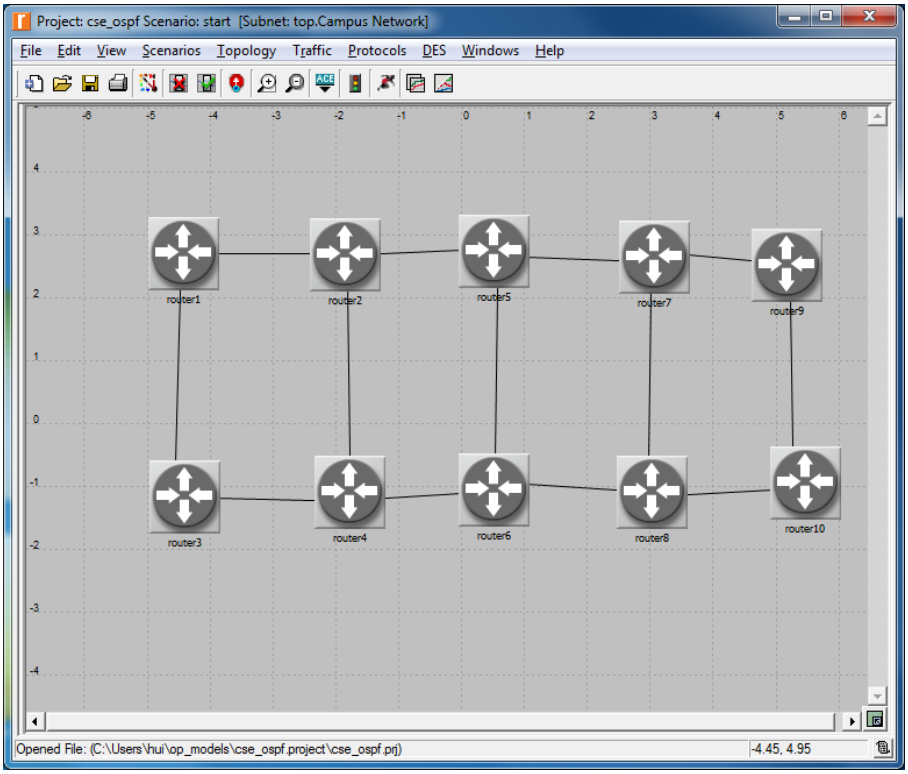
Laboratory 3: Open Shortest Path First (OSPF-2)

Objective:

- To determine the route of traffic demand from one router to another router
- To determine the routing table convergence after a link/node is failed.
- To understand load balancing in OSPF

1: Open the ospf project (you did last week)



Run the Simulation:

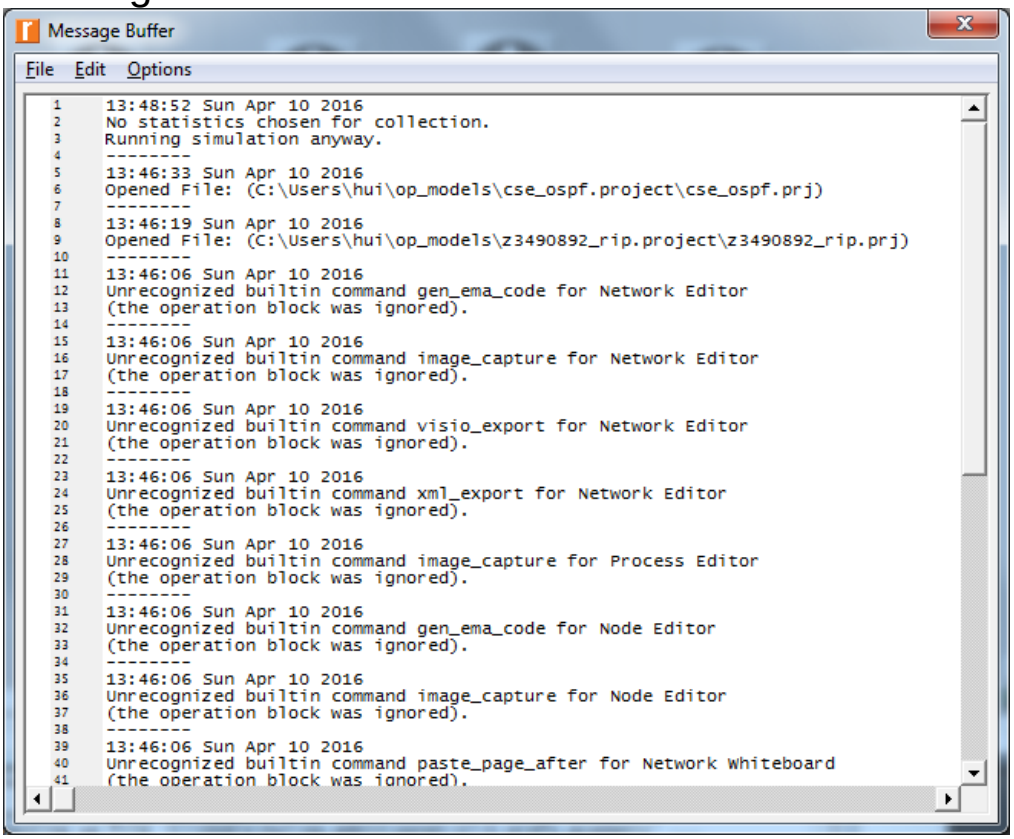
2. Click the **RUN** button to run the simulation for **15 min and** collect statistics. Save the project

Collect the results:

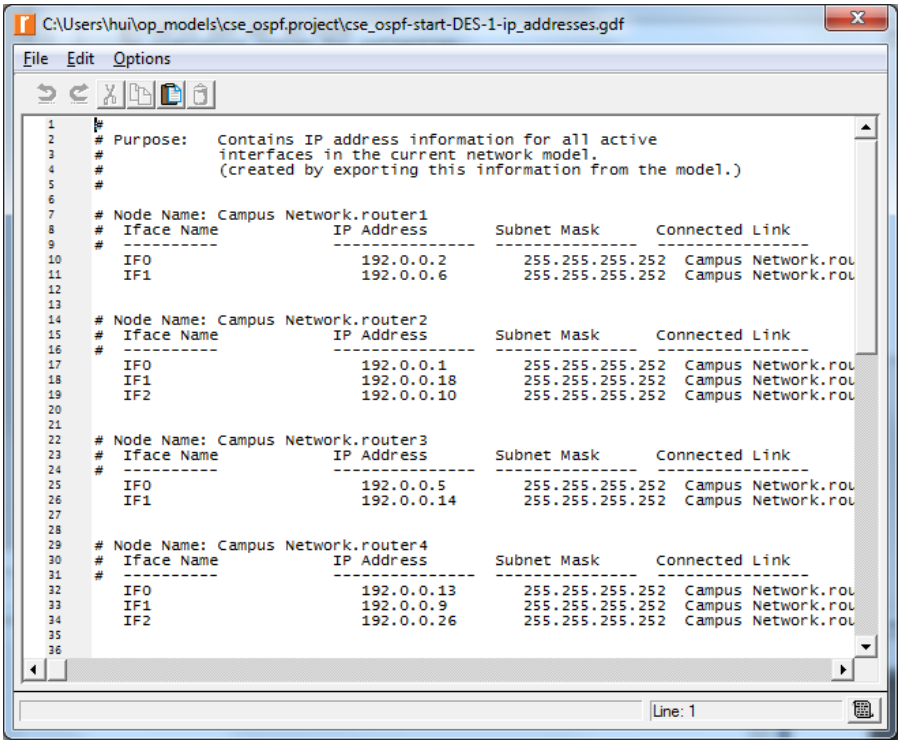
Now we want to collect the router interface address which is allocated automatically.

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

12. Click the button on the right-bottom corner, open message buffer window



Select **File/Open.** Select a file named cse_ospf-start-DES-1-ip_addresse.gdf and you will see the following window:



Task1:

Write down all the router interface address and link cost.

13. Select **DES/Results/View Results**
Observe all routers routing table and try to understand all information.

Task2:

Find the route for the traffic demand between router1 and router4.
(Hints: Select Protocols/IP/Demands/Display routes for configured Demands and select display yes).

Similarly, find the path for traffic demand between router 4 and router10.

Finally, find the route for the traffic demand between router7 and router8

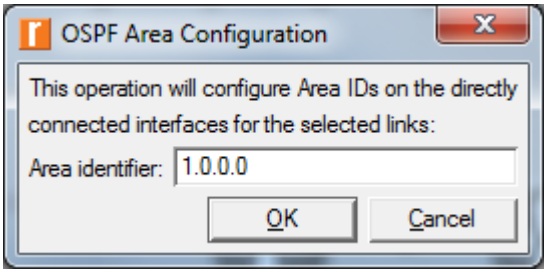
14. Save your project

Second Scenario (area):

Here you have to create a new scenario where you will divide the router into different areas. Then you will be able to compare the routing table of second scenario with first scenario.

1. Select **Scenario/Duplicate Scenario.** Set the scenario name: **area**
2. Select the link between all link of router1, router2, router3, and router4 and these routers will be under one **Area** say **(1.0.0.0)**

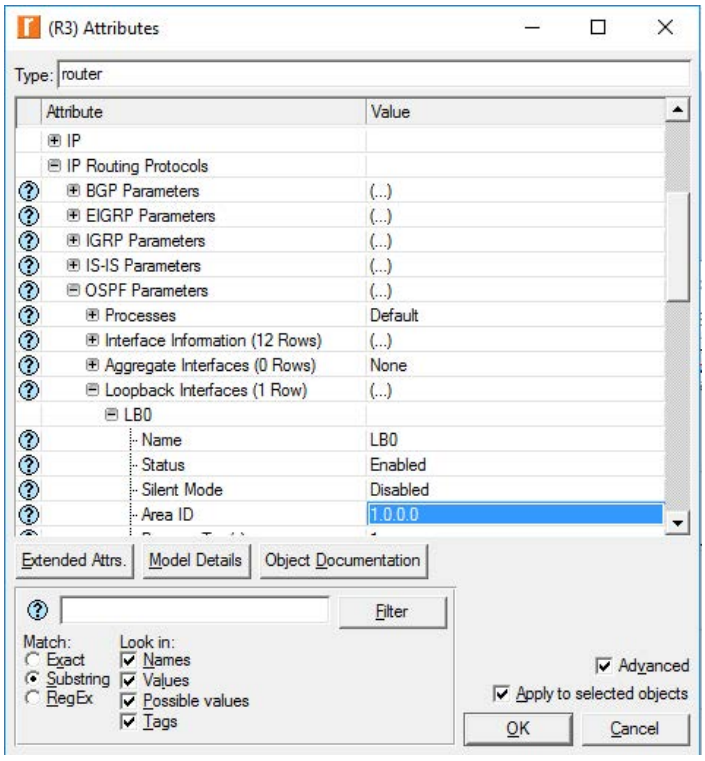
Select **Protocols/OSPF/Configure Area)** and set the **Area identifier 1.0.0.0**



3. Similarly set the **Area ID (2.0.0.0)** for all the links between router 7, 8, 9, and 10.
4. Rest of the link will go under the **Backbone area** and the default **Area ID** is **(0.0.0.0)**.

5. We also should set area id on loopback interfaces. Hold *Ctrl* and select router 1 to 4. Now right click one of the selected routers again and choose **Edit Attributes**. Click the box **Apply changes to selected objects**. Select and expand the **IP Routing Protocols\OSPF Parameters\Loopback Interfaces \LB0**. Now set **Area ID** to **(1.0.0.0)** and without changing any other field click on **OK** (then **Yes)**.

   Repeat the same process for Loopback Interfaces on Router 5 and 6 and set **Area ID** to **(0.0.0.0)**; Also, same process for Loopback Interfaces on Router 7 to 10 and set **Area ID** to **(2.0.0.0)**.



6. Save the project
7. Run the second scenario for 15 min.
8. View the results. Analyze the routing table of each router from **DES/Results/View Results.**

Task3:

1. Find the route between router1 and router4.
2. Find the route between router7 and router8

Task4:

Create a third scenario (failed) by duplicating the first scenario where the link between router2 and router5 is failed after 300 sec. Run the simulation and analyze the result and routing table. Find the new path between router2 and router4. Find also the convergence time. Compare the result with start scenario.

Task5:

Create a fourth scenario (load_balance) by duplicating the second scenario where you have to set router1 and router4 for testing the load balance. (Hints: Select Protocols/IP/Routing/Configure Load Balancing Selected Routers). Run the simulation and analyze the result and routing table. Find the traffic demand between router1 and router4. Compare the result with first two scenario.