

Configuring 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. The BGP Next Hop Unchanged feature allows BGP to send an update to an eBGP multihop peer with the next hop attribute unchanged.

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Restrictions for BGP Next Hop Unchanged

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

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.



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.

How to Configure BGP Next Hop Unchanged

The following procedures contain the steps of how to configure BGP next hop unchanged.

Configuring the BGP Next Hop Unchanged for an eBGP Peer

Procedure

	Command or Action	Purpose	
Step 1	enable	Enables privileged EXEC mode.	
	Example:	Enter your password if prompted.	
	Device> enable		
Step 2	configure terminal	Enters global configuration mode.	
	Example:		
	Device# configure terminal		
Step 3	router bgp as-number	Enters router configuration mode, and creates a BGP routing process.	
	Example:		
	Device(config)# router bgp 65535		
Step 4	address-family {ipv4 ipv6 l2vpn nsap rtfilter vpnv4 vpnv6}	Enters address family configuration mode to configure BGP peers to accept address family specific configurations.	
	Example:		
	Device(config-router-af)# address-family vpnv4		
Step 5	neighbor {ip-address ipv6-address peer-group-name} remote-as as-number	Adds an entry to the BGP neighbor table.	
	Example:		

	Command or Action	Purpose	
	Device(config-router-af)# neighbor 10.0.0.100 remote-as 65600		
Step 6	neighbor {ip-address ipv6-address peer-group-name} activate	Enables the exchange of information with the peer.	
	Example:		
	Device(config-router-af)# neighbor 10.0.0.100 activate		
Step 7	neighbor {ip-address ipv6-address	Configures the local router to accept and	
	peer-group-name} ebgp-multihop ttl	initiate connections to external peers that reside on networks that are not directly connected.	
	Example:		
	Device(config-router-af)# neighbor 10.0.0.100 ebgp-multihop 255		
Step 8	neighbor {ip-address ipv6-address	Configures the router to send BGP updates to	
	peer-group-name} next-hop-unchanged	the specified eBGP peer without modifying the next hop attribute.	
	Example:	the next nop attribute.	
	Device(config-router-af)# neighbor 10.0.0.100 next-hop-unchanged		
Step 9	end	Exits address family configuration mode, and	
	Example:	enters privileged EXEC mode.	
	Device(config-router-af)# end		
Step 10	show ip bgp	(Optional) Displays entries in the BGP routing	
	Example:	table.	
		The output will indicate if the neighbor	
	Device# show ip bgp	next-hop-unchanged command has been configured for the selected address.	

Configuring BGP Next Hop Unchanged using Route-Maps

Configuring outbound route-map for eBGP neighbor

To define the route-map and apply outbound policy for neighbor, use set ip next-hop unchanged command.

In the following configuration the next-hop for prefix 1.1.1.1 is not changed while sending to the eBGP neighbor 15.1.1.2:

```
enable
config terminal
router bgp 2
bgp log-neighbor-changes
neighbor 15.1.1.2 remote-as 3
```

```
neighbor 15.1.1.2 ebgp-multihop 10
!
address-family ipv4
neighbor 15.1.1.2 activate
neighbor 15.1.1.2 route-map A out
exit address-family
!
route-map A permit 10
match ip address 1
set ip next-hop unchanged
!
access-list 1 permit 1.1.1.1
end
```

Configuring next-hop unchanged for both iBGP and eBGP path prefixes while sending to eBGP neighbor

To configure next-hop unchanged for both iBGP and eBGP path prefixes while sending to eBGP neighbor, use **next-hop-unchanged allpaths** command.

In the following configuration the next-hop is not changed for both iBGP and eBGP path prefixes while sending to eBGP neighbor 15.1.1.2:

```
enable
config terminal
router bgp 2
bgp log-neighbor-changes
neighbor 15.1.1.2 remote-as 3
neighbor 15.1.1.2 ebgp-multihop 10
!
address-family ipv4
neighbor 15.1.1.2 activate
neighbor 15.1.1.2 next-hop-unchanged allpaths
exit address-family
!
end
```

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
```



Note

All address families, such as IPv4, IPv6, VPNv4, VPNv6, L2VPN, and so on support the **next-hop unchanged** command. However, for the address family L2VPN BGP VPLS signaling, you must use the **next-hop self** command for its proper functioning.

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 Gibraltar 16.11.1	The BGP Next Hop Unchanged feature allows BGP to send an update to an eBGP multihop peer with the next hop attribute unchanged.

Feature Information for BGP Next Hop Unchanged