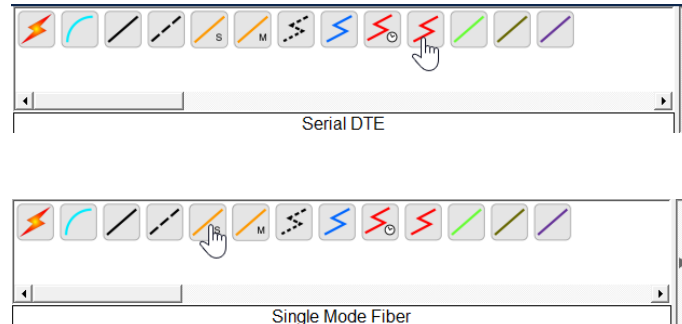


TP N° 5

1. C'est Quoi un cable **Serie** et un cable **Fibre**:

Cable

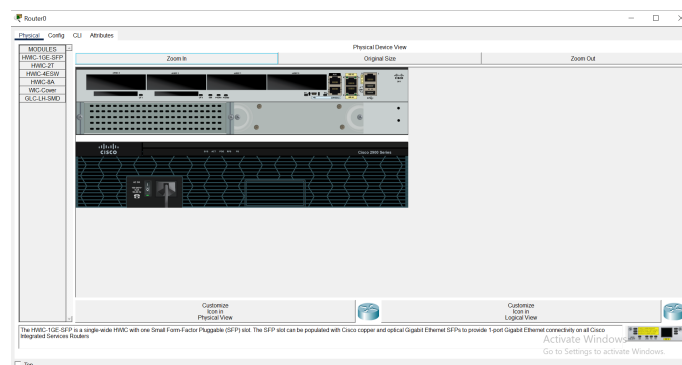
- **Serie** : un cable qui simule les connections **WAN** entre routeurs.
- **Fibre** : un cable qui utilise des fils de verre pour transmettre des données sous forme de lumiere.

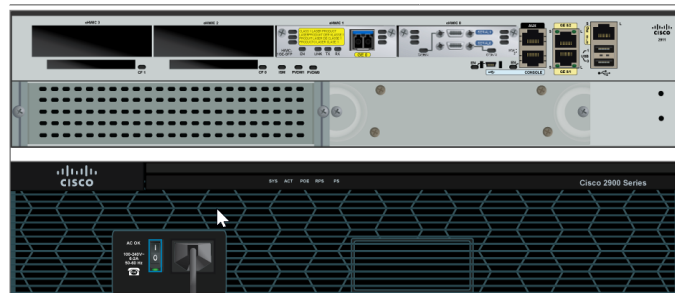
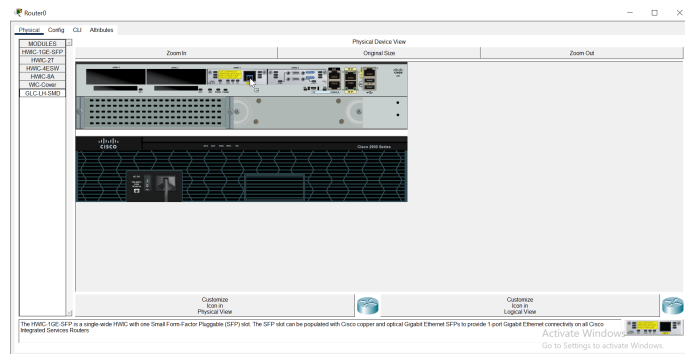
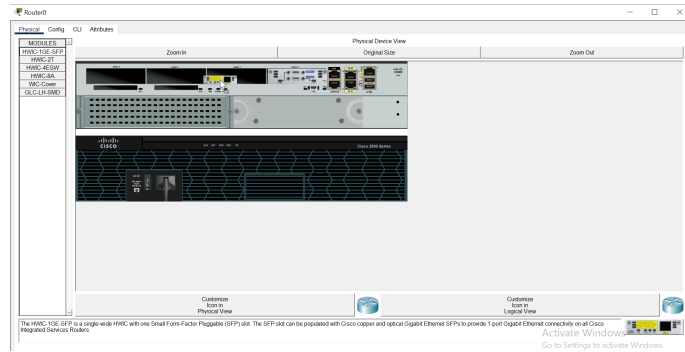
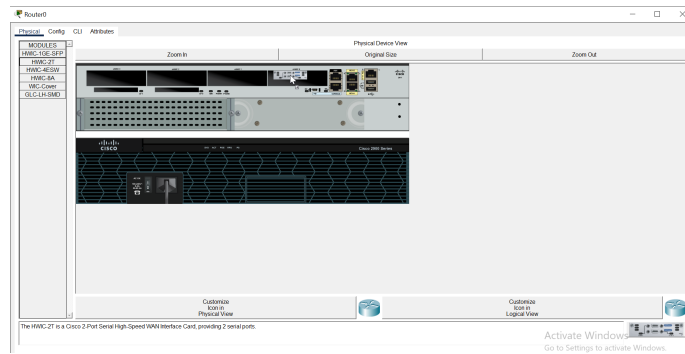


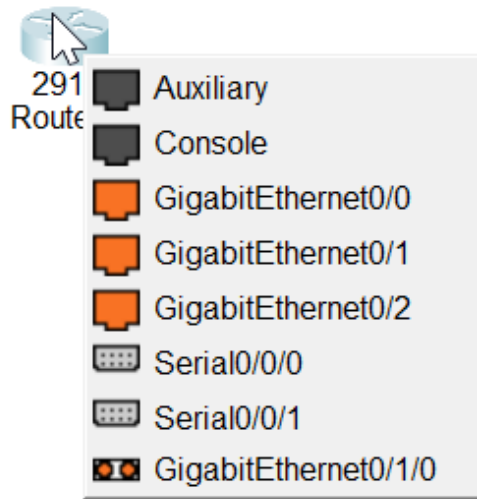
2. Comment ajouter les ports Serie et fibre dans un routeur?:

Ajouter Ports

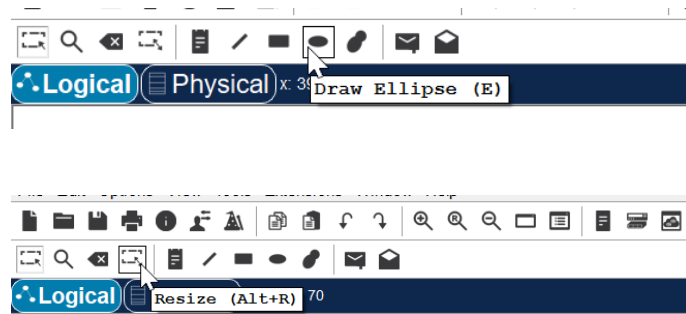
- Click sur le routeur
- Eteint le routeur
- Ajouter le module **HWIC-2T** pour ajouter le port **Serie**
- Ajouter le module **HWIC-1G-SFP**
- Ajouter le module **GLC-LH-SMD** sur **HWIC-1G-SFP** pour ajouter le port **Fibre**
- Allumer le routeur.



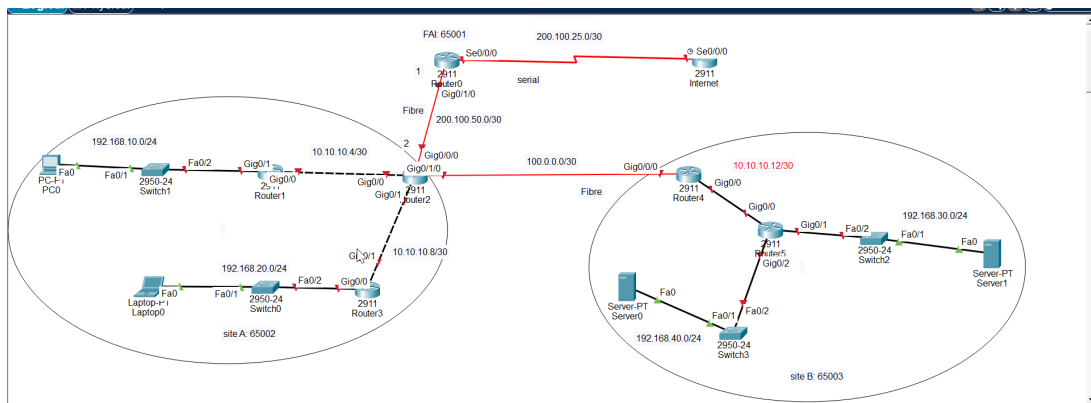




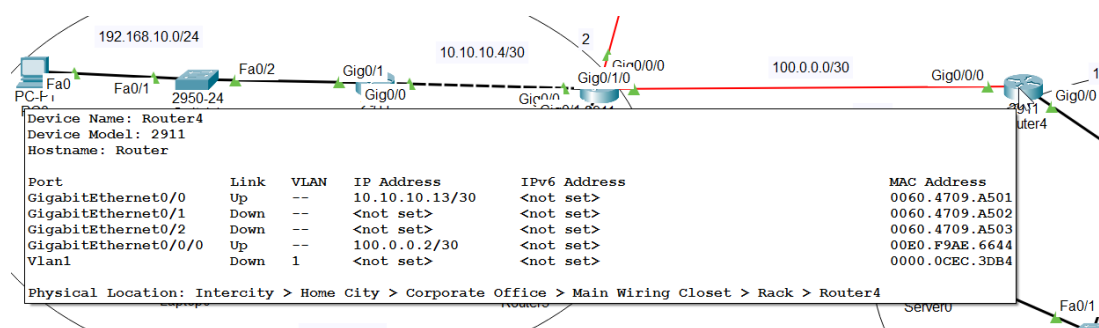
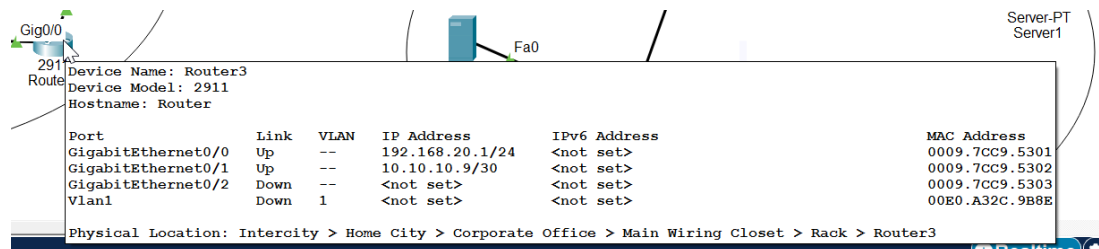
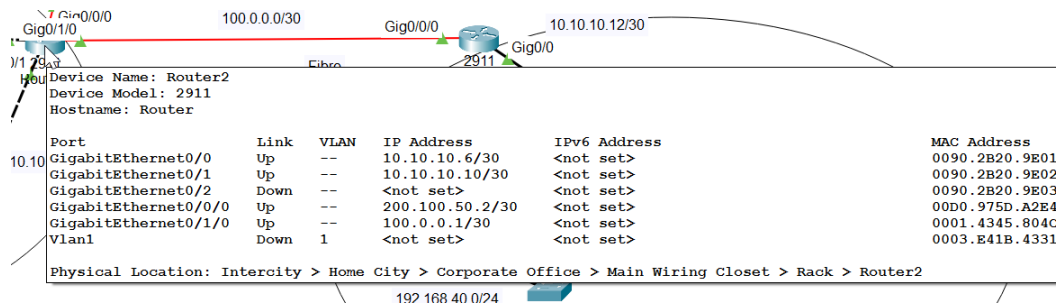
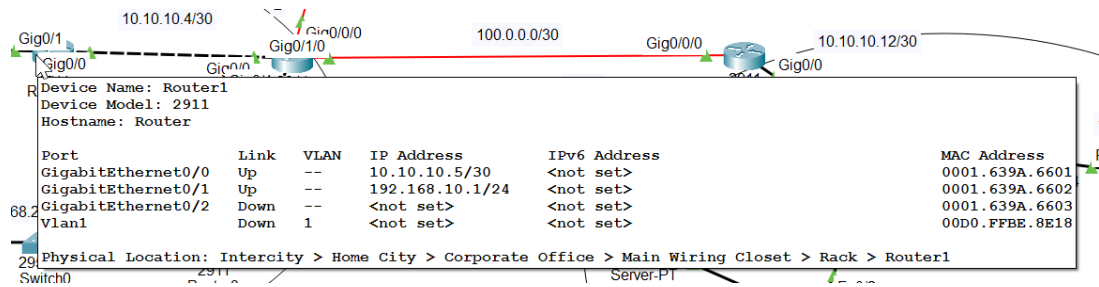
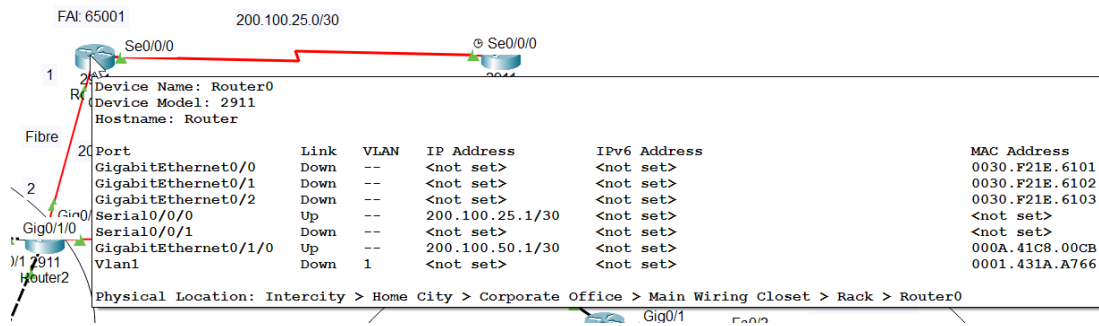
3. Comment ajouter Des ellipse et ajuster sa taille ?

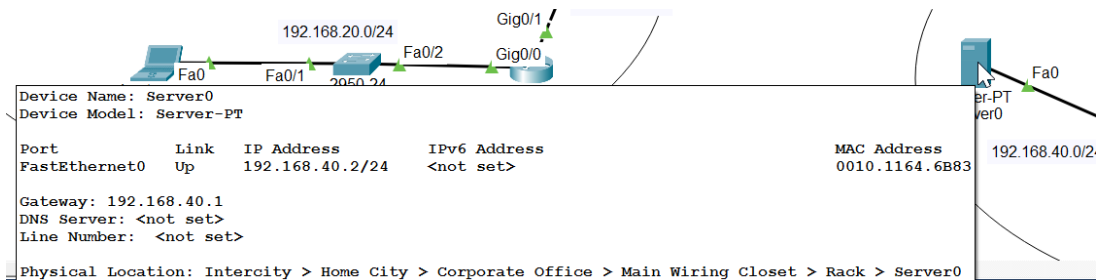
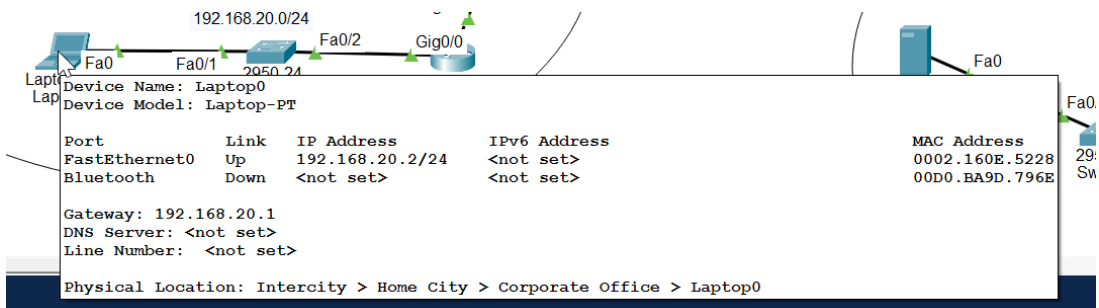
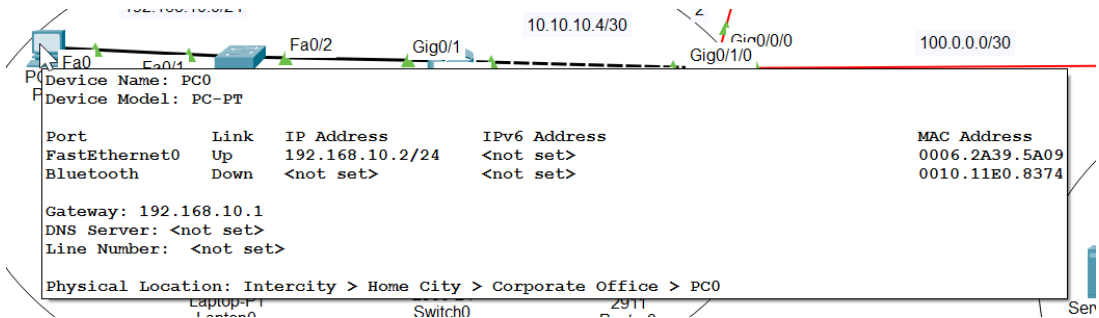
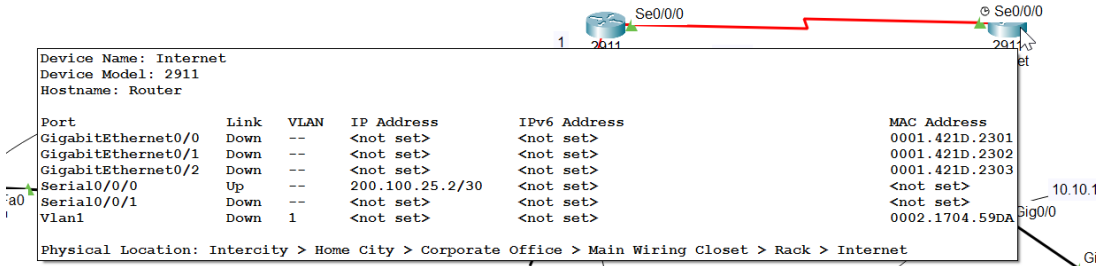
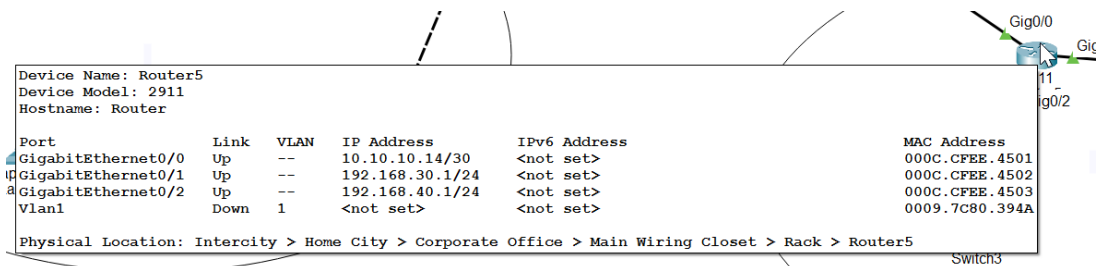


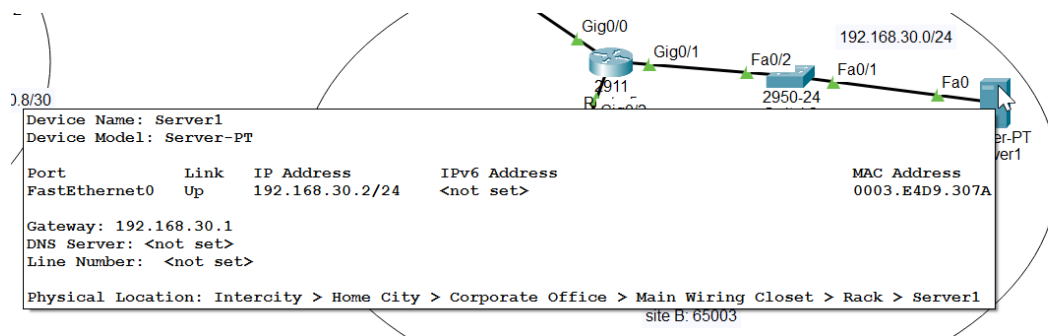
4. Faite la topologie suivants:



5. Faite l'adressage:







6. Configurez l'OSPF (en mode interface) au niveau des sites A et B:

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface
Router(config)#int g0/0
Router(config-if)#ip ospf 1 area 0
Router(config-if)#int g0/1
Router(config-if)#ip ospf 1 area 0

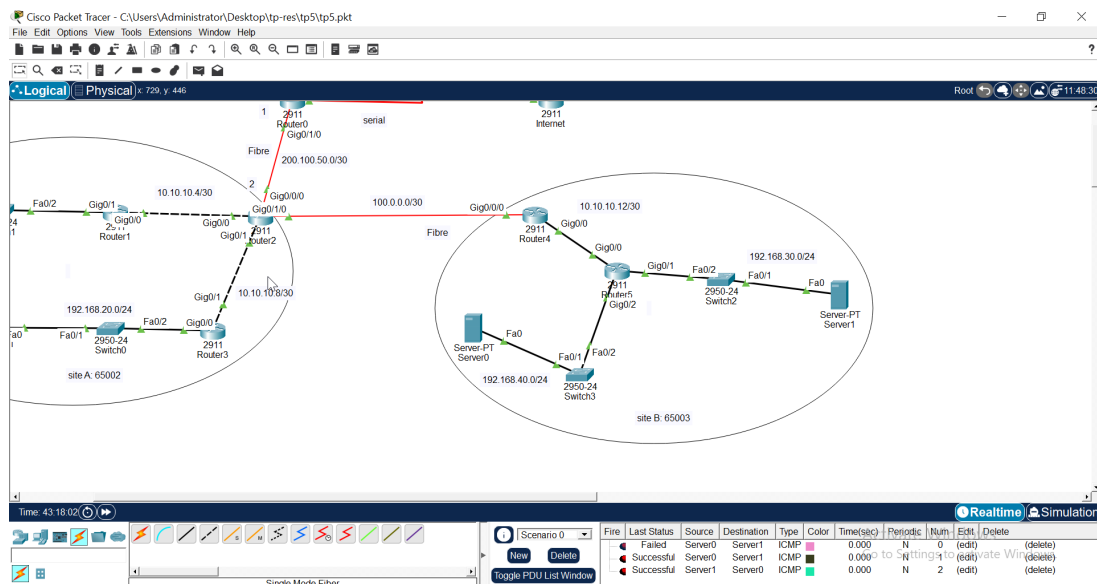
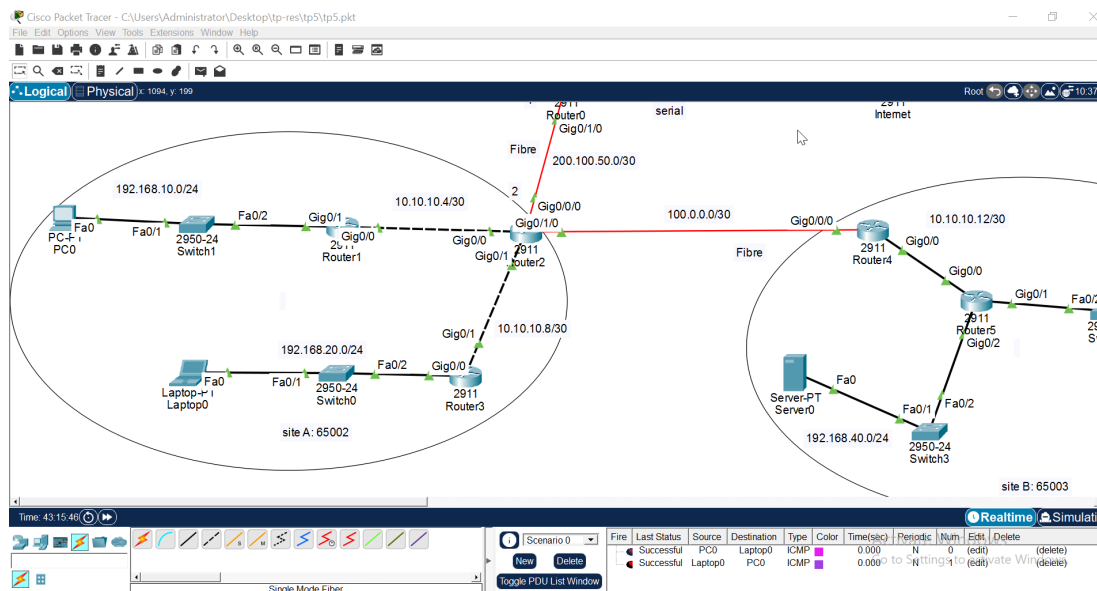
Router2
Physical Config CLI Attributes
IOS Command Line Interface
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip ospf 1 area 0
Router(config-if)#exit
Router(config)#int g0
00:50:37: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.10.1 on GigabitEthernet0/0 from LOADING to FULL, Loading Done
^
% Invalid input detected at '^' marker.
Router(config)#int g0/1
Router(config-if)#ip ospf 1 area 0

Router3
Physical Config CLI Attributes
IOS Command Line Interface
Router(config)#int g0/1
Router(config-if)#ip ospf 1 area 0
Router(config-if)#int g0/0
Router(config-if)#ip ospf 1 area 0

Router4
Physical Config CLI Attributes
IOS Command Line Interface
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip ospf 1 area 0
Router(config-if)#int g0/1
Router(config-if)#ip ospf 1 area 0

Router5
Physical Config CLI Attributes
IOS Command Line Interface
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int g0/0
Router(config-if)#ip ospf 1 area 0
Router(config-if)#int g0/1
Router(config-if)#ip ospf 1 area 0
Router(config-if)#int g0/2
Router(config-if)#ip ospf 1 area 0
```

7. Faire un ping entre machines du meme Site (Entre Machine Site A puis Entre Machine Site B) :



8. Configurez la route par défaut sur le routeur Router0 vers internet:

```
Router0
Physical Config CLI Attributes
IOS Command Line Interface
Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#ip route 0.0.0.0 0.0.0.0 200.100.25.2
Router(config)#do show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
I - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 200.100.25.2 to network 0.0.0.0

200.100.25.0/24 is variably subnetted, 2 subnets, 2 masks
C
200.100.25.0/30 is directly connected, Serial0/0/0
L
200.100.50.0/24 is variably subnetted, 2 subnets, 2 masks
C
200.100.50.0/30 is directly connected, GigabitEthernet0/1/0
L
200.100.50.1/32 is directly connected, GigabitEthernet0/1/0
S* 0.0.0.0/0 [1/0] via 200.100.25.2
```

9. C'est Quoi un systeme autonome?:

Système Autonome

Un système autonome est un système réseau qui dispose de **edge routers** qui configurent **BGP** pour permettre la communication avec des systèmes autonomes externes.

10. C'est Quoi le protocole **BGP**?

BGP

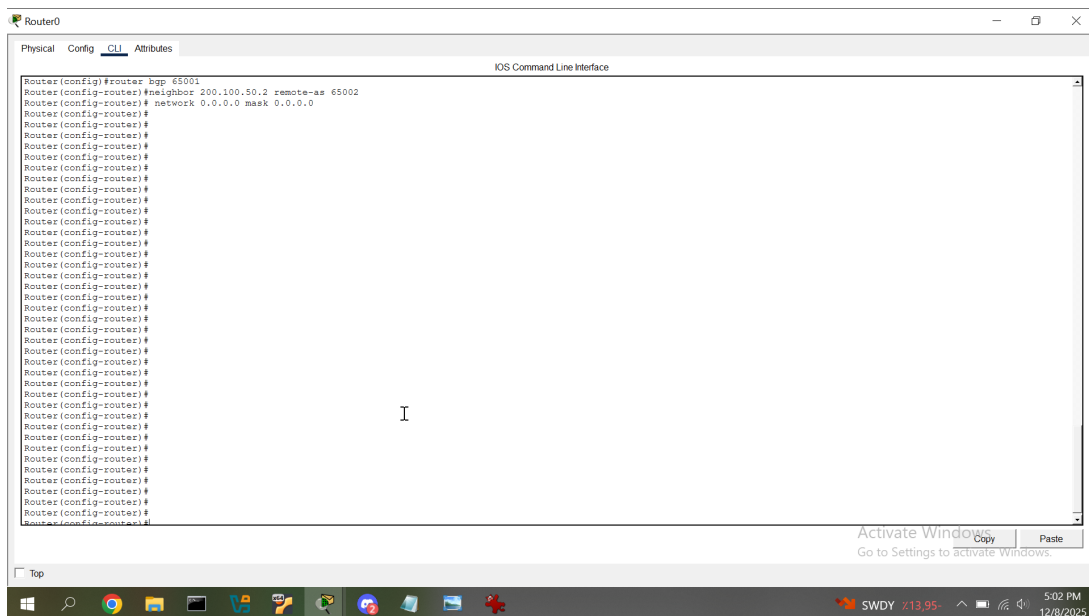
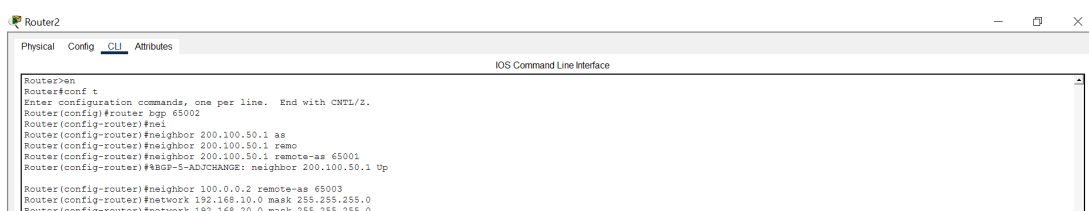
BGP est un protocole de routage dynamique qui permet la communication entre les systemes autonomes , ce dernier est configurer sur les edges routers qui vont partager leur reseaux **LAN** a ces voisins (edges routers d'autre systemes autonomes).

11. Comment Configurer **BGP**?

Configurer BGP

- On doit etre au niveau 3 pour activer le **BGP** avec l'ID du system autonome du routeur avec la commande : `router bgp <Current_SA_ID>`
- Apres la commande precedente on passe au niveau 4 (`config-router`)
- Pour creer une session avec un voisin on utilise la commande suivant :
`neighbor <@Neighbor> remote as <Neighbor_SA_ID>`
- Pour propager les reseaux **LAN** au voisin on utilise la commande suivant :
`network <@LAN> mask <mask>`

12. Configurez le **BGP** sur les edge routers (router0 , router2, router4)

A screenshot of the Router0 CLI interface. The window title is 'Router0'. The tabs at the top are 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, showing the 'IOS Command Line Interface'. The command history shows the following commands: `Router(config)#router bgp 65001`, `Router(config-router)#neighbor 200.100.50.2 remote-as 65002`, and `Router(config-router)# network 0.0.0.0 mask 0.0.0.0`. The rest of the history shows multiple `Router(config-router)#` prompts. At the bottom, there is a taskbar with various application icons and a system tray showing 'SWDY 13.95', a battery icon, and the date '12/8/2025'.A screenshot of the Router2 CLI interface. The window title is 'Router2'. The tabs at the top are 'Physical', 'Config', 'CLI', and 'Attributes'. The 'CLI' tab is active, showing the 'IOS Command Line Interface'. The command history shows the following commands: `Router>en`, `Router#conf t`, `Router(config)#router bgp 65002`, `Router(config-router)#nei`, `Router(config-router)#neighbor 200.100.50.1 as`, `Router(config-router)#neighbor 200.100.50.1 remo`, `Router(config-router)#neighbor 200.100.50.1 remote-as 65001`, `Router(config-router)#BGP-5-ADJCHANGE: neighbor 200.100.50.1 Up`, `Router(config-router)#neighbor 100.0.0.2 remote-as 65003`, `Router(config-router)#network 192.168.10.0 mask 255.255.255.0`, and `Router(config-router)#network 192.168.20.0 mask 255.255.255.0`.


```
Router4
Physical Config CLI Attributes
IOS Command Line Interface

Router>en
Router(config)#
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router bgp 65003
Router(config-router)#nei
Router(config-router)#neighbor 100.0.0.1 rem
Router(config-router)#neighbor 100.0.0.1 remote-as 65002
Router(config-router)#BGP-5-ADJCHANGE: neighbor 100.0.0.1 Up
Router(config-router)#network 192.168.30.0 mask 255.255.255.0
Router(config-router)#network 192.168.40.0 mask 255.255.255.0
```

13. Configurez la route par défaut sur le routeur Router2, Router4 et la propagation OSPF:

```
Router2
Physical Config CLI Attributes
IOS Command Line Interface

Router(config-router)#exit
Router(config)#ip route 0.0.0.0 0.0.0.0 200.100.50.1
Router(config)#router ospf 1
Router(config-router)#def
Router(config-router)#default-information or
Router(config-router)#default-information originate

Router4
Physical Config CLI Attributes
IOS Command Line Interface

Router(config-router)#exit
Router(config)#ip route 0.0.0.0 0.0.0.0 100.0.0.1
Router(config)#router ospf 1
Router(config-router)#def
Router(config-router)#default-information c
Router(config-router)#default-information originate
```

14. Affichez les tables de routage des différents routeurs :

```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

Router>en
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 200.100.25.2 to network 0.0.0.0

B 192.168.10.0/24 [20/0] via 200.100.50.2, 00:00:00
B 192.168.20.0/24 [20/0] via 200.100.50.2, 00:00:00
B 192.168.30.0/24 [20/0] via 200.100.50.2, 00:00:00
B 192.168.40.0/24 [20/0] via 200.100.50.2, 00:00:00
C 200.100.25.0/24 is variably subnetted, 2 subnets, 2 masks
C 200.100.25.0/30 is directly connected, Serial0/0/0
L 200.100.25.1/32 is directly connected, Serial0/0/0
C 200.100.50.0/24 is variably subnetted, 2 subnets, 2 masks
C 200.100.50.0/30 is directly connected, GigabitEthernet0/1/0
L 200.100.50.1/32 is directly connected, GigabitEthernet0/1/0
S* 0.0.0.0/0 [1/0] via 200.100.25.2
```

```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

Router>en
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 10.10.10.6 to network 0.0.0.0

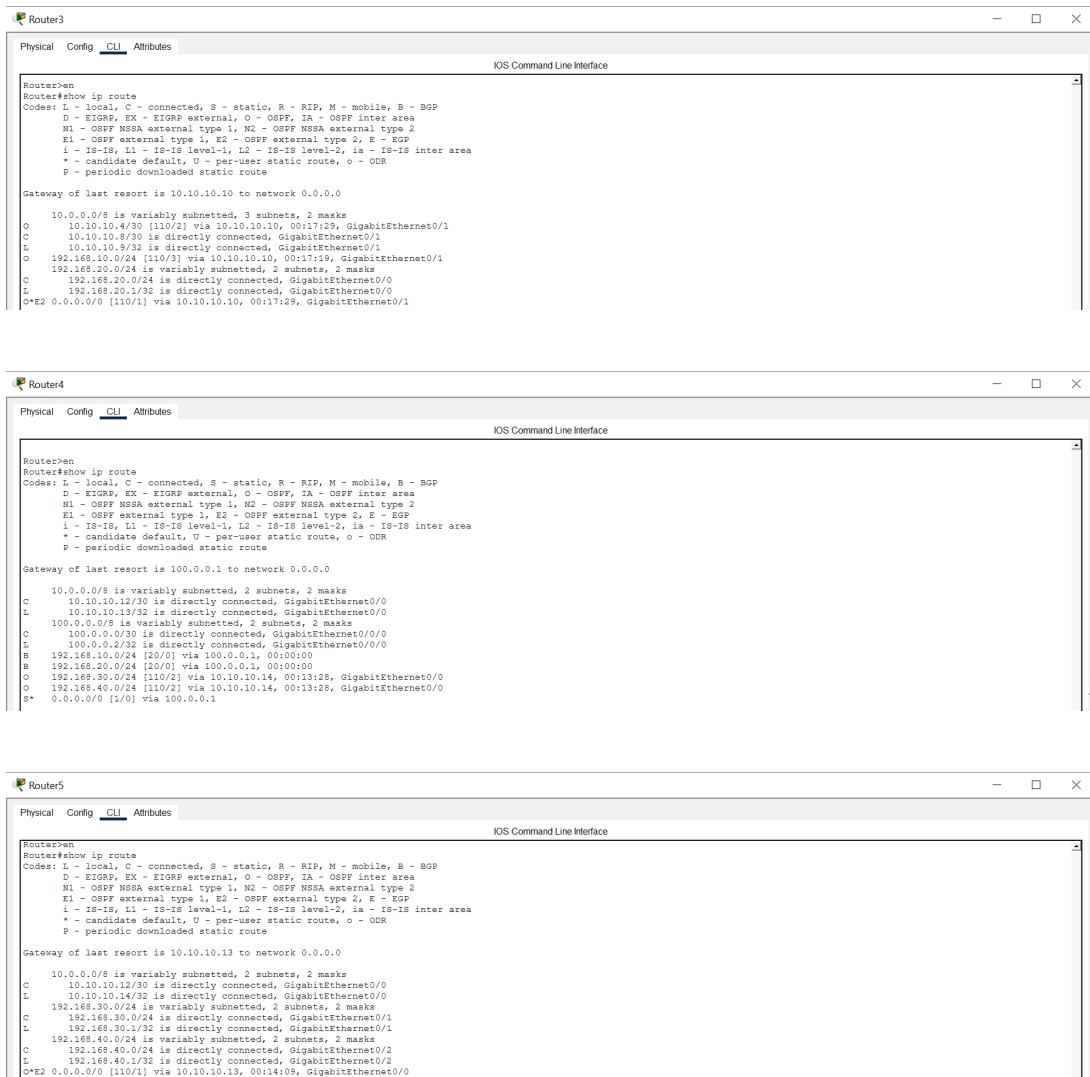
C 10.0.0.0/8 is variably subnetted, 3 subnets, 2 masks
C 10.10.10.4/30 is directly connected, GigabitEthernet0/0
L 10.10.10.5/32 is directly connected, GigabitEthernet0/0
O 10.10.10.0/30 [110/2] via 10.10.10.6, 00:12:11, GigabitEthernet0/0
C 192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C 192.168.10.0/24 is directly connected, GigabitEthernet0/1
L 192.168.10.1/32 is directly connected, GigabitEthernet0/1
O 192.168.20.0/24 [110/3] via 10.10.10.6, 00:12:11, GigabitEthernet0/0
O#2 0.0.0.0/0 [110/1] via 10.10.10.6, 00:12:11, GigabitEthernet0/0
```

```
Router2
Physical Config CLI Attributes
IOS Command Line Interface

Router>en
Router#show ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route

Gateway of last resort is 200.100.50.1 to network 0.0.0.0

C 10.0.0.0/8 is variably subnetted, 4 subnets, 2 masks
C 10.10.10.4/30 is directly connected, GigabitEthernet0/0
L 10.10.10.6/32 is directly connected, GigabitEthernet0/0
C 10.10.10.0/30 is directly connected, GigabitEthernet0/1
L 10.10.10.10/32 is directly connected, GigabitEthernet0/1
C 100.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C 100.0.0.0/30 is directly connected, GigabitEthernet0/1/0
L 100.0.0.1/32 is directly connected, GigabitEthernet0/1/0
O 192.168.10.0/24 [110/2] via 10.10.10.5, 00:12:41, GigabitEthernet0/0
O 192.168.20.0/24 [110/2] via 10.10.10.9, 00:12:41, GigabitEthernet0/1
B 192.168.30.0/24 [20/0] via 100.0.0.2, 00:00:00
B 192.168.40.0/24 [20/0] via 100.0.0.2, 00:00:00
C 200.100.50.0/24 is variably subnetted, 2 subnets, 2 masks
C 200.100.50.0/30 is directly connected, GigabitEthernet0/0/0
L 200.100.50.2/32 is directly connected, GigabitEthernet0/0/0
S* 0.0.0.0/0 [1/0] via 200.100.50.1
```



Remarque

On remarque que dans la table de routage des routeurs internes (pas les edge routers) qu'ils sont une route **O***E qui veut dire une route **OSPF** externe a son systeme autonome c'est la route qui mene vers son edge router pour quitter le systeme autonome.

15. Vérifiez la communication entre les différents équipements :

