



IP Routing: BGP Command Reference, Cisco IOS XE Release 3SE (Catalyst 3850 Switches)

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Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883



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address-family ipv4 (BGP)

To enter address family or router scope address family configuration mode to configure a routing session using standard IP Version 4 (IPv4) address prefixes, use the **address-family ipv4** command in router configuration or router scope configuration mode. To exit address family configuration mode and remove the IPv4 address family configuration from the running configuration, use the **no** form of this command.

Syntax Available Under Router Configuration Mode

address-family ipv4 [**mdt**| **tunnel**] {**multicast** | **unicast**} [**vrf vrf-name**]| **vrf vrf-name**]

no address-family ipv4 [**mdt**| **tunnel**] {**multicast** | **unicast**} [**vrf vrf-name**]| **vrf vrf-name**]

Syntax Available Under Router Scope Configuration Mode

address-family ipv4 [**mdt**| **multicast**| **unicast**]

no address-family ipv4 [**mdt**| **multicast**| **unicast**]

Syntax Description

mdt	(Optional) Specifies an IPv4 multicast distribution tree (MDT) address family session.
tunnel	(Optional) Specifies an IPv4 routing session for multipoint tunneling.
multicast	(Optional) Specifies IPv4 multicast address prefixes.
unicast	(Optional) Specifies IPv4 unicast address prefixes. This is the default.
vrf vrf-name	(Optional) Specifies the name of the VPN routing and forwarding (VRF) instance to associate with subsequent IPv4 address family configuration mode commands.

Command Default

IPv4 address prefixes are not enabled.

Command Modes

Router configuration (config-router)

Router scope configuration (config-router-scope)

Command History

Release	Modification
12.0(5)T	This command was introduced. This command replaced the match nlri and set nlri commands.

Release	Modification
12.0(28)S	This command was modified. The tunnel keyword was added.
12.0(29)S	This command was modified. The mdt keyword was added.
12.0(30)S	This command was modified. Support for the Cisco 12000 series Internet router was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SRB	This command was modified. Support for router scope configuration mode was added. The tunnel keyword was deprecated.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Aggregation Services Routers.
12.4(20)T	This command was modified. The mdt keyword was added.
Cisco IOS XE Release 3.6S	This command was modified. VRF-based multicast support was added.
15.2(4)S	This command was implemented on the Cisco 7200 series router.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines

The **address-family ipv4** command replaces the **match nlri** and **set nlri** commands. The **address-family ipv4** command places the device in address family configuration mode (prompt: config-router-af), from which you can configure routing sessions that use standard IPv4 address prefixes. To leave address family configuration mode and return to router configuration mode, type **exit**.



Note

Routing information for address family IPv4 is advertised by default for each Border Gateway Protocol (BGP) routing session configured with the **neighbor remote-as** command unless you enter the **no bgp default ipv4-unicast** command before configuring the **neighbor remote-as** command.

The **tunnel** keyword is used to enable the tunnel subaddress family identifier (SAFI) under the IPv4 address family identifier. This SAFI is used to advertise the tunnel endpoints and the SAFI-specific attributes (which contain the tunnel type and tunnel capabilities). Redistribution of tunnel endpoints into the BGP IPv4 tunnel SAFI table occurs automatically when the tunnel address family is configured. However, peers need to be activated under the tunnel address family before the sessions can exchange tunnel information.

The **mdt** keyword is used to enable the MDT SAFI under the IPv4 address family identifier. This SAFI is used to advertise tunnel endpoints for inter-AS multicast VPN peering sessions.

If you specify the **address-family ipv4 multicast** command, you will then specify the **network** *network-number* [**mask** *network-mask*] command. The **network** command advertises (injects) the specified network number and mask into the multicast BGP database. This route must exist in the forwarding table installed by an Interior Gateway Protocol (IGP) (that is, by EIGRP, OSPF, RIP, IGRP, static, or IS-IS), but not BGP.

In Cisco IOS Release 12.2(33)SRB and later releases, the ability to use address family configuration under the router scope configuration mode was introduced. The scope hierarchy can be defined for BGP routing sessions and is required to support Multitopology Routing (MTR). To enter the router scope configuration mode, use the **scope** command, which can apply globally or for a specific VRF. When using the scope for a specific VRF, only the **unicast** keyword is available.

Examples

The following example places the device in address family configuration mode for the IPv4 address family:

```
Device(config)# router bgp 50000
Device(config-router)# address-family ipv4
Device(config-router-af)#
```

The following example places the device in address family configuration mode and specifies only multicast address prefixes for the IPv4 address family:

```
Device(config)# router bgp 50000
Device(config-router)# address-family ipv4 multicast
Device(config-router-af)#
```

The following example places the device in address family configuration mode and specifies unicast address prefixes for the IPv4 address family:

```
Device(config)# router bgp 50000
Device(config-router)# address-family ipv4 unicast
Device(config-router-af)#
```

The following example places the device in address family configuration mode and specifies **cisco** as the name of the VRF instance to associate with subsequent IPv4 address family configuration mode commands:

```
Device(config)# router bgp 50000
Device(config-router)# address-family ipv4 vrf cisco
Device(config-router-af)#
```



Note

Use this form of the command, which specifies a VRF, only to configure routing exchanges between provider edge (PE) and customer edge (CE) devices.

The following example places the device in tunnel address family configuration mode:

```
Device(config)# router bgp 100
Device(config-router)# address-family ipv4 tunnel
Device(config-router-af)#
```

The following example shows how to configure a device to support an IPv4 MDT address-family session:

```
Device(config)# router bgp 45000
Device(config-router)# address-family ipv4 mdt
Device(config-router-af)#
```

The following example shows how to configure the IPv4 address family under router scope configuration mode. In this example, the scope hierarchy is enabled globally. The device enters router scope address family configuration mode, and only multicast address prefixes for the IPv4 address family are specified:

```
Device(config)# router bgp 50000
Device(config-router)# scope global
```

```
Device(config-router-scope) # address-family ipv4 multicast  
Device(config-router-scope-af) #
```

Related Commands

Command	Description
address-family ipv6	Places the device in address family configuration mode for configuring routing sessions, such as BGP, that use standard IPv6 address prefixes.
address-family vpn4	Places the device in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPN Version 4 address prefixes.
bgp default ipv4-unicast	Enables the IPv4 unicast address family on all neighbors.
neighbor activate	Enables the exchange of information with a BGP neighboring device.
neighbor remote-as	Adds an entry to the BGP or multiprotocol BGP neighbor table.
scope	Defines the scope for a BGP routing session and enters router scope configuration mode.

aggregate-address

To create an aggregate entry in a Border Gateway Protocol (BGP) database, use the **aggregate-address** command in address family or router configuration mode. To disable this function, use the **no** form of this command.

aggregate-address *address mask* [**as-set**] [**as-confed-set**] [**summary-only**] [**suppress-map** *map-name*] [**advertise-map** *map-name*] [**attribute-map** *map-name*]

no aggregate-address *address mask* [**as-set**] [**as-confed-set**] [**summary-only**] [**suppress-map** *map-name*] [**advertise-map** *map-name*] [**attribute-map** *map-name*]

Syntax Description

<i>address</i>	Aggregate address.
<i>mask</i>	Aggregate mask.
as-set	(Optional) Generates autonomous system set path information.
as-confed-set	(Optional) Generates autonomous confederation set path information.
summary-only	(Optional) Filters all more-specific routes from updates.
suppress-map <i>map-name</i>	(Optional) Specifies the name of the route map used to select the routes to be suppressed.
advertise-map <i>map-name</i>	(Optional) Specifies the name of the route map used to select the routes to create AS_SET origin communities.
attribute-map <i>map-name</i>	(Optional) Specifies the name of the route map used to set the attribute of the aggregate route.

Command Default

The atomic aggregate attribute is set automatically when an aggregate route is created with this command unless the **as-set** keyword is specified.

Command Modes

Address family configuration (config-router-af)
Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
11.1(20)CC	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were added.
12.0(2)S	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were added.
12.0(7)T	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were removed. Address family configuration mode support was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	Support for IPv6 was added.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.
12.2(33)SRE	The as-confed-set keyword was added.
Cisco IOS XE Release 3.1S	This command was introduced on Cisco ASR 1000 series routers.

Usage Guidelines

You can implement aggregate routing in BGP and Multiprotocol BGP (mBGP) either by redistributing an aggregate route into BGP or mBGP, or by using the conditional aggregate routing feature.

Using the **aggregate-address** command with no keywords will create an aggregate entry in the BGP or mBGP routing table if any more-specific BGP or mBGP routes are available that fall within the specified range. (A longer prefix that matches the aggregate must exist in the Routing Information Base (RIB).) The aggregate route will be advertised as coming from your autonomous system and will have the atomic aggregate attribute set to show that information might be missing. (By default, the atomic aggregate attribute is set unless you specify the **as-set** keyword.)

Using the **as-set** keyword creates an aggregate entry using the same rules that the command follows without this keyword, but the path advertised for this route will be an AS_SET consisting of all elements contained in all paths that are being summarized. Do not use this form of the **aggregate-address** command when aggregating many paths, because this route must be continually withdrawn and updated as autonomous system path reachability information for the summarized routes changes.

Using the **as-confed-set** keyword creates an aggregate entry using the same rules that the command follows without this keyword. This keyword performs the same function as the **as-set** keyword, except that it generates autonomous confed set path information.

Using the **summary-only** keyword not only creates the aggregate route (for example, 192.*.*) but also suppresses advertisements of more-specific routes to all neighbors. If you want to suppress only advertisements to certain neighbors, you may use the **neighbor distribute-list** command, with caution. If a more-specific

route leaks out, all BGP or mBGP routers will prefer that route over the less-specific aggregate you are generating (using longest-match routing).

Using the **suppress-map** keyword creates the aggregate route but suppresses advertisement of specified routes. You can use the **match** clauses of route maps to selectively suppress some more-specific routes of the aggregate and leave others unsuppressed. IP access lists and autonomous system path access lists match clauses are supported.

Using the **advertise-map** keyword selects specific routes that will be used to build different components of the aggregate route, such as AS_SET or community. This form of the **aggregate-address** command is useful when the components of an aggregate are in separate autonomous systems and you want to create an aggregate with AS_SET, and advertise it back to some of the same autonomous systems. You must remember to omit the specific autonomous system numbers from the AS_SET to prevent the aggregate from being dropped by the BGP loop detection mechanism at the receiving router. IP access lists and autonomous system path access lists **match** clauses are supported.

Using the **attribute-map** keyword allows attributes of the aggregate route to be changed. This form of the **aggregate-address** command is useful when one of the routes forming the AS_SET is configured with an attribute such as the community no-export attribute, which would prevent the aggregate route from being exported. An attribute map route map can be created to change the aggregate attributes.

Examples

Examples

In the following example, an aggregate BGP address is created in router configuration mode. The path advertised for this route will be an AS_SET consisting of all elements contained in all paths that are being summarized.

```
Router(config)# router bgp 50000
Router(config-router)# aggregate-address 10.0.0.0 255.0.0.0 as-set
```

Examples

In the following example, an aggregate BGP address is created in address family configuration mode and applied to the multicast database under the IP Version 4 address family. Because the **summary-only** keyword is configured, more-specific routes are filtered from updates.

```
Router(config)# router bgp 50000
Router(config-router)# address-family ipv4 multicast
Router(config-router-af)# aggregate-address 10.0.0.0 255.0.0.0 summary-only
```

Examples

In the following example, a route map called MAP-ONE is created to match on an AS-path access list. The path advertised for this route will be an AS_SET consisting of elements contained in paths that are matched in the route map.

```
Router(config)# ip as-path access-list 1 deny ^1234_
Router(config)# ip as-path access-list 1 permit .*
Router(config)# !
Router(config)# route-map MAP-ONE
Router(config-route-map)# match ip as-path 1
Router(config-route-map)# exit
Router(config)# router bgp 50000
Router(config-router)# address-family ipv4
Router(config-router-af)# aggregate-address 10.0.0.0 255.0.0.0 as-set advertise-map
MAP-ONE
Router(config-router-af)# end
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
ip as-path access-list	Defines a BGP autonomous system path access list.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
neighbor distribute-list	Distributes BGP neighbor information in an access list.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.

auto-summary (BGP)

To configure automatic summarization of subnet routes into network-level routes, use the **auto-summary** command in address family or router configuration mode. To disable automatic summarization and send subprefix routing information across classful network boundaries, use the **no** form of this command.

auto-summary

no auto-summary

Syntax Description This command has no arguments or keywords.

Command Default Automatic summarization is disabled by default (the software sends subprefix routing information across classful network boundaries).

Command Modes Address family configuration (config-router-af)
Router configuration (config-router)

Command History	Release	Modification
	10.0	This command was introduced.
	12.0(7)T	Address family configuration mode support was added.
	12.2(8)T	The command default behavior was changed to disabled.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
	15.0M, 12.2SRE	This command was modified. When an interface addressed with an address falling within the summarized range is shut down, that route no longer appears in the BGP routing table.

Usage Guidelines BGP automatically summarizes routes to classful network boundaries when this command is enabled. Route summarization is used to reduce the amount of routing information in routing tables. Automatic summarization applies to connected, static, and redistributed routes.



Note

The MPLS VPN Per VRF Label feature does not support auto-summary.

By default, automatic summarization is disabled and BGP accepts subnets redistributed from an Interior Gateway Protocol (IGP). To block subnets and create summary subprefixes to the classful network boundary when crossing classful network boundaries, use the **auto-summary** command.

To advertise and carry subnet routes in BGP when automatic summarization is enabled, use an explicit **network** command to advertise the subnet. The **auto-summary** command does not apply to routes injected into BGP via the **network** command or through iBGP or eBGP.

Why auto-summary for BGP Is Disabled By Default

When **auto-summary** is enabled, routes injected into BGP via redistribution are summarized on a classful boundary. Remember that a 32-bit IP address consists of a network address and a host address. The subnet mask determines the number of bits used for the network address and the number of bits used for the host address. The IP address classes have a natural or standard subnet mask, as shown in the table below.

Table 1: IP Address Classes

Class	Address Range	Standard Mask
A	1.0.0.0 to 126.0.0.0	255.0.0.0 or /8
B	128.1.0.0 to 191.254.0.0	255.255.0.0 or /16
C	192.0.1.0 to 223.255.254.0	255.255.255.0 or /24

Reserved addresses include 128.0.0.0, 191.255.0.0, 192.0.0.0, and 223.255.255.0.

When using the standard subnet mask, Class A addresses have one octet for the network, Class B addresses have two octets for the network, and Class C addresses have three octets for the network.

Consider the Class B address 156.26.32.1 with a 24-bit subnet mask, for example. The 24-bit subnet mask selects three octets, 156.26.32, for the network. The last octet is the host address. If the network 156.26.32.1/24 is learned via an IGP and is then redistributed into BGP, if **auto-summary** were enabled, the network would be automatically summarized to the natural mask for a Class B network. The network that BGP would advertise is 156.26.0.0/16. BGP would be advertising that it can reach the entire Class B address space from 156.26.0.0 to 156.26.255.255. If the only network that can be reached via the BGP router is 156.26.32.0/24, BGP would be advertising 254 networks that cannot be reached via this router. This is why the **auto-summary (BGP)** command is disabled by default.

Examples

In the following example, automatic summarization is enabled for IPv4 address family prefixes:

```
Router(config)# router bgp 50000
Router(config-router)# address-family ipv4 unicast
Router(config-router-af)# auto-summary
Router(config-router-af)# network 7.7.7.7 255.255.255.255
```

In the example, there are different subnets, such as 7.7.7.6 and 7.7.7.7 on Loopback interface 6 and Loopback interface 7, respectively. Both **auto-summary** and a **network** command are configured.

```
Router# show ip interface brief
Interface      IP-Address      OK? Method Status      Protocol
Ethernet0/0    100.0.1.7       YES NVRAM    up          up
Ethernet0/1    unassigned      YES NVRAM    administratively down down
```

```

Ethernet0/2      unassigned      YES NVRAM  administratively down down
Ethernet0/3      unassigned      YES NVRAM  administratively down down
Ethernet1/0      108.7.9.7       YES NVRAM  up          up
Ethernet1/1      unassigned      YES NVRAM  administratively down down
Ethernet1/2      unassigned      YES NVRAM  administratively down down
Ethernet1/3      unassigned      YES NVRAM  administratively down down
Loopback6       7.7.7.6         YES NVRAM  up          up
Loopback7       7.7.7.7         YES NVRAM  up          up

```

Note that in the output below, because of the **auto-summary** command, the BGP routing table displays the summarized route 7.0.0.0 instead of 7.7.7.6. The 7.7.7.7/32 network is displayed because it was configured with the **network** command, which is not affected by the **auto-summary** command.

```

Router# show ip bgp
BGP table version is 10, local router ID is 7.7.7.7
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, x best-external
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network        Next Hop        Metric LocPrf Weight Path
*> 6.6.6.6/32     100.0.1.6         0             0 6 i
*> 7.0.0.0        0.0.0.0           0             32768 ?  <-- summarization
*> 7.7.7.7/32     0.0.0.0           0             32768 i  <-- network command
r>i9.9.9.9/32     108.7.9.9         0          100      0 i
*> 100.0.0.0      0.0.0.0           0             32768 ?
r> 100.0.1.0/24   100.0.1.6         0             0 6 ?
*> 108.0.0.0      0.0.0.0           0             32768 ?
r>i108.7.9.0/24   108.7.9.9         0          100      0 ?
*>i200.0.1.0     108.7.9.9

```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
network (BGP and multiprotocol BGP)	Specifies the networks to be advertised by BGP and multiprotocol BGP.

bgp default ipv4-unicast

To set the IP version 4 (IPv4) unicast address family as default for BGP peering session establishment, use the **bgp default ipv4-unicast** command in router configuration mode. To disable default IPv4 unicast address family for peering session establishment, use the **no** form of this command.

bgp default ipv4-unicast

no bgp default ipv4-unicast

Syntax Description This command has no arguments or keywords.

Command Default IPv4 address family routing information is advertised by default for each BGP routing session configured with the **neighbor remote-as** command, unless you first configure the **no bgp default ipv4-unicast** command before configuring the **neighbor remote-as** command.

Command Modes Router configuration (config-router)

Command History	Release	Modification
	12.0(5)T	This command was introduced.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
	Cisco IOS XE Release 3.7S	This command was integrated into Cisco IOS XE Release 3.7S.
	15.2(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines The **bgp default ipv4-unicast** command is used to enable the automatic exchange of IPv4 address family prefixes. The **neighbor activate** address family configuration command must be entered in each IPv4 address family session before prefix exchange will occur.

Examples In the following example, the automatic exchange of IP version 4 unicast address family routing information is disabled:

```
Device(config)# router bgp 50000
Device(config-router)# no bgp default ipv4-unicast
```

Related Commands

Command	Description
neighbor activate	Enables the exchange of information with a neighboring router.

bgp fast-external-fallover

To configure a Border Gateway Protocol (BGP) routing process to immediately reset external BGP peering sessions if the link used to reach these peers goes down, use the **bgp fast-external-fallover** command in router configuration mode. To disable BGP fast external fallover, use the **no** form of this command.

bgp fast-external-fallover

no bgp fast-external-fallover

Syntax Description This command has no arguments or keywords.

Command Default BGP fast external fallover is enabled by default in Cisco IOS software.

Command Modes Router configuration (config-router)

Command History	Release	Modification
	10.0	This command was introduced.
	12.0(7)T	Address family configuration mode support was added.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines The **bgp fast-external-fallover** command is used to disable or enable fast external fallover for BGP peering sessions with directly connected external peers. The session is immediately reset if link goes down. Only directly connected peering sessions are supported.

If BGP fast external fallover is disabled, the BGP routing process will wait until the default hold timer expires (3 keepalives) to reset the peering session. BGP fast external fallover can also be configured on a per-interface basis using the **ip bgp fast-external-fallover** interface configuration command.

Examples In the following example, the BGP fast external fallover feature is disabled. If the link through which this session is carried flaps, the connection will not be reset.

```
Router(config)# router bgp 50000
```

```
Router(config-router)# no bgp fast-external-fallover
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
ip bgp fast-external-fallover	Configures per-interface BGP fast external fallover.

bgp graceful-restart

To enable the Border Gateway Protocol (BGP) graceful restart capability globally for all BGP neighbors, use the **bgp graceful-restart** command in address family or in router configuration mode. To disable the BGP graceful restart capability globally for all BGP neighbors, use the **no** form of this command.

bgp graceful-restart [**restart-time** *seconds* | **stalepath-time** *seconds*] [**all**]

no bgp graceful-restart

Syntax Description

restart-time <i>seconds</i>	(Optional) Sets the maximum time period that the local router will wait for a graceful-restart-capable neighbor to return to normal operation after a restart event occurs. The default value for this argument is 120 seconds. The configurable range of values is from 1 to 3600 seconds.
stalepath-time <i>seconds</i>	(Optional) Sets the maximum time period that the local router will hold stale paths for a restarting peer. All stale paths are deleted after this timer expires. The default value for this argument is 360 seconds. The configurable range of values is from 1 to 3600 seconds
all	(Optional) Enables BGP graceful restart capability for all address family modes.

Command Default

The following default values are used when this command is entered without any keywords or arguments:

restart-time : 120 seconds **stalepath-time**: 360 seconds



Note

Changing the restart and stalepath timer values is not required to enable the BGP graceful restart capability. The default values are optimal for most network deployments, and these values should be adjusted only by an experienced network operator.

Command Modes

Address-family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
12.0(22)S	This command was introduced.

Release	Modification
12.2(15)T	This command was integrated into Cisco IOS Release 12.2(15)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(28)SB	Support for this command was added into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	Support for IPv6 was added. The optional all keyword was added.
12.2(33)SRE	This command was modified. It was integrated into Cisco IOS Release 12.2(33)SRE.
12.2(33)XNE	This command was modified. It was integrated into Cisco IOS Release 12.2(33)XNE .

Usage Guidelines

The **bgp graceful-restart** command is used to enable or disable the graceful restart capability globally for all BGP neighbors in a BGP network. The graceful restart capability is negotiated between nonstop forwarding (NSF)-capable and NSF-aware peers in OPEN messages during session establishment. If the graceful restart capability is enabled after a BGP session has been established, the session will need to be restarted with a soft or hard reset.

The graceful restart capability is supported by NSF-capable and NSF-aware routers. A router that is NSF-capable can perform a stateful switchover (SSO) operation (graceful restart) and can assist restarting peers by holding routing table information during the SSO operation. A router that is NSF-aware functions like a router that is NSF-capable but cannot perform an SSO operation.

The BGP graceful restart capability is enabled by default when a supporting version of Cisco IOS software is installed. The default timer values for this feature are optimal for most network deployments. We recommend that they are adjusted only by experienced network operators. When adjusting the timer values, the restart timer should not be set to a value greater than the hold time that is carried in the OPEN message. If consecutive restart operations occur, routes (from a restarting router) that were previously marked as stale will be deleted.



Note

Changing the restart and stalepath timer values is not required to enable the BGP graceful restart capability. The default values are optimal for most network deployments, and these values should be adjusted only by an experienced network operator.

Examples

In the following example, the BGP graceful restart capability is enabled:

```
Router# configure terminal
Router(config)# router bgp 65000
Router(config-router)# bgp graceful-restart
```


In the following example, the restart timer is set to 130 seconds:

```
Router# configure terminal
Router(config)# router bgp 65000
Router(config-router)# bgp graceful-restart restart-time 130
```

In the following example, the stalepath timer is set to 350 seconds:

```
Router# configure terminal
Router(config)# router bgp 65000
Router(config-router)# bgp graceful-restart stalepath-time 350
```

Related Commands

Command	Description
show ip bgp	Displays entries in the BGP routing table.
show ip bgp neighbors	Displays information about the TCP and BGP connections to neighbors.

bgp log-neighbor-changes

To enable logging of BGP neighbor resets, use the **bgp log-neighbor-changes** command in router configuration mode. To disable the logging of changes in BGP neighbor adjacencies, use the **no** form of this command.

bgp log-neighbor-changes

no bgp log-neighbor-changes

Syntax Description This command has no arguments or keywords.

Command Default Logging of BGP neighbor resets is not enabled.

Command Modes Router configuration (config-router)

Command History	Release	Modification
	11.1CC	This command was introduced.
	12.0	This command was integrated into Cisco IOS release 12.0.
	12.0(7)T	Address family configuration mode support was added.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SRB	Support for IPv6 was added.
	12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
	12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.
	Cisco IOS XE Release 3.7S	This command was integrated into Cisco IOS XE Release 3.7S.
	15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines The **bgp log-neighbor-changes** command enables logging of BGP neighbor status changes (up or down) and resets for troubleshooting network connectivity problems and measuring network stability. Unexpected neighbor resets might indicate high error rates or high packet loss in the network and should be investigated.

Using the **bgp log-neighbor-changes** command to enable status change message logging does not cause a substantial performance impact, unlike, for example, enabling per BGP update debugging. If the UNIX syslog facility is enabled, messages are sent to the UNIX host running the syslog daemon so that the messages can be stored and archived. If the UNIX syslog facility is not enabled, the status change messages are retained in

the internal buffer of the router, and are not stored to disk. You can set the size of this buffer, which is dependent upon the available RAM, using the **logging buffered** command.

The neighbor status change messages are not tracked if the **bgp log-neighbor-changes** command is not enabled, except for the reset reason, which is always available as output of the **show ip bgp neighbors** and **show bgp ipv6 neighbors** commands.

The **eigrp log-neighbor-changes** command enables logging of Enhanced Interior Gateway Routing Protocol (EIGRP) neighbor adjacencies, but messages for BGP neighbors are logged only if they are specifically enabled with the **bgp log-neighbor-changes** command.

Use the **show logging** command to display the log for the BGP neighbor changes.

Examples

The following example logs neighbor changes for BGP in router configuration mode:

```
Device(config)# bgp router 40000
Device(config-router)# bgp log-neighbor-changes
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
eigrp log-neighbor-changes	Enables the logging of neighbor adjacency changes to monitor the stability of the routing system and to help detect problems.
logging buffered	Logs messages to an internal buffer.
show ip bgp ipv4	Displays information about the TCP and BGP connections to neighbors.
show ip bgp neighbors	Displays information about BGP neighbors.
show logging	Displays the state of logging (syslog).

bgp router-id

To configure a fixed router ID for the local Border Gateway Protocol (BGP) routing process, use the **bgp router-id** command in router or address family configuration mode. To remove the fixed router ID from the running configuration file and restore the default router ID selection, use the **no** form of this command.

Router Configuration

bgp router-id {*ip-address*| **vrf auto-assign**}

no bgp router-id [**vrf auto-assign**]

Address Family Configuration

bgp router-id {*ip-address*| **auto-assign**}

no bgp router-id

Syntax Description

<i>ip-address</i>	Router identifier in the form of an IP address.
vrf	Configures a router identifier for a Virtual Routing and Forwarding (VRF) instance.
auto-assign	Automatically assigns a router identifier for each VRF.

Command Default

The following behavior determines local router ID selection when this command is not enabled:

- If a loopback interface is configured, the router ID is set to the IP address of the loopback interface. If multiple loopback interfaces are configured, the router ID is set to the IP address of the loopback interface with the highest IP address.
- If no loopback interface is configured, the router ID is set to the highest IP address on a physical interface.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	The vrf and auto-assign keywords were added, and this command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command, including the vrf and auto-assign keywords, was integrated into Cisco IOS Release 12.2(31)SB2.

Release	Modification
12.2(33)SXH	This command, including the vrf and auto-assign keywords, was integrated into Cisco IOS Release 12.2(33)SXH.
12.4(20)T	The vrf and auto-assign keywords were added.

Usage Guidelines

The **bgp router-id** command is used to configure a fixed router ID for the local BGP routing process. The router ID is entered in IP address format. Any valid IP address can be used, even an address that is not locally configured on the router. If you use an IP address from a local interface, we recommend that you use the address of a loopback interface rather than the address of a physical interface. (A loopback interface is more effective than a fixed interface as an identifier because there is no physical link to go down.) Peering sessions are automatically reset when the router ID is changed.

In Cisco IOS Release 12.2(33)SRA, 12.2(31)SB2, 12.2(33)SXH, 12.4(20)T, and later releases, the Per-VRF Assignment of BGP Router ID feature introduced VRF-to-VRF peering in BGP on the same router. BGP is designed to refuse a session with itself because of the router ID check. The per-VRF assignment feature allows a separate router ID per VRF. The router ID can be manually configured for each VRF or automatically assigned either for each VRF or globally under address family configuration mode.

Examples

The following example shows how to configure the local router with a fixed BGP router ID of 192.168.254.254:

```
router bgp 50000
  bgp router-id 192.168.254.254
```

The following example shows how to configure a BGP router ID for the VRF named VRF1. This configuration is done under address family IPv4 VRF configuration mode.

```
router bgp 45000
  address-family ipv4 vrf VRF1
    bgp router-id 10.1.1.99
```

The following example shows how to configure an automatically assigned VRF BGP router ID for all VRFs. This configuration is done under BGP router configuration mode.

```
router bgp 45000
  bgp router-id vrf auto-assign
```

The following example shows how to configure an automatically assigned VRF BGP router ID for a single VRF. This configuration is done under address family IPv4 VRF configuration mode.

```
router bgp 45000
  address-family ipv4 vrf VRF2
    bgp router-id auto-assign
```

Related Commands

Command	Description
show ip bgp	Displays entries in the BGP routing table.
show ip bgp vpnv4	Displays VPNv4 address information from the BGP routing table.

bgp soft-reconfig-backup

To configure a Border Gateway Protocol (BGP) speaker to perform inbound soft reconfiguration for peers that do not support the route refresh capability, use the **bgp soft-reconfig-backup** command in address-family or router configuration mode. To disable this function, use the **no** form of this command.

bgp soft-reconfig-backup

no bgp soft-reconfig-backup

Syntax Description

This command has no arguments or keywords.

Command Default

Inbound soft reconfiguration for peers that do not support the route refresh capability is not performed.

Command Modes

Address-family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
12.3(14)T	This command was introduced.

Usage Guidelines

The **bgp soft-reconfig-backup** command is used to configure BGP to perform inbound soft reconfiguration for peers that do not support the route refresh capability. The configuration of this command allows you to configure BGP to store updates (soft reconfiguration) only as necessary. Peers that support the route refresh capability are unaffected by the configuration of this command.

Use the **show ip bgp neighbors** command to determine if a peer supports the route refresh capability. If supported, the following will be displayed in the output:

```
Route refresh: advertised and received(new)
```

Use the **show ip bgp** command to determine if the BGP speaker is storing inbound updates for peer that does not support the route refresh capability. If updates are stored, the following will be displayed in the output:

```
(received-only)
```

Examples

The following example, starting in Global configuration mode, configures the router perform inbound soft reconfiguration only if the peer does not support the route refresh capability:


```
Router(config)# router bgp 50000
Router(config-router)# bgp soft-reconfig-backup

Router(config-router)# neighbor 10.1.1.1 remote-as 40000

Router(config-router)# neighbor 192.168.1.1 remote-as 60000
```

Related Commands

Command	Description
show ip bgp	Displays entries in the Border Gateway Protocol (BGP) routing table.
show ip bgp neighbors	Displays information about the TCP and Border Gateway Protocol (BGP) connections to neighbors.

 **bgp soft-reconfig-backup**



BGP Commands_ C through I

- [clear bgp ipv6, page 28](#)
- [clear ip bgp, page 32](#)
- [continue, page 37](#)
- [default-metric \(BGP\), page 43](#)
- [exit-peer-session, page 46](#)
- [ha-mode graceful-restart, page 47](#)
- [ip community-list, page 49](#)
- [ip extcommunity-list, page 55](#)
- [ip prefix-list, page 62](#)

clear bgp ipv6

To reset IPv6 Border Gateway Protocol (BGP) sessions, use the **clear bgp ipv6** command in privileged EXEC mode.

[1](#)

Syntax Description

unicast	Specifies IPv6 unicast address prefixes.
multicast	Specifies IPv6 multicast address prefixes.
*	Resets all current BGP sessions.
<i>autonomous-system-number</i>	Resets BGP sessions for BGP neighbors within the specified autonomous system.
<i>ip-address</i>	Resets the TCP connection to the specified IPv4 BGP neighbor and removes all routes learned from the connection from the BGP table.
<i>ipv6-address</i>	Resets the TCP connection to the specified IPv6 BGP neighbor and removes all routes learned from the connection from the BGP table. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>peer-group-name</i>	Resets the TCP connection to the specified IPv6 BGP neighbor and removes all routes learned from the connection from the BGP table.
soft	(Optional) Soft reset. Does not reset the session.
in out	(Optional) Triggers inbound or outbound soft reconfiguration. If the in or out option is not specified, both inbound and outbound soft resets are triggered.

Command Default No reset is initiated.

Command Modes Privileged EXEC

Command History

Release	Modification
12.2(2)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.3(2)T	The unicast keyword was added to Cisco IOS Release 12.3(2)T.
12.0(26)S	The unicast and multicast keywords were added to Cisco IOS Release 12.0(26)S.
12.3(4)T	The multicast keyword was added to Cisco IOS Release 12.3(4)T.
12.2(25)S	The multicast keyword was added to Cisco IOS Release 12.2(25)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

The **clear bgp ipv6** command is similar to the **clear ip bgp** command, except that it is IPv6-specific.

Use of the **clear bgp ipv6** command allows a reset of the neighbor sessions with varying degrees of severity depending on the specified keywords and arguments.

Use the **clear bgp ipv6 unicast** command to drop neighbor sessions with IPv6 unicast address prefixes.

The **unicast** keyword is available in Cisco IOS Release 12.3(2)T and later releases. It is not available in releases prior to 12.3(2)T. Use of the **unicast** keyword is mandatory starting with Cisco IOS Release 12.3(2)T.

The **multicast** keyword is available in Cisco IOS Release 12.0(26)S and later releases. It is not available in releases prior to 12.0(26)S. Use of either the **unicast** or **multicast** keyword is mandatory starting with Cisco IOS Release 12.0(26)S.

Use the **clear bgp ipv6 *** command to drop all neighbor sessions. The Cisco IOS software will then reset the neighbor connections. Use this form of the command in the following situations:

- BGP timer specification change
- BGP administrative distance changes

Use the **clear bgp ipv6 soft out** or the **clear bgp ipv6 unicast soft out** command to drop only the outbound neighbor connections. Inbound neighbor sessions will not be reset. Use this form of the command in the following situations:

- BGP-related access lists change or get additions
- BGP-related weights change
- BGP-related distribution lists change
- BGP-related route maps change

Use the **clear bgp ipv6 soft in** or the **clear bgp ipv6 unicast soft in** command to drop only the inbound neighbor connections. Outbound neighbor sessions will not be reset. To reset inbound routing table updates dynamically for a neighbor, you must configure the neighbor to support the router refresh capability. To determine whether a BGP neighbor supports this capability, use the **show bgp ipv6 neighbors** or the **show bgp ipv6 unicast neighbors** command. If a neighbor supports the route refresh capability, the following message is displayed:

Received route refresh capability from peer.

If all BGP networking devices support the route refresh capability, use the **clear bgp ipv6** *{*| ip-address| ipv6-address| peer-group-name}* **in** or the **clear bgp ipv6 unicast** *{*| ip-address| ipv6-address| peer-group-name}* **in** command. Use of the **soft** keyword is not required when the route refresh capability is supported by all BGP networking devices, because the software automatically performs a soft reset.

Use this form of the command in the following situations:

- BGP-related access lists change or get additions
- BGP-related weights change
- BGP-related distribution lists change
- BGP-related route maps change

Examples

The following example clears the inbound session with the neighbor 7000::2 without the outbound session being reset:

```
Router# clear bgp ipv6 unicast 7000::2 soft in
```

The following example uses the **unicast** keyword and clears the inbound session with the neighbor 7000::2 without the outbound session being reset:

```
Router# clear bgp ipv6 unicast 7000::2 soft in
```

The following example clears the outbound session with the peer group named marketing without the inbound session being reset:

```
Router# clear bgp ipv6 unicast marketing soft out
```

The following example uses the **unicast** keyword and clears the outbound session with the peer group named peer-group marketing without the inbound session being reset:

```
Router# clear bgp ipv6 unicast peer-group marketing soft out
```

Related Commands

Command	Description
show bgp ipv6	Displays entries in the IPv6 BGP routing table.

clear ip bgp

To reset Border Gateway Protocol (BGP) connections using hard or soft reconfiguration, use the **clear ip bgp** command in privileged EXEC mode.

clear ip bgp {***| **all**| *autonomous-system-number*| *neighbor-address*| **peer-group** *group-name*} [**in** |**prefix-filter**]| **out**| **slow**| **soft** [**in** |**prefix-filter**]| **out**| **slow**]]

Syntax Description

<i>*</i>	Specifies that all current BGP sessions will be reset.
all	(Optional) Specifies the reset of all address family sessions.
<i>autonomous-system-number</i>	<p>Number of the autonomous system in which all BGP peer sessions will be reset. Number in the range from 1 to 65535.</p> <ul style="list-style-type: none"> • In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, 4-byte autonomous system numbers are supported in the range from 65536 to 4294967295 in asplain notation and in the range from 1.0 to 65535.65535 in asdot notation. • In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, 4-byte autonomous system numbers are supported in the range from 1.0 to 65535.65535 in asdot notation only. <p>For more details about autonomous system number formats, see the router bgp command.</p>
<i>neighbor-address</i>	Specifies that only the identified BGP neighbor will be reset. The value for this argument can be an IPv4 or IPv6 address.
peer-group <i>group-name</i>	Specifies that only the identified BGP peer group will be reset.
in	(Optional) Initiates inbound reconfiguration. If neither the in nor out keywords are specified, both inbound and outbound sessions are reset.
prefix-filter	(Optional) Clears the existing outbound route filter (ORF) prefix list to trigger a new route refresh or soft reconfiguration, which updates the ORF prefix list.

out	(Optional) Initiates inbound or outbound reconfiguration. If neither the in nor out keywords are specified, both inbound and outbound sessions are reset.
slow	(Optional) Clears slow-peer status forcefully and moves it to original update group.
soft	(Optional) Initiates a soft reset. Does not tear down the session.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.0(2)S	This command was integrated into Cisco IOS Release 12.0(2)S, and dynamic inbound soft reset capability was added.
12.0(7)T	The dynamic inbound soft reset capability was integrated into Cisco IOS Release 12.0(7)T.
12.0(22)S	The vpn4 and ipv4 keywords were added.
12.0(29)S	The mdt keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.0(32)S12	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.0(32)SY8	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
Cisco IOS XE Release 2.3	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.

Release	Modification
Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
15.0(1)S	This command was modified. The slow keyword was added.
Cisco IOS XE 3.1S	This command was modified. The slow keyword was added.

Usage Guidelines

The **clear ip bgp** command can be used to initiate a hard reset or soft reconfiguration. A hard reset tears down and rebuilds the specified peering sessions and rebuilds the BGP routing tables. A soft reconfiguration uses stored prefix information to reconfigure and activate BGP routing tables without tearing down existing peering sessions. Soft reconfiguration uses stored update information, at the cost of additional memory for storing the updates, to allow you to apply new BGP policy without disrupting the network. Soft reconfiguration can be configured for inbound or outbound sessions.



Note

Due to the complexity of some of the keywords available for the **clear ip bgp** command, some of the keywords are documented as separate commands. All of the complex keywords that are documented separately start with **clear ip bgp**. For example, for information on resetting BGP connections using hard or soft reconfiguration for all BGP neighbors in IPv4 address family sessions, refer to the **clear ip bgp ipv4** command.

Generating Updates from Stored Information

To generate new inbound updates from stored update information (rather than dynamically) without resetting the BGP session, you must preconfigure the local BGP router using the **neighbor soft-reconfiguration inbound** command. This preconfiguration causes the software to store all received updates without modification regardless of whether an update is accepted by the inbound policy. Storing updates is memory intensive and should be avoided if possible.

Outbound BGP soft configuration has no memory overhead and does not require any preconfiguration. You can trigger an outbound reconfiguration on the other side of the BGP session to make the new inbound policy take effect.

Use this command whenever any of the following changes occur:

- Additions or changes to the BGP-related access lists
- Changes to BGP-related weights
- Changes to BGP-related distribution lists
- Changes to BGP-related route maps

Dynamic Inbound Soft Reset

The route refresh capability, as defined in RFC 2918, allows the local router to reset inbound routing tables dynamically by exchanging route refresh requests to supporting peers. The route refresh capability does not store update information locally for non-disruptive policy changes. It instead relies on dynamic exchange with supporting peers. Route refresh is advertised through BGP capability negotiation. All BGP routers must support the route refresh capability.

To determine if a BGP router supports this capability, use the **show ip bgp neighbors** command. The following message is displayed in the output when the router supports the route refresh capability:

```
Received route refresh capability from peer.
```

If all BGP routers support the route refresh capability, use the **clear ip bgp** command with the **in** keyword. You need not use the **soft** keyword, because soft reset is automatically assumed when the route refresh capability is supported.



Note

After configuring a soft reset (inbound or outbound), it is normal for the BGP routing process to hold memory. The amount of memory that is held depends on the size of routing tables and the percentage of the memory chunks that are utilized. Partially used memory chunks will be used or released before more memory is allocated from the global router pool.

Examples

In the following example, a soft reconfiguration is initiated for the inbound session with the neighbor 10.100.0.1, and the outbound session is unaffected:

```
Router#
clear ip bgp 10.100.0.1 soft in
```

In the following example, the route refresh capability is enabled on the BGP neighbor routers and a soft reconfiguration is initiated for the inbound session with the neighbor 172.16.10.2, and the outbound session is unaffected:

```
Router#
clear ip bgp 172.16.10.2 in
```

In the following example, a hard reset is initiated for sessions with all routers in the autonomous system numbered 35700:

```
Router#
clear ip bgp 35700
```

In the following example, a hard reset is initiated for sessions with all routers in the 4-byte autonomous system numbered 65538 in asplain notation. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or a later release.

```
Router#
clear ip bgp 65538
```

In the following example, a hard reset is initiated for sessions with all routers in the 4-byte autonomous system numbered 1.2 in asdot notation. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(32)S12, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, 12.4(24)T, and Cisco IOS XE Release 2.3, or a later release.

```
Router#
clear ip bgp 1.2
```

Related Commands

Command	Description
bgp slow-peer split-update-group dynamic permanent	Moves a dynamically detected slow peer to a slow update group.
clear ip bgp ipv4	Resets BGP connections using hard or soft reconfiguration for IPv4 address family sessions.
clear ip bgp ipv6	Resets BGP connections using hard or soft reconfiguration for IPv6 address family sessions.
clear ip bgp vpnv4	Resets BGP connections using hard or soft reconfiguration for VPNv4 address family sessions.
clear ip bgp vpnv6	Resets BGP connections using hard or soft reconfiguration for VPNv6 address family sessions.
neighbor slow-peer split-update-group dynamic permanent	Moves a dynamically detected slow peer to a slow update group.
neighbor soft-reconfiguration	Configures the Cisco IOS software to start storing updates.
router bgp	Configures the BGP routing process.
show ip bgp	Displays entries in the BGP routing table.
show ip bgp neighbors	Displays information about BGP and TCP connections to neighbors.
slow-peer split-update-group dynamic permanent	Moves a dynamically detected slow peer to a slow update group.

continue

To configure a route map to go to a route-map entry with a higher sequence number, use the **continue** command in route-map configuration mode. To remove a continue clause from a route map, use the **no** form of this command.

continue [*sequence-number*]

no continue

Syntax Description

<i>sequence-number</i>	(Optional) Route-map sequence number. If a route-map sequence number is not specified when configuring a continue clause, the continue clause will continue to the route-map entry with the next sequence number. This behavior is referred to as an “implied continue.”
------------------------	---

Command Default

If the sequence number argument is not configured when this command is entered, the continue clause will go to the route-map entry with the next default sequence number.

If a route-map entry contains a continue clause and no match clause, the continue clause will be executed automatically.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
12.0(22)S	This command was introduced.
12.3(2)T	This command was integrated into Cisco IOS Release 12.3(2)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.0(31)S	Support for outbound route maps was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **continue** command supports inbound route maps only in Cisco IOS Release 12.2(18)S and prior releases. Support for both inbound and outbound route maps was introduced in Cisco IOS Release 12.0(31)S and later releases.

Route Map Operation Without Continue Clauses

A route map evaluates match clauses until a successful match occurs. After the match occurs, the route map stops evaluating match clauses and starts executing set clauses, in the order in which they were configured. If a successful match does not occur, the route map “falls through” and evaluates the next sequence number of the route map until all configured route-map entries have been evaluated or a successful match occurs. Each route-map sequence is tagged with a sequence number to identify the entry. Route-map entries are evaluated in order starting with the lowest sequence number and ending with the highest sequence number. If the route map contains only set clauses, the set clauses will be executed automatically, and the route map will not evaluate any other route-map entries.

Route Map Operation With Continue Clauses

When a continue clause is configured, the route map will continue to evaluate and execute match clauses in the specified route-map entry after a successful match occurs. The continue clause can be configured to go to (or jump to) a specific route-map entry by specifying the sequence number, or if a sequence number is not specified, the continue clause will go to the next sequence number. This behavior is called an “implied continue.” If a match clause exists, the continue clause is executed only if a match occurs. If no successful matches occur, the continue clause is ignored.

Match Operations With Continue Clauses

If a match clause does not exist in the route-map entry but a continue clause does, the continue clause will be automatically executed and go to the specified route-map entry. If a match clause exists in a route-map entry, the continue clause is executed only when a successful match occurs. When a successful match occurs and a continue clause exists, the route map executes the set clauses and then goes to the specified route-map entry. If the next route map contains a continue clause, the route map will execute the continue clause if a successful match occurs. If a continue clause does not exist in the next route map, the route map will be evaluated normally. If a continue clause exists in the next route map but a match does not occur, the route map will not continue and will “fall through” to the next sequence number if one exists.

Set Operations With Continue Clauses

Set clauses are saved during the match clause evaluation process and executed after the route-map evaluation is completed. The set clauses are evaluated and executed in the order in which they were configured. Set clauses are only executed after a successful match occurs, unless the route map does not contain a match clause. The continue statement proceeds to the specified route-map entry only after configured set actions are performed. If a set action occurs in the first route map and then the same set action occurs again, with a different value, in a subsequent route-map entry, the last set action will override any previous set actions that were configured with the same **set** command.



Note

A continue clause can be executed, without a successful match, if a route-map entry does not contain a match clause.

Examples

In the following example, continue clause configuration is shown.

The first continue clause in route-map entry 10 indicates that the route map will go to route-map entry 30 if a successful matches occurs. If a match does not occur, the route map will “fall through” to route-map entry 20. If a successful match occurs in route-map entry 20, the set action will be executed and the route-map will not evaluate any additional route-map entries. Only the first successful **match ip address** clause is supported.

If a successful match does not occur in route-map entry 20, the route-map will “fall through” to route-map entry 30. This sequence does not contain a match clause, so the set clause will be automatically executed and the continue clause will go to the next route-map entry because a sequence number is not specified.

If there are no successful matches, the route-map will “fall through” to route-map entry 30 and execute the set clause. A sequence number is not specified for the continue clause so route-map entry 40 will be evaluated.

```
Router(config)# route-map ROUTE-MAP-NAME permit 10
Router(config-route-map)# match ip address 1
Router(config-route-map)# match metric 10
Router(config-route-map)# set as-path prepend 10
Router(config-route-map)# continue 30
Router(config-route-map)# exit
Router(config)# route-map ROUTE-MAP-NAME permit 20
Router(config-route-map)# match ip address 2
Router(config-route-map)# match metric 20
Router(config-route-map)# set as-path prepend 10 10
Router(config-route-map)# exit
Router(config)# route-map ROUTE-MAP-NAME permit 30
Router(config-route-map)# set as-path prepend 10 10 10
Router(config-route-map)# continue
Router(config-route-map)# exit
Router(config)# route-map ROUTE-MAP-NAME permit 40
Router(config-route-map)# match community 10:1
Router(config-route-map)# set local-preference 104
Router(config-route-map)# exit
```

Related Commands

Command	Description
aggregate-address	Creates an aggregate entry in a BGP or multicast BGP database.
match as-path	Match BGP autonomous system path access lists.
match community	Matches a BGP community.
match extcommunity	Matches a BGP extended community.
match interface (IP)	Distributes routes that have their next hop out one of the interfaces specified.
match ip address	Distributes any routes that have a destination network number address permitted by a standard or extended access list, or performs policy routing on packets.

Command	Description
match ip next-hop	Redistributes any routes that have a next-hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match length	Bases policy routing on the Level 3 length of a packet.
match metric (IP)	Redistributes routes with the metric specified.
match mpls-label	Redistributes routes that include MPLS labels if the routes meet the conditions specified in the route map.
match route-type (IP)	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
neighbor default-originate	Allows a BGP speaker (the local router) to send the default route 0.0.0.0 to a neighbor for use as a default route.
neighbor route-map	Applies a route map to incoming or outgoing routes.
neighbor remote-as	Adds an entry to the BGP or multiprotocol BGP neighbor table.
redistribute (IP)	Redistributes routes from one routing domain into another routing domain.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol to another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value in a route-map configuration.
set comm-list delete	Removes communities from the community attribute of an inbound or outbound update.
set community	Sets the BGP communities attribute.
set dampening	Sets the BGP route dampening factors.

Command	Description
set default interface	Indicates where to output packets that pass a match clause of a route map for policy routing and have no explicit route to the destination.
set extcommunity	Sets the BGP extended communities attribute.
set interface	Indicates where to output packets that pass a match clause of route map for policy routing.
set ip default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco IOS software has no explicit route to a destination.
set ip default next-hop verify-availability	Configures a router to check the CDP database for the availability of an entry for the default next hop that is specified by the set ip default next-hop command.
set ip next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing.
set ip next-hop verify-availability	Configures policy routing to verify if the next hops of a route map are CDP neighbors before policy routing to those next hops.
set ip precedence	Sets the precedence value in the IP header.
set level (IP)	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set mpls-label	Enables a route to be distributed with an MPLS label if the route matches the conditions specified in the route map.
set next-hop	Specifies the address of the next hop.
set nlri	This command was replaced by the address-family ipv4 and address-family vpnv4 commands.
set origin (BGP)	Sets the BGP origin code.
set qos-group	Sets a group ID that can be used later to classify packets.
set tag (IP)	Sets the value of the destination routing protocol.

Command	Description
set traffic-index	Defines where to output packets that pass a match clause of a route map for BGP policy accounting.
set weight	Specifies the BGP weight for the routing table.
show ip bgp	Displays entries in the BGP routing table.
show route-map	Displays all route maps configured or only the one specified.

default-metric (BGP)

To set a default metric for routes redistributed into Border Gateway Protocol (BGP), use the **default-metric** command in address family or router configuration mode. To remove the configured value and return BGP to default operation, use the **no** form of this command.

default-metric *number*

no default-metric *number*

Syntax Description

<i>number</i>	Default metric value applied to the redistributed route. The range of values for this argument is from 1 to 4294967295.
---------------	---

Command Default

The following is default behavior if this command is not configured or if the **no** form of this command is entered:

- The metric of redistributed interior gateway protocol (IGP) routes is set to a value that is equal to the interior BGP (iBGP) metric.
- The metric of redistributed connected and static routes is set to 0.

When this command is enabled, the metric for redistributed connected routes is set to 0.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.0(7)T	Address family configuration mode support was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **default-metric** command is used to set the metric value for routes redistributed into BGP and can be applied to any external BGP (eBGP) routes received and subsequently advertised internally to iBGP peers.

This value is the Multi Exit Discriminator (MED) that is evaluated by BGP during the best path selection process. The MED is a non-transitive value that is processed only within the local autonomous system and adjacent autonomous systems. The default metric is not set if the received route has a MED value.

**Note**

When enabled, the **default-metric** command applies a metric value of 0 to redistributed connected routes. The **default-metric** command does not override metric values that are applied with the **redistribute** command.

Examples

In the following example, a metric of 1024 is set for routes redistributed into BGP from OSPF:

```
Router(config)# router bgp 50000
Router(config-router)# address-family ipv4 unicast
```

```
Router(config-router-af)# default-metric 1024
Router(config-router-af)# redistribute ospf 10
Router(config-router-af)# end
```

In the following configuration and output examples, a metric of 300 is set for eBGP routes received and advertised internally to an iBGP peer.

```
Router(config)# router bgp 65501
Router(config-router)# no synchronization
Router(config-router)# bgp log-neighbor-changes
Router(config-router)# network 172.16.1.0 mask 255.255.255.0
Router(config-router)# neighbor 172.16.1.1 remote-as 65501
Router(config-router)# neighbor 172.16.1.1 soft-reconfiguration inbound
Router(config-router)# neighbor 192.168.2.2 remote-as 65502
Router(config-router)# neighbor 192.168.2.2 soft-reconfiguration inbound
Router(config-router)# default-metric 300
Router(config-router)# no auto-summary
```

After the above configuration, some routes are received from the eBGP peer at 192.168.2.2 as shown in the output from the **show ip bgp neighbors received-routes** command.

```
Router# show ip bgp neighbors 192.168.2.2 received-routes
```

```
BGP table version is 7, local router ID is 192.168.2.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network        Next Hop           Metric LocPrf Weight Path
*> 172.17.1.0/24   192.168.2.2                 0 65502 i
```

After the received routes from the eBGP peer at 192.168.2.2 are advertised internally to iBGP peers, the output from the **show ip bgp neighbors received-routes** command shows that the metric (MED) has been set to 300 for these routes.

```
Router# show ip bgp neighbors 172.16.1.2 received-routes
BGP table version is 2, local router ID is 172.16.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network        Next Hop           Metric LocPrf Weight Path
* i172.16.1.0/24   172.16.1.2                 0 100 0 i
* i172.17.1.0/24   192.168.2.2              300 100 0 65502 i
Total number of prefixes 2
```

Related Commands

Command	Description
redistribute (IP)	Redistributes routes from one routing domain into another routing domain.

exit-peer-session

To exit session-template configuration mode and enter router configuration mode, use the **exit-peer-session** command in session-template configuration mode.

exit-peer-session

Syntax Description

This command has no arguments or keywords.

Command Default

No default behavior or values

Command Modes

Session-template configuration (config-router-stmp)

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Examples

In the following example, the router is configured to exit session-template configuration mode and enter router configuration mode:

```
Router(config-router-stmp) # exit-peer-session
Router(config-router) #
```

Related Commands

Command	Description
template peer-session	Creates a peer session template and enters session-template configuration mode.

ha-mode graceful-restart

To enable or disable the Border Gateway Protocol (BGP) graceful restart capability for a BGP peer session template, use the **ha-mode graceful-restart** command in peer session template configuration mode. To remove from the configuration the BGP graceful restart capability for a BGP peer session template, use the **no** form of this command.

ha-mode graceful-restart [disable]

no ha-mode graceful-restart [disable]

Syntax Description

disable	(Optional) Disables BGP graceful restart capability for a neighbor.
----------------	---

Command Default

BGP graceful restart is disabled.

Command Modes

Peer session template configuration (config-router-stmp)

Command History

Release	Modification
12.2(33)SRC	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG.
Cisco IOS XE 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.

Usage Guidelines

The **ha-mode graceful-restart** command is used to enable or disable the graceful restart capability for a BGP peer session template. Use the **disable** keyword to disable the graceful restart capability when graceful restart has been previously enabled for the BGP peer.

The graceful restart capability is negotiated between nonstop forwarding (NSF)-capable and NSF-aware peers in OPEN messages during session establishment. If the graceful restart capability is enabled after a BGP session has been established, the session will need to be restarted with a soft or hard reset.

The graceful restart capability is supported by NSF-capable and NSF-aware routers. A router that is NSF-capable can perform a stateful switchover (SSO) operation (graceful restart) and can assist restarting peers by holding routing table information during the SSO operation. A router that is NSF-aware functions like a router that is NSF-capable but cannot perform an SSO operation.

Peer session templates are used to group and apply the configuration of general BGP session commands to groups of neighbors that share session configuration elements. General session commands that are common for neighbors that are configured in different address families can be configured within the same peer session

template. Peer session templates are created and configured in peer session configuration mode. Only general session commands can be configured in a peer session template.

General session commands can be configured once in a peer session template and then applied to many neighbors through the direct application of a peer session template or through indirect inheritance from a peer session template. The configuration of peer session templates simplifies the configuration of general session commands that are commonly applied to all neighbors within an autonomous system.

To enable the BGP graceful restart capability globally for all BGP neighbors, use the **bgp graceful-restart** command. Use the **show ip bgp neighbors** command to verify the BGP graceful restart configuration for BGP neighbors.

Examples

The following example enables the BGP graceful restart capability for the BGP peer session template named S1 and disables the BGP graceful restart capability for the BGP peer session template named S2. The external BGP neighbor at 192.168.1.2 inherits peer session template S1, and the BGP graceful restart capability is enabled for this neighbor. Another external BGP neighbor, 192.168.3.2, is configured with the BGP graceful restart capability disabled after inheriting peer session template S2.

```
router bgp 45000
 template peer-session S1
  remote-as 40000
  ha-mode graceful-restart
 exit-peer-session
 template peer-session S2
  remote-as 50000
  ha-mode graceful-restart disable
 exit-peer-session
 bgp log-neighbor-changes
 neighbor 192.168.1.2 remote-as 40000
 neighbor 192.168.1.2 inherit peer-session S1
 neighbor 192.168.3.2 remote-as 50000
 neighbor 192.168.3.2 inherit peer-session S2
 end
```

Related Commands

Command	Description
bgp graceful-restart	Enables the BGP graceful restart capability globally for all BGP neighbors.
neighbor ha-mode graceful-restart	Enables or disables the BGP graceful restart capability for a BGP neighbor or peer group.
show ip bgp neighbors	Displays information about the TCP and BGP connections to neighbors.

ip community-list

To configure a BGP community list and to control which routes are permitted or denied based on their community values, use the **ip community-list** command in global configuration mode. To delete the community list, use the **no** form of this command.

Standard Community Lists

ip community-list {*standard*|**standard** *list-name*} {**deny**|**permit**} [*community-number*] [*AA:NN*] [**internet**] [**local-as**] [**no-advertise**] [**no-export**] [**gshut**]

no ip community-list {*standard*|**standard** *list-name*}

Expanded Community Lists

ip community-list {*expanded*|**expanded** *list-name*} {**deny**|**permit**} *regex*

no ip community-list {*expanded*|**expanded** *list-name*}

Syntax Description

<i>standard</i>	Standard community list number from 1 to 99 to identify one or more permit or deny groups of communities.
standard <i>list-name</i>	Configures a named standard community list.
deny	Denies routes that match the specified community or communities.
permit	Permits routes that match the specified community or communities.
<i>community-number</i>	(Optional) 32-bit number from 1 to 4294967200. A single community can be entered or multiple communities can be entered, each separated by a space.

<i>AA :NN</i>	(Optional) Autonomous system number and network number entered in the 4-byte new community format. This value is configured with two 2-byte numbers separated by a colon. A number from 1 to 65535 can be entered for each 2-byte number. A single community can be entered or multiple communities can be entered, each separated by a space.
internet	(Optional) Specifies the Internet community. Routes with this community are advertised to all peers (internal and external).
local-as	(Optional) Specifies the local-as community. Routes with community are advertised to only peers that are part of the local autonomous system or to only peers within a subautonomous system of a confederation. These routes are not advertised to external peers or to other subautonomous systems within a confederation.
no-advertise	(Optional) Specifies the no-advertise community. Routes with this community are not advertised to any peer (internal or external).
no-export	(Optional) Specifies the no-export community. Routes with this community are advertised to only peers in the same autonomous system or to only other subautonomous systems within a confederation. These routes are not advertised to external peers.

gshut	(Optional) Specifies the Graceful Shutdown (GSHUT) community.
<i>expanded</i>	Expanded community list number from 100 to 500 to identify one or more permit or deny groups of communities.
expanded <i>list-name</i>	Configures a named expanded community list.
<i>regexp</i>	Regular expression that is used to specify a pattern to match against an input string. Note Regular expressions can be used only with expanded community lists.

Command Default BGP community exchange is not enabled by default.

Command Modes Global configuration (config)

Command History	Release	Modification
	10.3	This command was introduced.
	12.0	This command was modified. The local-as keyword was added.
	12.0(10)S	This command was modified. Named community list support was added.
	12.0(16)ST	This command was modified. Named community list support was introduced.
	12.1(9)E	Named community list support was integrated into Cisco IOS Release 12.1(9)E.
	12.2(8)T	Named community list support was integrated into Cisco IOS Release 12.2(8)T.
	12.0(22)S	This command was modified. The maximum number of expanded community list numbers was increased from 199 to 500.
	12.2(14)S	This command was modified. The maximum number of expanded community list numbers was increased from 199 to 500 and named community list support were integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.2(15)T	This command was modified. The maximum number of expanded community list numbers was increased from 199 to 500.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.2(2)S	This command was modified. The gshut keyword was added.
Cisco IOS XE Release 3.6S	This command was modified. The gshut keyword was added.
Cisco IOS XE Release 3.7S	This command was implemented on the Cisco ASR 903 router.
15.2(4)S	This command was implemented on the Cisco ASR 7200 router.

Usage Guidelines

The **ip community-list** command is used to filter BGP routes based on one or more community values. BGP community values are configured as a 32-bit number (old format) or as a 4-byte number (new format). The new community format is enabled when the **ip bgp-community new-format** command is entered in global configuration mode. The new community format consists of a 4-byte value. The first two bytes represent the autonomous system number, and the trailing two bytes represent a user-defined network number. Named and numbered community lists are supported.

BGP community exchange is not enabled by default. The exchange of BGP community attributes between BGP peers is enabled on a per-neighbor basis with the **neighbor send-community** command. The BGP community attribute is defined in [RFC 1997](#) and [RFC 1998](#).

The Internet community is applied to all routes or prefixes by default, until any other community value is configured with this command or the **set community** command.

Use a route map to reference a community list and thereby apply policy routing or set values.

Community List Processing

Once a **permit** value has been configured to match a given set of communities, the community list defaults to an implicit deny for all other community values. Unlike an access list, it is feasible for a community list to contain only **deny** statements.

- When multiple communities are configured in the same **ip community-list** statement, a logical AND condition is created. All community values for a route must match the communities in the community list statement to satisfy an AND condition.
- When multiple communities are configured in separate **ip community-list** statements, a logical OR condition is created. The first list that matches a condition is processed.

Standard Community Lists

Standard community lists are used to configure well-known communities and specific community numbers. A maximum of 16 communities can be configured in a standard community list. If you attempt to configure

more than 16 communities, the trailing communities that exceed the limit are not processed or saved to the running configuration file.

Expanded Community Lists

Expanded community lists are used to filter communities using a regular expression. Regular expressions are used to configure patterns to match community attributes. The order for matching using the * or + character is longest construct first. Nested constructs are matched from the outside in. Concatenated constructs are matched beginning at the left side. If a regular expression can match two different parts of an input string, it will match the earliest part first. For more information about configuring regular expressions, see the “Regular Expressions” appendix of the *Terminal Services Configuration Guide*.

Examples

In the following example, a standard community list is configured that permits routes from network 10 in autonomous system 50000:

```
Router(config)# ip community-list 1 permit 50000:10
```

In the following example, a standard community list is configured that permits only routes from peers in the same autonomous system or from subautonomous system peers in the same confederation:

```
Router(config)# ip community-list 1 permit no-export
```

In the following example, a standard community list is configured to deny routes that carry communities from network 40 in autonomous system 65534 and from network 60 in autonomous system 65412. This example shows a logical AND condition; all community values must match in order for the list to be processed.

```
Router(config)# ip community-list 2 deny 65534:40 65412:60
```

In the following example, a named, standard community list is configured that permits all routes within the local autonomous system or permits routes from network 20 in autonomous system 40000. This example shows a logical OR condition; the first match is processed.

```
Router(config)# ip community-list standard RED permit local-as
Router(config)# ip community-list standard RED permit 40000:20
```

In the following example, a standard community list is configured that denies routes with the GSHUT community and permits routes with the local-AS community. This example shows a logical OR condition; the first match is processed.

```
Router(config)# ip community-list 18 deny gshut
Router(config)# ip community-list 18 permit local-as
```

In the following example, an expanded community list is configured that denies routes that carry communities from any private autonomous system:

```
Router(config)# ip community-list 500 deny _64[6-9][0-9][0-9]_|_65[0-9][0-9][0-9]_
```

In the following example, a named expanded community list is configured that denies routes from network 1 to 99 in autonomous system 50000:

```
Router(config)# ip community-list expanded BLUE deny 50000:[0-9][0-9]_
```

Related Commands

Command	Description
match community	Defines a BGP community that must match the community of a route.
neighbor send-community	Allows BGP community exchange with a neighbor.

Command	Description
neighbor shutdown graceful	Configures the BGP Graceful Shutdown feature.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set community	Sets the BGP communities attribute.
set comm-list delete	Removes communities from the community attribute of an inbound or outbound update.
show ip bgp community	Displays routes that belong to specified BGP communities.
show ip bgp regexp	Displays routes that match a locally configured regular expression.

ip extcommunity-list

To create an extended community list to configure Virtual Private Network (VPN) route filtering, use the **ip extcommunity-list** command in global configuration mode. To delete the extended community list, use the **no** form of this command.

To enter IP Extended community-list configuration mode to create or configure an extended community-list, use the **ip extcommunity-list** command in global configuration mode. To delete the entire extended community list, use the **no** form of this command. To delete a single entry, use the **no** form in IP Extended community-list configuration mode.

Global Configuration Mode CLI

ip extcommunity-list {*expanded-list* [**permit**|**deny**] [*regular-expression*]| **expanded** *list-name* [**permit**|**deny**] [*regular-expression*]| *standard-list* [**permit**|**deny**] [*rt value*] [*soo value*]| **standard** *list-name* [**permit**|**deny**] [*rt value*] [*soo value*]}

no ip extcommunity-list {*expanded-list*| **expanded** *list-name*| *standard-list*| **standard** *list-name*}

ip extcommunity-list {*expanded-list*| **expanded** *list-name*| *standard-list*| **standard** *list-name*}

no ip extcommunity-list {*expanded-list*| **expanded** *list-name*| *s* *tandard-list*| **standard** *list-name*}

Expanded IP Extended Community-List Configuration Mode CLI

[*sequence-number*] {**deny** [*regular-expression*]| **permit** [*regular-expression*]| **resequence** [*starting-sequence*] [*sequence-increment*]}

default {*sequence-number*| **deny** [*regular-expression*]| **permit** [*regular-expression*]| **resequence** [*starting-sequence*] [*sequence-increment*]}

no {*sequence-number*| **deny** [*regular-expression*]| **permit** [*regular-expression*]| **resequence** [*starting-sequence*] [*sequence-increment*]}

Standard IP Extended Community-List Configuration Mode CLI

default {*sequence-number*| **deny** [*rt value*] [*soo value*]| **permit** [*rt value*] [*soo value*]| **resequence** [*starting-sequence*] [*sequence-increment*]}

no {*sequence-number*| **deny** [*rt value*] [*soo value*]| **permit** [*rt value*] [*soo value*]| **resequence** [*starting-sequence*] [*sequence-increment*]}

Syntax Description

<i>expanded-list</i>	An expanded list number from 100 to 500 that identifies one or more permit or deny groups of extended communities.
<i>standard-list</i>	A standard list number from 1 to 99 that identifies one or more permit or deny groups of extended communities.

expanded <i>list-name</i>	Creates an expanded named extended community list and enters IP Extended community-list configuration mode.
standard <i>list-name</i>	Creates a standard named extended community list and enters IP Extended community-list configuration mode.
permit	Permits access for a matching condition. Once a permit value has been configured to match a given set of extended communities, the extended community list defaults to an implicit deny for all other values.
deny	Denies access for a matching condition.
<i>regular-expression</i>	(Optional) An input string pattern to match against.
rt	(Optional) Specifies the route target (RT) extended community attribute. The rt keyword can be configured only with standard extended community lists and not expanded community lists.
soo	(Optional) Specifies the site of origin (SOO) extended community attribute. The soo keyword can be configured only with standard extended community lists and not expanded community lists.
<i>value</i>	Specifies the route target or site of origin extended community value. This value can be entered in one of the following formats: <ul style="list-style-type: none"> • autonomous-system-number : network-number • ip-address : network-number
<i>sequence-number</i>	(Optional) The sequence number of a named or numbered extended community list. This value can be a number from 1 to 2147483647.
resequence	(Optional) Changes the sequences of extended community list entries to the default sequence numbering or to the specified sequence numbering. Extended community entries are sequenced by ten number increments by default.
<i>starting-sequence</i>	(Optional) Specifies the number for the first entry in an extended community list.
<i>sequence-increment</i>	(Optional) Specifies the increment range for each subsequent extended community entry.

Command Default

Extended community exchange is not enabled by default.

Command Modes

Global configuration (config)

IP Extended community-list configuration (config-extcom-list)

Command History

Release	Modification
12.1	This command was introduced.
12.0(22)S	The maximum number of expanded community list numbers was increased from 199 to 500.
12.2(15)T	The maximum number of expanded community list numbers was increased from 199 to 500.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(25)S	Support for the following was added in Cisco IOS Release 12.2(25)S: <ul style="list-style-type: none"> • Extended community-list sequencing • IP Extended community configuration mode • Named extended community lists
12.3(11)T	Support for the following was added in Cisco IOS Release 12.3(11)T: <ul style="list-style-type: none"> • Extended community-list sequencing • IP Extended community configuration mode • Named extended community lists
12.2(27)SBC	This command was integrated into the Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(14)SX	This command was integrated into the Cisco IOS Release 12.2(14)SX.
12.0(32)S12	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.0(32)SY8	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.

Release	Modification
Cisco IOS XE Release 2.3	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
Cisco IOS Release 15.1(1)SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
Cisco IOS XE Release 3.3SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Usage Guidelines

The **ip extcommunity-list** command is used to configure named or numbered extended community lists. Extended community attributes are used to filter routes for VPN routing and forwarding instances (VRFs) and Multiprotocol Label Switching (MPLS) Virtual Private Networks (VPNs). All of the standard rules of access lists apply to the configuration of extended community lists. The route target (RT) and site of origin (SOO) extended community attributes are supported by the standard range of extended community lists. Extended community list entries start with the number 10 and increment by ten for each subsequent entry when no sequence number is specified, when default behavior is configured, and when an extended community list is resequenced without specifying the first entry number or the increment range for subsequent entries. Regular expressions are supported in expanded extended community lists. For information about configuring regular expressions, see the “Regular Expressions” appendix of the Cisco IOS Terminal Services Configuration Guide.

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain--65538 for example--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, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot--1.2 for example--as the only configuration format, regular expression match, and output display, with no asplain support.

Route Target Extended Community Attribute

The route target (RT) extended community attribute is configured with the **rt** keyword. This attribute is used to identify a set of sites and VRFs that may receive routes that are tagged with the configured route target. Configuring the route target extended attribute with a route allows that route to be placed in the per-site forwarding tables that are used for routing traffic that is received from corresponding sites.

Site of Origin Extended Community Attribute

The site of origin (SOO) extended community attribute is configured with the **soo** keyword. This attribute uniquely identifies the site from which the provider edge (PE) router learned the route. All routes learned from a particular site must be assigned the same site of origin extended community attribute, regardless if a site is connected to a single PE router or multiple PE routers. Configuring this attribute prevents routing loops from occurring when a site is multihomed. The SOO extended community attribute is configured on the interface and is propagated into BGP through redistribution. The SOO should not be configured for stub sites or sites that are not multihomed.

IP Extended Community-List Configuration Mode

Named and numbered extended community lists can be configured in IP Extended community-list configuration mode. To enter IP Extended community-list configuration mode, enter the **ip extcommunity-list** command with either the **expanded** or **standard** keyword followed by the extended community list name. This configuration mode supports all of the functions that are available in global configuration mode. In addition, you can perform the following operations:

- Configure sequence numbers for extended community list entries
- Resequence existing sequence numbers for extended community list entries
- Configure an extended community list to use default values

Extended Community List Processing

When multiple values are configured in the same extended community list statement, a logical AND condition is created. All extended community values must match to satisfy an AND condition. When multiple values are configured in separate extended community list statements, a logical OR condition is created. The first list that matches a condition is processed.

Examples

Examples

In the following example, an extended community list is configured that permits routes from route target 64512:10 and site of origin 65400:20 and denies routes from route target 65424:30 and site of origin 64524:40. List 1 shows a logical OR condition; the first match is processed. List 2 shows a logical AND condition; all community values must match in order for list 2 to be processed.

```
Router(config)# ip extcommunity-list 1 permit rt 64512:10
Router(config)# ip extcommunity-list 1 permit soo 65400:20
Router(config)# ip extcommunity-list 2
deny rt 65424:30 soo 64524:40
```

Examples

In the following example, an expanded extended community list is configured to deny advertisements from any path through or from autonomous system 65534 from being advertised to the 192.168.1.2 neighbor:

```
Router(config)# ip extcommunity-list 500 deny _65412_
Router(config)# router bgp 50000
Router(config-router)# address-family vpnv4
Router(config-router-af)# neighbor 172.16.1.1 remote-as 65412
Router(config-router-af)# neighbor 172.16.1.1
```

```

neighbor send-community extended
Router(config-router-af) # neighbor 192.168.1.2 remote-as 65534
Router(config-router-af) # neighbor 192.168.1.2
neighbor send-community extended
Router(config-router-af) # end

```

Examples

In the following example, a named extended community list is configured that will permit routes only from route target 65505:50. All other routes are implicitly denied.

```
Router(config) # ip extcommunity-list standard NAMED_LIST permit rt 65505:50
```

Examples

In the following example, an expanded named extended community list is configured in IP Extended community-list configuration mode. A list entry is created with a sequence number 10 that will permit a route target or route origin pattern that matches any network number extended community from autonomous system 65412.

```

Router(config) # ip extcommunity-list RED
Router(config-extcom-list) # 10 permit 65412:[0-9][0-9][0-9][0-9][0-9]_
Router(config-extcom-list) # exit

```

Examples

In the following example, the first list entry is resequenced to the number 50 and each subsequent entry is configured to increment by 100:

```

Router(config) # ip extcommunity-list BLUE
Router(config-extcom-list) # resequence 50 100
Router(config-extcom-list) # exit

```

Examples

The following example shows how to filter traffic by creating an extended BGP community list to control outbound routes. In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, extended BGP communities support 4-byte autonomous system numbers in the regular expressions in asplain format. In this task, the router is configured with an extended named community list to specify that the BGP peer at 192.168.1.2 is not sent advertisements about any path through or from the 4-byte autonomous system 65550. The IP extended community-list configuration mode is used, and the ability to resequence entries is shown.

```

Router(config) # ip extcommunity-list expanded DENY65550
Router(config-extcomm-list) # 10 deny 65550
Router(config-extcomm-list) # 20 deny ^65550_.*
Router(config-extcomm-list) # resequence 50 100
Router(config-extcomm-list) # exit
Router(config) # router bgp 65538
Router(config-router) # network 172.17.1.0 mask 255.255.255.0

Router(config-router) # neighbor 192.168.3.2 remote-as 65550
Router(config-router) # neighbor 192.168.1.2 remote-as 65536
Router(config-router) # neighbor 192.168.3.2 activate
Router(config-router) # neighbor 192.168.1.2 activate
Router(config-router) # end
Router # show ip extcommunity-list DENY65550

```

In Cisco IOS Release 12.0(32)SY8, 12.0(32)S12, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, 12.4(24)T, and Cisco IOS XE Release 2.3, or a later releases, extended BGP communities support 4-byte autonomous system numbers in the regular expressions in asdot format. In this task, the router is configured with an extended named community list to specify that the BGP peer at 192.168.1.2 is not sent advertisements about any path

through or from the 4-byte autonomous system 1.14. The IP extended community-list configuration mode is used, and the ability to resequence entries is shown.

```
Router(config)# ip extcommunity-list expanded DENY114
Router(config-extcomm-list)# 10 deny 1\.14
Router(config-extcomm-list)# 20 deny ^1\.14 .*
Router(config-extcomm-list)# resequence 50 100
Router(config-extcomm-list)# exit
Router(config)# router bgp 1.2
Router(config-router)# network 172.17.1.0 mask 255.255.255.0
Router(config-router)# neighbor 192.168.3.2 remote-as 1.14
Router(config-router)# neighbor 192.168.1.2 remote-as 1.0
Router(config-router)# neighbor 192.168.3.2 activate
Router(config-router)# neighbor 192.168.1.2 activate
Router(config-router)# end
Router# show ip extcommunity-list DENY114
```

Related Commands

Command	Description
bgp asnotation dot	Changes the default display and regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
export map	Configures an export route map for a VRF.
match extcommunity	Matches a BGP VPN extended community list.
router bgp	Configures the BGP routing process.
set extcommunity	Sets BGP extended community attributes.
show ip extcommunity-list	Displays routes that are permitted by the extended community list.
show route-map	Displays configured route maps.

ip prefix-list

To create a prefix list or to add a prefix-list entry, use the **ip prefix-list** command in global configuration mode. To delete a prefix-list entry, use the **no** form of this command.

ip prefix-list {*list-name* [**seq** *number*] {**deny**|**permit**} *network/length* [**ge** *ge-length*] [**le** *le-length*]} **description** *description* [**sequence-number**]

no ip prefix-list {*list-name* [**seq** *number*] [{**deny**|**permit**} *network/length* [**ge** *ge-length*] [**le** *le-length*]]} **description** *description* [**sequence-number**]

Syntax Description

<i>list-name</i>	Configures a name to identify the prefix list. Do not use the word “detail” or “summary” as a list name because they are keywords in the show ip prefix-list command.
seq	(Optional) Applies a sequence number to a prefix-list entry.
<i>number</i>	(Optional) Integer from 1 to 4294967294. If a sequence number is not entered when configuring this command, default sequence numbering is applied to the prefix list. The number 5 is applied to the first prefix entry, and subsequent unnumbered entries are incremented by 5.
deny	Denies access for a matching condition.
permit	Permits access for a matching condition.
<i>network / length</i>	Configures the network address and the length of the network mask in bits. The network number can be any valid IP address or prefix. The bit mask can be a number from 1 to 32.
ge	(Optional) Specifies the lesser value of a range (the “from” portion of the range description) by applying the <i>ge-length</i> argument to the range specified. Note The ge keyword represents the greater than or equal to operator.
<i>ge-length</i>	(Optional) Represents the minimum prefix length to be matched.

le	(Optional) Specifies the greater value of a range (the “to” portion of the range description) by applying the <i>le-length</i> argument to the range specified. Note The le keyword represents the less than or equal to operator.
<i>le-length</i>	(Optional) Represents the maximum prefix length to be matched.
description	(Optional) Configures a descriptive name for the prefix list.
<i>description</i>	(Optional) Descriptive name of the prefix list, from 1 to 80 characters in length.
sequence-number	(Optional) Enables or disables the use of sequence numbers for prefix lists.

Command Default No prefix lists or prefix-list entries are created.

Command Modes Global configuration (config)

Command History	Release	Modification
	12.0(3)T	This command was introduced.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines Use the **ip prefix-list** command to configure IP prefix filtering. Prefix lists are configured with **permit** or **deny** keywords to either permit or deny a prefix based on a matching condition. An implicit deny is applied to traffic that does not match any prefix-list entry.

A prefix-list entry consists of an IP address and a bit mask. The IP address can be for a classful network, a subnet, or a single host route. The bit mask is a number from 1 to 32.

Prefix lists are configured to filter traffic based on a match of an exact prefix length or a match within a range when the **ge** and **le** keywords are used. The **ge** and **le** keywords are used to specify a range of prefix lengths and provide more flexible configuration than using only the *network / length* argument. A prefix list is processed using an exact match when neither the **ge** nor **le** keyword is specified. If only the **ge** value is specified, the range is the value entered for the **ge ge-length** argument to a full 32-bit length. If only the **le** value is specified, the range is from the value entered for the *network / length* argument to the **le le-length** argument. If both the

ge *ge-length* and **le** *le-length* keywords and arguments are entered, the range is between the values used for the *ge-length* and *le-length* arguments.

The following formula shows this behavior:

length < **ge** *ge-length* < **le** *le-length* <= 32

If the **seq** keyword is configured without a sequence number, the default sequence number is 5. In this scenario, the first prefix-list entry is assigned the number 5 and subsequent prefix list entries increment by 5. For example, the next two entries would have sequence numbers 10 and 15. If a sequence number is entered for the first prefix list entry but not for subsequent entries, the subsequent entry numbers increment by 5. For example, if the first configured sequence number is 3, subsequent entries will be 8, 13, and 18. Default sequence numbers can be suppressed by entering the **no ip prefix-list** command with the **seq** keyword.

Evaluation of a prefix list starts with the lowest sequence number and continues down the list until a match is found. When an IP address match is found, the permit or deny statement is applied to that network and the remainder of the list is not evaluated.



Tip

For best performance, the most frequently processed prefix list statements should be configured with the lowest sequence numbers. The **seq number** keyword and argument can be used for resequencing.

A prefix list is applied to inbound or outbound updates for a specific peer by entering the **neighbor prefix-list** command. Prefix list information and counters are displayed in the output of the **show ip prefix-list** command. Prefix-list counters can be reset by entering the **clear ip prefix-list** command.

Examples

In the following example, a prefix list is configured to deny the default route 0.0.0.0/0:

```
Router(config)# ip prefix-list RED deny 0.0.0.0/0
```

In the following example, a prefix list is configured to permit traffic from the 172.16.1.0/24 subnet:

```
Router(config)# ip prefix-list BLUE permit 172.16.1.0/24
```

In the following example, a prefix list is configured to permit routes from the 10.0.0.0/8 network that have a mask length that is less than or equal to 24 bits:

```
Router(config)# ip prefix-list YELLOW permit 10.0.0.0/8 le 24
```

In the following example, a prefix list is configured to deny routes from the 10.0.0.0/8 network that have a mask length that is greater than or equal to 25 bits:

```
Router(config)# ip prefix-list PINK deny 10.0.0.0/8 ge 25
```

In the following example, a prefix list is configured to permit routes from any network that have a mask length from 8 to 24 bits:

```
Router(config)# ip prefix-list GREEN permit 0.0.0.0/0 ge 8 le 24
```

In the following example, a prefix list is configured to deny any route with any mask length from the 10.0.0.0/8 network:

```
Router(config)# ip prefix-list ORANGE deny 10.0.0.0/8 le 32
```

Related Commands

Command	Description
clear ip prefix-list	Resets the prefix list entry counters.
ip prefix-list description	Adds a text description of a prefix list.
ip prefix-list sequence	Enables or disables default prefix-list sequencing.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
neighbor prefix-list	Filters routes from the specified neighbor using a prefix list.
show ip prefix-list	Displays information about a prefix list or prefix list entries.



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match as-path

To match a BGP autonomous system path that is specified by an access list, use the **match as-path** command in route-map configuration mode. To remove a path list entry, use the **no** form of this command.

match as-path *path-list-number*

no match as-path *path-list-number*

Syntax Description

<i>path-list-number</i>	Access list that specifies an autonomous system path. An integer from 1 to 199.
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Command Default

No matching occurs on an autonomous system path specified by an access list.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **ip as-path access-list** command to create an access list that determines which AS path is specified. Then use the **match as-path** command to create a route map based on matching the access list that determined the AS path.

The values set by the combination of the **match as-path** and **set weight** commands override global values. For example, the weights assigned with the **match as-path** and **set weight** route-map configuration commands override the weight assigned using the **neighbor weight** command.

A route map can have several parts. Any route that does not match at least one **match** clause relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route-map section with an explicit match specified.

Examples

The following example configures a route map that matches on the autonomous system path specified by access list 20:

```
route-map IGP2BGP
 match as-path 20
```

Related Commands

Command	Description
ip as-path access-list	Configures an AS path filter using a regular expression.
match community	Matches a BGP community.
match interface (IP)	Distributes routes that have their next hop out one of the interfaces specified.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match metric (IP)	Redistributes routes with the metric specified.
match route-type (IP)	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
neighbor weight	Assigns weight to a neighbor connection.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set as-path	Modifies an autonomous system path for BGP routes.
set automatic-tag	Automatically computes the tag value in a route map configuration.
set community	Sets the BGP communities attribute.

Command	Description
set level (IP)	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP, OSPF, RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set next-hop	Specifies the address of the next hop.
set origin (BGP)	Sets the BGP origin code.
set tag (IP)	Sets the value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.

match community

To match a Border Gateway Protocol (BGP) community, use the **match community** command in route-map configuration mode. To remove the **match community** command from the configuration file and restore the system to its default condition where the software removes the BGP community list entry, use the **no** form of this command.

match community {*standard-list-number*| *expanded-list-number*| *community-list-name* [**exact**]}

no match community {*standard-list-number*| *expanded-list-number*| *community-list-name* [**exact**]}

Syntax Description

<i>standard-list-number</i>	Specifies a standard community list number from 1 to 99 that identifies one or more permit or deny groups of communities.
<i>expanded-list-number</i>	Specifies an expanded community list number from 100 to 500 that identifies one or more permit or deny groups of communities.
<i>community-list-name</i>	The community list name.
exact	(Optional) Indicates that an exact match is required. All of the communities and only those communities specified must be present.

Command Default

No community list is matched by the route map.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
12.1	This command was introduced.
12.1(9)E	Named community list support was integrated into Cisco IOS Release 12.1(9)E.
12.2(8)T	Named community list support was integrated into Cisco IOS Release 12.2(8)T.
12.0(22)S	The maximum number of expanded extended community list numbers was changed from 199 to 500 in Cisco IOS Release 12.0(22)S.
12.2(14)S	The maximum number of expanded community lists was changed from 199 to 500 and named community list support were integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.2(15)T	The maximum number of expanded extended community list numbers was changed from 199 to 500 in Cisco IOS Release 12.2(15)T.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

A route map can have several parts. Any route that does not match at least one **match** command relating to a **route-map** command will be ignored; that is, the route will not be advertised for outbound route maps and will not be accepted for inbound route maps. If you want to modify only some data, you must configure a second route-map section with an explicit match specified.

Matching based on community list number is one of the types of **match** commands applicable to BGP.

Examples

The following example shows that the routes matching community list 1 will have the weight set to 100. Any route that has community 109 will have the weight set to 100.

```
Router(config)# ip community-list 1 permit 109
Router(config)# route-map set_weight
Router(config-route-map)# match community 1
Router(config-route-map)# set weight 100
```

The following example shows that the routes matching community list 1 will have the weight set to 200. Any route that has community 109 alone will have the weight set to 200.

```
Router(config)# ip community-list 1 permit 109
Router(config)# route-map set_weight
Router(config-route-map)# match community
1 exact
Router(config-route-map)# set weight 200
```

In the following example, the routes that match community list LIST_NAME will have the weight set to 100. Any route that has community 101 alone will have the weight set to 100.

```
Router(config)# ip community-list LIST_NAME permit 101
Router(config)# route-map set_weight
Router(config-route-map)# match community LIST_NAME
Router(config-route-map)# set weight 100
```

The following example shows that the routes that match expanded community list 500. Any route that has extended community 1 will have the weight set to 150.

```
Router(config)# ip community-list 500 permit [0-9]*
Router(config)# route-map MAP_NAME permit 10
Router(config-route-map)# match extcommunity 500
Router(config-route-map)# set weight 150
```

Related Commands

Command	Description
ip community-list	Creates a community list for BGP and controls access to it.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another.
set weight	Specifies the BGP weight for the routing table.

neighbor activate

To enable the exchange of information with a Border Gateway Protocol (BGP) neighbor, use the **neighbor activate** command in address family configuration mode or router configuration mode. To disable the exchange of an address with a BGP neighbor, use the **no** form of this command.

neighbor {*ip-address* | *peer-group-name* | *ipv6-address* %} **activate**

no neighbor {*ip-address* | *peer-group-name* | *ipv6-address* %} **activate**

Syntax Description

<i>ip-address</i>	IP address of the neighboring router.
<i>peer-group-name</i>	Name of the BGP peer group.
<i>ipv6-address</i>	IPv6 address of the BGP neighbor.
%	(Optional) IPv6 link-local address identifier. This keyword needs to be added whenever a link-local IPv6 address is used outside the context of its interface.

Command Default

The exchange of addresses with BGP neighbors is enabled for the IPv4 address family. Enabling address exchange for all other address families is disabled.



Note

Address exchange for address family IPv4 is enabled by default for each BGP routing session configured with the **neighbor remote-as** command unless you configure the **no bgp default ipv4-activate** command before configuring the **neighbor remote-as** command, or you disable address exchange for address family IPv4 with a specific neighbor by using the **no neighbor activate** command.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
11.0	This command was introduced.
12.0(5)T	Support for address family configuration mode and the IPv4 address family was added.
12.2(2)T	The <i>ipv6-address</i> argument and support for the IPv6 address family were added.

Release	Modification
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The % keyword was added
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines

Use this command to advertise address information in the form of an IP or IPv6 prefix. The address prefix information is known as Network Layer Reachability Information (NLRI) in BGP.

The % keyword is used whenever link-local IPv6 addresses are used outside the context of their interfaces. This keyword does not need to be used for non-link-local IPv6 addresses.

Examples

Examples

The following example shows how to enable address exchange for address family vpnv4 for all neighbors in the BGP peer group named PEPEER and for the neighbor 10.0.0.44:

```
Router(config)# address-family vpnv4
Router(config-router-af)# neighbor PEPEER activate
Router(config-router-af)# neighbor 10.0.0.44 activate
Router(config-router-af)# exit-address-family
```

Examples

The following example shows how to enable address exchange for address family IPv4 unicast for all neighbors in the BGP peer group named group1 and for the BGP neighbor 172.16.1.1:

```
Router(config)# address-family ipv4 unicast
Router(config-router-af)# neighbor group1 activate
Router(config-router-af)# neighbor 172.16.1.1 activate
```

Examples

The following example shows how to enable address exchange for address family IPv6 for all neighbors in the BGP peer group named group2 and for the BGP neighbor 7000::2:

```
Router(config)# address-family ipv6
Router(config-router-af)# neighbor group2 activate
Router(config-router-af)# neighbor 7000::2 activate
```

Related Commands

Command	Description
address-family ipv4	Places the router in address family configuration mode for configuring routing sessions, such as BGP, that use standard IPv4 address prefixes.
address-family ipv6	Places the router in address family configuration mode for configuring routing sessions, such as BGP, that use standard IPv6 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions, such as BGP, that use standard VPNv4 address prefixes.
address-family vpnv6	Places the router in address family configuration mode for configuring routing sessions, such as BGP, that use standard VPNv6 address prefixes.
exit-address-family	Exits from the address family submode.
neighbor remote-as	Adds an entry to the BGP or multiprotocol BGP neighbor table.

neighbor advertise-map

To install a Border Gateway Protocol (BGP) route as a locally originated route in the BGP routing table for conditional advertisement, use the **neighbor advertise-map** command in router configuration mode. To disable conditional advertisement, use the **no** form of this command.

neighbor *ip-address* **advertise-map** *map-name* {**exist-map** *map-name*| **non-exist-map** *map-name*}

no neighbor *ip-address* **advertise-map** *map-name* {**exist-map** *map-name*| **non-exist-map** *map-name*}

Syntax Description

<i>ip-address</i>	Specifies the IP address of the router that should receive conditional advertisements.
advertise-map <i>map-name</i>	Specifies the name of the route map that will be advertised if the conditions of the exist map or nonexist map are met.
exist-map <i>map-name</i>	Specifies the name of the route map that will be compared to the advertise map. If the condition is met and a match occurs between the advertise map and exist map, the route will be advertised. If no match occurs, then the condition is not met, and the route is withdrawn.
non-exist-map <i>map-name</i>	Specifies the name of the route map that will be compared to the advertise map. If the condition is met and no match occurs, the route will be advertised. If a match occurs, then the condition is not met, and the route is withdrawn.

Command Default

No default behavior or values

Command Modes

Router configuration (config-router)

Command History

Release	Modification
11.1CC	This command was introduced.
11.2	This command was integrated into Cisco IOS Release 11.2.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **neighbor advertise-map** router configuration command to conditionally advertise selected routes. The routes or prefixes that will be conditionally advertised are defined in 2 route-maps, an advertise map and an exist map or nonexist map. The route map associated with the exist map or nonexist map specifies the prefix that the BGP speaker will track. The route map associated with the advertise-map specifies the prefix that will be advertised to the specified neighbor when the condition is met. When configuring an exist map, the condition is met when the prefix exists in both the advertise map and the exist map. When configuring a nonexist map, the condition is met when the prefix exists in the advertise map but does not exist in the nonexist map. If the condition is not met, the route is withdrawn and conditional advertisement does not occur. All routes that may be dynamically advertised or not advertised need to exist in the BGP routing table for conditional advertisement to occur.

Examples

The following router configuration example configures BGP to conditionally advertise a prefix to the 10.2.1.1 neighbor using an exist map. If the prefix exists in MAP1 and MAP2, the condition is met and the prefix is advertised.

```
router bgp 5
 neighbor 10.2.1.1 advertise-map MAP1 exist-map MAP2
```

The following address family configuration example configures BGP to conditionally advertise a prefix to the 10.1.1.1 neighbor using a nonexist map. If the prefix exists in MAP3 but not MAP4, the condition is met and the prefix is advertised.

```
router bgp 5
 address-family ipv4 multicast
 neighbor 10.1.1.1 advertise-map MAP3 non-exist-map MAP4
```

Related Commands

Command	Description
address-family ipv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
route-map	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.

neighbor advertisement-interval

To set the minimum route advertisement interval (MRAI) between the sending of BGP routing updates, use the **neighbor advertisement-interval** command in address family or router configuration mode. To restore the default value, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **advertisement-interval** *seconds*

no neighbor {*ip-address*|*peer-group-name*} **advertisement-interval** *seconds*

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
<i>seconds</i>	Time (in seconds) is specified by an integer ranging from 0 to 600.

Command Default

eBGP sessions not in a VRF: 30 seconds

eBGP sessions in a VRF: 0 seconds

iBGP sessions: 0 seconds

Command Modes

Router configuration (config-router)

Command History

Release	Modification
10.3	This command was introduced.
12.0(7)T	Address family configuration mode was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.4T, 12.2SB, 12.2SE, 12.2SG, 12.2SR, 12.2SX, Cisco IOS XE 2.1	This command was modified. The default value for eBGP sessions in a VRF and for iBGP sessions changed from .5 seconds to 0 seconds.

Usage Guidelines

When the MRAI is equal to 0 seconds, BGP routing updates are sent as soon as the BGP routing table changes.

If you specify a BGP peer group by using the *peer-group-name* argument, all the members of the peer group will inherit the characteristic configured with this command.

Examples

The following router configuration mode example sets the minimum time between sending BGP routing updates to 10 seconds:

```
router bgp 5
 neighbor 10.4.4.4 advertisement-interval 10
```

The following address family configuration mode example sets the minimum time between sending BGP routing updates to 10 seconds:

```
router bgp 5
 address-family ipv4 unicast
 neighbor 10.4.4.4 advertisement-interval 10
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
neighbor peer-group (creating)	Creates a BGP peer group.

neighbor capability orf prefix-list

To advertise outbound route filter (ORF) capabilities to a peer router, use the **neighbor capability orf prefix-list** command in address family or router configuration mode. To disable ORF capabilities, use the **no** form of this command.

neighbor *ip-address* **capability orf prefix-list** [**receive**| **send**| **both**]

no neighbor *ip-address* **capability orf prefix-list** [**receive**| **send**| **both**]

Syntax Description

<i>ip-address</i>	The IP address of the neighbor router.
receive	(Optional) Enables the ORF prefix list capability in receive mode.
send	(Optional) Enables the ORF prefix list capability in send mode.
both	(Optional) Enables the ORF prefix list capability in both receive and send modes.

Command Default

No ORF capabilities are advertised to a peer router.

Command Modes

Address family configuration (config-router-af)
Router configuration (config-router)

Command History

Release	Modification
12.0(11)ST	This command was introduced.
12.2(4)T	This command was integrated into Cisco IOS Release 12.2(4)T.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The **neighbor capability orf prefix-list** command is used to reduce the number of BGP prefixes that a BGP speaker sends or receives from a peer router based on prefix filtering.

In most configurations, this command will be used to advertise both send and receive ORF capabilities with the **both** keyword. However, this feature can be configured in one direction between two routers with one router configured to send ORF capabilities and another router configured to receive ORF capabilities from the first router.

Examples

The following examples configure routers to advertise ORF send or receive capabilities to BGP neighbors.

Examples

The following example creates an outbound route filter and configures Router-A (10.1.1.1) to advertise the filter to Router-B (172.16.1.2). An IP prefix list named FILTER is created to specify the 192.168.1.0/24 subnet for outbound route filtering. The ORF send capability is configured on Router-A so that Router-A can advertise the outbound route filter to Router-B.

```
ip prefix-list FILTER seq 10 permit 192.168.1.0/24
!
router bgp 100
 address-family ipv4 unicast
  neighbor 172.16.1.2 remote-as 200
  neighbor 172.16.1.2 ebgp-multihop
  neighbor 172.16.1.2 capability orf prefix-list send
  neighbor 172.16.1.2 prefix-list FILTER in
exit
```

Examples

The following example configures Router-B to advertise the ORF receive capability to Router-A. Router-B will install the outbound route filter, defined in the FILTER prefix list, after ORF capabilities have been exchanged. An inbound soft reset is initiated on Router-B at the end of this configuration to activate the outbound route filter.

```
router bgp 200
 address-family ipv4 unicast
  neighbor 10.1.1.1 remote-as 100
  neighbor 10.1.1.1 ebgp-multihop 255
  neighbor 10.1.1.1 capability orf prefix-list receive
end
clear ip bgp 10.1.1.1 in prefix-filter
```

**Note**

The inbound soft refresh must be initiated with the **clear ip bgp** command in order for the BGP ORF feature to function.

Related Commands

Command	Description
neighbor prefix-list	Distributes BGP neighbor information as specified in a prefix list.

neighbor default-originate

To allow a BGP speaker (the local router) to send the default route 0.0.0.0 to a neighbor for use as a default route, use the **neighbor default-originate** command in address family or router configuration mode. To send no route as a default, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **default-originate** [**route-map** *map-name*]

no neighbor {*ip-address*|*peer-group-name*} **default-originate** [**route-map** *map-name*]

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
route-map <i>map-name</i>	(Optional) Name of the route map. The route map allows route 0.0.0.0 to be injected conditionally.

Command Default

No default route is sent to the neighbor.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
11.0	This command was introduced.
12.0	Modifications were added to permit extended access lists.
12.0(7)T	Address family configuration mode was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command does not require the presence of 0.0.0.0 in the local router. When used with a route map, the default route 0.0.0.0 is injected if the route map contains a **match ip address** clause and there is a route that matches the IP access list exactly. The route map can contain other match clauses also.

You can use standard or extended access lists with the **neighbor default-originate** command.

Examples

In the following router configuration example, the local router injects route 0.0.0.0 to the neighbor 172.16.2.3 unconditionally:

```
router bgp 109
 network 172.16.0.0
 neighbor 172.16.2.3 remote-as 200
 neighbor 172.16.2.3 default-originate
```

In the following example, the local router injects route 0.0.0.0 to the neighbor 172.16.2.3 only if there is a route to 192.168.68.0 (that is, if a route with any mask exists, such as 255.255.255.0 or 255.255.0.0):

```
router bgp 109
 network 172.16.0.0
 neighbor 172.16.2.3 remote-as 200
 neighbor 172.16.2.3 default-originate route-map default-map
!
route-map default-map 10 permit
 match ip address 1
!
access-list 1 permit 192.168.68.0
```

In the following example, the last line of the configuration has been changed to show the use of an extended access list. The local router injects route 0.0.0.0 to the neighbor 172.16.2.3 only if there is a route to 192.168.68.0 with a mask of 255.255.0.0:

```
router bgp 109
 network 172.16.0.0
 neighbor 172.16.2.3 remote-as 200
 neighbor 172.16.2.3 default-originate route-map default-map
!
route-map default-map 10 permit
 match ip address 100
!
access-list 100 permit ip host 192.168.68.0 host 255.255.0.0
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
neighbor ebgp-multihop	Accepts and attempts BGP connections to external peers residing on networks that are not directly connected.

neighbor description

To associate a description with a neighbor, use the **neighbor description** command in router configuration mode or address family configuration mode. To remove the description, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **description** *text*

no neighbor {*ip-address*|*peer-group-name*} **description** [*text*]

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>peer-group-name</i>	Name of an EIGRP peer group. This argument is not available in address-family configuration mode.
<i>text</i>	Text (up to 80 characters in length) that describes the neighbor.

Command Default

There is no description of the neighbor.

Command Modes

Router configuration (config-router) Address family configuration (config-router-af)

Command History

Release	Modification
11.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.0(1)M	This command was modified. Address-family configuration mode was added.
12.2(33)SRE	This command was integrated into Cisco IOS Release 12.2(33)SRE.
Cisco IOS XE Release 2.6	This command was integrated into Cisco IOS XE Release 2.6.

Examples

In the following examples, the description of the neighbor is “peer with example.com”:

```
Router(config)# router bgp 109
Router(config-router)# network 172.16.0.0
Router(config-router)# neighbor 172.16.2.3 description peer with example.com
```

In the following example, the description of the address family neighbor is “address-family-peer”:

```
Router(config)# router eigrp virtual-name
Router(config-router)# address-family ipv4 autonomous-system 4453
Router(config-router-af)#
network 172.16.0.0
Router(config-router-af)#
neighbor 172.16.2.3 description address-family-peer
```

Related Commands

Command	Description
address-family (EIGRP)	Enters address family configuration mode to configure an EIGRP routing instance.
network (EIGRP)	Specifies the network for an EIGRP routing process.
router eigrp	Configures the EIGRP address family process.

neighbor ebgp-multihop

To accept and attempt BGP connections to external peers residing on networks that are not directly connected, use the **neighbor ebgp-multihop** command in router configuration mode. To return to the default, use the **no** form of this command.

neighbor {*ip-address*|*ipv6-address*|*peer-group-name*} **ebgp-multihop** [*ttl*]

no neighbor {*ip-address*|*ipv6-address*|*peer-group-name*} **ebgp-multihop**

Syntax Description

<i>ip-address</i>	IP address of the BGP-speaking neighbor.
<i>ipv6-address</i>	IPv6 address of the BGP-speaking neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
<i>ttl</i>	(Optional) Time-to-live in the range from 1 to 255 hops.

Command Default

Only directly connected neighbors are allowed.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
11.0	The <i>peer-group-name</i> argument was added.
12.2(33)SRA	The <i>ipv6-address</i> argument and support for the IPv6 address family were added.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.
Cisco IOS XE Release 3.1S	This command was integrated into Cisco IOS XE Release 3.1S.

Usage Guidelines

This feature should be used only under the guidance of Cisco technical support staff.

If you specify a BGP peer group by using the *peer-group-name* argument, all the members of the peer group will inherit the characteristic configured with this command.

To prevent the creation of loops through oscillating routes, the multihop will not be established if the only route to the multihop peer is the default route (0.0.0.0).

Examples

The following example allows connections to or from neighbor 10.108.1.1, which resides on a network that is not directly connected:

```
router bgp 109
 neighbor 10.108.1.1 ebgp-multihop
```

Related Commands

Command	Description
neighbor advertise-map non-exist-map	Allows a BGP speaker (the local router) to send the default route 0.0.0.0 to a neighbor for use as a default route.
neighbor peer-group (creating)	Creates a BGP peer group.
network (BGP and multiprotocol BGP)	Specifies the list of networks for the BGP routing process.

neighbor ha-mode graceful-restart

To enable or disable the Border Gateway Protocol (BGP) graceful restart capability for a BGP neighbor or peer group, use the **neighbor ha-mode graceful-restart** command in router configuration mode. To remove from the configuration the BGP graceful restart capability for a neighbor, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **ha-mode graceful-restart** [**disable**]

no neighbor {*ip-address*|*peer-group-name*} **ha-mode graceful-restart** [**disable**]

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
disable	(Optional) Disables BGP graceful restart capability for a neighbor.

Command Default

BGP graceful restart capability is disabled.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
12.2(33)SRC	This command was introduced.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG.
Cisco IOS XE 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG.

Usage Guidelines

The **neighbor ha-mode graceful-restart** command is used to enable or disable the graceful restart capability for an individual BGP neighbor or peer group in a BGP network. Use the **disable** keyword to disable the graceful restart capability when graceful restart has been previously enabled for the BGP peer.

The graceful restart capability is negotiated between nonstop forwarding (NSF)-capable and NSF-aware peers in OPEN messages during session establishment. If the graceful restart capability is enabled after a BGP session has been established, the session will need to be restarted with a soft or hard reset.

The graceful restart capability is supported by NSF-capable and NSF-aware routers. A router that is NSF-capable can perform a stateful switchover (SSO) operation (graceful restart) and can assist restarting peers by holding routing table information during the SSO operation. A router that is NSF-aware functions like a router that is NSF-capable but cannot perform an SSO operation.

To enable the BGP graceful restart capability globally for all BGP neighbors, use the **bgp graceful-restart** command. When the BGP graceful restart capability is configured for an individual neighbor, each method of configuring graceful restart has the same priority, and the last configuration instance is applied to the neighbor.

Use the **show ip bgp neighbors** command to verify the BGP graceful restart configuration for BGP neighbors.

Examples

The following example enables the BGP graceful restart capability for the BGP neighbor, 172.21.1.2:

```
router bgp 45000
  bgp log-neighbor-changes
  address-family ipv4 unicast
  neighbor 172.21.1.2 remote-as 45000
  neighbor 172.21.1.2 activate
  neighbor 172.21.1.2 ha-mode graceful-restart
end
```

The following example enables the BGP graceful restart capability globally for all BGP neighbors and then disables the BGP graceful restart capability for the BGP peer group PG1. The BGP neighbor 172.16.1.2 is configured as a member of the peer group PG1 and inherits the disabling of the BGP graceful restart capability.

```
router bgp 45000
  bgp log-neighbor-changes
  bgp graceful-restart
  address-family ipv4 unicast
  neighbor PG1 peer-group
  neighbor PG1 remote-as 45000
  neighbor PG1 ha-mode graceful-restart disable
  neighbor 172.16.1.2 peer-group PG1
end
```

Related Commands

Command	Description
bgp graceful-restart	Enables the BGP graceful restart capability globally for all BGP neighbors.
ha-mode graceful-restart	Enables or disables the BGP graceful restart capability for a BGP peer session template.
show ip bgp neighbors	Displays information about the TCP and BGP connections to neighbors.

neighbor inherit peer-session

To send a peer session template to a neighbor so that the neighbor can inherit the configuration, use the **neighbor inherit peer-session** command in address family or router configuration mode. To stop sending the peer session template, use the **no** form of this command.

neighbor *ip-address* **inherit peer-session** *session-template-name*

no neighbor *ip-address* **inherit peer-session** *session-template-name*

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>session-template-name</i>	Name or tag for the peer session template.

Command Default

No default behavior or values

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command is used to send locally configured session templates to the specified neighbor. If the session template is configured to inherit configurations from other session templates, the specified neighbor will also indirectly inherit these configurations from the other session templates. A neighbor can directly inherit only one peer session template and indirectly inherit up to seven peer session templates.

**Note**

A Border Gateway Protocol (BGP) neighbor cannot be configured to work with both peer groups and peer templates. A BGP neighbor can be configured to belong only to a peer group or to inherit policies only from peer templates.

Examples

The following example configures the 172.16.0.1 neighbor to inherit the CORE1 peer session template. The 172.16.0.1 neighbor will also indirectly inherit the configuration from the peer session template named INTERNAL-BGP. The explicit remote-as statement is required for the neighbor inherit statement to work. If a peering is not configured, the specified neighbor will not accept the session template.

```
Router(config)# router bgp 101
Router(config)# neighbor 172.16.0.1 remote-as 202
Router(config-router)# neighbor 172.16.0.1 inherit peer-session CORE1
```

Related Commands

Command	Description
exit peer-session	Exits session-template configuration mode and enters router configuration mode.
inherit peer-session	Configures a peer session template to inherit the configuration from another peer session template.
show ip bgp neighbors	Displays information about the TCP and BGP connections to neighbors.
show ip bgp template peer-session	Displays locally configured peer session templates.
template peer-session	Creates a peer session template and enters session-template configuration mode.

neighbor maximum-prefix (BGP)

To control how many prefixes can be received from a neighbor, use the **neighbor maximum-prefix** command in router configuration mode. To disable this function, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **maximum-prefix** *maximum* [*threshold*] [**restart** *restart-interval*] [**warning-only**]

no neighbor {*ip-address*|*peer-group-name*} **maximum-prefix** *maximum*

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>peer-group-name</i>	Name of a Border Gateway Protocol (BGP) peer group.
<i>maximum</i>	Maximum number of prefixes allowed from the specified neighbor. The number of prefixes that can be configured is limited only by the available system resources on a router.
<i>threshold</i>	(Optional) Integer specifying at what percentage of the <i>maximum-prefix</i> limit the router starts to generate a warning message. The range is from 1 to 100; the default is 75.
restart	(Optional) Configures the router that is running BGP to automatically reestablish a peering session that has been disabled because the maximum-prefix limit has been exceeded. The restart timer is configured with the <i>restart-interval</i> argument.
<i>restart-interval</i>	(Optional) Time interval (in minutes) that a peering session is reestablished. The range is from 1 to 65535 minutes.
warning-only	(optional) Allows the router to generate a sys-log message when the <i>maximum-prefix</i> limit is exceeded, instead of terminating the peering session.

Command Default

This command is disabled by default. Peering sessions are disabled when the maximum number of prefixes is exceeded. If the *restart-interval* argument is not configured, a disabled session will stay down after the maximum-prefix limit is exceeded.

threshold : 75 percent

Command Modes

Router configuration (config-router)

Command History

Release	Modification
11.3	This command was introduced.
12.0(22)S	The restart keyword was introduced.
12.2(15)T	The restart keyword was integrated into Cisco IOS Release 12.2(15)T.
12.2(18)S	The restart keyword was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.2(4)S	This command was integrated into Cisco IOS Release 15.2(4)S.

Usage Guidelines

The **neighbor maximum-prefix** command allows you to configure a maximum number of prefixes that a Border Gateway Protocol (BGP) routing process will accept from the specified peer. This feature provides a mechanism (in addition to distribute lists, filter lists, and route maps) to control prefixes received from a peer.

When the number of received prefixes exceeds the maximum number configured, BGP disables the peering session (by default). If the **restart** keyword is configured, BGP will automatically reestablish the peering session at the configured time interval. If the **restart** keyword is not configured and a peering session is terminated because the maximum prefix limit has been exceeded, the peering session will not be reestablished until the **clear ip bgp** command is entered. If the **warning-only** keyword is configured, BGP sends only a log message and continues to peer with the sender.

There is no default limit on the number of prefixes that can be configured with this command. Limitations on the number of prefixes that can be configured are determined by the amount of available system resources.

Examples

In the following example, the maximum prefixes that will be accepted from the 192.168.1.1 neighbor is set to 1000:

```
Router(config)# router bgp 40000
Router(config-router)# network 192.168.0.0
Router(config-router)# neighbor 192.168.1.1 maximum-prefix 1000
```

In the following example, the maximum number of prefixes that will be accepted from the 192.168.2.2 neighbor is set to 5000. The router is also configured to display warning messages when 50 percent of the maximum-prefix limit (2500 prefixes) has been reached.

```
Router(config)# router bgp 40000
Router(config-router)# network 192.168.0.0
```

```
Router(config-router)# neighbor 192.168.2.2 maximum-prefix 5000 50
```

In the following example, the maximum number of prefixes that will be accepted from the 192.168.3.3 neighbor is set to 2000. The router is also configured to reestablish a disabled peering session after 30 minutes.

```
Router(config)# router bgp 40000
```

```
Router(config-router)# network 192.168.0.0
```

```
Router(config-router)# neighbor 192.168.3.3 maximum-prefix 2000 restart 30
```

In the following example, warning messages will be displayed when the threshold of the maximum-prefix limit ($500 \times 0.75 = 375$) for the 192.168.4.4 neighbor is exceeded:

```
Router(config)# router bgp 40000
```

```
Router(config-router)# network 192.168.0.0
```

```
Router(config-router)# neighbor 192.168.4.4 maximum-prefix 500 warning-only
```

Related Commands

Command	Description
clear ip bgp	Resets a BGP connection using BGP soft reconfiguration.

neighbor peer-group (assigning members)

To configure a BGP neighbor to be a member of a peer group, use the **neighbor peer-group** command in address family or router configuration mode. To remove the neighbor from the peer group, use the **no** form of this command.

neighbor {*ip-address*|*ipv6-address*} **peer-group** *peer-group-name*

no neighbor {*ip-address*|*ipv6-address*} **peer-group** *peer-group-name*

Syntax Description

<i>ip-address</i>	IP address of the BGP neighbor that belongs to the peer group specified by the <i>peer-group-name</i> argument.
<i>ipv6-address</i>	IPv6 address of the BGP neighbor that belongs to the peer group specified by the <i>peer-group-name</i> argument.
<i>peer-group-name</i>	Name of the BGP peer group to which this neighbor belongs.

Command Default

There are no BGP neighbors in a peer group.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
11.0	This command was introduced.
12.0(7)T	Address family configuration mode was added.
12.2(2)T	Support for IPv6 was added.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.

Usage Guidelines

The neighbor at the IP address indicated inherits all the configured options of the peer group.

**Note**

Using the **no** form of the **neighbor peer-group** command removes all of the BGP configuration for that neighbor, not just the peer group association.

Examples

The following router configuration mode example assigns three neighbors to the peer group named internal:

```
router bgp 100
 neighbor internal peer-group
 neighbor internal remote-as 100
 neighbor internal update-source loopback 0
 neighbor internal route-map set-med out
 neighbor internal filter-list 1 out
 neighbor internal filter-list 2 in
 neighbor 172.16.232.53 peer-group internal
 neighbor 172.16.232.54 peer-group internal
 neighbor 172.16.232.55 peer-group internal
 neighbor 172.16.232.55 filter-list 3 in
```

The following address family configuration mode example assigns three neighbors to the peer group named internal:

```
router bgp 100
 address-family ipv4 unicast
 neighbor internal peer-group
 neighbor internal remote-as 100
 neighbor internal update-source loopback 0
 neighbor internal route-map set-med out
 neighbor internal filter-list 1 out
 neighbor internal filter-list 2 in
 neighbor 172.16.232.53 peer-group internal
 neighbor 172.16.232.54 peer-group internal
 neighbor 172.16.232.55 peer-group internal
 neighbor 172.16.232.55 filter-list 3 in
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
neighbor peer-group (creating)	Creates a BGP peer group.
neighbor shutdown	Disables a neighbor or peer group.

neighbor peer-group (creating)

To create a BGP or multiprotocol BGP peer group, use the **neighbor peer-group** command in address family or router configuration mode. To remove the peer group and all of its members, use the **no** form of this command.

neighbor *peer-group-name* **peer-group**

no neighbor *peer-group-name* **peer-group**

Syntax Description

<i>peer-group-name</i>	Name of the BGP peer group.
------------------------	-----------------------------

Command Default

There is no BGP peer group.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
11.0	This command was introduced.
11.1(20)CC	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were added.
12.0(2)S	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were added.
12.0(7)T	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were removed. Address family configuration mode was added.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Often in a BGP or multiprotocol BGP speaker, many neighbors are configured with the same update policies (that is, same outbound route maps, distribute lists, filter lists, update source, and so on). Neighbors with the

same update policies can be grouped into peer groups to simplify configuration and make update calculation more efficient.

**Note**

Peer group members can span multiple logical IP subnets, and can transmit, or pass along, routes from one peer group member to another.

Once a peer group is created with the **neighbor peer-group** command, it can be configured with the **neighbor** commands. By default, members of the peer group inherit all the configuration options of the peer group. Members also can be configured to override the options that do not affect outbound updates.

All the peer group members will inherit the current configuration as well as changes made to the peer group. Peer group members will always inherit the following configuration options by default:

- remote-as (if configured)
- version
- update-source
- outbound route-maps
- outbound filter-lists
- outbound distribute-lists
- minimum-advertisement-interval
- next-hop-self

If a peer group is not configured with a remote-as option, the members can be configured with the **neighbor {ip-address | peer-group-name} remote-as** command. This command allows you to create peer groups containing external BGP (eBGP) neighbors.

Examples

The following example configurations show how to create these types of neighbor peer group:

- internal Border Gateway Protocol (iBGP) peer group
- eBGP peer group
- Multiprotocol BGP peer group

Examples

In the following example, the peer group named internal configures the members of the peer group to be iBGP neighbors. By definition, this is an iBGP peer group because the **router bgp** command and the **neighbor remote-as** command indicate the same autonomous system (in this case, autonomous system 100). All the peer group members use loopback 0 as the update source and use set-med as the outbound route map. The **neighbor internal filter-list 2 in** command shows that, except for 172.16.232.55, all the neighbors have filter list 2 as the inbound filter list.

```
router bgp 100
 neighbor internal peer-group
 neighbor internal remote-as 100
 neighbor internal update-source loopback 0
 neighbor internal route-map set-med out
 neighbor internal filter-list 1 out
 neighbor internal filter-list 2 in
```

neighbor peer-group (creating)

```
neighbor 172.16.232.53 peer-group internal
neighbor 172.16.232.54 peer-group internal
neighbor 172.16.232.55 peer-group internal
neighbor 172.16.232.55 filter-list 3 in
```

Examples

The following example defines the peer group named external-peers without the **neighbor remote-as** command. By definition, this is an eBGP peer group because each individual member of the peer group is configured with its respective autonomous system number separately. Thus the peer group consists of members from autonomous systems 200, 300, and 400. All the peer group members have the set-metric route map as an outbound route map and filter list 99 as an outbound filter list. Except for neighbor 172.16.232.110, all of them have 101 as the inbound filter list.

```
router bgp 100
 neighbor external-peers peer-group
 neighbor external-peers route-map set-metric out
 neighbor external-peers filter-list 99 out
 neighbor external-peers filter-list 101 in
 neighbor 172.16.232.90 remote-as 200
 neighbor 172.16.232.90 peer-group external-peers
 neighbor 172.16.232.100 remote-as 300
 neighbor 172.16.232.100 peer-group external-peers
 neighbor 172.16.232.110 remote-as 400
 neighbor 172.16.232.110 peer-group external-peers
 neighbor 172.16.232.110 filter-list 400 in
```

Examples

In the following example, all members of the peer group are multicast-capable:

```
router bgp 100
 neighbor 10.1.1.1 remote-as 1
 neighbor 172.16.2.2 remote-as 2
 address-family ipv4 multicast
  neighbor mygroup peer-group
  neighbor 10.1.1.1 peer-group mygroup
  neighbor 172.16.2.2 peer-group mygroup
 neighbor 10.1.1.1 activate
 neighbor 172.16.2.2 activate
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
clear ip bgp peer-group	Removes all the members of a BGP peer group.
show ip bgp peer-group	Displays information about BGP peer groups.

neighbor prefix-list

To prevent distribution of Border Gateway Protocol (BGP) neighbor information as specified in a prefix list, a Connectionless Network Service (CLNS) filter expression, or a CLNS filter set, use the **neighbor prefix-list** command in address family or router configuration mode. To remove a filter list, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **prefix-list** {*prefix-list-name*|*clns-filter-expr-name*|*clns-filter-set-name*} {**in**|**out**}

no neighbor {*ip-address*|*peer-group-name*} **prefix-list** {*prefix-list-name*|*clns-filter-expr-name*|*clns-filter-set-name*} {**in**|**out**}

Syntax Description

<i>ip-address</i>	IP address of neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
<i>prefix-list-name</i>	Name of a prefix list. This argument is used only under router configuration mode.
<i>clns-filter-expr-name</i>	Name of a CLNS filter expression. This argument is used only under network service access point (NSAP) address family configuration mode.
<i>clns-filter-set-name</i>	Name of a CLNS filter set. This argument is used only under NSAP address family configuration mode.
in	Filter list is applied to incoming advertisements from that neighbor.
out	Filter list is applied to outgoing advertisements to that neighbor.

Command Default

All external and advertised address prefixes are distributed to BGP neighbors.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
12.0	This command was introduced.
12.0(7)T	Address family configuration mode was added.

Release	Modification
12.2(8)T	Under address family configuration mode, the <i>prefix-list-name</i> argument was amended to specify the name of a CLNS filter expression or a CLNS filter set.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE 2.6	This command was integrated into Cisco IOS XE Release 2.6.

Usage Guidelines

Using prefix lists is one of three ways to filter BGP advertisements. You can also use AS-path filters, defined with the **ip as-path access-list** global configuration command and used in the **neighbor filter-list** command to filter BGP advertisements. The third way to filter BGP advertisements uses access or prefix lists with the **neighbor distribute-list** command.

If you specify a BGP peer group by using the *peer-group-name* argument, all the members of the peer group will inherit the characteristic configured with this command. Specifying the command with an IP address will override the value inherited from the peer group.

Use the **neighbor prefix-list** command in address family configuration mode to filter NSAP BGP advertisements.



Note

Do not apply both a **neighbor distribute-list** and a **neighbor prefix-list** command to a neighbor in any given direction (inbound or outbound). These two commands are mutually exclusive, and only one command (**neighbor distribute-list** or **neighbor prefix-list**) can be applied to each inbound or outbound direction.

Examples

The following router configuration mode example applies the prefix list named *abc* to incoming advertisements from neighbor 10.23.4.1:

```
router bgp 65200
 network 192.168.1.2
 neighbor 10.23.4.1 prefix-list abc in
```

The following address family configuration mode example applies the prefix list named *abc* to incoming advertisements from neighbor 10.23.4.2:

```
router bgp 65001
 address-family ipv4 unicast
 network 192.168.2.4
 neighbor 10.23.4.2 prefix-list abc in
```

The following router configuration mode example applies the prefix list named CustomerA to outgoing advertisements to neighbor 10.23.4.3:

```
router bgp 64800
 network 192.168.3.6
 neighbor 10.23.4.3 prefix-list CustomerA out
```

The following address family configuration mode example applies the CLNS filter list set named *default-prefix-only* to outbound advertisements to neighbor 10.1.2.1:

```
clns filter-set default-prefix-only deny 49...
clns filter-set default-prefix-only permit default
!
router bgp 65202
 address-family nsap
  neighbor 10.1.2.1 activate
  neighbor 10.1.2.1 default-originate
  neighbor 10.1.2.1 prefix-list default-prefix-only out
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Enters the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Enters the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
clear ip prefix-list	Resets the hit count of the prefix list entries.
clns filter-expr	Creates an entry in a CLNS filter expression.
clns filter-set	Creates an entry in a CLNS filter set.
ip as-path access-list	Defines a BGP-related access list.
ip prefix-list	Creates an entry in a prefix list.
ip prefix-list description	Adds a text description of a prefix list.
ip prefix-list sequence-number	Enables the generation of sequence numbers for entries in a prefix list.
neighbor filter-list	Sets up a BGP filter.
show bgp nsap filter-list	Displays information about a filter list or filter list entries.
show ip bgp peer-group	Displays information about BGP peer groups.

Command	Description
show ip prefix-list	Displays information about a prefix list or prefix list entries.

neighbor remote-as

To add an entry to the BGP or multiprotocol BGP neighbor table, use the **neighbor remote-as** command in router configuration mode. To remove an entry from the table, use the **no** form of this command.

neighbor {*ip-address*|*ipv6-address*%|*peer-group-name*} **remote-as** *autonomous-system-number* [**alternate-as** *autonomous-system-number* ...]

no neighbor {*ip-address*|*ipv6-address*%|*peer-group-name*} **remote-as** *autonomous-system-number* [**alternate-as** *autonomous-system-number* ...]

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>ipv6-address</i>	IPv6 address of the neighbor.
%	(Optional) IPv6 link-local address identifier. This keyword needs to be added whenever a link-local IPv6 address is used outside the context of its interface.
<i>peer-group-name</i>	Name of a BGP peer group.
<i>autonomous-system-number</i>	<p>Number of an autonomous system to which the neighbor belongs in the range from 1 to 65535.</p> <ul style="list-style-type: none"> In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, 4-byte autonomous system numbers are supported in the range from 65536 to 4294967295 in asplain notation and in the range from 1.0 to 65535.65535 in asdot notation. In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, 4-byte autonomous system numbers are supported in the range from 1.0 to 65535.65535 in asdot notation only. <p>For more details about autonomous system number formats, see the router bgp command.</p> <p>When used with the alternate-as keyword, up to five autonomous system numbers may be entered.</p>
alternate-as	(Optional) Specifies an alternate autonomous system in which a potential dynamic neighbor can be identified. Up to five autonomous system numbers may be entered when this keyword is specified.

Command Default There are no BGP or multiprotocol BGP neighbor peers.

Command Modes Router configuration (config-router)

Command History	Release	Modification
	10.0	This command was introduced.
	11.0	The <i>peer-group-name</i> argument was added.
	11.1(20)CC	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were added.
	12.0(7)T	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were removed.
	12.2(4)T	Support for the IPv6 address family was added.
	12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
	12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
	12.2(33)SRB	This command was modified. The % keyword was added.
	12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH. The alternate-as keyword was added to support BGP dynamic neighbors.
	12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
	Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.
	12.0(32)S12	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
	12.0(32)SY8	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
	12.4(24)T	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
	Cisco IOS XE Release 2.3	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
	12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Release	Modification
12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
15.0(1)S	This command was integrated into Cisco IOS Release 15.0(1)S.
15.1(1)SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
Cisco IOS XE Release 3.3SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines

Specifying a neighbor with an autonomous system number that matches the autonomous system number specified in the **router bgp** global configuration command identifies the neighbor as internal to the local autonomous system. Otherwise, the neighbor is considered external.

If you specify a BGP peer group by using the *peer-group-name* argument, all the members of the peer group will inherit the characteristic configured with this command.

By default, neighbors that are defined using the **neighbor remote-as** command in router configuration mode exchange only unicast address prefixes. To exchange other address prefix types, such as multicast and Virtual Private Network (VPN) Version 4, neighbors must also be activated in the appropriate address family configuration mode.

Use the **alternate-as** keyword introduced in Cisco IOS Release 12.2(33)SXH to specify up to five alternate autonomous systems in which a dynamic BGP neighbor may be identified. BGP dynamic neighbor support allows BGP peering to a group of remote neighbors that are defined by a range of IP addresses. BGP dynamic neighbors are configured using a range of IP addresses and BGP peer groups. After a subnet range is configured and associated with a BGP peer group using the **bgp listen** command and a TCP session is initiated for an IP address in the subnet range, a new BGP neighbor is dynamically created as a member of that group. The new BGP neighbor will inherit any configuration or templates for the group.

The **%** keyword is used whenever link-local IPv6 addresses are used outside the context of their interfaces. This keyword does not need to be used for non-link-local IPv6 addresses.

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain--65538 for example--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 followed by the **clear ip bgp *** command to perform a hard reset of all current BGP sessions.

In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot--1.2 for example--as the only configuration format, regular expression match, and output display, with no asplain support.



Note

In Cisco IOS releases that include 4-byte ASN support, command accounting and command authorization that include a 4-byte ASN number are sent in the asplain notation irrespective of the format that is used on the command-line interface.

To ensure a smooth transition, we recommend that all BGP speakers within an autonomous system that is identified using a 4-byte autonomous system number, be upgraded to support 4-byte autonomous system numbers.

Examples

The following example specifies that a router at the address 10.108.1.2 is an internal BGP (iBGP) neighbor in autonomous system number 65200:

```
router bgp 65200
 network 10.108.0.0
 neighbor 10.108.1.2 remote-as 65200
```

The following example specifies that a router at the IPv6 address 2001:0DB8:1:1000::72a is an external BGP (eBGP) neighbor in autonomous system number 65001:

```
router bgp 65300
 address-family ipv6 vrf site1
 neighbor 2001:0DB8:1:1000::72a remote-as 65001
```

The following example assigns a BGP router to autonomous system 65400, and two networks are listed as originating in the autonomous system. Then the addresses of three remote routers (and their autonomous systems) are listed. The router being configured will share information about networks 10.108.0.0 and 192.168.7.0 with the neighbor routers. The first router is a remote router in a different autonomous system from the router on which this configuration is entered (an eBGP neighbor); the second **neighbor remote-as** command shows an internal BGP neighbor (with the same autonomous system number) at address 10.108.234.2; and the last **neighbor remote-as** command specifies a neighbor on a different network from the router on which this configuration is entered (also an eBGP neighbor).

```
router bgp 65400
 network 10.108.0.0
 network 192.168.7.0
 neighbor 10.108.200.1 remote-as 65200
 neighbor 10.108.234.2 remote-as 65400
 neighbor 172.29.64.19 remote-as 65300
```

The following example configures neighbor 10.108.1.1 in autonomous system 65001 to exchange only multicast routes:

```
router bgp 65001
 neighbor 10.108.1.1 remote-as 65001
 neighbor 172.31.1.2 remote-as 65001
 neighbor 172.16.2.2 remote-as 65002
 address-family ipv4 multicast
 neighbor 10.108.1.1 activate
 neighbor 172.31.1.2 activate
 neighbor 172.16.2.2 activate
 exit-address-family
```

The following example configures neighbor 10.108.1.1 in autonomous system 65001 to exchange only unicast routes:

```
router bgp 65001
 neighbor 10.108.1.1 remote-as 65001
 neighbor 172.31.1.2 remote-as 65001
 neighbor 172.16.2.2 remote-as 65002
```

The following example, configurable only in Cisco IOS Release 12.2(33)SXH and later releases, configures a subnet range of 192.168.0.0/16 and associates this listen range with a BGP peer group. Note that the listen range peer group that is configured for the BGP dynamic neighbor feature can be activated in the IPv4 address family using the **neighbor activate** command. After the initial configuration on Router 1, when Router 2 starts a BGP router session and adds Router 1 to its BGP neighbor table, a TCP session is initiated, and Router 1 creates a new BGP neighbor dynamically because the IP address of the new neighbor is within the listen range subnet.

Examples

```
enable
configure terminal
router bgp 45000
  bgp log-neighbor-changes
  neighbor group192 peer-group
  bgp listen range 192.168.0.0/16 peer-group group192
  neighbor group192 remote-as 40000 alternate-as 50000
  address-family ipv4 unicast
  neighbor group192 activate
end
```

Examples

```
enable
configure terminal
router bgp 50000
  neighbor 192.168.3.1 remote-as 45000
exit
```

If the **show ip bgp summary** command is now entered on Router 1, the output shows the dynamically created BGP neighbor, 192.168.3.2.

```
Router1# show ip bgp summary
BGP router identifier 192.168.3.1, local AS number 45000
BGP table version is 1, main routing table version 1
Neighbor      V    AS MsgRcvd MsgSent  TblVer  InQ  OutQ Up/Down  State/PfxRcd
*192.168.3.2  4 50000      2        2      0    0    0 00:00:37      0
* Dynamically created based on a listen range command
Dynamically created neighbors: 1/(200 max), Subnet ranges: 1
BGP peergroup group192 listen range group members:
 192.168.0.0/16
```

The following example configures a BGP process for autonomous system 65538 and configures two external BGP neighbors in different autonomous systems using 4-byte autonomous system numbers in asplain format. This example is supported only on Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or later releases.

```
router bgp 65538
 neighbor 192.168.1.2 remote-as 65536
 neighbor 192.168.3.2 remote-as 65550
 neighbor 192.168.3.2 description finance
!
address-family ipv4
  neighbor 192.168.1.2 activate
  neighbor 192.168.3.2 activate
  no auto-summary
  no synchronization
```

```
network 172.17.1.0 mask 255.255.255.0
exit-address-family
```

The following example configures a BGP process for autonomous system 1.2 and configures two external BGP neighbors in different autonomous systems using 4-byte autonomous system numbers in asdot format. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(32)S12, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, 12.4(24)T, Cisco IOS XE Release 2.3, or a later release.

```
router bgp 1.2
neighbor 192.168.1.2 remote-as 1.0
neighbor 192.168.3.2 remote-as 1.14
neighbor 192.168.3.2 description finance
!
address-family ipv4
neighbor 192.168.1.2 activate
neighbor 192.168.3.2 activate
no auto-summary
no synchronization
network 172.17.1.0 mask 255.255.255.0
exit-address-family
```

Related Commands

Command	Description
bgp asnotation dot	Changes the default display and the regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
bgp listen	Associates a subnet range with a BGP peer group and activates the BGP dynamic neighbors feature.
neighbor peer-group	Creates a BGP peer group.
router bgp	Configures the BGP routing process.

neighbor route-map

To apply a route map to incoming or outgoing routes, use the **neighbor route-map** command in address family or router configuration mode. To remove a route map, use the **no** form of this command.

neighbor {*ip-address* | *peer-group-name* | *ipv6-address* [%]} **route-map** *map-name* {**in** | **out**}

no neighbor {*ip-address* | *peer-group-name* | *ipv6-address* [%]} **route-map** *map-name* {**in** | **out**}

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>peer-group-name</i>	Name of a BGP or multiprotocol BGP peer group.
<i>ipv6-address</i>	IPv6 address of the neighbor.
%	(Optional) IPv6 link-local address identifier. This keyword needs to be added whenever a link-local IPv6 address is used outside the context of its interface.
<i>map-name</i>	Name of a route map.
in	Applies route map to incoming routes.
out	Applies route map to outgoing routes.

Command Default

No route maps are applied to a peer.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.0(7)T	Address family configuration mode was added.
12.2(4)T	Support for IPv6 was added.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The % keyword was added.

Release	Modification
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.
12.2(33)SXI	This command was integrated into Cisco IOS Release 12.2(33)SXI.

Usage Guidelines

When specified in address family configuration mode, this command applies a route map to that particular address family only. When specified in router configuration mode, this command applies a route map to IPv4 or IPv6 unicast routes only.

If an outbound route map is specified, it is proper behavior to only advertise routes that match at least one section of the route map.

If you specify a BGP or multiprotocol BGP peer group by using the *peer-group-name* argument, all the members of the peer group will inherit the characteristic configured with this command. Specifying the command for a neighbor overrides the inbound policy that is inherited from the peer group.

The % keyword is used whenever link-local IPv6 addresses are used outside the context of their interfaces. This keyword does not need to be used for non-link-local IPv6 addresses.

Examples

The following router configuration mode example applies a route map named internal-map to a BGP incoming route from 172.16.70.24:

```
router bgp 5
 neighbor 172.16.70.24 route-map internal-map in
route-map internal-map
 match as-path 1
 set local-preference 100
```

The following address family configuration mode example applies a route map named internal-map to a multiprotocol BGP incoming route from 172.16.70.24:

```
router bgp 5
 address-family ipv4 multicast
 neighbor 172.16.70.24 route-map internal-map in
route-map internal-map
 match as-path 1
 set local-preference 100
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IP Version 4 address prefixes.
address-family ipv6	Enters address family configuration mode for configuring routing sessions such as BGP that use standard IPv6 address prefixes.

Command	Description
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPN Version 4 address prefixes.
address-family vpnv6	Places the router in address family configuration mode for configuring routing sessions that use standard VPNv6 address prefixes.
neighbor remote-as	Creates a BGP peer group.

neighbor shutdown

To disable a neighbor or peer group or to gracefully shut down a link for maintenance, use the **neighbor shutdown** command in router configuration mode or address family configuration mode. To reenable the neighbor or peer group, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **shutdown graceful** *seconds* [**community** *value*][**local-preference** *value*] [**community** *value*] [**local-preference** *value*]

no neighbor {*ip-address*|*peer-group-name*} **shutdown graceful** *seconds* [**community** *value*][**local-preference** *value*] [**community** *value*][**local-preference** *value*]

Syntax Description

<i>ip-address</i>	IP address of the neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
graceful	(Optional) Configures BGP graceful shutdown, and advertises the route with the GSHUT community and the other community, if specified.
<i>seconds</i>	(Optional) Number of seconds in which BGP graceful shutdown will occur. <ul style="list-style-type: none"> • Range is 30 to 65535 seconds. • Configure adequate time to allow iBGP peers to converge and to choose an alternate path as the best path.
community	Specifies whether another community value needs to added or not.
<i>value</i>	Specifies whether a value needs to added or not. <ul style="list-style-type: none"> • The GSHUT community is set by default. You may specify a community other than the GSHUT community, which the receiving router can use to apply a routing policy. Number from 1-4294967295.
local-preference	Advertises the route with the GSHUT community and the specified local preference value.
<i>value</i>	Value of the local preference assigned to routes to the neighbor. <ul style="list-style-type: none"> • The range is from 1 to 4294967295.

Command Default

No change is made to the status of any BGP neighbor or peer group.

Command Modes

Router configuration (config-router)
Address family configuration (config-router-af)

Command History

Release	Modification
12.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
15.2(2)S	This command was modified. The graceful seconds keyword and argument, the community value keyword and argument, and the local-preference value keyword and argument were added.
Cisco IOS XE 3.6S	This command was modified. The graceful seconds keyword and argument, the community value keyword and argument, and the local-preference value keyword and argument were added.
Cisco IOS XE 3.7S	This command was implemented on the Cisco ASR 903 router.
15.2(4)M	This command was integrated into Cisco IOS Release 15.2(4)M.
15.2(4)S	This command was implemented on the Cisco 7200 series router.

Usage Guidelines

The **neighbor shutdown** command terminates any active session for the specified neighbor or peer group and removes all associated routing information. In the case of a peer group, a large number of peering sessions could be terminated suddenly.

To display a summary of BGP neighbors and peer group connections, use the **show ip bgp summary** command. Those neighbors with an Idle status and the Admin entry have been disabled by the **neighbor shutdown** command.

“State/PfxRcd” shows the current state of the BGP session or the number of prefixes the router has received from a neighbor or peer group. When the maximum number (as set by the **neighbor maximum-prefix** command) is reached, the string “PfxRcd” appears in the entry, the neighbor is shut down, and the connection is idle.

BGP Graceful Shutdown

Use the BGP Graceful Shutdown feature to shut down a link for planned, manual, maintenance operations and thereby reduce or eliminate packet loss. The feature can be configured globally (for all address families) or for the IPv4 VRF or IPv6 VRF address family.

Keep in mind that you should configure adequate time to allow iBGP peers to converge and to choose an alternate path as the best path. BGP will not prevent a network administrator from specifying too low a number of seconds, in which case there might not be enough time for graceful shutdown to occur.

If you use the **graceful** keyword, you must also configure at least one of the **community** or **local-preference** keywords. You may use both the **community** and **local-preference** keywords.

During graceful shutdown timer, there is no nvgen. There will be nvgen of the **neighbor shutdown** command only after the shutdown.

neighbor *ip-address* **shutdown graceful seconds local-pref value community value**

Once the graceful shutdown timer expires, the command will be nvgened as follows:

neighbor *ip-address* **shutdown**

If you reset the sessions using the **clear ip bgp** command, all timers will be reset. Therefore, there will be no graceful shutdown.

Examples

The following example disables any active session for the neighbor 172.16.70.23:

```
neighbor 172.16.70.23 shutdown
```

The following example disables all peering sessions for the peer group named internal:

```
neighbor internal shutdown
```

The following example configures the specified neighbor to be gracefully shut down in 1200 seconds and advertises the route with the well-known GSHUT community and a local preference of 400:

```
neighbor 2001:db8:a::1 shutdown graceful 1200 local-preference 400
```

Related Commands

Command	Description
ip community-list	Creates a BGP community list.
neighbor maximum-prefix	Controls how many prefixes can be received from a neighbor.
show ip bgp community	Displays the neighbors that belong to various communities.
show ip bgp summary	Displays the status of all BGP connections.

neighbor soft-reconfiguration

To configure the Cisco IOS software to start storing updates, use the **neighbor soft-reconfiguration** command in router configuration mode. To not store received updates, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **soft-reconfiguration inbound**

no neighbor {*ip-address*|*peer-group-name*} **soft-reconfiguration inbound**

Syntax Description

<i>ip-address</i>	IP address of the BGP-speaking neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
inbound	Indicates that the update to be stored is an incoming update.

Command Default

Soft reconfiguration is not enabled.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
11.2	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Entering this command starts the storage of updates, which is required to do inbound soft reconfiguration. Outbound BGP soft reconfiguration does not require inbound soft reconfiguration to be enabled.

To use soft reconfiguration, or soft reset, without preconfiguration, both BGP peers must support the soft route refresh capability, which is advertised in the open message sent when the peers establish a TCP session. Routers running Cisco IOS software releases prior to Release 12.1 do not support the route refresh capability and must clear the BGP session using the **neighbor soft-reconfiguration** command. Clearing the BGP session using the **neighbor soft-reconfiguration** command has a negative effect on network operations and should only be used as a last resort. Routers running Cisco IOS software Release 12.1 or later releases support the route refresh capability and dynamic soft resets, and can use the **clear ip bgp** {***|*address*|*peer-group name*} **in** command to clear the BGP session.

To determine whether a BGP router supports this capability, use the **show ip bgp neighbors** command. If a router supports the route refresh capability, the following message is displayed:

```
Received route refresh capability from peer.
```

If you specify a BGP peer group by using the *peer-group-name* argument, all the members of the peer group will inherit the characteristic configured with this command.

Examples

The following example enables inbound soft reconfiguration for the neighbor 10.108.1.1. All the updates received from this neighbor will be stored unmodified, regardless of the inbound policy. When inbound soft reconfiguration is done later, the stored information will be used to generate a new set of inbound updates.

```
router bgp 100
 neighbor 10.108.1.1 remote-as 200
 neighbor 10.108.1.1 soft-reconfiguration inbound
```

Related Commands

Command	Description
clear ip bgp	Resets a BGP connection using BGP soft reconfiguration.
neighbor remote-as	Creates a BGP peer group.
show ip bgp neighbors	Display information about the TCP and BGP connections to neighbors.

neighbor unsuppress-map

To selectively advertise routes previously suppressed by the **aggregate-address** command, use the **neighbor unsuppress-map** command in address family or router configuration mode. To restore the system to the default condition, use the **no** form of this command.

neighbor {*ip-address*|*peer-group-name*} **unsuppress-map** *route-map-name*

no neighbor {*ip-address*|*peer-group-name*} **unsuppress-map** *route-map-name*

Syntax Description

<i>ip-address</i>	IP address of the BGP-speaking neighbor.
<i>peer-group-name</i>	Name of a BGP peer group.
<i>route-map-name</i>	Name of a route map.

Command Default

No routes are unsuppressed.

Command Modes

Address family configuration (config-router-af)
Router configuration (config-router)

Command History

Release	Modification
12.0(5)T	This command was introduced.
12.0(5)T	Address family configuration mode was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use of the **neighbor unsuppress-map** command allows specified suppressed routes to be advertised.

Examples

The following BGP router configuration shows that routes specified by a route map named map1 are suppressed:

```
access-list 3 deny 172.16.16.6
access-list 3 permit any
route-map map1 permit 10
match ip address 3
!
```

neighbor unsuppress-map

```

router bgp 65000
network 172.16.0.0
neighbor 192.168.1.2 remote-as 40000
aggregate-address 172.0.0.0 255.0.0.0 suppress-map map1
neighbor 192.168.1.2 unsuppress-map map1
neighbor 192.168.1.2 activate

```

The following example shows the routes specified by internal-map being unsuppressed for neighbor 172.16.16.6:

```

router bgp 100
address-family ipv4 multicast
network 172.16.0.0
neighbor 172.16.16.6 unsuppress-map internal-map

```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpnv4	Places the routing in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
aggregate-address	Creates an aggregate entry in a BGP routing table.
neighbor route-map	Applies a route map to inbound or outbound routes.

neighbor update-source

To have the Cisco software allow Border Gateway Protocol (BGP) sessions to use any operational interface for TCP connections, use the **neighbor update-source** command in router configuration mode. To restore the interface assignment to the closest interface, which is called the best local address, use the **no** form of this command.

neighbor {*ip-address* | *ipv6-address* [%] | *peer-group-name*} **update-source** *interface-type* *interface-number*

neighbor {*ip-address* | *ipv6-address* [%] | *peer-group-name*} **update-source** *interface-type* *interface-number*

Syntax Description

<i>ip-address</i>	IPv4 address of the BGP-speaking neighbor.
<i>ipv6-address</i>	IPv6 address of the BGP-speaking neighbor.
%	(Optional) IPv6 link-local address identifier. This keyword needs to be added whenever a link-local IPv6 address is used outside the context of its interface.
<i>peer-group-name</i>	Name of a BGP peer group.
<i>interface-type</i>	Interface type.
<i>interface-number</i>	Interface number.

Command Default

Best local address

Command Modes

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.2(4)T	The <i>ipv6-address</i> argument was added.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.

Release	Modification
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	The % keyword was added.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 series routers.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines

This command can work in conjunction with the loopback interface feature described in the “Interface Configuration Overview” chapter of the Cisco IOS Interface and Hardware Component Configuration Guide.

If you specify a BGP peer group by using the *peer-group-name* argument, all the members of the peer group will inherit the characteristic configured with this command.

The **neighbor update-source** command must be used to enable IPv6 link-local peering for internal or external BGP sessions.

The % keyword is used whenever link-local IPv6 addresses are used outside the context of their interfaces and for these link-local IPv6 addresses you must specify the interface they are on. The syntax becomes <IPv6 local-link address>%<interface name>, for example, FE80::1%Ethernet1/0. Note that the interface type and number must not contain any spaces, and be used in full-length form because name shortening is not supported in this situation. The % keyword and subsequent interface syntax is not used for non-link-local IPv6 addresses.

Examples

The following example sources BGP TCP connections for the specified neighbor with the IP address of the loopback interface rather than the best local address:

```
router bgp 65000
 network 172.16.0.0
 neighbor 172.16.2.3 remote-as 110
 neighbor 172.16.2.3 update-source Loopback0
```

The following example sources IPv6 BGP TCP connections for the specified neighbor in autonomous system 65000 with the global IPv6 address of loopback interface 0 and the specified neighbor in autonomous system 65400 with the link-local IPv6 address of Fast Ethernet interface 0/0. Note that the link-local IPv6 address of FE80::2 is on Ethernet interface 1/0.

```
router bgp 65000
 neighbor 3ffe::3 remote-as 65000
 neighbor 3ffe::3 update-source Loopback0
 neighbor fe80::2%Ethernet1/0 remote-as 65400
 neighbor fe80::2%Ethernet1/0 update-source FastEthernet 0/0
 address-family ipv6
  neighbor 3ffe::3 activate
  neighbor fe80::2%Ethernet1/0 activate
 exit-address-family
```


Related Commands

Command	Description
neighbor activate	Enables the exchange of information with a BGP neighboring router.
neighbor remote-as	Adds an entry to the BGP or multiprotocol BGP neighbor table.

network (BGP and multiprotocol BGP)

To specify the networks to be advertised by the Border Gateway Protocol (BGP) and multiprotocol BGP routing processes, use the **network** command in address family or router configuration mode. To remove an entry from the routing table, use the **no** form of this command.

network {*network-number* [**mask** *network-mask*]} [*nsap-prefix*] [**route-map** *map-tag*]

no network {*network-number* [**mask** *network-mask*]} [*nsap-prefix*] [**route-map** *map-tag*]

Syntax Description

<i>network-number</i>	Network that BGP or multiprotocol BGP will advertise.
mask <i>network-mask</i>	(Optional) Network or subnetwork mask with mask address.
<i>nsap-prefix</i>	Network service access point (NSAP) prefix of the Connectionless Network Service (CLNS) network that BGP or multiprotocol BGP will advertise. This argument is used only under NSAP address family configuration mode.
route-map <i>map-tag</i>	(Optional) Identifier of a configured route map. The route map should be examined to filter the networks to be advertised. If not specified, all networks are advertised. If the keyword is specified, but no route map tags are listed, no networks will be advertised.

Command Default

No networks are specified.

Command Modes

Address family configuration (config-router-af)
Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.0	The limit of 200 network commands per BGP router was removed.
11.1(20)CC	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were added.

Release	Modification
12.0(7)T	The nlri unicast , nlri multicast , and nlri unicast multicast keywords were removed. Address family configuration mode was added.
12.2(8)T	The <i>nsap-prefix</i> argument was added to address family configuration mode.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
Cisco IOS XE 2.6	This command was integrated into Cisco IOS XE Release 2.6.

Usage Guidelines

BGP and multiprotocol BGP networks can be learned from connected routes, from dynamic routing, and from static route sources.

The maximum number of **network** commands you can use is determined by the resources of the router, such as the configured NVRAM or RAM.

Examples

The following example sets up network 10.108.0.0 to be included in the BGP updates:

```
router bgp 65100
 network 10.108.0.0
```

The following example sets up network 10.108.0.0 to be included in the multiprotocol BGP updates:

```
router bgp 64800
 address family ipv4 multicast
 network 10.108.0.0
```

The following example advertises NSAP prefix 49.6001 in the multiprotocol BGP updates:

```
router bgp 64500
 address-family nsap
 network 49.6001
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Enters the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IP Version 4 address prefixes.

Command	Description
address-family vpnv4	Enters the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
default-information originate (BGP)	Allows the redistribution of network 0.0.0.0 into BGP.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another.
router bgp	Configures the BGP routing process.

network backdoor

To specify a backdoor route to a BGP-learned prefix that provides better information about the network, use the **network backdoor** command in address family or router configuration mode. To remove an address from the list, use the **no** form of this command.

network *ip-address* **backdoor**

no network *ip-address* **backdoor**

Syntax Description

<i>ip-address</i>	IP address of the network to which you want a backdoor route.
-------------------	---

Command Default

No network is marked as having a back door.

Command Modes

Address family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
10.0	This command was introduced.
12.0(7)T	Address family configuration mode was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

A backdoor network is assigned an administrative distance of 200. The objective is to make Interior Gateway Protocol (IGP) learned routes preferred. A backdoor network is treated as a local network, except that it is not advertised. A network that is marked as a back door is not sourced by the local router, but should be learned from external neighbors. The BGP best path selection algorithm does not change when a network is configured as a back door.

Examples

The following address family configuration example configures network 10.108.0.0 as a local network and network 192.168.7.0 as a backdoor network:

```
router bgp 109
address-family ipv4 multicast
```

```
network 10.108.0.0
network 192.168.7.0 backdoor
```

The following router configuration example configures network 10.108.0.0 as a local network and network 192.168.7.0 as a backdoor network:

```
router bgp 109
network 10.108.0.0
network 192.168.7.0 backdoor
```

Related Commands

Command	Description
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IP Version 4 address prefixes.
address-family vpnv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPN Version 4 address prefixes.
distance bgp	Allows the use of external, internal, and local administrative distances that could be a better route to a node.
network (BGP and multiprotocol BGP)	Specifies networks to be advertised by the BGP and multiprotocol BGP routing processes.
router bgp	Assigns an absolute weight to a BGP network.



BGP Commands_ 0 through show bgp

- [redistribute \(BGP to ISO IS-IS\), page 130](#)
- [redistribute \(IP\), page 133](#)
- [redistribute \(ISO IS-IS to BGP\), page 142](#)
- [router bgp, page 145](#)
- [set as-path, page 151](#)
- [set community, page 154](#)
- [set dampening, page 156](#)
- [set ip next-hop \(BGP\), page 159](#)
- [set ipv6 next-hop \(BGP\), page 162](#)
- [set metric \(BGP-OSPF-RIP\), page 165](#)
- [set origin \(BGP\), page 168](#)
- [set weight, page 170](#)

redistribute (BGP to ISO IS-IS)

To redistribute routes from a Border Gateway Protocol (BGP) autonomous system into an International Organization for Standardization (ISO) Intermediate System-to-Intermediate System (IS-IS) routing process, use the **redistribute** command in router configuration mode. To remove the **redistribute** command from the configuration file and restore the system to its default condition where the software does not redistribute BGP routes into IS-IS, use the **no** form of this command.

redistribute *protocol autonomous-system-number* [*route-type*] [**route-map** *map-tag*]

no redistribute *protocol autonomous-system-number* [*route-type*] [**route-map** *map-tag*]

Syntax Description

<i>protocol</i>	<p>Source protocol from which routes are being redistributed. It must be the bgp keyword.</p> <p>The bgp keyword is used to redistribute dynamic routes.</p>
<i>autonomous-system-number</i>	<p>The autonomous system number of the BGP routing process from which BGP routes are redistributed into IS-IS. The range of values for this argument is any valid autonomous system number from 1 to 65535.</p> <ul style="list-style-type: none"> • In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, 4-byte autonomous system numbers are supported in the range from 65536 to 4294967295 in asplain notation and in the range from 1.0 to 65535.65535 in asdot notation. • In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, 4-byte autonomous system numbers are supported in the range from 1.0 to 65535.65535 in asdot notation only. <p>For more details about autonomous system number formats, see the router bgp command.</p>
<i>route-type</i>	<p>(Optional) The type of route to be redistributed. It can be one of the following keywords: clns or ip. The default is ip.</p> <ul style="list-style-type: none"> • The clns keyword is used to redistribute BGP routes with network service access point (NSAP) addresses into IS-IS. • The ip keyword is used to redistribute BGP routes with IP addresses into IS-IS.

route-map <i>map-tag</i>	(Optional) Identifier of a configured route map. The route map should be examined to filter the importation of routes from this source routing protocol to IS-IS. If not specified, all routes are redistributed. If the keyword is specified, but no route map tags are listed, no routes will be imported.
---------------------------------	--

Command Default Route redistribution from BGP to ISO IS-IS is disabled.

Command Modes Router configuration (config-router)

Command History	Release	Modification
	12.2(8)T	This command was modified. The clns keyword was added.
	12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
	12.0(32)S12	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
	12.0(32)SY8	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
	12.4(24)T	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
	Cisco IOS XE Release 2.3	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
	12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
	12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
	Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
	12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added. Support for changing autonomous system number of the BGP routing process was removed.
	12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Usage Guidelines

The **clns** keyword must be specified to redistribute NSAP prefix routes from BGP into an ISO IS-IS routing process. This version of the **redistribute** command is used only under router configuration mode for IS-IS processes.

**Note**

Be aware that when you configure the **no redistribute bgp autonomous-system route-map map-name** command under the **router isis** router configuration command, IS-IS removes the entire **redistribute** command, not just the route map. This behavior differs from the **no redistribute isis** command configured under the **router bgp** router configuration command, which removes a keyword.

Examples

The following example configures NSAP prefix routes from BGP autonomous system 64500 to be redistributed into the IS-IS routing process called *osi-proc-17*:

```
router isis osi-proc-17
 redistribute bgp 64500 clns
```

Related Commands

Command	Description
network (BGP and multiprotocol BGP)	Specifies the list of networks for the BGP routing process.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another.
router bgp	Configures the BGP routing process.
show route-map	Displays all route maps configured or only the one specified.

redistribute (IP)

To redistribute routes from one routing domain into another routing domain, use the **redistribute** command in the appropriate configuration mode. To disable all or some part of the redistribution (depending on the protocol), use the **no** form of this command. See the Usage Guidelines section for detailed, protocol-specific behaviors.

redistribute *protocol* [*process-id*] {**level-1**|**level-1-2**|**level-2**} [*autonomous-system-number*] [**metric** {*metric-value*|**transparent**}] [**metric-type** *type-value*] [**match** {**internal**|**external 1**|**external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*] [**subnets**] [**nssa-only**]

no redistribute *protocol* [*process-id*] {**level-1**|**level-1-2**|**level-2**} [*autonomous-system-number*] [**metric** {*metric-value*|**transparent**}] [**metric-type** *type-value*] [**match** {**internal**|**external 1**|**external 2**}] [**tag** *tag-value*] [**route-map** *map-tag*] [**subnets**] [**nssa-only**]

Syntax Description

<i>protocol</i>	<p>Source protocol from which routes are being redistributed. It can be one of the following keywords: bgp, connected, eigrp, isis, mobile, ospf, static [ip], or rip.</p> <p>The static [ip] keyword is used to redistribute IP static routes. The optional ip keyword is used when redistributing into the Intermediate System-to-Intermediate System (IS-IS) protocol.</p> <p>The connected keyword refers to routes that are established automatically by virtue of having enabled IP on an interface. For routing protocols such as Open Shortest Path First (OSPF) and IS-IS, these routes will be redistributed as external to the autonomous system.</p>
<i>process-id</i>	<p>(Optional) For the bgp or eigrp keyword, this is an autonomous system number, which is a 16-bit decimal number.</p> <p>For the isis keyword, this is an optional <i>tag</i> value that defines a meaningful name for a routing process. You can specify only one IS-IS process per router. Creating a name for a routing process means that you use names when configuring routing.</p> <p>For the ospf keyword, this is an appropriate OSPF process ID from which routes are to be redistributed. This identifies the routing process. This value takes the form of a nonzero decimal number.</p> <p>For the rip keyword, no <i>process-id</i> value is needed.</p> <p>By default, no process ID is defined.</p>
level-1	<p>Specifies that, for IS-IS, Level 1 routes are redistributed into other IP routing protocols independently.</p>

level-1-2	Specifies that, for IS-IS, both Level 1 and Level 2 routes are redistributed into other IP routing protocols.
level-2	Specifies that, for IS-IS, Level 2 routes are redistributed into other IP routing protocols independently.
<i>autonomous-system-number</i>	<p>(Optional) Autonomous system number for the redistributed route. The range is from 1 to 65535.</p> <ul style="list-style-type: none"> • In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, 4-byte autonomous system numbers are supported in the range from 65536 to 4294967295 in asplain notation and in the range from 1.0 to 65535.65535 in asdot notation. • In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, 4-byte autonomous system numbers are supported in the range from 1.0 to 65535.65535 in asdot notation only. <p>For more details about autonomous system number formats, see the router bgp command.</p>
metric <i>metric-value</i>	(Optional) When redistributing from one OSPF process to another OSPF process on the same router, the metric will be carried through from one process to the other if no metric value is specified. When redistributing other processes to an OSPF process, the default metric is 20 when no metric value is specified. The default value is 0.
metric transparent	(Optional) Causes Routing Information Protocol (RIP) to use the routing table metric for redistributed routes as the RIP metric.
metric-type <i>type-value</i>	<p>(Optional) For OSPF, specifies the external link type associated with the default route advertised into the OSPF routing domain. It can be one of two values:</p> <ul style="list-style-type: none"> • 1 --Type 1 external route • 2 --Type 2 external route <p>If a metric-type is not specified, the Cisco IOS software adopts a Type 2 external route.</p> <p>For IS-IS, it can be one of two values:</p> <ul style="list-style-type: none"> • internal --IS-IS metric that is < 63. • external --IS-IS metric that is > 64 < 128. <p>The default is internal.</p>

match { internal external1 external2 }	<p>(Optional) Specifies the criteria by which OSPF routes are redistributed into other routing domains. It can be one of the following:</p> <ul style="list-style-type: none"> • internal --Routes that are internal to a specific autonomous system. • external 1 --Routes that are external to the autonomous system, but are imported into OSPF as Type 1 external route. • external 2 --Routes that are external to the autonomous system, but are imported into OSPF as Type 2 external route. <p>The default is internal.</p>
tag <i>tag-value</i>	<p>(Optional) Specifies the 32-bit decimal value attached to each external route. This is not used by OSPF itself. It may be used to communicate information between Autonomous System Boundary Routers (ASBRs). If none is specified, then the remote autonomous system number is used for routes from Border Gateway Protocol (BGP) and Exterior Gateway Protocol (EGP); for other protocols, zero (0) is used.</p>
route-map	<p>(Optional) Specifies the route map that should be interrogated to filter the importation of routes from this source routing protocol to the current routing protocol. If not specified, all routes are redistributed. If this keyword is specified, but no route map tags are listed, no routes will be imported.</p>
<i>map-tag</i>	<p>(Optional) Identifier of a configured route map.</p>
subnets	<p>(Optional) For redistributing routes into OSPF, the scope of redistribution for the specified protocol. By default, no subnets are defined.</p>
nssa-only	<p>(Optional) Sets the nssa-only attribute for all routes redistributed into OSPF.</p>

Command Default

Route redistribution is disabled.

Command Modes

Router configuration (config-router)

Address family configuration (config-af)

Address family topology configuration (config-router-af-topology)

Command History

Release	Modification
10.0	This command was introduced.
12.0(5)T	This command was modified. Address family configuration mode was added.
12.0(22)S	This command was modified. Address family support under EIGRP was added.
12.2(15)T	This command was modified. Address family support under EIGRP was added.
12.2(18)S	This command was modified. Address family support under EIGRP was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB	This command was modified. This command was made available in router address family topology configuration mode.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.0(32)S12	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.0(32)SY8	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
Cisco IOS XE Release 2.3	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is asplain.
15.0(1)M	This command was modified. The nssa-only keyword was added.
12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Release	Modification
15.1(1)SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
Cisco IOS XE Release 3.3SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Usage Guidelines

Using the no Form of the redistribute Command



Caution

Removing options that you have configured for the **redistribute** command requires careful use of the **no** form of the **redistribute** command to ensure that you obtain the result that you are expecting. Changing or disabling any keyword may or may not affect the state of other keywords, depending on the protocol.

It is important to understand that different protocols implement the **no** version of the **redistribute** command differently:

- In BGP, OSPF, and RIP configurations, the **no redistribute** command removes only the specified keywords from the **redistribute** commands in the running configuration. They use the *subtractive keyword* method when redistributing from other protocols. For example, in the case of BGP, if you configure **no redistribute static route-map interior**, *only the route map* is removed from the redistribution, leaving **redistribute static** in place with no filter.
- The **no redistribute isis** command removes the IS-IS redistribution from the running configuration. IS-IS removes the entire command, regardless of whether IS-IS is the redistributed or redistributing protocol.
- EIGRP used the subtractive keyword method prior to EIGRP component version rel5. Starting with EIGRP component version rel5, the **no redistribute** command removes the entire **redistribute** command when redistributing from any other protocol.

Additional Usage Guidelines for the redistribute command

A router receiving a link-state protocol with an internal metric will consider the cost of the route from itself to the redistributing router plus the advertised cost to reach the destination. An external metric only considers the advertised metric to reach the destination.

Routes learned from IP routing protocols can be redistributed at Level 1 into an attached area or at Level 2. The **level-1-2** keyword allows both Level 1 and Level 2 routes in a single command.

Redistributed routing information must be filtered by the **distribute-list out** router configuration command. This guideline ensures that only those routes intended by the administrator are passed along to the receiving routing protocol.

Whenever you use the **redistribute** or the **default-information** router configuration commands to redistribute routes into an OSPF routing domain, the router automatically becomes an ASBR. However, an ASBR does not, by default, generate a *default route* into the OSPF routing domain.

When routes are redistributed into OSPF from protocols other than OSPF or BGP, and no metric has been specified with the **metric-type** keyword and *type-value* argument, OSPF will use 20 as the default metric.

When routes are redistributed into OSPF from BGP, OSPF will use 1 as the default metric. When routes are redistributed from one OSPF process to another OSPF process, autonomous system external and not-so-stubby-area (NSSA) routes will use 20 as the default metric. When intra-area and inter-area routes are redistributed between OSPF processes, the internal OSPF metric from the redistribution source process is advertised as the external metric in the redistribution destination process. (This is the only case in which the routing table metric will be preserved when routes are redistributed into OSPF.)

When routes are redistributed into OSPF, only routes that are not subnetted are redistributed if the **subnets** keyword is not specified.

On a router internal to an NSSA area, the **nssa-only** keyword causes the originated type-7 NSSA LSAs to have their propagate (P) bit set to zero, which prevents area border routers from translating these LSAs into type-5 external LSAs. On an area border router that is connected to a NSSA and normal areas, the **nssa-only** keyword causes the routes to be redistributed only into the NSSA areas.

Routes configured with the **connected** keyword affected by this **redistribute** command are the routes not specified by the **network** router configuration command.

You cannot use the **default-metric** command to affect the metric used to advertise connected routes.



Note

The **metric** value specified in the **redistribute** command supersedes the **metric** value specified using the **default-metric** command.

The default redistribution of interior gateway protocol (IGP) or Exterior Gateway Protocol (EGP) into BGP is not allowed unless the **default-information originate** router configuration command is specified.

Release 12.2(33)SRB

If you plan to configure the Multi-Topology Routing (MTR) feature, you need to enter the **redistribute** command in router address family topology configuration mode in order for this OSPF router configuration command to become topology-aware.

4-Byte Autonomous System Number Support

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain--65538 for example--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, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot--1.2, for example--as the only configuration format, regular expression match, and output display, with no asplain support.

Examples

The following example shows how OSPF routes are redistributed into a BGP domain:

```
Router(config)# router bgp 109
Router(config-router)# redistribute ospf
```

The following example shows how to redistribute EIGRP routes into an OSPF domain:

```
Router(config)# router ospf 110
Router(config-router)# redistribute eigrp
```


The following example shows how to redistribute the specified EIGRP process routes into an OSPF domain. The EIGRP-derived metric will be remapped to 100 and RIP routes to 200.

```
Router(config)# router ospf 109
Router(config-router)# redistribute eigrp 108 metric 100 subnets
Router(config-router)# redistribute rip metric 200 subnets
```

The following example shows how to configure BGP routes to be redistributed into IS-IS. The link-state cost is specified as 5, and the metric type is set to external, indicating that it has lower priority than internal metrics.

```
Router(config)# router isis
Router(config-router)# redistribute bgp 120 metric 5 metric-type external
```

In the following example, network 172.16.0.0 will appear as an external LSA in OSPF 1 with a cost of 100 (the cost is preserved):

```
Router(config)# interface ethernet 0
Router(config-if)# ip address 172.16.0.1 255.0.0.0
Router(config)# ip ospf cost 100
Router(config)# interface ethernet 1
Router(config-if)# ip address 10.0.0.1 255.0.0.0
!
Router(config)# router ospf 1
Router(config-router)# network 10.0.0.0 0.255.255.255 area 0
Router(config-router)# redistribute ospf 2 subnet
Router(config)# router ospf 2
Router(config-router)# network 172.16.0.0 0.255.255.255 area 0
```

The following example shows how BGP routes are redistributed into OSPF and assigned the local 4-byte autonomous system number in asplain format. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or a later release.

```
Router(config)# router ospf 2
Router(config-router)# redistribute bgp 65538
```

The following example shows how to remove the **connected metric 1000 subnets** options from the **redistribute connected metric 1000 subnets** command and leave the **redistribute connected** command in the configuration:

```
Router(config-router)# no redistribute connected metric 1000 subnets
```

The following example shows how to remove the **metric 1000** options from the **redistribute connected metric 1000 subnets** command and leave the **redistribute connected subnets** command in the configuration:

```
Router(config-router)# no redistribute connected metric 1000
```

The following example shows how to remove the **subnets** option from the **redistribute connected metric 1000 subnets** command and leave the **redistribute connected metric 1000** command in the configuration:

```
Router(config-router)# no redistribute connected subnets
```

The following example shows how to remove the **redistribute connected** command, and any of the options that were configured for the **redistribute connected** command, from the configuration:

```
Router(config-router)# no redistribute connected
```

The following example shows how EIGRP routes are redistributed into an EIGRP process in a named EIGRP configuration:

```
Router(config)# router eigrp virtual-name
Router(config-router)# address-family ipv4 autonomous-system 1
Router(config-router-af)# topology base
Router(config-router-af-topology)# redistribute eigrp 6473 metric 1 1 1 1 1
```

The following example shows how to set and disable the redistributions in EIGRP configuration. Note that, **in the case of EIGRP**, the **no** form of the commands removes the entire set of **redistribute** commands from the running configuration.

```
Router(config)# router eigrp 1
Router(config-router)# network 0.0.0.0
Router(config-router)# redistribute eigrp 2 route-map x
Router(config-router)# redistribute ospf 1 route-map x
Router(config-router)# redistribute bgp 1 route-map x
Router(config-router)# redistribute isis level-2 route-map x
Router(config-router)# redistribute rip route-map x

Router(config)# router eigrp 1
Router(config-router)# no redistribute eigrp 2 route-map x
Router(config-router)# no redistribute ospf 1 route-map x
Router(config-router)# no redistribute bgp 1 route-map x
Router(config-router)# no redistribute isis level-2 route-map x
Router(config-router)# no redistribute rip route-map x
Router(config-router)# end

Router# show running-config | section router eigrp 1

router eigrp 1
 network 0.0.0.0
```

The following example shows how to set and disable the redistributions in OSPF configuration. Note that the **no** form of the commands removes only the specified keywords from the **redistribute** command in the running configuration.

```
Router(config)# router ospf 1
Router(config-router)# network 0.0.0.0
Router(config-router)# redistribute eigrp 2 route-map x
Router(config-router)# redistribute ospf 1 route-map x
Router(config-router)# redistribute bgp 1 route-map x
Router(config-router)# redistribute isis level-2 route-map x
Router(config-router)# redistribute rip route-map x

Router(config)# router ospf 1
Router(config-router)# no redistribute eigrp 2 route-map x
Router(config-router)# no redistribute ospf 1 route-map x
Router(config-router)# no redistribute bgp 1 route-map x
Router(config-router)# no redistribute isis level-2 route-map x
Router(config-router)# no redistribute rip route-map x
Router(config-router)# end

Router# show running-config | section router ospf 1

router ospf 1
 redistribute eigrp 2
 redistribute ospf 1
 redistribute bgp 1
 redistribute rip
 network 0.0.0.0
```

The following example shows how to remove only the route map filter from the redistribution in BGP; redistribution itself remains in force without a filter:

```
Router(config)# router bgp 65000
Router(config-router)# no redistribute eigrp 2 route-map x
```

The following example shows how to remove the EIGRP redistribution to BGP:

```
Router(config)# router bgp 65000
Router(config-router)# no redistribute eigrp 2
```

Related Commands

Command	Description
address-family (EIGRP)	Enters address family configuration mode to configure an EIGRP routing instance.
address-family ipv4 (BGP)	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard IPv4 address prefixes.
address-family vpv4	Places the router in address family configuration mode for configuring routing sessions such as BGP, RIP, or static routing sessions that use standard VPNv4 address prefixes.
bgp asnotation dot	Changes the default display and the regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
default-information originate (BGP)	Allows the redistribution of network 0.0.0.0 into BGP.
default-information originate (IS-IS)	Generates a default route into an IS-IS routing domain.
default-information originate (OSPF)	Generates a default route into an OSPF routing domain.
distribute-list out (IP)	Suppresses networks from being advertised in updates.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
router bgp	Configures the BGP routing process.
router eigrp	Configures the EIGRP address-family process.
show route-map	Displays all route maps configured or only the one specified.
topology (EIGRP)	Configures an EIGRP process to route IP traffic under the specified topology instance and enters address family topology configuration mode.

redistribute (ISO IS-IS to BGP)

To redistribute routes from an International Organization for Standardization (ISO) Intermediate System-to-Intermediate System (IS-IS) routing process into a Border Gateway Protocol (BGP) autonomous system, use the **redistribute** command in address family or router configuration mode. To remove the **redistribute** command from the configuration file and restore the system to its default condition where the software does not redistribute IS-IS routes into BGP, use the **no** form of this command.

redistribute *protocol* [*process-id*] [*route-type*] [**route-map** [*map-tag*]]

no redistribute *protocol* [*process-id*] [*route-type*] [**route-map** [*map-tag*]]

Syntax Description

<i>protocol</i>	Source protocol from which routes are being redistributed. It can be one of the following keywords: isis or static . <ul style="list-style-type: none"> • The isis keyword is used to redistribute dynamic routes. • The static keyword is used to redistribute static routes.
<i>process-id</i>	(Optional) When IS-IS is used as a source protocol, this argument defines a meaningful name for a routing process. The <i>process-id</i> argument identifies from which IS-IS routing process routes will be redistributed. <ul style="list-style-type: none"> • Routes can be redistributed only from IS-IS routing processes that involve Level 2 routes, including IS-IS Level 1-2 and Level 2 routing processes. • The <i>process-id</i> argument is not used when the static keyword is used as the <i>protocol</i>.
<i>route-type</i>	(Optional) The type of route to be redistributed. It can be one of the following keywords: clns or ip . The default is ip . <ul style="list-style-type: none"> • The clns keyword is used to redistribute Connectionless Network Service (CLNS) routes with network service access point (NSAP) addresses into BGP. • The ip keyword is used to redistribute IS-IS routes with IP addresses into BGP.
route-map <i>map-tag</i>	(Optional) Identifier of a configured route map. The route map is examined to filter the importation of routes from this source routing protocol to BGP. If no route map is specified, all routes are redistributed. If the route-map keyword is specified, but no <i>map-tag</i> value is entered, no routes are imported.

Command Default

Route redistribution from ISO IS-IS to BGP is disabled.

route-type : **ip**

Command Modes

Address family configuration (config-router-af) (Cisco IOS 12.3(8)T and later releases)

Router configuration (config-router) (T-releases after Cisco IOS 12.3(8)T)

Command History

Release	Modification
12.2(8)T	The clns keyword was added.
12.3(8)T	Beginning with Cisco IOS Release 12.3(8)T this version of the redistribute command should be entered under address family mode rather than router configuration mode.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
Cisco IOS XE 2.6	This command was integrated into Cisco IOS XE Release 2.6.

Usage Guidelines

The **clns** keyword must be specified to redistribute NSAP prefix routes from an ISO IS-IS routing process into BGP. Beginning with Cisco IOS Release 12.3(8)T, this version of the **redistribute** command is entered only in address family configuration mode for BGP processes.

Examples**Examples**

The following example configures CLNS NSAP routes from the IS-IS routing process called *osi-proc-6* to be redistributed into BGP:

```
Router(config)# router bgp 64352
Router(config-router)# redistribute isis osi-proc-6 clns
```

Examples

The following example configures CLNS NSAP routes from the IS-IS routing process called *osi-proc-15* to be redistributed into BGP:

```
Router(config)# router bgp 404
Router(config-router)# address-family nsap
Router(config-router-af)# redistribute isis osi-proc-15 clns
```

Related Commands

Command	Description
network (BGP and multiprotocol BGP)	Specifies the list of networks for the BGP routing process.

Command	Description
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another.
show route-map	Displays all route maps configured or only the one specified.

router bgp

To configure the Border Gateway Protocol (BGP) routing process, use the **router bgp** command in global configuration mode. To remove a BGP routing process, use the **no** form of this command.

router bgp *autonomous-system-number*

no router bgp *autonomous-system-number*

Syntax Description

<i>autonomous-system-number</i>	<p>Number of an autonomous system that identifies the router to other BGP routers and tags the routing information that is passed along. Number in the range from 1 to 65535.</p> <ul style="list-style-type: none"> • In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, 4-byte autonomous system numbers are supported in the range from 65536 to 4294967295 in asplain notation and in the range from 1.0 to 65535.65535 in asdot notation. • In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, 4-byte autonomous system numbers are supported in the range from 1.0 to 65535.65535 in asdot notation only. <p>For more details about autonomous system number formats, see the “Usage Guidelines” section.</p>
---------------------------------	--

Command Default No BGP routing process is enabled by default.

Command Modes Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.

Release	Modification
12.2(33)SRB	This command was modified. Support for IPv6 was added.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.2(33)SB	This command was modified. Support for IPv6 was added.
12.0(32)S12	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.0(32)SY8	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
Cisco IOS XE Release 2.3	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
15.1(1)SG	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
Cisco IOS XE Release 3.3SG	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Usage Guidelines

This command allows you to set up a distributed routing core that automatically guarantees the loop-free exchange of routing information between autonomous systems.

Prior to January 2009, BGP autonomous system numbers that were allocated to companies were 2-octet numbers in the range from 1 to 65535 as described in RFC 4271, *A Border Gateway Protocol 4 (BGP-4)*. Due to increased demand for autonomous system numbers, the Internet Assigned Number Authority (IANA)

will start in January 2009 to allocate four-octet autonomous system numbers in the range from 65536 to 4294967295. RFC 5396, *Textual Representation of Autonomous System (AS) Numbers*, documents three methods of representing autonomous system numbers. Cisco has implemented the following two methods:

- **Asplain**—Decimal value notation where both 2-byte and 4-byte autonomous system numbers are represented by their decimal value. For example, 65526 is a 2-byte autonomous system number and 234567 is a 4-byte autonomous system number.
- **Asdot**—Autonomous system dot notation where 2-byte autonomous system numbers are represented by their decimal value and 4-byte autonomous system numbers are represented by a dot notation. For example, 65526 is a 2-byte autonomous system number and 1.169031 is a 4-byte autonomous system number (this is dot notation for the 234567 decimal number).

For details about the third method of representing autonomous system numbers, see RFC 5396.



Note

In Cisco IOS releases that include 4-byte ASN support, command accounting and command authorization that include a 4-byte ASN number are sent in the asplain notation irrespective of the format that is used on the command-line interface.

Asdot Only Autonomous System Number Formatting

In Cisco IOS Release 12.0(32)S12, 12.4(24)T, Cisco IOS XE Release 2.3, and later releases, the 4-octet (4-byte) autonomous system numbers are entered and displayed only in asdot notation, for example, 1.10 or 45000.64000. When using regular expressions to match 4-byte autonomous system numbers the asdot format includes a period which is a special character in regular expressions. A backslash must be entered before the period for example, 1\.14, to ensure the regular expression match does not fail. The table below shows the format in which 2-byte and 4-byte autonomous system numbers are configured, matched in regular expressions, and displayed in **show** command output in Cisco IOS images where only asdot formatting is available.

Table 2: Asdot Only 4-Byte Autonomous System Number Format

Format	Configuration Format	Show Command Output and Regular Expression Match Format
asdot	2-byte: 1 to 65535 4-byte: 1.0 to 65535.65535	2-byte: 1 to 65535 4-byte: 1.0 to 65535.65535

Asplain as Default Autonomous System Number Formatting

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain as the default display format for autonomous system numbers, but you can configure 4-byte autonomous system numbers in both the asplain and asdot format. In addition, the default format for matching 4-byte autonomous system numbers in regular expressions is asplain, so you must ensure that any regular expressions to match 4-byte autonomous system numbers are written in the asplain 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. When the asdot format is enabled as the default, any regular expressions to match 4-byte autonomous system numbers must be written using the asdot format, or the regular expression match will fail. The tables below show that although you can configure 4-byte autonomous system numbers in either asplain or asdot format, only one format is used to display **show** command output and control 4-byte autonomous system number matching for regular expressions, and the

default is asplain format. To display 4-byte autonomous system numbers in **show** command output and to control matching for regular expressions in the asdot format, you must configure the **bgp asnotation dot** command. After enabling the **bgp asnotation dot** command, a hard reset must be initiated for all BGP sessions by entering the **clear ip bgp *** command.

**Note**

If you are upgrading to an image that supports 4-byte autonomous system numbers, you can still use 2-byte autonomous system numbers. The **show** command output and regular expression match are not changed and remain in asplain (decimal value) format for 2-byte autonomous system numbers regardless of the format configured for 4-byte autonomous system numbers.

Table 3: Default Asplain 4-Byte Autonomous System Number Format

Format	Configuration Format	Show Command Output and Regular Expression Match Format
asplain	2-byte: 1 to 65535 4-byte: 65536 to 4294967295	2-byte: 1 to 65535 4-byte: 65536 to 4294967295
asdot	2-byte: 1 to 65535 4-byte: 1.0 to 65535.65535	2-byte: 1 to 65535 4-byte: 65536 to 4294967295

Table 4: Asdot 4-Byte Autonomous System Number Format

Format	Configuration Format	Show Command Output and Regular Expression Match Format
asplain	2-byte: 1 to 65535 4-byte: 65536 to 4294967295	2-byte: 1 to 65535 4-byte: 1.0 to 65535.65535
asdot	2-byte: 1 to 65535 4-byte: 1.0 to 65535.65535	2-byte: 1 to 65535 4-byte: 1.0 to 65535.65535

Reserved and Private Autonomous System Numbers

In Cisco IOS Release 12.0(32)S12, 12.0(32)SY8, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, 12.4(24)T, Cisco IOS XE Release 2.3 and later releases, the Cisco implementation of BGP supports RFC 4893. RFC 4893 was developed to allow BGP to support a gradual transition from 2-byte autonomous system numbers to 4-byte autonomous system numbers. A new reserved (private) autonomous system number, 23456, was created by RFC 4893 and this number cannot be configured as an autonomous system number in the Cisco IOS CLI.

RFC 5398, *Autonomous System (AS) Number Reservation for Documentation Use*, describes new reserved autonomous system numbers for documentation purposes. Use of the reserved numbers allow configuration examples to be accurately documented and avoids conflict with production networks if these configurations are literally copied. The reserved numbers are documented in the IANA autonomous system number registry. Reserved 2-byte autonomous system numbers are in the contiguous block, 64496 to 64511 and reserved 4-byte autonomous system numbers are from 65536 to 65551 inclusive.

Private 2-byte autonomous system numbers are still valid in the range from 64512 to 65534 with 65535 being reserved for special use. Private autonomous system numbers can be used for internal routing domains but must be translated for traffic that is routed out to the Internet. BGP should not be configured to advertise private autonomous system numbers to external networks. Cisco IOS software does not remove private autonomous system numbers from routing updates by default. We recommend that ISPs filter private autonomous system numbers.

**Note**

Autonomous system number assignment for public and private networks is governed by the IANA. For information about autonomous-system numbers, including reserved number assignment, or to apply to register an autonomous system number, see the following URL: <http://www.iana.org/>.

Examples

The following example configures a BGP process for autonomous system 45000 and configures two external BGP neighbors in different autonomous systems using 2-byte autonomous system numbers:

```
router bgp 45000
 neighbor 192.168.1.2 remote-as 40000
 neighbor 192.168.3.2 remote-as 50000
 neighbor 192.168.3.2 description finance
 !
 address-family ipv4
  neighbor 192.168.1.2 activate
  neighbor 192.168.3.2 activate
  no auto-summary
  no synchronization
  network 172.17.1.0 mask 255.255.255.0
 exit-address-family
```

The following example configures a BGP process for autonomous system 65538 and configures two external BGP neighbors in different autonomous systems using 4-byte autonomous system numbers in asplain notation. This example is supported in Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases.

```
router bgp 65538
 neighbor 192.168.1.2 remote-as 65536
 neighbor 192.168.3.2 remote-as 65550
 neighbor 192.168.3.2 description finance
 !
 address-family ipv4
  neighbor 192.168.1.2 activate
  neighbor 192.168.3.2 activate
  no auto-summary
  no synchronization
  network 172.17.1.0 mask 255.255.255.0
 exit-address-family
```

The following example configures a BGP process for autonomous system 1.2 and configures two external BGP neighbors in different autonomous systems using 4-byte autonomous system numbers in asdot notation. This example is supported in Cisco IOS Release 12.0(32)SY8, 12.0(32)S12, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, 12.4(24)T, and Cisco IOS XE Release 2.3, and later releases.

```
router bgp 1.2
 neighbor 192.168.1.2 remote-as 1.0
 neighbor 192.168.3.2 remote-as 1.14
 neighbor 192.168.3.2 description finance
 !
 address-family ipv4
  neighbor 192.168.1.2 activate
  neighbor 192.168.3.2 activate
  no auto-summary
  no synchronization
```

 router bgp

```
network 172.17.1.0 mask 255.255.255.0
exit-address-family
```

Related Commands

Command	Description
bgp asnotation dot	Changes the default display and the regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
neighbor remote-as	Adds an entry to the BGP or multiprotocol BGP neighbor table.
network (BGP and multiprotocol BGP)	Specifies the list of networks for the BGP routing process.

set as-path

To modify an autonomous system path for BGP routes, use the **set as-path** command in route-map configuration mode. To not modify the autonomous system path, use the **no** form of this command.

set as-path {tag| prepend *as-path-string*}

no set as-path {tag| prepend *as-path-string*}

Syntax Description

tag	Converts the tag of a route into an autonomous system path. Applies only when redistributing routes into BGP.
prepend	Appends the string following the keyword prepend to the autonomous system path of the route that is matched by the route map. Applies to inbound and outbound BGP route maps.
<i>as-path-string</i>	<p>Number of an autonomous system to prepend to the AS_PATH attribute. The range of values for this argument is any valid autonomous system number from 1 to 65535. Multiple values can be entered; up to 10 AS numbers can be entered.</p> <ul style="list-style-type: none"> • In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, 4-byte autonomous system numbers are supported in the range from 65536 to 4294967295 in asplain notation and in the range from 1.0 to 65535.65535 in asdot notation. • In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, 4-byte autonomous system numbers are supported in the range from 1.0 to 65535.65535 in asdot notation only. <p>For more details about autonomous system number formats, see the router bgp command.</p>

Command Default An autonomous system path is not modified.

Command Modes Route-map configuration (config-route-map)

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.0(32)S12	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.0(32)SY8	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
Cisco IOS XE Release 2.3	This command was modified. Support for 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
15.1(1)SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
Cisco IOS XE Release 3.3SG	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Usage Guidelines

The only global BGP metric available to influence the best path selection is the autonomous system path length. By varying the length of the autonomous system path, a BGP speaker can influence the best path selection by a peer further away.

By allowing you to convert the tag into an autonomous system path, the **set as-path tag** variation of this command modifies the autonomous system length. The **set as-path prepend** variation allows you to “prepend”

an arbitrary autonomous system path string to BGP routes. Usually the local autonomous system number is prepended multiple times, increasing the autonomous system path length.

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain--65538 for example--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 followed by the **clear ip bgp *** command to perform a hard reset of all current BGP sessions.

In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot--1.2 for example--as the only configuration format, regular expression match, and output display, with no asplain support.

Examples

The following example converts the tag of a redistributed route into an autonomous system path:

```
route-map set-as-path-from-tag
  set as-path tag
!
router bgp 100
  redistribute ospf 109 route-map set-as-path-from-tag
```

The following example prepends 100 100 100 to all the routes that are advertised to 10.108.1.1:

```
route-map set-as-path
  match as-path 1
  set as-path prepend 100 100 100
!
router bgp 100
  neighbor 10.108.1.1 route-map set-as-path out
```

The following example prepends 65538, 65538, and 65538 to all the routes that are advertised to 192.168.1.2. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or a later release.

```
route-map set-as-path
  match as-path 1.1
  set as-path prepend 65538 65538 65538
exit
router bgp 65538
  neighbor 192.168.1.2 route-map set-as-path out
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
router bgp	Configures the BGP routing process.
set tag (IP)	Sets a tag value of the destination routing protocol.

set community

To set the BGP communities attribute, use the **set community** route map configuration command. To delete the entry, use the **no** form of this command.

set community {*community-number* [**additive**] [*well-known-community*]| **none**}

no set community

Syntax Description

<i>community-number</i>	Specifies that community number. Valid values are from 1 to 4294967200, no-export , or no-advertise .
additive	(Optional) Adds the community to the already existing communities.
<i>well-known-community</i>	(Optional) Well know communities can be specified by using the following keywords: <ul style="list-style-type: none"> • internet • local-as • no-advertise • no-export
none	(Optional) Removes the community attribute from the prefixes that pass the route map.

Command Default

No BGP communities attributes exist.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
10.3	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

You must have a match clause (even if it points to a “permit everything” list) if you want to set tags.

Use the **route-map** global configuration command, and the **match** and **set** route map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria* --the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions* --the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **set** route map configuration commands specify the redistribution *set actions* to be performed when all of the match criteria of a route map are met. When all match criteria are met, all set actions are performed.

Examples

In the following example, routes that pass the autonomous system path access list 1 have the community set to 109. Routes that pass the autonomous system path access list 2 have the community set to no-export (these routes will not be advertised to any external BGP [eBGP] peers).

```
route-map set_community 10 permit
 match as-path 1
 set community 109
route-map set_community 20 permit
 match as-path 2
 set community no-export
```

In the following similar example, routes that pass the autonomous system path access list 1 have the community set to 109. Routes that pass the autonomous system path access list 2 have the community set to local-as (the router will not advertise this route to peers outside the local autonomous system).

```
route-map set_community 10 permit
 match as-path 1
 set community 109
route-map set_community 20 permit
 match as-path 2
 set community local-as
```

Related Commands

Command	Description
ip community-list	Creates a community list for BGP and control access to it.
match community	Matches a BGP community.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set comm-list delete	Removes communities from the community attribute of an inbound or outbound update.
show ip bgp community	Displays routes that belong to specified BGP communities.

set dampening

To set the BGP route dampening factors, use the **set dampening** route map configuration command. To disable this function, use the **no** form of this command.

set dampening *half-life reuse suppress max-suppress-time*

no set dampening

Syntax Description

<i>half-life</i>	Time (in minutes) after which a penalty is decreased. Once the route has been assigned a penalty, the penalty is decreased by half after the half life period (which is 15 minutes by default). The process of reducing the penalty happens every 5 seconds. The range of the half life period is from 1 to 45 minutes. The default is 15 minutes.
<i>reuse</i>	Unsuppresses the route if the penalty for a flapping route decreases enough to fall below this value. The process of unsuppressing routes occurs at 10-second increments. The range of the reuse value is from 1 to 20000; the default is 750.
<i>suppress</i>	Suppresses a route when its penalty exceeds this limit. The range is from 1 to 20000; the default is 2000.
<i>max-suppress-time</i>	Maximum time (in minutes) a route can be suppressed. The range is from 1 to 20000; the default is four times the <i>half-life</i> value. If the <i>half-life</i> value is allowed to default, the maximum suppress time defaults to 60 minutes.

Command Default

This command is disabled by default.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
11.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria* --the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions* --the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

When a BGP peer is reset, the route is withdrawn and the flap statistics cleared. In this instance, the withdrawal does not incur a penalty even though route flap dampening is enabled.

Examples

The following example sets the half life to 30 minutes, the reuse value to 1500, the suppress value to 10000; and the maximum suppress time to 120 minutes:

```
route-map tag
 match as path 10
 set dampening 30 1500 10000 120
!
router bgp 100
 neighbor 172.16.233.52 route-map tag in
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match interface (IP)	Distributes routes that have their next hop out one of the interfaces specified.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match metric (IP)	Redistributes routes with the metric specified.

Command	Description
match route-type (IP)	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set ip next-hop	Specifies the address of the next hop.
set level (IP)	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP, OSPF, RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set origin (BGP)	Sets the BGP origin code.
set tag (IP)	Sets the value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.
show route-map	Displays all route maps configured or only the one specified.

set ip next-hop (BGP)

To indicate where to output packets that pass a match clause of a route map for policy routing, use the **set ip next-hop** command in route-map configuration mode. To delete an entry, use the **no** form of this command.

set ip next-hop *ip-address*[...*ip-address*][**peer-address**]

no set ip next-hop *ip-address*[...*ip-address*][**peer-address**]

Syntax Description

<i>ip-address</i>	IP address of the next hop to which packets are output. It need not be an adjacent router.
peer-address	(Optional) Sets the next hop to be the BGP peering address.

Command Default

This command is disabled by default.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
11.0	This command was introduced.
12.0	The peer-address keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.

Usage Guidelines

An ellipsis (...) in the command syntax indicates that your command input can include multiple values for the *ip-address* argument.

Use the **ip policy route-map** interface configuration command, the **route-map** global configuration command, and the **match** and **set** route-map configuration commands to define the conditions for policy routing packets. The **ip policy route-map** command identifies a route map by name. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria* --the conditions under which policy routing occurs. The **set** commands specify the *set actions* --the particular routing actions to perform if the criteria enforced by the **match** commands are met.

If the first next hop specified with the **set ip next-hop** command is down, the optionally specified IP addresses are tried in turn.

When the **set ip next-hop** command is used with the **peer-address** keyword in an inbound route map of a BGP peer, the next hop of the received matching routes will be set to be the neighbor peering address, overriding any third-party next hops. So the same route map can be applied to multiple BGP peers to override third-party next hops.

When the **set ip next-hop** command is used with the **peer-address** keyword in an outbound route map of a BGP peer, the next hop of the advertised matching routes will be set to be the peering address of the local router, thus disabling the next hop calculation. The **set ip next-hop** command has finer granularity than the (per-neighbor) **neighbor next-hop-self** command, because you can set the next hop for some routes, but not others. The **neighbor next-hop-self** command sets the next hop for all routes sent to that neighbor.

The set clauses can be used in conjunction with one another. They are evaluated in the following order:

- 1 **set ip next-hop**
- 2 **set interface**
- 3 **set ip default next-hop**
- 4 **set default interface**



Note

To avoid a common configuration error for reflected routes, do not use the **set ip next-hop** command in a route map to be applied to BGP route reflector clients.

Configuring the **set ip next-hop ...ip-address** command on a VRF interface allows the next hop to be looked up in a specified VRF address family. In this context, the *...ip-address* argument matches that of the specified VRF instance.

Examples

In the following example, three routers are on the same FDDI LAN (with IP addresses 10.1.1.1, 10.1.1.2, and 10.1.1.3). Each is in a different autonomous system. The **set ip next-hop peer-address** command specifies that traffic from the router (10.1.1.3) in remote autonomous system 300 for the router (10.1.1.1) in remote autonomous system 100 that matches the route map is passed through the router bgp 200, rather than sent directly to the router (10.1.1.1) in autonomous system 100 over their mutual connection to the LAN.

```
router bgp 200
 neighbor 10.1.1.3 remote-as 300
 neighbor 10.1.1.3 route-map set-peer-address out
 neighbor 10.1.1.1 remote-as 100
 route-map set-peer-address permit 10
 set ip next-hop peer-address
```

Related Commands

Command	Description
ip policy route-map	Identifies a route map to use for policy routing on an interface.

Command	Description
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
match length	Bases policy routing on the Level 3 length of a packet.
neighbor next-hop-self	Disables next hop processing of BGP updates on the router.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol to another, or enables policy routing.
set default interface	Indicates where to output packets that pass a match clause of a route map for policy routing and that have no explicit route to the destination.
set interface	Indicates where to output packets that pass a match clause of a route map for policy routing.
set ip default next-hop	Indicates where to output packets that pass a match clause of a route map for policy routing and for which the Cisco IOS software has no explicit route to a destination.

set ipv6 next-hop (BGP)

To indicate where to output IPv6 packets that pass a match clause of a route map for policy routing, use the **set ipv6 next-hop** command in route-map configuration mode. To delete an entry, use the **no** form of this command.

```
set ipv6 next-hop {ipv6-address [ link-local-address ]| encapsulate l3vpn profile name | peer-address}
no set ipv6 next-hop {ipv6-address [ link-local-address ]| encapsulate l3vpn profile name| peer-address}
```

Syntax Description

<i>ipv6-address</i>	IPv6 global address of the next hop to which packets are output. It need not be an adjacent router. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
<i>link-local-address</i>	(Optional) IPv6 link-local address of the next hop to which packets are output. It must be an adjacent router. This argument must be in the form documented in RFC 2373 where the address is specified in hexadecimal using 16-bit values between colons.
encapsulate l3vpn	Sets the encapsulation profile for VPN nexthop.
<i>profile name</i>	Name of the Layer 3 encapsulation profile.
peer-address	(Optional) Sets the next hop to be the BGP peering address.

Command Default IPv6 packets are forwarded to the next hop router in the routing table.

Command Modes Route-map configuration (config-route-map)

Command History

Release	Modification
12.2(4)T	This command was introduced.
12.0(21)ST	This command was integrated into Cisco IOS Release 12.0(21)ST.
12.0(22)S	This command was integrated into Cisco IOS Release 12.0(22)S.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.

Release	Modification
12.2(25)SG	This command was integrated into Cisco IOS Release 12.2(25)SG.
Cisco IOS XE Release 2.1	This command was introduced on Cisco ASR 1000 Series Routers.
12.2(33)SRE	This command was modified. The encapsulate l3vpn keyword was added.

Usage Guidelines

The **set ipv6 next-hop** command is similar to the **set ip next-hop** command, except that it is IPv6-specific. The **set** commands specify the *set actions* --the particular routing actions to perform if the criteria enforced by the **match** commands are met.

When the **set ipv6 next-hop** command is used with the **peer-address** keyword in an inbound route map of a BGP peer, the next hop of the received matching routes will be set to be the neighbor peering address, overriding any third-party next hops. So the same route map can be applied to multiple BGP peers to override third-party next hops.

When the **set ipv6 next-hop** command is used with the **peer-address** keyword in an outbound route map of a BGP peer, the next hop of the advertised matching routes will be set to be the peering address of the local router, thus disabling the next hop calculation. The **set ipv6 next-hop** command has finer granularity than the per-neighbor **neighbor next-hop-self** command, because you can set the next hop for some routes, but not others. The **neighbor next-hop-self** command sets the next hop for all routes sent to that neighbor.

The set clauses can be used in conjunction with one another. They are evaluated in the following order:

- 1 **set ipv6 next-hop**
- 2 **set interface**
- 3 **set ipv6 default next-hop**
- 4 **set default interface**

Configuring the **set ipv6 next-hop ipv6-address** command on a VRF interface allows the next hop to be looked up in a specified VRF address family. In this context, the *ipv6-address* argument matches that of the specified VRF instance.

Examples

The following example configures the IPv6 multiprotocol BGP peer FE80::250:BFF:FE0E:A471 and sets the route map named nh6 to include the IPv6 next hop global addresses of Fast Ethernet interface 0 of the neighbor in BGP updates. The IPv6 next hop link-local address can be sent to the neighbor by the nh6 route map or from the interface specified by the **neighbor update-source** router configuration command.

```
router bgp 170
  neighbor FE80::250:BFF:FE0E:A471 remote-as 150
  neighbor FE80::250:BFF:FE0E:A471 update-source fastether 0
  address-family ipv6
    neighbor FE80::250:BFF:FE0E:A471 activate
    neighbor FE80::250:BFF:FE0E:A471 route-map nh6 out
  route-map nh6
    set ipv6 next-hop 3FFE:506::1
```

**Note**

If you specify only the global IPv6 next hop address (the *ipv6-address* argument) with the **set ipv6 next-hop** command after specifying the neighbor interface (the *interface-type* argument) with the **neighbor update-source** command, the link-local address of the neighbor interface is included as the next hop in the BGP updates. Therefore, only one route map that sets the global IPv6 next hop address in BGP updates is required for multiple BGP peers that use link-local addresses.

Related Commands

Command	Description
ip policy route-map	Identifies a route map to use for policy routing on an interface.
match ipv6 address	Distributes IPv6 routes that have a prefix permitted by a prefix list.
match ipv6 next-hop	Distributes IPv6 routes that have a next hop prefix permitted by a prefix list.
match ipv6 route-source	Distributes IPv6 routes that have been advertised by routers at an address specified by a prefix list.
neighbor next-hop-self	Disables next-hop processing of BGP updates on the router.
neighbor update-source	Specifies that the Cisco IOS software allow BGP sessions to use any operational interface for TCP connections
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.

set metric (BGP-OSPF-RIP)

To set the metric value for a routing protocol, use the **setmetric** command in route-map configuration mode. To return to the default metric value, use the **no** form of this command.

set metric *metric-value*

no set metric *metric-value*

Syntax Description

<i>metric-value</i>	Metric value; an integer from -294967295 to 294967295. This argument applies to all routing protocols except Enhanced Interior Gateway Routing Protocol (EIGRP).
---------------------	--

Command Default

The dynamically learned metric value.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

We recommend that you consult your Cisco technical support representative before changing the default value.

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria* --the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions* --the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **noroute-map** command deletes the route map.

The **set** route-map configuration commands specify the redistribution *setactions* to be performed when all the match criteria of a route map are met. When all match criteria are met, all set actions are performed.

Examples

The following example sets the metric value for the routing protocol to 100:

```
route-map set-metric
 set metric 100
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match interface (IP)	Distributes routes that have their next hop out one of the interfaces specified.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match metric (IP)	Redistributes routes with the metric specified.
match route-type (IP)	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set ip next-hop	Specifies the address of the next hop.
set level (IP)	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.

Command	Description
set metric (BGP, OSPF, RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set origin (BGP)	Sets the BGP origin code.
set tag (IP)	Sets the value of the destination routing protocol.

set origin (BGP)

To set the BGP origin code, use the **set origin** command in route-map configuration mode. To delete an entry, use the **no** form of this command.

set origin {**igp**|**egp** *autonomous-system-number*|**incomplete**}

no set origin {**igp**|**egp** *autonomous-system-number*|**incomplete**}

Syntax Description

igp	Remote Interior Gateway Protocol (IGP) system.
egp	Local Exterior Gateway Protocol (EGP) system.
<i>autonomous-system-number</i>	Number of a remote autonomous system number. The range of values for this argument is any valid autonomous system number from 1 to 65535.
incomplete	Unknown heritage.

Command Default

The origin of the route is based on the path information of the route in the main IP routing table.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.4(2)T	This command was modified. The egp keyword and <i>autonomous-system-number</i> argument were removed.
12.0(33)S3	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for asplain notation was added and the default format for 4-byte autonomous system numbers is now asplain.
12.2(33)SRE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Release	Modification
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Usage Guidelines

You must have a match clause (even if it points to a “permit everything” list) if you want to set the origin of a route. Use this command to set a specific origin when a route is redistributed into BGP. When routes are redistributed, the origin is usually recorded as incomplete, identified with a ? in the BGP table.

Use the **route-map** global configuration command, and the **match** and **set** route-map configuration commands, to define the conditions for redistributing routes from one routing protocol into another. Each **route-map** command has a list of **match** and **set** commands associated with it. The **match** commands specify the *match criteria* --the conditions under which redistribution is allowed for the current **route-map** command. The **set** commands specify the *set actions* --the particular redistribution actions to perform if the criteria enforced by the **match** commands are met. The **no route-map** command deletes the route map.

The **set** route-map configuration commands specify the redistribution *set actions* to be performed when all of the match criteria of a route map are met. When all match criteria are met, all set actions are performed.

Examples

The following example sets the origin of routes that pass the route map to IGP:

```
route-map set_origin
match as-path 10
set origin igp
```

Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
router bgp	Configures the BGP routing process.
set as-path	Modifies an autonomous system path for BGP routes.

set weight

To specify the BGP weight for the routing table, use the **set weight** command in route-map configuration mode. To delete an entry, use the **no** form of this command.

set weight *number*
no set weight *number*

Syntax Description

<i>number</i>	Weight value. It can be an integer ranging from 0 to 65535.
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Command Default

The weight is not changed by the specified route map.

Command Modes

Route-map configuration (config-route-map)

Command History

Release	Modification
10.0	This command was introduced.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

The implemented weight is based on the first matched autonomous system path. Weights indicated when an autonomous system path is matched override the weights assigned by global **neighbor** commands. In other words, the weights assigned with the **set weight** route-map configuration command override the weights assigned using the **neighbor weight** command.

Examples

The following example sets the BGP weight for the routes matching the autonomous system path access list to 200:

```
route-map set-weight
match as-path 10
set weight 200
```


Related Commands

Command	Description
match as-path	Matches a BGP autonomous system path access list.
match community	Matches a BGP community.
match interface (IP)	Distributes routes that have their next hop out one of the interfaces specified.
match ip address	Distributes any routes that have a destination network number address that is permitted by a standard or extended access list, and performs policy routing on packets.
match ip next-hop	Redistributes any routes that have a next hop router address passed by one of the access lists specified.
match ip route-source	Redistributes routes that have been advertised by routers and access servers at the address specified by the access lists.
match metric (IP)	Redistributes routes with the metric specified.
match route-type (IP)	Redistributes routes of the specified type.
match tag	Redistributes routes in the routing table that match the specified tags.
route-map (IP)	Defines the conditions for redistributing routes from one routing protocol into another, or enables policy routing.
set automatic-tag	Automatically computes the tag value.
set community	Sets the BGP communities attribute.
set ip next-hop	Specifies the address of the next hop.
set level (IP)	Indicates where to import routes.
set local-preference	Specifies a preference value for the autonomous system path.
set metric (BGP, OSPF, RIP)	Sets the metric value for a routing protocol.
set metric-type	Sets the metric type for the destination routing protocol.
set origin (BGP)	Sets the BGP origin code.

Command	Description
set tag (IP)	Sets the value of the destination routing protocol.
set weight	Specifies the BGP weight for the routing table.



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- [show ip route, page 233](#)
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show ip bgp

To display entries in the Border Gateway Protocol (BGP) routing table, use the **show ip bgp** command in user EXEC or privileged EXEC mode.

show ip bgp [*ip-address* [*mask* [**longer-prefixes** [**injected**] | **shorter-prefixes** [*length*] | **bestpath** | **multipaths** | **subnets**] | **bestpath** | **multipaths**] | **all** | **oer-paths** | **prefix-list** *name* | **pending-prefixes** | **route-map** *name*]

Syntax Description

<i>ip-address</i>	(Optional) IP address entered to filter the output to display only a particular host or network in the BGP routing table.
<i>mask</i>	(Optional) Mask to filter or match hosts that are part of the specified network.
longer-prefixes	(Optional) Displays the specified route and all more-specific routes.
injected	(Optional) Displays more specific prefixes injected into the BGP routing table.
shorter-prefixes	(Optional) Displays the specified route and all less-specific routes.
<i>length</i>	(Optional) The prefix length. The range is a number from 0 to 32.
bestpath	(Optional) Displays the best path for this prefix.
multipaths	(Optional) Displays multipaths for this prefix.
subnets	(Optional) Displays the subnet routes for the specified prefix.
all	(Optional) Displays all address family information in the BGP routing table.
oer-paths	(Optional) Displays Optimized Edge Routing (OER) controlled prefixes in the BGP routing table.
prefix-list <i>name</i>	(Optional) Filters the output based on the specified prefix list.
pending-prefixes	(Optional) Displays prefixes that are pending deletion from the BGP routing table.
route-map <i>name</i>	(Optional) Filters the output based on the specified route map.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.0	This command was modified. The display of prefix advertisement statistics was added.
12.0(6)T	This command was modified. The display of a message indicating support for route refresh capability was added.
12.0(14)ST	This command was modified. The prefix-list , route-map , and shorter-prefixes keywords were added.
12.2(2)T	This command was modified. The output was modified to display multipaths and a best path to the specified network.
12.0(21)ST	The output was modified to show the number of Multiprotocol Label Switching (MPLS) labels that arrive at and depart from the prefix.
12.0(22)S	This command was modified. A new status code indicating stale routes was added to support BGP graceful restart.
12.2(14)S	This command was modified. A message indicating support for BGP policy accounting was added.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.2(15)T	This command was modified. A new status code indicating stale routes was added to support BGP graceful restart.
12.3(2)T	This command was modified. The all keyword was added.
12.2(17b)SXA	This command was integrated into Cisco IOS Release 12.2(17b)SXA.
12.3(8)T	This command was modified. The oer-paths keyword was added.
12.4(15)T	This command was modified. The pending-prefixes , bestpath , multipaths , and subnets keywords were added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.0(32)S12	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.

Release	Modification
12.0(32)SY8	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.
Cisco IOS XE Release 2.3	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format was changed asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format was changed asplain.
12.2(33)SRE	This command was modified. The command output was modified to show the backup path and the best external path information. Support for the best external route and backup path was added. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was integrated into Cisco IOS Release 12.2(33)XNE.
15.0(1)S	This command was integrated into Cisco IOS Release 15.0(1)S.
15.2(1)S	This command was modified to display an RPKI validation code per network, if one applies.
Cisco IOS XE Release 3.5S	This command was modified to display an RPKI validation code per network, if one applies.
15.1(1)SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
Cisco IOS XE Release 3.3SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
15.2(4)S	This command was modified. Output about discarded or unknown path attributes was added for the BGP Attribute Filter feature. Output about additional path selection was added for the BGP Additional Paths feature. Output about paths imported from a VRF table to the global table was added for the BGP Support for IP Prefix Export from a VRF Table into the Global Table.

Release	Modification
Cisco IOS XE Release 3.7S	This command was modified. Output about discarded or unknown path attributes was added for the BGP Attribute Filter feature. Output about additional path selection was added for the BGP Additional Paths feature. Output about paths imported from a VRF table to the global table was added for the BGP Support for IP Prefix Export from a VRF Table into the Global Table.
15.1(1)SY	This command was integrated into Cisco IOS Release 15.1(1)SY.

Usage Guidelines

The **show ip bgp** command is used to display the contents of the BGP routing table. The output can be filtered to display entries for a specific prefix, prefix length, and prefixes injected through a prefix list, route map, or conditional advertisement.

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain—65538, for example—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 followed by the **clear ip bgp *** command to perform a hard reset of all current BGP sessions.

In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot—1.2, for example—as the only configuration format, regular expression match, and output display, with no asplain support.

oer-paths Keyword

In Cisco IOS Release 12.3(8)T and later releases, BGP prefixes that are monitored and controlled by OER are displayed by entering the **show ip bgp** command with the **oer-paths** keyword.

Examples

Examples

The following sample output shows the BGP routing table:

```
Router# show ip bgp
```

```
BGP table version is 6, local router ID is 10.0.96.2
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale, m multipath, b backup-path, x best-external, f
RT-Filter, a additional-path
Origin codes: i - IGP, e - EGP, ? - incomplete
RPKI validation codes: V valid, I invalid, N Not found
```

	Network	Next Hop	Metric	LocPrf	Weight	Path
N*	10.0.0.1	10.0.0.3	0		0	3 ?
N*>		10.0.3.5	0		0	4 ?
Nr	10.0.0.0/8	10.0.0.3	0		0	3 ?
Nr>		10.0.3.5	0		0	4 ?
Nr>	10.0.0.0/24	10.0.0.3	0		0	3 ?
V*>	10.0.2.0/24	0.0.0.0	0		32768	i

```
Vr> 10.0.3.0/24      10.0.3.5      0      0 4 ?
```

The table below describes the significant fields shown in the display.

Table 5: show ip bgp Field Descriptions

Field	Description
BGP table version	Internal version number of the table. This number is incremented whenever the table changes.
local router ID	IP address of the router.
Status codes	<p>Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:</p> <ul style="list-style-type: none"> • s—The table entry is suppressed. • d—The table entry is dampened. • h—The table entry history. • *—The table entry is valid. • >—The table entry is the best entry to use for that network. • i—The table entry was learned via an internal BGP (iBGP) session. • r—The table entry is a RIB-failure. • S—The table entry is stale. • m—The table entry has multipath to use for that network. • b—The table entry has a backup path to use for that network. • x—The table entry has a best external route to use for the network.

Field	Description
Origin codes	<p>Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:</p> <ul style="list-style-type: none"> • a—Path is selected as an additional path. • i—Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a network router configuration command. • e—Entry originated from an Exterior Gateway Protocol (EGP). • ?—Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP.
RPKI validation codes	<p>If shown, the RPKI validation state for the network prefix, which is downloaded from the RPKI server. The codes are shown only if the bgp rpki server or neighbor announce rpki state command is configured.</p>
Network	IP address of a network entity.
Next Hop	<p>IP address of the next system that is used when forwarding a packet to the destination network. An entry of 0.0.0.0 indicates that the router has some non-BGP routes to this network.</p>
Metric	<p>If shown, the value of the interautonomous system metric.</p>
LocPrf	<p>Local preference value as set with the set local-preference route-map configuration command. The default value is 100.</p>
Weight	<p>Weight of the route as set via autonomous system filters.</p>
Path	<p>Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path.</p>
(stale)	<p>Indicates that the following path for the specified autonomous system is marked as “stale” during a graceful restart process.</p>

Examples

The following sample output shows the BGP routing table with 4-byte autonomous system numbers, 65536 and 65550, shown under the Path field. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or a later release.

```
RouterB# show ip bgp

BGP table version is 4, local router ID is 172.17.1.99
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure, S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network        Next Hop           Metric LocPrf Weight Path
*> 10.1.1.0/24     192.168.1.2             0           0 65536  i
*> 10.2.2.0/24     192.168.3.2             0           0 65550  i
*> 172.17.1.0/24   0.0.0.0                 0           32768  i
```

Examples

The following sample output displays information about the 192.168.1.0 entry in the BGP routing table:

```
Router# show ip bgp 192.168.1.0

BGP routing table entry for 192.168.1.0/24, version 22
Paths: (2 available, best #2, table default)
  Additional-path
  Advertised to update-groups:
    3
  10 10
    192.168.3.2 from 172.16.1.2 (10.2.2.2)
      Origin IGP, metric 0, localpref 100, valid, internal, backup/repair
  10 10
    192.168.1.2 from 192.168.1.2 (10.3.3.3)
      Origin IGP, localpref 100, valid, external, best , recursive-via-connected
```

The following sample output displays information about the 10.3.3.3 255.255.255.255 entry in the BGP routing table:

```
Router# show ip bgp 10.3.3.3 255.255.255.255

BGP routing table entry for 10.3.3.3/32, version 35
Paths: (3 available, best #2, table default)
Multipath: eBGP
Flag: 0x860
  Advertised to update-groups:
    1
  200
    10.71.8.165 from 10.71.8.165 (192.168.0.102)
      Origin incomplete, localpref 100, valid, external, backup/repair
      Only allowed to recurse through connected route
  200
    10.71.11.165 from 10.71.11.165 (192.168.0.102)
      Origin incomplete, localpref 100, valid, external, best
      Only allowed to recurse through connected route
  200
    10.71.10.165 from 10.71.10.165 (192.168.0.104)
      Origin incomplete, localpref 100, valid, external,
      Only allowed to recurse through connected route
```

The table below describes the significant fields shown in the display.

Table 6: show ip bgp Field Descriptions

Field	Description
BGP routing table entry for	IP address or network number of the routing table entry.

Field	Description
version	Internal version number of the table. This number is incremented whenever the table changes.
Paths	The number of available paths, and the number of installed best paths. This line displays “Default-IP-Routing-Table” when the best path is installed in the IP routing table.
Multipath	This field is displayed when multipath load sharing is enabled. This field will indicate if the multipaths are iBGP or eBGP.
Advertised to update-groups	The number of each update group for which advertisements are processed.
Origin	Origin of the entry. The origin can be IGP, EGP, or incomplete. This line displays the configured metric (0 if no metric is configured), the local preference value (100 is default), and the status and type of route (internal, external, multipath, best).
Extended Community	This field is displayed if the route carries an extended community attribute. The attribute code is displayed on this line. Information about the extended community is displayed on a subsequent line.

Examples

The following is sample output from the **show ip bgp** command entered with the **all** keyword. Information about all configured address families is displayed.

```
Router# show ip bgp all
```

```
For address family: IPv4 Unicast *****
BGP table version is 27, local router ID is 10.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network        Next Hop           Metric LocPrf Weight Path
*> 10.1.1.0/24     0.0.0.0                 0         32768 ?
*> 10.13.13.0/24   0.0.0.0                 0         32768 ?
*> 10.15.15.0/24   0.0.0.0                 0         32768 ?
*>i10.18.18.0/24   172.16.14.105          1388    91351      0 100 e
*>i10.100.0.0/16   172.16.14.107           262      272      0 1 2 3 i
*>i10.100.0.0/16   172.16.14.105          1388    91351      0 100 e
*>i10.101.0.0/16   172.16.14.105          1388    91351      0 100 e
*>i10.103.0.0/16   172.16.14.101          1388      173     173 100 e
*>i10.104.0.0/16   172.16.14.101          1388      173     173 100 e
*>i10.100.0.0/16   172.16.14.106          2219   20889      0 53285 33299 51178 47751 e
*>i10.101.0.0/16   172.16.14.106          2219   20889      0 53285 33299 51178 47751 e
* 10.100.0.0/16    172.16.14.109          2309      0     200 300 e
*>                  172.16.14.108          1388      0     100 e
* 10.101.0.0/16    172.16.14.109          2309      0     200 300 e
*>                  172.16.14.108          1388      0     100 e
*> 10.102.0.0/16    172.16.14.108          1388      0     100 e
*> 172.16.14.0/24   0.0.0.0                 0         32768 ?
```

show ip bgp

```

*> 192.168.5.0      0.0.0.0      0      32768 ?
*> 10.80.0.0/16     172.16.14.108 1388    0 50 e
*> 10.80.0.0/16     172.16.14.108 1388    0 50 e
For address family: VPNv4 Unicast *****
BGP table version is 21, local router ID is 10.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network      Next Hop      Metric LocPrf Weight Path
Route Distinguisher: 1:1 (default for vrf vpn1)
*> 10.1.1.0/24     192.168.4.3      1622          0 100 53285 33299 51178
{27016,57039,16690} e
*> 10.1.2.0/24     192.168.4.3      1622          0 100 53285 33299 51178
{27016,57039,16690} e
*> 10.1.3.0/24     192.168.4.3      1622          0 100 53285 33299 51178
{27016,57039,16690} e
*> 10.1.4.0/24     192.168.4.3      1622          0 100 53285 33299 51178
{27016,57039,16690} e
*> 10.1.5.0/24     192.168.4.3      1622          0 100 53285 33299 51178
{27016,57039,16690} e
*>i172.17.1.0/24   10.3.3.3         10      30      0 53285 33299 51178 47751 ?
*>i172.17.2.0/24   10.3.3.3         10      30      0 53285 33299 51178 47751 ?
*>i172.17.3.0/24   10.3.3.3         10      30      0 53285 33299 51178 47751 ?
*>i172.17.4.0/24   10.3.3.3         10      30      0 53285 33299 51178 47751 ?
*>i172.17.5.0/24   10.3.3.3         10      30      0 53285 33299 51178 47751 ?
For address family: IPv4 Multicast *****
BGP table version is 11, local router ID is 10.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network      Next Hop      Metric LocPrf Weight Path
*> 10.40.40.0/26    172.16.14.110    2219          0 21 22 {51178,47751,27016} e
*                   10.1.1.1         1622          0 15 20 1 {2} e
*> 10.40.40.64/26   172.16.14.110    2219          0 21 22 {51178,47751,27016} e
*                   10.1.1.1         1622          0 15 20 1 {2} e
*> 10.40.40.128/26  172.16.14.110    2219          0 21 22 {51178,47751,27016} e
*                   10.1.1.1         2563          0 15 20 1 {2} e
*> 10.40.40.192/26  10.1.1.1         2563          0 15 20 1 {2} e
*> 10.40.41.0/26    10.1.1.1         1209          0 15 20 1 {2} e
*>i10.102.0.0/16    10.1.1.1         300      500      0 5 4 {101,102} e
*>i10.103.0.0/16    10.1.1.1         300      500      0 5 4 {101,102} e
For address family: NSAP Unicast *****
BGP table version is 1, local router ID is 10.1.1.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal,
               r RIB-failure
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network      Next Hop      Metric LocPrf Weight Path
* i45.0000.0002.0001.000c.00
                        49.0001.0000.0000.0a00
                                                100      0 ?
* i46.0001.0000.0000.0000.0a00
                        49.0001.0000.0000.0a00
                                                100      0 ?
* i47.0001.0000.0000.000b.00
                        49.0001.0000.0000.0a00
                                                100      0 ?
* i47.0001.0000.0000.000e.00
                        49.0001.0000.0000.0a00

```

Examples

The following is sample output from the **show ip bgp** command entered with the **longer-prefixes** keyword:

```
Router# show ip bgp 10.92.0.0 255.255.0.0 longer-prefixes
```

```

BGP table version is 1738, local router ID is 192.168.72.24
Status codes: s suppressed, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network      Next Hop      Metric LocPrf Weight Path
*> 10.92.0.0     10.92.72.30    8896          0 109 108 ?
*               10.92.72.30          32768 ?
*> 10.92.1.0     10.92.72.30    8796          32768 ?

```

```

*          10.92.72.30          0 109 108 ?
*> 10.92.11.0 10.92.72.30 42482 32768 ?
*          10.92.72.30          0 109 108 ?
*> 10.92.14.0 10.92.72.30 8796 32768 ?
*          10.92.72.30          0 109 108 ?
*> 10.92.15.0 10.92.72.30 8696 32768 ?
*          10.92.72.30          0 109 108 ?
*> 10.92.16.0 10.92.72.30 1400 32768 ?
*          10.92.72.30          0 109 108 ?
*> 10.92.17.0 10.92.72.30 1400 32768 ?
*          10.92.72.30          0 109 108 ?
*> 10.92.18.0 10.92.72.30 8876 32768 ?
*          10.92.72.30          0 109 108 ?
*> 10.92.19.0 10.92.72.30 8876 32768 ?
*          10.92.72.30          0 109 108 ?

```

Examples

The following is sample output from the **show ip bgp** command entered with the **shorter-prefixes** keyword. An 8-bit prefix length is specified.

```

Router# show ip bgp 172.16.0.0/16 shorter-prefixes 8

*> 172.16.0.0 10.0.0.2 0 0 ?
*          10.0.0.2 0 0 200 ?

```

Examples

The following is sample output from the **show ip bgp** command entered with the **prefix-list** keyword:

```

Router# show ip bgp prefix-list ROUTE

BGP table version is 39, local router ID is 10.0.0.1
Status codes:s suppressed, d damped, h history, * valid, > best, i -
internal
Origin codes:i - IGP, e - EGP, ? - incomplete
  Network      Next Hop      Metric LocPrf Weight Path
*> 192.168.1.0 10.0.0.2          0          0 ?
*          10.0.0.2          0          0 200 ?

```

Examples

The following is sample output from the **show ip bgp** command entered with the **route-map** keyword:

```

Router# show ip bgp route-map LEARNED_PATH

BGP table version is 40, local router ID is 10.0.0.1
Status codes:s suppressed, d damped, h history, * valid, > best, i -
internal
Origin codes:i - IGP, e - EGP, ? - incomplete
  Network      Next Hop      Metric LocPrf Weight Path
*> 192.168.1.0 10.0.0.2          0          0 ?
*          10.0.0.2          0          0 200 ?

```

Examples

The following output indicates (for each neighbor) whether any of the additional path tags (group-best, all, best 2 or best 3) are applied to the path. A line of output indicates rx pathid (received from neighbor) and tx pathid (announcing to neighbors). Note that the “Path advertised to update-groups:” is now per-path when the BGP Additional Paths feature is enabled.

```

Device# show ip bgp 10.0.0.1 255.255.255.224

BGP routing table entry for 10.0.0.1/28, version 82
Paths: (10 available, best #5, table default)
  Path advertised to update-groups:
    21      25
  Refresh Epoch 1
  20 50, (Received from a RR-client)

```

```

192.0.2.1 from 192.0.2.1 (192.0.2.1)
  Origin IGP, metric 200, localpref 100, valid, internal, all
  Originator: 192.0.2.1, Cluster list: 2.2.2.2
  mpls labels in/out 16/nolabel
  rx pathid: 0, tx pathid: 0x9
Path advertised to update-groups:
  18      21
Refresh Epoch 1
30
192.0.2.2 from 192.0.2.2 (192.0.2.2)
  Origin IGP, metric 200, localpref 100, valid, internal, group-best, all
  Originator: 192.0.2.2, Cluster list: 4.4.4.4
  mpls labels in/out 16/nolabel
  rx pathid: 0x1, tx pathid: 0x8
Path advertised to update-groups:
  16      18      19      20      21      22      24
  25      27
Refresh Epoch 1
10
192.0.2.3 from 192.0.2.3 (192.0.2.3)
  Origin IGP, metric 200, localpref 100, valid, external, best2, all
  mpls labels in/out 16/nolabel
  rx pathid: 0, tx pathid: 0x7
Path advertised to update-groups:
  20      21      22      24      25
Refresh Epoch 1
10
192.0.2.4 from 192.0.2.4 (192.0.2.4)
  Origin IGP, metric 300, localpref 100, valid, external, best3, all
  mpls labels in/out 16/nolabel
  rx pathid: 0, tx pathid: 0x6
Path advertised to update-groups:
  10      13      17      18      19      20      21
  22      23      24      25      26      27      28
Refresh Epoch 1
10
192.0.2.5 from 192.0.2.5 (192.0.2.5)
  Origin IGP, metric 100, localpref 100, valid, external, best
  mpls labels in/out 16/nolabel
  rx pathid: 0, tx pathid: 0x0
Path advertised to update-groups:
  21
Refresh Epoch 1
30
192.0.2.6 from 192.0.2.6 (192.0.2.6)
  Origin IGP, metric 200, localpref 100, valid, internal, all
  Originator: 192.0.2.6, Cluster list: 5.5.5.5
  mpls labels in/out 16/nolabel
  rx pathid: 0x1, tx pathid: 0x5
Path advertised to update-groups:
  18      23      24      26      28
Refresh Epoch 1
60 40, (Received from a RR-client)
192.0.2.7 from 192.0.2.7 (192.0.2.7)
  Origin IGP, metric 250, localpref 100, valid, internal, group-best
  Originator: 192.0.2.7, Cluster list: 3.3.3.3
  mpls labels in/out 16/nolabel
  rx pathid: 0x2, tx pathid: 0x2
Path advertised to update-groups:
  25
Refresh Epoch 1
30 40, (Received from a RR-client)
192.0.2.8 from 192.0.2.8 (192.0.2.8)
  Origin IGP, metric 200, localpref 100, valid, internal, all
  Originator: 192.0.2.8, Cluster list: 2.2.2.2
  mpls labels in/out 16/nolabel
  rx pathid: 0x1, tx pathid: 0x3
Path advertised to update-groups:
  18      21      23      24      25      26      28
Refresh Epoch 1
20 40, (Received from a RR-client)
192.0.2.9 from 192.0.2.9 (192.0.2.9)
  Origin IGP, metric 200, localpref 100, valid, internal, group-best, all

```

```

    Originator: 192.0.2.9, Cluster list: 2.2.2.2
    mpls labels in/out 16/nolabel
    rx pathid: 0x1, tx pathid: 0x4
Path advertised to update-groups:
  21
Refresh Epoch 1
30 40
  192.0.2.9 from 192.0.2.9 (192.0.2.9)
    Origin IGP, metric 100, localpref 100, valid, internal, all
    Originator: 192.0.2.9, Cluster list: 4.4.4.4
    mpls labels in/out 16/nolabel
    rx pathid: 0x1, tx pathid: 0x1

```

Examples

The following is sample output from the **show ip bgp** command that displays unknown and discarded path attributes:

```

Router# show ip bgp 192.0.2.0/32

BGP routing table entry for 192.0.2.0/32, version 0
Paths: (1 available, no best path)
  Refresh Epoch 1
  Local
    192.168.101.2 from 192.168.101.2 (192.168.101.2)
      Origin IGP, localpref 100, valid, internal
      unknown transitive attribute: flag 0xE0 type 0x81 length 0x20
        value 0000 0000 0000 0000 0000 0000 0000 0000
              0000 0000 0000 0000 0000 0000 0000 0000

      unknown transitive attribute: flag 0xE0 type 0x83 length 0x20
        value 0000 0000 0000 0000 0000 0000 0000 0000
              0000 0000 0000 0000 0000 0000 0000 0000

      discarded unknown attribute: flag 0x40 type 0x63 length 0x64
        value 0000 0000 0000 0000 0000 0000 0000 0000
              0000 0000 0000 0000 0000 0000 0000 0000

```

Related Commands

Command	Description
bgp asnotation dot	Changes the default display and the regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
ip bgp community new-format	Configures BGP to display communities in the format AA:NN.
ip prefix-list	Creates a prefix list or adds a prefix-list entry.
route-map	Defines the conditions for redistributing routes from one routing protocol into another routing protocol.
router bgp	Configures the BGP routing process.
clear ip bgp	Resets BGP connections using hard or soft reconfiguration.

show ip bgp ipv4

To display entries in the IP version 4 (IPv4) Border Gateway Protocol (BGP) routing table, use the **show ip bgp ipv4** command in privileged EXEC mode.

show ip bgp ipv4 {**mdt** {**all** | **rd** *route-distinguisher* | **vrf** *vrf-name*} | **mvpn** {**all** | **rd** *route-distinguisher* | **vrf** *vrf-name*} | **unicast** *prefix* | **multicast** *prefix* | **tunnel**}

Syntax Description

mdt	Displays entries for multicast distribution tree (MDT) sessions.
all	Displays all the entries in the routing table.
rd <i>route-distinguisher</i>	Displays information about the specified VPN route distinguisher.
vrf <i>vrf-name</i>	Displays information about the specified VRF.
mvpn	Displays entries for multicast VPN (MVPN) sessions.
unicast	Displays entries for unicast sessions.
<i>prefix</i>	Displays entries for the specified prefix.
multicast	Displays entries for multicast sessions.
tunnel	Displays entries for tunnel sessions.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.0(7)T	This command was introduced.
12.0(29)S	This command was modified. The mdt keyword was added.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Release	Modification
12.4(20)T	This command was modified. The mdt keyword was added.
15.2(1)S	This command was modified. An RPKI validation code is displayed per network, if one applies.
Cisco IOS XE 3.5S	This command was modified. An RPKI validation code is displayed per network, if one applies.
Cisco IOS XE 3.7S	This command was modified. Imported paths from a VRF table to the global routing table are displayed, if any.
15.2(4)S	This command was implemented on the Cisco 7200 series routers.
Cisco IOS XE 3.8S	This command was modified. The mvpn keyword was added.

Examples

The following is sample output from the **show ip bgp ipv4 unicast** command:

```
Router# show ip bgp ipv4 unicast
```

```

BGP table version is 4, local router ID is 10.0.40.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network        Next Hop           Metric LocPrf Weight Path
*> 10.10.10.0/24   172.16.10.1             0           0 300 i
*> 10.10.20.0/24   172.16.10.1             0           0 300 i
* 10.20.10.0/24    172.16.10.1             0           0 300 i

```

The following is sample output from the **show ip bgp ipv4 multicast** command:

```
Router# show ip bgp ipv4 multicast
```

```

BGP table version is 4, local router ID is 10.0.40.1
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
   Network        Next Hop           Metric LocPrf Weight Path
*> 10.10.10.0/24   172.16.10.1             0           0 300 i
*> 10.10.20.0/24   172.16.10.1             0           0 300 i
* 10.20.10.0/24    172.16.10.1             0           0 300 i

```

The table below describes the significant fields shown in the display.

Table 7: show ip bgp ipv4 unicast Field Descriptions

Field	Description
BGP table version	Internal version number of the table. This number is incremented whenever the table changes.
local router ID	IP address of the router.

Field	Description
Status codes	<p>Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:</p> <ul style="list-style-type: none"> • s—The table entry is suppressed. • d—The table entry is damped. • h—The table entry history. • *—The table entry is valid. • >—The table entry is the best entry to use for that network. • i—The table entry was learned via an Internal Border Gateway Protocol (IBGP) session.
Origin codes	<p>Origin of the entry. The origin code is displayed at the end of each line in the table. It can be one of the following values:</p> <ul style="list-style-type: none"> • i—Entry originated from an Interior Gateway Protocol (IGP) and was advertised with a network router configuration command. • e—Entry originated from an Exterior Gateway Protocol (EGP). • ?—Origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP.
Network	IP address of a network entity.
Next Hop	IP address of the next system that is used when forwarding a packet to the destination network. An entry of 0.0.0.0 indicates that the router has some non-BGP routes to this network.
Metric	If shown, the value of the interautonomous system metric.
LocPrf	Local preference value as set with the set local-preference route-map configuration command. The default value is 100.
Weight	Weight of the route as set via autonomous system filters.

Field	Description
Path	Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path.

The following is sample output from the **show ip bgp ipv4 unicast *prefix*** command. The output indicates the imported path information from a VRF named vpn1.

Device# **show ip bgp ipv4 unicast 150.1.1.0**

```
BGP routing table entry for 150.1.1.0/24, version 2
Paths: (1 available, best #1, table default)
  Not advertised to any peer
  Refresh Epoch 1
  65002, imported path from 1:1:150.1.1.0/24 (vpn1)
    4.4.4.4 (metric 11) from 4.4.4.4 (4.4.4.4)
      Origin IGP, metric 0, localpref 100, valid, internal, best
      Extended Community: RT:1:1
      mpls labels in/out nolabel/16
```

Related Commands

Command	Description
clear ip bgp ipv4 mdt	Resets MDT IPv4 BGP address-family sessions.
export map	Exports IP prefixes from a VRF table into the global table.
show ip bgp	Displays entries in the BGP routing table.

show ip bgp neighbors

To display information about Border Gateway Protocol (BGP) and TCP connections to neighbors, use the **show ip bgp neighbors** command in user or privileged EXEC mode.

show ip bgp [**ipv4** {**multicast**|**unicast**}|**vpn4 all**|**vpn6 unicast all**] **neighbors** [**slow**|*ip-address*|*ipv6-address*] [**advertised-routes**|**dampened-routes**|**flap-statistics**|**paths** [*reg-exp*]|**policy** [**detail**]|**received prefix-filter**|**received-routes**|**routes**]

Syntax Description

ipv4	(Optional) Displays peers in the IPv4 address family.
multicast	(Optional) Specifies IPv4 multicast address prefixes.
unicast	(Optional) Specifies IPv4 unicast address prefixes.
vpn4 all	(Optional) Displays peers in the VPNv4 address family.
vpn6 unicast all	(Optional) Displays peers in the VPNv6 address family.
slow	(Optional) Displays information about dynamically configured slow peers.
<i>ip-address</i>	(Optional) IP address of the IPv4 neighbor. If this argument is omitted, information about all neighbors is displayed.
<i>ipv6-address</i>	(Optional) IP address of the IPv6 neighbor.
advertised-routes	(Optional) Displays all routes that have been advertised to neighbors.
dampened-routes	(Optional) Displays the dampened routes received from the specified neighbor.
flap-statistics	(Optional) Displays the flap statistics of the routes learned from the specified neighbor (for external BGP peers only).
paths <i>reg-exp</i>	(Optional) Displays autonomous system paths learned from the specified neighbor. An optional regular expression can be used to filter the output.
policy	(Optional) Displays the policies applied to this neighbor per address family.

detail	(Optional) Displays detailed policy information such as route maps, prefix lists, community lists, access control lists (ACLs), and autonomous system path filter lists.
received prefix-filter	(Optional) Displays the prefix list (outbound route filter [ORF]) sent from the specified neighbor.
received-routes	(Optional) Displays all received routes (both accepted and rejected) from the specified neighbor.
routes	(Optional) Displays all routes that are received and accepted. The output displayed when this keyword is entered is a subset of the output displayed by the received-routes keyword.

Command Default The output of this command displays information for all neighbors.

Command Modes User EXEC (>)
Privileged EXEC (#)

Command History	Mainline and T Release	Modification
	10.0	This command was introduced.
	11.2	This command was modified. The received-routes keyword was added.
	12.2(4)T	This command was modified. The received and prefix-filter keywords were added.
	12.2(15)T	This command was modified. Support for the display of BGP graceful restart capability information was added.
	12.3(7)T	This command was modified. The command output was modified to support the BGP TTL Security Check feature and to display explicit-null label information.
	12.4(4)T	This command was modified. Support for the display of Bidirectional Forwarding Detection (BFD) information was added.
	12.4(11)T	This command was modified. Support for the policy and detail keywords was added.
	12.4(20)T	This command was modified. The output was modified to support BGP TCP path MTU discovery.

Mainline and T Release	Modification
12.4(24)T	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation was added.

Command History

S Release	Modification
12.0(18)S	This command was modified. The output was modified to display the no-prepend configuration option.
12.0(21)ST	This command was modified. The output was modified to display Multiprotocol Label Switching (MPLS) label information.
12.0(22)S	This command was modified. Support for the display of BGP graceful restart capability information was added. Support for the Cisco 12000 series routers (Engine 0 and Engine 2) was also added.
12.0(25)S	This command was modified. The policy and detail keywords were added.
12.0(27)S	This command was modified. The command output was modified to support the BGP TTL Security Check feature and to display explicit-null label information.
12.0(31)S	This command was modified. Support for the display of BFD information was added.
12.0(32)S12	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation was added.
12.0(32)SY8	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format became asplain.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(17b)SXA	This command was integrated into Cisco IOS Release 12.2(17b)SXA.
12.2(18)SXE	This command was modified. Support for the display of BFD information was added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was modified. The output was modified to support BGP TCP path Maximum Transmission Unit (MTU) discovery.
12.2(33)SRB	This command was modified. Support for the policy and detail keywords was added.

S Release	Modification
12.2(33)SXH	This command was modified. Support for displaying BGP dynamic neighbor information was added.
12.2(33)SRC	This command was modified. Support for displaying BGP graceful restart information was added.
12.2(33)SB	This command was modified. Support for displaying BFD and the BGP graceful restart per peer information was added, and support for the policy and detail keywords was integrated into Cisco IOS Release 12.2(33)SB.
12.2(33)SXI1	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)SRE	This command was modified. Support for displaying BGP best external and BGP additional path features information was added. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
15.0(1)S	This command was modified. The slow keyword was added.
15.0(1)SY	This command was integrated into Cisco IOS Release 15.0(1)SY.
15.1(1)S	This command was modified. The Layer 2 VPN address family is displayed if graceful restart or nonstop forwarding (NSF) is enabled.
15.1(1)SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format became asplain.
15.2(4)S	This command was modified and implemented on the Cisco 7200 series router. The configured discard and treat-as-withdraw attributes are displayed, along with counts of incoming Updates with a matching discard attribute or treat-as-withdraw attribute, and number of times a malformed Update is treat-as-withdraw. The capabilities of the neighbor to send and receive additional paths that are advertised or received are added.
15.1(2)SNG	This command was implemented on the Cisco ASR 901 Series Aggregation Services Routers.

Command History

Cisco IOS XE	Modification
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.

Cisco IOS XE	Modification
Cisco IOS XE Release 2.4	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format became asplain.
Cisco IOS XE Release 3.1S	This command was modified. The slow keyword was added.
Cisco IOS XE Release 3.6S	This command was modified. Support for displaying BGP BFD multihop and C-bit information was added.
Cisco IOS XE Release 3.3SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format became asplain.
Cisco IOS XE Release 3.7S	This command was implemented on the Cisco ASR 903 router and the output modified. The configured discard and treat-as-withdraw attributes are displayed, along with counts of incoming Updates with a matching discard attribute or treat-as-withdraw attribute, and number of times a malformed Update is treat-as-withdraw. The capabilities of the neighbor to send and receive additional paths that are advertised or received are added.
Cisco IOS XE Release 3.8S	This command was modified. In support of the BGP Multi-Cluster ID feature, the cluster ID of a neighbor is displayed if the neighbor is assigned a cluster.

Usage Guidelines

Use the **show ip bgp neighbors** command to display BGP and TCP connection information for neighbor sessions. For BGP, this includes detailed neighbor attribute, capability, path, and prefix information. For TCP, this includes statistics related to BGP neighbor session establishment and maintenance.

Prefix activity is displayed based on the number of prefixes that are advertised and withdrawn. Policy denials display the number of routes that were advertised but then ignored based on the function or attribute that is displayed in the output.

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SXI1, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain—65538, for example—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 followed by the **clear ip bgp *** command to perform a hard reset of all current BGP sessions.

In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot—1.2 for example—as the only configuration format, regular expression match, and output display, with no asplain support.

Cisco IOS Releases 12.0(25)S, 12.4(11)T, 12.2(33)SRB, 12.2(33)SB, and Later Releases

When BGP neighbors use multiple levels of peer templates, determining which policies are applied to the neighbor can be difficult.

In Cisco IOS Release 12.0(25)S, 12.4(11)T, 12.2(33)SRB, 12.2(33)SB, and later releases, the **policy** and **detail** keywords were added to display the inherited policies and the policies configured directly on the specified neighbor. Inherited policies are policies that the neighbor inherits from a peer group or a peer policy template.

Examples

Example output is different for the various keywords available for the **show ip bgp neighbors** command. Examples using the various keywords appear in the following sections.

Examples

The following example shows output for the BGP neighbor at 10.108.50.2. This neighbor is an internal BGP (iBGP) peer. This neighbor supports the route refresh and graceful restart capabilities.

```
Device# show ip bgp neighbors 10.108.50.2

BGP neighbor is 10.108.50.2, remote AS 1, internal link
BGP version 4, remote router ID 192.168.252.252
BGP state = Established, up for 00:24:25
Last read 00:00:24, last write 00:00:24, hold time is 180, keepalive interval is
60 seconds
Neighbor capabilities:
  Route refresh: advertised and received(old & new)
  MPLS Label capability: advertised and received
  Graceful Restart Capability: advertised
  Address family IPv4 Unicast: advertised and received
Message statistics:
  InQ depth is 0
  OutQ depth is 0

      Sent      Rcvd
Opens:          3          3
Notifications:  0          0
Updates:        0          0
Keepalives:    113        112
Route Refresh:  0          0
Total:         116        115
Default minimum time between advertisement runs is 5 seconds
For address family: IPv4 Unicast
BGP additional-paths computation is enabled
BGP advertise-best-external is enabled
BGP table version 1, neighbor version 1/0
Output queue size : 0
Index 1, Offset 0, Mask 0x2
1 update-group member

      Sent      Rcvd
Prefix activity: ----
Prefixes Current:    0          0
Prefixes Total:      0          0
Implicit Withdraw:   0          0
Explicit Withdraw:   0          0
Used as bestpath:    n/a        0
Used as multipath:    n/a        0
                   Outbound    Inbound
Local Policy Denied Prefixes: -----
Total:                0          0
Number of NLRI in the update sent: max 0, min 0
Connections established 3; dropped 2
Last reset 00:24:26, due to Peer closed the session
External BGP neighbor may be up to 2 hops away.
Connection state is ESTAB, I/O status: 1, unread input bytes: 0
Connection is ECN Disabled
Local host: 10.108.50.1, Local port: 179
Foreign host: 10.108.50.2, Foreign port: 42698
Enqueued packets for retransmit: 0, input: 0 mis-ordered: 0 (0 bytes)
Event Timers (current time is 0x68B944):
Timer      Starts    Wakeups      Next
Retrans      27         0          0x0
TimeWait      0         0          0x0
```

```

AckHold          27          18          0x0
SendWnd          0           0          0x0
KeepAlive        0           0          0x0
GiveUp           0           0          0x0
PmtuAger         0           0          0x0
DeadWait         0           0          0x0
iss: 3915509457  snduna: 3915510016  sndnxt: 3915510016  sndwnd: 15826
irs: 233567076  rcvnxt: 233567616  rcvwnd: 15845  delrcwnd: 539
SRTT: 292 ms, RTTO: 359 ms, RTV: 67 ms, KRTT: 0 ms
minRTT: 12 ms, maxRTT: 300 ms, ACK hold: 200 ms
Flags: passive open, nagle, gen tcbs
IP Precedence value : 6
Datagrams (max data segment is 1460 bytes):
Rcvd: 38 (out of order: 0), with data: 27, total data bytes: 539
Sent: 45 (retransmit: 0, fastretransmit: 0, partialack: 0, Second Congestion: 08
The table below describes the significant fields shown in the display. Fields that are preceded by the asterisk
character (*) are displayed only when the counter has a nonzero value.

```

Table 8: show ip bgp neighbors Field Descriptions

Field	Description
BGP neighbor	IP address of the BGP neighbor and its autonomous system number.
remote AS	Autonomous system number of the neighbor.
local AS 300 no-prepend (not shown in display)	Verifies that the local autonomous system number is not prepended to received external routes. This output supports the hiding of the local autonomous systems when a network administrator is migrating autonomous systems.
internal link	“internal link” is displayed for iBGP neighbors; “external link” is displayed for external BGP (eBGP) neighbors.
BGP version	BGP version being used to communicate with the remote router.
remote router ID	IP address of the neighbor.
BGP state	Finite state machine (FSM) stage of session negotiation.
up for	Time, in hh:mm:ss, that the underlying TCP connection has been in existence.
Last read	Time, in hh:mm:ss, since BGP last received a message from this neighbor.
last write	Time, in hh:mm:ss, since BGP last sent a message to this neighbor.
hold time	Time, in seconds, that BGP will maintain the session with this neighbor without receiving messages.

Field	Description
keepalive interval	Time interval, in seconds, at which keepalive messages are transmitted to this neighbor.
Neighbor capabilities	BGP capabilities advertised and received from this neighbor. "advertised and received" is displayed when a capability is successfully exchanged between two routers.
Route refresh	Status of the route refresh capability.
MPLS Label capability	Indicates that MPLS labels are both sent and received by the eBGP peer.
Graceful Restart Capability	Status of the graceful restart capability.
Address family IPv4 Unicast	IP Version 4 unicast-specific properties of this neighbor.
Message statistics	Statistics organized by message type.
InQ depth is	Number of messages in the input queue.
OutQ depth is	Number of messages in the output queue.
Sent	Total number of transmitted messages.
Revd	Total number of received messages.
Opens	Number of open messages sent and received.
Notifications	Number of notification (error) messages sent and received.
Updates	Number of update messages sent and received.
Keepalives	Number of keepalive messages sent and received.
Route Refresh	Number of route refresh request messages sent and received.
Total	Total number of messages sent and received.
Default minimum time between...	Time, in seconds, between advertisement transmissions.
For address family:	Address family to which the following fields refer.

Field	Description
BGP table version	Internal version number of the table. This is the primary routing table with which the neighbor has been updated. The number increments when the table changes.
neighbor version	Number used by the software to track prefixes that have been sent and those that need to be sent.
1 update-group member	Number of the update-group member for this address family.
Prefix activity	Prefix statistics for this address family.
Prefixes Current	Number of prefixes accepted for this address family.
Prefixes Total	Total number of received prefixes.
Implicit Withdraw	Number of times that a prefix has been withdrawn and readvertised.
Explicit Withdraw	Number of times that a prefix has been withdrawn because it is no longer feasible.
Used as bestpath	Number of received prefixes installed as best paths.
Used as multipath	Number of received prefixes installed as multipaths.
* Saved (soft-reconfig)	Number of soft resets performed with a neighbor that supports soft reconfiguration. This field is displayed only if the counter has a nonzero value.
* History paths	This field is displayed only if the counter has a nonzero value.
* Invalid paths	Number of invalid paths. This field is displayed only if the counter has a nonzero value.
Local Policy Denied Prefixes	Prefixes denied due to local policy configuration. Counters are updated for inbound and outbound policy denials. The fields under this heading are displayed only if the counter has a nonzero value.
* route-map	Displays inbound and outbound route-map policy denials.
* filter-list	Displays inbound and outbound filter-list policy denials.

Field	Description
* prefix-list	Displays inbound and outbound prefix-list policy denials.
* Ext Community	Displays only outbound extended community policy denials.
* AS_PATH too long	Displays outbound AS_PATH length policy denials.
* AS_PATH loop	Displays outbound AS_PATH loop policy denials.
* AS_PATH confed info	Displays outbound confederation policy denials.
* AS_PATH contains AS 0	Displays outbound denials of autonomous system 0.
* NEXT_HOP Martian	Displays outbound martian denials.
* NEXT_HOP non-local	Displays outbound nonlocal next-hop denials.
* NEXT_HOP is us	Displays outbound next-hop-self denials.
* CLUSTER_LIST loop	Displays outbound cluster-list loop denials.
* ORIGINATOR loop	Displays outbound denials of local originated routes.
* unsuppress-map	Displays inbound denials due to an unsuppress map.
* advertise-map	Displays inbound denials due to an advertise map.
* VPN Imported prefix	Displays inbound denials of VPN prefixes.
* Well-known Community	Displays inbound denials of well-known communities.
* SOO loop	Displays inbound denials due to site-of-origin.
* Bestpath from this peer	Displays inbound denials because the best path came from the local router.
* Suppressed due to dampening	Displays inbound denials because the neighbor or link is in a dampening state.
* Bestpath from iBGP peer	Displays inbound denials because the best path came from an iBGP neighbor.
* Incorrect RIB for CE	Displays inbound denials due to RIB errors for a customer edge (CE) router.
* BGP distribute-list	Displays inbound denials due to a distribute list.

Field	Description
Number of NLRI's...	Number of network layer reachability attributes in updates.
Connections established	Number of times a TCP and BGP connection has been successfully established.
dropped	Number of times that a valid session has failed or been taken down.
Last reset	Time, in hh:mm:ss, since this peering session was last reset. The reason for the reset is displayed on this line.
External BGP neighbor may be...	Indicates that the BGP time to live (TTL) security check is enabled. The maximum number of hops that can separate the local and remote peer is displayed on this line.
Connection state	Connection status of the BGP peer.
unread input bytes	Number of bytes of packets still to be processed.
Connection is ECN Disabled	Explicit congestion notification status (enabled or disabled).
Local host: 10.108.50.1, Local port: 179	IP address of the local BGP speaker. BGP port number 179.
Foreign host: 10.108.50.2, Foreign port: 42698	Neighbor address and BGP destination port number.
Enqueued packets for retransmit:	Packets queued for retransmission by TCP.
Event Timers	TCP event timers. Counters are provided for starts and wakeups (expired timers).
Retrans	Number of times a packet has been retransmitted.
TimeWait	Time waiting for the retransmission timers to expire.
AckHold	Acknowledgment hold timer.
SendWnd	Transmission (send) window.
KeepAlive	Number of keepalive packets.
GiveUp	Number of times a packet is dropped due to no acknowledgment.
PmtuAger	Path MTU discovery timer.

Field	Description
DeadWait	Expiration timer for dead segments.
iss:	Initial packet transmission sequence number.
snduna:	Last transmission sequence number that has not been acknowledged.
sndnxt:	Next packet sequence number to be transmitted.
sndwnd:	TCP window size of the remote neighbor.
irs:	Initial packet receive sequence number.
rcvnxt:	Last receive sequence number that has been locally acknowledged.
rcvwnd:	TCP window size of the local host.
delrcvwnd:	Delayed receive window—data the local host has read from the connection, but has not yet subtracted from the receive window the host has advertised to the remote host. The value in this field gradually increases until it is higher than a full-sized packet, at which point it is applied to the rcvwnd field.
SRTT:	A calculated smoothed round-trip timeout.
RTTO:	Round-trip timeout.
RTV:	Variance of the round-trip time.
KRTT:	New round-trip timeout (using the Karn algorithm). This field separately tracks the round-trip time of packets that have been re-sent.
minRTT:	Shortest recorded round-trip timeout (hard-wire value used for calculation).
maxRTT:	Longest recorded round-trip timeout.
ACK hold:	Length of time the local host will delay an acknowledgment to carry (piggyback) additional data.
IP Precedence value:	IP precedence of the BGP packets.
Datagrams	Number of update packets received from a neighbor.
Rcvd:	Number of received packets.

Field	Description
out of order:	Number of packets received out of sequence.
with data	Number of update packets sent with data.
total data bytes	Total amount of data received, in bytes.
Sent	Number of update packets sent.
Second Congestion	Number of update packets with data sent.
Datagrams: Rcvd	Number of update packets received from a neighbor.
retransmit	Number of packets retransmitted.
fastretransmit	Number of duplicate acknowledgments retransmitted for an out of order segment before the retransmission timer expires.
partialack	Number of retransmissions for partial acknowledgments (transmissions before or without subsequent acknowledgments).
Second Congestion	Number of second retransmissions sent due to congestion.

Examples

The following partial example shows output for several external BGP neighbors in autonomous systems with 4-byte autonomous system numbers, 65536 and 65550. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or a later release.

```
Router# show ip bgp neighbors
```

```
BGP neighbor is 192.168.1.2, remote AS 65536, external link
  BGP version 4, remote router ID 0.0.0.0
  BGP state = Idle
  Last read 02:03:38, last write 02:03:38, hold time is 120, keepalive interval is 70
seconds
  Configured hold time is 120, keepalive interval is 70 seconds
  Minimum holdtime from neighbor is 0 seconds
.
.
.
BGP neighbor is 192.168.3.2, remote AS 65550, external link
  Description: finance
  BGP version 4, remote router ID 0.0.0.0
  BGP state = Idle
  Last read 02:03:48, last write 02:03:48, hold time is 120, keepalive interval is 70
seconds
  Configured hold time is 120, keepalive interval is 70 seconds
  Minimum holdtime from neighbor is 0 seconds
```


Examples

The following example displays routes advertised for only the 172.16.232.178 neighbor:

```
Device# show ip bgp neighbors 172.16.232.178 advertised-routes
```

```
BGP table version is 27, local router ID is 172.16.232.181
Status codes: s suppressed, d damped, h history, * valid, > best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Network      Next Hop      Metric LocPrf Weight Path
*>i10.0.0.0   172.16.232.179    0      100      0 ?
*> 10.20.2.0  10.0.0.0          0           32768 i
```

The table below describes the significant fields shown in the display.

Table 9: show ip bgp neighbors advertised-routes Field Descriptions

Field	Description
BGP table version	Internal version number of the table. This is the primary routing table with which the neighbor has been updated. The number increments when the table changes.
local router ID	IP address of the local BGP speaker.
Status codes	<p>Status of the table entry. The status is displayed at the beginning of each line in the table. It can be one of the following values:</p> <ul style="list-style-type: none"> • s—The table entry is suppressed. • d—The table entry is dampened and will not be advertised to BGP neighbors. • h—The table entry does not contain the best path based on historical information. • *—The table entry is valid. • >—The table entry is the best entry to use for that network. • i—The table entry was learned via an internal BGP (iBGP) session.

Field	Description
Origin codes	<p>Origin of the entry. The origin code is placed at the end of each line in the table. It can be one of the following values:</p> <ul style="list-style-type: none"> • i—Entry originated from Interior Gateway Protocol (IGP) and was advertised with a network router configuration command. • e—Entry originated from Exterior Gateway Protocol (EGP). • ?—Origin of the path is not clear. Usually, this is a route that is redistributed into BGP from an IGP.
Network	IP address of a network entity.
Next Hop	IP address of the next system used to forward a packet to the destination network. An entry of 0.0.0.0 indicates that there are non-BGP routes in the path to the destination network.
Metric	If shown, this is the value of the interautonomous system metric. This field is not used frequently.
LocPrf	Local preference value as set with the set local-preference route-map configuration command. The default value is 100.
Weight	Weight of the route as set via autonomous system filters.
Path	Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path.

Examples

The following is sample output from the **show ip bgp neighbors** command entered with the **check-control-plane-failure** option configured:

```
Device# show ip bgp neighbors 10.10.10.1

BGP neighbor is 10.10.10.1, remote AS 10, internal link
  Fall over configured for session
  BFD is configured. BFD peer is Up. Using BFD to detect fast fallover (single-hop) with
  c-bit check-control-plane-failure.
  Inherits from template cbit-tps for session parameters
  BGP version 4, remote router ID 10.7.7.7
  BGP state = Established, up for 00:03:55
  Last read 00:00:02, last write 00:00:21, hold time is 180, keepalive interval is 60 seconds

Neighbor sessions:
  1 active, is not multiseession capable (disabled)
```

```

Neighbor capabilities:
  Route refresh: advertised and received(new)
  Four-octets ASN Capability: advertised and received
  Address family IPv4 Unicast: advertised and received
  Enhanced Refresh Capability: advertised and received
  Multisession Capability:
  Stateful switchover support enabled: NO for session 1

```

Examples

The following is sample output from the **show ip bgp neighbors** command entered with the **paths** keyword:

```
Device# show ip bgp neighbors 172.29.232.178 paths 10
```

```

Address      Refcount Metric Path
0x60E577B0      2      40 10 ?

```

The table below describes the significant fields shown in the display.

Table 10: show ip bgp neighbors paths Field Descriptions

Field	Description
Address	Internal address where the path is stored.
Refcount	Number of routes using that path.
Metric	Multi Exit Discriminator (MED) metric for the path. (The name of this metric for BGP versions 2 and 3 is INTER_AS.)
Path	Autonomous system path for that route, followed by the origin code for that route.

Examples

The following example shows that a prefix list that filters all routes in the 10.0.0.0 network has been received from the 192.168.20.72 neighbor:

```
Device# show ip bgp neighbors 192.168.20.72 received prefix-filter
```

```

Address family:IPv4 Unicast
ip prefix-list 192.168.20.72:1 entries
  seq 5 deny 10.0.0.0/8 le 32

```

The table below describes the significant fields shown in the display.

Table 11: show ip bgp neighbors received prefix-filter Field Descriptions

Field	Description
Address family	Address family mode in which the prefix filter is received.
ip prefix-list	Prefix list sent from the specified neighbor.

Examples

The following sample output shows the policies applied to the neighbor at 192.168.1.2. The output displays both inherited policies and policies configured on the neighbor device. Inherited policies are policies that the neighbor inherits from a peer group or a peer-policy template.

```
Device# show ip bgp neighbors 192.168.1.2 policy

Neighbor: 192.168.1.2, Address-Family: IPv4 Unicast
Locally configured policies:
  route-map ROUTE in
Inherited policies:
  prefix-list NO-MARKETING in
  route-map ROUTE in
  weight 300
  maximum-prefix 10000
```

Examples

The following is sample output from the **show ip bgp neighbors** command that verifies that Bidirectional Forwarding Detection (BFD) is being used to detect fast fallover for the BGP neighbor that is a BFD peer:

```
Device# show ip bgp neighbors

BGP neighbor is 172.16.10.2, remote AS 45000, external link
.
.
.
Using BFD to detect fast fallover
```

Examples

The following is sample output from the **show ip bgp neighbors** command that verifies that BGP TCP path maximum transmission unit (MTU) discovery is enabled for the BGP neighbor at 172.16.1.2:

```
Device# show ip bgp neighbors 172.16.1.2

BGP neighbor is 172.16.1.2, remote AS 45000, internal link
  BGP version 4, remote router ID 172.16.1.99
.
.
.
For address family: IPv4 Unicast
  BGP table version 5, neighbor version 5/0
.
.
.
Address tracking is enabled, the RIB does have a route to 172.16.1.2
Address tracking requires at least a /24 route to the peer
Connections established 3; dropped 2
Last reset 00:00:35, due to Router ID changed
Transport(tcp) path-mtu-discovery is enabled
.
.
.
SRTT: 146 ms, RTTO: 1283 ms, RTV: 1137 ms, KRTT: 0 ms
minRTT: 8 ms, maxRTT: 300 ms, ACK hold: 200 ms
Flags: higher precedence, retransmission timeout, nagle, path mtu capable
```

Examples

The following is sample output from the **show ip bgp neighbors** command that verifies that the neighbor 192.168.3.2 is a member of the peer group group192 and belongs to the subnet range group 192.168.0.0/16, which shows that this BGP neighbor was dynamically created:

```
Device# show ip bgp neighbors 192.168.3.2
```

```

BGP neighbor is *192.168.3.2, remote AS 50000, external link
Member of peer-group group192 for session parameters
Belongs to the subnet range group: 192.168.0.0/16
BGP version 4, remote router ID 192.168.3.2
BGP state = Established, up for 00:06:35
Last read 00:00:33, last write 00:00:25, hold time is 180, keepalive intervals
Neighbor capabilities:
  Route refresh: advertised and received(new)
  Address family IPv4 Unicast: advertised and received
Message statistics:
  InQ depth is 0
  OutQ depth is 0

              Sent          Rcvd
Opens:         1            1
Notifications: 0            0
Updates:       0            0
Keepalives:    7            7
Route Refresh: 0            0
Total:         8            8
Default minimum time between advertisement runs is 30 seconds
For address family: IPv4 Unicast
BGP table version 1, neighbor version 1/0
Output queue size : 0
Index 1, Offset 0, Mask 0x2
1 update-group member
group192 peer-group member
.
.
.

```

Examples

The following is partial output from the **show ip bgp neighbors** command that verifies the status of the BGP graceful restart capability for the external BGP peer at 192.168.3.2. Graceful restart is shown as disabled for this BGP peer.

```

Device# show ip bgp neighbors 192.168.3.2

BGP neighbor is 192.168.3.2, remote AS 50000, external link
Inherits from template S2 for session parameters
BGP version 4, remote router ID 192.168.3.2
BGP state = Established, up for 00:01:41
Last read 00:00:45, last write 00:00:45, hold time is 180, keepalive intervals
Neighbor sessions:
  1 active, is multiseession capable
Neighbor capabilities:
  Route refresh: advertised and received(new)
  Address family IPv4 Unicast: advertised and received
.
.
.
Address tracking is enabled, the RIB does have a route to 192.168.3.2
Connections established 1; dropped 0
Last reset never
Transport(tcp) path-mtu-discovery is enabled
Graceful-Restart is disabled
Connection state is ESTAB, I/O status: 1, unread input bytes: 0

```

Examples

The following is partial output from the **show ip bgp neighbors** command. For this release, the display includes the Layer 2 VFN address family information if graceful restart or NSF is enabled.

```

Device# show ip bgp neighbors

Load for five secs: 2%/0%; one minute: 0%; five minutes: 0%
Time source is hardware calendar, *21:49:17.034 GMT Wed Sep 22 2010
BGP neighbor is 10.1.1.3, remote AS 2, internal link

```

show ip bgp neighbors

BGP version 4, remote router ID 10.1.1.3
 BGP state = Established, up for 00:14:32
 Last read 00:00:30, last write 00:00:43, hold time is 180, keepalive interval is 60 seconds

Neighbor sessions:

1 active, is not multisession capable (disabled)

Neighbor capabilities:

Route refresh: advertised and received(new)
 Four-octets ASN Capability: advertised and received
 Address family IPv4 Unicast: advertised and received
 Address family L2VPN Vpls: advertised and received
 Graceful Restart Capability: advertised and received
 Remote Restart timer is 120 seconds
 Address families advertised by peer:
 IPv4 Unicast (was not preserved), L2VPN Vpls (was not preserved)

Multisession Capability:

Message statistics:

InQ depth is 0
 OutQ depth is 0

	Sent	Rcvd
Opens:	1	1
Notifications:	0	0
Updates:	4	16
Keepalives:	16	16
Route Refresh:	0	0
Total:	21	33

Default minimum time between advertisement runs is 0 seconds

For address family: IPv4 Unicast

Session: 10.1.1.3

BGP table version 34, neighbor version 34/0

Output queue size : 0

Index 1, Advertise bit 0

1 update-group member

Slow-peer detection is disabled

Slow-peer split-update-group dynamic is disabled

	Sent	Rcvd
Prefix activity:	----	----
Prefixes Current:	2	11 (Consumes 572 bytes)
Prefixes Total:	4	19
Implicit Withdraw:	2	6
Explicit Withdraw:	0	2
Used as bestpath:	n/a	7
Used as multipath:	n/a	0

	Outbound	Inbound
Local Policy Denied Prefixes:	-----	-----
NEXT_HOP is us:	n/a	1
Bestpath from this peer:	20	n/a
Bestpath from iBGP peer:	8	n/a
Invalid Path:	10	n/a
Total:	38	1

Number of NLRI in the update sent: max 2, min 0

Last detected as dynamic slow peer: never

Dynamic slow peer recovered: never

For address family: L2VPN Vpls

Session: 10.1.1.3

BGP table version 8, neighbor version 8/0

Output queue size : 0

Index 1, Advertise bit 0

1 update-group member

Slow-peer detection is disabled

Slow-peer split-update-group dynamic is disabled

	Sent	Rcvd
Prefix activity:	----	----
Prefixes Current:	1	1 (Consumes 68 bytes)
Prefixes Total:	2	1
Implicit Withdraw:	1	0
Explicit Withdraw:	0	0
Used as bestpath:	n/a	1
Used as multipath:	n/a	0

	Outbound	Inbound
Local Policy Denied Prefixes:	-----	-----
Bestpath from this peer:	4	n/a

```

      Bestpath from iBGP peer:          1          n/a
      Invalid Path:                    2          n/a
      Total:                           7          0
Number of NLRI's in the update sent: max 1, min 0
Last detected as dynamic slow peer: never
Dynamic slow peer recovered: never
Address tracking is enabled, the RIB does have a route to 10.1.1.3
Connections established 1; dropped 0
Last reset never
Transport(tcp) path-mtu-discovery is enabled
Graceful-Restart is enabled, restart-time 120 seconds, stalepath-time 360 seconds
Connection state is ESTAB, I/O status: 1, unread input bytes: 0
Connection is ECN Disabled
Minimum incoming TTL 0, Outgoing TTL 255
Local host: 10.1.1.1, Local port: 179
Foreign host: 10.1.1.3, Foreign port: 48485
Connection tableid (VRF): 0
Enqueued packets for retransmit: 0, input: 0  mis-ordered: 0 (0 bytes)
Event Timers (current time is 0xE750C):
Timer           Starts      Wakeups      Next
Retrans         18          0           0x0
TimeWait        0           0           0x0
AckHold         22          20          0x0
SendWnd         0           0           0x0
KeepAlive       0           0           0x0
GiveUp          0           0           0x0
PmtuAger        0           0           0x0
DeadWait        0           0           0x0
Linger          0           0           0x0
iss: 3196633674  snduna: 3196634254  sndnxt: 3196634254      sndwnd: 15805
irs: 1633793063  rcvnxt: 1633794411  rcvwnd: 15037  delrcvwnd: 1347
SRTT: 273 ms, RTTO: 490 ms, RTV: 217 ms, KRTT: 0 ms
minRTT: 2 ms, maxRTT: 300 ms, ACK hold: 200 ms
Status Flags: passive open, gen tcbs
Option Flags: nagle, path mtu capable
Datagrams (max data segment is 1436 bytes):
Rcvd: 42 (out of order: 0), with data: 24, total data bytes: 1347
Sent: 40 (retransmit: 0 fastretransmit: 0),with data: 19, total data bytes: 579

```

Examples

The following is sample output from the **show ip bgp neighbors** command that indicates the discard attribute values and treat-as-withdraw attribute values configured. It also provides a count of received Updates matching a treat-as-withdraw attribute, a count of received Updates matching a discard attribute, and a count of received malformed Updates that are treat-as-withdraw.

```

Device# show ip bgp vpnv4 all neighbors 10.0.103.1

BGP neighbor is 10.0.103.1, remote AS 100, internal link
  Path-attribute treat-as-withdraw inbound
  Path-attribute treat-as-withdraw value 128
  Path-attribute treat-as-withdraw 128 in: count 2
  Path-attribute discard 128 inbound
  Path-attribute discard 128 in: count 2

      Outbound      Inbound
Local Policy Denied Prefixes:  -----  -----
MALFORM treat as withdraw:      0          1
Total:                          0          1

```

Examples

The following output indicates that the neighbor is capable of advertising additional paths and sending additional paths it receives. It is also capable of receiving additional paths and advertised paths.

```

Device# show ip bgp neighbors 10.108.50.2

BGP neighbor is 10.108.50.2, remote AS 1, internal link
  BGP version 4, remote router ID 192.168.252.252
  BGP state = Established, up for 00:24:25

```

```
Last read 00:00:24, last write 00:00:24, hold time is 180, keepalive interval is 60 seconds
```

```
Neighbor capabilities:
  Additional paths Send: advertised and received
  Additional paths Receive: advertised and received
  Route refresh: advertised and received(old & new)
  Graceful Restart Capabilty: advertised and received
  Address family IPv4 Unicast: advertised and received
```

Examples

In the following output, the cluster ID of the neighbor is displayed. (The vertical bar and letter “i” for “include” cause the device to display only lines that include the user's input after the “i”, in this case, “cluster-id.”) The cluster ID displayed is the one directly configured through a neighbor or a template.

```
Device# show ip bgp neighbors 192.168.2.2 | i cluster-id
```

```
Configured with the cluster-id 192.168.15.6
```

Related Commands

Command	Description
bgp asnotation dot	Changes the default display and the regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
bgp enhanced-error	Restores the default behavior of treating Update messages that have a malformed attribute as withdrawn, or includes iBGP peers in the Enhanced Attribute Error Handling feature.
neighbor path-attribute discard	Configures the device to discard unwanted Update messages from the specified neighbor that contain a specified path attribute.
neighbor path-attribute treat-as-withdraw	Configures the device to withdraw from the specified neighbor unwanted Update messages that contain a specified attribute.
neighbor send-label	Enables a BGP router to send MPLS labels with BGP routes to a neighboring BGP router.
neighbor send-label explicit-null	Enables a BGP router to send MPLS labels with explicit-null information for a CSC-CE router and BGP routes to a neighboring CSC-PE router.
router bgp	Configures the BGP routing process.

show ip bgp paths

To display all the BGP paths in the database, use the **show ip bgp paths** command in EXEC mode.

show ip bgp paths

Cisco 10000 Series Router

show ip bgp paths *regex*

Syntax Description

<i>regex</i>	Regular expression to match the BGP autonomous system paths.
--------------	--

Command Modes

EXEC

Command History

Release	Modification
10.0	This command was introduced.
12.2(31)SB	This command was integrated into Cisco IOS Release 12.2(31)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.0(33)S3	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format is now asplain.
12.2(33)SRE	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.

Examples

The following is sample output from the **show ip bgp paths** command in privileged EXEC mode:

```
Router# show ip bgp paths
Address      Hash Refcount Metric Path
0x60E5742C   0      1         0 i
0x60E3D7AC   2      1         0 ?
0x60E5C6C0   11     3         0 10 ?
0x60E577B0   35     2        40 10 ?
```

The table below describes the significant fields shown in the display.

Table 12: show ip bgp paths Field Descriptions

Field	Description
Address	Internal address where the path is stored.
Hash	Hash bucket where path is stored.
Refcount	Number of routes using that path.
Metric	The Multi Exit Discriminator (MED) metric for the path. (The name of this metric for BGP versions 2 and 3 is INTER_AS.)
Path	The autonomous system path for that route, followed by the origin code for that route.

show ip bgp summary

To display the status of all Border Gateway Protocol (BGP) connections, use the **show ip bgp summary** command in user EXEC or privileged EXEC mode.

```
show ip bgp [ipv4 {multicast| unicast}| vpnv4 all| vpnv6 unicast all| topology {*|
routing-topology-instance-name}] [update-group] summary [slow]
```

Syntax Description

ipv4 {multicast unicast}	(Optional) Displays peers in the IPv4 address family.
vpnv4 all	(Optional) Displays peers in the VPNv4 address family.
vpnv6 unicast all	(Optional) Displays peers in the VPNv6 address family.
topology	(Optional) Displays routing topology information.
*	(Optional) Displays all routing topology instances.
<i>routing-topology-instance-name</i>	(Optional) Displays routing topology information for that instance.
update-group	(Optional) Includes information about the update group of the peers.
slow	(Optional) Displays only information about dynamically configured slow peers.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
10.0	This command was introduced.
12.0	Support for the neighbor maximum-prefix command was added to the output.
12.2	This command was modified. <ul style="list-style-type: none"> The number of networks and paths displayed in the output was split out to two separate lines. A field was added to display multipath entries in the routing table.

Release	Modification
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(11)T	This command was modified. A line was added to the output to display the advertised bitfield cache entries and associated memory usage.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH, and the output was modified to support BGP dynamic neighbors.
12.0(32)S12	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.
12.0(32)SY8	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.
Cisco IOS XE Release 2.3	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format is now asplain.
12.2(33)SRE	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
15.0(1)S	This command was modified. The slow keyword was added.
Cisco IOS XE Release 3.1S	This command was modified. The slow keyword was added.
15.2(1)S	This command was modified. It will show information about how many paths are in each RPKI state.
Cisco IOS XE Release 3.5S	This command was modified. It will show information about how many paths are in each RPKI state.
15.1(1)SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.

Release	Modification
Cisco IOS XE Release 3.3SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
15.2(4)S	This command was implemented on the Cisco 7200 series routers.

Usage Guidelines

The **show ip bgp summary** command is used to display BGP path, prefix, and attribute information for all connections to BGP neighbors.

A prefix is an IP address and network mask. It can represent an entire network, a subset of a network, or a single host route. A path is a route to a given destination. By default, BGP will install only a single path for each destination. If multipath routes are configured, BGP will install a path entry for each multipath route, and only one multipath route will be marked as the bestpath.

BGP attribute and cache entries are displayed individually and in combinations that affect the bestpath selection process. The fields for this output are displayed when the related BGP feature is configured or attribute is received. Memory usage is displayed in bytes.

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain—65538 for example—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 followed by the **clear ip bgp *** command to perform a hard reset of all current BGP sessions.

In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot—1.2 for example—as the only configuration format, regular expression match, and output display, with no asplain support.

Examples

The following is sample output from the **show ip bgp summary** command in privileged EXEC mode:

```
Router# show ip bgp summary

BGP router identifier 172.16.1.1, local AS number 100
BGP table version is 199, main routing table version 199
37 network entries using 2850 bytes of memory
59 path entries using 5713 bytes of memory
18 BGP path attribute entries using 936 bytes of memory
2 multipath network entries and 4 multipath paths
10 BGP AS-PATH entries using 240 bytes of memory
7 BGP community entries using 168 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
90 BGP advertise-bit cache entries using 1784 bytes of memory
36 received paths for inbound soft reconfiguration
BGP using 34249 total bytes of memory
Dampening enabled. 4 history paths, 0 dampened paths
BGP activity 37/2849 prefixes, 60/1 paths, scan interval 15 secs

Neighbor      V    AS MsgRcvd MsgSent  TblVer  InQ  OutQ Up/Down State/PfxRcd
10.100.1.1    4    200     26     22     199   0    0 00:14:23 23
10.200.1.1    4    300     21     51     199   0    0 00:13:40 0
```

The table below describes the significant fields shown in the display. Fields that are preceded by the asterisk (*) are not shown in the above output.

Table 13: show ip bgp summary Field Descriptions

Field	Description
BGP router identifier	In order of precedence and availability, the router identifier specified by the bgp router-id command, a loopback address, or the highest IP address.
BGP table version	Internal version number of BGP database.
main routing table version	Last version of BGP database that was injected into the main routing table.
...network entries	Number of unique prefix entries in the BGP database.
...using ... bytes of memory	Amount of memory, in bytes, that is consumed for the path, prefix, or attribute entry displayed on the same line.
...path entries using	Number of path entries in the BGP database. Only a single path entry will be installed for a given destination. If multipath routes are configured, a path entry will be installed for each multipath route.
...multipath network entries using	Number of multipath entries installed for a given destination.
* ...BGP path/bestpath attribute entries using	Number of unique BGP attribute combinations for which a path is selected as the bestpath.
* ...BGP rinfo entries using	Number of unique ORIGINATOR and CLUSTER_LIST attribute combinations.
...BGP AS-PATH entries using	Number of unique AS_PATH entries.
...BGP community entries using	Number of unique BGP community attribute combinations.
*...BGP extended community entries using	Number of unique extended community attribute combinations.
BGP route-map cache entries using	Number of BGP route-map match and set clause combinations. A value of 0 indicates that the route cache is empty.
...BGP filter-list cache entries using	Number of filter-list entries that match an AS-path access list permit or deny statements. A value of 0 indicates that the filter-list cache is empty.

Field	Description
BGP advertise-bit cache entries using	(Cisco IOS Release 12.4(11)T and later releases only) Number of advertised bitfield entries and the associated memory usage. A bitfield entry represents a piece of information (one bit) that is generated when a prefix is advertised to a peer. The advertised bit cache is built dynamically when required.
...received paths for inbound soft reconfiguration	Number paths received and stored for inbound soft reconfiguration.
BGP using...	Total amount of memory, in bytes, used by the BGP process.
Dampening enabled...	Indicates that BGP dampening is enabled. The number of paths that carry an accumulated penalty and the number of dampened paths are displayed on this line.
BGP activity...	Displays the number of times that memory has been allocated or released for a path or prefix.
Neighbor	IP address of the neighbor.
V	BGP version number spoken to the neighbor.
AS	Autonomous system number.
MsgRcvd	Number of messages received from the neighbor.
MsgSent	Number of messages sent to the neighbor.
TblVer	Last version of the BGP database that was sent to the neighbor.
InQ	Number of messages queued to be processed from the neighbor.
OutQ	Number of messages queued to be sent to the neighbor.
Up/Down	The length of time that the BGP session has been in the Established state, or the current status if not in the Established state.

Field	Description
State/PfxRcd	<p>Current state of the BGP session, and the number of prefixes that have been received from a neighbor or peer group. When the maximum number (as set by the neighbor maximum-prefix command) is reached, the string “PfxRcd” appears in the entry, the neighbor is shut down, and the connection is set to Idle.</p> <p>An (Admin) entry with Idle status indicates that the connection has been shut down using the neighbor shutdown command.</p>

The following output from the **show ip bgp summary** command shows that the BGP neighbor 192.168.3.2 was dynamically created and is a member of the listen range group, group192. The output also shows that the IP prefix range of 192.168.0.0/16 is defined for the listen range group named group192. In Cisco IOS Release 12.2(33)SXH and later releases, the BGP dynamic neighbor feature introduced the ability to support the dynamic creation of BGP neighbor peers using a subnet range associated with a peer group (listen range group).

Router# **show ip bgp summary**

```

BGP router identifier 192.168.3.1, local AS number 45000
BGP table version is 1, main routing table version 1
Neighbor      V      AS MsgRcvd MsgSent   TblVer  InQ  OutQ Up/Down  State/PfxRcd
*192.168.3.2  4 50000      2       2       0    0    0 00:00:37      0
* Dynamically created based on a listen range command
Dynamically created neighbors: 1/(200 max), Subnet ranges: 1
BGP peer group group192 listen range group members:
  192.168.0.0/16

```

The following output from the **show ip bgp summary** command shows two BGP neighbors, 192.168.1.2 and 192.168.3.2, in different 4-byte autonomous system numbers, 65536 and 65550. The local autonomous system 65538 is also a 4-byte autonomous system number and the numbers are displayed in the default asplain format. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or a later release.

Router# **show ip bgp summary**

```

BGP router identifier 172.17.1.99, local AS number 65538
BGP table version is 1, main routing table version 1
Neighbor      V      AS MsgRcvd MsgSent   TblVer  InQ  OutQ Up/Down  Statd
192.168.1.2    4      65536      7       7       1    0    0 00:03:04      0
192.168.3.2    4      65550      4       4       1    0    0 00:00:15      0

```

The following output from the **show ip bgp summary** command shows the same two BGP neighbors, but the 4-byte autonomous system numbers are displayed in asdot notation format. To change the display format the **bgp asnotation dot** command must be configured in router configuration mode. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(32)S12, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, 12.4(24)T, or Cisco IOS XE Release 2.3 or later releases.

Router# **show ip bgp summary**

```

BGP router identifier 172.17.1.99, local AS number 1.2
BGP table version is 1, main routing table version 1
Neighbor      V      AS MsgRcvd MsgSent   TblVer  InQ  OutQ Up/Down  Statd
192.168.1.2    4       1.0      9       9       1    0    0 00:04:13      0
192.168.3.2    4      1.14      6       6       1    0    0 00:01:24      0

```


The following example displays sample output of the **show ip bgp summary slow** command:

```
Router# show ip bgp summary slow
```

```
BGP router identifier 2.2.2.2, local AS number 100
BGP table version is 37, main routing table version 37
36 network entries using 4608 bytes of memory
36 path entries using 1872 bytes of memory
1/1 BGP path/bestpath attribute entries using 124 bytes of memory
1 BGP rrinfo entries using 24 bytes of memory
2 BGP AS-PATH entries using 48 bytes of memory
1 BGP extended community entries using 24 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 6700 total bytes of memory
BGP activity 46/0 prefixes, 48/0 paths, scan interval 60 secs
Neighbor V AS MsgRcvd MsgSent TblVer InQ OutQ Up/Down State/PfxRcd
6.6.6.6 4 100 11 10 1 0 0 00:44:20 0
```

The following example displays counts of prefix/AS pairs for each RPKI state. The fourth line of output indicates "Path RPKI states: x valid, x not found, x invalid." Of course the line of output indicating RPKI states can be displayed only if the **bgp rpki server** command or the **neighbor announce rpki state** command is configured.

```
Router> show ip bgp summary
```

```
For address family: IPv4 Unicast
BGP router identifier 10.0.96.2, local AS number 2
BGP table version is 8, main routing table version 8
Path RPKI states: 0 valid, 7 not found, 0 invalid
6 network entries using 888 bytes of memory
7 path entries using 448 bytes of memory
3/3 BGP path/bestpath attribute entries using 384 bytes of memory
2 BGP AS-PATH entries using 48 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 1768 total bytes of memory
BGP activity 12/0 prefixes, 14/0 paths, scan interval 60 secs
```

Neighbor /PfxRcd	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State
10.0.0.3 3	4	3	6	9	8	0	0	00:01:04	
10.0.2.4 0	4	2	5	8	8	0	0	00:01:15	
10.0.3.5 3	4	4	6	7	8	0	0	00:01:14	
10.0.96.254	4	1	0	0	1	0	0	never	Idle

```
For address family: IPv6 Unicast
BGP router identifier 10.0.96.2, local AS number 2
BGP table version is 9, main routing table version 9
Path RPKI states: 3 valid, 4 not found, 0 invalid
6 network entries using 1032 bytes of memory
7 path entries using 616 bytes of memory
5/5 BGP path/bestpath attribute entries using 640 bytes of memory
2 BGP AS-PATH entries using 48 bytes of memory
0 BGP route-map cache entries using 0 bytes of memory
0 BGP filter-list cache entries using 0 bytes of memory
BGP using 2336 total bytes of memory
BGP activity 12/0 prefixes, 14/0 paths, scan interval 60 secs
```

Neighbor /PfxRcd	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State
2001::2 2	4	2	6	9	6	0	0	00:01:08	
2002::1 2	4	3	7	11	9	0	0	00:01:07	
2003::2	4	4	6	8	9	0	0	00:01:08	

Related Commands

Command	Description
bgp asnotation dot	Changes the default display and the regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
bgp router-id	Configures a fixed router ID for the local BGP routing process.
neighbor maximum-prefix	Controls how many prefixes can be received from a BGP neighbor.
neighbor shutdown	Disables a BGP neighbor or peer group.
neighbor slow-peer split-update-group dynamic	Causes a dynamically detected slow peer to be moved to a slow update group.
router bgp	Configures the BGP routing process.

show ip bgp template peer-policy

To display locally configured peer policy templates, use the **show ip bgp template peer-policy** command in user EXEC or privileged EXEC mode.

show ip bgp template peer-policy [*policy-template-name*] [**detail**]

Syntax Description

<i>policy-template-name</i>	(Optional) Name of a locally configured peer policy template.
detail	(Optional) Displays detailed policy information such as route maps, prefix lists, community lists, access control lists (ACLs), and AS-path filter lists.

Command Default

If a peer policy template is not specified using the *policy-template-name* argument, all peer policy templates will be displayed.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.0(25)S	The detail keyword was added.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.4(11)T	Support for the detail keyword was integrated into Cisco IOS Release 12.4(11)T.
12.2(33)SRB	This command and support for the detail keyword were integrated into Cisco IOS Release 12.2(33)SRB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Release	Modification
12.2(33)SB	Support for the detail keyword was integrated into Cisco IOS Release 12.2(33)SB.
15.1(1)SY	This command was integrated into Cisco IOS Release 15.1(1)SY.

Usage Guidelines

This command is used to display locally configured peer policy templates. The output can be filtered to display a single peer policy template using the *policy-template-name* argument. This command also supports all standard output modifiers.

When BGP neighbors use multiple levels of peer templates it can be difficult to determine which policies are associated with a specific template. In Cisco IOS Release 12.0(25)S, 12.4(11)T, 12.2(33)SRB, 12.2(33)SB, and later releases, the **detail** keyword was added to display the detailed configuration of local and inherited policies associated with a specific template. Inherited policies are policies that the template inherits from other peer-policy templates.

Examples

The **show ip bgp template peer-policy** command is used to verify the configuration of local peer policy templates. The following sample output shows the peer policy templates named GLOBAL and NETWORK1. The output also shows that the GLOBAL template was inherited by the NETWORK1 template.

```
Device# show ip bgp template peer-policy

Template:GLOBAL, index:1.
Local policies:0x80840, Inherited polices:0x0
*Inherited by Template NETWORK1, index:2
Locally configured policies:
  prefix-list NO-MARKETING in
  weight 300
  maximum-prefix 10000
Inherited policies:
Template:NETWORK1, index:2.
Local policies:0x1, Inherited polices:0x80840
This template inherits:
  GLOBAL, index:1, seq_no:10, flags:0x1
Locally configured policies:
  route-map ROUTE in
Inherited policies:
  prefix-list NO-MARKETING in
  weight 300
  maximum-prefix 10000
```

The table below describes the significant fields shown in the display.

Table 14: show ip bgp template peer-policy Field Descriptions

Field	Description
Template	Name of the peer template.
index	The sequence number in which the displayed template is processed.
Local policies	Displays the hexadecimal value of locally configured policies.

Field	Description
Inherited polices	Displays the hexadecimal value of inherited policies. The 0x0 value is displayed when no templates are inherited.
Locally configured policies	Displays a list of commands that are locally configured in a peer policy template.
Inherited policies	Displays a list of commands that are inherited from a peer template.

The following sample output of the **show ip bgp template peer-policy** command with the **detail** keyword displays details of the template named NETWORK1, which includes the inherited template named GLOBAL. The output in this example displays the configuration commands of the locally configured route map and prefix list and the inherited prefix list.

```
Device# show ip bgp template peer-policy NETWORK1 detail

Template:NETWORK1, index:2.
Local policies:0x1, Inherited polices:0x80840
This template inherits:
  GLOBAL, index:1, seq_no:10, flags:0x1
Locally configured policies:
  route-map ROUTE in
Inherited policies:
  prefix-list NO-MARKETING in
  weight 300
  maximum-prefix 10000
Template:NETWORK1 <detail>
Locally configured policies:
  route-map ROUTE in
route-map ROUTE, permit, sequence 10
  Match clauses:
    ip address prefix-lists: DEFAULT
ip prefix-list DEFAULT: 1 entries
  seq 5 permit 10.1.1.0/24
  Set clauses:
    Policy routing matches: 0 packets, 0 bytes
Inherited policies:
  prefix-list NO-MARKETING in
ip prefix-list NO-MARKETING: 1 entries
  seq 5 deny 10.2.2.0/24
```

Related Commands

Command	Description
inherit peer-policy	Configures a peer policy template to inherit the configuration from another peer policy template.
template peer-policy	Creates a peer policy template and enters policy-template configuration mode.

show ip bgp template peer-session

To display peer policy template configurations, use the **show ip bgp template peer-session** command in user EXEC or privileged EXEC mode.

show ip bgp template peer-session [*session-template-name*]

Syntax Description

<i>session-template-name</i>	(Optional) Name of a locally configured peer session template.
------------------------------	--

Command Default

If a peer session template is not specified with the *session-template-name* argument, all peer session templates will be displayed.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(31)SB	This command was integrated into Cisco IOS Release 12.2(31)SB.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
Cisco IOS XE Release 3.8S	This command was modified. The cluster ID for the template is displayed.

Usage Guidelines

This command is used to display locally configured peer session templates. The output can be filtered to display a single peer session template with the *peer-session-name* argument. This command also supports all standard output modifiers.

Examples

The **show ip bgp template peer-session** command is used to verify the configuration of local peer session templates. The following example shows the peer session templates named INTERNAL-BGP and CORE1. The output also shows that INTERNAL-BGP is inherited by CORE1.

```
Device# show ip bgp template peer-session

Template:INTERNAL-BGP, index:1
Local policies:0x21, Inherited policies:0x0
  *Inherited by Template CORE1, index= 2
Locally configured session commands:
  remote-as 202
  timers 30 300
Inherited session commands:
Template:CORE1, index:2
Local policies:0x180, Inherited policies:0x21
This template inherits:
  INTERNAL-BGP index:1 flags:0x0
Locally configured session commands:
  update-source loopback 1
  description CORE-123
Inherited session commands:
  remote-as 202
  timers 30 300
```

The table below describes the significant fields shown in the display.

Table 15: show ip bgp template peer-session Field Descriptions

Field	Description
Template:	Name of the peer template.
index:	The sequence number in which the displayed template is processed.
Local policies:	Displays the hexadecimal value of locally configured policies.
Inherited policies:	Displays the hexadecimal value of inherited policies. The 0x0 value is displayed when no templates are inherited.
Locally configured session commands:	Displays a list of commands that are locally configured in a peer template.
Inherited session commands:	Displays a list of commands that are inherited from a peer session template.

The following sample output displays the cluster ID assigned to the template:

```
Device# show ip bgp template peer-session TS1

Template:TS1, index:1
Local policies:0x10000000, Inherited policies:0x0
Locally configured session commands:
```

```
cluster-id 192.168.0.115
Inherited session commands:
```

Related Commands

Command	Description
bgp cluster-id	Sets the global cluster ID on a route reflector.
inherit peer-session	Configures a peer session template to inherit the configuration from another peer session template.
neighbor cluster-id	Sets the cluster ID for a neighbor.
template peer-session	Creates a peer session template and enters session-template configuration mode.

show ip community-list

To display configured community lists, use the **show ip community-list** command in user or privileged EXEC mode.

show ip community-list [*community-list-number*| *community-list-name*] [**exact-match**]

Syntax Description

<i>community-list-number</i>	(Optional) A standard or expanded community list number in the range from 1 to 500.
<i>community-list-name</i>	(Optional) Community list name. The community list name can be standard or expanded.
exact-match	(Optional) Displays only routes that have an exact match.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
11.0	This command was introduced.
12.0(10)S	Named community list support was added.
12.0(16)ST	Named community lists support was integrated into Cisco IOS Release 12.0(16)ST.
12.1(9)E	Named community lists support was integrated into Cisco IOS Release 12.1(9)E.
12.2(8)T	Named community lists support was integrated into Cisco IOS Release 12.2(8)T.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

This command can be used without any arguments or keywords. If no arguments are specified, this command will display all community lists. However, the community list name or number can be specified when entering the **show ip community-list** command. This option can be useful for filtering the output of this command and verifying a single named or numbered community list.

Examples

The following sample output is similar to the output that will be displayed when the **show ip community-list** command is entered in privileged EXEC mode:

```
Router# show ip community-list

Community standard list 1
    permit 3
    deny 5
Community (expanded) access list 101
    deny 4
    permit 6
Named Community standard list COMMUNITY_LIST_NAME
    permit 1
    deny 7
Named Community expanded list COMMUNITY_LIST_NAME_TWO
    deny 2
    permit 8
```

The Field Descriptions table below describes the significant fields shown in the display.

Table 16: show ip community-list Field Descriptions

Field	Description
Community standard list	If shown, this value will display a standard community list number (1 to 99). The standard community list number will immediately follow this value.
Community (expanded) access list	If shown, this value will display an expanded community list number (100 to 500). The expanded community list number will immediately follow this value.
Named community standard list	If shown, this value will display a standard community list name. The standard community list name will immediately follow this value.
Named community expanded list	If shown, this value will display an expanded community list name. The expanded community list name will immediately follow this value.

show ip extcommunity-list

To display routes that are permitted by an extended community list, use the **show ip extcommunity-list** command in user EXEC or privileged EXEC mode.

show ip extcommunity-list [*list-number*| *list-name*]

Syntax Description

<i>list-number</i>	(Optional) Specifies an extended community list number from 1 to 500. A standard extended community list number is from 1 to 99. An expanded extended list is from 100 to 500.
<i>list-name</i>	(Optional) Specifies an extended community list name. If a specific extended community list number is not specified, all locally configured extended community lists will be displayed by default.

Command Modes

User EXEC (>)
Privileged EXEC (#)

Command History

Release	Modification
12.1	This command was introduced.
12.2(25)S	Support for named extended community lists was added. Minor formatting changes were made to the output.
12.3(11)T	Support for named extended community lists was added. Minor formatting changes were made to the output.
12.2(27)SBC	This command was integrated into the Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.0(32)S12	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.
12.0(32)SY8	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.4(24)T	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.

Release	Modification
Cisco IOS XE Release 2.3	This command was modified. Support for displaying 4-byte autonomous system numbers in asdot notation only was added.
12.2(33)SX11	This command was modified. Support for 4-byte autonomous system numbers in asplain and asdot notation was added.
12.0(33)S3	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format is now asplain.
Cisco IOS XE Release 2.4	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain notation was added and the default display format is now asplain.
12.2(33)SRE	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
12.2(33)XNE	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
15.1(1)SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.
Cisco IOS XE Release 3.3SG	This command was modified. Support for displaying 4-byte autonomous system numbers in asplain and asdot notation was added.

Usage Guidelines

In Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, and later releases, the Cisco implementation of 4-byte autonomous system numbers uses asplain--65538 for example--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 followed by the **clear ip bgp *** command to perform a hard reset of all current BGP sessions.

In Cisco IOS Release 12.0(32)S12, 12.4(24)T, and Cisco IOS XE Release 2.3, the Cisco implementation of 4-byte autonomous system numbers uses asdot--1.2 for example--as the only configuration format, regular expression match, and output display, with no asplain support.

If the route target--RT in the output--contains a 4-byte autonomous system number as part of the extended community list, it will be displayed in the appropriate format.

Examples

The following is sample output from the **show ip extcommunity-list** command:

```
Router# show ip extcommunity-list
Standard extended community-list 1
  10 permit RT:64512:10
  20 permit SoO:65400:20
  30 deny RT:65424:30 SoO:64524:40
Standard extended community-list 99
```

```

10 permit RT:65504:40 SoO:65505:50
20 deny RT:65406:60 SoO:65307:70
Expanded extended community-list LIST_NAME
10 permit 0-9* A-Z* a-z*

```

The table below describes the significant fields shown in the display.

Table 17: show ip extcommunity-list Field Descriptions

Field	Description
... extended community-list...	The type of extended community-list (standard or expanded), and the name or number of the extended community list.
10	The sequence number of the extended community list entry. 10 is the lowest default sequence number. Extended community lists increment by 10 when default values are configured.
permit/deny	Indicates a permit or deny sequence entry.
RT/SoO	Indicates the route target or the site of origin used in a standard extended community list.
0-9* A-Z* a-z*	Regular expression used in an expanded extended community list.

The following output is from the **show ip extcommunity-list** command after a 4-byte autonomous system number has been configured as part of the route target. The 4-byte autonomous system number, 65537, is displayed in the default asplain format. This example requires Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or a later release.

```

Router# show ip extcommunity-list 1
Extended community standard list 1
  permit RT:65537:100

```

The following output displays a 4-byte autonomous system number that has been configured as part of the route target. The 4-byte autonomous system number--1.1--is displayed in asdot notation. The dot notation is the only format for 4-byte autonomous system numbers in Cisco IOS Release 12.0(32)S12, 12.4(24)T, or Cisco IOS XE Release 2.3. This output can also be seen in Cisco IOS Release 12.0(32)SY8, 12.0(33)S3, 12.2(33)SRE, 12.2(33)XNE, 12.2(33)SX11, Cisco IOS XE Release 2.4, or later releases. after the **bgp asnotation dot** command has been entered to display 4-byte autonomous system numbers in dot notation.

```

Router# show ip extcommunity-list 1
Extended community standard list 1
  permit RT:1.1:100

```

Related Commands

Command	Description
bgp asnotation dot	Changes the default display and the regular expression match format of BGP 4-byte autonomous system numbers from asplain (decimal values) to dot notation.
router bgp	Configures the BGP routing process.
show route-map	Displays configured route maps.

show ip route

To display contents of the routing table, use the **show ip route** command in user EXEC or privileged EXEC mode.

show ip route [*ip-address* [**repair-paths** | **next-hop-override** [**dhcp**]] *mask* [**longer-prefixes**]] [*protocol* [*process-id*]] **list** [*access-list-number* | *access-list-name*]] **static download** | **update-queue**

Syntax Description

<i>ip-address</i>	(Optional) IP address for which routing information should be displayed.
repair-paths	(Optional) Displays the repair paths.
next-hop-override	(Optional) Displays the Next Hop Resolution Protocol (NHRP) next-hop overrides that are associated with a particular route and the corresponding default next hops.
dhcp	(Optional) Displays routes added by the Dynamic Host Configuration Protocol (DHCP) server.
<i>mask</i>	(Optional) Subnet mask.
longer-prefixes	(Optional) Displays output for longer prefix entries.
<i>protocol</i>	(Optional) The name of a routing protocol or the keyword connected , mobile , static , or summary . If you specify a routing protocol, use one of the following keywords: bgp , eigrp , hello , isis , odr , ospf , nhrp , or rip .
<i>process-id</i>	(Optional) Number used to identify a process of the specified protocol.
list	(Optional) Filters output by an access list name or number.
<i>access-list-number</i>	(Optional) Access list number.
<i>access-list-name</i>	(Optional) Access list name.
static	(Optional) Displays static routes.
download	(Optional) Displays routes installed using the authentication, authorization, and accounting (AAA) route download function. This keyword is used only when AAA is configured.

update-queue	(Optional) Displays Routing Information Base (RIB) queue updates.
---------------------	---

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
9.2	This command was introduced.
10.0	This command was modified. The “D—EIGRP, EX—EIGRP, N1—SPF NSSA external type 1 route” and “N2—OSPF NSSA external type 2 route” codes were included in the command output.
10.3	This command was modified. The <i>process-id</i> argument was added.
11.0	This command was modified. The longer-prefixes keyword was added.
11.1	This command was modified. The “U—per-user static route” code was included in the command output.
11.2	This command was modified. The “o—on-demand routing” code was included in the command output.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA, and the update-queue keyword was added.
11.3	This command was modified. The command output was enhanced to display the origin of an IP route in Intermediate System-to-Intermediate System (IS-IS) networks.
12.0(1)T	This command was modified. The “M—mobile” code was included in the command output.
12.0(3)T	This command was modified. The “P—periodic downloaded static route” code was included in the command output.
12.0(4)T	This command was modified. The “ia—IS-IS” code was included in the command output.
12.2(2)T	This command was modified. The command output was enhanced to display information on multipaths to the specified network.

Release	Modification
12.2(13)T	This command was modified. The <i>egp</i> and <i>igrp</i> arguments were removed because the Exterior Gateway Protocol (EGP) and the Interior Gateway Routing Protocol (IGRP) were no longer available in Cisco software.
12.2(14)S	This command was integrated into Cisco IOS Release 12.2(14)S.
12.2(14)SX	This command was integrated into Cisco IOS Release 12.2(14)SX.
12.3(2)T	This command was modified. The command output was enhanced to display route tag information.
12.3(8)T	This command was modified. The command output was enhanced to display static routes using DHCP.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRE	This command was modified. The dhcp and repair-paths keywords were added.
12.2(33)XNE	This command was integrated into Cisco IOS Release 12.2(33)XNE.
Cisco IOS XE Release 2.5	This command was integrated into Cisco IOS XE Release 2.5. The next-hop-override and nhrp keywords were added.
15.2(2)S	This command was modified. The command output was enhanced to display route tag values in dotted decimal format.
Cisco IOS XE Release 3.6S	This command was modified. The command output was enhanced to display route tag values in dotted decimal format.
15.2(4)S	This command was implemented on the Cisco 7200 series router.
15.1(1)SY	This command was integrated into Cisco IOS Release 15.1(1)SY.

Examples

Examples

The following is sample output from the **show ip route** command when an IP address is not specified:

```
Device# show ip route
```

```
Codes: R - RIP derived, O - OSPF derived,
       C - connected, S - static, B - BGP derived,
       * - candidate default route, IA - OSPF inter area route,
       i - IS-IS derived, ia - IS-IS, U - per-user static route,
       o - on-demand routing, M - mobile, P - periodic downloaded static route,
       D - EIGRP, EX - EIGRP external, E1 - OSPF external type 1 route,
```

show ip route

```

E2 - OSPF external type 2 route, N1 - OSPF NSSA external type 1 route,
N2 - OSPF NSSA external type 2 route
Gateway of last resort is 10.119.254.240 to network 10.140.0.0
O E2 10.110.0.0 [160/5] via 10.119.254.6, 0:01:00, Ethernet2
E 10.67.10.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
O E2 10.68.132.0 [160/5] via 10.119.254.6, 0:00:59, Ethernet2
O E2 10.130.0.0 [160/5] via 10.119.254.6, 0:00:59, Ethernet2
E 10.128.0.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.129.0.0 [200/129] via 10.119.254.240, 0:02:22, Ethernet2
E 10.65.129.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.10.0.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.75.139.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2
E 10.16.208.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.84.148.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2
E 10.31.223.0 [200/128] via 10.119.254.244, 0:02:22, Ethernet2
E 10.44.236.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2
E 10.141.0.0 [200/129] via 10.119.254.240, 0:02:22, Ethernet2
E 10.140.0.0 [200/129] via 10.119.254.240, 0:02:23, Ethernet2

```

The following sample output from the **show ip route** command includes routes learned from IS-IS Level 2:

Device# **show ip route**

```

Codes: R - RIP derived, O - OSPF derived,
C - connected, S - static, B - BGP derived,
* - candidate default route, IA - OSPF inter area route,
i - IS-IS derived, ia - IS-IS, U - per-user static route,
o - on-demand routing, M - mobile, P - periodic downloaded static route,
D - EIGRP, EX - EIGRP external, E1 - OSPF external type 1 route,
E2 - OSPF external type 2 route, N1 - OSPF NSSA external type 1 route,
N2 - OSPF NSSA external type 2 route
Gateway of last resort is not set
10.89.0.0 is subnetted (mask is 255.255.255.0), 3 subnets
C 10.89.64.0 255.255.255.0 is possibly down,
routing via 10.0.0.0, Ethernet0
i L2 10.89.67.0 [115/20] via 10.89.64.240, 0:00:12, Ethernet0
i L2 10.89.66.0 [115/20] via 10.89.64.240, 0:00:12, Ethernet0

```

The following is sample output from the **show ip route ip-address mask longer-prefixes** command. When this keyword is included, the address-mask pair becomes the prefix, and any address that matches that prefix is displayed. Therefore, multiple addresses are displayed. The logical AND operation is performed on the source address 10.0.0.0 and the mask 10.0.0.0, resulting in 10.0.0.0. Each destination in the routing table is also logically ANDed with the mask and compared with 10.0.0.0. Any destinations that fall into that range are displayed in the output.

Device# **show ip route 10.0.0.0 10.0.0.0 longer-prefixes**

```

Codes: R - RIP derived, O - OSPF derived,
C - connected, S - static, B - BGP derived,
* - candidate default route, IA - OSPF inter area route,
i - IS-IS derived, ia - IS-IS, U - per-user static route,
o - on-demand routing, M - mobile, P - periodic downloaded static route,
D - EIGRP, EX - EIGRP external, E1 - OSPF external type 1 route,
E2 - OSPF external type 2 route, N1 - OSPF NSSA external type 1 route,
N2 - OSPF NSSA external type 2 route
Gateway of last resort is not set

S 10.134.0.0 is directly connected, Ethernet0
S 10.10.0.0 is directly connected, Ethernet0
S 10.129.0.0 is directly connected, Ethernet0
S 10.128.0.0 is directly connected, Ethernet0
S 10.49.246.0 is directly connected, Ethernet0
S 10.160.97.0 is directly connected, Ethernet0
S 10.153.88.0 is directly connected, Ethernet0
S 10.76.141.0 is directly connected, Ethernet0
S 10.75.138.0 is directly connected, Ethernet0
S 10.44.237.0 is directly connected, Ethernet0
S 10.31.222.0 is directly connected, Ethernet0
S 10.16.209.0 is directly connected, Ethernet0
S 10.145.0.0 is directly connected, Ethernet0

```

```

S    10.141.0.0 is directly connected, Ethernet0
S    10.138.0.0 is directly connected, Ethernet0
S    10.128.0.0 is directly connected, Ethernet0
    10.19.0.0 255.255.255.0 is subnetted, 1 subnets
C    10.19.64.0 is directly connected, Ethernet0
    10.69.0.0 is variably subnetted, 2 subnets, 2 masks
C    10.69.232.32 255.255.255.240 is directly connected, Ethernet0
S    10.69.0.0 255.255.0.0 is directly connected, Ethernet0

```

The following sample outputs from the **show ip route** command display all downloaded static routes. A “p” indicates that these routes were installed using the AAA route download function.

Device# **show ip route**

```

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * - candidate default
       U - per-user static route, o - ODR, P - periodic downloaded static route
       T - traffic engineered route

```

Gateway of last resort is 172.16.17.1 to network 10.0.0.0

```

    172.31.0.0/32 is subnetted, 1 subnets
P    172.31.229.41 is directly connected, Dialer1 10.0.0.0/8 is subnetted, 3 subnets
P    10.1.1.0 [200/0] via 172.31.229.41, Dialer1
P    10.1.3.0 [200/0] via 172.31.229.41, Dialer1
P    10.1.2.0 [200/0] via 172.31.229.41, Dialer1

```

Device# **show ip route static**

```

    172.16.4.0/8 is variably subnetted, 2 subnets, 2 masks
P    172.16.1.1/32 is directly connected, BRI0
P    172.16.4.0/8 [1/0] via 10.1.1.1, BRI0
S    172.31.0.0/16 [1/0] via 172.16.114.65, Ethernet0
S    10.0.0.0/8 is directly connected, BRI0
P    10.0.0.0/8 is directly connected, BRI0
    172.16.0.0/16 is variably subnetted, 5 subnets, 2 masks
S    172.16.114.201/32 is directly connected, BRI0
S    172.16.114.205/32 is directly connected, BRI0
S    172.16.114.174/32 is directly connected, BRI0
S    172.16.114.12/32 is directly connected, BRI0
P    10.0.0.0/8 is directly connected, BRI0
P    10.1.0.0/16 is directly connected, BRI0
P    10.2.2.0/24 is directly connected, BRI0
S*   0.0.0.0/0 [1/0] via 172.16.114.65, Ethernet0
S    172.16.0.0/16 [1/0] via 172.16.114.65, Ethernet0

```

The following sample output from the **show ip route static download** command displays all active and inactive routes installed using the AAA route download function:

Device# **show ip route static download**

Connectivity: A - Active, I - Inactive

```

A    10.10.0.0 255.0.0.0 BRI0
A    10.11.0.0 255.0.0.0 BRI0
A    10.12.0.0 255.0.0.0 BRI0
A    10.13.0.0 255.0.0.0 BRI0
I    10.20.0.0 255.0.0.0 172.21.1.1
I    10.22.0.0 255.0.0.0 Serial0
I    10.30.0.0 255.0.0.0 Serial0
I    10.31.0.0 255.0.0.0 Serial1
I    10.32.0.0 255.0.0.0 Serial1
A    10.34.0.0 255.0.0.0 192.168.1.1
A    10.36.1.1 255.255.255.255 BRI0 200 name remotel
I    10.38.1.9 255.255.255.0 192.168.69.1

```

The following sample outputs from the **show ip route nhrp** command display shortcut switching on the tunnel interface:

Device# **show ip route**

```
Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
Gateway of last resort is not set
10.0.0.0/16 is variably subnetted, 3 subnets, 2 masks
C       10.1.1.0/24 is directly connected, Tunnel0
C       172.16.22.0 is directly connected, Ethernet1/0
H       172.16.99.0 [250/1] via 10.1.1.99, 00:11:43, Tunnel0
       10.11.0.0/24 is subnetted, 1 subnets
C       10.11.11.0 is directly connected, Ethernet0/0
```

Device# **show ip route nhrp**

```
H       172.16.99.0 [250/1] via 10.1.1.99, 00:11:43, Tunnel0
```

The following are sample outputs from the **show ip route** command when the **next-hop-override** keyword is used. When this keyword is included, the NHRP next-hop overrides that are associated with a particular route and the corresponding default next hops are displayed.

```
=====
1) Initial configuration
=====
```

Device# **show ip route**

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route
Gateway of last resort is not set
10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
       10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
       10.11.0.0/24 is subnetted, 1 subnets
S       10.11.11.0 is directly connected, Ethernet0/0
```

Device# **show ip route next-hop-override**

```
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route
Gateway of last resort is not set
10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
       10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
       10.11.0.0/24 is subnetted, 1 subnets
```

S 10.11.11.0 is directly connected, Ethernet0/0

Device# **show ip cef**

Prefix	Next Hop	Interface
.		
.		
.		
10.2.1.255/32	receive	Loopback1
10.10.10.0/24	attached	Tunnel0 <<<<<<<
10.11.11.0/24	attached	Ethernet0/0
172.16.0.0/12	drop	

2) Add a next-hop override

address = 10.10.10.0
mask = 255.255.255.0
gateway = 10.1.1.1
interface = Tunnel0

Device# **show ip route**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP
+ - replicated route

Gateway of last resort is not set

10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 10.2.1.0/24 is directly connected, Loopback1
L 10.2.1.1/32 is directly connected, Loopback1
10.0.0.0/24 is subnetted, 1 subnets

S 10.10.10.0 is directly connected, Tunnel0
10.11.0.0/24 is subnetted, 1 subnets
S 10.11.11.0 is directly connected, Ethernet0/0

Device# **show ip route next-hop-override**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
ia - IS-IS inter area, * - candidate default, U - per-user static route
o - ODR, P - periodic downloaded static route, H - NHRP
+ - replicated route

Gateway of last resort is not set

10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 10.2.1.0/24 is directly connected, Loopback1
L 10.2.1.1/32 is directly connected, Loopback1
10.0.0.0/24 is subnetted, 1 subnets

S 10.10.10.0 is directly connected, Tunnel0
[NHO][1/0] via 10.1.1.1, Tunnel0
10.11.0.0/24 is subnetted, 1 subnets
S 10.11.11.0 is directly connected, Ethernet0/0

Device# **show ip cef**

Prefix	Next Hop	Interface
.		
.		
.		
10.2.1.255/32	receive	Loopback1
10.10.10.0/24		

```

10.10.10.0/24      10.1.1.1      Tunnel0
10.11.11.0/24      attached      Ethernet0/0
10.12.0.0/16 drop
.
.
.

```

```

=====
3) Delete a next-hop override
   address = 10.10.10.0
   mask = 255.255.255.0
   gateway = 10.11.1.1
   interface = Tunnel0
=====

```

Device# **show ip route**

```

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route

```

```

Gateway of last resort is not set
  10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
  10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
  10.11.0.0/24 is subnetted, 1 subnets
S       10.11.11.0 is directly connected, Ethernet0/0

```

Device# **show ip route next-hop-override**

```

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route, H - NHRP
       + - replicated route

```

```

Gateway of last resort is not set
  10.2.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       10.2.1.0/24 is directly connected, Loopback1
L       10.2.1.1/32 is directly connected, Loopback1
  10.0.0.0/24 is subnetted, 1 subnets
S       10.10.10.0 is directly connected, Tunnel0
  10.11.0.0/24 is subnetted, 1 subnets
S       10.11.11.0 is directly connected, Ethernet0/0

```

Device# **show ip cef**

Prefix	Next Hop	Interface
.		
.		
.		
10.2.1.255/32	receive	Loopback1
10.10.10.0/24	attached	Tunnel0
10.11.11.0/24	attached	Ethernet0/0
10.120.0.0/16 drop		
.		
.		
.		

The table below describes the significant fields shown in the displays:

Table 18: show ip route Field Descriptions

Field	Description
Codes (Protocol)	<p>Indicates the protocol that derived the route. It can be one of the following values:</p> <ul style="list-style-type: none"> • B—BGP derived • C—Connected • D—Enhanced Interior Gateway Routing Protocol (EIGRP) • EX—EIGRP external • H—NHRP • i—IS-IS derived • ia—IS-IS • L—Local • M—Mobile • o—On-demand routing • O—Open Shortest Path First (OSPF) derived • P—Periodic downloaded static route • R—Routing Information Protocol (RIP) derived • S—Static • U—Per-user static route • +—Replicated route
Codes (Type)	<p>Type of route. It can be one of the following values:</p> <ul style="list-style-type: none"> • *—Indicates the last path used when a packet was forwarded. This information is specific to nonfast-switched packets. • E1—OSPF external type 1 route • E2—OSPF external type 2 route • IA—OSPF interarea route • L1—IS-IS Level 1 route • L2—IS-IS Level 2 route • N1—OSPF not-so-stubby area (NSSA) external type 1 route • N2—OSPF NSSA external type 2 route

Field	Description
10.110.0.0	Indicates the address of the remote network.
[160/5]	The first number in brackets is the administrative distance of the information source; the second number is the metric for the route.
via 10.119.254.6	Specifies the address of the next device to the remote network.
0:01:00	Specifies the last time the route was updated (in hours:minutes:seconds).
Ethernet2	Specifies the interface through which the specified network can be reached.

Examples

The following is sample output from the **show ip route** command when an IP address is specified:

```
Device# show ip route 10.0.0.1
Routing entry for 10.0.0.1/32
  Known via "isis", distance 115, metric 20, type level-1
  Redistributing via isis
  Last update from 10.191.255.251 on Fddi1/0, 00:00:13 ago
  Routing Descriptor Blocks:
    * 10.22.22.2, from 10.191.255.247, via Serial2/3
      Route metric is 20, traffic share count is 1
    10.191.255.251, from 10.191.255.247, via Fddi1/0
      Route metric is 20, traffic share count is 1
```

When an IS-IS router advertises its link-state information, the router includes one of its IP addresses to be used as the originator IP address. When other routers calculate IP routes, they store the originator IP address with each route in the routing table.

The preceding example shows the output from the **show ip route** command for an IP route generated by IS-IS. Each path that is shown under the Routing Descriptor Blocks report displays two IP addresses. The first address (10.22.22.2) is the next-hop address. The second is the originator IP address from the advertising IS-IS router. This address helps you determine the origin of a particular IP route in your network. In the preceding example, the route to 10.0.0.1/32 was originated by a device with IP address 10.191.255.247.

The table below describes the significant fields shown in the display.

Table 19: show ip route with IP Address Field Descriptions

Field	Description
Routing entry for 10.0.0.1/32	Network number and mask.
Known via...	Indicates how the route was derived.
Redistributing via...	Indicates the redistribution protocol.

Field	Description
Last update from 10.191.255.251	Indicates the IP address of the router that is the next hop to the remote network and the interface on which the last update arrived.
Routing Descriptor Blocks	Displays the next-hop IP address followed by the information source.
Route metric	This value is the best metric for this Routing Descriptor Block.
traffic share count	Indicates the number of packets transmitted over various routes.

The following sample output from the **show ip route** command displays the tag applied to the route 10.22.0.0/16. You must specify an IP prefix to see the tag value. The fields in the display are self-explanatory.

```
Device# show ip route 10.22.0.0
Routing entry for 10.22.0.0/16
  Known via "isis", distance 115, metric 12
  Tag 120, type level-1
  Redistributing via isis
  Last update from 172.19.170.12 on Ethernet2, 01:29:13 ago
  Routing Descriptor Blocks:
    * 172.19.170.12, from 10.3.3.3, via Ethernet2
      Route metric is 12, traffic share count is 1
      Route tag 120
```

Examples

The following example shows that IP route 10.8.8.0 is directly connected to the Internet and is the next-hop (option 3) default gateway. Routes 10.1.1.1 [1/0], 10.3.2.1 [24/0], and 172.16.2.2 [1/0] are static, and route 10.0.0.0/0 is a default route candidate. The fields in the display are self-explanatory.

```
Device# show ip route

Codes: C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2
       i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
       ia - IS-IS inter area, * - candidate default, U - per-user static route
       o - ODR, P - periodic downloaded static route
Gateway of last resort is 10.0.19.14 to network 0.0.0.0
10.0.0.0/24 is subnetted, 1 subnets
C 10.8.8.0 is directly connected, Ethernet1
  10.0.0.0/32 is subnetted, 1 subnets
S 10.1.1.1 [1/0] via 10.8.8.1
  10.0.0.0/32 is subnetted, 1 subnets
S 10.3.2.1 [24/0] via 10.8.8.1
  172.16.0.0/32 is subnetted, 1 subnets
S 172.16.2.2 [1/0] via 10.8.8.1
  10.0.0.0/28 is subnetted, 1 subnets
C 10.0.19.0 is directly connected, Ethernet0
  10.0.0.0/24 is subnetted, 1 subnets
C 10.15.15.0 is directly connected, Loopback0
S* 10.0.0.0/0 [1/0] via 10.0.19.14
```

The following sample output from the **show ip route repair-paths** command shows repair paths marked with the tag [RPR]. The fields in the display are self-explanatory:

Device# **show ip route repair-paths**

Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
 D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
 E1 - OSPF external type 1, E2 - OSPF external type 2
 i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2
 ia - IS-IS inter area, * - candidate default, U - per-user static route
 o - ODR, P - periodic downloaded static route, H - NHRP
 + - replicated route, % - next hop override

Gateway of last resort is not set

```

      10.0.0.0/32 is subnetted, 3 subnets
C       10.1.1.1 is directly connected, Loopback0
B       10.2.2.2 [200/0] via 172.16.1.2, 00:31:07
          [RPR][200/0] via 192.168.1.2, 00:31:07
B       10.9.9.9 [20/0] via 192.168.1.2, 00:29:45
          [RPR][20/0] via 192.168.3.2, 00:29:45
      172.16.0.0/16 is variably subnetted, 2 subnets, 2 masks
C       172.16.1.0/24 is directly connected, Ethernet0/0
L       172.16.1.1/32 is directly connected, Ethernet0/0
      192.168.1.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.168.1.0/24 is directly connected, Serial2/0
L       192.168.1.1/32 is directly connected, Serial2/0
B       192.168.3.0/24 [200/0] via 172.16.1.2, 00:31:07
          [RPR][200/0] via 192.168.1.2, 00:31:07
B       192.168.9.0/24 [20/0] via 192.168.1.2, 00:29:45
          [RPR][20/0] via 192.168.3.2, 00:29:45
B       192.168.13.0/24 [20/0] via 192.168.1.2, 00:29:45
          [RPR][20/0] via 192.168.3.2, 00:29:45

```

Device# **show ip route repair-paths 10.9.9.9**

```

>Routing entry for 10.9.9.9/32
>  Known via "bgp 100", distance 20, metric 0
>  Tag 10, type external
>  Last update from 192.168.1.2 00:44:52 ago
>  Routing Descriptor Blocks:
>    * 192.168.1.2, from 192.168.1.2, 00:44:52 ago, recursive-via-conn
>      Route metric is 0, traffic share count is 1
>      AS Hops 2
>      Route tag 10
>      MPLS label: none
>    [RPR]192.168.3.2, from 172.16.1.2, 00:44:52 ago
>      Route metric is 0, traffic share count is 1
>      AS Hops 2
>      Route tag 10
>      MPLS label: none

```

Related Commands

Command	Description
show interfaces tunnel	Displays tunnel interface information.
show ip route summary	Displays the current state of the routing table in summary format.

template peer-session

To create a peer session template and enter session-template configuration mode, use the **template peer-session** command in router configuration mode. To remove a peer session template, use the **no** form of this command.

template peer-session *session-template-name*

no template peer-session *session-template-name*

Syntax Description

<i>session-template-name</i>	Name or tag for the peer session template.
------------------------------	--

Command Default

Removing a peer session template by using the **no** form of this command removes all session command configurations inside of the template.

Command Modes

Address family configuration

Router configuration

Command History

Release	Modification
12.0(24)S	This command was introduced.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.3(4)T	This command was integrated into Cisco IOS Release 12.3(4)T.
12.2(27)SBC	This command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.

Usage Guidelines

Peer session templates are used to group and apply the configuration of general session commands to groups of neighbors that share common session configuration elements. General session commands that are common for neighbors that are configured in different address families can be configured within the same peer session template. Peer session templates are created and configured in peer session configuration mode. Only general session commands can be configured in a peer session template. The following general session commands are supported by peer session templates:

- **description**
- **disable-connected-check**
- **ebgp-multihop**

- **exit peer-session**
- **inherit peer-session**
- **local-as**
- **password**
- **remote-as**
- **shutdown**
- **timers**
- **translate-update**
- **update-source**
- **version**

General session commands can be configured once in a peer session template and then applied to many neighbors through the direct application of a peer session template or through indirect inheritance from a peer session template. The configuration of peer session templates simplify the configuration of general session commands that are commonly applied to all neighbors within an autonomous system.

Peer session templates support direct and indirect inheritance. A peer can be configured with only one peer session template at a time, and that peer session template can contain only one indirectly inherited peer session template. However, each inherited session template can also contain one indirectly inherited peer session template. So, only one directly applied peer session template and up to seven additional indirectly inherited peer session templates can be applied, allowing you to apply up to a maximum of eight peer session configurations to a neighbor: the configuration from the directly inherited peer session template and the configurations from up to seven indirectly inherited peer session templates. Inherited peer session templates are evaluated first, and the directly applied template will be evaluated and applied last. So, if a general session command is reapplied with a different value, the subsequent value will have priority and overwrite the previous value that was configured in the indirectly inherited template.

Peer session templates support only general session commands. BGP policy configuration commands that are configured only for specific address families or NLRI configuration modes are configured with peer policy templates.

**Note**

A BGP neighbor cannot be configured to work with both peer groups and peer templates. A BGP neighbor can be configured only to belong to a peer group or to inherit policies from peer templates.

Examples

The following example creates a peer session template named CORE1. This example inherits the configuration of the peer session template named INTERNAL-BGP.

```
Router(config-router)# template peer-session CORE1
Router(config-router-stmp)# description CORE-123
Router(config-router-stmp)# update-source loopback 1
Router(config-router-stmp)# inherit peer-session INTERNAL-BGP
Router(config-router-stmp)# exit-peer-session
Router(config-router)#
```

Related Commands

Command	Description
description	Configures a description to be displayed by the local or a peer router.
disable-connected-check	Disables connection verification for eBGP peers no more than one hop away when the eBGP peer is configured with a loopback interface.
ebgp-multihop	Accepts or initiates BGP connections to external peers residing on networks that are not directly connected.
exit peer-session	Exits session-template configuration mode and enters router configuration mode.
inherit peer-session	Configures a peer session template to inherit the configuration from another peer session template.
local-as	Allows the customization of the autonomous system number for eBGP peer groupings.
neighbor inherit peer-session	Configures a router to send a peer session template to a neighbor so that the neighbor can inherit the configuration.
neighbor translate-update	Upgrades a router running BGP in the NLRI format to support multiprotocol BGP.
password	Enables MD5 authentication on a TCP connection between two BGP peers.
remote-as	Adds an entry to the BGP or multiprotocol BGP neighbor table.
show ip bgp template peer-policy	Displays locally configured peer policy templates.
show ip bgp template peer-session	Displays locally configured peer session templates.
shutdown	Disables a neighbor or peer group.
timers bgp	Adjusts BGP network timers.
update-source	Specifies that the Cisco IOS software allow internal BGP sessions to use any operational interface for TCP connections.
version	Configures the Cisco IOS software to accept only a particular BGP version.

timers bgp

To adjust BGP network timers, use the **timers bgp** command in router configuration mode. To reset the BGP timing defaults, use the **no** form of this command.

timers bgp *keepalive holdtime* [*min-holdtime*]

no timers bgp

Syntax Description

<i>keepalive</i>	Frequency (in seconds) with which the Cisco IOS software sends <i>keepalive</i> messages to its peer. The default is 60 seconds. The range is from 0 to 65535.
<i>holdtime</i>	Interval (in seconds) after not receiving a <i>keepalive</i> message that the software declares a peer dead. The default is 180 seconds. The range is from 0 to 65535.
<i>min-holdtime</i>	(Optional) Interval (in seconds) specifying the minimum acceptable hold-time from a BGP neighbor. The minimum acceptable hold-time must be less than, or equal to, the interval specified in the <i>holdtime</i> argument. The range is from 0 to 65535.

Command Default

keepalive : 60 seconds *holdtime*: 180 seconds

Command Modes

Router configuration

Command History

Release	Modification
10.0	This command was introduced.
12.0(26)S	The <i>min-holdtime</i> argument was added.
12.3(7)T	The <i>min-holdtime</i> argument was added.
12.2(22)S	The <i>min-holdtime</i> argument was added.
12.2(27)SBC	The <i>min-holdtime</i> argument was added and this command was integrated into Cisco IOS Release 12.2(27)SBC.
12.2(33)SRA	The <i>min-holdtime</i> argument was added and this command was integrated into Cisco IOS Release 12.2(33)SRA.

Release	Modification
12.2(33)SXH	The <i>min-holdtime</i> argument was added and this command was integrated into Cisco IOS Release 12.2(33)SXH.

Usage Guidelines

When configuring the *holdtime* argument for a value of less than twenty seconds, the following warning is displayed:

```
% Warning: A hold time of less than 20 seconds increases the chances of peer flapping
If the minimum acceptable hold-time interval is greater than the specified hold-time, a notification is displayed:
```

```
% Minimum acceptable hold time should be less than or equal to the configured hold time
```



Note

When the minimum acceptable hold-time is configured on a BGP router, a remote BGP peer session is established only if the remote peer is advertising a hold-time that is equal to, or greater than, the minimum acceptable hold-time interval. If the minimum acceptable hold-time interval is greater than the configured hold-time, the next time the remote session tries to establish, it will fail and the local router will send a notification stating “unacceptable hold time.”

Examples

The following example changes the keepalive timer to 70 seconds, the hold-time timer to 130 seconds, and the minimum acceptable hold-time interval to 100 seconds:

```
router bgp 45000
 timers bgp 70 130 100
```

Related Commands

Command	Description
clear ip bgp peer-group	Removes all the members of a BGP peer group.
router bgp	Configures the BGP routing process.
show ip bgp	Displays entries in the BGP routing table.