TCOM 515
IP Routing
Lab Exercise 6
Route Redistribution

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 OSPF and BGP with route redistribution on the routers.

In this lab, you will execute the following tasks:

1. Make physical connectivity between devices
2. Login to the terminal server via telnet
3. Configure the router and its interfaces
4. Configure OSPF
5. Configure BGP and advertise local routes
6. Inform your OSPF neighbors about your BGP routes.
7. Reset router configurations

References:

How to use Cisco CLI
Cisco Command Line Overview
Configuring Interfaces
Configuring BGP
Configuring OSPF

Equipment Used:

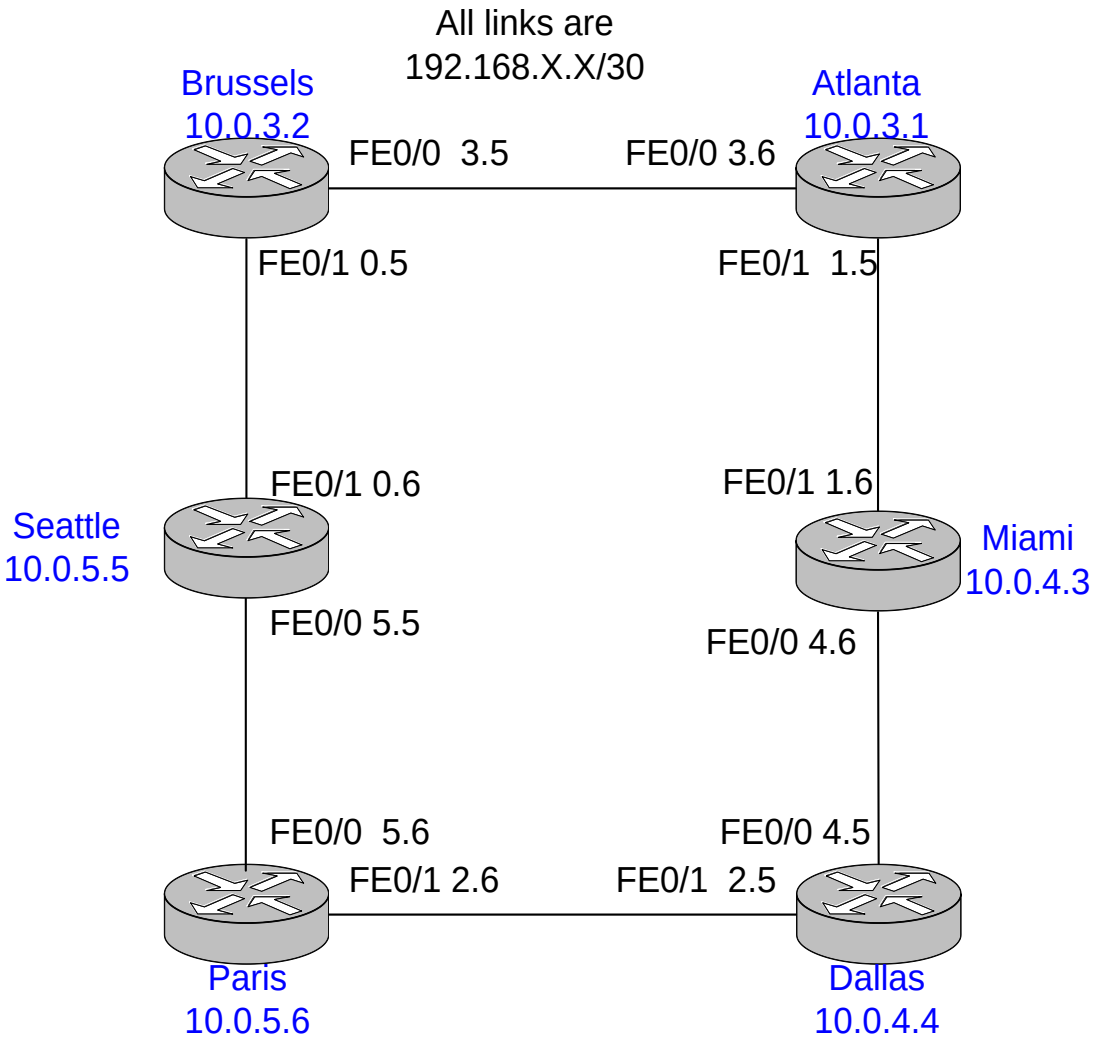
- Cisco router 2511 (terminal server)
- Six Cisco 2811 ISRs
- PC workstations for management

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 6 Physical Connectivity. Each router will have a FastEthernet connection to two other routers.

Figure 1 Lab 6 Physical Connectivity



2. Login to the router

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

Connect to the router by choosing 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 look 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 and its interfaces

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	Ethernet 0/0 and mask	Ethernet 0/1 and mask	AS number
Brussels	10.0.3.2/32	192.168.3.5/30	192.168.0.5/30	3
Atlanta	10.0.3.1/32	192.168.3.6/30	192.168.1.5/30	3
Miami	10.0.4.3/32	192.168.4.6/30	192.168.1.6/30	4
Dallas	10.0.4.4/32	192.168.4.5/30	192.168.2.5/30	4
Paris	10.0.5.6/32	192.168.5.6/30	192.168.2.6/30	5
Seattle	10.0.5.5/32	192.168.5.5/30	192.168.0.6/30	5

Use the above table to configure and enable all of the interfaces (2 FastEthernet and 1 loopback).

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

- Now type "*show ip route*"

3.2 What does your route table look like, how many entries, what kind of entries?

4. Configure OSPF as IGP

First you want an IGP on your network for your local routes. We will use OSPF for our IGP.

In global configuration mode:

- *"router ospf 1"*
- *"network <FastEthernet1 network address> 255.255.255.252 area 0"*
- *"network <FastEthernet2 network address> 255.255.255.252 area 0*
- *"network <loopback network address> 255.255.255.255 area 0"*
- *"passive-interface <FastEthernet 0/0 or FastEthernet0/1>" this is the interface that connects to your external AS*

Here is a sample configuration from Brussels:

- *"router ospf 1"*
- *"network 192.168.3.4 255.255.255.252 area 0"*
- *"network 192.168.0.4 255.255.255.252 area 0"*
- *"network 10.0.3.2 255.255.255.255 area 0"*
- *"passive-interface FastEthernet0/1"*

Look at the IP routing table

- Type "*show IP route*"

4.1 What routes do you have in the route table now? How many, what type?
4.2 How has the route table changed from Step 3?
4.3 Any IP addresses that you cannot ping now? Why not?

5. Configure BGP and advertise local routes to neighbors

For each router, you must determine the IP address of its eBGP neighbor and the AS of the neighbor to use for configuration.

Your local routes are the ones that currently exist only within your IGP. There are multiple ways to send your EBGP peer routing information about the local routes. For this lab, we will redistribute OSPF into BGP. Make sure your EBGP peer has made the same configuration change on his side before you do the show commands to answer the questions below.

5.1 Fill in ALL of the table entries for the lab report.

Router	Local AS	Neighbor	Remote AS
Brussels	3	192.168. .	
Atlanta	3	192.168. .	
Miami	4	192.168. .	
Dallas	4	192.168. .	
Paris	5	192.168. .	
Seattle	5	192.168. .	

- Type *"router bgp <local as>"*
- Type *"redistribute ospf 1"*
- Type *"neighbor <neighbor FastEthernet interface address> remote-as <neighbor AS number>"*
- Type *"no auto-summary"*

Use the outputs from these show commands to answer the following questions:

- Type *"show IP route"*
- Type *"show IP BGP"*
- Type *"show IP BGP summary"*
- Type *"show IP BGP neighbor"*
- Type *"show IP BGP neighbor <neighbor address> routes"*
- Type *"show IP BGP neighbor <neighbor address> advertised-routes"*

5.2 How has the IP route table changed from section 4? Any new routes or route types?
5.3 Any networks that you cannot ping to? Why not?
5.4 How many and which BGP routes have you received?
5.5 How many and which BGP routes are you advertising?
5.6 There are other possible ways to achieve the same BGP route advertisement that we accomplished through redistribution. Describe another method to advertise the same routes out to the BGP neighbors.

STOP and wait for class to finish before moving to section 6

6. Inform your OSPF neighbor router about the routes you received via eBGP

Your BGP routes currently exist only on your router. You need to advertise these routes into your AS so your IGP routers can have connectivity to these networks. Make sure every other group has completed both types of route redistribution before issuing the show commands to answer the questions below.

In global configuration mode:

- Type *"router ospf 1"*
- Type *"redistribute bgp <local as> subnets"*

Use the outputs from these show commands on your router to answer the following questions:

- Type *"show IP route"*
- Type *"show IP OSPF database"*
- Type *"show IP OSPF neighbor"*
- Type *"show IP route OSPF"*
- Type *"show IP BGP"*
- Type *"show IP BGP summary"*

6.1 How has the IP route table changed from section 5?
6.2 Are there any new OSPF routes? What type? What does this special type mean?
6.3 Are you able to ping all IP addresses in the network? How has this changed from section 6?
6.4 Instead of redistributing BGP routes into OSPF, what is another method of introducing the eBGP routes to the internal IGP routers?

STOP and wait for class to finish before moving to section 7

7. Power down 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?*

***Lab Diagram**: You are required to include a diagram as the network looked at the end of Section 6. Label router names with loopback interfaces, OSPF areas, AS, BGP sessions. This diagram can be computer generated or hand drawn. Use of different colors is encouraged.*

In section 5, we used IGP (OSPF) along with passive-interface to enable reachability for BGP next hop, what other methods can be used to provide reachability for BGP next hop?