

## 6PE-6VPE

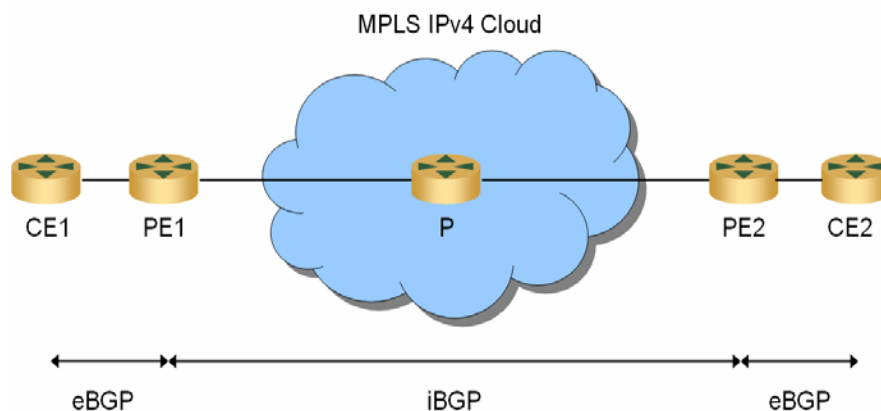
### Overview

To provide IPv6 connectivity over an MPLS core network, the current options available are to either require that IPv6-signalled Label Switch Paths (LSPs) be set up and establish connectivity using them or use configured tunneling over IPv4-signalled LSPs.

An alternative is to use IP Infusion's new ZebOS Network Platform 6PE (IPv6 Provider Edge) module to interconnect IPv6 islands over an IPv4 MPLS cloud. An IPv6 island is any network running native IPv6. An example of such a network is a customer with an IPv6 site connected via an IPv6 Customer Edge (CE) router to one or more dual stack PE routers. The 6PE approach requires that the PE routers be Dual Stack Multiprotocol-BGP (MP-BGP) speaking routers, while core routers only need to be capable of running IPv4 MPLS. Label processing identifies the 6PE routers by their IPv4 addresses using IPv4-signalled MPLS LSPs, and avoids the necessity of explicitly configuring routers for tunneling.

Each customer IPv6 site must connect to at least one PE router that is located at the border of the IPv4 MPLS cloud. The PE router must have at least one IPv4 address on the core side and one IPv6 address on the IPv6 side. As a result, 6PE routers know which MPLS label to use to send packets to any other 6PE router by exchanging reachability information transparently over the core using MP-BGP over IPv4.

The following figure illustrates a simple 6PE example. It shows two CE routers, two PE routers, and one core router (P).



**Example of 6PE Topology**

In the figure, CE1 and CE2 are IPv6 customer edge routers that connect to the IPv6 address side of the provider edge routers (that is, PE1 and PE2). PE1 and PE2 then communicate with the core router (that is, P) in the IPv4 MPLS cloud. To accomplish this configuration, clients must configure egress BGP (eBGP) between the CE and PE routers, and then configure ingress BGP (iBGP) between PE1 and PE2. In the MPLS core, the client can then use any Interior Gateway Protocol (IGP) (such as, IS-IS, RIP or OSPF) to establish the connections between the P router and the PE1 and PE2 routers.

## Features

- 6VPE supports BGP/MPLS-Virtual Private Networks (RFC 4659)
- Physical or logical interfaces between 6PE routers and CE routers
- Provides global IPv6 reachability

## Benefits

- Stable, robust implementation
- Cost-effective means for providers to offer IPv6 services to specific customers
- A means for customers with IPv4 sites to connect to IPv6 providers

## Requirements

- ZebOS Network Services Module
- ZebOS BGP4+

## Standards Support

- RFC 4760 — Multi-protocol Extensions for Border Gateway Protocol (MP-BGP)
- RFC 4798 — Connecting IPv6 Islands over MPLS using IPv6 Provider Edge Routers (6PE)

## Standard Deliverables

- Source code in ANSI-compliant C
- Installation Guide
- Configuration Guide