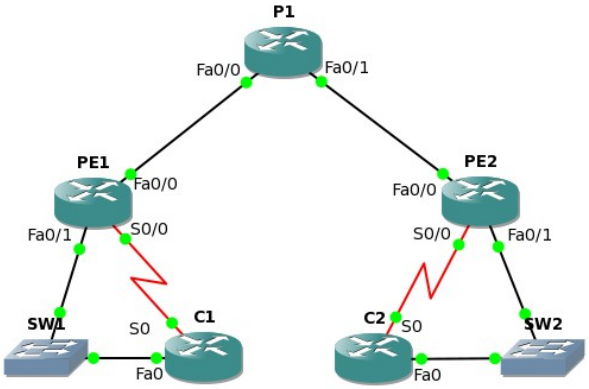
Laboratorio: Any Transport over MPLS

ethernet (anche dot1q) e frame-relay



Indirizzamento IP:
loopbacks:
P1: 10.0.0.1/32
PE1: 10.0.1.1/32
PE2: 10.0.1.2/32
P1 – PE1 : 10.1.0.0/30 (.1 - .2)
P1 – PE2 : 10.2.0.0/30 (.1 - .2)

C1(Fa0): 192.168.1.1/24
C1(S0.1): 172.16.0.1/30
C2(Fa0): 192.168.1.2/24
C2(S0.1): 172.16.0.2/30

P1

```
hostname P1
ip cef
!
mpls label protocol ldp
!
interface Loopback0
 ip address 10.0.0.1 255.255.255.255
!
interface FastEthernet0/0
 ip address 10.1.0.1 255.255.255.252
 duplex auto
 speed auto
 mpls ip
!
interface FastEthernet0/1
 ip address 10.2.0.1 255.255.255.252
 duplex auto
 speed auto
 mpls ip
!
router ospf 1
 log-adjacency-changes
 network 10.0.0.1 0.0.0.0 area 0
 network 10.1.0.0 0.0.0.3 area 0
 network 10.2.0.0 0.0.0.3 area 0
```

PE1

```
hostname PE1
!
ip cef
!
frame-relay switching
mpls label protocol ldp
!
interface Loopback0
 ip address 10.0.1.1 255.255.255.255
```

```
!
interface FastEthernet0/0
 ip address 10.1.0.2 255.255.255.252
 duplex auto
 speed auto
 mpls ip
!
interface Serial0/0
 no ip address
 encapsulation frame-relay IETF
 clock rate 2000000
 frame-relay intf-type dce
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 xconnect 10.0.1.2 10 encapsulation mpls
!
router ospf 1
 log-adjacency-changes
 network 10.0.1.1 0.0.0.0 area 0
 network 10.1.0.0 0.0.0.3 area 0
!
connect FR1-FR2 Serial0/0 102 l2transport
 xconnect 10.0.1.2 20 encapsulation mpls
```

PE2

```
hostname PE2
!
ip cef
!
frame-relay switching
mpls label protocol ldp
!
interface Loopback0
 ip address 10.0.1.2 255.255.255.255
!
interface FastEthernet0/0
 ip address 10.2.0.2 255.255.255.252
 duplex auto
 speed auto
 mpls ip
!
interface Serial0/0
 no ip address
 encapsulation frame-relay IETF
 clock rate 2000000
 frame-relay intf-type dce
!
interface FastEthernet1/0
 no ip address
 duplex auto
 speed auto
 xconnect 10.0.1.1 10 encapsulation mpls
!
router ospf 1
 log-adjacency-changes
 network 10.0.1.2 0.0.0.0 area 0
```

```
 network 10.2.0.0 0.0.0.3 area 0
!
connect FR2-FR1 Serial0/0 201 l2transport
 xconnect 10.0.1.1 20 encapsulation mpls
```

C1

```
hostname C1
!
interface FastEthernet0
 ip address 192.168.1.1 255.255.255.0
 speed auto
!
interface Serial0
 no ip address
 encapsulation frame-relay IETF
!
interface Serial0.1 point-to-point
 ip address 172.16.0.1 255.255.255.252
 frame-relay interface-dlci 102
```

C2

```
hostname C2
!
interface FastEthernet0
 ip address 192.168.1.2 255.255.255.0
 speed auto
!
interface Serial0
 no ip address
 encapsulation frame-relay IETF
!
interface Serial0.1 point-to-point
 ip address 172.16.0.2 255.255.255.252
 frame-relay interface-dlci 201
```

Ethernet

MPLS vc:

```
PE1>sh mpls l2transport vc 10 detail
Local interface: Fa1/0 up, line protocol up, Ethernet up
  Destination address: 10.0.1.2, VC ID: 10, VC status: up
    Next hop: 10.1.0.1
    Output interface: Fa0/0, imposed label stack {17 16}
  Create time: 00:03:36, last status change time: 00:02:11
  Signaling protocol: LDP, peer 10.0.1.2:0 up
    MPLS VC labels: local 16, remote 16
    Group ID: local 0, remote 0
    MTU: local 1500, remote 1500
    Remote interface description:
  Sequencing: receive disabled, send disabled
  VC statistics:
    packet totals: receive 17, send 22
    byte totals:   receive 2396, send 2736
    packet drops:  receive 0, seq error 0, send 0
```

Connection test:

```
C1>ping 192.168.1.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.1.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 32/61/80 ms
```

Frame-Relay

MPLS vc:

```
PE1>show mpls l2transport vc 20

Local intf     Local circuit              Dest address    VC ID      Status
-------------  -------------------------- --------------- ---------- ----------
Se0/0          FR DLCI 102                10.0.1.2        20         UP
```

Connection test:

```
C1>show frame-relay pvc

PVC Statistics for interface Serial0 (Frame Relay DTE)

               Active     Inactive      Deleted       Static
  Local           1           0           0           0
  Switched        0           0           0           0
  Unused          0           0           0           0

DLCI = 102, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0.1

  input pkts 5             output pkts 6            in bytes 1475
  out bytes 1770           dropped pkts 0           in pkts dropped 0
  out pkts dropped 0                 out bytes dropped 0
  in FECN pkts 0           in BECN pkts 0           out FECN pkts 0
  out BECN pkts 0          in DE pkts 0             out DE pkts 0
  out bcast pkts 6         out bcast bytes 1770
  pvc create time 00:08:43, last time pvc status changed 00:01:50
C1>ping 172.16.0.2

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 172.16.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 72/128/268 ms
```