BGP per Neighbor SoO Configuration

Last Updated: April 13, 2012

The BGP per Neighbor SoO Configuration feature simplifies the configuration of the site-of-origin (SoO) value. In Cisco IOS Release 12.4(9)T, 12.2(33)SRA, 12.2(31)SB2, and previous releases, the SoO value is configured using an inbound route map that sets the SoO value during the update process. Per neighbor SoO configuration introduces two new commands that can be configured in submodes under router configuration mode to set the SoO value. In Cisco IOS Release 12.4(24)T, support was added for 4-byte autonomous system numbers in asdot format only.

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.

Prerequisites for BGP per Neighbor SoO Configuration

This feature assumes that a Border Gateway Protocol (BGP) network is configured and that Cisco Express Forwarding is enabled in your network.

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Restrictions for BGP per Neighbor SoO Configuration

A BGP neighbor or peer policy template-based SoO configuration takes precedence over the SoO value configured in an inbound route map.

Information About Configuring BGP per Neighbor SoO

Site of Origin BGP Community Attribute

The site-of-origin (SoO) extended community is a BGP extended community attribute that is used to identify routes that have originated from a site so that the readvertisement of that prefix back to the source site can be prevented. The SoO extended community uniquely identifies the site from which a router has learned a route. BGP can use the SoO value associated with a route to prevent routing loops.

Route Distinguisher

A route distinguisher (RD) creates routing and forwarding tables and specifies the default route distinguisher for a VPN. The RD is added to the beginning of an IPv4 prefix to change it into a globally unique VPN-IPv4 prefix. An RD can be composed in one of two ways: with an autonomous system number and an arbitrary number or with an IP address and an arbitrary number.

You can enter an RD in either of these formats:

- Enter a 16-bit autonomous system number, a colon, and a 32-bit number. For example:

45000:3

- Enter a 32-bit IP address, a colon, and a 16-bit number. For example:

192.168.10.15:1

BGP Support for 4-Byte Autonomous System Numbers

In Cisco IOS Release 12.4(24)T, support was added for 4-byte autonomous system numbers as described in RFC 5396, *Textual Representation of Autonomous System (AS) Numbers* . In Cisco IOS Release 12.4(24)T, the Cisco implementation of 4-byte autonomous system numbers uses asdot notation--1.2 for example--as the only configuration format, regular expression match, and output display, with no asplain support.

In Cisco IOS Release 12.2(33)SRE, 12.2(33)XNE, and later releases, BGP support for 4-octet (4-byte) autonomous system numbers using the asplain format as the default format was introduced. The default asplain format uses decimal value numbers such as 65536, but you can configure 4-byte autonomous system numbers in both the asplain and asdot format. If you want to change the default **show** command output to display 4-byte autonomous system numbers in the asdot format, use the **bgp asnotation dot** command under router configuration mode.

For configuration examples involving 4-byte autonomous system numbers, see the Configuring a per Neighbor SoO Value with a 4-Byte AS Number Using a BGP Peer Policy Template Example, page 16 or the Configuring a per Neighbor SoO Value Using a BGP neighbor Command and 4-Byte Autonomous System Numbers Example, page 17.

For more details about the Cisco implementation of BGP autonomous system number formats, see the the "Cisco BGP Overview" module.

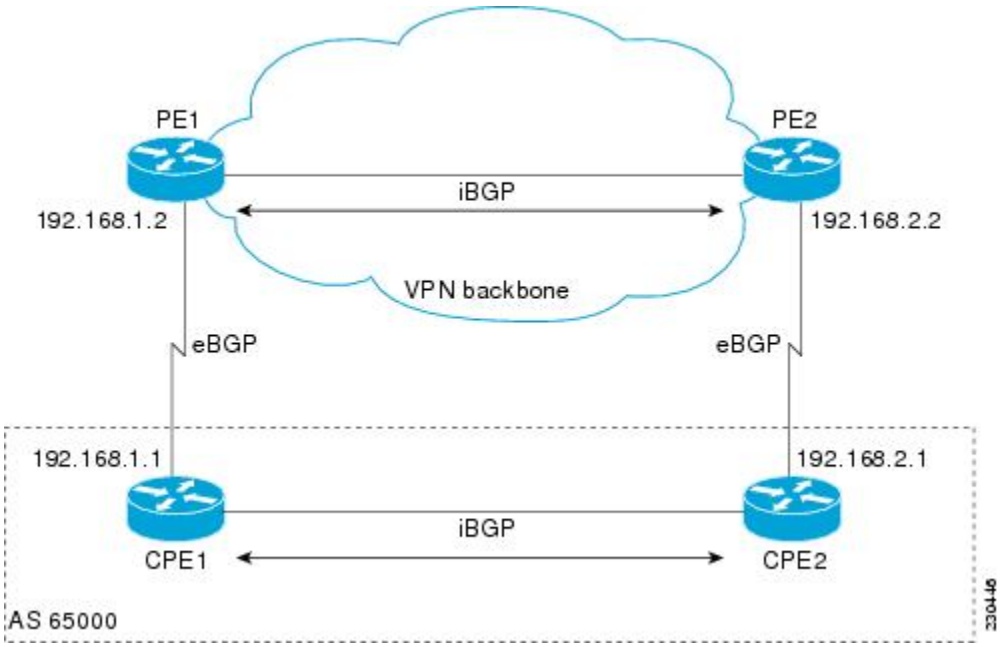
BGP per Neighbor Site of Origin Configuration

There are three ways to configure an SoO value for a BGP neighbor:

- BGP peer policy template--A peer policy template is created, and an SoO value is configured as part of the peer policy. Under address family IPv4 VRF, a neighbor is identified and is configured to inherit the peer policy that contains the SoO value.
- BGP **neighbor** command--Under address family IPv4 VRF, a neighbor is identified, and an SoO value is configured for the neighbor.
- BGP peer group--Under address family IPv4 VRF, a BGP peer group is configured, an SoO value is configured for the peer group, a neighbor is identified, and the neighbor is configured as a member of the peer group.

The configuration of SoO values for BGP neighbors is performed on a provider edge (PE) router, which is the VPN entry point. When SoO is enabled, the PE router forwards prefixes to the customer premises equipment (CPE) only when the SoO tag of the prefix does not match the SoO tag configured for the CPE. For example, in the figure below, an SoO tag is set as 65000:1 for the customer site that includes routers CPE1 and CPE2 with an autonomous system number of 65000. When CPE1 sends prefixes to PE1, PE1 tags the prefixes with 65000:1, which is the SoO tag for CPE1 and CPE2. When PE1 sends the tagged prefixes to PE2, PE2 performs a match against the SoO tag from CPE2. Any prefixes with the tag value of 65000:1 are not sent to CPE2 because the SoO tag matches the SoO tag of CPE2, and a routing loop is avoided.

Figure 1 Network Diagram for SoO Example



Benefits of BGP per Neighbor Site of Origin

In releases prior to Cisco IOS Release 12.4(11)T, 12.2(33)SRB, and 12.2(33)SB, the SoO extended community attribute is configured using an inbound route map that sets the SoO value during the update process. The introduction of two new commands configured in submodes under router configuration mode simplifies the SoO value configuration.

How to Configure BGP per Neighbor SoO

To configure an SoO value for a BGP neighbor, you must perform the first task in the following list and one of the next three tasks. The last three tasks are mutually exclusive; you need perform only one of them.

- Enabling Cisco Express Forwarding and Configuring VRF Instances, page 4
- Configuring a per Neighbor SoO Value Using a BGP Peer Policy Template, page 7
- Configuring a per Neighbor SoO Value Using a BGP neighbor Command, page 10
- Configuring a per Neighbor SoO Value Using a BGP Peer Group, page 12

Enabling Cisco Express Forwarding and Configuring VRF Instances

Perform this task on both of the PE routers in the figure above to configure Virtual Routing and Forwarding (VRF) instances to be used with the per-VRF assignment tasks. In this task, Cisco Express Forwarding is enabled, and a VRF instance named SOO_VRF is created. To make the VRF functional, a route distinguisher is created, and the VRF is associated with an interface. When the route distinguisher is created, the routing and forwarding tables are created for the VRF instance named SOO_VRF. After associating the VRF with an interface, the interface is configured with an IP address.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip cef**
4. **ip vrf** *vrf-name*
5. **rd** *route-distinguisher*
6. **route-target** {**export** | **both**} *route-target-ext-community*
7. **route-target** {**import** | **both**} *route-target-ext-community*
8. **exit**
9. **interface** *type number*
10. **ip vrf forwarding** *vrf-name* [**downstream** *vrf-name2*]
11. **ip address** *ip-address mask* [**secondary**]
12. **end**
13. **show ip vrf** [**brief** | **detail** | **interfaces** | **id**] [*vrf-name*] [*output-modifiers*]

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	**ip cef** **Example:** `Router(config)# ip cef`	Enables Cisco Express Forwarding on the route processor.
Step 4	**ip vrf** *vrf-name* **Example:** `Router(config)# ip vrf SOO_VRF`	Defines a VRF instance and enters VRF configuration mode.
Step 5	**rd** *route-distinguisher* **Example:** `Router(config-vrf)# rd 1:1`	Creates routing and forwarding tables for a VRF and specifies the default RD for a VPN. • Use the *route-distinguisher* argument to specify the default RD for a VPN. There are two formats that you can use to specify an RD: ◦ A 16-bit autonomous system number, a colon, and a 32-bit number, for example: 65000:3 ◦ A 32-bit IP address, a colon, and a 16-bit number, for example: 192.168.1.2:51 • In this example, the RD uses an autonomous system number with the number 1 after the colon.

	Command or Action	Purpose
Step 6	**route-target** {**export** | **both**} *route-target-ext-community* **Example:** `Router(config-vrf)# route-target export 1:1`	Creates a route-target extended community for a VRF. • Use the **export** keyword to export routing information to the target VPN extended community. • Use the **both** keyword to both import routing information from, and export routing information to, the target VPN extended community. • Use the *route-target-ext-community* argument to specify the VPN extended community. **Note** Only the syntax applicable to this step is displayed. For a different use of this syntax, see Step 7.
Step 7	**route-target** {**import** | **both**} *route-target-ext-community* **Example:** `Router(config-vrf)# route-target import 1:1`	Creates a route-target extended community for a VRF. • Use the **import** keyword to import routing information from the target VPN extended community. • Use the **both** keyword to both import routing information from, and export routing information to, the target VPN extended community. • Use the *route-target-ext-community* argument to specify the VPN extended community.
Step 8	**exit** **Example:** `Router(config-vrf)# exit`	Exits VRF configuration mode and returns to global configuration mode.
Step 9	**interface** *type number* **Example:** `Router(config)# interface GigabitEthernet 1/0/0`	Configures an interface type and enters interface configuration mode.
Step 10	**ip vrf forwarding** *vrf-name* [**downstream** *vrf-name2*] **Example:** `Router(config-if)# ip vrf forwarding SOO_VRF`	Associates a VRF with an interface or subinterface. • In this example, the VRF named SOO_VRF is associated with Gigabit Ethernet interface 1/0/0. **Note** Executing this command on an interface removes the IP address, so the IP address should be reconfigured.
Step 11	**ip address** *ip-address mask* [**secondary**] **Example:** `Router(config-if)# ip address 192.168.1.2 255.255.255.0`	Configures an IP address. • In this example, Gigabit Ethernet interface 1/0/0 is configured with an IP address of 192.168.1.2.

	Command or Action	Purpose
Step 12	**end** **Example:** `Router(config-if)# end`	Exits interface configuration mode and returns to privileged EXEC mode.
Step 13	**show ip vrf** [**brief** | **detail** | **interfaces** | **id**] [*vrf-name*] [*output-modifiers*] **Example:** `Router# show ip vrf`	Displays the configured VRFs. • Use this command to verify the configuration of this task.

Examples

The following output of the **show ip vrf** command displays the VRF named SOO_VRF configured in this task.

```
Router# show ip vrf
Name                              Default RD            Interfaces
SOO_VRF                                 1:1                 GE1/0/0
```

Configuring a per Neighbor SoO Value Using a BGP Peer Policy Template

Perform this task on router PE1 in the figure above to configure an SoO value for a BGP neighbor at the router CPE1 in the figure above using a peer policy template. In this task, a peer policy template is created, and the SoO value is configured for the peer policy. Under address family IPv4 VRF, a neighbor is identified and is configured to inherit the peer policy that contains the SoO value.

For a configuration example involving 4-byte autonomous system numbers, see the Configuring a per Neighbor SoO Value with a 4-Byte AS Number Using a BGP Peer Policy Template Example, page 16.

Note If a BGP peer inherits from several peer policy templates that specify different SoO values, the SoO value in the last template applied takes precedence and is applied to the peer. However, direct configuration of the SoO value on the BGP neighbor overrides any inherited template configurations of the SoO value.

- BGP Peer Policy Templates, page 7

BGP Peer Policy Templates

Peer policy templates are used to configure BGP policy commands that are configured for neighbors that belong to specific address families. Peer policy templates are configured once and then applied to many neighbors through the direct application of a peer policy template or through inheritance from peer policy templates. The configuration of peer policy templates simplifies the configuration of BGP policy commands that are applied to all neighbors within an autonomous system.

Peer policy templates support inheritance. A directly applied peer policy template can directly or indirectly inherit configurations from up to seven peer policy templates. So, a total of eight peer policy templates can be applied to a neighbor or neighbor group.

The configuration of peer policy templates simplifies and improves the flexibility of BGP configuration. A specific policy can be configured once and referenced many times. Because a peer policy supports up to eight levels of inheritance, very specific and very complex BGP policies can be created.

For more details about BGP peer policy templates, see the "Configuring a Basic BGP Network" module.

This task assumes that the task described in the "Verifying CEF and Configuring VRF Instances" section has been performed.

Note A BGP peer cannot inherit from a peer policy or session template and be configured as a peer group member at the same. BGP templates and BGP peer groups are mutually exclusive.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. **template peer-policy** *policy-template-name*
5. **soo** *extended-community-value*
6. **exit-peer-policy**
7. **address-family ipv4** [**unicast** | **multicast**| **vrf** *vrf-name*]
8. **neighbor** *ip-address* **remote-as** *autonomous-system-number*
9. **neighbor** *ip-address* **activate**
10. **neighbor** *ip-address* **inherit peer-policy** *policy-template-name*
11. **end**

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.

	Command or Action	Purpose
Step 3	**router bgp** *autonomous-system-number* **Example:** `Router(config)# router bgp 50000`	Enters router configuration mode for the specified routing process.
Step 4	**template peer-policy** *policy-template-name* **Example:** `Router(config-router)# template peer-policy SOO_POLICY`	Creates a peer policy template and enters policy-template configuration mode.
Step 5	**soo** *extended-community-value* **Example:** `Router(config-router-ptmp)# soo 65000:1`	Sets the SoO value for a BGP peer policy template. • Use the *extended-community-value* argument to specify the VPN extended community value. The value takes one of the following formats: ◦ A 16-bit autonomous system number, a colon, and a 32-bit number, for example: 45000:3 ◦ A 32-bit IP address, a colon, and a 16-bit number, for example: 192.168.10.2:51 • In this example, the SoO value is set at 65000:1.
Step 6	**exit-peer-policy** **Example:** `Router(config-router-pmtp)# exit-peer-policy`	Exits policy-template configuration mode and returns to router configuration mode.
Step 7	**address-family ipv4** [**unicast** | **multicast**| **vrf** *vrf-name*] **Example:** `Router(config-router)# address-family ipv4 vrf SOO_VRF`	Specifies the IPv4 address family and enters address family configuration mode. • Use the **unicast** keyword to specify the IPv4 unicast address family. By default, the router is placed in configuration mode for the IPv4 unicast address family if the **unicast** keyword is not specified with the **address-family ipv4** command. • Use the **multicast** keyword to specify IPv4 multicast address prefixes. • Use the **vrf** keyword and *vrf-name* argument to specify the name of the VRF instance to associate with subsequent IPv4 address family configuration mode commands.

	Command or Action	Purpose
Step 8	**neighbor** *ip-address* **remote-as** *autonomous-system-number* **Example:** `Router(config-router-af)# neighbor 192.168.1.1 remote-as 65000`	Adds the IP address of the neighbor in the specified autonomous system to the IPv4 multiprotocol BGP neighbor table of the local router.
Step 9	**neighbor** *ip-address* **activate** **Example:** `Router(config-router-af)# neighbor 192.168.1.1 activate`	Enables the neighbor to exchange prefixes for the IPv4 VRF address family with the local router.
Step 10	**neighbor** *ip-address* **inherit peer-policy** *policy-template-name* **Example:** `Router(config-router-af)# neighbor 192.168.1.1 inherit peer-policy SOO_POLICY`	Sends a peer policy template to a neighbor so that the neighbor can inherit the configuration. • In this example, the router is configured to send the peer policy template named SOO_POLICY to the 192.168.1.1 neighbor to inherit. If another peer policy template is indirectly inherited from SOO_POLICY, the indirectly inherited configuration will also be applied. Up to seven additional peer policy templates can be indirectly inherited from SOO_POLICY.
Step 11	**end** **Example:** `Router(config-router-af)# end`	Exits address family configuration mode and returns to privileged EXEC mode.

Configuring a per Neighbor SoO Value Using a BGP neighbor Command

Perform this task on router PE2 in the figure above to configure an SoO value for the BGP neighbor at router CPE2 in the figure above using a **neighbor** command. Under address family IPv4 VRF, a neighbor is identified, and an SoO value is configured for the neighbor.

Direct configuration of the SoO value on a BGP neighbor overrides any inherited peer policy template configurations of the SoO value.

This task assumes that the task described in the "Verifying CEF and Configuring VRF Instances" section has been performed with appropriate changes to interfaces and IP addresses.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. **address-family ipv4** [**unicast** | **multicast**| **vrf** *vrf-name*]
5. **neighbor** {*ip-address*| *peer-group-name*} **remote-as** *autonomous-system-number*
6. **neighbor** *ip-address* **activate**
7. **neighbor** {*ip-address*| *peer-group-name*} **soo** *extended-community-value*
8. **end**

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** *autonomous-system-number* **Example:** `Router(config)# router bgp 50000`	Enters router configuration mode for the specified routing process.
Step 4	**address-family ipv4** [**unicast**	**multicast**| **vrf** *vrf-name*] **Example:** `Router(config-router)# address-family ipv4 vrf SOO_VRF`	Specifies the IPv4 address family and enters address family configuration mode. • Use the **unicast** keyword to specify the IPv4 unicast address family. By default, the router is placed in configuration mode for the IPv4 unicast address family if the **unicast** keyword is not specified with the **address-family ipv4** command. • Use the **multicast** keyword to specify IPv4 multicast address prefixes. • Use the **vrf** keyword and *vrf-name* argument to specify the name of the VRF instance to associate with subsequent IPv4 address family configuration mode commands.

	Command or Action	Purpose
Step 5	**neighbor** {*ip-address*| *peer-group-name*} **remote-as** *autonomous-system-number* **Example:** `Router(config-router-af)# neighbor 192.168.2.1 remote-as 65000`	Adds the IP address of the neighbor in the specified autonomous system to the IPv4 multiprotocol BGP neighbor table of the local router.
Step 6	**neighbor** *ip-address* **activate** **Example:** `Router(config-router-af)# neighbor 192.168.2.1 activate`	Enables the neighbor to exchange prefixes for the IPv4 VRF address family with the local router. • In this example, the external BGP peer at 192.168.2.1 is activated. **Note** If a peer group has been configured in Step 5 , do not use this step because BGP peer groups are activated when any parameter is configured. For example, a BGP peer group is activated when an SoO value is configured using the **neighbor soo** command in Step 7.
Step 7	**neighbor** {*ip-address*| *peer-group-name*} **soo** *extended-community-value* **Example:** `Router(config-router-af)# neighbor 192.168.2.1 soo 65000:1`	Sets the site-of-origin (SoO) value for a BGP neighbor or peer group. • In this example, the neighbor at 192.168.2.1 is configured with an SoO value of 65000:1.
Step 8	**end** **Example:** `Router(config-router-af)# end`	Exits address family configuration mode and returns to privileged EXEC mode.

Configuring a per Neighbor SoO Value Using a BGP Peer Group

Perform this task on router PE1 in the figure above to configure an SoO value for the BGP neighbor at router CPE1 in the figure above using a **neighbor** command with a BGP peer group. Under address family IPv4 VRF, a BGP peer group is created and an SoO value is configured using a BGP **neighbor** command, and a neighbor is then identified and added as a peer group member. A BGP peer group member inherits the configuration associated with a peer group, which in this example, includes the SoO value.

Direct configuration of the SoO value on a BGP neighbor overrides any inherited peer group configurations of the SoO value.

This task assumes that the task described in "Enabling Cisco Express Forwarding and Configuring VRF Instances" has been performed.

Note A BGP peer cannot inherit from a peer policy or session template and be configured as a peer group member at the same. BGP templates and BGP peer groups are mutually exclusive.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **router bgp** *autonomous-system-number*
4. **address-family ipv4** [**unicast** | **multicast**| **vrf** *vrf-name*]
5. **neighbor** *peer-group-name* **peer-group**
6. **neighbor** {*ip-address*| *peer-group-name*} **soo** *extended-community-value*
7. **neighbor** *ip-address* **remote-as** *autonomous-system-number*
8. **neighbor** *ip-address* **activate**
9. **neighbor** *ip-address* **peer-group** *peer-group-name*
10. **end**

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** *autonomous-system-number* **Example:** `Router(config)# router bgp 50000`	Enters router configuration mode for the specified routing process.

	Command or Action	Purpose
Step 4	**address-family ipv4** [**unicast** | **multicast**| **vrf** *vrf-name*] **Example:** `Router(config-router)# address-family ipv4 vrf SOO_VRF`	Specifies the IPv4 address family and enters address family configuration mode. • Use the **unicast** keyword to specify the IPv4 unicast address family. By default, the router is placed in configuration mode for the IPv4 unicast address family if the **unicast** keyword is not specified with the **address-family ipv4** command. • Use the **multicast** keyword to specify IPv4 multicast address prefixes. • Use the **vrf** keyword and *vrf-name* argument to specify the name of the VRF instance to associate with subsequent IPv4 address family configuration mode commands.
Step 5	**neighbor** *peer-group-name* **peer-group** **Example:** `Router(config-router-af)# neighbor SOO_group peer-group`	Creates a BGP peer group.
Step 6	**neighbor** {*ip-address*| *peer-group-name*} **soo** *extended-community-value* **Example:** `Router(config-router-af)# neighbor SOO_group soo 65000:1`	Sets the site-of-origin (SoO) value for a BGP neighbor or peer group. • In this example, the BGP peer group, SOO_group, is configured with an SoO value of 65000:1.
Step 7	**neighbor** *ip-address* **remote-as** *autonomous-system-number* **Example:** `Router(config-router-af)# neighbor 192.168.1.1 remote-as 65000`	Adds the IP address of the neighbor in the specified autonomous system to the IPv4 multiprotocol BGP neighbor table of the local router.
Step 8	**neighbor** *ip-address* **activate** **Example:** `Router(config-router-af)# neighbor 192.168.1.1 activate`	Enables the neighbor to exchange prefixes for the IPv4 VRF address family with the local router.

	Command or Action	Purpose
Step 9	**neighbor** *ip-address* **peer-group** *peer-group-name* **Example:** `Router(config-router-af)# neighbor 192.168.1.1 peer-group SOO_group`	Assigns the IP address of a BGP neighbor to a peer group.
Step 10	**end** **Example:** `Router(config-router-af)# end`	Exits address family configuration mode and returns to privileged EXEC mode.

Configuration Examples for BGP per Neighbor SoO Configuration

Configuring a per Neighbor SoO Value Using a BGP Peer Policy Template Example

The following example shows how to create a peer policy template and configure an SoO value as part of the peer policy. After enabling Cisco Express Forwarding and configuring a VRF instance named SOO_VRF, a peer policy template is created and an SoO value is configured as part of the peer policy. Under address family IPv4 VRF, a neighbor is identified and configured to inherit the peer policy that contains the SoO value.

```
ip cef
ip vrf SOO_VRF
 rd 1:1
 route-target export 1:1
 route-target import 1:1
 exit
interface GigabitEthernet 1/0/0
 ip vrf forwarding SOO_VRF
 ip address 192.168.1.2 255.255.255.0
 exit
router bgp 50000
 template peer-policy SOO_POLICY
  soo 65000:1
  exit-peer-policy
```

```
 address-family ipv4 vrf SOO_VRF
  neighbor 192.168.1.1 remote-as 65000
  neighbor 192.168.1.1 activate
  neighbor 192.168.1.1 inherit peer-policy SOO_POLICY
  end
```

Configuring a per Neighbor SoO Value with a 4-Byte AS Number Using a BGP Peer Policy Template Example

The following example shows how to create a peer policy template and configure an SoO value using a 4-byte autonomous system number, 1.2 in asdot format, as part of the peer policy. Under address family IPv4 VRF, a neighbor is identified and configured to inherit the peer policy that contains the SoO value. This example requires Cisco IOS Release 12.4(24)T, or a later release.

```
router bgp 1.2
 template peer-policy SOO_POLICY
  soo 1.2:3
  exit-peer-policy
 address-family ipv4 vrf SOO_VRF
  neighbor 192.168.3.2 remote-as 1.14
  neighbor 192.168.3.2 activate
  neighbor 192.168.3.2 inherit peer-policy SOO_POLICY
  end
```

The following example shows how to create a peer policy template and configure an SoO value using a 4-byte autonomous system number, 65538 in asplain format, as part of the peer policy. Under address family IPv4 VRF, a neighbor is identified and configured to inherit the peer policy that contains the SoO value. This example requires Cisco IOS Release 12.2(33)SRE, 12.2(33)XNE, or a later release.

```
router bgp 65538
 template peer-policy SOO_POLICY
  soo 65538:3
  exit-peer-policy
 address-family ipv4 vrf SOO_VRF
  neighbor 192.168.3.2 remote-as 65550
  neighbor 192.168.3.2 activate
  neighbor 192.168.3.2 inherit peer-policy SOO_POLICY
  end
```

Configuring a per Neighbor SoO Value Using a BGP neighbor Command Example

The following example shows how to configure an SoO value for a BGP neighbor. After enabling Cisco Express Forwarding and configuring a VRF instance named SOO_VRF, a neighbor is identified under address family IPv4 VRF and an SoO value is configured for the neighbor.

```
ip cef
ip vrf SOO_VRF
 rd 1:1
 route-target export 1:1
 route-target import 1:1
 exit
interface GigabitEthernet 1/0/0
 ip vrf forwarding SOO_VRF
 ip address 192.168.2.2 255.255.255.0
 exit
router bgp 50000
 address-family ipv4 vrf SOO_VRF
  neighbor 192.168.2.1 remote-as 65000
  neighbor 192.168.2.1 activate
  neighbor 192.168.2.1 soo 65000:1
  end
```

Configuring a per Neighbor SoO Value Using a BGP neighbor Command and 4-Byte Autonomous System Numbers Example

The following example shows how to configure an SoO value for a BGP neighbor. In this example, all BGP neighbors, route targets, and SoO values use 4-byte autonomous system numbers in asplain format. After checking that CEF is enabled, a VRF instance named SOO_VRF is configured with route targets. In a BGP router session a neighbor is identified under address family IPv4 VRF, and an SoO value is configured for the neighbor. This example requires Cisco IOS Release 12.4(24)T, or a later release.

```
show ip cef
ip vrf SOO_VRF
 rd 100:200
 route-target export 1.14:1
 route-target import 1.14:1
 exit
interface Ethernet 1/0
 ip vrf forwarding SOO_VRF
 ip address 192.168.2.2 255.255.255.0
 exit
router bgp 1.2
 address-family ipv4 vrf SOO_VRF
  neighbor 192.168.2.1 remote-as 1.14
  neighbor 192.168.2.1 activate
  neighbor 192.168.2.1 soo 1.14:1
  end
```

Configuring a per Neighbor SoO Value Using a BGP Peer Group Example

The following example shows how to configure an SoO value for a BGP peer group. After enabling Cisco Express Forwarding and configuring a VRF instance named SOO_VRF, a BGP peer group is configured under address family IPv4 VRF, an SoO value is configured for the peer group, a neighbor is identified, and the neighbor is configured as a member of the peer group.

```
ip cef
ip vrf SOO_VRF
 rd 1:1
 route-target export 1:1
 route-target import 1:1
 exit
interface GigabitEthernet 1/0/0
 ip vrf forwarding SOO_VRF
 ip address 192.168.1.2 255.255.255.0
 exit
router bgp 50000
 address-family ipv4 vrf SOO_VRF
  neighbor SOO_GROUP peer-group
  neighbor SOO_GROUP soo 65000:65
  neighbor 192.168.1.1 remote-as 65000
  neighbor 192.168.1.1 activate
  neighbor 192.168.1.1 peer-group SOO_GROUP
  end
```

Where to Go Next

- To read an overview of BGP, proceed to the "Cisco BGP Overview" module.
- To perform basic BGP feature tasks, proceed to the "Configuring a Basic BGP Network" module.
- To perform advanced BGP feature tasks, proceed to the "Configuring Advanced BGP Features" module.

- To configure BGP neighbor session options, proceed to the "Configuring BGP Neighbor Session Options" module.
- To perform internal BGP tasks, proceed to the "Configuring Internal BGP Features" module.

Additional References

The following sections provide references related to the BGP support for per neighbor SoO configuration feature.

Related Documents

Related Topic	Document Title
Cisco IOS commands	Cisco IOS Master Commands List, All Releases
BGP commands: complete command syntax, command mode, defaults, command history, usage guidelines, and examples	*Cisco IOS IP Routing: BGP Command Reference*
IP Switching commands: complete command syntax, command mode, defaults, command history, usage guidelines, and examples	*Cisco IOS IP Switching Command Reference*

MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

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/cisco/web/support/index.html

Feature Information for BGP per Neighbor SoO Configuration

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 per Neighbor SoO Configuration

Feature Name	Releases	Feature Information
BGP per Neighbor SoO Configuration	12.2(33)SB 12.2(33)SRB 12.4(11)T 15.0(1)SY	The BGP per neighbor SOO configuration feature simplifies the configuration of the site-of-origin (SoO) parameter. In Cisco IOS Release 12.4(9)T, 12.2(33)SRA, 12.2(31)SB2, and previous releases, the SoO parameter is configured using an inbound route map that sets the SoO value during the update process. The per neighbor SoO configuration introduces two new commands that can be configured in submodes under router configuration mode to set the SoO value. The following commands were introduced by this feature: **neighbor soo**, **soo**.

Feature Name	Releases	Feature Information
BGP Support for 4-Byte ASN	12.0(32)S12 12.0(32)SY8 12.2(33)SRE 12.2(33)XNE 12.4(24)T	The BGP Support for 4-Byte ASN feature introduced support for 4-byte autonomous system numbers. Because of increased demand for autonomous system numbers, in January 2009 the IANA will start to allocate 4-byte autonomous system numbers in the range from 65536 to 4294967295. In Cisco IOS Release 12.0(32)SY8, 12.2(33)SRE, and 12.2(33)XNE, the Cisco implementation of 4-byte autonomous system numbers uses asplain as the default regular expression match and output display format for autonomous system numbers, but you can configure 4-byte autonomous system numbers in both the asplain format and the asdot format as described in RFC 5396. To change the default regular expression match and output display of 4-byte autonomous system numbers to asdot format, use the **bgp asnotation dot** command. In Cisco IOS Release 12.0(32)S12, and 12.4(24)T, the Cisco implementation of 4-byte autonomous system numbers uses asdot as the only configuration format, regular expression match, and output display, with no asplain support. The following commands were modified by this feature: **bgp asnotation dot**, **bgp confederation identifier**, **bgp confederation peers**, **clear ip bgp**, **ip bgp-community new-format**, **ip extcommunity-list**, **match source-protocol**, **neighbor local-as**, **neighbor remote-as**, **neighbor soo**, **redistribute (**IP**)**, **router bgp**, **set**

Feature Name	Releases	Feature Information
		as-path, **set extcommunity**, **set origin**, **soo**, and all **show ip bgp** commands that display an autonomous system number.