BGP Next Hop Unchanged

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In an external BGP (eBGP) session, by default, the router changes the next hop attribute of a BGP route (to its own address) when the router sends out a route. The BGP Next Hop Unchanged feature allows BGP to send an update to an eBGP multihop peer with the next hop attribute unchanged.

Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see 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 document.

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 Next Hop Unchanged

BGP Next Hop Unchanged

In an external BGP (eBGP) session, by default, the router changes the next hop attribute of a BGP route (to its own address) when the router sends out a route. If the BGP Next Hop Unchanged feature is configured, BGP will send routes to an eBGP multihop peer without modifying the next hop attribute. The next hop attribute is unchanged.

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Note There is an exception to the default behavior of the router changing the next hop attribute of a BGP route when the router sends out a route. When the next hop is in the same subnet as the peering address of the eBGP peer, the next hop is not modified. This is referred to as third party next-hop.

The BGP Next Hop Unchanged feature provides flexibility when designing and migrating networks. It can be used only between eBGP peers configured as multihop. It can be used in a variety of scenarios between two autonomous systems. One scenario is when multiple autonomous systems are connected that share the same IGP, or at least the routers have another way to reach each other's next hops (which is why the next hop can remain unchanged).

A common use of this feature is to configure Multiprotocol Label Switching (MPLS) inter-AS with multihop MP-eBGP for VPNv4 between RRs.

Another common use of this feature is a VPNv4 inter-AS Option C configuration, as defined in RFC4364, Section 10. In this configuration, VPNv4 routes are passed among autonomous systems between RR of different autonomous systems. The RRs are several hops apart, and have **neighbor next-hop unchanged** configured. PEs of different autonomous systems establish an LSP between them (via a common IGP or by advertising the next-hops--that lead to the PEs--via labeled routes among the ASBRs--routes from different autonomous systems separated by one hop). PEs are able to reach the next hops of the PEs in another AS via the LSPs, and can therefore install the VPNv4 routes in the VRF RIB.

Restriction

The BGP Next Hop Unchanged feature can be configured only between multihop eBGP peers. The following error message will be displayed if you try to configure this feature for a directly connected neighbor:

```
%BGP: Can propagate the nexthop only to multi-hop EBGP neighbor
```

How to Configure BGP Next Hop Unchanged

Configuring the BGP Next Hop Unchanged for an eBGP Peer

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *as-number*
4. **address-family** {**ipv4** [**unicast**]| **vpnv4** [**unicast**]}
5. **neighbor** *ip-address* **remote-as** *as-number*
6. **neighbor** *ip-address* **activate**
7. **neighbor** *ip-address* **ebgp-multihop** *ttl*
8. **neighbor** *ip-address* **next-hop-unchanged**
9. **end**
10. **show ip bgp**

DETAILED STEPS

	Command or Action	Purpose
Step 1	**enable** **Example:** `Router> enable`	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	**configure terminal** **Example:** `Router# configure terminal`	Enters global configuration mode.
Step 3	**router bgp** *as-number* **Example:** `Router(config)# router bgp 65535`	Enters router configuration mode, and creates a BGP routing process.
Step 4	**address-family** {**ipv4** [**unicast**]| **vpnv4** [**unicast**]} **Example:** `Router(config-router-af)# address-family vpnv4`	Enters address family configuration mode to configure BGP peers to accept address family specific configurations.

	Command or Action	Purpose
Step 5	**neighbor** *ip-address* **remote-as** *as-number* **Example:** `Router(config-router-af)# neighbor 10.0.0.100 remote-as 65600`	Adds an entry to the BGP neighbor table.
Step 6	**neighbor** *ip-address* **activate** **Example:** `Router(config-router-af)# neighbor 10.0.0.100 activate`	Enables the exchange of information with the peer.
Step 7	**neighbor** *ip-address* **ebgp-multihop** *ttl* **Example:** `Router(config-router-af)# neighbor 10.0.0.100 ebgp-multihop 255`	Configures the local router to accept and initiate connections to external peers that reside on networks that are not directly connected.
Step 8	**neighbor** *ip-address* **next-hop-unchanged** **Example:** `Router(config-router-af)# neighbor 10.0.0.100 next-hop-unchanged`	Configures the router to send BGP updates to the specified eBGP peer without modifying the next hop attribute.
Step 9	**end** **Example:** `Router(config-router-af)# end`	Exits address family configuration mode, and enters privileged EXEC mode.
Step 10	**show ip bgp** **Example:** `Router# show ip bgp`	(Optional) Displays entries in the BGP routing table. • The output will indicate if the **neighbor next-hop-unchanged** command has been configured for the selected address.

Configuration Example for BGP Next Hop Unchanged

Example BGP Next Hop Unchanged for an eBGP Peer

The following example configures a multihop eBGP peer at 10.0.0.100 in a remote AS. When the local router sends updates to that peer, it will send them without modifying the next hop attribute.

```
router bgp 65535
 address-family ipv4
 neighbor 10.0.0.100 remote-as 65600
 neighbor 10.0.0.100 activate
 neighbor 10.0.0.100 ebgp-multihop 255
 neighbor 10.0.0.100 next-hop-unchanged
 end
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
BGP commands	*Cisco IOS IP Routing: BGP Command Reference*
BGP configuration tasks	*IP Routing: BGP Configuration Guide*
MPLS configuration tasks	*MPLS Configuration Guide*
BGP Outbound Route Map on Route Reflector to Set IP Next Hop for iBGP Peer	"Configuring Internal BGP Features"

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 BGP Next Hop Unchanged

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 Next Hop Unchanged*

Feature Name	Releases	Feature Information
BGP Next Hop Unchanged	Cisco IOS XE Release 2.1	The BGP Next Hop Unchanged feature allows BGP to send an update to an eBGP multihop peer with the next hop attribute unchanged. The following command was added by this feature: **neighbor next-hop-unchanged**.