# Layer 2 MPLS VPNs

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A **Layer 2 MPLS VPN** is a term in [computer networking](https://en.wikipedia.org/wiki/Computer_networking). It is a method that [Internet service providers](https://en.wikipedia.org/wiki/Internet_service_providers) use to segregate their network for their customers, to allow them to transmit data over an [IP network](https://en.wikipedia.org/wiki/IP_network). This is often sold as a service to businesses.

Layer 2 VPNs are a type of [Virtual Private Network](https://en.wikipedia.org/wiki/Virtual_Private_Network) (VPN) that uses [MPLS](https://en.wikipedia.org/wiki/Multiprotocol_Label_Switching) labels to transport data. The communication occurs between [routers](https://en.wikipedia.org/wiki/Router_(computing)) that are known as *Provider Edge* routers (PEs), as they sit on the edge of the provider's network, next to the customer's network.

Internet providers who have an existing [Layer 2](https://en.wikipedia.org/wiki/Layer_2) network (such as [ATM](https://en.wikipedia.org/wiki/Asynchronous_Transfer_Mode) or [Frame Relay](https://en.wikipedia.org/wiki/Frame_Relay)) may choose to use these VPNs instead of the other common MPLS VPN, [Layer 3](https://en.wikipedia.org/wiki/Network_Layer). There is no one [IETF](https://en.wikipedia.org/wiki/IETF) standard for Layer 2 MPLS VPNs. Instead, two methodologies may be used. Both methods use a standard MPLS header to [encapsulate](https://en.wikipedia.org/wiki/Encapsulation_(networking)) data. However, they differ in their signaling protocols.

## Types of Layer 2 MPLS VPNs

### BGP-based

The BGP-based type is based on a draft specification by [Kireeti Kompella](https://en.wikipedia.org/w/index.php?title=Kireeti_Kompella&action=edit&redlink=1" \o "Kireeti Kompella (page does not exist)), from [Juniper Networks](https://en.wikipedia.org/wiki/Juniper_Networks). It uses the [Border Gateway Protocol](https://en.wikipedia.org/wiki/Border_Gateway_Protocol) (BGP) as the mechanism for PE routers to communicate with each other about their customer connections. Each router connects to a central cloud, using BGP. This means that when new customers are added (usually to new routers), the existing routers will communicate with each other, via BGP, and automatically add the new customers to the service.[[1]](https://en.wikipedia.org/wiki/Layer_2_MPLS_VPN#cite_note-1)

### LDP-based

The second type is based on a draft specification by Chandan Mishra from [Cisco Systems](https://en.wikipedia.org/wiki/Cisco_Systems). This method is also known as a *Layer 2 circuit*. It uses the [Label Distribution Protocol](https://en.wikipedia.org/wiki/Label_Distribution_Protocol) (LDP) to communicate between PE routers. In this case, every LDP-speaking router will exchange FECs (forwarding equivalence classes) and establish [LSPs](https://en.wikipedia.org/wiki/Label-switched_path) with every other LDP-speaking router on the network (or just the other PE router, in the case when LDP is tunnelled over [RSVP-TE](https://en.wikipedia.org/wiki/RSVP-TE)), which differs from the BGP-based methodology. The LDP-based style of layer 2 VPN defines new [TLVs](https://en.wikipedia.org/wiki/Type-length-value) and parameters for LDP to aid in the signaling of the VPNs.[[2]](https://en.wikipedia.org/wiki/Layer_2_MPLS_VPN#cite_note-2)

## Methods used by Vendors

* Alcatel-Lucent: LDP based
* [Foundry Networks](https://en.wikipedia.org/wiki/Foundry_Networks): LDP-based (NetIron XMR Series, NetIron MLX Series)
* [Juniper Networks](https://en.wikipedia.org/wiki/Juniper_Networks): BGP-based (MX/M/T/J-series)
* Juniper Networks: LDP-based (MX/M/T/J/E-series)
* Cisco Systems: LDP-based (IOS)
* Cisco Systems: LDP-based and BGP-based (IOS XR)
* Cisco Systems: LDP-Based [BGP-DISC][[1]](http://www.cisco.com/en/US/docs/ios/12_2sr/12_2srb/feature/guide/fs_vpls.html)
* MRV communications [[2]](http://www.mrv.com/): LDP-based
* [Lucent Technologies](https://en.wikipedia.org/wiki/Lucent_Technologies) (formerly [Riverstone Networks](https://en.wikipedia.org/wiki/Riverstone_Networks" \o "Riverstone Networks)): LDP-based
* [Ericsson](https://en.wikipedia.org/wiki/Ericsson) (formerly [Redback Networks](https://en.wikipedia.org/wiki/Redback_Networks" \o "Redback Networks)): LDP-based
* Huawei Technologies: LDP-based & BGP-based (NE/S-series)
* ZTE:LDP-based & BGP-based(ZXCTN6000/9000 series, ZXR10 series)

## L2VPN Configuration

Below is sample of L2VPN configuration.

Here goes L2VPN config

Here goes L2VPN config

Here goes L2VPN config

Configuration L2VPN Configuration