



CHAPTER 1

Implementation Overview

An end-to-end enterprise virtual network infrastructure requires the following primary components:

- Layer 2 (L2) instances on the edge router devices that bind the interface toward an enterprise branch or campus router to the L2 Virtual Private Network (L2VPN).
- Multiprotocol Label Switching (MPLS) for label-based forwarding in the network core so that forwarding does not rely on L2 addresses in the virtual network.

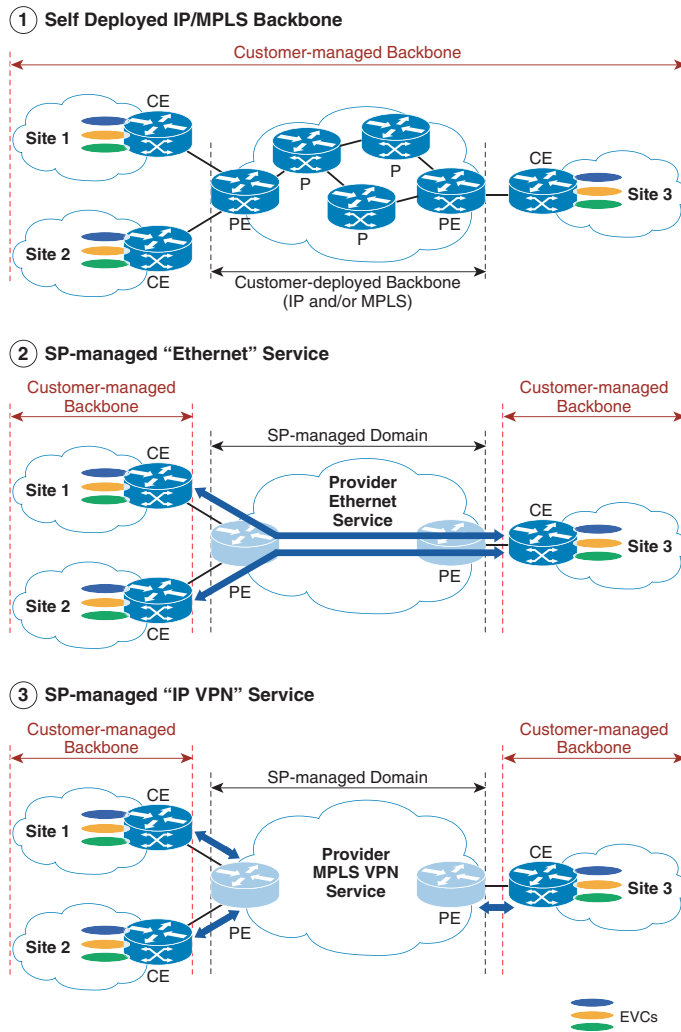
Table 1-1 lists terminology concerned with the MPLS L2VPN architecture.

Table 1-1 Terms used in MPLS L2VPN Architecture

Term	Explanation
Ethernet Virtual Connection (EVC)	This is the logical representation of an Ethernet service, defined as an association between two or more User Network Interfaces (UNIs) that identifies a point-to-point or multipoint-to-multipoint path within the core network.
Ethernet Flow Point (EFP)	An Ethernet service endpoint. An EFP classifies frames from the same physical port to one of the multiple service instances associated with that port, based on user-defined criteria.
Label Distribution Protocol (LDP)	This protocol is used on each link in the MPLS core network to distribute labels associated with prefixes; labels are locally significant to each link.
Provider Router	This type of router, also called a Label Switching Router (LSR), runs an Interior Gateway Protocol (IGP) and Label Distribution Protocol (LDP).
Provider Edge Router	This type of router, also called an edge router, imposes and removes MPLS labels and runs Interior Gateway Protocol (IGP), LDP, L2VPN instances and Multiprotocol Border Gateway Protocol (MP-BGP).
Customer Edge Router	This type of router is the demarcation device in a provider-managed VPN service. It is possible to connect a LAN to the provider edge router directly. If multiple networks exist at a customer location, a customer edge router simplifies the task of connecting the networks to L2VPN.

Figure 1-1 summarizes the three most common options used to virtualize Enterprise L2 WANs.

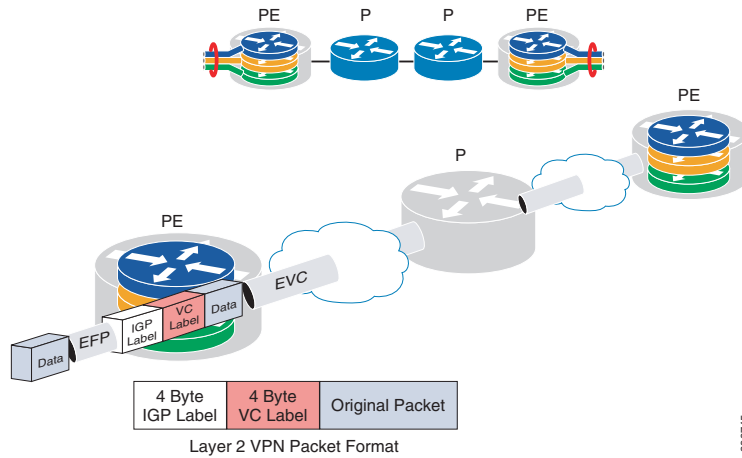
Figure 1-1 Transport Options for L2 WAN Virtualization



This guide focuses on Option 1 in shown in Figure 1, the enterprise owned-and-operated MPLS L2VPN model.

Figure 1-2 shows how the components combine to create an MPLS L2VPN service and support the multiple L2VPNs on the physical infrastructure. In Figure 2, a provider router connects two provider edge routers. The packet flow is from left-to-right.

Figure 1-2 Major MPLS L2VPN Components and Packet Flow



- The provider edge router on the left has three groups each using their own virtual network. Each provider edge router has three L2VPN instances (red, green, and blue); and, each L2 instance is for the exclusive use of one group using a virtual infrastructure.
- When a packet arrives on the provider edge router on the left, it appends two labels to the packet. The BGP or LDP appends the inner (VC) label and its value is constant as the packet traverses the network. The inner label value identifies the L2VPN instance on the egress provider edge so that the L2 frame can be forwarded to the corresponding destination interface. LDP assigns the outer (IGP) label and its value changes as the packet traverses the network to the destination provider edge router.

