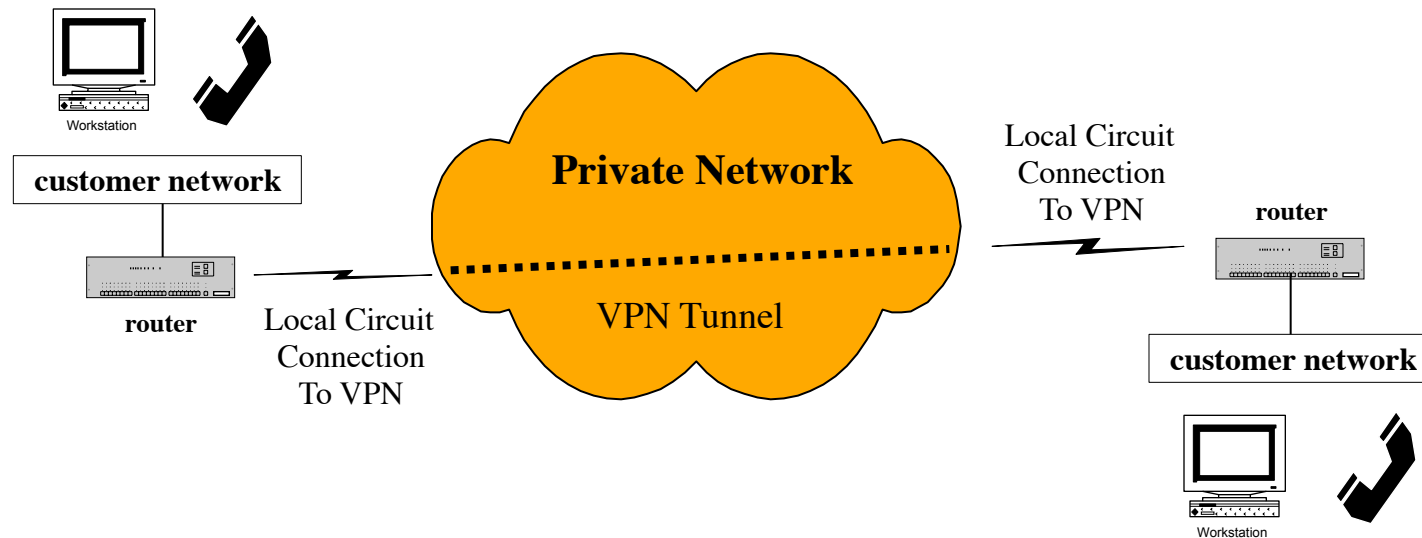


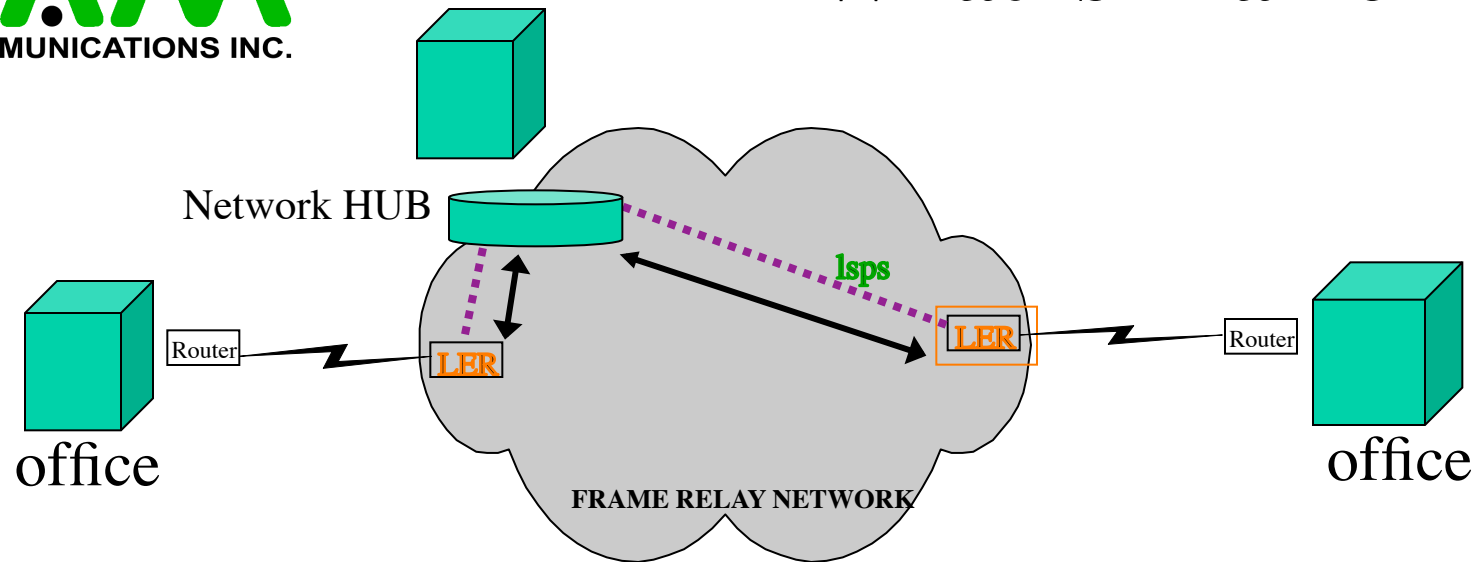
What is a VPN?

A VPN provides a private, end to end, secure connection for sharing data between company locations.



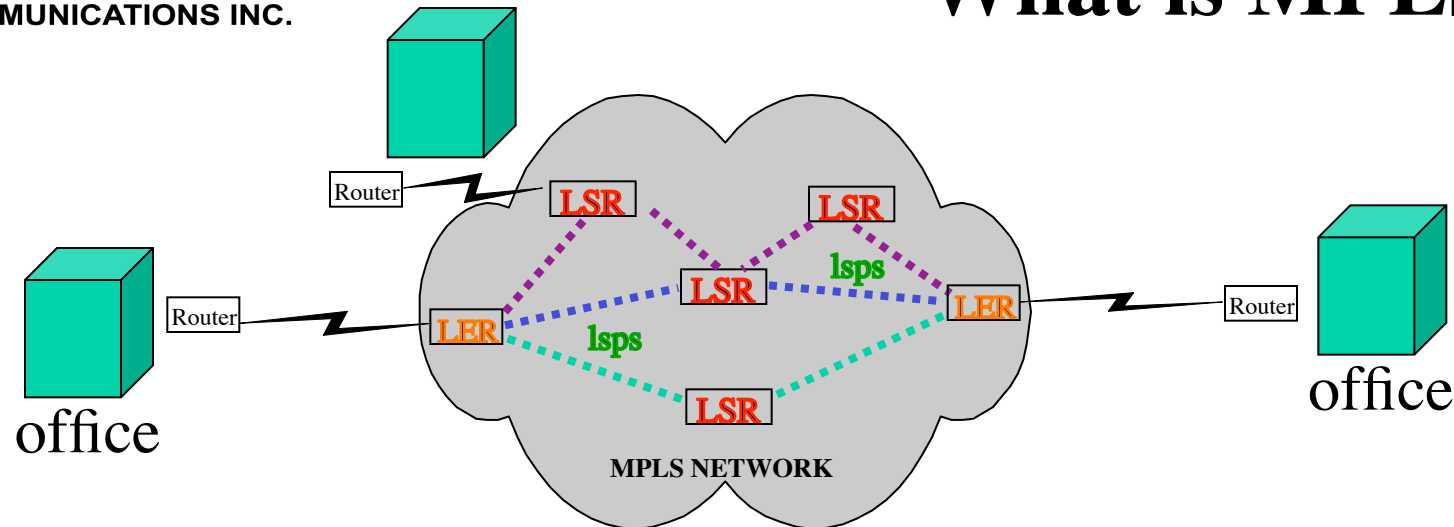
- A VPN is a *Virtual Private Network* that uses a public (internet) or carrier network to connect remote sites & users.
- VPN' s can be programmed privately on existing routers or via a hosted platform.
- Primarily used by business with multiple locations and home-based staffers.
- VPN prevents hackers and other users from accessing your communications.

What is Frame Relay?



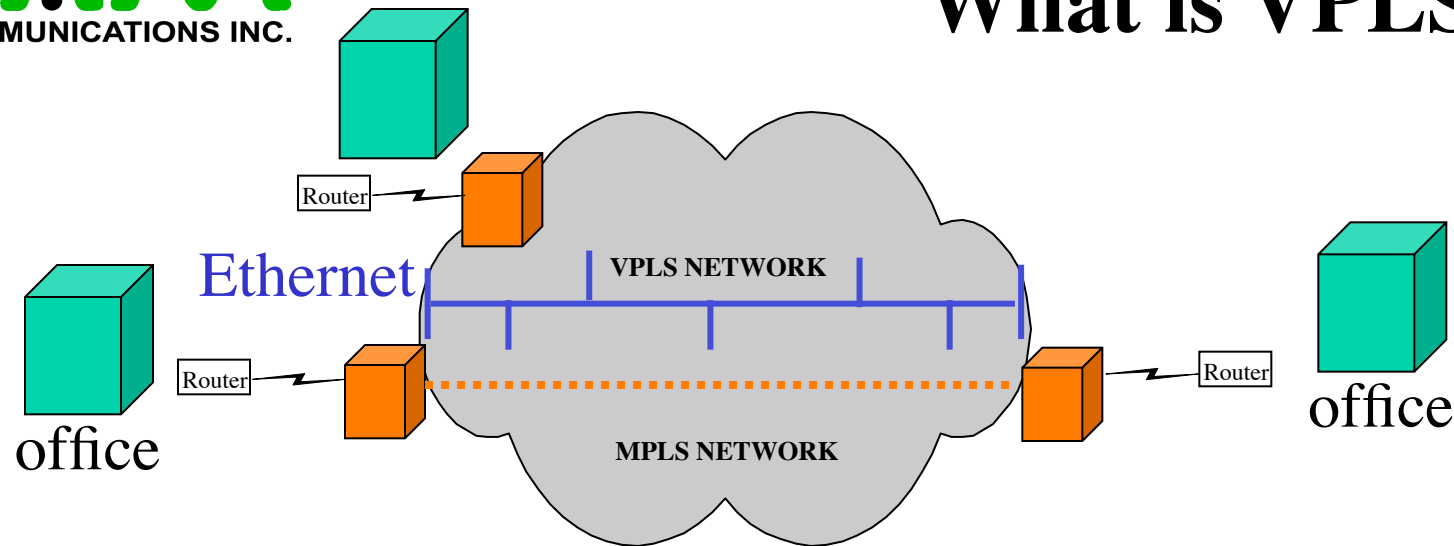
- Frame Relay is a wide area network technology using virtual paths between locations. Frame uses a packet-switched methodology to transfer data on the network.
- Frame Relay limits transmission speeds to a maximum 1.5MB per site
- Frame Relay operators control the amount of data passed from each node using CIR or Committed Information Rate. Once a CIR is assigned to a path it can only be changed via a MAC order with the carrier.
- All routes must come back to the HUB first before data can be sent to other destinations. This 'Hub and Spoke' arrangement can create congestion and bottlenecks during peak hours of usage.
- There's no QoS prioritization. All data including voice, Internet and file sharing, compete to move packets across the network.
- This open 'playing field' can result in packet delay making voice quality very unreliable.

What is MPLS?



- Short for **Multi-Protocol Label Switching**, a switching protocol integrating Layer 2 information about network links (bandwidth, latency, utilization) into Layer 3 (IP) within a particular autonomous system--or ISP--in order to simplify and improve IP-packet exchange.
- MPLS gives network operators a great deal of flexibility to divert and route traffic around link failures, congestion, and bottlenecks.
- From a QoS standpoint, ISPs are better able to manage different kinds of data streams based on priority and service plan.
- When packets enter a MPLS-based network, Label Edge Routers (**LERs**) give them a label (identifier). These labels not only contain information based on the routing table entry (i.e., destination, bandwidth, delay, and other metrics), but also refer to the IP header field (source IP address), Layer 4 socket number information and differentiated service. Once this classification is complete and mapped, different packets are assigned to corresponding Labeled Switch Paths (**LSPs**), where Label Switch Routers (**LSRs**) place outgoing labels on the packets.

What is VPLS?



- **Virtual Private LAN Service**, is a newer network architecture that enables Ethernet-based P2P communications on MPLS. The VPLS layer sits on top of MPLS as a Layer 2 multiport VPN.
- The client installs a router at each site. That router connects to an MPLS router on the network.
- VPLS creates a virtual LAN for the client. All remote locations behave as if they're on the same computer network.
- The MPLS layer only provides transport between sites. The VPN functions are controlled by the client VPLS sitting on top of the MPLS network.
- With the MPLS network in place, clients now have the ability to change VPN programming quickly and easily.
- The client still gets the security, QoS and network support from the carrier.



Why consider VPLS?

Greater Control

IT departments can work more efficiently with ownership to meet business goals
Moves, adds and changes are controlled at the user level NOT the carrier level.
Users can diagnose problems such as traffic congestion at their level from a PC.

Faster Implementation

The Virtual LAN functionality provides faster installation of new sites.
New sites can join the network using any access method (cable, T1, Ethernet without waiting on circuit roll outs from the carrier.

Scalability

Save \$\$\$ on bandwidth now and during expansion phases.
Simplifies network configuration (physical & interface).
Pay as you 'drink' – scalability.
Lower equipment, service and operational costs.