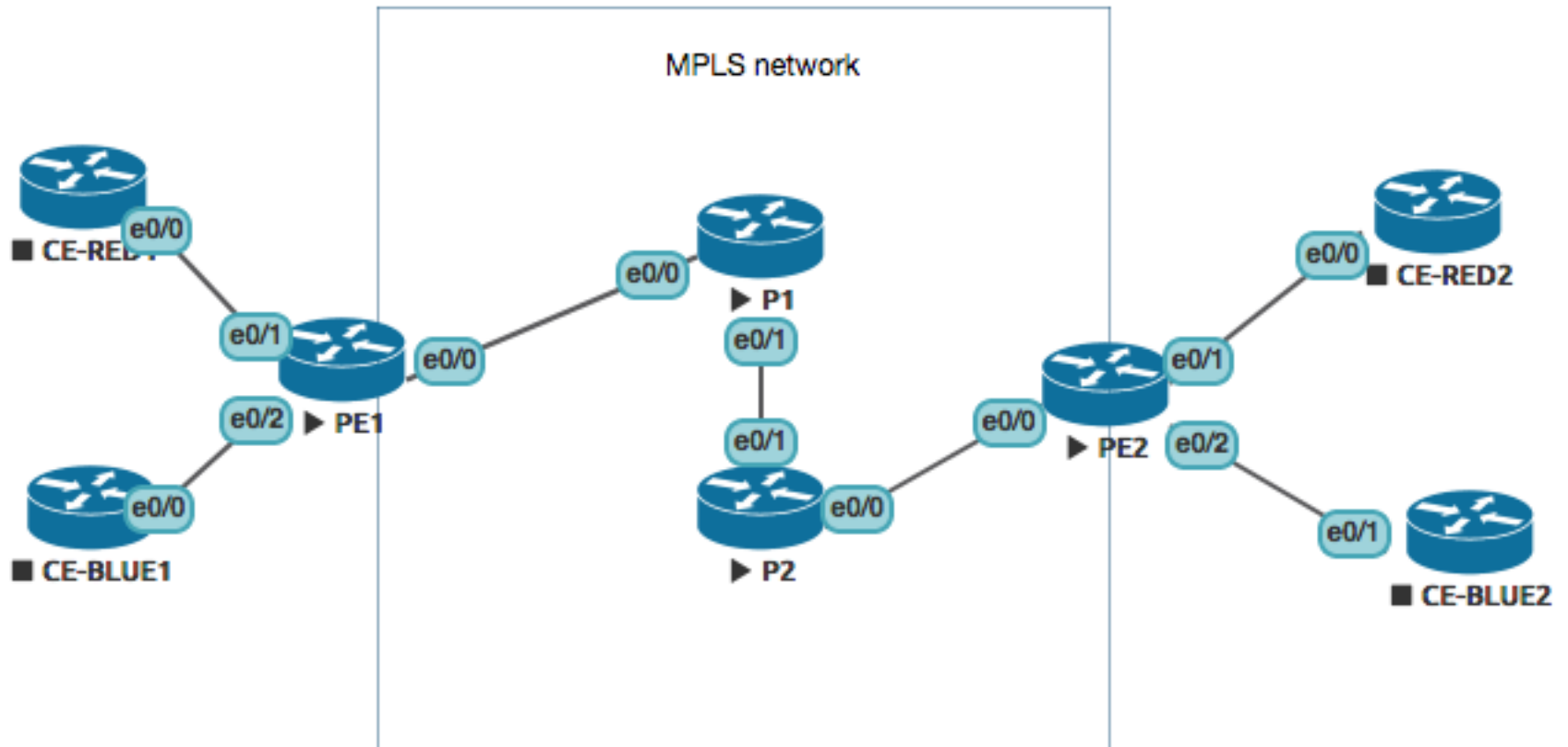


MPLS labs for CCS

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Topology



Address plan

- Customers: RED (AS 65100) and BLUE (AS65200)

Router	interface	IP addresses
CE-RED1	Loopback1	192.168.1.1/24, 2001:db8:face:A::1/64
CE-RED2	Loopback1	192.168.2.1/24, 2001:db8:face:B::1/64
CE-BLUE1	Loopback1	192.168.1.1/24, 2001:db8:cafe:A::1/64
CE-BLUE2	Loopback1	192.168.2.1/24, 2001:db8:cafe:B::1/64
PE1	Loopback1	1.1.1.1/32
PE2	Loopback1	1.1.1.2/32

- Infrastructure: 10.10.10.0/24 inside MPLS cloud, EIGRP – named mode

Link	IP addresses
PE1 – RED1	10.10.1.0/30, 2001:db8:ffff:a::/64
PE1 – BLUE1	10.10.1.4/30, 2001:db8:ffff:b::/64
PE2 – RED2	10.10.2.0/30, 2001:db8:ffff:c::/64
PE2 – BLUE2	10.10.2.4/30, 2001:db8:ffff:d::/64

Tasks

- Enable MPLS on the provider backbone.
- Create VRFs and assign routed interfaces to them.
- Configure MP-BGP between the PE routers.
- Configure BGP or IGP between each PE router and its attached CE routers.
- Enable route redistribution between the customer sites and the backbone.

Enable MPLS

- mpls ip

```
P1(config)# interface ether 0/1
P1(config-if)# mpls ip
P1(config-if)# do show mpls interfaces
```

Interface	IP	Tunnel	BGP	Static	Operational
Ethernet0/1	Yes (ldp)	No	No	No	Yes

- Show commands

- show mpls ldp neighbor
- show mpls ldp bindings
- show mpls ldp discovery
- show mpls interfaces
- show mpls forwarding

VRF

- Create VRF for each customer
 - Use vrf definition to support both address families
 - Configure router distinguisher using format ASN:CUSTOMERID

```
vrf definition RED
  rd 65100:1
  address-family ipv4 ! The same for IPv6
  route-target both 65100:1
  exit-address-family
```

- Assign interfaces to VRF

Configure MP-BGP between PE routers

- BGP AS 65300
- Use PE1/PE2 loopback addresses
- VPNv4, VPNv6 address family

```
PE1(config)# router bgp 65300
PE1(config-router)# neighbor x.x.x.x remote-as 65300
PE1(config-router)# neighbor x.x.x.x update source lo1
PE1(config-router)# address-family vpnv4
PE1(config-router-af)# neighbor x.x.x.x activate
```

Configure redistribution between PE/CE

- If BGP is used between CE/PE
 - as-override must be set as customers use the same AS on both sites
 - E.g. configuration on PE2

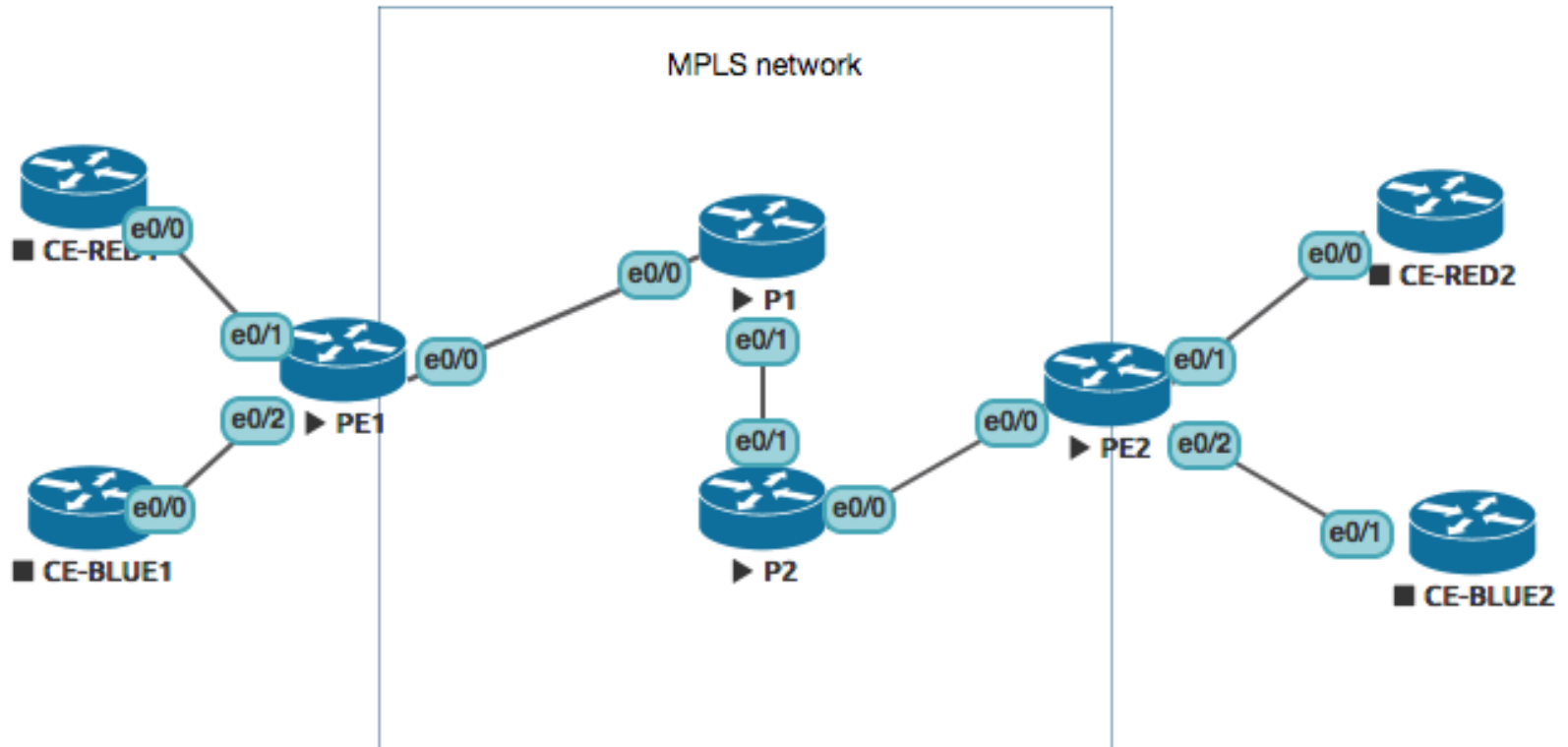
```
address-family ipv4 vrf RED
  neighbor 10.10.2.2 remote-as 65200
  neighbor 10.10.2.2 activate
  neighbor 10.10.2.2 as-override
exit-address-family
```

- If IGP is used between CE/PE
 - Redistribution from BGP to IGP needs to be configured in
address-family ipv4/ipv6 vrf XXX

Commands

- Show mpls ldp bindings
- Show mpls ldp discovery
- Show mpls interfaces

MPLS L2VPN



Address plan

- Customers: RED (AS 65100) and BLUE (AS65200)

Router	interface	IP addresses
CE-RED1	Eth0/0	192.168.1.1/24, 2001:db8:face:A::1/64
CE-RED2	Eth0/0	192.168.1.2/24, 2001:db8:face:A::2/64
CE-BLUE1	Eth0/0	192.168.1.1/24, 2001:db8:cafe:A::1/64
CE-BLUE2	Eth0/0	192.168.1.2/24, 2001:db8:cafe:A::2/64
PE1	Loopback1	1.1.1.1/32
PE2	Loopback1	1.1.1.2/32

- Infrastructure: 10.10.10.0/24 inside MPLS cloud, EIGRP – named mode

Link	IP addresses
PE1 – RED1	10.10.1.0/30, 2001:db8:ffff:a::/64
PE1 – BLUE1	10.10.1.4/30, 2001:db8:ffff:b::/64
PE2 – RED2	10.10.2.0/30, 2001:db8:ffff:c::/64
PE2 – BLUE2	10.10.2.4/30, 2001:db8:ffff:d::/64

MPLS L2VPN

- Create pseudowire class

```
PE1(config)# pseudowire-class inter-ether  
PE1(config-pw-class)# encapsulation mpls  
PE1(config-pw-class)# interworking ethernet
```

- Create a static pseudowire tunnel

```
!interface towards CE  
PE1(config-if)# xconnect 2.2.2.2 100 encapsulation mpls pw-class inter-ether
```

- The interface toward the CE router doesn't have any other config



Labs created by [Matěj Grégr](#) for CCS practice.

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