VRF Aware BGP Translate-Update

The VRF aware BGP translate-update feature enables multicast forwarding on those customer-edge (CE) devices, which have an older version of Cisco software that does not support multicast BGP (mBGP) routing.

The provider-edge (PE) devices establish a virtual routing and forwarding (VRF) session with the neighbor CE devices, and configure the translate-update feature under an IPv4/IPv6 VRF address family. The PE devices translate the updates from unicast to multicast on CE devices and put them as multicast updates in the Border Gateway Protocol (BGP) VRF routing table of the PE devices for processing.

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.

Prerequisites for VRF Aware BGP Translate-Update

- The VRF aware translate-update feature applies only to IPv4/IPv6 virtual routing and forwarding (VRF) address-families.

- You must use peer-group for the configuration of the neighbor under IPv4/IPv6 VRF address families.

- BGP neighbors that are only capable of unicast routing, must be activated under both unicast and multicast address families.

- BGP neighbors must also be enabled under the compatible multicast address family for the VRF aware translate-update feature to function as designed.

- The provider-edge (PE) devices must have multicast VRF enabled and must have a session established with the customer-edge (CE) devices.

Restrictions for VRF Aware BGP Translate-Update

- You must not configure (nonVRF) IPv4/IPv6 address families for the VRF aware BGP translate-update feature. The IPv4/IPv6 address family must be configured for multicast routing using the Subsequent Address Family Identifier (SAFI) feature.

- The VRF aware BGP translate-update feature does not support configuration of BGP neighbor using peer-template.

Information About VRF Aware BGP Translate-Update

VRF Aware BGP Translate-Update Overview

The VRF aware BGP translate-update feature enables multicast forwarding on those customer-edge (CE) devices, which have an older version of Cisco software that does not support multicast BGP (mBGP) routing.

This feature is analogous to the Subsequent Address Family Identifier (SAFI), which provides the capability to support multicast routing in the service provider's core IPv4 network, but is limited in support to IPv4/IPv6 address families. In the case of the virtual routing and forwarding (VRF) aware BGP translate-update feature, provider-edge (PE) devices establish a VRF session with the neighbor CE devices, and have the translate-update feature configured under an IPv4/IPv6 VRF address family.

When the **neighbor translate-update** command is configured on a PE device under the (IPv4 VRF) address-family configuration mode or the (IPv6 VRF) address-family configuration mode, the PE devices translate the updates from unicast to multicast on CE devices and put them in the Border Gateway Protocol (BGP) VRF routing table of the PE devices, as multicast updates, for processing. If you also configure the optional keyword **unicast**, the updates that are not translated, are placed in the PE device's unicast queue and populates the unicast VRF BGP table. The translation from unicast to multicast routes occurs from CE devices to PE devices only, and the multicast and unicast prefixes are only advertised from the CE device to the PE device's multicast neighbors.

For example, when you configure the VRF aware BGP translate-update feature under a VRF (v1) for a neighbor CE device (CE1), a neighbor topology under the IPv4-multicast-VRF or IPv6-multicast-VRF address-family is added to CE1's session with a PE device (PE1). The multicast-VRF neighbor topology does not actively participate in these multicast sessions and only forwards announcements that arrive from CE1. Once such announcements arrive, they are translated into multicast and placed in the nonactive multicast VRF neighbor's routing table. The Cisco software ensures that the routes advertised by CE1 configured under the IPv4/IPv6 VRF address-family are available on PE1's IPv4/IPv6 multicast VRF v1 address-family BGP table. These routes, along with PE1's IPv4/IPv6 multicast VRF v1 address-family BGP table, are advertised to PE1's

multicast peers if you have configured the **neighbor translate-update** command . The routes are also advertised to PE1's unicast peers if you have also configured the optional keyword **unicast**.

The **unicast** keyword is optional, yet significant, as it enables the PE devices to place unicast advertisements from the CE devices in the unicast BGP table of the PE devices. Therefore, route advertisements from CE devices populates both unicast and multicast BGP tables, else CE device's routes only populate the PE device's multicast BGP table.

Note   You must also enable address-family under the compatible multicast address-family for VRF aware BGP translate-update feature to function as designed.

How To Configure VRF Aware BGP Translate-Update

Configuring VRF Aware BGP Translate-Update

Perform this task to configure VRF aware BGP translate-update feature:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *as-number*
4. **address-family ipv4** [**mdt** | **tunnel** | {**multicast** | **unicast**} [**vrf** *vrf-name*] | **vrf** *vrf-name*]
5. **neighbor** *peer-group-name* **peer-group**
6. **neighbor** {*ipv4-addr* | *ipv6-addr* | *peer-group-name*} **remote-as** *autonomous-system-number*
7. **neighbor** {*ipv4-addr* | *ipv6-addr*} **peer-group** *peer-group-name*
8. **neighbor** {*ipv4-addr* | *ipv6-addr* | *peer-group-name*} **activate**
9. **neighbor** {*ipv4-address* | *ipv6-address*} **translate-update multicast** [**unicast**]
10. **end**
11. **show bgp vpnv4 multicast** {**all** | **vrf** *vrf-name* | **rd** *route-distinguisher*}
12. **show ip route multicast vrf** *vrf-name*
13. **show running-config**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Device> enable`	Enables privileged EXEC mode. • Enter your password if prompted.

	Command or Action	**Purpose**
Step 2	**configure terminal** **Example:** Device# configure terminal	Enters global configuration mode.
Step 3	**router bgp** *as-number* **Example:** Device(config)# router bgp 65000	Enters router configuration mode and creates a BGP routing process.
Step 4	**address-family ipv4** [**mdt**	**tunnel**	{**multicast**	**unicast**} [**vrf** *vrf-name*]	**vrf** *vrf-name*] **Example:** Device(config)# address-family ipv4 vrf v1	Enters address family configuration mode to configure a routing session using standard IP Version 4 (IPv4) address prefixes.
Step 5	**neighbor** *peer-group-name* **peer-group** **Example:** Device(config-af)# neighbor n2 peer-group	Creates a BGP or multiprotocol BGP peer group.
Step 6	**neighbor** {*ipv4-addr*	*ipv6-addr*	*peer-group-name*} **remote-as** *autonomous-system-number* **Example:** Device(config-af)# neighbor n2 remote-as 4	Adds an entry to the BGP or multiprotocol BGP neighbor table.
Step 7	**neighbor** {*ipv4-addr*	*ipv6-addr*} **peer-group** *peer-group-name* **Example:** Device(config-af)# neighbor 10.1.1.1 peer-group n2	Configures a BGP neighbor to be a member of a peer group.
Step 8	**neighbor** {*ipv4-addr*	*ipv6-addr*	*peer-group-name*} **activate** **Example:** Device(config-af)# neighbor 10.1.1.1 activate	Enables exchange of information with a BGP neighbor.

	Command or Action	Purpose
Step 9	**neighbor** {*ipv4-address* | *ipv6-address*} **translate-update multicast** [**unicast**] **Example:** Device(config-af)# neighbor 10.1.1.1 translate-update multicast unicast	Enables multicast routing on devices, which are not capable of multicast BGP (mBGP) routing.
Step 10	**end** **Example:** Device(config-af)# end	Returns to privileged EXEC mode.
Step 11	**show bgp vpnv4 multicast** {**all** | **vrf** *vrf-name* | **rd** *route-distinguisher*} **Example:** Device# show bgp vpnv4 mul vrf v1 summary	Displays Virtual Private Network Version 4 (VPNv4) multicast entries in a BGP table.
Step 12	**show ip route multicast vrf** *vrf-name* **Example:** Device# show ip route multicast vrf v1	Displays the IP routing table associated with a specific multicast VPN routing and forwarding (VRF) instance.
Step 13	**show running-config** **Example:** Device# show running-config	Displays the running configuration on the device.

Removing the VRF Aware BGP Translate-Update Configuration

Perform this task to disable the VRF aware BGP translate-update feature:

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *as-number*
4. **address-family ipv4** [**mdt** \| **tunnel** \| {**multicast** \| **unicast**} [**vrf** *vrf-name*] \| **vrf** *vrf-name*]
5. **no neighbor** {*ipv4-address* \| *ipv6-address*} **translate-update multicast** [**unicast**]
6. **end**
7. **show running-config**

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** *as-number* **Example:** Device(config)# router bgp 65000	Enters router configuration mode and creates a BGP routing process.
Step 4	**address-family ipv4** [**mdt** | **tunnel** | {**multicast** | **unicast**} [**vrf** *vrf-name*] | **vrf** *vrf-name*] **Example:** Device(config)# address-family ipv4 vrf v1	Enters address family configuration mode to configure a routing session using standard IP Version 4 (IPv4) address prefixes.
Step 5	**no neighbor** {*ipv4-address* | *ipv6-address*} **translate-update multicast** [**unicast**] **Example:** Device(config-af)# no neighbor 10.1.1.1 translate-update multicast unicast	Disables multicast routing on devices, which are not capable of multicast BGP (mBGP) routing.
Step 6	**end** **Example:** Device(config-af)# end	Returns to privileged EXEC mode.
Step 7	**show running-config** **Example:** Device# show running-config	Displays the running configuration on the device.

Configuration Examples for VRF Aware BGP Translate-Update

Example: Configuring VRF aware BGP Translate-Update

The following example shows how to configure the translate-update feature for an IPv4 VRF address-family named v1 and BGP neighbor n2 peer-group for VRF configuration:

Note   Peer-template configuration for BGP neighbor is not supported for this feature due to conflicts with the earlier versions of Cisco software.

```
Device> enable
Device# configure terminal
Device(config)# router bgp 65000
Device(config-router)# address-family ipv4 vrf v1
Device(config-router-af)# neighbor n2 peer-group
Device(config-router-af)# neighbor n2 remote-as 4
Device(config-router-af)# neighbor 10.1.1.1 peer-group n2
Device(config-router-af)# neighbor 10.1.1.1 activate
Device(config-router-af)# neighbor 10.1.1.1 translate-update multicast unicast
Device(config-router-af)# end
```

The following is sample output from the **show bgp vpnv4 multicast vrf** command. As the VRF aware BGP translate-update feature is configured, the state of the neighbor displays "NoNeg":

```
Device# show bgp vpnv4 multicast vrf v1 summary

BGP router identifier 10.1.3.1, local AS number 65000
BGP table version is 8, main routing table version 8
7 network entries using 1792 bytes of memory
8 path entries using 960 bytes of memory
5/3 BGP path/bestpath attribute entries using 1280 bytes of memory
3 BGP AS-PATH entries using 88 bytes of memory
2 BGP extended community entries using 48 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 4168 total bytes of memory
BGP activity 23/2 prefixes, 33/9 paths, scan interval 60 secs

Neighbor        V           AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down  State/PfxRcd
10.1.1.1        4            4       5      10        1    0    0 00:01:10 (NoNeg)

10.1.3.2        4            2      12      10        8    0    0 00:01:33
```

The following is sample output from the **show ip route multicast vrf** command:

Note   The routes configured using the translate-update feature does not have the "+" symbol against the prefixes in the Routing Information Base (RIB) table. Appearance of the symbol in the first entry indicates that the unicast route has leaked into the multicast table. However, the second entry is a translate-update route, which appears to be a multicast route.

```
Device# show ip route multicast vrf v1

B   +    10.1.1.0/24 [20/0] via 10.1.1.1 (v1), 00:00:08
```

```
B        10.1.1.0/24 [20/0] via 10.1.1.1 (v1), 00:00:42
```

The following is sample output from the **show running-config** command:

Note   The provider-edge (PE) device must activate its BGP neighbor under the multicast address-family even though the neighbor is not capable of multicast routing. If the unicast address-family identifier has the route-map configured and multicast address-family identifier has no route-map configured, the unicast route-map controls the route under the unicast table but not the route under multicast table.

```
Device# show running-config

address-family ipv4 vrf v1
redistribute connected
redistribute static
neighbor 10.1.1.1 remote-as 4
neighbor 10.1.1.1 activate
neighbor 10.1.1.1 translate-update multicast unicast
neighbor 10.1.1.1 remote-as 4
neighbor 10.1.1.1 activate
exit-address-family
!
address-family ipv4 multicast vrf v1
redistribute connected
redistribute static
neighbor 10.1.1.1 remote-as 4
neighbor 10.1.1.1 activate
neighbor 10.1.1.1 soft-reconfiguration inbound
neighbor 10.1.1.1 route-map x in
exit-address-family
```

Note   The "neighbor 10.1.1.1 soft-reconfiguration inbound" and the " neighbor 10.1.1.1 route-map x in" field in the output indicate that only the routes in the BGP multicast table are affected.

The following is sample output from the **show running-config** command when you configure a neighbor under different address-families:

Note   Configuring the BGP neighbor under different address-families manipulates the unicast routes and multicast routes advertised to the neighbor.

Configuration for IPv4/IPv6 unicast address-family:

```
Device# show running-config

address-family ipv4
neighbor 20.2.2.1 activate
neighbor 20.2.2.1 translate-update multicast unicast
exit-address-family
!
address-family ipv4 multicast
neighbor 20.2.2.1 activate
exit-address-family
!
```
Configuration for IPv4/IPv6 VRF unicast address-family:

```
Device# show running-config
```

```
address-family ipv4 vrf v1
neighbor 20.2.2.1 remote-as 4
neighbor 20.2.2.1 activate
neighbor 20.2.2.1 translate-update multicast unicast
exit-address-family
!
address-family ipv4 multicast vrf v1
neighbor 20.2.2.1 remote-as 4
neighbor 20.2.2.1 activate
exit-address-family
!
```

The following is sample configuration of the translate-update feature from a device with the old version of Cisco Software. The neighbor, in this case, is configured for IPv4/IPv6 unicast address-family, without running the **address-family** command:

Configuration in the old format, without an address-family configured:

```
Device> enable
Device# configure terminal
Device(config)# router bgp 65000
Device(config-router)# neighbor 20.2.2.1 remote-as 4
Device(config-router)# neighbor 20.2.2.1 translate-update nlri ipv4 multicast unicast
Device(config-router-af)# end
```

Configuration in the new format, without an address-family configured:

```
Device> enable
Device# configure terminal
Device(config)# router bgp 65000
Device(config-router)# neighbor 20.2.2.1 remote-as 4
Device(config-router)# neighbor 20.2.2.1 translate-update nlri multicast unicast
Device(config-router-af)# end
```

Example: Removing VRF aware BGP Translate-Update Configuration

The following example shows how to disable the VRF aware BGP translate-update feature for an IPv4 VRF address-family named v1 and BGP neighbor n2 peer-group for VRF:

Note   Disabling the translate-update configuration for a neighbor deletes the pseudo multicast neighbor and flaps the session, similar to removing the neighbor from a multicast session:

```
Device> enable
Device# configure terminal
Device(config)# router bgp 65000
Device(config-router)# address-family ipv4 vrf v1
Device(config-router-af)# no neighbor 10.1.1.1 translate-update multicast unicast
Device(config-router-af)# end
```

The following output displays the debug logs after you disable the translate-update feature on the neighbor:

```
*Nov 20 07:09:15.902: %BGP_SESSION-5-ADJCHANGE:
neighbor 2.2.2.1 IPv4 Multicast vpn vrf v1 topology base removed from session  Neighbor
deleted
*Nov 20 07:09:15.902: %BGP-5-ADJCHANGE:
neighbor 2.2.2.1 vpn vrf v1 Down Neighbor deleted
*Nov 20 07:09:15.902: %BGP_SESSION-5-ADJCHANGE:
neighbor 2.2.2.1 IPv4 Unicast vpn vrf v1 topology base removed from session  Neighbor deleted
*Nov 20 07:09:16.877: %BGP-5-ADJCHANGE:
neighbor 2.2.2.1 vpn vrf v1 Up
```

The following is sample output from the **show running-config** command:

Note   The associated neighbor 10.1.1.1 is removed even from the nonvolatile generation (NVGEN) after translate-update is disabled on that neighbor.

```
Device# show running-config

address-family ipv4 vrf v1
redistribute connected
redistribute static
neighbor 10.1.1.1 remote-as 4
neighbor 10.1.1.1 activate
exit-address-family
!
address-family ipv4 multicast vrf v1
redistribute connected
redistribute static
exit-address-family
```

Additional References for VRF Aware BGP Translate-Update

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 VRF Aware BGP Translate-Update

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 VRF Aware BGP Translate-Update

Feature Name	Releases	Feature Information
VRF aware BGP Translate-Update	15.4(1)S	The VRF aware BGP translate-update feature enables multicast forwarding on those customer-edge (CE) devices, which have an older version of Cisco software that does not support multicast BGP (mBGP) routing. The following command was introduced: **neighbor translate-update**