

## Lab 3

### Routing Protocol

#### Introduction

You are given a Packet Tracer file, with some of the IP addressing and routing protocol needs configured. You must follow all the steps carefully and answer the given questions.

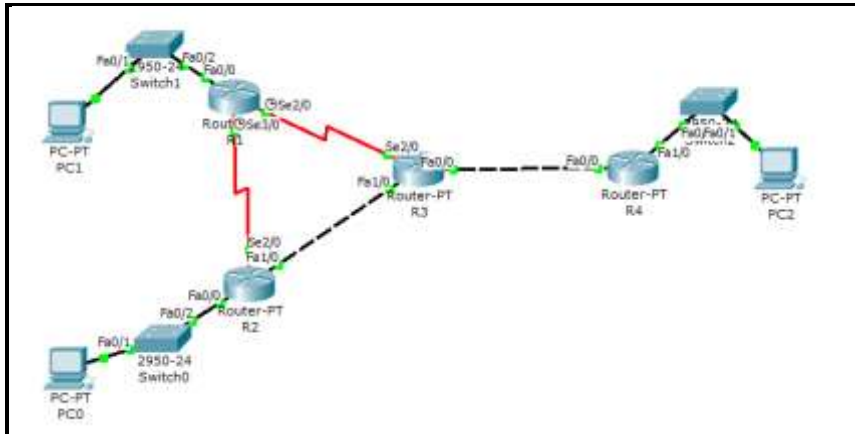


Figure 1

#### Task 1: IP addressing

**Step 1:** Fill in Table 1 below with the correct information. Note: The information may be found under the **Config** tab of each router (refer to Figure2).



Figure 2

Table 1

#	Device Name	Interface	IP Address	Subnet Mask
1	R1	Se2/0	200.200.200.1	255.255.255.252
2		Se3/0		
3		Fa0/0		
4	R2	Se2/0		
5		Fa0/0		
6		Fa1/0		
7	R3	Se2/0		
8		Fa0/0		
9		Fa1/0		
10	R4	Fa0/0		
11		Fa1/0		

**Step 2:** Given the information in file, answer the following questions:

- How many different subnets are there? \_\_\_\_\_
- What is the network address of each of these subnets? (*Hint: Given the IP address and the subnet mask, you can calculate the network address using AND operation*). Label the subnets in the topology given in Figure 1, and complete Table 2 below.

Table 2

Subnet #	Network Address	Broadcast Address	Range of usable addresses
1	10.10.10.0	10.10.10.255	10.10.10.1 – 10.10.10.254
2	200.200.200.0	200.200.200.3	200.200.200.1-200.200.200.2

- Provided that all PC will use the last usable address in its subnet, fill in Table 3 below with the correct information.

Table 3

#	Device Name	IP Address	Subnet Mask	Default Gateway
1	PC0			
2	PC1	10.10.10.254	255.255.255.0	10.10.10.10
3	PC2			

**Step 3:** Complete the IP addressing information on all the PCs in the topology. (*Hint: Click on the PC, choose the **Desktop** tab, then click **IP Configuration***).

**Step 4:** Open the routing table for each router. (Hint: you can use the 'magnifying glass' icon, then point to a router and choose 'Routing Table'. See Figure 3 below.)

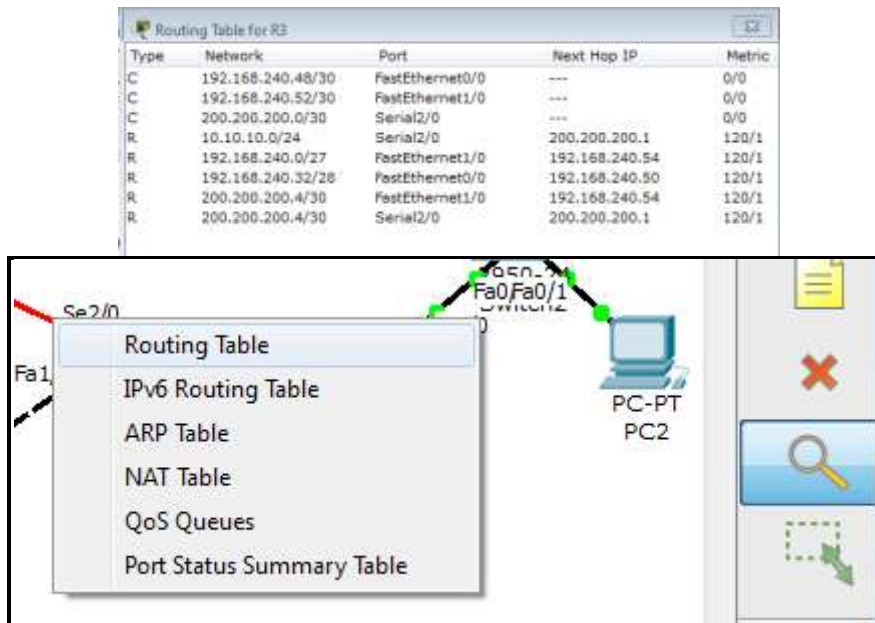


Figure 3

**Step 5:** Copy the image of the routing table for each router. (Hint: You can use 'Snipping Tool' to copy the image.)

**Step 6:** Answer the questions below.

- a. Do all the routers have the same information in its routing table?
- b. What is the difference that can be seen?
- c. Can all the PCs ping each other successfully?

Table 4

#	Ping between devices	Successful (✓)	Unsuccessful (x)
1	PC0-PC1		
2	PC0-PC2		
3	PC1-PC2		

- d. Reflection: what is the reason for your answer in (c)?

## Task 2: Dynamic routing configuration – RIP

Dynamic routing allows the network to be more flexible to changes. It can help the routers adapt to the changes in the pathways without much intervention from network administrators.

In this part of the lab, you will learn how to configure RIP routing protocol, and see how changes happen in the routing tables. Routers R1 and R4 is already configured for you.

**Step 1:** Choose Router R2. Click the CLI tab. Copy the following text into the command line interface.

```
R2>enable
R2#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#router rip
R2(config-router)#version 2
R2(config-router)#network 192.168.240.0
R2(config-router)#network 200.200.200.0
R2(config-router)#no auto-summary
R2(config-router)#exit
R2(config)#exit
R2#
%SYS-5-CONFIG_I: Configured from console by console
R2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R2#
```

**Step 2:** Choose Router R3. Click the CLI tab. Copy the following text into the command line interface.

```
R3>enable
R3#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#router rip
R3(config-router)#version 2
R3(config-router)#network 192.168.240.0
R3(config-router)#network 200.200.200.0
R3(config-router)#no auto-summary
R3(config-router)#exit
R3(config)#exit
R3#
%SYS-5-CONFIG_I: Configured from console by console
R3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R3#
```

**Step 3:** Copy the image of the routing table for each router. (*Hint: you can use the 'magnifying glass' icon, then point to a router and choose 'Routing Table'. You can use 'Snipping Tool' to copy the image.*)

**Step 4:** Answer the questions below.

- a. Can all the PCs ping each other successfully?

Table 4

#	Ping between devices	Successful (✓)	Unsuccessful (×)
1	PC0-PC1		
2	PC0-PC2		
3	PC1-PC2		

- b. Reflection: what is the reason for your answer in (a)?

**Step 5:** Switch off router R2. What are the changes noted in the routing tables?

**Step 6:** Switch on router R2. What are the changes noted in the routing tables?

**Step 7: Reflection:** What have you learned in this task?

### Task 3: Dynamic routing configuration – OSPF

Make sure that you have all the routing tables on display on one side (as before). As you go through the steps, look at the changes happening in the routing tables.

**Step 1:** On **all** the routers, do the following.

```
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#no router rip
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
Router#
```

**Step 2:** Copy the image of the routing table for each router.

**Step 3:** For Router R1, Click the CLI tab. Copy the following text into the command line interface.

```
R1#CONFIGURE TERMINAL
Enter configuration commands, one per line. End with CNTL/Z.
R1(config)#ROUTER OSPF 1
R1(config-router)#NETWORK 200.200.200.0 0.0.0.3 AREA 0
R1(config-router)#NETWORK 200.200.200.4 0.0.0.3 AREA 0
R1(config-router)#NETWORK 10.10.10.0 0.0.0.255 AREA 0
R1(config-router)#EXIT
R1(config)#EXIT
R1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R4#
```

**Step 4:** For Router R2, Click the CLI tab. Copy the following text into the command line interface.

```
R2#CONFIGURE TERMINAL
Enter configuration commands, one per line. End with CNTL/Z.
R2(config)#ROUTER OSPF 1
R2(config-router)#NETWORK 192.168.240.0 0.0.0.31 AREA 0
R2(config-router)#NETWORK 192.168.240.52 0.0.0.3 AREA 0
R2(config-router)#NETWORK 200.200.200.4 0.0.0.3 AREA 0
R2(config-router)#EXIT
R2(config)#EXIT
R2#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R4#
```

**Step 5:** For Router R3, Click the CLI tab. Copy the following text into the command line interface.

```
R3#CONFIGURE TERMINAL
Enter configuration commands, one per line. End with CNTL/Z.
R3(config)#ROUTER OSPF 1
R3(config-router)#NETWORK 192.168.240.48 0.0.0.3 AREA 0
R3(config-router)#NETWORK 192.168.240.52 0.0.0.3 AREA 0
R3(config-router)#NETWORK 200.200.200.0 0.0.0.3 AREA 0
R3(config-router)#EXIT
R3(config)#EXIT
R3#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R4#
```

**Step 6:** For Router R4, Click the CLI tab. Copy the following text into the command line interface.

```
R4#CONFIGURE TERMINAL
Enter configuration commands, one per line. End with CNTL/Z.
R4(config)#ROUTER OSPF 1
R4(config-router)#NETWORK 192.168.240.48 0.0.0.3 AREA 0
R4(config-router)#NETWORK 192.168.240.32 0.0.0.15 AREA 0
R4(config-router)#EXIT
R4(config)#EXIT
R4#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
R4#
```

**Step 7:** Switch off router R2. What are the changes noted in the routing tables?

**Step 8:** Switch on router R2. What are the changes noted in the routing tables?

**Step 9: Reflection:** What have you learned in this task?

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