VPLS BGP Signaling

The two primary functions of the Virtual Private LAN Service (VPLS) control plane are autodiscovery and signaling. The VPLS BGP Signaling feature enables you to use BGP as both an autodiscovery and a signaling protocol for VPLS, in accordance with RFC 4761.

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Prerequisites for VPLS BGP Signaling

You are familiar with the concepts in the “Configuring Virtual Private LAN Services” and the “VPLS Autodiscovery BGP Based” modules of the .

Information About VPLS BGP Signaling

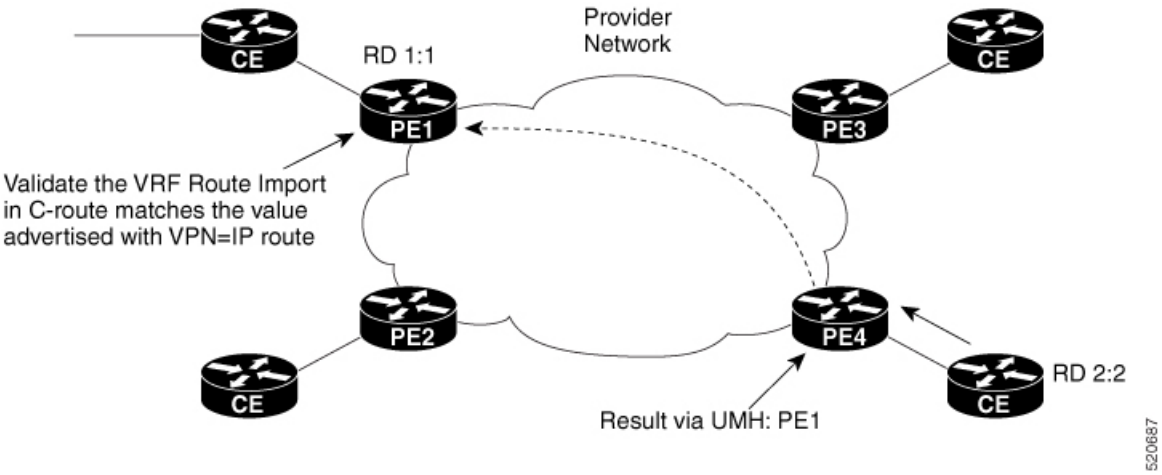
Overview of VPLS BGP Signaling

Prior to the VPLS BGP Signaling feature, BGP was used for autodiscovery and Label Distribution Protocol (LDP) for signaling in accordance with RFC 6074. The VPLS BGP Signaling feature enables you to use BGP as the control plane protocol for both autodiscovery and signaling in accordance with RFC 4761.

As specified in RFC 4761, internal BGP (iBGP) peers will exchange update messages of the L2VPN AFI/SAFI with L2VPN information to perform both autodiscovery and signaling. The BGP multiprotocol Network Layer Reachability Information (NLRI) consists of a Route Distinguisher (RD), VPLS Endpoint ID (VE ID), VE Block Offset (VBO), VE Block Size (VBS), and Label Base (LB).

The figure below shows the format of the NLRI for RFC 4761.

Figure 1: RFC 4761 NLRI



Additional information, such as next-hop, route target (specified for a VPLS instance), and other Layer 2 data are carried in the BGP extended community attributes. A route target-based import/export mechanism similar to L3VPN is performed by BGP to filter L2VPN NLRIs of a particular VPLS instance.

Whether you use BGP signaling (RFC 4761) or LDP signaling (RFC 6074) depends on the commands you specify. To enable the VPLS BGP Signaling feature, use the **autodiscovery bgp signaling bgp** command in L2 VFI configuration mode. This command is supported on a per VPLS instance basis.

If a BGP session receives an invalid (that is, not matching the configuration) BGP update advertisement (update or withdraw), it is ignored.

BGP's main task in supporting VPLS is route distribution via the L2VPN address family and interactions with L2VPN. Interactions between BGP and other components remain the same. Basic BGP functionalities like best-path selection, next-hop handling, and update generation, continue to operate in the same manner with VPLS BGP signaling. BGP RT constraint works seamlessly with the BGP VPLS Signaling feature.

The above example shows sample configuration on one PE. Similar configuration can be mirrored on other PEs.

How to Configure VPLS BGP Signaling

Configuring VPLS BGP Signaling

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **l2vpn vfi context** *name*
4. **vpn id** *vpn-id*
5. **autodiscovery bgp signaling** {**bgp** | **ldp**} [**template** *template-name*]
6. **ve id** *ve-id*
7. **ve range** *ve-range*

8. **exit**
9. **exit**
10. **router bgp** *autonomous-system-number*
11. **bgp graceful-restart**
12. **neighbor** *ip-address* **remote-as** *autonomous-system-number*
13. **address-family l2vpn** [**vpls**]
14. **neighbor** *ip-address* **activate**
15. **neighbor** *ip-address* **send-community** [**both** | **standard** | **extended**]
16. **neighbor** *ip-address* **suppress-signaling-protocol ldp**
17. **end**
18. **show bgp l2vpn vpls** {**all** | **rd** *route-distinguisher*}

DETAILED STEPS

Procedure

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Device# configure terminal`	Enters global configuration mode.
Step 3	**l2vpn vfi context** *name* **Example:** `Device(config)# l2vpn vfi context vfi1`	Establishes a L2VPN virtual forwarding interface (VFI) between two or more separate networks and enters Layer 2 VFI configuration mode.
Step 4	**vpn id** *vpn-id* **Example:** `Device(config-vfi)# vpn id 100`	Configures a VPN ID for the VPLS domain.
Step 5	**autodiscovery bgp signaling** {**bgp**	**ldp**} [**template** *template-name*] **Example:** `Device(config-vfi)# autodiscovery bgp signaling bgp`	Enables BGP signaling and discovery or LDP signaling and enters L2VPN VFI autodiscovery configuration mode. **Note** For the VPLS BGP Signaling feature use the **autodiscovery bgp signaling bgp** command.

	Command or Action	Purpose
Step 6	**ve id** *ve-id* **Example:** `Device(config-vfi-autodiscovery)# ve id 1001`	Specifies the VPLS endpoint (VE) device ID value. The VE ID identifies a VFI within a VPLS service. The VE device ID value is from 1 to 16384.
Step 7	**ve range** *ve-range* **Example:** `Device(config-vfi-autodiscovery)# ve range 12`	Specifies the VE device ID range value. The VE range overrides the minimum size of VE blocks. The default minimum size is 10. Any configured VE range must be higher than 10.
Step 8	**exit** **Example:** `Device(config-vfi-autodiscovery)# exit`	Exits L2VPN VFI autodiscovery configuration mode and enters L2VPN VFI configuration mode.
Step 9	**exit** **Example:** `Device(config-vfi)# exit`	Exits L2VPN VFI configuration mode and enters global configuration mode.
Step 10	**router bgp** *autonomous-system-number* **Example:** `Device(config)# router bgp 100`	Enters router configuration mode to create or configure a BGP routing process.
Step 11	**bgp graceful-restart** **Example:** `Device(config-router)# bgp graceful-restart`	Enables the BGP graceful restart capability and BGP nonstop forwarding (NSF) awareness.
Step 12	**neighbor** *ip-address* **remote-as** *autonomous-system-number* **Example:** `Device(config-router)# neighbor 10.10.10.1 remote-as 100`	Configures peering with a BGP neighbor in the specified autonomous system.
Step 13	**address-family l2vpn** [**vpls**] **Example:** `Device(config-router)# address-family l2vpn vpls`	Specifies the L2VPN address family and enters address family configuration mode. • The optional **vpls** keyword specifies that VPLS endpoint provisioning information is to be distributed to BGP peers. In this example, an L2VPN VPLS address family session is created.

	Command or Action	Purpose
Step 14	**neighbor** *ip-address* **activate** **Example:** `Device(config-router-af)# neighbor 10.10.10.1 activate`	Enables the neighbor to exchange information for the L2VPN VPLS address family with the local device.
Step 15	**neighbor** *ip-address* **send-community** [**both** | **standard** | **extended**] **Example:** `Device(config-router-af)# neighbor 10.10.10.1 send-community extended`	Specifies that a communities attribute should be sent to a BGP neighbor. • In this example, an extended communities attribute is sent to the neighbor at 10.10.10.1.
Step 16	**neighbor** *ip-address* **suppress-signaling-protocol ldp** **Example:** `Device(config-router-af)# neighbor 10.10.10.1 suppress-signaling-protocol ldp`	Suppresses LDP signaling and enables BGP signaling. • In this example LDP signaling is suppressed (and BGP signaling enabled) for the neighbor at 10.10.10.1.
Step 17	**end** **Example:** `Device(config-router-af)# end`	Exits address family configuration mode and returns to privileged EXEC mode.
Step 18	**show bgp l2vpn vpls** {**all** | **rd** *route-distinguisher*} **Example:** `Device# show bgp l2vpn vpls all`	(Optional) Displays information about the L2VPN VPLS address family.

Configuration Examples for VPLS BGP Signaling

Example: Configuring and Verifying VPLS BGP Signaling

```
l2vpn vfi context vfi1
 vpn id 100
 autodiscovery bgp signaling bgp
  ve id 1001
  ve range 10
 !
!
router bgp 100
 bgp graceful-restart
 neighbor 209.165.200.224 remote-as 100
 neighbor 209.165.200.224 update-source Loopback1
 !
 address-family l2vpn vpls
  neighbor 209.165.200.224 activate
```

```
  neighbor 209.165.200.224 send-community extended
  neighbor 209.165.200.224 suppress-signaling-protocol ldp
  exit-address-family
 !
show bgp l2vpn vpls all

Network                          Next Hop            Metric LocPrf Weight Path
Route Distinguisher: 100:100
*>100:100:VEID-1001:Blk-1001/136    0.0.0.0                                32768  ?

*>i 100:100:VEID-1003:Blk-1000/136  209.165.200.224              0      100     0     ?
```

Additional References for VPLS BGP Signaling

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases
BGP commands: complete command syntax, command mode, defaults, command history, usage guidelines, and examples.	Cisco IOS IP Routing: BGP Command Reference
Configuring Virtual Private LAN Services	
Configuring Access Port	Configuring Virtual Private LAN Services,
VPLS Autodiscovery BGP Based	

Standards and RFCs

Standard/RFC	Title
RFC 4761	*Virtual Private LAN Service (VPLS) Using BGP for Auto-Discovery and Signaling*
RFC 6074	*Provisioning, Auto-Discovery, and Signaling in Layer 2 Virtual Private Networks (L2VPNs)*

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 VPLS BGP Signaling

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.

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.

Table 1: Feature Information for VPLS BGP Signaling

Feature Name	Releases	Feature Information
VPLS BGP Signaling		The VPLS BGP Signaling feature enables you to use BGP as both an autodiscovery and signaling protocol for VPLS, in accordance with RFC 4761. The following commands were introduced or modified: **autodiscovery (MPLS)**, **neighbor suppress-signaling-protocol**, **show bgp l2vpn vpls**, and **ve**.