BGP Commands

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.

address-family ipv4 [**unicast**] [**vrf** *vrf-name*]
no address-family ipv4 [**unicast**] [**vrf** *vrf-name*]

Syntax Description

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)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `address-family ipv4` (BGP) command.

Examples

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

```
router bgp 50000
 address-family ipv4
```

The following example places the device in address family configuration mode, specifies unicast address prefixes for the IPv4 address family, and specifies 1 as the VRF instance to associate with subsequent address family configuration mode commands:

```
router bgp 64496
 address-family ipv4 unicast vrf 1
```

address-family ipv6

To enter address family configuration mode for configuring routing sessions, such as BGP, that use standard IPv6 address prefixes, use the **address-family ipv6** command in router configuration mode. To disable address family configuration mode, use the **no** form of this command.

address-family ipv6 [**vrf** *vrf-name*] [**unicast**]
no address-family ipv6 [**unicast**] [**vrf** *vrf-name*]

Syntax Description

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

IPv6 address prefixes are not enabled. Unicast address prefixes are the default when IPv6 address prefixes are configured.

Note Routing information for address family IPv4 is advertised by default for each BGP routing session configured with the **neighbor remote-as** command unless you 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
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `address-family ipv6` command.

Examples

The following example places the router in address family configuration mode and specifies unicast address prefixes for the IPv6 address family:

```
Router(config)# router bgp 100
Router(config-router)# address-family ipv6 unicast
Router(config-router-af)#
```

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**] [**summary-only**]
no aggregate-address *address mask* [**as-set**] [**summary-only**]

Syntax Description

address	Aggregate address.
mask	Aggregate mask.
as-set	(Optional) Generates autonomous system set path information.
summary-only	(Optional) Filters all more-specific routes from updates.

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)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `aggregate-address` command.

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. Because the **summary-only** keyword is configured, more-specific routes are filtered from updates.

```
router bgp 50000
 aggregate-address 192.168.51.0 255.255.255.0 as-set summary-only
```

bandwidth (policy-map class)

To specify or modify the bandwidth allocated for a class belonging to a policy map, or to enable ATM overhead accounting, use the **bandwidth** command in QoS policy-map class configuration mode. To remove the bandwidth specified for a class or disable ATM overhead accounting, use the **no** form of this command.

bandwidth [**remaining**] **percent** *percentage*
no bandwidth

Syntax Description

remaining	(Optional) Specifies that the percentage of guaranteed bandwidth is based on a relative percent of available bandwidth.
percent *percentage*	Specifies the percentage of guaranteed bandwidth based on an absolute percent of available bandwidth to be set aside for the priority class or on a relative percent of available bandwidth. The valid range is 1 to 100.

Command Default

No bandwidth is specified.

Command Modes

QoS policy-map class configuration (config-pmap-c)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

For usage guidelines, see the Cisco IOS XE `bandwidth (policy-map class)` command.

Examples

The following example shows how to create two policy maps called “PMap” and "generic-cos" and configure two class policies in each policy map.

```
policy-map PMap
 class PMap-super-fast
  priority level 1
  police percent 5
 !
 class PMap-fast
  priority level 2
  police percent 5
 !
!
policy-map generic-cos
 class cos-map-generic
  bandwidth remaining percent 5
  queue-limit 108 packets
 !
 class class-default
  bandwidth remaining percent 95
  queue-limit 2028 packets
 !
!
```

bgp always-compare-med

To enable the comparison of the Multi Exit Discriminator (MED) for paths from neighbors in different autonomous systems, use the **bgp always-compare-med** command in router configuration mode. To disallow the comparison, use the **no** form of this command.

bgp always-compare-med
no bgp always-compare-med

Syntax Description

This command has no arguments or keywords.

Command Default

The software does not compare the MED for paths from neighbors in different autonomous systems if this command is not enabled or if the **no** form of this command is entered. The MED is compared only if the autonomous system path for the compared routes is identical.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `bgp always-compare-med` command.

Examples

In the following example, the local BGP routing process is configured to compare the MED from alternative paths, regardless of the autonomous system from which the paths are received:

```
router bgp 1
 bgp always-compare-med
```

bgp bestpath as-path multipath-relax

To configure a Border Gateway Protocol (BGP) routing process to consider the different autonomous system (AS) paths and load balance multiple paths during best path route selection, use the **bgp bestpath as-path multipath-relax** command in router BGP configuration mode. To return the BGP routing process to the default operation, use the **no** form of this command.

bgp bestpath as-path multipath-relax

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Router BGP configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Qualified for use in Cisco vManage CLI templates.

Usage Guidelines

When BGP multi-pathing is enabled, BGP load-balances user traffic within a single autonomous system (AS). The criteria are that all attributes must match (weight, AS path, etc). However, when a device is multi-homed to multiple autonomous systems, BGP cannot load balance traffic between them by default.

In order to enable load-balancing of traffic among the multi-homed autonomous systems, the bgp bestpath as-path multipath-relax command needs to be enabled. The criteria required for this is that the AS-path length should be equal.

Before you use this command, ensure that BGP is enabled.

This command can be used to configure a Border Gateway Protocol (BGP) routing process to consider the different autonomous system (AS) paths and load balance multiple paths during best path route selection.

Example

The following example shows how to configure Border Gateway Protocol (BGP) routing process 65001 to consider the different autonomous system (AS) paths and load balance multiple paths during best path route selection.

```
Router(config)# router bgp 65001
Router(config-router)# bgp bestpath as-path multipath-relax
```

bgp bestpath compare-routerid

To configure a Border Gateway Protocol (BGP) routing process to compare identical routes received from different external peers during the best path selection process and to select the route with the lowest router ID as the best path, use the **bgp bestpath compare-routerid** command in router configuration mode. To return the BGP routing process to the default operation, use the **no** form of this command.

bgp bestpath compare-routerid
no bgp bestpath compare-routerid

Syntax Description

This command has no arguments or keywords.

Command Default

The behavior of this command is disabled by default; BGP selects the route that was received first when two routes with identical attributes are received.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

The **bgp bestpath compare-routerid** command is used to configure a BGP routing process to use the router ID as the tie breaker for best path selection when two identical routes are received from two different peers (all the attributes are the same except for the router ID). When this command is enabled, the lowest router ID will be selected as the best path when all other attributes are equal.

Examples

In the following example, the BGP routing process is configured to compare and use the router ID as a tie breaker for best path selection when identical paths are received from different peers:

```
router bgp 50000
 bgp bestpath compare-routerid
```

bgp bestpath med missing-as-worst

To configure a Border Gateway Protocol (BGP) routing process to assign a value of infinity to routes that are missing the Multi Exit Discriminator (MED) attribute (making the path without a MED value the least desirable path), use the **bgp bestpath med missing-as-worst** command in router configuration mode. To return the router to the default behavior (assign a value of 0 to the missing MED), use the **no** form of this command.

bgp bestpath med missing-as-worst
no bgp bestpath med missing-as-worst

Syntax Description

This command has no arguments or keywords.

Command Default

The software assigns a value of 0 to routes the are missing the MED attribute, causing the route with the missing MED attribute to be considered the best path.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Examples

In the following example, the BGP router process is configured to consider a route with a missing MED attribute as having a value of infinity (4294967294), making this path the least desirable path:

```
router bgp 50000
 bgp bestpath med missing-as-worst
```

bgp deterministic-med

To enforce the deterministic comparison of the Multi Exit Discriminator (MED) value between all paths received from within the same autonomous system, use the **bgp deterministic-med** command in router configuration mode. To disable the required MED comparison, use the **no** form of this command.

bgp deterministic-med
no bgp deterministic-med

Syntax Description

This command has no arguments or keywords.

Command Default

The software does not enforce the deterministic comparison of the MED variable between all paths received from the same autonomous system.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Examples

In the following example, BGP is configured to compare the MED during path selection for routes advertised by the same subautonomous system within a confederation:

```
outer bgp 50000
 bgp deterministic-med
```

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
no bgp graceful-restart

Command Default

By default, the restart time is set to 120 seconds and the stalepath time to 360 seconds.

Command Modes

Address-family configuration (config-router-af)

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `bgp graceful-restart` command.

Examples

In the following example, the BGP graceful restart capability is enabled for AS number 64496 and disabled for the neighbor:

```
router bgp 64496
 neighbor 10.0.0.1 remote-as 64496
 bgp graceful-restart
 neighbor 10.0.0.1 ha-mode graceful-restart disable
```

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
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `bgp log-neighbor-changes` command.

Examples

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

```
bgp router 40000
 bgp log-neighbor-changes
```

bandwidth remaining ratio

To specify a bandwidth-remaining ratio for class-level or subinterface-level queues to be used during congestion to determine the amount of excess bandwidth (unused by priority traffic) to allocate to nonpriority queues, use the **bandwidth remaining ratio** command in policy-map class configuration mode. To remove the bandwidth remaining ratio, use the **no** form of this command.

bandwidth remaining ratio *ratio*
no bandwidth remaining ratio *ratio*

Syntax Description

ratio	Relative weight of this subinterface or class queue with respect to other subinterfaces or class queues. Valid values are from 1 to 1000. At the subinterface level, the default value is platform dependent. At the class queue level, the default is 1.
ratio	Relative weight of this subinterface or class queue with respect to other subinterfaces or class queues.

Command Default

The default bandwidth ratio is 1.

Command Modes

Policy-map class (config-pmap-c)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `bandwidth remaining ratio` command.

Examples

```
class Queue1
   bandwidth remaining ratio 20
   random-detect precedence-based
  !
```

class (policy-map)

To specify the name of the class whose policy you want to create or change or to specify the default class (commonly known as the class-default class) before you configure its policy, use the **class**command in policy-map configuration mode. To remove a class from the policy map, use the **no** form of this command.

class { *class-name* | **class-default** }
no class { *class-name* | **class-default** }

Syntax Description

class-name	Name of the class to be configured or whose policy is to be modified. The class name is used for both the class map and to configure a policy for the class in the policy map.
class-default	Specifies the default class so that you can configure or modify its policy.

Command Default

No class is specified.

Command Modes

Policy-map configuration (config-pmap)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `class (policy-map)` command.

Examples

The following example shows how to create two policy maps called “PMap” and "generic-cos" and configure two class policies in each policy map.

```
policy-map PMap
 class PMap-super-fast
  priority level 1
  police percent 5
 !
 class PMap-fast
  priority level 2
  police percent 5
 !
!
policy-map generic-cos
 class cos-map-generic
  bandwidth remaining percent 5
  queue-limit 108 packets
 !
 class class-default
  bandwidth remaining percent 95
```

```
  queue-limit 2028 packets
 !
!
```

distance bgp

To configure the administrative distance for BGP routes, use the **distance bgp** command in address family or router configuration mode. To return to the administrative distance to the default value, use the **no** form of this command.

distance bgp *external-distance internal-distance local-distance*
no distance bgp

Syntax Description

external-distance	Administrative distance for external BGP routes. Routes are external when learned from an external autonomous system. The range of values for this argument are from 1 to 255.
internal-distance	Administrative distance for internal BGP routes. Routes are internal when learned from peer in the local autonomous system. The range of values for this argument are from 1 to 255.
local-distance	Administrative distance for local BGP routes. Local routes are those networks listed with a **network** router configuration command, often as back doors, for the router or for the networks that is being redistributed from another process. The range of values for this argument are from 1 to 255.

Command Default

The following values are used if this command is not configured or if the no form is entered:

external-distance : 20 *internal-distance*: 200 *local-distance: 200*

Routes with a distance of 255 are not installed in the routing table.

Command Modes

Router configuration (config-router)

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.
Cisco IOS XE Catalyst SD-WAN Release 17.4.1a	Starting from this release, this command can be configured in address-family (non-VRF) configuration mode only. It is no longer supported under router configuration mode.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `distance bgp` command.

Examples

The following example is applicable to releases before Cisco IOS XE Catalyst SD-WAN Release 17.2.1v.

In this example, the external distance is set to 10, the internal distance is set to 50, and the local distance is set to 100:

```
router bgp 50000
  distance bgp 10 50 100
  address family ipv4
   network 10.108.0.0
   neighbor 192.168.6.6 remote-as 123
   neighbor 172.16.1.1 remote-as 47
```

The following example is applicable to Cisco IOS XE Catalyst SD-WAN Release 17.4.1a and later.

```
router bgp 50000
 address family ipv4
  network 10.108.0.0
  neighbor 192.168.6.6 remote-as 123
  neighbor 172.16.1.1 remote-as 47
  distance bgp 10 50 100
```

exit-address-family (bgp)

To exit the BGP address family configuration mode, use the **exit-address-family** command in BGP Address-family configuration mode. There is no **no** form of this command.

exit-address-family

Syntax Description

This command has no arguments or keywords.

Command Default

None

Command Modes

Address-family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

Cisco routers can use various IP routing protocols, such as Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), or Border Gateway Protocol (BGP) to learn routes dynamically. You can configure these routing protocols on your router by entering the router configuration mode and address family configuration mode. You can use this command to exit the BGP address family configuration mode.

Example

The following example shows exiting from the BGP address family configuration mode.

```
Router(config)# router bgp 65001
Router(config-router)# address-family ipv4
```

```
Router(config-router-af)# exit-address-family
```

maximum-paths eibgp

To enable multipath load sharing among external Border Gateway Protocol (eBGP) and internal BGP (iBGP) routes, use the **maximum-paths eibgp** command in address family configuration mode. To disable multipath load sharing for eBGP and iBGP routes, use the **no** form of this command.

maximum-paths eibgp *number-of-paths*
no maximum-paths eibgp *number-of-paths*

Syntax Description

number-of-paths	Number of routes to install into the routing table. See the "Usage Guidelines" section for the number of paths that can be configured with this argument.

Command Default

BGP, by default, will install only one best path in the routing table.

Command Modes

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `maximum-paths eibgp` command.

Examples

The following example shows how to configure this command on a non-VRF address family.

```
Device(config)# router bgp 64498
Device(config-router)# address-family ipv4 unicast
Device(config-router-af)# maximum-paths eibgp 4
```

neighbor advertise-map

To advertise the routes in the BGP table matching the configured route-map, use the **neighbor advertise-map** command in router configuration mode. To disable route advertisement, use the **no** form of this command.

neighbor { *ipv4-address* | *ipv6-address* } **advertise-map** *map-name* { **non-exist-map** *map-name* }
no neighbor { *ipv4-address* | *ipv6-address* } **advertise-map** *map-name* { **non-exist-map** *map-name* }

Syntax Description

ip-address	Specifies the IPv4 address of the router that should receive conditional advertisements.

ipv6-address	Specifies the IPv6 address of the router that should receive conditional advertisements.
advertise-map *map-name*	Specifies the name of the route map that will be advertised if the conditions of the exist map or non-exist map are met.
non-exist-map *map-name*	Specifies the name of the non-exist-map that is compared with the routes in the BGP table to determine whether the advertise-map route is advertised or not.

Command Default

No default behavior or values.

Command Modes

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor advertise-map` command.

Examples

The following address family configuration example configures BGP to conditionally advertise a prefix to the 10.1.1.1 neighbor using a non-exist 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 unicast
  neighbor 10.1.1.1 advertise-map MAP3 non-exist-map MAP4
```

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* **advertisement-interval** *seconds*
no neighbor *ip-address* **advertisement-interval** *seconds*

Syntax Description

ip-address	IP address of the neighbor.
seconds	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
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

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

Examples

The following router configuration mode example sets the minimum time between sending BGP routing updates to 600 seconds:

```
router bgp 5
 neighbor 10.0.0.1 advertisement-interval 600
```

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* **description** *text*
no neighbor *ip-address* **description** [*text*]

Syntax Description

ip-address	IP address of the neighbor.
text	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
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	This command was introduced.

Examples

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

```
router bgp 109
 neighbor 172.16.2.3 description peer with example.com
```

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* } **ebgp-multihop** [*ttl*]
no neighbor { *ip-address* | *ipv6-address* } **ebgp-multihop**

Syntax Description

ip-address	IP address of the BGP-speaking neighbor.
ipv6-address	IPv6 address of the BGP-speaking neighbor.
peer-group-name	Name of a BGP peer group.
ttl	(Optional) Time-to-live in the range from 1 to 255 hops. For Cisco IOS XE Catalyst SD-WAN Release 17.4.1a and later, the supported range is from 2 to 255. If you have configured the value of 1, you must modify the device CLI template or CLI Add-on feature template with supported values.

Command Default

Only directly connected neighbors are allowed.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	This command was introduced.
Cisco IOS XE Catalyst SD-WAN Release 17.4.1a	This command was modified. The supported time-to-live range for **ebgp-multihop** is now 2 to 255.

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 255
```

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* **ha-mode graceful-restart** [**disable**]
no neighbor *ip-address* **ha-mode graceful-restart** [**disable**]

Syntax Description

ip-address	IP address of the neighbor.
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
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor ha-mode graceful-restart` command.

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 neighbor 10.0.0.1.

```
router bgp 64496
 neighbor 10.0.0.1 remote-as 64496
 bgp graceful-restart
 neighbor 10.0.0.1 ha-mode graceful-restart disable
```

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*]
no neighbor *ip-address* **maximum-prefix** *maximum*

Syntax Description

ip-address	IP address of the neighbor.
maximum	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.
threshold	(Optional) Integer specifying at what percentage of the *maximum*-prefix 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 *restart-interval* argument.
restart-interval	(Optional) Time interval (in minutes) that a peering session is reestablished. The range is from 1 to 65535 minutes.

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

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor maximum-prefix (BGP)` command.

Examples

In the following example, the maximum number of prefixes that will be accepted from the 192.168.3.3 neighbor is set to 769434. The router is configured to display a warning when 100 percent of the prefixes is reached. The router is also configured to reestablish a disabled peering session after 65535 minutes.

```
router bgp 40000
 address-family ipv4 unicast
  neighbor 192.168.3.3 maximum-prefix 769434 100 restart 65535
```

neighbor next-hop-self

To configure a router as the next hop for a BGP-speaking neighbor or peer group, use the **neighbor next-hop-self** command in router configuration mode. To disable this feature, use the **no** form of this command.

neighbor *ip-address* **next-hop-self**

no neighbor *ip-address* **next-hop-self**

Syntax Description

ip-address	IP address of the BGP-speaking neighbor.

Command Default

This command is disabled by default.

Command Modes

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor next-hop-self` command.

Examples

The following example forces all updates destined for 10.108.1.1 to advertise this router as the next hop:

```
router bgp 109
 neighbor 10.108.1.1 next-hop-self
```

neighbor password

To enable message digest5 (MD5) authentication on a TCP connection between two BGP peers, use the **neighbor password** command in router configuration mode. To disable this function, use the **no** form of this command.

neighbor *ip-address* **password** [*type*] *string*
no neighbor *ip-address* **password**

Syntax Description

ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	Name of a BGP peer group.
type	(Optional) The type of password. You can only specify the following: • *0*: Unencrypted • *7*: Encrypted with MD5 Even though the CLI accepts other values only these value change the encryption of the password.
string	Case-sensitive password of up to 25 characters in length. The first character cannot be a number. The string can contain any alphanumeric characters, including spaces. You cannot specify a password in the format *number-space-anything*. The space after the number can cause authentication to fail.

Command Default

MD5 is not authenticated on a TCP connection between two BGP peers.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor password` command.

Examples

The following example configures MD5 authentication for the peering session with the 10.108.1.1 neighbor. The same password must be configured on the remote peer before the hold-down timer expires.

```
router bgp 109
 neighbor 10.108.1.1 password 7 00141215174C04140B1E1E
```

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* } **remote-as** *autonomous-system-number*
no neighbor { *ip-address* | *ipv6-address* } **remote-as** *autonomous-system-number*

Syntax Description

ip-address	IP address of the neighbor.
ipv6-address	IPv6 address of the neighbor.
autonomous-system-number	Number of an autonomous system to which the neighbor belongs in the range from 1 to 65535.

Command Default

There are no BGP or multiprotocol BGP neighbor peers.

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor remote-as` command.

Examples

The following example specifies that a router at the address 10.0.0.1 is an internal BGP (iBGP) neighbor in autonomous system number 64496:

```
router bgp 64496
 neighbor 10.0.0.1 remote-as 64496
 bgp graceful-restart
 neighbor 10.0.0.1 ha-mode graceful-restart disable
```

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

Syntax Description

ip-address	IP address of the neighbor.
ipv6-address	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.
map-name	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

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor route-map` command.

Examples

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

```
router bgp 5
address-family ipv4 unicast
 neighbor 172.16.70.24 route-map internal-map in
```

neighbor send-community

To specify that a communities attribute should be sent to a BGP neighbor, use the **neighbor send-community** command in address family or router configuration mode. To remove the entry, use the **no** form of this command.

neighbor { *ip-address* *ipv6-address* } **send-community** **both**
no **neighbor** *ip-address ipv6-address* **send-community**

Syntax Description

ip-address	IP address of the neighbor.
ipv6-address	IPv6 address of the neighbor.
both	(Optional) Specifies that both standard and extended communities will be sent.

Command Default

No communities attribute is sent to any neighbor.

Command Modes

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Examples

In the following address family configuration mode example, the router belongs to autonomous system 109 and is configured to send the communities attribute to its neighbor at IP address 172.16.70.23:

```
router bgp 109
 address-family ipv4 unicast
  neighbor 172.16.70.23 send-community both
```

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* **shutdown**
no **neighbor** *ip-address* **shutdown**

Syntax Description

ip-address	IP address of the neighbor.

Command Default

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

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor shutdown` command.

Examples

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

```
router bgp 123134
 neighbor 172.16.70.23 shutdown
```

neighbor timers

To set the timers for a specific BGP peer or peer group, use the **neighbor timers** command in address family or router configuration mode. To clear the timers for a specific BGP peer or peer group, use the **no** form of this command.

neighbor *ip-address* **timers** *keepalive holdtime*
no neighbor *ip-address* **timers**

Syntax Description

ip-address	(Optional) A BGP peer or peer group IP address.
keepalive	Frequency (in seconds) with which the Cisco IOS software sends *keepalive* messages to its peer. The default is 60 seconds.The range is from 0 to 65535.
holdtime	Interval (in seconds) after not receiving a *keepalive* message that the software declares a peer dead. The default is 180 seconds. The range is from 0 to 65535.

Command Default

keepalive : 60 seconds*holdtime*: 180 seconds

Command Modes

Router configuration (config-router)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `neighbor timers` command.

Examples

The following example changes the keepalive timer to 70 seconds and the hold-time timer to 210 seconds for the BGP peer 192.168.47.0:

```
router bgp 109
 neighbor 192.168.47.0 timers 70 210
```

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*] }
no network { *network-number* [**mask** *network-mask*] }

Syntax Description

network-number	Network that BGP will advertise.
mask *network-mask*	(Optional) Network or subnetwork mask with mask address.

Command Default

No networks are specified.

Command Modes

Address family configuration (config-router-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

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 192.168.51.0 with mask of 255.255.255.0 to be included in unicast BGP updates:

```
router bgp 64800
 address-family ipv4 unicast
  network 192.168.51.0 mask 255.255.255.0
```

police (percent)

To configure traffic policing on the basis of a percentage of bandwidth available on an interface, use the **police** command in policy-map class configuration mode. To remove traffic policing from the configuration, use the **no** form of this command.

police rate percent *percentage*
no police rate percent *percentage*

Syntax Description

rate	Specifies the information rate.
percent	Specifies that a percentage of bandwidth will be used for calculating the CIR.

percentage	The bandwidth percentage. Valid range is a number from 1 to 100.

Command Default

No traffic policing is configured.

Command Modes

Policy-map class configuration (config-pmap-c)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `police (percent)` command.

Examples

The following example shows how to configure traffic policing:

```
Policy-map PMap
 class PMap-super-fast
  priority level 1
  police rate percent 5
 class PMap-fast
  priority level 2
  police rate percent 5
 !
!
policy-map generic-cos
 class cos-map-generic
  bandwidth remaining percent 5
  queue-limit 108 packets
 class class-default
  bandwidth remaining percent 95
  queue-limit 2028 packets
```

policy-map

To enter policy-map configuration mode and create or modify a policy map that can be attached to one or more interfaces to specify a service policy, use the **policy-map**command in global configuration mode. To delete a policy map, use the **no** form of this command.

policy-map [**type inspect**] *policy-map-name*
no policy-map [**type inspect**] *policy-map-name*

Syntax Description

type inspect	(Optional) Specifies the policy-map type as inspect.
policy-map-name	Name of the policy map.

Command Default

The policy map is not configured.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Qualified for use in Cisco vManage CLI templates.
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command modified to support **type inspect**.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `policy-map` command.

Examples

The following example shows how to create two policy maps called “PMap” and "generic-cos" and configure two class policies in each policy map.

```
policy-map PMap
 class PMap-super-fast
  priority level 1
  police percent 5
 !
 class PMap-fast
  priority level 2
  police percent 5
 !
!
policy-map generic-cos
 class cos-map-generic
  bandwidth remaining percent 5
  queue-limit 108 packets
 !
 class class-default
  bandwidth remaining percent 95
  queue-limit 2028 packets
 !
!
```

priority level

To configure multiple priority queues, use the **priority level** command in policy-map class configuration mode. To remove a previously specified priority level for a class, use the **no** form of this command.

priority level *level*
no priority level *level*

Syntax Description

level	Defines multiple levels of a strict priority service model. When you enable a traffic class with a specific level of priority service, the implication is a single priority queue associated with all traffic that is enabled with the specified level of priority service. Valid values are from 1 (high priority) to 2 (low priority). Default is 1.

Command Default

The priority level has a default level of 1.

Command Modes

Policy-map class configuration (config-pmap-c)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `priority level` command.

Examples

The following example shows how to configure multi level priority queues. In the example, the traffic class named PMap-super-fast is given high priority (level 1), and the class named PMap-fast is given level 2 priority. To prevent PMap-fast traffic from becoming starved of bandwidth, PMap-super-fast traffic is policed at 5 percent of the available bandwidth.

```
Policy-map PMap
 class PMap-super-fast
  priority level 1
  police percent 5
 class PMap-fast
  priority level 2
  police percent 5
 !
!
```

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.

redistribute { **omp** | **static** | **connected** | **nat-route** }

no redistribute { **omp** | **static** | **connected** | **nat-route** }

Syntax Description

omp	The omp keyword specifies OMP as the source protocol from which routes are being redistributed.].
static	The **static** [**ip**] keyword is used to redistribute IP static routes.
connected	The **connected** keyword refers to routes that are established automatically by virtue of having enabled IP on an interface.
nat-route	The **nat-route** keyword redistributes NAT66 DIA routes into BGP protocol.

Command Default

Route redistribution is disabled.

Command Modes

Address family configuration (config-af)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.
Cisco IOS XE Catalyst SD-WAN Release 17.14.x	This command was modified. Added the **nat-route** keyword to redistribute NAT66 DIA routes into BGP protocol.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `redistribute` (IP) command.

Examples

The following example redistributes a NAT66 DIA route into BGP:

```
router bgp 15
bgp bestpath as-path multipath-relax
bgp log-neighbor-changes
bgp router-id 10.1.1.1
address-family ipv4 unicast vrf 1
 neighbor 10.2.2.2 remote-as 2
 neighbor 10.2.2.2 activate
 redistribute nat-route dia
 exit-address-family
!
address-family ipv6 unicast vrf 1
 bgp router-id 10.1.1.1
 neighbor 2001:a14:18::64 remote-as 2
 neighbor 2001:a14:18::64 activate
 redistribute nat-route
 exit-address-family
!
```

The following example redistributes a NAT66 DIA route into OSPFv3:

```
interface GigabitEthernet5
ospfv3 1 network point-to-point
ospfv3 1 ipv4 area 0
ospfv3 1 ipv6 area 0
router ospfv3 1
max-lsa 50000
router-id 10.1.1.1
address-family ipv4 unicast vrf 1
 log-adjacency-changes
 redistribute connected
 exit-address-family
!
address-family ipv6 unicast
 log-adjacency-changes
 redistribute connected
 redistribute nat-route
 redistribute maximum-prefix 10240
 exit-address-family
!
```

Examples

The following example redistributes routes for an IPv4 address family:

```
router bgp 64496
 address-family ipv4 unicast vrf 1
  redistribute omp
  redistribute static
```

```
  redistribute connected
  exit-address-family
```

The following example redistributes routes for an IPv6 address family:

```
Device(config)# router eigrp 1
Device(config-router)# address-family ipv6 unicast vrf 1 autonomous-system 3
Device(config-router-af)# topology base
Device(config-router-af-toplogy)# redistribute static route-map route-map1
```

redistribute omp (bgp)

To enable redistributing omp routes into BGP, use the **redistribute omp** command in BGP Address-family IP configuration mode. To disable redistributing omp routes into BGP, use the **no** form of this command.

redistribute omp { **route-map** *string* }

no redistribute omp { **route-map** *string* }

Syntax Description

None	Enable redistributing omp routes into BGP.
route-map*string*	(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.

Command Default

None

Command Modes

BGP Address-family IP configuration (config-router-af)

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

By default, routes from other routing protocols are not redistributed into BGP. It can be useful for BGP to learn OMP routes, because OMP learns routes to destinations throughout the overlay network.

This command can be used to enable redistributing omp routes into BGP.

Example

The following example shows how to enable redistributing omp into BGP process 65001.

```
Router(config)# router bgp 65001
Router(config-router)# address-family ipv4
Router(config-router-af)# redistribute omp
```

The following example shows how to enable redistributing omp with the route-map named OMP-to-BGP into BGP process 65001.

```
Router(config)# router bgp 65001
Router(config-router)# address-family ipv4
Router(config-router-af)# redistribute omp route-map OMP-to-BGP
```

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

autonomous-system-number	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 for 2-byte non asdot notation. 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. **Note** When you run this command, the Cisco SD-WAN device does not verify the accuracy of the entered values. However when you commit the CLI, any invalid CLIs, either syntax or functionality, are rejected.

Command Default

No BGP routing process is enabled by default.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1r	Qualified for use in Cisco vManage CLI templates. with an *autonomous-system-number* of 64496.
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command modified to include full range of *autonomous-system-number*s

Usage Guidelines

For further usage guidelines on this command, see the Cisco IOS XE router bgp command.

Examples

Examples:

```
router bgp 64496
 neighbor 10.0.0.1 remote-as 64496
 bgp graceful-restart
 neighbor 10.0.0.1 ha-mode graceful-restart disable


router bgp 64496
 address-family ipv4 unicast vrf 1
 redistribute omp
 redistribute static
 redistribute connected
```

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

keepalive	Frequency (in seconds) with which the Cisco IOS software sends *keepalive* messages to its peer. The default is 60 seconds. The range is from 0 to 65535.
holdtime	Interval (in seconds) after not receiving a *keepalive* message that the software declares a peer dead. The default is 180 seconds. The range is from 0 to 65535.
min-holdtime	(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 *holdtime*argument. The range is from 0 to 65535.

Command Default

keepalive : 60 seconds

holdtime: 180 seconds

Command Modes

Router configuration

Command History

Release	Modification
Cisco IOS XE Catalyst SD-WAN Release 17.2.1v	Command qualified for use in Cisco vManage CLI templates.

Usage Guidelines

For usage guidelines, see the Cisco IOS XE `timers bgp` command.

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
```