Routing Configuration Commands

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CHAPTER 1 VRF CONFIGURATION COMMANDS

1.1. VRF Configuration Commands

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1.1.1. ip vrf vrf-name

Syntax

To configure VRF, enter the VRF configuration mode. To return to the default setting, use the no form of this command.

ip vrf *vrf-name*

no ip vrf *vrf-name*

Parameter

vrf-name	Name of VRF

Default value

None

Command mode

Routing configuration mode

Usage guidelines

If VRF is created, use command **ip vrf vrf-name** to enter VRF configuration mode and VRF will not be created again, vice verse.

Use command **no ip vrf vrf-name** to delete all configurations of VRF. Delete VRF table and VRF configuration of relevant ports but sitemap configuration will not be deleted.

Example

The following example shows how to create VRF named PE.

R1_config#ip vrf PE

Related command

rd

1.1.2. description

Syntax

To configure VRF description, run the following command.

description *LINE*

no **description**

Parameter

LINE	Description shall be 79 characters at most

Default value

None

Command mode

VRF configuration mode

Usage guidelines

Example

The following example shows how to configure description of VRF named PE.

R1_config#ip vrf PE

R1_config_vrf_PE#description this is description for pe vrf

Related command

ip vrf vrf-name

1.1.3. export map

Syntax

To configure expand attribute the route carries with which VRF sends out, run the following command. To return to the default setting, use the no form of this command.

export map *WORD*

no **export map** *WORD*

Parameter

WORD	name of route-map

Default value

None

Command mode

VRF configuration mode

Usage guidelines

When using the command **export map *WORD***, if the corresponding VRF is not configured with export map, the export map name of VRF is that of route-map. If export map is configured with a different name, the export map name of VRF is the new configured name of route-map; if VRF is configured with a same name that export map, there will be a hint: “%Warning, This entry have been configed.”

When using the command **no export map *WORD***, if the to be deleted export map name is not consistent with that of VRF, there will be a hint: “%Err, This entry is not configed”; if the to be deleted export map name is consistent with that of VRF, the export map of VRF will be deleted.

When using the command **no export map**, the corresponding VRF is configured with export map and export map of VRF will be deleted; if the corresponding VRF is not configured with export map, there will be no response.

MP-BGP route with VRF configured export map which sent out by VRF output target VPN expansion attribute.

Example

The following example shows how to configure route-map name of VRF export map of PE as pe-export-map:

R1_config#ip vrf PE

R1_config_vrf_PE#export map pe-export-map

R1_config_vrf_PE#exit

R1_config#route-map pe-export-map 10 permit

R1_config_route_map #set extcommunity rt 1:1

Related command

ip vrf vrf-name

rd

1.1.4. import map

Syntax

To configure route-map filter condition of addting to VRF routing table, run the following command. To return to the default setting, use the no form of this command.

import map *WORD*

no **import map** *WORD*

Parameter

WORD	name of route-map

Default value

None

Command mode

VRF configuration mode

Usage guidelines

When using the command **import map *WORD***, if the corresponding VRF is not configured with **import** map, the import map name of VRF is that of route-map. If import map is configured with a different name, the import map name of VRF is the new configured name of route-map; if VRF is configured with a same name that import map, there will be a hint: “%Warning, This entry have been configed.”

When using the command **no export map *WORD***, if the to be deleted import map name is not consistent with that of VRF, there will be a hint: “%Err, This entry is not configed”; if the to be deleted import map name is consistent with that of VRF, the import map of VRF will be deleted.

When using the command **no export map**, the corresponding VRF is configured with import map and import map of VRF will be deleted; if the corresponding VRF is not configured with import map, there will be no response.

MP-BGP route with VRF configured export map which sent out by VRF output target VPN expansion attribute.

Example

The following example shows how to configure route-map name of VRF import map of PE as pe-import-map:

R1_config#ip vrf PE

R1_config_vrf_PE#import map pe-import-map

R1_config_vrf_PE#exit

R1_config#route-map pe-import-map 10 permit

R1_config_route_map # match ip address 1

R1_config_route_map #exit

R1_config#ip access-list standard 1

R1_config_std#permit 1.1.1.0 255.255.255.0

R1_config_std#exit

Related command

ip vrf vrf-name

rd

1.1.5. rd

Syntax

To configure VPN route tag of VRF, run the following command.

rd *ASN:nn or IP-address:nn*

Parameter

ASN:nn or IP-address:nn	route tag of VPN

Default value

None

Command mode

VRF configuration mode

Usage guidelines

RD with 8-byte length is consist of 2-byte domain and 6-byte domain.

The type domain determines the length of two sub-domains (manager domain and distribution value sub domain) in the value domain. At present, the type domain defines 3 values: 0, 1 and 2.

For type 0, manger sub-domain has 2 bytes while the distribution value sub-domain has 4 bytes. Manger sub-domain uses 2-byte ASN and the distribution value domain offers value spaces managed by service provider. The value space is used for offering VPN service and is related to the distributed ASN.

For type 1, manger sub-domain has 4 bytes while the distribution value sub-domain has 2 bytes. Manger sub-domain uses 1 IPv4 address and the distribution value domain offers value spaces managed by service provider. The value space is used for offering VPN service and is related to the distributed IPv4.

For type 2, manger sub-domain has 4 bytes while the distribution value sub-domain has 2 bytes. Manger sub-domain uses ASN with 4 bytes and the distribution value domain offers value spaces managed by service provider. The value space is used for offering VPN service and is related to the distributed ASN.

When using the command **rd**, if its corresponding VRF is configured with the same route tag, there is a hint: “%Warning, This entry have been configed”; if its corresponding VRF is configured with a different route tag, there is a hint: “%Warning, Do 'no ip vrf' before redefining the VRF”. If you want to change the route tag of configured VRF, you must delete VRF first and re-create it; if the corresponding VRF hasn’t configure the route tag, the route tag of VRF will become the new configured route tag.

If configuring RD on PE router, it is not required all routes in one VPN use the same RD, but it must be guaranteed that each RD is globally exclusive.

Example

The following example shows how to configure VPN route tag of VRF named PE to 1:1:

R1_config#ip vrf PE

R1_config_vrf_PE#rd 1:1

Related command

ip vrf vrf-name

1.1.6. route-target

Syntax

To configure target VPN expansion attribute, run the following command. To return to the default setting, use the no form of this command.

route-target [**export**|**import**|**both**] *ASN:nn or IP-address:nn*

no **route-target** [**export**|**import**|**both**] [*ASN:nn or IP-address:nn*]

Parameter

ASN:nn or IP-address:nn	destination VPN expansion attribute

Default value

None

Command mode

VRF configuration mode

Usage guidelines

route-target ASN:nn or IP-address:nn

The command is used to add VRF input and output target VPN expansion attribute as the configured value.

route-target export ASN:nn or IP-address:nn

The command is used to add VRF output target VPN expansion attribute as the configured value.

route-target import ASN:nn or IP-address:nn

The command is used to add VRF input target VPN expansion attribute as the configured value.

route-target both ASN:nn or IP-address:nn

The command is used to add VRF input and output target VPN expansion attribute as the configured value.

no route-target

The command is used to delete all input and output target VPN expansion attribute of VRF.

no route-target ASN:nn or IP-address:nn

The command is used to delete all input and output target VPN expansion attribute of VRF.

The command is used to delete all output target VPN expansion attribute of VRF.

no route-target export ASN:nn or IP-address:nn

The command is used to delete all output target VPN expansion attribute of VRF.

no route-target import

The command is used to delete all output target VPN expansion attribute of VRF.

no route-target import ASN:nn or IP-address:nn

The command is used to delete all input target VPN expansion attribute of VRF.

The command is used to delete all output target VPN expansion attribute of VRF.

no route-target both

The command is used to delete all output target VPN expansion attribute of VRF.

no route-target both ASN:nn or IP-address:nn

The command is used to delete the designated input and output target VPN expansion attribute of VRF.

The command **route-target** is used to configure route-target expansion attribute. If the target expansion attribute is existed, there is a hint: “%Warning, This entry have been configed.”

The command **no route-target** is used to delete the command route-target expansion attribute. If the target expansion attribute is not existed, there is a hint: “%Err, This entry is not configed.”

Using BGP expansion community attribute of BGP to limit issue of VPN routing information. The expansion community attribute works as the carrier of route attribute in BGP information.

The route received by MP-BGP can only be added to VRF only if route-target import of VRF is allowed.

When MP-BGP sending route, VRF configured route-target export taken as route-target expansion attribute of VPN route will be informed to other PE.

Example

The following example shows how to input target VPN expansion attribute of VRF named PE as 1:1:

R1_config#ip vrf PE

R1_config_vrf_PE#route-target import 1:1

Related command

ip vrf vrf-name

rd

1.1.7. ip vrf forwarding

Syntax

To relate the interface to VRF, run the following command. To return to the default setting, use the no form of this command.

ip vrf forwarding *vrf-name*

no **ip vrf forwarding** [*vrf-name*]

Parameter

vrf-name	Name of VRF

Default value

The interface is non-related to VRF.

Command mode

Interface configuration mode

Usage guidelines

ip vrf forwarding *vrf-name*

If the interface is not related to VRF, the command is used to relate the interface to VRF and delete IP address on the interface;

If the interface is related to VRF, the command is used to delete the relation between the interface and the original VRF, set up the new relation between the interface and the new VRF, and delete the interface IP address;

If the interface has been related to the same VRF, there is a hint: "%Warning, Interface type num have existed in VRF vrf-name." Here, type means the port type, num means the interface number, vrf-name means VRF name of the interface.

no ip vrf forwarding

If the interface is not related to VRF, there is a hint: "%Warning, Interface type num not in any VRF." Here, type means the port type, num means the interface number.

If the interface is related to VRF, delete the relation between the interface and VRF and IP address of the interface.

no ip vrf forwarding vrf-name

If there is no related VRF, there is a hint "Err, Interface type num not in VRF vrf-name." Here, type means the port type, num means the interface number, vrf-name means VRF name of the interface.

If the interface is related to other VRF, delete the relation between the interface and VRF and IP address of the interface.

Example

The following example shows how to configure the relation between interface VLAN 1 and VRF PE:

R1_config#ip vrf PE

R1_config_vrf_PE#rd 1:1

R1_config_vrf_PE#exit

R1_config #interface vlan 1

R1_config_v1#ip vrf forwarding PE

Related command

ip vrf vrf-name

1.1.8. ip vrf sitemap

Syntax

To configure MP-BGP forwarded routing and Soo attribute of network imbedded route, run the following command. To return to the default setting, use the no form of this command.

ip vrf sitemap *WORD*

no **ip vrf sitemap** [*WORD*]

Parameter

WORD	name of route-map

Default value

None

Command mode

Interface configuration mode

Usage guidelines

The interface which configures sitemap will influence MP-BGP forwarded route and Soo attribute of network.

The command is configured with sitemap which will influence MP-BGP forwarded routing and Soo attribute of network imbedded route. There is no effect on ce route learned by MP-BGP.

Example

The following example shows how to configure sitemap of vlan 1 to intf-sitemap:

R1_config #interface vlan 1

R1_config_v1#ip vrf sitemap intf-sitemap

R1_config_v1#exit

R1_config#route-map intf-sitemap 10 permit

R1_config_route_map #set extcommunity soo 1:1

Related command

ip vrf forwarding

1.1.9. show ip vrf

Syntax

To designate VRF information, run the following command.

show ip vrf [**brief**|**detail**|**interface**] [*WORD*]

Parameter

WORD	name of VRF

Default value

None

Command mode

Other modes except exec

Usage guidelines

show ip vrf [vrf-name]

or

show ip vrf brief [vrf-name]

The command is used to show VRF brief information.

show ip vrf detail [vrf-name]

The command is used to show details of VRF.

show ip vrf interface [vrf-name]

The command is used to show port information of the designated VRF.

Example

The following example shows how to show VRF information.

```
R1 #show ip vrf
Name            RD              Interfaces
CE              1:1             vlan1
PE              2:1
```

Related command

ip vrf vrf-name

CHAPTER 2 STATIC ROUTE CONFIGURATION COMMANDS

2.1. Static route configuration commands include:

- ip route default
- ip route A.B.C.D
- ip route bfd

default	Sets the default route.
next-hop	Means the next hop-IP address that is used to reach a network.
interface	Stands for the to-be-used network interface.
distance	Means the management distance (1-255), which is optional.
tag tag	Sets a tag, which is used for matchup and route control.
description	Means the description for the static routing items.

- ip route load-balance
- ip route-weight
- ip route max-number
- ip route max-paths static
- show ip route
- show ip fib
- debug ip routing

2.1.1. ip route default

Syntax

To set the default route and the corresponding management distance, run ip route default {next-hop | interface} [distance] [tag tag] [global] [description]. To cancel this settings, run no ip route default {next-hop | interface} [distance] [tag tag] [global] [description].

ip route default {next-hop | interface} [distance] [tag *tag*] [description]

no **ip route default** {next-hop | interface} [distance] [tag *tag]* [description]

Parameters

Default Value

The function to generate a route is disabled.

Command Mode

Routing configuration mode

Usage Guidelines

1. This command is used to set the static route which points towards a port or the next hop. In order to avoid route loopback, we make our devices not support the next-hop recursive research of the default route. The configured next hop must be the address of the next-hop device that directly connects the local port.
2. The default route also supports to set the equivalent route.
3. If a routing device has its default route configured and if the destination address of a packet cannot match up with a specific subnet route or a host route, the packet will be forwarded through the default route.
4. If a route, which points to the loopback or null0 port, is set, it usually turns into a null route.
5. The main routing table can contains up to 2K static routes.

Example

The following example shows how to set a default route that points to next hop "192.168.1.133":

R-CE_config#interface vlan 1

R-CE_config_v1#ip address 192.168.1.132 255.255.255.0

R-CE_config_v1#exit

R-CE_config#ip route default 192.168.1.133

R-CE_config#

Related Command

ip route *A.B.C.D*

2.1.2. ip route A.B.C.D

Syntax

To set a route and its management distance, run ip route A.B.C.C mask {next-hop | interface} [distance] [tag tag] [global] [description]. To cancel this settings, run no ip route default {next-hop | interface} [distance] [tag tag] [global] [description].

ip route *A.B.C.C mask* {next-hop | interface} [distance] [tag *tag*] [description]

no **ip route** *A.B.C.C mask* {next-hop | interface} [distance] [tag *tag*] [description]

Parameters

a.b.c.d	Means the IP route of the destination address.
mask	Stands for the mask of the destination address.
next-hop	Means the next hop-IP address that is used to reach a network.

interface	Stands for the to-be-used network interface.
distance	Means the management distance (1-255), which is optional.
tag tag	Sets a tag, which is used for matchup and route control.
description	Means the description for the static routing items.

Default Value

The function to generate a route is disabled.

Command Mode

Routing configuration mode

Usage Guidelines

1. This command is used to set the static route which points towards a port or the next hop. In order to avoid route loopback, we make our devices not support the next-hop recursive research of the default route. The configured next hop must be the address of the next-hop device that directly connects the local port.
2. The static route or default route also supports the equivalent route.
3. If a routing device has its default route configured and if the destination address of a packet cannot match up with a specific subnet route or a host route, the packet will be forwarded through the default route.
4. If a route, which points to the loopback or null0 port, is set, it usually turns into a null route.
5. The main routing table can contains up to 2K static routes. The allowable maximum number of routes is 64K.

Example

The following example shows how to set a static route that points to next hop “192.168.1.133”:

R-CE_config#interface vlan 1

R-CE_config_v1#ip address 192.168.1.132 255.255.255.0

R-CE_config_v1#exit

R-CE_config#ip route 10.1.1.0 255.255.255.0 192.168.1.133

R-CE_config#

Related Command

ip route default

2.1.3. ip route vrf

Syntax

To configure static route or default value route in vpn, and set the max routing capacity of VPN table, run the following command. To return to the default setting, use the no form of this command.

ip route vrf *vpn_name* { {default | network mask } {next-hop | interface} [distance] [tag *tag*] [global] [description]} | **max-number** *value* }

no **ip route vrf** *vpn_name* {{default | network mask } {next-hop | interface} [distance] [tag *tag*] [global] [description]} | **max-number** *value*}

Parameter

vrf	Configure the default route in the corresponding VPN
vpn_name	name of the corresponding VPN
default	configure the default route
network	destination address IP route prefix
mask	destination address prefix mask
next-hop	next-hop IP address
interface	To be used network interface
distance	(optional) management distance (1 to 255)
tag tag	Set a tag, used for match and control the route
global *description*	Next-hop address belongs to the route in the global routing table Description of the static route entry
max-number	Configure the max route amount of VPN route entry
value	The max route amount of the routing table

Default value

No static route and default route

Command mode

Global configuration mode

Usage guidelines

1. The command is used to configure the static route designating port or next hop. For avoiding recursive query of the next-hop in the statix route, the next-hop

configured must be next-hop device address of the directly connected local port.

2. The static route or default route also supports configuration of the equivalent route.
3. Parameters of global mode only can be used in VPN static route next hop in the global routing table.
4. If the route configures a default route, once the packet destination address cannot be matched to the sub-net route or the host route, the packet will be forwarded by the default route.
5. If it is configured with the route directing to loopback or Null0, it will become the black-hole route in general.
6. The max routing number in VPN table is 10K.

Example

The following example shows how to configure a static route directing to 192.168.1.133 in vpn_1:

R-CE_config#interface vlan 1

R-CE_config_vl1#ip vrf forward vpn_1

R-CE_config_v1#ip address 192.168.1.132 255.255.255.0

R-CE_config_v1#exit

R-CE_config#ip route vrf vpn_1 10.1.1.0 255.255.255.0 192.168.1.133

R-CE_config#

Related command

ip route default

ip route *A.B.C.D*

2.1.4. ip route bfd

Syntax

To enable the bidirectional link query of the static route, run the first one of the following two commands.

ip route bfd { **static** { next-hop | A.B.C.D }| **query** <interval> | **reply** <interval> }

no ip route bfd { **static** { next-hop | A.B.C.D }| **query** <interval> | **reply** <interval> }

Parameters

Parameters	Description
static	Enables the bidirectional link query of the static route.
next-hop	Enables the bidirectional link query of the static route which is urgent for network query.

A.B.C.D	Means the address of the to-be-queried gateway.
query	Sets the query interval.
reply	Means the maximum interval between sending the query packets and receiving the response packets.
interval	Means the configured interval.

Default Value

The bidirectional link query of the static route is disabled.

Command Mode

Routing configuration mode

Usage Guidelines

None

Example

The following example shows hwo to detect the static routing gateway address 1.1.1.1:

ip route 10.0.0.0 255.0.0.0 1.1.1.1

ip route bfd static next-hop

ip route bfd static 1.1.1.1

Related Command

None

2.1.5. ip route load-balance

Syntax

To set the weight route balance, run the following command. To return to the default setting, use the no form of this command.

ip route load-balance

no ip route load-balance

Parameters

None

Default Value

The load balance of the route is disabled and the route search is conducted according to the load balance of the equivalent route.

Command Mode

Global configuration mode

Usage Guidelines

If you want the route load balance is conducted according to flows, you should run ip route load-balance in global configuration mode; moreover, you have to set the route load balance on the corresponding egress.

Example

S 1.1.1.0/24 is directly connected, vlan 1

is directly connected, vlan 2

Supposed that the above-mentioned equivalent route exists and the following equivalent route needs to follow the ratio “2:3” to carry out the load balance, you should set as follows:

R1_config#ip route load-balance

R1_config#interface vlan 1

R1_config_v1#ip route-weight 2

R1_config_v1#exit

R1_config# interface vlan 2

R1_config_v2#ip route-weight 3

R1_config_v2#exit

Related Command

ip route-weight

2.1.6. ip route-weight

Syntax

To set the route weight based on the data flows on the egress port, run the first one of the following two commands.

ip route-weight *value*

no ip route-weight *value*

Parameters

Parameters	Description
value	Designates the route weight.

Default Value

The route weight is not set by default, and if the equivalent route exists, the egress port need be selected according to the route balance mode.

Command Mode

Interface configuration mode

Usage Guidelines

If ip route load-balance is not run, this command will not take effect during unicast flow forwarding even though the route weight is set on the interface.

Example

S 1.1.1.0/24 is directly connected, vlan 1
is directly connected, vlan 2

Supposed that the above-mentioned equivalent route exists and the following equivalent route needs to follow the ratio “2:3” to carry out the load balance, you should set as follows:

R1_config#ip route load-balance

R1_config#interface vlan 1

R1_config_v1#ip route-weight 2

R1_config_v1#exit

R1_config#interface vlan 2

R1_config_v2#ip route-weight 3

R1_config_v2#

Related Command

ip route load-balance

2.1.7. ip route max-number

Syntax

To set the maximum number of routes in the global routing table, run the first one of the following two commands. If there is no further settings, the default maximum number of routes in a global routing table is 64K.

ip route max-number *value*

no ip route max-number

Parameters

Parameters	Description
max-number	Sets the maximum number of routes for the global routing table.
value	Means the maximum number of routes which is permitted by the routing table.

Default Value

64K

Command Mode

Global configuration mode

Usage Guidelines

None

Example

The following example shows how to set the maximum number of routes in the global routing table to 20K.

R1_config#ip route max-number 20000

Related Command

None

2.1.8. ip route max-paths static

Syntax

To set the number of max next hop of the static equivalent route, run the following command. If there is no further settings, the default value is 8.

ip route max-paths static *value*

no ip route max-number static

Parameters

Parameters	Description
value	The number of max next hop of the static equivalent route.

Default Value

8

Command Mode

Global configuration mode

Usage Guidelines

None

Example

The following example shows how to set the number of max next hop of the static equivalent route to 5:

R1_config#ip route max-paths static 5

Related Command

None

2.1.9. show ip route

Syntax

To display the contents of the routing table according to users' requirements, run the following commands for different devices.

show ip route [*A.B.C.D* **| all | cache | detail |** protocol **| bfd | summary | information]**

Parameters

A.B.C.D	Displays a specific route. Displays all routes that can reach address A.B.C.D.
all	Displays all routes, including those inactivated routes.
cache	Displays the status of the route cache.
detail	Displays the detailed routing information.
summary	Displays the summary information about all activated routes.
protocol	Means the protocol name or its keyword such as connected, static, bgp, Ospf, beigrp or rip.
bfd	Means the bidirectional listening of the next hop of the static route.
information	Displays the global route statistics information.

Default Value

None

Command Mode

This command can be run in all modes except the EXEC mode.

Usage Guidelines

None

Example

The following example shows how to display all routes:

show ip route all

Related Command

show ip fib

2.1.10. show ip fib

Syntax

To display the route in the fast forwarding table, run the following command.

show ip fib { route | summary }

Parameters

Parameters	Description
route	Displays the route in the fast forwarding table.
summary	Displays the statistics of FIB table.

Default Value

None

Command Mode

This command can be run in all modes except the EXEC mode.

Usage Guidelines

Summary, displays the statistics of FIB table, including the number of the total routing items, the number of the routing items, the status of synchronous traversing, the received number of added and deleted information sent by the main routing module.

Example

None

Related Command

show ip route

2.1.11. debug ip routing

Syntax

debug ip routing { bfd | memory | message | search | timer | cache}

Parameters

Parameters	Description
bfd	Means the debugging information about the BFD link of the static route.
memory	Means the debugging information about memory allocation.
message	Means the debugging information about route addition and deletion.
search	Means the debugging information about route query.
timer	Means the debugging information about the timer timeout.
cache	Means the debugging information about cache change.

Default Value

No debugging information is exported.

Command Mode

Routing configuration mode

Usage Guidelines

To disable the debugging information, you should run no debug ip routing.

Example

None

Related Command

None

CHAPTER 3 RIP CONFIGURATION COMMANDS

3.1. RIP Configuration Commands Include:

- auto-summary
- default-information originate
- default-metric
- ip rip authentication
- ip rip message-digest-key
- ip rip passive
- ip rip password
- ip rip receive version
- ip rip send version
- ip rip split-horizon
- neighbor
- network
- offset
- router rip
- timers expire
- timers holddown
- timers update
- validate-update-source
- version
- distance
- filter
- maximum-count
- show ip rip
- show ip rip database
- show ip rip protocol
- debug ip rip database
- debug ip rip protocol

3.1.1. auto-summary

Syntax

To activate the automatic summarization function, use the auto-summary command. To turn off this function, use the no form of this command.

auto-summary

no auto-summary

Parameter

This command has no parameter or keywords.

Default value

Enabled by default

Command mode

router configuration

Usage guidelines

Routing summarization reduces the amount of routing information in the routing tables and switching information. Routing Information Protocol (RIP) do not support subnet mask, therefore, if it is forwarded to subnets, routing possibly cause ambiguity. RIP Version 1 always uses routing summarizarion. If using RIP Version 2, you can turn off routing summarization by using the no auto-summary command. When routing summarization is off, Subnets are advertised.

Example

To specify RIP version on Serial 1/0 as RIP Version 2 and turn off routing summarization function.

router rip

version 2

no auto-summary

Related commands

version

3.1.2. default-information originate

Syntax

To generate a default route, use the default-information originate command. To disable this function, use the no form of this command.

default-information { originate | originate-safe }

no default-information

Parameter

originate Generates a default route in the RIP local routing table without condition

originate-safe Generates RIP local default route when there is non-RIP default routes in the master routing table

Default

disable this function by default

Command mode

RIP Global configuration mode

Usage guidelines

After the default-information originate command is activated, the routing information(0.0.0.0/0) is accompanied when send routing updating.

Example

When send routing updating information, the default routing(0.0.0.0/0) is accompanied.

!

router rip 1

version 2

default-information originate

!

ip route default vlan1

!

3.1.3. default-metric

To set default metric values for import routing, use the default-metric command. To return the default stata, use the no form of this command.

default-metric number

no default-metric

Parameter

parameter	description
number	Default metric value. It has a value from 1 to 16.

Default value

Built-in, automatic metric translations, as appropriate for each routing protocol

Command mode

router configuration

Usage guidelines

The default-metric command is used to set default routing metric used in importing routing of other routing protocols into Rip packets. When import routing of other protocols, use the specified default routing by default-metric if no specified routing metric.

Example

The following example shows a routing switch in autonomous system 119 using both the RIP and the OSPF routing protocols. The example advertises OSPF-derived routes using the RIP protocol and assigns the OSPF-derived routes a RIP metric of 8.

router rip

default-metric 8

redistribute ospf 119

Related commands

redistribute

default-information originate

3.1.4. ip rip authentication

Syntax

To specify the type of authentication used in Routing Information Protocol (RIP) Version 2 packets, use the ip rip authentication mode command in interface configuration mode. To restore plain text authentication, use the no form of this command.

ip rip authentication {**simple** | **message-digest**}

no ip rip authentication

Parameter

parameter	description
simple	Plain text authentication.
message-digest	Keyed Message Digest 5 (MD5) authentication.

Default value

disabled

Command mode

interface configuration mode

Usage guidelines

RIP Version 1 does not support authentication.

Example

The following example configures the interface to use MD5 authentication:

ip rip authentication message-digest

Related commands

ip rip password

ip rip message-digest-key

3.1.5. ip rip md5-key

Syntax

To activate authentication for RIP-2 packet and designate MD5-key ciphertext on the interface, run the following command. To return to the default setting, use the no form of this command.

ip rip md5-key *key-id* **md5** [0 | 7] *password*

no ip rip md5-key

Parameter

Parameter	Description
key-id	An identifier
Password	A designated password
0	The key is plaintext (default value)
7	The key is ciphertext

Default value

Invalid MD5 authentication

Command mode

Interface configuration mode

Usage guidelines

If there is no configuration of ip rip md5-key key-id md5 password, there will be no authentication.

Example

The following example shows how to configure MD5 encrypt authentication packet which belongs to mykey.

ip rip md5-key 4 md5 mykey

Related command

ip rip authentication

3.1.6. ip rip authentication

Syntax

To designate the authentication type of RIP-2, run the following command. To return to the default setting, use the no form of this command.

ip rip authentication { simple | md5 | dynamic | commit }

no **ip rip authentication**

Parameter

Parameter	Description
Simple	plaintext authentication type
Md5	MD5 ciphertext authentication type

Dynamic	Dynamic authentication type
Commit	Immediately forwarding authentication requirements (used for reauthention immediately after changing the authentication configuration)

Default value

No authentication

Command mode

Interface configuration mode

Usage guidelines

RIP-1 non-support

Example

The following example shows how to use MD5 ciphertext authentication type.

ip rip authentication md5;

The following example shows how to use the dynamic authentication type of the interface.

Ip rip authentication dynamic

Related command

ip rip password

ip rip md5-key

ip rip dynamic-key

3.1.7. ip rip dynamic-key

Syntax

To activate authentication of RIP-2 and designate MD5 or SHA1 ciphertext authentication key, run the following command. To return to the default setting, use the no form of this command.

ip rip dynamic-key *key-id* {**md5|sha1**} [0 | 7] *password xxxx-xx-xx-xx:xx xx:xx*

no ip rip dynamic-key *key-id* {**md5|sha1**}

Parameter

Parameter	Description
key-id	1 identifier
{md5|sha1}	Algorithm of key corresponding to key id

[0 | 7]	Designate the key type: plaintext (0) or ciphertext (7)
Password	Designate keyword (20 bytes in maximum)
xxxx-xx-xx-xx:xx	Effective time of key corresponding to key id
xx:xx	Effective time length of key corresponding to key id

Default value

Disabled dynamic authentication

Command mode

Interface configuration mode

Usage guidelines

Generally speaking, every key is effective only in the effective time period (As its effective time is based on the system time, it is suggested that the interface neighbor time must be consistant, for instance, refer to a standard time).

If the dynamic authentication is enabled and no key is activated, only non-authenticated packet can pass the authentication.

If **period of validity** of key is overtime, **Nonkey** can be updated, the length of effective time of the last key can be automatically extended, until the new key takes effect.

You can add many keys one time, the system will takes effect and lose effect according to configuration of the key.

It enables many keys taking effect, choose one key to execute operations when forwarding packets and verify the packet according to key id after receiving the packet.

Suggestion: The effective time length of every key is 24 hours and the one key in operation is activated and the effective time of one key is three minutes before the effective time of last key.

Example

ip rip dynamic-key 2 sha1 xxxxxxxxxx 2009-3-3-9:0 24:5

ip rip dynamic-key 5 md5 xxxxxxxx 2009-3-10-9:0 24:5

ip rip dynamic-key 6 sha1 xxxxxxxxxxxx 2009-3-11-9:0 24:5

Related command

ip rip authentication

3.1.8. ip rip password

Syntax

To activate Routing Information Protocol (RIP) Version 2 packets authentication and specify the plain text authentication used on the interface, use the ip rip password command Use the no form of this command to prevent authentication.

ip rip password *password*

no ip rip password *password*

Parameter

Parameter	Description
password	the specified password

Default value

no authenctication

Command mode

interface configuration mode

Usage guidelines

No authentications are carried out on interface without using the ip rip password command to configure any password.

Example

The following example configures interface to receive and send any plain text authentication packet that belong to password ‘mykey’

ip rip password mykey

Related commands

ip rip authentication

3.1.9. ip rip passive

Syntax

To cancel the routing switch to send routing updating on interface, use the ip rip passive command. To reactivate the routing updating, use the no form of this command.

ip rip passive

no ip rip passive

Parameter

none

Default value

send routing updates on the interface

Command mode

Interface configuration mode

Usage guidelines

If you cancel routing updating on a certain interface, a specified subnetwork will keep on announcing to other interfaces, and the routing updating that from other routing switches can be continuedly accepted and dealt with on this interface.

Example

The following example sends RIP packets updating to all interfaces that belong to the network 172.16.0.0 (except Ethernet interface 1/0):

interface ethernet 1/0

ip address 172.15.0.1 255.255.0.0

ip rip passive

router rip

network 172.16.0.0

Related commands

none

3.1.10. ip rip deaf

Syntax

To disable receiving rip protocol packet, run the following command. To return to the default setting, use the no form of this command.

ip rip deaf

no ip rip deaf

Parameter

None

Default value

Disabled

Command mode

Interface configuration mode

Usage guidelines

If the command is used on one interface, it will continue to forward routing requirements outward and inform the routing update, but without accepting any rip protocol packet.

Example

The following example shows how to forward RIP packets update to vlan 1 but not receiving rip packets:

interface vlan1

ip rip 1 enable

ip address 172.16.0.1 255.255.0.0

ip rip deaf

router rip 1

Related command

None

3.1.11. ip rip receive version

Syntax

To specify a Routing Information Protocol (RIP) version to receive on specified interface, use the ip rip receive version command in interface configuration mode. To follow the global version rules, use the no form of this command.

ip rip receive version [**1**] [**2**]

no ip rip receive version

Parameter

parameter	description
1	(Optional) Accepts only RIP Version 1 packets on the interface.
2	(Optional) Accepts only RIP Version 2 packets on the interface.

Default value

Accepts RIP Version 1 and RIP Version 2 packets

Command mode

interface configuration mode

Usage guidelines

Use this command to override the default behavior of RIP as specified by the version command. This command applies only to the interface being configured. You can configure the interface to receive both RIP versions.

Example

The following example configures the interface to receive both RIP Version 1 and Version 2 packets:

ip rip receive version 1 2

The following example configures the interface to receive only RIP Version 1 packets:

ip rip receive version 1

Related commands

ip rip send version

version

3.1.12. ip rip send version

Syntax

To specify a Routing Information Protocol (RIP) version to send on specified interface, use the ip rip send version command in interface configuration mode. To follow the global version rules, use the no form of this command.

ip rip send version [**1** | **2** | **compatibility**]

no ip rip send version

Parameter

parameter	description
1	(Optional) Sends only RIP Version 1 packets out the interface.
2	(Optional) Sends only RIP Version 2 packets out the interface.
compatibility	(Optional) Broadcasts only RIP Version 2 packets out the interface.

Default value

Sends only RIP Version 1 packets

Command mode

interface configuration mode

Usage guidelines

Use this command to override the default behavior of RIP as specified by the version command. This command applies only to the interface being configured. the interface can be configured to receive both RIP Version 1 and Version 2 packets

Example

The following example configures the interface to send only RIP Version 1 packets out the interface:

ip rip send version 1

The following example configures the interface to send only RIP Version 2 packets out the interface:

ip rip send version 2

Related commands

ip rip receive version

version

3.1.13. ip rip v1demand

Syntax

To forward request packets with v1 format, run the following command. To return to the default setting, use the no form of this command.

ip rip v1demand

no ip rip v1demand

or

default ip rip v1demand

Parameter

None

Default value

The command follows the set global version and interface version. If neither, it will follows the auto-adaptation principle(based on the received opposite terminal).

Command mode

Interface configuration mode

Usage guidelines

The command is used to forward request packets with v1 format. The command is non-related to version in the global mode and the version on the interface. The command is only used in forwarding request. In the normal condition, the interface and the global configuration modes are applied (such as update packet).

Example

The following example shows how to configure request packets with v1 format and RIP updated packets with v2 format:

The following example shows how to forward

ip rip v1demand

ip rip send version 2

Related command

Ip rip v2demand

Ip rip send

Version

3.1.14. ip rip v2demand

Syntax

To forward request packets with v2 format, run the following command. To return to the default setting, use the no form of this command.

ip rip v2demand

no ip rip v2demand

or

default ip rip v2demand

Parameter

None

Default value

The command follows the set global version and interface version. If neither, it will follows the auto-adaptation principle (based on the received opposite terminal).

Command mode

Interface configuration mode

Usage guidelines

The command is used to forward request packets with v2 format. The command is non-related to version in the global mode and the version on the interface. The command is only used in forwarding request. In the normal condition, the interface and the global configuration modes are applied (such as update packet).

Example

The following example shows how to configure request packets with v2 format and RIP updated packets with v1 format:

ip rip v2demand

ip rip send version 1

Related command

Ip rip v1demand

Ip rip send

version

3.1.15. ip rip split-horizon

Syntax

To enable the split horizon mechanism, use the ip split-horizon command in interface configuration mode. To disable the split horizon mechanism, use the no form of this command.

ip rip split-horizon

no ip rip split-horizon

Parameter

none

Default value

Default behavior varies with media type.

Command mode

Interface configuration mode

Usage guidelines

For all interfaces except those for which either Frame Relay or Switched Multimegabit Data Service (SMDS) encapsulation is enabled, the default condition for this command is ip split-horizon; in other words, the split horizon feature is active. If the interface configuration includes either the encapsulation frame-relay or encapsulation smds command, then the default is for split horizon to be disabled.

Note: For networks that include links over X.25 packet switched networks (PSNs), the neighbor routing switch configuration command can be used to defeat the split horizon feature. You can as an alternative explicitly specify the no ip split-horizon command in your configuration. However, if you do so you must similarly disable split horizon for all routing switches in any relevant multicast groups on that network.

If split horizon has been disabled on an interface and you want to enable it, use the ip split-horizon command to restore the split horizon mechanism.

Note: In general, changing the state of the default for the ip split-horizon command is not recommended, unless you are certain that your application requires a change in order to properly advertise routes. If split horizon is disabled on a serial interface (and that interface is attached to a PSN), you must disable split horizon for all routing switches and access servers in any relevant multicast groups on that network.

Example

The following simple example disables split horizon on a serial link. The serial link is connected to an X.25 network.

interface serial 1/0

encapsulation x25

no ip rip split-horizon

Related commands

neighbor

3.1.16. ip rip process-id enable

Syntax

To set the interface relate to one RIP instance, run the following command. To return to the default setting, use the no form of this command.

ip rip *process-id* **enable**

no ip rip *process-id* **enable**

Parameter

parameter	description
Process-id	Instance ID. The value ranges from 1 to 65535.

Default value

None

Command mode

Interface configuration mode

Usage guidelines

When one interface is configured with this command, the interface will be binded to its corresponding rip instance, becoming rip interface of the instance and generates

the direct network segment corresponding to the interface as the rip route; every interface can only connect to one RIP instance. By default the interface does not relate to any instance.

Note: If enable one to be created RIP instance on the interface, create RIP instance with the instance number and vrf of the interface; if enable an existed instance on the interface, but the port binded vrif and the designated vrf when creating the instance, the interface will not become the activation interface of RIP, until the interface vrf is consistant with the instance designated vrf.

Example

interface vlan1

ip rip 1 enable

Related command

Router rip ***process-id*** [vrf ***name***]

3.1.17. neighbor

Syntax

To define a neighboring routing switch with which to exchange routing information, use the neighbor command in routing switch configuration mode. To remove an entry, use the no form of this command.

neighbor *ip-address*

no neighbor *ip-address*

Parameter

parameter	description
ip-address	IP address of a peer routing switch with which routing information will be exchanged.

Default value

No neighboring routing switches are defined.

Command mode

router configuration

Usage guidelines

This command permits the point-to-point (nonbroadcast) exchange of routing information in order to meet special requirements of the specified nonbroadcast network.

Example

In the following example, the neighbor routing switch configuration command permits the sending of routing updating to specific neighbors.

router rip

neighbor 131.108.20.4

Related commands

network

3.1.18. offset

Syntax

To add an offset to incoming and outgoing metrics to routes learned via Routing Information Protocol (RIP), use the offset command in routing switch configuration mode. To remove an offset list, use the no form of this command.

offset {*type number* | ***}** {**in | out**} *access-list-name* **offset**

no offset {*type number* | ***}** {**in | out**}

Parameter

parameter	description
In	Applies the access list to incoming metrics.
Out	Applies the access list to outgoing metrics.
access-list-name	***Standard access list number to be applied. Access list number 0 indicates all access lists. If offset is 0, no action is taken.***
offset	Positive offset to be applied to metrics for networks matching the access list.
type	Interface type to which the offset list is applied.
number	(Optional) Interface number to which the offset list is applied.

Default value

This command is disabled by default.

Command mode

router configuration

Usage guidelines

The offset value is added to the routing metric. An offset list with an interface type and interface number is considered extended and takes precedence over an offset list that is not extended. Therefore, if an entry passes the extended offset list and the normal offset list, the offset of the extended offset list is added to the metric.

Example

In the following example, the routing switch applies an offset of 10 to routes learned from Ethernet interface 1/0:

offset ethernet 1/0 in 21 10

3.1.19. router rip process-id

Syntax

To configure RIP instance in the global mode, run the following command. To return to the default setting, use the no form of this command.

router rip *process-id* [vrf *vrf-name*]

no router rip *process-id* [vrf *vrf-name*]

Parameter

Parameter	Description
Process-id	Configures instance ID. The value ranges from 1 to 65535.
Vrf-name	Designates VRF belongs to RIP instance.

Default value

By default no RIP instance is operated. When configuring instance, process id is not by default; default vrf-name does not belong to any VRF.

Command mode

Global configuration mode

Usage guidelines

Only RIP instance is enabled can the routing instance configuration mode is entered and all global configuration parameters of RIP instance can be configured. Configuration of parameters related to the interface does not limit to the enable of RIP instance.

Example

The following example shows how to enable RIP instance and enter the instance configuration mode.

router rip 1

Related command

ip rip *process-id* **enable**

3.1.20. timers expire

Syntax

To adjust RIP network timers, use the timers expire router configuration command. To restore the default timers, use the no form of this command.

timers expire interval

no timers expire

Parameter

parameter	description
expire	Interval of time in seconds after which a route is declared invalid; it should be at least three times the value of update. A route becomes invalid when there is an absence of updates that refresh the route. The route then enters holddown. The route is marked inaccessible and advertised as unreachable. However, the route is still used for forwarding packets. The default is 180 seconds.

Default value

180 seconds

Command mode

router configuration

Usage guidelines

The basic timing parameters for RIP are adjustable. Since RIP is executing a distributed, asynchronous routing algorithm, it is important that these timers be the same for all routing switches and access servers in the network.

Note: The current and default timer values can be seen by the show ip rip command.

Example

In the following example, if a routing switch is not heard from in 30 seconds, the route is declared unusable.

router rip

timers expire 30

3.1.21. timers holddown

Syntax

To adjust RIP network timers, use the timers holddown routing switch configuration command. To restore the default timers, use the no form of this command.

timers holddown second

no timers holddown

Parameter

parameter	description
second	Interval in seconds during which routing information regarding better paths is suppressed. It should be at least three times the value of update. A route enters into a holddown state when an update packet is received that indicates the route is unreachable.

	The route is marked inaccessible and advertised as unreachable. However, the route is still used for forwarding packets. When holddown expires, routes advertised by other sources are accepted and the route is no longer inaccessible. The default is 120 seconds.

Default value

120 seconds

Command mode

router configuration

Usage guidelines

The basic timing parameters for RIP are adjustable. Since RIP is executing a distributed, asynchronous routing algorithm, it is important that these timers be the same for all routing switches and access servers in the network.

Note:

The current and default timer values can be seen by the show ip rip command.

Example

In the following example, if a routing switch is not heard from in 30 seconds, the route is declared unusable.

router rip

timers holddown 30

3.1.22. timers update

Syntax

To adjust RIP network timers, use the timers update routing switch configuration command. To restore the default timers, use the no form of this command.

timers update update

no timers update

Parameter

parameter	description
update	Rate in seconds at which updates are sent. This is the fundamental timing parameter of the routing protocol. The default is 30 seconds.

Default value

30 seconds

Command mode

router configuration

Usage guidelines

The basic timing parameters for RIP are adjustable. Since RIP is executing a distributed, asynchronous routing algorithm, it is important that these timers be the same for all routing switches and access servers in the network.

Note:

The current and default timer values can be seen by the show ip rip command.

Example

In the following example, updates are broadcast every 5 seconds.

router rip

timers update 5

Note that by setting a short update period, you run the risk of congesting slow-speed serial lines; however, this is not a big concern on faster-speed Ethernets and T1-rate serial lines. Also, if you have many routes in your updates, you can cause the routing switches to spend an excessive amount of time processing updates.

3.1.23. timers trigger

Syntax

To adjust trigger update timer, run the following command. To return to the default setting, use the no form of this command.

timers trigger *second*

no timers trigger

Parameter

Parameter	Description
second	Time interval of trigger update (unit: s)

Default value

5s

Command mode

RIP Global configuration mode

Usage guidelines

The basic timer parameters of RIP can be adjusted. As RIP works on the asynchronous routing algorithm, it's important to set timer parameters of the routers and access routers in the network to the same.

Note:

The command is used to show parameters of the current or default timer.

Example

router rip 1

timers trigger 4

3.1.24. timers peer

Syntax

To adjust peer overtime timer of RIP network, run the following command. To return to the default setting, use the no form of this command.

timers peer *second*

no timers peer

Parameter

Parameter	Description
second	Time interval of peer overtime

Default value

102s

Command mode

RIP Global configuration mode

Usage guidelines

The basic timer parameters of RIP can be adjusted. As RIP works on the asynchronous routing algorithm, it's important to set timer parameters of the routers and access routers in the network to the same.

Note:

The command is used to show parameters of the current or default timer.

Example

router rip 1

timers peer 50

3.1.25. validate-update-source

Syntax

To have the software validate the source IP address of incoming routing updates for RIP routing protocols, use the validate-update-source routing switch configuration command. To disable this function, use the no form of this command.

validate-update-source

no validate-update-source

Parameter

This command has no parameters or keywords.

Default value

Enabled

Command mode

router configuration

Usage guidelines

This command is only applicable to RIP and IGRP. The software ensures that the source IP address of incoming routing updates is on the same IP network as one of the addresses defined for the receiving interface.

Disabling split horizon on the incoming interface will also cause the system to perform this validation check.

For unnumbered IP interfaces (interfaces configured as ip unnumbered), no checking is performed.

Example

In the following example, a routing switch is configured to not perform validation checks on the source IP address of incoming RIP updates:

router rip

network 128.105.0.0

no validate-update-source

3.1.26. check-zero-domain

Syntax

To check the legality of zero-domain in the routing entries receiving from the neighbor, run the following command. To return to the default setting, use the no form of this command.

check-zero-domain

no check-zero-domain

Parameter

No parameters or key words

Default value

Activated

Command mode

RIP Global configuration mode

Usage guidelines

The command is mainly used in version 1. Only the segments such as route-tag, subnet mask and next hop of the routing entries received in version 1 must be 0.

Example

router rip 1

no check-zero-domain

3.1.27. version

Syntax

To specify a RIP version used globally by the routing switch, use the version routing switch configuration command. Use the no form of this command to restore the default value.

version {1 | 2}

no version

Parameter

Parameter	Description
1	Specifies RIP Version 1.
2	Specifies RIP Version 2.

Default value

The software receives RIP Version 1 and Version 2 packets, but sends only Version 1 packets.

Command mode

router configuration

Usage guidelines

To specify RIP versions used on an interface basis, use the ip rip receive version and ip rip send version commands; or it will send RIP packets in terms of the global configuration version.

Example

The following example enables the software to send and receive RIP Version 2 packets:

version 2

Related commands

ip rip receive version

ip rip send version

3.1.28. distance

To define an administrative distance for RIP routes, use the distance command in routing switch configuration mode.

Distance weight <address mask <access-list-name>>

Parameter

parameter	description
weight	Administrative distance. An integer from 1 to 255. It is recommended to use 10 to 255. (The values 0 to 9 are reserved

	for internal use.) Routes with a distance value of 255 are not installed in the routing table.)
address	(Optional) Source IP address (in four-part, dotted decimal notation)
mask	(Optional) IP address mask (in four-part, dotted decimal notation) If a certain digit is 0, software will omit the corresponding value in the address.
access-list-name	(Optional) Named access list to be applied to incoming routing updates.

Default value

120

Command mode

EXEC

Usage guidelines

Numerically, an administrative distance is an integer from 0 to 255. In general, the higher the value, the lower the trust rating. When the optional access list name or number is used with this command, it is applied when a network is being inserted into the routing table. This behavior allows filtering of networks according to the IP address of the routing switch that supplies the routing information.

Example

The following example sets the administrative distance to 100 for the routing switch with the address 192.1.1.0/24.

router rip

distance 100 192.1.1.0 255.255.255.0

3.1.29. filter

Syntax

To filter for RIP routes, use the filter command.

filter * in access-list {*access-list-name*}

filter * in gateway {*access-list-name*}

filter * in prefix { *prefix-list-name*}

filter type *number* **in access-list** {*access-list-name*}

filter type *number* **in gateway** {*access-list-name*}

filter type *number* **in prefix** {*prefix-list-name*}

no filter * in

no filter type *number* **in**

filter * out access-list {*access-list-name*}

filter * out gateway {*access-list-name*}

filter * out prefix { *prefix-list-name*}

filter type number out access-list {*access-list-name*}

filter type number out gateway {*access-list-name*}

filter type number out prefix {*prefix-list-name*}

no filter * out

no filter type *number* **out**

Parameter

Parameter	Description
access-list-name	Standard IP access list name. This list defines networks of which are received or suppressed in routing update.
prefix-list-name	Standard IP prefix list name. This list defines networks of which are received or suppressed in routing update.
in/out	Applies access list for in/out routing update.
type	(Optional) Interface type.
number	(Optional)Indicates number of interface on which applies the access list for in/out routing update. If no interface is defined, the access list is applicabale to all in/out routing update.

Default value

disabled

Command mode

EXEC

Usage guidelines

Filter the route that are to be sent and received.If you use the access-list command to configure access list for dynamic routing protocol, you shoul use the standard access list.

Example

The following example filter route 10.0.0.0/8 from interface s2/1:

router rip

filter s2/1 out access-list mylist

ip access-list standard mylist

deny 10.0.0.0 255.0.0.0

3.1.30. maxinum-nexthop

Syntax

To configure the max equivalent routing number in RIP routing information, run the following command. To return to the default setting, use the no form of this command.

maximum-nexthop *number*

no maximum-nexthop

Parameter

Parameter	Description
number	The max equivalent routing number. The value ranges from 1 to 16.

Default value

4

Command mode

RIP Global configuration mode

Usage guidelines

The command is used to set the max equivalent routing number of RIP local routing. When learning the complete equivalent routing information (metric, distance) from many neighbors. If the number of neighbor is greater than the max value of the equivalent routing number, there will be no next hop adding to the routing table.

Example

The following example shows how to the equivalent routing number of RIP routing information is 5.

router rip 1

maximum-nexthop 5

Related command

None

3.1.31. input-queue

Syntax

To adjust the size of receiving queue, run the following command. To return to the default setting, use the no form of this command.

input-queue *number*

no input-queue

Parameter

Parameter	Description
number	Size of the receiving queue. The value ranges from 1 to 61440.

Default value

200

Command mode

Routing configuration mode

Usage guidelines

The command is used to set size of the receiving queue which unit is packet. The size is suggested not to oversmall, otherwise, the routing cannot not be fully learned when quantities of routing are imput.

Example

The following example shows how to set the size of receiving queue of RIP routing information to 500.

router rip 1

input-queue 500

Related command

None

3.1.32. show ip rip

Syntax

To display RIP main information, use the show ip rip command.

show ip rip

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

User can see the current configuration status about RIP according to the output of this command.

Example

The following example displays configuration parameter information about RIP:

router#show ip rip

RIP protocol: Enabled

Decided on the interface version control

AUTO-SUMMARY: Yes

Update: 30, Expire: 180, Holddown: 120

Distance: 120

Defaultt-metric: 1

The meaning of the above fields are as follows:

Field	Description
Enabled	Indicates current state of the active routing protocol process.
Distance	Indicates current administrative distance.
Version	Indicates current version of the protocol.
AUTO-SUMMARY	Indicates whether to allow auto-summary or not.
Update	Interval of time at which updates are sent.
Holddown	Interval (in seconds) during which routing information regarding better paths is suppressed.
Expire	Interval of time after which a route is expired.
RIP default-metric	Default metric value during redistribute

3.1.33. show ip rip process-id interface

Syntax

To show all interfaces of RIP instances and status of these interfaces.

show ip rip *process-id* **interface**

Parameter

Parameter	Description
process-id	Instance ID. The value ranges from 1 to 65535.

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information and show all interfaces of RIP instances and status of these interfaces.

Example

The following example shows how to show all interfaces of RIP instances and status of these interfaces

```
Switch_config#show ip rip 1 interface
Interface Loopback7 ,vrf (0)
  Address:22.2.2.2, mask:255.255.255.0
  state:active
  Send version: V1(default)
  Receive version: V1 and V2(default)
  Passive: Disable
  v1demand: Disable
  v2demand: Disable
  deaf: Disable
  Authentication type: NULL
  MD5 authentication key: NULL
  Simple password: NULL
Interface GigaEthernet0/0 ,vrf (0)
  Address:2.2.2.1, mask:255.255.255.0
  state:active
  Send version: V1(default)
  Receive version: V1 and V2(default)
  Passive: Disable
  v1demand: Disable
  v2demand: Disable
  deaf: Disable
  Authentication type: simple
  MD5 authentication key: NULL
  Simple password: NULL
```

3.1.34. show ip rip process-id summary

Syntax

To show statistics of all routes of RIP instances, run the following command. To return to the default setting, use the no form of this command.

show ip rip *process-id* **summary**

Parameter

Parameter	Description
process-id	Instance ID. The value ranges from 1 to 65535.

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information, and show the designated statistics of all routes of RIP instances.

Example

The following example shows how to show statistics of all routes of RIP instances.

```
Switch_config#show ip rip 1 summary
*------------------- RIP Process 1 Summary Statistic ------------------*
RIP route table:
  Maximum route number  :1024
  Total route number    :8
    Connect route number      :2
    Learn route number        :4
    Redistributed route number :0
Holddown route number :0
*----------------------------------------------------------*
```

3.1.35. show ip rip process-id database

Syntax

To show all route information of RIP instances, run the following command.

show ip rip *process-id* **database**

Parameter

Parameter	Description

process-id	Instance ID. The value ranges from 1 to 65535.

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information. It shows all routing information of RIP.

Example

The following example shows how to show all routing information o RIP.

Switch#show ip rip *process-id* database

1.0.0.0/8 auto-summary

1.1.1.0/24 directly connected Loopback1

100.0.0.0/8 via 192.1.1.2 (on Vlan1)

192.1.1.0/24 redistributed

Definitions of the above domains:

Domain	Description
Network-number/network-mask	RIP routing
Summary/connected/redistributed/ via gateway	The corresponding RIP route type
Interface	Ports corresponding to RIP route

3.1.36. show ip rip process-id protocol

Syntax

To show RIP configuration information, run the following command.

show ip rip *process-id* **protocol**

Parameter

None

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information and show the current RIP configuration information.

Example

The following example shows how to show the configuration information of RIP protocol.

```
Switch_config_rip_1#show ip rip 1 pr
RIP 1 is Active
update interval 30(s), Invalid interval 180(s)
Holddown interval 120(s), Trigger interval 1(s), peer interval 102(s)
Automatic network summarization: Enable
Filter list:
Offset list:
Redistribute policy:
Interface send version and receive version:
Global version : default
  Interface              Send-version   Recv-version   Nbr_number
  Loopback7                 V2             V1 V2          0
  GigaEthernet0/0           V2             V1 V2          4
Distance: 0 (default is 120):
Maximum route count: 1024,      Current route count:8
```

3.1.37. show ip rip process-id peer

Syntax

To show status information of RIP neighbor, run the following command.

show ip rip *process-id* **peer**

Parameter

None

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information and show the current status information of RIP neighbor to the user.

3.1.38. debug ip rip database

Syntax

To monitor RIP route event, run the following command.

debug ip rip database

Parameter

None

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information and show the event of current RIP route.

Example

The following example shows how to monitor the event of RIP route.

switch# debug ip rip database

RIP-DB: Adding 192.1.1.0/24 <metric 2> via 10.1.1.2 to RIP database

Definitions of the above domains:

Domain	Description
192.1.1.0/24	Route adding to the routing table
<metric 2>	Routing metric value
10.1.1.2	Gateway address of the learned route

3.1.39. debug ip rip packet [send | receive]

Syntax

To monitor packets RIP received, run the following command.

debug ip rip packet

Parameter

None

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information and show the received and sent packets of the current RIP to the user.

Example

The following example shows how to monitor packets of RIP:

Switch# debug ip rip packet

RIP: send to 255.255.255.255 via Loopback1

vers 1, CMD_RESPONSE, length 24

192.1.1.0/0 via 0.0.0.0 metric 2

When running version 2, the following will be output:

RIP: send to 224.0.0.9 via Loopback1

vers 2, CMD_RESPONSE, length 24

192.1.1.0/24 via 0.0.0.0 metric 2

RIP: recv RIP from 10.1.1.2 on Vlan1

vers 2, CMD_REQUEST, length 24

Definitions of the above domains

Domain	Description
Send/Recv	Packets forwarded(send) and received
to/from xx.xx.xx.xx	Destination address or source address of IP packets
via Loopback1/on Vlan1	Ports for sending or receiving packets
vers 2	Version numbers for sending or receiving packets
CMD_RESPONSE/ CMD_REQUEST	Packet type
length 24	Packet length
192.1.1.0/24	Destination network of the routing information
via 0.0.0.0	Next hop address
metric	Metric of the route

3.1.40. debug ip rip message

Syntax

To monitor RIP events, run the following command.

debug ip rip message

Parameter

None

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information and show users to events of the current RIP, such as port address, status change and timer overtime.

Example

The following example shows how to monitor RIP packets:

Switch# debug ip rip message

RIP: Update timer timeout(process 1)

CHAPTER 4 OSPF CONFIGURATION COMMANDS

4.1. OSPF Configuration Commands

OSPF Configuration Commands Include:

- area authenticaion
- area default-cost
- area range
- area stub
- area virtual-link
- debug ip ospf adj
- debug ip ospf events
- debug ip ospf flood
- debug ip ospf lsa-generation
- debug ip ospf packet
- debug ip ospf retransmission
- debug ip ospf spf
- debug ip ospf tree
- default-information originate
- default-metric
- distance ospf
- filter
- ip ospf cost
- ip ospf dead-interval
- ip ospf hello-interval
- ip ospf message-digest-key
- ip ospf network
- ip ospf passive
- ip ospf password
- ip ospf priority
- ip ospf retransmit-interval
- ip ospf transmit-delay
- neighbor
- network area
- redistribute
- router ospf
- show ip ospf
- show ip ospf border-routers
- show ip ospf database
- show ip ospf interface
- show ip ospf neighbor

- show ip ospf virtual-link
- summary-address
- timers delay
- timers hold

4.1.1. authentication

Syntax

To enable authentication for an Open Shortest Path Firstly (OSPF) area, use the area authentication command in routing switch configuration mode. To remove an authentication specification of an area or a specified area from the configuration, use the no form of this command.

area *area-id* **authentication** [**simple | message-digest**]

no area *area-id* **authentication**

no area *area-id*

Parameter

Parameter	Description
area-id	Identifier of the area for which authentication is to be enabled.
simple	(Optional)authentication information, Plain text authentication.
message-digest	(Optional) Enables Message Digest 5 (MD5) authentication on the area specified by the area-id argument.

Default value

no authentication of interface receiving OSPF packet by default

Command mode

router configuration

Usage guidelines

The authentication value will be added into OSPF packet.The authentication type of all routing swithces in the same area must be the same.The authentication password for all OSPF routing switches on a network must be the same if they are to communicate with each other via OSPF.

Example

The following example mandates authentication simple for areas 0 and 36.0.0.0.

```
interface ethernet 1/0
ip address 131.119.251.201 255.255.255.0
ip ospf password adcdefgh
!
```

```
interface ethernet 1/0
ip address 36.56.0.201 255.255.0.0
ip ospf password ijklmnop
!
router ospf 1
network 36.0.0.0 255.0.0.0 area 36.0.0.0
network 131.119.0.0 255.255.0.0 area 0
area 36.0.0.0 authentication simple
area 0 authentication simple
```

Related commands

ip ospf password

ip ospf message-digest-key

4.1.2. area default-cost

Syntax

To specify a cost for the default summary route that is sent into a stub area or not-so-stubby area (NSSA), use the area default-cost command in router address family topology or routing switch configuration mode. To remove the assigned default route cost, use the no form of this command.

area *area-id* **default-cost cost**

no area *area-id* **default-cost**

no area *area-id*

Parameter

Parameter	Description
area-id	Identifier for the stub area.
cost	Cost for the default summary route used for a stub.

Default value

cost.1

Command mode

router configuration

Usage guidelines

This command is used only on an routing switch attached to a stub area or NSSA.

After configured the area stub default-information-originate command, the routing switch will send LSA(SUM-NER-LSA) including default router information to

correspondent field, the cost configured I this command is the correspondent cost used in LSA.

Note:

To remove the specified area from the software configuration, use the no area area-id command (without other keywords). That is, the no area area-id command removes all area options, such as area authentication, area default-cost, area nssa, area range, area stub, and area virtual-link.

Example

The following example assigns a default cost of 20 to stub network 36.0.0.0:

interface ethernet 1/0

ip address 36.56.0.201 255.255.0.0

!

router ospf 201

network 36.0.0.0 255.0.0.0 area 36.0.0.0

area 36.0.0.0 stub

area 36.0.0.0 default-cost 20

Related commands

area nssa

area stub

4.1.3. area filter

Syntax

To filter Type-3 LSA of in/out this area, run the following command. To return to the default setting, use the no form of this command.

area *area-id* **filter** {**in |out**} {**access-list** *access-list-name* | **prefix-list** *prefix-list-name*}

no area *area-id* **filter** {**in | out**}

no area *area-id*

Parameter

Parameter	Description
area-id	Domain which filters Type-3 LSA. It can be a decimal numeral or an ip address.
in	In ABR, filter Type-3 LSA sent to this area.
out	In ABR, filter Type-3 LSA sent from this area to other areas.

access-list-name	Name of access list
prefix-list-name	Name of prefix list

Default value

Disabled

Command mode

OSPF Routing configuration mode

Usage guidelines

The command only works on the ABR, but is not available to the area inner route. In direction **in**, Type-3 LSA of ABR sent to this area does not include the filtered network segment. This rule is also applicable to area-range segment of other areas; in direction **out**, Type-3 LSA of ABR sent to this area does not include the filtered network segment. If all sub-segments covered by an area-range are filtered, the area-range will not generate Type-3 LSA.

Note:

no area area-id (no other parameters)

The command can be used to cancel sub-commands of all domain parameters, such as area authentication, area default-cost, area filter, area nssa, area nssa-translate-interval,area nssa-range, area range, area stub, and area virtual-link.

Example

The following example shows how to configure area 36.0.0.0 which neither receives Type-3 LSA including in 192.0.0.0/8, nor generates Type-3 LSA including in 36.0.0.0/8.

```
!
interface VLAN1
 ip address 192.42.110.201 255.255.255.0
!
interface VLAN2
 ip address 36.56.0.201 255.255.0.0
!
router ospf 201
 network 36.0.0.0 255.0.0.0 area 36.0.0.0
 network 192.0.0.0 255.0.0.0 area 0
 area 36.0.0.0 filter in prefix-list bd1
 area 36.0.0.0 filter out prefix-list bd2
!
```

```
!
ip prefix-list bd1 seq 5 deny 192.0.0.0/8
ip prefix-list bd2 seq 5 deny 36.0.0.0/8
!
```

Related command

area authentication

4.1.4. area nssa

Syntax

To configure a NSSA area, run the following command. To return to the default setting, use the no form of this command.

area *area-id* **nssa** [**default-information-originate [metric** *value* **| metric-type {***1* **|** *2***}] |no-redistribute | no-summary | translate-always**]

no area *area-id* **nssa** [**default-information-originate | no-redistribute | no-summary | translate-always**]

no area *area-id*

Parameter

Parameter	Description
area-id	Area-ID of NSSA. It can be a decimal numeral or an ip address.
default-information-originate	(option) For ABR, if this command is configured but without configuring command **no-summany**, whether there is a default route, one Type-7 LSA will be generated to send the default route to the area; if command **no-summany** is configured, a Type-3 LSA will be generated to send the default route to the area. For ASBR, after configuration, only when the main routing table has a default route can Type-7 LSA be generated to sent a default route to the area.
metric	(option) default metric
metric-type	(option) default metric type of the route
no-redistribute	(option) The command is used to diable introduce AS outer route to NSSA by the form of Type-7 LSA. Usually it is only used in ABR of NSSA and ASBR or OSPF.
no-summary	(option) The command is only used in ABR of NSSA and disable ABR router forwarding Type-3 LSA to NSSA. After configuration, NSSA ABR send one default route to the area by generating one Type-3 LSA and does not send other Type-3

	LSA to the area (The area is also called NSSA Totally Stub).
translate-always	(option) Only used for ABR of NSSA domain. ABR works for translating Type-7 LSA into Type-5 LSA.

Default value

Non-NSSA area

Command mode

OSPF Routing configuration mode

Usage guidelines

The command “area nssa” must be configured on all routers and acess servers in NSSA area.

For further decreasing the amount of LSA, use command **no-summary** to sending summarizing LSA to NSSA on ABR.

Note:

no area area-id (no other parameters)

The command can be used to cancel sub-commands of all domain parameters, such as area authentication, area default-cost, area filter, area nssa, area nssa-translate-interval,area nssa-range, area range, area stub, and area virtual-link.

Example

The following example shows how to configure 36.0.0.0 as NSSA area.

```
!
interface VLAN2
 ip address 36.56.0.201 255.255.0.0
!
router ospf 201
 network 36.0.0.0 255.0.0.0 area 36.0.0.0
 area 36.0.0.0 nssa
 redistribute static
!
```

Related command

area authentication

area default-cost

redistribute

4.1.5. area nssa-range

Syntax

To translate Type-7 LSA for route aggregation, run the following command. To return to the default setting, use the no form of this command.

area *area-id* **nssa-range** *address mask* [**advertise | not-advertise | tag** *value*] [**cost** *cost*] [**cost** cost_value]

no area *area-id* **nssa-range** *address mask*

no area *area-id*

Parameter

Parameter	Description
area-id	Domain of Type-7 LSA route aggregation. It can be a decimal numeral or an ip address.
address	Destination IP address of the aggregation route.
mask	The network mask of aggregation route.
advertise	(option) Advertise after aggregation.
not-advertise	(option) Not-advertise after aggregation
tag	(option) Tag of aggregation route.
value	Route tag. The value ranges from 0 to 4294967295. The default value is 0.
cost	(option) Cost of aggregation route
cost_value	Cost value of aggregation route. The value ranges from 0 to 16777215. The default value is the max cost of all aggregated route.

Default value

Disabled

Command mode

OSPF Routing configuration mode.

Usage guidelines

The command can only be configured on the non-trunk domain.

If the local router is ABR and the translation router of NSSA, the command “area nssa-rang” will aggregates Type-7 LSA and generates Type-5 LSA; for translation router not in the NSSA, there is no aggregation.

Note:

no area area-id (no other parameters)

The command can be used to cancel sub-commands of all domain parameters, such as area authentication, area default-cost, area filter, area nssa, area nssa-translate-interval,area nssa-range, area range, area stub, and area virtual-link.

Example

The following example shows how to configure route aggregation of translatable Type-7 LSA in segment 50.0.0.0 of ABR.

```
!
interface VLAN1
 ip address 192.42.110.201 255.255.255.0
!
interface VLAN2
 ip address 36.56.0.201 255.255.0.0
!
!
router ospf 201
 network 36.0.0.0 255.0.0.0 area 36.0.0.0
 network 192.0.0.0 255.0.0.0 area 0
 area 36.0.0.0 nssa
 area 36.0.0.0 nssa-range 50.0.0.0 255.0.0.0
!
```

Related command

area nssa

4.1.6. area nssa-translate-interval

Syntax

To configure a time interval a translater elected by Type-7 LSA works after being replaced by another one. To return to the default setting, use the no form of this command.

area *area-id* **nssa-translate-interval** *interval*

no area *area-id* **nssa-translate-interval**

no area *area-id*

Parameter

Parameter	Description
area-id	Area-ID of NSSA. It can be a decimal numeral or an ip address.

interval	Time interval. Unit: s.

Default value

40s.

Command mode

OSPF Routing configuration mode

Usage guidelines

The command can only be configured on the non-trunk area.

Note:

no area area-id (no other parameters)

The command can be used to cancel sub-commands of all domain parameters, such as area authentication, area default-cost, area filter, area nssa, area nssa-translate-interval, area nssa-range, area range, area stub, and area virtual-link.

Example

The following example shows how to configure the time interval of area 36.0.0.0 to 100s.

```
!
interface VLAN1
 ip address 36.56.0.201 255.255.0.0
!
router ospf 201
 network 36.0.0.0 255.0.0.0 area 36.0.0.0
 area 36.0.0.0 nssa
 area 36.0.0.0 nssa-translate-interval 100
 redistribute static
!
```

Related command

area nssa

4.1.7. area range

Syntax

To consolidate and summarize routes at an area boundary, use the area range command. To disable this function, use the no form of this command.

area *area-id* **range** *address mask*[**not-advertise**]

no area *area-id* **range** *address mask* **not-advertise**

no area *area-id* **range** *address mask*

no area *area-id*

Parameter

parameter	description
area-id	Identifier of the area for which routes are to be summarized. It can be specified as either a decimal value or an IPv6 prefix.
address	IP address
mask	IP address mask
advertise	(Optional) Sets the address range status to advertise and generates a Type 3 summary link-state advertisement (LSA).
not-advertise	(Optional) Sets the address range status to DoNotAdvertise. The Type 3 summary LSA is suppressed, and the component networks remain hidden from other networks.

Default value

This command is disabled by default.

Command mode

router configuration

Usage guidelines

The area range command is used only with Area Border Routing switches. It is used to consolidate or summarize routes for an area. The result is that a single summary route is advertised to other areas by the ABR. Routing information is condensed at area boundaries. External to the area, a single route is advertised for each address range. This behavior is called route summarization.

Multiple area range routing switch configuration commands can be configured. Thus, OSPF can summarize addresses for many different sets of address ranges.

Note: To remove the specified area from the software configuration, use the no area area-id command (with no other keywords). That is, the no area area-id command removes all area options, such as area default-cost, area nssa, area range, area stub, and area virtual-link.

Example

The following example specifies one summary route to be advertised by the ABR to other areas for all subnets on network 36.0.0.0 and for all hosts on network 192.42.110.0:

interface ethernet 0

ip address 192.42.110.201 255.255.255.0

!

```
interface ethernet 1
ip address 36.56.0.201 255.255.0.0
!
router ospf 201
network 36.0.0.0 255.0.0.0 area 36.0.0.0
network 192.42.110.0 255.0.0.0 area 0
area 36.0.0.0 range 36.0.0.0 255.0.0.0
area 0 range 192.42.110.0 255.255.255.0
```

4.1.8. area stub

Syntax

To define an area as a stub area, use the area stub command. To disable this function, use the no form of this command.

area *area-id* **stub** [**no-summary**]

no area *area-id* **stub**

no area *area-id*

Parameter

Parameter	Description
area-id	Identifier for the stub area; either a decimal value or an IP address.
no-summary	(Optional) Prevents an Area Border Router (ABR) from sending summary link advertisements into the stub area.

Default value

No stub area is defined.

Command mode

router configuration

Usage guidelines

You must configure the area stub command on all routers and access servers in the stub area. Use the area router configuration command with the default-cost keyword to specify the cost of a default internal route sent into a stub area by an ABR switch.

There are two stub area router configuration commands: the stub and default-cost options of the area routing switch configuration command. In all routing switches attached to the stub area, the area should be configured as a stub area using the stub keyword of the area command. Use the default-cost keyword only on an ABR attached to the stub area. The default-cost keyword provides the metric for the summary default route generated by the ABR into the stub area.

To further reduce the number of link-state advertisements (LSAs) sent into a stub area, you can configure the no-summary keyword on the ABR switch to prevent it from sending summary LSAs (LSA type 3) into the stub area.

Note: To remove the specified area from the software configuration, use the no area area-id command (with no other keywords). That is, the no area area-id command removes all area options, such as area authentication, area default-cost, area nssa, area range, area stub, and area virtual-link.

Example

The following example assigns a default cost of 20 to stub network 36.0.0.0:

interface ethernet 0

ip address 36.56.0.201 255.255.0.0

!

router ospf 201

network 36.0.0.0 255.0.0.0 area 36.0.0.0

area 36.0.0.0 stub

area 36.0.0.0 default-cost 20

Related commands

area authentication

area default-cost

4.1.9. area virtual-link

Syntax

To define a virtual link, use the area virtual-link command

area *area-id* **virtual-link** *neighbor-ID* [**authentication** simple | message-digest] [**dead-interval** *dead-value*][**hello-interval** *hello-value*][**retransmit-interval** *retrans-value*][**transdly** *dly-value*][**password** *pass-string*] [message-digest-key key-id MD5 md5-string]

no area *area-id* **virtual-link** *neighbor-ID*

Parameter

Parameter	Description
area-id	Area ID assigned to the transit area for the virtual link.
neighbor-id	Router ID associated with the virtual link neighbor.
simple	Plain text authentication. The value must be the same for all routing switches and access servers attached to a common network.

message-digest	Enables Message Digest 5 (MD5) on virtual-link. The value must be the same for all routing switches and access servers attached to a common network.
dead-value	Time (in seconds) that hello packets are not seen before a neighbor declares the router down. The value must be the same for all routing switches and access servers attached to a common network.
hello-value	Time (in seconds) between the hello packets that the software sends on an interface. The value must be the same for all routing switches and access servers attached to a common network.
retrans-value	Time (in seconds) between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface. The value must be the same for all routing switches and access servers attached to a common network.
dly-value	Delay value in seconds to inform LSA on virtual-link for a routing switch. The configured value on both sides of the virtual-link should be the same.
pass-string	If virtual-link uses plain text authentication, the the maximum character of the configured password should be 8. The configuied value on both sides of the virtual-link should be the same.
key-id	If virtual-link uses MD5 authentication, the valid range of the used MD5 key should from 1 to 255. The configured value on both sides of the virtual-link should be the same.
MD5-String	Configures MD5 password, which is 16-character at most. The configured value on both sides of the virtual-link should be the same.

Default value

No virtual-link is configured.

Default value of other parameters are as follows:

Hello-value: 10s, Dead-value: 40s, Retrans-value: 5s, dly-value: 1s, no authentication

Command mode

OSPFrouter configuration

Usage guidelines

To establish a virtual link, user should configure both sides of the virtual link. The virtual link will fail if this command is only configured on one side.

The parameter-id must be a non-zero character, for the virtual link and the transit areda must be a non-backbone area. The configured area-id of the virtual link must be the same.

The neighbor-ID must be the same as the ospf router-id on the remote side during configuration, or the virtual link will not be established. Even if the configured neighbor-ID is another IP address of the other side.

You must make sure that all parameters on both sides must be the same.

The authentication parameters that configured on virtual-link become effective only when configured authentication types of virtual-link or configured the relevant authentication methods in backbone are (via the command area authentication)Only one kind of authentication parameter can be configured on virtual-link, that is, the MD5 and the plain text authenticationm are mutually exclusive.

Use the command no area area-id veitual-link neighbor-ID to cancel the formerly-configured virtual link.

Use the command show ip ospf virtual-link to check state of the virtual link.

Example

The following example configured a virtual link between router A and router B:

The configuration on router A (router-id: 200.200.200.1)

!

router ospf 100

network 192.168.20.0 255.255.255.0 area 1

area 1 virtual-link 200.200.200.2

!

The configuration on router B:

!

router ospf 100

network 192.168.30.0 255.255.255.0 area 1

area 1 virtual-link 200.200.200.1

!

Related commands

show ip ospf virtual-link

4.1.10. auto-cost

Syntax

To configure reference-bandwidth value, run the following command. To return to the default setting, use the no form of this command.

auto-cost reference-bandwidth *value*

no auto-cost reference-bandwidth

Parameter

Parameter	Description
value	Reference-bandwidth value for calculating link cost. The value ranges from 1 to 4294967. Unit: Mbps

Default value

100Mbps.

Command mode

OSPF Routing configuration mode

Usage guidelines

If the command is not configured, OSPF calculates cost according to the link bandwidth(cost=bandwidth reference value÷bandwidth; if the cost is larger than 65535. The max cost is 65535).

If the command is configured, OSPF does not calculate cost based on the link bandwidth, but based on the configured link.

Example

The following example shows how to configure the bandwidth reference of the link to 1000Mbps:

```
!
interface VLAN2
 ip address 36.56.0.201 255.255.0.0
!
router ospf 201
 auto-cost reference-bandwidth 1000
 network 36.0.0.0 255.0.0.0 area 36.0.0.0
!
```

Related command

ip ospf cost

4.1.11. debug ip ospf adj

Syntax

To monitor Open Shortest Path Firstly (OSPF)-related estabilishment process, use the debug ospf adj command

debug ip ospf adj

Parameter

none

Default

none

Command mode

EXEC

Usage guidelines

User can check the process of OSPF-related estabilishment process from the output of this command.

Example

Router# debug ip ospf adj

OSPF: Interface 192.168.40.0 on Serial1/0 going down

OSPF NBR: 192.168.40.2 address 192.168.40.2 on Serial1/0 is dead, state DOWN

OSPF NBR: 192.168.40.3 address 192.168.40.3 on Serial1/0 is dead, state DOWN

Line on Interface Serial1/0, changed state to up

Line protocol on Interface Serial1/0 changed state to up

OSPF: Interface 192.168.40.0 on Serial1/0 going Up

OSPF: 2 Way Communication to 192.168.40.2 on Serial1/0, state 2WAY

OSPF: NBR 192.168.40.2 on Serial1/0 Adjacency OK, state NEXSTART.

OSPF: NBR Negotiation Done. We are the SLAVE

OSPF: NBR 192.168.40.2 on Serial1/0 Negotiation Done. We area the SLAVE

OSPF: Exchange Done with 192.168.40.2 on Serial1/0

OSPF: Loading Done with 192.168.40.2 on Serial1/0, database Synchronized (FULL)

OSPF: 2 Way Communication to 192.168.40.3 on Serial1/0, state 2WAY

OSPF: NBR 192.168.40.3 on Serial1/0 Adjacency OK, state NEXSTART.

OSPF: NBR Negotiation Done. We are the SLAVE

OSPF: NBR 192.168.40.3 on Serial1/0 Negotiation Done. We area the SLAVE

OSPF: Bad Sequence with 192.168.40.3 on Serial1/0, state NEXSTART

OSPF: NBR Negotiation Done. We are the SLAVE

OSPF: NBR 192.168.40.3 on Serial1/0 Negotiation Done. We area the SLAVE

OSPF: Exchange Done with 192.168.40.3 on Serial1/0

OSPF: Loading Done with 192.168.40.3 on Serial1/0, database Synchronized (FULL)

4.1.12. debug ip ospf events

Syntax

To monitor OSPF interface and OSPF-related events, use the debug ip ospf events command.

debug ip ospf events

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display OSPF interface and OSPF-related adjacency events from the ouput of this command.

Example

Router# debug ip ospf events
OSPF: Interface Serial1/0 going Up
OSPF: INTF(192.168.40.0) event INTF_UP
OSPF: NBR(192.168.40.2) event HELLO_RX
OSPF: NBR(192.168.40.2) event TWOWAY
OSPF: NBR(192.168.40.2) event ADJ_OK
OSPF: NBR(192.168.40.2) event NEGO_DONE
OSPF: NBR(192.168.40.2) event EXCH_DONE
OSPF: NBR(192.168.40.2) event LOAD_DONE
OSPF: NBR(192.168.40.3) event HELLO_RX
OSPF: NBR(192.168.40.3) event TWOWAY
OSPF: NBR(192.168.40.3) event ADJ_OK
OSPF: NBR(192.168.40.3) event NEGO_DONE
OSPF: NBR(192.168.40.3) event SEQ_MISMATCH
OSPF: NBR(192.168.40.3) event NEGO_DONE
OSPF: NBR(192.168.40.3) event EXCH_DONE
OSPF: NBR(192.168.40.3) event LOAD_DONE

4.1.13. debug ip ospf flood

Syntax

To display OSPF-related database pervasion process, use the debug ip ospf flood command.

debug ip ospf flood

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display OSPF-related database pervasion process from the output of this command.

Example

Router# debug ip ospf flood

OSPF: recv UPDATE, type 1 LSID 192.168.40.2 ADV_RTR 192.168.40.2 AGE 2 SEQ 0x8000022B

OSPF: Send UPDATE, type 1 LSID 192.168.20.240 ADV_RTR 192.168.20.240 AGE 1 SEQ 0x80000234

OSPF: Send ACK, type 1 LSID 192.168.40.2 ADV_RTR 192.168.40.2 AGE 2 SEQ 0x8000022B

OSPF: recv ACK, type 1 LSID 192.168.20.240 ADV_RTR 192.168.20.240 AGE 1 SEQ 0x80000234

OSPF: recv ACK, type 1 LSID 192.168.20.240 ADV_RTR 192.168.20.240 AGE 18 SEQ 0x80000233

OSPF: Send UPDATE, type 1 LSID 192.168.40.2 ADV_RTR 192.168.40.2 AGE 10 SEQ 0x8000022B

OSPF: recv UPDATE, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 5 SEQ 0x8000021C

OSPF: Send UPDATE, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 6 SEQ 0x8000021C

OSPF: Send UPDATE, type 1 LSID 192.168.20.240 ADV_RTR 192.168.20.240 AGE 1 SEQ 0x80000235

OSPF: recv ACK, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 4 SEQ 0x8000021C

4.1.14. debug ip ospf lsa-generation

Syntax

To display OSPF-related LSA generation process, use the debug ip ospf lsa generation command.

debug ip ospf lsa-generation

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display OSPF interface and adjacency events from the output of this command.

Example

router# debug ip ospf lsa-generation

OSPF: Send UPDATE, type 1 LSID 192.168.40.2 ADV_RTR 192.168.40.2 AGE 10 SEQ 0x8000022D

OSPF: recv UPDATE, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 5 SEQ 0x8000021E

OSPF: Send UPDATE, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 6 SEQ 0x8000021E

OSPF: Send UPDATE, type 1 LSID 192.168.20.240 ADV_RTR 192.168.20.240 AGE 1 SEQ 0x80000239

OSPF: recv ACK, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 4 SEQ 0x8000021E

OSPF: Send ACK, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 5 SEQ 0x8000021E

OSPF: recv UPDATE, type 1 LSID 192.168.40.2 ADV_RTR 192.168.40.2 AGE 1 SEQ 0x8000022E

OSPF: Send UPDATE, type 1 LSID 192.168.40.2 ADV_RTR 192.168.40.2 AGE 2 SEQ 0x8000022E

OSPF: recv ACK, type 1 LSID 192.168.20.240 ADV_RTR 192.168.20.240 AGE 1 SEQ 0x80000239

OSPF: recv ACK, type 1 LSID 192.168.40.3 ADV_RTR 192.168.40.3 AGE 6 SEQ 0x8000021E

OSPF: recv ACK, type 1 LSID 192.168.20.240 ADV_RTR 192.168.20.240 AGE 1 SEQ 0x80000239

4.1.15. debug ip ospf packet

Syntax

To display OSPF packets, use the debug ip ospf packet command.

debug ip ospf packet

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display OSPF interface and adjacency events from the output of this command.

Example

router# debug ip ospf packet

OSPF: Recv HELLO packet from 192.168.40.3 (addr: 192.168.40.3) area 0 from Serial1/0

OSPF: End of hello processing

OSPF: Send HELLO to 224.0.0.5 on Loopback0

HelloInt 10 Dead 40 Opt 0x2 Pri 1 len 44

OSPF: Send HELLO to 224.0.0.5 on Loopback0

HelloInt 10 Dead 40 Opt 0x2 Pri 1 len 44

OSPF: Send HELLO to 224.0.0.5 on Loopback0

HelloInt 10 Dead 40 Opt 0x2 Pri 1 len 44

OSPF: Recv HELLO packet from 192.168.40.2 (addr: 192.168.40.2) area 0 from Serial1/0

OSPF: End of hello processing

OSPF: Send HELLO to 224.0.0.5 on Serial1/0

HelloInt 30 Dead 120 Opt 0x2 Pri 1 len 52

OSPF: Recv HELLO packet from 192.168.40.3 (addr: 192.168.40.3) area 0 from Serial1/0

OSPF: End of hello processing

OSPF: Send HELLO to 224.0.0.5 on Loopback0

HelloInt 10 Dead 40 Opt 0x2 Pri 1 len 44

4.1.16. debug ip ospf restart

Syntax

To moniter the smooth restart process of OSPF, run the following command.

debug ip ospf restart

Parameter

None

Default value

None

Command mode

Exec

Usage guidelines

The command is used to output information and show the smooth restart process of OSPF.

Example

GR Restarter end:

Switch# debug ip ospf restart

OSPF: Recv MSG_OSPF_GRACEFUL_RESTART message

OSPF: Build grace-LSA, adv_rtr:5.5.5.5, in area 0, at interface VLink 0.0.0.0

OSPF: Build grace-LSA, adv_rtr:5.5.5.5, in area 1, at interface VLAN1

OSPF: grace-LSAs have been flooded out. switch redundant

OSPF: The OSPF process 1 is restarting gracefully now.

OSPF: Recv MSG_OSPF_RESTART message

OSPF: OSPF process 1 is restarting

OSPF: Database resynchronized with 12.12.12.12 on VLAN1 done, to FULL

OSPF: OSPF process 1 has reestablished all its adjacencies. GR successfully

OSPF: Recv MSG_OSPF_GR_TERMINATE message

OSPF: GR of OSPF process 1 terminated

GR Helper end:

router# debug ip ospf restart

OSPF: IETF GR Received grace-LSA from 5.5.5.5(addr: 192.167.1.1) on VLink 192.167.1.1

OSPF: IETF GR Validate grace-LSA from nbr 5.5.5.5 on VLink 192.167.1.1

OSPF: IETF GR Process grace-LSA from nbr 5.5.5.5 on VLink 192.167.1.1, age 1, grace period 200, graceful restart reason: Switch to redundant control processor, graceful ip address: 0.0.0.0

OSPF: IETF GR Enter graceful restart helper mode for nbr 5.5.5.5 on VLink 192.167.1.1 for 199 seconds (requested 200 sec)

OSPF: IETF GR Received grace-LSA from 5.5.5.5(addr: 192.167.1.1) on FastEthernet0/0

OSPF: IETF GR Validate grace-LSA from nbr 5.5.5.5 on FastEthernet0/0

OSPF: IETF GR Process grace-LSA from nbr 5.5.5.5 on FastEthernet0/0, age 1, grace period 200, graceful restart reason: Switch to redundant control processor, graceful ip address: 192.167.1.1

OSPF: IETF GR Enter graceful restart helper mode for nbr 5.5.5.5 on FastEthernet0/0 for 199 seconds (requested 200 sec)

OSPF: IETF GR Resynchronize with nbr 5.5.5.5(addr: 192.167.1.1)

OSPF: IETF GR Received grace-LSA from 5.5.5.5(addr: 192.167.1.1) on FastEthernet0/0

OSPF: IETF GR Validate grace-LSA from nbr 5.5.5.5 on FastEthernet0/0

OSPF: IETF GR Process grace-LSA from nbr 5.5.5.5 on FastEthernet0/0, age 3600, grace period 200, graceful restart reason: Switch to redundant control processor, graceful ip address: 192.167.1.1

OSPF: Recv MSG_OSPF_GR_HELP_RT_TERMINATE message

OSPF: IETF GR Exiting graceful restart helper mode for nbr 5.5.5.5(addr: 192.167.1.1) on VLink 192.167.1.1 with 21 secs remaining

OSPF: scheduling rtr lsa for area 0 process 1

OSPF: IETF GR Exiting graceful restart helper mode for nbr 5.5.5.5(addr: 192.167.1.1) on FastEthernet0/0 with 21 secs remaining

OSPF: scheduling rtr lsa for area 1 process 1

OSPF: scheduling net lsa on intf FastEthernet0/0

4.1.17. debug ip ospf retransmission

Syntax

To display retransmission of OSPF paceket, uset the debug ip ospf retransmission command;

debug ip ospf retransmission

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display transmission processo OSPF packets.

Example

router# debug ip ospf retransmission

OSPF: retransmit UPDATE to 192.168.40.3 (RID 192.168.40.3), state FULL

4.1.18. debug ip ospf spf

Syntax

To display information of SPF algorithm, use the debug ip ospf spf statistic command

debug ip ospf spf statistic

debug ip ospf spf

debug ip ospf spf intra

debug ip ospf spf inter

debug ip ospf spf external

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

The debug ip ospf spf statistic command displays the OSPF routes calculation process.

Example

router# debug ip ospf spf

OSPF: run ospf_spf_run

OSPF: start doing SPF for AREA 0.0.0.0

OSPF: RTAB_REV(ospf) 1390.

OSPF : Initializing to do SPF

OSPF: addroute LSID 192.168.20.240

OSPF: ospf_nh_find: 192.168.40.2

OSPF: addroute LSID 192.168.40.3

OSPF: build a OSPF_ROUTE, dest: 192.168.40.3

OSPF: addroute LSID 192.168.40.2

OSPF: SPF Area A running Network Summary

OSPF: Processing LS_SUM_NET 192.168.40.24, mask 255.255.255.248, adv 192.168.40.3, age 599

OSPF: addroute LSID 192.168.40.24

OSPF: ospf_build_route RT 192.168.40.24

OSPF: build route 192.168.40.24(255.255.255.248).

OSPF: Processing LS_SUM_NET 1.1.1.1, mask 255.255.255.255, adv 192.168.20.240, age 228

OSPF: addroute LSID 192.168.20.236

OSPF: build a OSPF_ROUTE, dest: 192.168.20.236

OSPF: start Building AS External Routes

OSPF: processing LS_ASE 192.168.42.0, mask 255.255.255.248, adv 192.168.20.236, age 258

OSPF: addroute LSID 192.168.42.0

OSPF: ospf_build_route RT 192.168.42.0

OSPF: build route 192.168.42.0(255.255.255.248).

OSPF: processing LS_ASE 192.168.43.0, mask 255.255.255.0, adv 192.168.20.236, age 258

OSPF: addroute LSID 192.168.43.0

OSPF: ospf_build_route RT 192.168.43.0

OSPF: build route 192.168.43.0(255.255.255.0).

OSPF: processing LS_ASE 192.168.44.0, mask 255.255.255.0, adv 192.168.20.236, age 258

OSPF: addroute LSID 192.168.44.0

OSPF: ospf_build_route RT 192.168.44.0

OSPF: build route 192.168.44.0(255.255.255.0).

OSPF: end doing SPF for AREA 0.0.0.0

Description of the displaying fields:

Field	Description
LSA(192.168.20.236, LS_SUM_ASB)	ID and type of LSA

4.1.19. debug ip ospf tree

Syntax

To display establishment of SPF tree of OSPF, use the debug ip ospf tree.

debug ip ospf tree

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display establishment of SPF tree of OSPF from the output of this command.

Example

router# debug ip ospf tree

B3710_221#

OSPF: add LSA(192.168.40.0, LS_STUB) 1600 under LSA(192.168.20.240, LS_RTR)

OSPF: add LSA(192.168.40.2, LS_RTR) 1600 under LSA(192.168.20.240, LS_RTR)

OSPF: add LSA(192.168.40.3, LS_RTR) 1600 under LSA(192.168.20.240, LS_RTR)

OSPF: add LSA(192.168.40.1, LS_STUB) 0 under LSA(192.168.20.240, LS_RTR)

OSPF: add LSA(192.168.40.3, LS_STUB) 1600 under LSA(192.168.40.3, LS_RTR)

OSPF: add LSA(192.169.1.5, LS_RTR) 3200 under LSA(192.168.40.2, LS_RTR)

OSPF: add LSA(192.168.40.18, LS_STUB) 1600 under LSA(192.168.40.2, LS_RTR)

OSPF: add LSA(192.168.40.2, LS_STUB) 1600 under LSA(192.168.40.2, LS_RTR)

OSPF: add LSA(192.168.40.17, LS_STUB) 3200 under LSA(192.169.1.5, LS_RTR)

OSPF: add LSA(192.168.40.24, LS_SUM_NET) 1601 under LSA(192.168.40.3, LS_RTR)

OSPF: add LSA(192.168.40.32, LS_SUM_NET) 3200 under LSA(192.168.40.2, LS_RTR)

OSPF: add LSA(192.168.40.40, LS_SUM_NET) 14577 under LSA(192.169.1.5, LS_RTR)

OSPF: add LSA(192.168.20.236, LS_SUM_ASB) 3200 under LSA(192.168.40.2, LS_RTR)

Description of the displaying fields:

Field	Description
LSA(192.168.20.236, LS_SUM_ASB)	ID and type of LSA
add	Sub-LSA
under	parent LSA

4.1.20. default-information originate (OSPF)

Syntax

To generate a default external route into an Open Shortest Path Firstly (OSPF) routing domain, use the default-information originate command

default-information originate [**always**] [**route-map** *map-name*]

no default-information originate [**always**] [**route-map** *map-name*]

Parameter

Parameter	Description

Originate	Generate a default external route into an Open Shortest Path Firstly (OSPF) routing domain
Always	(Optional) Always advertises the default route regardless of whether the software has a default route.
route-map map-name	(Optional) Routing process will generate the default route if the route map is satisfied.

Default value

This command is disabled by default. No default external route is generated into the OSPF routing domain.

Command mode

router configuration

Usage guidelines

Whenever you use the redistribute or the default-information router configuration command to redistribute routes into an OSPF routing domain, the software automatically becomes an Autonomous System Boundary Router Switch. However, an ASBR Switch does not, by default, generate a default route into the OSPF routing domain. The software still must have a default route for itself before it generates one, except when you have specified the always keyword.

When you use this command for the OSPF process, you must satisfy the route-map argument. Use the default-information originate always route-map command when you do not want the dependency on the default network in the routing table.

Example

The following example specifies a metric of 100 for the default route redistributed into the OSPF routing domain and an external metric type of Type 1:

router ospf 109

redistribute rip

default-information originate

Related commands

Redistribute

4.1.21. default-metric

Syntax

To set default metric values for the Open Shortest Path Firstly (OSPF) routing protocol, use the default-metric command. To return to the default state, use the no form of this command.

default-metric *value*

no default-metric

Parameter

Parameter	Description
value	Default metric value appropriate for the specified routing protocol, in the range 1~4294967295.

Default value

Default metric value is 10.

Command mode

router configuration

Usage guidelines

The default-metric command is used in conjunction with the redistribute router configuration command to cause the current routing protocol to use the same metric value for all redistributed routes. A default metric helps solve the problem of redistributing routes with incompatible metrics. Whenever metrics do not convert, using a default metric provides a reasonable substitute and enables the redistribution to proceed.

Example

The example assigns 10 as the default metric routes.

router_config_ospf_100#default-metric 3

Related commands

redistribute

4.1.22. distance

Syntax

To set the management distance based on the router-id of inform route and of ospf route set by the destination segment, run the following command. To return to the default setting, use the no form of this command.

distance *value* [*network mask] [access-list-name]*

no distance *value* [*network mask]*

Parameter

Parameter	Description
value	(option) management distance. The value ranges from 1 to 255.
network	(option) The segment which router-id of the inform router locates
mask	(option) The segment mask which router-id of the inform router locates

access-list-name	(option) Name of the access list

Default value

intra-area: 110

inter-area: 110

external: 150.

Command mode

OSPF Routing configuration mode

Usage guidelines

At least there is a parameter.

The command works the same with command “distance ospf”. While this command can set a finer management distance according to router-id of the inform router and destination segment.

Example

The following example shows how to set the management distance of the route complying with the list bd which sent by router 1.1.1.1. as 100:

```
!
router ospf 1
 distance 100 1.1.1.1 255.255.255.255 bd
 redistribute ospf 2
!
```

Related command

distance ospf

4.1.23. distance ospf

Syntax

To define Open Shortest Path Firstly (OSPF) route administrative distances based on route type, use the distance ospf command To restore the default value, use the no form of this command.

distance ospf {[**intra-area** *dist1*] [**inter-area** *dist2*] [**external** *dist3*]}

no distance ospf [**intra-area**] [**inter-area**] [**external**]

Parameter

Parameter	Description
intra-area dist1	(Optional) Sets the distance for routes in an area, learned by redistribution. The default value is 110.

inter-area dist2	(Optional) Sets the distance for all routes from one area to another area. The default value is 110.
external dist3	(Optional) Sets the distance for routes from other routing domains, learned by redistribution. The default value is 110.

Default value

intra-area: 110

inter-area: 110

external: 150

Command mode

router configuration

Usage guidelines

This command performs the same function as the distance command used with an access list. However, the distance ospf command allows you to set a distance for an entire group of routes, rather than a specific route that passes an access list.

Example

The following example changes the external distance to 200:

Router A

router ospf 1

redistribute ospf 2

distance ospf external 200

!

router ospf 2

redistribute ospf 1

distance ospf external 200

Router B

router ospf 1

redistribute ospf 2

distance ospf external 200

!

router ospf 2

redistribute ospf 1

distance ospf external 200

Related commands

distance

4.1.24. filter

Syntax

To configure routing fliter list, use the filter command. Use the no filter command to restore the default.

filter {*interface*-**type interface-**number | ***} {**in | out** } {**access-list** *access-list-name* | **gateway** *access-list-name* | **prefix-list** *prefix-list-name*}

no filter {*interface*-**type interface-**number | ***} {**in** | out} {**access-list** *access-list-name* | **gateway** *access-list-name* | **prefix-list** *prefix-list-name*}

Parameter

Parameter	Description
interface-**type**	Interface type
interface-number	Interface number
*	All interfaces
In	Filters incoming ospf routes
out	Filters outgong routes
access-list-name	Name of access list
access-list-name	Name of access list
prefix-list-name	Name of prefix list

Default value

none

Command mode

router configuration

Usage guidelines

none

Example

filter * in access-list mylist

4.1.25. graceful-restart

Syntax

To set OSPF graceful restart and related parameters, run the following command. To return to the default setting, use the no form of this command.

graceful-restart { *ietf* **[helper {disable | strict-lsa-checking }]** | **interval** *period* }

no graceful-restart { *ietf* **[helper {disable | strict-lsa-checking }]** | **interval** }

Parameter

Parameter	Description
ietf	Enables graceful restart of IETF standard (based on rfc 3623). The command is disabled by default.
***interval* period**	Configures the time limit of graceful restart. The value ranges from 40~1800s. The default value is 120s.
helper disable	(option) Disable GR helper. By default, the device can be GR helper of any OSPF neighbor.
helper strict-lsa-checking	(option) Enable strict-lsa-checking. When GR Helper detects the change of LSA, exit from Help mode. The command is disabled by default.

Default value

None

Command mode

OSPF Routing configuration mode

Usage guidelines

None

Example

```
!
router ospf 1
 router-id 192.85.1.1
 network 192.85.1.0 255.255.255.0 area 0
 graceful-restart ietf
 graceful-restart interval 90
!
```

4.1.26. ip ospf authentication

Syntax

To designate the authentication mode of an interface receiving and sending ospf packets, run the following command. To return to the default setting, use the no form of this command.

ip ospf authentication { **simple | message-digest** }

no ip ospf authentication

Parameter

Parameter	Description
simple	Authentication information verified by the plaintext
message-digest	Authentication information verified by MD5

Default value

No authentication

Command mode

Interface configuration mode

Usage guidelines

If use the command "**ip ospf authentication simple**" to verify the interface with the plaintext, you must configure a plaintext password with the command "**ip ospf password**". If use the command "**ip ospf authentication message-digest**" to designate the specified interface with md5 encryption authentication, you must configure md5 key with the command "**ip ospf message-digest-key**". If in one network, all OSPF are guaranteed with OSPF mutual communication, they must share the same verification type and passwords.

Considering the compatibility, the authentication type of one ospf domain must be kept. If no ospf authentication type is configured on the interface, the authentication type of the domain which the interface belongs to will be used (The default authentication type is no authentication.)

Example

The following example shows how to verify interface VLAN 2 with md5 verification.

```
!
interface VLAN2
 ip address 131.119.251.201 255.255.255.0
 no ip directed-broadcast
 ip ospf authentication message-digest
 ip ospf message-digest-key 1 md5 0 abcdefg
!
router ospf 1
 network 131.119.0.0 255.255.0.0 area 0
!
```

Related command

ip ospf password

ip ospf message-digest-key

area authentication

4.1.27. ip ospf bfd

Syntax

To enable BFD fast check function in the routing configuration mode, run the following command.

ip ospf bfd

To return to the default setting, use the no form of this command.

ip ospf bfd [disable]

To disable interface bfd, run the following command.

no ip ospf bfd

Parameter

disable: disable the function of bfd on the interface

Default value

No bfd

Command mode

Interface configuration mode

Usage guidelines

This function enables ospf and bfd collaborating to detect change of the fast detection link status.

Example

The following example shows how to enable bfd collaboration on the interface vlan2:

```
!
interface VLAN2
 ip address 172.16.0.1 255.255.0.0
 no ip directed-broadcast
 ip ospf bfd
!
router ospf 110
 network 172.16.0.0 255.255.0.0 area 1
!
```

Related command

bfd all-interfaces

4.1.28. ip ospf cost

Syntax

To specify the cost of OSPF protocol on an interface, use the ip ospf cost command in interface configuration mode. To restore to the default value, use the no form of this command.

ip ospf cost cost

no ip ospf cost

Parameter

Parameter	Description
cost	The cost of OSPF protocol. It can be a value in the range from 1 to 65535.

Default value

Default value of the OSPF protocol cost depends on rate of the interface.

Command mode

interface configuration mode

Example

The following example sets the interface cost value to 2:

ip ospf cost 2

specify the the interface cost of OSPF protocol, to restore the default value,use the no ip ospf command

4.1.29. ip ospf dead-interval

Syntax

To set the dead-interval of specified routing switch in neighbourhood, use the ip ospf dead-interval command in interface configuration mode. To restore the default value, use the no form of this command.

ip ospf dead-interval *seconds*

ip ospf dead-interval

Parameter

Parameter	Description
seconds	Interval (in seconds) of specified routing switch in neighbourhood. The range is 1 to 65535.

Default value

40 seconds

Command mode

interface configuration

Usage guidelines

The dead interval is advertised in OSPF hello packets and sent with OSPF hello packets. This value must be the same for all networking devices on a specific network and four times the interval set by the ip ospf hello-interval command.

Example

The following example sets the OSPF dead interval to 60 seconds:

router_config_S1/0#ip ospf dead-interval 60

Related commands

ip ospf hello-interval

4.1.30. ip ospf demand-circuit

Syntax

To designate the interface as the demand circuit, run the following command. To return to the default setting, use the no form of this command.

ip ospf demand-circuit

no ip ospf demand-circuit

Parameter

None

Default value

Disabled

Command mode

Interface configuration mode

Usage guidelines

After configuring the on-demand circuit, hello packets and periodically link status update packets can be suppressed. The bottom link can be disabled after the network topology is stable.

Example

The following example shows how to configure interface VLAN2 as on-demand circuit.

Switch_config_v2#ip ospf demand-circuit

4.1.31. ip ospf hello-interval

Syntax

To specify the interval between hello packets that the Cisco IOS software sends on the interface, use the ip ospf hello-interval command. To return to the default value, use the no form of this command.

ip ospf hello-interval *seconds*

no ip ospf hello-interval

Parameter

Parameter	Description
seconds	Specifies the interval (in seconds) of sending hello packets. The range is from 1 to 255.

Default value

10 seconds

Command mode

interface configuration mode

Usage guidelines

This value is advertised in the hello packets and sent with the hello packets. The smaller the hello interval, the faster topological changes will be detected, but more routing traffic will ensue. This value must be the same for all routers and access servers on a specific network.

Example

The following example sets the interval between hello packets to 20 seconds:

router_config_S1/0#ip ospf hello-interval 20

Related commands

ip ospf dead-interval

4.1.32. ip ospf message-digest-key

Syntax

To enable Open Shortest Path Firstly (OSPF) Message Digest 5 (MD5) authentication, use the ip ospf message-digest-key md5 command. To remove an old MD5 key, use the no form of this command.

ip ospf message-digest-key *keyid* **md5 key**

no ip ospf message-digest-key *keyid*

Parameter

Parameter	Description
keyid	An identifier in the range from 1 to 255.
key	Alphanumeric password of up to 16 bytes.

Default value

OSPF MD5 authentication is disabled.

Command mode

interface configuration mode

Usage guidelines

Usually, one key per interface is used to generate authentication information when sending packets and to authenticate incoming packets. The same key identifier on the neighbor router must have the same key value.

The process of changing keys is as follows. Suppose the current configuration is as follows:

interface ethernet 1

ip ospf message-digest-key 100 md5 OLD

You change the configuration to the following:

interface ethernet 1

ip ospf message-digest-key 101 md5 NEW

The system assumes its neighbors do not have the new key yet, so it begins a rollover process. It sends multiple copies of the same packet, each authenticated by different keys. In this example, the system sends out two copies of the same packet—the first one authenticated by key 100 and the second one authenticated by key 101.

Rollover allows neighboring routers to continue communication while the network administrator is updating them with the new key. Rollover stops once the local system finds that all its neighbors know the new key. The system detects that a neighbor has the new key when it receives packets from the neighbor authenticated by the new key.

After all neighbors have been updated with the new key, the old key should be removed. In this example, you would enter the following:

interface ethernet 1

no ip ospf message-digest-key 100

Then, only key 101 is used for authentication on Ethernet interface 1.

We recommend that you not keep more than one key per interface. Every time you add a new key, you should remove the old key to prevent the local system from continuing to communicate with a hostile system that knows the old key. Removing the old key also reduces overhead during rollover.

Example

The following example sets a new key 19 with the password 8ry4222:

interface ethernet 1

ip ospf message-digest-key 10 md5 xvv560qle

ip ospf message-digest-key 19 md5 8ry4222

Related commands

area authentication

4.1.33. ip ospf mib-binding

Syntax

To set OSPF progress of mib, run the following command. To return to the default setting, use the no form of this command.

ip ospf mib-binding *process-id*

no ip ospf mib-binding

Parameter

Parameter	Description
process-id	OSPF process ID. The value ranges from 1 to 65535.

Default value

MIB operation binds on OSPF with the most small progress.

Command mode

Global configuration mode

Usage guidelines

When multiple OSPF progresses are configured, the command can be used to bind MIB with a specific OSPF progress.

Example

The following example shows how to bind MIB operation to OSPF 100:

Switch_config#ip ospf mib-binding 100

4.1.34. ip ospf network

Syntax

To configure the Open Shortest Path Firstly (OSPF) network type, use the ip ospf network command. To return to the default value, use the no form of this command.

ip ospf network { **broadcast | nonbroadcast | point_to_multipoint** | **point-to-point**}

no ip ospf network { **broadcast | nonbroadcast | point_to_multipoint | point-to-point**}

Parameter

Parameter	Description
broadcast	Sets the network type to broadcast.

nonbroadcast	Sets the network type to nonbroadcast multiaccess
point-to-point	Sets the network type to point-to-point.
point-to-multipoint	Sets the network type to point-to-multipoint.

Command mode

interface configuration mode

Usage guidelines

Using this feature, you can configure broadcast networks as NBMA networks. Configuring NBMA networks as point-to-multipoint network if there is no assurance to direct connection between any two routing switches.

Example

The following example sets serial1/0 as a nonbroadcast network type:

router_config_S1/0#ip ospf network nonbroadcast

4.1.35. ip ospf passive

Syntax

To cancel sending a HELLO packets on an interface, use the ip ospf passive command. Use the no form of this command to reactivate the sending of HELLO packet.

ip ospf passive

no ip ospf passive

Parameter

This command has no keywords or parameters.

Default value

disabled

Command mode

all configruration mode

Usage guidelines

If you cancel sending a HELLO packet on an interface, a specified subnetwork wll keep on declaring to other interfaces, and the routing update from other routing switch to this interface can still be received and dealt with. This is usually applicable to the STUB network, for in this kind of network there is usually no other OSPF routing switches.

Example

The following example sends a HELLO packet to all interfaces(except for Ethernet 1/0) overridden by network 172.16.0.0:

interface ethernet 1/0

ip address 172.16.0.1 255.255.0.0

ip ospf passive

router ospf 110

network 172.16.0.0 255.255.0.0 area 1

Related commands

none

4.1.36. ip ospf password

Syntax

To configure password for a neighbor route, use the ip ospf password command. Use the no form of this command to cancel the configuration.

ip ospf password *password*

no ip ospf password

Parameter

Parameter	Description
password	Any consecutive 8-digit character string.

Default value

No password is predefined by default.

Command mode

Interface configuration mode

Usage guidelines

The password generated by this command directly inserts OSPF information packet. This command can configure one password for each network of each interface. All neighbor routers must have the same password to exchange OSPD routing information.

Note: This command is only valid when configured with the area authentication command.

Example

ip ospf password yourpass

Related commands

area authentication

4.1.37. ip ospf priority

Syntax

To set the router priority, use the ip ospf priority command. To return to the default value, use the no form of this command.

ip ospf priority *priority*

no ip ospf priority

Parameter

Parameter	Description
priority	Specifies the priority. The range is from 0 to 255.

Default value

Priority of 1

Command mode

interface configuration mode

Usage guidelines

When two routing switches attached to a network both attempt to become the designated routing switch, the one with the higher routing switch priority takes precedence. If there is a tie, the routing switch with the higher routing switch ID takes precedence. A routing switch with a routing switch priority set to zero is ineligible to become the designated routing switch or backup designated routing switch. routing switch priority is configured only for interfaces to multiaccess networks (in other words, not to point-to-point networks).

This priority value is used when you configure Open Shortest Path Firstly (OSPF) for nonbroadcast networks using the neighbor routing switch configuration command for OSPF.

Example

The following example sets the routing switch priority value to 8:

router_config_S1/0#ip ospf priority 8

Related commands

neighbor

4.1.38. ip ospf retransmit-interval

Syntax

To specify the time between link-state advertisement (LSA) retransmissions for adjacencies belonging to the interface, use the ip ospf retransmit-interval command. To return to the default value, use the no form of this command.

ip ospf retransmit *seconds*

no ip ospf retransmit

Parameter

Parameter	Description
seconds	Time (in seconds) between retransmissions. The range is from 1 to 65535 seconds.

Default value

The default is 5 seconds.

Command mode

interface configuration mode

Usage guidelines

When a routing switch sends an LSA to its neighbor, it keeps the LSA until it receives back the acknowledgment message. If the routing switch receives no acknowledgment, it will resend the LSA. The setting of the seconds argument should be greater than the expected round-trip delay between any two routing switches on the attached network.

Example

The following example sets the retransmit interval value to 8 seconds: router_config_S1/0#ip ospf retransmit 8

4.1.39. ip ospf transmit-delay

Syntax

To set ip ospf transmit-delay time on the interface, run the following command. To return to the default setting, use the no form of this command.

ip ospf transmit-delay *time*

no ip ospf transmit-delay

Parameter

Parameter	Description
time	ip ospf transmit-delay time Units, the value ranges from 1 to 3600.

Default value

1s

Command mode

Interface configuration mode

Example

The following example shows how to configure the transmit-delay time on interface VLAN2 as 3s.

Switch_config_v2#ip ospf transmit-delay 3

4.1.40. limit retransmissions

Syntax

To set the max re-transmit times of ospf, run the following command. The re-transmit packets are DD, REQ and LSU. To return to the default setting, use the no form of this command.

limit retransmissions { *timers* | **disable }**

no limit retransmissions [dsiable]

Parameter

Parameter	Description
timers	Max re-transmit times (The default value is 25)
disable	Cancel the max re-transmit times (No limit to the re-transmit)

Default value

The default re-transmit times is 25.

Command mode

OSPF Routing configuration mode

Usage guidelines

None

Example

The following example shows how to modify the retransmit times to 10:

Switch_config_ospf_100#limit retransmissions 10

The following example shows how to restart the retransmit times without limit:

Switch_config_ospf_100#limit retransmissions disable

4.1.41. limit max-ext-lsa

Syntax

To set max amount of AS external LSA, run the following command. To return to the default setting, use the no form of this command.

limit max-ext-lsa *value*

no limit max-ext-lsa

Parameter

Parameter	Description
value	Max amount of AS external LSA. The value ranges from 0 to

	1000000.

Default value

No limit to the max amount of AS external LSA.

Command mode

OSPF Routing configuration mode.

Usage guidelines

The command is used to set all routes in OSPF autonomous domain as the same value.

Example

To set max amount of AS external LSA in OSPF progress 100 to be 1000:

Switch_config#router ospf 100

Switch_config _ospf_100#limit max-ext-lsa 1000

4.1.42. maximum-paths

Syntax

To set the max amount of next hop of the equivalent route, run the following command. To return to the default setting, use the no form of this command.

maximum-paths *value*

no maximum-paths

Parameter

Parameter	Description
value	The max amount of next hop of the equivalent route. The value ranges from 1 to 8.

Default value

8

Command mode

OSPF Routing configuration mode

Usage guidelines

If the value is 1, the load distribution does not work.

Example

The following example shows how to set next hop of the equivalent route in OSPF progress 100 to be 3.

Switch_config#router ospf 100

Switch_config_ospf_100#maximum-paths 3

4.1.43. neighbor

Syntax

To configure Open Shortest Path Firstly (OSPF) routing switch interconnecting to nonbroadcast networks, use the neighbor command. To remove a configuration, use the no form of this command.

neighbor *ip-address* [*priority number*] [**poll-interval** *seconds*] [**cost** *number*]

no neighbor *ip-address* [*priority number*] [**poll-interval** *seconds*] [*cost number*]

Parameter

Parameter	Description
ip-address	Interface IP address of the neighbor.
priority number	(Optional) A number that indicates the router priority value of the nonbroadcast neighbor associated with the IP address specified. The default is 0. This keyword does not apply to point-to-multipoint interfaces.
poll-interval seconds	(Optional) A number value that represents the poll interval time (in seconds). RFC 1247 recommends that this value be much larger than the hello interval. The default is 120 seconds (2 minutes). This keyword does not apply to point-to-multipoint interfaces.
cost number	(Optional) Assigns a cost to the neighbor, in the form of an integer from 1 to 65535. Neighbors with no specific cost configured will assume the cost of the interface, based on the ip ospf cost command. For point-to-multipoint interfaces, the cost keyword and the number argument are the only options that are applicable. This keyword does not apply to nonbroadcast multiaccess (NBMA) networks.

Default value

no default value

Command mode

router configuration

Usage guidelines

In X.25 and Frame Relay networks you can configure OSPF to run as a broadcast network. Detailed information is as follow:

In X.25 and frame relay map

One nonbroadcast network neighbor must be configured in the routing switch. The neighbor address must be on the primary address of the interface.

If a neighboring router has become inactive, it may still be necessary to send hello packets to the dead neighbor. These hello packets will be sent at a reduced rate called Poll Interval.

When the routing switch first starts up, it sends only hello packets to those routing switches with nonzero priority, that is, routing switches that are eligible to become designated routeing switch (DRs) and backup designated routing switches (BDRs). After the DRs and BDRsare selected, DRs and BDRs will then start sending hello packets to all neighbors in order to form adjacencies.

Example

The following example declares a routing switch at address 131.108.3.4 on a nonbroadcast network, with a priority of 1 and a poll interval of 180 seconds:

router ospf

neighbor 131.108.3.4 priority 1 poll-interval 180

The following example illustrates a point-to-multipoint network with nonbroadcast:

interface Serial0

ip address 10.0.1.1 255.255.255.0

ip ospf network point-to-multipoint non-broadcast

encapsulation frame-relay

no keepalive

frame-relay local-dlci 200

frame-relay map ip 10.0.1.3 202

frame-relay map ip 10.0.1.4 203

frame-relay map ip 10.0.1.5 204

no shut

!

router ospf 1

network 10.0.1.0 255.255.255.0 area 0

neighbor 10.0.1.3 cost 5

neighbor 10.0.1.4 cost 10

neighbor 10.0.1.5 cost 15

Related commands

ip ospf priority

4.1.44. network area

Syntax

To define the interfaces on which Open Shortest Path Firstly (OSPF) runs and to define the area ID for those interfaces, use the network area command. To disable the feature, use the no form of this command.

network *network mask* **area** *area_id* **[advertise | not-advertise]**

[no] network *network mask* **area** *area_id* **[advertise | not-advertise]**

Parameter

Parameter	Description
network	Network Ip address, in dotted decimal format.
mask	Mask, in dotted decimal format.
area_id	Id of area.
advertise notadvertise	Specifies whether to advertise the abstract information or not

Default value

This command is disabled by default. command mode

router configuration

Usage guidelines

Any individual interface can only be attached to a single area. If the address ranges specified for different areas overlap, the software will adopt the first area in the network command list and ignore the subsequent overlapping portions. Importing network range and specifying the range can reduce the switch state of routing information among areas

Example

The following example defines network range 10.0.0.0 255.0.0.0 and adds to area 2:

router_config_ospf_10#network 10.0.0.0 255.0.0.0 area 2

4.1.45. redistribute

Syntax

To configure OSPF to redistribute routes of other routing protocols, use the redistribute command. Use the no form of this command to restore the default.

redistribute protocol [*as-number*] [**route-map map-tag**]

no redistribute protocol [*as-number*] [**route-map map-tag**]

Parameter

Parameter	Description

protocol	Redistributes former protocols that learned, it should be one of the following: beigrp, bgp, connect, ospf, rip, static.
as_number	(Optional) Autonomous system number. There is no parameter for connect, rip and static.
map-tag	(Optional) Name of the route map.

Default value

disabled

Command mode

router configuration

Usage guidelines

none

Example

The following example redistributes OSPF protocol from the autonomous system 0:

Redistribute ospf 0

4.1.46. router ospf

Syntax

To configure an Open Shortest Path Firstly (OSPF) routing process, use the router ospf command. To terminate an OSPF routing process, use the no form of this command.

router ospf *process-id*

no router ospf *process-id*

Parameter

Parameter	Description
process-id	Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process.

Default value

No OSPF routing process is defined.

Command mode

global configuration mode

Usage guidelines

You can specify multiple OSPF routing processes in each router.

Example

The following example configures an OSPF routing process and assign a process number of 109:

router ospf 109

Related commands

network area

4.1.47. router-id

Syntax

To designate router-id in OSPF in progesss, run the following command. To return to the default setting, use the no form of this command.

router-id *ip-address*

no router-id

Parameter

Parameter	Description
ip-address	Outer ID of OSPF progress. Point spread decimalism.

Default value

OSPF progress selects router-id on its own.

Command mode

OSPF Routing configuration mode

Usage guidelines

After configuring the new router-id, the OSPF progress will be restarted. The configured router-id is exclusive to the whole OSPF autonomous domain.

Example

The following example shows how to configure one OSPF progress and the designated router-id is 1.1.1.1:

!

router ospf 109

router-id 1.1.1.1

!

Related command

router ospf

4.1.48. show ip ospf

Syntax

To display general information about Open Shortest Path Firstly (OSPF) routing processes, use the show ip ospf command.

show ip ospf [*process-id*]

Parameter

parameter	description
process-id	(Optional) Process ID. If

Default value

none

Command mode

EXEC

Usage guidelines

Troubleshoot OSPF problems according to the output of this command. To display only the global configuration information of the corresponding OSPF process if configured with the process-id parameter.

Example

The following display the configuration information of OSPF process :

router#show ip ospf

OSPF process: 1, Router ID is 192.168.99.81

Distance: intra-area 110 inter-area 130 external 150

Source Distance Access-list

240.240.1.1/24 1 what

SPF schedule delay 5 secs, Hold time between two SPFs 10 secs

Number of areas is 3

AREA: 1

Number of interface in this area is 1(UP: 1)

Area authentication type: None

AREA: 36.0.0.1

This is a stub area.

Number of interface in this area is 0(UP: 0)

Area authentication type: None

AREA: 192.168.20.0

Number of interface in this area is 0(UP: 0)

Area authentication type: None

Net Range list:

10.0.0.0/255.0.0.0 Not-Advertise

140.140.0.0/255.255.0.0 Advertise
filter list on receiving UPDATE is Gateway: weewe
filter list on sending UPDATE is Prefix: trtwd
Summary-address list:
150.150.0.0/16 advertise
router#
description of the displaying fields

Field	Description
OSPF process: 1	OSPF process ID
Router ID is 192.168.99.81	Routing switch ID
Distance: intra-area 110 inter-area 130 external 150	The default administrative distance that the current routing switch adopts
Source Distance Access-list	Administrative distance based on concrete routing configuration
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs	Value of two timer related to OSPF
Number of areas is 3	The number of the field that currently configured and the parameter configured in each field
filter list on receiving	The configured filter list on receiving routes
filter list on sending	The configured filter list on sending routes
Summary-address list	The configured routing summary address

4.1.49. show ip ospf border-routers

Syntax

To display the internal Open Shortest Path Firstly (OSPF) routing table entries to an Area Border Router (ABR) and Autonomous System Boundary Router (ASBR), use the show ip ospf border-routers command.

show ip ospf border-routers

Parameter

none

Default value

none

Command mode

EXEC

Example

router#

router#sh ip os bor

OSPF process: 1

Codes: i - Intra-area route, I - Inter-area route

Destination Adv-Rtr Cost Type Area

i 192.168.20.77 192.168.20.77 11 ABR 0

router#

field description:

Field	Description
Destination	Routing switch ID of the destination.
Adv-Rtr	Next hop toward the destination.
Cost	Cost of using this route.
Type	The routing switch type of the destination; it is either an ABR or ASBR or both.
Area	The area ID of the area from which this route is learned.

4.1.50. show ip ospf database

Syntax

To display lists of information related to the Open Shortest Path Firstly (OSPF) database, use the show ip ospf database command.

show ip ospf database

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

Display lists of information related to the Open Shortest Path Firstly (OSPF) database in accordance with debugging information of the command, and it is helpful for users in troubleshooting.

Example

router#

router#show ip ospf database

OSPF process: 1

(Router ID 192.168.99.81)

AREA: 0

Router Link States

Link ID ADV Router Age Seq # Checksum Link count

192.168.20.77 192.168.20.77 77 0x8000008a 0x90ed 1

192.168.99.81 192.168.99.81 66 0x80000003 0xd978 1

Net Link States

Link ID ADV Router Age Seq # Checksum

192.168.20.77 192.168.20.77 80 0x80000001 0x9625

Summary Net Link States

Link ID ADV Router Age Seq # Checksum

192.168.99.0 192.168.99.81 87 0x80000003 0xd78c

AREA: 1

Router Link States

Link ID ADV Router Age Seq # Checksum Link count

192.168.99.81 192.168.99.81 70 0x80000002 0x0817 1

Summary Net Link States

Link ID ADV Router Age Seq # Checksum

192.168.20.0 192.168.99.81 66 0x80000006 0xd1c1

router#

field description:

Field	Description
AREA: 1	OSPF area.

Router Link States/Net Link States/Summary Net Link States	LSA type
Link ID	LSA ID.
ADV Router	Advertising routing switch's ID.
Age	Link state age.
Seq #	Link state sequence number
Checksum	Fletcher checksum of the complete contents of the link state advertisement.

4.1.51. show ip ospf interface

Syntax

To display Open Shortest Path Firstly (OSPF)-related interface information, use the show ip ospf interface command.

show ip ospf interface

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display configuration and operation situation of OSPF on an interface according to the debugging information of this command. Users can confirm whether the configuration is right or not and it is helpful in troubeshooting

Example

router#sh ip os int

Ethernet 1/0 is up, line protocol is up

Internet Address: 192.168.20.81/24, Nettype: BROADCAST

OSPF process is 1, AREA 0, Router ID 202.96.135.201

Cost 10, Transmit Delay is 1 sec, Priority 1

Hello interval 10, Dead timer 40, Retransmit 5

OSPF INTF State is DrOther
Designated Router id 131.119.254.10, Interface address 131.119.254.10
Backup Designated router id 131.119.254.28, Interface addr 131.119.254.28
Neighbor Count is 8, Adjacent neighbor count is 2
Adjacent with neighbor 131.119.254.28 (Backup Designated Router)
Adjacent with neighbor 131.119.254.10 (Designated Router)
router#
displaying field description:

Field	Description
Internet Address:	Interface IP address
Nettype	Net type of OSPF interface
OSPF process is	OSPF process number
AREA	OSPF area.
Router ID	Routing switch ID
Cost	Cost of routing switch OSPF interface
Transmit Delay is	Transmit delay
Priority	Priority of routing switch interface
Hello interval	Number of seconds until next hello packet is sent out this interface.
Dead timer	Dead timer
Retransmit	Retransmit interval
OSPF INTF State is	OSPF nterface state
Designated Router id	Designated router id and interface ip address
Backup Designated router id	Backup Designated routing switch id and interface ip address
Neighbor Count is	Number of the neighbor routing switch

Adjacent neighbor count is	Number of the adjacent neighbor that has established
Adjacent with neighbor	List of the adjacent neighbor

4.1.52. show ip ospf neighbor

Syntax

To display Open Shortest Path Firstly (OSPF)-neighbor information, use the show ip ospf neighbor command.

show ip ospf neighbor

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

To display neighbor situation of OSPF from the output of this command to help user troubleshoot OSPF.

Example

router#show ip ospf neighbor

OSPF process: 1

AREA 1

Neighbor Pri State DeadTime Address Interface

21.0.0.32 1 FULL /DR 31 192.168.99.32 Ethernet1/0

AREA 36.0.0.1

Neighbor Pri State DeadTime Address Interface

199.199.199.137 1 EXSTART/DR 31 202.19.19.137 Ethernet2/1

AREA 192.168.20.0

Neighbor Pri State DeadTime Address Interface

140.140.0.46 1 FULL /DR 108 140.140.0.46 Serial 1/0

133.133.2.11 1 FULL /DR 110 133.133.2.11 Serial1/0

192.31.48.200 1 FULL / DROTHER 31 192.31.48.200 Ethernet1/0

Displaying field description:

Field	Description

OSPF process	OSPF process number
AREA	OSPF area
Neighbor	Neighbor routing switch ID.
Pri	Routing switch priority of the neighbor, neighbor state.
State	OSPF state.
DeadTime	Expected time before software will declare the neighbor dead.
Address	Neighbor ip address
Interface	Interface to which connects the neighbor

4.1.53. show ip ospf virtual-link

Syntax

To display information of Open Shortest Path Firstly (OSPF) virtual links, use the show ip ospf virtual-links command.

show ip ospf virtual-link

Parameter

none

Default value

none

Command mode

EXEC

Usage guidelines

The information displayed by the show ip ospf virtual-links command is useful in debugging OSPF routing operations. To display the detailed information of adjacency relation of the OSPF neighbour, use the show show ip ospf neighbour command

Example

router#show ip ospf vir

Virtual Link Neighbor ID 200.200.200.2 (UP)

Run as Demand-Circuit

TransArea: 1, Cost is 185

Hello interval is 10, Dead timer is 40 Retransmit is 5

INTF Adjacency state is IPOINT_TO_POINT

Description of the displaying fields:

Field	Description
neibhbor ID	The configured neighbor ID of the remote side
neighbour state	Adjacency relation of the OSPF neighbor
Demand-Circuit	Indicates working under DC mode
TransArea	The transit area through which the virtual link is formed.
cost	The cost of reaching the OSPF neighbor through the virtual link.
Hello Interval	The current Hello interval
DeadTime	Expected time before software will declare the neighbor dead.
Retrans	Retransmit interval
INTF Adjacency State	The state of virtual link.

Related commands

area vritual-link

show ip ospf neighbor

4.1.54. stub-router

Syntax

To set stub route, rrun the following command. To return to the default setting, use the no form of this command.

stub-router

no stub-router

Parameter

None

Default value

Disabled

Command mode

OSPF Routing configuration mode

Usage guidelines

After the router is configured as Stub router, the router will not forward packets whose destination segment is not in the router. At the moment, in Router-LSA published by the router, the value of the link whose type is 1 (point to point link), 1(connecting to the transmission network) and 4 (virtual link) will be set as 65535, while the value of the link 3 (connecting to Stub network) will not be changed. Thus, when other routers are working, if there is a smaller router with less cost in the destination address, the data will not be forwarded by this Stub router.

Example

The following example shows how to configure Stub router as the local router:

router ospf 109

stub-router

4.1.55. summary-address

Syntax

To create aggregate addresses for Open Shortest Path Firstly (OSPF), use the summary-address command. To restore the default, use the no form of this command.

summary-address *address mask* [**not-advertise**]

no summary-address *address mask*

Parameter

Parameter	Description
address	Summary address designated for a range of addresses.
mask	IP subnet mask used for the summary route.
not-advertise	(Optional) Suppress match routes that creat LSA

Default value

none

Command mode

router configuration

Usage guidelines

Routes learned from other routing protocols can be summarized. The metric used to advertise the summary is the smallest metric of all the more specific routes. This command helps reduce the size of the routing table.

Using this command for OSPF causes an OSPF Autonomous System Boundary Routing switch (ASBRs) to advertise one external route as an aggregate for all redistributed routes that are covered by the address. For OSPF, this command summarizes only routes from other routing protocols that are being redistributed into OSPF. Use the area range command for route summarization.

Example

In the following example, the summary address 10.1.0.0 includes address 10.1.1.0, 10.1.2.0, 10.1.3.0, and so on. Only the address 10.1.0.0 is advertised in an external link-state advertisement.

summary-address 10.1.0.0 255.255.0.0

Related commands

area range

ip ospf password

ip ospf message-digest-key

4.1.56. timers delay-timer

Syntax

To specify the delay interval between OSPF receiving a topology structure variety and initializing a minimum route priority computation, use the timer delay command. Use the no form of this command to resotre default value.

timers delay *spf-delay*

no timers delay

Parameter

Parameter	Description
spf-delay	Delay between topology variety and computation commencement in seconds, from 0 to 65535. Default value is 5 seconds. If the value is o, that indicates there is no delay, namely, once there is a variety, the commencement of computation immediately starts.

Default value

spf-delay: 5 seconds

Command mode

router configuration

Usage guidelines

The less the configured time is, the quicker the response to network variety. But this will take up more processing time.

Example

timers spf 10

4.1.57. timers hold-timer

Syntax

To configure the interval between two continuous SPF computation, use the timers hold command. Use the no form of this command to restore the default value.

timers hold *spf-holdtime*

no timers hold

Parameter

Parameter	Description
spf-holdtime	The minimum value between two continuous computation, in the range from 0 to 65535.

Default value

spf-holdtime: 10 seconds

Command mode

router configuration

Usage guidelines

The less the configured time is, the quicker the response to network variety. But this will take up more processing time.

Example

timers spf 20

4.1.58. timers age-timer

Syntax

To set time interval of OSPF checking LSA database aging, run the following command. To return to the default setting, use the no form of this command.

timers age-timer *agetime*

no timers age-timer

Parameter

Parameter	Description
agetime	Check lsa database every agetime.

Default value

agetime: 60s

Command mode

OSPF Routing configuration mode

Usage guidelines

The smaller the time, the faster the database responds, but with more processer time.

Example

timers age-timer 50

CHAPTER 5 BGP CONFIGURATION COMMANDS

5.1. BGP Configuration Commands include:

- aggregate-address
- bgp always-compare-med
- bgp bestpath med
- bgp client-to-client reflection
- bgp cluster-id
- bgp confederation identifier
- bgp confederation peers
- bgp dampening
- bgp default
- bgp deterministic-med
- bgp redistribute-internal
- clear ip bgp
- debug chat
- debug dialer
- debug ip bgp
- distance
- filter
- neighbor default-originate
- neighbor description
- neighbor distribute-list
- neighbor ebgp-multihop
- neighbor filter-list
- neighbor maximum-prefix
- neighbor next-hop-self
- neighbor password
- neighbor prefix-list
- neighbor remote-as
- neighbor route-map
- neighbor route-reflector-client
- neighbor route-refresh
- neighbor send-community
- neighbor shutdown
- neighbor soft-reconfiguration
- neighbor timers
- neighbor update-source
- neighbor weight
- network (BGP)

- redistribute(BGP)
- router bgp
- show ip bgp
- show ip bgp community
- show ip bgp neighbors
- show ip bgp paths
- show ip bgp prefix-list
- show ip bgp regexp
- show ip bgp summary
- synchronization
- table-map
- timers

5.1.1. address-family ipv4

Syntax

To eneter bgp ipv4 address family mode, run the following command. To return to the default setting, use the no form of this command.

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

Parameter

Parameter	Description
mdt	Enters ipv4 mdt configuration mode. It is used for mvpn.
multicast	Enters ipv4 multicast configuration mode. It is used for multicast rpf query.
unicast	Enters ipv4 unicast configuration mode. It is used for ipv4 unicast.
name	Configuration parameters of address-family ipv4 vrf, which means enter vpn configuration mode.

Default value

None

Command mode

BGP configuration mode

Usage guidelines

Expand bgp configuration mode.

Example

The following example shows how to activate neighbor 1.1.1.1 ipv4 mdt route inform.

router bgp 1
bgp log-neighbor-changes
neighbor 1.1.1.1 remote-as 1
address-family ipv4 mdt
neighbor 1.1.1.1 activate
exit-address-family

Related command

exit-address-family

5.1.2. address-family ipv6

Syntax

To enter bgp ipv6 address family configuration mode, run the following command.

address-family ipv6 {multicast | unicast}

Parameter

Parameter	Description
multicast	Enters the configuration mode of ipv6 multicast.
unicast	Enters the configuration mode of ipv6 unicast.

Default value

None

Command mode

BGP configuration mode

Usage guidelines

Expand bgp configuration mode

Example

The following example shows how to activate neighbor 1.1.1.1 ipv6 routing inform:

router bgp 1
bgp log-neighbor-changes
neighbor 1.1.1.1 remote-as 1
address-family ipv6
neighbor 1.1.1.1 activate
exit-address-family

Related command

exit-address-family

5.1.3. address-family vpnv4

Syntax

To enter bgp vpnv4 address family configuration mode, run the following command.

address-family vpnv4

Parameter

None

Default value

None

Command mode

BGP configuration mode

Usage guidelines

Expand bgp configuration mode: used for l3vpn configuration environment. The configuration mode is often used in condition of PE-PE interconnection.

Example

The following example shows how to activate neighbor 1.1.1.1 vpnv4 routing inform.

router bgp 1

bgp log-neighbor-changes

neighbor 1.1.1.1 remote-as 1

address-family vpnv4

neighbor 1.1.1.1 activate

exit-address-family

Related command

exit-address-family

5.1.4. aggregate-address

Syntax

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

aggregate-address A.B.C.D/n [**summary-only**] [**route-map** *map-name*]

no aggregate-address A.B.C.D/n [**summary-only**] [**route-map** *map-name*]

Parameter

Parameter	Description
A.B.C.D/n	Aggregate network

summary-only	Filters all more-specific routes from updates.
route-map	Name of the route map used to set the attribute of the aggregate route.
map-name	Name of the route map

Default value

none

Command mode

BGP configuration mode

Usage guidelines

You can implement aggregate routing in BGP in three methods:first,dynamic implement routing by forwarding redistribute; second, static implement routing by network command; third, static implement routing by aggregate. The routing created in this way are local routing, which can be announced to other equivalent, but not implement local IP address table.

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 which matches the aggregate must exist in the 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 summary-only keyword not only creates the aggregate route (for example, 19.*.*.*) 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.

Example

In the following example, an aggregate BGP address is created:

```
router bgp 5
aggregate-address 193.0.0.0/8
```

Related commands

route-map

5.1.5. bgp always-compare-med

Syntax

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. To disallow the comparison, use the no form of this command.

bgp always-compare-med

no bgp always-compare-med

Parameter

none

Default value

Default 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.

Command mode

BGP configuration mode

Usage guidelines

Default 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.

Example

The following example enables the function

router bgp 5

bgp always-compare-med

Related commands

bgp bestpath med

bgp deterministic-med

5.1.6. bgp asnotation dot

Syntax

To enable asdot mode, run the following command.

bgp asnotation dot

no bgp asnotation dot

Parameter

None

Default value

asplain

Command mode

BGP configuration mode

Usage guidelines

The command is used to configure the display form of as. Only when as is greater than 65535 can it is displayed in the form of asdot. The command takes effect needs to activate **clear ip bgp***.

Example

The following example shows how to enable the function:

router bgp 100

bgp asnotation dot

Related command

route bgp

show ip bgp

5.1.7. bgp bestpath med

Syntax

To modify the process way of Border Gateway Protocol (BGP) on Multi Exit Discriminator (MED) attribute, use the bgp bestpath med command. To disable the feature, use the no form of this command.

Parameter

Parameter	Description
confed	Autonous system confederation MED comparison attrubute
missing-as-worst	(Optional) Assigns the value of infinity to received routes that do not carry the MED attribute, making these routes the least desirable.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

If the MED attribute of BGP route is not configured, the value of MED is always considered to be 0, that is the least value, which has the most priority. When configured with the missing-as-worst option, if the MED attribute of BGP route is not configured, the value of MED is always considered to be the most maximum value, which has the least priority.

Example

By default, the MED comparison between (100) and (200) doesn't occur for they are not the routes from the same sub-autonomous system. But the MED comparison occurs when configured with the bgp bestpath med confed command, for they come from the sub-autonomous system 100 and 200 respecitively in the autonomous system alliance.

Related commands

bgp always-compare-med

bgp deterministic-med

5.1.8. bgp client-to-client reflection

Syntax

To enable or restore route reflection from a BGP route reflector to clients, use the bgp client-to-client reflection command. To disable client-to-client route reflection, use the no form of this command.

bgp client-to-client reflection

no bgp client-to-client reflection

Parameter

none

Default value

Client-to-client route reflection is enabled by default; when a route reflector is configured, the route reflector reflects routes from a client to other clients.

Command mode

BGP configuration mode

Usage guidelines

By default, the clients of a route reflector are not required to be fully meshed and the routes from a client are reflected to other clients. However, if the clients are fully meshed, route reflection is not required. In this case, use the no bgp client-to-client reflection command to disable client-to-client reflection.

Example

In the following example, the local routing switch is a route reflector, and the three neighbors are fully meshed, turn off client-to-client reflection

router bgp 5

neighbor 192..168.20.190 router-reflector-client

neighbor 192..168.20.191 router-reflector-client

neighbor 192..168.20.192 router-reflector-client

no bgp client-to-client reflection

Related commands

neighbor route-reflector-client

bgp cluster-id

5.1.9. bgp cluster-id

Syntax

To set the cluster ID on a route reflector in a route reflector cluster, use the bgp cluster-id command in router configuration mode. To remove the cluster ID, use the no form of this command.

bgp cluster-id *cluster-id*

no bgp cluster-id *cluster-id*

Parameter

Parameter	Description
cluster-id	Cluster ID of this router acting as a route reflector; maximum of 4 bytes.

Default value

The local routing switch ID of the route reflector is used as the cluster ID when no ID is specified or when the no form of this command is entered.

Command mode

BGP configuration mode

Usage guidelines

Together, a route reflector and its clients form a cluster. When a single route reflector is deployed in a cluster, the cluster is identified by the routing switch ID of the route reflector. The bgp cluster-id command is used to assign a cluster ID to a route reflector when the cluster has one or more route reflectors. Multiple route reflectors are deployed in a cluster to increase redundancy and avoid a single point of failure. When multiple route reflectors are configured in a cluster, the same cluster ID is assigned to all route reflectors. This allows all route reflectors in the cluster to recognize updates from peers in the same cluster and reduces the number of updates that need to be stored in BGP routing tables.

Example

In the following example, the local routing switch is one of the route reflectors serving the cluster. It is configured with the cluster ID to identify the cluster.

router bgp 5

neighbor 198.92.70.24 route-reflector-client

bgp cluster-id 50000

Related commands

neighbor route-reflector-client

show ip bgp summary

5.1.10. bgp confederation identifier

Syntax

To specify a BGP confederation identifier, use the bgp confederation identifier command. To remove the confederation identifier, use the no form of this command.

bgp confederation identifier autonomous-system

no bgp confederation identifier autonomous-system

Parameter

Parameter	Description
autonomous-system	Autonomous system number to be configured to internally include multiple autonomous systems.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

The bgp confederation identifier command is used to configure a single autonomous system number to identify a group of smaller autonomous systems as a single confederation.

A confederation can be used to reduce the internal BGP (iBGP) mesh by dividing a large single autonomous system into multiple subautonomous systems and then grouping them into a single confederation. The subautonomous systems within the confederation exchange routing information like iBGP peers. External peers interact with the confederation as if it is a single autonomous system.

Each subautonomous system is fully meshed within itself and has a few connections to other autonomous systems within the confederation. Next hop, Multi Exit Discriminator (MED), and local preference information is preserved throughout the confederation, allowing you enables to you to retain a single Interior Gateway Protocol (IGP) for all the autonomous systems.

Example

In the following example, the routing domain is divided into autonomous systems AS4001, 4002, 4003, 4004, 4005, 4006 and 4007 and identified by the confederation identifier 50000. Neighbor 1.2.3.4 is a peer inside of the routing domain confederation. Neighbor 3.4.5.6 is a peer outside of the routing domain confederation.

router bgp 4001

bgp confederation identifier 5

bgp confederation peers 4002 4003 4004 4005 4006 4007

neighbor 1.2.3.4 remote-as 4002

neighbor 3.4.5.6 remote-as 510

Related commands

bgp confederation peers

show ip bgp summary 30

5.1.11. bgp confederation peers

Syntax

To configure subautonomous systems to belong to a single confederation, use the bgp confederation peers command in router configuration mode. To remove an autonomous system from the confederation, use the no form of this command.

bgp confederation peers autonomous-system [**autonomous-system**]

no bgp confederation peers autonomous-system [**autonomous-system**]

Parameter

Parameter	Description
autonomous-system	Autonomous system numbers for BGP peers that will belong to the confederation.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

The bgp confederation peers command is used to configure multiple autonomous systems as a single confederation. The ellipsis (...) in the command syntax indicates that your command input can include multiple values for the as-number argument.

The autonomous systems specified in this command are visible internally to the confederation. Each autonomous system is fully meshed within itself. The bgp confederation identifier command specifies the confederation to which the autonomous systems belong.

Example

In the following example, autonomous systems 1091, 1092 and 1093 are configured to belong to a single confederation under the identifier 1090:

router bgp 1090

bgp confederation identifier 23

bgp confederation peers 1091 1092 1093

Related commands

bgp confederation identifier

show ip bgp summary

5.1.12. bgp dampening

Syntax

To enable BGP route dampening or change BGP route dampening parameters, use the bgp dampening command in address family or router configuration mode. To disable BGP dampening, use the no form of this command.

bgp dampening [**route-map** *name*] | [*half-time resuse-value suppress-value hold-time*]

no bgp dampening [**route-map** *name*] | [*half-time resuse-value suppress-value hold-time*]

Parameter

Parameter	Description
route-map	Name of route map that controls where BGP route dampening is enabled.
name	Name of route map that controls parameters.

half-time	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.
reuse-value	Reuse values based on accumulated penalties.
suppress-value	A route is suppressed when its penalty exceeds this limit.
hold-time	Maximum time (in minutes) a route can be suppressed.

Default value

half-time: 15 minutes
reuse-value: 750
suppress-value: 2000
hold-time: 60 minutes

Command mode

BGP configuration mode

Usage guidelines

The bgp dampening command is used to enable BGP route dampening. This command can be entered without any arguments or keywords. The half-life, reuse, suppress, and hold-time arguments are position-dependent; meaning that if any of these arguments are entered, then all optional arguments must be entered.

When BGP dampening is configured and a prefix is withdrawn, BGP considers the withdrawn prefix as a flap and increases the penalty by a 1000. If BGP receives an attribute change, BGP increases the penalty by 500. If then the prefix has been withdrawn, BGP keeps the prefix in the BGP table as a history entry. If the prefix has not been withdrawn by the neighbor and BGP is not using this prefix, the prefix is marked as dampened. Dampened prefixes are not used in the BGP decision process and not installed to the routing table.

Example

In the following example, the bgp dampening command can be used to enable BGP route dampening function and use default parameter configuration. Use the following commands to configure different dampening parameters for different rouing configurations:

```
Router bgp 100
bgp dampening route-map DMAP
!
route-map DMAP 10 permit
match as-path ASLIST-1
set dampening 15 750 2000 60
```

```
!
route-map DMAP 20 permit
match as-path ASLIST-2
set dampening 2 750 2000 8
!
ip as-path access-list ASLIST-1 permit ^3_
ip as-path access-list ASLIST-2 permit ^5_
```

Related commands

set dampening

5.1.13. bgp default local-preference

Syntax

To configure default parameter of BGP process, use the bgp default command. Use the no form of this command to restore the default value.

bgp default local-preference *<0-4294967295>*

no bgp default local-preference *<0-4294967295>*

Parameter

Parameter	Description
local-preference	Configures default parameter of the local preference.
<0-4294967295>	Default value of the local preference.

Default value

100

Command mode

BGP configuration mode

Usage guidelines

The route received from IBGP will be set as the local preference by BGP. The default value is 100, which can be modified via this command.

Example

The following example configures 200 as the local preference for the route from IBGP neighbor:

```
router bgp 100
bgp default local-preference 200
```

Related commands

none

5.1.14. bgp default route-target filter

Syntax

To set BGP VPN route filter function, run the following command. To return to the default setting, use the no form of this command.

bgp default route-target filter

no bgp default route-target filter

Parameter

None

Default value

Enabled

Command mode

BGP configuration mode

Usage guidelines

The command is enabled by default. It is used to control VPN multi-communication. To disable the filter function, run the command “no bgp default route-target filter”, which means all VPN routes are received, generally applied to the solution of cross-domain VPN option-B.

Example

The following example shows how to enable all VPN routes passing.

router bgp 100

no bgp default route-target filter

Related command

None

5.1.15. bgp deterministic-med

Syntax

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

Parameter

none

Default value

none

Command mode

BGP configuration mode

Usage guidelines

The bgp always-compare-med command is used to enable the comparison of the Multi Exit Discriminator (MED) for paths from neighbors in different autonomous systems. After the bgp always-compare-med command is configured, all paths for the same prefix that are received from different neighbors, which are in the same autonomous system, will be grouped together and sorted by the ascending MED value (received-only paths are ignored and not grouped or sorted). The best path selection algorithm will then pick the best paths using the existing rules; the comparison is made on a per neighbor autonomous system basis and then global basis. The grouping and sorting of paths occurs immediately after this command is entered. For correct results, all routers in the local autonomous system must have this command enabled (or disabled).

Example

none

Related commands

bgp bestpath med

bgp always-compare-med

5.1.16. bgp fast-external-fallover

Syntax

To enable fast clear neighbor function, run the following command. To return to the default setting, use the no form of this command.

bgp fast-external-fallover

no bgp fast-external-fallover

Parameter

None

Default value

Enabled

Command mode

BGP configuration mode

Usage guidelines

The function is enabled by default. If the interface status becomes **Down**, it will immediately clear the BGP dialogue of the direct external neighbor on the interface.

Example

None

Related command

router bgp

clear ip bgp

5.1.17. bgp graceful-restart

Syntax

To configure bgp graceful restart, run the following command.

bgp graceful-restart [**restart-time** value] | [**stalepath-time** value]

no bgp graceful-restart [restart-time] | [stalepath-time]

Parameter

Parameter	Description
restart-time	To configure the max waiting time of protocol restarting neighbor up. The default value is 120s.
stalepath-time	To configure the max stalepath time of restarting the neighbor and aging the route. The default value is 360s.

Default value

Disabled

Command mode

BGP configuration mode

Usage guidelines

bgp graceful-restart restart-time

The command is used to configure Restart Time of BGP GR, which is used by Receiving Speaker

bgp graceful-restart stalepath-time

The configuration time should be the time of keeping aging route.

Example

None

Related command

bgp update-delay

clear ip bgp

5.1.18. bgp maxas-limit

Syntax

To configure the max amount limit of as which bgp route passes, run the following command.

bgp maxas-limit <value>

no bgp maxas-limit

Parameter

Parameter	Description
value	The value ranges from 1 to 500.

Default value

None

Command mode

BGP configuration mode

Usage guidelines

The command is used to limit the amount of **as** which is part of **aspath** of routes received by the neighbor. The value will de dropped if the amount of **as** is greater than the configured value.

Example

None

Related command

clear ip bgp

5.1.19. bgp router-id

Syntax

To configure bgp router identifier, run the following command.

bgp router-id <*A.B.C.D*>

no bgp router-id <*A.B.C.D*>

Parameter

Parameter	Description
A.B.C.D	To be configured ID.

Default value

None

Command mode

BGP configuration mode

Usage guidelines

The command is used to configure a new router ID. Peer in the state of Established will automatically resume to BGP.

Example

None

Related command

clear ip bgp

show ip bgp

5.1.20. bgp update-delay

Syntax

To configure bgp route update delay, run the following command. To return to the default setting, use the no form of this command.

bgp update-delay <value>

no bgp update-delay

Parameter

Parameter	Description
value	Time of the route update delay. The value ranges from 1 to 3600s.

Default value

360s

Command mode

BGP configuration mode

Usage guidelines

The command takes effect only when BGP supports GR. After BGP restart, BGP will not send the firstly update packets until the timer is overtime.

Another condition is that BGP updates without waiting for overtime of the timer. Refer to the command “**bgp graceful restart**” for more information. ()

Example

None

Related command

bgp graceful-restart

clear ip bgp

5.1.21. bgp redistribute-internal

Syntax

To configure IBGP redistribution into an interior gateway protocol (IGP), such as RIP or OSPF, use the bgp redistribute-internal command in address family or router configuration mode. To return the router to default behavior and stop iBGP redistribution into IGPs, use the no form of this command.

bgp redistribute-internal

no bgp redistribute-internal

Parameter

none

Default value

IBGP routes are not redistributed into IGP.

Command mode

BGP configuration mode

Usage guidelines

The bgp redistribute-internal command is used to configure iBGP redistribution into an IGP. The clear ip bgp command must be entered to reset BGP connections after this command is configured. When redistributing BGP into any IGP, be sure to use IP prefix-list and route-map statements to limit the number of prefixes that are redistributed.

Example

In the following example, BGP to OSPF3 route redistribution is enabled:

```
router ospf 3
redistribute bgp 2
!
router bgp 2
 bgp redistribute-internal
!
```

Related commands

none

5.1.22. clear ip bgp

Syntax

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 {***** | *ip-address* | *as-number* | **peer-group** *name* | **aggregates** | **networks** | **redistribute}** [**soft** [**in** | **out**]]

Parameter

Parameter	Description
*	Specifies that all current BGP sessions will be reset.
ip-address	Specifies that only the identified BGP neighbor will be reset.

AS	Specifies that sessions with BGP peers in the specified autonomous system will be reset.
peer-group-name	Specifies that the identified BGP peer group will be reset.
aggregates	Specifies that all aggregate routes will be reset.
networks	Specifies that all static network routes will be reset.
redistribute	Specifies that all redistributed routes will be reset.
soft	Initiates a soft reset.
in | *out*	Initiates inbound or outbound reconfiguration.

Command mode

EXEC

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.

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.

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.

Example

The following example clear all the current BGP sessions:

```
clear ip bgp *
```

Related commands

neighbor soft-reconfiguration

show ip bgp

5.1.23. debug ip bgp

Syntax

To display information related to processing of the Border Gateway Protocol (BGP), use the debug ip bgp command in privileged EXEC mode. To disable debugging output, use the no form of this command.

debug ip bgp {**all | fsm | keepalive | open | update**}

no debug ip bgp {**all | fsm | keepalive | open | update**}

Parameter

Parameter	Description
all	Displays all BGP debugging functions.
dampening	Displays BGP dampening.
event	Displays BGP events.
fsm	Displays BGP fsms.
keepalive	Displays BGP keepalives.
notify	Displays BGP notifies.
open	Displays BGP opens.
update	Displays BGP updates.

Default value

No default behavior or values

Command mode

EXEC

Usage guidelines

It is valid globally when configured with the debug ip bgp command to display debugging information and other VTY. If configured with the terminal monitor command, the debugging information will also be displayed. Use the no terminal monitor to close this function to disable displaying any debugging information on the VTY.

The command debug ip bgp all can enable all BGP debugging function, including dampening, fsm,keepalives,open and update. Use the no debug ip bgp all command to disable all BGP debugging functions.

Example

The following example is the process to establish a BGP. The debugging information shows that a router establishes a connection with BGP neighbor 10.1.1.3.

BGP: 10.1.1.3 start connecting to peer

BGP: 10.1.1.3 went from Idle to Connect

BGP: 10.1.1.3 went from Connect to OpenSent

BGP: 10.1.1.3 send OPEN, length 41

BGP: 10.1.1.3 recv OPEN, length 41

BGP: 10.1.1.3 went from OpenSent to OpenConfirm

BGP: 10.1.1.3 send KEEPALIVE, length 19

BGP: 10.1.1.3 recv KEEPALIVE, length 19

BGP: 10.1.1.3 went from OpenConfirm to Established

BGP: 10.1.1.3 send KEEPALIVE, length 19

BGP: 10.1.1.3 send UPDATE, length 43

BGP: 10.1.1.3 send UPDATE, length 43

BGP: 10.1.1.3 recv KEEPALIVE, length 19

BGP: 10.1.1.3 recv KEEPALIVE, length 19

5.1.24. distance

Syntax

To configure the administrative distance for BGP routes, use the distance command in 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

Parameter

Parameter	Description
external-distance	Administrative distance for external BGP routes. Routes are external when learned from an external autonomous system. The default value is 20.
internal-distance	Administrative distance for internal BGP routes. Routes are internal when learned from peer in the local autonomous system. The default value is 200.
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 default value is 200.

Default value

external-distance: 20

internal-distance: 200

local-distance: 200

Command mode

BGP configuration

Usage guidelines

The distance bgp command is used to configure a rating of the trustworthiness of a routing information source, such as an individual router or a group of routers. Numerically, an administrative distance is a positive integer from 1 to 255. In general, the higher the value, the lower the trust rating. An administrative distance of 255 means the routing information source cannot be trusted at all and should be ignored. Use this command if another protocol is known to be able to provide a better route to a node than was actually learned via external BGP (eBGP), or if some internal routes should be preferred by BGP.

Example

In the following example, the administrative distance for BGP routes is set:

router bgp 109

network 131.108.0.0

neighbor 129.140.6.6 remote-as 123

neighbor 128.125.1.1 remote-as 47

distance 20 20 200

Related commands

set metric

set tag

5.1.25. filter

Syntax

To filter routes based on an interface in order to realize the administrative strategy. Use the no form of this command to delete the configuration.

filter interface <**in | out**> **access-list** *access-list-name* **gateway** *access-list-name* **prefix-list** *prefix-list-name*

no filter interface <**in | out**> **access-list** *access-list-name* **gateway** *access-list-name* **prefix-list** *prefix-list-name*

Parameter

Parameter	Description
interface	Interface name. Asterisk signifies all interfaces.
in | out	Filter the incoming of outgoing routes.
access-list	Specifies the access-list to filter routes.
access-list-name	Name of the access list.
gateway	Specifies the access list to filter gateway.
access-list-name	Name of the access list.
prefix-list	Specifies the prefix list to filter routes.
prefix-list-name	Name of the prefix list.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

The access-list option specifies the access list to filter network prefix of routes; the gateway option specifies the access list to filter nexthop attribute of routes; the prefix list option specifies the prefix list filter network prefix of routes.

The access list and the prefix list options are mutually exclusive simultaneously. But then can be used with the gateway option together.

The asterisk signifies all interfaces.

If a none-existant prefix list or access list is configured on an interface, then all routes will pass.

Example

The following example configures prefix and gateway to filter routes received on all interface:

router bgp 109

filter * in prefix-list prefix-guize gateway gateway-guize

Related commands

neighbor distribute-list

neighbor filter-list

neighbor route-map

5.1.26. maximum-paths

Syntax

To enable bgp supporting equivalent route, run the following command. To return to the default setting, use the no form of this command.

maximum-paths [*value*] [**ibgp** value]

no maximum-paths **[*value* |** ibgp**]**

Parameter

Parameter	Description
value	Max amount of the equivalent route supported by BGP

Default value

None

Command mode

BGP configuration mode

Usage guidelines

The command is used to modify the amount of bgp supported equivalent routes. Parameters without ibgp is the modified amount of the EBGP equivalent route, which will not affect the choosing result of the optimized routes.

Example

The following example shows how to set the equivalent route which supports 3 ibgp:

router bgp 100

maximum-paths ibgp 3

Related command

clear ip bgp

show ip bgp

5.1.27. neighbor activate

Syntax

To activate the specified neighbor corresponded address family routing information, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address*| *X:X::X:X* | *peer-group-name*} **activate**

no neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **activate**

Parameter

Parameter	Description

ip-address	IP address of the neighbor
X:X::X:X	Ipv6 address of the neighbor
peer-group-name	Peer group name

Default value

Activated

Command mode

BGP address protocol stack configuration mode

Usage guidelines

The command is used to activate the support for the specified neighbor corresponded address family routing information.

Example

Related command

neighbor remote-as

5.1.28. neighbor advertisement-interval

Syntax

To set the minimum interval of forwarding UPDATE information, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **advertisement-interval** *value*

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor
X:X::X:X	Ipv6 address of the neighbor
peer-group-name	BGP peer group name
Value	<1-600> Unit: s

Default value

ibgp: The default value is 1s. ebgp: The default value is 30s.

Command mode

BGP configuration mode

Usage guidelines

The command is used to set the minimum interval of forwarding UPDATE information

Example

The following example shows how to set the minimum interval of the neighbor 10.10.10.11 forwarding UPDATE information to 15s.

router bgp 1

neighbor 10.10.10.11 remote-as 2

neighbor 10.10.10.11 advertisement-interval 15

Related command

neighbor remote-as

5.1.29. neighbor allowas-in

Syntax

To enable BGP receiving route which including **as** from the neighbor learned **aspath,** run the following command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **allowas-in** [*value*]

no neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **allowas-in**

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
X:X::X:X	IPv6 address of the neighbor.
peer-group-name	BGP peer group name.
Value	<1-10> Times which enable locak as appeared in the attribute of aspath. The default value is 3.

Default value

Disabled

Command mode

BGP configuration mode

Usage guidelines

The command is used to enable BGP receiving route which including **as** from the neighbor learned **aspath**

Example

The following example shows how to enable BGP receiving route which including **as** (3 times in maximum) from the neighbor (10.10.10.11) learned **aspath**:

router bgp 1

neighbor 10.10.10.11 remote-as 2

neighbor 10.10.10.11 allowas-in

Related command

neighbor remote-as

5.1.30. neighbor capability orf prefix-list

Syntax

To enable ORF, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **capability orf prefix-list** {both| receive| send}

no neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **capability orf prefix-list** {both| receive| send}

Parameter

Parameter	Description
ip-address	IP address of the neighbor
X:X::X:X	IPv6 address of the neighbor
peer-group-name	BGP peer group name

Default value

Non-support

Command mode

BGP configuration mode

Usage guidelines

The command enables BGP to support ORF. ORF is a filtration mode based on prefix-list. It only informs the local required routes to the neighbor, reducing the unnecessary update packets. The command is used by combining with the command “neighbor prefix-list in”. The command takes effect only when combining with the command “clear ip bgp *”.

Example

The following example shows how to set the output route filtration of neighbor 10.10.10.11(receiving and forwarding):

router bgp 100

neighbor 10.10.10.11 remote-as 2

neighbor 10.10.10.11 capability orf prefix-list both

Related command

neighbor prefix-list in

clear ip bgp in prefix-filter

5.1.31. neighbor default-originate

Syntax

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**

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name.

Default value

No default route is sent to the neighbor.

Command mode

BGP configuration mode

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.

Example

In the following example, the local router injects route 0.0.0.0 to the neighbor 160.89.2.3 rather than to 160.89.2.1:

router bgp 109

network 160.89.0.0

neighbor 160.89.2.1 remote-as 100

neighbor 160.89.2.3 remote-as 200

neighbor 160.89.2.3 default-originate

Related commands

neighbor ebgp-multihop

5.1.32. neighbor description

Syntax

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

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

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name.
line	Text that describes the neighbor.

Default value

There is no description of the neighbor.

Command mode

BGP configuration mode

Usage guidelines

It is easier for user to understand the configuration to associate a description with a neighbor.

Example

In the following example, the description of the neighbor is "peer with abc.com":

router bgp 109

network 160.89.0.0

neighbor 160.89.2.3 description peer with abc.com

5.1.33. neighbor distribute-list

Syntax

To distribute BGP neighbor information as specified in an access list, use the neighbor distribute-list command in address family or router configuration mode. To remove an entry, use the no form of this command.

neighbor {*ip-address* | *peer-group-name*} **distribute-list** {*access-list name* } {**in | out**}

no neighbor {*ip-address* | *peer-group-name*} **distribute-list** {*access-list name* } {**in | out**}

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name.
access-list name	Name of a standard or extended access list.
In	Access list is applied to incoming advertisements to that neighbor.
Out	Access list is applied to outgoing advertisements to that neighbor.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

Use access-list filters network prefix of BGP routes; use aspath-list filters AS_PATH attribute of BGP routes; use prefix list to filter network prefix of BGP routes.

The access-list option specifies the access list to filter network prefix of routes; the gateway option specifies the access list to filter nexthop attribute of routes; the prefix list option specifies the prefix list filter network prefix of routes.

If you specify a non-existant access list, all routes will be allowed to pass as a result.

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 for a neighbor overrides the inbound policy that is inherited from the peer group.

Example

The following router configuration mode example applies list beijing to incoming advertisements from neighbor120.23.4.1.

router bgp 109

network 131.108.0.0

neighbor 120.23.4.1 distribute-list beijing in

Related commands

ip aspath-list

neighbor filter-list

ip prefix-list 1

neighbor prefix-list

5.1.34. neighbor ebgp-multihop

Syntax

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* | *peer-group-name*} **ebgp-multihop** [*ttl*]

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

Parameter

Parameter	Description
ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	BGP peer group name.
ttl	Time-to-live in the range from 1 to 255 hops.

Default value

For EBGP-speaking neighbor, only directly connected neighbors are allowed, ttl default value is 1; for IBGP-speaking neighbor, ttl default is 255.

Command mode

BGP configuration mode

Usage guidelines

Under default, BGP connection can not be established unless EBGP neighbors are directly connected ones. The allowable maximum number of hops for EBGP neighbors can be set with the neighbor ebgp-multihop command. Ttl is configured to 255 if not specified. 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.

Example

The following example allows connections to neighbor 131.108.1.1, which resides on a network that is not directly connected:

router bgp 109:

neighbor 131.108.1.1 ebgp-multihop

Related commands

neighbor default-originate

5.1.35. neighbor ebgp-multihop

Syntax

To enable EBGP in non-direct network, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **ebgp-multihop** *ttl*

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

Parameter

Parameter	Description
ip-address	BGP dialogue neighbor IP address.
X:X::X:X	BGP dialogue neighbor ipv6address.
peer-group-name	BGP peer group name.
ttl	The hop number between 1 and 255.

Default value

EBGP neighbor only enables direct connection. ttl is 1; and IBGP neighbor ttl is 255.

Command mode

BGP configuration mode

Usage guidelines

By default, EBGP neighbor must be work on the direct network. If EBGP neighbor does not work on the direct network, BGP connection cannot be set. The command “neighbor ebgp-multihop” can set the max hop number which enables EBGP neighbor.

If ttl is not set, set ttl to be 255.

If you designate the BGP peer group with the command, all members of the peer group will take the characteristics of the configured command.

Example

The following example shows how to enable connection to the neighbor 131.108.1.1, but the neighbor is not in the direct connected network.

router bgp 109:
neighbor 131.108.1.1 ebgp-multihop

Related command

neighbor default-originate

5.1.36. neighbor fall-over

Syntax

To activate bfd of the neighbor, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **fall-over bfd**

no neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **fall-over bfd**

Parameter

Parameter	Description
ip-address	BGP dialogue neighbor IP address
X:X::X:X	BGP dialogue neighbor IPv6 address
peer-group-name	BGP peer group name

Default value

Disabled

Command mode

BGP configuration mode

Usage guidelines

The command is used to detect the link. If there is problem in the link, bfd will inform bgp to update the route, which will realize fast switch of the route.

Example

Related command

neighbor remote-as

bfd enable

5.1.37. neighbor filter-list

Syntax

To set up a BGP filter, use the neighbor filter-list command in address family or router configuration mode. To disable this function, use the no form of this command.

neighbor {*ip-address* | *peer-group-name*} **filter-list** *as-path-list name* {**in | out** }

no neighbor {*ip-address* | *peer-group-name*} **filter-list** *as-path-list name* {**in | out** }

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name.

as-path-list name	AS-PATH list name. The ip as-path-list command can be used to define this list.
In	Access list applied to incoming routes.
Out	Access list applied to outgoing routes.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

Use access-list filters network prefix of BGP routes; use aspath-list filters AS_PATH attribute of BGP routes; use prefix list to filter network prefix of BGP routes.

If you specify a non-existant access list, all routes will be allowed to pass as a result.

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 for a neighbor overrides the inbound policy that is inherited from the peer group.

Example

In the following router configuration mode example, the BGP neighbor with IP address 128.125.1.1 is not sent advertisements about any path through or from the adjacent autonomous system AS123:

```
ip as-path-list shanghai deny _123_
ip as-path-list shanghai deny ^123$
router bgp 109
network 131.108.0.0
neighbor 129.140.6.6 remote-as 123
neighbor 128.125.1.1 remote-as 47
neighbor 128.125.1.1 filter-list shanghai out
```

Related commands

ip aspath-list

neighbor distribute-list

ip prefix-list 1

neighbor prefix-list

5.1.38. neighbor maximum-prefix

Syntax

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*

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name.
Maximum	Maximum number of prefixes allowed from this neighbor.

Default value

This command is disabled by default. There is no limit on the number of prefixes.

Command mode

BGP configuration mode

Usage guidelines

This command allows you to configure a maximum number of prefixes that a BGP router is allowed to receive from a peer. It adds another 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, the router terminates the peering (by default). However, if the warning-only keyword is configured, the router instead only sends a log message, but continues peering with the sender. If the peer is terminated, the peer stays down until the clear ip bgp command is issued.

Example

The following example sets the maximum number of prefixes allowed from the neighbor at 129.140.6.6 to 1000:

router bgp 109

network 131.108.0.0

neighbor 129.140.6.6 maximum-prefix 1000

Related commands

clear ip bgp

5.1.39. neighbor next-hop-self

Syntax

To configure the 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* | *peer-group-name*} **next-hop-self**

no neighbor {*ip-address* | *peer-group-name*} **next-hop-self**

Parameter

Parameter	Description
ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	BGP peer group name.

Default value

This command is disabled by default.

Command mode

BGP configuration mode

Usage guidelines

The disposal of nexthop attribute in BGP is more complicated than IGP . It usually follows three rules:

1. For EBGP session, configure the local ip address of BGP connection as the nexthop attribute when sending routes;
2. For IBGP session, configure the local ip address of BGP connection as the nexthop attribute if the routes are locally generated; if the routes are learned from EBGP, the nexthop attribute is to be filled in intactly the packet when sending routes;
3. If the nexthop parameter of the ip address of the routes belong to the network of BGP session, then the nexthop attribute always adopts the former nexthop;

This command is useful in unmeshed networks (such as Frame Relay or X.25) where BGP neighbors may not have direct access to all other neighbors on the same IP subnet. 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.

Example

The following example forces all updates destined for 131.108.1.1 to advertise this router as the next hop:

router bgp 109

neighbor 131.108.1.1 next-hop-self

Related commands

set ip next-hop 18

5.1.40. neighbor password

Syntax

To enable Message Digest 5 (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* | *peer-group-name*} **password** *LINE*

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

Parameter

Parameter	Description
ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	BGP peer group name
password	Enables MD5 authentication
LINE	Plainr text password

Default value

none

Command mode

BGP configuration mode

Usage guidelines

Use the neighbor remote-as command to specify the neighbor before using this command.

You can configure MD5 authentication between two BGP peers, meaning that each segment sent on the TCP connection between the peers is verified. MD5 authentication must be configured with the same password on both BGP peers; otherwise, the connection between them will not be made. The length of password should between 1 and 20 characters.

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.

Example

The following example configures ‘abcd’ as the authentication password of neighbor 120.23.4.1:

router bgp 109

neighbor 120.23.4.1 remote-as 108

neighbor 120.23.4.1 password abcd

Related commands

neighbor remote-as

5.1.41. neighbor prefix-list

Syntax

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-listname* {**in | out**}

no neighbor {*ip-address* | *peer-group-name*} **prefix-list** *prefix-listname* {**in | out**}

Parameter

Parameter	Description
ip-address	IP address of neighbor.
peer-group-name	BGP peer group name
prefix-list	Prefix list is applied to advertisements of that neighbor
prefix-listname	Prefix list名Name of a prefix list.
In	Filter list is applied to incoming advertisements from that neighbor.
Out	Filter list is applied to outgoing advertisements to that neighbor.

Default value

none

Command mode

BGP configuration mode

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.

Example

The following router configuration mode example applies the prefix list named abc to incoming advertisements from neighbor 120.23.4.1:

router bgp 109

network 131.108.0.0

neighbor 120.23.4.1 prefix-list abc in

The following router configuration mode example applies the prefix list named CustomerA to incoming advertisements from neighbor 120.23.4.1:

router bgp 109

network 131.108.0.0

neighbor 120.23.4.1 prefix-list CustomerA in

Related commands

ip prefix-list

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

neighbor filter-list

5.1.42. neighbor remote-as

Syntax

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* | *peer-group-name*} **remote-as** *number*

no neighbor {*ip-address* | *peer-group-name*} **remote-as** *number*

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name.
Number	Nmuber of autonomous system to which the neighbor belongs.

Default value

none

Command mode

BGP configuration mode

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.

Example

The following example assigns a BGP router to autonomous system 109, 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 131.108.0.0 and 192.31.7.0 with the neighbor routers.

router bgp 109

network 131.108.0.0

network 192.31.7.0

neighbor 131.108.200.1 remote-as 167

neighbor 131.108.234.2 remote-as 109

neighbor 150.136.64.19 remote-as 99

Related commands

neighbor peer-group (creating)

5.1.43. neighbor remove-private-AS

Syntax

To remove private aspath when informing the route to ebgp neighbor, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **remove-private-AS**

no neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **remove-private-AS**

Parameter

Parameter	Description
ip-address	IP address of the neighbor
X:X::X:X	IPv6 address of the neighbor
peer-group-name	BGP peer group name

Default value

None

Command mode

BGP configuration mode

Usage guidelines

None

Example

In the following example, the local autonomous system is 100, the neighbor is 10.1.1.1、20.1.1.1, the autonomous system is 64512, 200. The command is used to delete private aspath attribute when informing 10.1.1.1 learned route to ebgp neighbor 20.1.1.1.

router bgp 100

neighbor 10.1.1.1 remote-as 64512

neighbor 20.1.1.1 remote-as 200

neighbor 20.1.1.1 remove-private-AS

Related command

neighbor remote-as

5.1.44. neighbor route-map

Syntax

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*} **route-map** *map-name* {*in* | *out*}

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	Name of a BGP or multiprotocol BGP peer group.
map-name	Name of a route map.
in	Applies route map to incoming routes.
Out	Applies route map to outgoing routes.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

It is only based on neighbor to filter routes using distribute-list, prefix-list and as-path-list, while it is not only based on neighbor to filter routes but also based on neighbor to modify the attribute of routes to realize a more flexible routing strategy.

Different routes have different attributes. The route-map can modify attributes of different kinds of routes. 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. The rules which is valid to BGP route are as follows: match aspath-list, match community-list, match ip address, match ip nexthop, match ip prefix-list, match metric, match tag, set aggregator, set as-path, set atomic-aggregate, set community, set community-additive, set ip nexthop, set local-preference, set metric, set origin, set tag, set weight.

If configured with a non-existent route-map, then all routes is allowed to receive as a result without any modification.

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.

Example

The following router configuration mode example applies a route map named internal-map to a BGP incoming route from 198.92.70.24:

router bgp 5

neighbor 198.92.70.24 route-map internal-map in

route-map internal-map

match as-path abc

set local-preference 100

Related commands

neighbor peer-group (creating)

route-map 1

5.1.45. neighbor route-reflector-client

Syntax

To configure the router as a BGP route reflector and configure the specified neighbor as its client, use the neighbor route-reflector-client command in address family or router configuration mode. To indicate that the neighbor is not a client, use the no form of this command.

neighbor *ip-address* **route-reflector-client**

no neighbor *ip-address* **route-reflector-client**

Parameter

Parameter	Description
ip-address	IP address of the BGP neighbor being identified as a client.

Default value

There is no route reflector in the autonomous system.

Command mode

BGP configuration mode

Usage guidelines

By default, all internal BGP (iBGP) speakers in an autonomous system must be fully meshed, and neighbors do not readvertise iBGP learned routes to neighbors, thus preventing a routing information loop. When all the clients are disabled, the local router is no longer a route reflector.

If you use route reflectors, all iBGP speakers need not be fully meshed. In the route reflector model, an Interior BGP peer is configured to be a route reflector responsible for passing iBGP learned routes to iBGP neighbors. This scheme eliminates the need for each router to talk to every other router.

Use the neighbor route-reflector-client command to configure the local router as the route reflector and the specified neighbor as one of its clients. All the neighbors configured with this command will be members of the client group and the remaining iBGP peers will be members of the nonclient group for the local route reflector.

The bgp client-to-client reflection command controls client-to-client reflection.

Example

In the following router configuration mode example, the local router is a route reflector. It passes learned iBGP routes to the neighbor at 198.92.70.24.

router bgp 5

neighbor 198.92.70.24 route-reflector-client

Related commands

bgp cluster-id

show ip bgp

5.1.46. neighbor route-refresh

Syntax

To allow neighbor to use route refresh function, use the neighbor route-refresh command. Use the no form of this command to disable route refresh function.

neighbor *ip-address* **route-refresh**

no neighbor *ip-address* **route-refresh**

Parameter

Parameter	Description
ip-address	BGP neighbor and ip address

Default value

Disabled

Command mode

BGP configuration mode

Usage guidelines

By default, BGP route exchange for only once when the connection is established, then only exchanging changed routes afterwards. If the routing strategy configuration is modified, it will not become effective immediately. Generally, there are two methods:

- Reset BGP connection
- Use soft-reconfiguration function

The first method is relatively slow, and the routes vary greatly. The second method needs too much storage space and occupies more CPU time. These two methods are not good method, and therefore a new method arises, that is, the route refresh.

The route refresh is a negotiation option based on BGP connection, aiming to send the route refresh request packet to ask neighbor to re-send all update packets to oneself, which do not need to reset BGP connection and also do not need to store a great amount of routes. This a a more ideal solution at the moment.

Example

The following example allows neighbor at address 198.92.70.24 to use route refresh function:

router bgp 5

neighbor 198.92.70.24 route-refresh

Related commands

show ip bgp neighbors

5.1.47. neighbor send-community

Syntax

To specify that a community 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* | *peer-group-name*} **send-community**

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name

Default value

The communities attribute can be sent to the neighbor.

Command mode

BGP configuration mode

Usage guidelines

The route's group attribute of routes can be configured via the set community command of route-map or via neighbor's routing inform.

Use the show ip bgp neighbors command to see whether allows to send group attribute to neigh or not.

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.

Example

In the following router configuration mode example, the router belongs to autonomous system 109 and is not permitted to send the communities attribute to its neighbor at IP address 198.92.70.23:

router bgp 109

no neighbor 198.92.70.23 send-community

Related commands

match community-list 4

neighbor peer-group (creating)

set community 15

set community-additive 17

5.1.48. neighbor send-label

Syntax

To activate neighbor or peer group NLRI with tag, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name* } **send-label**

no neighbor {*ip-address* | *X:X::X:X* | *peer-group-name* }**send-label**

Parameter

Parameter	Description

ip-address	IP address of neighbor
X:X::X:X	IPv6 address of neighbor
peer-group-name	BGP peer group name

Default value

None

Command mode

BGP configuration mode

Usage guidelines

The command is used to activate **nlri** with **mpls** tag, which is usually applied in cross-domain vpn option solution. The command must be combined with command “route-map”, if mpls tag is distributed by the public network.

Related command

neighbor remote-as

neighbor route-map

show ip bgp neighbors

5.1.49. neighbor shutdown

Syntax

To disable a neighbor or peer group, use the neighbor shutdown command in router configuration mode. To reenable the neighbor or peer group, use the no form of this command.

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

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name

Default value

none

Command mode

BGP configuration mode

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.

Related commands

show ip bgp summary

show ip bgp neighbors

5.1.50. neighbor soft-reconfiguration

Syntax

To configure the 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**]

Parameter

Parameter	Description
ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	BGP peer group name
inbound	Indicates that the update to be stored is an incoming update.

Default value

The incoming update is not stored and the outgoing update is stored.

Command mode

BGP configuration mode

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. 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 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:

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.

Example

The following example enables inbound soft reconfiguration for the neighbor 131.108.1.1. All the updates received from this neighbor will be stored unmodified, regardless of the inbound policy.

router bgp 100

neighbor 131.108.1.1 remote-as 200

neighbor 131.108.1.1 soft-reconfiguration inbound

Related commands

clear ip bgp

neighbor peer-group (creating)

5.1.51. neighbor timers

Syntax

To set the timers for a specific BGP peer or peer group, use the neighbor timers command in 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* | *peer-group-name}* **timers keepalive** *holdtime*

no neighbor {*ip-address* | *peer-group-name*} **timers keepalive** *holdtime*

Parameter

Parameter	Description
ip-address	A BGP peer or peer group IP address.
peer-group-name	Name of the BGP peer group.
Keepalive	Frequency (in seconds) with which the software sends keepalive messages to its peer.
Holdtime	Interval (in seconds) after not receiving a keepalive message that the software declares a peer dead.

Default value

keepalive: 60 s

holdtime: 180 s

Command mode

BGP configuration mode

Usage guidelines

Generally, the value of holdtime is three times larger than keepalive. If you configure 0 as the value of keealive and holdtime, then the sending of keepalive packets is disabled, which needs tcp connection manager to inform BGP module for state change.

The timers configured for a specific neighbor or peer group override the timers configured for all BGP neighbors using the timers bgp command.

Example

The following example changes the keepalive timer to 70 seconds and the hold-time timer to 210 seconds for the BGP peer 192.98.47.10:

router bgp 109

neighbor 192.98.47.10 timers 70 210

5.1.52. neighbor ttl-security-hop

To configure TTL hop limit for BGP, run the following command. To return to the default setting, use the no form of this command.

neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **ttl-security-hop** *value*

no neighbor {*ip-address* | *X:X::X:X* | *peer-group-name*} **ttl-security-hop**

Parameter

Parameter	Description
ip-address	IP address of neighbor
X:X::X:X	IPv6 address of neighbor
peer-group-name	peer group name of BGP
value	Value of hop limit. The value ranges from 1 to 254.

Default value

None

Command mode

BGP configuration mode

Usage guidelines

The command is used to configure the max hop supported by bgp neighbor. The connection exceeds this hop cannot be established.

Example

The following example shows how to configure neighbor 10.1.1.2 ttl hop limit to 1:

```
router bgp 100
neighbor 10.1.1.2 ttl-security-hop 1
```

Related command

neighbor peer-group (creating)

neighbor remote-as

5.1.53. neighbor update-source

To have the 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* | *peer-group-name*} **update-source interface**

no neighbor {*ip-address* | *peer-group-name*} **update-source interface**

parameter

Parameter	Description
ip-address	IP address of the BGP-speaking neighbor.
peer-group-name	BGP peer group name
Interface	Interface name

Default

Best local address

Command mode

BGP configuration mode

Usage guidelines

By default, the ip module decides the local ip address of TCP connection when BGP establishes the connection. IP module decides interface depending on routes, and then binds the main ip address of this interface as the local address of TCP. Use the update-source command can bind the main ip address of the local specified interface during the establishment of TCP connection.

It is generally specified to use loopback interface, for the loopback interface ‘s protocol state is always up. And so this keeps the stability of BGP session and avoids route fluctuation.

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.

Example

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

router bgp 110

network 160.89.0.0

neighbor 160.89.2.3 remote-as 110

neighbor 160.89.2.3 update-source Loopback0

Related commands

neighbor peer-group (creating)

5.1.54. neighbor weight

Syntax

To assign a weight to a neighbor connection, use the neighbor weight command in address family or router configuration mode. To remove a weight assignment, use the no form of this command.

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

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

Parameter

Parameter	Description
ip-address	IP address of the neighbor.
peer-group-name	BGP peer group name
Weight	Weight to assign. Acceptable values are from 0 to 65535.

Default value

Routes learned through another BGP peer have a default weight of 0 and routes sourced by the local router have a default weight of 32768.

Command mode

BGP configuration mode

Usage guidelines

BGP routing metric is the important standard to choose routes. The default metric of all routes that learned from neighbors is 0. Use this command to set metric for routes that learned from neighbor.

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.

Example

The following router configuration mode example sets the weight of all routes learned via 151.23.12.1 to 50:

router bgp 109 neighbor 151.23.12.1 weight 50

Related commands

neighbor peer-group (creating)

set weight 23

5.1.55. network (BGP)

Syntax

To specify the networks to be advertised by the Border Gateway Protocol (BGP), use the network command. To remove an entry from the routing table, use the no form of this command.

network A.B.C.D/n route-map *map-name* **backdoor**

no network A.B.C.D/n route-map *map-name* **backdoor**

Parameter

Parameter	Description
A.B.C.D/n	Network prefix that BGP will advertise
route-map	The specified route map
map-name	Name of the route map
backdoor	Backdoor network

Default value

No networks are specified.

Command mode

BGP configuration mode

Usage guidelines

There are three ways to specify the networks to be included by the BGP:

- Via the redistribute command to include routes dynamically
- Via the network command to include routes statically
- Via the aggregate command to include routes

All routes generated by these three methods are regarded as the local routes which can be informed to other peers but not to be included by local IP routing table.

A totally same route in the main routing table of IP is the basis for the network configured with the network command to become effective.

A more precise or totally same route in the local BTP routing table is the basis for the network to become effective that configured with the aggretgate-address command.

The length of mask code is generated in term of standard network type if not specified

Use the route-map to configure route's attribute.

The backdoor network is used to modify route distance rather than to generate routes. It changes route's default distance that learned from the neighbor to the local route's distance. The default value is 200.

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

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

Example

The following example sets up network 131.108.0.0/8 to be included in the BGP updates:

router bgp 120

network 131.108.0.0/8

Related commands

redistribute (BGP)

aggregate-address

5.1.56. redistribute(BGP)

Syntax

To redistribute a route process to Border Gateway Protocol (BGP), use the redistribute command. To remove the redistribute command from the configuration file, use the no form of this command.

redistribute protocol [*process-id*] [route-map *map-name*]

no redistribute protocol [*process-id*] [route-map *map-name*]

Parameter

Parameter	Description
protocol	Type of routing protocol
process-id	Process id of routing protocol, such as process if of ospf
route-map	Applies route map to configure route attribute
map-name	Name of route map

Default value

Disabled

Command mode

BGP configuration mode

Usage guidelines

There are three ways to specify the networks to be included by the BGP:

- Via the redistribute command to include routes dynamically
- Via the network command to include routes statically
- Via the aggregate command to include routes

All routes generated by these three methods are regarded as the local routes which can be informed to other peers but not to be included by local IP routing table.

Use redistribute command to include routes dynamically to BGP. The change of route source will be reflected to BGP automatically. The automatically-included routes will be informed to other neighbors. The configuration of the redistribute command will re-check the specified type of routes in the routing table. The outer routes in OSPF will not be included to BGP.

Use the route-map to configure route's attribute.

Example

The following example configures routes from OSPF process 23 to be redistributed into BGP:

router bgp 109

redistribute ospf 23

related commands

route-map 1

5.1.57. router bgp

Syntax

To configure the BGP routing process, use the router bgp command in global configuration mode. To remove a routing process, use the no form of this command.

router bgp *as-number*

no router bgp *as-number*

Parameter

Parameter	Description
as-number	Number of autonomous system

Default value

No BGP routing process is enabled by default.

Command mode

global configuration mode

Usage guidelines

The system allows to configure one BGP process at most. The BGP task is established in the process of system initialization, and it is activated when the BGP process is started up. The BGP task only receives information from command module without configuring the BGP process. It is not related to routing module or any other module and will not response other information. The related show and clear command are all invalid.

Use no router bgp command to delete BGP process, and at the same time other configuration related to BGP will also be deleted, such as neighbors and so on. The BGP route in routing table is also be deleted.

To configure BGP process using the show running and show ip bgp summary command to check.

Example

The following example configures a BGP process for autonomous system 200:

router bgp 200

Related commands

neighbor remote-as

5.1.58. show ip bgp

Syntax

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 [**network**]

Parameter

Parameter	Description
network	Displays the specified routing information

Command mode

EXEC

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.

Example

The following is a group of BGP displaying information. The former two lines display some marked information.

Status code indicates the status of the table entry. The status is displayed at the beginning of each line in the table. S indicates the table entry is suppressed, which is the invalid route and will not be chosen. D indicates the table entry is dampened,

which is the invalid route. H indicates the table entry history, which is not a ture route and is the invalid route. “* “indicates the table entry is valid, which can be chosen as the best route.” > “indiates the table entry is the best entry to use for that network. “I” indicates the table entry was learned via an internal BGP (iBGP) session.

Origin codes indicates the origin of the entry. I is the entry originated from an Interior Gateway Protocol (IGP). E is the entry originated from an Exterior Gateway Protocol (EGP). ? is the origin of the path is not clear. Usually, this is a router that is redistributed into BGP from an IGP.

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. Local preference value as set with the set local-preference route-map configuration command. The default value is 100. Weight of the route as set via autonomous system filters. Autonomous system paths to the destination network. There can be one entry in this field for each autonomous system in the path.

The last line displays number of routes, including all valid and invalid routes.

B3710_118#show ip bgp

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
* 192.168.10.0/24	192.168.69.5	0			10 400 i
*>i192.168.10.0/24	192.168.69.14	100		0	(65030) 400 i
*>i192.168.11.0/24	192.168.69.14	100		0	(65030) 400 i
* 192.168.65.0/30	192.168.69.1	100		0	(65020) 10 ?
*> 192.168.65.0/30	192.168.69.5	0			10 ?
* 192.168.65.4/30	192.168.69.1	100		0	(65020) 10 ?
*> 192.168.65.4/30	192.168.69.5	0			10 ?
* 192.168.65.8/30	192.168.69.1	100		0	(65020) 10 ?
*> 192.168.65.8/30	192.168.69.5	0			10 ?
* 192.168.66.0/30	192.168.66.2	100		0	(65020) ?
*> 192.168.66.0/30	0.0.0.0	32768			?
* i192.168.66.4/30	192.168.66.6	100			0 ?
*> 192.168.66.4/30	0.0.0.0	32768			?
*>i192.168.66.8/30	192.168.66.6	100			0 ?
*>i192.168.67.0/30	192.168.69.18	200	100	0	500 ?

Number of displayed routes: 15

Related commands

show ip bgp community

show ip bgp neighbors

show ip bgp paths

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

5.1.59. show ip bgp community

Syntax

To display routes that belong to specified BGP communities, use the show ip bgp community command in EXEC mode.

show ip bgp community

Parameter

none

Command mode

exec

Usage guidelines

This command is used to display statistics information of BGP communities attribute structure in the system.

Related commands

show ip bgp

show ip bgp neighbors

show ip bgp paths

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

5.1.60. show ip bgp ipv6 unicast

Syntax

To show the entry in ipv6 BGP routing table, run the following command.

show ip bgp ipv6 unicast[**network**]

Parameter

Parameter	Description
network	Show the designated routing information.

Command mode

Exec

Usage guidelines

The whole ipv6 BGP routing table is shown if the network is not designated. Details of the network is only shown if the network is designated.

Example

The following is display information of a group of BGP. The front two rows show some tag information.

Status code describes definition of the tag in front of the route. S represents suppression, which indicates the route is suppressed by the aggregation configuration and is an invalid route which will not be selected; d represents attenuation, which indicates the route is suppressed by the fluctuation and is an invalid route; h represents the historic route, which represents the route is saved as of the attenuation control and there is no a real route but only an invalid route. * represents a valid route, which indicates the route is valid and can be selected as the best route; > represents the best route, which indicates the best route slected from the valid routes; I represents the inner route, which indicates the route is from IBGP neighbor, which does not include routes from the sub-autonomous system of the autonomous league.

Origin codes describes the Origin of the route, i means IGP, e means EGP, ? means indefinite.

The command shows the attributes including the status, destination addres, gateway address, Metric(MED), Local-preference, Weight and AS Path of every route. The gateway address of the local route is 0.0.0.0. Metric is not shown if it is not configured with a definite setting. Local-preference for IBGP route is 100 by default; it includes the default value even if it is not shown or it is shown with the set value. Weight is 32768 or the set value; if it is not configured, it is 0. AS Path domain shows the attribute of AS Path, including AS list an Origin attribute. In the brackets is AS-set or sub-autonomous system of the autonomous system league.

The last row shows the number of routes shown altogether, including valid and invalid routes.

Related command

5.1.61. show ip bgp neighbors

Syntax

To display information about Border Gateway Protocol (BGP) and TCP connections to neighbors, use the show ip bgp neighbors command.

show ip bgp neighbors [*ip-address*] [**received-routes | routes** | **advertised-routes**]

Parameter

Parameter	Description

ip-ddress	IP address of a neighbor. If this parameter is omitted, information about all neighbors is displayed.
received-routes	Displays all received routes (both accepted and rejected) from the specified neighbor.
routes	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.
advertised-routes	Displays all routes that have been advertised to neighbors.

Command mode

EXEC

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.

Related commands

show ip bgp

show ip bgp community

show ip bgp paths

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

5.1.62. show ip bgp paths

Syntax

To display all the BGP paths in the database, use the show ip bgp paths command in EXEC mode.

show ip bgp paths

Parameter

none

Command mode

EXEC

Usage guidelines

This command is used to display statistics information of BGP paths structure.

Related commands

show ip bgp

show ip bgp community

show ip bgp neighbors

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

5.1.63. show ip bgp prefix-list

Syntax

To display information about a prefix list or prefix list entries, use the show ip prefix-list command.

show ip bgp prefix-list {*prefix-list name*}

Parameter

Parameter	Description
prefix-list name	Name of prefix-list

Command mode

EXEC

Usage guidelines

This command specifies prefix-list to filter display of the show ip bgp command. Only the routes matching the prefix-list will be displayed.

Related commands

show ip bgp

show ip bgp community

show ip bgp neighbors

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

ip prefix-list

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

5.1.64. show ip bgp regexp

Syntax

To display routes matching the autonomous system path regular expression, use the show ip bgp regexp command in EXEC mode.

show ip bgp regexp regular-expression

Parameter

Parameter	Description
regular-expression	Regular expression to match the BGP autonomous system paths.

Command mode

EXEC

Usage guidelines

This command specifies the regular expression to filter the display of the show ip bgp command. Only the routes matching the regular expression will be displayed.

Related commands

show ip bgp

show ip bgp community

show ip bgp neighbors

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

5.1.65. show ip bgp summary

Syntax

To display the status of all Border Gateway Protocol (BGP) connections, use the show ip bgp summary command.

show ip bgp summary

Parameter

This command has no parameters or keywords.

Command mode

EXEC

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.

Example

The following is sample output from the show ip bgp summary command:

```
router bgp 4
BGP local AS is 4
Router ID is 192.168.20.72
IGP synchronization is enabled
Distance: external 20 internal 200
Neighbor        V    AS MsgRcvd MsgSent   TblVer InQ OutQ Up/Down  State/Pref
192.168.20.12   4     5       0       0        0   0    0 never    Connect
```

Related commands

show ip bgp

show ip bgp community

show ip bgp neighbors

show ip bgp paths

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

5.1.66. synchronization

Syntax

To enable the synchronization between BGP and your Interior Gateway Protocol (IGP) system, use the synchronization command in address family or router configuration mode. Use the no form of this command to disable this function.

synchronization

no synchronization

Parameter

none

Default value

enabled

Command mode

BGP configuration mode

Usage guidelines

Usually, a BGP speaker does not advertise a route to an external neighbor unless that route is local or exists in the IGP. By default, synchronization between BGP and the IGP is turned off to allow the software to advertise a network route without waiting for route validation from the IGP. This feature allows routers and access servers within an autonomous system to have the route before BGP makes it available to other autonomous systems.

IGP function is enabled by default.

To enable to advertise a network route without waiting for the IGP, use the no form of this command.

Example

The following example enables router to advertise the route without waiting for IGP synchronization.

router bgp 120

no synchronization

Related commands

router bgp

5.1.67. table-map

Syntax

To modify metric and tag values when the IP routing table is updated with BGP learned routes, use the table-map command in address family or router configuration mode. To disable this function, use the no form of the command.

table-map <*name*>

no table-map <*name*>

Parameter

Parameter	Description
name	Route map name from the route-map command.

Default value

none

Command mode

BGP configuration mode

Usage guidelines

This command adds the route map name defined by the route-map command to the IP routing table. This command is used to set the tag name and the route metric to implement redistribution.

Example

none

Related commands

none

5.1.68. timers

Syntax

To adjust BGP network timers, use the timers bgp command. To reset the BGP timing defaults, use the no form of this command.

timers bgp *<keepalive> <holdtime>*

no timers bgp *<keepalive> <holdtime>*

Parameter

Parameter	Description
keepalive	Frequency (in seconds) with which the software sends keepalive messages to its peer.
holdtime	Interval (in seconds) after not receiving a keepalive message that the software declares a peer dead.

Default value

Keepalive: 60 seconds

Holdtime: 180 seconds

Command mode

BGP configuration mode

Usage guidelines

Configure BGP neighbor clock in global configuration mode to modify default clock configuration. The configuration towards neighbor is prior to global configuration.

Example

The following example changes the keepalive timer to 10 seconds and the hold-time timer to 40 seconds:

router bgp 100

timers bgp 10 40

Related commands

neighbor timers

CHAPTER 6 PUBLIC ROUTING CONFIGURATION COMMANDS

6.1. Ip aspath-list Configuration Commands

6.1.1. ip as-path access-list

Syntax

To create the as-path list, run ip as-path access-list <*name*> <deny | permit> <*regexp*>. To cancel the configured as-path list, run no ip as-path access-list <*name*> [deny | permit] [*regexp*].

ip as-path access-list <*name*> <deny | permit> <*regexp*>

no ip as-path access-list <*name*> [deny | permit] [*regexp*]

Parameter

Parameter	Description
name	Name of the as-path list
deny | permit	Attribute of the as-path list
regexp	Regular expression of the as-path

Default value

All as-path expressions except those having a clear explanation on the **permit** regulation are declined by default.

Command mode

Global configuration mode

Usage guidelines

The AS-path list is used to filter the AS-PATH attribute of the BGP route. The AS-PATH attribute of the BGP route is a number sequence which is expressed in form of the character string. The number at the right end is the autonomous system number for the route starting, while the numbers leftwards in turn are the numbers of the autonomous systems which the BGP route passes. For example, character string 22 23 98 means that the BGP route is transmitted from autonomous system 98, passes through autonomous system 23 and autonomous system 22, and finally reaches the local autonomous system.

The AS-path list in the system is identified with the name. The total number of AS-path lists which are allowed to configure in the system is limited by the resource of the system. The same AS-path list can be configured with multiple matchup regulation. The procedure to apply the AS-path list is to check whether the matchup is successful or not according to the configuration order. Once a matchup is found to be successful, the following check-up will be stopped and the nature of the regulation (deny/permit) is then returned. If the matchup of all regulations is not successful, the

nature of the regulation, **deny**, will be returned. Each regulation is organized according to their configuration order.

The as-path expression is normally the regular expression. The special characters which are always used in the expression are shown in the following table:

Character	Symbol	Meaning
Full stop	.	Matches any single character, including space.
Asterisk	*	Matches the **0** sequence or more sequences.
Plus	+	Matches the **1** sequence or more sequences.
Question mark	!	Follows the number 0 or 1.
Addition character	^	Starting point of the matchup character string
Dollar	$	End point of the matchup character string
Underline	_	Matches these symbols: “”, “{ }”, “( )”, “^”, “$” and “space”.
Square bracket	[ ]	Stands for the range of the single-character mode.
Hyphen	-	Separates a range.

With the aid of the presentation methods of the AS-PATH attribute, the correct usage of the regular expression can help create the powerful AS-path list. The following examples are given:

.* Representing any attribute of the AS path.

^$ Representing the attributes of the null path

^22$ Representing the path attributes of autonomous system 22

^22_ Representing the path attribute starting with 22

_22$ Representing the path attribute starting with 22, such as 22, 34 22 and 99 45 22

_22_ Representing the path attribute containing 22, like 23 22 45 and 442 22 23 44

The **as-path list** command can be used together with the **match as-path** command and the **neighbor filter-list** command.

Example

In the following example, the defined **as-path list hell** command permits all path attributes starting with 23 or containing 22:

ip as-path access-list hell permit ^23

ip as-path access-list hell permit _22_

Or:

ip as-path access-list guangzhou deny ^300

ip as-path access-list guangzhou deny _300_

ip as-path access-list guangzhou permit .*

The AS-PATH attributes starting with 300 or containing 300 will be declined, while other AS-PATH attributes can pass. If the defined order is different, the results will be totally different. The following AS-PATH attributes can pass.

ip as-path access-list guangzhou permit .*

ip as-path access-list guangzhou deny ^300

ip as-path access-list guangzhou deny _300_

Related command

match as-path

neighbor filter-list

6.1.2. show ip aspath-list

Syntax

To display the AS-path list configured in the system, run the following command:

show ip as-path-list <*name*>

Parameter

Parameter	Description
name	Name of the as-path list

Default value

None

Command mode

EXEC

Usage guidelines

If the name of the as-path list is not designated, all configured as-path lists in the system will be displayed.

Example

The following example shows that all as-path lists in the system will be displayed:

show ip as-path-list

Related command

ip as-path access-list

6.2. ip community-list Configuration Commands

6.2.1. ip community-list

Syntax

To create the regulations for the community list of the BGP route, run **ip community list**. To cancel the regulations for the community list, run **no community list**.

ip community-list <*name*> <**deny** | **permit**> [**aa:nn** | *1-4294967295* | **local-AS** | **no-advertise** | **no-export**]

no ip community-list <*name*> <**deny** | **permit**> [**aa:nn** | *1-4294967295* | **local-AS** | **no-advertise** | **no-export**]

Parameter

Parameter	Description
name	Name of the community list
deny | permit	Attribute of the community list
<1-4294967295>	Value of the community, which is a 32-bit integer
aa:nn	New form of the community value **aa** stands for a 16-bit value. **nn** stands for the next 16-bit value.
no-advertise	Means that no neighbor will be reported.
local-AS	Means that the EBGP neighbor outside of the local autonomous system or in the same autonomous system ally will not be reported.
no-export	Means that the neighbors in the local autonomous system or the autonomous system ally will not be reported.

Default value

All communities except those having a clear explanation on the **permit** regulation are declined by default.

Command mode

Global configuration mode

Usage guidelines

The community list is used to filter or set the community attribute of the BGP route. The community attribute is a group number or a community group number. A community

number is a 4-byte value. The community numbers between 0x00000000 and 0x0000FFFF or between 0xFFFF0000 and 0xFFFFFFFF are reserved. These community numbers are globally accepted. The frequently-used community numbers are the following ones:

NO_EXPORT (0xFFFFFF01): After the route with this community number is received, the peers outside the autonomous system or autonomous system ally will not be reported.

NO_ADVERTISE(0xFFFFFF02): After the route with the community number is received, no peers will be reported.

NO_EXPORT_SUBCONFED (0xFFFFFF03): It is always called as LOCAL_AS. After the route with the community number is received, the peers outside the local autonomous system are not reported.

The community list in the system is identified by a name. The total number of the community lists which can be configured in the system is limited by the system's resource. The same community list can be configured with multiple matchup regulations. The procedure to apply the community list is to check whether the matchup is successful or not according to the configuration order. Once a matchup is found to be successful, the following check-up will be stopped and the nature of the regulation (deny/permit) is then returned. If the matchup of all regulations is not successful, the nature of the regulation, **deny**, will be returned. The order to check each regulation is the configuration order.

One community-list regulation has three elements: name, regulation's attribute (deny/permit) and community number sequence. The community number sequence is a set of a group of community numbers. If all community numbers in the community attribute are in the community sequence with designated regulations, the matchup is successful. If not, the matchup fails and the next regulation will be matched.

The **community list** command can be used together with commands **route-map** and **match community**.

Example

In the following example, the community will be declined by the **ip community-list yall** command if the value of the community is 5 or 10; the community will be accepted by the **ip community-list yall** command if the value of the community is 15 or 20.

```
ip community-list yall deny 5 10
ip community-list yall permit 15 20
```

Related command

match community-list 4

6.2.2. show ip community-list

Syntax

To display the community list configured in the system, run the following command:

show ip community-list <*name*>

Parameter

Parameter	Description
name	Name of the community list

Default value

None

Command mode

EXEC

Usage guidelines

If the name of the community list is not designated, all configured community lists in the system will be displayed.

Example

The following example shows that all community lists in the system will be displayed:

Show ip community-list

Related command

ip community-list

6.3. ip prefix-list commands

6.3.1. clear ip prefix-list

Syntax

To delete the statistics information about the designated prefix list, run the following command:

clear ip prefix-list [<name> [<*prefix*>]]

Parameter

Parameter	Description
name	Name of the prefix list
prefix	Network prefix which is in the A.B.C.D/n format **n** here stands for the length of the mask.

Default

None

Command mode

EXEC

Usage guidelines

If the prefix is not designated, all statistics information in the prefix list will be canceled.

Example

None

Related command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

6.3.2. ip prefix-list

Syntax

To establish a prefix list or add a prefix-list regulation, run **ip prefix-list <*name*> [<seq> <*seq_number*>] <deny | permit> <prefix | any> [<*ge*> <*value*>] [<le> <*value*>].** To cancel the configuration, run **no prefix-list <*name*> [<seq> <*seq_number*>] <deny | permit> <prefix | any> [<*ge*> <*value*>] [<le> <*value*>].**

ip prefix-list <*name***> [<seq> <***seq_number***>] <deny | permit> <prefix | any> [<***ge***> <***value***>] [<le> <***value***>]**

no ip prefix-list <*name***> [<seq> <***seq_number***>] <deny | permit> <prefix | any> [<***ge***> <***value***>] [<le> <***value***>]**

Parameter

Parameter	Description
name	Name of the prefix list
seq	Designates the sequence number.
seq_number	Value of the sequence number
deny | permit	Attribute of the prefix list
prefix | any	Designated prefix or any prefix
ge	Designates the minimum length of the matched prefix.
value	Length of the prefix which ranges from 0 to 32
le	Designates the maximum length of the matched prefix.
value	Length of the prefix which ranges from 0 to 32

Default value

None

Command mode

Global configuration mode

Usage guidelines

The prefix list is a set of regulations for filtrating the network prefix. Each regulation has five elements: sequence, deny/permit, prefix and length (a.b.c.d/n), upper limitation (le y) and bottom limitation (ge x). All regulations are sorted according to the sequence. When the prefix list is applied, the regulation of the smallest sequence is first checked. If the matchup is successful, other regulations stop the matchup operation and the matched regulation's attribute (deny/permit) is returned.

When you check whether a regulation matches a designated network prefix, you should not only check the length of the network prefix but also check whether the network prefixes have the same length in the designated length. For example, to check whether a regulation of a prefix list, **ip prefix-list test seq 5 A.B.C.D/M ge X le Y**, matches the designated network **a.b.c.d/n**, the following procedure will be taken.

Firstly, check whether the mask length of the network (n) meets the requirement of the expression: X <= n <= Y (if **ge X** is not designated, the expression is **M <= n<= Y**; if the **le Y** is not designated, the expression is **X <=n <= 32**; if both **ge X** and **le Y** are not designated, the expression is **n == M**). If the mask length meets the requirements of the expression, the next operation will be performed. If the mask length does not meet the regulation, the following regulation will be used.

Check whether network a.b.c.d/n and the first M bit of A.B.C.D are same. If they are same, the regulation is met and the attribute of the regulation is returned; if the regulation is not met, the next regulation will be seen whether it is met.

If all regulations are not met, the **deny** attribute will be returned.

Example

The following are destination routes and prefix lists:

Destination route 1: 120.120.0.0/14

Destination route 2: 120.120.0.0/16

Destination route 3: 120.120.0.0/25

Destination route 4: 130.130.0.0/16

Destination route 5: 130.130.0.0/8

Destination route 6: 130.130.0.0/24

Destination route 7: 12.0.0.0/8

Prefix-list:

ip prefix-list sample permit 120.120.0.0/8 ge 16 le 24

ip prefix-list sample deny 130.130.0.0/16

The following are the matchup results:

Destination route 1: unsuccessful, deny

Destination route 2: successful, permit

Destination route 3: unsuccessful, deny

Destination route 4: successful, deny

Destination route 5: unsuccessful, deny

Destination route 6: unsuccessful, deny

Destination route 7: unsuccessful, deny

Related command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

6.3.3. ip prefix-list description

Syntax

To configure the description of the prefix list, run **ip prefix-list <*name*> <description> <*strings*>**. To cancel the description of the prefix list, run **no ip prefix-list <*name*> <description> <*strings*>**.

ip prefix-list <*name*> <**description**> <*strings*>

no ip prefix-list <*name*> <**description**>

Parameter

Parameter	Description
name	Name of the prefix list
description	Designates the description information of the prefix list.
strings	Description information

Default value

None

Command mode

Global configuration mode

Usage guidelines

None

Example

The following example shows how to add the description information to **prefix-list hard** for convenient reading:

ip prefix-list hard deny any

ip prefix-list hard description This prefix-list is used to filter routes from neighbor hard

Related command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

6.3.4. ip prefix-list sequence-number

Syntax

To enable the prefix list to use the sequence, run **ip prefix-list *sequence-number***. To cancel the sequence, run **no ip prefix-list *sequence-number***.

ip prefix-list *sequence-number*

no ip prefix-list *sequence-number*

Parameter

None

Default value

The sequence is used by default.

Command mode

Global configuration mode

Usage guidelines

The command is used to decide whether each regulation of the prefix list has been allocated with a sequence. After the sequence is used, the same sequence corresponds to only one regulation. Hence, if a regulation with a same sequence is newly generated, the previously old regulation will be deleted. If the sequence is not used, you have to run a command to delete the regulation. The sequence may not be designated during configuration. The system then allocates the sequence for all regulations. The sequence starts from 5 and adds 5 each time.

Example

None

Related command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

6.3.5. show ip prefix-list

Syntax

To display the information about the prefix list or all prefix lists, including the configuration information and statistics information about the prefix list, run the following command:

show ip prefix-list [<**summary | detail**> <*name*>]

Parameter

Parameter	Description
summary	Summary information
detail	Detailed information
name	Name of the prefix list

Default value

None

Command mode

EXEC

Usage guidelines

If the name of the prefix list is not designated, all information about the prefix list will be displayed.

Example

The following example shows that a prefix list is configured.

ip prefix-list yell permit 130.12.19.0/24

ip prefix-list yell permit 140.20.0.0/16 ge 16 le 24

The following information is shown after the **show ip prefix-list detail** command is run:

Prefix-list with the last deletion/insertion: yell

ip prefix-list yell: 2 entries

count: 2, range entries: 1, sequences: 5 - 10

seq 5 permit 130.12.19.0/24 (hit count: 0, refcount: 10)

seq 10 permit 140.20.0.0/16 ge 16 le 24 (hit count: 0, refcount: 10)

The first information line indicates that the recently-modified prefix list is **yell**.

Starting from the second information line, all information about the prefix list is listed. Here only one prefix list is configured, whose name is **yell**.

Count: 2, indicating that the prefix list has two options.

Range entries: 1, indicating that the number of network range defined in the prefix list is 1.

Sequences: 5-10, indicating the sequence range of each option in the prefix list

The following are the definition of each option and the statistics information.

Hit count: 0, indicating that the times of option matchup is 0

Refcount: 10, meaning that the times of option matchup are 10

Related command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

6.4. route-map Commands

6.4.1. route-map

Syntax

To create a route map or define a route-map item, run **route-map [*name seq*]** [**deny** | **permi**]. To delete the created route map or the defined route-map item, run **no route-map [*name seq*]** [**deny** | **permi**].

route-map [*name seq*] [**deny** | **permi**]

no route-map [*name seq*] [**deny** | **permi**]

Parameter

Parameter	Description
name	Name of the route map
seq	Sequence of the route map whose default value is 0
deny | permit	Attribute of the route map whose default value is **permit**

Default value

By default, the value of the **seq** parameter is 10 and the attribute is **permit**.

Command mode

Global configuration mode

Usage guidelines

The route map is used to modify the route's attribute or the filtration route. The route map is always used for the strategy of the dynamic routing protocol, such as redistribute route, filtration route, setting the route's attribute for strategic routing, and so on.

The same route map may have multiple items. The total number of the route map in the system is limited by the system's resource.

Each item in the same route map can be designated with the sequence or the system will automatically generate the sequence for each item.

Each item has a kind of attribute (deny/permit); each item can be conducted with the matchup regulation (match), regulations (set) and exit strategies (on-match).

Tue matchup regulation is used to check whether a feature of an object meets a certain rule. If the object meets all matchup regulations in the item, the object matches the item successfully, or the item matchup fails. If an item is not configured with the matchup regulation, any object cannot match the item. If the matchup regulation adopts other lists such as the access list, prefix list, community list or as-path list to check whether an object is matched, the returned value of the list is the result of regulation matchup.

The setting regulation is used to set an attribute of an object. If an object matches the item successfully and the attribute of the item is **permit**, the setting regulations configured under the item are used to modify the attribute of the object. If the object matches the item and the attribute of the item is **deny**, the exit strategy will be checked. If the object fails to match the item, the next item matchup will be conducted until the matchup succeeds.

The exit strategy decides the actions after the object matches the item successfully. If an object matches an item successfully and the item have not configured with the exit strategy, the checking to other items will be stopped and the attribute of the item (deny/permit) will be returned. If **on-match next** is configured, the checking on the next item will be continued. If **on-match goto N** is configured, the designated item, item N, will be the first one to be checked; if the designated item does not exist, the attribute of the item (deny/permit) will be returned.

Under the same item, only one matchup regulation of the same attribute or the settings regulation can be configured. The following matchup regulation or settings regulation configured will replace the previous one. The following configuration can be done for the same item:

match metric 34

set metric 100

In the previous example, there is only one **match** regulation and the **set** regulation.

To realize multiple values for matching the same attribute, you can use the exit regulations.

- route-map match-multi-metric 10 permit
- match metric 10
- on-match goto 30
- route-map match-multi-metric 20 permit
- match metric 20
- on-match goto 30
- route-map match-multi-metric 30 permit

– set metric 100

In the same example, the route whose metric is 10 or 20 is matched and its metric will be set to 100.

During configuration, the system can automatically generate a sequence for each item, starting from 10 by default and then adding 10 in turn. When the route map is applied, the system will check the sequence of the item from small to big.

The route map can handle different types of routes, some **match** regulations and **set** regulations only suitable for parts of routes. If you try to use the unsupported **match** regulations or **set** regulations to match or modify the objects, the system will omit these regulations.

If there is no name behind the **no route map** command, the whole route map will be deleted, or the designated item will be deleted.

Example

The following example shows the route map is used to filter the routes forwarded by OSPF and to set the relative attributes.

router bgp 20

redistribute ospf 3 route-map redist-ospf

route-map redist-ospf

match tag 139009

set local-preference 300

Related command

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.2. match as-path

Syntax

To set a **match** regulation of the route map and check the attributes of the BGP route through the AS-path map, run **match as-path <as-path-list-name>**. To delete the configuration you have just done, run **no match as-path <as-path-list-name>**.

match as-path <*as-path-list-name***>**

no match as-path <*as-path-list-name***>**

Parameter

Parameter	Description
as-path-list-name	Name of the as-path list

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

The designated AS path list is used to match the object or to filter the AS-PATH attribute of the BGP route.

Example

The following example shows how to check the whether the BGP route is matched using **as-list1**.

route-map match-aspath

match as-path as-list1

Related command

route-map

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.3. match community

Syntax

To set a **match** regulation of the route map and check the attributes of the BGP route through the community list, run **match community <*community-list-name*>**. To delete the configuration you have just done, run **no match community <*community-list-name*>**.

match community <*community-list-name***>**

no match community <*community-list-name***>**

Parameter

Parameter	Description
community-list-name	Name of the community list

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

The designated community list is used to match the object and to filter the community attribute of the BGP route.

Example

The following example shows how to check the whether the BGP route is matched using **as-list1**.

route-map match-comm

match community comm-list1

Related command

route-map

match as-path

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.4. match ip address

Syntax

To set a route-map **match** regulation and match the destination network's address, run **match ip address <*name*>**. To delete the configuration you have just done, run **no match ip address <*name*>**.

match ip address <*name***>**

no match ip address <*name***>**

Parameter

Parameter	Description
name	Name of the IP access list

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

The access list is used to filter the network address of the route, which is suitable for all IP routes and packets.

Example

In the following example, the route checked by the access list is set to metric.

route-map set-metric

match ip address acl-metric

set metric 100

Related command

route-map

match as-path

match community-list

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.5. match ip next-hop

Syntax

To set a route-map **match** regulation and check whether the next hop address of the route matches with the address of the designated next hop, run **match ip next-hop <*a.b.c.d*>**. To delete the configuration you have just done, run **no match ip next-hop <*a.b.c.d*>**.

match ip next-hop <*a.b.c.d***>**

no match ip next-hop <*a.b.c.d***>**

Parameter

Parameter	Description
a.b.c.d	IP address

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

The access list is used to check the attribute of the next hop, which is suitable for all IP routes.

Example

In the following example, the route with the next hop's address 192.121.13.28 matches item 20 of the route map.

```
route-map beijing 10 permit
match ip nexthop 172.12.29.98
set metric 100
route-map beijing 20 permit
match ip nexthop 192.121.13.28
set metric 20
```

Related command

route-map

match as-path

match community-list

match ip address

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.6. match ip address prefix-list

Syntax

To set a route-map **match** regulation and match the destination network's address, run **match ip address prefix list <*name*>**. To delete the configuration you have just done, run **no match ip address prefix-list <*name*>**.

match ip address prefix-list <*name***>**

no match ip address prefix-list <*name***>**

Parameter

Parameter	Description
name	Name of the prefix list

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to all IP routes.

Example

The following example shows that the route whose destination address is 192.121.0.0 matches **route-map match-prefix**.

ip prefix-list beijing permit 192.121.0.0/16

route-map match-prefix

match ip address prefix-list beijing

set metric 100

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.7. match length

Syntax

To set a route-map **match** regulation and check whether the route's metric matches the address of the designated metric, run **match length <*minimum-length*> <*maximum-length*>**. To delete the configuration you have just done, run **no match length <*minimum-length*> <*maximum-length*>**.

match length <*minimum-length***> <***maximum-length***>**

no match length <*minimum-length***> <***maximum-length***>**

Parameter

Parameter	Description
minimum-length	Minimum length of the packet
maximum-length	Maximum length of the packet

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to the strategy route.

Related command

route-map

6.4.8. match metric

Syntax

To set a route-map **match** regulation and check whether the route's metric matches the address of the designated metric, run **match metric <*value*>**. To delete the configuration you have just done, run **no match metric <*value*>**.

match metric <*value***>**

no match metric <*value***>**

Parameter

Parameter	Description
value	Metric value

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to all routes.

Example

The following example shows that the routes whose metric values are 120 are declined because they match item 20 of the route map.

route-map beijing 10 permit

match ip nexthop 172.12.29.98

set metric 100

route-map beijing 20 deny

match ip metric 120

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.9. match tag

Syntax

To set a route-map **match** regulation and check whether the route's tag matches the designated tag, run **match tag <*value*>**. To delete the configuration you have just done, run **no match tag <*value*>**.

match tag <*value***>**

no match tag <*value***>**

Parameter

Parameter	Description

value	Value of the Tag

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to all routes.

Example

The following example shows that the routes whose tags' values are 120923 are declined because they match item 20 of the route map.

route-map huang 10 permit

match ip nexthop 172.12.29.98

set metric 100

route-map huang 20 deny

match ip tag 120923

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.10. on-match

Syntax

To configure the exit strategy of the route-map item, run **on-match {next | goto *n*}**. To cancel the configuration, run **no on-match {next | goto *n*}**.

on-match {next | goto *n*}

no on-match {next | goto *n*}

Parameter

Parameter	Description
n	Sequence of the item

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

The command is used to configure the exit strategy of the route-map item. If a route-map item is successfully matched and the item have not configured with the exit strategy, the checking to other items will be stopped and the attribute of the item (deny/permit) will be returned. If **on-match next** is configured, the checking on the next item will be continued. If **on-match goto N** is configured, the designated item, item N, will be the first one to be checked; if the designated item does not exist, the attribute of the item (deny/permit) will be returned.

Example

The following example shows that all routes are set to **aggregator**.

route-map huang

set aggregator as 200 192.12.90.82

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric
match tag
set aggregator
set as-path
set atomic-aggregate
set community
set community-additive
set ip next-hop
set local-preference
set metric
set origin
set tag
set weight
show route-map

6.4.11. set aggregator

Syntax

To configure a route-map setting regulation and set the BGP route to **aggregator**, run **set aggregator <as> <*as-number*> <*a.b.c.d*>**. To delete the configuration you have just done, run **no set aggregator <as> <*as-number*> <*a.b.c.d*>**.

set aggregator <as> <*as-number***> <***a.b.c.d***>**

no set aggregator <as> <*as-number***> <***a.b.c.d***>**

Parameter

Parameter	Description
as-number	Number of the autonomous system of the route aggregator
a.b.c.d	IP address of the route aggregator

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route.

Example

The following example shows that all routes are set to **aggregator**.

route-map huang

set aggregator as 200 192.12.90.82

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.12. set as-path

Syntax

To configure a route-map setting regulation and add AS before the **as-path** attribute of the BGP route, run **set as-path <prepend> <*as*>**. To delete the configuration you have just done, run **no set as-path <prepend> <*as*>**.

set as-path <prepend> <*as***>**

no set as-path <prepend> <*as***>**

Parameter

Parameter	Description

prepend	Means that AS is added before the **as-path** attribute.
as	Number of the autonomous system

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route.

Example

In the following example, the length of the **as-path** attribute is added by adding the autonomous system number before the **as-path** attribute for each route and the result of routing choice is herein changed.

route-map add-as

set as-path prepend 200 200 200 200

Related command

route-map
match as-path
match community-list
match ip address
match ip next-hop
match ip prefix-list
match metric
match tag
on-match
set aggregator
set atomic-aggregate
set community
set community-additive
set ip next-hop
set local-preference
set metric
set origin
set tag
set weight

show route-map

6.4.13. set atomic-aggregate

Syntax

To configure a route-map setting regulation and set the BGP route to **aggregator**, run **set atomic-aggregate**. To delete the configuration you have just done, run **no set atomic-aggregate**.

set atomic-aggregate

no set atomic-aggregate

Parameter

None

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route. If the aggregation of information loss is generated when a system transmits the route, you need set the route to **atomic-aggregate**.

Example

In the following example, the length of the **as-path** attribute is added by adding the autonomous system number before the **as-path** attribute for each route and the result of routing choice is herein changed.

route-map tee

set atomic-aggregate

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set community
set community-additive
set ip next-hop
set local-preference
set metric
set origin
set tag
set weight
show route-map

6.4.14. set community

Syntax

To configure a route-map setting regulation and set the BGP route to **community**, run **set community** <***aa:nn* | *1-4294967295*** | ***local-AS* | *no-advertise* | *no-export***>. To delete the configuration you have just done, run **no set community** <***aa:nn* | *1-4294967295*** | ***local-AS* | *no-advertise* | *no-export***>.

set community <*aa:nn* | *1-4294967295* | ***local-AS* | *no-advertise* | *no-export***>

no set community <*aa:nn* | *1-4294967295* | ***local-AS* | *no-advertise* | *no-export***>

Parameter

Parameter	Description
aa:nn	Format of the community value
1-4294967295	Value range of the **community** parameter
no-advertise	Means that any neighbor will not be reported.
local-AS	Means that the EBGP neighbor outside of the local autonomous system or in the same autonomous system ally will not be reported.
no-export	Means that the neighbors in the local autonomous system or the autonomous system ally will not be reported.

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route. The newly-set community attribute will replace the previous community attribute of the route.

Example

In the following example, all routes from neighbor 193.12.202.12 will be set to **local-AS community**, enabling these routes not to be reported to other autonomous systems.

```
router bgp 200
neighbor 193.12.202.12 remote 100
neighbor 193.12.202.12 route-map tee in
route-map tee
set community local-AS
```

Related command

route-map
match as-path
match community-list
match ip address
match ip next-hop
match ip prefix-list
match metric
match tag
on-match
set aggregator
set as-path
set atomic-aggregate
set community-additive
set ip next-hop
set local-preference
set metric
set origin
set tag
set weight
show route-map

6.4.15. set community-additive

Syntax

To configure a route-map setting regulation and add a value to the community attribute of the BGP route, run **set community-additive <*aa:nn* | *1-4294967295* | *local-AS* | *no-advertise* | *no-export*>**. To delete the configuration you have just done, run **no set community-additive <*aa:nn* | *1-4294967295* | *local-AS* | *no-advertise* | *no-export*>**.

set community-additive <*aa:nn* | *1-4294967295* | ***local-AS* | *no-advertise* | *no-export***>

no set community-additive <*aa:nn* | *1-4294967295* | ***local-AS* | *no-advertise* | *no-export***>

Parameter

Parameter	Description
aa:nn	Format of the community value
1-4294967295	Value of the **community** parameter
no-advertise	Means that any neighbor will not be reported.
local-AS	Means that the EBGP neighbor outside of the local autonomous system or in the same autonomous system ally will not be reported.
no-export	Means that the neighbors in the local autonomous system or the autonomous system ally will not be reported.

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route. The newly-set community attribute will be added to the previous community attribute of the route.

Example

In the following example, all routes from neighbor 193.12.202.12 will be set to **local-AS community**, enabling these routes not to be reported to other autonomous systems.

```
router bgp 200
neighbor 193.12.202.12 remote 100
neighbor 193.12.202.12 route-map tee in
route-map tee
set community-additive local-AS
```

Related command

route-map
match as-path
match community-list
match ip address
match ip next-hop
match ip prefix-list
match metric
match tag
on-match
set aggregator
set as-path
set atomic-aggregate
set community
set ip next-hop
set local-preference
set metric
set origin
set tag
set weight
show route-map

6.4.16. set dampening

Syntax

To set the fluctuation control parameter of the BGP route and not to modify the attributes of the route, run **set dampening** [***half-time*|*reuse-value*|*suppress-value*|*hold-time***]. To delete the configuration you have just done, run **no set dampening** [***half-time*|*reuse-value*|*suppress-value*|*hold-time***].

set dampening [*half-time*|*reuse-value*|*suppress-value*|*hold-time*]

no set dampening[*half-time*|*reuse-value*|*suppress-value*|*hold-time*]

Parameter

Parameter	Description
half-time	Means the half punishment time of route attenuation.
reuse-value	Means the punishment value for BGP to reuse wave-limited routes.

suppress-value	Punishment value for BGP to limit the wave route
hold-time	Maximum hold time for the wave limitation of BGP route (unit: minute)

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

It is used to provide parameters for the control of BGP fluctuation route.

Example

None

Related command

route-map

6.4.17. set default

Syntax

To set the default information for the strategy route, run **set default interface *<interface-name>***. To cancel the configuration, run **no set default interface *<interface-name>***.

set default interface <*interface-name*>

no set default interface <*interface-name*>

Parameter

Parameter	Description
interface-name	Name of the designated interface

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to the strategy route. The default outgoing interface of the strategy route is configured through the command. Only when the interface is in the **use** state can this command validate. The interface must meet two conditions before it is used.

Firstly: The UP protocol is running on the interface.

Second: The interface has the IP address or the negotiation IP address, or the interface is the NULL interface.

Related command

route-map

6.4.18. set interface

Syntax

To set the outgoing interface for the strategy route, run **set interface <*interface-name*>**. To cancel the configuration, run **no set interface <*interface-name*>**.

set interface <*interface-name*>

no set interface <*interface-name*>

Parameter

Parameter	Description
interface-name	Name of the designated interface

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to the strategy route. The default outgoing interface of the strategy route is configured through the command. Only when the interface is in the **use** state can this command validate. The interface must satisfy two conditions before it is used.

Firstly: The UP protocol is running on the interface.

Secondly: The interface has the IP address or the negotiation IP address, or the interface is the NULL interface.

Related command

route-map

6.4.19. set ip default

Syntax

To set the default next hop for the strategy route, run **set ip default nexthop <*A.B.C.D*>**. To cancel the configuration, run **no set ip default nexthop <*A.B.C.D*>**.

set ip default nexthop <*A.B.C.D*>

no set ip default nexthop <*A.B.C.D*>

Parameter

Parameter	Description
A.B.C.D	Gateway's address

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to the strategy route. Only when the next hop arrives can this command be valid.

Example

None

Related command

route-map

6.4.20. set ip precedence

Syntax

To set the precedence for the strategy route, run **set ip precedence <0-7>**. To cancel the configuration, run **no set ip precedence <0-7>**.

set ip precedence <0-7>

no set ip precedence <0-7>

Parameter

Parameter	Description
0-7	Precedence which is set for the packet

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to the strategy route. When the suitable route is found by the strategy route for routing, the precedence can also be set. If the strategy route fails, the precedence cannot be set. The precedence of the IP packet is defined as follows:

routine	0
priority	1
immediate	2
flash	3
flash-override	4
critical	5
internet	6
network	7

Related command

route-map

6.4.21. set ip tos

Syntax

To set the precedence for the strategy route, run **set ip tos <0-15>**. To cancel the configuration, run **no set ip tos <0-15>**.

set ip tos <0-15>

no set ip tos <0-15>

Parameter

Parameter	Description
0-15	TOS which is set for the packet

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to the strategy route. When the suitable route is found by the strategy route for routing, TOS can also be set. If the strategy route fails, the TOS cannot be set. Different TOS' can be set according to their order or can be set together:

normal	0
min-monestary	1
max-reliability	2
max-throughput	4
min-delay	8

Related command

route-map

6.4.22. set ip next-hop

Syntax

To configure a route-map setting regulation and set the next-hop address of the route, run **set ip next-hop <*a.b.c.d*>**. To delete the configuration you have just done, run **no set ip next-hop <*a.b.c.d*>**.

set ip next-hop <*a.b.c.d*>

no set ip next-hop <*a.b.c.d*>

Parameter

Parameter	Description
a.b.c.d	IP address

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to all IP routes.

Example

In the following example, the next-hop addresses of all routes from neighbor 193.12.202.12 are set to 193.12.202.1:

```
router bgp 200
neighbor 193.12.202.12 remote 100
neighbor 193.12.202.12 route-map tee in
route-map tee
set ip next-hop 193.12.202.1
```

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.23. set local-preference

Syntax

To configure a route-map setting regulation and set the local preference of the BGP route, run **set local-preference <*value*>**. To delete the configuration you have just done, run **no set local-preference <*value*>**.

set local-preference <*value*>

no set local-preference <*value*>

Parameter

Parameter	Description
value	Value of the local preference

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route.

Example

The following example shows that the route map can set **local-preference** to 200:

route-map set-local-pref

set local-preference 200

Related command

route-map
match as-path
match community-list
match ip address
match ip next-hop
match ip prefix-list
match metric
match tag
on-match
set aggregator
set as-path
set atomic-aggregate
set community
set community-additive
set ip next-hop
set metric
set origin
set tag
set weight
show route-map

6.4.24. set metric

Syntax

To configure a route-map setting regulation and set the metric of the route, run **set metric <*value*>**. To delete the configuration you have just done, run **no set metric <*value*>**.

set metric <*value*>

no set metric <*value*>

Parameter

Parameter	Description
value	Value of the metric

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to all IP routes.

Example

The following example shows that the route map can set **metric** to 120:

route-map set-metric

set metric 120

Related command

route-map
match as-path
match community-list
match ip address
match ip next-hop
match ip prefix-list
match metric
match tag
on-match
set aggregator
set as-path
set atomic-aggregate
set community
set community-additive
set ip next-hop
set local-preference
set origin
set tag
set weight
show route-map

6.4.25. set metric-type

Syntax

To set the value of the **metric-type** parameter for supporting the **external type** OSPF route, run **set metric-type** [**type-1 | type2**]. To delete the configuration you have just done, run **no set metric-type** [**type-1 | type2**].

set metric-type [**type-1 | type2**]

no set metric-type [**type-1 | type2**]

Parameter

Parameter	Description
Type-1	External type-1 of OSPF metric
Type-2	External type-2 of OSPF metric

Default value

None

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to external OSPF routes.

Example

The following example shows that the route map can set **metric-type** to **type1**:

route-map set-metric-type

set metric-type type1

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

set weight

show route-map

6.4.26. set origin

Syntax

To set the **origin** attribute of the BGP route, run **set origin** [**igp | egp | incomplete**]. To delete the configuration you have just done, run **no set origin** [**igp | egp | incomplete**].

set origin [**igp | egp | incomplete**]

no set origin [**igp | egp | incomplete**]

Parameter

Parameter	Description
igp	Internal route of the autonomous system
egp	External route of the autonomous system
incomplete	Uncertain route

Default value

Igp is he default route locally configured through the **network** command, **Incomplete** is the default route locally configured through the **aggregate** command or the **redistribute** command.

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route.

Example

The following example shows how the defined route map sets the BGP route with a 10-starting **original** attribute to **igp**.

ip as-path-list self permit ^10

route-map set-origin

match as-path self

set origin igp

Related command

route-map
match as-path
match community-list
match ip address
match ip next-hop
match ip prefix-list
match metric
match tag
on-match
set aggregator
set as-path
set atomic-aggregate
set community
set community-additive
set ip next-hop
set local-preference
set metric
set tag
set weight
show route-map

6.4.27. set tag

Syntax

To set the tag of the route, run **set tag <*value*>**. To delete the configuration you have just done, run **no set tag <*value*>**.

set tag <*value*>

no set tag <*value*>

Parameter

Parameter	Description
value	Value of the tag

Default value

The default tag value is 0.

Command mode

Route-map configuration mode

Usage guidelines

This command is suitable to all IP routes.

Example

The following example shows how to set **tag** to 120980 through the route map:

route-map set-tag

set tag 120980

Related command

route-map
match as-path
match community-list
match ip address
match ip next-hop
match ip prefix-list
match metric
match tag
on-match
set aggregator
set as-path
set atomic-aggregate
set community
set community-additive
set ip next-hop
set local-preference
set metric
set origin
set weight
show route-map

6.4.28. set weight

Syntax

To set the weight of the BGP route, run **set weight <*value*>**. To delete the configuration you have just done, run **no set weight <*value*>**.

set weight <*value*>

no set weight <*value*>

Parameter

Parameter	Description
value	Value of the weight

Default value

The default weight value of the locally-generated BGP route is 32768 and the weight value obtained from the neighbor is 0.

Command mode

Route-map configuration mode

Usage guidelines

This command is only suitable to the BGP route.

Example

The following example shows how to set the weight to 230 through the route map:

route-map set-weight

set weight 230

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive

set ip next-hop

set local-preference

set metric

set origin

set tag

show route-map

6.4.29. show route-map

Syntax

To display the information about the route map, run the following command:

show route-map [*name*]

Parameter

Parameter	Description
name	Name of the route map

Default value

None

Command mode

EXEC

Usage guidelines

If the name of the route map is not designated, all configured route maps in the system will be displayed.

Example

The following example shows that all route maps in the system are displayed:

Show ip route-map

Related command

route-map

match as-path

match community-list

match ip address

match ip next-hop

match ip prefix-list

match metric

match tag

on-match

set aggregator

set as-path

set atomic-aggregate

set community

set community-additive
set ip next-hop
set local-preference
set metric
set origin
set tag
set weight

CHAPTER 7 PBR CONFIGURATION COMMANDS

7.1. PBR Configuration Commands

HTTP configuration commands include:

- debug ip policy
- ip policy route-map
- match ip address
- match length
- set default interface
- set interface
- set ip default next-hop
- set ip next-hop
- route-map
- Debug ip policy
- ip local policy
- ip policy
- ip route-weight
- show ip local policy
- show ip policy

7.1.1. debug ip policy

Syntax

To check the results of applying the policy route, run **debug ip policy**. To return to the default setting, use the no form of this command.

debug ip policy

no debug ip policy

Parameter

None

Default value

By default, the results of policy route application will not be printed.

Command mode

EXEC

Usage guidelines

This command can be used to check whether the IP packets received from the interface have been applied with the policy route.

Because the results of policy routing application for each interface-received IP packet will be printed after this command is run, please use this command when the network traffic is low.

Example

The following example shows after the **debug ip policy** command is run:

Router# debug ip policy

2004-1-16 15:32:54 PBR: s=10.1.1.2 (FastEthernet0/0), d=99.1.1.1, len 84, policy rejected -- normal forwarding

2004-1-16 15:32:54 PBR: s=10.1.1.21 (FastEthernet0/0), d=99.1.1.1 (FastEthernet0/0.13), len= 84, gate=13.1.1.99 policy routed

Related command

None

7.1.2. ip policy route-map

Syntax

To apply the policy route to the interface-received IP packet, run **ip policy route-map *route-map name*** in interface configuration mode. To cancel the policy route on the interface, run **no ip policy route-map *route-map name***.

ip policy route-map *route-map name*

no ip policy route-map *route-map name*

Parameter

Parameter	Description
route-map name	Name of the route map

Default value

None

Command mode

Interface configuration mode

Usage guidelines

If you want to apply the policy route to the interface-received IP packet, you need to run the **ip policy route-map** command.

Example

The following example shows how to enable the policy route on interface f0/0.

Router_config#int f0/0

Router_config_f0/0#ip policy route-map pbr

Related command

route-map

7.1.3. match ip address

Syntax

To apply the matchup policy based on source IP address, run **match ip address *access-list name***.

match ip address *access-list name*

no match ip address [*access-list name*]

Parameter

Parameter	Description
access-list name	Name of the standard IP access control list

Default value

The access list is not designated by default.

Command mode

Route-map configuration mode

Usage guidelines

If the route map is applied to the policy route, the source address of the IP packet will be used to match the configured access list. If the source address does match the access list, the set regulation is then applied; otherwise, the next sequence number of the same route map will be used.

Example

The following example shows that the packets whose source IP addresses are allowed by access list **net1** will be transmitted to interface s0/0:

```
interface f0/0
ip policy route-map moon
!
route-map moon
match ip address net1
set interface s0/0
```

Related command

set default interface

set interface

set ip default next-hop

set ip next-hop

route-map

7.1.4. match length

Syntax

To set the route policy according to the length of the IP packet, run **match length**.

match length *minimum-length maximum-length*

no match length *minimum-length maximum-length*

Parameter

Parameter	Description
minimum-length	Designates the minimum length of the matched packet.
maximum-length	Designates the maximum length of the matched packet.

Default value

It is not configured by default.

Command mode

Route-map configuration mode

Usage guidelines

This command is used to conduct the policy routing according to the size of the IP packet.

Example

The following example shows that the IP packet whose size ranges between 1000 bytes to 1500 bytes will be transmitted to interface s0/0.

```
interface f0/0
ip policy route-map moon
!
route-map moon
match length 1000 1500
set interface s0/0
```

Related command

match ip address

set default interface

set interface

set ip default next-hop

set ip next-hop

route-map

7.1.5. set default interface

Syntax

To set the default next-hop interface for the matched IP packet, run **set default interface**.

set default interface *interface name* *[...interface name]* ***[*load-balance*]***

no set default interface *interface name* *[...interface name]* ***[*load-balance*]***

Parameter

Parameter	Description
interface name	Name of the interface

Default value

It is not configured by default.

Command mode

Route-map configuration mode

Usage guidelines

Before you set the default next-hop interface for the matched IP packet through the set default interface command, the following conditions must be satisfied:

The **set ip next-hop** command is not configured, or the **set ip next-hop** command is configured but the route of the next hop designated by **set ip next-hop** is not in the routing table.

If the **set interface** command is not configured or the **set interface** command is configure but these interfaces cannot be routed (the interface is down or there is no IP address).

The **set ip default next-hop** command or the **set ip default next-hop** command is not configured but the route of the next hop designated by **set ip default next-hop** is not in the routing table.

Example

None

Related command

match ip address

match length

set interface

set ip default next-hop

set ip next-hop

route-map

7.1.6. set interface

Syntax

To set the next-hop interface for the matched IP packet, run **set interface**.

set interface *interface name* *[...interface name]* ***[*load-balance*]***

no set interface *interface name* *[...interface name]* ***[*load-balance*]***

Parameter

Parameter	Description
interface name	Name of the interface

Default value

It is not configured by default.

Command mode

Route-map configuration mode

Usage guidelines

Before you set the next-hop interface for the matched IP packet through the set interface command, the following conditions must be satisfied:

The **set ip next-hop** command or the **set ip next-hop** command is not configured, and the route of the next hop designated by **set ip next-hop** is not in the routing table.

The interface is in the routing state (the protocol on the interface is up and the IP address exists).

Example

None

Related command

match ip address

match length

set default interface

set ip default next-hop

set ip next-hop

route-map

7.1.7. set ip default next-hop

Syntax

To set the default next-hop for the matched IP packet, run **set ip default next-hop**.

set ip default next-hop *A.B.C.D* *[...A.B.C.D]* ***[*Load-balance*]***

no set ip default next-hop *A.B.C.D* *[...A.B.C.D]* ***[*Load-balance*]***

Parameter

Parameter	Description
A.B.C.D	Address of the next hop

Default value

It is not configured by default.

Command mode

Route-map configuration mode

Usage guidelines

Before you set the default next hop for the matched IP packet through the **set ip default next-hop** command, the following conditions must be satisfied.

The **set ip next-hop** command or the **set ip next-hop** command is not configured, and the route of the next hop designated by **set ip next-hop** is not in the routing table.

If the **set interface** command is not configured or the **set interface** command is configure but these interfaces cannot be routed (the interface is down or there is no IP address).

The route of the next hop designated by the **set ip default next-hop** command exists in the routing table.

Related command

set default interface

set interface

set ip next-hop

route-map

7.1.8. set ip next-hop

Syntax

To set the next hop for the matched IP packet, run **set ip next-hop**.

set ip next-hop *A.B.C.D* *[...A.B.C.D]* ***[*Load-balance*]***

no set ip next-hop *A.B.C.D* *[...A.B.C.D]* ***[*Load-balance*]***

Parameter

Parameter	Description
A.B.C.D	Address of the next hop

Default value

It is not configured by default.

Command mode

Route-map configuration mode

Usage guidelines

Before you set the next hop for the matched IP packet through the **set ip next-hop** command, the following conditions must be satisfied:

The route of the next hop designated by the **set ip next-hop** command exists in the routing table.

Related command

set default interface

set interface

set ip default next-hop

set ip next-hop

route-map

7.1.9. route-map

Syntax

route-map *route-map name* [*sequence-number*] [**permit** | **deny**]

no route-map *route-map name* [*sequence-number*] [**permit** | **deny**]

Parameter

Parameter	Description
route-map name	Name of the route map.
sequence-number	Sequence number of the designated route map, which is optional
permit	Means that the route or the policy route is allowed to be forwarded if the IP packet is matched. The parameter is optional.
deny	Means that the route or the policy route is forbidden to be forwarded if the IP packet is matched. The parameter is optional.

Default value

There is no static routes by default.

Command mode

Global configuration mode

Usage guidelines

The **route-map** command is used to configure the route map.

Example

The following example shows that route map **pbr** is configured.

```
route-map pbr 10 permit
match ip address net1
set ip next-hop 13.1.1.99
!
route-map pbr 20 permit
match ip address net2
set ip next-hop 14.1.1.99
!
route-map pbr 30 permit
match ip address net3
set ip next-hop 13.1.1.99 14.1.1.99 load-balance
```

Related command

match ip address
match length
set default interface
set interface
set ip default next-hop
set ip next-hop

7.1.10. debug ip policy

Syntax

debug ip policy
no debug ip policy

Parameter

None

Default value

The trace function of the policy route is not enabled by default.

Command mode

EXEC

Usage guidelines

The **debug ip policy** command is used to open the trace function of the policy route, while the **no debug ip policy** command is used to shut down the trace function of the policy route.

Example

None

Related command

ip local policy

ip policy

show ip local policy

show ip policy

7.1.11. ip local policy

Syntax

To open the policy route of the local packet, run **ip local policy route-map [*name*]**. To shut down the policy route of the local packet, run **no ip local policy route-map [*name*]**.

ip local policy route-map [*name*]

no ip local policy route-map [*name*]

Parameter

Parameter	Description
name	Name of the route map used by the policy route

Default value

The policy routing function of the local packet is shut down by default.

Command mode

Global configuration mode

Usage guidelines

The policy route can be applied to the locally-transmitted packets or the forwarded packets. The route applied to the locally-transmitted packets are called as the local policy route. After the **ip local policy route-map <*name*>** command and a proper route map are configured in global configuration mode, you can apply the policy route to the locally-transmitted packets.

The policy route checks whether the packets are the broadcast packets, and the broadcast packets also checks the corresponding policy route. Among the results of the policy route, only an outgoing interface or a next hop is shown. The route-to-multiport condition does not exist.

The route map which is used for the policy route can match the packet according to the access list or the packet's length. The policy routing is conducted by setting the next hop or the outgoing interface. Various policies can be satisfied using the access list according to the routes, such as the route of the source address and the application route.

The policy route can be used to set the outgoing interface, next hop, TOS and precedence of the packet. The order to choose the policy route is as follows: nexthop, default nexthop, interface and default interface. The normal route can be adopted when all the four types of previous policy routes are unavailable.

If **nexthop** is available, it means that a route can be found in the routing table for **nexthop**. If **interface** is available, it means that the IP protocol on the interface is up and the legal IP address exists.

Example

The following example shows that the policy routing is conducted to the locally-transmitted packets. The packets from the network whose destination address is 100.0.0.0/8 will be transmitted to interface s0/0:

```
ip local policy route-map Policy
!
route-map Policy
match ip address Policy-ACL
set interface s1/0
!
ip access-list extended
permit ip any 100.0.0.0 255.0.0.0
!
```

Related command

ip policy

show ip local policy

show ip policy

7.1.12. ip policy

Syntax

To open the policy route on an interface, run **ip policy route-map [*name*]**. To shut down the local policy route, run **no ip policy route-map [*name*]**.

ip local policy route-map [*name*]

no ip policy route-map [*name*]

Parameter

Parameter	Description
name	Name of the route map used by the policy route

Default value

The policy routing function on an interface is shut down by default.

Command mode

Port configuration mode.

Usage guidelines

The policy route can be applied to the locally-transmitted packets or the forwarded packets.

The policy route is to check whether the packet is the broadcast packet, while the broadcast packet is also to check the corresponding policy route.

The route map which is used to match the policy route can match the packet according d to the access list or the packet's length. Various policy requirements can be satisfied through the usage of the access list, such as source-address-based routing and application-based routing.

You can set the egress port, nexthop, tos and precedence for the policy route. When the policy route is used, the order to select the route is: set ip nexthop, set interface,non-default normal route, set ip default nexthop, set default interface, normal route or default route. The policy route can set tos and precedence uniquely for normal routes.

The availability of nexthop means that the nexthop can be used to find a route in the routing table. The interface availability means that the IP protocol on the interface is up and the interface has a legal IP address.

Example

The following example shows that the policy routing can be conducted to a packet received by interface s1/1 and the packet whose destination address is 100.0.0.0/8 can be transmitted to interface s1/0:

```
interface s1/1
ip policy route-map Policy
!
route-map Policy
match ip address Policy-ACL
set interface s1/0
!
ip access-list extended
permit ip any 100.0.0.0 255.0.0.0
!
```

Related command

ip local policy

show ip local policy

show ip policy

7.1.13. ip route-weight

Syntax

To configure the route weight on an interface, run **ip route-weight**. To resume the original route weight on an interface, run **no route-weight**. The original value of the route weight is 1.

ip route-weight [*value*]

no ip route-weight

Parameter

Parameter	Description
value	Route weight

Default value

The default value of the route weight is 1.

Command mode

Port configuration mode

Usage guidelines

You can configure the **ip route-weight** command on an interface to realize rate-based flow distribution.

At first, you need to configure the **ip route load-balance** command in global mode; then, you need to configure the route weight at the egress port of the equivalence route according to the flow distribution rate. In this way, the packet can be transmitted on different egress ports of the equivalence route according to the configured rate. In this case, you must disable the ip cache function.

Example

The following example shows that the packet is transmitted at a rate of 3:2 on interface f0/0 and interface e1/1 after it arrives destination network 5.0.0.0.

```
interface FastEthernet0/0
ip route-weight 3
ip address 3.0.0.1 255.0.0.0
no ip directed-broadcast
!
interface Ethernet1/1
ip route-weight 2
ip address 8.0.0.1 255.0.0.0
no ip directed-broadcast
duplex half
```

!

ip route load-balance

ip route 5.0.0.0 255.0.0.0 FastEthernet0/0 1.2.3.5 2

ip route 5.0.0.0 255.0.0.0 Ethernet1/1 2.2.3.5 2

The route weight of interface f0/0 is set to 3, while the route weight of interface 1/1 is set to 2.

Related command

ip route load-balance

ip route-cache

7.1.14. show ip local policy

Syntax

show ip policy

Parameter

None

Default value

None

Command mode

EXEC mode

Usage guidelines

show ip local policy

The command is used to how to show the configuration status of local policy routing.

Example

None

Related command

ip local policy

ip policy

show ip policy

7.1.15. show ip policy

Syntax

show ip policy

Parameter

None

Default value

None

Command mode

EXEC mode

Usage guidelines

The **show ip policy** command is used to display the configuration state of the policy route.

Example

None

Related command

ip local policy

ip policy

show ip local policy

CHAPTER 8 SWITCH ROUTING PROTOCOL HIGHPRIORITY CONFIGURATION COMMANDS

8.1. Switch Routing Protocol Highpriority Configuration Commands

Switch routing protocol highpriority configuration commands include:

- switch routing-protocol-highpriority

8.1.1. switch routing-protocol-highpriority

Syntax

To enable or disable set priority of the routing packets forwarding to CPU, run the following command. To return to the default setting, use the no form of this command.

[no] switch routing-protocol-highpriority

Parameter

None

Default value

Disabled

Command mode

Global configuration mode

Usage guidelines

None

Example

The following example shows how to set priority of the routing packets forwarding to CPU.

Switch _config# switch routing-protocol-highpriority

Switch _config#