Router Protocol Command

Table of Content

Chapter 1 RIP Protocol Command

1.1 RIP Protocol

1.1.1 auto-summary

Use command “auto-summary” to enable automatic route summary function. Command “no auto-summary” is used to disable automatic route summary function.

Syntas

auto-summary

no auto-summary

Parameter

none

Default

Valid. The default state is using automatic route summary function.

Command mode

route configuration state

Explanation

Route summary reduces the volume of routing information in routing list and the volume of exchange information. RIP-1 doesn’t support sub-network mask. Redistributing sub-network routing may cause misunderstanding. RIP-1 always switches on route summary function. When using RIP-2, route summary function can be switched off by command “no auto-summary”. When you want to broadcast sub-network route, you can disable route summary function.

Example

Set version of RIP on interface Serial1/0 as RIP-2 and disable route summary function:

```
router rip
version 2
no auto-summary
```

Related commands

version

1.1.2 default-information originate

Use command “**default-information originate**” to generate a default route. Use command “no **default-information originate**” to disable this function.

Syntas

default-information originate

no default-information originate

Parameter

none

Default

Default state is switching off this function.

Command mode

route configuration state

Explanation

After command “default-information originate” is enabled, 0.0.0.0/0 route information will be taken together when route update is transmitted.

Example

A default route (0.0.0.0/0) is carried when route update information is transmitted.

```
router rip
version 2
network 172.68.16.0
default-information originate
```

1.1.3 default-metric

Set default routing cost for introducing route. Command “no default-metric” reset default setting.

Syntas

default-metric *number*

no default-metric

Parameter

Parameter	Description
number	Metric to be set. Value ranges from 1 to 16.

Default

Apply relevant route cost auto-conversion for each routing protocol.

Command mode

route configuration state

Explanation

Command “default-metric” is used to set the default route cost that is used when routes of other routing protocol is introduced into RIP massage. If no specific route cost is designated, the default route cost designated by command “default-metric” will be based to introduce routes of other protocol by using command “redistribute”.

Example

In the following example, routers of RIP and OSPF routing protocol are used in autonomous system 119. RIP is used to announce routers from OSPF and designate Metric 8 to RIP route.

```
router rip
 default-metric 8
 redistribute ospf 119
```

Related commands

redistribute

default-information originate

1.1.4 ip rip authentication

Use interface configuration command “**ip rip authentication**” to designate authentication type for RIP-2 package. Command “no ip rip authentication” doesn’t make authentication on packet.

Syntas

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

no ip rip authentication

Parameter

Parameter	Description
simple	Plain Text **authentication** type.
message-digest	MD5 Cipher Text **authentication** type.

Default

Doesn’t **authenticate**

Command mode

interface configuration state

Explanation

RIP-1 doesn’t support **authentication**.

Example

In this example, MD5 Cipher Text **authentication** type is used to configure the interface.

ip rip authentication message-digest

Related commands

ip rip password

ip rip message-digest-key

1.1.5 ip rip message-digest-key

Use interface configuration command "**ip rip message-digest-key**" to active the **authentication** on RIP-2 package and designate the secret key link of MD5 Cipher Text **authentication** used on this interface. Command "no ip rip message-digest-key" is used to prevent **authentication**.

Syntas

ip rip message-digest-key *key-id* **md5** *password*

no ip rip message-digest-key [*key-id*]

Parameter

Parameter	Description
key-id	An identifier.
password	Designated secret key.

Default

MD5 **authentication** is invalid.

Command mode

Interface configuration state

Explanation

No **authentication** will be executed on interface if no secret key is configured by using "ip rip message-digest-key *key-id* md5 *password* " .

Example

In this example, configuration interface can receive and send MD5 Cipher Text **authentication** massage belonging to secret key mykey.

ip rip message-digest-key 4 md5 mykey

Related commands

ip rip authentication

1.1.6 ip rip passive

Use configuration command “ip rip passive” to disable sending route update. Use configuration command “no ip rip passive” to enable sending route update again.

Syntas

ip rip passive

no ip rip passive

Parameter

none

Default

Send route update on the interface.

Command mode

Interface configuration state

Explanation

In you disable sending route update on a interface, a certain sub network will continue to announce to other interfaces. Route update reached this interface from other router will be received and processed continuously.

Example

In the following example, RIP massage update will be sent to all interfaces (excluding Ethernet interface 1/0) belonging to 172.16.0.0.

```
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

1.1.7 ip rip password

Use interface configuration command “**ip rip password**” to enable the certification on RIP-2 package and designate Plain Text certification secret key used on this interface. “no ip rip password” can be used to prevent from certification.

Syntas

ip rip password *password*

no ip rip pssword [*password*]

Parameter

Parameter	Description
password	Designate secret key

Default

No authentication.

Command mode

interface configuration state

Explanation

If no secret key is configured by using “ip rip password”, no authentication will be executed on the interface.

Example

In this example, configuration interface can receive and send any Plain Text certification massage belonging to secret key mykey.

ip rip password mykey

Related commands

ip rip authentication

1.1.8 ip rip receive version

Use interface configuration command designate the version of the RIP package that is permitted to be received by the interface. Use “no ip rip receive version” to follow the global version agreement.

Syntas

ip rip receive version [1] [2]

no ip rip receive version

Parameter

Parameter	Description
1	(Alternative) Interface is only permitted to receive RIP package of Version 1.
2	(Alternative) Interface is only permitted to receive RIP package of Version 2.

Default

Receive the grouping of RIP-1 and RIP-2.

Command mode

interface configuration state

Explanation

Use this command to cover default action of RIP designated by version. This command can only be used on the interface that is being configured. Interface can be configured to be able to accept RIP package of version 1 and 2.

Example

In the next example, the interface is configured to be able to accept RIP package of version 1 and 2:

ip rip receive version 1 2

In the next example, the interface is configured to only accept RIP package of version 1:

ip rip receive version 1

Related commands

ip rip send version

version

1.1.9 ip rip send version

Use interface configuration command "**ip rip send version**" to designate the version of which the RIP package is permitted to send on the interface. Use "no ip rip send version" to follow global version agreement.

Syntas

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

no ip rip send version

Parameter

Parameter	Description
1	(Alterative) Only RIP package of version 1 is permitted to be sent by the interface.
2	(Alterative) Only RIP package of version 2 is permitted to be sent by the interface.
compatibility	(Alterative)Only RIP package of version 2 is permitted to be broadcasted by the interface.

Default

Send only grouping of RIP-1.

Command mode

interface configuration state

Explanation

Use this command to cover the default action of RIP designated by version. This command can only be used for the interface being configured. The interface can be configured to send version 1 or 2.

Example

In the following example, configuration interface can send RIP package of version 1:

ip rip send version 1

In the following example, configuration interface can send only RIP package of version 2:

ip rip send version 2

Related commands

ip rip receive version

version

1.1.10 ip rip split-horizon

Set whether the horizontal split is used for sending RIP massage.

Syntas

ip rip split-horizon

no ip rip split-horizon

Parameter

none

Default

It differs according to different medias.

Command mode

interface configuration state

Explanation

For any interfaces excluding those using frame relay or SMDS, horizontal split is enabled under a default situation. Horizontal split is not enabled under default situation when interface is configured by using " encapsulation frame-relay".

Notes:

For network containing X.25 PSN links, router configuration command "neighbor" will invalidate horizontal split. Or you can use command "no ip rip split-horizon" in configuration. But you do so, you should use the same command "no ip rip split-horizon" for all routers in relevant multi-program broadcast groups.

If the horizontal split on the interface is not enabled, use command "ip rip split-horizon" to enable horizontal split function.

Notes:

Under common circumstance, default state of the command “ip rip split-horizon” should not be changed unless you are sure that your application cannot announce the router properly without such kind of change. If horizontal split on a serial interface or a connected grouping exchange network is not enabled, you should prohibit all relevant routers on the network and horizontal split function to access the server.

Example

In this example, horizontal split function on serial link is prohibited (this link is connected with X.25 network):

```
interface serial 1/0
encapsulation x25
no ip rip split-horizon
```

Related commands

neighbor

1.1.11 neighbor

Use command “neighbor” to define neighboring router to exchange routing information. Use “no neighbor” to disable neighboring router.

Syntas

neighbor *ip-address*

no neighbor *ip-address*

Parameter

Parameter	Description
ip-address	IP address of routers exchanging routing information.

Default

none

Command mode

route configuration state

Explanation

Command “neighbor” designate the address spotted to transmit. It is mainly designed to meet some special needs of special non-broadcast network that cannot be transmitted by broadcast address.

Example

In the following example, router configuration command “neighbor” permits updating RIP and sending it to designated neighbor.

```
router rip
```

neighbor 131.108.20.4

Related commands

network

1.1.12 network

Use command “network” designate number of connected network for RIP protocol. Use “no network” to disable a network number.

Syntas

network *network-numbe network-mask*

no network *network-number network-mask*

Parameter

Parameter	Description
network-number	Network IP address of directly connected network.
network-mask	(Alternative) Network IP address mask of directly connected network.

Default

No network is designated..

Command mode

Route configuration state

Explanation

Designated network number cannot contain any sub-network information. You can designate several commands of “network”. RIP update can only be transmitted and received on the interfaces on this network.

RIP sends RIP update to interfaces on designated network. If a network connected to the interface is not designated, it will not be announced in any RIP update.

Example

In the following example, RIP is defined as routing protocol of the interface connected with networks 128.99.0.0 and 192.31.7.0.

```
router rip
  network 128.99.0.0
  network 192.31.7.0
```

Related commands

router rip

1.1.13 offset

Use router configuration command “offset router” to add an offset to (incoming or

outgoing) Metric learned through RIP. Use “no offset” to disable adding an offset.

Syntas

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

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

Parameter

Parameter	Description
in	Use access-list for incoming route Metric
out	Use access-list for outgoing route Metric
access-list-name	Number or name of standard access-list being used. Access-list number 0 refers to all access-lists. If offset is 0, no action is to be executed.
offset	Positive offset. Used to match route Metric of access-list network.
type	(Alternative) Type of the interface using offset list.
number	(Alternative) Number of the interface using offset list.

Default

Invalid state

Command mode

Route configuration state

Explanation

Add an offset to route Metric. Offset list with interface type and interface number is extended and has higher priority than the offset list that is not extended. Thus extended offset will be added to route Metric if extended offset list and non-extended offset list are used at the same time.

Example

In the following example, router adds offset 10 to the route captured from Ethernet interface 1/0.

offset ethernet 1/0 in 21 10

1.1.14 router rip

Use global command “**router rip**” to enable RIP routing process. Use “no router rip” to disable RIP routing process.

Syntas

router rip

no router rip

Parameter

none

Default

The default setting of the system is not running RIP.

Command mode

global configuration mode

Explanation

RIP must be enabled and then can enter route configuration state to configure various global parameters of RIP. Configuring the parameters relevant to interface is not constrained by switching on/off RIP.

Example

Enable RIP and enter into route configuration state.

router rip

Related commands

network (RIP)

1.1.15 timers expire

Use router configuration command “timers expire router” adjust timers of RIP network. Use “no timers expire” to reset default timers.

Syntas

timers expire *interval*

no timers expire

Parameter

Parameter	Description
interval	Interval during which the route is announced invalid is at least 3 times the value of parameter update. If no update of refreshed route comes, the route becomes invalid route and enters into prevent state with being marked inaccessible and unreachable. But this route can still be used for redistributing and grouping. Default value is 180 seconds.

Default

“*interval*” is 180 seconds

Command mode

Route configuration state

Explanation

Basic timing parameter of RIP is adjustable. Because RIP executes a distributed

Asynchronous router arithmetic, it is very important to set the same timing parameter for all routers and access-servers.

Notes:

Current or default timer parameter can be viewed by using command “show ip rip”.

Example

In the following example, RIP is set. If no information is received from router within 30 seconds, this route will be announced as not available.

```
router rip
timers expire 30
```

1.1.16 timers holddown

Use router configuration command “timers holddown router” to adjust the timer of RIP network. Use “no timers holddown” to reset default timer.

Syntas

timers holddown *second*

no timers holddown

Parameter

Parameter	Description
second	Interval (unit: second).After receiving update grouping showing the route is unreachable, the route enters into *holddown* state and is announced as un reachable. This route can still be used for redistributing and grouping. As soon as the “*holddown*” expires, routes from other resource will be accepted and fomer routes will be deleted from the routing table. The default value is 120 seconds.

Default

holddown is 120 seconds

Command mode

Route configuration state

Explanation

Basic timing parameter of RIP is adjustable. Because RIP executes a distributed Asynchronous router arithmetic, it is very important to set the same timing parameter for all routers and access-servers.

Notes:

Current or default timer parameter can be viewed by using command “show ip rip”.

Example

In the following example, RIP is set. If no information is received from router within 30 seconds after the router is announced as not available, this router will be deleted from

routing table.

router rip
timers holddown 30

1.1.17 timers update

Use route configuration command “timers update router” to adjust timers of RIP network. Use “no timers update” to reset default timer.

timers update *update*

no timers update

Parameter

Parameter	Description
update	Basic timing parameter of routers. Designate interval in which route update is sent. Default value is 30 seconds.

Default

update is 30 senconds

Command mode

Route configuration state

Explanation

Basic timing parameter of RIP is adjustable. Because RIP executes a distributed Asynchronous router arithmetic, it is very important to set the same timing parameter for all routers and access-servers.

Note: Current or default timer parameter can be viewed by using command “show ip rip protocol”.

Example

In the following example, RIP update is set as broadcast one time every 5 seconds.

router rip
timers update 5

Notes:

Update cycle being set too small may cause congestion of low speed serial link. But it will be OK on fast Ethernet an serial link with T-1 speed rate. Meanwhile, more routers contained in update may cause that the routers take more time to deal with update.

1.1.18 validate-update-source

Use router configuration command “validate-update-source” to prove the router IP address sending RIP update. Use “no validate-update-source” to disable this function.

Syntas

validate-update-source

no validate-update-source

Parameter

none

Default

This function is under active state.

Command mode

route configuration state

Explanation

This command is only used for RIP and IGRP. The software ensures that router IP address sending router update and a certain network address accepting interface definition.

Disabling horizontal split may also have the system execute this validating function.

This validating is not executed for IP interfaces without any number (IP unnumbered).

Example

In the following example, configuring the router validates source IP address incoming for RIP updating.

```
router rip
 network 128.105.0.0
 no validate-update-source
```

1.1.19 version

Use command “version” to set the version of RIP massage on the interface. Use “no version” to reset the default.

Syntas

version {1 | 2}

no version

Parameter

Parameter	Description
1	Designate the version as RIP-1
2	Designate the version as RIP-2

Default

Receive RIP-1and RIP-2 grouping according to configuration on each interface. Send only grouping of RIP-1.

Command mode

route configuration state

Explanation

After using command “no version”, available RIP version can be designated on interface by using commands “ip rip receive version” and “ip rip send version”. Otherwise RIP massage will be sent and received in terms of global configuration version.

Example

In the following example, software sends and receives grouping of RIP-2.

version 2

Related commands

ip rip receive version

ip rip send version

1.1.20 distance

Set **admi**nistrative distance of RIP route.

Syntas

Distance *weight* [*address mask* [*access-list-name*]]

Parameter

Parameter	Description
weight	Administrative distance ranges from 1 to 255. Suggested use range is from 10 to 255 (0-9 reserved). If the parameter is used independently, it will inform router system software to use it as default administrative distance. The route with administrative distance of 255 will not be installed in the routing list.
address	(Alternative) IP address (form: aa.bb.cc.dd)
mask	(Alternative) IP address mask (form: aa.bb.cc.dd). If one digit of it is 0, software will ignore the value of relevant digit in the address.
access-list-name	(Alternative) Name of standard access list used for updating incoming routes.

Default

Weight is 120

Command mode

Supervisor mode

Explanation

Administrative distance is a whole number ranges from 0 to 255. Under general circumstance, the higher the value, the lower the reliability. If alternative parameter access list "*access-list-name* " is used in the command, this access list will be used when a network route is inserted into routing table. Thus some networks will be filtered according to route address providing routing information.

Example

Distance value of route received from network 192.1.1.0/24 is set as 100.

```
router rip
  distance 100 192.1.1.0 255.255.255.0
```

1.1.21 filter

Filtering RIP routes received and sent.

Syntas

filter * in [**access-list| gateway** {*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	Name of standard access list. This list defines which network to be received or restrained in route updating.
prefix-list-name	Name of standard IP prefix list. This list defines which network to be received or restrained in route update.
in/out	Use access list for updating in/out route.
type	(Alternative) interface type
number	(Alternative) Designate the interface on which to use access list for in/out updating. If no interface is designated, access list will be used for all in/out updating.

Default

Sent and received RIP route will not be filtered.

Command mode

Supervisor mode

Explanation

Filtering sent and received route. When using access-list to filter routes, please use standard access-list

Example

Route 10.0.0.0/8 sent from interface s2/1 is filtered.

```
router rip
  filter s2/1 out access-list mylist
ip access-list standard mylist
   deny 10.0.0.0 255.0.0.0
```

1.1.22 maximum-count

Configure the maximum routing number for the RIP local routing list, and “no maximum-count” will resume to the default.

Syntas

maximum-count *number*

no maximum-count

Parameter

Parameter	Description
number	Maximum routing number to set. The range is 512~4096.

Default

1024

Command mode

Router configuration mode

Explanation

Maximum-count can set the maximum routing number in the RIP local routing list. When the routing number exceeds the maximum specified in the routing list, the routing will no longer be added to the routing list.

Example

In the following example, the maximum routing number in the RIP local routing list is 2000.

```
router rip
 maximum-count 2000
```

Related commands

None

1.1.23 show ip rip

Show main information of RIP.

Syntas

show ip rip

Parameter

None

Default

None

Command mode

Supervisor mode

Explanation

The user can view configuration situation of current RIP according to this command output information.

Example

Show configuration parameter information of 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
default-metric: 1
Meanings of the above areas are as the follows:

Area	Description
Enabled	State of protocol
Distance	Currant administrative distance
Version	Version used by current protocol
AUTO-SUMMARY	Auto-summary or not
Update	Interval for sending update massage
Holddown	Time for keeping routes
Expire	Time for route aging
RIP default-metric	Default cost used for redistribute

1.1.24 show ip rip database

Show all RIP route information.

Syntas

show ip rip database

Parameter

None

Default

None

Command mode

Supervisor mode

Explanation

The user can view all RIP routing information according to this command output information.

Example

Show all RIP routing information.

```
router#show ip rip 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 00:00:02
 192.1.1.0/24  directly connected  Serial2/1
 192.1.1.0/24  auto-summary
```

Meanings of the above areas are as the follows.

Area	Description
Network-number/network-mask	RIP route
Summary/connected/via gateway	Corresponding RIP router type
interface	RIP interface corresponding to summary and directly route
time	Refreshed time

1.1.25 show ip rip protocol

Show RIP protocol configuration information.

Syntas

show ip rip protocol

Parameter

None

Default

none

Command mode

Supervisor mode

Explanation

Users can view current RIP protocol configuration information according to command output information.

Example

Show RIP protocol configuration information

```
router#show ip rip protocol
RIP is Active
 Sending updates every 30 seconds, next due in 30 seconds
 Invalid after 180 seconds, holddown 120
 update filter list for all interfaces is:
 update offset list for all interfaces is:
 Redistributing:
 redistribute connect
 Default version control: send version 1, receive version 1 2
  Interface        Send            Recv
  Async0/0         1               1 2
  FastEthernet0/0  1               1 2
  Serial1/0        1               1 2
  Ethernet1/1      1               1 2
  Serial2/0        1               1 2
  Serial2/1        1               1 2
```

Loopback1 1 1 2

Automatic network summarization is in effect

Routing for Networks:
174.168.0.0/16
Distance: 120 (default is 120)

1.1.26 debug ip rip database

Trace route events of RIP.

Syntas

debug ip rip database

Parameter

None

Default

None

Command mode

Supervisor mode

Explanation

Users can view some events of current RIP route according to the command output information.

Example

Trace some events of RIP route.

router# debug ip rip database
RIP-DB: Adding summary route 192.1.1.0/24 <metric 0> to RIP database

Meanings of the above areas are as the follows:

Area	Description
Summary	Type of routes joining in routing table
192.1.1.0/24	Routes joining in routing table
<metric 0>	Route metric value

1.1.27 debug ip rip protocol

Trace massage of RIP.

Syntas

debug ip rip protocol

Parameter

None

Default

None

Command mode

Supervisor mode

Explanation

Users can view the content of massage received and sent by current RIP according to this command output information.

Example

Trace massage of RIP.

```
router# debug ip rip protocol
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 1.
When it is run under version 2, the following output will be available:
RIP: send to 255.255.255.255 via Loopback1
   vers 2, CMD_RESPONSE, length 24
   192.1.1.0/24 via 0.0.0.0 metric 1
```

Meanings of the above areas are as the follows:

Area	Description
Send/Recv	Means sent or received massage
To 255.255.255.255	Destination address of IP massage
Via Loopback1	Interface receiving or sending massage
Vers 2	Version number of sent or received massage
CMD_RESPONSE/ CMD_REQUEST	Massage type
length 24	Massage length
192.1.1.0/24	Destination network in routing information
via 0.0.0.0	Next-hop information
metric	Cost of route

Chapter 2 BEIGRP Protocol Command

In this chapter, BEIGRP configuration command will be introduced with detailed description of its usage and syntax.

2.1 BEIGRP Protocol Command

2.1.1 auto-summary

If you want to automatically summarize the routes of BEIGRP, you can use this command. Under default configuration, BEIGRP is automatically summarized. If you want to disable automatic summary and announce each specific route to its neighbor, you can use the “no” form of this command.

Syntas

auto-summary

no auto-summary

Parameter

None

Default

Under default configuration auomatic summary is enable.

Command mode

Route configuration mode

Explanation

In current BEIGRP version, route summary are relative to network command. It executes the following summary rules:

- When a BEIGRP process defines several networks, summary route of the defined network will be generated as long as at least one sub network of the network is in the BEIGRP topology table.
- The generated summary route points to Null0 interface and has the shortest distance of all sub-networks in the network contained by the summary route. Summary route also inserts into main IP routing table with administrative distance of 5 (not configurable).
- When update packets is sent to neighbors of different IP networks, sub networks summarized by Rule 1 and Rule 2 will be disableled and send only summary route.
- Sub-networks of networks not listed in BEIGRP process definition will not be summarized.

Relevant command

ip beigrp summary-address

network

2.1.2 clear ip beigrp neighbors

If you want to remove the adjacency with exiting neighbor, this command can be entered under the management state.

Syntas

clear ip beigrp [*as-number*] **neighbors** [*ip-address* | interface-type *interface-number]*

Parameter

Parameter	Description
as_number	(Alternative) autonomous system number of neighbor
ip-address	(Alternative) address of BEIGRP neighbor
interface	(Alternative) name of the interface. After entering this parameter, adjacency of all neighbors on the interface will be reset.

Default

None

Command mode

Supervisor mode

Explanation

All BEIGRP neighbors will be reset if no parameter is designated.

Use this command to reset the adjacency of one or more neighbors and then enable routing operation. When many routes are involved, the waving of routes will be caused. It will take some time to recover. Thus we suggest not to use this command unless it is under networking testing phase.

Example

clear ip beigrp ethernet1/1
It will clear all neighbors on Ethernet1/1 and enable recalculating of relevant routes.

2.1.3 debug ip beigrp

If you want to trace BEIGRP protocol information, you may enter this command under management state.

Syntas

debug ip beigrp

no debug ip beigrp

Parameter

none

Default

none

Command mode

Supervisor mode

Explanation

Use this command to find network failure.

Example

clear ip beigrp ethernet1/1

It will clear all neighbors on Ethernet1/1 and enable recalculating of relevant routes.

2.1.4 debug ip beigrp fsm

If you want to trace state and change of BEIGRP DUAL arithmetic, you may enter this command under management state.

Syntas

debug ip beigrp fsm [*detail*]

Parameter

Parameter	Description
detail	(Alternative) show detailed information

Default

None

Command mode

Supervisor mode

Explanation

Use this command to find network failure.

Relevant command

debug ip beigrp packet

2.1.5 debug ip beigrp neighbors

If you want to trace the establishment and deleting of BEIGRP neighbors, you may enter this command under management state.

Syntas

debug ip beigrp neighbors

Parameter

None

Default

None

Command mode

Supervisor mode

Explanation

Use this command to find network failure.

Example

```
TestC#debug ip beigrp neighbors
BEIGRP: Neighbor 192.168.20.141 went down on Ethernet1/1 for peer restarted.
BEIGRP: Neighbor(192.168.20.141) not yet found.
BEIGRP: Neighbor(192.168.20.141) not yet found.
BEIGRP: New neighbor 192.168.20.141
BEIGRP: Neighbor 202.117.80.143 went down on Ethernet2/1 for manually cleared.
BEIGRP: Neighbor 192.168.20.141 went down on Ethernet1/1 for manually cleared.
BEIGRP: New neighbor 192.168.20.204
BEIGRP: New neighbor 202.117.80.143
BEIGRP: New neighbor 192.168.20.141
```

Relevant command

debug ip beigrp fsm

2.1.6 debug ip beigrp packet

If you want to track the receiving and sending of BEIGRP massage, you may enter this command under management state.

Syntas

debug ip beigrp packets [**ack** | **hello** | **query** | **reply** | **retry** | **terse** | **update**]

no debug ip beigrp packets [**ack** | **hello** | **query** | **reply** | **retry** | **terse** | **update**]

Parameter

Parameter	Description
ack	(Alternative) trace ACK massage
hello	(Alternative) trace hello massage
query	(Alternative) trace query massage

reply	(Alternative) trace reply massage
retry	(Alternative) trace massage resent
terse	(Alternative) all massages excluding hello massage
update	(Alternative) trace update massage

Default

none

Command mode

Supervisor mode

Explanation

Use this command to find network failure.

Example

router#debug ip beigrp packet
BEIGRP: Send HELLO packet to 224.0.0.10 via Ethernet2/1 with Ack 0/0
BEIGRP: Receive ACK packet from 192.168.20.141 via Ethernet1/1 with Ack 0/54
BEIGRP: Receive HELLO packet from 202.117.80.143 via Ethernet2/1 with Ack 0/0
BEIGRP: Receive UPDATE packet from 192.168.20.204 via Ethernet1/1 with Ack 142/0
BEIGRP: Send HELLO packet to 192.168.20.204 via Ethernet1/1 with Ack 0/142
BEIGRP: Receive HELLO packet from 192.168.20.141 via Ethernet1/1 with Ack 0/0
BEIGRP: Receive HELLO packet from 192.168.20.204 via Ethernet1/1 with Ack 0/0
BEIGRP: Receive QUERY packet from 192.168.20.204 via Ethernet1/1 with Ack 143/0
BEIGRP: Send HELLO packet to 192.168.20.204 via Ethernet1/1 with Ack 0/143
BEIGRP: Send REPLY packet to 192.168.20.204 via Ethernet1/1 with Ack 55/143
BEIGRP: Send UPDATE packet to 224.0.0.10 via Ethernet2/1 with Ack 57/0
BEIGRP: Receive ACK packet from 192.168.20.204 via Ethernet1/1 with Ack 0/55
BEIGRP: resend UPDATE packet for neighbor 192.168.20.204 with retry num 1.
BEIGRP: Receive ACK packet from 202.117.80.143 via Ethernet2/1 with Ack 0/57
BEIGRP: Send UPDATE packet to 202.117.80.143 via Ethernet2/1 with Ack 57/77
BEIGRP: Send UPDATE packet to 224.0.0.10 via Ethernet1/1 with Ack 56/0
BEIGRP: Receive ACK packet from 192.168.20.204 via Ethernet1/1 with Ack 0/56
BEIGRP: Send UPDATE packet to 192.168.20.141 via Ethernet1/1 with Ack 56/88
BEIGRP: Send UPDATE packet to 192.168.20.204 via Ethernet1/1 with Ack 56/143
BEIGRP: Receive UPDATE packet from 202.117.80.143 via Ethernet2/1 with Ack 79/0
BEIGRP: Send HELLO packet to 202.117.80.143 via Ethernet2/1 with Ack 0/79
BEIGRP: Receive ACK packet from 192.168.20.204 via Ethernet1/1 with Ack 0/56
BEIGRP: Send QUERY packet to 224.0.0.10 via Ethernet1/1 with Ack 60/0
BEIGRP: Send UPDATE packet to 224.0.0.10 via Ethernet1/1 with Ack 61/0

Area	Explanation
Recv / Send / Enqueueing	Receive/ send massage or add massage into the sending queue.
HELLO / UPDATE / QUERY / ACK	Type of massages received and sent.
192.1.1.1	IP address of neighbors sending massage.
Serial1/2	Importing or exporting interface of massage.

AS 100	Number of autonomous system.
Flags 0	Flag field of BEIGRP massage header.
Seq 0	Sequence number of massage.
Ack 20	sequence number of acknowledge for certain packet

Relevant command

debug ip beigrp fsm

2.1.7 debug ip beigrp transmit

If you want to trace process events of BEIGRP massage, you may enter this command under management state.

Syntas

debug ip beigrp transmit [**ack** | **build** | **link** | **packetize** | **peerdown** | **startup**]

no debug ip beigrp transmit [**ack** | **build** | **link** | **packetize** | **peerdown** | **startup**]

Parameter

Parameter	Description
ack	(Alternative) trace events
build	(Alternative) trace BUILD events
link	(Alternative) trace LINK events
packetize	(Alternative) trace PACKETIZE events
peerdown	(Alternative) trace PEERDOWN events
startup	(Alternative) trace STARTUP events

Default

None

Command mode

Supervisor mode

Explanation

Use this command to find network failure.

Relevant command

debug ip beigrp fsm

2.1.8 default-metric

Use this command to reset default vector distance of BEIGRP. Use the “no” form of this command to reset original default value.

Syntas

default-metric *bandwidth* **delay reliability loading** mtu

no default-metric

Parameter

Parameter	Description
bandwidth	default bandwidth
delay	default interface time delay
reliability	default interface reliability
loading	default interface load
mtu	Default maximum transmitting unit

Default

bandwidth： 128kpbs

delay： 2000（10ms）

reliability： 255（255 means 100%）

loading： 255（255 means 100%）

mtu： 1500

Command mode

Route configuration mode

Explanation

This command is usually used together with command redistribute to designate initial distance vector of routes of other routing protocol that are distributed to BEIGRP topology table. After configuring this command, all relevant routes that has been restributed to BEIGRP topology table. are recalculated.

It is necessary to configure the command "default-metric" when we redistribute the routes except static routes, connected routes and BEIGRP routes.

Example

default-metric 200 1000 100 200 1500

Set the bandwidth of default distance vector as 200（kbps）, the delay as 1000(10ms), reliability as100, loading as 200, mtu as 1500.

Relevant command

redistribute

2.1.9 distance

This command allows us to revise administrative distance of BEIGRP route, including administrative distance of BEIGRP internal route and administrative distance of BEIGRP exterior route, to influence routing forward ultimately. Use “no” form of this

command to reset default value of BEIGRP administrative distance.

Syntas

distance beigrp internal-distance external-distance

no distance beigrp

distance weight ip-address ip-address-mask [ip-access-list]

no distance weight ip-address ip-address-mask [ip-access-list]

Parameter

Parameter	Description
internal-distance	Administrative distance of BEIGRP interior route with value ranging from 1 to 255.
external-distance	Administrative distance of BEIGRP exterior route with value ranging from 1 to 255.
ip-address	IP address of BEIGRP neighbor.
ip-address-mask	IP address mask of BEIGRP neighbor.
ip-access-list	Access-list name of BEIGRP neighbor.

Default

internal-distance： 90

external-distance：170

Command mode

Route configuration mode

Explanation

Use administrative distance to compare priorities of routes of different routing protocols. Thus adjusting administrative distance of BEIGRP may influence forwarding policy of router ultimately to meet different needs of users.

It is commended to apply the standard IP access-list when we use it in the command, for it is not work to configure the extern IP access-list.

Example

router beigrp 2
network 192.10.0.0 255.255.0.0
distance beigrp 100 200
distance 110 192.31.7.0 255.255.255.0
distance 220 128.88.1.0 255.255.255.0

In the above configuration, set administrative distance of BEIGRP internal route as 100 and administrative distance of external route as 200. At the same time, set distance of the route which gateway address is located in network 192.31.7.0/24 as 110 and distance of the route which gateway address is located in network 128.88.1.0/24 as 220.

Relevant command

show ip protocol

2.1.10 filter

This command allows us to filter routes sent and received for designated interface. Use access list or prefix list to filter the routes exactly. Use the “no” form of this command to disable the filter.

Syntas

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-number*	Interface type and interface number.
*	All interfaces.
in	Apply access list to incoming route update.
out	Apply access list to outgoing route update.
access-list	Name of standard access list. The list defines which networks to be received or sent and which networks to be suppressed during route update.
gateway	Apply access list to filter routes sent or received for its gateway.
access-list-name	Name of the access list.
prefix-list	Apply standard IP prefix list to filter routes sent or received.
prefix-list-name	Name of standard IP prefix list. The list defines which networks to be received and which networks to be suppressed during route update.

Default

None

Command mode

Route configuration mode

Explanation

It is commended to apply the standard IP access-list when we use it in the command, for it is not work to configure the extern IP access-list.

Example

In the following example, BEIGRP route process receives only 131.108.0.0：
access-list 1 permit 131.108.0.0
access-list 1 deny 0.0.0.0 255.255.255.255
router beigrp 64

```
network 131.108.0.0
filter * out 1
```

2.1.11 beigrp log-neighbor-changes

Use this command to record neighbor change information in the log. Use “no” form of this command to disable the log record.

Syntas

beigrp log-neighbor-changes

no beigrp log-neighbor-changes

Parameter

None

Default

disabled

Command mode:

route configuration mode

2.1.12 beigrp router-id

Use this command to designate router indicator of this process. Use “no” form of this command to disable the setting of router indicator.

Syntas

beigrp router-id *ip-address*

no beigrp router-id

Parameter

Parameter	Description
ip-address	BEIGRP router indicator in the form of IP address.

Default

BEIGRP automatically selecting router indicator: If there exists loopback interface, the largest loopback interface address will be used as router indicator. Otherwise the largest direct connecting address will be used as router indicator.

Command mode

route configuration mode

2.1.13 ip beigrp bandwidth-percent

Use this command to designate the rate of total bandwidth that is permitted to be used

for BEIGRP massage exchange. Use “no” form of this command to reset original default value.

Syntas

ip beigrp bandwidth-percent *percent*

no ip beigrp bandwidth-percent *percent*

Parameter

Parameter	Description
percent	Percentage of total bandwidth that can be occupied.

Default

50％

Command mode

interface configuration state

Explanation

For low speed circuit, configuration of this command can be adjusted to restrict bandwidth rate that BEIGRP can use to prevent from that BEIGRP influences normal data transmitting.

Example

```
interface Ethernet1/1
ip beigrp bandwidth-percent 100
```

The above command will permit BEIGRP to use all bandwidth of this interface.

Relevant command

bandwidth

2.1.14 ip beigrp hello-interval

Use this command to configure the interval to send Hello massage on the interface running BEIGRP routing protocol. Use “no” form of this command to reset original default value.

Syntas

ip beigrp hello-interval *seconds*

no ip beigrp hello-interval *seconds*

Parameter

Parameter	Description
second	Interval to send Hello massage with second as the unit.

Default

5 seconds

Command mode

interface configuration mode

Example

interface Ethernet1/1
ip beigrp hello-interval 20

The above command will change the interval to send Hello packet on router interface Ethernet 1/1 as 20 seconds.

Relevant command

ip beigrp hold-time

2.1.15 ip beigrp hold-time

Use this command to configure hold time of neighbor on interface running BEIGRP routing protocol. Use “no” form of this command to reset the default value.

Syntas

ip beigrp hold-time *seconds*

no ip beigrp hold-time *seconds*

Parameter

Parameter	Description
seconds	Hold time of neighbor when no BEIGRP massage is received. Use second as the unit.

Default

15 seconds

Command mode

interface configuration mode

Example

interface Ethernet1/1

ip beigrp hold-time 60

The above command will set the hold time of neighbor on router interface Ethernet 1/1 as 1 minute.

Relevant command

ip beigrp hello-interval

2.1.16 ip beigrp passive

If you don't want to exchange BEIGRP route update information, you can use this command. Use its "no" form to reset default state.

Syntas

ip beigrp passive

no ip beigrp passive

Parameter

None

Default

The interface is not under passive mode.

Command mode

interface configuration mode

Explanation

If an interface is configured as passive state, the interface will receive no route update and establish no adjacency with any neighbor that the interface can reach. But a directly connecting route generated by the interface itself will be broadcasted through other interface running BEIGRP.

Example

The following command will set Ethernet 1/1 as passive interface:

interface ethernet1/1
ip beigrp passive

2.1.17 ip beigrp split-horizon

Enable Horizontal splitting of BEIGRP process on this interface. Use "no" form of this command to close horizontal split.

Syntas

ip beigrp split-horizon

no ip beigrp split-horizon

Parameter

None

Default

under enabled state

Command mode

interface configuration mode

Explanation

Use this command to prevent from route loop. Thus you should make sure that it won't cause inappropriate results before disable horizontal split.

Example

interface Ethernet1/1
no ip beigrp split-horizon

The above command will disable the horizontal splitting on router interface Ethernet 1/1.

2.1.18 ip beigrp summary-address

If you want to summarize BEIGRP route information sent from a certain interface, you may use this command. Use "no" form of this command to disable summary process.

Syntas

ip beigrp summary-address *as_number address mask*

no ip beigrp summary-address *as_number address mask*

Parameter

Parameter	Description
as_number	BEIGRP autonomous system number the summary route configuration aiming to.
address	Destination network of the summary route.
mask	Network mask of the summary route.

Default

None

Command mode

interface configuration state

Explanation

When summarizing the routes to interfaces, we should adhere the following principle:

- After summary command is configured on a interface, summary route of the defined network will be generated as long as there is at least one sub-network in BEIGRP topology list.
- When the summary route points to Null0 interface, it will have the shortest distance of all specific routes included in the summary routes. Summary route will insert into main IP routing table with administrative distance 5 (not configurable).
- When configuring route update sent on interface within the summary range, specific route belonging to summary network will be disableled. Updating sent to other interfaces will not be influenced.

Example

interface Ethernet1/1

ip beigrp summary-address 100 12.1.0.0 255.255.0.0

After configuring the above command, all specific router (belonging to router beigrp 100) belonging to network 12.1.0.0/16 will not be broadcasted from ethernet 1/1. Instead of it, there will be a summary route with destination network 12.1.0.0/16.

Relevant command

auto-summary

2.1.19 metric weights

Use this command to change the coefficient used when BEIGRP calculates compound distance of the route. Use the “no” form of this command to reset the default value of the coefficient.

Syntas

metric weights k1 k2 k3 k4 k5

no metric weights

Parameter

Parameter	Description
k1,k2,k3,k4,k4	5 constant coefficients. They are used to convert the vector distance of a route to a standard value.

Default

k1: 1

k2: 0

k3: 1

k4: 0

k5: 0

Command mode

route configuration mode

Explanation

The formula converting vector distance to compound distance adopts 2 steps:

Step 1

Composite metric = K1*BW*256 + K2 * BW/(256 - load) + K3 * DLY * 256,

Thereinto

BW 10Gbps/bandwidth

DLY Delay, 10 millisecond

Step 2 (only used when k5 is not equal to 0)

Composite metric = Composite metric * K5/(reliability + K4)

K2, K4 and K5 are left by IGRP to be compatible with Cisco's EIGRP protocol. Under general situation, load and reliability are not used to calculate compound distance. Thus don't change default value of K2, K4 and K5 unless you are sure about the result. Otherwise unexpected things will be resulted during routing decision-making.

Example

router beigrp 2
network 131.108.0.0 255.255.0.0
metric weights 2 0 2 0 0

Relevant command

bandwidth

delay

2.1.20 network

Use command "network" to designate a network to run BEIGRP routing protocol. Use "no" form of this command to disable BEIGRP routing protocol on this network.

Syntas

network *network-numbe*r [*netmask*]

no network *network-number* [*netmask*]

Parameter

Parameter	Description
network-number	network number
netmask	network mask

Default

None

Command mode

route configuration mode

Explanation

You can configure several commands of “network” to run BEIGRP dynamic routing protocol on several network simultaneously. Use natural mask mode if mask is not configured.

Example

router beigrp 2
network 131.108.0.0 255.255.0.0
network 122.11.2.0

Relevant command

router beigrp

2.1.21 offset

Use router configuration commands “offset router” to add an offset to BEIGRP route (incoming or outgoing) Metric. Use “no offset” to disable the offset.

Syntas

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

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

Parameter

Parameter	Description
In	Apply access list to incoming route Metric
Out	Apply access list to outgoing route Metric
access-list-name	Name of standard access list to be applied.
Offset	Positive offset used to match route Metricof access list network.
Type	Interface type
Number	(Alternative) number of interface using offset list

Default

None

Command mode

route configuration mode

Explanation

Add an offset to route Metric. Offset list with interface type and interface number is extended and has the higher priority than the offset list that is not extend. Thus extended offset list will be added to route value when extended and not extended offset

list are applied simultaneously.

Because BEIGRP is a vector distance, this offset will be added to delay (interface delay).

It is commended to apply the standard IP access-list when we use it in the command, for it is not work to configure the extern IP access-list.

Example

In the following example, the router add offset 10 to BEIGRP router matching access list 21.

offset * out 21 10

In the following example, the router add offset 10 to BEIGRP router obtained from Ethernet 1/0.

offset e1/0 in 21 10

Relevant command

ip access-list

2.1.22 redistribute

Use this command to reditribute other routing protocol or route of other EIGER process to routing table of this EIGER process.

Syntas

redistribute *protocol* [*process*] **route-map** *name*

no redistribute *protocol* [*process*]

Parameter

Parameter	Description
protocol	Source protocol to redistribute the route. It can be one of the following keywords: bgp, ospf, static, connected, and rip.
process	(Alternative) For bgp or bigp, the parameter refers to autonomous system number of 16 digits. For OSPF, it is the relevant OSPF process ID by which the routing key is redistributed. It identifies the routing process. It is decimal number excluding 0.For “rip”, process identifier “process-id” is not needed.
route-map	(Alternative) This parameter provides route map to filter the routes redisitributed from source protocol to current routing protocol. If the parameter is not given, all routes will be redistributed. If the keyword is given without listing routing mark, no route will be introduced.
name	character string of the name of route-map.

Default

none

Command mode

EIGER route configuration state

Explanation

Connected routes, static routes and routes of other BEIGRP process will be redistributed without configuring default-metric. But default-metric has to be configured when Implementationting the routes excluding the said 3 routes. Otherwise it won't be reditributed even if it is configured.

Example

default-metric 64 250 255 255 1500
redistribute ospf 1

2.1.23 router beigrp

Use this command to add a BEIGRP route process. Use "no" form of this command to delete the process.

Syntas

router beigrp *autonomous-system-number*

no router beigrp autonomous-system-number

Parameter

Parameter	Description
autonomous-system-number	It is used to distinguish different BEIGRP processes.

Default

none

Command mode

Global configuration mode

Explanation

Use this command run several BEIGRP processes simultaneously.

Example

The following example will tell us how to add a BEIGRP process with autonomous system number 30:

router beigrp 30

Relevant command

network

2.1.24 show ip beigrp interface

Use this command to show the state of all neighbors of BEIGRP.

Syntas

show ip beigrp interfaces [**interface-*type*** *interface-number*] [*as-number*]

Parameter

Parameter	Description
as-number	Autonomous system number. If this parameter is designated, only neighbor of this BEIGRP process.
interface	Interface name. If this parameter is designated, only BEIGRP neighbor on this interface will be showed.

Default

None

Command mode

Supervisor mode or global configuration mode

Explanation

Use this command to view state information of the interface running BEIGRP dynamic routes.

Relevant command

show ip beigrp topology

2.1.25 show ip beigrp neighbors

Use this command to show the state of all neighbors of BEIGRP.

Syntas

show ip beigrp neighbors [interface-*type interface-number*] [*as-number*] [**detail**]

Parameter

Parameter	Description
as-number	Autonomous system number. If this parameter is designated, only neighbors of this BEIGRP process will be showed.
interface	Interface name. If this parameter is specified, only BEIGRP neighbor on this interface will be showed.
detail	Show detailed neighbor information.

Default

None

Command mode

Supervisor modeor global configuration mode

Explanation

Use this command to view which neighbors there are, which neighbors are added newly, which neighbors are disappeared and the state of neighbors. It will help to find network failure.

Example

Router# show ip beigrp neighbors
Information of BEIGRP neighbors with AS 1024
Address interface hold uptime Q_cnt Seq
192.168.20.204 Ethernet1/1 15 00:08:06 0 159
202.117.80.143 Ethernet2/1 10 00:08:05 0 100
192.168.20.141 Ethernet1/1 12 00:07:38 0 254

Area	Explanation
process 64	Autonomous system number.
Address	IP address of the neighbor.
Interface	Find local interface of the neighbor.
Hold	Show how long any BEIGRP group of this neighbor has not been received locally till now.
Uptime	How long adjacency has been established with this neighbor till now.
Q Count	The number of massages waiting for sending to this neighbor in queues.
Seq Num	The latest serial number received from this neighbor.

Relevant command

show ip beigrp topology

2.1.26 show ip beigrp protocol

This command is used to show parameters and statistic information of BEIGRP routing protocol process.

Syntas

show ip beigrp protocols [*as-number*]

Parameter

Parameter	Description
as-number	Autonomous system number. If this parameter is specified, only parameters and statistic information of BEIGRP process.

Command mode

Supervisor modeor global configuration state

Explanation

Use this command to view protocol parameter of BEIGRP at any time.

Example

```
R142#show ip bei pro
Protocol Information of BEIGRP with AS 1024:
  Metric Weight: K1=1, K2=0, K3=1, K4=0, K5=0.
  Filter * in access-list in12
  Filter * out access-list ou12
  Offset * in in23 12
  Offset * out ou23 12
  Redistributing: connect, ospf 1, ospf 2
  Automatic network summarization is enable.
  Active-time: 3(minutes)
  Routing for Networks:
    192.168.20.0/24
    10.0.0.0/8
    167.20.0.0/16
    202.117.80.0/24
  Distance: internal 90, external 170
  Active Route:
```

Relevant command

show ip beigrp topology

2.1.27 show ip beigrp topology

Use this command to show topology table of BEIGRP process.

Syntas

show ip beigrp topology [*as-number*] [*network-number subnet-mask* |**active** | **all-links** | **pending** | **summary** | **zero-successors**]

Parameter

Parameter	Description
as-number	Autonomous system number. If this parameter is specified, only topology table of this BEIGRP process.
network-number	Show detailed information of specific network.
subnet-mask	Network mask.
active	Only shows routes under active state.
all-link	Shows all content of topology including non-feasible follower. Otherwise only follower and feasible follower will be showed.
pdening	Only list not receiving response will be showed.
summary	Only summary information will be showed.

zero-successors	No following list will be showed.

Default

None

Command mode

Supervisor modeor global configuration mode

Explanation

Use this command to view topology of BEIGRP at any time.

Example

```
Router# show ip beigrp topology
P 10.10.10.0/24 successors: 1 FD: 13056
      via connect(Loopback1) Metric: 13056/0
P 167.20.0.0/16 successors: 1 FD: 261132
      via 202.117.80.143(Ethernet2/1) Metric: 261132/258560
P 192.166.100.0/24 successors: 1 FD: 281856
      via redistribute Metric: 281856/0
P 192.168.20.0/24 successors: 1 FD: 258560
      via connect(Ethernet1/1) Metric: 258560/0
P 202.1.1.0/24 successors: 1 FD: 297246988
      via 192.168.20.204(Ethernet1/1) Metric: 297246988/297244416
P 202.117.80.0/24 successors: 1 FD: 258560
      via connect(Ethernet2/1) Metric: 258560/0
A 202.117.93.0/24 successors: 1 FD: unaccessible, R serno: 32
      via 192.168.20.141(Ethernet1/1) Metric: 271372/13056
   SIA-Info: (active: 00:02:20 query-origin: Local origin)
      Unreplied Neighbors:
         via 202.117.80.143, Ethernet2/1
P 202.192.168.0/24 successors: 1 FD: 284172
      via 192.168.20.204(Ethernet1/1) Metric: 284172/281600
```

Area	Description
160.89.90.0 等	Destination network number
255.255.255.0	Destination network mask
successors	Number of the successors
FD	Feasible distance
Via	Gateway address
(90,46251776/46226176)	The first number is the administrative distance of this route. The second number is the compound distance of this route. The third is the report distance of this route.
Ethernet1/1	Explaining local interface receives this route.

Relevant command

show ip beigrp neighbor

2.1.28 show ip beigrp traffic

This command may show BEIGRP flow statistic information.

Syntas

show ip beigrp traffic [*as-number*]

Parameter

Parameter	Description
as-number	Autonomous system number. If this parameter is specified, only flow statistic information of BEIGRP process will be showed.

Default

none

Command mode

Supervisor mode or global configuration mode

Explanation

Use this command to view flow statistic information of BEIGRP.

Example

```
R142#show ip bei tra
Traffic Statistics of BEIGRP 1024
  Packet Type      Hello    Update    Query     Reply     ACK
  Send/Receive   770/1021   133/44     29/7      7/9     60/147
```

Relevant command

show ip beigrp topology

Chapter 3 OSPF Protocol Command

3.1 OSPF Protocol Command

This chapter introduces mainly relevant commands of OSPF Which will be Used to configure parameters and monitor the state of OSPF.

3.1.1 area authentication

Use command “area authentication” to authenticate an OSPF area under route configuration mode. Use command “no area area-id authentication” to disable the authentication on an area and “no area area-id” to delete an area.

Syntas

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

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

no area *area-id*

Parameter

Parameter	Description
area-id	Area need to be authenticated
simple	(Alternative 1) Use plaintext method to authenticate.
message-digest	(Alternative 1) Use MD5 method to authenticate.

Default

It does not have to authenticate when receiving OSPF packet on the interface.

Command mode

route configuration mode

Explanation

The value of authentication will be written into OSPF packet. Verification types of all routers in the same area should be the same. All OSPF routers in a network should keep same authentication password if they want to communicate with each other.

Example

The following example show plaintext-authentication on area 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
```

Relevant command

ip ospf password

ip ospf message-digest-key

3.1.2 area default-cost

Use “area area-id default-cost cost” to designate the cost of default summary routes sent to NSSA or STUB area. If you want to resume the default value of the cost , use command “no area area-id default-cost”

Syntas

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

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

no area *area-id*

Parameter

Parameter	Description
area-id	Means ID of stub area
cost	Cost

Default

Default value is 1.

Command mode

route configuration mode

Explanation

This command can only take effect on the area-border routers connected to NSSA or STUB area.

After configuring the command “area stub default-information-originate”, the router will generate LSA (SUM_NET_LSA) containing default router information to relevant stub areas. And the cost configured by this command will be used in this LSA.

Notes:

If use command “**no area** area-id” (without any parameter) to delete the area, all subcommand related to the area will be disabled , such as: area authentication, area default-cost, area nssa, area range, area stub, and area virtual-link.

Example

Set default cost of stub network 36.0.0.0 as 20 as the following section:

```
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
```

Relevant command

area nssa

area stub

area range

Summarize routes on area border. Use “no area range” to cancel it.

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	Referring to the area to process route summary. It could be either a decimal number or an ip address.
address	IP address
mask	IP mask
advertise	To release after being summarized.
not-advertise	Not to release after being summarized.

Default

It doesn’t work.

Command mode

route configuration mode

Explanation

The command **“area** range ” is only used on Area Border Router.. ABR broadcasts one summarized route to other routers, therefore the route on the border of an area is concentrated and there is only one summarizing route for each address range outside of the area.

This command can be configured on the router with multiple areas. Hence OSPF can summarize several address ranges.

Note If use command “**no area** area-id” (without any parameter) to delete the area, all subcommand related to the area will be disabled , such as area authentication, area default-cost, area nssa, area range, area stub, and area virtual-link.

Example

In the following example, area range for sub-network 36.0.0.0 and 192.42.110.0 are configured.

```
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
area stub
```

To configure an area as a stub area. “No area stub” command is used to disable the settings.

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

Parameter

Parameter	Description
area-id	Set the area id of stub area. It can be either a decimal number or an ip address.
no-summary	(Option 1) It is forbidden that ABRrouter sends summarizing link to stub area.

Default

No stub area is defined.

Command mode

Route configuration mode

Explanation

It is necessary to configure “area stub” command on all routers and access severs in the stub area. ABRrouter uses “default-cost” option (in command “area”) to set the cost for the inner router to reach the stub area border.

There are two commands related to stub area : “area xx stub” and “area xx default-cost”. All routers and access severs connected to stub area should be configured with “area stub”. And sub command “default-cost” is only used on the area border routers connected to stub area. The default-cost option provides the metric for the summary default route generated by the ABR into the stub area.

In order to reduce the number of LSA a little further, “no-summary” could be used on ABRrouter to prohibit sending summarizing LSA into stub area.

Note: If use command “**no area** area-id” (without any parameter) to delete the area, all subcommand related to the area will be disabled , 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 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 36.0.0.0 255.255.255.0 area 36.0.0.0
area 36.0.0.0 stub
area 36.0.0.0 default-cost 20
```

Relevant command

area authentication

area default-cost

3.1.3 area range

This command is used to take route collection on the area range.And “ no area range” can cancel the setting.

Syntas

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	It is the area range of route collection. It can be a algorism number or a IP address.
address	IP address
mask	IP hidden code.
advertise	After collection and then advertisement.
not-advertise	After collection and no advertisement.

Default

no use

Command mode

route configuration mode

Explanation

The command “area range” only use on ABR router. The action is that ABR use a collection route and broadcast to other router.In this way the route is dwindled in area range. To the area exterior, there is only one collection route in each address bound. That is route collection.

This command can configure on multiarea router, so OSPF can collect many address bound.

Note：

When we use “no area area-id” (no parameter else) to cancel the setting, it will cancel all the area parameter subcommand. Eg: area authentication, area default-cost, area nssa, area range, area stub and area virtual-link.

Example

The following example configure the collection route that is ABR router for subnet 36.0.0.0 and all host computer of 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
```

3.1.4 area stub

This command is used to configure one area to Stub. And “no area stub” can cancel the setting.

syntas

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

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

no area *area-id*

parameter

Parameter	Description
area-id	Configure the field ID of stub area. It can be a algorism number or a IP address.
no-summary	(any option) forbid ABR router to send collection route to stub area.

Default

not stub area

Command mode

route configuration mode

Explanation

It is must use “area stub” to configure on all routers and call servers of stub area. ABR router use “default-cost” option to configure cost from inside router to stub area.

There is two relevant command about stub area: stub and default-cost. Stub command must be configured on all router and call server which is conjoint with stub area. And default-cost command only use on area range routers which is conjoint with stub area. Default-cost command can configure the cost from collection route to stub area that is maked by area range routers.

In order to more reduce the quantity of LAS, it is can use “no-summary” command to forbid to send the collection LAS into stub area.

Note:

When we use “no area area-id” (no parameter else) to cancel the setting, it will cancel all the area parameter subcommand. Eg: area authentication, area default-cost, area nssa, area range, area stub and area virtual-link.

Example

This following example assign a default cost 20 to stub net 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
```

Relevant command

area authentication

area default-cost

3.1.5 area virtual-link

To define an OSPF virtual link, use the **area** virtual-link router configuration command with the optional parameters. To remove a virtual link, use the no form of this command.

Syntas

area *area-id* **virtual-link** *neighbor-id* [**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*

Parameters

Parameter	Description
area-id	Area ID assigned to the transit area for the virtual link. This can be either a decimal value or a valid IP address. There is no default.
neighbor-id	Router ID associated with the virtual link neighbor. The router ID appears in the show ip ospf display. It is internally derived by each router from the router's interface IP addresses. This value must be entered in the format of an IP address. There is no default.
hello-interval *seconds*	(Optional) Time in seconds between the Hello packets that the router sends on an interface. Unsigned integer value to be advertised in the router's Hello packets. The value must be the same for all routers attached to a common network. The default is 10 seconds.
retransmit-interval *seconds*	(Optional) Time in seconds between link state advertisement retransmissions for adjacencies belonging to the interface. Expected round-trip delay between any two routers on the attached network. The value must be greater than the expected round-trip delay. The default is 5 seconds.
transdly *seconds*	(Optional) Estimated time in seconds it takes to transmit a link state update packet on the interface. Integer value that must be greater than zero. Link state advertisements in the update packet have their age incremented by this amount before transmission. The default value is 1 second.
dead-interval *seconds*	(Optional) Time in seconds that a router's Hello packets are not seen before its neighbors declare the router down. Unsigned integer value. The default is four times the Hello interval, or 40 seconds. As with the Hello interval, this value must be the same for all routers attached to a common network.
password pass-string	(Optional) Password to be used by neighboring routers. Any continuous string of characters that you can enter from the keyboard up to 8 bytes long. This string acts as a key that will allow the authentication procedure to generate or verify the authentication field in the OSPF header. This key is inserted directly into the OSPF header when originating routing protocol packets. A separate password can be assigned to each network on a per-interface basis. All neighboring routers on the same network must have the same password to be able to route OSPF traffic.
message-digest-key *key-id md5 key*	(Optional) Key identifier and password to be used by neighboring routers and this router for MD5 authentication. The keyid is a number in the range 1 through 255. The key is an alphanumeric string of up to 16 characters. All neighboring routers on the same network must have the same key identifier and key to be able to route OSPF traffic. There is no default value.

Default

area-id: No area ID is predefined.

neighbor-id: No router ID is predefined.

hello-interval seconds: 10 seconds

retransmit-interval seconds: 10 seconds

transdly seconds: 1 second

dead-interval seconds: 40 seconds

password key: No key is predefined.

message-digest-key keyid md5 key: No key is predefined.

Command Mode

Ospf Router configuration

Explanation

In OSPF, all areas must be connected to a backbone area. If the connection to the backbone is lost, it can be repaired by establishing a virtual link.

The smaller the Hello interval, the faster topological changes will be detected, but more routing traffic will ensue.

The setting of the retransmit interval should be conservative, or needless retransmissions will result. The value should be larger for serial lines and virtual links.

The transmit delay value should take into account the transmission and propagation delays for the interface.

A router will use the specified authentication key only when authentication is enabled for the backbone with the area area-id authentication router configuration command.

The two authentication schemes, simple text and MD5 authentication, are mutually exclusive. You can specify one or the other or neither. Any keywords and arguments you specify after authentication-key key or message-digest-key keyid md5 key are ignored. Therefore, specify any optional arguments before such a keyword-argument combination.

Examples

The following example establishes a virtual link with default values for all optional parameters:

```
router ospf 100
   network 192.168.20.0  255.255.255.0 area 1
   area 1 virtual-link 192.168.20.17
```

The following example establishes a virtual link with MD5 authentication:

```
router ospf 100
   network 192.168.20.0  255.255.255.0 area 1
   area 1 virtual-link 192.168.20.17 mess 100 md5 cx002dxfs
```

Relevant Commands

area authentication

show ip ospf virtual-link

3.1.6 debug ip ospf adj

Monitor the procedure establishing OSPF adjacency:

Syntas

debug ip ospf adj

Parameter

None

Default

None

Command mode

supervisor mode

Explanation

The produce establishing OSPF adjacency could be consulted according to output information of the 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)
……
```

3.1.7 debug ip ospf events

Monitor events of interface and neighbor:

Syntas

debug ip ospf events

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

Events triggered by OSPF interface actions and neighbor operations can be consulted according to the output information of the 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
……
```

3.1.8 debug ip ospf flood

Monitor the flooding process of OSPF link state database:

Syntas

debug ip ospf flood

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

The flooding process of OSPF link state database could be viewed according to the command output information.

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
……

3.1.9 debug ip ospf lsa-generation

Supervise the generating process of LSA of OSPF:

debug ip ospf lsa-generation

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

The produce of LSA generation can be viewed according to the command output information.

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
……

3.1.10 debug ip ospf packet

Supervise the packet of ospf:

Syntas

debug ip ospf packet

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

Senging/Receiving all kind of OSPF packet can be viewed according to the command output information.

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

……

3.1.11 debug ip ospf retransmission

Supervise the packet- retransmission process of ospf:

debug ip ospf retransmission

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

Retransmiting OSPF packets can be viewed according to command output information.

Example

router# debug ip ospf retransmission
OSPF: retransmit UPDATE to 192.168.40.3 (RID 192.168.40.3), state FULL
……

3.1.12 debug ip ospf spf

Supervise the SPF calculation of OSPF:

Syntas

debug ip ospf spf

debug ip ospf spf intra

debug ip ospf spf inter

debug ip ospf spf external

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

The SPF calculation process can be viewed according to command output information.

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

Display field decryption:

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

3.1.13 debug ip ospf tree

Supervise the establishment of SPF tree of OSPF:

Syntas

debug ip ospf tree

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

The establishment of SPF tree of OSPF can be viewed according to command output information.

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)
```

show field description.

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

3.1.14 default-information originate (OSPF)

Generate a default route into OSPF routing domain.

Syntas

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

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

Parameter

Parameter	Description
originate	Use this command, if there has been a default route and it is expected to be transmitted to other routers. This parameter will cause the system to transmit an external route into OSPF routing domain.
Always	(Option) Whether the system has a default route or not, the system will broadcast the default route.
route-map *map-name*	(Option) If route-map is met, a default route will be generated.

Default

default route is not generated

Command mode

route configuration state

Explanation

Use either command “redistribute” or command “default-information” to distribute a route to OSPF routing domain. The router will become ASBR. But ASBR doesn’t generate a default route into OSPF routing domain in default case， unless “always” option has been set， otherwise a default route should be configured.

When this command is used, the default network should be contained in the routing table and must satify condition of the option “route-map”. If you don’t want the dependency on the default network in routing table, use command “default-information originate always route-map”.

Example

The following example shows the default route distributed into OSPF routing domain:

```
router ospf 109
redistribute rip
default-information originate
```

Relevant command

Redistribute

3.1.15 default-metric

Set the default metric value for the route introduced . Use “no default-metric” to reset the default value.

Syntas

default-metric *value*

no default-metric

Parameter

Parameter	Description
value	The route Metric to be set is “value” with a range from 1 to 4294967295.

Default

The default route Metric is 10.

Command mode

route configuration state

Explanation

The command “default-metric” is used to set the default Metric that is used to introduce the route of other routing protocol into ospf routing domain. When using the command “redistribute” to introduce the route of other routing protocol, the default Metric designated by “default-metric” is used if no specific route value is designated.

Example

Set the default metric value to 3 to distribute routes of other routing protocol.

router_config_ospf_100#default-metric 3

Relevant command

redistribute

3.1.16 distance ospf

Define the administrative administrative distance according to the type. Use “no distance ospf” to disable the settings.

Syntas

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

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

Parameter

Parameter	Description
intra-area *dist1*	(Option) Set the distance for all routes of an area. The default value is 110.

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

Default

intra-area: 110

inter-area: 110

external: 150

Command mode

route configuration state

Explanation

Should have at least one parameter.

This command has the same function as “distance”. However command “distance ospf” can configure the distance of the whole route group not only the route passing through a certain access list.

Example

The following example set external distance as 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

Relevant command

distance

3.1.17 filter

Use route configuration state command “filter” to set route filtering list. Use command “no filter” to reset the default settings.

Syntas

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

access-list-name | **prefix-list** *prefix-list-name*}

filter {*interface*-type *interface*-number | *****} {**in** } {**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
access-list-name	Name of the access list
access-list-name	name of the access list
prefix-list-name	Name of the prefix list

Default

None

Command mode

route configuration state

Explanation

none

Example

filter * in access-list mylist

3.1.18 ip ospf cost

Designate the cost needed for the interface to run “OSPFprotocol”. Command “no ip ospf cost” is used to reset the default value.

Syntas

ip ospf cost cost

no ip ospf cost

Parameter

“cost” is the value to be spent for “OSPFprotocol”, ranging from 1to 65535 (whole number).

Default

The default value of the cost is calculated according to the rate of the interface.

Command mode

interface configuration state

Example

Set the value of the cost to 2 on the interface serial 0 for OSPF.

ip ospf cost 2

Designate the cost needed for interface to run “OSPFprotocol”. Command “no ip ospf cost” is used to reset the default value.

3.1.19 ip ospf dead-interval

Designate the time length to recognize the death of neighboring routers. Command “no ip ospf dead-interval” is used to reset default value.

Syntas

ip ospf dead-interval seconds

no ip ospf dead-interval

Parameter

Parameter	Description
Seconds	The time value of the death of neighboring routers, which is calculated in seconds. The legal range is 1 ~ 65535.

Default

The default time length of the death of neighboring routers on the interface is 40 seconds.

Command mode

interface configuration state

Explanation

Value of dead-interval will be written into “Hello” packet and will be sent together with “hello” packet. It should be ensured that the dead-interval is in accordance with the dead-interval set in the “hello” packet by other adjacent neighbors on the interface and is 4 times the value of Hello-interval.

Example

Configure dead-interval of neighboring routers on interface Serial0 as 60 seconds.

router_config_S1/0#ip ospf dead-interval 60

Relevant command

ip ospf hello-interval

3.1.20 ip ospf hello-interval

Designate the interval to send Hello packet on the interface. Command “no ip ospf hello-interval” reset the default value.

Syntas

ip ospf hello-interval *seconds*

no ip ospf hello-interval

Parameter

Parameter	Description
seconds	the interval to send HELLO packet and is calculated in seconds. The range is from 1 to 255.

Default

The default interval to send HELLO packet on the interface is 10 seconds.

Command mode

interface configuration mode

Explanation

The value of the hello-interval will be written into the HELLO packet and will be sent together with the HELLO packet. The smaller the value of hello-interval is, the more quickly the topology of the network will be found and the more the router cost will cost. It should be ensured that the value of hello-interval is in accordance with the hello-interval set by other adjacent neighbors on the interface.

Example

Configure the interval to send HELLO packet on interface Serial1/0 as 20 seconds.

router_config_S1/0#ip ospf hello-interval 20

Relevant command

ip ospf dead-interval

3.1.21 ip ospf message-digest-key

Set that ospf applies MD5 authentication. Use “no ip ospf message-digest-key” to disable the setting. ˚

Syntas

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

no ip ospf message-digest-key *keyid*

Parameter

Parameter	Description
keyid	Authenticate ID(1 – 255).
key	16-digit letter and number string

Default

OSPF MD5 authentication is not used.

Command mode

interface configuration mode

Explanation

Usually each interface uses a key value to generate authentication information or validate the package received. Both adjacent routers should have the same key.

The process to change the key is as follows.

If the current configuration is as the following:

interface ethernet 1

ip ospf message-digest-key 100 md5 OLD

Change it into the following configuration:

interface ethernet 1

ip ospf message-digest-key 101 md5 NEW

The system assumes its neighboring router has no new key either. It will send the same package in many copies. Each copy applies different key value. This example router will send each package in 2 copies with one copy's key=100 and the other one key=101.

This allows the neighboring routers to continue to communicate when the manager is revising a key value. The process stops as soon as it is found that all adjacencies apply a new key value. When the system receives packages with a new key value sent by neighboring router, it will recognize that neighboring router has a new key.

After all neighbors have applied a new key, the old key will be deleted. In this example, it should be configured as the following:

interface ethernet 1/0

no ip ospf message-digest-key 100

Thus the Ethernet interface 1/0 can only apply key=101 to make the authentication.

Suggest that each interface had better not to have several keys. Former key value should be deleted after new key value is added to prevent that local system uses former key to communicate with unfriendly system knowing the former system. Deleting the former key value will also reduce the communication burden.

Example

The following example sets a new key=19. The password is 8ry4222:

```
interface ethernet 1
ip ospf message-digest-key 10 md5 xvv560qle
ip ospf message-digest-key 19 md5 8ry4222
```

Relevant command

area authentication

3.1.22 ip ospf network

Set network type of the interface. command “no ip ospf network” is used to disable the setting.

Syntas

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	Set the network type of interface as broadcast type.
nonbroadcast	Set the network type of interface as non-broadcast NBMA type.
point-to-point	Set the network type of interface as the point-to-point type.
point-to-multipoint	Set the network type of interface as point-to-multipoint type.

Command mode

interface configuration mode.

Explanation

On the broadcast network without multi-address access ability, the interface should be configured as NBMA type. If it cannot be ensured that any two routers on a NBMA network are accessible to each other, the network should be set as point-to-multipoint type.

Example

Configure the interface Serial1/0 as non-broadcast NBMA type.

router_config_S1/0#ip ospf network nonbroadcast

3.1.23 ip ospf passive

Use command “ip ospf passive” to disable sending HELLO packet on the interface. Use “no ip ospf passive” to enable sending HELLO packet.

Syntas

ip ospf passive

no ip ospf passive

Parameter

none

Default

Send HELLO massage on interface.

Command mode

interface configuration mode

Explanation

If you disable sending HELLO massage on a certain interface, a specific sub network will continue to announce to other interfaces and route update from other router to this interface will continue to be accepted and processed. This is usually used on STUB network. There usually aren't any other OSPFrouter on such a network.

Example

The following example sends HELLO packet for network 131.108.0.0 to all interfaces (excluding Ethernet interface 1/0):

```
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
```

3.1.24 ip ospf password

Configure password for plain-text authentication on the interface . Use "no ip ospf password" to disable the setting.

Syntas

ip ospf password *password*

no ip ospf *password*

Parameter

Parameter	Description
password	Any sequential 8-digit character string.

Default

No Password

Command mode

interface configuration mode

Explanation

The password generated from this command inserts route information package directly. You can configure one password for each netework on each interface. All neighbors on the interface should have the same password to exchange route

information.

Notes:

This command will validate only after the command “area authentication” configured.

Example

ip ospf password yourpass

Relevant command

area authentication

3.1.25 ip ospf priority

Configure the priority for electing “DR router” on the interface. Use “no ip ospf priority” to reset the default value.

Syntas

ip ospf priority priority

no ip ospf priority

Parameter

Parameter	Description
priority	refers to the priority with rightful range from 0 to 255.

Default

The default priority of the interface for electing DR router is 1.

Command mode

interface configuration mode

Explanation

When both routers connected to the same section of a network want to become DR, choose the one with a higher priority. If they share the same priority, choose the one with the bigger router ID number. A router with priority 0 will not be elected as “DR” or “BDR”. The priority will validate only when it is configured on non-point-to-point network.

Example

Set the priority of interface Serial1/0 for electing DR as 8.

router_config_S1/0#ip ospf priority 8

Relevant command

neighbor

3.1.26 ip ospf retransmit-interval

Designate the retransmission interval for transmitting link state packet to the adjacent neighbor on the interface. Command “no ip ospf retransmit” reset the default value.

Syntas

ip ospf retransmit *seconds*

no ip ospf retransmit

Parameter

Parameter	Description
seconds	the retransmit interval for transmitting link state broadcast between interface and neighboring router and is calculated in seconds. Its range is from 1 to 65535.

Default

The default retransmission interval for transmitting link state broadcast between interface and neighboring router is 5 seconds.

Command mode

interface configuration mode

Explanation

When a router send link state broadcast to its neighboring router, it will keep the link state packet until receiving confirmation from its neighbor. If confirmation is not received within the interval “seconds”, it should be retransmitted. Value of “seconds” should be longer than the round-trip time between the routers.

Example

Configurate the retransmit interval for transmitting link state broadcast between interface Serial1/0 and neighboring router as 8 seconds.

router_config_S1/0#ip ospf retransmit 8

3.1.27 ip ospf transmit-delay

Configure the time delay value for transmitting link state broadcast on the interface. Use “no ip ospf transit-delay” to reset the default value.

Syntas

ip ospf transit-delay *time*

no ip ospf transit-delay

Parameter

Parameter	Description
time	Configurate the retransmit interval for transmitting link state broadcast between interface Serial1/0 and neighboring router as 8 seconds.

Default

The default time delay value for transmitting link state broadcast on the interface is 1 second.

Command mode

interface configuration mode

Example

Configure the time delay value for transmitting link state broadcast on interface Serial1/0 as 3 seconds.

router_config_S1/0#ip ospf transit-delay 3

3.1.28 neighbor

Configure the OSPFrouter in adjacency with non-broadcast network. Use “no neighbor” to delete it.

Syntas

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	IP address of neighboring router.
priority *number*	(Option 1) 8-digit priority. Default value is 0. This option cannot be used for point-multipoint interface.
poll-interval *seconds*	(Option 1) Referring to poll interval. Suggest that it should be longer than hello interval for RFC 1247. This option cannot be used for point-multipoint interface.
cost *number*	(Option 1) Designate cost (1-65535) for neighboring router. If the cost is not designated, use the cost designated by “ip ip ospf co”. This option is the only one that works for a point-multipoint network. It is not fitted for NBMA network.

Default

none

Command mode

router configuration mode

Explanation

For X . 25 and frame relay network, you can set OSPF to work with broadcast type. Referring to the following for the details:

Command "X25 map " and " frame-relay map "

For each non-broadcast neighbor, the configuration should be configured within the router. The neighbor address should be the main address of the interface.

If the neighboring router is in a non-active state, it is still necessary to send hello packages to it. These hello packages will be sent at poll interval.

When turning on the router, a hello package is only sent to the router with a non-zero priority. This router can be changed into DR and BDR routers. When DR and BDR routers are selected, DR and BDR routers will send hello package all neighbor to form adjacencies

Example

The following example designate router 131.108.3.4 address as non-broadcast network with priority 1 and poll interval 180 seconds.

```
router ospf
neighbor 131.108.3.4 priority 1 poll-interval 180
```

The following example refers to the configuration of point-to-multipoint non-broadcast network.

```
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
```

Relevant command

ip ospf priority

3.1.29 network area

Start OSPF on the interface if it is covered by the network, and specify the area ID. Command "no network" is used to disable network.

Syntas

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

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

Parameter

Parameter	Description
Network mask	net work IP address and mask with dotted decimal notation.
area_id	the area number.

Default

The default of the system doesn't configure the network range.

Command mode

route configuration mode

Explanation

Once a network range is added in the area, all internal routes of IP addresses reaching the network range within the area will not be broadcast to other areas individually. Only abstract information of routes within the whole network range. Introducing network range and restriction to the network range will reduce the communication between routes of different areas.

Example

Define network range 10.0.0.0 255.0.0.0 and add it into area 2.

router_config_ospf_10#network 10.0.0.0 255.0.0.0 area 2

3.1.30 redistribute

Use route configuration state command "redistribute" to set ospf to redistribute route of other routing protocol. Use command "no redistribute" to reset default setting.

Syntas

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

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

Parameter

Parameter	Description
Protocol	The source protocol to be distributed can only be one of the following: beigrp, bgp, connect, ospf, rip and static .
as_number	(Optional) Autonomous system number. There is no such a parameter for connect, rip and static.

map-tag	(Optional) Name of route-map

Default

Don't redistribute

Command mode

route configuration mode

Explanation

None

Example

Redistribute ospf 0 (redistribute ospf routes in process 0)

3.1.31 router ospf

Enable OSPF routing protocol on the router. Use "No router ospf" to prohibit routers from using ospf.

Syntas

router ospf *process-id*

no router ospf *process-id*

Parameter

Parameter	Description
process-id	The parameter used to mark OSPF router process internally. It is a non-negative integer allocated locally. It uniquely refers to a route processing process.

Default

No ospf route processing is defined.

Command mode

global configuration mode

Explanation

There can be several ospf route-processing processes in a router.

Example

An ospf route process with ID 109 is configured as the following.

router ospf 109

Relevant command

network area

3.1.32 show ip ospf

Show main information of OSPF.

Syntas

show ip ospf [*process-id*]

Parameter

Parameter	Description
process-id	（alternative）process number.

Default

none

Command mode

supervisor mode

Explanation

The command output information can be used to help users to diagnose OSPF failure. With process-id, only global configuration information of corresponding OSPF process will be shown.

Example

Show all 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#

Show field description.

Area	Description
OSPF process: 1	ID of OSPF process
Router ID is 192.168.99.81	ID of router
Distance: intra-area 110 inter-area 130 external 150	Default administrative distance adopted when the routing is generated by current router
Source Distance Access-list	Administrative distance based on access list configured
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs	Two 0SPF related TIMER values
Number of areas is 3	The number of area configured currently and parameter configured in each area
filter list on receiving…	Filter configured for imported route
filter list on sending	Filter configured for exported route
Summary-address list	route summarizing configured

3.1.33 show ip ospf border-routers

Show data item of ABR and ASBR in router.

Syntas

show ip ospf border-routers

Parameter

none

Default

none

Command mode

supervisor mode

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#

Show field description.

Field	Description
Destination	ID of target router
Adv-Rtr	Next hop to reach target router
Cost	Cost of using this route.
Type	Type of target router. It can be ABR, ASBR or both of them.
Area	Area ID from which the router is learned.

3.1.34 show ip ospf database

show OSPF link state database information

Syntas

show ip ospf database

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

OSPF link state database information can be viewed according to this command. It will help the users to diagnose the failure.

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
Show field description

Field	Description
AREA: 1	the area where it is in
Router Link States/Net Link States/Summary Net Link States	LSA type
Link ID	LSA ID.
ADV Router	Advertising router
Age	LSA age
Seq #	Sequence number
Checksum	checksum value

3.1.35 show ip ospf interface

Show OSPF interface information.

Syntas

show ip ospf interface

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

View configuration and running state of OSPF on the interface.

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#

show field description.

Field	Description
Internet Address:	IP address of the interface.
Nettype	OSPF interface network type
OSPF process is	The process number of the OSPF
AREA	the area where it is
Router ID	router ID of the process where it is
Cost	interface cost
Transmit Delay is	transmit delay
Priority	priority of the router interface
Hello interval	hello interval
Dead timer	dead time
Retransmit	retransmit interval
OSPF INTF State is	OSPF interface state
Designated Router id	Router ID of DR and IP address of the interface on DR
Backup Designated router id	Router ID of BDR and IP address of the interface on BDR
Neighbor Count is	number of neighboring routers
Adjacent neighbor count is	number of the neighbors that have established adjacency
Adjacent with neighbor	list of the neighbors that have established adjacency

3.1.36 show ip ospf neighbor

Show OSPF adjacency point information.

Syntas

show ip ospf neighbor

Parameter

none

Default

none

Command mode

supervisor mode

Explanation

The information of OSPF neighbors can be viewed according to command output. It will help the user to make sure if OSPF neighbor configuration is right and diagnose OSPF failure.

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

show field description.

Field	Description
OSPF process	number of the process of OSPF where it is
AREA	the area where it is
Neighbor	ID of the neighbor
Pri	priority of the neighbor
State	the state of the connection with the neighbor
DeadTime	time of invalidation of the neighbor
Address	IP address of the neighbor
Interface	interface used by router to reach the neighbor

3.1.37 show ip ospf virtual-link

To display parameters about and the current state of OSPF virtual links, use the show ip ospf virtual-link command.

Syntas

show ip ospf virtual-link

Parameter

This command has no arguments or keywords.

Command Mode

supervisor mode

Explanation

The information displayed by show ip ospf virtual-link is useful in debugging OSPF routing operations.

Example

The following is sample output from the show ip ospf virtual-link command:

RouterA#show ip ospf vir

Virtual Link Neighbor ID 200.200.200.200 (UP)
TransArea: 1, Cost is 1600
Hello interval is 10, Dead timer is 40 Retransmit is 5
INTF Adjacency state is IPOINT_TO_POINT

Show field Description.

Field	Description
Virtual Link Neighbor ID 200.200.200.200 (UP)	Specifies the OSPF neighbor, and if the link to that neighbor is Up or Down.
TransArea: 1	The transit area through which the virtual link is formed.
Cost is 1600	The cost of reaching the OSPF neighbor through the virtual link.
Hello interval is 10	The hello interval on this virtual-link.
Dead timer is 40	The dead interval on this virtual-link.
Retransmit is 5	The retransmit interval on this virtual link.
INTF Adjacency state is IPOINT_TO_POINT	The state of this virtual link interface.

3.1.38 summary-address

Use route configuration state command “summary-address” to establish route summary address for OSPF. Use route configuration state command “no summary-address” to delete route summary address.

Syntas

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

no summary-address address *mask*

Parameter

Parameter	Description
address	Network for summary.
Mask	Sub network Mask of summarizing route.
not-advertise	(Optional) It is used to restrain the generation of LSA from matched routes.

Default

none

Command mode

route configuration mode

Explanation

There can be groups of addresses to be summarized. The route learned from other routing protocol can also be summarized. After being summarized, all networks covered by it will not be transmitted to other route area. The cost for the summary route is the smallest one among routes summarized. This command can reduce the route

number in the routing table.

Using this command for OSPF will cause the OSPF autonomous system border router （ ASBR ） to inform an exterior route into OSPF domain for these routes distributed from exterior networks covered by the network configured. This command can only summarize routes entering into OSPF by redistributing from other routing protocol. “area range”can be used to summarize routes in OSPF domain.

Example

In the following example, summarized address 10.1.0.0 represents 10.1.1.0, 10.1.2.0, 10.1.3.0,etc. only address 10.1.0.0 is broadcasted.

summary-address 10.1.0.0 255.255.0.0

Relevant command

area range

ip ospf password

ip ospf message-digest-key

3.1.39 timers delay

Use route configuration state command “timer delay” to designate the time we could delay for SPF calculation after receiving a topology change. Use command “no timers delay” to reset the default settings.

Syntas

timers delay spf-delay

no timers delay

Parameter

Parameter	Description
spf-delay	Time delay in seconds between the topology changing and SPF starting calculation. The range is from 0 to 65535. Default value is 5 seconds. If it is 0 second, it means no time delay. Recalculate at once if there is any change.

Default

spf-delay: 5 seconds

Command mode

route configuration mode

Explanation

The less the setting time is, the more quickly it reflects the change of the network topology. But it will take more time of the processor. ˚

Example

timers spf 10

3.1.40 timers hold

Use route configuration command “timers hold” to set interval between two sequential calculations for OSPF. Use command “no timers spf” to reset the default setting. °

Syntas

timers hold *spf-holdtime*

no timers hold

Parameter

Parameter	Description
spf-holdtime	The smallest value between the two sequential calculations. The range is from 0 to 65535. The default is 10 secnds. If it is 0, it means that there is no interval between the two calculations.

Default

spf-holdtime: 10 seconds

Command mode

route configuration mode

Explanation

The less the setting time is, the more quickly to reflect the change of the network topology. But it will take more time of the processor.

Example

timers spf 20

Chapter 4 BGP Configuration Command

4.1 BGP Configuration Command

4.1.1 aggregate-address

Syntas

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	control all route
route-map	Appoint route-mapto set the performance of aggregate network
map-name	route-map name

Default

none

Command mode

BGP configuration mode

Example

The following example will creat aggregate address

router bgp 5
aggregate-address 193.0.0.0/8

Relevant command

route-map

network (BGP)

redistribute(BGP)

4.1.2 bgp always-compare-med

Syntas

bgp always-compare-med

no bgp always-compare-med

Parameter

none

Default

In Default,it dou't compare MED of route from different AS.

Command mode

BGP CONFIGURATION MODE

Example

router bgp 5
bgp always-compare-med

Relevant command

bgp bestpath med

bgp deterministic-med

4.1.3 bgp bestpath med

Syntas

bgp bestpath med confed

Parameter

Parameter	Description
confed	AS compare MED performance.

Default

none

Command mode

BGP CONFIGURATION MODE

Relevant command

bgp always-compare-med

bgp deterministic-med

4.1.4 bgp client-to-client reflection

Syntas

bgp client-to-client reflection

no bgp client-to-client reflection

Parameter

none

Command mode

BGP configuration mode

Example

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

Relevant command

neighbor route-reflector-client

bgp cluster-id

4.1.5 bgp cluster-id

Syntas

bgp cluster-id *cluster-id*

no bgp cluster-id *cluster-id*

Parameter

Parameter	Description
cluster-id	BGP route cluster-id,it can be the format of ip address,alse can be number,the largest number is 4 bytes.

Command mode

BGP configuration mode

Example

router bgp 5
neighbor 198.92.70.24 route-reflector-client
bgp cluster-id 50000

Relevant command

neighbor route-reflector-client

show ip bgp summary

4.1.6 bgp confederation identifier

use bgp confederation identifier to appoint a BGP AS id,use no bgp confederation

identifier to delete it.

Syntas

bgp confederation identifier *autonomous-system*

no bgp confederation identifier *autonomous-system*

Parameter

Parameter	Description
autonomous-system	AS number of AS

Default

none

Command mode

BGP configuration mode

Example

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

Relevant command

bgp confederation peers

show ip bgp summary

4.1.7 bgp confederation peers

Syntas

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

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

Parameter

Parameter	Description
autonomous-system	AS number

Default

none

Command mode

BGP configuration mode

Example

router bgp 1090
bgp confederation identifier 23
bgp confederation peers 1091 1092 1093

Relevant command

bgp confederation identifier

show ip bgp summary

4.1.8 bgp dampening

Syntas

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	Route-map

Default

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

Command mode

BGP configuration mode

Example

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_
```

Relevant command

set dampening

4.1.9 bgp default

Syntas

bgp default local-preference <0-4294967295>

no bgp default local-preference <0-4294967295>

Parameter

Parameter	Description
local-preference	local preference .
<0-4294967295>	default value of local priority.

Default

100

Command mode

BGP configuration mode

Example

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

4.1.10 bgp deterministic-med

Syntas

bgp deterministic-med

no bgp deterministic-med

Parameter

none

Default

none

Command mode

BGP configuration mode

Relevant command

bgp bestpath med

bgp always-compare-med

4.1.11 bgp redistribute-internal

Syntas

bgp redistribute-internal

no bgp redistribute-internal

Parameter

none

Default

The route get from IBGP don't be added to IGP.

Command mode

BGP configuration mode

Example

```
router ospf 3
 redistribute bgp 2
!
router bgp 2
 bgp redistribute-internal
!
```

Relevant command

none

4.1.12 clear ip bgp

Syntas

clear ip bgp {***** | *ip-address* | *as-number* | *peer-group name* | **aggregates | networks | redistribute**} **[soft [in | out]]**

Parameter

Parameter	Description
*	Reset all current BGP session
ip-address	Reset appointed BGP neighbor
AS	Reset appointed AS neighbor
peer-group-name	Reset appointed BGP peer-group
aggregates	Reset all aggregate route

networks	Reset all static network route
redistribute	Reset all **redistribute**
soft	soft-reconfiguration
in | out	soft-reconfiguration of in/out route

Command mode

Supervisor mode

Example

clear ip bgp *

Relevant command

neighbor soft-reconfiguration

show ip bgp

4.1.13 debug chat

Syntas

debug chat

no debug chat

Parameter

none

Command mode

Supervisor mode

Example

```
Router#debug chat
Router#SCRIPT: start script default_dialer_script...
SCRIPT:Sending string: ATZ
SCRIPT:Expecting string: OK
SCRIPT: Receive string:
41 54 0D 0D 0A 4F 4B 0D 0A AT...OK..
SCRIPT:Completed match for expect:OK
SCRIPT:Sending string: ATDT 2
SCRIPT:Expecting string: CONNECT
SCRIPT: Receive string:
43 4F 4E 4E 45 43 54 CONNECT
SCRIPT: Completed match for expect:CONNECT
SCRIPT:Chat script finished
```

Relevant command

chat-script

4.1.14 debug dialer

Syntas

debug dialer

no debug dialer

Parameter

none

Command mode

Supervisor mode

Example

Router#debug dialer
DIALER Serial 1/0: Dialing cause ip(PERMIT).
DIALER Serial 1/0: Dialing using Modem script: default_dialer_script & System script: none
DIALER Serial 1/0: Attempting to dial 2
DIALER Serial 1/0: process started
DIALER Serial 1/0: Chat script default_dialer_script (dialer) started.....
DIALER Serial 1/0: Connection established
DIALER Serial 1/0: Modem script finished successfully

4.1.15 debug ip bgp

Syntas

debug ip bgp { **all | fsm | keepalive | open | update** }

no debug ip bgp { **all | fsm | keepalive | open | update** }

Parameter

Parameter	Description
all	enable BGP all track function
dampening	enable BGP route dampening track function
event	enable BGP event track function
fsm	enable BGP fsm track function
keepalive	enable BGP Keepalive packet track function
notify	enable BGP Notify packet track function
open	enable BGP Open packet track function
update	enable BGP Update packet track function

Default

All track function is enabled.

Command mode

Supervisor mode

Example

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

4.1.16 distance

Syntas

distance bgp *external-distance internal-distance local-distance*

no distance bgp

Parameter

Parameter	Description
external-distance	BGP external route distance ,Default is 200.
internal-distance	BGP internal route distance ,Default is 200.
local-distance	BGP local route distance ,Default is 200.

Default

external-distance: 20

internal-distance: 200

local-distance: 200

Command mode

BGP configuration mode

Example

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

Relevant command

set metric

set tag

4.1.17 filter

Syntas

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
access-list-name	access-list name
prefix-list-name	prefix-list name

Default

none

Command mode

BGP configuration mode

Example

router bgp 109

filter * in prefix-list prefix-guize gateway gateway-guize

Relevant command

neighbor distribute-list

neighbor filter-list

neighbor route-map

4.1.18 neighbor default-originate

Syntas

neighbor {*ip-address* | *peer-group-name*} **default-originate**

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

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name

Default

don't sent Default route to neighbor

Command mode

BGP configuration mode

Example

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

Relevant command

neighbor ebgp-multihop

4.1.19 neighbor description

Syntas

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

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

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name

Default

none

Command mode

BGP configuration mode

Example

router bgp 109

network 160.89.0.0
neighbor 160.89.2.3 description peer with abc.com

4.1.20 neighbor distribute-list

Syntas

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	IPaddress of neighbor
peer-group-name	BGP peer group name
access-list name	access-list name

Default

none

Command mode

BGP configuration mode

Example

router bgp 109
network 131.108.0.0
neighbor 120.23.4.1 distribute-list beijing in

Relevant command

ip aspath-list

neighbor filter-list

ip prefix-list

neighbor prefix-list

4.1.21 neighbor ebgp-multihop

Syntas

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

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

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name
ttl	1~255

Command mode

BGP configuration mode

Example

router bgp 109:
neighbor 131.108.1.1 ebgp-multihop

Relevant command

neighbor default-originate

4.1.22 neighbor filter-list

Syntas

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	IPaddress of neighbor
peer-group-name	BGP peer group name

Default

none

Command mode

BGP configuration mode

Example

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

Relevant command

ip aspath-list

neighbor distribute-list

ip prefix-list

neighbor prefix-list

4.1.23 neighbor maximum-prefix

Syntas

neighbor {*ip-address* | *peer-group-name*} **maximum-prefix** *maximum*

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

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name

Default

Don't limit

Command mode

BGP configuration mode

Example

router bgp 109
network 131.108.0.0
neighbor 129.140.6.6 maximum-prefix 1000

Relevant command

clear ip bgp

4.1.24 neighbor next-hop-self

Syntas

neighbor {*ip-address* | *peer-group-name*} **next-hop-self**

no neighbor {*ip-address* | *peer-group-name*} **next-hop-self**

Parameter

Parameter	Description
ip-address	IPaddress of neighbor

peer-group-name	BGP peer group name

Default

disable

Command mode

BGP configuration mode

Example

router bgp 109
neighbor 131.108.1.1 next-hop-self

Relevant command

set ip next-hop

4.1.25 neighbor prefix-list

Syntas

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	IPaddress of neighbor
peer-group-name	BGP peer group name
prefix-listname	Prefix list name

Default

none

Command mode

BGP configuration mode

Example

router bgp 109
network 131.108.0.0
neighbor 120.23.4.1 prefix-list abc in

router bgp 109
network 131.108.0.0
neighbor 120.23.4.1 prefix-list CustomerA in

Relevant command

ip prefix-list

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

neighbor filter-list

4.1.26 neighbor remote-as

Syntas

neighbor {*ip-address* | *peer-group-name*} **remote-as** *number*

no neighbor {*ip-address* | *peer-group-name*} **remote-as** *number*

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name

Default

none

Command mode

BGP configuration mode

Example

```
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
```

Relevant command

neighbor peer-group (creating)

4.1.27 neighbor route-map

Syntas

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	IPaddress of neighbor
peer-group-name	BGP peer group name
map-name	Routr map name

Default

none

Command mode

BGP configuration mode

Example

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

Relevant command

neighbor peer-group (creating)

route-map

4.1.28 neighbor route-reflector-client

Syntas

neighbor *ip-address* **route-reflector-client**

no neighbor *ip-address* **route-reflector-client**

Parameter

Parameter	Description
ip-address	ip address of BGP neighbor

Command mode

BGP configuration mode

Example

router bgp 5
neighbor 198.92.70.24 route-reflector-client

Relevant command

bgp cluster-id

show ip bgp

4.1.29 neighbor route-refresh

Syntas

neighbor *ip-address* **route-refresh**

no neighbor *ip-address* **route-refresh**

Parameter

Parameter	Description
ip-address	ip address of BGP neighbor

Command mode

BGP configuration mode

Example

router bgp 5
neighbor 198.92.70.24 route-refresh

Relevant command

show ip bgp neighbors

4.1.30 neighbor send-community

Syntas

neighbor {*ip-address* | *peer-group-name*} **send-community**

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

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name

Command mode

BGP configuration mode

Example

router bgp 109

no neighbor 198.92.70.23 send-community

Relevant command

match community-list

neighbor peer-group (creating)

set community

set community-additive

4.1.31 neighbor shutdown

Syntas

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

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

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name

Default

none

Command mode

BGP configuration mode

Relevant command

show ip bgp summary

show ip bgp neighbors

4.1.32 neighbor soft-reconfiguration

Syntas

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

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

Parameter

Parameter	Description
ip-address	IPaddress of neighbor.
peer-group-name	BGP peer group name.

Command mode

BGP configuration mode

Example

router bgp 100
neighbor 131.108.1.1 remote-as 200
neighbor 131.108.1.1 soft-reconfiguration inbound

Relevant command

clear ip bgp

neighbor peer-group (creating)

4.1.33 neighbor timers

Syntas

neighbor {*ip-address* | *peer-group-name*} **timers** *keepalive holdtime*

no neighbor {*ip-address* | *peer-group-name*} **timers** *keepalive holdtime*

Parameter

Parameter	Description
ip-address	IPaddress of neighbor
peer-group-name	BGP peer group name

Default

keepalive 60 s

holdtime 180 s

Command mode

BGP configuration mode

Example

router bgp 109
neighbor 192.98.47.10 timers 70 210

4.1.34 neighbor update-source

use **neighbor update-source allow** BGP session to set TCP connection with appionted interface address.

Syntas

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 BGP session neighbor
peer-group-name	BGP peer group name
Interface	Interface name

Default

Use local interface IP address accounted by route to set TCP connection.

Command mode

BGP configuration mode

Example

The following example display the loopback interface IP used by appointed neighbor

router bgp 110
network 160.89.0.0
neighbor 160.89.2.3 remote-as 110
neighbor 160.89.2.3 update-source Loopback0

Relevant command

neighbor peer-group (creating)

4.1.35 neighbor weight

use n**eighbor weight** command to set BGP priority; use "**no neighbor weight"to** delete the priority.

Syntas

neighbor {*ip-address* | *peer-group-name*} **weigh**t *weight*

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

Parameter

Parameter	Description
ip-address	neighbor ip address
peer-group-name	BGP peer group name
Weight	Priority,the range is 0~65535

Default

Default value of router priority knowed by BGP peer group is 0, Default value of router priority produced d by local router is 32768

Command mode

BGP configuration mode

Example

The following example set the router priority knowed by 151.23.12.1 is 50

router bgp 109 neighbor 151.23.12.1 weight 50

Relevant command

neighbor peer-group (creating)

set weight

4.1.36 network (BGP)

use command "**network"can add network route to** BGP,use "**no network"to delete the configuration.**

Syntas

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
route-map	Appointed route-map
map-name	route-map name
backdoor	**backdoor network**

Default

In Default,don't add and network prefix to BGP.

Command mode

BGP configuration mode

Example

The following example add route 131.108.0.0/8 to BGP process:

router bgp 120
network 131.108.0.0/8

Relevant command

redistribute (BGP)

aggregate-address

4.1.37 redistribute(BGP)

use "redistribute"command add route of a route process to BGP.use "**no redistribute"forbid it.**

Syntas

redistribute *protocol [process-id]* ***[*route-map** *map-name]*

no redistribute *protocol [process-id]* ***[*route-map** *map-name]*

Parameter

Parameter	Description
protocol	Type of route protocol
process-id	Process number of route protocol
route-map	Use route-map to set route performance
map-name	route-map name

Default

forbid redistribute

Command mode

BGP configuration mode

Example

router bgp 109
redistribute ospf 23

Relevant command

route-map

4.1.38 router bgp

use command"router bgp" to enable BGP or enter BGP configuration mode.use "no router bgp"to disable BGP.

Syntas

router bgp *as-number*

no router bgp *as-number*

Parameter

Parameter	Description
as-number	AS number

Default

BGP is disable

Command mode

global configuration mode

Explanation

.use “no router bgp” can delete BGP process and other relevant BGPconfiguration,such as neighbors, route in the route-map will be deleted,too.

You can use command “show running, show ip bgp summary” to see the configuraion information after configure BGP.

Example

The following example enable BGP and appoint the AS mumber to 200

router bgp 200

Relevant command

neighbor remote-as

4.1.39 show ip bgp

The command “**show ip bgp**”is used to display the items of BGP router-map.

Syntas

show ip bgp [*network*]

Parameter

Parameter	Description
network	display appointed router information.

Command mode

Supervisor mode

Explanation

If don’t appoint network,it will display all BGP router-map.

If appoint network,it will display BGP router-map information of the network

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
```

Relevant command

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

4.1.40 show ip bgp community

The command “s**how ip bgp community”**is used to display the statistic information of BGP group performance.

Syntas

show ip bgp community

Parameter

none

Command mode

Supervisor mode

Explanation

The command is used to display the statistic information of BGP group performance.

Relevant command

show ip bgp

show ip bgp neighbors

show ip bgp paths

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

4.1.41 show ip bgp neighbors

use "**show ip bgp neighbors**"to display the information of BGP neighbor.

Syntas

show ip bgp neighbors [*ip-address*] [**received-routes | routes | advertised-routes**]

Parameter

Parameter	Description
ip-ddress	ip-ddress of neighbor
received-routes	the routes received from all appointed neighbors.(accepted and rejected)
routes	the routes received from all appointed neighbors.(received and accepted)
advertised-routes	all routes announced to all neighbors by router.

Command mode

Supervisor mode

Explanation

Use the command can display the information and current state of BGP neighbor,and some configuration information.

Relevant command

show ip bgp

show ip bgp community

show ip bgp paths

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

4.1.42 show ip bgp paths

use "**show ip bgp paths**"to display the statistic information of BGP path

Syntas

show ip bgp paths

Parameter

none

Command mode

Supervisor mode

Explanation

The command is used to display the statistic information of BGP path

Relevant command

show ip bgp

show ip bgp community

show ip bgp neighbors

show ip bgp prefix-list

show ip bgp regexp 29

show ip bgp summary

4.1.43 show ip bgp prefix-list

use "**show ip bgp prefix-list**"to display the router information matched with prefix-list:

Syntas

show ip bgp prefix-list {*prefix-list name*}

Parameter

Parameter	Description
prefix-list name	Prefix-list name

Command mode

Supervisor mode

Explanation

The command can filter the information displayed by command"show ip bgp"by appointting prefix-list.the route matched with prefix-list can be displayed.

Relevant command

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

4.1.44 show ip bgp regexp

use "**show ip bgp regexg**"to display the router information matched with regular-expression:

Syntas

show ip bgp regexp *regular-expression*

Parameter

Parameter	Description
regular-expression	regular-expression of AS path

Command mode

Supervisor mode

Explanation

The command can filter the information displayed by command"show ip bgp"by appointting regular-expression about as-path.the route matched with regular-expression can be displayed.

Relevant command

show ip bgp

show ip bgp community

show ip bgp neighbors

show ip bgp prefix-list

show ip bgp regexp

show ip bgp summary

4.1.45 show ip bgp summary

use "show ip bgp summary"to see all information of BGP connecter.

Syntas

show ip bgp summary

Parameter

none

Command mode

Supervisor mode

Explanation

You can use command “show ip bgp summary” to see some global configuraion about BGP protocol.such as global distance configuraion, IGP synchronization configuraion,ID number of AS confederation,AS confederation member, local AS number, local router-id, information of all nerghbors.

Example

The following example display some information provided by “show ip bgp summary” :

```
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
```

Relevant command

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

4.1.46 synchronization

use “**synchronization**”to enable the synchronization between BGP and IGP.

use “**no synchronization**”to disable it.

Syntas

synchronization

no synchronization

Parameter

none

Default

Synchronization is enabled

Command mode

BGP configuration mode

Explanation

Normally, you do not expect to redistribute all routes to your IGP. A common design is to redistribute one or two routes, and make them the external routes in IGRP, or force the BGP session to generate an AS default route. When BGP redistribute routes to IGP, only the routes acquired through EBGP will be redistributed. Under most situations, you do not want to allocate your IGP to BGP, just use configuration command “network “ to list the network in AS, then your network will be broadcasted. The networks listed in this form are called local network, and enables BGP to have attribute “Origin” of IGP. They must appear in the main IP routing table, and are effective; for example, they are direct-connected routes, static routes or routes known through IGP. BGP routing process periodically scans the main IP routing table to check the existence of a local network, and accordingly updates BGP routing table if you really want BGP to execute redistribution, you must be very careful, because these may be the routes in IGP that are injected by other routers through BGP, this may bring force a kind of situation that BGP potentially injects the information into IGP, and then send back the information to BGP. Vice versa. In Default,IGP function is enabled.

Example

router bgp 120
no synchronization

Relevant command

router bgp

4.1.47 table-map

set Route-map when BGP add route to route-map to modify some performance .Use no table-mapto delete the configuration.

Syntas

table-map [*name*]

no table-map [*name*]

Parameter

Parameter	Description
name	Route-map name

Default

none

Command mode

BGP configuration mode

Explanation

Setting table-map can filter route or modify performance when BGP add route to route list.

Example

none

Relevant command

none

4.1.48 timers

modify Default timers of BGP neighbor,use no timers to resume the default value.

Syntas

timers bgp [*keepalive*|*holdtime*]

no timers bgp [*keepalive*|*holdtime*]

Parameter

Parameter	Description
keepalive	Keepalive interval of BGP neighbor
holdtime	hodetime interval of BGP neighbor

Default

Keepalive: 60 seconds

Holdtime: 180 seconds

Command mode

BGP configuration mode

Example

The following configuration will set the default clock to 10 or 40.

router bgp 100
timers bgp 10 40

Relevant command

neighbor timers

4.1.49 ip as-path access-list

Establish as-path list regulation to match BGP route. Use command “no” to delete as-path list configured.

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 as-path-list
deny |	character of as-path-list regulation
permit	character of as-path-list regulation
regexp	as-path property regular expression

Default

Default refuses all as-path expression except for those with clearly stated permit.

Command mode

global configuration mode

Explanation

AS path list is used to filter BGP routes according to routes’s AS_PATH attribute. AS_PATH attribute of BGP routes are series of numbers (indicating autonomous system number). They are usually expressed in character strings. The number on the most right side is the number of autonomous system originating this route. Then there are numbers of autonomous systems passed through. For example, 22 23 98, means that this route originated by autonomous system 98, then passes through autonomous systems 23 and 22, and reaches this autonomous system.

AS path list is indicted with names. The total number of AS PATH list in the system is only constrained by system resource. Several matching rules can be configured under one as-path list. The process to apply the as-path list is to check in turn according to configuration orders. Once a rule is matched successfully, stop the following check and return the attribute of this rule (deny/permit). If all rules cannot be matched successfully, return deny. Every rule is organized according to configuration orders. The “as path” expression is expressed in regular expressionwith the following commonly used special characters of expression:

Character	Symbol	Meaning
Period	.	To match any single character including blank character.
Star	*	Matching 0 or more series in the mode.
Plus	+	Matching 1 or more series in the mode.
Question mark	!	Matching 0 or 1 time appearance in the mode (the same to “?”).
Adding symbol	^	Matching the beginning of entering character strings.
Symbol $	$	Matching the end of entering character strings.

Underline	_	Matching comma, left big bracket, right big bracket, left bracket, right bracket, beginning of entering character strings, ending of entering character strings, or a space.
Brackets	[Range]	Means the range of single character mode.
Slash	-	Separate a range.

Use regular expression with right expression of path attribute will establish powerful as path list. The following are some examples:

.* Means any as path attributes.

^$ Means empty path attribute.

^22$ Means attribute of path only containing autonomous system 22.

^22_ Means path attribute beginning with 22, such as 22, 22 33.

_22$ Means path attribute ending with 22, such as 22, 34 22，99 45 22.

_22_ Means path attribute containing 22, such as 23 22 45，442 22 23 44.

The as-path list can be used together with command “match as-path” in route-map and command “filter-list” of BGP.

Example

The as-path list hell defined in the following example will only permit path attribute beginning with 23 or containing 22:

```
ip as-path access-list hell permit ^23
ip as-path access-list hell permit _22_
And:
ip as-path access-list guangzhou deny ^300
ip as-path access-list guangzhou deny _300_
ip as-path access-list guangzhou permit .*
```

All as-path attributes beginning with 300 of containing 300 are refused. Others are passed. The result will be different if the order of defining is different. In the following example, all as-path attributes will pass.

```
ip as-path access-list guangzhou permit .*
ip as-path access-list guangzhou deny ^300
ip as-path access-list guangzhou deny _300_
```

Relevant command

match as-path

neighbor filter-list

4.1.50 show ip aspath-list

Show as path list configured in the system. Designating names can show designated as path list information.

Syntas

show ip as-path-list [*name*]

Parameter

Parameter	Description
name	name of as path-list.

Default

none

Command mode

Supervisor mode

Explanation

If name is not designated, all information of as path list configured in the system.

Example

In the following example, all as path lists will be showed:

show ip as-path-list

Relevant command

ip as-path access-list

4.1.51 ip community-list

Create community list rule used for BGP route. Use command “no” to delete configured community list rules.

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 Community-list.
deny	Character of Community-list rules.
permit	Character of Community-list rules.
1-4294967295	Community value. Community is a 32-digit symbol whole number.
aa:nn	New form of Community. The aa means high 16-digit value and nn means low 16-digit value.
no-advertise	Not advertiseto any neighbor (well-known community number)
local- AS	Not advertise outside of autonomous system, including EBGP neighborin the same autonomous system confederation. (well-known community number)
no-export	Not advertise outside ofthe same autonomous system or outside the autonomous system confederation (well-known community number).

Default

Default is to refuse all communities excluding those with clear explanation to permit.

Command mode

global configuration mode

Explanation

The “community-list” is also called community list used to filter or set community attribute of BGP routes. Community attribute is the number of a community or a group of communities. A community number is a 4-byte value. he following range are reserved: 0x00000000 - 0x0000FFFF and 0xFFFF0000 - 0xFFFFFFFF. These community numbers are recognized with global meanings. Commonly used well-know community are:

NO_EXPORT（0xFFFFFF01）: After receiving routeswith this community number, it should not be advertised to peersoutside of the autonomous system or autonomous system confederation (if this router belongs to an autonomous system confederation).

NO_ADVERTISE (0xFFFFFF02): After receiving routes with this community, it should not be advertised to any peer

N NO_EXPORT_SUBCONFED（0xFFFFFF03）: It is always called LOCAL_AS. After receiving routes with this community, it should not be advertised to any peeroutside own autonomous system.

Community list is indicated with names in the system. Total number of communities configurable is only constrained to system resource. Several matching rules can be configured under the same community list. The process to apply the community list is to check in turn according to configuration orders. Once a rule is matched successfully, stop the following check and return to the attribute of this rule (deny/permit). If all rules cannot be matched successfully, return deny. The order to check every rule is organized according to configuration orders.

A community-list rule has three elements: name, rule attribute （deny/permit）, community sequences number. Community listis a collection of a group of community. To check whether a given community matches a rule is to check whether all community numbers of this community is in the community series of given rule. If yes, it is recognized matched successfully. Return the attribute of the rule. If not, it is recognized as failed. Continue to make the matching of next rule.

The community list can be used together with command “match community” of route-map.

Example

The “community-list yall” defined in the following example refuses communities with value of 5 or 10 and permits communities with value of 15 or 20.

```
ip community-list yall deny 5 10
ip community-list yall permit 15 20
```

Relevant command

match community-list

4.1.52 show ip community-list

Show community list configured in the system. Designate name to show information of

designated community list.

Syntas

show ip community-list *name*

Parameter

Parameter	Description
name	Name of community list

Default

none

Command mode

Supervisor mode

Explanation

If No nameprovided. display information of all community list configured in the system.

Example

In the following example, all community lists in the system will be diplayed:

Show ip community-list

Relevant command

ip community-list

Chapter 5 RSVP Protocol Command

5.1.1 debug ip rsvp local

Use command "**debug ip rsvp local**" to show receive/send state of RSVP information. Use "no" form of the command to prohibit the output of this information.

Syntas

[**no**] **debug ip rsvp local** [**call** | **upcall**] [*detail*]

Parameter

Parameter	Description
call | upcall	Show local task or RSVP request sent /received by the users.

Default

none

Command mode

Supervisor mode

Explanation

Use this command to track interaction of local RSVP. If the parameter is "call", local task or RSVP information received by the user will be showed. If the parameter is "upcall", local task or RSVP request will be showed. If the parameter is not "call" or "upcall", all information will be showed. If there is a parameter "detail", detailed information of RSVP interaction will be showed.

Example

The following the output sample when command "debug ip rsvp local" is used for call.

router# debug ip rsvp local call
RSVP:RSVP trace call on
RSVP: <Session 1> session from api // local RSVP api create session

Command "debug ip rsvp locall call" tracks the state of RSVP local session and shows session identifier and execution action.

the following is the output sample when command "debug ip rsvp packet detail" is used for call.

router# debug ip rsvp call detail
RSVP:RSVP trace call detail on
RSVP: session from api // local RSVP api crease session
Session ID :2
Session Addr:33.33.33.33
Session Port:4554
Session Pid :17

Command “debug ip rsvp locall call” tracks the state of RSVP local session and shows session identifier and execution action. Explains the specific content of execution action. The explanation is in accordance with RAPI form in RSVP protocol.

The following is the output sample when command “debug ip rsvp local” is used for “upcall”:

ROUTER# debug ip rsvp upcall
RSVP:RSVP trace upcall on
RSVP: <Session 1> confirm upcall

Relevant command

debug ip rsvp packet

5.1.2 debug ip rsvp packet

In order to show receiving/sending state of RSVP information in router interface, command “debug ip rsvp packet” can be used. Use the “no” form to prohibit the output of the information.

Syntas

[**no**] **debug ip rsvp packet** [*detail*]

Parameter

Parameter	Description
detail	Whether to show detailed content

Default

none

Command mode

Supervisor mode

Explanation

Use this command to track receiving/sending state of RCVP package. If there is detailed parameter, detailed information of RSVP package will be showed.

Example

The following is an output sample when command “debug ip rsvp packet” is used for f0/0:

ROUTER# debug ip rsvp packet
RSVP:RSVP trace on
RSVP: Receive RSVP PATH packet for 192.168.20.44 from local application
RSVP: Send RSVP PATH packet for 192.168.20.44 to 192.168.20.44

Command “debug ip rsvp packet” outputs receiving/sending package tracking RSVP protocol Implementation and shows the type, source address and destination address of the package.

the following is an output sample when command “debug ip rsvp packet detail” doesn’t have parameter:

```
ROUTER# debug ip rsvp packet detail
RSVP:RSVP trace detail on
RSVP: Send RSVP PATH packet for 192.168.20.44 to 192.168.20.44 //sent RSVP PATH massege
command header: version:1 flags:0000 type:PATH cksum:5073 ttl:128 reserved:0 length:180 // RSVP top
SESSION       type 1  length  12: C0A8142C : 0601014D
RSVP_HOP      type 1  length  12: C0A81463 : 00000001
TIME_VALUES   type 1  length   8: 00007530
SENDER_TEMPLATE   type 1  length  12: C0A81463 : 0000014D
SENDER_TSPEC       type 2  length 36
        version: 0  length: 7
        service header  id:1  length:6
        parameter header  id:127  flags:0  length:5
    average rate(Bps)         :125
    burst depth(byte)         :1000
    peak rate(Bps)      :125
    min unit(bype)              :0
    max unit(bype)      :0
ADSPEC       type 2  length 92
version: 0  length: 21
        general parameters  break bit:0  length:8
    IS hop cnt                        :1
    minimum path bandwidth(Bps)             :10000000
    minimum path latency(byte)                      :0
    composed MTU(byte)          :1500
    guaranteed service  break bit:0  length:8
    path delay(ms)                      :192000
    path jitter(ms)                   :12000
    path delay since shaping(ms)                    :192000
    path jitter since shaping(ms)             :12000
    Control Load service  break bit:0  length:2
minimum path bandwidth(Bps)               :1000
```

Command “deb ip rsvp packet detail” tracks the receiving/sending package realized by RAVP and explain the content of the whole packge.

Relevant command

debug ip rsvp local

5.1.3 ip rsvp bandwidth

Use configuration command “ip rsvp bandwidth” to enable RSVP protocol on a interface. Use the “no” form of the command to prohibit running RSVP protocol on the interface.

Syntas

ip rsvp bandwidth [*interface-kbps*] [*single-flow-kbps*]

no ip rsvp bandwidth [interface-kbps] [single-flow-kbps]

Parameter

Parameter	Description
interface-kbps	Upper limit of reserved resource can applied by the whole interface
single-flow-kbps	Upper limit of reserved resource can applied by a single data flow

Default

Prohibit RSVP on this interface.

Command mode

interface configuration mode

Explanation

This command can make an interface have RSVP function. Parameter “single-flow-kbps” sets upper limit of reserved resource can be applied by a single data flow. Command “interface-kbps” can set upper limit of reserved resource can be applied by the whole interface. When there is no parameter, default limit is 75% of interface general resource.

Example

In the following example, configure RSVP total reserve bandwidth as 1M, single flow bandwidth as 200K.

```
interface f0/0
ip rsvp bandwidth 1000 200
```

Relevant command

ip rsvp neighbor

5.1.4 ip rsvp local reservation

To ensure that users can have RSVP interaction with other hosts, there must be the ability to send RSVP RESV information to the other side. Command “ip rsvp local reservation” can meet this requirement. What needs special attention is that “ip rsvp local session” should be used to create RSVP session before using “ip rsvp local reservation” to send RSVP RESV information. Use the “no” form of the command to disable the configuration.

Syntas

ip rsvp local reservation *session-id sender-ip-address sender-sport* [**guarantee** | **load**] [**bandwidth**] [*burst-size*]

no ip rsvp local reservation *session-id*

Parameter

Parameter	Description
session-id	identifier of session
sender-ip-address	Address of the host of the sender in RSVP flow
sender-sport	Port of the host of the sender in RSVP flow
guarantee | load	RSVP reversed type
bandwidth	Average rate of reserved resource
burst-size	size of the largest burst data

Default

user has not configured this command

Command mode

global configuration mode

Explanation

Users use this command to send “resv” information towards outside. Use the “no” form to send “resv tear” information. Under default state, reserved type is “Control Load”, the average rate of reserved resource and the size of the largest burst data are both 1K.

Example

The following example shows how to use this command.
ip rsvp local reservation 1 1.0.0.2 3000 load 100 60
ip rsvp local reservation 2 2.0.3.2 4000 guarantee 150 65

Relevant command

ip rsvp local session

ip rsvp local sender

5.1.5 ip rsvp local sender

In order to ensure that users can have RSVP interaction with other hosts initiatively, RSVP PATH information must be sent to the other side. Command “ip rsvp local sender” can meet this requirement. What needing special attention is that “ip rsvp local session” should be used to create RSVP session before using “ip rsvp local sender” to send RSVP PATH information. Use the “no” form of the command to disable the configuration.

Syntas

ip rsvp local sender *session-id sender-ip-address sender-sport* [**bandwidth**] [*burst-size*]

no ip rsvp local sender *session-id*

Parameter

Parameter	Description
session-id	Identifier of session
sender-ip-address	Host address of sender in RSVP flow
sender-sport	Host port of sender in RSVP flow
bandwidth	Average rate of reserved resource
burst-size	Size of the largest burst data

Default

users have not configured this command

Command mode

global configuration mode

Explanation

Users use this command to send “path” information towards outside. Use the “no” form to send “path tear” information. Under default state, reserved type is “Control Load”, the average rate of reserved resource and the size of the largest burst data are both 1K.

Example

The following example shows how to use this command.

ip rsvp local sender 1 1.0.0.2 3000 100 60
ip rsvp local sender 2 2.0.3.2 4000 150 65

Relevant command

ip rsvp local session

ip rsvp local reservation

5.1.6 ip rsvp local session

Users can use this command “ip rsvp local session” to create RSVP session. Use “no” form of the command to disable the configuration.

Syntas

ip rsvp local session *session-ip-address session-dport* {**tcp** | **udp**}

no ip rsvp local session *session-id*

Parameter

Parameter	Description
session-id	Identifier of session
session-ip-address	Destination host address

session-dport	Destination host port number
tcp | **udp**	Protocol number of data flow to be reserved

Default

Users have not configured this command

Command mode

global configuration mode

Explanation

Use this command to configure a new RSVP session. This session can be used by other commands

Example

The following example shows hoe to use the commands.

ip rsvp local session 1.0.0.3 3000 UDP
ip rsvp local session 3.4.4.3 5600 TCP

Relevant command

ip rsvp local sender

ip rsvp local reservation

5.1.7 ip rsvp neighbor

In order to receive RSVP request from other hosts on a port, command “ip rsvp neighbor” can be used. Use the “no” form to disable the configuration.

Syntas

ip rsvp neighbor *access-list-name*

no ip rsvp neighbor *access-list-name*

Parameter

Parameter	Description
access-list-name	name of access list

Default

All RSVP packet received on this interface.

Command mode

interface configuration mode

Explanation

It will let the request of some RSVP hosts be accepted and the request of other hosts

will be refused. This command is used to control the running state of RAVP. Under this command, only the request of the host fitting the access list. Otherwise it will be refused.

Example

The following example allows satisfying RSVP request of RAVP host required by access-list ABC on port f0/0.

interface f0/0

ip rsvp neighbor ABC

Relevant command

ip rsvp bandwidth

5.1.8 ip rsvp precedence

In order to let users improve the effect of RSVP reservation a little further, users can use this command to configure precedence value of data flow.

Syntas

ip rsvp precedence {**conform**|exceed} *precedence-value*

no ip rsvp precedence {conform|exceed}

Parameter

Parameter	Description
conform|exceed	Use “conform” to set TOS setting when data flow is lower than reserved value. Use “exceed” to set TOS setting when data flow exceeds reserved value.
precedence-value	value of precedence

Default

users have not configured this command.

Command mode

interface configuration mode

Explanation

Use this command to set precedence option of reserved flow. Use “conform” to set precedence setting when data flow is lower than reserved value. Use “exceed” to set precedence setting when data flow exceeds reserved value.

Example

The following example shows how to use this command.

ip rsvp precedence conform 6
ip rsvp precedence exceed 5

Relevant command

ip rsvp tos

5.1.9 ip rsvp tos

In order to let users improve the effect of RSVP reservation a little further, users can use this command to configure TOS value of data flow.

Syntas

ip rsvp tos {**conform**|**exceed**} *tos-value*

no ip rsvp tos {**conform**|**exceed**}

Parameter

Parameter	Description
conform|exceed	Use “conform” to set TOS setting when data flow is lower than reserved value. Use “exceed” to set TOS setting when data flow exceeds reserved value.
tos-value	Value of TOS

Default

Users have not configured this command.

Command mode

interface configuration mode

Explanation

This command can be used to set TOS option of reserved flow. Use “conform” to set TOS setting when data flow is lower than reserved value. Use “exceed” to set TOS setting when data flow exceeds reserved value.

Example

The following example shows how to use this command.

```
ip rsvp tos conform 6
ip rsvp tos exceed 5
```

Relevant command

ip rsvp precedence

5.1.10 show ip rsvp installed

Use command “**show ip rsvp installed**” to show reserved information on RSVP port.

Syntas

show ip rsvp installed [*type-number*]

Parameter

Parameter	Description
type-number	number of router port

Default

none

Command mode

Supervisor mode

Explanation

Use command "**show ip rsvp installed**" to show specific situation of RSVP reserved flow on router port. If no parameter is provided, specific situation of reserved flow on all ports with RSVP function will be showed.

Example

The following is an output sample when command "show ip rsvp installed" is used on f0/0:

```
ROUTER# show ip rsvp installed f0/0
f0/0 :
allocate  SessAddr      SessPort  SrcAddr      SrcPort   ProtId
20K     12.3.3.45          1000     30.2.3.2      2000     TCP
```

The following is an output sample when command "show ip rsvp interface" is used without any parameter:

```
ROUTER# show ip rsvp installed
      f0/0 :
allocate  SessAddr      SessPort  SrcAddr      SrcPort   ProtId
20K     12.3.3.45          1000     30.2.3.2      2000     TCP
      api :
allocate  SessAddr      SessPort  SrcAddr      SrcPort   ProtId
10K     12.43.3.45         1030     40.2.3.2      2040     UDP
```

Relevant command

show ip rsvp interface

show ip rsvp sender

show ip rsvp reservation

show ip rsvp neighbor

show ip rsvp local

show ip rsvp tos

show ip rsvp precedence

5.1.11 show ip rsvp interface

Use command “**show ip rsvp interface**” to show reserved information n RSVP port.

Syntas

show ip rsvp interface [*type-number*]

Parameter

Parameter	Description
type-number	number of router port

Default

RSVP is prohibited on this port.

Command mode

Supervisor mode

Explanation

Use command “**show ip rsvp interface**” to show situation of RSVP reservation on router port. If no parameter is provided, situation of reservation on all ports with RSVP function will be showed.

Example

The following is an output sample when command “show ip rsvp interface” is used on f0/0:

```
ROUTER# show ip rsvp interface f0/0
interface   allocate   i/f max   flow max
f0/0        30K        7500K     7500K
```

The following is an output sample when command “show ip rsvp interface” is used without any parameter

```
ROUTER# show ip rsvp interface
      interface   allocate   i/f max   flow max
f0/0        30K        7500K     7500K
api         20K        -         -
```

Relevant command

show ip rsvp installed

show ip rsvp sender

show ip rsvp reservation

show ip rsvp neighbor

show ip rsvp local

show ip rsvp tos

show ip rsvp precedence

5.1.12 show ip rsvp local

Use command "**show ip rsvp local**" to show reservation information in router database.

Syntas

show ip rsvp local [*session-id*]

Parameter

Parameter	Description
session-id	Identifier of RSVP local session

Default

none

Command mode

Supervisor mode

Explanation

Use command "**show ip rsvp local**" to show information of local session in router database. If no parameter is provided, all local session information of this router will be showed.

Example

The following is an output sample when command "show ip rsvp sender" is used on 192.14.3.2:

The following is an output sample when command "show ip rsvp sender" is used for session identification of 20:

```
ROUTER# show ip rsvp local 20
    Sid SessAddr       SrcAddr        Pro  DPort  Sport  Type   BPS  Bytes User
    20  23.44.33.44    33.33.44.33    TCP 2200    3333  GU    2     2   SYS
```

The following is an output sample when command "show ip rsvp local" is used without any parameter:

```
ROUTER# show ip rsvp local
    Sid SessAddr       SrcAddr        Pro  DPort  Sport  Type   BPS  Bytes User
    20  23.44.33.44    33.33.44.33    TCP 2200    3333  GU    2     2   SYS
42  24.54.36.64    34.63.77.53    UDP 2500    3773  LD    5     5   USR
```

Relevant command

show ip rsvp interface

show ip rsvp installed

show ip rsvp sender

show ip rsvp reservation

show ip rsvp neighbor

show ip rsvp tos

show ip rsvp precedence

5.1.13 show ip rsvp neighbor

Use command "**show ip rsvp neighbor**" to show reservation information in router database.

Syntas

show ip rsvp neighbor [*type-number*]

Parameter

Parameter	Description
type-number	Number of route port.

Default

none

Command mode

Supervisor mode

Explanation

Use command "show ip rsvp neighbor" to show address information of host or router with RSVP function in adjacency with an interface in the database. Information of all interfaces of this router will be showed if no parameter is provided.

Example

The following is an output sample when command "show ip rsvp neighbor" is used for f0/0:

```
ROUTER# show ip rsvp neighbor f0/0
f0/0 :
Neighbor        Encapsulation
192.168.20.43   RAW
```

The following is an output sample when command "show ip rsvp neighbor" is used without any parameter:

```
ROUTER# show ip rsvp neighbor
f0/0 :
Neighbor        Encapsulation
192.168.20.43   RAW
    a0 :
Neighbor        Encapsulation
193.148.20.43   UDP
```

Relevant command

show ip rsvp interface

show ip rsvp installed

show ip rsvp sender

show ip rsvp reservation

show ip rsvp local

show ip rsvp tos

show ip rsvp precedence

5.1.14 show ip rsvp precedence

Use command “show ip rsvp precedence” to show the setting of TOS about RSVP flow on router interface.

Syntas

show ip rsvp precedence [*type-number*]

Parameter

Parameter	Description
type-number	Number of route port

Default

none

Command mode

Supervisor mode

Explanation

Use command “show ip rsvp precedence” to show the setting of precedence about RSVP flow in router port. If no parameter is provided, the setting of precedence about RSVP flow in all router ports will be showed.

Example

The following is an output sample when command “show ip rsvp precedence” is used for f0/0:

```
ROUTER# show ip rsvp precedence f0/0
      Interface   Conform     Exceed
f0/0        4          -
```

The following is an output sample when command “show ip rsvp precedence” is used without any parameter:

```
ROUTER# show ip rsvp precedence
      Interface   Conform     Exceed
```

f0/0 4 -
e1/1 - 4

Relevant command

show ip rsvp interface

show ip rsvp installed

show ip rsvp sender

show ip rsvp reservation

show ip rsvp neighbor

show ip rsvp local

show ip rsvp tos

5.1.15 show ip rsvp reservation

Use command "**show ip rsvp reservation**" to show reservation information in router database.

Syntas

show ip rsvp reservation [*dest-ip-address*]

Parameter

Parameter	Description
dest-ip-address	Destination IP address of RSVP session

Default

none

Command mode

Supervisor mode

Explanation

Use command "**show ip rsvp reservation**" to show reservation information in router database. If no parameter is provided, all reservation information passing through the router will be showed.

Example

The following is an output sample when command "show ip rsvp reservation" is used for destination of 192.14.3.2:

```
ROUTER# show ip rsvp reservation 192.14.3.2
    SessAddr      DP   Pid SrcAddr      SP   NextHop       Int  Fi Sv Bps byte
    192.14.3.2    1000   TCP 122.3.4.6     2000  133.3.3.4          a0  FF GU10K 10K
    193.14.3.2    1030   TCP 124.3.3.7       2300  143.3.5.4            f0/0 FF LD 1K  2K
```

The following is an output sample when command "show ip rsvp reservation" is used

without any parameter:

```
ROUTER# show ip rsvp reservation
    SessAddr      DP   Pid SrcAddr      SP   NextHop       Int  Fi Sv Bps byte
    192.14.3.2    1000   TCP 122.3.4.6     2000  133.3.3.4          a0 FF GU10K 10K
    193.14.3.2    1030   TCP 124.3.3.7       2300  143.3.5.4            f0/0 FF LD 1K  2K
```

Relevant command

show ip rsvp interface

show ip rsvp installed

show ip rsvp sender

show ip rsvp neighbor

show ip rsvp local

show ip rsvp tos

show ip rsvp precedence

5.1.16 show ip rsvp sender

Use command "**show ip rsvp sender**" to show sender information in router database.

Syntas

show ip rsvp sender [*dest-ip-address*]

Parameter

Parameter	Description
dest-ip-address	Destination IP address of RSVP session

Default

none

Command mode

Supervisor mode

Explanation

Use command "show ip rsvp sender" to show sender information in router database. If no parameter is provided, all sender information passing through the router will be showed.

Example

The following is an output sample when command "show ip rsvp sender" is used for the destination address of 192.14.3.2:

```
ROUTER# show ip rsvp sender 192.14.3.2
    SessAddr      DP   Pid  SrcAddr      SP   PrevHop       Intf  Bps  byte
    192.14.3.2    1000   TCP 122.3.4.6          2000  133.3.3.4                f0/0   10K
```

```
10K
     193.14.3.2      1030   TCP 124.3.3.7              2300  143.3.5.4                  e0/0    1K
2K
```

The following is an output sample when command “show ip rsvp sender” is used without any parameter:

```
ROUTER# show ip rsvp sender
     SessAddr       DP    Pid  SrcAddr        SP    PrevHop        Intf  Bps  byte
     192.14.3.2     1000   TCP 122.3.4.6              2000  133.3.3.4                  f0/0    10K
10K
     193.14.3.1     1230   TCP 124.3.3.7              2300  143.3.5.4                  e0/0    1K
2K
```

Relevant command

show ip rsvp interface

show ip rsvp installed

show ip rsvp reservation

show ip rsvp neighbor

show ip rsvp local

show ip rsvp tos

show ip rsvp precedence

5.1.17 show ip rsvp tos

Use command “**show ip rsvp tos**” to show the setting of TOS about RSVP flow in router ports.

Syntas

show ip rsvp tos [*type-number*]

Parameter

Parameter	Description
type-number	router port number.

Default

None

Command mode

Supervisor mode

Explanation

Use command “show ip rsvp tos” to show the setting of TOS about RSVP flow in router port. If no parameter is provided, the setting of TOS about RSVP flow in al ports of the router will be showed.

Example

The following is an output sample when command “show ip rsvp tos” is used f0/0:

```
 ROUTER# show ip rsvp tos f0/0
       Interface   Conform     Exceed
f0/0        4          -
```

The following is an output sample when command “show ip rsvp tos” is used without any parameter:

```
ROUTER# show ip rsvp tos
       Interface   Conform     Exceed
f0/0        4          -
e1/1        -          3
```

Relevant command

show ip rsvp interface

show ip rsvp installed

show ip rsvp sender

show ip rsvp reservation

show ip rsvp neighbor

show ip rsvp local

show ip rsvp precedence

Chapter 6 PBR Configuration Command

6.1.1 debug ip policy

Use command debug ip policy to see the result of applying policy based routing.

Syntas

debug ip policy

no debug ip policy

Parameter

None

Default

No default is available

Command mode

Supervisor mode

Explanation

Use debug ip policy to see whether policy based routing is applied to ip packet received from the interface 。

Use debug ip policy will inflence perfomance of the use, don't use it when many packets are been routed by router.

Example

In the following example, we'll see packet from 10.1.1.21 is policy routed, but packet from 10.1.1.2 isn't policy routed.

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 Commands

None

6.1.2 ip policy route-map

To use policy routing on an interface, use ip policy route-map *route-map name in interface configuration mode.*

Syntas

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

No policy routing occurs on the interface.

Command mode

interface configuration

Explanation

If you want to use policy routing rather than destination base routing, use ip policy route-map 。

Example

In the following example, policy routing on interface f0/0 is enabled.

Router_config#int f0/0
Router_config_f0/0#ip policy route-map pbr

Related Commands

route-map

6.1.3 match ip address

To configure policy using source ip address, use match ip address *access-list name* .

Syntas

match ip address *access-list name*

no match ip address [*access-list name*]

Parameter

Parameter	Description
access-list name	name of standard access-list

Default

No access-list avaible by default 。

Command mode

route-map configuration

Explanation

If route-map is used for PBR, if the source ip address of ip packet match access-list, set rule will be used, otherwise, destination ip address based routing will be use.

Example

In the following example,source ip address permitted by access-list net1 will be sent to interface s0/0(if interface s0/0 is routbale).

```
interface f0/0
ip policy route-map moon
!
route-map moon
 match ip address net1
set interface s0/0
```

Related Commands

set default interface

set interface

set ip default next-hop

set ip next-hop

route-map

6.1.4 match length

To configure policy using length of ip packet, use match length.

Syntas

match length *minimum-length maximum-length*

no match length *minimum-length maximum-length*

Parameter

Parameter	Description
minimum-length	matched minimum ip packet length included
maximum-length	matched maximum ip packet length included

Default

No match length configured by default。

Command mode

route-map configuration

Explanation

match length make you to route ip packet based on the length of it ˚

Example

In the following example, packet between 1000 and 1500 bytes willed be routed to s0/0.

```
interface f0/0
ip policy route-map moon
!
route-map moon
match length 1000 1500
set interface s0/0
```

Related Commands

match ip address

set default interface

set interface

set ip default next-hop

set ip next-hop

route-map

6.1.5 set default interface

To set default outgoing interface, use set default interface ˚

Syntas

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 outgoing interface

Default

No default outgoing interface by default ˚

Command mode

route-map configuration

Explanation

Default outgoing interface won't be used untill all the following situation met:

(1) set ip next-hop is not configured,or set ip next-hop is configured，but no route in routing table to the nexthop set by set ip next-hop command.

(2) set interface is not configured, or set interface is configured ，but these interfaces are unroutable(interface protocol down or no ip address).

(3) set ip default next-hop is not configured,or set ip default next-hop is configured ，but no route in routing table to the nexthop set by set ip default next-hop command.

Example

None

Related Commands

match ip address

match length

set interface

set ip default next-hop

set ip next-hop

route-map

6.1.6 set interface

To set outgoing interface, use set interface command 。

Syntas

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 outgoing interface.

Default

No set interface configured by default 。

Command mode

route-map configuration

Explanation

Outgoing interface won't be used untill all the following situation met:

(4) Set ip next-hop is not configured,or set ip next-hop is configured，but no route in routing table to the nexthop set by set ip next-hop command.

(5) Interfaces are routable(interface protocol UP or have ip address).

Related Commands

match ip address

match length

set default interface

set ip default next-hop

set ip next-hop

route-map

6.1.7 set ip default next-hop

To set default gateway for outputing packets when no route, use set ip default next-hop。

Syntas

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 gateway
Load-balance	(optional) load balance between the gateways

Default

No set ip default next-hop configured by default。

Command mode

route-map configuration

Explanation

Default gateway won't be used untill all the following situations met:

(6) Set ip next-hop is not configured,or set ip next-hop is configured，but no route in routing table to the nexthop set by set ip next-hop command.

(7) Set interface is not configured, or set interface is configured，but these interfaces are unroutable(interface protocol down or no ip address).

(8) Default gateway is reachable.

Related Commands

set default interface

set interface

set ip next-hop

route-map

6.1.8 set ip next-hop

To set gateway for packets matching, use set ip next-hop 。

Syntas

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 gateway
Load-balance	(optional) load balance between the gateways

Default

No set ip next-hop is configured by default 。

Command mode

route-map configuration

Explanation

Gateway set by set ip next-hop won't be used untill the following situation met:
the gateway is reachable.

Related Commands

set default interface

set interface

set ip default next-hop

set ip next-hop

route-map

6.1.9 route-map

Syntas

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	(optional)route-map sequence-number.
permit	(optional)if match, policy based routing is used.
deny	(optional)if match，policy based routing isn't used.

Default

No route-map configured by default.

Command mode

global configuration

Explanation

To configure policy used by PBR, use route-map command.

Example

In the following example, a route-map with name 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 Commands

match ip address

match length

set default interface

set interface

set ip default next-hop

set ip next-hop

6.1.10 debug ip policy

Use “debug ip policy” command to open the tracefunction of strategic route. Use “no debug ip policy” to close the tracking function of strategic route.

debug ip policy

no debug ip policy

Parameter

None

Default

Strategic route tracking function is not open.

Command mode

Supervisor mode

Explanation

none

Example

none

Relevant command

ip local policy

ip policy

show ip local policy

show ip policy

6.1.11 ip local policy

Use command "**ip local policy**" to switch on policypolicyrouting function of local packets. Use "**no ip local policy**" to switch off local policy routing function.

Syntas

ip local policy route-map [*name*]

no ip local policy route-map [*name*]

Parameter

Parameter	Description
name	Name of route-map used by policy routing.

Default

The policy routing function of local packet is switched off.

Command mode

Global configuration mode

Explanation

Policy routing can be applied to packets sent of redistributed locally. Policy routing applied to packets sent locally is called local policy routing. By configuring the command “ip local policy route-map <*name*>” under global configuration mode and configuring proper route-map, policy routing to packets sent locally will be realized.

Policy routing checks whether a packet is broadcasting packet and searches relevant policy routing for broadcasting packet. Policy routing result will return olny output interface or a nexthop

Route-map used for policy routing can match packets with access-list or packet length and process policy routing by setting nexthop or output interface. Using access-list can meet various policy needed, such as routing by source address, routing by application, etc.

Policy routing can set nexthop, tos, precedence and output interface of a packet. The sequence to select policy routing is as the following: nexthop, default nexthop, interface and default interface. When all of them are not available, use normal routing.

Nexthop available means that routing can be found for the nexthop in the routing table. Interface available means that the interface is “IpprotocolUP” and has licit IP address (or negotiation address, Null interface).

Example

The following configuration will process policypolicy routing for packet sent locally and send the packet of network with address 100.0.0.0/8 to a0/0 interface:

```
    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
    !
```

Relevant command

ip policy

show ip local policy

show ip policy

6.1.12 ip policy

Use “**ip policy**” command to switch on the policy routing function on the interface.

Syntas

ip local policy route-map [*name*]

no ip policy route-map [*name*]

Parameter

Parameter	Description
name	Name of route-map used by policy routing.

Default

Policy routing function of the interface is switched off.

Command mode

Interface configuration mode

Explanation

Policy routing can be applied to packets sent locally of redistributed. By configuring command “ip policy route-map <name>” on packet input interface and configuring proper route-map, policy routing of packet received from the interface will be realized.

Policy routing checks whether the packet is a broadcasting packet and checks relevant policy packet for broadcasting packet. Policy routing result will return only to an output interface or a nexthop with routing to several interfaces.

Route-map used for policy routing can match packets with access-list or packet length and process policy routing by setting nexthop or output interface. Using access-list can meet various policy need, such as routing by source address, routing by application, etc.

Policy routing can set nexthop, tos, precedence and output interface of a packet. The sequence to select policy routing is as the following: set ip nexthop, set interface, non-default normal route, set ip default nexthop, set default interface, normal route, or default route. Policy routing can set tos and precedence for the normal routing separately.

Nexthop available means that routing can be found for the nexthop in the routing table. Interface available means that the interface is “IpprotocolUP” and has licit IP address (or negotiation address, Null interface).

Example

The following configuration will process policy routing for packet received by interface s1/1 and send packet of network with address 100.0.0.0/8 to s1/1 interface:

```
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
!
```

Relevant command

ip local policy

show ip local policy

show ip policy

6.1.13 show ip local policy

Command “show ip local policy” is used to show configuration state of local policy route.

Syntas

show ip policy

Parameter

none

Default

none

Command mode

Supervisor mode

Explanation

none

Example

none

Relevant command

ip local policy

ip policy

show ip policy

6.1.14 show ip policy

Command “show ip policy” is used to show configuration state of interface policy route.

Syntas

show ip policy

Parameter

none

Default

none

Command mode

Supervisor mode

Explanation

none

Example

none

Relevant command

ip local policy

ip policy

show ip local policy

Chapter 7 DNS Command

7.1 DNS Command

7.1.1 ip domain lookup

Syntas

ip domain lookup

no **ip domain lookup**

Parameters

This command has no parameter or key word.

Default

Enable DNS lookup。

Command mode

In configure.

Explanation

Enables DNS-based host name-to-address translation.If it needs to disable the lookup, can use the no format of the command.

Example

The following example will enable the DNS lookup:

ip domain lookup

7.1.2 ip domain name-server

Specify the IP address of a domain name server.If it needs to delete the name server,can use the no format of the command.

Syntas

ip domain name-server *ip-address*

no **ip domain name-server** *[ip-address]*

Parameter

Parameter	Description
ip-address	the IP address of a domain name server

Default

There is no domain name server。

Command mode

In configure.

Explanation

It may assign serveral name servers,but can only appoint six at most.The name server assigned before will be queried earlier. When we use the no format without any parameter,it express for delete all the name servers.

Example

The following set the IP address of a name server as 192.168.1.3：

ip domain name-server 192.168.1.3

7.1.3 ip domain name

Set a default domain name.If it needs to delete a default domain name, can use the no format of the command.

Syntas

ip domain name *name*

no **ip domain name**

Parameter

Parameter	Description
name	The default domain name.

Default

There is no domain name.

Command mode

In configure

Explanation

We can complete the host name by a default domain name.But the default domain name is useful only when there is no domain list.

Example

The following example set the default domain name as bdcom.com.cn：

ip domain name bdcom.com.cn

7.1.4 ip domain list

Defines a list of domains. We can use the no format of the command if we want to delete a domain list

Syntas

ip domain list *name*

no ip domain list *[name]*

Parameter

Parameter	Description
name	domain list name

Default

There is no domain list。

Command mode

In configure

Explanation

The DNS Resolver completes a host name by the domain list, it can try the domain list in turn until it find the host or all the domain lists are tried. The domain name will not be used if a domain list exists. We can set six domain lists at most. The command no **ip domain list** *name* express for deleting a domain list, but the command no ip domain list express for delete all the domain lists.

Example

The following example set the domain lists as com.cn and edu.cn：

ip domain list com.cn
ip domain list edu.cn

7.1.5 ip host

Defines static host name-to-address mapping.If it needs to delete a mapping,use the commmand no ip host. The same name can correspond to many IP addresses.

Syntas

ip host *name address1*[*address2*，…]

no ip host *name* [*address1*，…]

Parameters

Parameter	Description
name	host name.
address	IP address.

Default

There is no mapping 。

Command mode

In configure

Explanation

If the command **no ip host** *name* is used without IP address, it expresses delete the host named 后 *name*.

Example

The following example configure a host named dns-server which IP address is 202.96.1.3.

ip host dns-server 202.96.1.3

The same name can correspond to much IP address，the following express mapping a name to several IP addresses

router_config# ip host *djh 172.16.20.209*
router_config# ip host *djh 172.16.20.210*

or：

router_config# ip host djh 172.16.20.209 172.16.20.210

If you want to delete, you can delete a IP address or delete many addresses or delete the host.

router_config# no ip host djh 172.16.20.209 /*delete a IP address mapping to a host name djh*/
router_config# no ip host djh 172.16.20.209 172.16.20.210
/**delete 2 IP address mapping to a host name djh*/
router_config# no ip host djh /*delete the host named djh*/

7.1.6 ip domain retry

Syntas

ip domain retry *count*

no ip domain retry

Parameters

Parameter	Description
count	retry times(Range：1 ~ 10

Default

Retry time is 3。

Command mode

In configure

Explanation

Specify times to retry a DNS query.If you want to restore to the default , use the no format of the command.

Example

The following set the retry times as 5：

ip domain retry *5*

7.1.7 ip domain timeout

Syntas

ip domain timeout *seconds*

no ip domain timeout

Parameters

Parameter	Description
seconds	timeout value. Range：1 ~ 30

Default

The timeout value is 2（seconds）。

Command mode

In configure

Explanation

Specify timeout waiting for response to a DNS query。If you want to restore to the default , use the no format of the command.

Example

The following example set the timout value as 3 seconds：

ip domain timeout *3*

7.1.8 clear ip host

Delete the mapping of a host name and IP address from cache.

Syntas

clear ip host *name*

clear ip host *

Parameter

Parameter	Description
name	The host name being deleted.
*	delete all the hosts in the cache.

Command mode

In manager.

Explanation

The host having been queried will be set in cache. We can delete one or all of the hosts in cache. The command can't delete the static mapping of host and IP address.

Example

The following example will delete the host named www.sina.com.cn：

clear ip host www.sina.com.cn

Related command

show ip host

7.1.9 ip domain primary-server

Specify a primary name server.If you want to delete a primary server,you can use the no format of the command.

Syntas

ip domain primary-server *address*

no **ip domain primary-server**

Parameter

Parameter	Description
address	the IP address of a primary server.

Default

There is no primary server。

Command mode

In configure

Explanation

You can configue only one primary.If you configue another,it will replace the one earlier.

Example

The folling example specify the IP address of a primary server as 192.168.1.8：

ip domain primary-server 192.168.1.8

7.1.10 ip domain dynamic enable

Enable update function of dynamic DNS.You can use the no format of the command if you want to disable domain dynamic.

Syntas

ip domain dynamic enable

no ip domain dynamic enable

Parameters

The command has no parameter or key word。

Default

Disable of domain dynamic。

Command mode

In configure

Explanation

Example

The following example enable the domain dynamic：

ip domain dynamic enable

7.1.11 ip domain dynamic period

Set the period of DNS update。You can use the no format of the command if you want to restore to the default.

Syntas

ip domain dynamic period *seconds*

no **ip domain dynamic period**

Parameters

Parameter	Description
seconds	Time(second) of the domain dynamic period

Default

The time is 60 seconds 。

Command mode

In configure

Explanation

Example

The following example set the domain dynamic period as *3600*

ip domain dynamic period *3600*

7.1.12 ip domain bind

Bind the domain name to a IP address or IP address of interface.You can use the no format of the command if you want to cancel the binding.

Bind the primary IP address of the interface with a domain name(Note:an interface can only bind with one domain name,if you bind another,the later will replace the earlier) ：

Syntas

ip domain bind *name* **interface** *number [*singly*]*

no ip domain bind *name* **interface** *number*

bind a IP address with a domain name(Note: one domain name can bind with serverallP address)

ip domain bind *name ip_addr [*singly*]*

no ip domain bind *name ip_addr*

Delete all the hosts named *name* in the primary server.

no ip domain bind *name*

Parameters

Parameter	Description
name	the domain name will be binded
number	the interface number will be binded
ip_addr	the IP address will be binded
singly	[selectful]bind the name with one IP address. It will delete all the hosts named *name* if the parameter is used.

Default

There is no binding 。

Command mode

In configure

Explanation

If the command ip domain dynamic enable or ip domain primary-server is not been configurated , then command ip domain bind and no ip domain bind will not be successful，and will not be in flash memory or be deleted from flash memory.

To the command of domain dynamic,the router will register to the primary server autoly,but if the interface shut down, the communication to primary server will fail,that is,it can't register successly. In order that the register goes along after the interface shut up, the modual set a much bigger timeout and retry,so the configuring of retry and timeout go into effect after 30 seconds when the router reboots.

On the side, If we bind a domain name with an interface,when the ip address of the interface changed and makes the communication to the primary server fail,but after a while,it can restore, at this instance, we can enhance the times of retry and the seconds of timeout so that it can update successfully.

Example

The following will bind an interface with a domain name,bind a IP address with a domain name.

ip domain bind *inter.edu.cn* interface *e1/1*
ip domain bind *addr.edu.cn 172.16.20.205*

7.1.13 show ip host

show some characters such as the default domain name,domain list,the host in the cache and so on.

Syntas

show ip hosts [**detail**]

Parameters

Parameter	Description
detail	[selectful] It show some information of the applications using the DNS Resolver unblocking such as the queue ID(or address of a callback) an time before ttl.

Command mode

In manager

Example

The following example will show all the host in cache：

show ip hosts

Related command

clear ip host

7.1.14 debug ip domain

open the debug of DNS Resolver.You can use the no format of the command if you want to close the debug。

Syntas

debug ip domain

Parameters

The command has no parameters of key word.

Command mode

In manager

Example

The example will open the debug：

debug ip domain

Chapter 8 Router Management Command mode

8.1.1 distance

Use “distance” to define a administrative distance. Use “**no distance**” to delete the definition of a adminitrativedistance.

Syntas

distance *weight* [*address mask* [*access-list-name*]]

no distance *weight* [*address mask* [*access-list-name*]]

Parameter

Parameter	Description
weight	**Administrative** distance ranges from 1 to 255. The suggested distance ranges from 10-255 (0-9 reserved). If this parameter is used separately, it will tell the router that system software will use it as default **admi**nistrative distance when there is no relevant regulation about information source of a route. The route with **admi**nistrative distance of 255 will not be installed in the routing table.
address	(Alternative) IP address (in the form of aa.bb.cc.dd)
mask	(Alternative) IP address mask (in the form of aa.bb.cc.dd). If a certain bit is 0, the software will neglect the of relevant bit in the address.
access-list-name	(Alternative) Update the name of standard access list for incoming route.

Default

Default Administrative distance is listed below:

Route source	Default distance
Connected	0
Static	1
External BGP	20
BIGP	90
OSPF	110
RIP	120
Internal BGP	200

Command mode

Route configuration mode

Explanation

Administrative distance is a whole number ranging from 0 to 255. Under general situation, the higher the value of number, the lower the reliability. Administrative

distance of 255 means is unreliable at all and should be ignored.

If in RIP or BEIGRP, *address/mask* means the IP address of a neighbor; while in OSPF, *address/mask* is a router ID which declares related LSA.

If "*access-list-name*" (access list with alternative parameter) is used in the command, this access list will be used when a network route is inserted into a routing table. In this way, some networks can be filtered by route address providing routing information. For example, it can be used to filter wrong routing information got from the route that is not under your management and control.

Notes:

the sequence of administrative distance you inputted may has unexpected effect on the allocated **admi**nistrative distance (please refer to the explanation in the following example for the details).

The value of parameter "weight" is completely subjective, there is no quantitative means to select this value.

Example

In the following example, RIP route is set in global command "router rip". Router configuration command "network" designates RIP route reaching network 192.31.7.0 and 128.88.0.0. The first router configuration command "distance" set the default administrative distance as 255. It informs the router: if a certain router is not evidently set a administrative distance, all route update from that router will be ignored.

router rip
network 192.168.7.0
network 133.8.0.0
distance 255
distance 90 192.168.7.0 0.0.0.255
distance 120 133.8.1.3 0.0.0.0

8.1.2 filter in

Use router configuration command "filter" to filter the network received during route update. Use "no filter" to change or disable the filter.

Syntas

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**

Parameter

Parameter	Description

access-list-name	Name of standard access list. The list defines which networks to be received and which networks to be suppressed during route update.
prefix-list-name	Name of standard IP prefix list. The list defines which networks to be received and which networks to be suppressed during route update.
In	Apply access list to incoming route update.
type	(Alternative) Interface type
number	(Alternative) In which interface the access list will be applied to incoming route update. If no interface is designated, access list will be applied to all incoming update.

Default

invalid state

Command mode

Route configuration mode

Explanation

to filter the network receiving update

Example

In the following example, RIP route process receives only two networks---0.0.0.0 and 131.108.0.0:

access-list 1 permit 0.0.0.0
access-list 1 permit 131.108.0.0
access-list 1 deny 0.0.0.0 255.255.255.255
router rip
network 131.108.0.0
filter * in 1

Relevant command

filter out

8.1.3 filter out

Use router configuration command “filter out” suppress some networks to prevent them from advertising in the update. Use “no filter out” to disable this function.

Syntas

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	Number or name of standard IP access list. This list defines which networks to be received and which networks to be suppressed during route update.
prefix-list-name	Name of standard IP prefix list. The list defines which networks to be received and which networks to be suppressed during route update.
Out	Apply access list to outgoing route update.
Interface-name	(Alternative) Name of an interface

Default

Invalid state

Command mode

Route configuration mode

Explanation

When you redistribute the network, name of routing process can be designated as an alternative suffix parameter of the command "**filter**". In this way, the access list will only be applied to the routes acquired from designated routing process. After the access list relevant to process is applied, any access list designated in "**filter**" without process name parameter will be applied. Address that is not designated in "**filter**" will not be advertised in the outgoing route update.

Notes:

Use command "filter in" to filter the networks receiving update.

Example

The following example makes a network 131.108.0.0 can be advertised by RIP routing process:

access-list 1 permit 131.108.0.0
access-list 1 deny 0.0.0.0 255.255.255.255
router rip
network 131.108.0.0
filter * out 1

Relevant command

filter in

8.1.4 ip route

Use "**ip route**" global configuration command to establish static routing. Use "**no ip route**" to delete static routing.

ip route prefix *mask* {**address** | **interface**} [**distance**]

no ip route prefix *mask* [{**address** | **interface**}] [**distance**]

Parameter

Parameter	Description
Prefix	prefix of destination address IP route
mask	prefix mask of destination address IP route
address	nexthop IP address to reach the network
interface	network interface to be used
distance	(Alternative) administrative distance

Default

no static routing established

Command mode

Global configuration mode

Explanation

Use key word “default” to replace “prefix” and “mask” to configure default route.

If router cannot dynamically create routing for a certain destination, it will be more proper to use static routing.

If you have designated administrative distanceadministrative distance, the static routing will be identified that dynamic routing cannot substitute it. For example, default administrative distance of the route obtained from RIP is 100. If you want to create a static routing that can be substitutedby RIP dynamic routing, you can designate the administrative distance “distance” as any value larger than 100. Default administrative distance of static routing is 1.

No matter whether the command “redistribute static” is applied to RIP or other static routing protocol, the static routing aiming to interface will advertise through these protocols. The reason is that static routing aiming to interface is regarded as directly connected in routing table and having lost static character. However, if you define a static routing for the interface and the interface is not in the network defined by the command “network”, the static routing will not be advertised by dynamic routing protocol (unless use command “redistribute static” for these dynamic routes).

Now,the number of static route you can configure is no more than 2048.

Example

The following example selects 110 as the administrative distance. Under this circumstance, if there is no dynamic routing information reaching network 10.0.0.0 and with administrative distance less than 110, the group sent to the network will pass through router 131.108.3.4.

ip route 10.0.0.0 255.0.0.0 131.108.3.4 110

In the following example, the group heading for network 131.108.0.0 is sent to router 131.108.6.6：

ip route 131.108.0.0 255.255.0.0 131.108.6.6

8.1.5 redistribute

Use router configuration command “**redistribute**” to redistribute the route from one

routing area to another routing area. Use "**no redistribute**" to disable the redistribution.

Syntas

redistribute *protocol* [*process-id*] [**route-map** *map-name*]

no redistribute *protocol* [*process-id*] [**route-map** *map-name*]

Parameter

Parameter	Description
protocol	Source protocol to redistribute the route. It can be one of the following keywords: **bgp**, **ospf, static** [**ip**], **connected,** and **rip**. The keyword "**static** [**ip**]" is used to redistribute IP static route. When the route is redistributed into the IS-IS, use this alternative IP keyword. Keyword "**connected**" refers to the routes created automatically after IP on interface being enabled. For routing protocol like OSPF and IS-IS, these routes are redistributed as exterior routes of autonomous system.
process-id	(Alternative) For **bgp** or **bigp**, the parameter refers to autonomous system number of 16 digits. For OSPF, it is the relevant OSPF process ID by which the routing key is redistributed. It identifies the routing process. It is decimal number excluding 0. For "**rip**", process identifier "process-id" is not needed.
route-map	(Alternative) This parameterprovide routemapp to filter the routes redisitributed from source protocol to current routing protocol. If the parameter is not given, all routes will be redistributed. If the keyword is given without listing routing mark, no route will be introduced.

Default

The redistribution of the route is inuse.

protocol--- no routing protocol is defined

process-id--- no process ID is defined

route-map *map-tag*--- If parameter "route-map" is not given, all routes will be redistributed. If "*map-tag*" is not entered, no route will be introduced.

Command mode

route configuration mode

Explanation

Changing or invalidating any keyword will not affect the state of other keyword.

When the router receives a linking state protocol group with interior Metric, it will take the sum of the value from itself to the redistributed router and the value of the advertised destination as the value of the route. For the exterior route value, only the value of the destination announced in the advertisement will be taken into account.

The redistributed routing information will be filtered by router configuration command "filter out". In this way, it will be ensured that only the route designated by the administrator can enter the accepted routing protocol.

No matter when you use router configuration command “redistribute” or “default-information” to redistribute the route into OSPF routing area, the router will become the autonomous system border router (ASBR). But under default state, ASBR will not generate a default route into OSPF routing area.

When the route is redistributed among OSPF processes, OSPF Metric will be used.

When route is redistributed to OSPF, OSPF uses 20 as the default Metric (uses route value 1 for BGR) for rotes of all other protocols (excluding BGR) if Metric is not designated by using keyword “meric”. Furthermore, when route is redistributed between 2 OSPF processes of a router, route value within a routing process will be introduced into the process of redistributing if no default Metric is designated.

When route is redistributed into OSPF, only the new routes without sub-network can be redistributed if the keyword “subnets” is not given.

The connected routes effected by command “redistribute” are those routes not designated by using command “network”. Command “default-metric” cannot be used to effect advertising connected Metric.

Notes:

Suppress to use Metric designated by “default-metric” as the Metric designated by “redistribute”.

Unless command “default-information originate” is given, it is not allowed to redistribute routes from IGP or EGP to BGP.

Example

The following example makes the OSPF route can be redistributed into BGP routing area:

```
router bgp 109
redistribute ospf...
```

The following example makes the RIP route be redistributed into OSPF area:

```
router ospf 109
redistribute rip
```

In the following example, network 20.0.0.0 in OSPF 1 presents as exterior linking state advertising

```
interface ethernet 0
ip address 20.0.0.1 255.0.0.0
ip ospf cost 100
interface ethernet 1
ip address 10.0.0.1 255.0.0.0
!
router ospf 1
network 10.0.0.0 0.255.255.255 area 0
redistribute ospf 2
router ospf 2
network 20.0.0.0 0.255.255.255 area 0
```

8.1.6 show ip route

Use command “show ip route” to show current state of routing table.

Syntas

show ip route [*protocol*]

Parameter

Parameter	Description
protocol	(Alternative) routing protocol name or keyword: connected, **static**, **ospf** or **rip**.

Command mode

Supervisor mode

Explanation

show ip route IP address command output shows the generating of IP routes in IS-IS network.

Example

The following is an example output using “show ip route” command without address:

Router# show ip route

```
Codes: C – connected, S – static, R – RIP, B – BGP
D – BIGP, DE – external BIGP, O – OSPF, OIA – OSPF inter area
ON1 – OSPF NSSA external type 1, ON2 – OSPF NSSA external type 2
OE1 – OSPF external type 1, OE2 – OSPF external type 2
C 2.0.0.0/24 is directly connected, Serial1/1
C 133.133.0.0/16 is directly connected, Serial1/2
C 133.133.0.81/32 is directly connected, Serial1/2
S 192.167.0.0/16 [6,0] via 133.133.0.81
C 192.168.20.0/24 is directly connected, FastEthernet0/0
O E2 150.150.0.0 [160/5] via 131.119.254.6
O E2 192.68.132.0 [160/5] via 131.119.254.6, 0:00:59, Ethernet2
O E2 130.130.0.0 [160/5] via 131.119.254.6, 0:00:59, Ethernet2
```

The meaning of each area will be explained in the following table.

area	Desc ription
O	Means protocols obtained route. Possible group includes the following values: R---Route obtained from RIP O---Route obtained from OSPF. C---Connected routes S--- Static routes B---Route obtained from BGP.
E2	Routing type. Possible group includes the following values: E1--- OSPF exterior type 1 route E2--- OSPF exterior type 2 route
150.150.0.0	Means remote network address.
[160/5]	First number in the bracket is administrative distance of information source. Second number is the Metric.
via 131.119.254.6	Next route value designated to remote network.
Ethernet2	Designate the interface through which the designated network is reachable.

Chapter 9 router Public Configuration Command

9.1 ip prefix-list configuration command directory

9.1.1 clear ip prefix-list

Clear statistic information ofdesignated prefix-list.

Syntas

clear ip prefix-list [*name* [*prefix*]]

Parameter

Parameter	Description
name	name of Prefix-list
prefix	network prefix with format: A.B.C.D/n，n is the length of the mask

Default

None

Command mode

Supervisor mode

Explanation

If no prefix is designated, all statistic information in prefix-listwill be cleared.

Example

none

Relevant command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

9.1.2 ip prefix-list

Create a prefix-list or add a prefix-list rule. Use “no” command to delete the configuration.

Syntas

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 prefix-list
seq	Designate sequence-number
seq_number	Value of sequence-number
deny	Property of prefix-list rule.
permit	Property of prefix-list rule.
prefix	Designated prefix or any prefix..
any	Designated prefix or any prefix..
ge	Smallest length of prefix, i.e. lower limit, with designated matching.
value	Length of prefix, 0-32.
le	Biggest length of prefix (higher limit) with designated matching.
value	Length of prefix: 0-32.

Default

none

Command mode

global configuration mode

Explanation

Prefix-list is a collection of rules used to filter network prefix. Each rule contains 5 elements: sequence number, property (deny/permit), prefix and length (a.b.c.d/n), lower limit (gex) and higher limit (ley). All rules are ranged from small to large with sequence number. When prefix list is applied, begin to check it from the rule of the smallest number. If the matching is done successfully, stop matching other rules and return property (deny/permit) of the rule.

To check whether the given network prefix is matched, it is necessary not only to check the length of the network prefix but also to check whether the network prefixes within a specific length are completely the same. For a given network a.b.c.d/n, to check the matching by using a rule of prefix list “ip prefix-list test seq 5 A.B.C.D/M ge X le Y”, the following process must be executed:

The first thing to check is whether the mask length (n) of the network meets the expression: X <= n <= Y (If ge X is not designated, the expression should be：M <= n<= Y; if le Y is not designated, the expression should be: X <=n <= 32; if both ge X and le Y are not designated, the expression should be: n ＝＝ M). If the expression is met, continue to the next process. If the rule is not met, execute the comparison of the next rule.

Check whether the network （ a.b.c.d/n ） is the same to the first M bitsof A.B.C.D. If it’s the same, it meets the rule. Return to the property (deny/permit) of this rule.

Otherwise it doesn't matchthe rule, execute the comparison of the next rule.

If all rules are not matched, return deny.

For the seqencenumber of prefix-list, there is another command: ip prefix-list sequence-number. Use this command to control whether the prefix uses the seqencenumber. For details, please refer to the description of this command.

Designate only the command "no" of the name to delete whole prefix list.

Example

If there is the following matching object and prefix list definition, the result of matching will be as follows.

Target route 1: 120.120.0.0/14
Target route 2: 120.120.0.0/16
Target route 3: 120.120.0.0/25
Target route 4: 130.130.0.0/16
Target route 5: 130.130.0.0/8
Target route 6: 130.130.0.0/24
Target 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 result of matching all target routes with prefix-list sample:
Target route 1: Matching fails. Deny.
Target route 2: Matching succeeds. Permit.
Target route 3: Matching fails. Deny.
Target route 4: Matching succeeds. Deny.
Target route 5: Matching succeeds. Deny.
Target route 6: Matching succeeds. Deny.
Target route 7: Matching succeeds. Deny.

Relevant command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

9.1.3 ip prefix-list description

Configure description of prefix list. Use "no" command to delete the configuration.

Syntas

ip prefix-list *name* **[description** *strings***]**

no ip prefix-list *name* **[description]**

Parameter

Parameter	Description
name	Name of prefix-list.

description	Designate description information of prefix list.
strings	Description information.

Default

none

Command mode

global configuration mode

Explanation

none

Example

The following example adds description information to prefix-list hard to make configuration easy to read:

ip prefix-list hard deny any

ip prefix-list hard description This prefix-list is used to filter routes from neighbor hard

Relevant command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

9.1.4 ip prefix-list sequence-number

Set prefix-list using /not usingseqence number. Use “no” command to delete the setting.

Syntas

ip prefix-list sequence-number

no ip prefix-list sequence-number

Parameter

none

Default

Default seqencenumber for use.

Command mode

global configuration mode

Explanation

This command is used to control whether to use seqencenumber for each ruleof prefix-list. After using serial number, only one rule will exist for one serial number. Thus newly configured rule for one serial number will indicate to delete the old one. If no serial number is used, command should be used to delete the rule clearly. If configured without designating serial number, the system conceals serial numbers allocated to all rules, beginning from 5 and increases 5 by degrees.

Example

none

Relevant command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

9.1.5 show ip prefix-list

display relevant information of designated prefix-lists or all prefix-lists including configuration and statistics of the prefix-lists.

Syntas

show ip prefix-list [**summary | detail** *name*]

Parameter

Parameter	Description
summary	Summarized information
detail	Detailed information
name	Name of prefix-list

Default

none

Command mode

Supervisor mode

Explanation

If no name of prefix-list is designated, information of all prefix-list will be diplayed.

Example

In the following example, 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

Information diplayed.by “show ip prefix-list detail” is as follows:

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 line means that the prefix-list with latest revised configuration is yell.

List all prefix-list information from the second line. Only one prefix-list is configured here. Its name is yell. It contains 2 parts.

Count: 2, meaning that this prefix-list has 2 parts;
range entries: 1, meaning that network range number defined in this prefix-list is 1 one part corresponding to seq 10);
sequences: 5 – 10, meaning the range of serial number of each part in this refix-list.

There are definition and statistics of each part.

Hit count: 0, meaning the times to match this part is 0;
Ref count: 10, meaning that the time to try to match this part is 10.

Relevant command

ip prefix-list description

ip prefix-list sequence-number

show ip prefix-list

clear ip prefix-list

9.2 ip aspath-list configuration command

9.2.1 ip as-path access-list

This command is used to found as-path list rule that matching BGP route. And “no” command can delete the configuration of as-path list.

Syntas

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 as-path-list.
deny | permit	Property of as-path-list rule.

regexp	Positive rule expression of as-path property.

Default

Reject all as-path expression except it is specific explanation “permit”.

Command mode

global configuration mode

Explanation

As-path list is used to percolate AS-PATH property of BGP route. AS-PATH property of BGP route is some lists of number (autonomy system number).Its expression is character string, thereinto the furthest dexter number is the initiative autonomy system number. And go left that is the passing autonomy system number. For example: 22 23 98, it represents that the route sends out from autonomy system 98, then passes through autonomy system 23 ` 22, at last reach this autonomy system.

In system, as-path list is signed by name, system resource limits the configuration as-path list quantity. It can configure many pieces of matching rule under the same as-path list. Once there is one rule successfully matching, that will stop the following check and return the property of rule (deny/permit). If all rules matching failure, that will return deny. Every piece of rule is arranged according to configuration order.

The expression of aspath use the generic positive rule expression, in common used special character of expression as follows:

character	sign	meaning
full stop	.	Matching any monocase, including blank character.
asterisk	*	Matching mode 0 or added list.
plus sign	+	Matching mode 1 or added list.
question mark	?	Appear 0 or 1 time in matching mode.
adding character	^	Matching the beginning of inputting character string.
Dollar symbol	$	Matching the ending of inputting character string.
underline	_	Matching comma, left big bracket, right big bracket, left bracket,right bracket , the beginning or ending of inputting character string or a blank.
square brackets	[ ]	Show the range of monocase mode
digraph symbol	-	Cleft a range

Combine the denotation method of path property, use the positive rule expression correctly in order to establish mighty as-path list. As follows is some examples:

.* show any as-path property.

^$ show empty as-path property.

^22$ show the path property of only including autonomy system number 22

^22_ show the front of 22 path property, eg.:22， 22 33.

_22$ show the terminal 22 path property, eg.:22，34 22，99 45 22.

_22_ show the path property of including 22 in bosom, eg.:23 22 45，442 22 23 44。

As–path list can combine to use with match as-path command of route-map and neighbor filter-list of BGP.

Example

The following example defines as-path list hell will allow the path property including front of 23 or including 22 in bosom.

```
ip as-path access-list hell permit ^23
ip as-path access-list hell permit _22_
```

Another example:：

```
ip as-path access-list guangzhou deny ^300
ip as-path access-list guangzhou deny _300_
ip as-path access-list guangzhou permit .*
```

It reject all path property that include the front of 300 or includeing 300 in bosom, others can pass through. But if the designed order is different, the effect will be different completely.

```
ip as-path access-list guangzhou permit .*
ip as-path access-list guangzhou deny ^300
ip as-path access-list guangzhou deny _300_
```

Relevant command

match as-path

neighbor filter-list

9.2.2 show ip aspath-list

This command is used to show the as-path list of configuration in system. The designed name can show the information of designed as-path list.

syntas

show ip as-path-list <*name*>

Parameter

Parameter	Description
name	The name of as-path list

Default

none

Command mode

management mode

Explanation

If don’t design the name, it will show all information of the configuration as-path list in system.

Example

The following example shows all information of as-path list in system.

show ip as-path-list

Relevant command

ip as-path access-list

9.3 ip community-lis configuration command

9.3.1 ip community-list

This command is used to establish the community list rule of BGP route. And “no” command can delete the rule.

Syntas

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	The name of community-list
deny | permit	The property of community-list rule
<1-4294967295>	The value of community, Community is a 32bits no symbol integer
aa:nn	The new style of community value,aa shows high 16bits value,nn showslow 16bits value.
no-advertise	Don’t announce any neighbor (famous republic number)
local-AS	Don’t announce the besides of autonomy system, including the EBGP neighbor of the same autonomy system union (famous republic number).
no-export	Don’t announce this autonomy system or besides of autonomy system union (famous republic number).

Default

Reject all community except it is specific explanation “permit”.

Command mode

global configuration mode

Explanation

community-list is used to leach or configure the community property of BGP route, the community property is a community number or a group of community number. A community number is a 4bytes value, it is saved under the following bound: from 0x00000000 to 0x0000FFFF and from 0xFFFF0000 to 0xFFFFFFFF. These community number are acknowledged and have the seven seas meaning. In common use of the acknowledged community number are:

NO_EXPORT（0xFFFFFF01）: After receiving the route with this community number, it shuouldn't announce the equity style of autonomy system or besides of autonomy system union (If the router belongs to one autonomy system union.

NO_ADVERTISE(0xFFFFFF02): After receiving the route with this community number, it shouldn't announce any equity style.

NO_EXPORT_SUBCONFED（0xFFFFFF03）: It is often intituled LOCAL_AS. After receiving the route with this community number, it shouldn't announce the equity style of besides of this autonomy system.

The community list is signed by name in system. The number of configuration community list is confined by system resource. It can configure many matching rule under the same community list. The applied process of community list is checked in turn according to configuration order. Once there is one rule successfully matching, that will stop the following check and return the property of rule (deny/permit). If all rules matching failure, that will return deny. Checking the order of every piece of rule is processed according to configuration order.

There is three elements in one community –list rule. They are name, property of rules (deny/permit) and community number list. The community number list is a group of community number aggregate. If it is need to check whether the given community property matching a rule, that is need to check whether all community number of this community property is contained in the community list of signed rules. If it is yes, shows success and return property of this rule. If it is no, shows failure and continue to match next rule.

community list and match community of route-map can combine to use.

Example

Community-list yall is defined by the following example will reject the value 5 and 10 of community, but accept value 15 and 20.

```
ip community-list yall deny 5 10
ip community-list yall permit 15 20
```

Relevant command

match community-list 4

9.3.2 show ip community-list

This command is used to show community list of system configuration. And it can show the information of appointed community list by the appointed name.

Syntas

show ip community-list <*name*>

Parameter

Parameter	Description
name	The name of community-list

Default

none

Command mode

management mode

Explanation 使用 明

It will show all community-list information of system configuration if there is no appointed name.

Example

The following example shows all community-list of system.

show ip community-list

Relevant command

ip community-list

9.4 route-map configuration command

9.4.1 route-map

Create a route-map or define an entry of a route-map. Used “no” command to delete it.

route-map *name* [*seq*] [**deny** | **permit**]

no route-map *name* [*seq*] [**deny** | **permit**]

Parameter

Parameter	Description
name	Name of route-map.
seq	Executing serial number of route-map entry with default of 10.
deny	**permit**	Property of route-map entries, with default of permit.

Default

Under default situation, seq value is 10 and property is “permit”.

Command mode

global configuration mode

Explanation

Route-map is used to revise property of routes and filter routes. It is often used for policy of dynamic routing protocol, such as redistributing route, filter the route, set route property, running policyrouting, etc. Route-map is indicated with name. There can be several entries under the same route-map. Total number of route-map in the system is only constrained by system resource. Serial number can be designated or generated automatically by the system. Each entry has a property (deny/permit). Matching rule (using command “match”), setting rule (using command “set”) and withdrawing policy (using command “on-match”) can be configured under each entry.

Matching rule is used to check whether a property of the object meets certain rules. If

the object meets all matching rules under this entry, it will be recognized as matching this entry successfully. Otherwise it will be recognized as failed. If no matching rule is configured under an entry, any object matches this entry. If matching rules are checked, by using other lists (like access-list, prefix-list, community-list, as path-list etc.), for whether the object is matched, the return value using this list is the very result of the matching rules.

Set the rules to set a property of the object. If object matches this entry successfully and the property of this entry is “permit”, use the setting rules configured under this entry to revise the property of the object. If object matches this entry successfully and the property of this entry is “deny”, check the withdraw policy. If the object fails to match the entry, check the next entry.

Withdraw policy is used to determine the action after the object matches the entry successfully. When the object matches an entry successfully and no withdraw policy is configured under this entry, stop checking other entries and return to the property （deny /permit） of this entry. If “on-match next” is configured, continue to check next entry. If “on-match goto N” is configured, skip to the entry with designated serial number and begin to check. If the designated entry doesn’t exist, return to the property （deny /permit）of this entry.

Only one matching rule or setting rule about the same property can be configured under one entry. Latest configured one will cover previous configuration. There can be the following configuration under the same entry:

match metric 34
set metric 100

There is only one match rule and one set rule.

In order to match several values of the same property, exitcan be used:

```
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 above example, match the route with metric of 10 or 20 and set its metric as 100.

When Configuring the system can generate serial numbers for each entry. The default begins from 10 and is added 10 in turn. When using route-map, the system checks from the small to the big following the serial number of the entry.

Route-map can deal with routes of different types, among which some matching rules and setting rules are only used for few routes. If the object is matched or revised with matching rule or setting rule not supported, it will be ignored by the system.

If there is only name after the command “no route-map”, whole route-map should be deleted. Otherwise designated entry will be deleted.

Example

The following EXAMPLE uses route-map to filter routes redistibutefrom OSPF and set their property:

```
router bgp 20
redistribute ospf 3 route-map redist-ospf
route-map redist-ospf
match tag 139009
set local-preference 300
```

Relevant 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

9.4.2 match as-path

Set a route-map matching rule. Check BGP route bying usingas-path list. Use “no” command to delete the configuration.

Syntas

match as-path *as-path-list-name*

no match as-path *as-path-list-name*

Parameter

Parameter	Description
as-path-list-name	Name of as-path list.

Default

none

Command mode

Route-map configuration mode

Explanation

Use designated as path list to match the object. It is used only for BGP route. It is used to filter BGP route accorging the AS_PATH of BGP route.

Example

Use as-list to check whether BGP route is matched.

route-map match-aspath
match as-path as-list1

Relevant 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

9.4.3 match community

Set a route-map matching rule to check BGP route property through “community list”. Use “no” command to delete the configuration.

Syntas

match community *community-list-name*

no match community *community-list-name*

Parameter

Parameter	Description
community-list-name	Name of community-list

Default

none

Command mode

Route-map configuration mode

Explanation

Use designated community to match the object. It is only applicable for BGP routes 。

Example

Use “comm-list1” to check whether the BGP route is matched.

```
route-map match-comm
match community comm-list1
```

Relevant 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

9.4.4 match ip address

Set a route-map matching rule to match destination network numberof the route by “ip access list”. Use “no” command to delete the configuration.

Syntas

match ip address *name*

no match ip address *name*

Parameter

Parameter	Description
name	Name of “ip access list”.

Default

none

Command mode

Route-map configuration mode

Explanation

Use “access-list” to filter network address of routes. It is applicable for routes and massages.

Example

In the following example, routes passed by checking “access list” is set with metric:

route-map set-metric
match ip address acl-metric
set metric 100

Relevant 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

9.4.5 match ip next-hop

Set a route-map matching rule to check whether the nexthop address of the route is matched with the designated nexthop address. Use “no” command to delete the configuration.

Syntas

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

none

Command mode

Route-map configuration mode

Explanation

Use “access-list” to check nexthop property of the route. It is applicable to all ip routes.

Example

In the following example, the route with nexthop address of 192.121.13.28 will matchwith entry 20 of 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

Relevant 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

9.4.6 match ip address prefix-list

Set a matching rule of route-map to match destination network address of the route with “ip prefix list”.

Syntas

match ip address prefix-list *name*

no match ip address prefix-list *name*

Parameter

Parameter	Description
name	Name of prefix-list

Default

none

Command mode

Route-map configuration mode.

Explanation

It is applicable for all ip routes.

Example

In the following example, only route with destination address 192.121.0.0 will matchwith 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

Relevant 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

9.4.7 match length

Set a route-map matchrule to check whether the metric of the route is matched with designated metric. Use “no” command to delete the configuration.

Syntas

match length [*minimum-length*|*maximum-length*]

no match length [*minimum-length*|*maximum-length*]

Parameter

Parameter	Description
minimum-length	Smallest length of the massage.
maximum-length	Largest length of the massage.

Default

None

Command mode

Route-map configuration mode.

Explanation

It is applied for policypolicy route.

Example

none

Relevant command

route-map

9.4.8 match metric

Set a route-map matching rule to check whether the metric of the route is matched with designated metric. Use “no” command to delete the configuration.

Syntas

match metric *value*

no match metric *value*

Parameter

Parameter	Description
value	Value of metric

Default

none

Command mode

Route-map configuration mode.

Explanation

It is applicable for all ip routes.

Example

In the following example, the route with metric of 120 will be matched with the entry 20 of route-map and be refused

route-map beijing 10 permit
match ip nexthop 172.12.29.98
set metric 100
route-map beijing 20 deny
match ip metric 120

Relevant 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

9.4.9 match tag

Set a route-map matching rule to check whether the tag of the route is matched with designated tag. Use “no” command to delete the configuration.

Syntas

match tag *value*

no match tag *value*

Parameter

Parameter	Description
value	Tag value.

Default

none

Command mode

Route-map configuration mode.

Explanation

It is applicable to all routes.

Example

In the following example, the route with tag of 120923 will be matched with the entry 20 of route-map and then be refused.

route-map huang 10 permit
match ip nexthop 172.12.29.98
set metric 100
route-map huang 20 deny
match ip tag 120923

Relevant 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

9.4.10 on-match

Configure exit policy of route-map entry. Use “no” command to delete configuration.

Syntas

on-match {**next** | **goto** *n*}

no on-match {**next** | **goto** *n*}

Parameter

Parameter	Description
n	Serial number of target entry

Default

none

Command mode

Route-map configuration mode.

Explanation

Used to set the withdraw policy of route-map entry. When the route-map entry is matched successfully, stop checking other entries and return to property of the route-map entry if no withdraw policy is configured under the entry. Continue to check the next entry if “on-match next” is configured. Skip to the entry with specified serial number N and begin to check if “on-match goto N” is configured. If the specified entry doesn’t exist, return to the property (deny/permit) of the entry.

Example

In the following example, set aggregator attributefor all routes:

route-map huang
set aggregator as 200 192.12.90.82

Relevant 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

9.4.11 set aggregator

Configure a route-map setting rule to set aggregator property of BGP route. Use command “no” to delete the setting.

Syntas

set aggregator as *as-number a.b.c.d*

no set aggregator as *as-number a.b.c.d*

Parameter

Parameter	Description
as-number	Autonomous system number of route aggregate.
a.b.c.d	IP address of summary routes.

Default

none

Command mode

Route-map configuration state

Explanation

Only applicable to BGP routes.

Example

In the following example, set aggregator property for all routes.

route-map huang

set aggregator as 200 192.12.90.82

Relevant 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

9.4.12 set as-path

Add AS in front of as-path property of BGP route to configure a route-map setting rule. Use command “no” to delete the configuration.

Syntas

set as-path prepend *as*

no set as-path prepend *as*

Parameter

Parameter	Description
prepend	Add in front of as-path property
as	autonomous system number

Default

none

Command mode

Route-map configuration state

Explanation

Only applicable to BGP routes.

Example

In the following example, add respective autonomous system numbers in front of as-path properties of all routes to enlarge the length of as-path property and change the result of selecting routes.

```
route-map add-as
set as-path prepend 200 200 200 200
```

Relevant 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

9.4.13 set atomic-aggregate

Configure a route-map setting rule to set atomic-aggregate property of BGP route. Use command “no” to delete the configuration.

Syntas

set atomic-aggregate

no set atomic-aggregate

Parameter

None

Default

None

Command mode

Route-map configuration state

Explanation

Only applicable to BGP routes. If the aggregate of information losing is caused when a system transmits routes, it is necessary to set atomic-aggregate property for this route.

Example

In the following example, add respective autonomous system numbers in front of as-path properties of all routes to enlarge the length of as-path property and change the result of selecting routes.

```
route-map tee
set atomic-aggregate
```

Relevant 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

9.4.14 set community

Configure a route-map setting rule to set community property of BGP route. Use command “no” to delete the configuration.

Syntas

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	New form of community value.
1-4294967295	Community value
no-advertise	Without advertising to any neighbor (famous community number).
local-as	Without advertising outside this autonomous system including outside EBGP neighbor (well known community) within the same autonomous system confederation.
no-export	Without advertising outside this autonomous system or autonomous system confederation (well known community).

Default

none

Command mode

Route-map configuration mode

Explanation

Only applicable to BGP routes. Newly set community value will replace the former community property of the route.

Example

In the following example, set local-AS property for all routes from neighbor 193.12.202.12 to make these routes not to be advertised 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
```

Relevant 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

9.4.15 set community-additive

Set a route-map setting rule to add community value to community property of BGP routes. Use command “no” to delete the configuration.

Syntas

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	New form of community value
1-4294967295	Community value
no-advertise	Without advertising to any neighbor (well know community number)
local-as	Without advertising outside this autonomous system including outside EBGP neighbor (well known community) within the same autonomous system confederation.
no-export	Without advertising outside this autonomous system or autonomous system confederation (well known community).

Default

none

Command mode

Route-map configuration mode

Explanation

Only applicable to BGP routes. Newly set community value will be added to the former community value of the route.

Example

In the following example, add local-AS community property to routes from neighbor 193.12.202.12 to make these routes not to be advertised 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
```

Relevant 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

9.4.16 set dampening

Set BGP route dampening control parameter without revising route's property. Use "no" command to delete.

Syntas

set dampening [*half-time*|*reuse-value*|*suppress-valu*|*hold-time*]

no set dampening [*half-time*|*reuse-value*|*suppress-value*|*hold-time*]

Parameter

Parameter	Description
half-time	Half-life of BGP route dampening punishment attenuation. The unit is min ute.
reuse-value	BGP reuses punishment value of route suppressed by dampening
suppress-value	Punishment value of route that BGP suppresses dampening
hold-time	The longest time BGP route dampening being held. The unit is minute.

Default

None

Command mode

Route-map configuration mode

Explanation

Used only to provide parameter to BGP dampening route control

Example

None

Relevant command

route-map

9.4.17 set default

Set default information for policy routes. Use "no" command to delete configuration.

Syntas

set default interface *interface-name*

no set default interface *interface-name*

Parameter

Parameter	Description
interface-name	Name of specified interface

Default

None

Command mode

Route-map configuration mode

Explanation

Applicable topolicy routes. Used to set default output interface for strategic routes. It will be really validated only when the state of the interface is available. The interface is available means that the interface meets two conditions:

First: IpprotocolUP of the interface.

Second: the interface has IP address, or negotiated IP address, or NULL interface.

Relevant command

route-map

9.4.18 set interface

Set outgoing interface for the route. Use “no” command to delete the configuration.

Syntas

set interface *interface-name*

no set interface *interface-name*

Parameter

Parameter	Description
interface-name	Name of specified interface.

Default

None

Command mode

Route-map configuration mode

Explanation

Applicable to strategic routes. Used to set default output interface for strategic routes. It will be really validated only when the state of the interface is available. The interface is available means that the interface meets two conditions:

First: IpprotocolUP of the interface.

Second: the interface has IP address, or negotiated IP address, or NULL interface.

Relevant command

route-map

9.4.19 set ip default

Set default naxthop for strategic routes. Use “no” command to disable the configuration.

Syntas

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 address

Default

none

Command mode

Route-map configuration mode

Explanation

Applicable to strategic routes. It will be valid only when nexthop is reachable. It can be set as a route.

Example

none

Relevant command

route-map

9.4.20 set ip precedence

Set precedence for policyroute. Use “no” command to delete the configuration.

Syntas

set ip precedence *0-7*

no set ip precedence *0-7*

Parameter

Parameter	Description
0-7	Precedence set for packet.

Default

none

Command mode

Route-map configuration mode

Explanation

applicable to strategic routes. After strategic route finds proper usable routing for the route, it will set precedence for the route. If the strategic route fails, precedence won't be set. Precedence definition of IP packet is as the following:

routine	0
priority	1
immediate	2
flash	3
flash-override	4
critical	5
internet	6
network	7

Example

none

Relevant command

route-map

9.4.21 set ip tos

Set precedence for strategic routes. Use "no" command to delete the configuration.

Syntas

set ip tos *0-15*

no set ip tos*0-15*

Parameter

Parameter	Description
0-15	TOS set for the packet.

Default

None

Command mode

Route-map configuration state

Explanation

Applicable for policy routes. After the strategic find proper usable route, it will also set tos for it. If strategic route fails, tos won't be set. Different tos can be set according to bit or set together as the following:

normal		0
min-monestary	1	
max-reliability	2	
max-throughput		4
min-delay	8	

Relevant command

route-map

9.4.22 set ip next-hop

Configure a route-map setting rule to set next-hop address. Use "no" command to delete the configuration.

Syntas

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

None

Command mode

Route-map configuration state

Explanation

Applicable to all IP routes.

Example

In the following example, set the nexthop address of all routes from neighbor 193.12.202.12 as 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
```

Relevant 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

9.4.23 set local-preference

Configure a route-map setting rule to set local-preference property of BGP route. Use “no” command to delete the configuration.

Syntas

set local-preference *value*

no set local-preference *value*

Parameter

Parameter	Description
value	Local-preference vlue

Default

none

Command mode

Route-map configuration state

Explanation

Applicable only for BGP routes.

Example

The defined ROUTE-MAP as the following will set local-preference of BGP route as 200:

route-map set-local-pref
set local-preference 200

Relevant 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

9.4.24 set metric

Set a route-map setting rule to set metric value of route. Use “no” command to delete configuration.

Syntas

set metric *value*

no set metric *value*

Parameter

Parameter	Description
value	Metric value

Default

None

Command mode

Route-map configuration mode

Explanation

Applicable to all ip routes.

Example

In the following example, defined ROUTE-MAP can set metric value of the route as 120:

route-map set-metric
set metric 120

Relevant 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

9.4.25 set origin

Configure a ROUTE-MAP setting rule to set origin property of BGP route. Use “no” command to delete the configuration.

Syntas

set origin [**igp** | **egp** | **incomplete**]

no set origin [**igp** | **egp** | **incomplete**]

Parameter

Parameter	Description
igp	Interior route of autonomous system
egp	Exterior route of autonomous system
incomplete	Uncertain route

Default

The default of route configured locally with “network” command is igp. The default of route configured locally with “aggregate” command is incomplete. The route default generated by redistribute is incomplete.

Command mode

Route-map configuration mode

Explanation

Applicable only to BGP route.

Example

ROUTE-MAP defined in the following example can set origin property of BGP route with path property beginning from 10 as igp:

```
ip as-path-list self permit ^10
route-map set-origin
match as-path self
```

set origin igp

Relevant 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

9.4.26 set tag

Set a route-map setting rule to set tag value of the route. Use “no” command to delete the configuration.

Syntas

set tag *value*

no set tag *value*

Parameter

Parameter	Description
value	Tag value.

Default

Default tag value is 0.

Command mode

Route-map configuration mode

Explanation

Applicable to all ip routes

Example

The ROUTE-MAP defined in the following example can set tag value of the route as 120980:

route-map set-tag
set tag 120980

Relevant 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

9.4.27 set weight

Set a route-map setting rule to set weight value of BGP route. Use “no” command to delete the configuration.

Syntas

set weight *value*

no set weight *value*

Parameter

Parameter	Description
value	Weight value.

Default

Default weight value of BGP route generated locally is 32768. route weight value obtained from neighbor is 0.

Command mode

Route-map configuration mode

Explanation

Applicable only to BGP route.

Example

ROUTE-MAP defined in the following example can set the weight value of BGP route as 230:

route-map set-weight
set weight 230

Relevant 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

9.4.28 show route-map

Show route map configured in the system. Specifying the name will show specified route map information.

show route-map *name*

Parameter

Parameter	Description
name	Name of route-map

Default

none

Command mode

supervisor mode

Explanation

If no name is specified, route-map information of all configurations in the system will be showed.

Example

All route-maps in the system is showed in the following example:

Show ip route-map

Relevant 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