27/11/2017

# Mise en place de l'infrastructure Réseaux

Version 1.0 : Version Initiale

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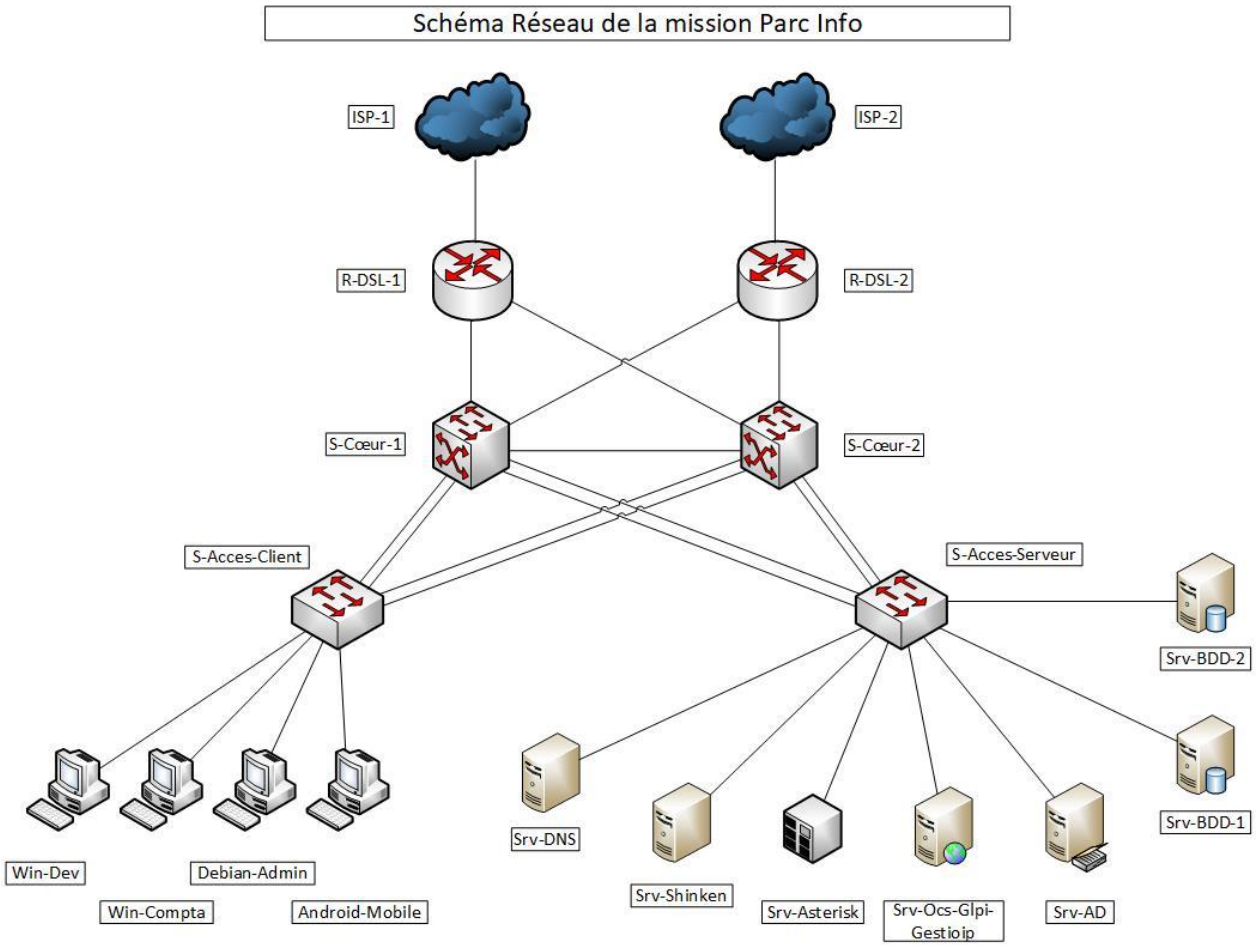
## Contexte :

Pour permettre un accès fiable des clients aux serveurs et à internet il est nécessaire de mettre en place une infrastructure hautement disponible.

Pour ce faire plusieurs protocoles ont été mis en place commela protocole LACP qui permet une redondance des liens entre les switchs et encore le protocole GLBP qui permet une répartition de charge entre les passerelles.

Les connexions vers internet ont également été doublées pour permettre une tolérance aux pannes.

### Voici l'architecture mise en place :



# Sommaire

# I. Présentation et choix des solutions

## 1. Plan d'adressage et vlan de l'infrastructure BORA

| Service | Vlan | Adresses Sous-réseaux | Passerelle |
|---|---|---|---|
| Serveurs | 10 | 192.168.10.0/24 | 192.168.10.250 |
| Développeur | 20 | 192.168.20.0/24 | 192.168.20.250 |
| Administrateur | 30 | 192.168.30.0/24 | 192.168.30.250 |
| Compta | 40 | 192.168.40.0/24 | 192.168.40.250 |
| Mobilité | 50 | 192.168.50.0/24 | 192.168.50.250 |
| Natif | 100 | | |

## 2. Table d'adressage des équipements réseaux

| Equipement | Interface | Sous-Interfaces | Adresse IP | Equipement connecté | Interface connecté |
|---|---|---|---|---|---|
| R-DSL-1 | G0/0 | N/D | DHCP | NAT | NAT 0 |
| | G0/1 | N/D | 192.168.200.254 | S-Cœur-1 | G0/0 |
| | G0/2 | N/D | 192.168.201.254 | S-Cœur-2 | G0/0 |
| R-DSL-2 | G0/0 | N/D | DHCP | NAT | NAT 0 |
| | G0/1 | N/D | 192.168.202.254 | S-Cœur-1 | G0/1 |
| | G0/2 | N/D | 192.168.203.254 | S-Cœur-2 | G0/1 |
| S-Cœur-1 | G0/0 | N/D | 192.168.200.253 | R-DSL-1 | G0/1 |
| | G0/1 | N/D | 192.168.202.253 | R-DSL-2 | G0/1 |
| | G1/0 | N/D | 192.168.204.254 | S-Cœur-2 | G1/0 |
| | P1 | G2/0 | N/D | S-Acces-Client | P1 |
| | | G2/1 | N/D | | |
| | P2 | G3/0 | N/D | S-Acces-Serveur | P2 |
| | | G3/1 | N/D | | |
| | Vlan 10 | N/D | 192.168.10.254 | N/D | N/D |
| | Vlan 20 | N/D | 192.168.20.254 | N/D | N/D |
| | Vlan 30 | N/D | 192.168.30.254 | N/D | N/D |
| | Vlan 40 | N/D | 192.168.40.254 | N/D | N/D |
| | Vlan 50 | N/D | 192.168.50.254 | N/D | N/D |
| S-Cœur-2 | G0/0 | N/D | 192.168.201.253 | R-DSL-1 | G0/2 |
| | G0/1 | N/D | 192.168.203.253 | R-DSL-2 | G0/2 |
| | G1/0 | N/D | 192.168.204.253 | S-Cœur-1 | G1/0 |
| | P1 | G2/0 | N/D | S-Acces-Client | P2 |
| | | G2/1 | | | |
| | P2 | G3/0 | N/D | S-Acces-Serveur | P1 |
| | | G3/1 | | | |
| | Vlan 10 | N/D | 192.168.10.253 | N/D | N/D |
| | Vlan 20 | N/D | 192.168.20.253 | N/D | N/D |

| | | | | | |
|---|---|---|---|---|---|
| | Vlan 30 | N/D | 192.168.30.253 | N/D | N/D |
| | Vlan 40 | N/D | 192.168.40.253 | N/D | N/D |
| | Vlan 50 | N/D | 192.168.50.253 | N/D | N/D |
| S-Acces-Serveur | G0/0 | N/D | N/D | Srv_Ocs_Glpi_Gestioip | Ens33 |
| | G0/1 | N/D | N/D | Srv_BDD_1 | Ens33 |
| | G0/2 | N/D | N/D | Srv_BDD_2 | Ens33 |
| | G0/3 | N/D | Srv_DNS | Srv_DNS | Ens33 |
| | G1/0 | N/D | N/D | Srv_AD | Ethernet 0 |
| | G1/1 | N/D | N/D | Srv_Shinken | Ens33 |
| | G1/2 | N/D | N/D | Srv_Asterisk | Ens33 |
| | G1/3 | N/D | N/D | | |
| | P1 | G2/0 | N/D | S-Cœur-2 | P1 |
| | | G2/1 | | | |
| | P2 | G3/0 | N/D | S-Cœur-1 | P2 |
| | | G3/1 | | | |
| S-Acces-Client | G0/0 | N/D | N/D | Win_Dev | Ethernet 0 |
| | G0/1 | N/D | N/D | Debian_Admin | Ens33 |
| | G0/2 | N/D | N/D | Win_Compta | Ethernet 0 |
| | G0/3 | N/D | N/D | Android_Mobile | Ethernet 0 |
| | P1 | G1/0 | N/D | S-Cœur-1 | P1 |
| | | G1/1 | | | |
| | P2 | G2/0 | N/D | S-Cœur-2 | P2 |
| | | G2/1 | | | |

3. Table d'adressage des équipements client et serveurs

| Equipement | Interface | Vlan | Adresse IP | Passerelle | DNS |
|---|---|---|---|---|---|
| Srv_Ocs_Glpi_Gestioip | Ens33 | 10 | 192.168.10.1/24 | 192.168.10.250 | 192.168.10.230 |
| Srv_BDD_1 | Ens33 | 10 | 192.168.10.2/24 | 192.168.10.250 | 192.168.10.230 |
| Srv_BDD_2 | Ens33 | 10 | 192.168.10.3/24 | 192.168.10.250 | 192.168.10.230 |
| Srv_DNS | Ens33 | 10 | 192.168.10.230/24 | 192.168.10.250 | 192.168.10.230 |
| Srv_AD | Ethernet 0 | 10 | 192.168.10.235/24 | 192.168.10.250 | 192.168.10.230 |
| Srv_Shinken | Ens33 | 10 | 192.168.10.240/24 | 192.168.10.250 | 192.168.10.230 |
| Srv_Asterisk | Ens33 | 10 | 192.168.10.245/24 | 192.168.10.250 | 192.168.10.230 |
| Win_Dev | Ethernet 0 | 20 | 192.168.20.1/24 | 192.168.20.250 | 192.168.10.235; 192.168.10.230 |
| Debian_Admin | Ens33 | 30 | 192.168.30.1/24 | 192.168.30.250 | 192.168.10.235; 192.168.10.230 |
| Win_Compta | Ethernet 0 | 40 | 192.168.40.1/24 | 192.168.40.250 | 192.168.10.235; 192.168.10.230 |
| Android_Mobile | | 50 | DHCP | 192.168.50.250 | 192.168.10.235; 192.168.10.230 |

II. Prérequis
III. Configuration des routeurs

Récapitulatif de la configuration du routeur R-DSL-1 :

- Configuration des interface :
  - Dhcp sur la liason Wan
  - Et Ip fixe sur la liason avec les cœur de réseau
- Configurationdu nat sur l'interface Wan

```
R_DSL_1#sh ip int br
Interface                  IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0         192.168.122.113 YES DHCP   up                    up
GigabitEthernet0/1         192.168.200.254 YES manual up                    up
GigabitEthernet0/2         192.168.201.254 YES manual up                    up
GigabitEthernet0/3         unassigned      YES unset  administratively down down
NVI0                       192.168.122.113 YES unset  up                    up
R_DSL_1#sh ip nat sta
R_DSL_1#sh ip nat statistics
Total active translations: 0 (0 static, 0 dynamic; 0 extended)
Peak translations: 1, occurred 00:03:48 ago
Outside interfaces:
  GigabitEthernet0/0
Inside interfaces:
  GigabitEthernet0/1, GigabitEthernet0/2
Hits: 5  Misses: 0
CEF Translated packets: 0, CEF Punted packets: 0
Expired translations: 0
Dynamic mappings:
-- Inside Source
[Id: 1] access-list 10 interface GigabitEthernet0/0 refcount 0

Total doors: 0
Appl doors: 0
Normal doors: 0
Queued Packets: 0
R_DSL_1#
R_DSL_1#show acc
R_DSL_1#show access-l
R_DSL_1#show access-lists
Standard IP access list 10
    10 permit any (5 matches)
R_DSL_1#
```

Récapitulatif de la configuration du routeur R-DSL-1 :

- Configuration des interface :
  - Dhcp sur la liason Wan
  - Et Ip fixe sur la liason avec les cœur de réseau
- Configurationdu nat sur l'interface Wan

```
R_DSL_2#sh ip int br
Interface                  IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0         192.168.122.181 YES DHCP   up                    up
GigabitEthernet0/1         192.168.202.254 YES manual up                    up
GigabitEthernet0/2         192.168.203.254 YES manual up                    up
GigabitEthernet0/3         unassigned      YES unset  administratively down down
NVI0                       192.168.122.181 YES unset  up                    up
R_DSL_2#
R_DSL_2#sh ip nat statistics
Total active translations: 0 (0 static, 0 dynamic; 0 extended)
Peak translations: 1, occurred 00:03:21 ago
Outside interfaces:
  GigabitEthernet0/0
Inside interfaces:
  GigabitEthernet0/1, GigabitEthernet0/2
Hits: 5  Misses: 0
CEF Translated packets: 0, CEF Punted packets: 0
Expired translations: 0
Dynamic mappings:
-- Inside Source
[Id: 1] access-list 10 interface GigabitEthernet0/0 refcount 0

Total doors: 0
Appl doors: 0
Normal doors: 0
Queued Packets: 0
R_DSL_2#
R_DSL_2#
R_DSL_2#sh access-lists
Standard IP access list 10
    10 permit any (5 matches)
R_DSL_2#
```

Configuration de la route statique vers l'interface wan de réseau 192.168.122.0/24

```
R_DSL_1#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is 192.168.122.1 to network 0.0.0.0

S*    0.0.0.0/0 [254/0] via 192.168.122.1
      192.168.122.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.122.0/24 is directly connected, GigabitEthernet0/0
L        192.168.122.113/32 is directly connected, GigabitEthernet0/0
      192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.200.0/24 is directly connected, GigabitEthernet0/1
L        192.168.200.254/32 is directly connected, GigabitEthernet0/1
      192.168.201.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.201.0/24 is directly connected, GigabitEthernet0/2
L        192.168.201.254/32 is directly connected, GigabitEthernet0/2
R_DSL_1#
```

Configuration de la route statique vers l'interface wan de réseau 192.168.122.0/24

```
R_DSL_2#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is 192.168.122.1 to network 0.0.0.0

S*    0.0.0.0/0 [254/0] via 192.168.122.1
      192.168.122.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.122.0/24 is directly connected, GigabitEthernet0/0
L        192.168.122.181/32 is directly connected, GigabitEthernet0/0
      192.168.202.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.202.0/24 is directly connected, GigabitEthernet0/1
L        192.168.202.254/32 is directly connected, GigabitEthernet0/1
      192.168.203.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.203.0/24 is directly connected, GigabitEthernet0/2
L        192.168.203.254/32 is directly connected, GigabitEthernet0/2
R_DSL_2#
```

## IV. Configuration des switch cœur de réseau

Le routage inter-vlan se fait au niveau du cœur de réseau.

Configuration de tous les vlans sur les switch cœur de réseau :

```
Switch(config)#host S_Coeur_1
S_Coeur_1(config)#
S_Coeur_1(config)#
S_Coeur_1(config)#vlan 10
S_Coeur_1(config-vlan)#name Serveurs
S_Coeur_1(config-vlan)#vlan 20
S_Coeur_1(config-vlan)#name Developpeurs
S_Coeur_1(config-vlan)#vlan 30
S_Coeur_1(config-vlan)#name Administrateurs
S_Coeur_1(config-vlan)#vlan 40
S_Coeur_1(config-vlan)#name Compta
S_Coeur_1(config-vlan)#vlan 50
S_Coeur_1(config-vlan)#name Mobilite
S_Coeur_1(config-vlan)#vlan 100
S_Coeur_1(config-vlan)#name Natif
```

Récapitulatif de la configuration des vlans :

```
S_Coeur_1#sh vlan br

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gi0/0, Gi0/1, Gi0/2, Gi0/3
                                                Gi1/0, Gi1/1, Gi1/2, Gi1/3
                                                Gi2/0, Gi2/1, Gi2/2, Gi2/3
                                                Gi3/0, Gi3/1, Gi3/2, Gi3/3
10   Serveurs                         active
20   Developpeurs                     active
30   Administrateurs                  active
40   Compta                           active
50   Mobilite                         active
100  Natif                            active
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup
S_Coeur_1#
```

Configuration des adresse IP pour chaque vlan (configuration des interfaces virtuelles des commutateurs) :

```
S_Coeur_1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S_Coeur_1(config)#int vlan 10
S_Coeur_1(config-if)#ip addr 192.168.10.254 255.255.255.0
S_Coeur_1(config-if)#no sh
```

Les interfaces des switchs qui sont connecté au routeur font partie du domaine de niveau 3 donc il faut désactiver le mode switchport sur ces interfaces puis leur attribué une adresse IP :

```
S_Coeur_1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S_Coeur_1(config)#int g0/0
S_Coeur_1(config-if)#no swi
S_Coeur_1(config-if)#no switchport
S_Coeur_1(config-if)#ip addr 192.168.200.253 255.255.255.0
*Oct 22 01:14:28.056: %LINK-3-UPDOWN: Interface GigabitEthernet0/0, changed state to up
*Oct 22 01:14:29.057: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
S_Coeur_1(config-if)#ip addr 192.168.200.253 255.255.255.0
S_Coeur_1(config-if)#no sh
S_Coeur_1(config-if)#
```

Récapitulatif des interfaces des switch cœur de réseau :

```
S_Coeur_1#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/2     unassigned      YES unset  up                    up
GigabitEthernet0/3     unassigned      YES unset  up                    up
GigabitEthernet0/0     192.168.200.253 YES manual up                    up
GigabitEthernet0/1     192.168.202.253 YES manual up                    up
GigabitEthernet1/0     unassigned      YES unset  up                    up
GigabitEthernet1/1     unassigned      YES unset  up                    up
GigabitEthernet1/2     unassigned      YES unset  up                    up
GigabitEthernet1/3     unassigned      YES unset  up                    up
GigabitEthernet2/0     unassigned      YES unset  up                    up
GigabitEthernet2/1     unassigned      YES unset  up                    up
GigabitEthernet2/2     unassigned      YES unset  up                    up
GigabitEthernet2/3     unassigned      YES unset  up                    up
GigabitEthernet3/0     unassigned      YES unset  up                    up
GigabitEthernet3/1     unassigned      YES unset  up                    up
GigabitEthernet3/2     unassigned      YES unset  up                    up
GigabitEthernet3/3     unassigned      YES unset  up                    up
Vlan10                 192.168.10.254  YES manual down                  down
Vlan20                 192.168.20.254  YES manual down                  down
Vlan30                 192.168.30.254  YES manual down                  down
Vlan40                 192.168.40.254  YES manual down                  down
Vlan50                 192.168.50.254  YES manual down                  down
S_Coeur_1#
```

```
S_Coeur_2#sh ip int br
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/2     unassigned      YES unset  up                    up
GigabitEthernet0/3     unassigned      YES unset  up                    up
GigabitEthernet0/0     192.168.201.253 YES manual up                    up
GigabitEthernet0/1     192.168.203.253 YES manual up                    up
GigabitEthernet1/0     unassigned      YES unset  up                    up
GigabitEthernet1/1     unassigned      YES unset  up                    up
GigabitEthernet1/2     unassigned      YES unset  up                    up
GigabitEthernet1/3     unassigned      YES unset  up                    up
GigabitEthernet2/0     unassigned      YES unset  up                    up
GigabitEthernet2/1     unassigned      YES unset  up                    up
GigabitEthernet2/2     unassigned      YES unset  up                    up
GigabitEthernet2/3     unassigned      YES unset  up                    up
GigabitEthernet3/0     unassigned      YES unset  up                    up
GigabitEthernet3/1     unassigned      YES unset  up                    up
GigabitEthernet3/2     unassigned      YES unset  up                    up
GigabitEthernet3/3     unassigned      YES unset  up                    up
Vlan10                 192.168.10.253  YES manual down                  down
Vlan20                 192.168.20.253  YES manual down                  down
Vlan30                 192.168.30.253  YES manual down                  down
Vlan40                 192.168.40.253  YES manual down                  down
Vlan50                 192.168.50.253  YES manual down                  down
S_Coeur_2#
```

Affichage de la table de routage des cœurs de réseau :

```
S_Coeur_1#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

      192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.10.0/24 is directly connected, Vlan10
L        192.168.10.254/32 is directly connected, Vlan10
      192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.20.0/24 is directly connected, Vlan20
L        192.168.20.254/32 is directly connected, Vlan20
      192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.30.0/24 is directly connected, Vlan30
L        192.168.30.254/32 is directly connected, Vlan30
      192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.40.0/24 is directly connected, Vlan40
L        192.168.40.254/32 is directly connected, Vlan40
      192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.50.0/24 is directly connected, Vlan50
L        192.168.50.254/32 is directly connected, Vlan50
      192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.200.0/24 is directly connected, GigabitEthernet0/0
L        192.168.200.253/32 is directly connected, GigabitEthernet0/0
      192.168.202.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.202.0/24 is directly connected, GigabitEthernet0/1
L        192.168.202.253/32 is directly connected, GigabitEthernet0/1
S_Coeur_1#
```

## V. Configuration des switch d'accés

### Configuration des vlans pour les switch d'accés :

Le switch d'accés serveur n'a besion que du vlan 10 pour communiquer avec les serveur et du vlan natif :

```
S_Acces_Serveur#sh vlan br
*Oct 22 04:12:24.738: %SYS-5-CONFIG_I: Configured from console by console

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gi0/0, Gi0/1, Gi0/2, Gi0/3
                                                Gi1/0, Gi1/1, Gi1/2, Gi1/3
                                                Gi2/2, Gi2/3, Gi3/0, Gi3/1
                                                Gi3/2, Gi3/3
10   Serveurs                         active
100  Natif                            active
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup
S_Acces_Serveur#
```

Le switch d'accés client a besion de tous les vlans sauf de celui du serveur :

```
S_Acces_Client#sh vlan br

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Gi0/0, Gi0/1, Gi0/2, Gi0/3
                                                Gi1/2, Gi1/3, Gi2/2, Gi2/3
                                                Gi3/0, Gi3/1, Gi3/2, Gi3/3
20   Developpeurs                     active
30   Administrateurs                  active
40   Compta                           active
50   Mobilite                         active
100  Natif                            active
1002 fddi-default                     act/unsup
1003 token-ring-default               act/unsup
1004 fddinet-default                  act/unsup
1005 trnet-default                    act/unsup
S_Acces_Client#
```

Les macros sont des séquences de commandes prédéfinies qui peuvent être exécutées à la demande pour automatiser les tâches d'administration les plus fréquentes. Ces objets, présents sur certains commutateurs, peuvent s'avérer très pratiques pour les administrateurs.

Création de la macro : désactivation d'un port inutilisé
C'est une macro à exécuter lors de la libération d'un port du commutateur. Cette macro va éteindre
le port, supprimer son adresse IP s'il en a une, puis le placer dans le VLAN de quarantaine.

Création de la macro : port access
Cette macro regroupe les commandes communes à la configuration de tous les ports de type access.
Exemple de création d'une macro à exécuter lors de la création d'un port Access :

Création de la macro : port trunk
Cette macro regroupe les commandes communes à la configuration de tous les ports de type trunk.
Exemple de création d'une macro à exécuter lors de la création d'un port Trunk :

```
macro name Port_trunk
no vtp
no cdp enable
switchport trunk encapsulation dot1q
switchport mode trunk
switchport nonegotiate
switchport trunk allowed vlan none
switchport trunk native vlan 100
@
macro name Port_access
no vtp
no cdp enable
switchport mode access
switchport nonegotiate
spanning-tree portfast
@
macro name Port_inutilise
shutdown
no vtp
no cdp enable
switchport mode access
switchport nonegotiate
@
```

Pour utiliser une macro préalablement créée, il suffit de sélectionner les interfaces sur lesquelles l'exécuter, puis de saisir la commande d'application de la macro :

- Macro apply non de la macro

```
S_Acces_Serveur#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S_Acces_Serveur(config)#int range g3/0-1
S_Acces_Serveur(config-if-range)#macro apply Port_trunk
S_Acces_Serveur(config-if-range)#channel-group 2 mode active
Creating a port-channel interface Port-channel 2

S_Acces_Serveur(config-if-range)#no sh
S_Acces_Serveur(config-if-range)#
```

## VI. Configuration du protocol OSPF

```
R_DSL_1#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is 192.168.122.1 to network 0.0.0.0

S*    0.0.0.0/0 [254/0] via 192.168.122.1
      192.168.122.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.122.0/24 is directly connected, GigabitEthernet0/0
L        192.168.122.113/32 is directly connected, GigabitEthernet0/0
      192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.200.0/24 is directly connected, GigabitEthernet0/1
L        192.168.200.254/32 is directly connected, GigabitEthernet0/1
      192.168.201.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.201.0/24 is directly connected, GigabitEthernet0/2
L        192.168.201.254/32 is directly connected, GigabitEthernet0/2
R_DSL_1#
```

```
R_DSL_1(config)#router ospf 1
R_DSL_1(config-router)#network 192.168.122.0 0.0.0.255 area 0
R_DSL_1(config-router)#network 192.168.200.0 0.0.0.255 area 0
R_DSL_1(config-router)#network 192.168.201.0 0.0.0.255 area 0
R_DSL_1(config-router)#passive-interface g0/0
R_DSL_1(config-router)#default-information originate
R_DSL_1(config-router)#
```

```
S_Coeur_1#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override

Gateway of last resort is not set

      192.168.10.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.10.0/24 is directly connected, Vlan10
L        192.168.10.254/32 is directly connected, Vlan10
      192.168.20.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.20.0/24 is directly connected, Vlan20
L        192.168.20.254/32 is directly connected, Vlan20
      192.168.30.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.30.0/24 is directly connected, Vlan30
L        192.168.30.254/32 is directly connected, Vlan30
      192.168.40.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.40.0/24 is directly connected, Vlan40
L        192.168.40.254/32 is directly connected, Vlan40
      192.168.50.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.50.0/24 is directly connected, Vlan50
L        192.168.50.254/32 is directly connected, Vlan50
      192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.200.0/24 is directly connected, GigabitEthernet0/0
L        192.168.200.253/32 is directly connected, GigabitEthernet0/0
      192.168.202.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.202.0/24 is directly connected, GigabitEthernet0/1
L        192.168.202.253/32 is directly connected, GigabitEthernet0/1
S_Coeur_1#
```

```
S_Coeur_1(config)#router ospf 1
S_Coeur_1(config-router)#network 192.168.10.0 0.0.0.255 area 0
S_Coeur_1(config-router)#network 192.168.20.0 0.0.0.255 area 0
S_Coeur_1(config-router)#network 192.168.30.0 0.0.0.255 area 0
S_Coeur_1(config-router)#network 192.168.40.0 0.0.0.255 area 0
S_Coeur_1(config-router)#network 192.168.50.0 0.0.0.255 area 0
S_Coeur_1(config-router)#network 192.168.200.0 0.0.0.255 area 0
S_Coeur_1(config-router)#network 192.168.202.0 0.0.0.255 area 0
S_Coeur_1(config-router)#
*Oct 22 05:10:35.770: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.203.254 on GigabitEthernet0/1
 from LOADING to FULL, Loading Done
*Oct 22 05:10:36.767: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.201.254 on GigabitEthernet0/0
 from LOADING to FULL, Loading Done
S_Coeur_1(config-router)#passive-interface PO1
S_Coeur_1(config-router)#passive-interface PO2
```

```
R_DSL_1#sh 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
       i - IS-IS, su - IS-IS summary, 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, H - NHRP, l - LISP
       a - application route
       + - replicated route, % - next hop override, p - overrides from PfR

Gateway of last resort is 192.168.200.253 to network 0.0.0.0

O*E2  0.0.0.0/0 [110/1] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
O     192.168.10.0/24
           [110/2] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
O     192.168.20.0/24
           [110/2] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
O     192.168.30.0/24
           [110/2] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
O     192.168.40.0/24
           [110/2] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
O     192.168.50.0/24
           [110/2] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
      192.168.122.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.122.0/24 is directly connected, GigabitEthernet0/0
L        192.168.122.113/32 is directly connected, GigabitEthernet0/0
      192.168.200.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.200.0/24 is directly connected, GigabitEthernet0/1
L        192.168.200.254/32 is directly connected, GigabitEthernet0/1
      192.168.201.0/24 is variably subnetted, 2 subnets, 2 masks
C        192.168.201.0/24 is directly connected, GigabitEthernet0/2
L        192.168.201.254/32 is directly connected, GigabitEthernet0/2
O     192.168.202.0/24
           [110/2] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
O     192.168.203.0/24
           [110/3] via 192.168.200.253, 00:05:48, GigabitEthernet0/1
O     192.168.204.0/24
           [110/3] via 192.168.200.253, 00:03:04, GigabitEthernet0/1
R_DSL_1#
```

```
S_Coeur_1#ping 8.8.8.8
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 8.8.8.8, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 31/35/39 ms
S_Coeur_1#
```

## VII. Configuration du protocole LCAP

```
S_Acces_Serveur#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S_Acces_Serveur(config)#int range g3/0-1
S_Acces_Serveur(config-if-range)#macro apply Port_trunk
S_Acces_Serveur(config-if-range)#channel-group 2 mode active
Creating a port-channel interface Port-channel 2

S_Acces_Serveur(config-if-range)#no sh
S_Acces_Serveur(config-if-range)#
```

```
S_Coeur_1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S_Coeur_1(config)#int port-cha
S_Coeur_1(config)#int port-channel 1
S_Coeur_1(config-if)#switchport trunk allowed vlan 20,30,40,50,100
S_Coeur_1(config-if)#exit
S_Coeur_1(config)#int port-channel 2
S_Coeur_1(config-if)#switchport trunk allowed vlan 10,100
S_Coeur_1(config-if)#exit
S_Coeur_1(config)#
```

```
interface Port-channel2
 switchport trunk allowed vlan 10,100
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 100
 switchport mode trunk
 switchport nonegotiate
!
interface Port-channel1
 switchport trunk allowed vlan 20,30,40,50,100
 switchport trunk encapsulation dot1q
 switchport trunk native vlan 100
 switchport mode trunk
 switchport nonegotiate
```

## VIII. Configuration du protocole GLBP

```
interface Vlan10
 ip address 192.168.10.254 255.255.255.0
 glbp 1 ip 192.168.10.250
 glbp 1 preempt
!
interface Vlan20
 ip address 192.168.20.254 255.255.255.0
 glbp 1 ip 192.168.20.250
 glbp 1 preempt
!
interface Vlan30
 ip address 192.168.30.254 255.255.255.0
 glbp 1 ip 192.168.30.250
 glbp 1 preempt
!
interface Vlan40
 ip address 192.168.40.254 255.255.255.0
 glbp 1 ip 192.168.40.250
 glbp 1 preempt
!
interface Vlan50
 ip address 192.168.50.254 255.255.255.0
 glbp 1 ip 192.168.50.250
 glbp 1 preempt
```

```
S_Coeur_1#sh glbp brief
Interface   Grp  Fwd Pri State    Address         Active router   Standby router
Vl10        1    -   100 Active   192.168.10.250  local           unknown
Vl10        1    1   -   Active   0007.b400.0101  local           -
Vl20        1    -   100 Active   192.168.20.250  local           192.168.20.253
Vl20        1    1   -   Active   0007.b400.0101  local           -
Vl20        1    2   -   Listen   0007.b400.0102  192.168.20.253  -
Vl30        1    -   100 Active   192.168.30.250  local           192.168.30.253
Vl30        1    1   -   Active   0007.b400.0101  local           -
Vl30        1    2   -   Listen   0007.b400.0102  192.168.30.253  -
Vl40        1    -   100 Active   192.168.40.250  local           192.168.40.253
Vl40        1    1   -   Active   0007.b400.0101  local           -
Vl40        1    2   -   Listen   0007.b400.0102  192.168.40.253  -
Vl50        1    -   100 Active   192.168.50.250  local           192.168.50.253
Vl50        1    1   -   Active   0007.b400.0101  local           -
Vl50        1    2   -   Listen   0007.b400.0102  192.168.50.253  -
S_Coeur_1#
```

## IX. Configuration des ACL

Extended IP access list Vlan-Compta

1 permit tcp 192.168.40.0 0.0.0.255 any established

20 deny ip 192.168.40.0 0.0.0.255 host 192.168.10.2

30 deny ip 192.168.40.0 0.0.0.255 host 192.168.10.3

40 deny ip 192.168.40.0 0.0.0.255 host 192.168.10.10

50 deny tcp 192.168.40.0 0.0.0.255 host 192.168.10.240 neq 7767

60 deny tcp 192.168.40.0 0.0.0.255 host 192.168.10.230 neq domain

61 permit icmp 192.168.40.0 0.0.0.255 any

62 deny ip 192.168.40.0 0.0.0.255 192.168.50.0 0.0.0.255

80 permit ip 192.168.40.0 0.0.0.255 any

Extended IP access list Vlan-Dev

1 permit tcp 192.168.20.0 0.0.0.255 any established

20 deny ip 192.168.20.0 0.0.0.255 host 192.168.10.2

30 deny ip 192.168.20.0 0.0.0.255 host 192.168.10.3

40 deny ip 192.168.20.0 0.0.0.255 host 192.168.10.10

50 deny tcp 192.168.20.0 0.0.0.255 host 192.168.10.240 neq 7767

60 deny tcp 192.168.20.0 0.0.0.255 host 192.168.10.230 neq domain

61 permit icmp 192.168.20.0 0.0.0.255 any

62 deny ip 192.168.20.0 0.0.0.255 192.168.50.0 0.0.0.255

80 permit ip 192.168.20.0 0.0.0.255 any

Extended IP access list Vlan-Mobilite

1 permit tcp 192.168.50.0 0.0.0.255 any established

20 deny ip 192.168.50.0 0.0.0.255 host 192.168.10.2

30 deny ip 192.168.50.0 0.0.0.255 host 192.168.10.3

40 deny ip 192.168.50.0 0.0.0.255 host 192.168.10.10

50 deny ip 192.168.50.0 0.0.0.255 host 192.168.10.235

60 deny ip 192.168.50.0 0.0.0.255 host 192.168.10.240

70 deny ip 192.168.50.0 0.0.0.255 host 192.168.10.245

80 deny tcp 192.168.50.0 0.0.0.255 host 192.168.10.230 neq domain

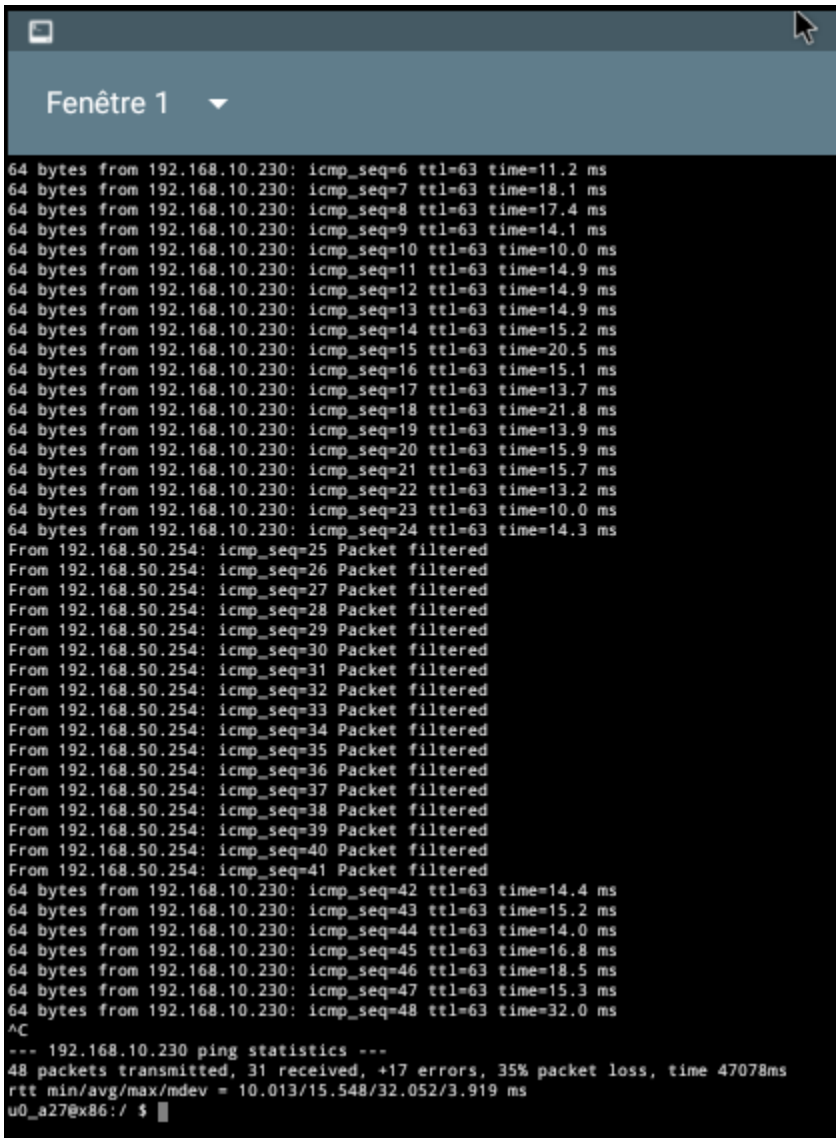
81 permit icmp 192.168.50.0 0.0.0.255 any

82 deny ip 192.168.50.0 0.0.0.255 192.168.20.0 0.0.0.255

83 deny ip 192.168.50.0 0.0.0.255 192.168.30.0 0.0.0.255

84 deny ip 192.168.50.0 0.0.0.255 192.168.40.0 0.0.0.255

100 permit ip 192.168.50.0 0.0.0.255 any


Fenêtre 1
64 bytes from 192.168.10.230: icmp_seq=6 ttl=63 time=11.2 ms
64 bytes from 192.168.10.230: icmp_seq=7 ttl=63 time=18.1 ms
64 bytes from 192.168.10.230: icmp_seq=8 ttl=63 time=17.4 ms
64 bytes from 192.168.10.230: icmp_seq=9 ttl=63 time=14.1 ms
64 bytes from 192.168.10.230: icmp_seq=10 ttl=63 time=10.0 ms
64 bytes from 192.168.10.230: icmp_seq=11 ttl=63 time=14.9 ms
64 bytes from 192.168.10.230: icmp_seq=12 ttl=63 time=14.9 ms
64 bytes from 192.168.10.230: icmp_seq=13 ttl=63 time=14.9 ms
64 bytes from 192.168.10.230: icmp_seq=14 ttl=63 time=15.2 ms
64 bytes from 192.168.10.230: icmp_seq=15 ttl=63 time=20.5 ms
64 bytes from 192.168.10.230: icmp_seq=16 ttl=63 time=15.1 ms
64 bytes from 192.168.10.230: icmp_seq=17 ttl=63 time=13.7 ms
64 bytes from 192.168.10.230: icmp_seq=18 ttl=63 time=21.8 ms
64 bytes from 192.168.10.230: icmp_seq=19 ttl=63 time=13.9 ms
64 bytes from 192.168.10.230: icmp_seq=20 ttl=63 time=15.9 ms
64 bytes from 192.168.10.230: icmp_seq=21 ttl=63 time=15.7 ms
64 bytes from 192.168.10.230: icmp_seq=22 ttl=63 time=13.2 ms
64 bytes from 192.168.10.230: icmp_seq=23 ttl=63 time=10.0 ms
64 bytes from 192.168.10.230: icmp_seq=24 ttl=63 time=14.3 ms
From 192.168.50.254: icmp_seq=25 Packet filtered
From 192.168.50.254: icmp_seq=26 Packet filtered
From 192.168.50.254: icmp_seq=27 Packet filtered
From 192.168.50.254: icmp_seq=28 Packet filtered
From 192.168.50.254: icmp_seq=29 Packet filtered
From 192.168.50.254: icmp_seq=30 Packet filtered
From 192.168.50.254: icmp_seq=31 Packet filtered
From 192.168.50.254: icmp_seq=32 Packet filtered
From 192.168.50.254: icmp_seq=33 Packet filtered
From 192.168.50.254: icmp_seq=34 Packet filtered
From 192.168.50.254: icmp_seq=35 Packet filtered
From 192.168.50.254: icmp_seq=36 Packet filtered
From 192.168.50.254: icmp_seq=37 Packet filtered
From 192.168.50.254: icmp_seq=38 Packet filtered
From 192.168.50.254: icmp_seq=39 Packet filtered
From 192.168.50.254: icmp_seq=40 Packet filtered
From 192.168.50.254: icmp_seq=41 Packet filtered
64 bytes from 192.168.10.230: icmp_seq=42 ttl=63 time=14.4 ms
64 bytes from 192.168.10.230: icmp_seq=43 ttl=63 time=15.2 ms
64 bytes from 192.168.10.230: icmp_seq=44 ttl=63 time=14.0 ms
64 bytes from 192.168.10.230: icmp_seq=45 ttl=63 time=16.8 ms
64 bytes from 192.168.10.230: icmp_seq=46 ttl=63 time=18.5 ms
64 bytes from 192.168.10.230: icmp_seq=47 ttl=63 time=15.3 ms
64 bytes from 192.168.10.230: icmp_seq=48 ttl=63 time=32.0 ms
^C
--- 192.168.10.230 ping statistics ---
48 packets transmitted, 31 received, +17 errors, 35% packet loss, time 47078ms
rtt min/avg/max/mdev = 10.013/15.548/32.052/3.919 ms
u0_a27@x86:/ $

# X. Configuration de l'authtification radius

**Configuration du protocole radius sur les équipement cisco :**

```
username xxxx privilege 15 secret yyyy
crypto key generate rsa modulus 2048
ip ssh version 2
ip ssh time-out 30
ip ssh dh min size 2048
ip scp server enable
service tcp-keepalives-in
ip ssh logging events
line vty 0 4
transport input ssh
exec -timeout 15
exit

conf t
username admin priv 15 secret admin
aaa new-model
aaa group server radius BORA
server-private 192.168.10.235 key toor


aaa authentication login default group BORA local
aaa authorization exec default group BORA local
aa accounting exec default start-stop group BORA

ip radius source-interface Vlan10

line vty 0 4
transport input ssh
login authentication default
authorization exec default

line con 0
transport input ssh
login authentication default
authorization exec default
```

```
S_Coeur_2(config)#ip domain-name bora-bora.nc
S_Coeur_2(config)#crypto key generate rsa modulus 2048
The name for the keys will be: S_Coeur_2.bora-bora.nc

% The key modulus size is 2048 bits
% Generating 2048 bit RSA keys, keys will be non-exportable...
[OK] (elapsed time was 4 seconds)

S_Coeur_2(config)#
*Oct 29 06:36:51.062: %SSH-5-ENABLED: SSH 1.99 has been enabled
S_Coeur_2(config)#ip ssh version 2
S_Coeur_2(config)#ip shh logging events
                  ^
% Invalid input detected at '^' marker.

S_Coeur_2(config)#ip ssh logging events
S_Coeur_2(config)#line vty 0 4
S_Coeur_2(config-line)#transport input ssh
S_Coeur_2(config-line)#exec-timeout 15
S_Coeur_2(config-line)#exit
S_Coeur_2(config)#
```

```
S_Coeur_2#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S_Coeur_2(config)#aaa new-model
S_Coeur_2(config)#aaa group server radius BORA
S_Coeur_2(config-sg-radius)#server-private 192.168.10.235 key toor
S_Coeur_2(config-sg-radius)#exit
S_Coeur_2(config)#aaa authentication login default group BORA
S_Coeur_2(config)#aaa authorization exec default group BORA
S_Coeur_2(config)#
S_Coeur_2(config)#line vty 0 4
S_Coeur_2(config-line)#login authentification default
                       ^
% Invalid input detected at '^' marker.

S_Coeur_2(config-line)#login authentication default
*Oct 29 06:40:39.879: %GLBP-6-FWDSTATECHANGE: Vlan40 Grp 1 Fwd 1 state Listen -> Active
*Oct 29 06:40:40.554: %GLBP-6-STATECHANGE: Vlan40 Grp 1 state Standby -> Active
S_Coeur_2(config-line)#login authentication default
S_Coeur_2(config-line)#
```

# XI. Configuration de syslog

logging trap notifications

logging facility local3

logging source-interface Vlan30

logging host 192.168.10.240

```
S_Coeur_1>en
S_Coeur_1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
S_Coeur_1(config)#loggi
S_Coeur_1(config)#logging 192.168.10.240
S_Coeur_1(config)#log
*Nov  4 23:43:59.095: %SYS-6-LOGGINGHOST_STARTSTOP: Logging to host 192.168.10.2
40 port 514 started - CLI initiated
S_Coeur_1(config)#logging trap notifications
S_Coeur_1(config)#logging source-interface vlan 30
S_Coeur_1(config)#archive
S_Coeur_1(config-archive)#log config
S_Coeur_1(config-archive-log-cfg)#logging size 1000
S_Coeur_1(config-archive-log-cfg)#hidekeys
S_Coeur_1(config-archive-log-cfg)#notify syslog
S_Coeur_1(config-archive-log-cfg)#exit
S_Coeur_1(config-archive)#exit
S_Coeur_1(config)#
```

```
logging trap notifications
logging facility local3
logging source-interface Vlan30
logging host 192.168.10.240
```

```
*Nov  5 00:05:39.467: %SYS-5-CONFIG_I: Configured from console by consoleCompressed configuration from 6580 bytes to 3022 bytes[OK]
S_Coeur_1#
*Nov  5 00:05:43.429: %SSH-5-SSH2_USERAUTH: User 'admin' authentication for SSH2 Session from 192.168.10.235 (tty = 0) using crypto cipher 'aes256-ctr', hmac 'hmac-sha1' Failed
*Nov  5 00:05:43.429: %SSH-5-SSH2_CLOSE: SSH2 Session from 192.168.10.235 (tty = 0) for user 'admin' using crypto cipher 'aes256-ctr', hmac 'hmac-sha1' closed
*Nov  5 00:05:43.481: %GRUB-5-CONFIG_WRITING: GRUB configuration is being updated on disk. Please wait...
*Nov  5 00:05:44.189: %GRUB-5-CONFIG_WRITTEN: GRUB configuration was written to disk successfully.
S_Coeur_1#
*Nov  5 00:05:51.756: %SSH-5-SSH2_SESSION: SSH2 Session request from 192.168.10.235 (tty = 0) using crypto cipher 'aes256-ctr', hmac 'hmac-sha1' Succeeded
S_Coeur_1#
*Nov  5 00:05:55.904: %SSH-5-SSH2_USERAUTH: User 'admin' authentication for SSH2 Session from 192.168.10.235 (tty = 0) using crypto cipher 'aes256-ctr', hmac 'hmac-sha1' Succeeded
S_Coeur_1#
```

# XII. Annexes

https://www.ssi.gouv.fr/uploads/2016/07/nt_commutateurs.pdf

https://enableconfig.wordpress.com/2016/09/06/ha-campusnetwork/

https://www.it-connect.fr/mise-en-place-du-protocole-glbp-sous-cisco/

https://www.it-connect.fr/etherchannel-sous-cisco-avec-lacp/

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http://www.lolokai.com/blog/2012/03/26/les-acl-sur-les-equipements-cisco/

https://www.cisco.com/c/fr_ca/support/docs/ip/access-lists/26448-ACLsamples.html

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