



## 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
<b>Step 1</b>	<b>enable</b>  <b>Example:</b>  Device> <b>enable</b>	Enables privileged EXEC mode.  Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b>  Device# <b>configure terminal</b>	Enters global configuration mode.
<b>Step 3</b>	<b>router bgp</b> <i>as-number</i>  <b>Example:</b>  Device(config)# <b>router bgp</b> 65535	Enters router configuration mode, and creates a BGP routing process.
<b>Step 4</b>	<b>address-family</b> { <i>ipv4</i>   <i>ipv6</i>   <i>l2vpn</i>   <i>nsap</i>   <i>rtfilter</i>   <i>vpn4</i>   <i>vpn6</i> }  <b>Example:</b>  Device(config-router-af)# <b>address-family</b> <b>vpn4</b>	Enters address family configuration mode to configure BGP peers to accept address family specific configurations.
<b>Step 5</b>	<b>neighbor</b> { <i>ip-address</i>   <i>ipv6-address</i>   <i>peer-group-name</i> } <b>remote-as</b> <i>as-number</i>  <b>Example:</b>	Adds an entry to the BGP neighbor table.

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

## Example: BGP Next Hop Unchanged for an eBGP Peer

```

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 History for BGP Next Hop Unchanged

This table provides release and related information for the features explained in this module.

These features are available in all the releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco IOS XE Gibraltar 16.11.1	BGP Next Hop Unchanged	The BGP Next Hop Unchanged feature allows BGP to send an update to an eBGP multihop peer with the next hop attribute unchanged.
Cisco IOS XE Cupertino 17.7.1	BGP Next Hop Unchanged	Support for this feature was introduced on the Cisco Catalyst 9600 Series Supervisor 2 Module (C9600X-SUP-2).

Use the Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to <https://cfng.cisco.com/>

