# TCOM 515
# IP Routing
# Lab Exercise 2

## RIP Routing

*Name:*
*Lab Day:*
*Router Name:*
*Team Members:*

Objective: The purpose of this lab is to become familiar with routers and their configuration parameters. You will physically set-up the equipment, configure the routers, learn to configure RIP and watch a topology change affect the route table.

In this lab, you will execute the following tasks:

1. Make physical connectivity between devices
2. Login to the terminal server and clear the router
3. Configure the router and its interfaces
4. Configure RIP
5. Turn up one additional link
6. Shut down two existing links
7. Clear Configuration

References:

How to use Cisco CLI
Cisco Command Line Overview
Configuring Interfaces
Configuring RIP

Equipment Used:

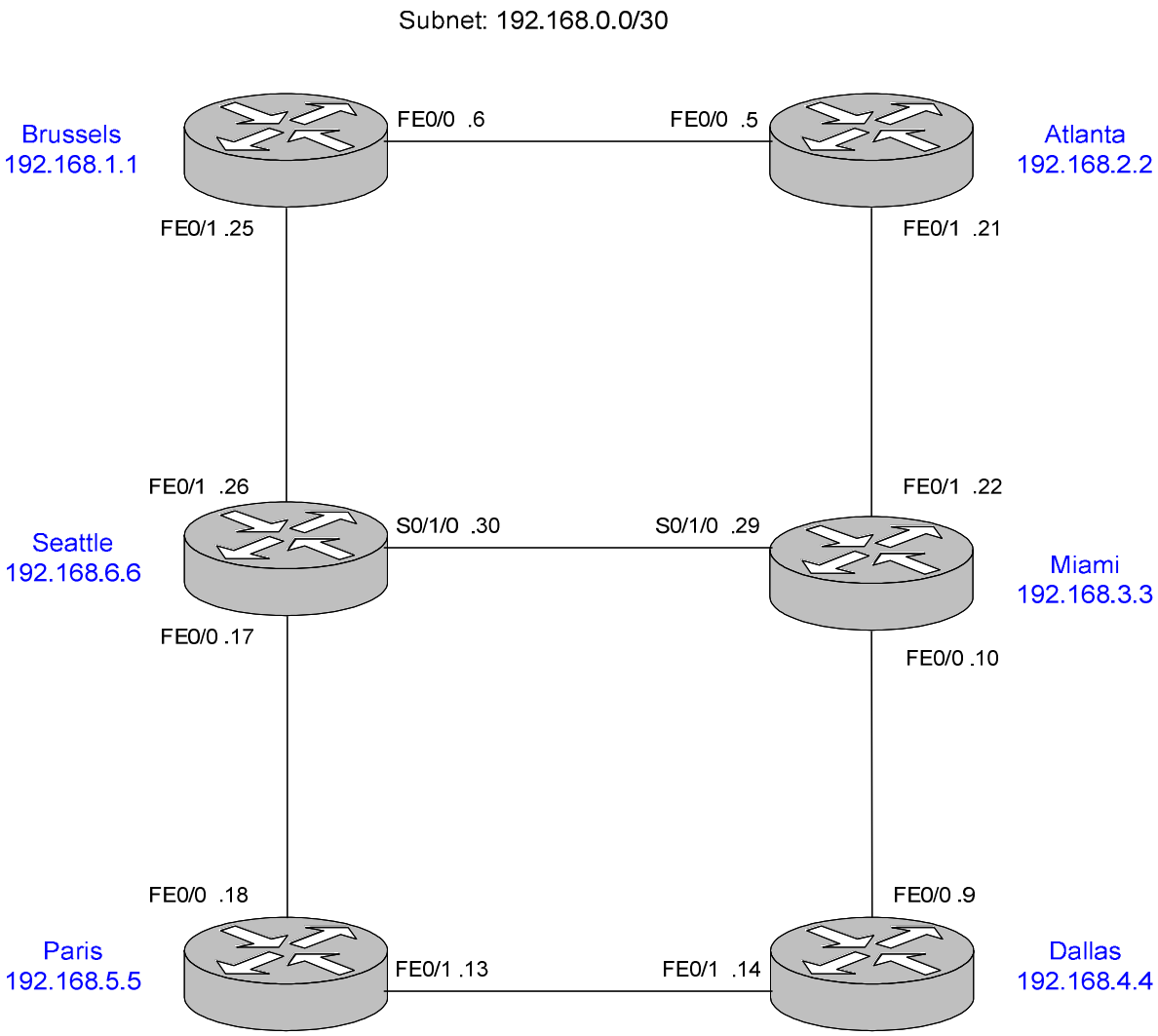
- Cisco router 2511 (terminal server)
- Six 2811 Cisco ISRs
- PC workstations for management

# Detailed Lab Steps

### 1. Make physical connectivity between devices

The first objective of this lab is to create the physical topology required. The physical connectivity is shown below in Figure 1 – Lab 2 Physical Connectivity. Each router will have a FastEthernet connection to two other routers.

**Figure 1 Lab 1 Physical Connectivity**



**2. Login to the router**

You must connect to your assigned router through the terminal server.

From SDTConnector, choose corresponding router from the list. Login using the following info,

- User: *student*
- Password: *nocnoc*

Now once you are on the appropriate router, type the following commands:

- *"enable"*
- *"nocnoc"* If prompted for password
- *"erase start"*
- *"reload"*

When the router reloads you will get the autoinstall menu, type "no" or "ctrl-c" to cancel the autoinstall program. Now you will see a prompt that looks like this:

router>

Now enter the following commands:

- *"enable"*
- *"conf t"*
- *"hostname <your router's name>"*
- *"no ip domain lookup"*
- *"line console 0"*
- *"logging synchronous"*

Enter "*Ctrl+Z"* to exit configuration mode.

### 3. Configure the router

You will not be configuring any passwords for the labs. They are already established for the labs. Please do not change any passwords on the routers so other groups will not have trouble accessing the routers.

Now that you have configured a few basic global parameters, you will configure the physical interfaces for your base topology.

The table below lists the IP addresses for the various router interfaces as they were identified in Figure 1. Identify your interface from the table below:

| Router Name | Loopback0 | FastEthernet Interface 0/0 and mask | FastEthernet Interface 0/1 and mask |
|---|---|---|---|
| Brussels | 192.168.1.1/32 | 192.168.0.6/30 | 192.168.0.25/30 |
| Atlanta | 192.168.2.2/32 | 192.168.0.5/30 | 192.168.0.21/30 |
| Miami | 192.168.3.3/32 | 192.168.0.10/30 | 192.168.0.22/30 |
| Dallas | 192.168.4.4/32 | 192.168.0.9/30 | 192.168.0.14/30 |
| Paris | 192.168.5.5/32 | 192.168.0.18/30 | 192.168.0.13/30 |
| Seattle | 192.168.6.6/32 | 192.168.0.17/30 | 192.168.0.26/30 |

To enter configuration mode again,

- Type "*config terminal* "

To enter the interface configuration mode from the global configuration mode,

- Type *"interface <your FastEthernet interface>* "

Now type your FastEthernet description.

- Type "*description Link to <Other Router Name> <Network Address>* "

Now you will assign the IP addresses to your interfaces.

- Type *"ip address <address number from chart> 255.255.255.252 "*

Note that the 255.255.255.252 is the dotted decimal equivalent of the network mask listed a /30 in the chart.

To bring the interface up,

- Type *"no shut "*

Repeat the last 4 commands for your other FastEthernet interface.

Now you will configure your loopback interface, which is logical rather than physical like the FastEthernet interfaces above.

- Type *"interface loop 0 "*

Now you will assign the IP addresses to your loopback0 interface.

- Type *"ip address <address number from chart> 255.255.255.255 "*

Exit the interface configuration mode and the global configuration mode by typing either "ctrl-z" or "end".

**The groups on Seattle and Miami have one last interface to configure but not turn up.**

| Seattle S0/1/0 | Miami S0/1/0 |
|---|---|
| 192.168.0.30/30 | 192.168.0.29/30 |

Type “show ip interface brief”

*3.1 Are each the interfaces you configured up that should be? Which ones?*

If not please check physical connectivity and your configuration. Ping the other side of each of your two links for IP connectivity.

- Type “ping <IP address of other side of link>”
- Now type “show ip route”

You should all have three directly connected routes out each of your two interfaces that are configured and turned up.

*3.2 Once all the links are up, which IP addresses can you ping?*
*3.3 What does your IP route table look like, how many entries, what kind of entries?*

**4. Configure RIP.**

Now you will turn on RIP on your router. In global configuration mode:

- Type *“router rip”*
- Type *“version 2”*
- Type *“network 192.168.0.0”*
- Type *“network 192.168.1.0”*
- Type *“network 192.168.2.0”*
- Type *“network 192.168.3.0”*
- Type *“network 192.168.4.0”*
- Type *“network 192.168.5.0”*
- Type “*network 192.168.6.0”*
- Type “*no auto-summary”*

Now to watch the RIP advertisements, go back to enable mode,

- Type “*debug IP RIP”*

Now sit and wait for the messages to appear on your screen. Once you have seen enough messages, to stop the output:

- Type *"no debug IP RIP"*

Look at the IP routing table:

- Type "*show IP route"*

Make sure every router has RIP configured and all interfaces in the network are reachable before answering the following questions.

*4.1 How many route entries are visible in the IP routing table? What types of routes do you have?*

*4.2 Save one of the RIP route entries from the IP routing table. Explain each part of the entry.*

*4.3 What is the destination address of the RIP updates? What information is included in these updates? Please include an output of an update.*

Now if you are on Paris, Seattle or Brussels, traceroute to Miami's loopback. If you are on Dallas, Miami or Atlanta, traceroute to Seattle's loopback.

- Type " *traceroute X.X.X.X"*

*4.4 What is your path to the destination? Please explain why this path was taken. How many hops away are you from this destination?*

**Stop here and wait for all the groups to complete section 4.**

**5. Turn up one additional link**

Seattle and Miami should now turn up their third link, make sure the RIP commands were added to these interfaces as well. Make sure you can ping across this link.

Now for all groups to watch the RIP advertisements of the new link:

- Type "*debug IP RIP"*

Now sit and wait for the messages to appear on your screen. Look for the new network to be included in the advertisements you receive. Once you have seen enough messages, to stop the output:

- Type "*no debug IP RIP*"

Look at the IP routing table:

- Type "*show IP route"*

*5.1 How has the IP routing table changed from section 4?*

*5.2 Has the RIP update changed from section 4?*

Now if you are on Paris, Seattle or Brussels, traceroute to Miami's loopback. If you are on Dallas, Miami or Atlanta, traceroute to Seattle's loopback.

- Type " *traceroute X.X.X.X"*

*5.3 What is your path? How has this changed from section 4?*

**Stop here and wait for all the groups to complete section 5.**

## 6. Shut down two existing links

Paris and Dallas should shut down the link between them. Brussels and Atlanta should also shut down the link between them.

Now for all groups to watch the RIP advertisements:

- Type *"debug IP RIP"*

Now sit and wait for the messages to appear on your screen. Look for the shutdown networks to be removed in the advertisements you receive. Once you have seen enough messages, to stop the output:

- Type *"no debug IP RIP"*

Look at the IP routing table:

- Type *"show IP route"*

*6.1 How has the IP routing table changed from section 5?*

*6.2 How has the RIP update changed from section 5?*

*6.3 Which destination networks are you not able to ping?*

Now if you are on Paris, Seattle or Brussels, traceroute to Miami's loopback. If you are on Dallas, Miami or Atlanta, traceroute to Seattle's loopback.

- Type " *traceroute X.X.X.X"*

*6.4 What is your path? How has this changed from section 5?*

**Stop here and wait for all the groups to complete section 6.**

**7. Power down the router and undo all cabling.**

*Lab Questions: Answer these questions in addition to all questions contained within the lab itself.* ***2-3 sentence*** *answers should suffice.*

1. *What was the most important piece of knowledge you took away from this lab?*
2. *What new command did you find most useful and why?*
3. *Identify at least one problem you experienced in this lab. How did you figure out the problem? How did you resolve it?*

*List and explain the various RIP timers.*