



## BGP—IPv6 NSR

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Border Gateway Protocol (BGP) support for Nonstop Routing (NSR) enables provider edge (PE) routers to maintain BGP state with customer edge (CE) routers and ensure continuous packet forwarding during a Route Processor (RP) switchover or during a planned In-Service Software Upgrade (ISSU) for a PE router. The BGP—IPv6 NSR feature extends BGP support for NSR to Cisco IPv6 VPN Provider Edge Routers (6VPE).

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### 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 module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>. An account on Cisco.com is not required.

### Prerequisites for BGP—IPv6 NSR

- Your network is configured to run BGP.
- Multiprotocol Layer Switching (MPLS) Layer 3 Virtual Private Networks (VPNs) are configured.
- All platforms are HA capable.

- You are familiar with the concepts in the “BGP Support for Nonstop Routing (NSR) with Stateful Switchover (SSO)” and “BGP NSR Support for iBGP Peers” modules of the *IP Routing: BGP Configuration Guide*.

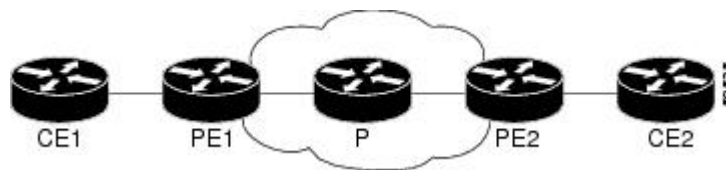
## Information About BGP—IPv6 NSR

### Overview of BGP—IPv6 NSR

Nonstop routing (NSR) is beneficial for BGP peers because it reduces the likelihood of dropped packets during switchover from the active Route Processor (RP) to the standby RP. Switchover occurs when the active RP fails for some reason and the standby RP takes control of active RP operations. The BGP—IPv6 NSR feature extends BGP support for NSR to include the following IPv6-based address families:

- IPv6 unicast
- IPv6 unicast + label
- IPv6 PE-CE
- VPNv6 unicast

**Figure 1: Basic 6VPE Network Configuration**



The figure above depicts a basic deployment scenario. Provider edge (PE) router 1, P, and PE2 form a 6VPE cloud. The customer edge (CE) router 1 to PE1 connection is IPv6 (VRF). The PEs are HA/SSO and NSF capable. The P routers are capable of Multiprotocol Label Switching (MPLS) label preservation (NSF equivalent).

As the CE1 is customer equipment, the provider cannot determine that it must be upgraded to be NSF aware. If PE1 can perform NSR on its connection to CE1, then CE1 will not be aware or impacted when PE1 performs a switchover in SSO mode. For all other connections within the autonomous system, the operations may be NSF or graceful restart. This means the control plane will be reset, and all the immediate peers will be aware of it and will resend data to help re-establish the session, but forwarding will be uninterrupted.

Neighbors not operating under NSR are still expected to be NSF capable/aware. If the CE is already NSF aware (that is, it can handle a BGP graceful restart by its peers), then the PE-CE connection will not be NSR, and will instead follow the regular NSF processing model. This parallels NSR for VPNv4 and assists in conserving network resources.

# How to Configure BGP—IPv6 NSR

## Configuring BGP—IPv6 NSR

Perform this task on a PE router if you want to configure a BGP peer to support BGP—IPv6 NSR.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. Enter one of the following:
  - **address-family ipv6** [**unicast** | **multicast** | **vpnv6**] [**vrf** *vrf-name*]
  - **address-family vpnv6** [**unicast** | **multicast**]
5. **neighbor** *ipv6-address%* **remote-as** *as-number*
6. **neighbor** *ipv6-address%* **activate**
7. **neighbor** *ipv6-address%* **ha-mode** **sso**
8. **end**

### DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b>  <b>Example:</b> Device> enable	Enables privileged EXEC mode.  • Enter your password if prompted.
<b>Step 2</b>	<b>configure terminal</b>  <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	<b>router bgp</b> <i>autonomous-system-number</i>  <b>Example:</b> Device(config)# router bgp 4000	Enters router configuration mode for the specified routing process.
<b>Step 4</b>	Enter one of the following:  • <b>address-family ipv6</b> [ <b>unicast</b>   <b>multicast</b>   <b>vpnv6</b> ] [ <b>vrf</b> <i>vrf-name</i> ]	Specifies the IPv6 address family and enters address family configuration mode.

	Command or Action	Purpose
	<ul style="list-style-type: none"> <li>• <b>address-family vpnv6 [unicast   multicast]</b></li> </ul> <p><b>Example:</b></p> <pre>Device(config-router)# address-family ipv6 unicast</pre>	<ul style="list-style-type: none"> <li>• The <b>unicast</b> keyword specifies the IPv6 unicast address family.</li> <li>• The <b>vrf</b> keyword and <i>vrf-name</i> argument specify the name of the virtual routing and forwarding (VRF) instance to associate with subsequent IPv6 address family configuration mode commands.</li> </ul>
<b>Step 5</b>	<p><b>neighbor <i>ipv6-address%</i> remote-as <i>as-number</i></b></p> <p><b>Example:</b></p> <pre>Device(config-router-af)# neighbor 2001:DB8:0:CC00::1 remote-as 4000</pre>	Specifies the autonomous system of the neighbor.
<b>Step 6</b>	<p><b>neighbor <i>ipv6-address%</i> activate</b></p> <p><b>Example:</b></p> <pre>Device(config-router-af)# neighbor 2001:DB8:0:CC00::1 activate</pre>	Activates the specified peer.
<b>Step 7</b>	<p><b>neighbor <i>ipv6-address%</i> ha-mode sso</b></p> <p><b>Example:</b></p> <pre>Device(config-router-af)# neighbor 2001:DB8:0:CC00::1 ha-mode sso</pre>	Configures a BGP neighbor to support BGP NSR.
<b>Step 8</b>	<p><b>end</b></p> <p><b>Example:</b></p> <pre>Device(config-router-af)# end</pre>	Exits address family configuration mode and returns to privileged EXEC mode.

## Configuration Examples for BGP—IPv6 NSR

### Example: Configuring BGP—IPv6 NSR

```
router bgp 4000
 address-family ipv6 unicast
  neighbor 2001:DB8:0:CC00::1 remote-as 4000
  neighbor 2001:DB8:0:CC00::1 activate
  neighbor 2001:DB8:0:CC00::1 ha-mode sso
```

## Additional References for BGP—IPv6 NSR

### Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Command List, All Releases</a>
BGP commands	<a href="#">Cisco IOS IP Routing: BGP Command Reference</a>

### Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>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.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<a href="http://www.cisco.com/support">http://www.cisco.com/support</a>

## Feature Information for BGP—IPv6 NSR

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](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for BGP—IPv6 NSR**

<b>Feature Name</b>	<b>Releases</b>	<b>Feature Information</b>
BGP—IPv6 NSR	Cisco IOS XE Release 3.9S	BGP support for NSR enables provider edge (PE) routers to maintain BGP state with customer edge (CE) routers and ensure continuous packet forwarding during a Route Processor (RP) switchover or during a planned ISSU for a PE router. The BGP—IPv6 NSR feature extends BGP support for NSR to Cisco IPv6 VPN Provider Edge Routers (6VPE).