



BGP-RTC for Legacy PE

The BGP-Route Target Constrain (RTC) for Legacy PE feature helps to prevent the propagation of VPN Network Layer Reachability Information (NLRI) to a provider edge (PE) device that is not interested in the VPN. This feature builds an outbound filter used by a Border Gateway Protocol (BGP) speaker to decide which routes to pass to its peer and propagates route target (RT) reachability information between internal BGP (iBGP) meshes.

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Prerequisites for BGP-RTC for Legacy PE

Before you configure the BGP-RTC for Legacy PE feature, you must configure the RT filter unicast address family type. For more information, see "Configuring BGP: RT Constrained Route Distribution" module in the *IP Routing: BGP Configuration Guide*.

Information About BGP-RTC for Legacy PE

Overview of BGP-RTC for Legacy PE

The BGP—RTC for Legacy PE feature makes use of VPN unicast route exchange from the legacy provider edge (PE) devices to a new Border Gateway Protocol (BGP) speaker (route reflector [RR]) to signal route target (RT) membership. The legacy PEs announce a set of special routes with mapped RTs to the RR along with a standard community. The presence of the community triggers the RR to extract the RTs and build RT membership information.

In scenarios where VPN membership is normal, this functionality helps reduce the scaling requirements on the PE devices and the RRs. The PE devices need not to spend resources for filtering out unwanted routes. The BGP peers that have common outbound policies are grouped under a single format group. Separate replication groups are used within a format group to separate BGP peers with its own peer-based policies. The Route Target Constrain (RTC)-capable peers are placed in separate format groups. Each RTC peers have

a separate replication group. When legacy RT is configured for a peer, then it must be treated the same way as the RTC peer except that there is no capability negotiation.

Legacy PE Support-PE Behavior

Each legacy Route Target Constrain (RTC) speaking neighbor is assigned a separate replication group. BGP checks the VPN table for any route with a reserved community value and uses it to create RTC network from the VPN prefix received from a legacy RTC peer with community values. The PE device uses the existing VPN advertisement mechanism to convey route target (RT) membership from the legacy provider edge (PE) devices. The route reflector (RR) processes advertisement mechanisms of RT membership information from legacy PE devices. RRs translate the legacy PE RT membership information to equivalent RTC Network Layer Reachability Information (NLRIs) to propagate to other RRs.

Legacy PE Support-RR Behavior

Route reflectors (RR) identify routes from legacy provider edge (PE) devices for retrieving route target (RT) membership information by the community value and filter VPN routes to legacy PE devices. RRs use the existing VPN advertisement mechanism to convey and process RT membership from the legacy PEs. The legacy PE RT membership information is translated into equivalent RT membership Network Layer Reachability Information (NLRI) from the client to propagate to other RRs. The RR then creates the route target filter list for each legacy client by collecting the entire set of route targets.

How to Configure BGP-RTC for Legacy PE

Configuring BGP-RTC for Legacy PE

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp *as-number***
4. **address-family {*vpn4* | *vpn6* } unicast**
5. **neighbor {*ip-address* | *peer-group-name* | *ipv6-address*} accept-route-legacy-rt**
6. **address-family *rtfilter***
7. **end**
8. **show ip bgp *vpn4* all update-group *update-group***
9. **show ip bgp *vpn4* all neighbors {*ip-address* | *ipv6-address*}**
10. **show ip bgp *vpn4* all peer-group**
11. **debug ip bgp all updates in**

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	router bgp <i>as-number</i> Example: Device(config)# router bgp 1	Configures a Boarder Gateway Protocol (BGP) routing process and enters router configuration mode.
Step 4	address-family {vpnv4 vpnv6 } unicast Example: Device(config-router)# address-family vpnv4 unicast	Specifies the VPNv4 or VPNv6 address family and enters address family configuration mode.
Step 5	neighbor {<i>ip-address</i> <i>peer-group-name</i> <i>ipv6-address</i>} accept-route-legacy-rt Example: Device(config-router-af)# neighbor 10.0.0.1 accept-route-legacy-rt	Configures the neighbor on the route reflector (RR) to treat the provider edge (PE) device as a legacy PE for the route target (RT) and accepts VPN routes tagged with the special community.
Step 6	address-family rtfiler Example: Device(config-router-af)# address-family rtfiler	Specifies the RT filter address family type.
Step 7	end Example: Device(config-router-af)# end	Exits address family configuration mode and returns to privileged EXEC mode.
Step 8	show ip bgp vpnv4 all update-group <i>update-group</i> Example: Device# show ip bgp vpnv4 all update-group 2	(Optional) Displays the information about neighbors in the update group.
Step 9	show ip bgp vpnv4 all neighbors {<i>ip-address</i> <i>ipv6-address</i>} Example: Device# show ip bgp vpnv4 all neighbors 192.168.3.3	(Optional) Displays information about the BGP VPNv4 neighbor.

	Command or Action	Purpose
Step 10	show ip bgp vpnv4 all peer-group Example: Device# show ip bgp vpnv4 all peer-group	(Optional) Displays information about the peer groups.
Step 11	debug ip bgp all updates in Example: Device# debug ip bgp all updates in	(Optional) Displays BGP update messages.

Configuration Examples for BGP-RTC for Legacy PE

Example: BGP-RTC for Legacy PE

Configuration on the Route Reflector

The following example shows how to configure the neighbor on the route reflector (RR) to treat the provider edge (PE) device as a legacy PE for the route target (RT) and accept VPN routes tagged with the special community:

```
Device# configure terminal
Device(config)# router bgp 1
Device(config-router)# address-family vpnv4 unicast
Device(config-router-af)# neighbor 10.1.1.1 accept-route-legacy-rt
Device(config-router-af)# address-family rtfilter
Device(config-router-af)# exit address-family
```

Configuration on the Legacy PE

The following example shows how to create a route filter VRF and attach an export map that collects and carries all RTs locally configured on Layer 3 VPN virtual routing and forwarding (VRF):

```
ip vrf route-filter
rd 55:1111
export map SET_RT

route-map SET_RT permit 10
match ip address prefix-list RT_NET1
set community 4294901762 (0xFFFF0002)
set extcommunity rt 255.220.0.0:12241 255.220.0.0:12242 additive
set extcommunity rt 255.220.0.0:12243 255.220.0.0:12244 additive
set extcommunity rt 255.220.0.0:12245 255.220.0.0:12246 additive
set extcommunity rt 255.220.0.0:12247 255.220.0.0:12248 additive
set extcommunity rt 255.220.0.0:12249 255.220.0.0:12250 additive
!
route-map SET_RT permit 20
match ip address prefix-list RT_NET2
set community 4294901762 (0xFFFF0002)
set extcommunity rt 255.220.0.0:12251 255.220.0.0:12252 additive
set extcommunity rt 255.220.0.0:12253 255.220.0.0:12254 additive
set extcommunity rt 255.220.0.0:12255 additive
!

ip route vrf route-filter 5.5.5.5 255.255.255.255 Null0 - (matching prefix-set RT_NET1)
```

```
ip route vrf route-filter 6.6.6.6 255.255.255.255 Null0 -(matching prefix-set RT_NET2)

route-map LEG_PE permit 10
 match ip address prefix-list RT_NET1 RT_NET2
 set community no-advertise additive
```

The following example shows how to apply the route map to a VPNv4 neighbor:

```
router bgp 55
 address-family vpnv4 unicast
 neighbor x.x.x.x route-map LEG_PE out
```

The following example shows how to source a static route into a Border Gateway Protocol (BGP) network using a network statement:

```
router bgp 55
 address-family ipv4 vrf route-filter
 network 5.5.5.5 mask 255.255.255.255
 network 6.6.6.6 mask 255.255.255.255
```

Additional References for BGP-RTC for Legacy PE

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
Configuring BGP: RT Constrained Route Distribution	"Configuring BGP: RT Constrained Route Distribution" module in the <i>IP Routing: BGP Configuration Guide</i>

Standards and RFCs

Standard/RFC	Title
RFC 4684	<i>Constrained Route Distribution for Border Gateway Protocol/MultiProtocol Label Switching (BGP/MPLS) Internet Protocol (IP) Virtual Private Networks (VPNs)</i>

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-RTC for Legacy PE

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 BGP-RTC for Legacy PE

Feature Name	Releases	Feature Information
BGP-RTC for Legacy PE		The BGP-RTC for Legacy PE feature helps to prevent the propagation of VPN Network Layer Reachability Information (NLRI) to a provider edge (PE) device that is not interested in the VPN. This feature builds an outbound filter used by a Border Gateway Protocol (BGP) speaker to decide which routes to pass to its peer and propagates route target (RT) reachability information between internal BGP (iBGP) meshes. The neighbor accept-route-legacy-rt command was introduced.