Objectif :

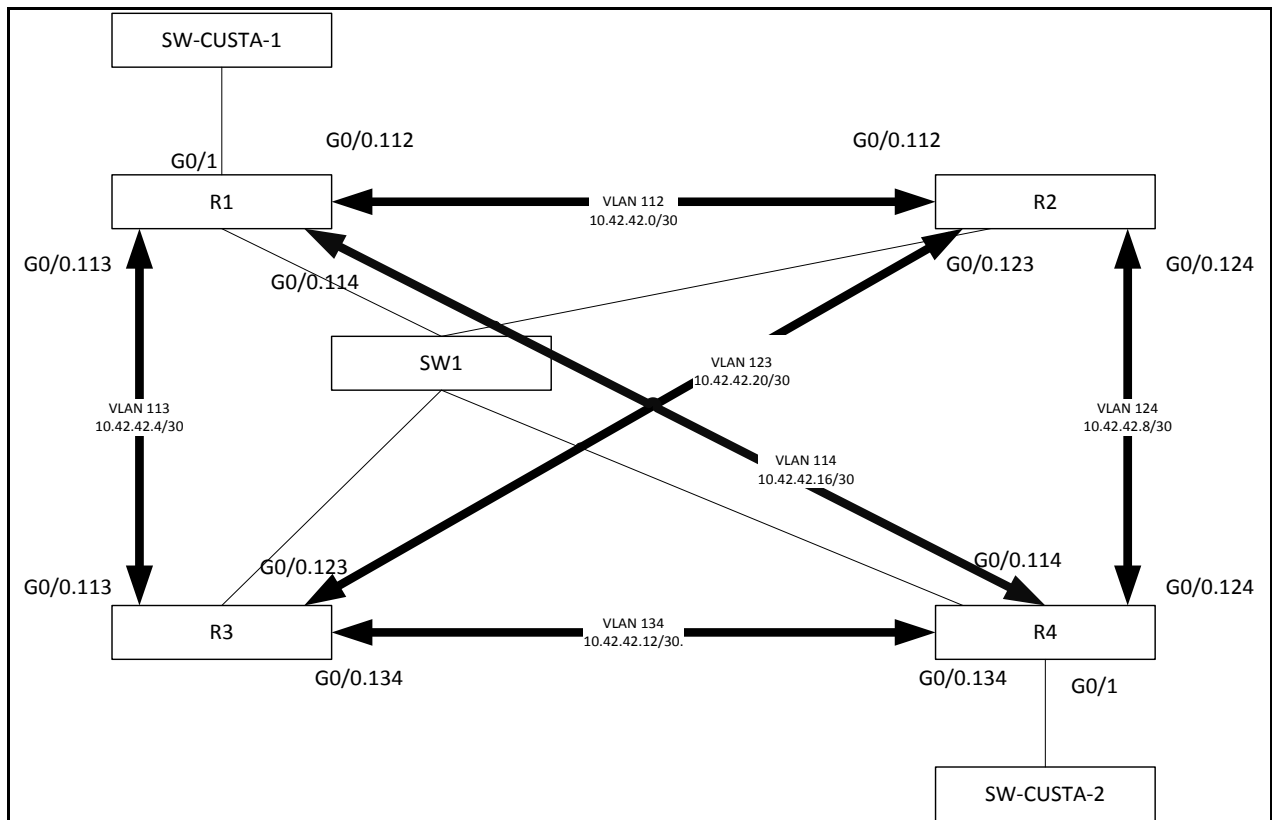Réaliser un cross-connect over MPLS entre Gi0/1.R1 et Gi0/1.R4

Contexte utile :

Un client souhaite interconnecter ses 2 sites au travers notre réseau MPLS. Il commande une interconnexion entre nos 2 sites de livraison. Notre réseau est agnostique

L'interco doit pouvoir converger rapidement et automatiquement.

R1 et R4 comme PE

R3 et R2 comme router P

Schéma du réseau

Paramétrage de SW1

Interface	Router	vlans
Gi1/0/1	R1	112,113,114
Gi1/0/2	R2	112,123,124
Gi1/0/3	R3	113,123,134
Gi1/0/4	R4	114,124,134

Paramétrage IP

Loopback

Router	Loopback0
R1	10.42.42.241/32
R2	10.42.42.242/32
R3	10.42.42.243/32
R4	10.42.42.244/32

Interconnexion Inter-router

Par soucis de manque d'interface, nous utiliserons l'interface g0/0 taggué en 802.1Q

Chaque G0/0 des 4 routeurs est interconnecté à SW1. Le mappage doit être fait en conséquence

Interface	vlans	Description	Subnet
Gi0/0.112	112	Interco R1-R2	10.42.42.0/30
Gi0/0.113	113	Interco R1-R3	10.42.42.4/30
Gi0/0.114	114	Interco R1-R4	10.42.42.8/30
Gi0/0.123	123	Interco R2-R3	10.42.42.12/30
Gi0/0.124	124	Interco R2-R4	10.42.42.16/30
Gi0/0.134	134	Interco R3-R4	10.42.42.20/30

schéma

Paramétrage des interfaces des routeurs :

R1	R2
interface Loopback0 ip address 10.42.42.241 255.255.255.255 ! interface GigabitEthernet0/0.112 description "interco vers R2" encapsulation dot1Q 112 ip address 10.42.42.1 255.255.255.252 ! interface GigabitEthernet0/0.113 description "interco vers R3" encapsulation dot1Q 113 ip address 10.42.42.5 255.255.255.252 ! interface GigabitEthernet0/0.114 description "interco vers R4" encapsulation dot1Q 114 ip address 10.42.42.9 255.255.255.252 !	interface Loopback0 ip address 10.42.42.242 255.255.255.255 ! interface GigabitEthernet0/0.112 description "interco vers R1" encapsulation dot1Q 112 ip address 10.42.42.2 255.255.255.252 ! interface GigabitEthernet0/0.123 description "interco vers R3" encapsulation dot1Q 123 ip address 10.42.42.13 255.255.255.252 ! interface GigabitEthernet0/0.124 description "interco vers R4" encapsulation dot1Q 124 ip address 10.42.42.17 255.255.255.252 !
R3	**R4**
interface Loopback0 ip address 10.42.42.243 255.255.255.255 ! interface GigabitEthernet0/0.113 description "interco vers R1" encapsulation dot1Q 113 ip address 10.42.42.6 255.255.255.252 ! interface GigabitEthernet0/0.123 description "interco vers R2" encapsulation dot1Q 123 ip address 10.42.42.14 255.255.255.252 ! interface GigabitEthernet0/0.134 description "interco vers R4" encapsulation dot1Q 134 ip address 10.42.42.21 255.255.255.252 !	interface Loopback0 ip address 10.42.42.244 255.255.255.255 ! interface GigabitEthernet0/0.114 description "interco vers R1" encapsulation dot1Q 114 ip address 10.42.42.10 255.255.255.252 ! interface GigabitEthernet0/0.124 description "interco vers R2" encapsulation dot1Q 124 ip address 10.42.42.18 255.255.255.252 ! interface GigabitEthernet0/0.134 description "interco vers R3" encapsulation dot1Q 134 ip address 10.42.42.22 255.255.255.252 !

Déploiement de L'IGP OSPF:

R1	R2
router ospf 1	router ospf 1
router-id 10.42.42.241	router-id 10.42.42.242
redistribute connected subnets	redistribute connected subnets
passive-interface default	passive-interface default
no passive-interface GigabitEthernet0/0.112	no passive-interface GigabitEthernet0/0.112
no passive-interface GigabitEthernet0/0.113	no passive-interface GigabitEthernet0/0.123
no passive-interface GigabitEthernet0/0.114	no passive-interface GigabitEthernet0/0.124
network 10.42.42.0 0.0.0.3 area 0	network 10.42.42.0 0.0.0.3 area 0
network 10.42.42.4 0.0.0.3 area 0	network 10.42.42.12 0.0.0.3 area 0
network 10.42.42.8 0.0.0.3 area 0	network 10.42.42.16 0.0.0.3 area 0
R3	**R4**
router ospf 1	router ospf 1
router-id 10.42.42.243	router-id 10.42.42.244
redistribute connected subnets	redistribute connected subnets
passive-interface default	passive-interface default
no passive-interface GigabitEthernet0/0.113	no passive-interface GigabitEthernet0/0.114
no passive-interface GigabitEthernet0/0.123	no passive-interface GigabitEthernet0/0.124
no passive-interface GigabitEthernet0/0.134	no passive-interface GigabitEthernet0/0.134
network 10.42.42.4 0.0.0.3 area 0	network 10.42.42.8 0.0.0.3 area 0
network 10.42.42.12 0.0.0.3 area 0	network 10.42.42.16 0.0.0.3 area 0
network 10.42.42.20 0.0.0.3 area 0	network 10.42.42.20 0.0.0.3 area 0
!	!

Vérifier les adjacencies

```
R2#show ip ospf neighbor

Neighbor ID    Pri  State        Dead Time  Address      Interface
10.42.42.244    1   FULL/BDR     00:00:30   10.42.42.18   GigabitEthernet0/0.124
10.42.42.243    1   FULL/BDR     00:00:39   10.42.42.14   GigabitEthernet0/0.123
10.42.42.241    1   FULL/DR      00:00:37   10.42.42.1    GigabitEthernet0/0.112
R2#
```

Note (redistribuer les interfaces connectées, les router-id sont sur des loopbacks, sans cela, les adjacences ne monteront pas.

Paramétrage de LDP

Maintenant que nous avons un réseau IP qui est Up and Running, il est temps de lui faire causer MPLS ;)

R1	R2
interface Loopback0 ip address 10.42.42.241 255.255.255.255 ! interface GigabitEthernet0/0.112 description "interco vers R2" encapsulation dot1Q 112 ip address 10.42.42.1 255.255.255.252 **mpls ip** ! interface GigabitEthernet0/0.113 description "interco vers R3" encapsulation dot1Q 113 ip address 10.42.42.5 255.255.255.252 mpls ip ! interface GigabitEthernet0/0.114 description "interco vers R4" encapsulation dot1Q 114 ip address 10.42.42.9 255.255.255.252 mpls ip !	interface Loopback0 ip address 10.42.42.242 255.255.255.255 ! interface GigabitEthernet0/0.112 description "interco vers R1" encapsulation dot1Q 112 ip address 10.42.42.2 255.255.255.252 **mpls ip** ! interface GigabitEthernet0/0.123 description "interco vers R3" encapsulation dot1Q 123 ip address 10.42.42.13 255.255.255.252 mpls ip ! interface GigabitEthernet0/0.124 description "interco vers R4" encapsulation dot1Q 124 ip address 10.42.42.17 255.255.255.252 mpls ip !
R3	**R4**
interface Loopback0 ip address 10.42.42.243 255.255.255.255 ! interface GigabitEthernet0/0.113 description "interco vers R1" encapsulation dot1Q 113 ip address 10.42.42.6 255.255.255.252 **mpls ip** ! interface GigabitEthernet0/0.123 description "interco vers R2" encapsulation dot1Q 123 ip address 10.42.42.14 255.255.255.252 **mpls ip** ! interface GigabitEthernet0/0.134 description "interco vers R4" encapsulation dot1Q 134 ip address 10.42.42.21 255.255.255.252 **mpls ip** !	interface Loopback0 ip address 10.42.42.244 255.255.255.255 ! interface GigabitEthernet0/0.114 description "interco vers R1" encapsulation dot1Q 114 ip address 10.42.42.10 255.255.255.252 **mpls ip** ! interface GigabitEthernet0/0.124 description "interco vers R2" encapsulation dot1Q 124 ip address 10.42.42.18 255.255.255.252 **mpls ip** ! interface GigabitEthernet0/0.134 description "interco vers R3" encapsulation dot1Q 134 ip address 10.42.42.22 255.255.255.252 **mpls ip** !

On vérifie les adjacences LDP sur R1 par exemple

```
R1#sh mpls ldp neighbor
Peer LDP Ident: 10.42.42.242:0; Local LDP Ident 10.42.42.241:0
 Addresses bound to peer LDP Ident:
 10.42.42.2    10.42.42.13    10.42.42.17    10.42.42.242
Peer LDP Ident: 10.42.42.243:0; Local LDP Ident 10.42.42.241:0
 Addresses bound to peer LDP Ident:
 10.42.42.6    10.42.42.14    10.42.42.21    10.42.42.243
Peer LDP Ident: 10.42.42.244:0; Local LDP Ident 10.42.42.241:0
 Addresses bound to peer LDP Ident:
 10.42.42.10    10.42.42.18    10.42.42.22    10.42.42.244
```

Nos équipements ont établis les adjacences LDP.

Maintenant que notre réseau IP MPLS est opérationnel

On cross connect Gi0/1.R1 et Gi0/1.R4.

R1	R4
interface GigabitEthernet0/1 no ip address duplex auto speed auto xconnect 10.42.42.244 101 encapsulation mpls !	interface GigabitEthernet0/1 no ip address duplex auto speed auto xconnect 10.42.42.241 101 encapsulation mpls !

On vérifie

```
R1#show mpls l2transport vc

Local intf    Local circuit          Dest address    VC ID      Status
-------------  ------------------------- --------------- ---------- ----------
Gi0/1          Ethernet               10.42.42.244    101        UP
R1#
```

Et voila, le client est livré.