BGP Support for Multiple Sourced Paths Per Redistributed Route

The BGP Support for Multiple Sourced Paths per Redistributed Route feature allows multiple paths with route redistribution or other sourcing mechanisms like the **network** command into BGP. This feature also allows multiple paths from the same source to be imported and exported across virtual routing and forwarding (VRF) instances.

This module provides an overview of the feature and describes how to configure it.

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.

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.

Restrictions for BGP Support for Multiple Sourced Paths Per Redistributed Route

The following restriction apply to this feature:

- Paths that are sourced with 0.0.0.0 as the gateway address will not have multiple paths redistributed into the Border Gateway Protocol (BGP). As a result, every sourced path must have a unique gateway.

- Suppose that for a prefix in the RIB we have a manually configured static route with a tag and a route without a tag inserted through RRI. In such a scenario, the route selection may be inconsistent, and either the manually configured route or the RRI route may be chosen.

  To prevent such an inconsistency, perform one of the following actions:

  - If you are manually configuring static routes to all the peer VPN networks of the router, disable RRI by removing reverse route configuration from the crypto map.

  - Set an identical tag in the crypto map for the route inserted through RRI.

Information About BGP Support for Multiple Sourced Paths Per Redistributed Route

BGP Support for Multiple Sourced Paths Per Redistributed Route Overview

The BGP Support for Multiple Sourced Paths per Redistributed Route feature allows multiple paths with route redistribution or other sourcing mechanisms like the **network** command into the Border Gateway Protocol (BGP). Prior to this feature, BGP accepted only one path from the Routing Information Base (RIB) to create a single BGP-sourced path for a redistributed network; even if the RIB had more than one path for the same network.

This feature also allows multiple paths from the same source to be imported and exported across virtual routing and forwarding (VRF) instances. Import of more than the default path into a VRF instance was already supported in BGP. However, these multiple paths had to be from different neighbors or sources and not from the same source.

By enabling this feature, customers can export Equal Cost Multipath (ECMP) sourced paths or next-hops from one VRF into hundreds of VRFs on the same device using BGP. Each of these paths are installed as multipaths into the RIB, and provides ECMP paths in other VRFs also.

For BGP to accept all the paths or next-hops per route from the redistributing protocol in the RIB, configure the **bgp sourced-paths** command. If you either disable or do not enable this command, BGP allows the import of only one sourced path per network from the RIB.

How to Configure BGP Support for Multiple Sourced Paths Per Redistributed Routes

Configuring Multiple Sourced Paths

When you configure the **bgp sourced-paths** command, the Border Gateway Protocol (BGP) accepts all paths from the Routing Information Base (RIB). When the **bgp sourced-paths** command is removed, the configuration returns to the default behavior of allowing only one sourced path per network from the RIB into BGP.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. **address-family ipv4 vrf** *vrf-name*
5. **bgp sourced-paths per-net static all**
6. **redistribute static**
7. **neighbor** *ip-address* **remote-as** *neighbor-as*
8. **neighbor** *ip-address* **activate**
9. **neighbor** *ip-address* **send-community both**
10. **end**

DETAILED STEPS

	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	**router bgp** *autonomous-system-number* **Example:** Device(config)# router bgp 65000	Configures the BGP routing process and enters the routing configuration mode.
Step 4	**address-family ipv4 vrf** *vrf-name* **Example:** Device(config-router)# address-family ipv4 vrf blue	Enters address family configuration mode to configure a routing session using standard IPv4 address prefixes. **Note** You can also configure the **address-family ipv6** command based on your network configuration.
Step 5	**bgp sourced-paths per-net static all** **Example:** Device(config-router-af)# bgp sourced-paths per-net static all	Allows per network sourcing of all static paths in the RIB.
Step 6	**redistribute static** **Example:** Device(config-router-af)# redistribute static	Redistributes static routes from another routing protocol.
Step 7	**neighbor** *ip-address* **remote-as** *neighbor-as* **Example:** Device(config-router-af)# neighbor 204.0.0.3 remote-as 65000	Adds an entry into the BGP or multiprotocol BGP neighbor table.

	Command or Action	Purpose
Step 8	**neighbor** *ip-address* **activate** **Example:** `Device(config-router-af)# neighbor 204.0.0.3 activate`	Enables the exchange of information with a BGP neighbor.
Step 9	**neighbor** *ip-address* **send-community both** **Example:** `Device(config-router-af)# neighbor 204.0.0.3 send-community both`	Specifies that a communities attribute should be sent to a BGP neighbor.
Step 10	**end** **Example:** `Device(config-router-af)# end`	Exits address family configuration mode and returns to privileged EXEC mode.

Configuration Examples for BGP Multiple Sourced Paths Per Redistributed Route

Example: Configuring Multiple Sourced Paths

Figure 1: Deployment Scenario for BGP Multiple Paths Replication
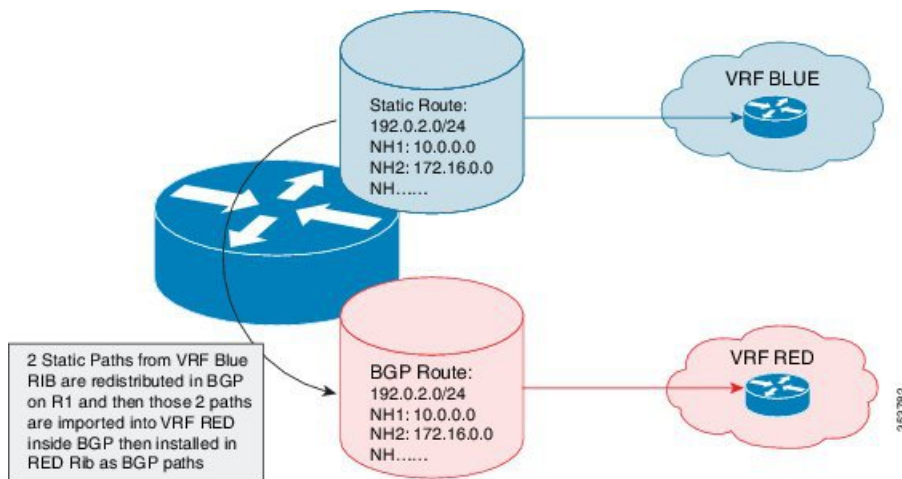
The above figure displays a deployment scenario in which BGP replicates multiple paths from VRF BLUE to VRF RED. VRF RED can import more paths, in addition to the best-path, by using the same route target export in VRF BLUE and VRF RED. This helps multiple paths to get into VRF RED.

```
Device# configure terminal
Device(config)# ip vrf blue
Device(config-vrf)# rd 100:200
```

```
Device(config-vrf)# route-target export 200:200
Device(config-vrf)# route-target import 200:200
Device(config-vrf)# exit

Device(config)# ip vrf red
Device(config-vrf)# rd 200:200
Device(config-vrf)# route-target export 300:200
Device(config-vrf)# route-target import 300:200
Device(config-vrf)# route-target import 200:200
Device(config-vrf)# exit

Device(config)# interface Loopback 0
Device(config-if)# ip address 198.51.100.1 255.255.255.255
Device(config-if)# exit

Device(config)# interface Ethernet 1/0
Device(config-if)# ip address 203.0.113.1 19.0.0.32 255.255.255.255
Device(config-if)# no shutdown
Device(config-if)# exit

Device(config)# interface Ethernet 1/2
Device(config-if)# ip address 209.165.200.225 255.255.255.240
Device(config-if)# no shutdown
Device(config-if)# exit

Device(config)# interface Ethernet 1/2.2
Device(config-subif)# encapsulation dot1Q 2
Device(config-subif)# ip vrf forwarding blue
Device(config-subif)# ip address 192.168.0.1 255.255.255.240
Device(config-subif)# no shutdown
Device(config-subif)# exit

Device(config)# interface Ethernet 1/2.3
Device(config-subif)# encapsulation dot1Q 3
Device(config-subif)# ip vrf forwarding blue
Device(config-subif)# ip address 1922.168.0.17 255.255.255.240
Device(config-subif)# no shutdown
Device(config-subif)# exit

Device(config)# router ospf 2 vrf blue
Device(config-router)# network 192.68.0.0 0.0.0.255 area 0
Device(config-router)# network 192.68.1.16 0.0.0.255 area 0
Device(config-router)# exit
!
Device(config)# router ospf 1
Device(config-router)# network 209.165.200.224 0.0.255.255 area 0
Device(config-router)# exit

Device(config)# router bgp 65000
Device(config-router)# no bgp default ipv4-unicast
Device(config-router)# neighbor 10.0.0.2 remote-as 65000
Device(config-router)# neighbor 10.0.0.2 update-source Loopback0
Device(config-router)# address-family ipv4
Device(config-router-af)# exit-address-family

Device(config-router)# address-family vpnv4
Device(config-router-af)# neighbor 10.0.0.2 activate
Device(config-router-af)# neighbor 10.0.0.2 send-community extended
Device(config-router-af)# exit-address-family

Device(config-router)# address-family ipv4 vrf blue
Device(config-router-af)# bgp sourced-paths per-net static all
```

```
Device(config-router-af)# bgp sourced-paths per-net ospf all
Device(config-router-af)# redistribute static
Device(config-router-af)# redistribute ospf 2
Device(config-router-af)# exit-address-family

Device(config-router)# address-family ipv4 vrf red
Device(config-router-af)# import path selection all
Device(config-router-af)# import path limit 2
Device(config-router-af)# maximum-paths 2
Device(config-router-af)# exit-address-family
Device(config-router)# exit

Device(config)# ip route vrf blue 192.0.2.2 255.255.255.255 10.0.0.2 global
Device(config)# ip route vrf blue 192.0.2.2 255.255.255.255 172.16.0.2 global
Device(config)# end
```

Additional References for BGP Support for Multiple Sourced Paths Per Redistributed Route

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Command List, All Releases
BGP commands	Cisco IOS IP Routing: BGP Command Reference

Technical Assistance

Description	Link
The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies. To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds. Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.	http://www.cisco.com/support

Feature Information for BGP Support for Multiple Sourced Paths Per Redistributed Route

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 BGP Support for Multiple Sourced Paths Per Redistributed Route

Feature Name	Releases	Feature Information
BGP Support for Multiple Sourced Paths Per Redistributed Route	Cisco IOS XE Release 3.15S	The BGP Support for Multiple Sourced Paths per Redistributed Route feature allows multiple paths with route redistribution or other sourcing mechanisms like the **network** command into BGP. This feature also allows multiple paths from the same source to be imported and exported across virtual routing and forwarding (VRF) instances. In Cisco IOS XE Release 3.15S, this feature was introduced on Cisco ASR 1000 Series Aggregation Services Routers. The following command was introduced: **bgp sourced-paths**.