Laboratory 6: Border Gateway Protocol (BGP)

In this Lab not many hints are given. We want to see who can complete the task. You can decide your own way to implement the given network model.

Objective:

- To configure and analyze the performance of BGP
- To understand the routing table of each router created by BGP

Introduction

BGP is Inter-domain path vector routing protocol. Within an autonomous system, one router works as a border router one behalf of the entire autonomous system. The border router creates a routing table and exchanges it using reliable TCP connection. The border router within an autonomous system advertises the path to its neighbor AS. Each border router gets a set of path in order to reach another AS. The organization can choose any path based on their policies.

In this Lab you have to create a project using BGP with only one scenario. In that scenario **(start)**, you will configure the router and BGP parameters to analyze the performance of BGP.

Create a project

First Scenario (start):

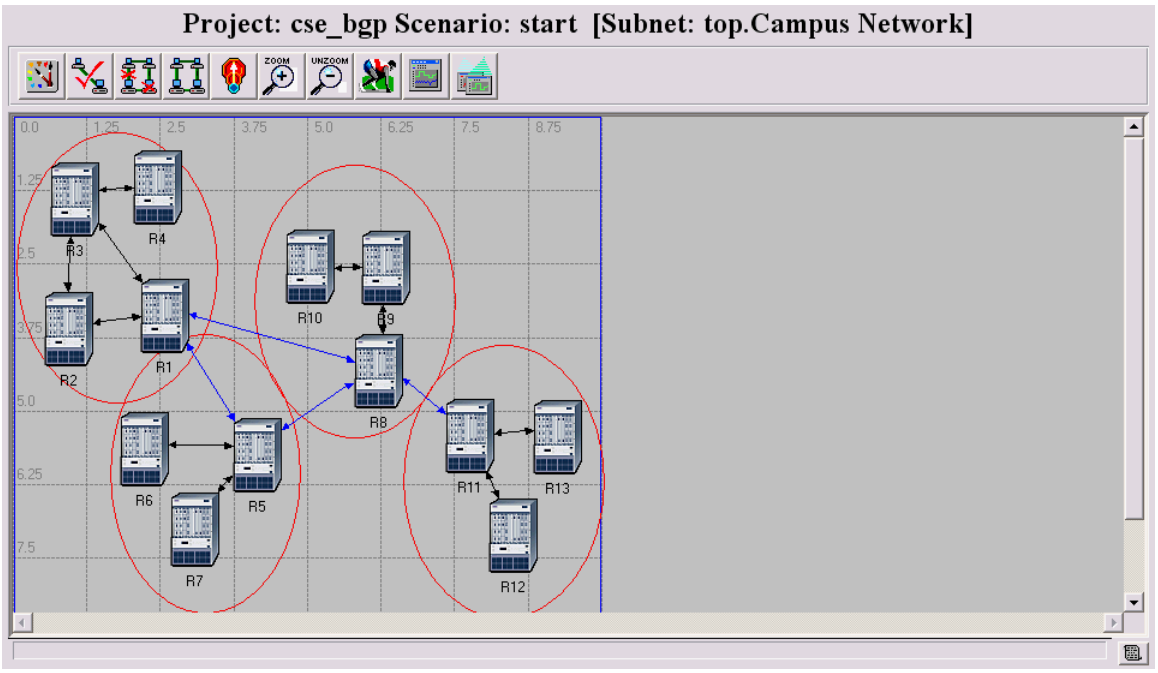
1. Create a project (cse_**bgp**) and first scenario (**start**).

2. Select **create empty scenario** and click next

3. Select **Network Scale: Campus**
Network Size: 10 mi x 10 mi
Model family: internet_toolbox, routers, advanced routers.

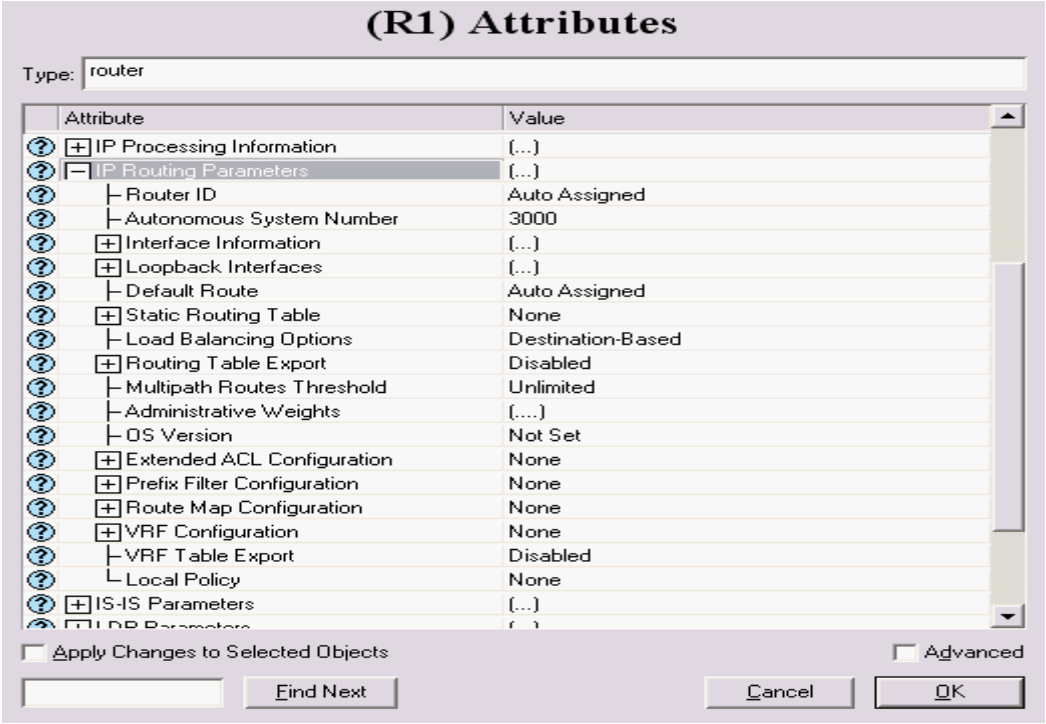
Now you will see an empty workspace.

4. Click the object Palette and bring 13 slip8_gtwy (one of the routers) or any advanced router object to workspace and change the name R1, R2,…..R13 and connect the router using PPP-DS3 link in the following way



Assign the Autonomous System Number:

Assign autonomous system number,3000, for router R1-R4
Assign autonomous system number,1000, for router R5-R7
Assign autonomous system number,2000, for router R8-R10
Assign autonomous system number,4000, for router R11-R13
Out of 13 Routers, Router 1,5,8, and 11 will act as a border router.

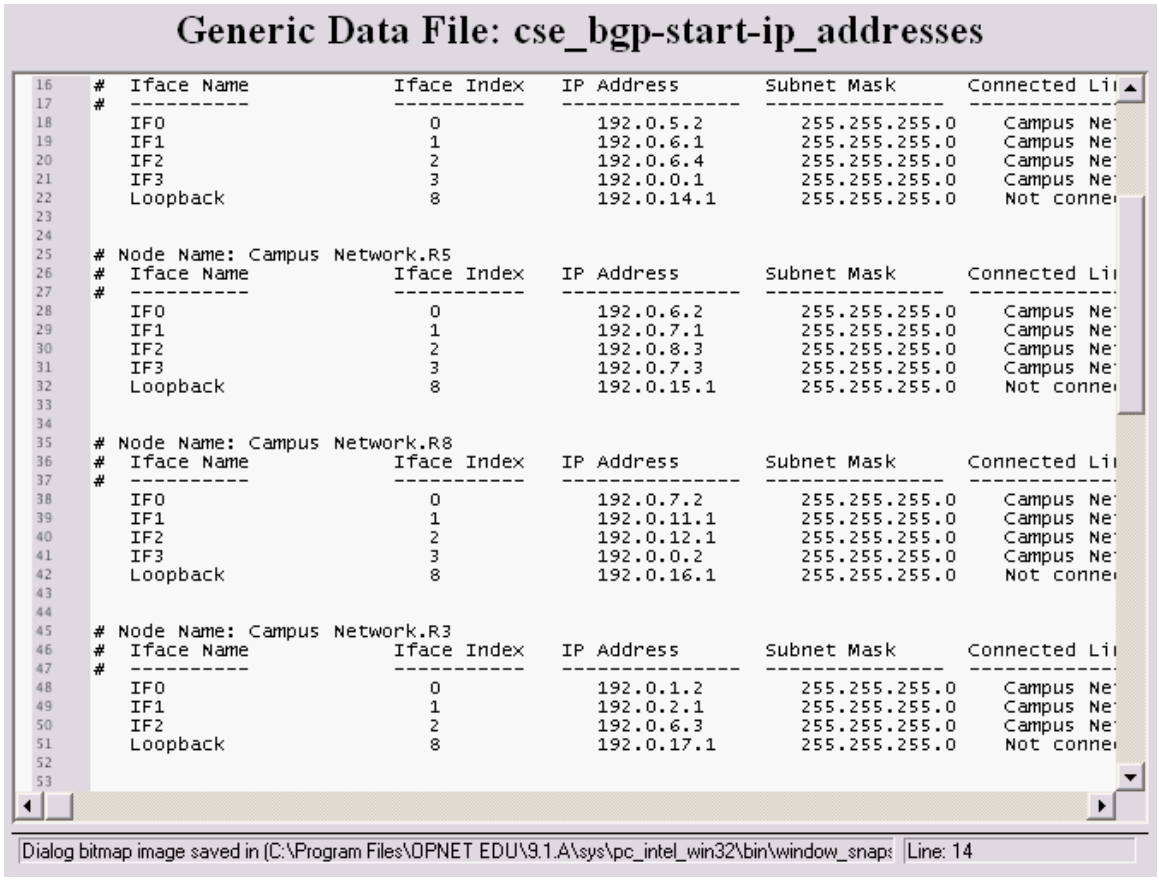


Collect all Interface address*:*

Run the simulation for 20 minutes and collect the router interface address which is allocated automatically.

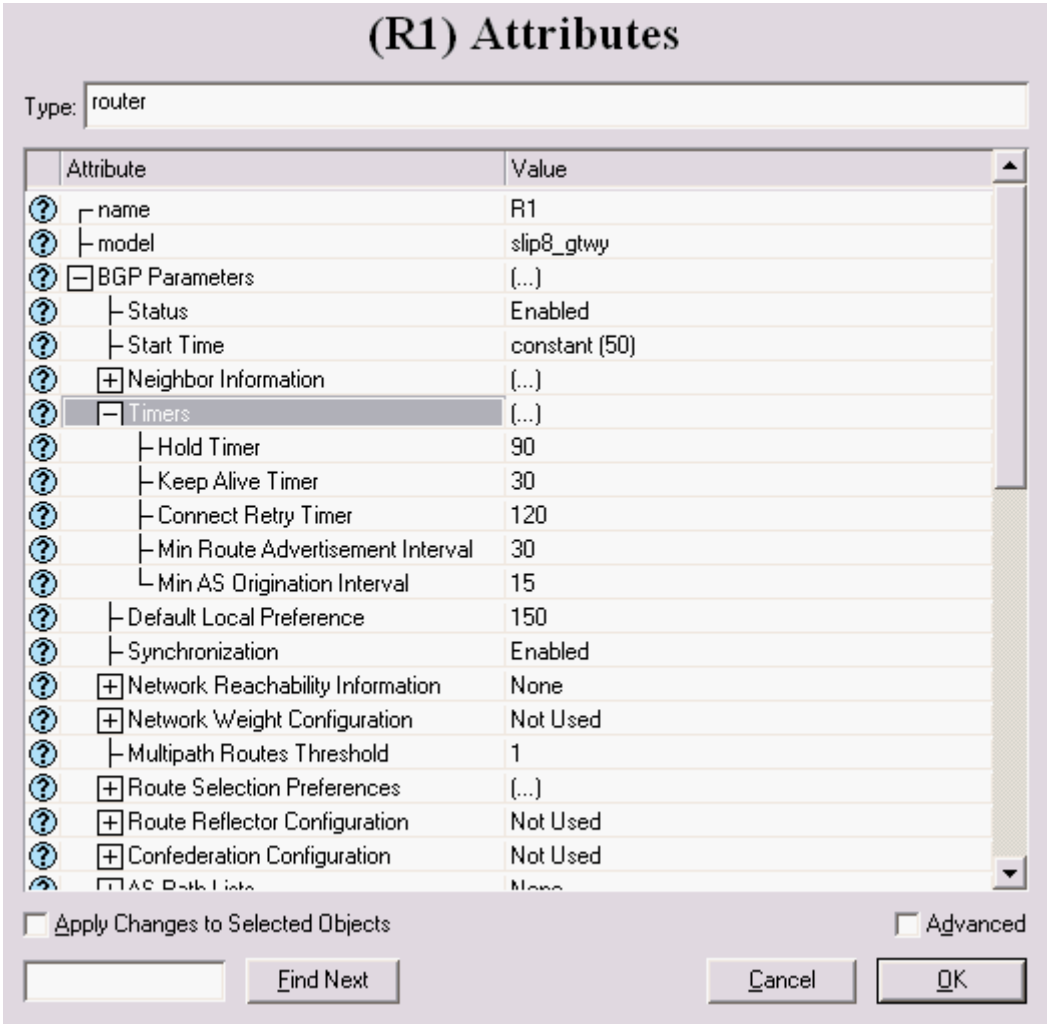
11. Select **File/Model Files/Refresh Model Directories.**

12. Select **File/Open/Generic Data File.** Select a file named cse_bgp_startip_addr and you will see the following window:



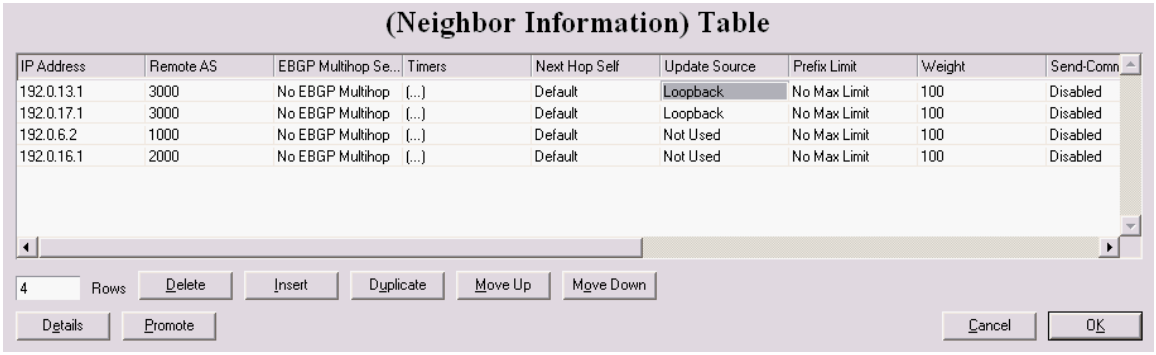
Configure BGP Attribute:

5. Select one of the routers and **Edit Attribute/BGP Parameters.** You will see the following BGP parameters in a window:



6. **Set Start Time:** The default start time is 70sec. You have to set the start time such a way so that it starts after creating the internal routing table within autonomous system.

7. **Set Neighbor Information:** BGP does not discover neighbor automatically. You have to explicitly configure the neighbor manually for each and every router. In order to set neighbor, you have to know all interface addresses of every router. One of the routers neighbor is set in the following way:



You have to set each and every router neighbor.

8. **Set the Timers:**

You can set the following timer:

Hold Timer
Keep Alive Timer
Connect Retry Timer
Min Route Advertisement Interval
Min As Origination Interval

EXPORT ROUTING TABLE:

9. Select Router1, Router5, Router8, and Router 11 and then select **Protocols/IP/Routing/Export Routing Table for Selected Routers.**

Now save your project

Configure Simulation Parameters:

11. Click on the **Configure and Run** button from the menu. Now select the **Global Attributes** and change the following:

* **IP Dynamic Routing Protocol: BGP**
* **IP Interface Addressing Mode: Auto Addressed/Export**

Run the Simulation:

12. Click the **RUN** button to run the simulation for **30 min and** collect statistics. Save the project

Collect the results:

13. Select **Results/Open Simulation Log** and expand it. Select **IP Routing Table.**

Observe all routers routing table and try to understand all information.

14. Save your project

Task1: Analyze the routing table of border routers and other routers.

Task2: Create another scenario (failure) where one of the routers or links fails after certain time. Analyze the new routing table.