

Laboratory 6: Border Gateway Protocol (BGP)

Objective:

- To configure BGP for inter-AS routing
- To configure route redistribution for BGP and RIP

Introduction

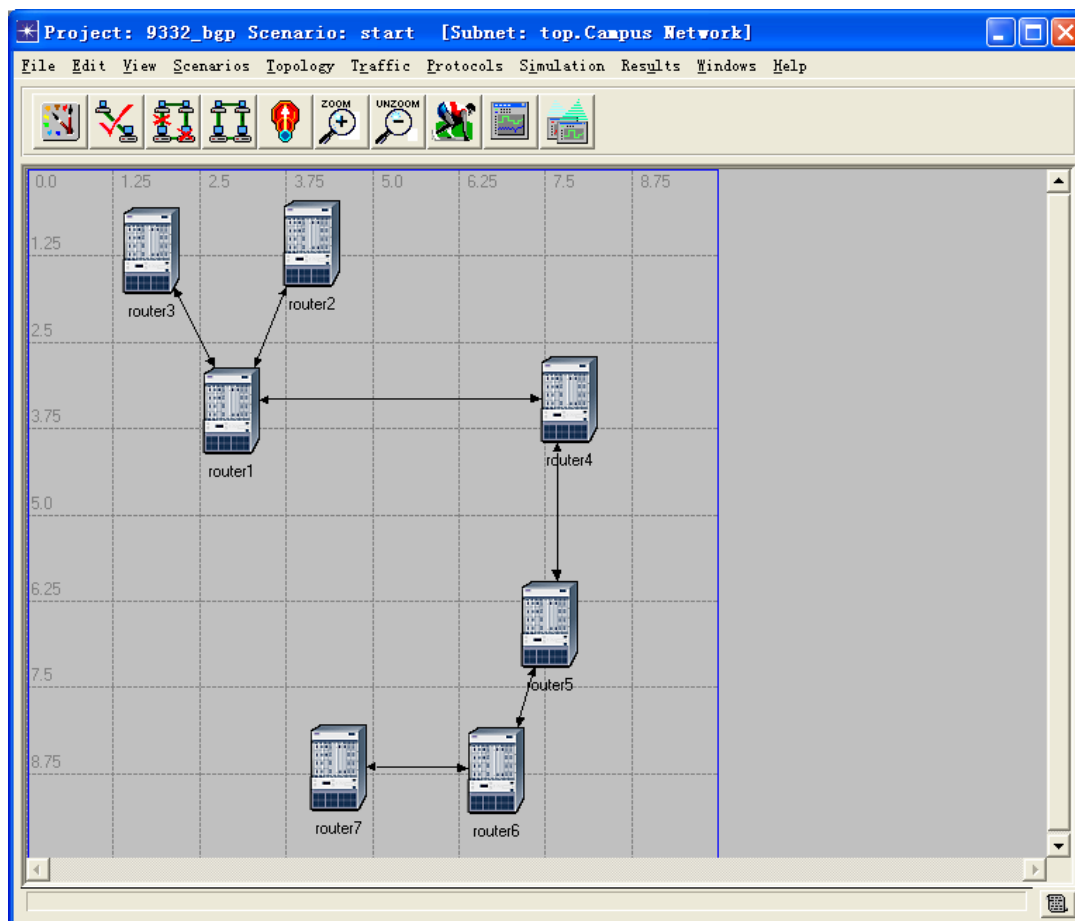
BGP is Inter-domain path vector routing protocol. Within an autonomous system, one router works as a border router on behalf of the entire autonomous system. The border router creates a routing table and exchanges it using reliable TCP connection. The border router within an autonomous system advertises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

In this Lab you will create a project using BGP as inter-AS routing protocol and RIP as intra-AS routing protocol.

In this lab, the instructions are not as detailed as in previous labs. You should be able to create and configure a simulation project by yourself, and it will be tested in the lab exam.

Create the network

1. Create the following network



Network Scale:	Campus
Network Size:	10km × 10km
Router Model:	slip8_gtwy
Link Model:	PPP-DS3
IP Address:	IP address are automatically assigned

Set the autonomous system number

The autonomous system (AS) number of router 1, 2 and 3 is 1000.
The AS number of router 4 is 2000.
The AS number of router 5, 6 and 7 is 3000.

Hint: to set the AS number, go to the router's attributes and expand "IP routing parameters".

Configure routing protocols

1. Intra-AS routing:

RIP is used for routing between router 1, 2 and 3 (within AS 1000).
RIP is used for routing between router 5, 6 and 7 (within AS 3000).

2. Inter-AS routing:

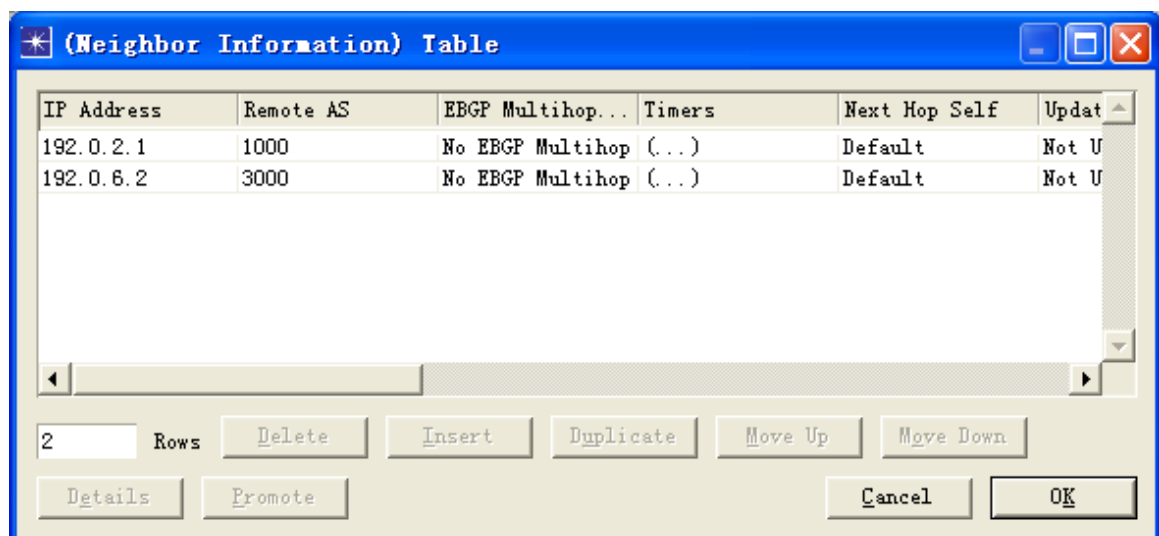
BGP is used for routing between router 1, 4, and 5 (inter-AS routing).

Hint: to enable BGP for router 1, 4 and 5, select the routers and go to “protocols”->“BGP”->“configure status”

3. Configure neighbor information of BGP

Unlike RIP and OSPF, a router running BGP does not automatically discover its neighbors. To make routers exchange BGP routing information with their neighbors, the neighbor information of each router has to be configured **manually**.

Hint: to configure the neighbor information, go to the router’s attributes and expand “BGP parameters”. For each neighbor information record, you only need to set the “IP address” and “Remote AS”.



4. NLDI (Network Layer Reachability Information)

To include the directly connected networks in to NLDI, you need to **manually** configure NLDI for the routers running BGP.

Hint: to configure the neighbor information, go to the router's attributes and expand "BGP parameters".

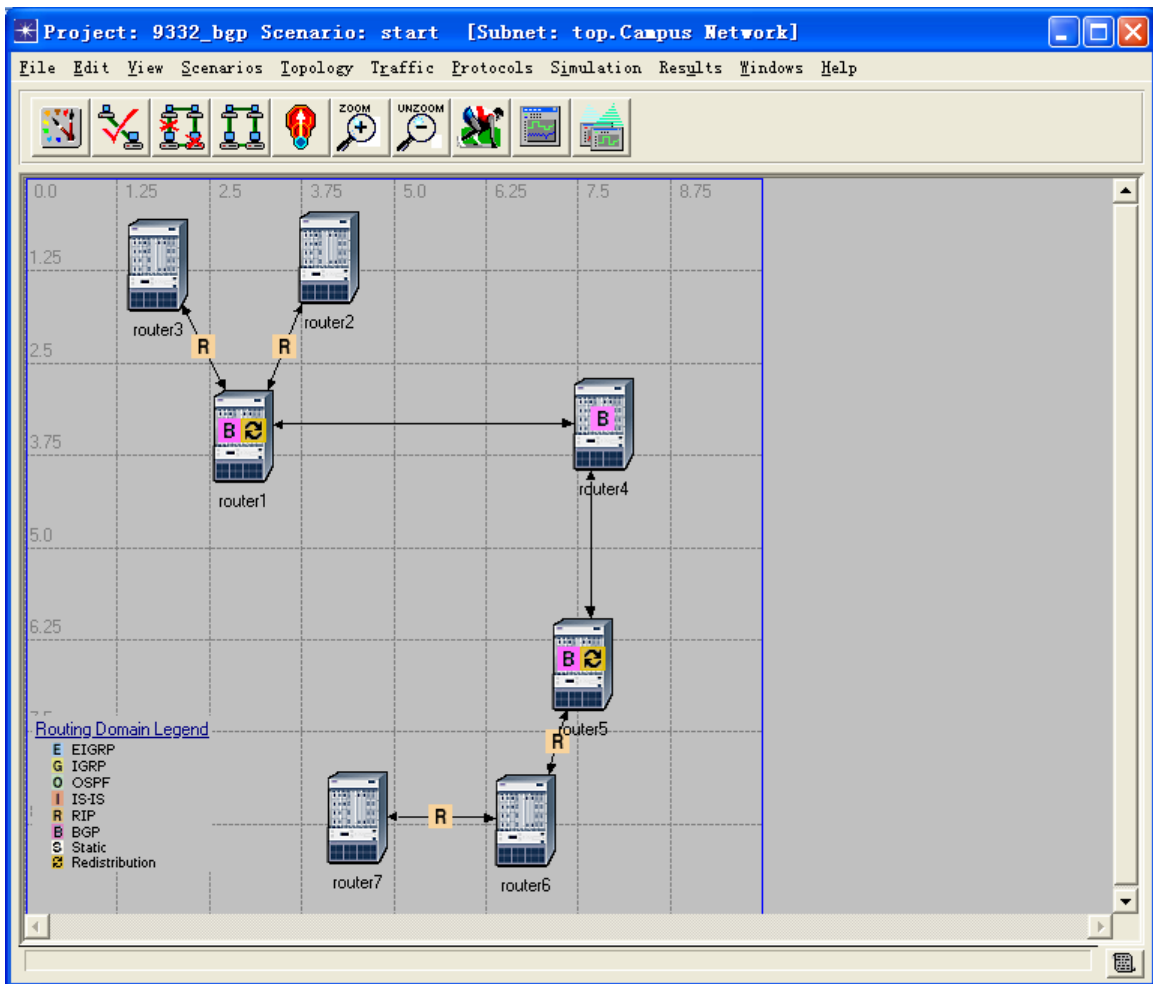
5. Route redistribution

To make the routers inside a AS to learn the routes to the external routers (and vice versa), you need to make the border routers (router 1 and 5) redistribute routes between intra-AS (RIP) and inter-AS (BGP) protocols.

Hint: to enable route redistribution, select the routers and go to "Protocols" -> "BGP"(or "RIP") -> "configure route distribution".

Running simulation

After finishing the routing protocol configuration, if you visualize the routing domains ("protocols"->"IP"->"routing"), the network will look like this:



Now run the simulation and observe the routing tables to see if every router has learned the routes to all the other routers.