

Layer 2 VPNs

Using MPLS Infrastructure



What Is A VPN?

- **Private Communication over Public Infrastructure**
- **Control over the connectivity**
- **Security (Optional)**



Type of VPNs

- **Overlay VPNs**
- **Peer to Peer VPNs**



Overlay VPNs

- **Provider devices are transparent**
- **Customer Devices are directly connected**
- **Underlying and Overlying Infrastructures**
- **Leased Lines, Frame Relay, ATM etc.**
- **Simple to implement**
- **Sub optimal routing**



Peer to Peer VPNs

- Customer routers peer with Provider routers
- Provider network not transparent
- Provider aware of customer routes
- Optimal routing
- Complicated



Layer 2 vs Layer 3

- Carrying IP traffic vs carrying Ethernet, HDLC, PPP, Frame Relay, ATM etc. traffic
- Layer 2 VPNs will always be overlay
- MPLS supports both



Overview of L2VPNs

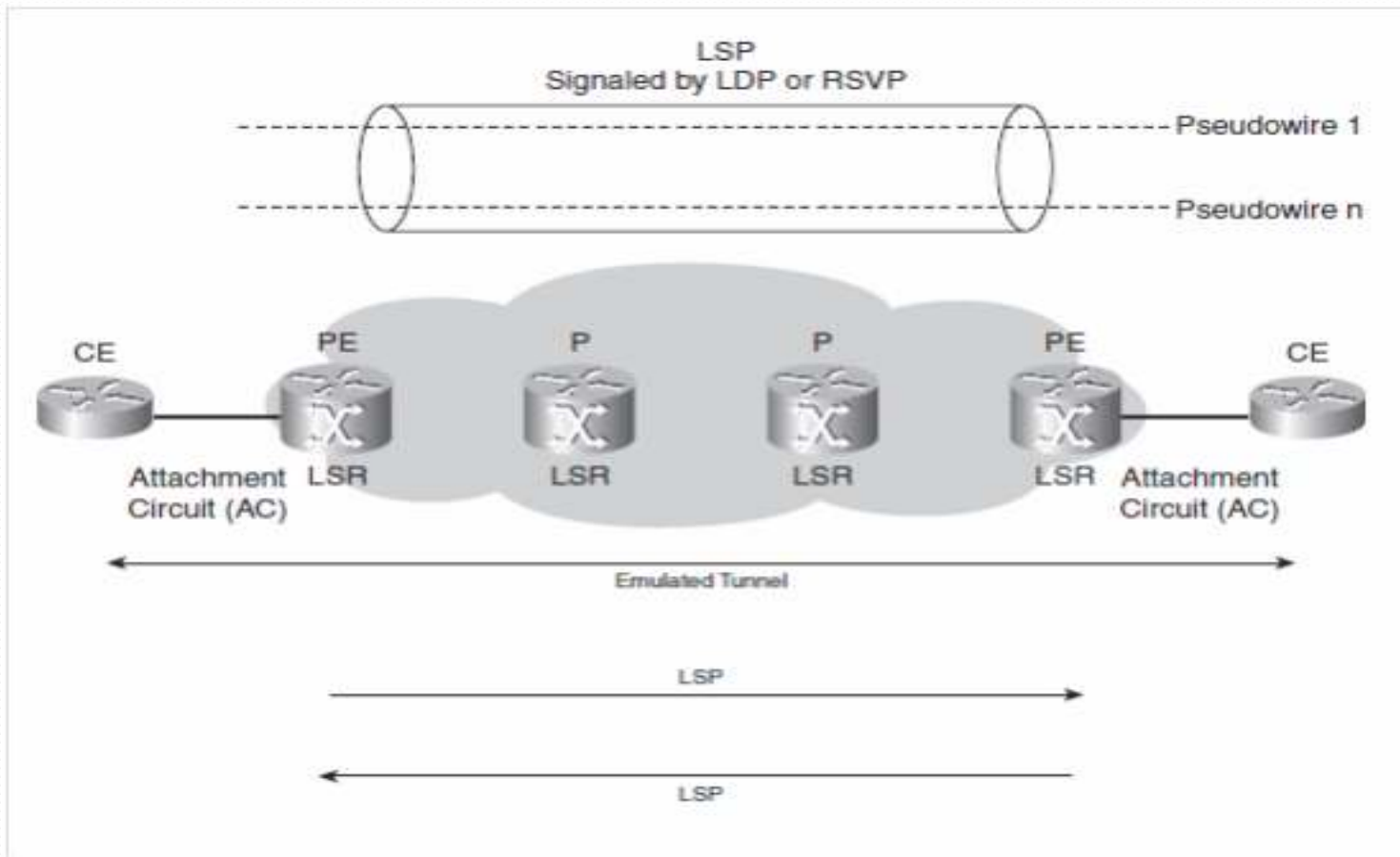
- L2TPv3 or AToM
- L2TPv3 relies on IP infrastructure
- AToM relies on MPLS infrastructure
- Supports carrying Layer 2 frames over IP or MPLS



Need For L2VPNs or AToM

- No need to maintain two separate infrastructures
- Customers with traditional layer 2 connectivity needs
- Cost saving
- Flexibility for SPs

AToM Architecture





Data Plane of AToM

- Attachment Circuit
- Ingress PE
- VC Label
- Tunnel Label
- PHP
- PE-PE tunnel (PSN Tunnel)
- Pseudowire or Virtual Circuit



Signaling The Pseudowire

- **PW ID FEC TLV**
 - C-bit
 - PW type
 - Group ID
 - PW ID
 - Interface Parameters
- **Label TLV**



The Control Word

- Pad small packets
- Carry control bits
- Preserve the sequence of frames
- Load Balancing of AToM packets
- Fragmentation and Reassembly



MPLS MTU Issues

- Labels increase the packet size
- Packet size can go upto 1530 bytes
- Need to change 'mpls mtu'