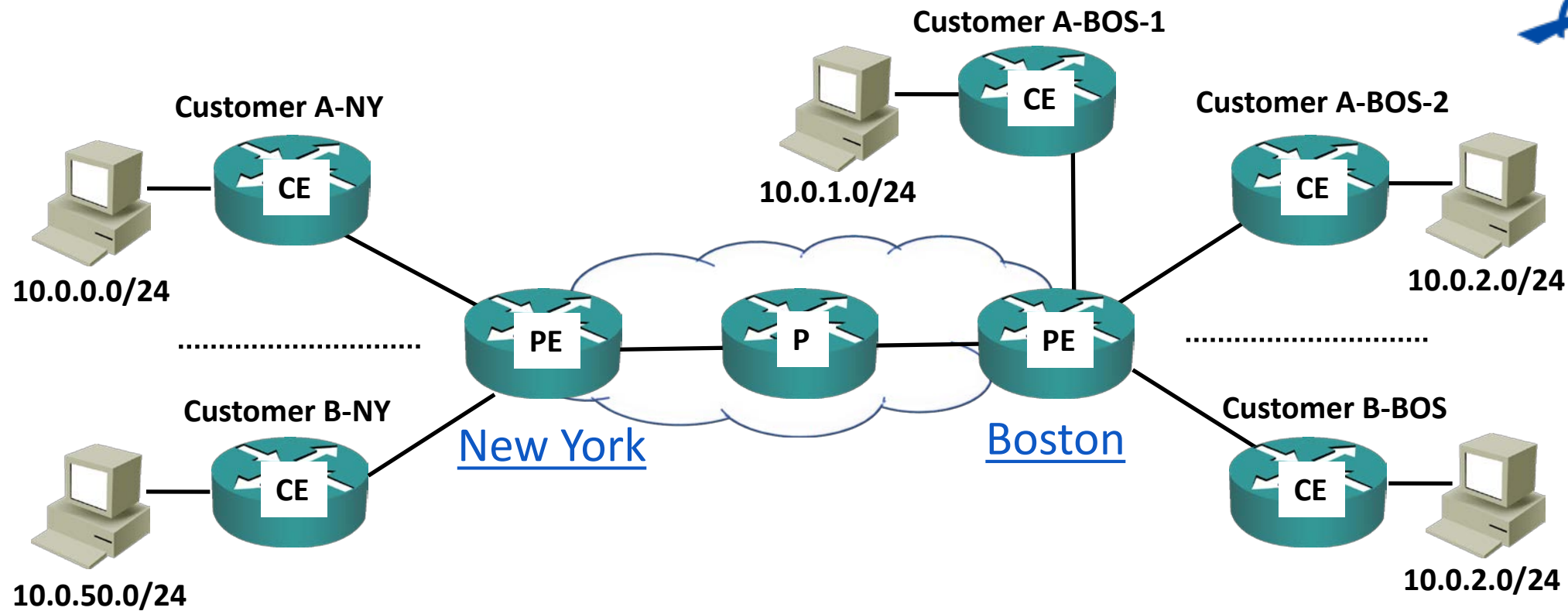# MPLS (Multi Protocol Label Switching) VPN

- WAN connectivity can be provided over an MPLS infrastructure, usually operated by a service provider

- Traffic from multiple customers can travel over the provider's shared MPLS network, so this is a VPN service

- Different levels of SLA for uptime and traffic delay and loss are often available at different price points

- Ethernet connections are typically used to the customer router

- MPLS VPNs provide a full mesh topology by default

Layer 3 MPLS VPN

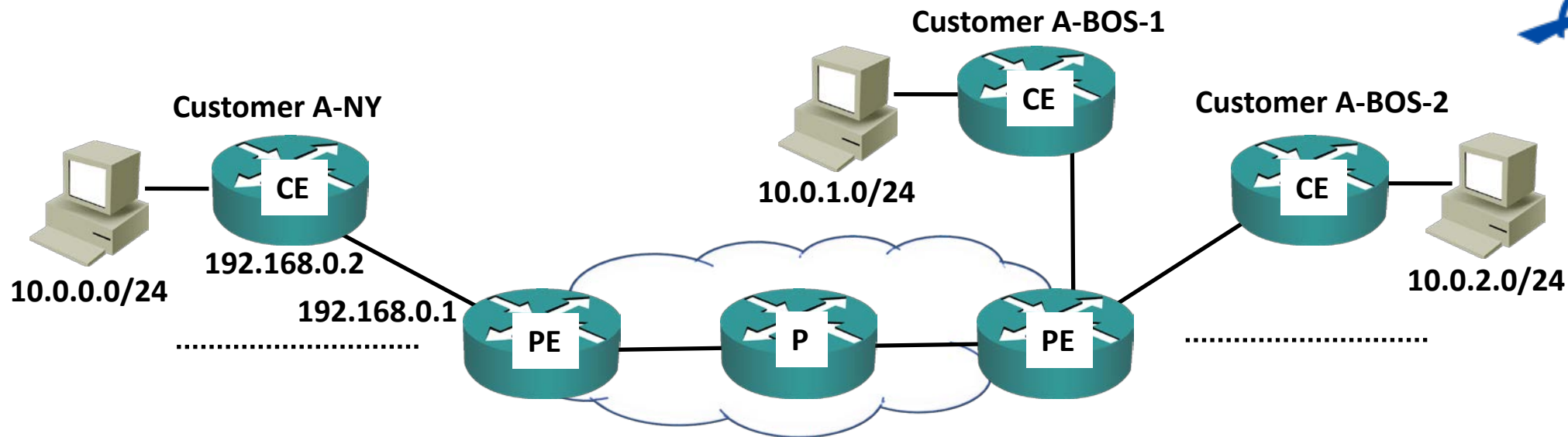CE: Customer Edge device
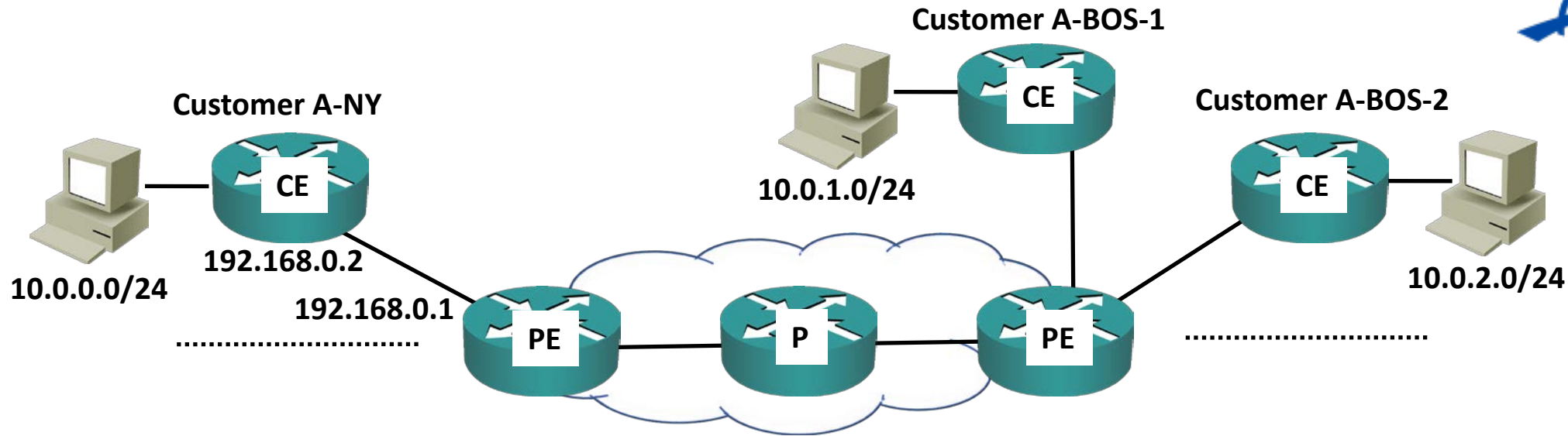PE: Provider Edge device
P: Provider core device

Layer 3 MPLS VPN

- MPLS runs across the providers core on the PE and P routers
- The customer CE routers do not run MPLS
- The customer CE routers peer at Layer 3 with the provider PE routers
- Static routes or a routing protocol runs between the CE and PE
- The PE router looks like another customer router to the customer
- The provider's core routers are transparent to the customer
- The customer sites are in different IP subnets

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CE Router Configuration – Static Routes


```
CE1(config)#int g0/0
CE1(config-router)#ip address 192.168.0.2 255.255.255.252
CE1(config)#ip route 10.0.2.0 255.255.0.0 192.168.0.1
```

CE Router Configuration - RIP

Customer A-BOS-1

Customer A-NY

CE

Customer A-BOS-2

CE

CE

10.0.1.0/24

192.168.0.2

CE

10.0.2.0/24

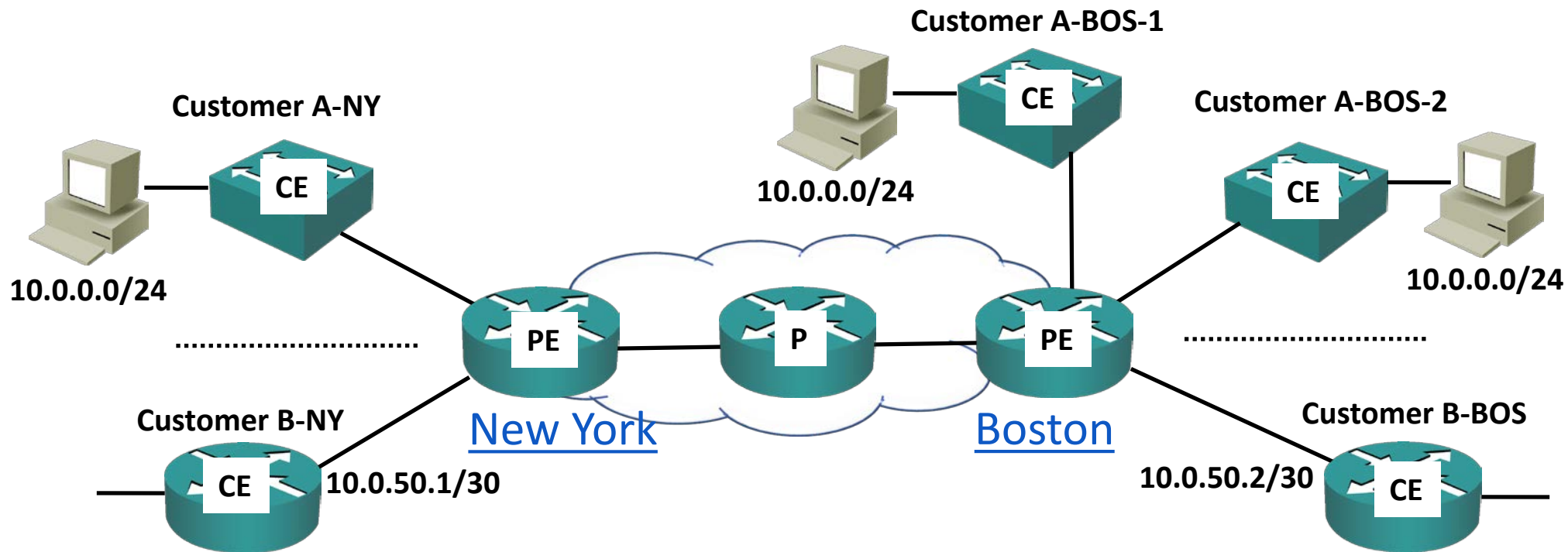10.0.0.0/24

192.168.0.1

PE

P

PE

```
CE1(config)#int g0/0
CE1(config-router)#ip address 192.168.0.2 255.255.255.0
CE1(config)#router rip
CE1(config-router)#version 2
CE1 (config-router)#network 10.0.0.0
CE1 (config-router)#network 192.168.0.0
```

Layer 2 MPLS VPN

- The CE devices do not peer with the PE devices. The entire provider network is transparent to the customer

- The provider network acts like a giant switch

- The customer sites are in the same IP subnet(s)

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Layer 2 MPLS VPN

Customer A-BOS-1

Customer A-NY

CE

10.0.0.0/24

10.0.0.0/24

Customer A-BOS-2

CE

10.0.0.0/24

PE

New York

P

PE

Boston

Customer B-NY

CE   10.0.50.1/30

Customer B-BOS

10.0.50.2/30   CE

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- This may be required for clustering an application over the WAN
- It can also be useful for migrating hosts during Disaster Recovery

Layer 2 MPLS VPN Terminology

- **VPLS (Virtual Private LAN Service):** Multipoint Layer 2 VPN

- **VPWS (Virtual PseudoWire Service):** Point to point Layer 2 VPN