MPLS VPN 6VPE Support Over IP Tunnels

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This feature allows the use of IPv4 GRE tunnels to provide IPv6 VPN over MPLS functionality to reach the BGP next hop.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see Bug Search Tool and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to www.cisco.com/go/cfn. An account on Cisco.com is not required.

Information About MPLS VPN 6VPE Support Over IP Tunnels

MPLS Forwarding

When it receives IPv6 traffic from one customer site, the ingress PE device uses MPLS to tunnel IPv6 VPN packets over the backbone toward the egress PE device identified as the BGP next hop. The ingress PE device prepends the IPv6 packets with the outer and inner labels before putting the packet on the egress interface.

Under normal operation, a P device along the forwarding path does not look inside the frame beyond the first label. The P device either swaps the incoming label with an outgoing one or removes the incoming label if the next device is a PE device. Removing the incoming label is called penultimate hop popping.

The remaining label (BGP label) is used to identify the egress PE interface toward the customer site. The label also hides the protocol version (IPv6) from the last P device, which it would otherwise need to forward an IPv6 packet.

A P device is ignorant of the IPv6 VPN routes. The IPv6 header remains hidden under one or more MPLS labels. When the P device receives an MPLS-encapsulated IPv6 packet that cannot be delivered, it has two options. If the P device is IPv6 aware, it exposes the IPv6 header, builds an Internet Control Message Protocol (ICMP) for IPv6 message, and sends the message, which is MPLS encapsulated, to the source of the original packet. If the P device is not IPv6 aware, it drops the packet.

6VPE over GRE Tunnels

In some Cisco software releases, the ingress PE device uses IPv4 generic routing encapsulation (GRE) tunnels combined with 6VPE over MPLS to tunnel IPv6 VPN packets over the backbone toward the egress PE device identified as the BGP next hop.

Additional References

Related Documents

Related Topic	Document Title
IPv6 addressing and connectivity	*IPv6 Configuration Guide*
Cisco IOS commands	Master Commands List, All Releases
IPv6 commands	IPv6 Command Reference
Cisco IOS IPv6 features	IPv6 Feature Mapping

Standards and RFCs

Standard/RFC	Title
RFCs for IPv6	IPv6 RFCs

Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	http://www.cisco.com/cisco/web/support/index.html

Feature Information for MPLS VPN 6VPE Support Over IP Tunnels

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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Table 1 Feature Information for MPLS VPN 6VPE Support Over IP Tunnels

Feature Name	Releases	Feature Information
MPLS VPN 6VPE Support Over IP Tunnels	Cisco IOS XE Release 3.1S	This feature allows the use of IPv4 GRE tunnels to provide IPv6 VPN over MPLS functionality to reach the BGP next hop.