ADVANCED COMPUTER NETWORKS

eBGP and iBGP

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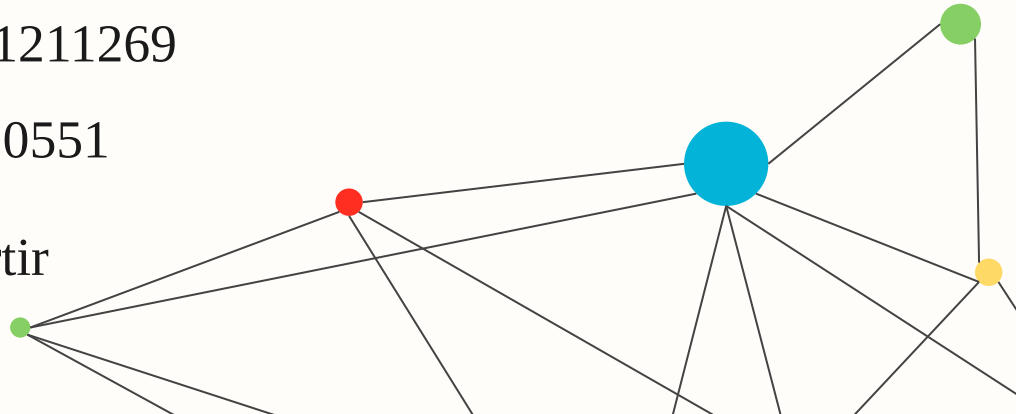
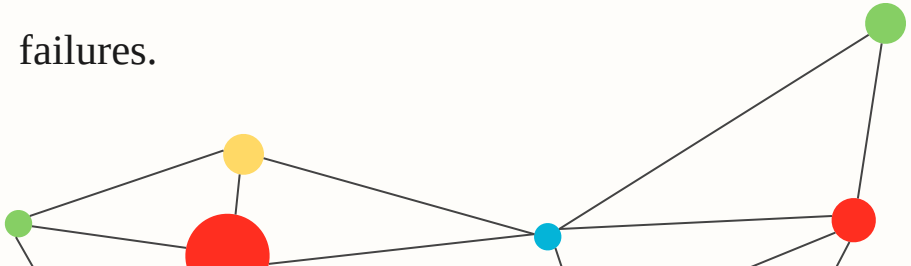


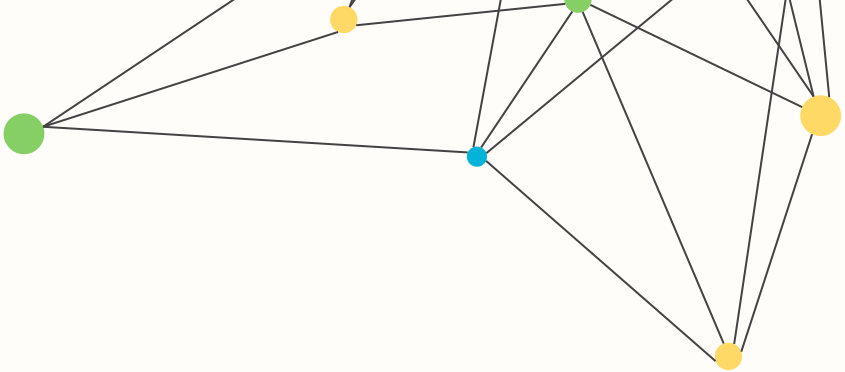
Table of contents

Introduction

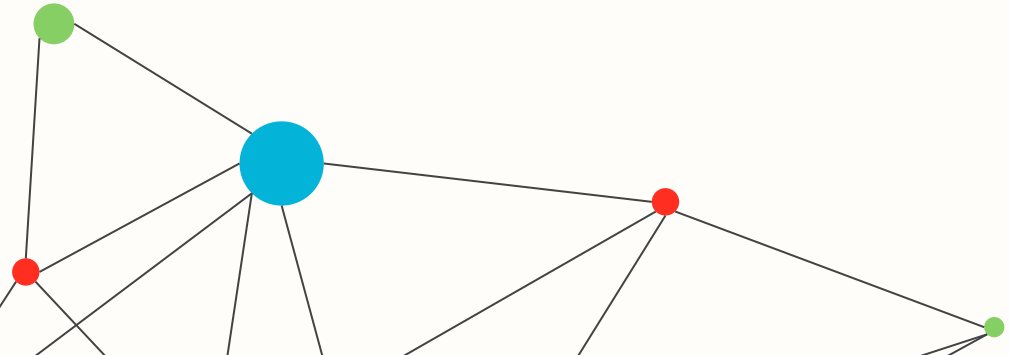
In this project multi routing protocols applyes, OSPF over AS 100, 200, and 300, RIP over AS 400. eBGP protocol applies at the connections between the AS’s. and the iBGP applies at the BGP routers inside each AS in a complete mesh. Thie project done using GNS3.

The aim of this project is to understand BGP protocols, how to apply each, and how its work in practical way. BGP manages how the packets routed globally, exchanging routing information among edge routers and ensuring network stability by finding new paths during route failures.





EBGP allows different networks to share the routing information, help efficient message delivery across the internet. OSPF and RIP are important protocols too, which used for routing within the autonomous systems “AS”.



Topology

The topology contains four AS's each one them have multi network as shown:

AS100:

26.19.10.0/24, 26.19.20.0/24, 26.19.30.0/24, 26.19.40.0/24, 26.19.50.0/24, 26.19.60.0/24, 26.19.70.0/24.

AS200:

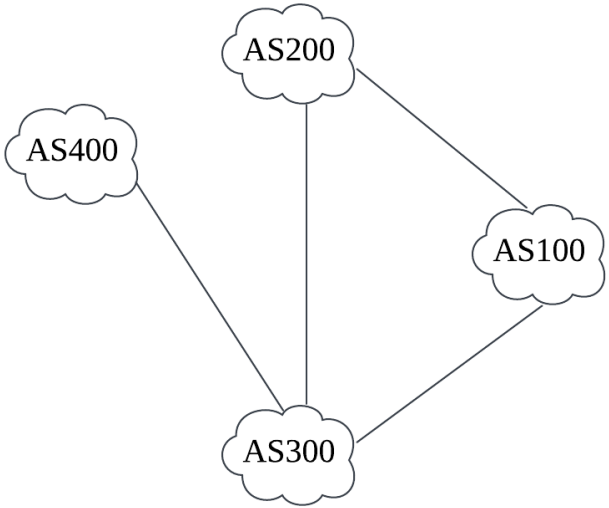
12.69.1.0/24, 12.69.2.0/24, 12.69.3.0/24.

AS300:

69.12.10.0/24, 69.12.20.0/24, 69.12.30.0/24, 69.12.40.0/24.

AS400:

112.69.40.0/24, 112.69.50.0/24, 112.69.60.0/24.



Topology

Each router or device in the network has multi- interfaces, which can be Fast-Ethernet or serial. The IP applies using same steps:

1. Enter the configuration terminal

   config t

2. Enter the interface, for example:

   interface fastethernet 0/0 or interface serial2/0

3. Add the IP address

   ip address 112.69.50.1 255.255.255.0

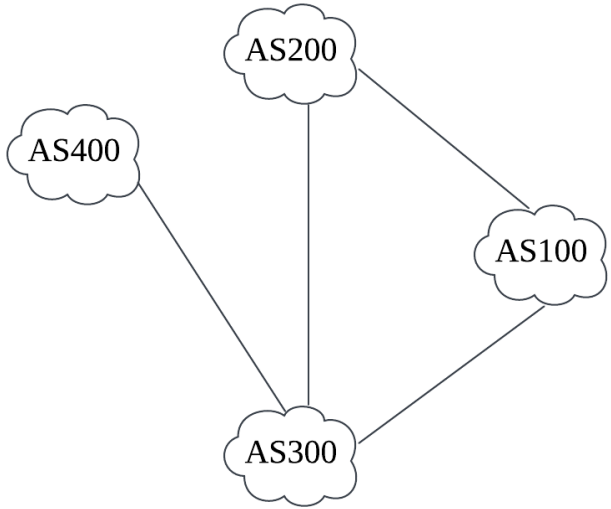
4. Exit the interface and the configuration mode:

   exit

   exit

4. Save the configurations in the memory

   write memory



01

Applying OSPF

How to apply the OSPF protocol

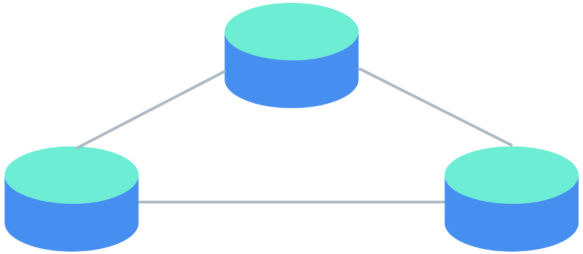
The following steps used for router 15 in AS 100:

1. config t
2. router ospf 1

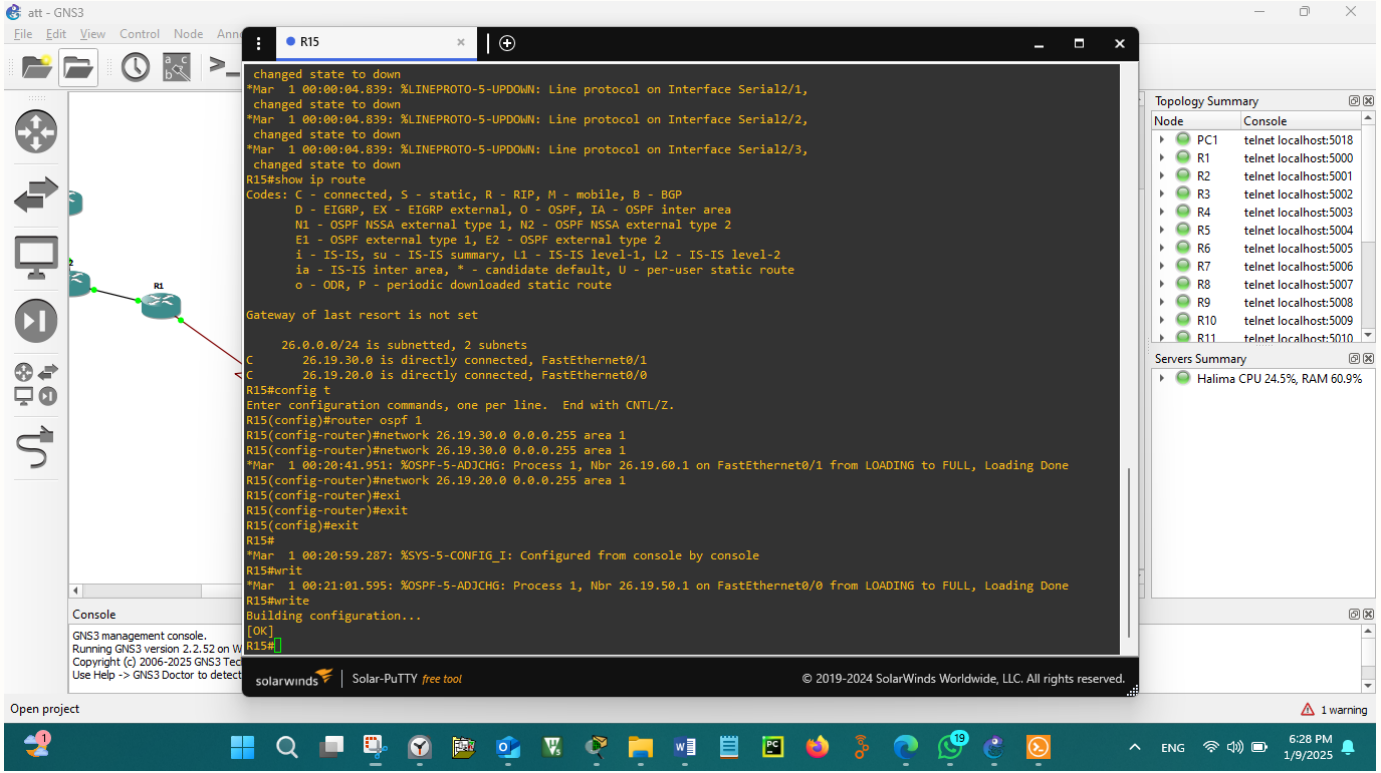
   start the OSPF configuration, number 1 is the OSPF process ID. Which can be between 1 and 65535.
3. network 26.19.30.0 0.0.0.255 area 1

   define the neighbour networks 26.19.30.0, the wildcard-mask 0.0.0.255, and the area id which equal to 1 for AS 100.
4. network 26.19.20.0 0.0.0.255 area 1
5. exit

   exit router configuration
6. exit
7. write memory



OSPF at router 15



02

Applying RIP

How to apply the RIP protocol

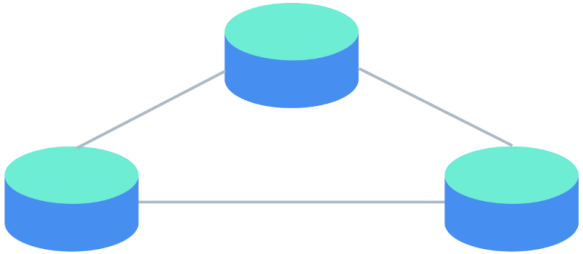
The following steps used for router 2 in AS 400:

1. config t
2. router rip

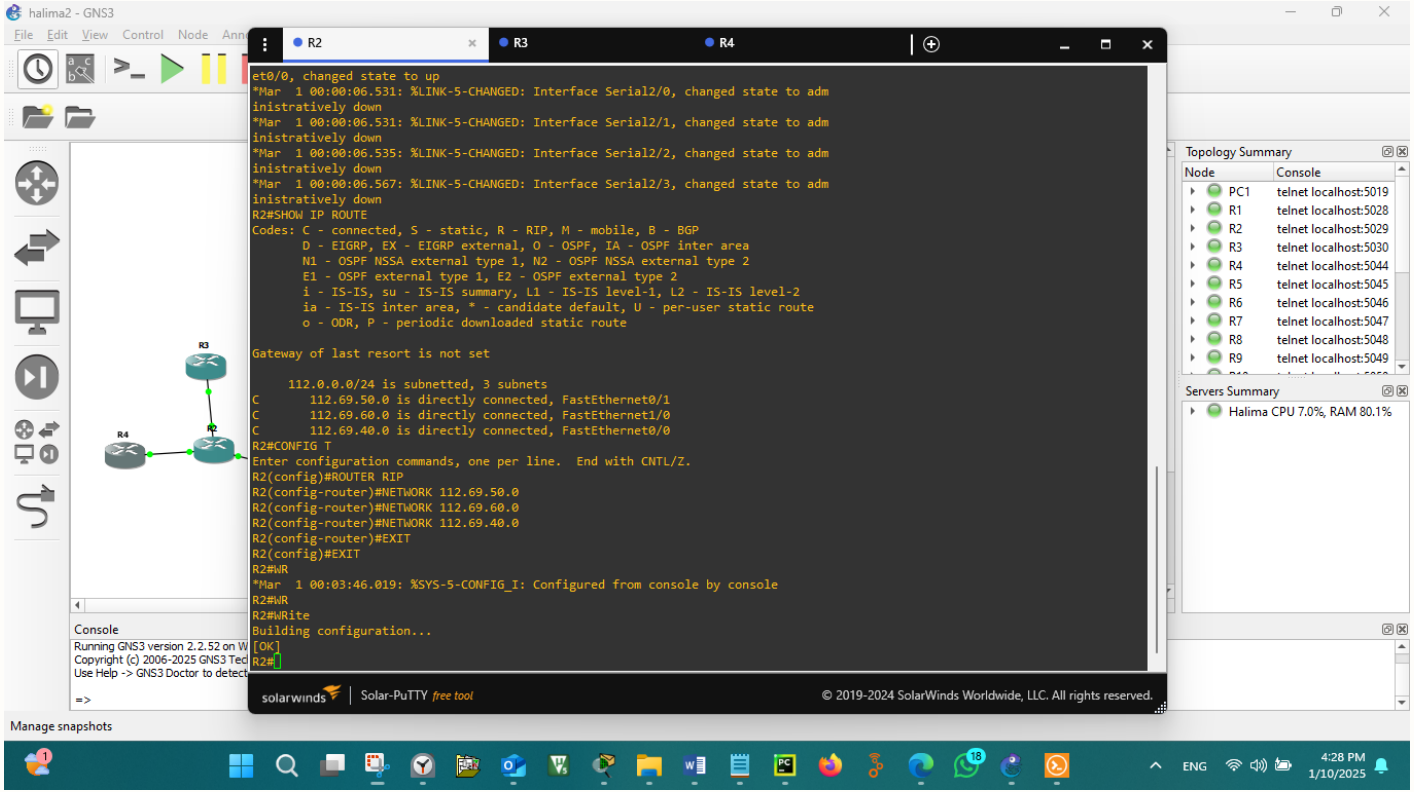
   Enable RIP routing.
3. network 112.69.40.0

   define the neighbour networks.
4. network 112.69.50.0
5. network 112.69.60.0
6. exit

   exit router configuration
7. exit
8. write memory



RIP at router 2



03

Applying eBGP

How to apply the eBGP protocol

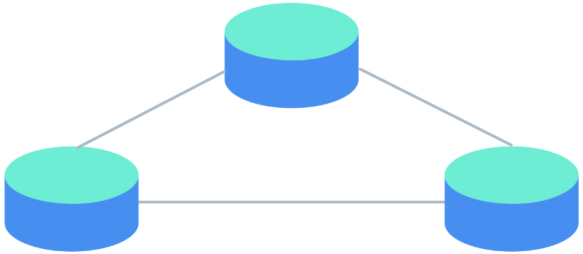
The following steps used for router 5:

1. config t
2. router bgp 200

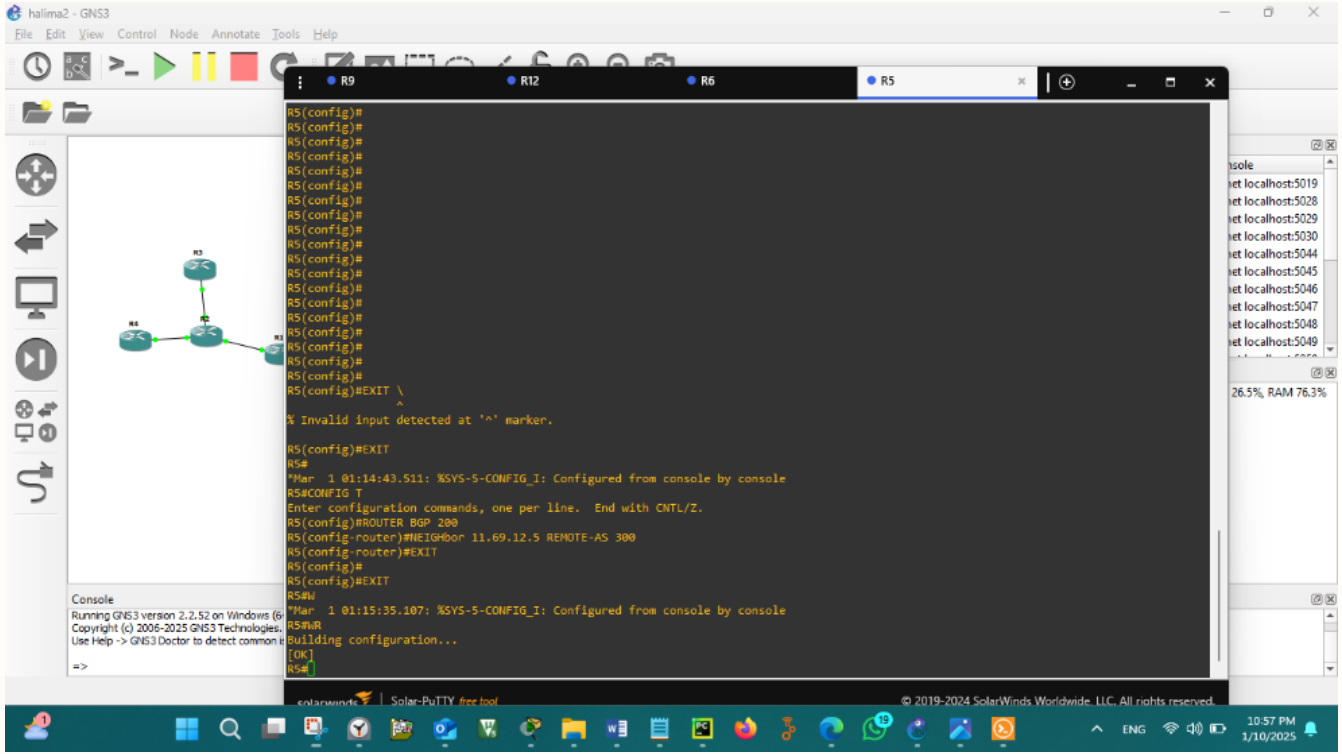
   Enable BGP configuration process for AS 200.
3. neighbor 11.69.12.5 remote as 300

   configures BGP neighbor, which has IP of 11.69.12.5 in AS 300.
4. exit

   exit the BGP configuration mode.
5. exit
6. write “same as write memory”



eBGP at router 5



04

Applying iBGP

How to apply the iBGP protocol

config t

for both routers to enter the configuration mode.

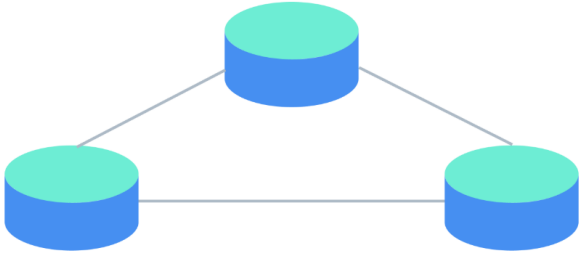
- Router 5:

1. router bgp 200
2. neighbor 12.69.1.2 remote-as 200

   IP of the second BGP router.

3. network 12.69.1.0 mask 255.255.255.0

   IP of the connection network.



How to apply the iBGP protocol

- Router 6:

1. router bgp 200

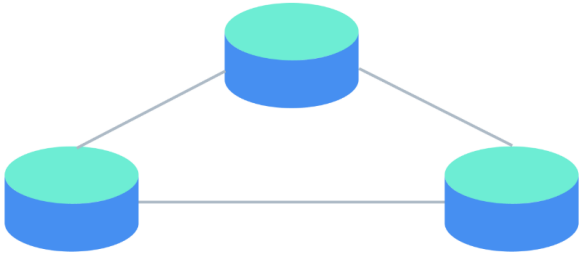
2. neighbor 12.69.1.1 remote-as 200

   IP of the second BGP router.

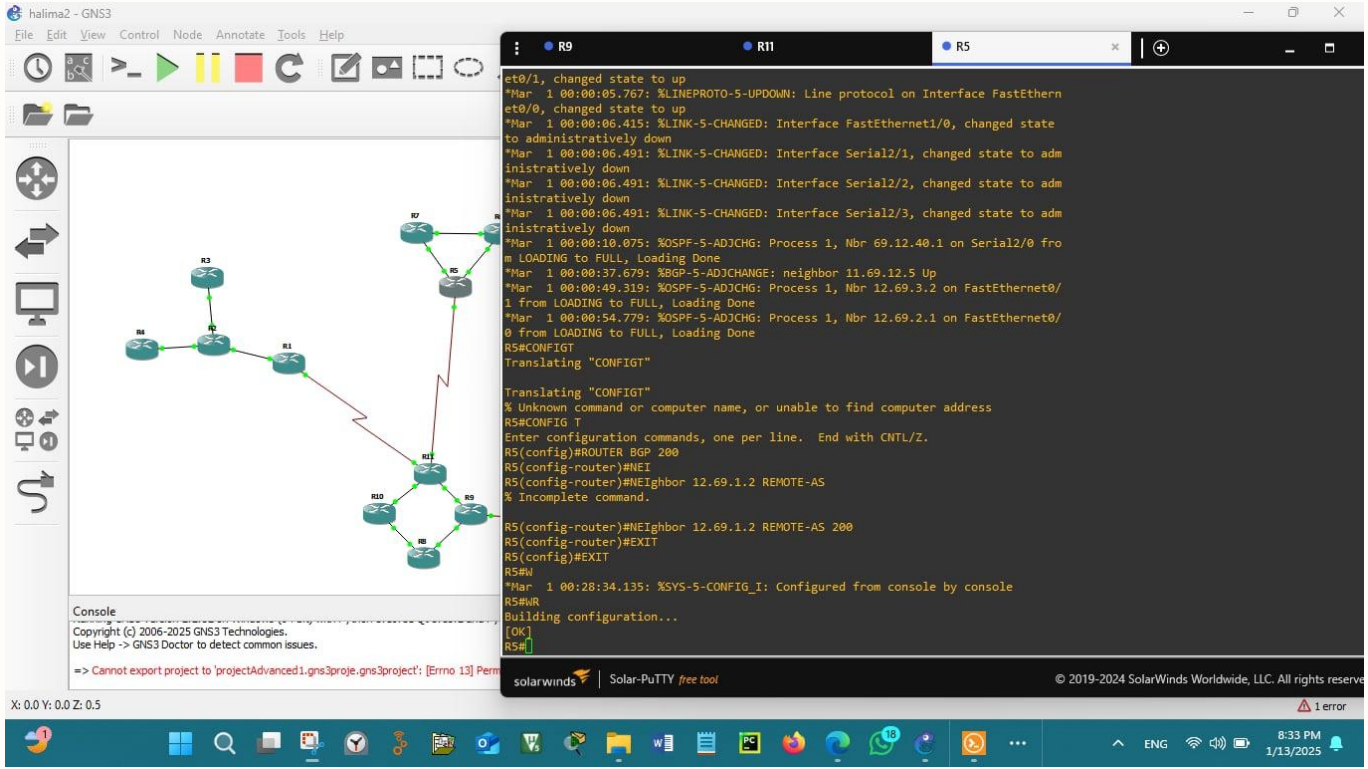
3. network 12.69.1.0 mask 255.255.255.0

   IP of the connection network.

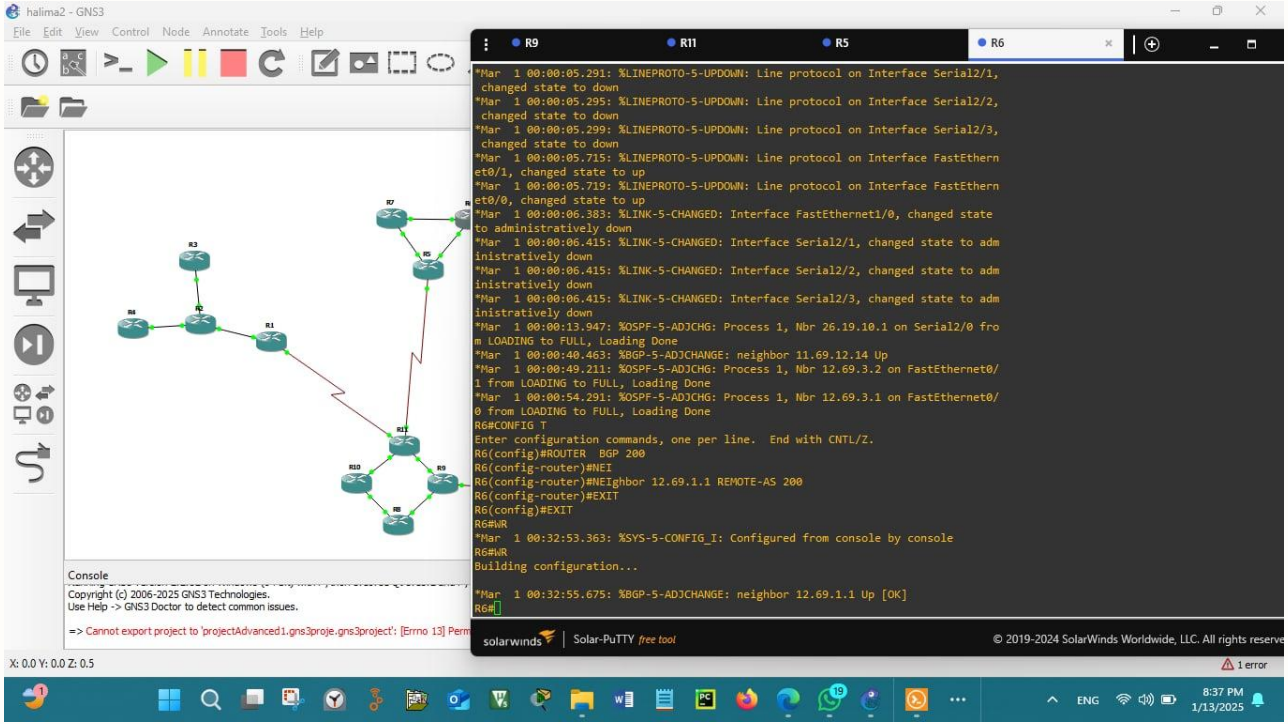
Exit and write memory for both routers.

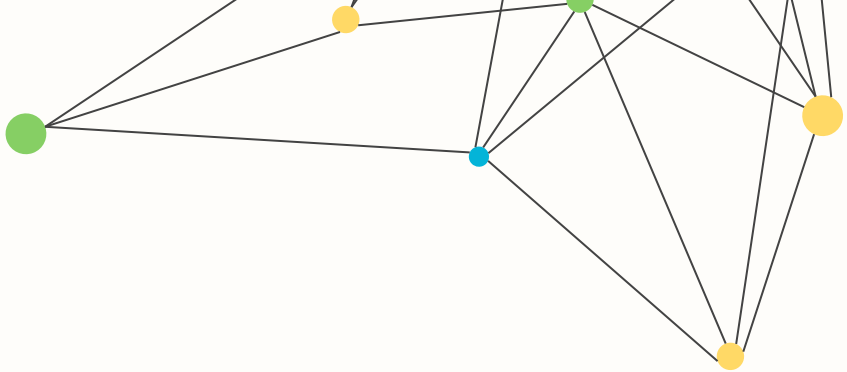


iBGP at router 5

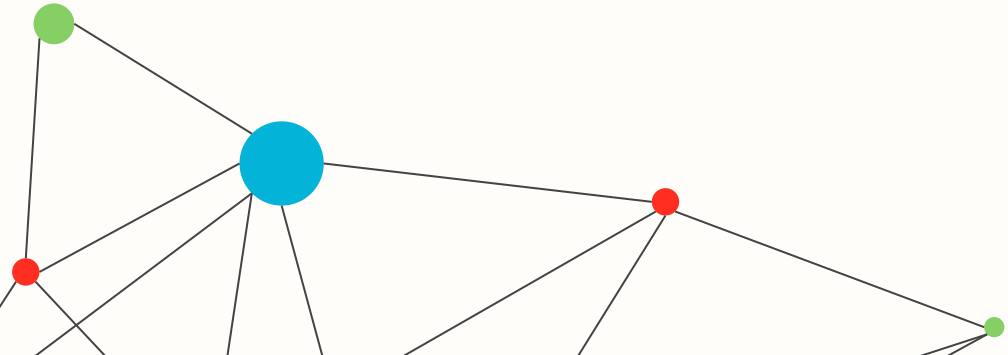


iBGP at router 6





The previous steps works when the routers have a physical connection between each other. When the routers don’t have any physical connection, like AS 100, a logical connection should be established. Usually using loopback interfaces.



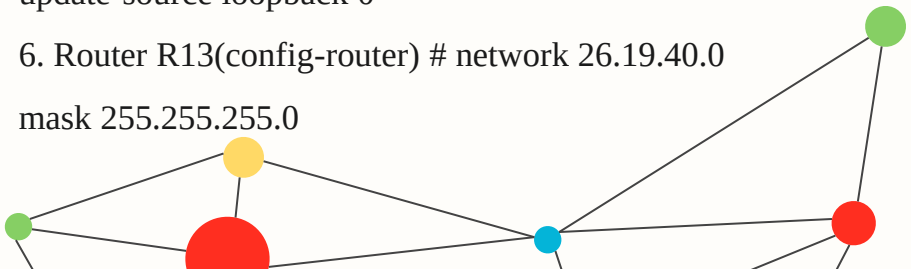
How to apply the iBGP protocol

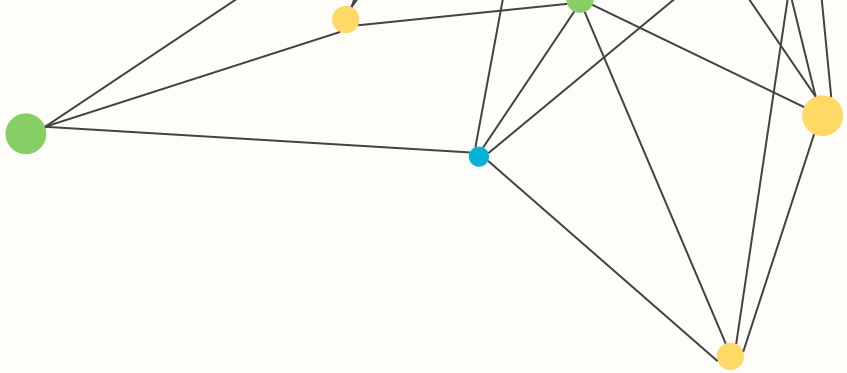
Router 12

1. Router R12(config) # interface loopback 0
2. Router R12(config-if) # ip address 5.5.5.5 255.255.255.255
3. Router R12(config) # router bgp 100
4. Router R12(config-router) # neighbor 6.6.6.6 remote-as 100
5. Router R12(config-router) # neighbor 6.6.6.6 update-source loopback 0
6. Router R12(config-router) # network 26.19.10.0 mask 255.255.255.0

Router 13

1. Router R13(config) # interface loopback 0
2. Router R13(config-if) # ip address 6.6.6.6 255.255.255.255
3. Router R13(config) # router bgp 100
4. Router R13(config-router) # neighbor 5.5.5.5 remote-as 100
5. Router R13(config-router) # neighbor 5.5.5.5 update-source loopback 0
6. Router R13(config-router) # network 26.19.40.0 mask 255.255.255.0





Note:

In the practical part of the iBGP the configuration just has these two steps for all routers:

1. router bgp AS

2. neighbor X remote-as AS when X equivalent to the neighbour BGP router at the same AS.

the configuration seems to be right; that’s Maby happens because it’s a small topology and there is no conflict between the AS’s.