no shutdown

*Mar 1 01:16:08.212: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state to up
*Mar 1 01:16:09.214: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

```
R1#show interfaces fastethernet 0/0
FastEthernet0/0 is up, line protocol is up
  Hardware is AmdFE, address is 000c.3010.9260 (bia 000c.3010.9260)
  Internet address is 172.16.3.1/24

R1#
```

General configuration interfaces

- Basic Configuration

IP and mask

Interface Identification

```
Router> enable
Router# configure terminal
Router(config)# interface serial0
Router(config-if)# description LAN Engineering, Bldg.2
Router(config-if)# ip address <ip address> <netmask>
Router(config-if)# clock rate 56000
Router(config-if)# no shutdown
```

In serial interfaces when the router acts as DCE (i.e. assumes the role of CSU / DSU) it is necessary to generate clock. Valid bps: 1200, 2400, 9600, 19200, 38400, 56000, 64000, 72000, 125000, 148000, 500000, 800000, 1000000, 1300000, 2000000, 4000000.

Active the interface

Static Routes

- **Command ip route**

  - To configure a static route, use the following command:

```
Router(config)# ip route network-address subnet-mask
{ip-address | exit-interface }
```

Parâmetro	Descrição
network-address	Endereço da rede de destino da rede remota a ser adicionado à tabela de roteamento.
subnet-mask	Máscara de sub-rede da rede remota a ser adicionada à tabela de roteamento. A máscara de sub-rede pode ser modificada para sumarizar um grupo de redes.
ip-address	Normalmente conhecido como o endereço IP do roteador do próximo salto.
exit-interface	Interface de saída usada no encaminhamento de pacotes para a rede de destino.

Static Routes

- Static routes configured with an output interface are more efficient.
- The routing table can identify the output interface in a single query, rather than two when using the IP address.

```
R1(config)#no ip route 192.168.2.0 255.255.255.0 172.16.2.2
R1(config)#ip route 192.168.2.0 255.255.255.0 serial 0/0/0
R1(config)#end
R1#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     172.16.0.0/24 is subnetted, 3 subnets
S       172.16.1.0 [1/0] via 172.16.2.2
C       172.16.2.0 is directly connected, Serial0/0/0
C       172.16.3.0 is directly connected, FastEthernet0/0
S     192.168.1.0/24 [1/0] via 172.16.2.2
S     192.168.2.0/24 is directly connected, Serial0/0/0
```

Agora a interface de saída está especificada na rota estática. Não há necessidade de uma pesquisa recursiva.

Static Routes

▪Existing static routes can not be modified. An old route must be removed by placing a no before the **ip route** command.

no ip route 192.168.2.0 255.255.255.0 serial 0/0/1

▪The new static route must be rewritten in the router configuration.

```
R1(config)#no ip route 172.16.1.0 255.255.255.0 172.16.2.2
R1(config)#ip route 172.16.1.0 255.255.255.0 serial 0/0/0
R1(config)#no ip route 192.168.1.0 255.255.255.0 172.16.2.2
R1(config)#ip route 192.168.1.0 255.255.255.0 serial 0/0/0
```

```
R2(config)#no ip route 172.16.3.0 255.255.255.0 172.16.2.1
R2(config)#ip route 172.16.3.0 255.255.255.0 serial 0/0/0
R2(config)#no ip route 192.168.2.0 255.255.255.0 192.168.1.1
R2(config)#ip route 192.168.2.0 255.255.255.0 serial 0/0/1
```

```
R3(config)#no ip route 172.16.1.0 255.255.255.0 192.168.1.2
R3(config)#ip route 172.16.1.0 255.255.255.0 serial 0/0/1
R3(config)#no ip route 172.16.2.0 255.255.255.0 192.168.1.2
R3(config)#ip route 172.16.2.0 255.255.255.0 serial 0/0/1
R3(config)#no ip route 172.16.3.0 255.255.255.0 192.168.1.2
R3(config)#ip route 172.16.3.0 255.255.255.0 serial 0/0/1
```

Static Routes

- To check the static route setting:
  - Use the following commands:
    - **Step 1** - *show running-config*
    - **Step 2** - Verify that the static route has been entered correctly
    - **Step 3** - *show ip route*
    - **Step 4** - Verify that the route has been added in the routing table
    - **Step 5** - Use the *ping* command to verify that the packets can reach the destination and that the return path is working.
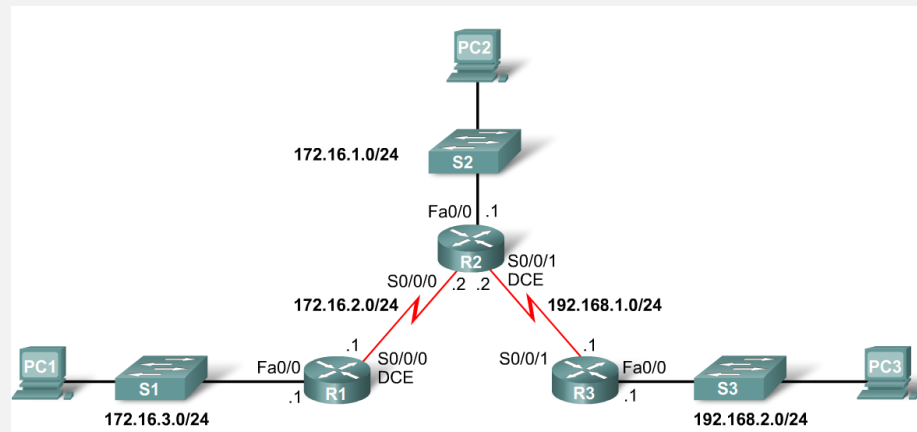
DHCP Relay

- A DHCP client uses broadcast mechanisms to locate DHCP and request TCP / IP settings.

- The default routers do not route this type of traffic. That is, clients can only obtain TCP / IP settings if the DHCP server is located on the same local network.

- There may be situations in which the DHCP server is located on another subnet, that is, located on another LAN. In this case, we must configure a DHCP Relay Agent on the network where the DHCP server does not exist.

- The DHCP Relay Agent picks up packets sent by DHCP clients, transforms these packets into a format that rr can either forward them to the DHCP server, that is, it is an intermediary between the DHCP clients and the DHCP server.
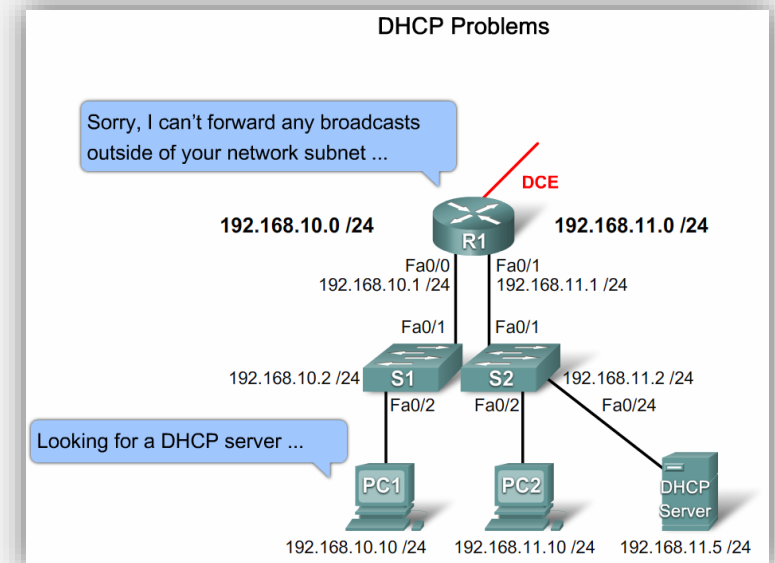
DHCP Relay - Cisco
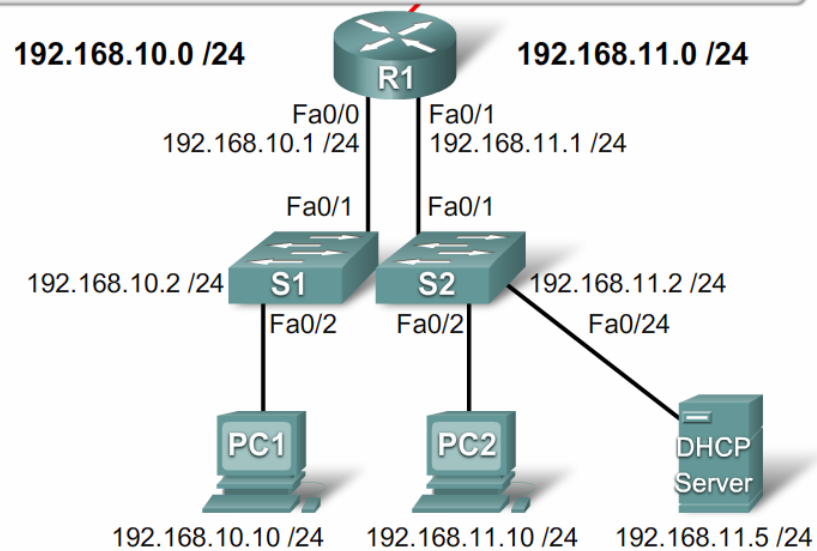
Packet Tracer - DHCP Server

Questions