



RG-S8600

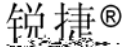
IPv6

RGOS 10.3(5)

©2010

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山 4 4 4 4 4 4

   
RGOS® 4 RGNOS® 4  
 4  4 

{ x | y | ... }

Ш

[x | y | ...]

Ш

//

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3.

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ч

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1)

2)

ч

Ш

3)

Ш

```

aaa-gs      AAA server group mode
acl         acl configure mode
bgp         Configure bgp Protocol
config      globle configure mode

```

*

**command-alias=original-command*

```

EXEC      "s"      "show"      山      "s?"
's'

```

Ruijie# **s?**

*s=show show start-chat start-terminal-service

山

```

EXEC      "sv"      "show version"

```

Ruijie# **s?**

*s=show *sv="show version" show start-chat
start-terminal-service

山

Ruijie# **s?**

show start-chat start-terminal-service

```

"ia"      "ip address"

```

Ruijie(config-if)# **ia ?**

A.B.C.D IP address

dhcp IP Address via DHCP

Ruijie(config-if)# **ip address**

```

"ip address"

```

山

山

show aliases

山

r A

"def-route"

"ip route 0.0.0.0 0.0.0.0 192.168.1.1"

Ruijie# **configure terminal**

Ruijie(config)# **alias config** def-route ip route 0.0.0.0
0.0.0.0 192.168.1.1

Ruijie(config)# **def-route?**

*def-route="ip route 0.0.0.0 0.0.0.0 192.168.1.1"

exec	
interface	
ip-dhcp-pool	DHCP
keychain	KeyChain
keychain-key	KeyChain-key
time-range	Time-Range

Г Д

CLI 1 "test" reload

mode

Ш

г А

г А

EXEC

г А

Ш

г А

EXEC

Ruijie# **show aliases exec**

exec mode alias:

h	help
p	ping
s	show
u	undebug
un	undebug

г А

alias	

2

2.1

CLI

- **disable**
- **enable**
- **enable password**
- **enable secret**
- **password**
- **login**
- **login local**
- **login authentication**
- **username**
- **lock**
- **lockable**
- **telnet**
- **ip telnet source-interface**
- **enable service**

2.1.1 disable

disable

disable [*privilege-level*]

└─┬─┘

privilege-level

└─┬─┘

└─┬─┘

└─┘

└─┘

&

disable

Ш

г Д

Ruijie# **disable 10**

г Д

enable	Ш

2.1.2 enable

enableШ

Э

ЮШ

2.1.3 enable password

enable passwordШ

no

Ш

enable password [*level level*] {*password* | [**0** | **7**] *encrypted-password*}

no enable password

г Д

Password

EXEC

Ш

Level

Ш

0|7

0

7

Ш

encrypted-password

Ш

г Д

г Д

Ш

Ш

о

1 26

Ш

enable password	␣

2.1.6 password

```

                                line                line      password␣␣
no                                line                ␣␣

password {password | [0|7] encrypted-password}
no password

r      A
      password                line                ␣␣
      0|7                    0          7          ␣␣
      encrypted-password                ␣␣

r      A
      line

r      A
                                line                ␣␣

r      A
                                line                red

Ruijie(config)# line vty 0
Ruijie(config-line)# password red

r      A

```

login	␣

2.1.7 login

AAA

```

Ruijie(config)# aaa
Ruijie(config)# line
Ruijie(config-line)#
Ruijie(config-line)# AAA
Ruijie(config-line)# VTY console
Ruijie(config-line)#
Ruijie(config-line)# VTY
Ruijie(config)# no aaa new-model
Ruijie(config)# line vty 0
Ruijie(config-line)# password 0 normatest
Ruijie(config-line)# login

```

password	line

2.1.8 login local

```

Ruijie(config)# AAA
Ruijie(config)# login local
Ruijie(config)# no
Ruijie(config)# login local
Ruijie(config)# no login local
Ruijie(config)#
Ruijie(config)# line
Ruijie(config-line)#
Ruijie(config-line)# AAA
Ruijie(config-line)#

```

```
Ruijie(config)# no aaa new-model
Ruijie(config)# username test password 0 test
Ruijie(config)# line vty 0
Ruijie(config-line)# login local
```

Г А

username	Ш

2.1.9 login authentication

AAA

AAA

Ш

no

Ш

login authentication {default | *list-name*}

no login authentication {default | *list-name*}

Г А

default

list-name

Г А

line

Г А

AAA

АЕ â

АЕ \$X12D10a× 2^Àadnusthentication

2.1.10 username

username

username *name* { **nopassword** | **password** { *password* | [0|7] *encrypted-password* }}

username *name* **privilege** *privilege-level*

no username *name*

Г Д

name Ш

password Ш

0|7 0 7 Ш

encrypted-password Ш

privilege-level Ш

Г Д

Г Д

Ш

7 Ш

7Ш

7Ш

Г Д

15

Ruijie(config)# **username** *test* **privilege** *15* **password** *0* *pw15*

Г Д

login local	Ш

2.1.11 lock

		EXEC	lock
	lock		
Г	А		
Г	А		
Г	А		
	Щ		
	1. lock		
	2.	Щ	
		Г Locked Г	
	3.		
	lockable	line	line
Г	А		Щ
	<pre> Ruijie(config-line)# lockable Ruijie(config-line)# end Ruijie# lock Password: <password> Again: <password> Locked Password: <password> Ruijie# </pre>		
Г	А		
	lockable	Щ Q , È ü,É ð Ç% Â ðÁ€`•@¥ D!ÿQN0=ñf³â	

			no lockable
Г	А		
Г	А		
			line
Г	А		
		EXEC	lock Ш
Г	А		

```

Ruijie(config)# line console 0
Ruijie(config-line)# lockable
Ruijie(config-line)# end
Ruijie# lock
Password: <password>
Again: <password>
Locked
Password: <password>
Ruijie#

```

Г	А		
		lock	Ш

2.1.13 telnet

			telnet		EXEC
		telnet		Ш	
		telnet <i>host</i> [<i>port</i>] [<i>keyword</i>]			
Г	А				
		<i>Host</i>	IP		
		<i>Port</i>	TCP	23	
		<i>Keyword</i>			

		/source-interface	telnet
г	А		
г	А		
		telnet	Ш
г	А		
		telnet	192.168.1.11
		vlan 1	VRF vpn1
		Ruijie# telnet 192.168.1.11 /source interface vlan 1 /vrf vpn1	
г	А		
		Show sessions	
		exit	

2.1.14 ip telnet source-interface

		IP	Telnet
		ip telnet source-interface	
		ip telnet source-interface <i>interface-name</i>	
г	А		
		<i>interface-name</i>	IP Telnet
г	А		
г	А		
		telnet	IP Telnet
		source-interface	Telnet Ш no ip telnet Ш
г	А		
		Loopback 1	IP Telnet
		Ruijie(config)# ip telnet source-interface Loopback 1	
г	А		

telnet	Telnet

2.1.15 enable service

SSH Server/Telnet Server/Web Server/Snmp Agent
enable service

enable service { ssh-sesrver | telnet-server | web-server | snmp-agent }

Г Д

ssh-sesrver	SSH Server
telnet-server	Telnet Server
web-server	Http Server
snmp-agent	Snmp Agent

Г Д

Г Д

⏏ **no enable service**

⏏

Г Д

enable service ssh-sesrver, SSH Server
 Ruijie(Config # **enable service ssh-sesrver**

Г Д

show service	

2.2

- **clock set**
- **clock update-calendar**

-
- exec-timeout
 - hostname
 - session-timeout
 - show clock
 - show running-config
 - show startup-config
 - reload
 - show reload
 - prompt
 - banner motd
 - banner login
 - speed
 - show line
 - write

2.2.1 clock set

clock set

clock set *hh:mm:ss month day year*

```

Ruijie# clock set
  hh:mm:ss          24 : :
  day               1-31  3
  month             1-12
  year              1993-2035  3

Ruijie# clock set

Ruijie# clock set
  3
  clock set
  3

Ruijie# clock set
  2003  3  17  10  20  30

Ruijie# clock set 10:20:30 3 17 2003
Ruijie# show clock

```

clock: 2003-3-17 10:20:32

г д

2.2.2 clock update-calendar

clock clock privileged EXEC clock clock
update-calendar clock clock
clock update-calendar

г д

г д

г д

calendar

Ш

Ш

г д

clock clockШ

Ruijie# clock update-calendar

г д

--

LINE6.02c 0 Tw 0 Ts 1002.47488.5 <361D0E311FF514E3>.02cd()TjE488.5 786.02c 0 Tw 0 Ts.0057 1

2.2.5 session-timeout

```

LINE
session-timeout 0 no session-timeout
LINE

session-timeout minutes [seconds]
no session-timeout

Ruijie> session-timeout
minutes
seconds

Ruijie> session-timeout 0 min
0 min

Ruijie> session-timeout
LINE

Ruijie> session-timeout
LINE
LINE
LINE

Ruijie> session-timeout
line vty 0 5 30 :
Ruijie(config-line)# exec-timeout 5 30
```

2.2.6 show clock

```

show clock
show clock
show clock [detail]

Ruijie> show clock
detail

Ruijie> show clock
detail

Ruijie> show clock
detail

Ruijie> show clock
show clock
```

```
Ruijie# show clock detail
clock: 2003-3-17 10:27:21
Clock read from calendar when system boot.
```

r A

clock set	

2.2.7 show running-config

```
month      1  12
day        1  31
year       1993  2035
cancel
```

```
r      A
```

```
r      A
```

```
▯▯
```

```
r      A
```

```
10
```

```
Ruijie# reload in 10
Router will reload in 600 seconds.
```

2.2.10 show reload

```
show
```

```
reload▯▯
```

```
show reload
```

```
r      A
```

```
r      A
```

```
r      A
```

```
▯▯
```

```
r      A
```

```
Ruijie# show reload
Reload scheduled in 595 seconds.
At 2003-12-29 11:37:42
Reload reason: test.
```

2.2.11 prompt

```
prompt▯▯
```

```
no prompt  ▯▯
```

```

    prompt string
r      A
    string 32
r      A
r      A
    EXEC
r      A
    RGOS
Ruijie(config)# prompt RGOS
Ruijie(config)# end
RGOS

```

2.2.12 banner motd

```

no banner motd banner motd
banner motd c message c
r      A
    c
    message
r      A
r      A
    EXEC
Ruijie(config)
Ruijie(config)# banner motd $ hello,world $

```

2.2.13 banner login

```
Ruijie(config)#
Ruijie(config)# line console 0
Ruijie(config-line)# speed 57600
Ruijie(config-line)#
```

2.2.15 show line

show line 

show line [**console** *line-num* | **vty** *line-num* | *line-num*]

```
r      A
```

console

vty vty

line-num line

```
r      A
```

```
r      A
```

```
r      A
```



```
r      A
```

console

```
Ruijie# show line console 0
```

```
CON      Type      speed  Overruns
```

```
* 0      CON      9600   45927
```

```
Line 0, Location: "", Type: "vt100"
```

```
Length: 24 lines, Width: 79 columns
```

```
Special Chars: Escape Disconnect Activation
```

```
          ^^x      none      ^M
```

```
Timeouts:      Idle EXEC      Idle Session
```

```
          never      never
```

```
History is enabled, history size is 10.
```

```
Total input: 53564 bytes
```

```
Total output: 395756 bytes
```

```
Data overflow: 27697 bytes
```

```
stop rx interrupt: 0 times
```

2.2.16 write

write▯▯

write [memory | network | terminal]

r A

memory running-config NVRAM copy
running-config startup-config▯▯

network TFTP copy
running-config tftp▯▯

terminal **show running-config**▯▯

r A

r A

Q

3 LINE

3.1 LINE

3.1.1 line

LINE

line [console | vty] first-line [last-line]

Г А

console	
vty	telnet/ssh
First-line	first-line
Last-line	last-line

Г А

Г А

Г А

LINE

Г А

LINE VTY 1 3 LINE

Ruijie(config)# line vty 1 3

Г А

3.1.2 line vty

VTY VTY 3 no
VTY 3

line vty *line-number*
no line vty *line-number*

```

r      A
                                     VTY          5          0--4
r      A
r      A
                                     VTY
r      A
                                     VTY          20          VTY          0--19
Ruijie(config)# line vty 19
                                     VTY          10          VTY          0--9
Ruijie(config)# line vty 10
r      A

```

3.1.3 transport input

Line **transport input** Line
 default transport input LINE

transport input {all | ssh | telnet | none}
default transport input

```

r      A

```

all	Line
ssh	Line SSH
telnet	Line Telnet
none	Line

```

r      A

```

Г Д

Г Д

Г Д

```
Ruijie# configure terminal
Ruijie(config)# line vty 0 4
Ruijie(config-line)# transport input telnet
```

Г Д

show running	山

Г Д

RGOS10.1

Г Д

--	--

LINE

4

4.1

	CLI	COPY	
°	Xmodem	copy xmodem	⏏
°	Tftp	copy tftp	

4.1.1 copy xmodem

```
xmodem                                xmodem
⏏

copy flash: filename xmodem
copy xmodem flash: filename

r      A
      filename

r      A
      ⏏

r      A

r      A
      Xmodem                                ⏏                                ⏏Xmodem
      ⏏                                4
      :                                xmodem
      xmodem                                ⏏
```

```
copy xmodem flash:"filename"    copy flash:"filename" xmodem
```

```
r      A
```

```
Ruijie# copy xmodem flash: config.text
```

```
Ruijie# copy flash: config.text xmodem
```

```
└      A
```

4.1.2 copy tftp

```
          tftp                                tftp                                W
```

```
copy flash: filename tftp:// location / filename
```

```
copy tftp:// location/filename flash: filename
```

```
copy flash: filename tftp:// location / filename vrf vrfname
```

```
copy tftp:// location/filename flash: filename vrf vrfname
```

```
└      A
```

```
filename                                W
```

```
vrfname vrf                            W
```

```
└      A
```

```
W
```

```
└      A
```

```
└      A
```

```
TFTP                                W                                W  
                                     4                                WTFTP  
W
```

```
tftp
```

```
copy tftp://"location/filename" flash:filename vrf vrfname
```

```
copy tftp://localtion/filename flash:"filename" vrf vrfname
```

```
└      A
```

```
config.bak                                ip 192.168.12. 1  
;                                          switch.bin  
ip 192.168.12.1
```

```
Ruijie# copy tftp://192.168.12.1/config.bak flash:  
config.text
```

```
Ruijie# copy flash: swhich.bin tftp://192.168.12.1/  
config.bak
```

```
r      A
```

5

5.1

- ping
- traceroute
- line-detect

5.1.1 ping

4

山

ping [**vrf**] [*vrf-name*] [**ip**] [*ip-address* [**length** *length*] [**ntimes** *times*] [**timeout** *seconds*] [**data** *data*] [**source** *source*]]

г А

<i>vrf-name</i>	VRF
<i>ip-address</i>	IPv4 山
<i>length</i>	
<i>times</i>	
timeout	
<i>data</i>	
<i>source</i>	IPv4

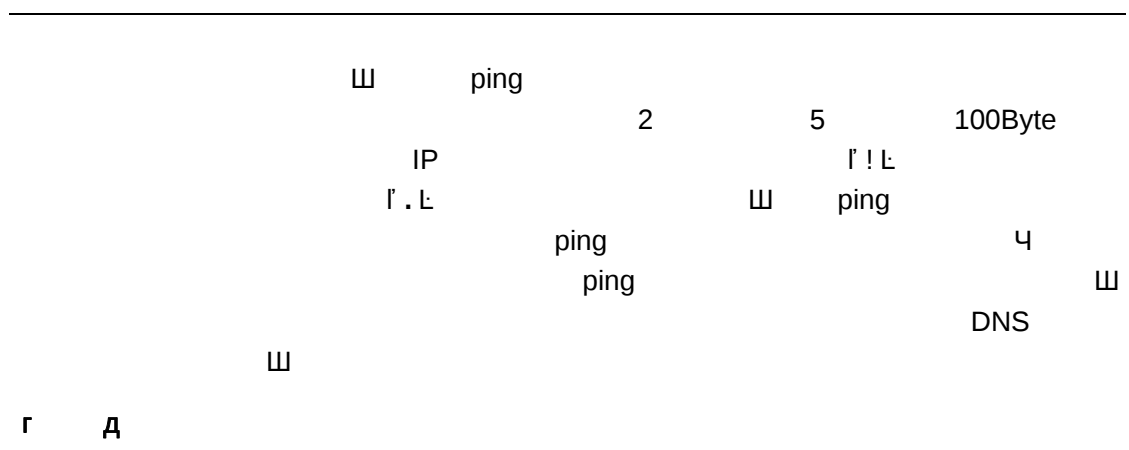
г А

IP 山 2 5 100Byte

г А

г А

Ping ping ping



<i>ip-address</i>	IPv4 山
<i>number</i>	
<i>source-address</i>	IPV4
<i>seconds</i>	
<i>minimum maximum</i>	TTL

г А

г А

traceroute

山
DNS 山

г А

traceroute
山

14 traceroute

```
Ruijie# traceroute 61.154.22.36
< press Ctrl+C to break >
Tracing the route to 61.154.22.36
 1  192.168.12.1    0 msec  0 msec  0 msec
 2  192.168.9.2    4 msec  4 msec  4 msec
 3  192.168.9.1    8 msec  8 msec  4 msec
 4  192.168.0.10   4 msec  28 msec 12 msec
 5  202.101.143.130 4 msec  16 msec  8 msec
 6  202.101.143.154 12 msec  8 msec  24 msec
 7  61.154.22.36   12 msec  8 msec  22 msec

                                IP      61.154.22.36
                                1 6
                                山
```

24 traceroute

```
Ruijie# traceroute 202.108.37.42
< press Ctrl+C to break >
Tracing the route to 202.108.37.42
 1  192.168.12.1    0 msec  0 msec  0 msec
 2  192.168.9.2    0 msec  4 msec  4 msec
 3  192.168.110.1   16 msec 12 msec 16 msec
 4  * * *
 5  61.154.8.129    12 msec 28 msec 12 msec
```

```

6      61.154.8.17      8 msec  12 msec  16 msec
7      61.154.8.250     12 msec  12 msec  12 msec
8      218.85.157.222   12 msec  12 msec  12 msec
9      218.85.157.130   16 msec  16 msec  16 msec
10     218.85.157.77    16 msec  48 msec  16 msec
11     202.97.40.65     76 msec  24 msec  24 msec
12     202.97.37.65     32 msec  24 msec  24 msec
13     202.97.38.162    52 msec  52 msec  224 msec
14     202.96.12.38     84 msec  52 msec  52 msec
15     202.106.192.226   88 msec  52 msec  52 msec
16     202.106.192.174   52 msec  52 msec  88 msec
17     210.74.176.158   100 msec  52 msec  84 msec
18     202.108.37.42    48 msec  48 msec  52 msec
Ruijie#

```

```

                                     IP
202.108.37.42                       1  17
      4                               山

```

```
Ruijie# traceroute www.ietf.org
```

```
Translating " www.ietf.org "...[OK]
```

```
< press Ctrl+C to break >
```

```
Tracing the route to 64.170.98.32
```

```

1      192.168.217.1    0 msec  0 msec  0 msec
2      10.10.25.1       0 msec  0 msec  0 msec
3      10.10.24.1       0 msec  0 msec  0 msec
4      10.10.30.1      10 msec  0 msec  0 msec
5      218.5.3.254      0 msec  0 msec  0 msec
6      61.154.8.49     10 msec  0 msec  0 msec
7      202.109.204.210   0 msec  0 msec  0 msec
8      202.97.41.69     20 msec  10 msec  20 msec
9      202.97.34.65     40 msec  40 msec  50 msec
10     202.97.57.222     50 msec  40 msec  40 msec
11     219.141.130.122   40 msec  50 msec  40 msec
12     219.142.11.10    40 msec  50 msec  30 msec
13     211.157.37.14    50 msec  40 msec  50 msec
14     222.35.65.1      40 msec  50 msec  40 msec
15     222.35.65.18     40 msec  40 msec  40 msec
16     222.35.15.109    50 msec  50 msec  50 msec
17     *               *
18     64.170.98.32     40 msec  40 msec  40 msec

```

```
Г      Д
```

```
山
```

5.1.3 Line-detect

line-detect

⏏

line-detect

⏏

⏏

A

⏏

A

⏏

A

line-detect

⏏

⏏

A

Ruijie(config)#**int gigabitEthernet 3/1**

Ruijie(config-if)#**line-detect**

start cable-diagnoses,please wait...

cable-daignoses end!this is result:

4 pairs

pair state length(meters)

A Ok 2

B Ok 1

C Short 1

D Short 1

pairs	⏏

State

OK

⏏

X € €3

«

S8600

M8600_48GT_4SFP_POE_II

M8600_48GT_4SFP_E

M8600_48GT_4SFP_E_II

6

6.1

- interface aggregateport
- interface giagbitEthernet
- interface vlan
- medium-type
- descriptioin
- shutdown
- speed
- duplex
- flowcontrol
- mtu
- carrier-delay
- clear counters
- clear interface
- switchport
- switchport mode
- switchport access
- switchport trunk
- snmp trap link-status

6.1.1 interface aggregateport

		no	
		interface aggregateport <i>port-number</i>	
r	A	<i>port-number</i>	Aggregate port
r	A		
r	A		
		port	aggregate port
			Aggregate

aggregate port 山 show interfaces show
interfaces aggregateport 山

Г А

Ruijie(config)# interface aggregateport 3
Ruijie(config-if)#

Г А

show interfaces	山

Г А

S8600 € S €

6.1.3 interface vlan

		virtual interface	SVI	switch				
			SVI	no				
		interface vlan <i>vlan-id</i>						
		no interface vlan <i>vlan-id</i>						
Г	Д							
		<i>vlan-id</i>	VLAN ID					
Г	Д							
Г	Д							
		show interfaces	show interfaces vlan					
Г	Д							
		Ruijie(config)# interface vlan 2						
		Ruijie(config-if)#						
Г	Д							
		<table><tr><td></td><td></td></tr><tr><td>show interfaces</td><td></td></tr></table>					show interfaces	
show interfaces								
Г	Д							
		S8600						
		o	2K	SVI				
		o	2K	IP				

6.1.4 medium-type

				no	.
		medium-type { fiber copper }			
		no medium-type			
Г	Д				
		fiber			
		copper			
Г	Д				

Г Д

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# description GBIC-1
```

Г Д

show interfaces	Ш

6.1.6 shutdown

```
Ш no
Ш
shutdown
no shutdown
```

Г Д

Г Д

```
Ч Ap Ч SVI
Ш show interfaces
Ш
```

Г Д

```
Ap 1
Ruijie(config)# interface aggregateport 1
Ruijie(config-if)# shutdown

Ap 1
Ruijie(config)# interface aggregateport 1
Ruijie(config-if)# no shutdown
```

Г Д

clear interface	Ш
show interfaces	Ш

&

```

no shutdown

```

6.1.7 speed

```

no
10 10Mbps
100 100Mbps
1000 1000Mbps
10G 10Gbps
auto

```

```


```

```


```

```

Ap
show interfaces
SFP 10M 100M
Ap

```

```

Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# speed 100

```

show interfaces	

show interfaces	山

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

r D

seconds 1 60

r D

2

r D

r D

DCD Down Up

carrier-delay [seconds]

no carrier-delay

r D

seconds 1 60

r D

2

r D

r D

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

carrier-delay [seconds]

no carrier-delay

seconds 1 60

2

DCD Down Up

```
Ruijie# clear counters gigabitethernet 1/1
```

```
r      A
```



```
show interfaces
```

```
!!!
```

switch port trunk VLAN 三

VLAN VLAN VLAN trunk port

VLAN VLAN 三 **switchport trunk**

VLAN

Г Д

Ruijie(config-if)# **switchport mode trunk**

Г Д

```

VLAN      VLAN ID  Trunk      native VLAN
  1         1         1         1

VLAN
Trunk VLAN 14094
Trunk VLAN VLAN

switchport

1/15

interface fastethernet 1/15
switchport trunk allowed vlan remove

end
faces fastethernet1/15 switchport
led

ative vlan is 1
led

```

	show interfaces	
	switchport access	statics accessport VLAN

6.1.18 snmp trap link-status

```

Link      SNMP      LinkTrap
no        LinkTrap,

```

Г А

Ч Ap Ч SVI
LinkTrap Link SNMP
LinkTrap, Ш

Г А

Link trap

```
Ruijie(config)# interface gigabitEthernet 1/1  
Ruijie(config-if)# no snmp trap link-status
```

Link trap

```
Ruijie(config)# interface gigabitEthernet 1/1
```

г А

Ш

г А

г А

Ш

г А

```
Ruijie# show interfacesgigabitEthernet 0/1 switchport
Interface Switchport ModeAccess Native Protected VLAN
lists
```

```
-----
GigabitEthernet 0/1 enabled Access 11 Disabled ALL
```

г А

duplex	Ш
flowcontrol	Ш
interface gigabitEthernet	Ш
interface aggregateport	Ш
interface vlan	switch virtual interface SVI Ш
shutdown	Ш
speed	Ш
switchport priority	802.1q Ш
switchport protected	Ш

7 Aggregate Port

7.1

7.1.1 port-group

```

Aggregate Port
Aggregate Port
Aggregate Port
no
port-group port-group-number
no port-group

r      A
Aggregate Port

r      A


|                   |                                  |
|-------------------|----------------------------------|
|                   |                                  |
| port-group-number | Aggregate Port<br>Aggregate Port |



r      A

r      A
AP          VLAN          trunk port
native VLAN          AP

r      A
1/3          AP 3

Ruijie(config)# interface gigabitethernet 1/3
Ruijie(config-if)# port-group 3

r      A
S8600
o          8
o          128  AP

```

7.1.2 aggregateport load-balance

AP
 111 no

**aggregateport load-balance {dst-mac | src-mac | src-dst-mac |
 dst-ip | src-ip | src-dst-ip }**

no aggregateport load-balance

1 A

dst-mac	MAC 111 AP MAC MAC
src-mac	MAC 111 AP MAC MAC
src-dst-ip	IP IP 111 IP—— IP IP—— IP 111 111
dst-ip	IP 111 AP IP IP
src-ip	IP 111 AP IP IP
src-dst-mac	MAC MAC 111 MAC—— MAC MAC—— MAC 111

1 A

MAC

1 A

1 A

show aggregateport load-balance

1 A

Ruijie(config)# **aggregateport load-balance dst-mac**

1 A

--	--

show aggregateport load-balance	aggregateport	Ш
--	---------------	---

г А

S8600

7.2

7.2.1 show aggregateport

aggregateport Ш

show aggregateport {[*aggregate-port-number*] **summary** |
load-balance}

г А

<i>aggregate-port-number</i>	Aggregate Port Ш
load-balance	aggeregaye port Ш
summary	aggregate port Ш

г А

г А

aggregate port

aggregate port

г А

```
Ruijie# show aggregateport 1 summary
AggregatePort  MaxPorts      SwitchPort Mode   Ports
-----
Ag1             8             Enabled   ACCESS
```

г А

--	--

8 LACP

8.1

8.1.1 lacp port-priority

LACP $\mathbb{W}$ no $\mathbb{W}$

larp port-priority *port-priority*

```
no lacp port-priority
```

<i>port-priority</i>	Ш 0-65535

32768山

W

2

2

22

8.1.2 port-group mode

LACP ID 11 no
LACP 11

port-group key mode active | passive

no port-group

Key	ID, key 11
active	LACP 11
passive	LACP LACP LACP

LACP 11

11

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# port-group 1 mode active
```

lacp port-priority	

<i>port-priority</i>	⏏	0-65535

32768⏏

⏏

” , , ⏏

Ruijie(config)# **interface gigabitethernet 1/1**
 Ruijie(config-if)# **lacp port-priority 4096**

port-group key mode active passive	LACP	ID
port-group key mode	⏏	

-	-	

8.1.4 lacp system-priority

LACP ⏏ no ⏏

lacp system-priority *system-priority*

no lacp system-priority

<i>system-priority</i>	LACP	0-65535⏏

III

Ruijie(config)# **lacp system-priority 4096**



Local information:

		LACP port		Oper	Port	Port
Port	Flags	State	Priority	Key	Number	State

Gi0/1	SA	bndl	4096		0x3	0x1 0x3d
Gi0/2	SA	bndl	4096		0x3	0x2 0x3d
Gi0/3	SA	bndl	4096		0x3	0x3 0x3d

Partner information:

		LACP port		Oper	Port	Port
Port	Flags	Priority	Dev ID	Key	Number	State

Gi0/1	SA	61440	00d0.f800.0002	0x3	0x1	0x3d
Gi0/2	SA	61440	00d0.f800.0002	0x3	0x2	0x3d
Gi0/3	SA	61440	00d0.f800.0002	0x3	0x3	0x3d

Local information		LACP				
Port		ID				
Flags		I S' LACP LACPPDU				
		'A'				
State		I bndl L				
		Down				
		sup				

9 VLAN

9.1

9.1.1 vlan

	VLAN	W	no
VLANW			
vlan <i>vlan-id</i>			
no vlan <i>vlan-id</i>			

Г Д

<i>vlan-id</i>	VLAN ID $\sqcup$ VLAN VLAN 1 $\sqcup$

Г Д

Г Д

end Ctrl+C 冂

exit

Г Д

```
Ruijie(config)# vlan 1
Ruijie(config-vlan)#
```

Г Д

show vlan	VLAN 3

Г Д

S8600 4093 vlan

9.1.2 name

VLAN

|

no

|

name *vlan-name***no name**

r A

<i>vlan-name</i>	VLAN

r A

VLAN

r A

VLAN

r A

show vlan

vlan

r A

Ruijie(config)# **vlan 10**Ruijie(config-vlan)# **name vlan10**

r A

show vlan	VLAN

9.1.3 switchport mode

switch port

access port

trunk port,

802.1Q

|

no

|

switchport mode {access | trunk}**no switchport mode**

r A

access	switch port access port
trunk	switch port trunk port

r A

switch port

access


```

VLAN ID
VLAN
VLAN ID
VLAN
VLAN
VLAN ID
trunkport

```

└ A

```

Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport access vlan 2

```

└ A

switchport mode	switch port
switchport trunk	trunkport native VLAN Trunk VLAN

9.1.5 switchport trunk

```

trunkport native VLAN Trunk VLAN
no trunk

```

```

switchport trunk {allowed vlan { all | [add | remove | except]
vlan-list }| native vlan vlan-id}
no switchport trunk {allowed vlan | native vlan }

```

└ A

|--|--|

```

Trunk VLAN
vlan-list VLAN
VLAN ID
ID -

```

allowed vlan *vlan-list*

└ A

VLAN all Native VLAN VLAN 1

└ A

└ A

Native VLAN

Trunk native VLAN native VLAN
 UNTAG VLAN ┐
 VLAN ID IEEE 802.1Q PVID native
 VLAN VLAN ID ┐ Trunk native VLAN
 UNTAG ┐
 ┐

VLAN

Trunk VLAN 1 4094 ┐
 Trunk VLAN VLAN
 Trunk ┐

show interfaces switchport ┐

└ A

VLAN 2 1/15

```
Ruijie(config)# interface fastethernet 1/15
Ruijie(config-if)# switchport trunk allowed vlan remove
2
Ruijie(config-if)# end
Ruijie# show interfaces fastethernet1/15 switchport
Switchport is enabled
Mode is trunk port
Access vlan is 1,Native vlan is 1
Protected is disabled
Vlan lists is
1,3-4094
```

└ A

show interfaces	┐
switchport access	statics accessport VLAN ┐

9.2

9.2.1 show vlan

VLAN 1

show vlan [id *vlan-id*]

└─┘ A

<i>vlan-id</i>	VLAN ID 1

└─┘ A

└─┘ A

└─┘ A

end **Ctrl+C** 1
exit

└─┘ A

```
Ruijie# show vlan id 1
VLAN[1] "VLAN0001"
GigabitEthernet 3/1
GigabitEthernet 3/2
GigabitEthernet 3/3
GigabitEthernet 3/4
GigabitEthernet 3/5
GigabitEthernet 3/6
GigabitEthernet 3/7
GigabitEthernet 3/8
GigabitEthernet 3/9
GigabitEthernet 3/10
GigabitEthernet 3/11
GigabitEthernet 3/12
```

└─┘ A

name	VLAN 1
switchport access	Vlan1

10 Super-vlan

10.1

10.1.1 supervlan

```

#
vlan 100
  supervlan
#
vlan 101
  no supervlan
#
interface Ethernet1/0/24
  vlan 100
#
interface Ethernet1/0/25
  vlan 101
#
interface Ethernet1/0/26
  vlan 100
#
end
Ctrl+C  ä  6|6| 6
```

<i>Vlan-id-list</i>	VLAN subvlan ID, vlan

「 ㏿

VLAN

「 ㏿

no subvlan supevlan subvlan

「 ㏿

```
Ruijie(config)# vlan 3
Ruijie(config-vlan)# supervlan
Ruijie(config-vlan)# subvlan 5
Ruijie(config-vlan)# subvlan 7-19
```

「 ㏿

show supervlan	supervlan ㄣ

「 ㏿

10.1.3 subvlan-address-range

subvlan ip ㄣ

subvlan-address-range *start-ip end-ip*

no subvlan-address-range

「 ㏿

<i>start-ip</i>	SubVLAN IP
<i>end-ip</i>	SubVLAN IP

「 ㏿

VLAN

「 ㏿

end **Ctrl+C** ㄣ

exit

Г Д

```
Ruijie(config)# vlan 3
Ruijie(config-vlan)# subvlan-address-range
192.168.3.10 192.168.3.100
```

Г Д

show supervlan	supervlan 山

Г Д

10.1.4 proxy-arp

VLAN ARP 山

```
proxy-arp
no proxy-arp
```

Г Д

Г Д

VLAN

Г Д

end Ctrl+C 山

exit

Г Д

```
Ruijie(config)# vlan 3
Ruijie(config-vlan)# proxy-arp
```

Г Д

show supervlan	supervlan 山

Г Д

11 Protocol VLAN

11.1

- **protocol-vlan ipv4** *addr mask addr* **vlan** *id*
- **protocol-vlan profile** *num* **frame-type** [*type*] **ether-type** [*type*]
- **protocol-vlan profile** *num* **vlan** *id*

11.1.1 protocol-vlan ipv4 addr mask addr vlan id

```

      IP      4      VLAN
r      A
      addr      IP      x.x.x.x
      id      VLAN ID  1-      VLAN
r      A
r      A
r      A
r      A
      Ruijie(config)# protocol-vlan ipv4 192.168.100.3 mask
      255. 255.255.0 vlan 100
r      A
      show protocol-vlan ipv4
      no protocol-vlan ipv4 addr mask addr
      no protocol-vlan ipv4
r      A
      RGOS10.1
```

11.1.2 protocol-vlan profile num frame-type type ether-type

type

profile

```

r      A
      num    profile
      type

r      A

r      A

r      A

Ruijie(config)# protocol-vlan profile 1 frame-type
ETHERII ether-type aarp

r      A

show protocol-vlan profile
show protocol-vlan profile num
no protocol-vlan profile
no protocol-vlan profile num

r      A

RGOS10.1

```

11.1.3 protocol-vlan profile num vlan id

```

      profile

r      A

      num    profile
      id  VLAN ID  1-          VLAN

r      A

r      A

Ruijie(config-if)# protocol-vlan profile 1 vlan 101

r      A

show protocol-vlan profile
show protocol-vlan profile num
no protocol-vlan profile

```

no protocol-vlan profile *num*

Г Д

RGOS10.1

11.2

° **show protocol-vlan**

11.2.1 show protocol-vlan

Protocol VLAN

show vlan protocol-vlan

Г Д

Г Д

Г Д

Г Д

Ruijie# **show protocol-vlan**

Г Д

RGOS10.1

12 PrivateVLAN

12.1

- **private-vlan type**
- **private-vlan association**
- **private-vlan mapping**
- **switchport mode private-vlan**
- **switchport private-vlan host-association**
- **switchport private-vlan mapping**

12.1.1 private-vlan type

VLAN VLAN

private-vlan {*community* | *isolated* | *primary*}

no private-vlan {*community* | *isolated* | *primary*}

└ A

community community VLAN

isolated isolated VLAN

primary primary VLAN

no VLAN

└ A

└ A

VLAN

└ A

Ruijie(config)# **vlan 22**

Ruijie(config-vlan)# **private-vlan primary**

└ A

show vlan private-vlan

└ A

RGOS10.1

Г Д

```
Ruijie(config)# interface vlan 22
```

```
Ruijie(config-if)# private-vlan mapping add 24-26
```

Г Д

```
show vlan private-vlan
```

no switchport private-vlan host-association

┌ ┐

p_vid primary VID

s_vid secondary VID

no : VLAN

┌ ┐

┌ ┐

┌ ┐

```
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# switchport mode private-vlan host
Ruijie(config-if)# switchport private-vlan host-association 22 23
```

┌ ┐

show vlan private-vlan

┌ ┐

RGOS10.1

12.1.6 switchport private-vlan association trunk

private VLAN trunk primary VLAN
secondary VLAN

switchport private-vlan association trunk *p_vid* *s_vid*

no switchport private-vlan association trunk *p_vid* *s_vid*

┌ ┐

p_vid primary VID

s_vid secondary VID

no : VLAN

┌ ┐

┌ ┐

```
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# switchport mode trunk
```

```

Ruijie(config-if)# switchport private-vlan associatio
n trunk 22 23

r      A

show vlan private-vlan

r      A

RGOS10.3(5)

```

12.1.7 switchport private-vlan mapping

```

private VLAN                                secondary VLAN

switchport private-vlan mapping p_vid {svlist|add svist |remove
svlist}
no switchport private-vlan mapping

r      A

p_vid                primary VID
svlist               secondary VLAN list
no                    secondaryVLAN

r      A

VLAN

r      A

Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# switchport mode private-vlan
promiscuous
Ruijie(config-if)# switchport private-vlan mapping 22
add 23-25

r      A

show vlan private-vlan

r      A

RGOS10.1

```

12.2

Private VLAN

Г Д

Г Д

Ruijie(config-if)# **switchport mode hybrid**

Г Д

RGOS10.1

12.3.2 switchport hybrid native vlan

switchport hybrid native vlan *vid*

Г Д

Г Д

Ruijie(config-if)# **switchport hybrid allowed vlan add
untagged 3-5**

Г Д

RGOS10.1

13 802.1Q Tunneling

13.1

- **switchport mode dot1q-tunnel**
- **switchport mode uplink**
- **switchport dot1q-tunnel allowed vlan**
- **switchport dot1q-tunnel native vlan**
- **dot1q outer-vid**
- **dot1q relay-vid**
- **traffic-redirect access-group acl outer-vlan**
- **traffic-redirect access-group acl inner-vlan**
- **traffic-redirect access-group acl nested-vlan**
- **frame-tag tpid *tpid***
- **inner-priority-trust enable**
- **l2protocol-tunnel**
- **l2protocol-tunnel proto-type enable**

13.1.1 switchport mode dot1q-tunnel

802.1Q tunneling

switchport mode dot1q-tunnel

no switchport mode

r **A**

no 802.1Q tunneling

r **A**

802.1Q tunneling

r **A**

r **A**

dot1q-tunnel

```
ruijie(config)#interface gigabitEthernet 0/1
ruijie(config-if)#switchport mode dot1q-tunnel
ruijie(config)#end
```

```
r      A
      show vlan
```

```
r      A
      RGOS10.1
```

13.1.2 switchport mode uplink

```
      uplink
      switchport mode uplink
      no switchport mode

r      A
      no      uplink

r      A
      uplink

r      A

r      A
      uplink

      ruijie(config)#interface gigabitEthernet 0/1
      ruijie(config-if)#switchport mode uplink
      ruijie(config)#end

r      A
      show vlan

r      A
      RGOS10.1
```

13.1.3 switchport dot1q-tunnel allowed vlan

```
      dot1q-tunnel      vlan

      switchport dot1q-tunnel allowed vlan [add] {tagged|untagged}
      v_list

      switchport dot1q-tunnel allowed vlan remove v_list

      no switchport dot1q-tunnel allowed vlan
```

└─── A

```
tagged : tag
untagged : tag
v_list : vlan id
no
```

└─── A

```
vlan 1 untagged
```

└─── A

└─── A

```
dot1q-tunnel vlan 3-6 vlan tag
```

```
ruijie(config)#interface gigabitEthernet 0/1
ruijie(config-if)#dot1q-tunnel allowed vlan
```

```
tagged 3-6
ruijie(config)#end
```

A

```
show interface dot1q-tunnel
```

A

RGOS10.3

13.1.4

```
dot1q-tunnel vlan id
```

```
sw4tchport dot1q-tunnel native vlanvid
no sw4tchport dot1q-tunnel native vlan
```

└─── A

```
vid vlan id
no vlan 1
```

└─── A

```
vlan 1
```

└─── A

r **A**

dot1q-tunnel vid 8

```
ruijie(config)#interface gigabitEthernet 0/1
ruijie(config-if)#switchport dot1q-tunnel native vlan
8
ruijie(config)#end
```

r **A**

show interface dot1q-tunnel

r **A**

RGOS10.3

13.1.5 dot1q outer-vid

tunnel vid

dot1q outer-vid *vid* **register inner-vid** *v_list*

no dot1q outer-vid *vider* **inner-vid** *v_list*

vidTj /C
ruijie(con

RGOS10.3

13.1.6 dot1q relay-vid

access trunk hybrid vid

dot1q relay-vid *vid* **translate local-vid** *v-list*

no dot1q relay-vid *vid* **translate local-vid** *v-list*

┌ └─┘

v_list vid

vid tag vid

no

┌ └─┘

┌ └─┘

┌ └─┘

tag

```
vid
no vid
r A
r A
r A
1.1.1.1 vid 3
Ruijie#configure
Ruijie(config)#ip access-list standard 2
Ruijie(config-std-nacl)#permit host 1.1.1.1
Ruijie(config-std-nacl)#exit
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# switchport mode trunk
Ruijie(config-if)# traffic-redirect access-group 2
outer-vlan 3 in
Ruijie(config-if)# end
r A
show traffic-redirect
r A
RGOS10.3
```

13.1.8 traffic-redirect access-group acl inner-vlan

```
access trunk hybrid vid
traffic-redirect access-group acl inner-vlan vid out
no traffic-redirect access-group acl inner-vlan
r A
acl acl
vid vid
no vid
r A
r A
```

r A

1.1.1.2 vid 6

```
Ruijie#configure
Ruijie(config)#ip access-list standard to_6
Ruijie(config-std-nacl)#permit host 1.1.1.2
Ruijie(config-std-nacl)#exit
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# switchport mode trunk
Ruijie(config-if)# traffic-redirect access-group to_6
inner-vlan 6 out
Ruijie(config-if)# end
```

r A

```
show traffic-redirect
```

r A

RGOS10.3

13.1.9 traffic-redirect access-group acl nested-vlan

dot1q-tunnel vid

```
traffic-redirect access-group acl nested-vlan vid in
no traffic-redirect access-group acl nested -vlan
```

r A

```
acl                      acl
vid                      vid
no                      vid
```

r A

r A

r A

1.1.1.3 vid 9

```
ruijie#configure
ruijie(config)#ip access-list standard 20
ruijie(config-std-nacl)#permit host 1.1.1.3
```

```
ruijie(config-std-nacl)#exit
ruijie(config)# interface gigabitEthernet 0/1
ruijie(config-if)# switchport mode dot1q-tunnel
ruijie(config-if)# traffic-redirect access-group 20
nested-vlan 10 in
ruijie(config-if)# end
```

r A

```
show traffic-redirect
```

r A

```
RGOS10.1
```

13.1.10 frame-tag tpid tpid

```
tpid
```

```

/ tag tag
inner-priority-trust enable
no inner-priority-trust enable
r      A
no tag tag
r      A
r      A
tag tag
ruijie#configure
ruijie(config)# interface gigabitEthernet 0/2
ruijie(config-if)# inner-priority-trust enable
ruijie(config-if)#end
r      A
show inner-priority-trust
r      A
RGOS10.1  W

```

13.1.12 l2protocol-tunnel

```

dot1q-tunnel

l2protocol-tunnel {stp|gvrp}
no l2protocol-tunnel {stp|gvrp}
r      A 550?|1? dot1q-tunnelF0?e0,800?— A1?

```

```

ruijie(config)#end
r      A
      show l2protocol-tunnel {gvrp|stp}
```

```
r      A
```

RGOS10.3

13.1.13 l2protocol-tunnel *proto-type* enable

```

      l2protocol-tunnel {stp|gvrp} enable
      no l2protocol-tunnel {stp|gvrp} enable
r      A
      stp      stp
      gvrp      gvrp
      no
```

```
r      A
```

```
r      A
```

```

ruijie#configure
ruijie(config)# interface fa 0/1
ruijie(config-if)# l2protocol-tunnel gvrp enable
ruijie(config-if)#end
r      A
      show l2protocol-tunnel {gvrp|stp}
```

```
r      A
```

RGOS10.3

13.2

- show dot1q-tunnel
- show interface dot1q-tunnel
- show frame-tag tpid
- show inner-priority-trust
- show registration-table

- **show translation-table**
- **show traffic-redirect**
- **show l2protocol-tunnel**

13.2.1 show dot1q-tunnel

dot1q-tunnel

show dot1q-tunnel [**interface** *intf-id*]

r **A**

intf-id

r **A**

r **A**

r **A**

ruijie#

```
ruijie# show interface dot1q-tunnel
Interface: Gi0/3
Native vlan: 10
Allowed vlan list: 4-6 10 30-60
Tagged vlan list: 4 6 30-60
```

r A

RGOS10.3

13.2.3 show frame-tag tpid

tpid

show frame-tag tpid [*interface intf-id*]

r A

intf-id

r A

tpid

r A

r A

```
ruijie# show frame-tag tpid
Ports tpid
-----
Gi0/1  0x9100
```

r A

RGOS10.1

13.2.4 show ~~ly~~ (10B2aP8DpD)

İ Q μ ã Đ

└─── A

```
ruijie# show inner-priority-trust
Ports   inner-priority-trust
-----
Gi0/1   enable
```

└─── A

RGOS10.1

13.2.5 show registration-table

dot1q-tunnel vid

show registration-table [interface *intf-id*]

└─── A

intf-id

└─── A

└─── A

└─── A

```
ruijie# show registration-table
Ports      Outer-VID  Inner-VID-list
-----
Gi0/7      5           7-10,15,20-30
```

└─── A

RGOS10.3

13.2.6 show translation-table

access,trunk,hybrid vid

show translation-table [interface *intf-id*]

└─── A

intf-id

└─── A

Г Д

Г Д

```
ruijie# show translation-table
Ports      Relay-VID  Local-VID-list
-----
Gi0/8      10         8-9,15,20-30
```

Г Д

RGOS10.3

13.2.7 show traffic-redirect

vid

show traffic-redirect [*interface intf-id*]

Г Д

intf-id

Г Д

Г Д

Г Д

```
ruijie# show traffic-redirect
Ports      Type      VID  Match-filter
-----
Gi0/3      Mod-outer  23   11
Gi0/3      Mod-outer  3     4
Gi0/3      Mod-outer  6     5
Gi0/3      Mod-inner  8   inner-to-8
Gi0/6      Mod-inner  9   100
Gi0/7      Nested-vid 13  nest-13
```

Г Д

RGOS10.3

13.2.8 show l2protocol-tunnel

show l2protocol-tunnel{gvrp|stp}

Г Д

	gvrp	gvrp
	stp	stp
r	A	
r	A	
r	A	
		ruijie# show l2protocol-tunnel stp L2protocol-tunnel: Stp Enable ruijie# show l2protocol-tunnel gvrp L2protocol-tunnel: gvrp Disable
r	A	

RGOS10.3

14 MAC

14.1

- 0 mac-address-table aging-time
- 0 clear mac-address-table dynamic
- 0 clear mac-address-table filtering
- 0 clear mac-address-table static
- 0 mac-address-table static
- 0 mac-address-table filtering
- 0 mac-address-table notification
- 0 nmp trap mac-notification
- 0 address-bind
- 0 address-bind ip-address
- 0 address-bind uplink
- 0 address-bind install
- 0 address-bind ipv6-mode
- 0 mac-manage-learning uniform
- 0 mac-manage-learning uniform learning-synchronization
- 0 mac-manage-learning dispersive

14.1.1 mac-address-table aging-time

no

mac-address-table aging-time seconds

no mac-address-table aging-time

seconds

300

Г Д

show mac-address-table aging-time Щ
show mac-address-table dynamic Щ

Г Д

Ruijie(config)# mac-address-table aging-time 150

Г Д

show mac-address-table aging-time		Щ
show mac-address-table dynamic		Щ

14.1.2 clear mac-address-table dynamic

Щ

clear mac-address-table dynamic[address *mac-addr*] [interface
interface-id] [vlan *vlan-id*]

Г Д

--	--	--



clear mac-address-table static [**address** *mac-addr*] [**interface** *interface-id*] [**vlan** *vlan-id*]

└─┬─┘

static	▮
address <i>mac-addr</i>	▮
interface <i>interface-id</i>	▮
vlan <i>vlan-id</i>	VLAN ▮

└─┬─┘

└─┬─┘

show mac-address-table static

└─┬─┘

MAC 00d0.f800.073c

Ruijie# **clear mac-address-table static address**
00d0.f800.073c

└─┬─┘

Ш

Г А

Г А

VLAN
MAC

VLAN

Ш

Г А

VLAN1

160

Ruijie#configure terminalEnter configuration commands, one per line. End with
CNTL/Z.Ruijie(config)#**vlan 1**Ruijie(config-vlan)#**max-dynamic-mac-count 160**

Г А

▮

Г Д

Г Д

▮

▮
mac-address-table static
mac-address-table static

▮ **show mac-address-table static**
clear mac-address-table static

Г Д

00d0.f800.073c VLAN 4

gigabitethernet 1/1

Ruijie(config)# **mac-address-table static**
00d0.f800.073c vlan 4 interface gigabitethernet 1/1

Г Д

show mac-address-table static	▮
clear mac-address-table static	▮

Г Д

S8600

◦ MAC 16K

◦ MAC 1K

14.1.7 mac-address-table filtering

▮

no

▮

mac-address-table filtering *mac-address* **vlan** *vlan-id*

no mac-address-table filtering *mac-address* **vlan** *vlan-id*

Г Д

<i>mac-address</i>	▮
vlan <i>vlan-id</i>	VLAN ID ▮

Г Д

Ш

Г Д

Г Д

Ш show mac-address-table filtering

Ш

Г Д

```
Ruijie(config)# mac-address-table filtering  
00d0f8000000 vlan 1
```

Г Д



MAC

Trap Ⅲ

enable traps mac-notification**snmp-server**

MAC Trap

Ⅲ

r Ⅲ

Ruijie(config)# **mac-address-table notification**Ruijie(config)# **mac-address-table notification****interval 40**Ruijie(config)# **mac-address-table notification****history-size 100**

r Ⅲ

snmp-server enable traps	trap Ⅲ
show mac-address-table notification	MAC Ⅲ
snmp trap mac-notification	MAC Ⅲ

14.1.9 snmp trap mac-notification

MAC

Ⅲ

no

Ⅲ

snmp trap mac-notification {added | removed}**no snmp trap mac-notification {added | removed}**

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# snmp trap mac-notification added
```

r **A**

mac-address-table notification	MAC 卩
show mac-address-table notification	MAC 卩

14.1.10 address-bind ip-address

ip mac .

address-bind *ip-address mac-address*

no address-bind *ip-address*

Г Д

Ш

Г Д

fa 0/1

```
Ruijie(config)# address-bind uplink fa0/1
Ruijie(config)# address-bind install
```

Г Д

o	o
show address-bind uplink	o

Г Д

RGOS10.1

14.1.13 address-bind ipv6-mode

ip IP

address-bind ipv6-mode compatible

address-bind ipv6-mode loose

address-bind ipv6-mode strict

Г Д

Г Д

Г Д

Ш

Г Д

Ш

	Ipv4	IPV6
--	------	------

	IPV4+MAC □	ipv6 □
	IPV4+MAC □	IPV6 □
	IPV4+MAC □	MAC MAC IPV6

Г Д

IP 192.168.5.2 00d0.f822.33aa
IPV6 □

Ruijie# **configure t**

Enter configuration commands, one per line. End with
CNTL/Z.

Ruijie(config)# **address-bind 00d0.f822.33aa ip
192.168.5.2**

Ruijie(config)# **address-bind ipv6-mode compatible**

14.1.14 mac-manage-learning uniform

MAC uniform .

Г Д

Г Д

Г Д

MAC uniform
MAC
MAC

Г Д

Г Д

show mac-address-table mac-manage-learning	MAC

14.1.15 mac-manage-learning uniform

learning-synchronization

uniform MAC .

no mac-manage-learning uniform learning-synchronization

Г Д

Г Д

Г Д

uniform no MAC MAC

Г Д

Г Д

show mac-address-table mac-manage-learning	MAC

14.1.16 mac-manage-learning dispersive

MAC dispersive .

Г Д

Г Д

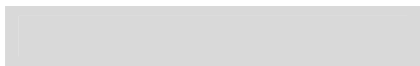
Г Д

MAC dispersive
MAC

Г Д

Г

Д



Г Д

Ruijie# **show mac-address-table address 00d0.f800.1001**

Vlan	MAC Address	Type	Interface
1	00d0.f800.1001	STATIC	Gi1/1

Г Д

show mac-address-table static	Ш
show mac-address-table filtering	Ш
show mac-address-table dynamic	Ш
show mac-address-table interface	Ш
show mac-address-table vlan	VLAN
show mac-address-table count	Ш
show mac-address-table static	Ш
show mac-address-table filtering	Ш

14.2.2 show mac-address-table aging-time

Ш

show mac-address-table aging-time

Г Д

Г Д

Ruijie# **show mac-address-table aging-time**

Aging time : 300

Г Д

mac-address-table aging-time	Ш

14.2.3 show mac-address-table count

▮

show mac-address-table count

Г Д

Г Д

Ruijie# **show mac-address-table count**

Dynamic Address Count : 51

Static Address Count : 0

Filter Address Count : 0

Total Mac Addresses : 51

Total Mac Address Space Available: 8139

Г Д

show mac-address-table static	▮
show mac-address-table filtering	▮
show mac-address-table dynamic	▮
show mac-address-table address	▮
show mac-address-table interface	▮
show mac-address-table vlan	VLAN ▮

14.2.4 show mac-address-table dynamic

▮

show mac-address-table dynamic [**address** *mac-addr*] [**interface** *interface-id*] [**vlan** *vlan-id*]

Г Д

<i>mac-addr</i>	MAC ▮
<i>vlan-id</i>	VLAN▮
<i>interface-id</i>	(AggregatePort)

Г Д

Г Д

Г Д

Ruijie# **show mac-address-table dynamic**

Vlan	MAC Address	Type	Interface
----	-----	-----	-----
1	0000.0000.0001	DYNAMIC	gigabitethernet 1/1
1	0001.960c.a740	DYNAMIC	gigabitethernet 1/1
1	0007.95c7.dff9	DYNAMIC	gigabitethernet 1/1
1	0007.95cf.eee0	DYNAMIC	gigabitethernet 1/1
1	0007.95cf.f41f	DYNAMIC	gigabitethernet 1/1
1	0009.b715.d400	DYNAMIC	gigabitethernet 1/1
1	0050.bade.63c4	DYNAMIC	gigabitethernet 1/1

Г Д

clear mac-address-table dynamic	Ш

14.2.5 show mac-address-table filtering

show mac-address-table static [*addr mac-addr*] [*vlan vlan-id*]

Г Д

<i>mac-addr</i>	MAC Ш
<i>vlan-id</i>	VLANШ

Г Д

Г Д

Ruijie# **show mac-address-table filtering**

Vlan	MAC Address	Type	Interface
----	-----	-----	-----
1	0000.2222.2222	FILTER	Not available

Г Д

MAC

14.2.7 show mac-address-table notification

14.2.8 show mac-address-table static

▮

```
show mac-address-table static [addr mac-addr] [interface  
interface-id] [vlan vlan-id ]
```

Г

А

MAC

<i>vlan-id</i>	VLAN ID
----------------	---------

3.3.3.4 00d0.f811.1117

Г Д

address-bind	Ш

14.2.11 show mac-address-table mac-manage-learning

MAC

Г Д

Г Д

Г Д

```
Ruijie# show mac-address-table mac-manage-learning
#####MAC manage-learning
running mode: uniform
configuration mode: uniform
dynamic address learning-synchronization: off.
```

Г Д

mac-manage-learning uniform	MAC uniform
mac-manage-learning uniform learning-synchronization	MAC
mac-manage-learning dispersive	MAC dispersive

15 DHCP Snooping

15.1 DHCP snooping

DHCP snooping

- **ip dhcp snooping**
- **ip dhcp snooping vlan**
- **ip dhcp snooping bootp-bind**
- **ip dhcp snooping verify mac-address**
- **ip dhcp snooping information option**
- **ip dhcp snooping database write-delay**
- **ip dhcp snooping database write-to-flash**

15.1.1 ip dhcp snooping

```

DHCP Snooping
no
DHCP Snooping
[no] ip dhcp snooping
r      A
r      A
r      A
r      A
DHCP Snooping
DHCP snooping
show ip dhcp snooping
DHCP Snooping Private VLAN
DHCP snooping
```

show ip dhcp snooping	DHCP snooping

15.1.4 ip dhcp snooping verify mac-address

```

MAC
no
[no] ip dhcp snooping verify mac-address

r      A

r      A

MAC
DHCP CLIENT
MAC DHCP CLIENT MAC
MAC

r      A

DHCP MAC

Ruijie# configure terminal
Ruijie(config)# ip dhcp snooping verify mac-address
Ruijie(config)# end
Ruijie# show ip dhcp snooping
Switch DHCP snooping status  ENABLE
Verification of hwaddr field status  ENABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP snooping Support Bootp bind status: ENABLE
Interface                    Trusted    Rate limit (pps)
-----
r      A

```

show ip dhcp snooping	DHCP snooping

15.1.5 ip dhcp snooping information option

```

DHCP                               option82
  1  1                               1
[no] ip dhcp snooping information option

r      A

r      A

r      A

DHCP                               option82      DHCP
option82                               1

r      A

DHCP                               option82

Ruijie# configure terminal
Ruijie(config)# ip dhcp snooping information option
Ruijie(config)# end
Ruijie# show ip dhcp snooping
Switch DHCP snooping status      ENABLE
Verification of hwaddr field status  DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP snooping Support Bootp bind status: ENABLE
Interface                        Trusted      Rate limit (pps)
-----
r      A

```

show ip dhcp snooping	DHCP snooping

15.1.6 ip dhcp snooping database write-delay

```

DHCP Snooping      1
FLASH              1      no
FLASH              1

o ip dhcp snooping database write-delay time
o [no] ip dhcp snooping database write-delay

r      A

time      DHCP snooping      FLASH      1

```


Г Д

DHCP

[no] ip dhcp snooping trust

r A

UNTRUST

r A

r A

TRUST DHCP TRUST 山
DHCP UNTRUST

r A

fastEthernet 0/1 TRUST

Ruijie# configure terminal

Ruijie(config)# interface fastEthernet 0/1

Ruijie(config-if)# ip dhcp snooping trust

Ruijie(config-if)# end

Ruijie# show ip dhcp snooping

Switch DHCP snooping status ENABLE

Verification of hwaddr field status DISABLE

DHCP snooping database write-delay time: 0 seconds

DHCP snooping option 82 status: ENABLE

DHCP snooping Support ijie(co

Г А

Г А

```

DHCP Snooping VLAN
CPP[CPU Protect Protocol]
DHCP Snooping CPP DHCP
show ip dhcp snooping

```

S86 DHCP

Г А

1 100pps

```

Ruijie# configure terminal
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# ip 62.70.130.100 255.255.255.0

```

° show ip dhcp snooping binding

15.3.1 show ip dhcp snooping

DHCP Snooping

山

show ip dhcp snooping

г А

г А

г А

г А

DHCP Snooping

山

г А

DHCP Snooping

```
Ruijie# show ip dhcp snooping
Switch DHCP snooping status  ENABLE
Verification of hwaddr field status  DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP snooping Support Bootp bind status: ENABLE
Interface                Trusted      Rate limit (pps)
-----
```

г А

ip dhcp snooping	DHCP snooping
ip dhcp snooping verify mac-address	DHCP snooping mac
ip dhcp snooping write-delay	flash
ip dhcp snooping information option	DHCP option82
ip dhcp snooping bootp-bind	DHCP Snooping Bootp
ip dhcp snooping trust	DHCP snooping trust

Г А

DHCP snooping

```
Ruijie# clear ip dhcp snooping binding
Ruijie# show ip dhcp snooping binding
Total number of bindings: 0
MacAddress IpAddress Lease(sec) Type VLAN Interface
-----
```

Г А

show ip dhcp snooping binding	DHCP snooping

15.4.2 debug ip dhcp snooping

DHCP Snooping

Ш

debug ip dhcp snooping {event | packet}

Г А

Г А

Г А

DHCP snooping

Ш

Г А

DHCP snooping

```
Ruijie# debug ip dhcp snooping event
Ruijie# debug ip dhcp snooping packet
```

16 IGMP Snooping

16.1

IGMP Snooping profile 三

Profile

- **range**
- **deny**
- **permit**

- **ip igmp profile**
- **ip igmp snooping ivgl**
- **ip igmp snooping svgl**
- **ip igmp snooping svgl profile**
- **ip igmp snooping ivgl-svgl**
- **ip igmp snooping vlan**
- **ip igmp snooping dyn-mr-aging-time**
- **ip igmp snooping query-max-response-time**
- **ip igmp snooping vlan mrouter learn pim-dvmrp**
- **ip igmp snooping vlan mrouter interface**
- **ip igmp snooping vlan static interface**
- **ip igmp snooping fast-leave enable**
- **ip igmp snooping suppression enable**
- **ip igmp snooping source-check port**
- **ip igmp snooping source-check default-server**
- **ip igmp snooping limit-ipmc vlan server**
- **ip igmp snooping filter**
- **ip igmp snooping max-groups**

16.1.1 ip igmp profile

IGMP profile 三 profile

profile-number profile 三

igmp profile 三

ip igmp profile *profile-number*

no ip igmp profile *profile-number*

┌ ┐

<i>profile-number</i>	profile 1-65535

┌ ┐

┌

┌ ┐

┌

┌ ┐

IGMP Profiles

┌ 4 ┐

┌

┌

┌ SVGL

┌ 4 ┐ IGMP Filtering

profile

┌

profile

┌ ┐

1 profile profile ┌

Ruijie(config)# **ip igmp profile 1**

Ruijie(config-profile)#

┌ ┐

range	profile

16.1.2 range

profile
range

profile

profile

┌

no

┌

range *low-ip-address* [*high-ip-address*]

no range *low-ip-address* [*high-ip-address*]

┌ ┐

<i>low-ip-address</i>	
<i>high-ip-address</i>	

┌ ┐

```

Ruijie(config)# ip igmp profile 1
Ruijie(config-profile)# range 233.3.3.3 234.4.4.4
Ruijie(config-profile)# deny
Ruijie(config-profile)# permit
Ruijie(config-profile)# 233.3.3.3 234.4.4.4 profile :

```

ip igmp profile	profile
deny	profile deny
permit	profile permit

16.1.3 deny

```

Ruijie(config)# ip igmp profile 1
Ruijie(config-profile)# deny
Ruijie(config-profile)# permit
Ruijie(config-profile)# 233.3.3.3 234.4.4.4 profile :
Ruijie(config-profile)# deny
Ruijie(config-profile)# permit
Ruijie(config-profile)# 233.3.3.3 234.4.4.4 profile :

```


山


```

ip igmp snooping ivgl-svgl
no ip igmp snooping

r      A
      W

r      A
      disable  W

r      A
      W

r      A
      IVGL 4 SVGL      WIVGL  SVGL
      IGMP Profile
      SVGL      VLAN

      VLAN  W

&

IVGL#SVGL@N0@
VLAN

@VZC@N0@MTB-SVG10.6

```

VLAN igmp snooping
ip igmp snooping vlan 3

<i>num</i>	1-3600 Ⅲ

Г Д

300s

Г Д

Ⅲ

Г Д

IGMP

PIM Hello

Ⅲ

Г Д

500s

Ruijie(config)# **ip igmp snooping dyn-mr-aging-time 500**

Г Д

16.1.11 ip igmp snooping query-max-response-time

ip igmp snooping query-max-response-time IGMP

no ip igmp snooping query-max-response-time

Ⅲ

ip igmp snooping query-max-response-time *num*

no ip igmp snooping query-max-response-time

Г Д

<i>num</i>	IGMP 1-65535 Ⅲ

Г Д

10s

Г Д

Ⅲ

```

IGMP Query      4 DVMRP Probe
PIM                               ip igmp
snooping vlan mrouter learn pim-dvmrp  no
    11
ip igmp snooping vlan vid mrouter learn pim-dvmrp
no ip igmp snooping vlan vid mrouter learn pim-dvmrp

```

<i>vid</i>	VLAN IGMP Snooping VLAN ID

11
 igmp

snooping 11

11 11

Ruijie(config)# ip igmp snooping vlan 1 mrouter learn pim-dvmrp

11 11

ip igmp snooping vlan mrouter interface	

16.1.13 ip igmp snooping vlan mrouter interface

ip igmp snooping vlan
 mrouter interface 11 no 11

ip igmp snooping vlan *vid* mrouter interface *interface-id*
 no ip igmp snooping vlan *vid* mrouter interface *interface-id*

11 11

<i>vid</i>	vlan id
<i>interface-id</i>	

11 11

11

11 11

11

11 11

IP

11

11

11 11

```
Ruijie(config)# ip igmp snooping vlan 1 mrouter
interface fastEthernet 0/1
```

г А

16.1.14 ip igmp snooping vlan static interface

igmp snooping

IGMP report Ш

ip igmp snooping vlan static interface Ш no

Ш

ip igmp snooping vlan vid static address interface interface-id

no ip igmp snooping vlan vid static address interface interface-id

г А

г А

Ш

г А

Ш

г А

Ш

г А

vlan1 224.3.3.3

```
Ruijie(config)# ip igmp snooping vlan 1 static 224.3.3.3
interface fastEthernet 0/1
```

г А QaadWAS

--	--

ip igmp snooping vlan mrouter interface	
--	--

16.1.15 ip igmp snooping fast-leave enable

igmp snooping fast-leave snooping fast-leave enable 山	no	ip igmp igmp snoopin]TJEi[ip <1FF5747
---	----	--

IGMP SNOOPING IGMP ❸

IGMP Sooping ❸
IGMP SNOOPING

❸

❸

VLAN

❸

Г А

igmp snooping ❸

Ruijie(config)# **ip igmp snooping source-check port**

Г А

ip igmp snooping source-check default-server	IP

16.1.18 ip igmp snooping source-check default-server

IP IP
❸ igmp snooping IP
ip igmp snooping source-check default-server❸ no
IP ❸

ip igmp snooping source-check default-server *address*
no ip igmp snooping souce-check

Г А

<i>address</i>	❸

Г А

❸

Г А

❸

Г А

Ш

Г Д

.

Г Д

IP Ш

Ruijie(config)# **ip igmp snooping limit-ipmc vlan**

г д

ip igmp profile	profile

16.1.21 ip igmp snooping max-groups

, ip

o debug igmp-snp

16.2.1 show ip igmp snooping

igmp snooping

Show ip igmp snooping [gda-table | interfaces | mrouter| statistics
[vlan vlan-id]]

r D

	igmp snooping
gda-table	
interfaces	filter max-group
mrouter	
statistics	snooping

r D

W

r D

EXEC W

r D

W

r D

fa0/1 100

Ruijie(config-if)# ip igmp snooping gda-table

Abbr:M - mrouter

D - dynamic

S - static

VLAN	Address	Member ports

1	233.3.3.3	Gi0/2(S)
2	234.4.4.4	Gi0/11(S)
1	233.4.4.4	Ag2(S)

r D

16.2.2 show ip igmp profile

profile 1

show ip igmp profile

show ip igmp profile *profile-number*

1 1

	profile 1
<i>profile-number</i>	profile

1 1

1

1 1

EXEC 1

1 1

profile 1

1 1

fa0/1 100

Ruijie(config-if)#**show ip igmp profile**

Profile 1

Permit

range 224.0.1.0, 239.255.255.255

1 1

16.2.3 clear ip igmp snooping gda-table

1

1 1

1 1

```

    1
    2
    3 EXEC
    4
    5
    6 Ruijie# clear ip igmp snooping gda-table
    7
    8
```

16.2.4 clear ip igmp snooping statistics

```

    1
    2
    3
    4
    5 EXEC
    6
    7
    8
    9
    10 Ruijie# clear ip igmp snooping gda-table
    11
    12
```

16.2.5 debug igmp-snp

```

    1 igmp
    2
    3 no
    4
    5
    6 debug igmp-snp
    7 debug igmp-snp event
    8 debug igmp-snp packet
    9 debug igmp-snp msf
   10 debug igmp-snp warning
   11 undebug igmp-snp
```

undebug igmp-snp event

undebug igmp-snp packet

undebug igmp-snp msf

undebug igmp-snp warning

г д

	IGMP Snooping
event	IGMP Snooping
packet	IGMP Snooping
msf	IGMP Snooping
warning	IGMP Snooping

г д

Ш

г д

EXEC Ш

г д

Ш

г д

г д


```
Ruijie#show ip pim snooping
PIM Snooping table: 2 neighbours, Memory:16
Interface VLAN 7(4103), PC:2
Port GigabitEthernet 0/7(7), NC:1
Neighbour 4.4.4.1, GenID 0X2f853a91, Holdtime 105s, NLT
79s
Port GigabitEthernet 0/8(8), NC:1
Neighbour 4.4.4.2, GenID 0X38545b24, Holdtime 105s, NLT
81s
```

Г А



17.1.4 show ip pim snooping vlan

PIM-Snooping VLAN show ip pim snooping
vlan interface-number 
show ip pim snooping vlan interface-number

Г А

	
interface-number	VLAN ID

18 MSTP

18.1

18.1.1 spanning-tree

```

MSTP
└─ no
MSTP
└─ spanning-tree
MSTP
└─ no
   spanning tree└─

spanning-tree [ forward-time seconds | hello-time seconds |
max-age seconds ]

no spanning-tree [forward-time | hello-time | max-age]

r      A
      forward-time seconds
      hello-time seconds
      max-age seconds
      BPDUs
r      A
      spanning-tree
r      A
      └─
r "    u  forward-timehello-time
```

disabled BPDU filter ⏏ enabled
BPDU filter ⏏
spanning-tree bpdupfilter [enabled | disabled]

命令	作用
<code>spanning-tree bpduguard {enabled disabled}</code>	BPDU filter 配置
<code>spanning-tree bpdufilter enable disable</code>	BPDU filter 配置
<code>spanning-tree guard {enable disable}</code>	BPDU guard 配置
<code>spanning-tree guard {enable disable} vlan {all vlan-id}</code>	BPDU guard 配置
<code>spanning-tree guard {enable disable} interface {all interface-name}</code>	BPDU guard 配置
<code>show spanning-tree</code>	显示 STP 信息
<code>show spanning-tree interface {all interface-name}</code>	显示 STP 信息

```

spanning-tree bpduguard [enabled | disabled]

```

Configuration	BPDU Guard	BPDU Filter
enabled	BPDU Guard	BPDU Filter
disabled	BPDU Guard	BPDU Filter

1

Ruijie

```

Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# spanning-tree bpduguard enable
  
```

Ruijie

```

show spanning-tree interface STP
  
```

18.1.4 spanning-tree link-type

“ ”

1

```

spanning-tree link-type [point-to-point | shared]
  
```

```

no spanning-tree link-type
  
```

Ruijie

```

point-to-point point-to-point.
  
```

```

Shared shared
  
```

Ruijie

```

point-to-point
  
```

```

shared
  
```

Ruijie

1

Ruijie

```

Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# spanning-tree link-type
  
```

```

/ BA20_
  
```

no spanning-tree max-hops

```

r      A
      hop-count   BPDU                      1  40

r      A
      hop-count                20

r      A
      .

r      A
      Region      Root Bridge      BPDU      Hot Count      Root
      Bridge
      BPDU              Hop Count      1      0
              Hops      0   BPDU      W

      max-hops              InstanceW

r      A
      MST Instance      Max-hops      10
Ruijie(config)# spanning-tree max-hops 10

show spanning-tree mst

r      A
show spanning-tree      MSTP      W

```

18.1.6 spanning-tree mode

```

      STP      W      no
      W

spanning-tree mode [stp | rstp | mstp]

no spanning-tree mode

r      A
stp   Spanning tree protocol(IEEE 802.1d)
rstp  Rapid spanning tree protocol(IEEE 802.1w)
mstp  Multiple spanning tree protocol(IEEE 802.1s)

r      A
      MSTP

r      A

```

└─ A

```
Ruijie(config)# spanning-tree mode stp
```

└─ A

```
show spanning-tree
```

18.1.7 spanning-tree mst configure

```

no
    MST
    name 4 revision 4 vlan map
    MSTP Region
    spanning-tree mst configuration
no spanning-tree mst configuration

└─ A
    instance vlan
    name
    revision 0

└─ A

└─ A
    end
    exit

MST
instance instance-id vlan vlan-range Vlan MST Instance
└─ instance-id 0 64 Vlan 1 4095
    vlan VLAN ID
    └─ VLAN ID instance 10 vlan 2,3,6-9
    VLAN 2 3 6 7 8 9 Instance 10
    VLAN Instance 0 VLAN Instance
no no instance instance-id [vlan vlan-range]
Instance 1 64)

name name MST 32
no name

revision version J

```

```

show          MST region  ㄣ

r      A

                                MST          VLAN 3, 5-10          MST
Instance 1 ㄣ

Ruijie(config)# spanning-tree mst configuration
Ruijie(config-mst)# instance 1 vlan 3 5-10
Ruijie(config-mst)# name region 1
Ruijie(config-mst)# revision 1
Ruijie(config-mst)# show
MST configuration
Name [region1]
Revision 1
Instance  Vlan  Mapped
-----
0          1-2,4,11-4094
1          3,5-10
-----
Ruijie(config-mst)# exit
Ruijie(config)#

                                VLAN 3   Instance 1          MST

Ruijie(config-mst)# no instance 1 vlan 3

                                Instance 1

Ruijie(config-mst)# no instance 1

                                MST          show          ㄣ

```

```

r      A

show spanning-tree mst          MST region

instance instance-id vlan vlan-range  Vlan          MST Instance

name          MST

revision          MST

show          MST          MST

```

18.1.8 spanning-tree mst cost

```

                                Instance          ㄣ  no
                                ㄣ

```

spanning-tree [**mst** *instance-id*] **cost** *cost*

no spanning-tree [**mst** *instance-id*] **cost**

└─┬─┐

instance-id Instance 0 64
cost 1 200 000 000

└─┬─┐

Instance-ID 0
 Interface 100
 • 1000 Mbps—20000
 • 100 Mbps—200000
 • 10 Mbps—2000000

└─┬─┐

└─┬─┐

cost

└─┬─┐

Instance 3 400
 Ruijie(config)# **interface** **gigabitethernet** 1/1
 Ruijie(config-if)# **spanning-tree** **mst** 3 **cost** 400
show spanning-tree mst interface *interface-id*

└─┬─┐

show spanning-tree mst MSTP 100
spanning-tree mst port-priority
spanning-tree mst priority instance

18.1.9 spanning-tree mst port-priority

Instance
 Region
 100 no 100
spanning-tree [**mst** *instance-id*] **port-priority** *priority*
no spanning-tree [**mst** *instance-id*] **port-priority**

```

r      A
      Instance-id  Instance          0  64
      priority          0  16  32  48  64  80  96  112  128
      144  160  176  192  208  224  240    16          16

```

```

r      A
      Instance-id          0
      priority          128

```

```

r      A

```

```

r      A
      .

```

```

r      A
      Region                                     W

```

```

r      A
      Instance 20      Gigabitethernet 1/1
      10
      Ruijie(config)# interface gigabitethernet 1/1
      Ruijie(config-if)# spanning-tree mst 20 port-priority
      0

```

```

priority                                0, 4096,8192, 12288, 16384, 20480,
24576, 28672, 32768, 36864, 40960, 45056, 49152,53248, 57344
61440  16                                4096

```

```

r      A

```

```

instance-id                            0

```

```

priority                                32768

```

```

r      A

```

```

r      A

```

```

Instance 20                            8192

```

```

Ruijie(config-if)# spanning-tree mst 20 priority 8192

```

```

show spanning-tree mst instance interface interface-id

```

```

r      A

```

```

show spanning-tree mst                  MSTP      1

```

```

spanning-tree mst cost

```

```

spanning-tree mst port-priority        Instance

```

18.1.11 spanning-tree reset

```

spanning-tree                          1          no      1

```

```

spanning-tree reset

```

```

r      A

```

```

1

```

```

r      A

```

```

1

```

```

r      A

```

```

Ruijie(config)# spanning-tree reset

```

```

r      A

```

```

show spanning-tree                      STP          1

```

```

show spanning-tree interface           STP          1

```

18.1.12 spanning-tree tx-hold-count

```

    STP          TxHoldCount          BPDU
    no
    spanning-tree tx-hold-count tx-hold-count
    no spanning-tree tx-hold-count

r      A
    tx-hold-count TxHoldCount  1  10

r      A
    3

r      A
    3

r      A
    Ruijie(config)# spanning-tree tx-hold-count 5

r      A
    show spanning-tree          MSTP

```

18.1.13 spanning-tree pathcost method

```

    no
    spanning-tree pathcost method [long | short]
    no spanning-tree pathcost method

r      A
    long      802.1t      path-cost
    short     802.1d      path-cost

r      A
    802.1T      Path-cost

r      A
    3

r      A
    Ruijie(config-if)# spanning-tree pathcost method long

r      A
    show spanning-tree interface          STP

```



```
Ruijie(config)# spanning-tree portfast bpduguard
default
```

```
r      A
```

```
show spanning-tree interface STP
```

18.1.16 spanning-tree portfast bpdufilter default

```
BPDU filter
filter
```

```
spanning-tree portfast bpdufilter default
```

```
no spanning-tree portfast bpdufilter default
```

```
r      A
```

```
r      A
```

```
BPDU filter
```

```
r      A
```

```
r      A
```

```
BPDU Filter BPDU
spanning-tree
```

```
r      A
```

```
Ruijie(config)# spanning-tree portfast bpdufilter
default
```

```
r      A
```

```
show spanning-tree interface STP
```

18.1.17 spanning-tree portfast default

```
Portfast
Portfast
```

```
spanning-tree portfast default
```

```
no spanning-tree portfast default
```

```
r      A
```

```

r      A
                                     Portfast   W
r      A
                                     W
r      A
                                     Ruijie(config)# spanning-tree portfast default
r      A
                                     show spanning-tree interface   STP   W

```

18.1.18 spanning-tree tc- protection

```

                                     tc- protection   W           no           tc-
protection   W
                                     spanning-tree tc- protection
                                     no spanning-tree tc- protection
r      A
                                     W
r      A
                                     tc- protection   W
r      A
                                     W
r      A
                                     Ruijie(config)# spanning-tree tc- protection

```

18.1.19 spanning-tree tc-protection tc-guard

```

                                     tc- guard   W           no           tc- guard   W
tc-guard           tc           W
                                     spanning-tree tc-protection tc-guard
                                     no spanning-tree tc-protection tc-guard
r      A
                                     W
r      A

```

```

tc-guard  1
Ruijie(config-if)# spanning-tree tc-protection tc-guard

```

18.1.20 spanning-tree tc-guard

```

tc-guard  1          no          tc-guard  1
tc-guard  1          tc          1

spanning-tree tc-guard
no spanning-tree tc-guard

Ruijie(config-if)# spanning-tree tc-guard

```

18.1.21 spanning-tree guard root

```

root guard  1          no          root guard  1
root guard  1
1

spanning-tree guard root
no spanning-tree guard root

Ruijie(config-if)# spanning-tree guard root

```



```

r      A

```

```

Ruijie(config-if)# spanning-tree guard loop

```

18.1.24 spanning-tree guard none

```

guard      W          no          guard      W

```

```

spanning-tree guard none

```

```

no spanning-tree guard none

```

```

r      A

```

```

W

```

```

r      A

```

```

guard      W

```

```

r      A

```

```

W

```

```

r      A

```

```

Ruijie(config-if)# spanning-tree guard none

```

18.1.25 spanning-tree autoedge

```

Autoedge      W          disabled
Autoedge      W

```

```

spanning-tree autoedge [disabled]

```

```

r      A

```

```

disabled      Autoedge      W

```

```

r      A

```

```

W

```

```

r      A

```

```

W

```

```

r      A

```

```

Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# spanning-tree autoedge disabled

```

```

r      A

```

```

show spanning-tree interface      STP      W

```

18.1.26 bpdu src-mac-check

```

                bpdu mac  卩
            bpdu mac  卩
        bpdu src-mac-check H.H.H
        no bpdu src-mac-check

r      A
        H.H.H          mac          bpdu 卩
        no              bpdu 卩

r      A
        卩

r      A
        卩

r      A
        Ruijie(config)# interface gigabitethernet 1/1
        Ruijie(config-if)# bpdu src-mac-check 00d0.f800.1e2f

r      A
```

18.1.27 clear spanning-tree detected-protocols

```

                RSTP BPDU  BPDU          卩
        clear spanning-tree detected-protocols [interface interface-id]

r      A
        interface-id

r      A
        卩

r      A

r      A
        Ruijie# clear spanning-tree detected-protocols

r      A
```

show spanning-tree interface

STP

Ш

18.1.28 spanning-tree compatible enable

MSTI

18.2

18.2.1 show spanning-tree

▮

show spanning-tree [summary | forward-time | hello-time | max-age
| inconsistentports | tx-hold-count | pathcost method | max_hops]

└ └

summary MSTP instance ▮
Inconsistentports block ▮
forward-time BridgeForwardDelay▮
hello-time BridgeHelloTime▮
max-age BridgeMaxAge▮
max-hops instance ▮
tx-hold-count TxHoldCount▮
pathcost method ▮

└ └

▮

└ └

Ruijie# **show spanning-tree hello-time**

└ └

spanningtree pathcost method
spanning-tree forward-time BridgeForwardDelay▮
spanning-tree hello-time BridgeHelloTime▮
spanning-tree max-age BridgeMaxAge▮
spanning-tree max-hops instance
spanning-tree tx-hold-count TxHoldCount▮

18.2.2 show spanning-tree interface

STP ▮ ▮

```
show spanning-tree interface interface-id [{bpdudfilter | portfast |
bpduguard | link-type } ]
```

```
└─┬─┐
```

```
interface-id
```

```
bpdudfilter          bpdudfilter      111
```

```
portfast           portfast      111
```

```
bpduguard          bpduguard      111
```

```
link-type           linktype
```

```
└─┬─┐
```

```
111
```

```
└─┬─┐
```

```
Ruijie# show spanning-tree interface gigabitethernet
1/5
```

```
└─┬─┐
```

```
spanning-tree bpdudfilter          BPDU filter      111
```

```
spanning-tree portfast           portfast      111
```

```
spanning-tree bpduguard          BPDU guard      111
```

```
spanning-tree link-type           " "            111
```

18.2.3 show spanning-tree mst

```
MST          Instance      111
```

```
show spanning-tree mst { configuration | instance-id [ interface
interface-id ] }
```

```
└─┬─┐
```

```
configuration          mst
```

```
instance-id    Instance
```

```
interface-id
```

```
└─┬─┐
```

```
Instance111
```

```
└─┬─┐
```

```
└─┬─┐
```

```
Ruijie# show spanning-tree mst configuration
```

Г Д

spanning-tree mst configuration	MST region
spanning-tree mst cost	instance
spanning-tree mst max-hops	instance
spanning-tree mst priority	instance
spanning-tree mst port-priority	instance

19 SPAN

19.1 monitor session

SPAN

no

W

monitor session *session_number* {**source interface** *interface-id* [**both** | **rx** | **tx**] | **destination interface** *interface-id* [**switch**]} [**acl name**]

no monitor session *session_number* [**source interface** *interface-id* [**both** | **rx** | **tx**] | **destination interface** *interface-id* [**switch**]] [**acl name**]

no monitor session all

r

A

<i>session_number</i>	SPAN W
source interface <i>interface-id</i>	W <i>interface-id</i> SVI S8600 AP
destination interface <i>interface-id</i>	W <i>interface-id</i> SVI S8600 APW
both acl name	W acl name/id
rx	W
tx	W
all	
switch	

r

A

r

A

switch port routed port

WSPAN

W

SPAN

disabled port

SPAN

W

Г А

Г А

Г А

show monitor SPAN 1

Ruijie# show monitor session 1
sess-num: 1
src-intf:
GigabitEthernet 3/1 frame-type Both
dest-intf:
GigabitEthernet 3/8

Г А



monitor session SPAN

20 RSPAN

20.1

20.1.1 monitor session

RSPAN Ⅲ

monitor session *session_num* {**remote-destination** | **remote-source**}

monitor session *session-num* **destination remote vlan** *vlan-id*
interface *interface-name* [**switch**]

monitor session *session-num* **source interface** *interface-id* [**rx** | **tx** | **both**]

└ Ⅲ

<i>session-num</i>	
<i>vlan-id</i>	remote span vlan id
<i>Interface-id</i>	

└ Ⅲ

└ Ⅲ

end Ctrl+C Ⅲ

exit

└ Ⅲ

Ruijie(config)# **monitor session 1 source interface fastethernet 0/1**
Ruijie(config)# **monitor session 1 destination remote vlan 5 reflector-port interface fastethernet 0/5**

```
Ruijie(config)# monitor session 1 remote-destination
```

```
r      A
```

show monitor	␣

20.1.2 remote-span

RSPAN VLAN

```
[no] remote-span
```

```
r      A
```

```
r      A
```

```
Vlan
```

```
r      A
```

```
end          Ctrl+C      ␣
```

```
exit
```

```
r      A
```

```
Ruijie(config)# vlan 5
```

```
Ruijie(config-vlan)# remote-span
```

```
r      A
```

show vlan	Vlan ␣

21 IP

21.1

- **ip address**
- **ip unnumbered**

21.1.1 ip address

IP no IP Ш

ip address *ip-address network-mask* [**secondary**]

no ip address *ip-address network-mask* [**secondary**]

Г Д

<i>ip-address</i>	32 IP 8 Ш
<i>network-mask</i>	32 Ш 8 Ш "1" "0"
secondary	IP Ш

Г Д

IP Ш

Г Д

Г Д

Г Д

21.1.2 ip unnumbered

Г Д

<i>interface-number</i>	
-------------------------	--

г д

ш

г д

г д

IP IP IP IP IP
 IP IP IP IP IP
 IP IP IP IP IP

о

ш

о

SLIP ч HDLC ч PPP ч LAPB ч Frame-relay

ш

ш X.25

ш

о

ping

IP

ш

SNMP

ш

о

ш

г д

FastEthernet 0/1 ш

IP ш

ip unnumbered fastEthernet 0/1

г д

show interface	

21.2

- о **arp**
- о **arp retry interval**
- о **arp retry times**
- о **arp trusted num**
- о **arp trusted aging**

- **arp unresolve**
- **arp gratuitous-send interval**
- **arp timeout**
- **ip proxy-arp**
- **service trustedarp**

21.2.1 arp

	ARP	IP	MAC
Ш	no	Ш	

arp *ip-address MAC-address type [alias]*

no arp *ip-address MAC-address type [alias]*

Г **А**



IP



clear arp-cache

arp IP

ARP
5 ARP 10

arp retry times *number*
no arp retry times

г д

<i>number</i>	ARP 1 ARP 1 ARP <1-100>10

г д

ARP ARP 5 10

г д

ARP

v p " u ý

г д

<i>number</i>	ARP <10-4096>Ш

г д

Ш

г д

г д

ARP Ш ARP
ARP

Ш

Ш

г д

1000 ARPШ

arp trusted 1000

г д

service trustedarp	ARP

21.2.5 arp trusted aging

ARP Ш no

Ш

arp trusted aging

no arp trusted aging

г д

г д

GSN ARP Ш

г д

г д

[illegible]

The diagram illustrates the ARP resolution process for the IP address 1.1.1.1. It consists of a table and a sequence of steps.

	ARP	no
arp unresolved number	8192	
no arp unresolved		

Step 1: Initial state. The ARP table is empty. The IP address 1.1.1.1 is entered into the 'number' column.

Step 2: The system searches for the IP address in the ARP table. The result is 'no arp unresolved'.

Step 3: The system sends an ARP request to the network. The result is 'arp unresolved number'.

Step 4: The system receives an ARP response from the network. The result is 'arp resolved number'.

Step 5: The system adds the resolved IP address and its corresponding MAC address to the ARP table. The result is 'arp resolved number'.

Step 6: The system successfully resolves the IP address to a MAC address. The result is 'arp resolved number'.

21-8

arp no

arp gratuitous-send interval *seconds*

no arp gratuitous-send

 A

<i>seconds</i>	ARP <1-3600>

 A

ARP

 A

 A

ARP

 A

SVI 1

ARP

Ruijie(config)# interface vlan 1

Ruijie(config-if)# arp gratuitous-send interval 1

SVI 1 ARP

Ruijie(config)# interface vlan 1

Ruijie(config-if)# no arp gratuitous-send

 A

21.2.8 arp timeout

ARP

ARP

no

arp timeout *seconds*

no arp timeout

 A

<i>seconds</i>	0-2147483

Г А

3600 Ш

Г А

Г А

ARP ARP IP MAC Ш
ARP Ш ARP
ARP Ш

Г А

FastEthernet 0/1 ARP
120 Ш

interface fastEthernet 0/1
arp timeout 120

Г А

clear arp-cache	ARP
show interface	

21.2.9 ip proxy-arp

ARP

```

      ARP
      IP      MAC      Ш      ARP      ARP      IP
      IP
      MAC      Ш      ARP      ARP      MAC      Ш
      MAC      Ш      ARP      MAC      Ш

r      A

FastEthernet 0      ARP      Ш

interface fastEthernet 0
ip proxy-arp

```

21.2.10 service trustedarp

```

      ARP      service trustedarp      Ш
no      ARP      Ш

service trustedarp
no service trustedarp

r      A

      ARPШ

r      A

r      A

      ARP      ARP      GSN
      GSN      Ш
      STP      MAC      MAC
      MAC      ARPШ

1)      STP
2)      root port      design      ,
updown
3)      tc

r      A

      service trustedarp      Ш

config
service trustedarp

```

21.3

- **ip broadcast-addresss**
- **ip directed-broadcast**

21.3.1 ip broadcast-addresss

ip broadcast-addresss **no**

no

no

ip broadcast-addresss *ip-address*

no ip broadcast-addresss *ip-address*

ip **no**

<i>ip-address</i>	IP

ip **no**

IP 255.255.255.255

ip **no**

ip **no**

IP 1 1 255.255.255.255
RGOS IP
1 1

ip **no**

IP 0.0.0.0

ip broadcast-address 0.0.0.0

21.3.2 ip directed-broadcast

IP

directed-broadcast

no

ip

no

ip directed-broadcast [*access-list-number*]

no ip directed-broadcast

ip **no**

--	--

<i>access-list-number</i>	2699	1-199	1300 -
	IP		

Г Д

W

Г Д

Г Д

IP

172.16.16.255

IP

IP

W

W

IP

W

IP

1. 14

W

W

W

W

W

no ip directed-broadcast RGOS

W

Г Д

FastEthernet 0/1

W

```
interface fastEthernet 0/1
```

```
ip directed-broadcast
```

21.4 IP

IP

- ```
0 clear arp-cache
0 show arp
0 show arp counter
0 show arp timeout
0 clear ip route
```

- **show ip arp**
- **show ip interface**

### 21.4.1 clear arp-cache

ARP ARP IP  
clear arp-cache

**clear arp-cache** [*A.B.C.D*] | **interface** *interface-name*]

Г Д

Г Д

ARP

NFPP(Network Foundation Protection Policy, )

clear arp mac ( IP) ARP  
1s  
ARP

Г Д

ARP

clear arp-cache

ARP 1.1.1.1

clear arp-cache 1.1.1.1

SVI1 ARP

clear arp-cache interface Vlan 1

Г Д

| arp | ARP |
|-----|-----|

### 21.4.2 show arp

ARP

**show arp** [*ip [mask] | mac-address*] **static** | **complete** | **incomplete**

Г Д

| <i>ip</i>          | ip ip ARP   |
|--------------------|-------------|
| <i>ip mask</i>     | ip mask ARP |
| <i>mac-address</i> | mac ARP     |
| <b>static</b>      | arp         |
| <b>complete</b>    | arp         |
| <b>incomplete</b>  | arp         |

Г Д

Г Д

show arp

Ruijie# **show arp**

Total Numbers of Arp: 7

| Protocol | Address        | Age(min) | Hardware       |
|----------|----------------|----------|----------------|
| Internet | 192.168.195.68 | 0        | 0013.20a5.7a5f |
| arpa     | VLAN 1         |          |                |
| Internet | 192.168.195.67 | 0        | 001a.a0b5.378d |
| arpa     | VLAN 1         |          |                |
| Internet | 192.168.195.65 | 0        | 0018.8b7b.713e |
| arpa     | VLAN 1         |          |                |
| Internet | 192.168.195.64 | 0        | 0018.8b7b.9106 |
| arpa     | VLAN 1         |          |                |
| Internet | 192.168.195.63 | 0        | 001a.a0b5.3990 |
| arpa     | VLAN 1         |          |                |
| Internet | 192.168.195.62 | 0        | 001a.a0b5.0b25 |
| arpa     | VLAN 1         |          |                |
| Internet | 192.168.195.5  | --       | 00d0.f822.33b1 |
| arpa     | VLAN 1         |          |                |

ARP

| Protocol | Internet |
|----------|----------|
| Address  | IP       |

IP

---

Age (min)

ARP

$\bar{E}$

Ш

Г Д

Г Д

### show arp counter

```
Ruijie# show arp counter
The Arp Entry counter:0
The Unresolve Arp Entry:0
```

## 21.4.4 show arp detail

ARP Ш

### show arp detail

**show arp detail interface-type** *interface-number*

**show arp detail** [**vrf** *vrfname*] [**ip** [**mask**] | *mac-address* | **static** | **complete** | **incomplete**]

**show arp detail trusted** [**ip** [*mask*]]

| <i>interface-type interface-number</i> | ARP         |
|----------------------------------------|-------------|
| <b>vrf</b> <i>vrfname</i>              |             |
| <i>ip</i>                              | ip ip ARP   |
| <i>ip mask</i>                         | ip mask ARP |
| <i>mac-address</i>                     | mac ARP     |
| <b>static</b>                          | arp         |
| <b>complete</b>                        | arp         |
| <b>incomplete</b>                      | arp         |
| <b>trusted</b>                         | ARP         |

ARP

ARP

4

4

4

4

Ш

### show arp detail

Ruijie# show arp detail

| IP Address   | MAC Address    | Type    | Age(min) |         | Interface | Port |
|--------------|----------------|---------|----------|---------|-----------|------|
| 20.1.1.1     | 000f.e200.0001 | Static  | --       | --      | --        |      |
| 20.1.1.1     | 000f.e200.0001 | Static  | --       | VI3     | --        |      |
| 20.1.1.1     | 000f.e200.0001 | Static  | --       | VI3     | Gi2/0/1   |      |
| 193.1.1.70   | 00e0.fe50.6503 | Dynamic | 1        | VI3     | Gi2/0/1   |      |
| 192.168.0.1  | 0012.a990.2241 | Dynamic | 10       | Gi2/0/3 | Gi2/0/3   |      |
| 192.168.0.1  | 0012.a990.2241 | Dynamic | 20       | Ag1     | Ag1       |      |
| 192.168.0.1  | 0012.a990.2241 | Dynamic | 30       | VI2     | Ag2       |      |
| 192.168.0.39 | 0012.a990.2241 | Local   | --       | VI3     | --        |      |
| 192.168.0.39 | 0012.a990.2241 | Local   | --       | Gi2/0/3 | --        |      |
| 192.168.0.1  | 0012.a990.2241 | Local   | --       | VI3     | --        |      |
| 192.168.0.1  | 0012.a990.2241 | Local   | --       | Gi2/3/2 | --        |      |

ARP

| IP Address  | IP      11                                             |
|-------------|--------------------------------------------------------|
| MAC Address | IP                      11                             |
| Type        | ARP                      4      4              4<br>11 |
| Age         | ARP                                      11            |
| Interface   | IP                      11                             |
| Port        | ARP                      11                            |

|   |   |
|---|---|
|   |   |
| - | - |

W

|  |  |
|--|--|
|  |  |
|--|--|

10.3(5)

## 21.4.5 show arp timeout

ARP

show arp timeout

г д

г д

г д

show arp timeout

Ruijie# show arp timeout

Interface arp timeout(sec)

-----

VLAN 1 3600

ARP

## 21.4.6 clear ip route

IP

IP

clear ip route Ш

clear ip route { \* | network [ netmask ] }

г д

| *       |  |
|---------|--|
| network |  |
| netmask |  |

г д

г д

Ш

Ш

г д

192.168.12.0      Ⅲ

clear ip route 192.168.12.0

Г      Д

| show ip route | IP |
|---------------|----|

## 21.4.7 show ip arp

ARP

Ⅲ

show ip arp

Г      Д

Г      Д

Г      Д

show ip arp

```
Ruijie# show ip arp
Protocol Address Age(min) Hardware Type
Interface
Internet 192.168.7.233 23 0007.e9d9.0488 ARPA
FastEthernet 0/0
Internet 192.168.7.112 10 0050.eb08.6617 ARPA
FastEthernet 0/0
Internet 192.168.7.79 12 00d0.f808.3d5c ARPA
FastEthernet 0/0
Internet 192.168.7.1 50 00d0.f84e.1c7f ARPA
FastEthernet 0/0
Internet 192.168.7.215 36 00d0.f80d.1090 ARPA
FastEthernet 0/0
```

|           |            |
|-----------|------------|
| Protocol  | Internet   |
| Address   | IP         |
| Age (min) | ARP<br>“-” |
| Hardware  | IP         |

Type



## 22 IP

### 22.1 IP

IP

- **ip mask-reply**
- **ip mtu**
- **ip redirects**
- **ip source-route**
- **ip unreachable**

#### 22.1.1 ip mask-reply

```
RGOS ICMP
ip mask-reply no ICMP
 ICMP
 Ш
ip mask-reply
no ip mask-reply

r Д
 ICMP Ш
r Д

r Д

 ICMP Ш ICMP
r Д

 FastEthernet 0/1 ICMP
 Ш
interface fastEthernet 0/1
ip mask-reply
```

#### 22.1.2 ip mtu

```

 IP MTU ip mtu
no
ip mtu bytes
no ip mtu

```

```

r A

```

|       |            |
|-------|------------|
|       |            |
| bytes | IP 68~1500 |

```

r A

```

```

 mtu

```

```

r A

```

```

r A

```

```

 IP IP MTU RGOS IP MTU
 mtu
 MTU MTU IP MTU
 MTU MTU

```

```

r A

```

```

 FastEthernet 0/1 IP MTU 512

```

```

interface fastEthernet 0/1
ip mtu 512

```

```

r A

```



```

 Ш
r A
r A

 Ш
 ICMP
 Ш
 Ш
RGOS ICMP Ш
r A

 FastEthernet 0/1 ICMP Ш
interface fastEthernet 0/1
no ip redirects

```

## 22.1.4 ip source-route

```

 RGOS IP ip
source-routeШ no Ш
ip source-route
no ip source-route
r A
 Ш
r A
r A
RGOS IP Ш IP IP
 Ч Ч RFC 791
 Ш
 Ш ICMP
RGOS IP Ш
r A
 IP Ш
no ip source-route

```

## 22.1.5 ip unreachable

```

 RGOS
 unreachable
 ip unreachable
 no ip unreachable

r A
 W

r A

r A

 RGOS
 ICMP
 W

 RGOS
 ICMP
 W

 ICMP
 W

r A

 FastEthernet 0/1
 ICMP
 W

interface fastEthernet 0/1
no ip unreachable

```

## 23 DHCP

### 23.1 DHCP

DHCP

- **bootfile**
- **client-identifier**
- **client-name**
- **default-router**
- **dns-server**
- **domain-name**
- **hardware-address**
- **host**
- **ip address dhcp**
- **ip dhcp excluded-address**
- **ip dhcp ping packet**
- **ip dhcp ping timeout**
- **ip dhcp pool**
- **lease**
- **netbios-name-server**
- **netbios-node-type**
- **network DHCP**
- **next-server**
- **option**
- **service dhcp**

#### 23.1.1 bootfile

|                    | DHCP             |           | DHCP |
|--------------------|------------------|-----------|------|
| <b>bootfile</b>    | ⏏                | <b>no</b> | ⏏    |
| <b>bootfile</b>    | <i>file-name</i> |           |      |
| <b>no bootfile</b> |                  |           |      |

Г А

| <i>file-name</i> | Ш |
|------------------|---|

Г А

Ш

Г А

DHCP

Г А

DHCP

Ч

DHCP

DHCP

TFTP

Ш

**next-server**

Ш

Г А

router.conf

Ш

bootfile router.conf

Г А

| <b>ip dhcp pool</b> | DHCP Ш DHCP |
|---------------------|-------------|
| <b>next-server</b>  | DHCP IP Ш   |

## 23.1.2 client-identifier

DHCP

DHCP

**client-identifier** Ш

**no**

Ш

**client-identifier** *unique-identifier*

**no client-identifier**

Г А

| <i>unique-identifier</i> | DHCP Ш<br>0100.d0f8.2233.b467.6967.6162.6974.4574.686<br>5.726e.6574.302f.31 Ш |
|--------------------------|--------------------------------------------------------------------------------|

г д

Ш

г д

DHCP

г д

DHCP

DHCP

IP

ч MAC

MAC

00d0.f822.33b4 ч

GigabitEthernet

0/1

0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31

01

67.6967.6162.6974.4574.6865.726e.6574.302f.31

GigabitEthernet0/1

Ш

RFC1700

Address Resolution Protocol Parameters L

Ш

DHCP

Ш

г д

MAC

00d0.f822.33b4

DHCP

Ш

client-identifier

0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31

г д

| <b>hardware-address</b> | DHCP Ш         |
|-------------------------|----------------|
| <b>host</b>             | IP Ш<br>DHCP Ш |
| <b>ip dhcp pool</b>     | DHCP<br>DHCP Ш |



|              |              |
|--------------|--------------|
|              |              |
| ip dhcp pool | DHCP<br>DHCP |

|                                  |           |
|----------------------------------|-----------|
|                                  |           |
| <i>ip-address</i>                | DNS IP 3  |
| <i>ip-address2...ip-address8</i> | 8 DNS 3   |
| <b>use-dhcp-client</b>           | RGOS DHCP |
| <i>interface-type</i>            | DNS DHCP  |
| <i>interface-number</i>          | DNS 3     |

```

DHCP
r A
 DNS
 DNS
 DHCP
 DNS
 W
RGOS DHCP
 DHCP
 W
r A
 DHCP
 DNS
 192.168.12.3W
 dns-server 192.168.12.3

```

```

r A

```

| <b>domain-name</b>     | DHCP W      |
|------------------------|-------------|
| <b>ip address dhcp</b> | DHCP IP W   |
| <b>ip dhcp pool</b>    | DHCP W DHCP |

### 23.1.6 domain-name

```

 DHCP
 no
 DHCP
 domain-nameW
 domain-name domain-name
 no domain-name

```

```

r A

```

| <i>domain-name</i> | DHCP W |
|--------------------|--------|

```

r A

```

```

 W

```

```

r A

```

```

 DHCP

```

```

r A

```

```

 DHCP

```

```

 W

```

Г А

DHCP

i-net.com.cnШ

domain-name i-net.com.cn

Г А

| <b>dns-server</b>   | DHCP DNS    |
|---------------------|-------------|
| <b>ip dhcp pool</b> | DHCP Ш DHCP |

### 23.1.7 hardware-address

DHCP

DHCP

hardware-address 00d0.f838.bf3d

г д

| <b>client-identifier</b> | DHCP<br>Ш      |
|--------------------------|----------------|
| <b>host</b>              | IP Ш DHCP      |
| <b>ip dhcp pool</b>      | DHCP DHCP<br>Ш |

### 23.1.8 host

DHCP IP DHCP  
**host** Ш **no** DHCP IP  
 Ш

**host** *ip-address* [ *netmask* ]

**no host**

г д

| <i>ip-address</i> | DHCP IP Ш |
|-------------------|-----------|
| <i>netmask</i>    | DHCP Ш    |

г д

IP Ш

г д

DHCP

г д

DHCP IP  
 ШA 255.0.0.0 B 255.255.0  
 C 255.255.255.0Ш  
 DHCP Ш

г д

IP 192.168.12.91  
 255.255.255.240Ш  
**host** 192.168.12.91 255.255.255.240

г      д

|                   |           |
|-------------------|-----------|
|                   |           |
| client-identifier | DHCP<br>Ш |
| hardware-address  | DHCP<br>Ш |

ip dhcp pool                      DHCP                      Ш                      DHCP

### 23.1.10 ip dhcp excluded-address

IP DHCP DHCP  
**ip dhcp excluded-address** IP **no**  
 IP

**ip dhcp excluded-address** *low-ip-address* [ *high-ip-address* ]

**no ip dhcp excluded-address** *low-ip-address* [ *high-ip-address* ]

Г А

| <i>low-ip-address</i>  | IP IP<br>IP Ш |
|------------------------|---------------|
| <i>high-ip-address</i> | IP Ш          |

Г А

DHCP IP Ш

Г А

Г А

IP Ш IP DHCP  
 DHCP Ш IP IP DHCP  
 Ш

Г А

DHCP 192.168.12.100~150  
 IP Ш

**ip dhcp excluded-address** 192.168.12.100 192.168.12.150

Г А

| <b>ip dhcp pool</b> | DHCP DHCP<br>Ш |
|---------------------|----------------|
| <b>network</b> DHCP | DHCP Ш         |

### 23.1.11 ip dhcp ping packet

DHCP ping  
ip dhcp ping packet no

ip dhcp ping packet [ number ]  
no ip dhcp ping packet

г д

|        |                     |
|--------|---------------------|
|        |                     |
| number | 0 10 0<br>ping ping |

г д

ping 2

г д

г д

DHCP DHCP IP ping  
DHCP Ping  
10

г д

ping 3  
ip dhcp ping packets 3

г д

|                        |      |
|------------------------|------|
|                        |      |
| clear ip dhcp conflict | DHCP |

**ip dhcp ping timeout** *milli-seconds*

**no ip dhcp ping timeout**

Г А

| <i>milli-seconds</i> | DHCP ping 100 10000Ш |
|----------------------|----------------------|

Г А

500 Ш

Г А

Г А

ping Ш

Г А

ping 600msШ

**ip dhcp ping timeout** 600

Г А

| <b>clear ip dhcp conflict</b> | DHCP Ш      |
|-------------------------------|-------------|
| <b>ip dhcp ping packets</b>   | DHCP ping Ш |
| <b>show ip dhcp conflict</b>  | DHCP Ш      |

### 23.1.13 ip dhcp pool

DHCP DHCP  
**ip dhcp pool**Ш **no** DHCP Ш

**ip dhcp pool** *pool-name*

**no ip dhcp pool** *pool-name*

Г А

| <i>pool-name</i> | Ш mypool 1Ш |
|------------------|-------------|

г А

DHCP Ш

г А

г А

DHCP

Ruijie(dhcp-config)#

IP ЧDNS Ч

Ш

г А

mypool0 DHCP Ш

ip dhcp pool mypool0

г А

| <b>host</b>                         | IP Ш DHCP<br>Ш |
|-------------------------------------|----------------|
| <b>ip dhcp<br/>excluded-address</b> | DHCP IP        |
| <b>network DHCP</b>                 | DHCP           |

### 23.1.14 lease

DHCP DHCP

**lease** Ш **no** Ш

**lease** { *days* [ *hours* ] [ *minutes* ] | **infinite** }

**no lease**

г

| <i>days</i>     | Ш   |
|-----------------|-----|
| <i>hours</i>    | Ш Ш |
| <i>minutes</i>  | Ш Ш |
| <i>infinite</i> |     |

г А

Ш

г А

DHCP

г А

DHCP

ШDHCP

Ш

г А

DHCP 1 Ш

lease 0 1

DHCP 1 Ш

lease 0 0 1

г А

| <b>ip dhcp pool</b> | DHCP DHCP<br>Ш |
|---------------------|----------------|

### 23.1.15 netbios-name-server

DHCP NETBIOS WINS

**netbios-name-server** Ш

no

DHCP

WINS

Ш

**netbios-name-server** *ip-address* [ *ip-address2...ip-address8* ]

**no netbios-name-server**

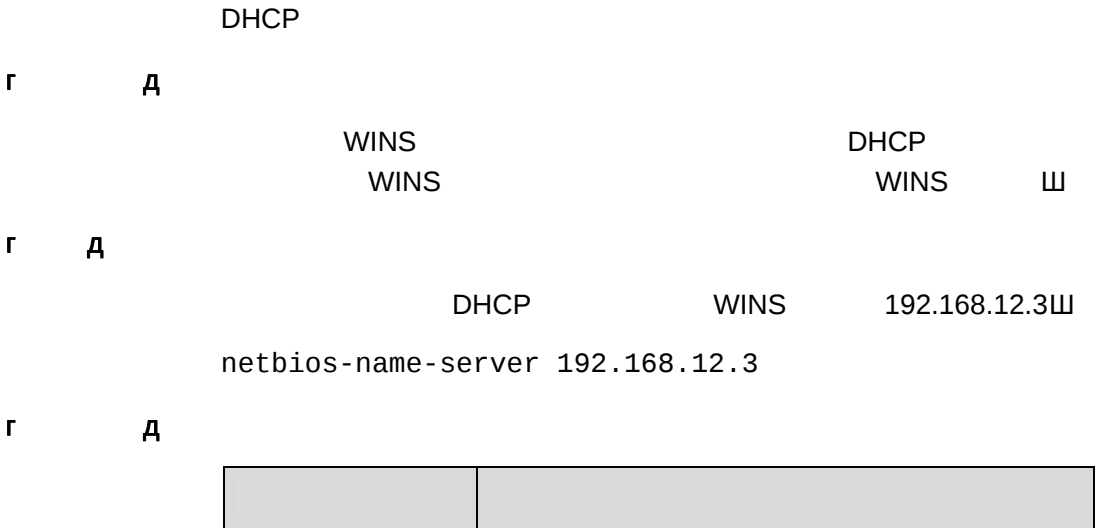
г А

| <i>ip-address</i>                | WINS IP Ш<br>Ш |
|----------------------------------|----------------|
| <i>ip-address2...ip-address8</i> | Ш 8 WINS       |

г А

WINS Ш

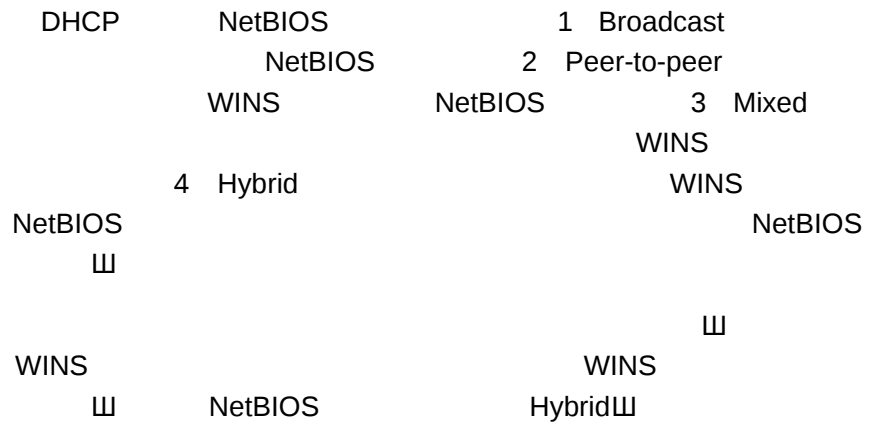
г А



Г А

DHCP

Г А



Г А

DHCP NetBIOS WINS  
netbios-node-type h-node

Г А

| ip dhcp pool        | DHCP WINS DHCP    |
|---------------------|-------------------|
| netbios-name-server | DHCP NETBIOS WINS |

### 23.1.17 network DHCP

DHCP DHCP  
network WINS no WINS  
network net-number net-mask  
no network

Г А

| net-number | DHCP IP WINS      |
|------------|-------------------|
| net-mask   | DHCP IP WINS WINS |

Г А



Ш

Г А

DHCP

Г А

DHCP

Ш

Г А

DHCP

192.168.12.4Ш

next-server 192.168.12.4

Г А

| <b>bootfile</b>        | DHCP        |
|------------------------|-------------|
| <b>ip dhcp pool</b>    | DHCP Ш DHCP |
| <b>ip help-address</b> | Helper      |
| <b>option</b>          | RGOS DHCP Ш |

### 23.1.19 option

DHCP DHCP optionШ

no option Ш

**option** *code* { **ascii** *string* | **hex** *string* | **ip** *ip-address* }

**no option**

Г А

| <i>code</i>                 | DHCP Ш  |
|-----------------------------|---------|
| <b>ascii</b> <i>string</i>  | ASCII Ш |
| <b>hex</b> <i>string</i>    | Ш       |
| <b>ip</b> <i>ip-address</i> | IP Ш    |

Г А

Ш

г д

г д

DHCP TCP/IP Ш  
 DHCP option DHCP 312 option Ш  
 DHCP Ш DHCP Ш  
 DHCP option RFC 2131 Ш

г д

19 DHCP  
 IP Ш IP 1 IP Ш  
 DHCP IP Ш  
 option 19 hex 1  
 33 DHCP  
 DHCP 1  
 172.16.12.0 192.168.12.12 2 172.16.16.0  
 192.168.12.16Ш  
 option 33 ip 172.16.12.0 192.168.12.12 172.16.16.0  
 192.168.12.16

г д

|  |   |
|--|---|
|  | 1 |
|--|---|



Ш

г д

г д

dhcp pool DHCP DHCP no ip  
Ш

г д

IP 192.168.12.100 DHCP Ш  
clear ip dhcp binding 192.168.12.100

г д

О

Г Д

| ip dhcp ping packets  | DHCP ping Ш |
|-----------------------|-------------|
| show ip dhcp conflict | DHCP Ш      |

### 23.2.3 clear ip dhcp server statistics

DHCP server statistics Ш clear ip dhcp

clear ip dhcp server statistics

Г Д

Ш

Г Д

Г Д

DHCP DHCP ч ч clear Ш  
ip dhcp server statistics Ш

Г Д

DHCP Ш

clear ip dhcp server statistics

Г Д

| show ip dhcp server statistics | DHCP Ш |
|--------------------------------|--------|

### 23.2.4 debug ip dhcp client

DHCP Client debug ip dhcp client Ш

debug ip dhcp client

no debug ip dhcp client

Г Д

Г А

Г А

Г А

dhcp client  
Ш

Г А

dhcp Ш  
debug ip dhcp client

Г А

### 23.2.5 debug ip dhcp server

DHCP Server  
Ш

**debug ip dhcp server**

**debug ip dhcp server**  
**no debug ip dhcp server**

Г А

Г А

Г А

Г А

dhcp server  
Ш

Г А

dhcp Ш  
debug ip dhcp server

Г А

## 23.2.6 show dhcp lease

```

DHCP EXEC show dhcp lease
show dhcp lease

r A

r A

 W

r A

r A

 IP W IP
 IP W

r A

 show dhcp lease W

Ruijie# show dhcp lease
Temp IP addr: 192.168.5.71 for peer on Interface:
FastEthernet0/0
Temp sub net mask: 255.255.255.0
DHCP Lease server: 192.168.5.70, state: 3 Bound
DHCP transaction id: 168F
Lease: 600 secs, Renewal: 300 secs, Rebind: 525 secs
Temp default-gateway addr: 192.168.5.1
Next timer fires after: 00:04:29
Retry count: 0 Client-ID:
redgaint-00d0.f8fb.5740-Fa0/0

```

## 23.2.7 show ip dhcp binding

```

DHCP EXEC show ip dhcp binding
show ip dhcp binding [ip-address]

r A

```

| <i>ip-address</i> | IP W |
|-------------------|------|

Г А

Ш

Г А

Г А

IP

Ш

IP

IP

Ш

Г А

**show ip dhcp binding**

Ш

Ruijie# **show ip dhcp binding**

IP address      Client-Id/      Lease expiration      Type  
Hardware address

192.168.1.2      00d0.f866.4777      IDLE      Manual

Ш

| IP address                     | DHCP      IP      Ш                 |
|--------------------------------|-------------------------------------|
| Client-Id/<br>Hardware address | DHCP      client identifier         |
| Lease expiration               | Ш Infinite<br>IDLE      DHCP      Ш |
| Type                           | Ш Automatic<br>Manual      Ш        |

Г А

| <b>clear ip dhcp binding</b> | DHCP |
|------------------------------|------|

## 23.2.8 show ip dhcp conflict

DHCP

EXEC

**show ip dhcp conflict**Ш

**show ip dhcp conflict**

Г А

Г А

❏

r A

r A

DHCP

❏

r A

**show ip dhcp conflict**

❏

Ruijie# **show ip dhcp conflict**

IP address Detection Method

192.168.12.1 Ping

dhcpd excluded ipaddress

192.168.12.100

❏

| IP address               | DHCP IP ❏ |
|--------------------------|-----------|
| Detection Method         | ❏         |
| dhcpd excluded ipaddress | ❏         |

## DHCP



Г А

## show ip dhcp server statistics



Ruijie# show ip dhcp server statistics

```
Address pools 4
Automatic bindings 4
Manual bindings 0
Expired bindings 0
Malformed messages 2
```

| Message      | Received |
|--------------|----------|
| BOOTREQUEST  | 216      |
| DHCPDISCOVER | 33       |
| DHCPREQUEST  | 25       |
| DHCPDECLINE  | 0        |
| DHCPRELEASE  | 1        |
| DHCPINFORM   | 150      |

| Message   | Sent |
|-----------|------|
| BOOTREPLY | 16   |
| DHCPOFFER | 9    |
| DHCPACK   | 7    |
| DHCPNAK   | 0    |



| Address pools            |        |
|--------------------------|--------|
| Automatic bindings       | Ш      |
| Manual bindings          | Ш      |
| Expired bindings         | Ш      |
| Malformed messages       | DHCP Ш |
| Message Received or Sent | DHCP Ш |

Г А

| clear ip dhcp server statistics | DHCP Ш |
|---------------------------------|--------|

## 24 DHCP Relay

## 24.1 DHCP Relay

## DHCP

- 0 service dhcp
- 0 ip helper-address

### 24.1.1 service dhcp

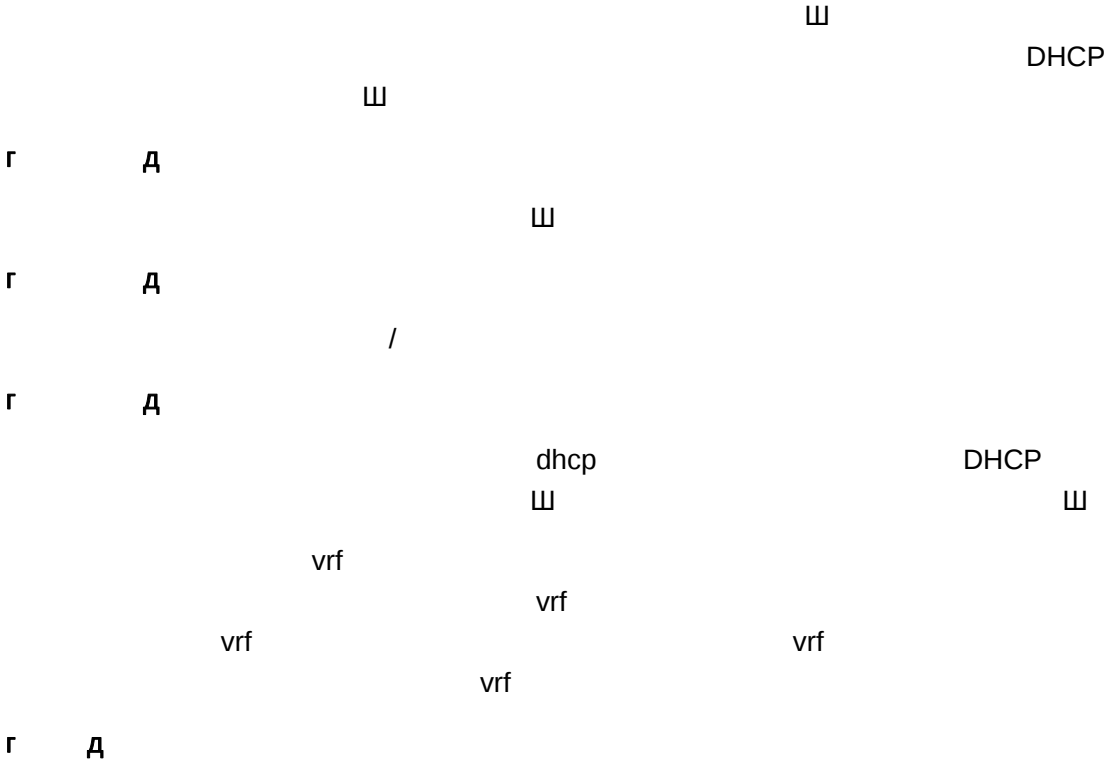
The diagram illustrates the relationship between two states, 'service dhcp' and 'no service dhcp', across four rows. Each row is associated with a 'Г' (G) label on the left and a 'Д' (D) label on the right. The diagram includes various text labels and symbols indicating different states or transitions.

- Row 1:**
  - Left side: 'Г' (G)
  - Right side: 'Д' (D)
  - Labels: 'no', 'DHCP', 'DHCP', 'Ш' (Sh), 'service dhcp |||'
- Row 2:**
  - Left side: 'Г' (G)
  - Right side: 'Д' (D)
  - Labels: 'service dhcp', 'no service dhcp', 'DHCP', 'Ш' (Sh)
- Row 3:**
  - Left side: 'Г' (G)
  - Right side: 'Д' (D)
  - Labels: 'DHCP', 'DHCP', 'DHCP', 'Ш' (Sh)
- Row 4:**
  - Left side: 'Г' (G)
  - Right side: 'Д' (D)
  - Labels: 'DHCP', 'DHCP', 'DHCP', 'Ш' (Sh), 'service dhcp'

|                                               |             |
|-----------------------------------------------|-------------|
|                                               |             |
| <b>ip helper-address</b> [vrf] <i>A.B.C.D</i> | DHCP server |

### 24.1.2 ip helper-address

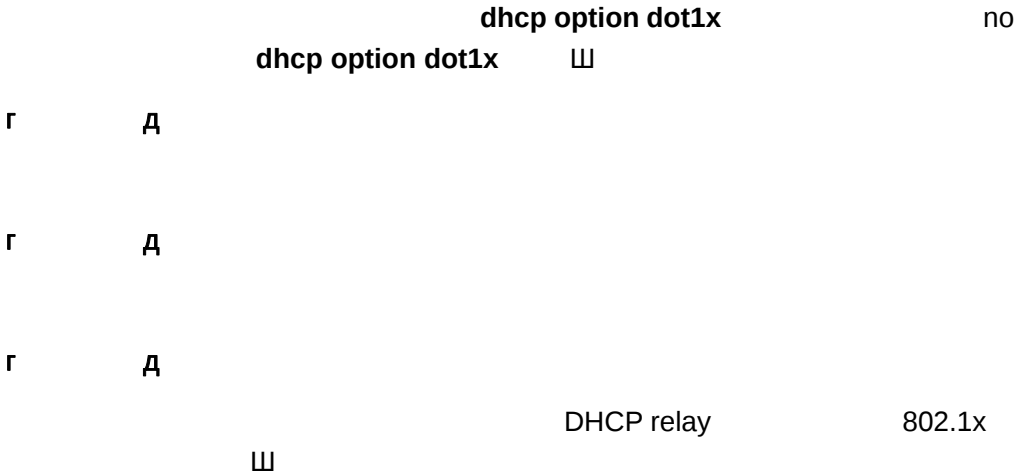
|  |      |    |
|--|------|----|
|  | DHCP | no |
|  |      |    |



```
61.154.26.49 vrf local 192.168.197.1
ip helper-address 61.154.26.49
ip helper-address vrf local 192.168.197.1
```

|              |      |
|--------------|------|
|              |      |
| service dhcp | DHCP |

24.1.3 ip dhcp relay information option dot1x



Г А

Ш

Ip dhcp relay information option dot1x

Г А

| service dhcp                                        | DHCP             |
|-----------------------------------------------------|------------------|
| ip dhcp relay information option dot1x access-group | option dot1x acl |

#### 24.1.4 ip dhcp relay information option dot1x access-group

dhcp option dot1x acl no  
dhcp option dot1x acl Ш

Г А

ACL

Г А

Г А

ACL ACE Ш

Г А

Ш

Ip dhcp relay information option dot1x access-group  
acl-name

Г А

| service dhcp                           | DHCP              |
|----------------------------------------|-------------------|
| ip dhcp relay information option dot1x | DHCP option dot1x |

#### 24.1.5 ip dhcp relay information option82

no ip dhcp relay information option82 Ш  
ip dhcp relay information option82

Г А

г А

г А

option dot1x Ш

г А

Ш

Ip dhcp relay information option82

г А

| Service dhcp                           | DHCP              |
|----------------------------------------|-------------------|
| ip dhcp relay information option dot1x | DHCP option dot1x |

## 24.1.6 ip dhcp relay check server-id

**ip dhcp relay check *server-id***

no **ip dhcp relay information check *server-id*** Ш

г А

г А

г А

DHCP REQUEST

server-id option serverШ

г А

Ш

Ip dhcp relay check server-id

г А

| Service dhcp | DHCP |
|--------------|------|

|              |      |
|--------------|------|
|              |      |
| service dhcp | DHCP |

## 25 DNS

### 25.1

#### 25.1.1 ip domain-lookup

```

DNS
no
DNS
ip domain-lookup
no ip domain-lookup

r A
DNS
r A
r A
DNS
r A
DNS
Ruijie(config)# ip domain-lookup
r A
show hosts
DNS
r A

```

|            |     |
|------------|-----|
|            |     |
| show hosts | DNS |

#### 25.1.2 ip name-server

```

IP
no
ip name-server ip-address
no ip name-server [ip-address]

```

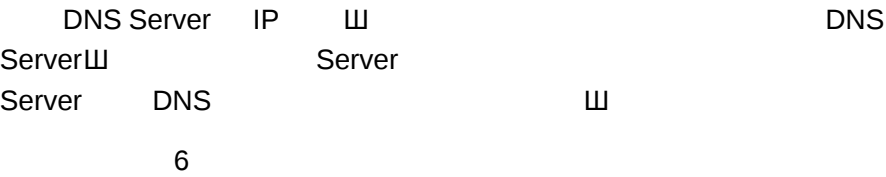
г      А

|                   |    |
|-------------------|----|
|                   |    |
| <i>ip-address</i> | IP |

г      А

г      А

г      А



Г Д

no ip host host-name ip-address

Г Д

Ruijie(config)# ip host switch 192.168.5.243

Г Д

| show hosts | DNS Ш |
|------------|-------|

Г Д

## 25.1.4 clear host

Ш

clear host [*host-name*]

Г Д

| <i>host-name</i> | Ш "*" Ш |
|------------------|---------|

Г Д

Г Д

DNS Ш 1 ip host DNS 2 Ш

Г Д

-IP

Ш

clear host \*

Г Д

| show hosts |  |
|------------|--|

Г А

## 25.1.5 show hosts

DNS Ш

**show hosts**

Г А

Г А

DNS Ш

Г А

Ruijie# **show hosts**

Name servers are:

static

| host           | type    | address       |
|----------------|---------|---------------|
| switch         | static  | 192.168.5.243 |
| www.ruijie.com | dynamic | 192.168.5.123 |

Г А

| ip host        | IP  |
|----------------|-----|
| ip name-server | DNS |

Г А

## 26 SNTP

### 26.1

- **sntp enable**
- **sntp server**
- **sntp interval**

#### 26.1.1 sntp enable

```

Ruijie(config)# sntp enable
Ruijie(config)# sntp server 192.168.1.1
Ruijie(config)# sntp interval 3600
Ruijie(config)# no sntp enable
Ruijie(config)#

```

```

Ruijie# show sntp

```

```

Ruijie# show sntp

```

```

Ruijie# show sntp

```

```

Ruijie# show sntp

```

```

Ruijie# show sntp

```

```

Ruijie# show sntp

```

```

Ruijie# show sntp

```

```

Ruijie(config)# sntp enable

```

```

Ruijie# show sntp

```

| <b>show sntp</b>             | SNTP |
|------------------------------|------|
| <b>clock update-calendar</b> |      |
| <b>clock set</b>             |      |

```

Ruijie# show sntp

```

RGOS10.0



1800s

Г А

Г А

show sntp SNTP Ш

Г А

Ruijie(config)# sntp interval 3600

Г А

| sntp enable           | SNTP |
|-----------------------|------|
| show sntp             | SNTP |
| clock update-calendar |      |

Г А

RGOS10.0

sntp enable Ш

26.2

:

° show sntp

26.2.1 show sntp

SNTP Ш

Г А

Г А

Г А

**show sntp**

SNTP

Г А

Ruijie# **show sntp**

SNTP state : Enable

SNTP server : 192.168.4.12

SNTP sync interval : 60

Time zone : +8

Г А

|                    |      |
|--------------------|------|
|                    |      |
| <b>sntp enable</b> | SNTP |
| <b>show sntp</b>   | SNTP |

Г А

RGOS10.0

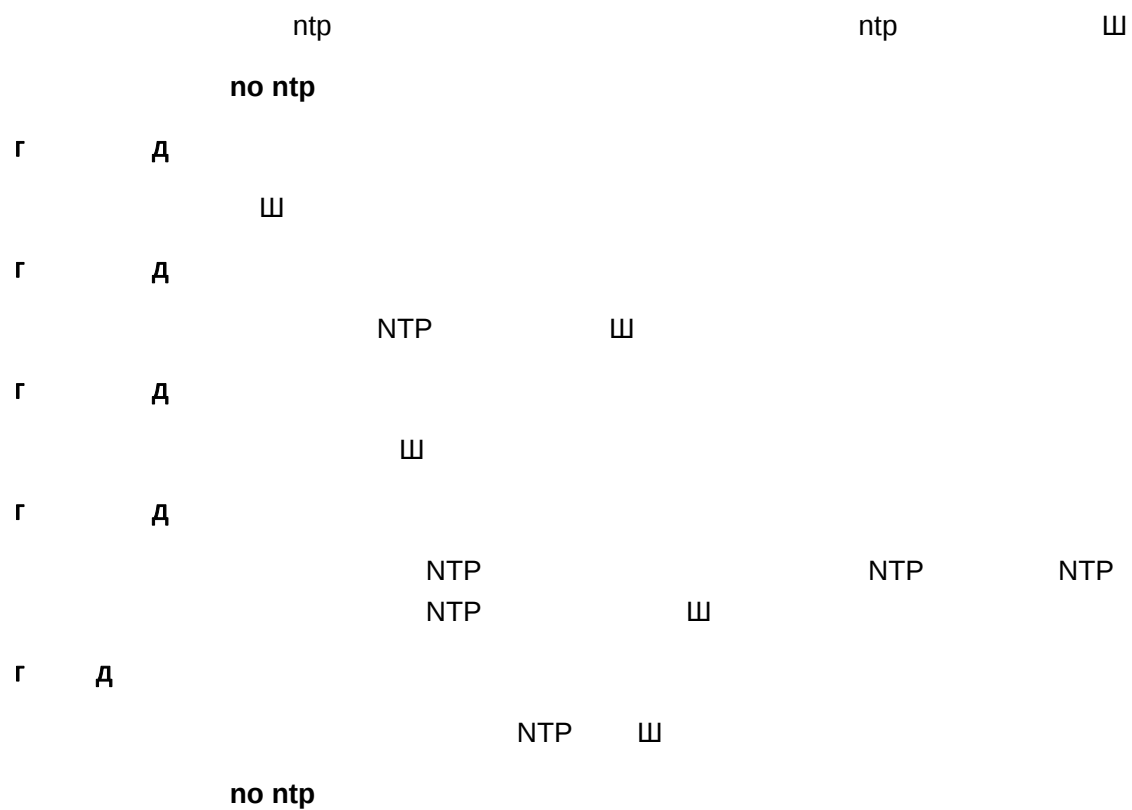
## 27 NTP

### 27.1 NTP

NTP

- **no ntp**
- **ntp access-group**
- **ntp authenticate**
- **ntp authentication-key**
- **ntp disable**
- **ntp master**
- **ntp server**
- **ntp trusted-key**
- **ntp update-calendar**

#### 27.1.1 no ntp



Г Д

|            |     |
|------------|-----|
|            |     |
| ntp server | NTP |

## 27.1.2 ntp access-group

NTP no  
Ш

**ntp access-group {peer|serve|serve-only|query-only}**  
*access-list-number| access-list-name*

**no ntp access-group {peer|serve|serve-only|query-only}**  
*access-list-number| access-list-name*

Г Д

|      |          |
|------|----------|
|      |          |
| peer | NTP<br>Ш |

NTP á uE| { Q£0 ¶ È 3 A£ A' Ô ãES66607 A



Ш

Ш

ntp authentication-key Ч ntp trusted-key

Ш

Г Д

Ш

ntp authentication-key 6 md5 woooooop  
ntp trusted-key 6  
ntp authenticate

Г Д

|                        |   |
|------------------------|---|
|                        |   |
| ntp authentication-key |   |
| ntp trusted-key        | Ш |

27.1.4 ntp authentication-key

NTP NTP Ш

ntp authentication-key key-id ypeTc 0.28 0 Td[(k4 0 j/C<2\_02405B504C]f10.5 0 0 10.5 4

```

 md5
ntp trusted-key key-id key-id
 1024

r A

 ID 6
ntp authentication-key 6 md5 woooooop
```

r A

|                  |     |
|------------------|-----|
|                  |     |
| ntp authenticate |     |
| ntp trusted-key  |     |
| ntp server       | NTP |

27.1.5 ntp disable

```

 NTP 1024
ntp disable

r A 1024

 1024

r A 1024

 NTP 1024

r A 1024

 1024

r A 1024

 NTP

 NTP 1024

 IP

 1024

r A
```

NTP Ш

no ntp

Г А

Ш

## 27.1.6 ntp master

NTP

Ш

no

NTP

Ш

**ntp master** *[stratum]***no ntp master**

Г А



Г Д

12Ш

```
Ruijie(config)# ntp master 12
```

Г Д

27.1.7 ntp server

NTP Ш

```
ntp server ip-addr [version version] [source if-name] [key
keyid][prefer]
```

```
no ntp server ip-addr
```

Г Д

| <i>ip-addr</i> | NTP    | IP  | IPv4  | IPv6 |
|----------------|--------|-----|-------|------|
| <i>version</i> | NTP    | 1-3 | NTPv3 |      |
| <i>if-name</i> | NTP    |     |       |      |
| <i>keyid</i>   |        |     |       |      |
| <b>prefer</b>  | Prefer |     |       |      |

Г Д

NTP Ш

Г Д

Ш

Г Д

20 Ш

prefer

```

NTP
IP
NTP
NTP server
IPv4 Ruijie(config)# ntp server 192.168.210.222

```

```


```

|        |     |
|--------|-----|
|        |     |
| no ntp | NTP |

### 27.1.8 ntp trusted-key

```

ID
ntp trusted-key key-id
no ntp trusted-key key-id

```

```


```

|        |    |
|--------|----|
|        |    |
| key-id | ID |

```


```

```


```

```


```

```


```

```


```

```

NTP

```

```

ID

```

```


```

```


```

```

ntp authentication-key 6 md5 woooooop
ntp trusted-key 6
ntp server 192.168.210.222 key 6

```

```


```

|  |  |
|--|--|
|  |  |
|--|--|

|                               |       |
|-------------------------------|-------|
| <b>ntp authenticate</b>       | Ш     |
| <b>ntp authentication-key</b> | NTP Ш |
| <b>ntp server</b>             | NTP Ш |

### 27.1.9 ntp update-calendar

```

NTP
Ш no Ш

ntp update-calendar
no ntp update-calendar

г Д

г Д

Ш

г Д

Ш

NTP
Ш
Ш
NTP Ш NTP
Ш

г Д

NTP

Ruijie(config)# ntp update-calendar

г Д

```

## 27.2

- **debug ntp**
- **show ntp status**

### 27.2.1 debug ntp

```

 NTP Ш
 debug ntp
 no debug ntp
г Д
 Ш
г Д
 Ш
г Д
 Ш
г Д
 NTP Ш
г Д
 NTP Ш
 debug ntp
г Д
 Ш
```

### 27.2.2 show ntp status

```

 NTP Ш
 show ntp status
г Д
 Ш
г Д
 Ш
г Д
г Д
```

NTP

---

NTP

NTP

Ш

Г Д

NTP

Ш

show ntp status

Г Д

# 28                    UDP-Helper

## 28.1

### 28.1.1 udp-helper enable

|                   |     |    |
|-------------------|-----|----|
| udp-helper enable | UDP | no |
| udp-helper enable | UDP |    |

**ip helper-address** *address*  
**no ip helper-address** *address*

┌     ┐

| <i>address</i> | UDP<br>20 |
|----------------|-----------|

┌     ┐

UDP

┌     ┐

┌     ┐

20     

UDP-Helper

UDP

**no ip helper-address**

┌     ┐

UDP

Ruijie(config-if)# **ip helper-address** *192.168.100.1*

┌     ┐

| <b>ip forward-protocol</b> | UDP |
|----------------------------|-----|

┌     ┐

### 28.1.3 ip forward-protocol

UDP     no

UDP     

**ip forward-protocol udp** [*port* | **tftp** | **domain** | **time** | **netbios-ns** | **netbios-dgm** | **tacacs**]

**no ip forward-protocol udp** [*port* | **tftp** | **domain** | **time** | **netbios-ns** | **netbios-dgm** | **tacacs**]

┌     ┐

| <i>port</i>       | 69,53,37,137,138,49<br>⏏                       |
|-------------------|------------------------------------------------|
| <b>tftp</b>       | Trivial File Transfer Protocol(69)<br>UDP 69 ⏏ |
| <b>domain</b>     | Domain Name System(53) UDP<br>53 ⏏             |
| <b>time</b>       | Time service(37) UDP<br>37 ⏏                   |
| <b>netbios-ns</b> | NetBIOS Name Service(137)                      |

## 29 SNMP

## 29.1

## SNMP

- o **no snmp-server**
- o **snmp-server chassis-id**
- o **snmp-server community**
- o **snmp-server contact**
- o **snmp-server enable traps**
- o **snmp-server host**
- o **snmp-server location**
- o **snmp-server packetsize**
- o **snmp-server queue-length**
- o **snmp-server system-shutdown**
- o **snmp-server trap-source**
- o **snmp-server trap-timeout**
- o **snmp-server user**
- o **snmp-server group**
- o **snmp-server view**
- o **snmp-server if-index persist**

### 29.1.1 no snmp-server

[illegible]

## **29.1.2 snmp-server chassis-id**

SNMP





|                         |      |
|-------------------------|------|
|                         |      |
| <b>snmp-server host</b> | SNMP |

### 29.1.6 snmp-server host

SNMP NMS

**snmp-server host**  $\sqcup$  no SNMP  $\sqcup$

**snmp-server host** {*host-addr* | **ipv6** *ipv6-addr*} [**vrf** *vrfname*] [**traps**]  
 [version {1 | 2c | 3 [auth | noauth | priv]} community-string [udp-port  
*port-num*][notification-type]

**no snmp-server host** *host-addr*

Г А

*host-addr* SNMP

*ipv6-addr* SNMP ipv6

*vrfname* vrf

**version** snmp V1 Ч V2C Ч V3

**auth | noauth | priv** V3  $\sqcup$

*community-string* V3  $\sqcup$

*port-num* snmp

*notification-type* snmp  $\sqcup$

Г А

SNMP  $\sqcup$

$\sqcup$

Г А

Г А

**snmp-server enable traps**

NMS  $\sqcup$

SNMP

vrf

[ Ч vrf ]

$\sqcup$

Г А

SNMP

SNMP

```
Ruijie(config)# snmp-server host 192.168.12.219 public
snmp
```

Г Д

|                          |  |
|--------------------------|--|
|                          |  |
| snmp-server enable traps |  |

## 29.1.7 snmp-server location

SNMP

location

no

SNMP

snmp-server

location

```
snmp-server location text
```

```
no snmp-server location
```

Г Д

```
text
```

location

Г Д

Г Д

Г Д

```
Ruijie(config)# snmp-server location start-technology
```

```

Ruijie> show snmp
byte-count 484 17876 1

```

```

Ruijie> show snmp
1500

```

```

Ruijie> show snmp

```

```

Ruijie> show snmp
SNMP 1492
Ruijie(config)# snmp-server packetsize 1492

```

```

Ruijie> show snmp

```

|                          |      |
|--------------------------|------|
|                          |      |
| snmp-server queue-length | SNMP |

## 29.1.9 snmp-server queue-length

snmp-server

queue-length 1

snmp-server queue-length length

```

Ruijie> show snmp
length 1 1000

```

```

Ruijie> show snmp
10

```

```

Ruijie> show snmp

```

```

Ruijie> show snmp
 4

```

```

Ruijie> show snmp
4
Ruijie(config)# snmp-server queue-length 4

```

```

Ruijie> show snmp

```

|                               |      |
|-------------------------------|------|
|                               |      |
| <b>snmp-server packetsize</b> | SNMP |

### 29.1.10 snmp-server system-shutdown

```

SNMP
system-shutdown 1 no SNMP
snmp-server
no snmp-server system-shutdown

r A
SNMP
r A
r A
reload/reboot SNMP RGOS
 NMS 1
r A
SNMP
Ruijie(config)# snmp-server system-shutdown

```

### 29.1.11 snmp-server trap-source

```

SNMP
trap-source 1 no 1 snmp-server
snmp-server trap-source interface
no snmp-server trap-source

r A
interface SNMP
r A
SNMP IP 1
r A
r A

```

SNMP

IP

IP

SNMP



Г Д

0 IP

SNMP

Ruijie(config)# **snmp-server trap-source fastethernet 0**

Г Д

| <b>snmp-server enable traps</b> |     |
|---------------------------------|-----|
| <b>snmp-server enable host</b>  | NMS |

## 29.1.12 snmp-server trap-timeout

**snmp-server**

**trap-timeout**  no 

**snmp-server trap-timeout** *seconds*

**no snmp-server trap-timeout**

Г Д

*seconds* 

Г Д

30

Г Д

Г Д

60

Ruijie(config)# **snmp-server trap-timeout 60**

Г Д

| <b>snmp-server queue-length</b> |     |
|---------------------------------|-----|
| <b>snmp-server enable host</b>  | NMS |

## 29.1.13 snmp-server user

|                                                                                                                                                                                                                                                                                     |  |                  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------|--|
| SNMP                                                                                                                                                                                                                                                                                |  | snmp-server user |  |
| no                                                                                                                                                                                                                                                                                  |  |                  |  |
| <b>snmp-server user</b> <i>username</i> <i>groupname</i> { <b>v1</b>   <b>v2</b>   <b>v3</b> [ <b>encrypted</b> ] [ <b>auth</b> { <b>md5</b>   <b>sha</b> } <i>auth-password</i> ] [ <b>priv</b> <b>des56</b> <i>priv-password</i> ]} [ <b>access</b> { <i>num</i>   <i>name</i> }] |  |                  |  |
| <b>no snmp-server user</b> <i>username</i> <i>groupname</i> { <b>v1</b>   <b>v2c</b>   <b>v3</b> }                                                                                                                                                                                  |  |                  |  |
| <i>username</i>                                                                                                                                                                                                                                                                     |  |                  |  |
| <i>groupname</i>                                                                                                                                                                                                                                                                    |  |                  |  |
| <b>v1</b>   <b>v2</b>   <b>v3</b>                                                                                                                                                                                                                                                   |  |                  |  |
| <b>encrypted</b>                                                                                                                                                                                                                                                                    |  |                  |  |
| <b>auth</b>                                                                                                                                                                                                                                                                         |  |                  |  |
| <b>auth-password:</b>                                                                                                                                                                                                                                                               |  |                  |  |
| <b>priv</b>                                                                                                                                                                                                                                                                         |  |                  |  |
| <b>priv-password</b>                                                                                                                                                                                                                                                                |  |                  |  |
| <b>access</b>                                                                                                                                                                                                                                                                       |  |                  |  |
| <b>snmpV3</b>                                                                                                                                                                                                                                                                       |  |                  |  |
| <b>md5</b>                                                                                                                                                                                                                                                                          |  |                  |  |
| <b>DES</b>                                                                                                                                                                                                                                                                          |  |                  |  |
| Ruijie(config)# <b>snmp-server user</b> <i>user-2</i> <i>mib2user</i> <b>v3</b> <b>auth</b> <b>md5</b> <i>authpassstr</i> <b>priv</b> <b>des56</b> <i>despassstr</i>                                                                                                                |  |                  |  |
| <b>show snmp user</b>                                                                                                                                                                                                                                                               |  |                  |  |
| SNMP                                                                                                                                                                                                                                                                                |  |                  |  |

## 29.1.14 snmp-server group

SNMP

```

view-name 1
oid-tree MIB MIB 1
include MIB 1
exclude MIB 1

```

```

r A

```

```

default MIB 1

```

```

r A

```

```

r A

```

```

MIB-2 oid 1.3.6.1

```

```

Ruijie(config)# snmp-server view mib2 1.3.6.1 include

```

```

r A

```

|                |      |
|----------------|------|
|                |      |
| show snmp view | SNMP |

## 29.1.16 snmp-server if-index persist

```

snmp-server if-index persist 1

```

```

no 1

```

```

snmp-server if-index persist

```

```

no snmp-server if-index persist

```

```

r A

```

```

r A

```

```

1

```

```

r A

```

```

r A

```

```

Ruijie(config)# snmp-server if-index persist

```

```

r A

```

|          |  |
|----------|--|
|          |  |
| show run |  |

## 29.2

### 29.2.1 show snmp

SNMP

show snmp

show snmp [mib | user | view | group]

r A

r A

show snmp SNMP

show snmp mib snmp mib

show snmp user snmp

show snmp view snmp

show snmp group snmp

r A

SNMP

Ruijie# show snmp

Chassis: 60FF60

0 SNMP packets input

0 Bad SNMP version errors

0 Unknown community name

0 Illegal operation for community name supplied

0 Encoding errors

0 Number of requested variables

0 Number of altered variables

0 Get-request PDUs

0 Get-next PDUs

0 Set-request PDUs

0 SNMP packets output

0 Too big errors (Maximum packet size 1500)

0 No such name errors

0 Bad values errors

0 General errors

0 Response PDUs

0 Trap PDUs  
SNMP global trap: disabled  
SNMP logging: disabled  
SNMP agent: enabled

r

A

| <b>snmp-server</b> <i>chassis-id</i> | SNMP |
|--------------------------------------|------|

## 30 RMON

### 30.1

#### RMON

- **rmon collection stats** *index* [**owner** *owner-string*]
- **rmon collection history** *index* [**owner** *owner-string*] [**buckets** *bucket-number*] [**interval** *seconds*]
- **rmon alarm** *number variable interval* {**absolute** | **delta** } **rising-threshold** *value* [*event-number*] **falling-threshold** *value* [*event-number*] [**owner** *ownername*]
- **rmon event** *number* [**log**] [**trap** *community*] [*description-string*]
- **show rmon statistics**
- **show rmon history**
- **show rmon events**
- **show rmon alarms** *ion stat/TT2 1 TtTf0 Tc 0 Tw 11.697 0 Td( )*

Г Д

| <b>rmon collection history</b><br><i>index</i> [ <b>owner</b> <i>owner-name</i> ]<br><b>buckets</b> <i>bucket-number</i><br><b>interval</b> <i>seconds</i> |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

### 30.1.2 rmon collection history

Ш no Ш

**rmon collection history** *index* [**owner** *ownername*] [**buckets** *bucket-number*] [**interval** *seconds*]  
**no rmon collection history** *index*

Г Д

Г Д

Г Д

RGOS  
owner Ч buckets interval

Г Д

1 Ш

Ruijie(config)# **interface fast-Ethernet 0/1**  
Ruijie(config-if)# **rmon collection history 1 zhansan**  
**buckets 10 interval 10**

**rmon alarm** *number variable interval {absolute | delta}*  
**rising-threshold** *value [event-number]* **falling-threshold** *value*  
*[event-number] [owner ownername]*  
**no rmon alarm** *number*

r A

r A

r A

RGOS  
variable 4 interval 4 absolute/delta 4 owner 4 interval 4  
rising-threadhold/falling-threadhold event

r A

MIB ifInNUcastPkts.6W

Ruijie(config)# **rmon alarm** 10 1.3.6.1.2.1.2.2.1.12.6 30  
**delta rising-threshold** 20 1 **falling-threshold** 10 1 **owner**  
*zhangsan*

r A

| <b>rmon event</b> <i>number [log] [trap community]</i><br><i>[description-string]</i> |  |
|---------------------------------------------------------------------------------------|--|

Г Д

Ч trap Ш

```
Ruijie(config)# rmon event 1 log trap rmon description
"ifInNUcastPkts is too much " owner zhangsan
```

Г Д

| <b>rmon alarm</b> <i>number variable interval</i><br>{absolute   delta } <b>rising-threshold</b> <i>value</i><br>[event-number] <b>falling-threshold</b> <i>value</i><br>[event-number] <b>owner</b> <i>ownername</i> |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

## 30.2

### 30.2.1 show rmon statistics

Ш

**show rmon statistics**

Г Д

Г Д

Г Д

Г Д

```
Ruijie# show rmon statistics
Statistics : 1
Data source : Gi1/1
DropEvents : 0
Octets : 1884085
Pkts : 3096
BroadcastPkts : 161
MulticastPkts : 97
CRCAlignErrors : 0
UndersizePkts : 0
OversizePkts : 1200
```

```

Fragments : 0
Jabbers : 0
Collisions : 0
Pkts64Octets : 128
Pkts65to127Octets : 336
Pkts128to255Octets : 229
Pkts256to511Octets : 3
Pkts512to1023Octets : 0
Pkts1024to1518Octets : 1200
Owner : zhangsan

```

Г А

| <b>rmon collection stats</b> <i>index</i><br>[owner owner-string] |  |
|-------------------------------------------------------------------|--|

## 30.2.2 show rmon history

Ш

**show rmon history**

Г А

Г А

Г А

Г А

```

Ruijie# show rmon history
Entry : 1
Data source : Gi1/1
Buckets requested : 65535
Buckets granted : 10
Interval : 1
Owner : zhangsan
Sample : 198
Interval start : 0d:0h:15m:0s
DropEvents : 0
Octets : 67988

```

```
Pkts : 726
BroadcastPkts : 502
MulticastPkts : 189
CRCAlignErrors : 0
UndersizePkts : 0
OversizePkts : 0
Fragments : 0
Jabbers : 0
Collisions : 0
Utilization : 0
```

└     A

| <b>rmon collection history</b> <i>index</i> [owner<br>ownername] [buckets bucket-number]<br>[interval seconds] |  |
|----------------------------------------------------------------------------------------------------------------|--|

### 30.2.3 show rmon alarm

┌

**show rmon alarm**

└     A

└     A

└     A

└     A

```
Ruijie# show rmon alarm
Event : 1
Description : firstevent
Event type : log-and-trap
Community : public
Last time sent : 0d:0h:0m:0s
Owner : zhangsan
Log : 1
Log time : 0d:0h:37m:47s
Log description : ipttl
```

Log : 2  
 Log time : 0d:0h:38m:56s  
 Log description : ipttl

r A

| <b>rmon alarm</b> <i>number variable interval</i><br><b>{absolute   delta} rising-threshold</b> <i>value</i><br><i>[event-number]</i> <b>falling-threshold</b> <i>value</i><br><i>[event-number]</i> <b>owner</b> <i>ownername</i> |  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|

### 30.2.4 show rmon event

W

show rmon event

r A

r A

r A

r A

Ruijie# show rmon event

Alarm : 1

Interval : 1

Variable : 1.3.6.1.2.1.4.2.0

Sample type : absolute

Last value : 64

Startup80n-4 T22o Tw 0 Td[(fall1.44 1.3.6.1.2.1.4.2.0 FTc 2.0 Td[(

|             |                  |                               |       |       |  |
|-------------|------------------|-------------------------------|-------|-------|--|
| <b>rmon</b> | <b>event</b>     | <i>number</i>                 | [log] | [trap |  |
|             | <i>community</i> | [ <i>description-string</i> ] |       |       |  |



## 31 IPFIX

### 31.1 IPFIX

#### 31.1.1 cache

|                                                                      |      |         |          |
|----------------------------------------------------------------------|------|---------|----------|
| IPFIX                                                                |      | , cache |          |
|                                                                      | Ш    | no      | Ш        |
| cache {entries number   timeout {active minutes   inactive seconds}} |      |         |          |
| no cache {entries   timeout {active   inactive}}                     |      |         |          |
| г                                                                    | Д    |         |          |
| entries <i>number</i>                                                |      |         |          |
|                                                                      | 1024 | 131072. |          |
| timeout                                                              |      |         |          |
|                                                                      |      |         | Ш        |
| active <i>minutes</i>                                                |      |         |          |
|                                                                      |      |         | 1 60     |
|                                                                      | 30   | Ш       |          |
| inactive <i>seconds</i>                                              |      |         |          |
|                                                                      |      | Ш       | 10 600 Ш |
|                                                                      | 15   | Ш       |          |
| г                                                                    | Д    |         |          |
|                                                                      |      | 4096    |          |
|                                                                      |      | 30      |          |
|                                                                      |      | 15      |          |
| г                                                                    | Д    |         |          |
|                                                                      |      | IPFIX   |          |
| г                                                                    | Д    |         |          |
|                                                                      |      | IPFIX   |          |
|                                                                      |      | Ш       |          |
|                                                                      |      | Ш       |          |
| г                                                                    | Д    |         |          |
|                                                                      |      |         | 4        |

```

Ruijie(config)# ip flow-aggregation cache
protocol-port
Ruijie(config-flow-cache)# cache entries 2046
Ruijie(config-flow-cache)# cache timeout inactive 199
Ruijie(config-flow-cache)# cache timeout active 45
Ruijie(config-flow-cache)# enabled

```

┌      ▴

| show ip flow cache             |  |
|--------------------------------|--|
| show ip flow cache aggregation |  |

### 31.1.2 cache-timeout

top-talker      ▴

**cache-timeout** *milliseconds*

**no cache-timeout**

┌      ▴

*milliseconds*    top-talker      1 ~ 3,600,000    1  
1      ▴

┌      ▴

5,000ms

┌      ▴

top-talker

┌      ▴

┌      ▴

top-talker

Ruijie(config-flow-top-talkers)#**cache-timeout** 300

┌      ▴

### 31.1.3 clear ip flow stats

▴

**clear ip flow stats**

Ruijie#

Ruijie#

Ruijie#

Ruijie#

flow IP IPFIX show ip cache  
clear ip flow stats  
└─┘

Ruijie#

Ip

Ruijie# clear ip flow stats

Ruijie#

| show ip flow cache             |  |
|--------------------------------|--|
| show ip flow cache aggregation |  |

31.1.4 enabled (aggregation cache)

IPFIX enabled  
no └─┘

enabled  
no enabled

Ruijie#

Ruijie#

Ruijie#

IPFIX

Ruijie#

IPFIX

Г Д

**protocol-port** :

Ruijie(config)# **ip flow-aggregation cache**  
**protocol-port**

Ruijie(config-flow-cache)# **enabled**

**protocol-port** :

Ruijie(config)# **ip flow-aggregation cache**  
**protocol-port**

Ruijie(config-flow-cache)# **no enabled**

Г Д

| <b>ip flow-aggregation cache</b>              |  |
|-----------------------------------------------|--|
| <b>cache</b>                                  |  |
| <b>export destination (aggregation cache)</b> |  |
| <b>mask (IPv4)</b>                            |  |
| <b>show ip flow cache aggregation</b>         |  |

### 31.1.5 export

IPFIX **export**

no

Ш

**export** {**destination** [*ip-address* | *hostname*] *udp-port* } | **version** [9|10]  
| **template** [**refresh-rate** *packets* | **timeout-rate** *minutes*]

**no export** {**destination** [*ip-address* | *hostname*] *udp-port*} | **version** |  
**template** [**refresh-rate** | **timeout-rate**]

Г Д

**destination** *ip-address* | *hostname* *udp-port*

**version** [9 | 10]

version 10 IETF

ШVersion 9 Netflow V9

version 10Ш

**template**

refresh-rate timeout-rate

**refresh-rate** *packets*

1 600 20

**timeout-rate** *minutes*

1 3600 10

r A

**refresh-rate** 20**timeout-rate** 10

r A

IPFIX

r A

IPFIX

山

**export****destination**

山

r A

protocol-port

Ruijie(config)# **ip flow-aggregation cache****protocol-port**Ruijie(config-flow-cache)# **export destination**

10.41.41.1 9992

Ruijie(config-flow-cache)# **export destination**

172.16.89.1 9992

Ruijie(config-flow-cache)# **enabled****protocol-port**Ruijie(config)# **ip flow-aggregation cache****protocol-port**Ruijie(config-flow-cache)# **export template***refresh-rate 100*Ruijie(config-flow-cache)# **export template***timeout-rate 120*Ruijie(config-flow-cache)# **enabled**

r A

| <b>ip flow-aggregation cache</b> |  |
|----------------------------------|--|
| <b>cache</b>                     |  |

**export destination**  
**(aggregation cache)**

```

Ruijie(config)# interface gi 2/2
Ruijie(config-if)# flow-sampler my_sampler
Ruijie(config-if)# exit

```

┌      ▴

| flow-sampler-map       |  |
|------------------------|--|
| mode random one-out-of |  |

### 31.1.7 flow-sampler-map

no

▮

```

flow-sampler-map sampler-map-name
no flow-sampler-map sampler-map-name

```

┌      ▴

sampler-map-name                      ▮

┌      ▴

┌      ▴

┌      ▴

```

egress IPFIX ip flow ingress 4 ip flow
 ingress service-policy ▮

```

```
ip flow {ingress | egress}
```

```
flow-sampler
```

```
service-policy
```

┌      ▴

2/2                      ▮

```

Ruijie# config terminal
Ruijie(config)# flow-sampler-map my_sampler
Ruijie(config-sampler)# mode random one-out-of 666
Ruijie(config-sampler)# exit
Ruijie(config)# interface gi 2/2

```

```
Ruijie(config-if)# flow-sampler my_sampler
Ruijie(config-if)# exit
```

└     A

| <b>flow-sampler</b>           |  |
|-------------------------------|--|
| <b>mode random one-out-of</b> |  |

### 31.1.8 ip flow egress

**ip flow egress**

no

┌

**ip flow egress**

**no ip flow egress**

└     A

└     A

└     A

└     A

ip flow egress      IPFIX      ┌  
ip flow Ingress    IPFIX      ┌

└     A

1/1      IP      ┌

```
Ruijie(config)# interface gigabitEthernet 1/1
```

```
Ruijie(config-if)# ip flow egress
```

└     A

| <b>ip flow-aggregation<br/>cache</b>              |  |
|---------------------------------------------------|--|
| <b>cache</b>                                      |  |
| <b>export destination<br/>(aggregation cache)</b> |  |



**no**

W

```
no ip flow-aggregation cache { as | as-tos | destination-prefix |
destination-prefix-tos | prefix | prefix-port | prefix-tos |
protocol-port | protocol-port-tos | source-prefix |
source-prefix-tos}
```

Д

AS

AS-Tos

**destination-prefix**

## destination-prefix-tos

**prefix**

**prefix-port**

**prefix-tos**

**protocol-port****protocol-port-tos**

**source-prefix**

**source-prefix-tos**

Д

Д

**Д**

W

## export

W

Tos

Tos

W

IP

**prefix**  $\sqcup$  **prefix-port**  $\sqcup$  **prefix-tos**  $\sqcup$  **source-prefix**  $\sqcup$   
**sourece-prefix-tos**  $\sqcup$

**prefix**  $\sqcup$  **prefix-port**  $\sqcup$  **prefix-tos**  $\sqcup$  **destination-prefix**  
**destination-prefix-tos**  $\sqcup$

**prefix**  $\sqcup$

31.1.11 ip flow-cache entries

|   |   | ip flow-cache entries               |              |
|---|---|-------------------------------------|--------------|
|   |   | no                                  | ⌵            |
|   |   | ip flow-cache entries <i>number</i> |              |
|   |   | no ip flow-cache entries            |              |
| г | А |                                     |              |
|   |   | <i>Number</i>                       | 1024 580000. |
|   |   | 65536 (64K)⌵                        |              |
| г | А |                                     |              |
|   |   | 65536 (64K)                         |              |
| г | А |                                     |              |
| г | А |                                     |              |
|   |   |                                     | ⌵            |
|   |   | 580000⌵                             | ⌵            |
|   |   | show ip cache flow                  | ⌵            |

|                        |       |
|------------------------|-------|
| ip flow egress         |       |
| ip flow-cache timeout  |       |
| show ip flow interface | IPFIX |

### 31.1.12 ip flow-cache timeout

```

Ruijie(config)# ip flow-cache timeout
Ruijie(config)# ip flow-cache timeout [active minutes | inactive seconds]
Ruijie(config)# no ip flow-cache timeout [active | inactive]

Ruijie(config)# ip flow-cache timeout active 1 60
Ruijie(config)# ip flow-cache timeout active 30 15
Ruijie(config)# ip flow-cache timeout inactive 10 600
Ruijie(config)# ip flow-cache timeout inactive 15 30

Ruijie(config)# ip flow-cache timeout active 30
Ruijie(config)# ip flow-cache timeout inactive 15

Ruijie(config)# ip flow-cache timeout active 20
Ruijie(config)# ip flow-cache timeout inactive 10

Ruijie(config)# ip flow-cache timeout active 20
Ruijie(config)# ip flow-cache timeout inactive 10

```



**refresh-rate** *packets*

1 600M

20M -eets

| ip flow ingress        | ⏏       |
|------------------------|---------|
| ip flow egress         | ⏏       |
| ip flow-cache timeout  |         |
| show ip flow cache     | ⏏       |
| show ip flow interface | IPFIX ⏏ |

### 31.1.14 ip flow-top-talkers

```

 ip flow-top-talker top talker ⏏

ip flow-top-talkers
no ip flow-top-talkers

r A

r A

 top talker

r A

r A

 top number sort-by

 [bytes | packets]⏏

 no top-talker

r A

Ruijie(config)#ip flow-top-talkers

```

### 31.1.15 mask (IPv4)

```

 mask ⏏

 no ⏏

mask {[destination | source] minimum value}
no mask {[destination | source] minimum }

r A

destination

```

**minimum**

1 32

0      mask

Г Д

Г Д

IP

0 1 2 3 4 5 6 7 8 9  
 10 11 12 13 14 15 16 17 18 19  
 20 21 22 23 24 25 26 27 28 29  
 30 31 32 33 34 35 36 37 38 39  
 40 41 42 43 44 45 46 47 48 49  
 50 51 52 53 54 55 56 57 58 59  
 60 61 62 63 64 65 66 67 68 69  
 70 71 72 73 74 75 76 77 78 79  
 80 81 82 83 84 85 86 87 88 89  
 90 91 92 93 94 95 96 97 98 99

|                               |         |
|-------------------------------|---------|
|                               |         |
| <b>ip flow ingress</b>        | ⏏       |
| <b>ip flow egress</b>         | ⏏       |
| <b>ip flow-cache timeout</b>  |         |
| <b>show ip flow cache</b>     | ⏏       |
| <b>show ip flow interface</b> | IPFIX ⏏ |

### 31.1.16 match

top-talker ⏏ no  
⏏

**match** { **byte-range** {*max-byte-number min-byte-number* | **max** *max-byte-number* | **min** *min-byte-number*} | **destination** {**address** *ip-address* [*mask* | */nn*] | **as** *as-number* | **port** {*max-port-number min-port-number* | **max** *max-port-number* | **min** *min-port-number*}} | **direction** {**egress** | **ingress**} | **input-interface** *interface-type interface-number* | **nexthop-address** *ip-address* [*mask* | */nn*] | **output-interface** *interface-type interface-number* | **packet-range** {*max-packets min-packets* | **max** *max-packets* | **min** *min-packets*} | **protocol** {*protocol-number* | **tcp** | **udp**} | **source** {**address** *ip-address* [*mask* | */nn*] | **as** *as-number* | **port** {*max-port-number min-port-number* | **max** *max-port-number* | **min** *min-port-number*}} | **tos** {*tos-byte* | **dscp** *dscp* | **precedence** *precedence*}}

**no match** { **byte-range** | **destination** [**address** | **as** | **port**] | **direction** | **flow-sampler** | **input-interface** | **nexthop-address** | **output-interface** | **packet-range** | **protocol** | **source** [**address** | **as** | **port**] | **tos**}

Г А

**byte-range** IP ⏏  
*max-byte-number*  
*min-byte-number*  
IP 1–4294967295⏏  
**max** *max-byte-number* IP 1–4294967295⏏  
**min** *min-byte-number* IP 1–4294967295⏏  
**destination** {**address** *ip-address* [*mask* | */nn*] | **as** *as-number* | **port** {*max-port-number min-port-number* | **max** *max-port-number* | **min** *min-port-number*}}  
**destination address** IP ⏏

---

```

ip-address IP 10 255.255.255.0
mask IP 10 255.255.255.0
/nn CIDR IP mask 255.255.255.0
 1 /24 1 1
destination as 1
as-number 1
destination port 1
max-port-number
min-port-number
 1 0-65535 1
max max-port-number 1 0-65535 1
min min-port-number 1 0-65535 1
direction egress 1
direction ingress 1
input-interface interface-type interface-number

nexthop-address IP 1
ip-address IP 1
mask IP 10 255.255.255.0
/nn CIDR IP mask 255.255.255.0
 1 /24 1 1
output-interface interface-type interface-number
 1

packet-range IP 1
max-packets
min-packets
 IP IP 1 1-4294967295 1
max max-packets IP 1-4294967295 1
min min-packets IP 1-4294967295 1
protocol 1
protocol-number 0-255 1
tcp tcp 1
udp udp 1
source address IP 1
ip-address IP 1
mask IP 10 255.255.255.0
/nn CIDR IP mask 255.255.255.0
 1 /24 1 1
source as 1

```

---

```

as-number 0-65535
source port 0-65535
max-port-number
min-port-number
max max-port-number 0-65535
min min-port-number 0-65535
tos TOS
tos-byte tos
dscp dscp TOS dscp
precedence precedence TOS precedence
sort-by
ip flow-top-talker
Ruijie(config-flow-top-talks)#match input-interface
fa 0/1

```

### 31.1.17 mode(Flow Sampler Configuration)

```

no
mode random one-out-of packet-interval
packet-interval packet-interval

```

Г Д

Г Д

2/2 Ш

```
Ruijie# config terminal
Ruijie(config)# flow-sampler-map my_sampler
Ruijie(config-sampler)# mode random one-out-of 666
Ruijie(config-sampler)# exit
Ruijie(config)# interface gi 2/2
Ruijie(config-if)# flow-sampler my_sampler
Ruijie(config-if)# exit
```

Г Д

|              |  |
|--------------|--|
|              |  |
| flow-sampler |  |

### 31.1.18 sort-by

Н

### 31.1.19 top

```

top-talker
top-talker
top number
no top
r A
number top-talker
1-200
r A
top
r A
top-talker
r A
r A
top
Ruijie(config-flow-top-talks)#top 150
r A

```

## 31.2 IPFIX

### 31.2.1 show flow-sampler

er-7(e2(n)46ae-ename

└     A

```
Ruijie# show flow-sampler my_sampler
Sampler : my_sampler, id : 1, packets matched : 10, mode :
random sampling mode
sampling interval is : 666
```

└         A

## 31.2.2 show ip flow cache

show ip flow cache

山

show ip flow cache

└         A

└         A

└         A

└         A

IP

└     A

```
Ruijie(config)# show ip flow cache
IP Flow Switching Cache, 4456448 bytes
3 active, 65533 inactive, 820628747 added
0 flow alloc failures
Exporting flows to 1.1.15.1 (2057)
820563238 flows exported in 34485239 udp datagrams, 0
failed
Last clearing of statistics 00:00:03
```

| Protocol    | Total     | Flows | Packets | Bytes | Packets |
|-------------|-----------|-------|---------|-------|---------|
| Active(Sec) | Idle(Sec) |       |         |       |         |
| -----       | Flows     | /Sec  | /Flow   | /Pkt  | /Sec    |
| /Flow       | /Flow     |       |         |       |         |
| TCP-BGP     | 71        | 0.0   | 1       | 49    | 0.0     |
| 2.5         | 15.8      |       |         |       |         |
| UDP-other   | 17        | 0.0   | 1       | 328   | 0.0     |
| 15.7        |           |       |         |       |         |
| ICMP        | 18966     | 6.7   | 10      | 28    | 0.1     |

```

22.9
Total: 19054 6.7 10 28 72.9 0.1
22.9

```

```

SrcIf SrcIPAddress DstIf DstIPAddress
Pr TOS Flgs Pkts
Port Msk AS Port Msk AS NextHop
B/Pk Active
Et1/1 52.52.52.1 Fd4/0 42.42.42.1
01 55 10 3748
0000 /8 50 0000 /8 40 202.120.130.2
28 17.8
Et1/2 52.52.52.1 Fd4/0 42.42.42.1
01 CC 10 3568
0000 /8 50 0000 /8 40 202.120.130.2
28 17.8
Et1/2 10.1.3.2 Fd4/0 42.42.42.1
01 C0 10 1124
0000 /0 0 0000 /8 40 202.120.130.2
28 17.8
...

```

```

r A

```

|                        |                                            |
|------------------------|--------------------------------------------|
|                        |                                            |
| clear ip flow stats    |                                            |
| show ip flow interface | IPFIX <span style="float: right;">⏏</span> |

### 31.2.3 show ip flow cache aggregation

```
show ip flow cache aggregation mode
```

```
⏏
```

```

show ip flow cache aggregation { as | as-tos | destination-prefix |
destination-prefix-tos | prefix | prefix-port | prefix-tos |
protocol-port | protocol-port-tos | source-prefix |
source-prefix-tos}

```

```

r A

```

```
as
```

|   |   |                               |     |   |
|---|---|-------------------------------|-----|---|
|   |   | <b>destination-prefix-tos</b> | TOS |   |
|   |   | ┌                             |     |   |
|   |   | <b>prefix</b>                 |     | ┌ |
|   |   | <b>prefix-port</b>            |     |   |
|   |   | ┌                             |     |   |
|   |   | <b>prefix-tos</b>             | TOS | ┌ |
|   |   | <b>protocol-port</b>          |     | ┌ |
|   |   | <b>protocol-port-tos</b>      | TOS |   |
|   |   | ┌                             |     |   |
|   |   | <b>source-prefix</b>          |     |   |
|   |   | ┌                             |     |   |
|   |   | <b>source-prefix-tos</b>      | TOS |   |
|   |   | ┌                             |     |   |
| r | A |                               |     |   |
| r | A |                               |     |   |
| r | A |                               |     |   |
|   |   |                               | IP  |   |
| r | A |                               |     |   |

```
Ruijie# sh ip flow cache aggregation protocol-port
IP Flow Switching Cache, 278544 bytes
2 active, 4094 inactive, 102 added
0 flow alloc failures
```

| Prot | SrcPort | DstPort | Flows | Pkts | B/Pk | Active |
|------|---------|---------|-------|------|------|--------|
| 0x01 | 0000    | 0000    | 15    | 17K  | 28   | 17.8   |
| 0x01 | 0000    | 0000    | 1     | 3568 | 28   | 17.8   |

|   |   |
|---|---|
| r | A |
|---|---|

### 31.2.4 show ip flow export

```
show ip flow export
┌
```

```
show ip flow export
```

г д

г д

г д

г д

Exporting using source IP address 172.16.6.2  
Version 9 flow records  
Template ID = 260  
Template timeout = 120

Г А

IP

Г А

```
Ruijie# show ip flow interface
FastEthernet 0/1
ip flow ingress
```

Г А

### 31.2.6 show ip flow top-talkers

( match)  
Ш

sort-by

**show ip flow top-talkers**

Г А

Г А

Г А

Г А

Г А

```
Ruijie# show ip flow top-talkers
SrcIf SrcIPAddress DstIf DstIPAddress Pr SrcP
DstP Bytes
Gi1/1 10.10.18.1 Gi1/2 172.16.10.232 11 00A1
00A1 144K
Gi1/1 10.10.19.1 Gi1/2 172.16.10.2 11 00A2
00A2 144K
Gi1/1 172.30.216.196 Gi1/2 172.16.10.2 06 0077
0077 135K
Gi1/1 10.162.37.71 Gi1/2 172.16.10.2 06 0050
0050 125K
Gi1/1 10.92.231.235 Gi1/2 172.16.10.2 06 0041
0041 115K
5 of 5 top talkers shown. 11 flows processed
```

Г А



## VRF

**clear ip route vrf** *vrf-name* {*\** | *network* [*mask*]}

Г А

| <i>vrf-name</i> | VRF |
|-----------------|-----|
| <i>*</i>        | VRF |
| <i>network</i>  |     |
| <i>mask</i>     |     |

Г А

Г А

Ш

Г А

Ruijie# **clear ip route vrf redvrf \***

Г А

**show ip route vrf**

Г А

RGOS10.1

### 32.1.3 ip vrf

VRF

VRF

no

**ip vrf** *vrf-name*

**no ip vrf** *vrf-name*

Г А

*vrf-name* VRF

Г А

Г А

VRF

Г А

Ruijie(config)# **ip vrf redvrf**

Г А

RGOS10.1

RGOS 10.3(4)  
VRF

S86

E

MPLS

VRF

### 32.1.4 rd

**rd** *rd\_value*

vrf rd

VRF

VRF

rd

VRF

VRF

**r** **A**

*rd\_value*

1) *rd\_value* *as\_num* *nn*

*an\_num* *nn*

2) *rd\_value* *ip\_addr:nn*

*ip\_addr* *IP* *nn*

**r** **A**

rd

vrf

rd

**r** **A**

vrf

**r** **A**

vrf

RD

RD

RD

vrf

RD

vrf

RD

RD

**r** **A**

Ruijie(config)# **ip vrf** *vrf1*

Ruijie (config-vrf)# **rd** *100:1*

**r** **A**

| <b>ip vrf</b>      | vrf |
|--------------------|-----|
| <b>show ip vrf</b> | vrf |

**r** **A**

RGOS10.3(3)

### 32.1.5 route-target

[no] **route-target** {*import|export|both*} *rt\_value*

vrf *rt*

**r**      **A**

*import*

### 32.1.6 ip vrf forwarding

```

VRF; VRF no

ip vrf forwarding vrf-name
no ip vrf forwarding vrf-name

r A
 vrf-name VRF

r A
 VRF

r A

r A
 VRF

r A
Ruijie(config-if)# ip vrf forwarding redvrf

r A
RGOS10.1

```

### 32.1.7 show ip vrf

```

VRF

show ip vrf [brief | detail | interfaces] [vrf-name]

r A
 brief VRF
 detail VRF
 interfaces VRF
 vrf-name () VRF

r A
 VRF

r A

r A
 VRF
 ° brief
 ° detail

```



## 33 RIP

### 33.1

#### 33.1.1 address-family RIP

RIP

**address-family****no** **address-family ipv4 vrf** *vrf-name***no address-family ipv4 vrf** *vrf-name*

r A

|                            |                                                                                          |
|----------------------------|------------------------------------------------------------------------------------------|
|                            |                                                                                          |
| <b>vrf</b> <i>vrf-name</i> | VRF  |

r A

RIP 

r A



r A

**address-family**(config-router-af)# 

VRF

RIP

VRF RIP 

VRF RIP

**exit-address-family** **exit** 

r A

vpn1 VRF vrf

RIP Ruijie(config)# **ip vrf vpn1**Ruijie(config-vrf)# **exit**Ruijie(config)# **interface FastEthernet 1/0**Ruijie(config-if)# **ip vrf forwarding vpn1**Ruijie(config-if)# **ip address 192.168.1.1**

```
Ruijie(config)# router rip
Ruijie(config-router)# address-family ipv4 vrf vpn1
Ruijie(config-router-af)# network 192.168.1.0
Ruijie(config-router)# exit-address-family
```

|                     |      |
|---------------------|------|
|                     |      |
| exit-address-family | ⏏    |
| ip vrf              | VRF⏏ |

RIPv2

|  |
|--|
|  |
|--|

```
Ruijie(config)# router rip
```

```
Ruijie(config-router)# version 2
```

```
Ruijie(config-router)# no auto-summary
```

```

r A

```

| version | <div>RIP<div><div></div><div></div><div></div><div></div></div><div>v1v2</div><div>v1&amp;v2</div></div> |
|---------|----------------------------------------------------------------------------------------------------------|

### 33.1.3 default-metric (RIP)

RIP

default-metric

no

default-metric *metric*

no default-metric

```

r A

```

| <i>metric</i> | 1 16 metric 16 RGOS |
|---------------|---------------------|

```

r A

```

1

```

r A

```

|  |
|--|
|  |
|--|

```

r A

```

redistribute

|  |
|--|
|  |
|--|

RIP

|  |
|--|
|  |
|--|

RIP

|  |
|--|
|  |
|--|

RIP

default-metric

default-metric

|  |
|--|
|  |
|--|

default-metric

1

```

r A

```

RIP

OSPF

RIP

3

```
Ruijie(config)# router rip
```

```
Ruijie(config-router)# default-metric 3
Ruijie(config-router)# redistribute ospf 100
```

┌      A

| redistribute | ┐ |
|--------------|---|

### 33.1.4 default-information originate(RIP)

```
RIP
default-information originate no
┐

default-information originate [always] [metric metric-value]
[route-map map-name]

no default-information originate [always] [metric] [route-map
map-name]
```

┌      A

| always                | RIP<br>┐                 |
|-----------------------|--------------------------|
| metric metric-value   | metric-value<br>1-15┐    |
| route-map<br>map-name | route-map ,<br>route-map |

┌      A

metric      1┐

┌      A

┐

┌      A

```
RIP
default-information originate
┐
```

```
always RIP
```

┐

```
show ip rip database RIP
```

┐

RIP  
set metric

route-map  


metric

route-map set metric  
 RIP 

metric

RIP  


RIP

ip default-network  
 default-information originate

RIP

г д

\$ Б i 

г д

120Ш

г д

Ш

г д

RIP

Г А

Ш

Г А

Ш

Ш

Г А

RIP Fastethernet 0/0

172.16 Ш

```
Ruijie(config)# router rip
Ruijie(config-router)# network 200.168.23.0
Ruijie(config-router)# distribute-list 10 in
fastethernet 0/0
Ruijie(config-router)# no auto-summary
Ruijie(config)#access-list 10 permit 172.16.0.0
0.0.255.255
```

Г А

| access-list | Ш |
|-------------|---|
| prefix-list | Ш |

### 33.1.7 distribute-list out RIP

distribute-list out Ш no Ш

**distribute-list** {[*access-list-number* | *name*] | **prefix** *prefix-list-name*}  
**out** [*interface* | *protocol* [*process-id* | *process-name*]]

**no distribute-list** {[*access-list-number* | *name*] | **prefix** *prefix-list-name*}  
**out** [*interface* | *protocol* [*process-id* | *process-name*]]

Г А

| <i>access-list-number</i>             | Ш Ш   |
|---------------------------------------|-------|
| <b>prefix</b> <i>prefix-list-name</i> | Ш     |
| <i>interface</i>                      | ( ) Ш |

|                     |                                      |
|---------------------|--------------------------------------|
| <i>protocol</i>     | ( )<br>Ш                             |
| <i>process-id</i>   | ( ) <i>protocol</i> OSPF<br>OSPF idШ |
| <i>process-name</i> | ( ) <i>protocol</i> ISIS<br>ISIS Ш   |

г А

Ш

г А

Ш

г А

Ш

г А

RIP

192.168.12.0/24

Ш

```
Ruijie(config)# router rip
Ruijie(config-router)# network 200.4.4.0
Ruijie(config-router)# network 192.168.12.0
Ruijie(config-router)# distribute-list 10 out
Ruijie(config-router)# version 2
Ruijie(config)# access-list 10 permit 192.168.12.0
0.0.0.255
```

г А

|                     |   |
|---------------------|---|
|                     |   |
| <b>access-list</b>  | Ш |
| <b>prefix-list</b>  | Ш |
| <b>redistribute</b> | Ш |

### 33.1.8 exit-address-family

**exit-address-family**

Ш

**exit-address-family**

г А

|                |     |
|----------------|-----|
|                |     |
| address-family | III |

|                         |                                          |
|-------------------------|------------------------------------------|
|                         |                                          |
| <i>name-of-keychain</i> | RIP <span style="float: right;">⏏</span> |

RIPv1

RIP

RIPv2

Ш

Г А

Serial 0

RIP

ripchainШ

Ruijie(config)# **interface serial 0/0**Ruijie(config-if)# **ip rip authentication key-chain**  
*ripchain*

Г А

| <b>ip rip authentication mode</b>          | RIP Ш |
|--------------------------------------------|-------|
| <b>ip rip authentication text-password</b> | RIP Ш |
| <b>key chain</b>                           | Ш     |

### 33.1.10 ip rip authentication mode

RIP

Serial 0

RIP

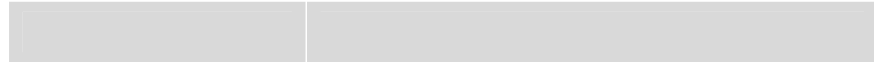
MD5Ш

```
Ruijie(config)# interface serial 0/0
```

```
Ruijie(config-if)# ip rip authentication mode md5
```

r

A



|                                 |                                                     |
|---------------------------------|-----------------------------------------------------|
|                                 |                                                     |
| ip rip authentication mode      | RIP      ㄱ                                          |
| ip rip authentication key-chain | RIP      RIP      ㄱ<br>ㄱ      RIPv2      RIP      ㄱ |

### 33.1.12 ip rip default-information

default-information ㄱ      RIP      ip rip  
                                          no      ㄱ  
 ip rip default-information only originate [metric *metric-value*]  
 no ip rip default-information

r      A

|      |   |
|------|---|
|      |   |
| only | ㄱ |

ethernet0/0

⌵

Ruijie(config)# **interface ethernet 0/0**

Ruijie(config-if)# **ip rip default-information only**

Г А

| default-information originate | RIP |
|-------------------------------|-----|

### 33.1.13 ip rip receive enable

RIP receive enable⌵ no RIP ip rip RIP

⌵

**ip rip receive enable**

**no ip rip receive enable**

Г А

Г А

RIP

Г А

⌵

Г А

no RIP  
default⌵ RIP⌵

Г А

Fastethernet 0/0 RIP ⌵

Ruijie(config)# **interface fastethernet 0/0**

Ruijie(config-if)# **no ip rip receive enable**

Г А

| ip rip send enable | RIP |
|--------------------|-----|
| passive-interface  | RIP |



**no ip rip send enable**

└     A

└     A

RIP

└     A

└     A

RIP

**no  
default**

┐

RIP

┐

┐

└     A

Fastethernet 0/0

RIP

┐

Ruijie(config)# **interface fastethernet 0/0**

Ruijie(config-if)# **no ip rip send enable**

└     A

| <b>ip rip receive enable</b> | RIP |
|------------------------------|-----|
| <b>passive-interface</b>     | RIP |

### 33.1.16 ip rip send version

RIP

**ip rip receive version**┐

RIP

**no**

┐

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

**no ip rip send version**

└     A

| <b>1</b> | RIPv1     ┐ |
|----------|-------------|
| <b>2</b> | RIPv2     ┐ |

└     A

**version**

┐

RIP

---

Г      Д

```
Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# ip rip v2-broadcast
```

Г А

|         |       |
|---------|-------|
|         |       |
| version | RIP Ш |

### 33.1.18 ip split-horizon (RIP)

RIP ip split-horizon Ш  
no RIP Ш

ip split-horizon  
no ip split-horizon

Г А

Ш

Г А

Ш

Г А

Ш

Г А

IP

Ш

Ш

4 X.25

Ш

Ш

IP

Ш

RIP

Ш

show ip rip

RIP

Ш

neighbor

Ш

Г А

Fastethernet 0/0

RIP

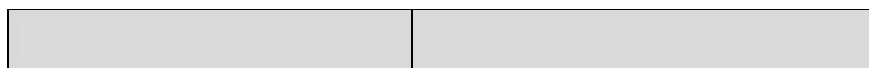
Ш

```
Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# no ip split-horizon
```

Г А

RIP

---



neighbor RIP

RIP

|                     |     |
|---------------------|-----|
|                     |     |
| <b>auto-summary</b> | RIP |



|                         |  |
|-------------------------|--|
| <i>interface-number</i> |  |
|-------------------------|--|

```

r A

```

```

 offset-list

```

```

r A

```

```

 list

```

```

r A

```

```

 RIP
offset-list RIP
 offset-list metric

```

```

r A

```

```

 acl 7
 RIP
 metric 7

```

```

Ruijie(config-router)# offset-list 7 out 7

```

```

 fastEthernet1/0
RIP
metric 7

```

```

Ruijie(config-router)# offset-list 7 in 7

```

```

Ruijie(config-router)# offset-list 8 in 7 fastEthernet
1/0

```

### 33.1.23 output-delay

RIP 512 25

25

⏏

⏏

**output-delay**

⏏

Г А

RIP 30

Ruijie(config)# **router rip**

Ruijie(config-router)# **output-delay 30**

### 33.1.24 passive-interface

**passive-interface** ⏏ **no**

⏏

**passive-interface** {**default** | *interface-type interface-num*}

**no passive-interface** {**default** | *interface-type interface-num*}

Г А

| <b>default</b>                      | passive |
|-------------------------------------|---------|
| <i>interface-type interface-num</i> |         |

Г А

passive ⏏

Г А

⏏

Г А

**passive-interface default** passive

**no passive-interface** *intface-type interface-num*

passive ⏏

**ip rip send enable** **ip rip receive enable**

RIP

passive

RIP

RIP

**ip rip send enable**

**ip rip receive**

**enable**

⏏

Г Д

passive ethernet0/0

passive

```
Ruijie(config-router)# passive-interface default
Ruijie(config-router)# no passive-interface ethernet
0/0
```

Г Д

| ip rip receive enable | RIP |
|-----------------------|-----|
| ip rip send enable    | RIP |

Г Д

### 33.1.25 redistribute RIP

redistribute

no

```
redistribute {bgp | isis [process-name] | ospf <1-65535> | connec
ted | static}[metric value] [route-map route-map-name][match i
nternal | external type | nssa-external type]
```

```
no redistribute {bgp | isis [process-name] | ospf <1-65535> |
connected | static}[metric value] [route-map route-map-name]
[match internal | external type | nssa-external type]
```

Г Д

| bgp   isis   ospf   connected   static |        |
|----------------------------------------|--------|
| metric                                 | metric |
| route-map                              |        |
| match                                  | ospf   |
| process-name                           | ISIS   |
| <1-65535>                              | OSPF   |

Г Д

RIP

---

OSPF  
ISIS  
level-2  
metric 1  
route-map

г А

г А

RIP Ш

OSPF € ШRIP

RIP

---

Ш

Г

А

|              |              |                |                |
|--------------|--------------|----------------|----------------|
| <i>flush</i> | <i>flush</i> | RIP            | <i>invalid</i> |
|              | <i>Flush</i> | <i>invalid</i> |                |
|              |              | 120            | 30             |

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

### 33.1.28 validate-update-source

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```

```

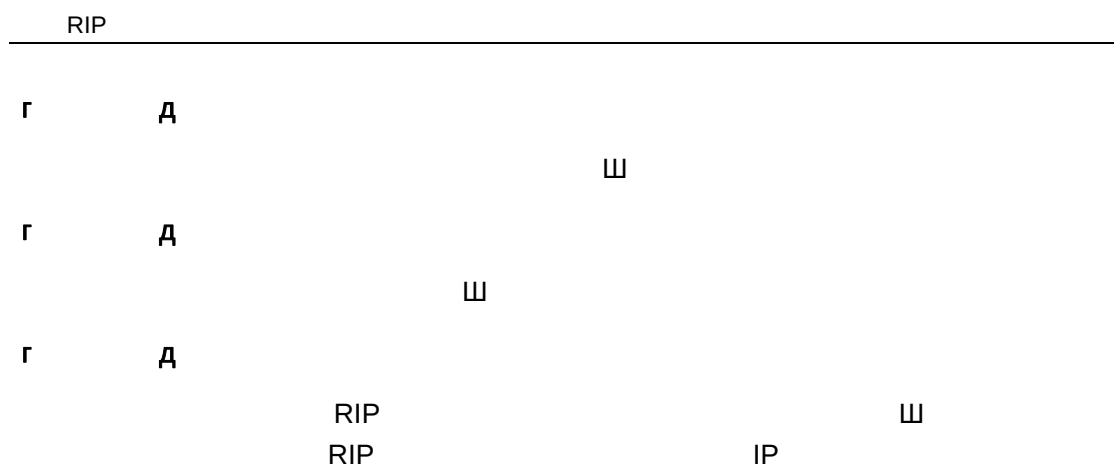
Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

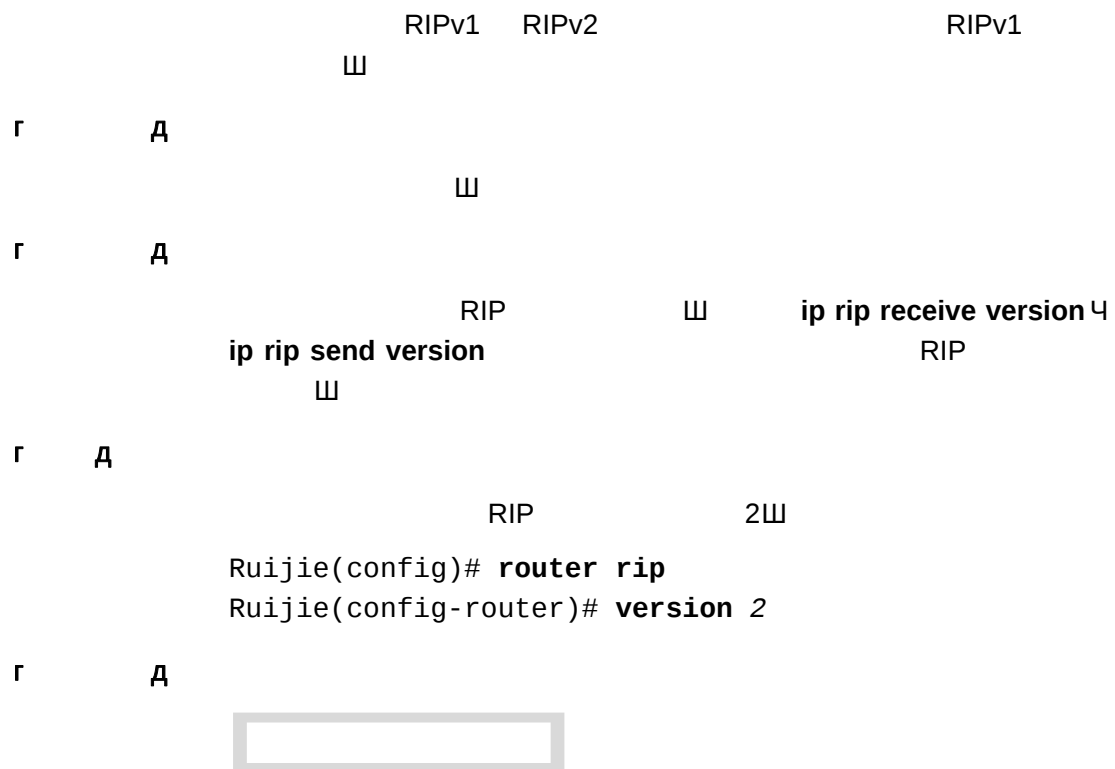
```

```

Ruijie(config)# show ip rip
Ruijie(config)# timers basic 10 30 90

```





Г А

RIP  
 Ч rip Ч rip Ч metric distance Ш  
 VRF VRF VRF-id

Г А

Ш RIP Ч

```
Ruijie# show ip rip
Routing Protocol is "rip"
Sending updates every 10 seconds, next due in 4 seconds
Invalid after 20 seconds, flushed after 10 seconds
```

### 33.2.2 show ip rip database

RIP

show ip rip database

**show ip rip database** [*vrf vrf-name*] [*network-number {network-mask}*]

Г А

| <b>vrf vrf-name</b>   | VRF RIP |
|-----------------------|---------|
| <i>network-number</i> | Ш       |
| <i>network-mask</i>   | Ш       |

Г А

Ш

Г А

Ч

Ч

Ш

Г А

RIP

Ш

Ш

Г А

RIP

Ш

Ruijie# **show ip rip database**

192.168.1.0/24 auto-summary

192.168.1.0/30 directly connected, Loopback 3

192.168.1.8/30 directly connected, FastEthernet 0/0

192.168.121.0/24 auto-summary

192.168.121.0/24 redistributed

[1] via 192.168.2.22, FastEthernet 0/1

RIP

192.168.121.0/24

Ш

Ruijie# **show ip rip database 192.168.121.0 255.255.255.0**

192.168.121.0/24 redistributed

[1] via 192.168.2.22, FastEthernet 0/1

Г А

|  |  |
|--|--|
|  |  |
|--|--|

show ip rip

Ш

### 33.2.3 show ip rip external

RIP

show ip rip external

Ш

**show ip rip external** [**bgp** | **connected** | **isis** [*process-name*] | **ospf** <1-65535> | **static**] [**vrf** *vrf-name*]

г А

| <b>bgp</b>   <b>connected</b>  <br><b>isis</b>   <b>ospf</b>   <b>static</b> |         |
|------------------------------------------------------------------------------|---------|
| <b>vrf</b> <i>vrf-name</i>                                                   | VRF RIP |
| <i>process-name</i>                                                          | ISIS    |
| <1-65535>                                                                    | OSPF    |

г А

Ш

г А

Ч

Ч

Ш

г А

г А

RIP

Ш

Ruijie# **show ip rip external connected**

Protocol connected route:

[connected] 1.0.0.0/8 metric=0

nhop=0.0.0.0, if=2

[connected] 3.0.0.0/8 metric=0

nhop=0.0.0.0, if=16391

[connected] 4.4.0.0/16 metric=0

nhop=0.0.0.0, if=16388

[connected] 5.0.0.0/8 metric=0

nhop=0.0.0.0, if=16386

[connected] 192.168.195.0/24 metric=0

nhop=0.0.0.0, if=1

г А

|             |   |
|-------------|---|
|             |   |
| show ip rip | ▯ |

### 33.2.4 show ip rip interface

RIP

show ip rip interface▯

show ip rip interface [vrf *vrf-name*]

r A

|                     |         |
|---------------------|---------|
|                     |         |
| vrf <i>vrf-name</i> | VRF RIP |

r A

▯

r A

4

4

▯

r A

r A

RIP

▯

Ruijie# show ip rip interface

FastEthernet 1/1 is down, line protocol is down

RIP is not enabled on this interface

FastEthernet 1/0 is up, line protocol is up

Routing Protocol: RIP

Receive RIPv2 packets only

Send RIPv2 packets only

Passive interface: Disabled

Split horizon: Enabled

V2 Broadcast: Disabled

Multicast register: Registered

Interface Summary Rip:

Not Configured

Authentication mode: Text

Authentication key-chain: ripk1

Authentication text-password: ruijie

Default-information: only, metric 5

IP interface address:

192.168.64.100/24

```

RIP BFD ,
:
Ruijie#show ip rip interface
VLAN 1 is up, line protocol is up
Routing Protocol: RIP
 Receive RIPv1 and RIPv2 packets
 Send RIPv1 packets only
 Receive RIP packet: Enabled
 Send RIP packet: Enabled
 Send RIP supernet routes: Enabled
 Passive interface: Disabled
 Split horizon: Enabled
 BFD: Enabled
 V2 Broadcast: Disabled
 Multicast registe: Registered
 Interface Summary Rip:
 Not Configured
 IP interface address:
2.2.2.111/24 ()TjETu46 T1786.02 418.62 0.72 ref1/24
```

RIP

---

Г Д

RIP

Ш

Ruijie#

## 34 OSPF

### 34.1

#### 34.1.1 area

no OSPF

area area-id

no area area-id

г А

| о         | о                |
|-----------|------------------|
| о area-id | о OSPF<br>Ш IP Ш |

г А

OSPF Ш

г А

Ш

г А

no OSPF

area authentication Ч area default-cost Ч area filter-list Ч

area nssa

Ш

OSPF

1.

Ш

Ш

2.

network area

Ш

Ш

г А

OSPF 2

Ruijie(config)# router ospf 2

Ruijie(config)# no area 2

Г А

|                |                |
|----------------|----------------|
| о              | о              |
| о network area | о OSPF<br>OSPF |

### 34.1.2 area authentication

OSPF

area authentication

no OSPF

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

no area *area-id* authentication

Г А

|                  |                             |
|------------------|-----------------------------|
| о                | о                           |
| о area-id        | о OSPF<br>Ш IP Ш            |
| о message-digest | о MD5 message<br>digest 5 Ш |

Г А

Ш

Г А

Ш

Г А

RGOS

OSPF

OSPF

message-digest

MD5

message-digest

Ш

OSPF

Ш

Ш

ip

ospf authentication-key

ip ospf

message-digest-key

MD5

Ш

Г А

OSPF0MD5

backbone

```
Ruijie(config)# interface FastEthernet 0/0
Ruijie(config-if)# ip address 192.168.12.1
255.255.255.0
Ruijie(config-if)# ip ospf message-digest-key 1 md5
backbone

OSPF

Ruijie(config)# router ospf 1
Ruijie(config-router)# network 192.168.12.0
0.0.0.255 area 0
Ruijie(config-router)# area 0 authentication
message-digest
```

r

A

|                              |        |
|------------------------------|--------|
| o                            | o      |
| o ip authentication-key ospf | o OSPF |

|             |                  |
|-------------|------------------|
| <i>cost</i> | STUB<br>NSSA<br> |
|-------------|------------------|

Г А

Г А

Г А

ABR  
STUB

NSSA  
ABR

OSPF STUB NSSA area  
stub area nssa area default-cost  
area stub NSSA STUB  
nssa area default-cost ABR

Г А

50

```
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.0.0 0.0.255.255
area 0
Ruijie(config-router)# network 192.168.12.0 0.0.0.255
area 1
Ruijie(config-router)# area 1 stub
Ruijie(config-router)# area 1 default-cost 50
```

Г А

|             |             |
|-------------|-------------|
| °           | °           |
| ° area stub | ° OSPF      |
| ° area nssa | ° OSPF NSSA |

Г А

Г А

### 34.1.4 area filter-list

ABR

intra-area

**area** *area-id* **filter-list** [**access** *acl-name* | **prefix** *prefix-name*] [**in** | **out**]  
**no area** *area-id* **filter-list** [**access** *acl-name* | **prefix** *prefix-name*] [**in** | **out**]

Г А

|                 |   |
|-----------------|---|
|                 |   |
| <i>area-id</i>  | Ш |
| <i>acl-name</i> |   |

OSPF nssa area nssa  
no nssa nssa

area area-id nssa [ no-redistribution] [default-information-originate  
[metric <0-16777214> | metric-type <1-2>]] [no-summary]  
no area area-id nssa [ no-redistribution][default-information-originate] [no-summary]

г А

|                                 |                                  |
|---------------------------------|----------------------------------|
| о                               | о                                |
| о area-id                       | о NSSA                           |
| о no-redistribution             | о nssa ABR<br>nssa               |
| о default-information-originate | о 7 LSA nssa<br>NSSA ABR<br>ASBR |
| о no-summary                    | о nssa<br>(ABR)<br>LSA nssa      |

г А

NSSA

г А

г А

default-information-originate Type-7 LSA  
nssa ABR ASBR ABR  
Type-7 LSA

|  |                          |            |     |      |      |
|--|--------------------------|------------|-----|------|------|
|  |                          | NSSA       |     |      | LSA  |
|  | ABR                      | no-summary |     | ABR  | NSSA |
|  | summary LSAs             | Type-3 LSA | III |      |      |
|  | <b>area default-cost</b> |            |     | NSSA | ABR  |

|                                         |   |
|-----------------------------------------|---|
| <i>ip-address</i>                       | Ш |
| <b>advertise</b>   <b>not-advertise</b> |   |
| <b>cost</b> <i>cost</i>                 | Ш |

```

r A
 Ш
 RFC1583
RFC1583 Ш RFC1583
 cost cost
r A
 Ш
r A
 ABR
 Ш
 Ш advertise not-advertise
 Ш
 OSPF
 Ш
r A
 172.16.16.0/20Ш
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.0.0 0.0.15.255
area 0
Ruijie(config-router)# network 172.16.17.0 0.0.15.255
area 1
Ruijie(config-router)# area 1 range 172.16.16.0 255.2
55.240.0

```

```

r A
r A

```

### 34.1.7 area stub

OSPF

**area stub**  $\Downarrow$  **no**  $\Downarrow$

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

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

г д

| <i>area-id</i>    | STUB $\Downarrow$    |
|-------------------|----------------------|
| <b>no-summary</b> | ABR $\Downarrow$ ABR |

г д

$\Downarrow$

г д

$\Downarrow$

г д

OSPF **area stub**  $\Downarrow$  ABR

```
Ruijie(config-router)# area 1 stub
```

```
r A
```

|                                                    |                                                                  |
|----------------------------------------------------|------------------------------------------------------------------|
| <b>authentication-key</b> <i>key</i>               | OSPF<br>service password-encryption<br>┌┐┌                       |
| <b>message-digest-key</b><br><i>key-id md5 key</i> | OSPF MD5<br>┌┐┌ MD5<br>┌┐┌ service<br>password-encryption<br>┌┐┌ |
| <b>authentication</b>                              | ┌┐┌                                                              |
| <b>message-digest</b>                              | MD5 ┌┐┌                                                          |
| <b>null</b>                                        | ┌┐┌                                                              |

Г Д

```
dead-interval 40
hello-interval 10
retransmit-interval 5
transmit-delay 1
;
┌┐┌
```

Г Д

┌┐┌

Г Д

```
OSPF
┌┐┌
┌┐┌ ABR Stub Area NSSA ABR
┌┐┌
router-id OSPF router-id
show ip ospf neighbor ┌┐┌ Loopback
┌┐┌
area virtual-link
OSPF area authentication┌┐┌
```

Г Д

1 2.2.2.2 ┌┐┌

```
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.0.0 0.0.15.255 area 0
Ruijie(config-router)# network 172.16.17.0 0.0.15.255area 1
 Ruijie(config-router)# area 1 virtual-link 2.2.2.2

 Ruijie(config)# router ospf 1 æ
 Ruijie(config-router)# network 172.16.17.0 0.0.15.255area 1
RuijieRuijie(config-router)#
```





Ruijie(config-router)# **no compatible rfc1583**

Г А

| <b>show ip ospf</b> | ospf |
|---------------------|------|

Г А

Г А

### 34.1.12 default-information originate OSPF

OSPF

**default-information originate**  $\sqcup$  **no**  $\sqcup$

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

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

Г А

| <b>always</b>                    | OSPF $\sqcup$                                                  |
|----------------------------------|----------------------------------------------------------------|
| <b>metric</b> <i>metric</i>      | 1 $\sqcup$                                                     |
| <b>metric-type</b> <i>type</i>   | $\sqcup$ OSPF<br>1<br>2<br>$\sqcup$ 1 2 $\sqcup$<br>2 $\sqcup$ |
| <b>route-map</b> <i>map-name</i> | route-map ,<br>route-map                                       |

Г А

$\sqcup$

Г А

$\sqcup$

Г А

```

redistribute default-information OSPF
ASBR ASBR
OSPF ASBR
default-information originate
always OSPF
show ip ospf database OSPF
0.0.0.0 OSPF
show ip route OSPF
default-information originate
default-metric OSPF
OSPF 1 2
show ip route
1 1 2
STUB

```

г д

```

OSPF OSPF
1 50
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.24.0 0.0.0.255
area 0
Ruijie(config-router)# default-information originate
always metric 50 metric-type 1

```

г д

| show ip ospf database | OSPF |
|-----------------------|------|
| show ip route         | IP   |

г д

г д

### 34.1.13 default-metric

```

OSPF
default-metric no

```

**default-metric** *metric*

**no default-metric**

Г А

| <i>metric</i> | OSPF<br>Ш |
|---------------|-----------|

Г А

20Ш

Г А

Ш

Г А

**default-metric**

**redistribute**

Ш

**default-metric**

OSPF

**default-information originate**

Ш

Г А

OSPF

50Ш

Ruijie(config)# **router rip**

Ruijie(config-router)# **network 192.168.12.0**

Ruijie(config-router)# **version 2**

Ruijie(config-router)# **exit**

Ruijie(config)# **router ospf**

Ruijie(config-router)# **network 172.16.10.0 0.0.0.255**  
**area 0**

Ruijie(config-router)# **default-metric 50**

Ruijie(config-router)#**redistribute rip subnets**

Г А

| <b>redistribute</b> | Ш    |
|---------------------|------|
| <b>show ip ospf</b> | ospf |

Г А

Г А

### 34.1.14 distance ospf

OSPF

**distance ospf** {intra-area <1-255> | inter-area <1-255> | external <1-255>}

**no distance ospf**

Г А

| <b>intra-area</b> <1-255> | 110 |
|---------------------------|-----|
| <b>inter-area</b> <1-255> | 110 |
| <b>external</b> <1-255>   | 110 |

Г А

110

Г А

OSPF

Г А

OSPF

110

Г А

OSPF

160

Ruijie(config)# **router ospf 1**

Ruijie(config-router)# **distance ospf external 160**

Г А

Г А

Г А

### 34.1.15 distribute-list in

LSA

**distribute-list** {listname | gateway plist-name | prefix plist-name }

**in** [interface-type num]

**no distribute-list** {listname | gateway plist-name | prefix plist-name }

**in** [interface-type num]

Г А

| <i>listname</i>                  | acl         |
|----------------------------------|-------------|
| <b>gateway</b> <i>plist-name</i> | gateway     |
| <b>prefix</b> <i>plist-name</i>  | prefix-list |
| <b>interface-type</b> <i>num</i> | LSA         |

Г А

Ш

Г А

Ш

Г А



Г А

```

Ruijie(config)# access-list 3 permit 172.16.0.0
0.0.127.255
Ruijie(config)# router ospf 25
Ruijie(config-router)# redistribute rip metric 100
Ruijie(config-router)# distribute-list 3 in ethernet
1/0
Ruijie(config-router)# distribute-list 3 in ethernet
1/1

```

Г А

Г А

Г А

### 34.1.16 distribute-list out

**redistribute**

**distribute-list** {*listname* | **gateway** *plist-name* | **prefix** *plist-name*}

**out** [**bgp** | **connected** | **isis** *area-tag* | **ospf** *process-id*] **rip** | **static**]

**r**      **A**

| <i>listname</i>                  | acl         |
|----------------------------------|-------------|
| <b>gateway</b> <i>plist-name</i> | gateway     |
| <b>prefix</b> <i>plist-name</i>  | prefix-list |

[**bgp** | **connected** | **isis**  
*area-tag*      |      **ospf**  
*process-id*   | **rip**



|        |      |      |    |
|--------|------|------|----|
| OSPFv2 | 16   | TRAP | 4  |
|        | TRAP | ⏏    | no |
| TRAP   | ⏏    |      |    |

**enable traps** [error [ifauthfailure | ifconfigerror | ifrxbadpacket |  
virtifauthfailure | virtifconfigerror | virtifrxbadpacket] | lsa  
[lsdbapproachoverflow | lsdboverflow | maxagelsa | originatelsa] |  
retransmit [iftxretransmit | virtiftxretransmit] | state-change  
[ifstatechange | nbrstatechange | virtifstatechange |  
virtnbrstatechange]]

**no enable traps** [error [ifauthfailure | ifconfigerror | ifrxbadpacket |  
virtifauthfailure | virtifconfigerror | virtifrxbadpacket] | lsa  
[lsdbapproachoverflow | lsdboverflow | maxagelsa | originatelsa] |  
retransmit [iftxretransmit | virtiftxretransmit] | state-change  
[ifstatechange | nbrstatechange | virtifstatechange |  
virtnbrstatechange]]

r      A



|              |                                                                                                                                                                                                                                                                                                      |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>error</b> | <div>error traps<br/>error traps<br/>    <b>ifauthfailure</b><br/>    <b>ifconfigerror</b><br/>    <b>ifrxbadpacket</b><br/>    <b>virtifauthfailu</b><br/>        re<br/>    <b>virtifconfigerr</b><br/>        or<br/>    <b>virtifrxbadpac</b><br/>        ket</div> |
|              | 34-23                                                                                                                                                                                                                                                                                                |

|     |                                                                                                                                                                                                      |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lsa | <div>lsa traps<br/>lsa traps<br/>lsdbapproach<br/>overflow<br/><br/>lsdboverflow<br/><br/>maxagelsa<br/>originatelsa</div> <div>L</div> |
|     | <div>34-24</div>                                                                                                                                                       |

|            |                                                                                                                             |
|------------|-----------------------------------------------------------------------------------------------------------------------------|
| retransmit | <div>retransmit traps</div> <div>retransmit traps</div> <div>iftxretransmit</div> <div>virtiftxretrans</div> <div>mit</div> |
|------------|-----------------------------------------------------------------------------------------------------------------------------|

|              |                    |
|--------------|--------------------|
| state-change | state-change traps |
|              | state-change traps |
|              | ifstatechange      |
|              | nbrstatechang      |
|              | e                  |
|              | virtifstatechan    |
| state-change | ge                 |
|              | virtnbrstatech     |
|              | ange               |
|              |                    |
|              |                    |
|              |                    |

г д

TRAP Ш

г д

Ш

г д

snmp-server  
enable traps ospf

MIB

snmp-server

TRAP Ш

г д

OSPFv2      100      TRAP

```
Ruijie(config)# router ospf 100
Ruijie(config)# enable traps
```

Г      А

| show ip ospf       | OSPF            |
|--------------------|-----------------|
| enable mib-binding | OSPFv2      MIB |

Г      А

Г      А

### 34.1.19

FastEthernet 0/0

OSPF

MD5

```


```

```

Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# ip address 172.16.10.0
255.255.255.0
Ruijie(config-if)# ip ospf authentication
message-digest

```

```


```

| area authentication        | OSPF     |
|----------------------------|----------|
| ip ospf authentication-key | OSPF     |
| ip ospf message-digest-key | OSPF MD5 |

```


```

```


```

### 34.1.20 ip ospf authentication-key

```

OSPF
authentication-key no
ip ospf authentication-key key
no ip ospf authentication-key

```

```


```

| Key | 8 |
|-----|---|

```


```

```


```

```


```

```


```

```


```

```

ip ospf authentication-key
OSPF
OSPF

```

OSPF

Г А

Ш

Г А

OSPF

100Mbps/Bandwidth  
bandwidth

Bandwidth

Ш

OSPF

° 64K cost 1562

° E1 cost 48

° 10M cost 10

° 100M cost Ш

**ip ospf cost**

OSPF

Ш

Г А

serial 1/0

OSPF

100Ш

Ruijie(config)# **interface serial 1/0**

Ruijie(config-if)# **ip ospf cost 100**

Г А



Г Д

Г Д

Г Д

Г Д

III

Г

А

**network area**

Г Д

serial 1/0 OSPF Hello

15 Ш

```
Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip address 172.16.10.1
255.255.255.0
Ruijie(config-if)# encapsulation ppp
Ruijie(config-if)# ip ospf hello-interval 15
```

Г Д

| ip ospf dead-interval | OSPF Ш |
|-----------------------|--------|

Г Д

Г Д

### 34.1.26 ip ospf message-digest-key

OSPF MD5 ip ospf  
message-digest-key Ш no OSPF MD5  
Ш

```
ip ospf message-digest-key key-id md5 key
no ip ospf message-digest-key
```

Г Д

| Key    | 16 Ш  |
|--------|-------|
| Key-id | 255 Ш |

Г Д

MD5 Ш

Г Д

Ш

Г Д

```

ip ospf message-digest-key OSPF
┌┐
┌┐
┌┐
┌┐
OSPF
authentication
ip ospf authentication
,
.
RGOS
┌┐
MD5
OSPF MD5
OSPF
┌┐
┌┐

```

Г Д

```

FastEthernet 0/0
hello5┌┐
OSPF

```

```

Ruijie(config)# interface Serial 1/0
Ruijie(config-if)# ip address 172.16.24.2
255.255.255.0
Ruijie(config-if)# ip ospf authentication
message-digest
Ruijie(config-if)# ip ospf message-digest-key 10 md5
hello10
Ruijie(config-if)# ip ospf message-digest-key 5 md5
hello5

```

┌┐

```

Ruijie(config)# interface Serial1/0
Ruijie(config-if)# no ip ospf message-digest-key 10 md5
hello10

```

Г Д

| area authentication    | OSPF ┌┐ |
|------------------------|---------|
| ip ospf authentication |         |

Г Д

Г Д



г д

| <b>broadcast</b>                               | OSPF Ш                         |
|------------------------------------------------|--------------------------------|
| <b>non-broadcast</b>                           | OSPF<br>NBMA Ш                 |
| <b>point-to-multipoint<br/>[non-broadcast]</b> | OSPF Ш<br>, non-broadcast<br>Ш |
| <b>point-to-point</b>                          | OSPF Ш                         |

г д

- ° PPP Ш SLIP Ш Ш X.25
- ° NBMA Ш X.25
- °
- ° Ш

г д

Ш

г д

- OSPF
- ° FDDI
- ° X.25
- ° HDLC PPP SLIP
- OSPF
- ° (NBMA) Ш NBMA SVC
- X.25 PVC
- Ш OSPF NBMA
- Designated Router NBMA
- Ш
- ° Ш
- OSPF Ш
- OSPF Ш
- Ш
- ,
- .





Г А

fastethernet 0/0

0

Ruijie(config)# **interface fastethernet 0/0**

Ruijie(config-if)# **ip ospf priority 0**

Г А

|                        |      |
|------------------------|------|
|                        |      |
| <b>ip ospf network</b> | OSPF |

Г А

Г А

### 34.1.30 ip ospf retransmit-interval

LSU

**ip ospf retransmit-interval**

**no**

**ip ospf retransmit-interval** *seconds*

**no ip ospf retransmit-interval**

Г А

|                |     |
|----------------|-----|
|                |     |
| <i>Seconds</i> | LSU |

Г А

5

Г А

Г А

LSU

LSU

**ip ospf retransmit-interval**

LSA

LSU

area

virtual-link

retransmit-interval

```

r A
 serial 1/0 LSU 10 W
Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip ospf retransmit-interval 10

```

|                   |      |   |
|-------------------|------|---|
|                   |      |   |
| area virtual-link | OSPF | W |

```

r A
r A

```

### 34.1.31 ip ospf transmit delay

```

 OSPF LSU ip ospf
transmit delayW no W
ip ospf transmit delay seconds
no ip ospf transmit delay

```

|         |                              |
|---------|------------------------------|
|         |                              |
| Seconds | OSPF      LSU<br>W      1  W |

```

r A
 1 W
r A
 W

```

```

r A
 LSU LSAs Age
 ip ospf transmit delay W
 W LSU area
virtual-link retransmit-interval W
RGOS Age 3600 LSA
 LSA W

```

Г Д

serial1/ 0 5

Ruijie(config)# **interface serial 1/0**  
 Ruijie(config-if)# **ip ospf transmit delay 10**

Г Д

|                          |      |
|--------------------------|------|
|                          |      |
| <b>area virtual-link</b> | OSPF |

Г Д

Г Д

### 34.1.32 log-adj-changes

**no default**

**log-adj-changes [detail]**  
**no log-adj-changes [detail]**

Г Д

|               |  |
|---------------|--|
|               |  |
| <b>detail</b> |  |

Г Д

**detail** Full

Г Д

Г Д

Ruijie(config)# **router ospf 1**  
 Ruijie(config-router)# **log-adj-changes detail**

Г Д

|  |  |
|--|--|
|  |  |
|--|--|

|              |      |   |
|--------------|------|---|
| show ip ospf | ospf | Ш |
|--------------|------|---|

Г А

Г А

### 34.1.33 max-concurrent-dd

DD

Ш

max-concurrent-dd <1-65535>

Г А

|  |  |
|--|--|
|  |  |
|--|--|

*cost*]

**no neighbor** *ip-address*

Г А

| <i>ip-address</i>                      | IP Ш                                           |
|----------------------------------------|------------------------------------------------|
| <b>poll-interval</b><br><i>seconds</i> | ШNon-broadcast(NBMA) 120 Ш                     |
| <b>priority</b><br><i>priority</i>     | Non-broadcast(NBMA) Ш                          |
| <b>Cost</b> <i>cost</i>                | , costШpoint-to-multipoint [ non-broadcast ] Ш |

Г А

Ш

Г А

Ш

Г А

RGOS

Ш

IP

IP Ш

NBMA

Hello

OSPF

Hello

Hello

Ш OSPF

0

Hello

0

DR/BDR

Ш

DR/BDR

DR/BDR

Hello

Ш

,

,

cost

,

.

Г А

OSPF

IP

172.16.24.2

1

150 Ш

Ruijie(config)# **router ospf 20**

Ruijie(config-router)# **network 172.16.24.0 0.0.0.255**

**area 0**

```
Ruijie(config-router)# neighbor 172.16.24.2 priority 1
poll-interval 150
```

**r**      **A**



```

 OSPF network IP
 OSPF 山
r A

 0 1 172.16.16.0山 IP
192.168.12.0/24 1 IP
172.16.16.0/20 172.16.16.0
 0山

Ruijie(config)# router ospf 20
Ruijie(config-router)# network 172.16.16.0
0.0.15.255 area 172.16.16.0
Ruijie(config-router)# network 192.168.12.0
0.0.0.255 area 1
Ruijie(config-router)# network 0.0.0.0 255.255.255.255
area 0

```

r A

| router ospf | OSPF 山 |
|-------------|--------|

r A

r A

### 34.1.36 overflow database

```

 OSPF LSA 山

overflow database <0-4294967294> hard | soft
no overflow database

```

r A

| <1-4294967294> | LSA                         |
|----------------|-----------------------------|
| hard   soft    | hard LSA OSPF<br>soft LSA 山 |

r A

r A

山

```

Ruijie# show ip ospf database
OSPF
 hard
 soft
 OSPF
 OSPF

```

```

Ruijie# show ip ospf database
LSA 10 OSPF 10

```

```

Ruijie# config terminal
Ruijie(config)# router ospf 10
Ruijie(config-router)# overflow database 10 hard

```

```

Ruijie# show ip ospf database
Ruijie# show ip ospf database
Ruijie# show ip ospf database

```

### 34.1.37 overflow database external

external LSA  
 10

**overflow database external** *max-dbsize wait-time*  
**no overflow database external**

```

Ruijie# show ip ospf database

```

| <i>max-dbsize</i> | external lsa AS<br>0-2147483647 10 |
|-------------------|------------------------------------|
| <i>wait-time</i>  | 0-65535 10                         |

```

Ruijie# show ip ospf database
external-LSA 10
external-LSA 10
external-LSA 10

```

```

Ruijie# show ip ospf database

```

```

Ruijie# show ip ospf database
Ruijie# show ip ospf database

```

```

external-LSA max-dbsize
external-LSA external-LSA
wait-time external-LSA

```

```

Ruijie# config terminal
Ruijie(config)# router ospf 10
Ruijie(config-router)# overflow database external 10 3

```

```

r A
r A
r A

```

### 34.1.38 overflow memory-lack

```

no OSPF OVERFLOW
overflow memory-lack
no overflow memory-lack

```

```

r A

```

| no | OSPF OVERFLOW |
|----|---------------|

```

r A

```

```

OSPF OVERFLOW

```

```

r A

```

```


```

```

r A

```

```

OSPF OVERFLOW
OSPF OVERFLOW
OSPF NULL
OVERFLOW

```

```

clear ip ospf process OSPF
OSPF OVERFLOW ❸

no OSPF OVERFLOW
 OSPF
 ❸

```

Г Д

```

OSPF OVERFLOW

```

```

Ruijie# config terminal
Ruijie(config)# router ospf 10
Ruijie(config-router)# no overflow memory-lack

```

Г Д

| clear ip ospf process  | OSPF |
|------------------------|------|
| show ip protocols ospf | OSPF |

Г Д

Г Д

### 34.1.39 passive-interface

❸

```

no ❸

```

```

passive-interface [default | type number]
no passive-interface [default | type number]

```

Г Д

| <i>type number</i> | ❸ |
|--------------------|---|
| default            | ❸ |

Г Д

OSPF

Г Д

❸

Г Д

Ш

Г Д

serial 1/0

Ш



```
Ruijie(config-router)# redistribute isis isis-001
level-1
```

Show run

```
router ospf 1
redistribute ospf 2 match external 1 internal subnets
redistribute isis isis-001 level-1-2
```

```
r A
```

```
r A
```

```
r A
```

### 34.1.41 router ospf

```
no OSPF router ospf
no OSPF
```

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

**no router ospf** *process-id*

```
r A
```

| <i>process-id</i> | ospf         |
|-------------------|--------------|
| <i>vrf-name</i>   | OSPF VRF VRF |



|                   |   |
|-------------------|---|
|                   |   |
| show ip protocols | Ш |

г А

г А

### 34.1.43 summary-address

OSPF

**summary-address**Ш **no** Ш

**summary-address** *ip-address net-mask* [**not-advertise** | **tag** <0-4294967295> | ]

г А

|                      |      |
|----------------------|------|
|                      |      |
| <i>ip-address</i>    | IP Ш |
| <i>net-mask</i>      | Ш    |
| <b>not-advertise</b> | Ш    |

г А

Ш

г А

Ш

г А

OSPF

OSPF Ш

Ш

**area rang** area range OSPF  
summary-address OSPF Ш

NSSA **summary-address** NSSA ABR

Ш

г А

100.100.0.0/16Ш

redRuijie(config)# **router ospf 20**

```

Ruijie(config-router)# summary-address 100.100.0.0
255.255.0.0
Ruijie(config-router)# redistribute static subnets
Ruijie(config-router)# network 200.2.2.0 0.0.0.255
area 1
Ruijie(config-router)# network 172.16.24.0 0.0.0.255
area 0
Ruijie(config-router)# area 1 nssa

```

┌      A

| area range | OSPF      ▮ |
|------------|-------------|

┌      A

┌      A

### 34.1.44 timers lsa-group-pacing

LSA

no

▮

**timers lsa-group-pacing** *seconds*

**no timers lsa-group-pacing**

┌      A

| <i>seconds</i> | LSA<br>: 10-1800      ▮ |
|----------------|-------------------------|

┌      A

: 240      ▮

┌      A

▮

┌      A

LSA

120 Ⅲ

```
Ruijie(config)#router ospf 20
```

```
Ruijie(config-router)#timers lsa-group-pacing 120
```

r

A



*spf-delay*

*spf-holdtime*

OSPF

|                         |                                              |
|-------------------------|----------------------------------------------|
| <i>spf-delay</i>        | SPF<br>1-6000000<br>OSPF<br>SPF<br>spf-delay |
| <i>spf-holdtime</i>     | SPF<br>1-6000000                             |
| <i>spf-max-waittime</i> | SPF<br>1-6000000                             |

г А

*spf-delay* 1000  
*spf-holdtime* 5000  
*spf-max-waittime* 10000

г А

г А

*spf-delay* SPF SPF  
*spf-holdtime* SPF  
*spf-max-waittime* SPF  
*spf-holdtime* SPF  
*spf-delay* *spf-holdtime* SPF  
*spf-max-waittime* SPF  
**timers spf** SPF  
**timers throttle spf** SPF

- 1 *spf-holdtime* *spf-delay* *spf-holdtime*  
*spf-delay*
- 2 *spf-max-waittime* *spf-holdtime* *spf-max-waittime*  
*spf-holdtime*
- 3 **timers throttle spf** **timers spf**
- 4 **timers spf** **timers throttle spf** **timers throttle spf**

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Г Д

### 34.2.1 show ip ospf

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Г Д

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OSPF

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**show ip ospf**

```
Ruijie# show ip ospf
Routing Process "ospf 1" with ID 1.1.1.1
Process uptime is 4 minutes
Process bound to VRF default
Conforms to RFC2328, and RFC1583Compatibility flag
isenabled
Supports only single TOS(TOS0) routes
Supports opaque LSA
This router is an ASBR (injecting external routing
information)
SPF schedule delay 5 secs, Hold time between two SPFs
10 secs
LsaGroupPacing: 240 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 4. Checksum 0x0278E0
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 4
External LSA database is unlimited.
Number of LSA originated 6
Number of LSA received 2
Log Neighbor Adjacency Changes : Enabled
Number of areas attached to this router: 1
Area 0 (BACKBONE)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 1
Area has no authentication
SPF algorithm last executed 00:01:26.640 ago
SPF algorithm executed 4 times
Number of LSA 3. Checksum 0x0204bf
Area 1 (NSSA)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 0
Number of fully adjacent virtual neighbors through this
area is 0
Area has no authentication
SPF algorithm last executed 02:09:23.040 ago
```

SPF algorithm executed 4 times  
Number of LSA 6. Checksum 0x028638  
NSSA Translator State is elected

OSPF BFD , "BFD is enabled",

Ruijie# **show ip ospf**

Routing Process "ospf 1" with ID 1.1.1.1  
Process uptime is 4 minutes  
Process bound to VRF default  
Conforms to RFC2328, and RFC1583 Compatibility flag is enabled  
Supports only single TOS(TOS0) routes  
Supports opaque LSA  
Supports Graceful Restart  
This router is an ASBR (injecting external routing information)  
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs  
LsaGroupPacing: 240 secs  
Number of incoming current DD exchange neighbors 0/5  
Number of outgoing current DD exchange neighbors 0/5  
Number of external LSA 4. Checksum 0x0278E0  
Number of opaque AS LSA 0. Checksum 0x000000  
Number of non-default external LSA 4  
External LSA database is unlimited.  
Number of LSA originated 6  
Number of LSA received 2  
Log Neighbor Adjacency Changes : Enabled  
Graceful-restart disabled  
Graceful-restart helper support enabled  
Number of areas attached to this router: 1  
**BFD is enabled**  
Area 0 (BACKBONE)  
Number of interfaces in this area is 1(1)  
Number of fully adjacent neighbors in this area is 1  
Area has no authentication  
SPF algorithm last executed 00:01:26.640 ago  
SPF algorithm executed 4 times  
Number of LSA 3. Checksum 0x0204bf  
Area 1 (NSSA)

Downloaded from <http://ajph.org/> on November 10, 2015

---

|                      |            |
|----------------------|------------|
| Number of opaque LSA | opaque-LSA |
| Opaque LSA Checksum  |            |

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## 34.2.2 show ip ospf border-routers

ABR/ASBR OSPF  
**show ip ospf border-routers**Щ

**show ip ospf [process-id] border-routers**

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|                   |      |
|-------------------|------|
|                   |      |
| <i>process-id</i> | ospf |

Г Д

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Г Д

Щ OSPF ABR ASBR OSPF  
**show ip route** OSPF  
 OSPF Щ

Г Д

**show ip ospf border-routers**

Ruijie# **show ip ospf border-routers**  
 OSPF internal Routing Table

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

i 1.1.1.1 [2] via 10.0.0.1, FastEthernet 0/1, ABR, ASBR,  
 Area 0.0.0.1 select

Щ

|  |  |
|--|--|
|  |  |
|--|--|

l.994 0 Td ( )Tj /530022 Tw 843C3263 0

|                  |                  |
|------------------|------------------|
| FastEthernet 0/1 | Ш                |
| ABR, ASBR        | ASBR ABR ASBRШ   |
| Area 0.0.0.1     | Ш                |
| select           | ASBR select<br>Ш |

г А  
г А

### 34.2.3 show ip ospf database

OSPF show ip  
ospf databaseШ

LSAs Ш

**show ip ospf [process-id area-id] database**

**show ip ospf [process-id area-id] database [adv-router ip-address]**

**show ip ospf [process-id area-id] database [self-originate | max-age]**

**show ip ospf [process-id area-id] database [router] [link-state-id]**

**show ip ospf [process-id area-id] database [router] [adv-router ip-address]**

**show ip ospf [process-id area-id] database [router] [self-originate]**

**show ip ospf [process-id area-id] database [network][link-state-id]**

**show ip ospf [process-id area-id] database [network] [link-state-id] [adv-router ip-address]**

**show ip ospf [process-id area-id] database [network] [link-state-id] [self-originate]**

**show ip ospf [process-id area-id] database [summary] [link-state-id]**

**show ip ospf [process-id area-id] database [summary] [link-state-id] [adv-router ip-address]**

**show ip ospf [process-id area-id] database [summary] [link-state-id] [self-originate]**

**show ip ospf [process-id area-id] database [asbr-summary] [link-state-id]**

**show ip ospf [process-id area-id] database [asbr-summary]**

*[link-state-id]* **[adv-router** *ip-address]*

|                         |             |
|-------------------------|-------------|
| <b>opaque-area</b>      | LSA         |
| <b>opaque-as</b>        | LSA         |
| <b>opaque-link</b>      | LSA         |
| <b>database-summary</b> | OSPF<br>LSA |

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OSPF

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OSPF

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г А

### show ip ospf database

Ruijie# **show ip ospf database**

OSPF Router with ID (1.1.1.1) (Process ID 1)

#### Router Link States (Area 0.0.0.0)

| Link ID    | ADV Router | Age | Seq#       | CkSum    |
|------------|------------|-----|------------|----------|
| Link count |            |     |            |          |
| 1.1.1.1    | 1.1.1.1    | 2   | 0x80000011 | 0x6f39 2 |
| 3.3.3.3    | 3.3.3.3    | 120 | 0x80000002 | 0x26ac 1 |

#### Network Link States (Area 0.0.0.0)

| Link ID      | ADV Router | Age | Seq#       | CkSum  |
|--------------|------------|-----|------------|--------|
| 192.88.88.27 | 1.1.1.1    | 120 | 0x80000001 | 0x5366 |

#### Summary Link States (Area 0.0.0.0)

| Link ID      | ADV Router | Age | Seq#       | CkSum  |
|--------------|------------|-----|------------|--------|
| Route        |            |     |            |        |
| 10.0.0.0     | 1.1.1.1    | 2   | 0x80000003 | 0x350d |
| 10.0.0.0/24  |            |     |            |        |
| 100.0.0.0    | 1.1.1.1    | 2   | 0x8000000c | 0x1ecb |
| 100.0.0.0/16 |            |     |            |        |

#### Router Link States (Area 0.0.0.1 [NSSA])

| Link ID    | ADV Router | Age | Seq# | CkSum |
|------------|------------|-----|------|-------|
| Link count |            |     |      |       |

```
1.1.1.1 1.1.1.1 2 0x80000001 0x91a2 1
```

#### Summary Link States (Area 0.0.0.1 [NSSA])

| Link ID        | ADV Router | Age | Seq#       | CkSum  |
|----------------|------------|-----|------------|--------|
| Route          |            |     |            |        |
| 100.0.0.0      | 1.1.1.1    | 2   | 0x80000001 | 0x52a4 |
| 100.0.0.0/16   |            |     |            |        |
| 192.88.88.0    | 1.1.1.1    | 2   | 0x80000001 | 0xbb2d |
| 192.88.88.0/24 |            |     |            |        |

#### NSSA-external Link States (Area 0.0.0.1 [NSSA])

| Link ID      | ADV Router | Age | Seq#       | CkSum     |
|--------------|------------|-----|------------|-----------|
| Route        | Tag        |     |            |           |
| 20.0.0.0     | 1.1.1.1    | 1   | 0x80000001 | 0x033c E2 |
| 20.0.0.0/24  | 0          |     |            |           |
| 100.0.0.0    | 1.1.1.1    | 1   | 0x80000001 | 0x9469 E2 |
| 100.0.0.0/28 | 0          |     |            |           |

#### AS External Link States

| Link ID         | ADV Router | Age | Seq#       | CkSum  |
|-----------------|------------|-----|------------|--------|
| Route           | Tag        |     |            |        |
| 20.0.0.0        | 1.1.1.1    | 380 | 0x8000000a | 0x7627 |
| E2 20.0.0.0/24  | 0          |     |            |        |
| 100.0.0.0       | 1.1.1.1    | 620 | 0x8000000a | 0x0854 |
| E2 100.0.0.0/28 | 0          |     |            |        |

#### show ip ospf database

▯▯

| OSPF Router with ID       | OSPF<br>OSPF |
|---------------------------|--------------|
| Router Link States        | ▯▯           |
| Net Link States           | ▯▯           |
| Summary Net Link States   | ▯▯           |
| NSSA-external Link States |              |
| AS External Link States   | ▯▯           |
| Link ID                   | ▯▯           |
| ADV Router                | ▯▯           |

|            |      |
|------------|------|
| Age        | ▯    |
| Seq#       | LSA▯ |
| Cksum      | ▯    |
| Link-Count |      |
| Route      | LSA  |
| Tag        | ▯    |

### show ip ospf database asbr-summary

```

Ruijie# show ip ospf database asbr-summary
OSPF Router with ID (1.1.1.35) (Process ID 1)
ASBR-Summary Link States (Area 0.0.0.1)
LS age: 47
Options: 0x2 (*|-|-|-|-|E|-)
LS Type: ASBR-summary-LSA
Link State ID: 3.3.3.3 (AS Boundary Router address)
Advertising Router: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0xbe8c
Length: 28
Network Mask: /0
TOS: 0 Metric: 1

```

### show ip ospf database asbr-summary

▯

| OSPF Router with ID    | OSPF    |
|------------------------|---------|
| AS Summary Link States | AS<br>▯ |
| LS age                 | ▯       |
| Options                | ▯       |
| LS Type                | ▯       |
| Link State ID          | ▯       |
| Advertising Router     | ▯       |
| LS Seq Number          | ▯       |

|              |        |
|--------------|--------|
| Checksum     | Ш      |
| Length       | Ш      |
| Network Mask | Ш      |
| TOS          | TOS 0Ш |
| Metric       | Ш      |

**show ip ospf database external**

```
Ruijie# show ip ospf database external
OSPF Router with ID (1.1.1.35) (Process ID 1)
AS External Link States
LS age: 752
Options: 0x2 (*|-|-|-|-|E|-)
LS Type: AS-external-LSA
Link State ID: 20.0.0.0 (External Network Number)
Advertising Router: 1.1.1.1
LS Seq Number: 8000000a
Checksum: 0x7627
Length: 36
Network Mask: /24
Metric Type: 2 (Larger than any link state path)
TOS: 0
Metric: 20
Forward Address: 0.0.0.0
External Route Tag: 0
```

**show ip ospf database external**

Ш

|  |  |
|--|--|
|  |  |
|--|--|

|               |   |
|---------------|---|
| LS Seq Number | W |
| Checksum      | W |
| Length        | W |
| Network Mask  | W |

|                    |   |
|--------------------|---|
| LS age             | ▯ |
| Options            | ▯ |
| LS Type            | ▯ |
| Link State ID      | ▯ |
| Advertising Router | ▯ |
| LS Seq Number      | ▯ |
| Checksum           | ▯ |
| Length             | ▯ |
| Network Mask       | ▯ |
| Attached Router    | ▯ |

### show ip ospf database router

```

Ruijie# show ip ospf database router
OSPF Router with ID (1.1.1.1) (Process ID 1)
Router Link States (Area 0.0.0.0)
LS age: 322
Options: 0x2 (*|-|-|-|-|E|-)
Flags: 0x3 : ABR ASBR
LS Type: router-LSA
Link State ID: 1.1.1.1
Advertising Router: 1.1.1.1
LS Seq Number: 80000012
Checksum: 0x6d3a
Length: 48
Number of Links: 2

```

```

Link connected to: Stub Network
(Link ID) Network/subnet number: 100.0.1.1
(Link Data) Network Mask: 255.255.255.255
Number of TOS metrics: 0
TOS 0 Metric: 0

```

### show ip ospf database router

▯

|                     |        |
|---------------------|--------|
|                     |        |
| OSPF Router with ID | OSPF ▯ |
| Router Link States  | ▯      |

|                    |        |
|--------------------|--------|
| LS age             | W      |
| Options            |        |
| Flag               | router |
| LS Type            | W      |
| Link State ID      | W      |
| Advertising Router | W      |
| LS Seq Number      | W      |
| Checksum           | W      |

Length

|                         |      |    |
|-------------------------|------|----|
| OSPF Router with ID     | OSPF | W  |
| Summary Net Link States |      | W  |
| LS age                  |      | W  |
| Options                 | W    |    |
| LS Type                 |      | W  |
| Link State ID           |      | W  |
| Advertising Router      |      | W  |
| LS Seq Number           |      | W  |
| Checksum                |      | W  |
| Length                  | W    |    |
| Network Mask            | W    |    |
| TOS                     | TOS  | 0W |
| Metric                  |      | W  |

#### show ip ospf database nssa-external

```

Ruijie# show ip ospf database nssa-external
OSPF Router with ID (1.1.1.1) (Process ID 1)
 NSSA-external Link States (Area 0.0.0.1 [NSSA])
LS age: 1
Options: 0x0 (*|-|-|-|-|-|-)
LS Type: AS-NSSA-LSA
Link State ID: 20.0.0.0 (External Network Number For
NSSA)
Advertising Router: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0x033c
Length: 36
Network Mask: /24
Metric Type: 2 (Larger than any link state path)
TOS: 0
Metric: 20
NSSA: Forward Address: 100.0.2.1
External Route Tag: 0

```

**show ip ospf database nssa-external**

▮

| OSPF Router with ID | OSPF ▮ |
|---------------------|--------|
| NSSA-external       |        |
| Link States         | ▮      |

Advertising Router: 1.1.1.1  
LS Seq Number: 8000000a  
Checksum: 0x7627  
Length: 36  
Network Mask: /24  
Metric Type: 2 (Larger than any link state path)  
TOS: 0  
Metric: 20  
Forward Address: 0.0.0.0  
External Route Tag: 0

**show ip ospf database external**

III



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Г А

Designated Router (ID) 1.1.1.1, Interface Address 192.88.88.27

Backup Designated Router (ID) 3.3.3.3, Interface Address 192.88.88.72

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:03

Neighbor Count is 1, Adjacent neighbor count is 1

Crypt Sequence Number is 70784

Hello received 1786 sent 1787, DD received 13 sent 8

LS-Req received 2 sent 2, LS-Upd received 29 sent 53

LS-Ack received 46 sent 23, Discarded 1

**show ip ospf interface serial 1/0**

▯▯

| FastEthernet 0/0 State       | UP<br>Down ▯▯                 |
|------------------------------|-------------------------------|
| Internet Address             | IP ▯▯                         |
| Area                         | OSPF ▯▯                       |
| MTU                          | MTU                           |
| Matching network config      | OSPF network area             |
| Process ID                   |                               |
| Router ID                    | OSPF ▯▯                       |
| Network Type                 | OSPF ▯▯                       |
| Cost                         | OSPF ▯▯                       |
| Transmit Delay is            | OSPF ▯▯                       |
| State                        | DR/BDR ▯▯                     |
| Priority                     |                               |
| Designated Router(ID)        | DR                            |
| DR's Interface address       | DR                            |
| Backup designated router(ID) | BDR                           |
| BDR's Interface address      | BDR                           |
| Time intervals configured    | Hello Dead Wait<br>Retransmit |

|                         |              |
|-------------------------|--------------|
| Hello due in            | HELLO        |
| Neighbor count          |              |
| Adjacent neighbor count | Full         |
| Crypt Sequence Number   | md5          |
| Hello received send     | HELLO      ▯ |
| DD received send        | DD      ▯    |
| LS-Req received send    | LS      ▯    |
| LS-Upd received send    | LS      ▯    |
| LS-Ack received send    | LS      ▯    |
| Discard                 | OSPF      ▯  |
| BFD enabled             | OSPF    BFD  |

└      A

└      A

### 34.2.5 show ip ospf neighbor

OSPF      show ip ospf  
neighbor ▯

**show ip ospf** [*process-id*] **neighbor** [[**detail**] | [[*interface-type*  
*interface-number*] [*neighbor-id*]]]

└      A

| <b>detail</b>                                    | ▯ |
|--------------------------------------------------|---|
| <i>interface-type</i><br><i>interface-number</i> | ▯ |
| <i>neighbor-id</i>                               | ▯ |

└      A

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└      A

▮

Г А

OSPF

▮

Г А

### show ip ospf neighbor

```
Ruijie# show ip ospf neighbor
OSPF process 1, 1 Neighbors, 1 is Full:
Neighbor ID Pri State BFD State Dead Time
Address Interface
3.3.3.3 1 Full/BDR Up 00:00:32
192.88.88.72 FastEthernet 1/0
```

```
Ruijie# show ip ospf neighbor detail
Neighbor 3.3.3.3, interface address 192.88.88.72
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 11 state changes
DR is 192.88.88.27, BDR is 192.88.88.72
Options is 0x52 (*|0|-|EA|-|-|E|-)
Dead timer due in 00:00:32
Neighbor is up for 05:11:27
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
Crypt Sequence Number is 0
Thread Inactivity Timer on
Thread Database Description Retransmission off
Thread Link State Request Retransmission off
Thread Link State Update Retransmission off
Thread Poll Timer on
BFD session state up
```

### show ip ospf neighbor

| Neighbor ID | ▮    |
|-------------|------|
| Pri         | DR   |
| State       |      |
| Dead Time   | Dead |

|                                            |                                                          |
|--------------------------------------------|----------------------------------------------------------|
| Address                                    |                                                          |
| Interface                                  |                                                          |
| interface address                          |                                                          |
| In the area                                |                                                          |
| via interface                              | W                                                        |
| Neighbor priority                          | OSPF W                                                   |
| State                                      | OSPF WFULL<br>DR<br>BDR<br>DROTHER<br>DR/BDRW<br>DR BDRW |
| State changes times                        |                                                          |
| Dead Time                                  |                                                          |
| DR                                         | DR<br>( Hello DR )                                       |
| BDR                                        | BDR<br>( Hello BDR )                                     |
| Options                                    | Hello E 0<br>STUB<br>STUB W                              |
| Dead timer due in                          | W                                                        |
| Neighbor up time                           |                                                          |
| Database Summary List                      | DD                                                       |
| Link State Request List                    | LS                                                       |
| Link State Retransmission List             |                                                          |
| Crypt Sequence Number                      | MD5                                                      |
| Thread Inactivity Timer                    |                                                          |
| Thread Database Description Retransmission | DD                                                       |
| Thread Link State Request Retransmission   | LS                                                       |
| Thread Link State Update Retransmission    | LS                                                       |

|                   |            |
|-------------------|------------|
| Thread Poll Timer | Poll Timer |
|-------------------|------------|

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└      A

### 34.2.6 show ip ospf route

ospf    ▯

**show ip ospf [process-id] route[count]**

└      A

| <i>process-id</i> | ospf                                  ospf    ▯ |
|-------------------|-------------------------------------------------|
| <b>count</b>      | ospf                                  ▯         |

└      A

└      A

▯

└      A

└      A

Ruijie# **show ip ospf route**

OSPF process 1:

Codes: C - connected, D - Discard, O - OSPF,

IA - OSPF inter area N1 - OSPF NSSA external type 1,

N2 - OSPF NSSA external type 2

E1 - OSPF external type 1, E2 - OSPF external type 2

E2 100.0.0.0/24 [1/20] via 192.88.88.126, FastEthernet 1/0

C    192.88.88.0/24    [1]    is    directly    connected,  
FastEthernet 1/0, Area 0.0.0.1

**show ip ospf route**

| codes |  |
|-------|--|

|     |      |
|-----|------|
| [1] | cost |
| via |      |

г А

г А

г А

### 34.2.7 show ip ospf summary-address

OSPF

show ip ospf summary-address

show ip ospf summary-address

г А

Ш

г А

Ш

г А

Ш

г А

NSSA ABR

Ш

г А

show ip ospf summary-address

Ruijie# show ip ospf summary-address

| Summary Address    | Summary Mask | Advertise | Status |
|--------------------|--------------|-----------|--------|
| Aggregated subnets |              |           |        |

|             |             |           |  |
|-------------|-------------|-----------|--|
| 202.101.0.0 | 255.255.0.0 | advertise |  |
| Inactive 0  |             |           |  |

Ruijie#

| Summary Address |   |
|-----------------|---|
| Summary Mask    | Ш |

|                    |  |
|--------------------|--|
| Advertise          |  |
| Status             |  |
| Aggregated subnets |  |

r A

r A

## 34.2.8 show ip ospf virtual-link

OSPF show ip ospf  
virtual-link

show ip ospf [process-id] virtual-link

r A

|  |  |
|--|--|
|  |  |
|  |  |

r A

W

r A

W

r A

Wshow ip ospf neighbor

W

r A

show ip ospf virtual-links

```
Ruijie# show ip ospf virtual-links
Virtual Link VLINK0 to router 1.1.1.1 is up
Transit area 0.0.0.1 via interface FastEthernet 0/1
Local address 10.0.0.37/32
Remote address 10.0.0.27/32
Transmit Delay is 1 sec, State Point-To-Point,
Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
Hello due in 00:00:05
```

Adjacency state Full

W

| Virtual Link VLINK0 to router |   |
|-------------------------------|---|
| Virtual Link state            | . |
| Transit area                  | W |
| via interface                 | W |
| Local address                 |   |
| Remote Address                |   |
| Transmit Delay                |   |

## 35 BGP

### 35.1

#### 35.1.1 address-family ipv4

```

address-family ipv4 BGP
exit-address-family BGP
address-family ipv4 [unicast]
no address-family ipv4 [unicast]

```

Г Д

|         |      |
|---------|------|
|         |      |
| unicast | IPv4 |

Г Д

Г Д

```
BGP
```

Г Д

```

BGP IPv4
BGP exit-address-family

```

Г Д

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# address-family ipv4

```

Г Д

|                     |  |
|---------------------|--|
|                     |  |
| exit-address-family |  |

#### 35.1.2 address-family ipv4 vrf

```

 address-family IPv4 VRF
 vrf
 exit-address-family
 BGP
 BGP

```

**address-family ipv4 vrf** *vrf-name*

**no address-family ipv4 vrf** *vrf-name*

Г Д

|                 |     |
|-----------------|-----|
|                 |     |
| <i>vrf-name</i> | vrf |

Г Д

vrf

Г Д

BGP

Г Д

PE CE

BGP exit-address-family

Г Д

Ruijie(config)# **router bgp** 65000

Ruijie(config-router)# **address-family ipv4 vrf** *vpn1*

Г Д

|                     |  |
|---------------------|--|
|                     |  |
| exit-address-family |  |

### 35.1.3 address-family vpnv4

```

 PE VPN
 address-family VPN
 address-family VPN
 exit-address-family

```

**address-family vpnv4** [unicast]

**no address-family vpnv4** [unicast]

Г Д

|  |  |
|--|--|
|  |  |
|--|--|

|         |      |
|---------|------|
| unicast | IPv4 |
|---------|------|

Г Д

vpn

Г Д

BGP Ш

Г Д

vpn PE  
vpn

BGP exit-address-family Ш

Г Д

Ruijie(config)# **router bgp 65000**  
Ruijie(config-router)# **address-family vpnv4**

Г Д

|                     |  |
|---------------------|--|
|                     |  |
| exit-address-family |  |

### 35.1.4 aggregate-address IPv4

BGP IPv4 Ш no  
Ш

**aggregate-address** *ip-address mask* [**as-set**][**summary-only**]

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

Г Д

|                     |      |
|---------------------|------|
|                     |      |
| <i>ip-address</i>   |      |
| <i>mask</i>         |      |
| <b>as-set</b>       | AS Ш |
| <b>summary-only</b> |      |

Г Д

Ш

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# aggregate-address summary-only 10.0.0.0 255.0.0.0 as-set

```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# aggregate-address summary-only 10.0.0.0 255.0.0.0 as-set

```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# aggregate-address 10.0.0.0 255.0.0.0 as-set

```

|            |                               |
|------------|-------------------------------|
|            |                               |
| router bgp | BGP 10.0.0.0 255.0.0.0 as-set |

### 35.1.5 bgp always-compare-med

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# multi-exit-discriminator 100
Ruijie(config-router)# no multi-exit-discriminator

```

```

Ruijie(config-router)# bgp always-compare-med
Ruijie(config-router)# no bgp always-compare-med

```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# multi-exit-discriminator 100
Ruijie(config-router)# no multi-exit-discriminator
Ruijie(config-router)# bgp always-compare-med
Ruijie(config-router)# no bgp always-compare-med

```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# multi-exit-discriminator 100
Ruijie(config-router)# no multi-exit-discriminator
Ruijie(config-router)# bgp always-compare-med
Ruijie(config-router)# no bgp always-compare-med

```

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# bgp always-compare-med
```

г А

| show ip bgp                          | BGP       |
|--------------------------------------|-----------|
| bgp bestpath med confed              | AS<br>MED |
| bgp bestpath med<br>missing-as-worst | MED<br>Ш  |
| bgp deterministic-med                | AS        |

### 35.1.6 bgp bestpath as-path ignore

```
no Ш AS Ш
bgp bestpath as-path ignore
no bgp bestpath as-path ignore
```

г А

Ш

г А

AS Ш

г А

BGP

г А

(Ruijie1771)

|             |     |
|-------------|-----|
|             |     |
| show ip bgp | BGP |

### 35.1.7 bgp bestpath compare-confed-aspath

# ASPATH

# ASPATH

W

no



|                  |     |
|------------------|-----|
| missing-as-worst | MED |
|------------------|-----|

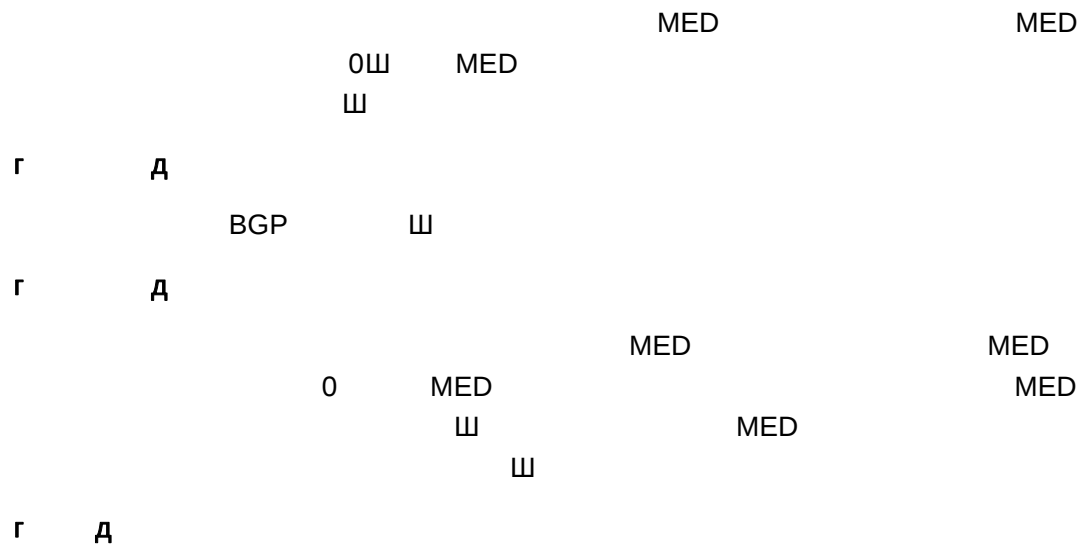
1. 配置 BGP 路由策略，防止 AS 内路由环路。
 2. 配置 BGP 路由策略，防止 AS 内路由环路。

1. 配置 BGP 路由策略，防止 AS 内路由环路。
 2. 配置 BGP 路由策略，防止 AS 内路由环路。

1. 配置 BGP 路由策略，防止 AS 内路由环路。
 2. 配置 BGP 路由策略，防止 AS 内路由环路。

1. 配置 BGP 路由策略，防止 AS 内路由环路。
 2. 配置 BGP 路由策略，防止 AS 内路由环路。

1. 配置 BGP 路由策略，防止 AS 内路由环路。
 2. 配置 BGP 路由策略，防止 AS 内路由环路。



```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# bgp bestpath med
missing-as-worst
```

|                                                                                                                                              |     |  |  |             |     |              |  |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----|--|--|-------------|-----|--------------|--|
| r                                                                                                                                            | A   |  |  |             |     |              |  |
| <table border="1"> <tr> <td></td><td></td></tr> <tr> <td>show ip bgp</td><td>BGP</td></tr> <tr> <td>bgp bestpath</td><td></td></tr> </table> |     |  |  | show ip bgp | BGP | bgp bestpath |  |
|                                                                                                                                              |     |  |  |             |     |              |  |
| show ip bgp                                                                                                                                  | BGP |  |  |             |     |              |  |
| bgp bestpath                                                                                                                                 |     |  |  |             |     |              |  |

BGP III

\_\_\_\_\_

no bgp client-to-client

reflection

```
Ruijie(config)# vy4rT config)# vy<?U#F#?@
```

г д

router ID

ш

ID

ш

г д

BGP speakers  
BGP speaker EBGP IBGP  
BGP speakers EBGP  
MED

BGP speakers  
4 MED

EBGP

Ш

ASШ

15

15

Ш

Г Д

```
Ruijie(config-router)# bgp confederation peers 65000
65100
```

Г Д

|                              |  |
|------------------------------|--|
|                              |  |
| bgp confederation identifier |  |

Г Д

### 35.1.15 bgp default ipv4-unicast

address family

IPv4

Ш

no

Ш

**bgp default ipv4-unicast**

**no bgp default ipv4-unicast**

Г Д

Ш

Г Д

ipv4-unicast

Ш

Г Д

BGP

Ш

Г Д

BGP

**address family ipv4**

Ш

Г Д

```
Ruijie(config-router)# bgp default ipv4-unicast
```





### 35.1.18 bgp enforce-first-as

```

 AS_PATH
 AS
 UPDATE
 no
 bgp enforce-first-as
 no bgp enforce-first-as

 D
 W

 D

 D

 BGP

 D
 UPDATE
 AS
 W

 D
 Ruijie(config-router)# bgp enforce-first-as

 D
 show ip bgp
 BGP

```

|             |     |
|-------------|-----|
|             |     |
| show ip bgp | BGP |

### 35.1.19 bgp fast-external-fallover

```

#Qd1Rp 00 Šh,w, Uó , 9 } / BGPnoCÀK•Ó'—r CĂ X!%o Äfast-ext527

```

Г Д

Г Д

Г Д

|            |     |
|------------|-----|
|            |     |
| router bgp | BGP |

**no** debug BGP 

no bgp log-neighbor-changes

Г Д

Г Д

Г Д

BGP debug bg36Df8g7&lt;76 Td&lt;10 T52 Td41Cd(BGP43309C34BC9P)Tj/C2\_0 16 0.96 23

**Д**

Г Д



BGP

---

ipv4

peer

ipv4

Ш

г Д

| <b>neighbor soft-reconfiguration inbound</b> | BGP session ( ) BGP |
|----------------------------------------------|---------------------|
| <b>show ip bgp</b>                           | BGP                 |

### 35.1.23 clear ip bgp dampening

Ш

**clear ip bgp [ipv4 unicast] dampening [address mask]**

г Д

| <b>ipv4 unicast</b> | IPv4 |
|---------------------|------|
| <i>address</i>      | IP Ш |
| <i>mask</i>         | Ш    |

г Д

г Д

г Д

BGP

Ш

BGP Ш

г Д

Ruijie# **clear ip bgp dampening 192.168.0.0 255.255.0.0**

г Д

| <b>show ip bgp dampening dampened-paths</b> |  |
|---------------------------------------------|--|
| <b>bgp dampening</b>                        |  |

### 35.1.24 clear ip bgp external

## EBGP

**clear ip bgp external [ipv4 unicast] [[soft] [in | out]]**

Г Д

| <b>ipv4 unicast</b> | ipv4               |
|---------------------|--------------------|
| <b>in</b>           | soft Ш             |
| <b>out</b>          | soft BGP speaker Ш |
| <b>soft in</b>      | Ш                  |
| <b>soft out</b>     | Ш                  |

Г Д

Г Д

Ш

Г Д

BGP Ш

Г Д

Ruijie# **clear ip bgp external in**

Г Д

| <b>clear ip bgp</b>          | BGP |
|------------------------------|-----|
| <b>show ip bgp neighbors</b> | BGP |

### 35.1.25 clear ip bgp flap-statistics

Ш

**clear ip bgp flap-statistics [address[ mask]]**

Г Д

| <i>address</i> | IP |
|----------------|----|

|             |  |
|-------------|--|
| <i>mask</i> |  |
|-------------|--|

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г      д

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г      д

ш



|          |   |
|----------|---|
| soft out | ⏏ |
|----------|---|

└ A

└ A

⏏

└ A

vrf BGP ⏏

└ A

Ruijie# clear ip bgp vrf my-vrf in

└ A

|              |     |
|--------------|-----|
|              |     |
| clear ip bgp | BGP |
| show ip bgp  | BGP |

35.1.28 default-informnation originate

⏏

no ⏏

[no] default-informnation originate

└ A

⏏

└ A

no ⏏

└ A

BGP ⏏

└ A

⏏

⏏

network ⏏ default-informnation  
originate network  
IGP ⏏

Г Д

Ruijie(config-router)# **default-information originate**

Г Д

| <b>network</b>      |  |
|---------------------|--|
| <b>redistribute</b> |  |

### 35.1.29 default-metric

BGP

metric Ш

**no** Ш

**default-metric** *number*

**no default-metric**

Г Д

| <i>number</i> | metric Ш 1.. 4294967295 |
|---------------|-------------------------|

Г Д

**no** default-metric Ш

Г Д

BGP Ш

Г Д

metric BGP Ш metric Ш

metric **redistribute metric**

metric Ш

default-metric connected metric  
0Ш

Г Д

```
Ruijie(config-router)# default-metric 45
```

```

r A

```

|                     |  |
|---------------------|--|
|                     |  |
| <b>redistribute</b> |  |

### 35.1.30 distance bgp

BGP **no**

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

```

r A

```

|                          |                                                       |
|--------------------------|-------------------------------------------------------|
|                          |                                                       |
| <i>external-distance</i> | EBGP peers <b>no</b><br>1..255                        |
| <i>internal-distance</i> | IBGP peers <b>no</b><br>1..255                        |
| <i>local-distance</i>    | peers IGP<br><b>network backdoor</b> <b>no</b> 1..255 |

```

r A

```

```
external-distance 20
```

```
internal-distance 200
```

```
local-distance 200
```

```

r A

```

```
BGP no
```

```

r A

```

BGP **no**

1. *external-distance* IGP (OSPF 4 RIP )

2. *internal-distance* *local-distance* IGP

❏

г А

Ruijie(config-router)# **distance bgp 20 20 200**

г А

| <b>neighbor soft-reconfiguration inbound</b> | BGP session BGP ( ) |
|----------------------------------------------|---------------------|
| <b>show ip bgp</b>                           | BGP                 |

г А

35.1.31 exit-address-family

BGP address-family ❏

**exit-address-family**

г А

❏

г А

г А

BGP address-family ❏

г А

bgp address-family bgp ❏

г А

Ruijie(config-router-af)# **exit-address-family**

г А

| <b>address-family ipv4</b> | <b>address-family ipv4</b> |
|----------------------------|----------------------------|

35.1.32 ip as-path access-list

AS ❏ no

❏

**ip as-path access-list** *path-list-num* {**permit** | **deny**}

*regular-expression*

**no ip as-path access-list** *path-list-num*

Г Д

| <i>path-list-num</i>      | AS<br>AS 1---500 |
|---------------------------|------------------|
| <b>permit</b>             |                  |
| <b>deny</b>               |                  |
| <i>regular-expression</i> | 1..255           |

Г Д

Г Д

Г Д

Э BGP Ю

Г Д

Ruijie(config-router)# **ip as-path access-list 1 deny**  
^123\$

Г Д

| <b>neighbor filter-list</b>     | as-path |
|---------------------------------|---------|
| <b>neighbor distribute-list</b> |         |

### 35.1.33 neighbor activate

no

**neighbor** {*peer-address* | *peer-group-name*} **activate**

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

Г Д



*peer-address*

|                        |            |
|------------------------|------------|
| <i>peer-group-name</i> | Ш 32       |
| <i>seconds</i>         | Ш : 1..600 |

г А

IBGP : 15seconds

EBGP : 30seconds

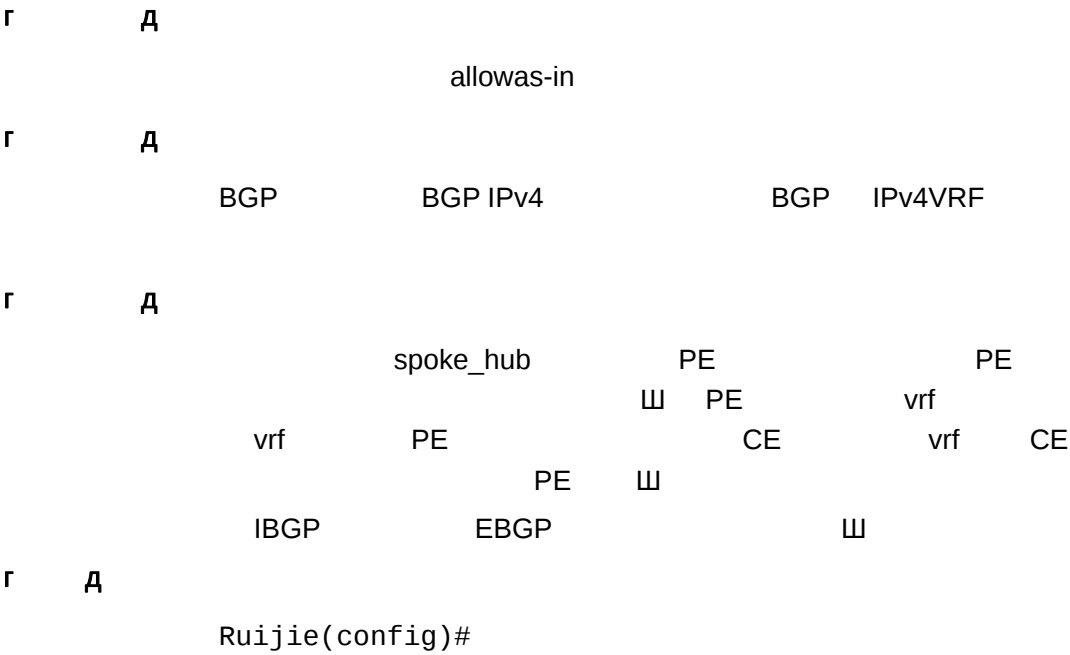
г А

BGP

г А

BGP

|               |              |   |
|---------------|--------------|---|
| <i>number</i> | AS<br>[1,10] | 3 |
|---------------|--------------|---|



|                        |                             |
|------------------------|-----------------------------|
| <i>peer-group-name</i> | <div>32</div> <div>32</div> |
|------------------------|-----------------------------|

1 1

as-override

1 1

BGP BGP IPv4 BGP IPv4VRF

1 1

BGP AS BGP AS AS

| <i>peer-address</i>    | Ш                             |
|------------------------|-------------------------------|
| <i>peer-group-name</i> | Ш<br>32 Ш                     |
| <i>map-tag</i>         | route map Ш<br>route map 32 Ш |

г А

Ш

г А

BGP Ш

г А

|                        |               |
|------------------------|---------------|
| <i>peer-address</i>    | Ш             |
| <i>peer-group-name</i> | Ш<br>32 Ш     |
| <i>text</i>            | ( ) Ш<br>80 Ш |

Г А

Ш

Г А

BGP Ш

Г А

Ш

Ш

Г А

```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.1.1.1 remote-as 80
Ruijie(config-router)# neighbor 10.1.1.1 description
xyz.com
```

Г А

|                           |          |
|---------------------------|----------|
|                           |          |
| <b>router bgp</b>         | BGP      |
| <b>neighbor remote-as</b> | BGP ( )Ш |

### 35.1.39 neighbor distribute-list

BGP ACL Ш  
no ACLШ

```
neighbor {peer-address | peer-group-name} distribute-list
access-list-number {in | out}
no neighbor {peer-address | peer-group-name} distribute-list
access-list-number {in | out}
```

Г А

|                     |                |
|---------------------|----------------|
|                     |                |
| <i>peer-address</i> | IPv4<br>IPv6 Ш |

|                           |     |
|---------------------------|-----|
| <i>peer-group-name</i>    | 32  |
| <i>access-list-number</i> | ACL |
| <b>in</b>                 | ACL |
| <b>out</b>                | ACL |

г д

Ш

г д

BGP BGP IPv4 BGP IPv6  
BGP IPv4 VRF BGP VPNv4

г д

prefix-list (in) (out) neighbor  
Ш BGP Ш  
Ш neighbor distribute-list Ш

Ш

г д

Ruijie(config)# **router bgp 60**

Ruijie(config-router)# **neighbor 10.1.1.1 remote-as 60**



BGP

no

**neighbor** {*peer-address* | *peer-group-name*} **filter-list** *access-list-number* {**in** | **out**}

**no neighbor** {*peer-address* | *peer-group-name*} **filter-list** *access-list-number* {**in** | **out**}

r

A

| <i>peer-address</i>       | IPv6 <div></div> IPv4      |
|---------------------------|----------------------------|
| <i>peer-group-name</i>    | <div></div> 32 <div></div> |
| <i>access-list-number</i> | as-path list               |
| <b>in</b>                 | as-path list <div></div>   |
| <b>out</b>                | as-path list <div></div>   |

r

A

r

A

BGP BGP IPv4 BGP IPv6  
BGP IPv4 VRF BGP VPNv4

r

A

BGP

neighbor filter-list

r

A

```
Ruijie(config)# ip as-path access-list 1 deny _123_
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1 remote-as 65100
Ruijie(config-router)# neighbor 10.0.0.1 filter-list 1 out
```

r

A

|  |  |
|--|--|
|  |  |
|--|--|

|                               |              |
|-------------------------------|--------------|
| <b>router bgp</b>             | BGP          |
| <b>neighbor remote-as</b>     | BGP $\sqcup$ |
| <b>ip as-path access-list</b> | AS_PATH list |
| <b>match as-path</b>          | AS_PATH list |

### 35.1.42 neighbor maximum-prefix

BGP       $\sqcup$       no  
 $\sqcup$

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

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

Г      Д

| <i>peer-address</i>    | IPv4<br>IPv6 $\sqcup$   |
|------------------------|-------------------------|
| <i>peer-group-name</i> | $\sqcup$<br>32 $\sqcup$ |
| <i>maximum</i>         | $\sqcup$                |
| <i>threshold</i>       |                         |
| <b>warning-only</b>    | BGP<br>$\sqcup$         |

Г      Д

$\sqcup$

Г      Д

BGP      BGP IPv4      BGP IPv6  
BGP IPv4 VRF

Г      Д

BGP       $\sqcup$   
warning-only       $\sqcup$

BGP

$\sqcup$

Г Д

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
maximum-prefix 1000
```

Г Д

| router bgp         | BGP   |
|--------------------|-------|
| neighbor remote-as | BGP Ш |

### 35.1.43 neighbor next-hop-self

BGP  
BGP speaker Ш no Ш

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

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

Г Д

| <i>peer-address</i>    | IPv6 Ш IPv4 |
|------------------------|-------------|
| <i>peer-group-name</i> | Ш 32 Ш      |

Г Д

Ш

Г Д

BGP BGP IPv4 BGP IPv6  
BGP IPv4 VRF

Г Д

( Frame Relay ЧХ.25)  
BGP speakers Ш  
BGP  
Ш

Г Д

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1 next-hop-self
```

BGP

1

password

2

Ruijie

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1 password
Red-Giant

```

Ruijie

| router bgp         | BGP   |
|--------------------|-------|
| neighbor remote-as | BGP 1 |

### 35.1.45 neighbor peer-group (assigning members)

```

no router bgp
no neighbor peer-address peer-group peer-group-name
no neighbor peer-address peer-group peer-group-name

```

Ruijie

| peer-address    | IPv4<br>IPv6 1 |
|-----------------|----------------|
| peer-group-name | 1<br>32 1      |

Ruijie

1

Ruijie

BGP

Ruijie

1

▮

**remote-as** 4 **update-source** 4 **local-as** 4 **reconnect-interval** 4 **times** 4  
**advertisemet-interval** 4 **default-originate** 4 **next-hop-self** 4 **remove-p**  
**ivate-as** 4 **send-community** 4 **distribute-list out** 4 **filter-list out** 4 **p**  
**refix-list out** 4 **route-map out** 4 **unsuppress-map** 4 **route-reflector-c**  
**lient**▮

EBGP peer-group IBGP  
peer-group ▮

Г Д

Ruijie(config)# **router bgp 65000**



|                         |                |
|-------------------------|----------------|
| <i>prefix-list-name</i> | prefix-list 32 |
| <b>in</b>               | prefix list    |
| <b>out</b>              | prefix list    |

Г А

Ш

Г А

BGP BGP IPv4 BGP IPv6  
BGP IPv4 VRF BGP VPNv4

Г А

(in) (out) neighbor  
distribute-list Ш  
BGP  
neighbor prefix-list in  
Ш  
Ш

Г А

```
Ruijie(config)# ip prefix-list bgp-filter deny
10.0.0.1/16
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1 prefix-list
bgp-filter in
```

Г А

| <b>router bgp</b>         | BGP   |
|---------------------------|-------|
| <b>neighbor remote-as</b> | BGP Ш |
| <b>ip prefix-list</b>     | ip    |

### 35.1.48 neighbor remote-as

BGP ( ) Ш no  
( ) Ш

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

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

**r**

[illegible]

|     |     |      |  |     |      |
|-----|-----|------|--|-----|------|
| BGP | BGP | IPv4 |  | BGP | IPv6 |
|-----|-----|------|--|-----|------|

BGP IPv4 VRF

EBGP III

AS                      AS                      ERGP                      AS

AS AS AS EGGF AS

AS 64512 65535III

5. **Author Contributions:** All authors contributed to the study's conception and design. Material preparation, data collection, and analysis were performed by all authors. The first author wrote the first draft of the manuscript. All authors contributed to writing the manuscript. All authors read and approved the final manuscript.

```
Ruijie(config)# router bgp 65000
```

```
Ruijie(config-router)# neighbor 10.0.0.1
```

**remove-private-as**

Г Д

|  |  |
|--|--|
|  |  |
|--|--|

\_\_\_\_\_

**neighbor** {*peer-address* | *peer-group-name*} **route-map** *map-tag* {**in** |

```
out}
```

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

|  |  |
|--|--|
|  |  |
|--|--|

hŮA Ÿ `# @ SÁ S"u Ö'pĭ TÂ #lě-p ÆðÔsm1 / ðÁ t !fØu ZŮŮ #r?#ÆP vQ ħ ĐU # || X~† P <30€ ,ÖĂ6Ñ Ö 0ÑÍÓP `4

| <i>ip-address</i>      | Ш         |
|------------------------|-----------|
| <i>peer-group-name</i> | Ш<br>32 Ш |

Г А

Г А

BGP

Г А

BGP speaker IBGP speakers  
IBGP peers IBGP peer Ш  
IBGP peers Ш IBGP speakers  
IBGP IBGP

Г А

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
route-reflector-client
```

Г А

| <b>router bgp</b>                      | BGP   |
|----------------------------------------|-------|
| <b>neighbor remote-as</b>              | BGP Ш |
| <b>bgp cluster-id</b>                  | ID Ш  |
| <b>bgp client-to-client reflection</b> | Ш     |

### 35.1.52 neighbor send-community

Ш BGP Ш no  
Ш  
**neighbor {peer-address | peer-group-name} send-community**  
**[both|standard|extended]**  
**no neighbor {peer-address | peer-group-name} send-community**

[both|standard|extended]

r

A

|  |  |
|--|--|
|  |  |
|--|--|

г д

|                        |                 |
|------------------------|-----------------|
|                        |                 |
| <i>peer-address</i>    | IPv6 32 32 IPv4 |
| <i>peer-group-name</i> | 32 32           |

Г Д

| <i>peer-address</i>    | IPv4<br>IPv6 Ш |
|------------------------|----------------|
| <i>peer-group-name</i> | Ш<br>32 Ш      |

Г Д

Г Д

BGP

Г Д

Ш BGP BGP ( )

**show ip bgp neighbors**

Ш

BGP

Ш

Г Д

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
soft-reconfiguration inbound
```

Г Д

| <b>router bgp</b>            | BGP   |
|------------------------------|-------|
| <b>neighbor remote-as</b>    | BGP Ш |
| <b>show ip bgp neighbors</b> | BGP   |
| <b>clear ip bgp</b>          | BGP   |

### 35.1.55 neighbor soo

Ш Ш , **no** Ш  
Ш Ш

**neighbor** [*peer-address* | *peer-group-name*] **soo** **soo-value**

**no neighbor** [*peer-address* | *peer-group-name*] **soo**

r

A

| <i>peer-address</i>    | 32 |
|------------------------|----|
| <i>peer-group-name</i> | 32 |

soo 32 soo\_value

1 soo\_value as\_num nn an\_num

soo-value

e 6 i

i

**neighbor** [*peer-address* | *peer-group-name*] **timers** *keepalive* *holdtime*

**no neighbor** [*peer-address* | *peer-group-name*] **timers** *keepalive*  
*holdtime*

Г Д

| <i>peer-address</i>    | IPv6 Ⅲ IPv4                        |
|------------------------|------------------------------------|
| <i>peer-group-name</i> | Ⅲ<br>32 Ⅲ                          |
| <i>keepalive</i>       | BGP message Ⅲ KEEPALIVE 0..65535 Ⅲ |
| <i>holdtime</i>        | BGP Ⅲ<br>0..65535 Ⅲ                |

Г Д

*keepalive*: 60

*holdtime*: 180

Г Д

BGP

Г Д

keepalive holdtime Ⅲ  
peer peer-group peer peer  
group Ⅲ  
BGP  
Ⅲ

Г Д

Ruijie(config)# **router bgp** 65000

Ruijie(config-router)# **neighbor** 10.0.0.1 80 240

Г Д

| <b>router bgp</b> | BGP                              |
|-------------------|----------------------------------|
| <b>timers bgp</b> | <i>keepalive</i> <i>holdtime</i> |

### 35.1.57 neighbor unsuppress-map

**aggregate-address**

┌┐ no ┌┐

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

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

Г Д

| <i>peer-address</i>    | ┌┐                              |
|------------------------|---------------------------------|
| <i>peer-group-name</i> | ┌┐<br>32 ┌┐                     |
| <i>map-tag</i>         | route-map ┌┐<br>route map 32 ┌┐ |

Г Д

Г Д

BGP

Г Д

┌┐

BGP

┌┐

Г Д

Ruijie(config)# **router bgp 65000**

Ruijie(config-router)# **neighbor 10.0.0.1**

**unsuppress-map unspress-route**

Г Д

| <b>router bgp</b>         | BGP       |
|---------------------------|-----------|
| <b>neighbor remote-as</b> | BGP ┌┐    |
| <b>aggregate-address</b>  |           |
| <b>route-map</b>          | route-map |



|                    |     |   |
|--------------------|-----|---|
| neighbor remote-as | BGP | 山 |
|--------------------|-----|---|

### 35.1.59 neighbor version

|    |     |     |   |
|----|-----|-----|---|
| no | BGP | BGP | 山 |
|    | 山   |     |   |

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

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

Г Д

| <i>ip-address</i>      | Ш           |
|------------------------|-------------|
| <i>peer-group-name</i> | Ш<br>32 Ш   |
| <i>number</i>          | Ш 0...65535 |

Г Д

0

32768Ш

Г Д

BGP Ш

Г Д

Ш

Ш

route-map set weight

Ш

Г Д

Ruijie(config-router)# **neighbor** 10.1.1.1 **weight** 73

Г Д

| <b>router bgp</b>         | BGP   |
|---------------------------|-------|
| <b>neighbor remote-as</b> | BGP Ш |

### 35.1.61 network(BGP)

BGP speaker

Ш

**no**

Ш

**network** *network-number* **mask** *mask* [**route-map** *map-tag*]  
[**backdoor**]

**no network** *network-number* **mask** *mask* [**route-map**] [**backdoor**]

Г Д

| <i>network-number</i> |                       |
|-----------------------|-----------------------|
| <i>mask</i>           |                       |
| <i>map-tag</i>        | route-map    32    32 |
| <b>backdoor</b>       |                       |

Г Д

Г Д

BGP

Г Д

IGP                      BGP  
                                 32

route-map

Г Д

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# network 10.0.0.1 mask
255.255.0.0
```

Г Д

| <b>router bgp</b>              | BGP     |
|--------------------------------|---------|
| <b>redistribute</b>            |         |
| <b>Network synchronization</b> | Network |

### 35.1.62 network synchronization

BGP speaker                      network  
                                 32                      no                      network  
                                 32

**network synchronization**  
**no network synchronization**

Г Д

Г Д

Г Д

BGP

Г Д

network  
Ш

Г Д

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# network synchronization
```

Г Д

| router bgp   | BGP |
|--------------|-----|
| redistribute |     |
| network(BGP) |     |

35.1.63 redistribute

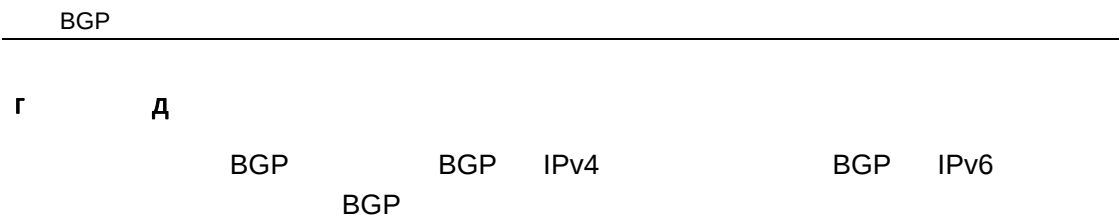
BGP  
Ш

no

```
redistribute protocol-type [route-map map-tag] [metric metric-value]
no redistribute protocol-type [route-map map-tag] [metric
metric-value]
```

Г Д





**redistribute ospf** *process-id* [**route-map** *map-tag*] [**metric** *metric-value*]  
**[match internal external [1|2] nssa-external [1|2]]**

**no redistribute ospf** *process-id* [**route-map** *map-tag*] [**metric** *metric-value*]  
**[match {internal|external [1|2]|nssa-external [1|2]]**

Г А

| <i>process-id</i>                 | OSPF                                                                                                                                                                                     |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>route-map</b> <i>map-tag</i>   | <b>route-map</b> <br><b>route-map</b>                                                                 |
| <b>metric</b> <i>metric-value</i> | <b>metric</b> <br> |
| <b>match</b>                      | OSPF                                                                                                                                                                                     |
| <b>internal</b>                   | OSPF <b>internal</b><br>ospf <b>match</b>                                                             |
| <b>external [1 2]</b>             | OSPF <b>external</b><br>1 2<br>1 2                                                                                                                                                       |
| <b>nssa-external [1 2]</b>        | OSPF <b>nssa-external</b><br>1 2<br>1 2                                                                                                                                                  |

Г А

OSPF 

Г А

BGP BGP IPv4 BGP IPv6  
BGP IPv4 VRF 

Г А





&

**no**

**no**

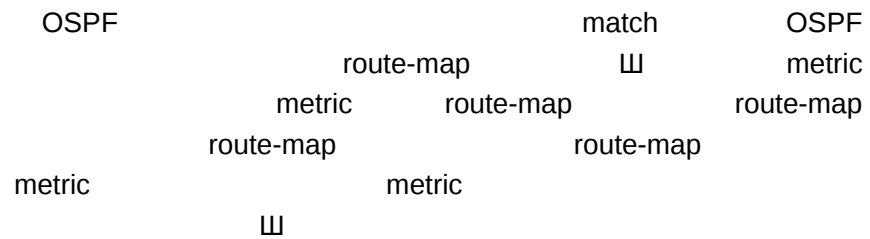


**redistribute**

**no**







Г А

```
Ruijie(config-router)# redistribute ospf 2 route-map
static-rmap
```

```
Ruijie(config-router)# no redistribute ospf 4 match
external route-map ospf-rmap
```

```
Ruijie(config-router)# no redistribute ospf 78
```

Г А



**level-1-2**

isis level-1

|                   |  |
|-------------------|--|
|                   |  |
| show ip protocols |  |

### 35.1.66 router bgp

BGP

no

BGP

Ш

BGP

Ш

**router bgp** *as-number*

**no router bgp** *as-number*

Г

А

**no synchronization**

**r**

**d**

```

 keepalive 60
 holdtime 180

```

Г Д

BGP

Г Д

```

 keepalive holdtime Ш
 peer peer-group peer peer
group Ш
 BGP

```

Ш

Г Д

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# timers bgp 80 240

```

Г Д

|                        |                                  |
|------------------------|----------------------------------|
|                        |                                  |
| <b>neighbor timers</b> | <i>keepalive</i> <i>holdtime</i> |

## 35.2

### 35.2.1 show ip bgp

BGP Ш

```

show ip bgp [{network | network-mask}] [longer-prefixes]

```

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|  |  |
|--|--|
|  |  |
|--|--|

Г Д

BGP

Г Д

```
Ruijie# show ip bgp
Status codes: s suppressed, d damped, h history, * valid,
> b7.Ct 474- internal
```

|                               |   |
|-------------------------------|---|
| <b>bgp dampening</b>          |   |
| <b>clear ip bgp dampening</b> | ⏏ |

### 35.2.3 show ip bgp community

community BGP ⏏

**show ip bgp community** *community-number* [**exact -match**]

г д

|                         |                                                              |
|-------------------------|--------------------------------------------------------------|
|                         |                                                              |
| <i>community-number</i> | ⏏ AA:NN( /2<br>) internet<br>no-export local-as no-advertise |
| <b>exact -match</b>     |                                                              |

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г д

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community ⏏

г д

```
Ruijie# show ip bgp community local-as 111:12345
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Status Network Next Hop Metric LocPrf Path

*> 211.21.21.0/24 110.110.110.10 0 1000 200
300
*> 211.21.23.0/24 110.110.110.10 0 1000 200
300
*> 211.21.25.0/24 110.110.110.10 0 1000 300
*> 211.21.26.0/24 110.110.110.10 0 1000 300
*> 211.21.27.0/24 110.110.110.10 0 1000 200
```

### 35.2.4 show ip bgp community-list

**show ip bgp community-list** *community-name* [**exact-match**]

Г Д

| <i>community-name</i> |  |
|-----------------------|--|
| <b>exact-match</b>    |  |

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BGP

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```
Ruijie# show ip bgp community-list my_comm
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Status Network Next Hop Metric LocPrf Path

*> 211.21.21.0/24 110.110.110.10 0 1000 200
300
*> 211.21.23.0/24 110.110.110.10 0 1000 200
300
*> 211.21.25.0/24 110.110.110.10 0 1000 300
*> 211.21.26.0/24 110.110.110.10 0 1000 300
*> 211.21.27.0/24 110.110.110.10 0 1000 200
```

Г Д

| <b>ip community-list</b> |  |
|--------------------------|--|

### 35.2.5 show ip bgp dampening dampened-paths

**show ip bgp dampening dampened-paths**



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Г Д

## BGP

Г Д

Ruijie# **show ip bgp dampening flap-statistics**

Status codes: s suppressed, d damped, h history, \* valid,  
> best, i - internal

Origin codes: i - IGP, e - EGP, ? - incomplete

| Status | Network | From | Flaps | Duration |
|--------|---------|------|-------|----------|
|--------|---------|------|-------|----------|

| Reuse    | Path            |                |   |  |
|----------|-----------------|----------------|---|--|
| h        | 192.168.64.0/24 | 110.110.110.10 | 2 |  |
| 00:19:17 | 1000 i          |                |   |  |
| h        | 201.234.1.0/24  | 110.110.110.10 | 2 |  |
| 00:19:17 | 1000 ?          |                |   |  |
| h        | 201.234.2.0/23  | 110.110.110.10 | 2 |  |
| 00:19:17 | 1000 ?          |                |   |  |
| h        | 201.234.2.0/23  | 110.110.110.10 | 2 |  |
| 00:19:17 | 1000 ?          |                |   |  |
| h        | 201.234.2.0/23  | 110.110.110.10 | 2 |  |
| 00:19:17 | 1000 ?          |                |   |  |
| h        | 201.234.2.0/23  | 110.110.110.10 | 2 |  |
| 00:19:17 | 1000 ?          |                |   |  |

## 35.2.7 show ip bgp dampening parameters

### BGP



**show ip bgp dampening parameters**

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Г Д

Г Д

### BGP

Г Д

```
Ruijie (config-router)# bgp dampening 25 10000 10000 200
Ruijie# show ip bgp dampening parameters
dampening 25 10000 10000 200
Dampening Control Block(s):
Reachability Half-Life time : 25 min
Reuse penalty : 10000
Suppress penalty : 10000
Max suppress time : 200 min
Max penalty (ceil) : 29800000
Min penalty (floor) : 5000
```

## 35.2.8 show ip bgp filter-list

Ш

**show ip bgp filter-list** *path-list-number*

Г Д

| <i>path-list-number</i> |  |
|-------------------------|--|

Г Д

Г Д

Г Д

Г Д

```
Ruijie(config)# ip as-path access-list 5 permit .*
Ruijie# show ip bgp filter-list 5
BGP table version is 1, local router ID is 192.168.88.200
```

Status codes: s suppressed, d damped, h history, \* valid,  
 > best, i - internal,  
 S Stale  
 Origin codes: i - IGP, e - EGP, ? - incomplete  
 Network Next Hop Metric LocPrf Weight Path  
 \*> 192.168.88.0 0.0.0.0 32768 ?  
 Total number of prefixes 1

### 35.2.9 show ip bgp inconsistent-as

```

AS
show ip bgp inconsistent-as

r A
 W

r A

r A

r A

AS

r A

```

Ruijie# show ip bgp inconsistent-as

### 35.2.10 show ip bgp neighbors

```

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

```

```

r A

```

| <i>neighbor-address</i> | W      |
|-------------------------|--------|
| <b>received-routes</b>  | peer W |
| <b>routes</b>           | peer W |

|                   |   |
|-------------------|---|
| advertised-routes | 山 |
|-------------------|---|

r A

r A

## BGP

r A

```

Ruijie# show ip bgp neighbors
BGP neighbor : 12.12.12.2
Remote AS : 100
Local AS : 100
Neighbor type : internal
BGP version : 4
Remote ID : 192.168.4.2
BGP state : Established, up for 00:53:30
Min advertisement interval(secs): 15
Configured holdtime : 90
Configured keepalive : 30
Hold time : 90
keepalive : 30
Neighbor capabilities : ignore
Address family IPv4 Unicast: advertised , recieved
Route refresh : advertised , recieved
Connections established : 1
Connections dropped : 0
Last reset : never
Local host : 12.12.12.1 Local port : 179
Remote host : 12.12.12.2 Remote port : 1067
Maximum-Prefix limit : 4294967295
Threshold for warning : 0%
Accepted prefixes : 0
Prefix advertised : 6
Received messages : 110
Sent messages : 116
Received notifications : 0
Sent notifications : 0
Route refresh received : 0
Route refresh sent : 0

Ruijie# show ip bgp neighbors 15.15.15.5 routes
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete

```

| Status    | Network      | Next Hop   | Metric | LocPrf |
|-----------|--------------|------------|--------|--------|
| Path      |              |            |        |        |
| -----     |              |            |        |        |
| *>i       | 58.1.1.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.2.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.3.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.4.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.5.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.6.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.7.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.8.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.9.0/24  | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 58.1.10.0/24 | 58.58.58.8 |        | 58     |
| 100 800 ? |              |            |        |        |
| *>i       | 67.1.1.0/24  | 67.67.67.7 |        | 67     |
| 100 700 ? |              |            |        |        |
| *>i       | 67.1.2.0/24  | 67.67.67.7 |        | 67     |
| 100 700 ? |              |            |        |        |
| *>i       | 67.1.3.0/24  | 67.67.67.7 |        | 67     |
| 100 700 ? |              |            |        |        |
| *>i       | 67.1.4.0/24  | 67.67.67.7 |        | 67     |
| 100 700 ? |              |            |        |        |
| *>i       | 67.1.5.0/24  | 67.67.67.7 |        | 67     |
| 100 700 ? |              |            |        |        |
| *>i       | 67.1.6.0/24  | 67.67.67.7 |        | 67     |
| 100 700 ? |              |            |        |        |

### 35.2.11 show ip bgp paths

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show ip bgp paths

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Г Д

Г Д

```
Ruijie# show ip bgp paths
```

### 35.2.12 show ip bgp quote-regexp

AS

BGP

Ш

```
show ip bgp quote-regexp regexp
```

Г Д

| <i>regexp</i> | AS Ш |
|---------------|------|

Г Д

Г Д

Г Д

AS

BGP

Ш

Ш

Г Д

```
Ruijie# show ip bgp quote-regexp "_300_"
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Network Next Hop Metric LocPrf Path
```

```

*> 211.21.21.0/24 110.110.110.10 0 1000 200
300
*> 211.21.23.0/24 110.110.110.10 0 1000 200
300
*> 211.21.25.0/24 110.110.110.10 0 1000 300
*> 211.21.26.0/24 110.110.110.10 0 1000 300

```

### 35.2.13 show ip bgp regexp

AS

BGP

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**show ip bgp regexp** *regexp*

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| <i>regexp</i> | AS Ш |
|---------------|------|

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Г Д

Г Д

AS

BGP

Г Д

Ruijie# **show ip bgp regexp** *\_300\_*  
Status codes: s

BGP

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**show ip bgp summary**

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r A

BGP

r A

Ruijie # **show ip bgp summary**

BGP router identifier 192.168.88.200, local AS number 500

BGP table version is 1

1 BGP AS-PATH entries

0 BGP community entries

| Neighbor | V | AS | MsgRcvd | MsgSent | TblVer | InQ |
|----------|---|----|---------|---------|--------|-----|
|----------|---|----|---------|---------|--------|-----|

| OutQ | Up/Down | State/PfxRcd |
|------|---------|--------------|
|------|---------|--------------|

|         |   |     |   |   |   |   |
|---------|---|-----|---|---|---|---|
| 1.1.1.1 | 4 | 200 | 0 | 0 | 0 | 0 |
|---------|---|-----|---|---|---|---|

never Active

Total number of neighbors 1

r A

|            |     |
|------------|-----|
|            |     |
| router bgp | BGP |

|                 |   |
|-----------------|---|
| <i>network</i>  | 山 |
| <b>neighbor</b> |   |
| <b>summary</b>  |   |
| <b>label</b>    |   |



| <i>community-list-number</i> | Ш |
|------------------------------|---|
| <i>community-list-name</i>   |   |

г А

г А

г А

г А

```
Ruijie# show ip community-list
Community-list standard local
permit local-AS
Community-list standard Red-Giant
permit 0:10
deny 0:20
```

---

# 36

## 36.1

### 36.1.1 distribute-list in

**distribute-list in**  $\sqcup$  **no**  $\sqcup$

**distribute-list** {[*access-list-number* | *name*] | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*]} **in** [*interface-type* *interface-number*]

**no distribute-list** {[*access-list-number* | *name*] | **prefix** *prefix-list-name* [**gateway** *prefix-list-name*]} **in** [*interface-type* *interface-number*]

Г А

| <i>access-list-number</i>                     | $\sqcup$ |
|-----------------------------------------------|----------|
| <b>prefix</b> <i>prefix-list-name</i>         |          |
| <b>gateway</b> <i>prefix-list-name</i>        |          |
| <i>interface-type</i> <i>interface-number</i> | ( )      |

Г А

$\sqcup$

Г А

$\sqcup$

Г А

OSPF  $\sqcup$  OSPF

---

```

RIP Fastethernet 0/0
172.16 11

```

```

router rip
network 200.168.23.0
distribute-list/T.Bh fastethernet 0/0
no auto-summary
!
access-list/T.permit/72.16.0.0 0.0.255.255

```

г      А

| <b>access-list</b> |  |
|--------------------|--|
| <b>prefix-list</b> |  |

### 36.1.2 distribute-listout

```

distribute-listout 11 no 11
no distribute-list {[access-list-number | name] | prefix prefix-list-name}
out [interface | protocol | process-id]

```

г      А

| <i>access-list-number</i>             | 11     |
|---------------------------------------|--------|
| <b>prefix</b> <i>prefix-list-name</i> |        |
| <i>interface</i>                      | (    ) |
| <i>protocol</i>                       | (    ) |

г      А

11

г      А

11

г      А



---

Ш AA:NN(

*community-number*

Г Д

|         |   |
|---------|---|
|         |   |
| network | Ш |

Г Д

0.0.0.0/0Ш

Г Д

Ш

Г Д

default-network

Ш

“\*”

connected

Ш

Ш

Г Д

192.168.100.0

Ш

```
ip route 192.168.100.0 255.255.255.0 serial 0/1
ip default-network 192.168.100.0
```

200.200.200.0

200.200.200.0

Ш

```
ip default-network 200.200.200.0
```

Г Д

|               |      |
|---------------|------|
|               |      |
| show ip route | IP Ш |

### 36.1.5 ip prefix-list

ip prefix-list

Ш no

Ш

```
ip prefix-list prefix-lis-name [seq seq-number] { deny | permit }
ip-prefix [ge minimum-prefix-length][le maximum-prefix-length]
no ip prefix-list prefix-lis-name [seq seq-number] { deny | permit }
ip-prefix [ge minimum-prefix-length][le maximum-prefix-length]
```

Г Д

|                              |                  |
|------------------------------|------------------|
|                              |                  |
| <i>prefix-list-name</i>      |                  |
| <i>seq-number</i>            | 1 2147483647 5 5 |
| <b>deny</b>                  |                  |
| <b>permit</b>                |                  |
| <i>ip-prefix</i>             | IP 0 32          |
| <i>minimum-prefix-length</i> | ) ge             |
| <i>maximum-prefix-length</i> | ) le             |

г А

Ш

г А

Ш

г А

**ip prefix-list** IP Ш permit deny

Ш

Ш ge le

Ш ge le

Ш ge

minimum-prefix-length 32 Ш le ip-prefix

maximum-prefix-length Ш

minimum-prefix-length maximum-prefix-length Ш ip-prefix

4 minimum-prefix-length maximum-prefix-length

ip-prefix < minimum-prefix-length < maximum-prefix-length <= 32 Ш

г А

---

```

 OSPF
 RIP
 IP
 IP
 201.1.1.0/24
)

Ruijie# configure terminal
Ruijie(config)# ip prefix-list pre1 permit 201.1.1.0/24
Ruijie(config)# router ospf
Ruijie(config-router)# distribute-list prefix pre1 out
rip
Ruijie(config-router)# end

```

### 36.1.6 ip prefix-list description

```

 ip prefix-list description
 no
 111
 111

ip prefix-list prefix-lis-name description descripton-text

r A

<i>prefix-lis-name</i>	
<i>descripton-text</i>	

r A

r A

r A

 OSPF
 RIP
 IP
 IP
 201.1.1.0/24
)

Ruijie# configure terminal
Ruijie(config)# ip prefix-list pre description Deny
routes from Net-A

```

|                                |   | ip prefix-list description                           |     |
|--------------------------------|---|------------------------------------------------------|-----|
| no                             |   |                                                      |     |
| ip prefix-list sequence-number |   |                                                      |     |
| г                              | д |                                                      |     |
| г                              | д |                                                      |     |
| г                              | д |                                                      |     |
| г                              | д |                                                      |     |
|                                |   | OSPF                                                 | RIP |
|                                |   | IP                                                   | IP  |
| (                              |   | IP ÊEliö !4Ôce-ì•à ë>T0jT1,7PaT0Qs0P@<21A80F52x7Iro8 |     |

---

|                       |  |
|-----------------------|--|
| <b>permanent</b>      |  |
| <i>number</i>         |  |
| <b>disable/enable</b> |  |

г А

Ш

г А

Ш

г А

1

Ш

Ш OSPF 110

125 OSPF

Ш

vrf vrfШ

1 **show ip route weight**

Ш weight WCMP

weight

Ш WCMP 32

WCMP

Ш

Ш

Ш

ip

route 0.0.0.0 0.0.0.0 Fastethernet 0/0 Ш

---

```
ip route 172.16.100.0 255.255.255.0 fastethernet 0/0
192.168.12.1
```

```

r A

```

|               |    |
|---------------|----|
|               |    |
| show ip route | IP |

### 36.1.9 ip routing

```

 RGOS IP
no IP

```

```
ip routing
```

```
no ip routing
```

```

r A

```

```
IP
```

```

r A

```

```

r A

```

```

 RGOS IP VOIP RGOS IP

```

```

r A

```

```

 RGOS IP

```

```
no ip routing
```

```

r A

```

```


```

### 36.1.10 ip static route-limit

```
ip static route-limit
```

```
no
```

```
ip static route-limit number
```

```
ip static route-limit number
```

```

r A

```

|  |  |
|--|--|
|  |  |
|--|--|

|               |         |
|---------------|---------|
| <i>number</i> | 1-10000 |
|---------------|---------|

Г Д

1000

Г Д

Г Д

ip static

route-limit

show running config

Г Д

900

ip static route-limit 900

Г Д

### 36.1.11 ipv6 prefix-list

IPv6 prefix-list no ipv6

**IPv6 prefix-list** *prefix-list-name* [ **seq** *seq-number* ] { **deny** | **permit** }  
*ipv6-prefix* [ **ge** *minimum-prefix-length* ] [ **le** *maximum-prefix-length* ]  
**no ipv6 prefix-list** *prefix-list-name* [ **seq** *seq-number* ] { **deny** | **permit** }  
*ipv6-prefix* [ **ge** *minimum-prefix-length* ] [ **le** *maximum-prefix-length* ]

Г Д

| <i>prefix-list-name</i> |                  |
|-------------------------|------------------|
| <i>seq-number</i>       | 1 2147483647 5 5 |
| <b>deny</b>             |                  |



|             |      |    |      |             |
|-------------|------|----|------|-------------|
|             | IPv6 |    | ipv6 | prefix-list |
| description | ⏏    | no |      | ⏏           |

```
ipv6 prefix-list prefix-lis-name description descripton-text
```

Г Д

|                        |      |
|------------------------|------|
|                        |      |
| <i>prefix-lis-name</i> | IPv6 |
| <i>descripton-text</i> | IPv6 |

Г Д

Г Д

Г Д

Г Д

```

 OSPF
 RIP
 IP
 IP 201.1.1.0/24
 (

```

---

Г А

|                   | OSPF | RIP |
|-------------------|------|-----|
| IP                |      | IP  |
| ( IP 201.1.1.0/24 |      | )   |

```
Ruijie# configure terminal
Ruijie(config)# ipv6 prefix-list pre description Deny
routes from Net-A
```

### 36.1.14 match as-path

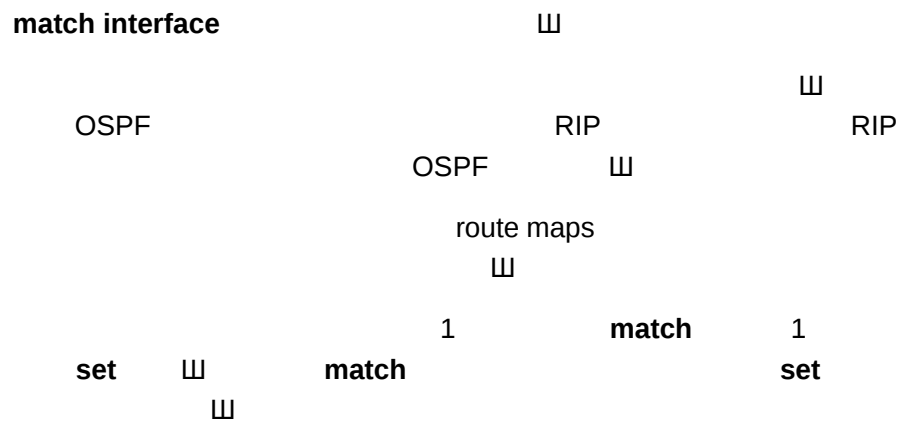
---

|                     |         |
|---------------------|---------|
| match metric        |         |
| match origin        |         |
| set as-path prepend | AS_PATH |
| set metric          |         |
| set metric-type     |         |

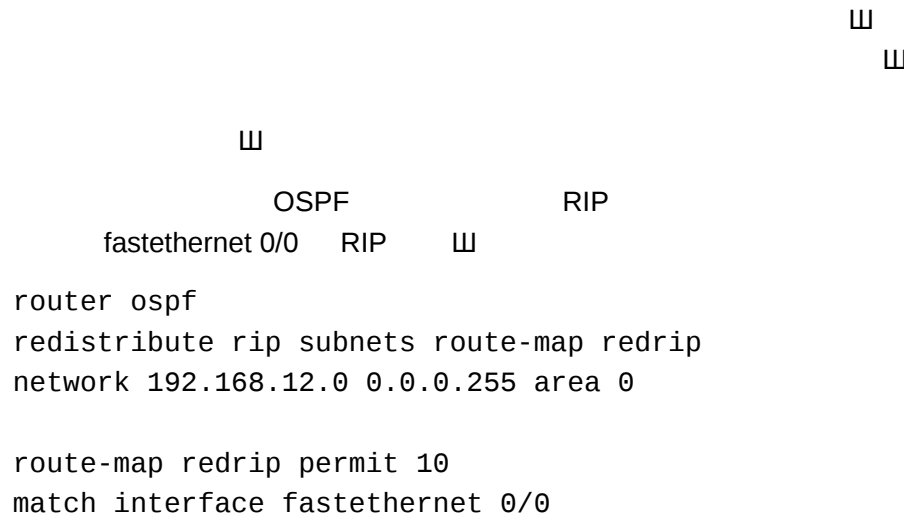
### 36.1.15 match community



Г А



Г А



Г А

| match ip address      |  |
|-----------------------|--|
| match ip next-hop     |  |
| match ip route-source |  |
| match metric          |  |
| match route-type      |  |
| match tag             |  |
| set metric            |  |
| set metric-type       |  |
| set tag               |  |

---

### 36.1.17 match ip address

**match ip address**  **no** 

**match ip address** {*access-list-number* [*access-list-number...* | *access-list-name...*] | *access-list-name* [*access-list-number...* | *access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

**no match ip address** {*access-list-number* [*access-list-number...* | *access-list-name...*] | *access-list-name* [*access-list-number...* | *access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

Г А

| <i>access-list-number</i>                  |  |
|--------------------------------------------|--|
| <i>access-list-name</i>                    |  |
| <b>prefix-list</b> <i>prefix-list-name</i> |  |

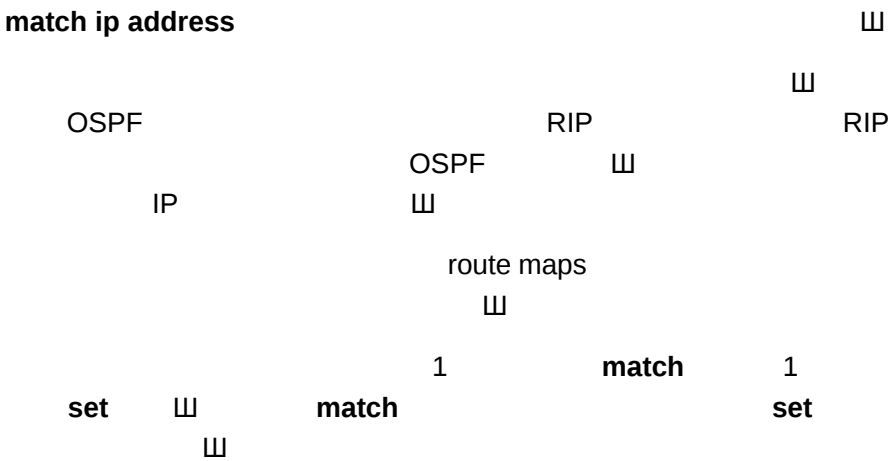
Г А



Г А



Г А



Г А


---

```

 10
 RIP
 OSPF
 OSPF
 RIP
 40
 type-1

router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
access-list 10 permit 200.168.23.0
route-map redrip permit 10
match ip address 10
set metric 40
set metric-type type-1

```

Г А

| access-list           |  |
|-----------------------|--|
| match interface       |  |
| match ip next-hop     |  |
| match ip route-source |  |
| match metric          |  |
| match route-type      |  |
| match tag             |  |
| set metric            |  |
| set metric-type       |  |
| set tag               |  |

### 36.1.18 match ip next-hop

```

IP
match ip next-hop 10 no 10

match ip next-hop {access-list-number [access-list-number... |
access-list-name...] | access-list-name [access-list-number... |
access-list-name] | prefix-list prefix-list-name [prefix-list-name...]}

no match ip next-hop {access-list-number [access-list-number... |
access-list-name...] | access-list-name [access-list-number... |
access-list-name] | prefix-list prefix-list-name [prefix-list-name...]}

```

Г А

|                                            |  |
|--------------------------------------------|--|
|                                            |  |
| <i>access-list-number</i>                  |  |
| <i>access-list-name</i>                    |  |
| <b>prefix-list</b> <i>prefix-list-name</i> |  |

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**match ip next-hop**

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OSPF  
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route maps  
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**set**

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**match**

1

**match**

1  
**set**

Г А

OSPF

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```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
access-list 10 permit 192.168.100.1
access-list 20 permit 172.16.10.1
route-map redrip permit 10
match ip next-hop 10 20
```

Г А

|  |  |
|--|--|
|  |  |
|--|--|

|                       |  |
|-----------------------|--|
| match ip address      |  |
| match interface       |  |
| match ip route-source |  |
| match metric          |  |
| match route-type      |  |
| match tag             |  |
| set metric            |  |
| set metric-type       |  |
| set tag               |  |

### 36.1.19 match ip route-source

IP

**match ip route-source** **no**

▮

**match ip route-source** {*access-list-number* [*access-list-number...* | *access-list-name...*] | *access-list-name* [*access-list-number...* | *access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

**no match ip route-source** {*access-list-number* [*access-list-number...* | *access-list-name...*] | *access-list-name* [*access-list-number...* | *access-list-name*] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

Г А

|                                            |  |
|--------------------------------------------|--|
|                                            |  |
| <i>access-list-number</i>                  |  |
| <i>access-list-name</i>                    |  |
| <b>prefix-list</b> <i>prefix-list-name</i> |  |

Г А

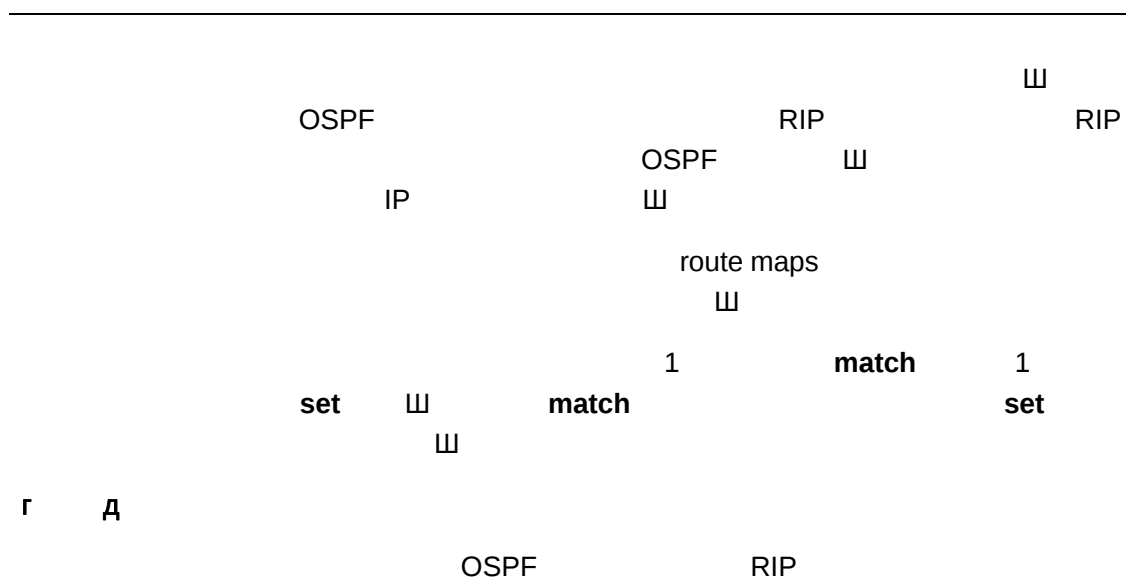
▮

Г А

▮

Г А

**match ip route-source** **no**



**match ipv6 address** { *access-list-name* | **prefix-list** *prefix-list-name* }

**no match ipv6 address**

**r**      **A**

| <i>access-list-name</i>                    |      |
|--------------------------------------------|------|
| <b>prefix-list</b> <i>prefix-list-name</i> | IPv6 |

**r**      **A**

┌

**r**      **A**

┌

**r**      **A**

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RIP

IP

OSPF

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route maps

┌

set

┌

match

1

match

1

set

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**r**      **A**

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OSPF

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OSPF

type-1

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```
ipv6 router ospf
redistribute rip subnets route-map redrip
ipv6 access-list v6acl
10 permit ipv6 2620::/64 any
route-map redrip permit 10
match ipv6 address v6acl
set metric 30
```

Г Д

| ipv6 access-list        | IPv6 |
|-------------------------|------|
| match interface         |      |
| match ipv6 next-hop     | IPv6 |
| match ipv6 route-source | IPv6 |
| match metric            |      |
| match route-type        |      |
| match tag               |      |
| set metric              |      |
| set metric-type         |      |
| set tag                 |      |

### 36.1.21 match ipv6 next-hop

IPv6

match ipv6 address  $\square$  no

$\square$

match ipv6 next-hop { *access-list-name* | **prefix-list** *prefix-list-name* }

no match ipv6 next-hop

Г Д

| <i>access-list-name</i>                    |      |
|--------------------------------------------|------|
| <b>prefix-list</b> <i>prefix-list-name</i> | IPv6 |

Г Д

$\square$

Г Д

$\square$

Г Д

$\square$



IPv6

```
match ipv6 address
```

**no**

W

```
match ipv6 route-source { access-list-name | prefix-list
prefix-list-name }
```

no match ipv6 route-source

Г Д

|                                            |      |
|--------------------------------------------|------|
|                                            |      |
| <i>access-list-name</i>                    |      |
| <b>prefix-list</b> <i>prefix-list-name</i> | IPv6 |

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## OSPF

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## OSPF

IP

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route maps

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**match**

1

**set**

W

**match**

**set**

W

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W

## OSPF

RIP

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## OSPF

type-1

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```

ipv6 router ospf
 redistribute rip subnets route-map redrip
 ipv6 access-list v6acl
 10 permit ipv6 5200::/64 any
 route-map redrip permit 10
 match ipv6 route-source v6acl
 set metric 50

```

Г А

| ipv6 access-list        | IPv6 |
|-------------------------|------|
| match interface         |      |
| match ipv6 address      | IPv6 |
| match ipv6 route-source | IPv6 |
| match metric            |      |
| match route-type        |      |
| match tag               |      |
| set metric              |      |
| set metric-type         |      |
| set tag                 |      |

### 36.1.23 match length

IP match  
 length  $\sqcup$  no  $\sqcup$   
**match length** *min-length max-length*  
**no match length** *min-length max-length*

Г А

| <i>min-length</i> | IP |
|-------------------|----|
| <i>max-length</i> | IP |

Г А

$\sqcup$

Г А



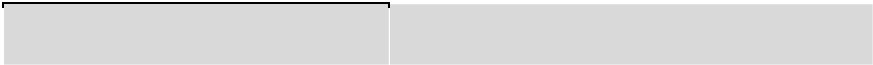
---

**match metric** *metric*

**no match metric**

**r**

**A**



---

|                       |  |
|-----------------------|--|
| match ip next-hop     |  |
| match ip route-source |  |
| match route-type      |  |
| match tag             |  |

set ip netmask 14.663.0.017 Td1412135447A107DA13D7143C32B0

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```

match origin incomplete
set community no-export

```

Г А

| match as-path       | AS_PATH |
|---------------------|---------|
| match metric        |         |
| match origin        |         |
| set as-path prepend | AS_PATH |
| set metric          |         |
| set origin          |         |

### 36.1.26 match route-type

match route-type

no

```

match route-type {local | internal | external [type-1 | type-2] | level-1
| level-2}
no match route-type {local | internal | external [type-1 | type-2] |
level-1 | level-2}

```

Г А

| local             |             |
|-------------------|-------------|
| Internal          | OSPF        |
| external          | (BGP OSPF ) |
| type-1   type-2   | OSPF 1 2    |
| level-1   level-2 | ISIS 1 2    |

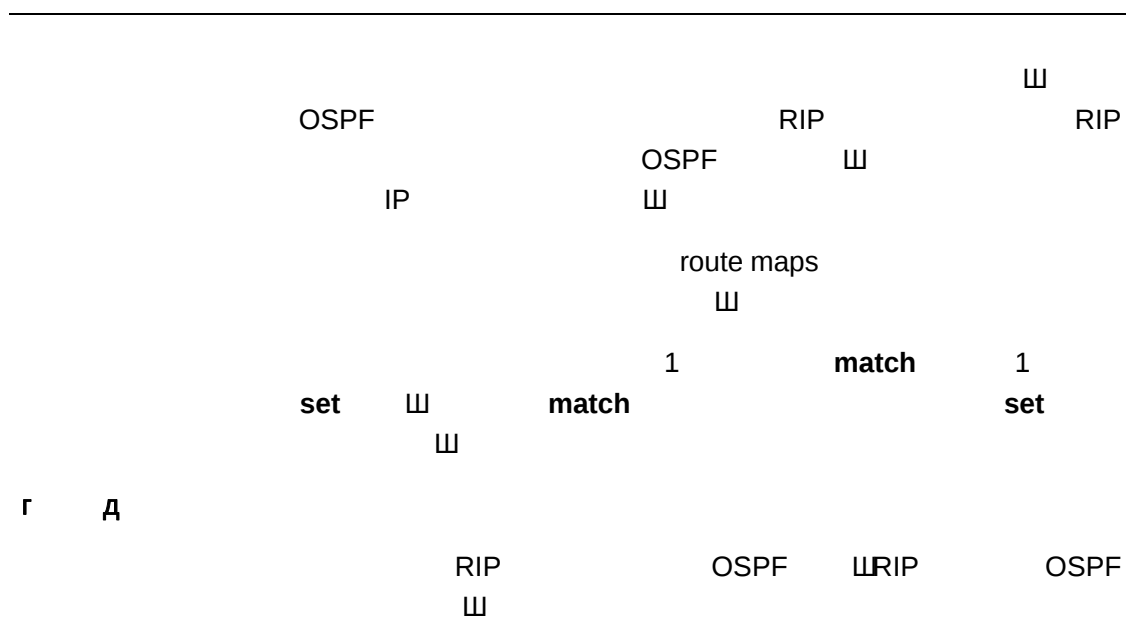
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Г А

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Г А



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```

router rip
redistribute ospf route-map redrip
network 192.168.12.0

```

```

route-map redrip permit 10
match route-type internal

```

Г    Д

| access-list           |  |
|-----------------------|--|
| match ip address      |  |
| match interface       |  |
| match ip next-hop     |  |
| match ip route-source |  |
| match metric          |  |
| match tag             |  |
| set metric            |  |
| set metric-type       |  |
| set tag               |  |

### 36.1.27 match tag

match tag    no

```
match tag tag [...tag]
```

**no match tag** *tag* [...*tag*]

Г Д

|            |  |
|------------|--|
|            |  |
| <i>tag</i> |  |

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Г Д

**match tag**

tag $\sqcup$ 

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## OSPF

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|                       |  |
|-----------------------|--|
| match interface       |  |
| match ip route-source |  |
| match metric          |  |
| match ip next-hop     |  |
| match route-type      |  |
| set metric            |  |
| set metric-type       |  |
| set tag               |  |

### 36.1.28 maximum-paths

no maximum-paths<sup>111</sup>

36.1.29 route-map

route-map

no

route-map route-map-name [permit | deny] [sequence-number]  
no route-map route-map-name [permit | deny] [sequence-number]

Г А

| route-map-name  |                                       |
|-----------------|---------------------------------------|
| permit          | match permit set set set permit match |
| deny            | match deny deny match set             |
| sequence-number |                                       |

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Г А

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|              |  |
|--------------|--|
|              |  |
| Redistribute |  |

### 36.1.30 set aggregator as

match AS

set aggregator as  $\sqcup$  no  $\sqcup$

$\sqcup$

```
set aggregator as as-num ip_addr
```

```
no set aggregator as [as-num ip_addr]
```

Г Д

|                  |    |
|------------------|----|
|                  |    |
| <i>as-number</i> | AS |
| <i>ip_addr</i>   |    |

Г Д

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Г Д

W

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BGP W

as,ip-addr

|                        |           |
|------------------------|-----------|
| <b>set community</b>   | COMMUNITY |
| <b>set metric</b>      |           |
| <b>set metric-type</b> |           |

### 36.1.31 set as-path prepend

```

match AS_PATH
set as-path prepend AS_PATH no

```

```

set as-path prepend as-number
no set as-path prepend [as-number]

```

Г А

|                  |            |
|------------------|------------|
|                  |            |
| <i>as-number</i> | AS_PATH AS |

Г А

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Г А

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Г А

AS\_PATH

as-path 15 as Ш

Г А

```

route-map set-as-path
match as-path 1
set as-path prepend 100 101 102

```

Г А

|                        |           |
|------------------------|-----------|
|                        |           |
| <b>match as-path</b>   | AS_PATH   |
| <b>match community</b> |           |
| <b>match metric</b>    |           |
| <b>match origin</b>    |           |
| <b>set community</b>   | COMMUNITY |
| <b>set metric</b>      |           |



---

Г      А

| match as-path        | AS_PATH |
|----------------------|---------|
| match metric         |         |
| match origin         |         |
| set as-path prepend  | AS_PATH |
| set local-preference |         |
| set metric-type      |         |

### 36.1.33 set community

match                      COMMUNITY  
**set community**  $\sqcup$                       **no**                       $\sqcup$   
                                          $\sqcup$

**set community** {*community-number*[*community-number* ...] **additive**

```

match as-path 1
set community 109:10

route-map SET_COMMUNITY 20 permit
match as-path 2
set community no-export

```

Г А

| match as-path       | AS_PATH |
|---------------------|---------|
| match community     |         |
| match metric        |         |
| match origin        |         |
| set as-path prepend | AS_PATH |
| set origin          |         |
| set metric-type     |         |

### 36.1.34 set dampening

```

match
dampening [] no [] set
[]

set dampening half-life reuse suppress max-suppress-time
no set dampening

```

Г А

| half-life         | [ ]<br>1..45( ) 15            |
|-------------------|-------------------------------|
| reuse             | [ ] 1..20000 750 [ ]          |
| suppress          | 1..20000 2000 [ ] [ ]         |
| max-suppress-time | [ ]<br>1..255( ) 4* half-life |

Г А

[ ]

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Г      А

Ш

Г      А

```
route-map tag
match as path 10
set dampening 30 1500 10000 120
```

```
router bgp 100
neighbor 172.16.233.52 route-map tag in
```

Г      А

| match as-path        | AS_PATH |
|----------------------|---------|
| match community      |         |
| match metric         |         |
| match origin         |         |
| set as-path prepend  | AS_PATH |
| set metric           |         |
| set local-preference |         |

### 36.1.35 set extcommunity

match

```
set extcommunity Ш no Ш
Ш
```

```
set extcommunity {rt extend-community-value | soo
extend-community-value}
```

```
no set extcommunity {rt | soo}
```

Г      А

| rt  | RT  |
|-----|-----|
| soo | SOO |

---

|                               |  |
|-------------------------------|--|
| <i>extend-community-value</i> |  |
|-------------------------------|--|

|                   |    |
|-------------------|----|
| <i>ip-address</i> | IP |
| <i>weight</i>     |    |

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set

WCMP

WCMP

W

weight

WCMP

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## set ip default next-hop

IP

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V&I~~MP~~

Eggs(next-hop)]TJ/C2\_0 14Tf57 1 WCMP6M45BPQ&gt;5E▶ 02

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```
access-list 1 permit ip 1.1.1.1 0.0.0.0
access-list 2 permit ip 2.2.2.2 0.0.0.0
```

```
interface async 1
ip policy route-map equal-access
```

```
route-map equal-access permit 10
match ip address 1
set ip default next-hop 6.6.6.6
route-map equal-access permit 20
match ip address 2
set ip default next-hop 7.7.7.7
route-map equal-access permit 30
set default interface null0
```

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|                         |  |
|-------------------------|--|
|                         |  |
| <b>route-map</b>        |  |
| <b>match ip address</b> |  |

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Г      А

Г      А

Г      А

| route-map               |    |
|-------------------------|----|
| match ip address        |    |
| set default interface   |    |
| set default interface   |    |
| set interface           |    |
| set ip default next-hop | IP |
| set ip precedence       | IP |

### 36.1.38 set ip next-hop

match IP Ш  
**set ip next-hop**Ш      **no** Ш  
Ш

**set ip next-hop** *ip-address* [*weight*] [...*ip-address* [*weight*] ]  
**no set ip next-hop** *ip-address* [*weight*] [...*ip-address* [*weight*] ]

Г      А

| <i>ip-address</i> | IP |
|-------------------|----|
| <i>weight</i>     |    |

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Г      А

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Г      А

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|                         |    |
|-------------------------|----|
|                         |    |
| route-map               |    |
| match ip address        |    |
| set default interface   |    |
| set default interface   |    |
| set interface           |    |
| set ip default next-hop | IP |
| set ip precedence       | IP |

### 36.1.39 set ip next-hop verify-availability

```

IP
set ip
next-hop verify-availability
no

```

```
ip policy route-map load-balance

access-list 10 permit 10.0.0.0 0.255.255.255
access-list 20 permit 172.16.0.0 0.0.255.255

route-map load-balance permit 10
match ip address 10
set ip next-hop 192.168.100.1

route-map load-balance permit 20
match ip address 20
set ip next-hop 172.16.100.1

route-map load-balance permit 30
set interface Null0
```

Г А

| route-map               |    |
|-------------------------|----|
| match ip address        |    |
| set default interface   |    |
| set default interface   |    |
| set interface           |    |
| set ip default next-hop | IP |
| set ip precedence       | IP |

36.1.40 set level

```
match
set level ☐ no ☐

set level {level 1| level 2 | level 1-2 | stub-area | backbone}
no set level
```

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OSPF RIP backbone Ш

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
```

```
route-map redrip permit 10
set level backbone
```

Г Д

| match interface       |  |
|-----------------------|--|
| match ip address      |  |
| match ip next-hop     |  |
| match ip route-source |  |
| match metric          |  |
| match route-type      |  |
| match tag             |  |
| set metric-type       |  |
| set tag               |  |

### 36.1.41 set local-preference

match LOCAL\_PREFERENCE

set local-preference Ш no Ш

set local-preference *number*

no set local-preference

Г Д

| <i>number</i> | Ш 0..4294967295 |
|---------------|-----------------|

Г Д

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---

|                 |  |
|-----------------|--|
| match tag       |  |
| set metric-type |  |

|  |       |  |
|--|-------|--|
|  | 36-53 |  |
|--|-------|--|

---

set tag

---

```
route-map redrip permit 10
set metric-type type-1
```

**r**      **A**

| match interface       |  |
|-----------------------|--|
| match ip address      |  |
| match ip next-hop     |  |
| match ip route-source |  |
| match metric          |  |
| match route-type      |  |
| match tag             |  |
| set metric            |  |
| set tag               |  |

**36.1.44    set next-hop**

```
match
set next-hop IP
no

```

**set next-hop *ip-address***  
**no set next-hop *ip-address***

**r**      **A**

|                   |    |
|-------------------|----|
|                   |    |
| <i>ip-address</i> | IP |



|                   |     |
|-------------------|-----|
| <b>egp</b>        | EGP |
| <b>igp</b>        | IGP |
| <b>Incomplete</b> |     |

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```
route-map SET_ORIGIN 10 permit
match as-path 1
set origin igp
route-map SET_ORIGIN 20 permit
match as-path 2
set origin egp
```

Г Д

| <b>match as-path</b> | AS_PATH |
|----------------------|---------|
| <b>match metric</b>  |         |
| <b>match origin</b>  |         |

---

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д



| <i>tag</i> |  |
|------------|--|

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OSPF

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```
router ospf
 redistribute rip subnets route-map redrip
 network 192.168.12.0 0.0.0.255 area 0
 route-map redrip permit 10
 set tag 100
```

Г Д

| <b>match interface</b>       |  |
|------------------------------|--|
| <b>match ip address</b>      |  |
| <b>match ip next-hop</b>     |  |
| <b>match ip route-source</b> |  |
| <b>match metric</b>          |  |
| <b>match route-type</b>      |  |
| <b>match tag</b>             |  |
| <b>set metric</b>            |  |
| <b>set metric-type</b>       |  |

### 36.1.48 set weight

**set weight** *number*  
**no set weight**

|               |           |
|---------------|-----------|
|               |           |
| <i>number</i> | 0...65535 |

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BGP 山

neighbor weight  
32768山

BGP 山

BGP in 100M

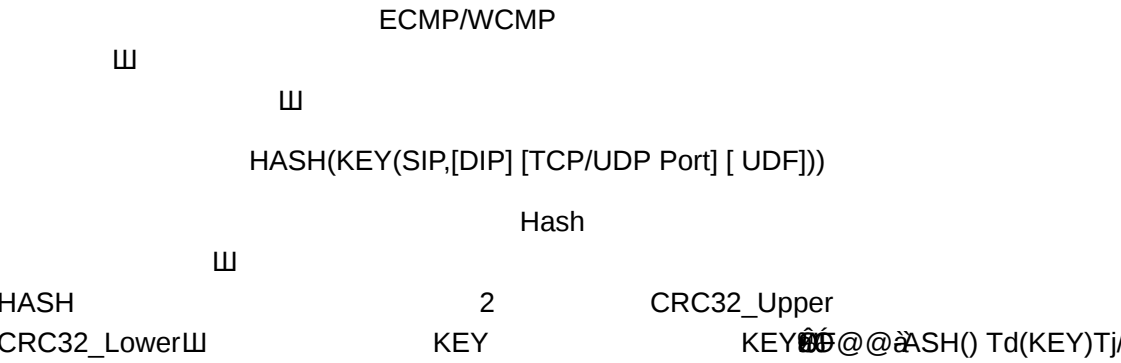
```
router bgp 1
neighbor 1.1.1.1 route-map nei-rmap-in in
route-map nei-rmap-in permit 10
set weight 100
```

|                 |           |
|-----------------|-----------|
|                 |           |
| match as-path   | AS_PATH   |
| match community |           |
| match metric    |           |
| match origin    |           |
| set community   | COMMUNITY |
| set metric      |           |

---

|                 |  |
|-----------------|--|
| set metric-type |  |
|-----------------|--|

**36.1.49 ip ref ecmp load-balance source**



---

**show route-map** ⌵

**show route-map** *route-map-name*

Г      А

|                       |  |
|-----------------------|--|
|                       |  |
| <i>route-map-name</i> |  |

Г      А

⌵

Г      А

Ч                      Ч                      Ч                      Ч  
⌵

Г      А

⌵

Г      А

Ruijie# **show route-map**  
route-map AAA, permit, sequence 10  
Match clauses:  
ip address 2  
Set clauses:  
metric 10

|               |                                                                |
|---------------|----------------------------------------------------------------|
|               |                                                                |
| route-map     |                                                                |
| permit        | permit                                                         |
| sequence 10   |                                                                |
| Match clauses | ⌵                      permit<br>deny                      set |
| Set clauses   | match                                                          |

## 36.2.2 show ip community-list

⌵

**show ip community-list** [*community-list-number*][*community-list-name*]

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| <i>community-list-number</i> | Ш |
|------------------------------|---|
| <i>community-list-name</i>   |   |

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```
Ruijie# show ip community-list
Community-list standard local
permit local-AS
Community-list standard Red-Giant
permit 0:10
deny 0:20
```

### 36.2.3 show ip prefix-list

show ip prefix-list

Ш

show ip prefix-list [ *prefix-name* ]

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| prefix-name |  |
|-------------|--|

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```
Ruijie# show ip prefix-list
ip prefix-list pre: 2 entries
seq 5 permit 192.168.64.0/24
seq 10 permit 192.2.2.0/24
```

### 36.2.4 show ip route

IP show ip route Ш

**show ip route** *[[vrf vrf\_name] [network [mask] | count | protocol  
[process-id] | weight ]]*

Г Д

| <b>vrf vrf_name</b> | VRF                                       |
|---------------------|-------------------------------------------|
| <i>network</i>      |                                           |
| <i>mask</i>         |                                           |
| <b>count</b>        |                                           |
| <b>protocol</b>     | static connected,<br>bgp, isis, ospf, rip |
| <i>process-id</i>   |                                           |
| <b>weight</b>       |                                           |

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**show ip route**

Ruijie# **show ip route**

Codes: C - connected, S - static, R - RIP, B - BGP  
 O - OSPF, IA - OSPF inter area  
 N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2  
 E1 - OSPF external type 1, E2 - OSPF external type 2  
 i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2 - IS-IS level-2  
 ia - IS-IS inter area, \* - candidate default

Gateway of last resort is no set

S 20.0.0.0/8 is directly connected, VLAN 1  
 S 22.0.0.0/8 [1/0] via 20.0.0.1  
 O E2 30.0.0.0/8 [110/20] via 192.1.1.1, 00:00:06, VLAN 1  
 R 40.0.0.0/8 [120/20] via 192.1.1.2, 00:00:23, VLAN 1  
~~B 50.0.0.0/8 [120/0] via 192.1.1.3, 00:00:41~~  
 C 192.1.1.0/24 is directly connected, VLAN 1  
 C 192.1.1.254/32 is local host.

**show ip route**

|    |                                    | ⏏     |
|----|------------------------------------|-------|
| O  | C<br>S<br>R RIP<br>B BGP<br>O OSPF |       |
|    | i IS-IS                            | ⏏     |
|    |                                    | ⏏     |
|    | E1 OSPF                            |       |
|    | E2 OSPF                            |       |
|    | N1 OSPF NSSA                       | 1     |
| E2 | N2 OSPF NSSA                       | 2     |
|    | IA OSPF                            | IS-IS |

---

|              |    |
|--------------|----|
| Via 20.0.0.1 | IP |
| 00:00:06     |    |
| VLAN 1       |    |

**show ip route network**

Ruijie# **show ip route 30.0.0.0**  
Routing entry for 30.0.0.0/8  
Distance 110, metric 20  
Routing Descriptor Blocks:  
\*192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF,  
extern 2

**show ip route network**



---

```

 IPv6 3
r d
 4 4 4 4

r d

 3

r d

Ruijie# show ipv6 prefix-list
ipv6 prefix-list p6: 2 entries
permit 13::/20
permit 14::/20

```

---

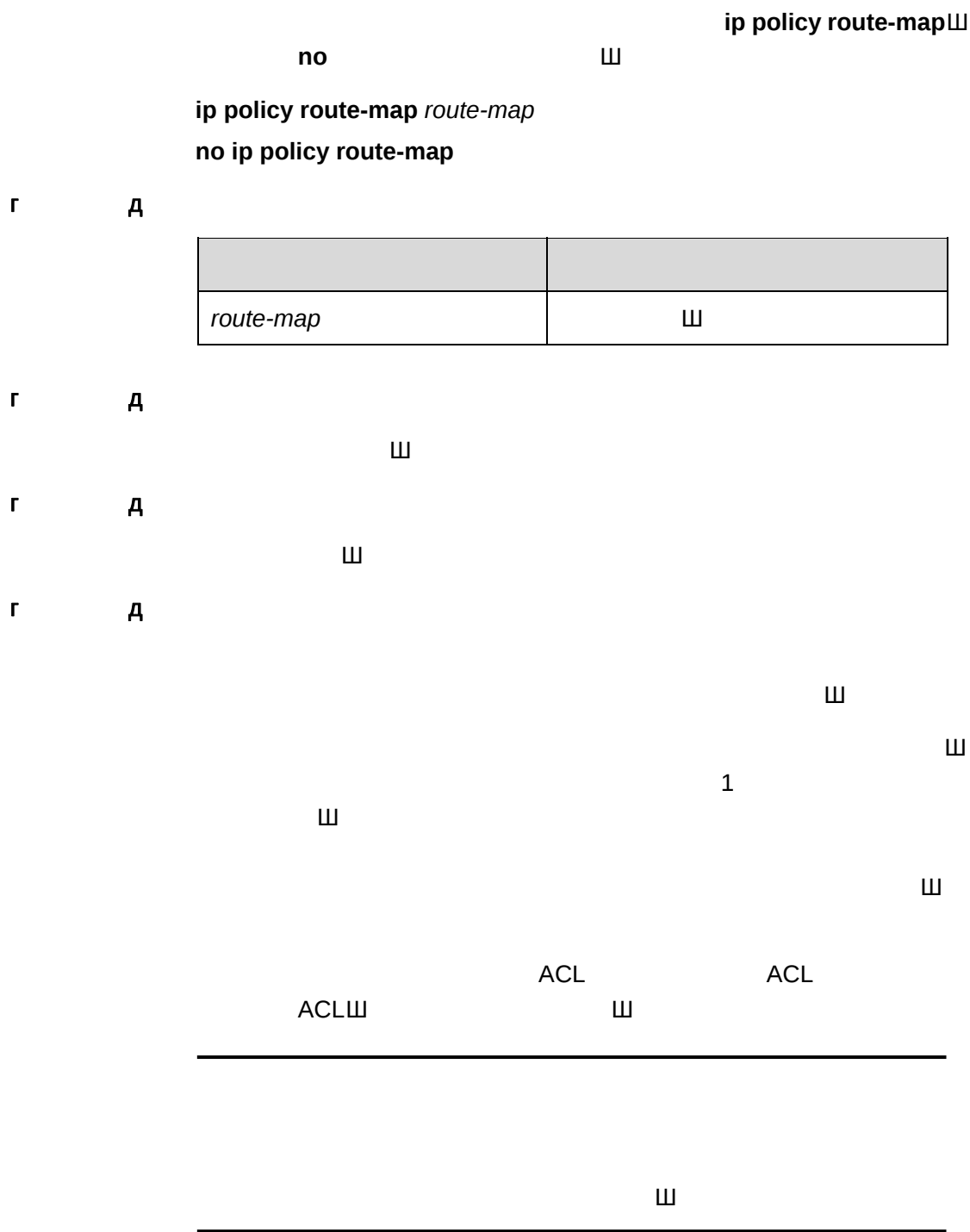
|           |  |
|-----------|--|
| adj_nodes |  |
| res_adj   |  |

---

# 37

## 37.1

### 37.1.1 ip policy route-map



---

Г А

```

 FE0
10.0.0.1 196.168.4.6 20.0.0.1
 196.168.5.6 Ш

access-list 1 permit 10.0.0.1
access-list 2 permit 20.0.0.1
route-map lab1 permit 10
match ip address 1
set ip next-hop 196.168.4.6
exit
route-map lab1 permit 20
match ip address 2
set ip next-hop 196.168.5.6
exit
interface FastEthernet 0/0
ip policy route-map lab1
exit
```

Г А

| access-list             | Ш       |
|-------------------------|---------|
| route-map               | Ш       |
| set ip next-hop         |         |
| set ip default next-hop |         |
| set ip dscp             | IP DSCP |
| match ip address        |         |
| match length            |         |

route-map Э Ю

### 37.1.2 ip policy

```

 set ip nexthop
 ip policy Ш no
 Ш

ip policy {load-balance|redundance}
no ip policy
```

Г А



# 38 IPv6

## 38.1

### IPv6

- ping ipv6
- ipv6 address
- ipv6 enable
- ipv6 hop-limit
- ipv6 neighbor
- ipv6 source-route
- ipv6 route
- ipv6 ns-linklocal-src
- ipv6 nd ns-interval
- ipv6 nd reachable-time
- ipv6 nd prefix
- ipv6 nd ra-lifetime
- ipv6 nd ra-interval
- ipv6 nd ra-hoplimit
- ipv6 nd ra-mtu
- ipv6 nd managed-config-flag
- ipv6 nd other-config-flag
- ipv6 nd dad attempts
- ipv6 nd suppress-ra
- ipv6 redirects
- clear ipv6 neighbors
- tunnel destination
- tunnel mode ipv6ip
- tunnel source
- tunnel ttl

### 38.1.1 ping ipv6

IPV6 配置

ping ipv6 [ipv6-address]

配置

ipv6-address

配置

配置

ping 命令

| ! |                  |
|---|------------------|
| . |                  |
| U |                  |
| R |                  |
| F |                  |
| A |                  |
| D | Down<br>IPV6 ( ) |
| ? |                  |

配置

Ruijie# ping ipv6 fec0::1

38.1.2 ipv6 address

IPV6 配置, no

配置

ipv6 address ipv6-prefix/prefix-length [eui-64]

no ipv6 address [ipv6-prefix/prefix-length] [eui-64]

配置

ipv6-prefix IPV6 配置, RFC2373  
16

prefix-length IPV6 配置 IPV6 配置

| S86    |   | IPv6                                                       |    | [0,64] | [128,128] |
|--------|---|------------------------------------------------------------|----|--------|-----------|
| eui-64 |   | IPv6                                                       |    | 64     | ID        |
| г      | Д |                                                            |    |        |           |
| г      | Д |                                                            |    |        |           |
|        |   | eui-64                                                     | 64 | IPv6   |           |
|        |   | Up                                                         |    |        | Ш         |
|        |   | no ipv6 address                                            |    |        |           |
|        |   | Ш                                                          |    |        |           |
|        |   | no ipv6 address ipv6-prefix/prefix-length eui-64           |    |        |           |
|        |   | ipv6 address ipv6-prefix/prefix-length eui-64              |    |        |           |
|        |   | Ш                                                          |    |        |           |
| г      | Д |                                                            |    |        |           |
|        |   | Ruijie(config-if)# <b>ipv6 address 2001:1::1/64</b>        |    |        |           |
|        |   | Ruijie(config-if)# <b>no ipv6 address 2001:1::1/64</b>     |    |        |           |
|        |   | Ruijie(config-if)# <b>ipv6 address 2002:1::1/64 eui-64</b> |    |        |           |
|        |   | Ruijie(config-if)# <b>no ipv6 address 2002:1::1/64</b>     |    |        |           |
|        |   | Ш                                                          |    |        |           |
|        |   | ipv6 enable                                                |    |        |           |
|        |   | no ipv6 enable                                             |    |        |           |
|        |   | г                                                          | Д  |        |           |
|        |   |                                                            |    | IPv6   | Ш         |
|        |   | г                                                          | Д  |        |           |
|        |   | г                                                          | Д  |        |           |
|        |   |                                                            |    | 2      |           |
|        |   |                                                            |    | ,      |           |
|        |   |                                                            |    |        | IP        |
|        |   |                                                            |    |        | IP        |

IPv6

IPv6

48      MAC      'X'

Г Д

W

Г Д

Г Д

ARP

## IPV6

NDP

W

Reachble

W

```
clear ipv6 neighbors
```

( NDP)

W

```
show ipv6 neighbors
```

W

Г Д

```
Ruijie(config)# ipv6 neighbor 2001::1 vlan 1
00d0.f811.1111
```

Г Д

|                      |  |
|----------------------|--|
|                      |  |
| show ipv6 interface  |  |
| clear ipv6 neighbors |  |

### 38.1.6 ipv6 source-route

IPv6

no

IPv6

9 -

Д

Г

г Д

0

IPv6

0

IPv6 Ш

г Д

Ruijie(config)# no ipv6 source-route

г Д

### 38.1.7 ipv6 route

IPV6

no

Ш

**ipv6 route** *ipv6-prefix/prefix-length* {*ipv6-address* | *interface-id* [*ipv6-address*]}

**no ipv6 route** *ipv6-prefix/prefix-length* {*ipv6-address* | *interface-id* [*ipv6-address*]}

г Д

*ipv6-prefix* IPV6 RFC2373  
*prefix-length* IPV6 'l'

S86

[0,64]

[128,128]Ш

*ipv6-address*

Ш

RFC2373

Ш

Ш

*interface-id*

Ш

Ш

г Д

г Д

,  
 11

11

Г Д

Ruijie(config)# **ipv6 route 2001::/64 vlan 1 2005::1**

Г Д

| show ipv6 route | IPv6 |
|-----------------|------|

### 38.1.8 ipv6 ns-linklocal-src

11

1 no ipv6 ns-linklocal-src 1  
 11

**ipv6 ns-linklocal-src**

**no ipv6 ns-linklocal-src**

Г Д

11

Г Д

Г Д

Г Д

Ruijie(config)# **no ipv6 ns-linklocal-src**

### 38.1.9 ipv6 nd ns-interval

(NS)

no

11

**ipv6 nd ns-interval milliseconds**

**no ipv6 nd ns-interval**

Г Д

milliseconds  
1000-4294672953600000

Г А

(RA) 0( )  
1000ms(1 )

Г А

Г А

(RA)  
Ш Ш

Г А

Ruijie(config-if)# **ipv6 nd ns-interval 2000**

Г А

|                     |  |
|---------------------|--|
|                     |  |
| show ipv6 interface |  |

### 38.1.10 ipv6 nd reachable-time

NDP

no

**ipv6 nd reachable-time** *milliseconds*

**no ipv6 nd reachable-time**

Г А

*milliseconds*  
0-3600000

Г А

(RA) 0( )  
30000ms(30 )

Г А

Г А

4  
 0.5 1.5  
 (RA)  
 0  
 RFC4861  
 0.5 1.5

г д

Ruijie(config-if)# **ipv6 nd reachable-time 10000000**

г д

|                            |  |
|----------------------------|--|
|                            |  |
| <b>show ipv6 interface</b> |  |

### 38.1.11 ipv6 nd prefix

(RA)  
 no  
**ipv6 nd prefix** *ipv6-prefix/prefix-length* | **default** [ [ *valid-lifetime* *preferred-lifetime* ] | [ **at** *valid-date preferred-date* ] | **infinite** | **no-advertise** ] [ **off-link** ] [ **no-autoconfig** ]  
**no ipv6 nd prefix** *ipv6-prefix/prefix-length* | **default** { [ **off-link** ] [ **no-autoconfig** ] | [ **no-advertise** ] }  
 г д  
*ipv6-prefix* IPV6 RFC2373  
*prefix-length* IPV6 '  
*valid-lifetime*  
*preferred-lifetime*  
**at** *valid-date preferred-date*  
 4 4 4 4  
**infinite**  
**default**  
**no-advertise**

**off-link**

IPv6

(on-link)

⏏

on-link

⏏

**no-autoconfig**

r

A

IPv6 address

⏏

:

*valid-lifetime: 2592000 (30 )**preferred-lifetime: 604800 (7 ),*

on-link

r

A

r

A

(RA)

ipv6

address

⏏

**ipv6 nd prefix default**

ipv6 nd prefix default

⏏

⏏

ipv6 nd prefix default

⏏

**at valid-date preferred-date**

2

0⏏

r

A

SVI 1

Ruijie(config)#**interface vlan 1**Ruijie(config-if)# **ipv6 nd prefix 2001::/64 infinite**  
**2592000**

SVI 1

(

)

Ruijie(config)# **interface vlan 1**Ruijie(config-if)# **ipv6 nd prefix default no-autoconfig**

山

г А

|                     |         |
|---------------------|---------|
|                     |         |
| show ipv6 interface | ra-info |

38.1.12 ipv6 nd ra-lifetime

(RA) 1 2

no 山

ipv6 nd ra-lifetime seconds  
no ipv6 nd ra-lifetime

г А

seconds 0-9000山

г А

1800

г А

г А

“ ” (RA) 山  
0 山 0 山  
(RA) (ra-interval)山

г А

Ruijie(config)# interface vlan 1  
Ruijie(config-if)# ipv6 nd ra-lifetime 2000

г А

|                     |         |
|---------------------|---------|
|                     |         |
| show ipv6 interface | ra-info |
| ipv6 nd ra-interval |         |
| ipv6 nd ra-hoplimit |         |
| ipv6 nd ra-mtu      | MTU     |

### **38.1.13    ipv6 nd ra-interval**

(RA)

### **38.1.14    ipv6 nd ra-hoplimit**



```
Ruijie(config)# int vlan 1
Ruijie(config)# ipv6 nd managed-config-flag
```

**r**

**A**



```
show ipv6 interface
```

|                     |  |
|---------------------|--|
|                     |  |
| show ipv6 interface |  |

### 38.1.18 ipv6 nd suppress-ra

(RA) no  
(RA) 山

ipv6 nd suppress-ra

no ipv6 nd suppress-ra

г д

IPv6 山

г д

г д

ipv6 suppress-ra

山

г д

Ruijie(config)# interface vlan 1

Ruijie(config-if)# ipv6 nd suppress-ra

г д

|                     |         |
|---------------------|---------|
|                     |         |
| show ipv6 interface | ra-info |

### 38.1.19 ipv6 redirects

IPv6

ICMPv6

no

ICMPv6

山

ipv6 redirects

no ipv6 redirects

г д

IPv6

ICMPv6

山

Г Д

Г Д

ICMPv6  
100 ICMPv6 (100pps)Ш

Г Д

Ruijie(config)# **interface vlan 1**  
Ruijie(config-if)# **ipv6 redirects**

Г Д

|                     |  |
|---------------------|--|
|                     |  |
| show ipv6 interface |  |

### 38.1.20 clear ipv6 neighbors

Ш

**clear ipv6 neighbors**

Г Д

Г Д

RDP

Ш

Г Д

Ruijie# **clear ipv6 neighbors**

Г Д

|                     |  |
|---------------------|--|
|                     |  |
| ipv6 neighbor       |  |
| show ipv6 neighbors |  |

### 38.1.21 tunnel mode ipv6ip

IPv6 Ш , no

**tunnel mode ipv6ip [6to4 | isatap]**

**no tunnel mode**

**r      A**

**6to4**

6to4

**isatap**

ISATAP

**r      A**

IPv6

Ш

**r      A**

**r      A**

|

r

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Г Д

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Г Д

Г Д

Ч

Ш

(6to4 isatap)

Ш

Г Д

IPv6 :

Ruijie(config)# **interface tunnel**

W

W

IPv4 , ( 6to4 isatap)

4

W

W

IPv6

```
Ruijie(config)# interface tunnel 1
Ruijie(config-if)# tunnel mode ipv6ip
Ruijie(config-if)# tunnel source vlan 1
Ruijie(config-if)# tunnel destination 192.168.5.1
```

Г Д

|                           |     |
|---------------------------|-----|
|                           |     |
| <b>tunnel mode</b>        |     |
| <b>tunnel destination</b> |     |
| <b>tunnel ttl</b>         | TTL |

| IPv6 | IPv4 | TTL | no |
|------|------|-----|----|
| 128  | 32   | 64  | 64 |

no tunnel ttl

Г Д

*value* TTL

Г Д

128Ш

Г Д

Г Д

IPv6

IPv4

TTL Ш

Г Д

Ruijie(config)# **interface tunnel 1**

Ruijie(config-if)# **tunnel ttl 64**

Г Д

| <b>tunnel mode</b>        |  |
|---------------------------|--|
| <b>tunnel source</b>      |  |
| <b>tunnel destination</b> |  |

## 38.2

### 38.2.1 show ipv6 route

IPV6 Ш

**show ipv6 route [static**



Г Д

```
Ruijie# show ipv6 route
Codes: C - Connected, L - Local, S - Static, R - RIP,
B - BGP
 I1 - ISIS L1, I2 - ISIS L2, IA - IIS interarea
L ::1/128
 via ::1, loopback 0
C fa::/64
 via ::, vlan 1
L fa::1/128
 via ::, loopback 0
C 2001::/64
 via ::, vlan 2
L 2001::1/128
 via ::, loopback 0
L fe80::/10
 via ::1, Null0
C fe80::/64
 via ::, vlan 1
```

r A

SVI 1

Ruijie# show ipv6 neighbors vlan 1

```
IPv6 Address Linklayer Addr Interface
fa::1 00d0.0000.0002 vlan 1
fe80::200:ff:fe00:2 00d0.0000.0002 vlan 1
```

Ruijie# show ipv6 neighbors verbose

```
IPv6 Address Linklayer Addr Interface
2001::1 00d0.f800.0001 vlan 1
 State: Reach/H Age: - asked: 0
fe80::200:ff:fe00:1 00d0.f800.0001 vlan 1
 State: Reach/H Age: - asked: 0
```

| IPv6 Address   | IPV6                                                                                                                                                                                                                                                                                                             |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Linklayer Addr | Mac<br>incomplete                                                                                                                                                                                                                                                                                                |
| Interface      |                                                                                                                                                                                                                                                                                                                  |
| State          | : state/H(R)<br>STATE :<br>INCOMP( Incomplete)—<br>(NS)<br>(NA).<br>REACH(Reachable) —<br><br>STALE—<br><br>NUD(Neighbor<br>Unreachability Detection)III<br>DELAY— STALE<br>STALE DELAY<br>DELAY_FIRST_PROBE_TIME seconds(5 )<br><br>DELAY PROBE<br>(NS) NUD.<br>PROBE— NUD<br>RetransTimer milliseconds<br>(NS) |

Ш



```
INET6: 2001::1 , subnet is 2001::/64 [TENTATIVE]
Joined group address(es):
ff01:1::1
ff02:1::1
ff02:1::2
ff02:1::1:ff00:1
MTU is 1500 bytes
ICMP error messages limited to one every 10 milliseconds
ICMP redirects are enabled
ND DAD is enabled, number of DAD attempts: 1
ND reachable time is 30000 milliseconds
ND advertised reachable time is 0 milliseconds
ND retransmit interval is 1000 milliseconds
ND advertised retransmit interval is 0 milliseconds
ND router advertisements are sent every 200
seconds<240--160>
ND router advertisements live for 1800 seconds

 INET6: 2001::1 , subnet is 2001::/64
[TENTATIVE]
```

ND advertised reachable time is 0 milliseconds  
 ND advertised retransmit time is 0 milliseconds  
 ND advertised CurHopLimit is 64  
 Prefixes: (total: 1)  
 fec0:1:1:1::/64(Def,Auto,vltime: 2592000, pltime:  
 604800, flags: LA)

**ra-info**

| RA timer is stopped (on) |                                      |
|--------------------------|--------------------------------------|
| waits                    |                                      |
| initcount                | RA                                   |
| RA(out/in/inconsistent)  | out:<br><br>in:<br><br>inconsistent: |
| RS(input)                |                                      |
| Link-layer address       |                                      |
| Physical MTU             | MTU                                  |
| !M   M                   | !M<br>managed-config-flag<br><br>M:  |
| !O   O                   | !O<br>other-config-flag<br>O:        |

**ra-info** (Prefix)

| total           |  |
|-----------------|--|
| fec0:1:1:1::/64 |  |

|            |                    |
|------------|--------------------|
| Def        |                    |
| Auto   CFG | Auto<br>IPV6 , CFG |
| !Adv       |                    |
| vltime     | ( )                |
| pltime     | ( )                |
| L   !L     | L on-link<br>!L    |
| A   !A     | A auto-config , !A |

## 39 OSPFv3

### 39.1

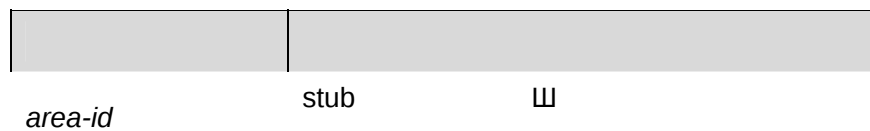
#### 39.1.1 area default-cost

stub ABR no stub NSSA  
 ❸ ❸

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

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

r A





```

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

```

г А

| area-id    | stub NSSA IPv6                |
|------------|-------------------------------|
| no-summary | stub ABR 3 LSA ABR stub 3 LSA |

г А

Stub

г А

OSPFv3

г А

```

no area area-id stub
no area area-id ()
stub ABR 3 LSA
stub NSSA ABR no-su
mmmary 3 LSA NSSA

```

г А

```

Stub 10 ABR Stub
ipv6 router ospf 1
area 10 stub
area 10 stub no-summary

```

г А

| area default-cost   | Stub   |
|---------------------|--------|
| show ipv6 ospf area | OSPFv3 |

### 39.1.4 area virtual-link

no

山

```

o stub NSSA 1
o hello-interval 4 dead-interval
instance 1
o no area area-id ()1

```

---

Г Д

```

ipv6 router ospf 1
area 1 virtual-link 192.1.1.1

```

Г Д

| show ipv6 ospf               | OSPFv3 1 |
|------------------------------|----------|
| show ipv6 ospf neighbor      | OSPFv3 1 |
| show ipv6 ospf virtual-links | OSPFv3 1 |

### 39.1.5 auto-cost

OSPF

no  
1

```

auto-cost [reference-bandwidth ref-bw]
no auto-cost [reference-bandwidth]

```

Г Д

| reference-bandwidth<br>ref-bw | Mbps 1<br>1-4294967 100Mbps1 |
|-------------------------------|------------------------------|

Г Д

100Mbps1

Г Д

OSPFv3 1

Г Д

no auto-cost reference-bandwidth 1

**ipv6 ospf cost**

10M

10M

10M

```

ipv6 router ospf 1
auto-cost reference-bandwidth 5

```

10M

|                |            |
|----------------|------------|
|                |            |
| ipv6 ospf cost | 10M        |
| show ipv6 ospf | OSPFv3 10M |

**39.1.6 clear ipv6 ospf process**

OSPF 10M

**clear ipv6 ospf {process | process-id}**

10M

|            |                |
|------------|----------------|
|            |                |
| process-id | ospf <1-65535> |

10M

10M

10M

10M

10M

ospf

```

en
clear ipv6 ospf process

```

**39.1.7 default-information originate**

OSPF

**default-information originate** 10M **no** 10M

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

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

**r**      **A**

| <b>always</b>               | OSPF<br>1 |
|-----------------------------|-----------|
| <b>metric</b> <i>metric</i> | 1         |

OSPF

**metric-type** *type*

Г Д

default-information originate always

Г Д

| redistribute            | Ш        |
|-------------------------|----------|
| show ipv6 ospf          | OSPFv3 Ш |
| show ipv6 ospf database | OSPFv3 Ш |

### 39.1.8 default-metric

no

Ш

**default-metric** *metric-value*

**no default-metric**

Г Д

| <i>metric-value</i> | Ш<br>1-16777214 20Ш |
|---------------------|---------------------|

Г Д

20

Г Д

OSPFv3 Ш

Г Д

**redistribute**

Ш

1. **default-information originate**

2. 20 Ш

Г Д

metric 10

default-metric 10

Г Д

|                       |          |
|-----------------------|----------|
|                       |          |
| <b>redistribute</b>   | Ш        |
| <b>show ipv6 ospf</b> | OSPFv3 Ш |

### 39.1.9 ipv6 ospf area

OSPFv3

no

Ш

**ipv6 ospf** *process-id* **area** *area-id* [**instance** *instance-id*]

**no ipv6 ospf** *process-id* **area** [**instance** *instance-id*]

Г Д

|                                    |                    |
|------------------------------------|--------------------|
|                                    |                    |
| <i>process-id</i>                  | ospf               |
| <b>area</b> <i>area-id</i>         | OSPFv3 Ш<br>IPv6 Ш |
| <b>instance</b> <i>instance-id</i> | OSPFv3             |

Г Д

Ш

Г Д

Ш

Г Д

OSPFv3

ipv6

**router ospf** OSPFv3 OSPFv3 Ш

**no ipv6 ospf area** OSPFv3 Ш

**no ipv6 router ospf** OSPFv3 Ш

*instance-id* Ш

OSPFv3 Ш

Г Д

int fastethernet 0/0 OSPFv3

int fastethernet 0/0

ipv6 ospf 1 area 2 instance 2



### 39.1.11 ipv6 ospf dead-interval

hello no

ipv6 ospf dead-interval *seconds* [**instance** *instance-id*]

no ipv6 ospf dead-interval [**instance** *instance-id*]

г А

| <i>seconds</i>                     | 1-65535( ) |
|------------------------------------|------------|
| <b>instance</b> <i>instance-id</i> | OSPFv3     |

г А

ip ospf hello-interval 4

г А

г А

hello 4 hello

- hello
- 

г А

60s

ipv6 ospf dead-interval 60

г А

| ipv6 ospf hello-interval           | Hello  |
|------------------------------------|--------|
| show ipv6 ospf interface           | OSPFv3 |
| <b>instance</b> <i>instance-id</i> | OSPFv3 |

### 39.1.12 ipv6 ospf hello-interval





Г Д

Ш

Г Д

Г Д

Ш

Г Д

OSPFv3

ipv6 ospf network point-to-point

Г Д

| ipv6 ospf priority          | Ш        |
|-----------------------------|----------|
| show ipv6 ospf interface    | OSPFv3 Ш |
| instance <i>instance-id</i> | OSPFv3   |

### 39.1.15 ipv6 ospf priority

no

Ш

ipv6 ospf priority

```

 DR/BDR(/)
DR/BDR Router-ID DR BDR
DR BDR
DR/BDR
DR BDR
DR BDR
r A
DR/BDR DR BDR
ipv6 ospf priority 0

```

r A

| <b>ipv6 ospf network</b>           |        |
|------------------------------------|--------|
| <b>router-id</b>                   |        |
| <b>show ipv6 ospf interface</b>    | OSPFv3 |
| <b>instance</b> <i>instance-id</i> | OSPFv3 |

### 39.1.16 ipv6 ospf retransmit-interval

```

LSA no
no
ipv6 ospf retransmit-interval seconds [instance instance-id]
no ipv6 ospf retransmit-interval [instance instance-id]

```

LSA  
LSA  
10s  
ipv6 ospf retransmit-interval 10

|                          |        |
|--------------------------|--------|
| show ipv6 ospf interface | OSPFv3 |
| instance instance-id     | OSPFv3 |

39.1.17 ipv6 ospf transmit-delay

no  
seconds [instance instance-id]  
no ipv6 ospf transmit-delay [instance instance-id]

|                      |                   |
|----------------------|-------------------|
| seconds              | LSA<br>1-65535( ) |
| instance instance-id | OSPFv3<br>0-255.  |

1  
LSA  
LSA  
LSA  
ipv6 ospf transmit-delay 2

Г Д

|                          |          |
|--------------------------|----------|
|                          |          |
| show ipv6 ospf interface | OSPFv3 Ш |

### 39.1.18 ipv6 router ospf

OSPFv3

no

OSPFv3

Ш

ipv6 router ospf *process-id*

no ipv6 router ospf *process-id*

Г Д

|                   |      |
|-------------------|------|
|                   |      |
| <i>process-id</i> | OSPF |

Г Д

OSPFv3

Ш

Г Д

Ш

Г Д

OSPFv3

OSPFv3

Ш

Г Д

OSPFv3

ipv6 router ospf 1

Г Д

|                |          |
|----------------|----------|
|                |          |
| ipv6 ospf area | OSPFv3 Ш |
| show ipv6 ospf | OSPFv3 Ш |

### 39.1.19 log-adj-changes

no default

Ш

log-adj-changes [detail]

**no log-adj-changes [detail]**

Г А

|               |  |
|---------------|--|
|               |  |
| <b>detail</b> |  |

Г А

FULL

Г А

Ш

Г А

Ш

Ruijie(config)# **router ospf 1**

Ruijie(config-router)# **log-adj-changes detail**

Г А

|                       |        |
|-----------------------|--------|
|                       |        |
| <b>show ipv6 ospf</b> | ospf Ш |

**39.1.20 max-concurrent-dd**

DD

Ш

**max-concurrent-dd** *number*

**no max-concurrent-dd**

Г А

|               |            |
|---------------|------------|
|               |            |
| <i>number</i> | , 1-65535. |

Г А

Г А

OSPFv3

Ш

Г А

```

max-concurrent-dd 4 4
DD
router ipv6 ospf 1
max-concurrent-dd 4

```

### 39.1.21 passive-interface

**no** ▮

**passive-interface** {**default** | *interface-type interface-number* }  
**no passive-interface** {**default** | *interface-type interface-number* }

Г Д

| <i>default</i>                                   | ▮ |
|--------------------------------------------------|---|
| <i>interface-type</i><br><i>interface-number</i> | ▮ |

Г Д

▮

Г Д

OSPFv3 ▮

Г Д

hello ▮

OSPF ▮

Г Д

VLAN1 OSPFv3

```

passive-interface default
no passive-interface vlan 1

```

Г Д

| <b>ipv6 ospf area</b>          | OSPFv3 ▮ |
|--------------------------------|----------|
| <b>show ipv6 ospf</b>          | OSPFv3 ▮ |
| <b>show ipv6 ospf neighbor</b> | OSPFv3 ▮ |

## 39.1.22 redistribute

OSPFv3                      **no**  
                                 **no**

**redistribute** *protocol* [**metric** *metric-value*] [**metric-type**  
*type-value*][**route-map** *map-tag*] [**match** [**internal** | [**external** |  
**nssa-external**

```

OSPF
 match
OSPF
 route-map
 match
 tag metric metric-type
route-map
 set
metric 20
set metric 30
route-map test
match
redistribute connect metric 10 route-map test
metric 20
metric 30

```

г д

| default-information originate | Ш        |
|-------------------------------|----------|
| default-metric                | Ш        |
| summary-prefix                | Ш        |
| show ipv6 ospf                | OSPFv3 Ш |
| show ipv6 ospf database       | OSPFv3 Ш |

### 39.1.23 router-id

```

(Router ID)
no
Router ID
Router ID Ш
router-id router-id
no router-id

```

г д

| router-id | Ш IPv4 Ш |
|-----------|----------|

г д

Ш

г д

OSPFv3 Ш

Г

Д

OSPFv3

Г Д

```
spf-delay 5
spf-holdtime 10
```

Г Д

```
OSPFv3 Ш
```

Г Д

```
spf-delay spf-holdtime OSPF Ш
```

Г Д

```
timers spf 2 4
```

Г Д

| <b>clear ipv6 ospf</b> | OSPFv3 Ш |
|------------------------|----------|
| <b>show ipv6 ospf</b>  | OSPFv3 Ш |

## 39.2

### 39.2.1 show ipv6 ospf

```
OSPFv3 Ш
```

```
show ipv6 ospf [process-id]
```

Г Д

| <i>process- id</i> | ospf , 1-65535. |
|--------------------|-----------------|

Г Д

```
Ш
```

Г Д

```
OSPFv3
```

```
Ruijie# show ipv6 ospf
Routing Process "OSPFv3 (1)" with ID 1.1.1.1
Process uptime is 24 minutes
SPF schedule delay 5 secs, Hold time between SPFs 10 secs
```

```

Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum Sum 0x0000
Number of AS-Scoped Unknown LSA 0
Number of LSA originated 11
Number of LSA received 4
Log Neighbor Adjacency Changes : Enabled
Number of areas in this router is 2
Area BACKBONE(0)
Number of interfaces in this area is 1(1)
SPF algorithm executed 4 times
Number of LSA 3. Checksum Sum 0x1DDF1
Number of Unknown LSA 0

```

```

OSPFv3 BFD , "BFD is enabled",

```

```

Ruijie# show ipv6 ospf

```

```

Routing Process "OSPFv3 (1)" with ID 1.1.1.1
Process uptime is 24 minutes
SPF schedule delay 5 secs, Hold time between SPFs 10 secs
Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum Sum 0x0000
Number of AS-Scoped Unknown LSA 0
Number of LSA originated 11
Number of LSA received 4
Log Neighbor Adjacency Changes : Enabled
Number of areas in this router is 2
BFD is enabled
Area BACKBONE(0)
Number of interfaces in this area is 1(1)
SPF algorithm executed 4 times
Number of LSA 3. Checksum Sum 0

```

r      A

| ipv6 router ospf              | OSPFv3      山 |
|-------------------------------|---------------|
| default-information originate | 山             |

|                       |                      |   |
|-----------------------|----------------------|---|
| <b>default-metric</b> |                      | ⏏ |
| <i>router-id</i>      | OSPFv3               | ⏏ |
| <b>timers spf</b>     | OSPFv3<br>SPF<br>SPF | ⏏ |

### 39.2.2 show ipv6 ospf database

OSPFv3 ⏏

**show ipv6 ospf [**

```

Router-LSA (Area 0.0.0.0)
Link State ID ADV Router Age Seq# CkSum
Link
0.0.0.0 1.1.1.1 17 0x800000006 0x62a1 1
0.0.0.0 2.2.2.2 156 0x800000003 0x8653
1
Network-LSA (Area 0.0.0.0)
Link State ID ADV Router Age Seq# CkSum
0.0.0.5 2.2.2.2 157 0x800000001 0xf8f6
Router-LSA (Area 0.0.0.1)
Link State ID ADV Router Age Seq# CkSum
Link
0.0.0.0 1.1.1.1 17 0x800000002 0x0529
0
Inter-Area-Prefix-LSA (Area 0.0.0.1)

Link State ID ADV Router Age Seq# CkSum
0.0.0.1 1.1.1.1 77 0x800000002 0x83b4

AS-external-LSA

Link State ID ADV Router Age Seq# CkSum
0.0.0.1 1.1.1.1 1 0x800000001 0x6035 E2

```

Г А

|                  |          |
|------------------|----------|
|                  |          |
| ipv6 router ospf | OSPFv3 Ш |

### 39.2.3 show ipv6 ospf interface

OSPFv3 Ш

**show ipv6 ospf interface** [*interface-type interface-number*]

Г А

|                       |  |
|-----------------------|--|
|                       |  |
| <i>interface-type</i> |  |

```
Ruijie# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0

 BFD | BFD
enabled
```

```
Ruijie# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1 BFD enabled
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured, Hello 10, Dead 40, Wait
40, Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0
```

|  |  |
|--|--|
|  |  |
|--|--|

```

Database Summary List 0
Link State Request List 0
Link State Retransmission List 0

 BFD
| BFD session state up |
Ruijie# show ipv6 ospf neighbor detail
Neighbor 2.2.2.2, interface address
fe80::c800:eff:fe84:1c
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 6 state changes
DR is 2.2.2.2 BDR is 1.1.1.1
Options is 0x000013 (-|R|-|-|E|V6)
Dead timer due in 00:00:36
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
BFD session state up

```

r      A

| ipv6 router ospf         | OSPFv3      Ⅲ |
|--------------------------|---------------|
| ipv6 ospf area           | OSPFv3      Ⅲ |
| area virtual-link        | OSPFv3      Ⅲ |
| show ipv6 ospf interface | OSPFv3      Ⅲ |

### 39.2.5 show ipv6 ospf route

OSPFv3      Ⅲ

**show ipv6 ospf [process- id] route[count]**

r      A

| process- id | OSPFv3      , 1-65535. |
|-------------|------------------------|
| count       | OSPFv3                 |

r      A

Ⅲ

Г Д

## OSPF

```
Ruijie# show ipv6 ospf route
OSPFv3 Process (1)
Codes: C - connected, D - Discard, O - OSPF, IA - OSPF
inter area, E1 - OSPF external type 1, E2 - OSPF external
type 2
Destination Metric
Next-hop
E2 2222::/64 1/20
via fe80::c800:eff:fe84:1c, FastEthernet 1/0
O 3333::/64 11
via fe80::c800:eff:fe84:1c, FastEthernet 1/0, Area
0.0.0.0
```

Г Д

| ipv6 router ospf | OSPFv3 Ш |
|------------------|----------|

## 39.2.6 show ipv6 ospf topology

OSPFv3 Ш

**show ipv6 ospf** [*process- id*] **topology** [*area area-id*]

Г Д

| <i>process- id</i> | OSPFv3 , 1-65535. |
|--------------------|-------------------|
| <i>area-id</i>     |                   |

Г Д

Ш

Г Д

## OSPFv3

```
Ruijie# show ipv6 ospf topology
OSPFv3 Process (1)
OSPFv3 paths to Area (0.0.0.0) routers
Router ID Bits Metric Next-Hop
Interface
1.1.1.1 EB --
```

```

2.2.2.2 E 1 2.2.2.2
FastEthernet 1/0

```

```

OSPFv3 paths to Area (0.0.0.1) routers
Router ID Bits Metric Next-Hop
Interface
1.1.1.1 B --

```

```

r A

```

| ipv6 router ospf | OSPFv3    ▯ |
|------------------|-------------|
| area range       | OSPF        |

### 39.2.7 show ipv6 ospf virtual-links

```

OSPFv3 ▯

```

```
show ipv6 ospf [process- id] virtual-links

```

```

r A

```

| process- id | OSPFv3    , 1-65535. |
|-------------|----------------------|

```

r A

```

```

▯

```

```

r A

```

```

OSPFv3

```

```

Ruijie# show ipv6 ospf virtual-links
Virtual Link VLINK1 to router 2.2.2.2 is down
Transit area 0.0.0.1 via interface FastEthernet 1/0,
instance ID 0
Local address *
Remote address 3333::1/128
Transmit Delay is 1 sec, State Down,
Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
Hello due in inactive
Adjacency state Down

```

```

r A

```

| <b>ipv6 router ospf</b>        | OSPFv3 | Ⅲ |
|--------------------------------|--------|---|
| <b>area virtual-link</b>       | OSPFv3 | Ⅲ |
| <b>show ipv6 ospf neighbor</b> | OSPFv3 | Ⅲ |

# 40 IGMP

## 40.1 IGMP

- clear ip igmp group
- clear ip igmp interface
- ip igmp access-group
- ip igmp join-group
- ip igmp static-group
- ip igmp immediate-leave group-list
- ip igmp last-member-query-count
-

**clear ip igmp group***[group-address | interface-type interface-number]*

**Г**      **Д**

|  |  |
|--|--|
|  |  |
|  |  |

*group-address*



## 40.1.4 ip igmp join-group

no

Ш

Г      А

**ip igmp join-group** *group-address***no ip igmp join-group** *group-address*

Г      А



|                      |  |
|----------------------|--|
| <i>group-address</i> |  |
|----------------------|--|

Г А

Г А

Г А

Ш

Г А

Eth0 236.6.6.6Ш

Ruijie# **configure terminal**

Ruijie(config)# **interface ethernet 0**

Ruijie(config-if)# **ip igmp static-group 236.6.6.6**

Ruijie(config-if)# **exit**

#### 40.1.6 ip igmp immediate-leave group-list

IGMPversion2 IGMPversion3

Ш

Ш

no

Ш

Г А

**ip igmp immediate-leave group-list *access-list***

**no ip igmp immediate-leave group-list**

Г А

|                    |  |
|--------------------|--|
|                    |  |
| <i>access-list</i> |  |

Г А

Г А

Г А

Downloaded from <http://ajph.org/> on November 10, 2014

Г Д

#### 40.1.7 ip igmp last-member-query-count

Г Д

Г Д

Г Д

Г Д

Г Д

13.

ip igmp immediate-leave

40.1.9 ip igmp limit ( )

igmp states Ш no

Ш

Г Д

ip igmp limit number except access-list]

no ip igmp limit

Г Д

|             |             |       |
|-------------|-------------|-------|
|             |             |       |
| number      | IGMP        | Ш     |
| except      | access-list | limit |
| access-list |             |       |

no

Г Д

**ip igmp query-interval** *seconds*

**no ip igmp query-interval**

Г Д

| <i>seconds</i> | Ш s 1 18000 |
|----------------|-------------|

Г Д

125 Ш

Г Д

Г Д

Ш

Г Д

Ethernet 0

120sШ

Ruijie(config-if)# **ip igmp query-interval 120**

Ethernet 0

Ш

Ruijie(config-if)# **no ip igmp query-interval**

#### 40.1.11 ip igmp query-max-response-time

no

Ш

Г Д

**ip igmp query-max-response-time** *seconds*

**no ip igmp query-max-response-time**

Г Д

| <i>seconds</i> | s 1 25 |
|----------------|--------|

Г Д

10sШ

Г Д

Г Д

IGMPv2 Ш Ш

Г Д

Ethernet 0 20s Ш

Ruijie(config-if)# **ip igmp query-max-response-time 20**

Ethernet 0 Ш

Ruijie(config-if)# **no ip igmp query-max-response-time**

## 40.1.12 ip igmp query-timeout

no

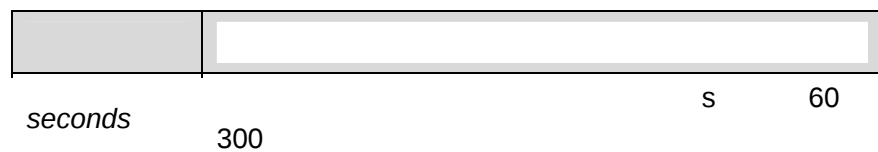
Ш

Г Д

**ip igmp query-timeout** *seconds*

**no ip igmp query-timeout**

Г Д



Ethernet 0

Ш

```
Ruijie(config-if)# no ip igmp query-timeout
```

### 40.1.13 ip igmp robustness-variable

no Ш

Г Д

```
ip igmp robustness-variable number
```

```
no ip igmp robustness-variable
```

Г Д

|               |         |
|---------------|---------|
|               |         |
| <i>number</i> | Ы12-7 Ъ |

Г Д

2

Г Д

Ш

Г Д

3

```
Ruijie# configure terminal
```

```
Ruijie(config)# interface ethernet 0
```

```
Ruijie(config-if)# ip igmp robustness-variable 3
```

### 40.1.14 ip igmp version

IGMP

Ш

no Ш

Г Д

```
ip igmp version {1 | 2 | 3}
```

```
no ip igmp version
```

Г Д

|  |  |
|--|--|
|  |  |
|--|--|

{1 | 2 | 3}

&lt;1-3&gt;

Г Д

2.

Г Д

Г Д

igmp

igmp

Ш

Г Д

2

```
Ruijie# configure terminal
```

```
Ruijie(config)# interface ethernet 0
```

```
Ruijie(config-if)# ip igmp version 2
```

#### 40.1.15 ip igmp limit ( )

igmp

Ш

no Ш

Г Д

```
ip igmp limit number [except access-list]
```

```
no ip igmp limit number [except access-list]
```

IGMP  
IGMP

Ш

Ш

Г Д

300

Ruijie config # **ip igmp limit 300**

#### 40.1.16 ip igmp proxy-service

mroute-proxy Ш  
mroute-proxy  
Ш

**ip igmp proxy-service**

**no ip igmp proxy-service**

Г Д

proxy-service

Г Д

Г Д

proxy-service 255 Ш 32 Ш  
proxy-service Ш  
proxy-service Ш mroute-proxy  
Ш proxy-service  
switchport Ш **ip igmp**  
**mroute-proxy interface** Ш

Г Д

proxy-service

Ruijie(config-if)# **ip igmp proxy-service**

#### 40.1.17 ip igmp mroute-proxy

Ш

```
ip igmp mroute-proxy interfname
```

```
no ip igmp mroute-proxy
```

```
└─┬─┐
 │ 4
```

| <i>interfname</i> |  |
|-------------------|--|

```
└─┬─┐
 │ 4
```

```
└─┬─┐
 │ 4
```

```
└─┬─┐
 │ 4
```

```

 proxy-service
 ┌─┐
gmp └─┘
```

```
└─┬─┐
 │ 4
```

```
 mroute-proxy
```

```
Ruijie(config-if)# ip igmp mroute-proxy fa 0/1
```

#### 40.1.18 ip igmp ssm-map enable

```
 igmp ssm-map
```

```
ip igmp ssm-map enable
```

```
no ip igmp ssm-map enable
```

```
└─┬─┐
 │ 4
```

```
 ┌─┐
```

```
└─┬─┐
 │ 4
```

```
└─┬─┐
 │ 4
```

```
 ┌─┐ ip igmp ssm-map static ┌─┐
```

```
└─┬─┐
 │ 4
```

```
 igmp ssm-map ┌─┐
```

```
Ruijie(config)# ip igmp ssm-map enable
```

### 40.1.19 ip igmp ssm-map static

ssm-map

**ip igmp ssm-map static** *access-list a.b.c.d*

**no ip igmp ssm-map static** *access-list a.b.c.d*

Г Д

| <i>access-list</i> | Acl <1-99>  <1300-1999>  WORD |
|--------------------|-------------------------------|
| <i>a.b.c.d</i>     |                               |

Г Д

Г Д

Г Д

**ip igmp ssm-map enable**

v3

Ш

Г Д

ACL 11 192.168.2.2,

Ruijie(config)# **ip igmp ssm-map static 11 192.168.2.2.**

### 40.1.20 show ip igmp groups

IGMP

Ш

Г Д

**show ip igmp groups** [*group-address* | *interface-type*  
*interface-number*] [*detail*]

Г Д

| <i>group-address</i>  | 32 IP D 8 |
|-----------------------|-----------|
| <i>interface-type</i> |           |

|                         |  |
|-------------------------|--|
| <i>interface-number</i> |  |
| <i>detail</i>           |  |
|                         |  |

г А

г А

Ш

г А

Ч

Ш

Ш

г А

Ruijie# **show ip igmp groups**

IGMP Connected Group Membership

| Group Address   | Interface | Uptime   | Expires  | Last Reporter |
|-----------------|-----------|----------|----------|---------------|
| 224.0.1.1       | eth2      | 00:00:09 | 00:04:17 | 10.10.0.82    |
| 224.0.1.24      | eth2      | 00:00:06 | 00:04:14 | 10.10.0.84    |
| 224.0.1.40      | eth2      | 00:00:09 | 00:04:15 | 10.10.0.91    |
| 224.0.1.60      | eth2      | 00:00:05 | 00:04:15 | 10.10.0.7     |
| 239.255.255.250 | eth2      | 00:00:12 | 00:04:15 | 10.10.0.228   |
| 239.255.255.254 | eth2      | 00:00:08 | 00:04:13 | 10.10.0.84    |

Ruijie# **show ip igmp groups 224.1.1.1 detail**

Interface: eth1

Group: 224.1.1.1

Uptime: 00:00:42

Group mode: Include

Last reporter: 192.168.50.111

TIB-A Count: 2

TIB-B Count: 0

Group source list: (R - Remote, M - SSM Mapping)

Source Address Uptime v3 Exp Fwd Flags

192.168.55.55 00:00:42 00:03:38 Yes R

192.168.55.66 00:00:42 00:03:38 Yes R

## 40.1.21 show ip igmp interface

Ш

Г А

**show ip igmp interface** [*interface-type interface-number*]

Г А

| <i>interface-type</i>   |  |
|-------------------------|--|
| <i>interface-number</i> |  |
|                         |  |

Г А

Г А

Г А

```
Ruijie# show ip igmp interface
Interface vlan 1(Index 4294967295)
IGMP Active, Non-Querier, Version 3 (default)
IGMP querying router is 0.0.0.0
IGMP query interval is 125 seconds
IGMP querier timeout is 255 seconds
IGMP max query response time is 10 seconds
Last member query response interval is 1000 milliseconds
Group Membership interval is 260 seconds
IGMP Snooping is globally enabled
IGMP Snooping is enabled on this interface
IGMP Snooping fast-leave is not enabled
IGMP Snooping querier is not enabled
IGMP Snooping report suppression is enabled
```

#### 40.1.22 show ip igmp ssm-mapping

IGMP ssm-map

**show ip igmp ssm-mapping** [*A.B.C.D*]

Г А

| <i>A.B.C.D</i> |  |
|----------------|--|

Г А

IGMP ssm-map Ш

Г А

Г А

Ш

Г А

ssm-map

Ruijie# **sh ip igmp ssm-mapping**

SSM Mapping : Enabled

Database : Static mappings configured

233.3.3.3

Ruijie#**show ip igmp ssm-mapping 233.3.3.3**

Group address: 233.3.3.3

Database : Static

Source list : 192.3.3.3

: 3.3.3.3

# 41 PIM-DM

## 41.1 PIM-DM

PIM-DM

- **ip pim dense-mode**
- **ip pim neighbor-filter**
- **ip pim query-interval**
- **ip pim state-refresh disable**
- **ip pim state-refresh origination-interval**
- **show ip pim dense-mode interface**
- **show ip pim dense-mode neighbor**
- **show ip pim dense-mode nexthop**
- **show ip pim dense-mode mroute**

### 41.1.1 ip pim dense-mode

```
no ip pim dense-mode PIM-DM ip pim dense-mode 3
PIM-DM 3
ip pim dense-mode
no ip pim dense-mode

r A
3
r A
PIM-DM 3
r A

r A

Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/1
Ruijie(config-if)# ip pim dense-mode
```

&

```
Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/1
Ruijie(config-if)# ip pim neighbor-filter 14
```

&

**ip pim neighbor-filter**

1. ACL ACL PIM PIM

2. ACL peering PIM PIM

### 41.1.3 ip pim query-interval

hello interval                      N                      í



**ip pim state-refresh origination-interval** *interval-seconds*

**no ip pim state-refresh origination-interval**

Г Д

| <i>interval-seconds</i> | <1-100> Ш |
|-------------------------|-----------|

Г Д

60 Ш

Г Д

Г Д

```
Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/1
Ruijie(config-if)# ip pim state-refresh
origination-interval 65
```

### 41.1.6 show ip pim dense-mode interface

PIM-DM **show ip pim dense-mode**  
**interface** Ш

**show ip pim dense-mode interface** [ *interface-type*  
*interface-number* ] [ *detail* ]

Г Д

| <i>interface-type</i><br><i>interface-number</i> |  |
|--------------------------------------------------|--|
| <i>detail</i>                                    |  |

Г Д

/ /

Г Д

**show ip pim dense-mode interface**

```
Ruijie# show ip pim dense-mode interface
Address Interface VIFIndex Ver/ Nbr
 Mode Count
10.10.10.10 FastEthernet 0/45 3 v2/D 1
```

---

50.50.50.50    VLAN 4                      2        v2/D        1

| Address   | PIM-DM            IP |
|-----------|----------------------|
| Interface | PIM-DM               |
| VIF Index | VIF            ID    |
| Ver/Mode  | PIM        /         |
| Nbr Count | PIM-DM               |

|                  |     |
|------------------|-----|
|                  |     |
| Neighbor-Address |     |
| Interface        |     |
| Uptime/Expires   |     |
| Ver              | PIM |

41.1.8 show ip pim dense-mode nexthop

```
PIM-DM show ip pim dense-mode nexthop
┌───┴───┐
show ip pim dense-mode nexthop

r d

r d
 / /

r d
```

```
PIM-DM
Ruijie# show ip pim dense-mode nexthop
Destination Nexthop Nexthop Nexthop Metric Pref
 Num Addr Interface
1.1.1.111 1 50.50.50.1 VLAN 4 0 1
```

|              |  |
|--------------|--|
|              |  |
| Destination  |  |
| Nexthop Num  |  |
| Nexthop Addr |  |

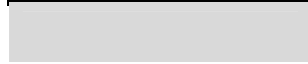
Nexthop Interface p4 Tc 10.5 0 0 10.5 180.6 268.8803

PIM-DM  
Ш

**show ip pim dense-mode mroute**

**show ip pim dense-mode mroute** [ *A.B.C.D A.B.C.D* ] [ *summary* ]

Г      Д



## 42 PIM-SM

### 42.1 PIM-SM

#### PIM-SM

- **clear ip mroute**
- **clear ip mroute statistics**
- **clear ip pim sparse-mode bsr rp-set**
- **ip multicast-routing**
- **ip pim accept-register list**
- **ip pim bsr-candidate**
- **ip pim cisco-register-checksum**
- **ip pim dr-priority**
- **ip pim ignore-rp-set-priority**
- **ip pim jp-timer**
- **ip pim mib**
- **ip pim neighbor-filter**
- **ip pim query-interval**
- **ip pim register-rate-limit**
- **ip pim register-rp-reachability**
- **ip pim register-source**
- **ip pim register-suppression**
- **ip pim rp-address**
- **ip pim rp-candidate**
- **ip pim rp-1 Tf-0.E0t**
- **ip pim sparse-mode**
- **ip pim spt-threshold**
- **ip pim ssm**
- **show debugging**
- **show ip pim sparse-mode bsr-router**

- **show ip pim sparse-mode interface**
- **show ip pim sparse-mode local-members**
- **show ip pim sparse-mode mroute**
- **show ip pim sparse-mode neighbor**
- **show ip pim sparse-mode nexthop**
- **show ip pim sparse-mode rp mapping**
- **show ip pim sparse-mode rp-hash**

### 42.1.1 clear ip mroute

Г Д

**clear ip mroute** { \* | *group\_address* [*source\_address*] }

Г Д

| *                                             | Ш |
|-----------------------------------------------|---|
| <i>group_address</i>                          | Ш |
| <i>group_address</i><br><i>source_address</i> | Ш |

Г Д

Г Д

Г Д

```
Ruijie# clear ip mroute *
Ruijie# clear ip mroute 224.2.2.2
Ruijie# clear ip mroute 224.2.2.2 2.2.2.2
```

### 42.1.2 clear ip mroute statistics

Г Д

**clear ip mroute statistics** { \* | *group\_address* [*source\_address*] }

Г Д

| * | Ш |
|---|---|

|                                               |   |
|-----------------------------------------------|---|
| <i>group_address</i>                          | Ш |
| <i>group_address</i><br><i>source_address</i> | Ш |

Г А

Г А

Г А

```
Ruijie# clear ip mroute statistics *
Ruijie# clear ip mroute statistics 224.2.2.2
Ruijie# clear ip mroute statistics 224.2.2.2 2.2.2.2
```

```

Ruijie(config)# ip pim sparse-mode

```

```

Ruijie(config)# ip multicast-routing

```

### 42.1.5 ip pim accept-register list

```

Ruijie(config)# ip pim accept-register list access-list

```

| <i>access-list</i> | access-list <100 199> 4<br><2000 2699> acl |
|--------------------|--------------------------------------------|

```

Ruijie(config)# ip pim accept-register list 100

```

```

Ruijie(config)# access-list 100 permit ip 192.168.195.0

```

```

Ruijie(config)# access-list 100 permit ip 192.168.195.0
0.0.0.255 225.1.1.1 0.0.0.255

```

```

Ruijie(config)# ip pim accept-register list 100
Ruijie(config)# access-list 100 permit ip 192.168.195.0
0.0.0.255 225.1.1.1 0.0.0.255

```

```

Ruijie(config)# access-list

```

### 42.1.6 ip pim bsr-candidate

```

Ruijie(config)# ip pim bsr-candidate interface-type interface-number
[hash-mask-length][priority-value]

```

```

Ruijie(config)#

```

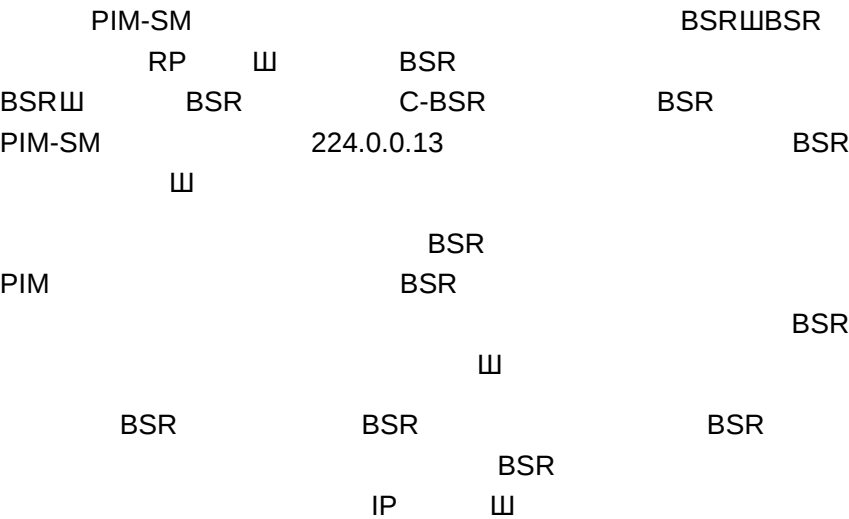
|                                        |                         |
|----------------------------------------|-------------------------|
|                                        |                         |
| <i>interface-type interface-number</i> |                         |
| <i>hash-mask-length</i>                | <0-32> RP<br>HASH<br>10 |
| <i>priority-value</i>                  | <0-255><br>BSR<br>64    |

└     A

BSR

└     A

└     A



└     A

```
Ruijie# configure terminal
Ruijie(config)# ip pim bsr-candidate g 0/3
Ruijie(config)# ip pim bsr-candidate g 0/3 30 192
```

42.1.7 ip pim cisco-register-checksum

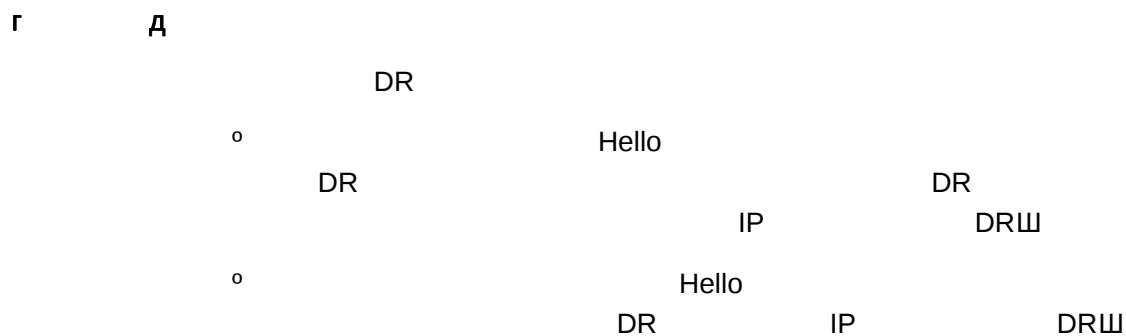
└     A

```
ip pim cisco-register-checksum [group-list access-list]
```

└     A

|  |  |
|--|--|
|  |  |
|--|--|

|                    |             |             |               |
|--------------------|-------------|-------------|---------------|
|                    | access-list | <1 99>      | 4 <1300 1999> |
| <i>access-list</i> | acl         | ▯▯          |               |
|                    | group-list  | access-list |               |
|                    |             | ▯▯          |               |



R1 R2

```
Ruijie# configure terminal
Ruijie(config)# interface g 0/3
Ruijie(config-if)# ip pim dr-priority 10000
```

### 42.1.9 ip pim ignore-rp-set-priority

R1 R2

```
ip pim ignore-rp-set-priority
```

R1 R2

R1 R2

```
RP-SET RP
```

R1 R2

R1 R2

```
RP RP
```

R1 R2

```
Ruijie# configure terminal
Ruijie(config)# ip pim ignore-rp-set-priority
```

### 42.1.10 ip pim jp-timer

R1 R2

```
ip pim jp-timer interval-seconds
```

R1 R2



|                         |           |
|-------------------------|-----------|
| <i>interval-seconds</i> | <1-65535> |
|-------------------------|-----------|

Г А

Join/Prune 60s

Г А

Г А

Join/Prune

Г А

```
Ruijie# configure terminal
Ruijie(config)# ip pim jp-timer 50
```

### 42.1.11 ip pim mib

Г А

**ip pim mib dense-mode**

Г А

sparse-mode MIB

Г А

Г А

dense-mode MIB

Г А

```
Ruijie# configure terminal
Ruijie(config)# ip pim mib dense-mode
```

### 42.1.12 ip pim neighbor-filter

Г А

**ip pim neighbor-filter *access\_list***

Г А

| <i>access_list</i> | access-list | acl | 1-99 | acl |
|--------------------|-------------|-----|------|-----|

Г Д

Г Д

Г Д

PIM

Ш

PIM-SM

peering

Ш

Г Д

Ruijie# **configure terminal**

Ruijie(config)# **interface g 0/3**

Ruijie(config-if)# **ip pim neighbor-filter 14**

Ruijie(config-if)# **exit**

Ruijie(config)# **access-list 14 deny 192.168.1.5**  
**0.0.0.255**

Г Д

**access-list**

Г Д

```
Ruijie# configure terminal
Ruijie(config)# interface g 0/3
Ruijie(config-if)# ip pim query-interval 123
```

42.1.14 ip pim register-rate-limit

Г Д

```
ip pim register-rate-limit rate
```

Г Д ~~QXN9D~~ ~~SR~~ ~~AT~~

|      |                       |
|------|-----------------------|
|      |                       |
| rate | register<br><1-65535> |

Г Д уТД\_8

RP

Ш

г д

```
Ruijie# configure terminal
```

```
Ruijie(config)# ip pim register-rp-reachability
```

### 42.1.16 ip pim register-source

```
г д ster-6(urce))T0 1 Tf57 Tc 0 T0 177247 0 Td{y
```

Г Д

**ip pim register-suppression** *seconds*

Г Д

| <i>seconds</i> | <11-21843> Ш |
|----------------|--------------|

Г Д

60 Ш

Г Д

Г Д

DR DR ip pim  
rp-register-kat RP RP keepalive  
Ш

Г Д

Ruijie# **configure terminal**

Ruijie(config)# **ip pim register-suppression 100**

## 42.1.18 ip pim rp-address

Г Д

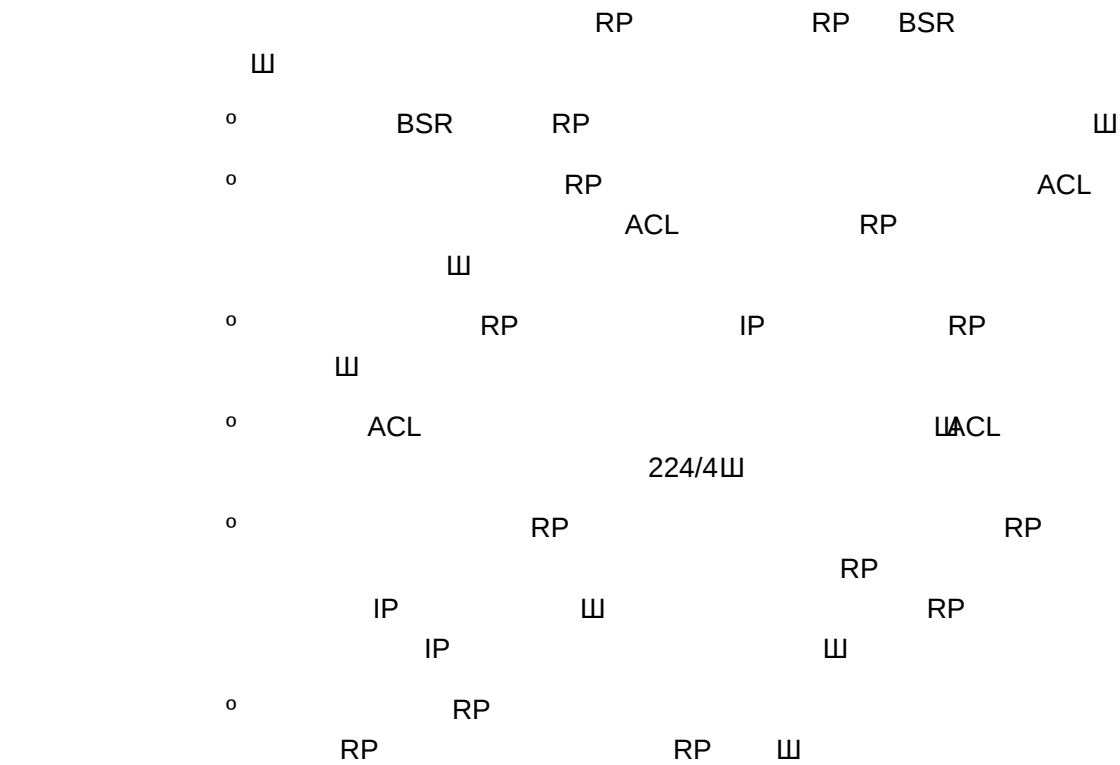
**ip pim rp-address** *rp-address* [*access\_list*]

Г Д

| <i>rp-address</i>  | RP IP                                             |
|--------------------|---------------------------------------------------|
| <i>access_list</i> | access-list acl <1-99> Ч<br><1300-1999> aclШ<br>Ш |

Г Д

RP



Г Д

```
Ruijie# configure terminal
Ruijie(config)# ip pim rp-address 210.34.0.55
Ruijie(config)# ip pim rp-address 210.34.0.55 4
Ruijie(config)# access-list 4 permit 225.1.1.1
0.0.0.255
```

Г Д

access-list

42.1.19 ip pim rp-candidate

Г Д

```
ip pim rp-candidate interface-type interface-number [priority
priority-value][interval interval-seconds][group-list access_list]
```

Г Д

| interface-type<br>interface-number |                                                             |
|------------------------------------|-------------------------------------------------------------|
| priority-value                     | <0-255> priority priority-value<br>192                      |
| Interval-seconds                   | <1-16383> interval<br>interval-seconds interval-seconds 60s |

|                    |                        |     |
|--------------------|------------------------|-----|
| <i>access_list</i> | acl 1-99               | acl |
|                    | group-list access_list | ⌵   |

Г А

RP

Г А

Г А

PIM-SM RPT RP ⌵  
 BSR C-RP BSR C-RP  
 BSR PIM ⌵  
 ⌵ RP  
 ace ⌵ permit ace deny

Г А

Ruijie#

└─┐ A

RP KAT

└─┐ A

Ruijie# **configure terminal**

Ruijie(config)# **ip pim rp-register-kat 250**

### 42.1.21 ip pim sparse-mode

└─┐ A

**ip pim sparse-mode**

└─┐ A

PIM-SM

└─┐ A

└─┐ A

PIM-SM Ⅲ

└─┐ A

Ruijie# **configure terminal**

Ruijie(config)# **interface g 0/3**

Ruijie(config-if)# **ip pim sparse-mode**

&

PIM-SM

PIM-SM Ⅲ

PIM-SM IGMP

Ⅲ

! Failed to enable PIM-SM on <

>, resource temporarily unavailable, please try again Ⅲ

Ⅲ

! PIM-SM Configure failed! VIF limit

exceeded in NSM!!! Ⅲ

Ⅲ

PIM-SM PIM-DM DVMRP Ⅲ

v4 Ⅲ

## 42.1.22 ip pim spt-threshold

Г Д

**ip pim spt-threshold** [**group-list** *access-list*]

Г Д

| <i>access-list</i> | access-list acl 1-99 Ч<br>1300-1999 acl Ш<br>group-list access-list<br>SPT |
|--------------------|----------------------------------------------------------------------------|

Г Д

SPT

Г Д

Г Д

RPT SPT

SPT

group-list

group-list

SPT Ш

Г Д

```
Ruijie# configure terminal
Ruijie(config)# ip pim spt-threshold
Ruijie(config)# ip pim spt-threshold group-list 12
Ruijie(config)# access-list 12 permit 225.1.1.1
0.0.0.255
```

Г Д

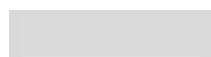
**access-list**

## 42.1.23 ip pim ssm

Г Д

**ip pim ssm** { **default** | **range** *access\_list* }

Г Д



|                    |       |      |     |
|--------------------|-------|------|-----|
| <i>default</i>     | 232/8 |      |     |
| <i>access_list</i> | acl   | 1-99 | acl |

Г Д

SSM

Г Д

Г Д

PIM-SSM

PIM-SSM

Г Д

232/8

Ш

Ruijie# **configure terminal**

Ruijie(config)# **ip pim ssm default**

10

Ш

Ruijie(config)# **ip pim ssm range 10**

Ruijie(config)# **access-list 10 permit 232.0.0.1  
0.0.0.255**

Г Д

**access-list**

## 42.1.24 show debugging

Г Д

**show debugging**

Г Д

Г Д

/ /

Г Д

Г Д

Ruijie #**show debugging**

PIM-SM Debugging status:

PIM packet debugging is on

### 42.1.25 show ip pim sparse-mode bsr-router

└     A

**show ip pim sparse-mode bsr-router**

└     A

└     A

/     /

└     A

BSR     .

└     A

Ruijie# **show ip pim sparse-mode bsr-router**

PIMv2 Bootstrap information

This system is the Bootstrap Router (BSR)

BSR address: 192.168.127.1

Uptime:       01d23h14m, BSR Priority: 64, Hash mask  
length: 10

Next bootstrap message in 00:00:42

Role: Candidate BSR   Priority: 64, Hash mask length: 10

State: Elected BSR

Candidate RP: 30.30.100.200(GigabitEthernet 0/3)

Advertisement interval 60 seconds

Next Cand\_RP\_advertisement in 00:00:32

### 42.1.26 show ip pim sparse-mode interface

└     A

**show ip pim sparse-mode interface** [*interface-type interface-number*  
[*detail*] ]

└     A

| <i>interface-type</i>   |  |
|-------------------------|--|
| <i>interface-number</i> |  |
| <i>detail</i>           |  |

└     A

/     /

Г Д

PIM SM

Г Д

```
Ruijie# show ip pim sparse-mode interface detail
GigabitEthernet 0/3 (vif 2):
Address 30.30.100.200, DR 30.30.100.200
Hello period 30 seconds, Next Hello in 13 seconds
Triggered Hello period 5 seconds
Neighbors:
30.30.100.1
```

## 42.1.27 show ip pim sparse-mode local-members

Г Д

```
show ip pim sparse-mode local-members
[interface-type interface-number]
```

Г Д

| <i>interface-type</i>   |  |
|-------------------------|--|
| <i>interface-number</i> |  |

Г Д

/ /

Г Д

PIM SM IGMP Ш

Г Д

```
Ruijie# show ip pim sparse-mode local-members
PIM Local membership information
GigabitEthernet 0/3:
(*, 225.1.1.1) : Include
Loopback 1:
```

## 42.1.28 show ip pim sparse-mode mroute

Г Д

```
show ip pim sparse-mode mroute [group_address | source_address]
```

Г Д

| <i>group_address</i>  | A.B.C.D | Ш |
|-----------------------|---------|---|
| <i>source_address</i> | A.B.C.D | Ш |

Г Д

/ /

Г Д

Ш

Ш

Ш

## 42.1.29 show ip pim sparse-mode neighbor

Г Д

**show ip pim sparse-mode neighbor** [*detail*]

Г Д

| <i>detail</i> |  |
|---------------|--|

Г Д

/ /

Г Д

Ш

Г Д

Ruijie# **show ip pim sparse-mode neighbor detail**  
 Nbr 5.5.5.3 (VLAN 1)  
 Expires in 81 seconds

## 42.1.30 show ip pim sparse-mode nexthop

Г Д

**show ip pim sparse-mode nexthop**

Г Д

Г Д

/ /

┌           ┐

metric    ┐

### 42.1.31   show ip pim sparse-mode rp mapping

┌           ┐

show ip pim sparse-mode rp mapping

┌           ┐

┌           ┐

/           /

┌           ┐

RP

┌    ┐

```
Ruijie# show ip pim sparse-mode rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4
RP: 30.30.200.1
Info source: 30.30.200.1, via bootstrap, priority 192
Uptime: 00:00:51, expires: 00:01:39
RP: 30.30.100.1
Info source: 30.30.200.1, via bootstrap, priority 192
Uptime: 00:19:14, expires: 00:01:38
Group(s): 224.0.0.0/4, Static
RP: 100.100.100.100
Uptime: 00:45:35
```

### 42.1.32   show ip pim sparse-mode rp-hash

┌           ┐

show ip pim sparse-mode rp-hash *group-address*

┌           ┐

| <i>group-address</i> |  |
|----------------------|--|

┌           ┐

/           /



---

# 43

## 43.1

- clear ip mroute
- clear ip mroute statistics
- ip mroute
- ip multicast route-limit
- ip multicast ttl-threshold
- ip multicast-routing
- ip multicast boundary
- show ip mroute
- show ip rpf
- show ip mvif

### 43.1.1 clear ip mroute

IP 山

**clear ip mroute** { \* | *group-address* [*source -address*]

Г Д

| *                     | 山 |
|-----------------------|---|
| <i>group-address</i>  | 山 |
| <i>source-address</i> | 山 |

Г Д

山

Г Д

230.0.0.1

Ruijie# **clear ip mroute 230.0.0.1**

Г Д

| show ip mroute | 山 |
|----------------|---|

---

### 43.1.2 clear ip mroute statistics

IP

Ш

**clear ip mroute statistics** {*\** | *group-address* [*source -address*]}

Г

А



W

Г Д

IPv6

W

W

Г Д

500 W

```
Ruijie(config)# ip multicast route-limit 500
```

### 43.1.5 ip multicast ttl-threshold

TTL Time-To-Live

W

**no**

W

**ip multicast ttl-threshold** *ttl-value*

**no ip multicast ttl-threshold**

Г Д

|                  |             |
|------------------|-------------|
|                  |             |
| <i>ttl-value</i> | TTL , 0~255 |

Г Д

```
ttl-value 1M
```

Г Д

W

Г Д

TTL

W

TTL

WTTL

W TTL

0

W

Г Д

---

TTL 5

Ruijie(config-if)# **ip multicast ttl-threshold 5**

### 43.1.6 ip multicast-routing

no

**ip multicast-routing**

**no ip multicast-routing**

r A

W

r A

W

r A

IPv4

W

IPv4

W

SNOOPING SVGL S8606 4 S8610 4 S8614 IGMP  
IVGL-SVGL 4 IVGL-SVGL W  
IGMP SNOOPING SVGL  
IVGL-SVGL W ip



---

```
show ip mroute [group-address] [source-address] [dense][sparse]
[summary] [count]
```

```
r A
```

| <i>group-address</i>  | W     |
|-----------------------|-------|
| <i>source-address</i> | W     |
| <b>dense</b>          | PIMDM |
| <b>sparse</b>         | PIMSM |
| <b>summary</b>        | W     |
| <b>count</b>          | W     |

```
r A
```

```
r A
```

```
Ruijie# show ip mroute
IP Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder
installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(10.10.1.52, 224.0.1.3), uptime 00:00:31, stat expires
00:02:59
Owner PIM-SM, Flags: TF
Incoming interface: FastEthernet 2/1
Outgoing interface list:
FastEthernet 1/3
```

```
Ruijie# show ip mroute 10.10.1.52 224.0.1.3
IP Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder
installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(10.10.1.52, 224.0.1.3), uptime 00:03:24, stat expires
00:01:28
Owner PIM-SM, Flags: TF
Incoming interface: FastEthernet 2/1
Outgoing interface list:
```

---

## FastEthernet 1/3

Ruijie# **show ip mroute count**

IP Multicast Statistics

Total 1 routes using 132 bytes memory

Route limit/Route threshold: 2147483647/2147483647

Total NOCACHE/WRONGVIF/WHOLEPKT recv from fwd: 1/0/0

Total NOCACHE/WRONGVIF/WHOLEPKT sent to clients: 1/0/0

Immediate/Timed stat updates sent to clients: 0/0

Reg ACK recv/Reg NACK recv/Reg pkt sent: 0/0/0

Next stats poll: 00:01:10

Forwarding Counts: Pkt count/Byte count, Other Counts:  
Wrong If pkts

Fwd msg counts: WRONGVIF/WHOLEPKT recv

Client msg counts: WRONGVIF/WHOLEPKT/Imm Stat/Timed  
Stat sent

Reg pkt counts: Reg ACK recv/Reg NACK recv/Reg pkt sent  
(10.10.1.52, 224.0.1.3), Forwarding: 2/19456, Other: 0

Fwd msg: 0/0, Client msg: 0/0/0/0, Reg: 0/0/0

Ruijie# **show ip mroute summary**

IP Multicast Routing Table

Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder  
installed

Timers: Uptime/Stat Expiry

Interface State: Interface (TTL)

(10.10.1.52, 224.0.1.3), 00:01:32/00:03:20, PIM-SM,

Flags: T

| Flags                     | I-<br>T-<br>F- |
|---------------------------|----------------|
| Timers:Uptime/Stat Expiry |                |
| Interface State           |                |
| Owner                     |                |
| Incoming interface        |                |
| Outgoing interface list   |                |

|                                            |   |
|--------------------------------------------|---|
| Forwarding Counts Pkt<br>count/Byte count, | / |
| Other Counts: Wrong If pkts                |   |

г А

|                             |        |
|-----------------------------|--------|
|                             |        |
| <b>ip multicast-routing</b> |        |
| <b>ip pim dense-mode</b>    | PIM-DM |
| <b>ip pim sparse-mode</b>   | PIM-SM |

### 43.1.9 show ip rpf

RPF Ш

**show ip rpf** {*source-address*}

г А

|                       |  |
|-----------------------|--|
|                       |  |
| <i>source-address</i> |  |

г А

Ш

г А

192.168.1.54 RPF

```
Ruijie# show ip rpf 192.168.1.54
RPF information for 192.168.1.54
RPF interface: VLAN 1
RPF neighbor: 0.0.0.0
RPF route: 192.168.1.0/24
RPF type: unicast (connected)
RPF recursion count: 0
Doing distance-preferred lookups across tables
Distance: 0
Metric: 0 RPF information for 192.168.1.54
RPF interface: VLAN 1
RPF neighbor: 0.0.0.0
RPF route: 192.168.1.0/24
RPF type: unicast (connected)
RPF recursion count: 0
Doing distance-preferred lookups across tables
```

---

Distance: 0

Metric: 0

### 43.1.10 show ip mvif

▮

**show ip mvif** { *interface-type interface-number* }

Г А

| ° <i>interface-type</i><br><i>interface-number</i> |  |
|----------------------------------------------------|--|

Г А

▮

Г А

svi1

Ruijie# **show ip mvif vlan 1**

| Interface  | Vif      | Owner   | TTL | Local       |
|------------|----------|---------|-----|-------------|
| Remote     | Uptime   |         |     |             |
| Idx Module | Address  | Address |     |             |
| VLAN 1     | 1        | PIM-DM  | 2   | 192.168.1.1 |
| 0.0.0.0    | 00:13:16 |         |     |             |

## 43.2 IP

IP

o

---

г Д

г Д

г Д

Ш

г Д

Ruijie# **debug nsm mcast all**

### 43.2.2 debug nsm mcast fib-msg

Ш no

**debug nsm mcast fib-msg**

г Д

г Д

г Д

Ш

г Д

Ruijie# **debug nsm mcast fib-msg**

### 43.2.3 debug nsm mcast vif

---

Г Д

Ш

Г Д

Ruijie# debug nsm mcast vif

#### 43.2.4 debug nsm mcast register

Ш

no

debug nsm mcast register

Г Д

Г Д

Г Д

Ш

Г Д

Ruijie# debug nsm mcast register

#### 43.2.5 debug nsm mcast stats

Ш

no

debug nsm mcast stats

Г Д

Г Д

Г Д

---

Ш  
Г А

Ruijie# **debug nsm mcast stats**



**Ruijie(config-mpls-router)#advertise-labels** for  
bgp-routes

r A

44.2 discovery targeted-hello

hello no

**discovery targeted-hello {holdtime | interval} seconds**  
**no discovery targeted-hello {holdtime | interval}**

r A

|          |                        |
|----------|------------------------|
|          |                        |
| holdtime | hello                  |
| interval | hello                  |
| seconds  | 1-65535 holdtime 65535 |

r A

hello 45 hello 5  
1/9

r A

**config-mpls-router**

r A

target hello holdtime interval  
LDP  
targeted hello

r A

Ruijie(config)# **mpls router ldp**  
Ruijie(config-mpls-router)# **discovery target-hello**  
**holdtime 90**

r A

|                          |     |
|--------------------------|-----|
|                          |     |
| show mpls ldp parameters | LDP |

44.3 label-merge

no

⌵

[no] label-merge

г

А

⌵

г

А

config-mpls-router

г

А

DU

LDP

⌵

⌵

г

А

Ruijie(config)# **mpls router ldp**

Ruijie(config-mpls-router)# **label-merge**

г

А

|                            |     |
|----------------------------|-----|
|                            |     |
| Show mpls ldp parameters   | LDP |
| mpls ldp distribution-mode |     |

44.4 label-retention-mode

no

⌵

label-retention-mode {liberal | conservative}

[no] label-retention-mode

г

А

|  |  |
|--|--|
|  |  |
|--|--|

liberal

LDP

山

r A

```
Ruijie(config)# mpls router ldp
Ruijie(config-mpls-router)#label-retention-mode
liberal
```

r A

|                          |     |
|--------------------------|-----|
|                          |     |
| show mpls ldp parameters | LDP |

## 44.5 label-switching

MPLS  
MPLS

MPLS  
山

[no] label-switching

r A

r A

MPLS MPLS  
MPLS 山

r A

r A

MPLS M8600-MPLS MPLS  
山

r A

```
Ruijie(config)# interface Gi4/1
Ruijie(config-if)# label-switching
```

r A

|                      |  |
|----------------------|--|
|                      |  |
| show mpls label-pool |  |

## 44.6 ldp router-id

LDP LSR ID no

[no] **ldp router-id** *A.B.C.D*

└─┘ *A*

|                |  |
|----------------|--|
|                |  |
| <i>A.B.C.D</i> |  |

└─┘ *A*

Router ID LDP LSR ID

└─┘ *A*

config-mpls-router

└─┘ *A*

**ldp router-id** **transport-address** **ldp router-id** **ldp router-id** LSR

└─┘ *A*

Ruijie(config-mpls-router)# **ldp router-id 10.10.10.30**

└─┘ *A*

|                                |     |
|--------------------------------|-----|
|                                |     |
| <b>show mpls ldp parameter</b> | LDP |

## 44.7 loop-detection

no

[no]**loop-detection**

└─┘ *A*

└─┘ *A*

config-mpls-router

└─┘ *A*

LDP

└─┘ *A*

Ruijie(config)# **mpls router ldp**

```
Ruijie(config-mpls-router)# loop-detection
```

```
r A
```

| show mpls ldp parameters | LDP |
|--------------------------|-----|
| mpls ldp max-path-vector | LDP |
| mpls ldp max-hop-count   |     |

## 44.8 lsp-control-mode

```
LDP no W
```

```
lsp-control-mode {independent | ordered}
```

```
no lsp-control-mode
```

```
r A
```

| independent |  |
|-------------|--|
| ordered     |  |

```
r A
```

```
W
```

```
r A
```

```
config-mpls-router
```

```
r A
```

```
LDP W
```

```
r A
```

```
LDP W
```

```
Ruijie(config)# mpls router ldp
```

```
Ruijie(config-mpls-router)# lsp-control-mode ordered
```

```
r A
```

| show mpls ldp parameters | LDP |
|--------------------------|-----|

## 44.9 mpls ip

MPLS

no

```

MPLS
MPLS
MPLS
MPLS
LDP
LDP
LSP
MPLS

```

```

Ruijie

```

```

Ruijie(config)# interface Gi4/1
Ruijie(config-if)# mpls ip

```

```

Ruijie

```

| <b>mpls ldp hello-interval</b> | hello |
|--------------------------------|-------|
| <b>mpls ldp hello-holdtime</b> | hello |

## 44.11 mpls ip fragment

```

IP
MPLS
MPLS MTU
[no] mpls ip fragment

```

```

Ruijie

```

```

Ruijie

```

```

IP
MPLS
MPLS MTU
IP
MPLS

```

```

Ruijie

```

```

Ruijie

```

```

MPLS MTU
no mpls ip fragment
IP
MPLS
MPLS MTU

```

```

Ruijie

```

```

Ruijie(config)# no mpls ip fragment

```

```

Ruijie

```

| <b>mpls ip</b> | MPLS |
|----------------|------|

## 44.12 mpls ip icmp forward

PE                      W                      ICMP

⌋

Г А

**no mpls ip ttl expiration**

MPLS TTL

⌋

Г А

Ruijie(config)# **no mpls ip ttl expiration**

Г А

| <b>mpls ip</b> | MPLS |
|----------------|------|

## 44.14 mpls ip ttl propagate

MPLS IP TTL ⌋

**mpls ip ttl propagate {public | vpn}**

**no mpls ip ttl propagate**

Г А

| <b>public</b> | TTL |
|---------------|-----|
| <b>vpn</b>    | TTL |

Г А

TTL ⌋

Г А

Г А

MPLS TTL TTL TTL ⌋

° TTL ⌋ Push

TTL IP MPLS TTL

Pop IP MPLS TTL

TTL ⌋

° TTL Push

TTL 255⌋Pop IP MPLS

TTL ⌋

Г А

TTL 11

Ruijie(config)# no mpls ip ttl propagate public

1 A

|         |      |
|---------|------|
|         |      |
| mpls ip | MPLS |

44.15 mpls ldp distribution-mode

LDP 11 no

mpls ldp distribution-mode {dod | du}  
no mpls ldp distribution-mode

1 A

|     |  |
|-----|--|
|     |  |
| dod |  |
| du  |  |

LDP hello no  
  └─┘

mpls ldp hello-holdtime <1-65535>  
no mpls ldp hello-holdtime

  └─┘

|           |                    |
|-----------|--------------------|
|           |                    |
| <1-65535> | hello 65535<br>└─┘ |

  └─┘

15 └─┘

  └─┘

  └─┘

LDP Link Hello └─┘  
Hello Hello           ↑↵

|           |       |   |
|-----------|-------|---|
| <1-65535> | Hello | W |
|-----------|-------|---|

r A

5 W

r A

r A

hello-holdtime W LDP  
LDP Link Hello W

Hello Holdtime **discovery targeted-hello**

W

r A

LDP hello 10

Ruijie(config) # **interface vlan 10**  
Ruijie(config-if)# **mpls ldp hello-interval 10**

r A

|                                 |       |
|---------------------------------|-------|
|                                 |       |
| <b>mpls ldp hello-holdtime</b>  | hello |
| <b>discovery targeted-hello</b> | hello |



```
Ruijie(config) # interface vlan 10
Ruijie(config-if)# mpls ldp max-hop-count 30
```

Г А

|                |     |
|----------------|-----|
|                |     |
| loop-detection | LDP |

## 44.20 mpls ldp max-label-requests

```
LDP
no

```

```
mpls ldp max-label-requests <0-255>
no mpls ldp max-label-requests
```

Г А

|         |  |
|---------|--|
|         |  |
| <0-255> |  |

Г А

Ш

Г А

Г А

```
LDP
LDP Ш 0 Ш
```

Г А

```
LDP
5Ш
```

```
Ruijie(config) # interface vlan 10
Ruijie(config-if)# mpls ldp max-label-requests 5
```

Г А

|                            |  |
|----------------------------|--|
|                            |  |
| mpls ldp distribution-mode |  |

## 44.21 mpls ldp max-path-vector



|            |     |     |
|------------|-----|-----|
| <256-4096> | LDP | PDU |
|------------|-----|-----|

Г А

4096Ш

Г А

Г А

LDP

LDP

Ш

Г А

LDP

256Ш

Ruijie(config)# **interface vlan 10**

Ruijie(config-if)# **mpls ldp max-pdu 256**

## 44.23 transport-address

no

[no] **transport-address** [*interface*|*ipaddr*]*interface\_name*

Г А

| <b>interface</b>      | IP |
|-----------------------|----|
| <i>ipaddr</i>         | IP |
| <i>interface_name</i> | IP |

Г А

LDP LSR ID transport-address

Г А

**config-mpls-router**

Г А

Ruijie(config-mpls-router)#**transport-address**

**192.168.0.1**

Г А

|                          |     |
|--------------------------|-----|
|                          |     |
| show mpls ldp parameters | LDP |

## 44.24 mpls mtu

mpls mtu Ш

mpls mtu <64-65535>

no mpls mtu

Г А

|            |  |
|------------|--|
|            |  |
| <64-65535> |  |

Г А

mpls mtu MTU Ш

Г А

Г А

MPLS MTU MTU 8 ШMPLS MTU MPLS  
MPLS MTU MPLS  
IP Ш MPLS MTU  
Ш

MTU MTU MTU Ш  
MTU mtu Ш

Г А

Ruijie(config)# interface Gi4/1  
Ruijie(config-if)# mpls mtu 1510

Г А

|         |      |
|---------|------|
|         |      |
| mpls ip | MPLS |

## 44.25 mpls router ldp

LDP

no

LDP

┘

[no] **mpls router ldp**

r      A

LDP      ┘

r      A

r      A

LDP

LDP

Ruijie(config)# **mpls router ldp**

Ruijie(config-mpls-router)

## 44.26 mpls static ftn

FTN

FTN    ┘

no

F

TN      FTN    ┘

**mpls static ftn** *A.B.C.D/Mask* **out-label** *label* **nexthop** *interface-name nexthop-ip*

**no mpls static ftn** *A.B.C.D/Mask*

r      A

| <i>A.B.C.D/Mask</i>                                          | FEC       |
|--------------------------------------------------------------|-----------|
| <b>out-label</b> <i>label</i>                                | FEC       |
| <b>nexthop</b><br><i>interface-name</i><br><i>nexthop-ip</i> | FEC<br>IP |

```
Ruijie(config)# mpls static ftn 192.168.0.0/16
out-label 100 nexthop gi4/1 10.10.10.1
```

Г А

|                            |     |
|----------------------------|-----|
|                            |     |
| show mpls forwarding-table | FTN |

## 44.27 mpls static l3vpn-ftn

L3 VPN FTN no FTNШ

```
mpls static l3vpn-ftn vrf-name A.B.C.D/Mask out-label label rem
ote-pe ip-addr
mpls static l3vpn-ftn vrf-name A.B.C.D/Mask local-forward nexth
op interface-name nexthop-ip
no mpls static l3vpn-ftn vrf A.B.C.D/Mask
```

Г А

|                                                          |                |
|----------------------------------------------------------|----------------|
|                                                          |                |
| vrf-name                                                 | FTN VRF FTN    |
| A.B.C.D/Mask                                             | Fec            |
| out-label label                                          | FTN LSP<br>PE  |
| remote-pe<br>ip-addr                                     | PE             |
| local-forward<br>nexthop<br>interface-name<br>nexthop-ip | FTN PE<br>IP Ш |

Г А

Г А

```

vrf FTN FTN Ш MPLS
IP VRF VRF FTN
IP
Ш 0 FTN IP
Ш
Ш

```

Г Д

```
Ruijie(config)# mpls static l3vpn-ftn 192.168.0.0/16
out-label 100 remote-pe 10.10.10.1
```

Г Д

| show mpls forwarding-table | FTN |
|----------------------------|-----|

## 44.28 mpls static l2vc-ftn

VC FTN Ш no FT  
N Ш

```
mpls static l2vc-ftn vc_id vc_peer_ip out_label label
no mpls static l2vc-ftn vc_id vc_peer_ip
```

Г Д

| vc_id           | vc id    |
|-----------------|----------|
| vc_peer_ip      | Vc PE IP |
| out_label label | VC FTN   |

Г Д

Г Д

vc ftn VC AC  
ftn vc peer ip  
PE LSP Ш

Г Д

```
Ruijie(config)# mpls static l2vc-ftn 1 10.10.10.1
out_label 21
```

Г Д

| show mpls l2vc ftn_table   | vc ftn |
|----------------------------|--------|
| show mpls forwarding-table | MPLS   |

## 44.29 mpls static ilm in-label

ILM ILM no  
ILM W

**mpls static ilm in-label** *in\_label* **forward-action swap-label** *label*  
**nexthop** *interface-name nexthop-ip* **fec** *A.B.C.D/M*

**mpls static ilm in-label** *in\_label* **forward-action pop-l3vpn-nexthop**  
**op** *vrf-name nexthop interface-name nexthop-ip* **fec** *A.B.C.D/Mask*  
*k*

**mpls static ilm in-label** *in\_label* **forward-action pop-l2vc-destport**  
**t** *interface-name* **fec** *vc\_id*

**no mpls static ilm in-label** *in\_label*

r A

| <i>in_label</i>                                              | ILM                                                                                                                           |
|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>forward-action</b>                                        | ILM<br><b>swap-label</b> ILM<br>W<br><b>pop-l3vpn-nexthop</b> L3 VPN ILM<br>VRF W<br><b>pop-l2vc-destport</b> L2 VPN ILM<br>W |
| <i>label</i>                                                 | swap-label                                                                                                                    |
| <i>vrf-name</i>                                              | pop-l3vpn-nexthop ILM<br>VPN VRFW                                                                                             |
| <i>interface-name</i>                                        | pop-l2vc-destport W                                                                                                           |
| <b>nexthop</b><br><i>interface-name</i><br><i>nexthop-ip</i> | IP                                                                                                                            |
| <b>fec</b>                                                   | ILM FEC                                                                                                                       |
| <i>A.B.C.D/Mask</i>                                          | l3 vpn fec                                                                                                                    |
| <i>vc_id</i>                                                 | l2vpn fec VC W                                                                                                                |

r A

r A

ILM ILM W MPLS  
IP ILM IP

MPLS

|                        |     |
|------------------------|-----|
| show mpls ldp neighbor | LDP |
|------------------------|-----|

## 44.31 propagate-release

no

**ftn**

**ilm**

**vc**       vc       MPLS

**ip**       ip       mpls

**detail**       mpls       ;

**vrf**       VRF       MPLS       ;

**summary**       MPLS       ;

г       А

ч       ш

г       А

MPLS       ,       122F0E>Tj/T31558>Tj/TT0 1 Tf4 0 Td(,n0r8CR2 T01D0>]TJ/TT

Prefix or Tunnel Id: IP ;

Outgoing interface: 11

Next Hop: 0 11

Ruijie# **sh mpls forwarding-table summary**

MPLS forwarding is ON

Enable count:1

ILM entrys:14

ILM changes:14

ILM failed changes :0

IP FTN entrys:0

IP FTN changes:4

IP FTN faild changes:0

L2 FTN entrys:0

L2 FTN changes:0

L2 FTN faild changes:0

In label packets:0

Out label packets:0

Send label packets:0

In ip packets:0

Out ip packets:0

Out ip statck packets:0

Forwarding packets:0

Fragment packets:0

Fragment error packets:0

Label error packets:0

Label failed packets:0

Ttl over packets:0

Buffer failed packets:0

Ip don't fragment packets:0

Other failed packets:0

## 44.33 show mpls label-pool

11

**show mpls label-pool** [*label\_space*]

r A

*label\_space* label\_space 11

r A

Г Д

Ч Ш Ч Ш

Г Д

```
Ruijie# show mpls label-pool
label space: 0
label pool bucket size 512
min label 16, max label 1048575
label block used 2, free 2046
CLI: 0, 1 (Include label [16,1023], reserved)
LDP: 3, 4
```

Г Д

|  |                |               |
|--|----------------|---------------|
|  | 45F,lar_160PBR | ReB#15,RoleQT |
|--|----------------|---------------|

```

192.168.4.0/24 remote binding: no outlabel lsr:
192.168.0.3:0
192.168.0.100/32 local binding: label: gen impl-null
192.168.4.0/24 local binding: label: gen impl-null

```

r A

| show mpls ldp neighbor | LDP |
|------------------------|-----|

## 44.35 show mpls ldp discovery

LDP W

show mpls ldp discovery

r A

r A

r A

r A

hello LDP LDP LDP  
hello

r A

LDP W

Ruijie# show mpls ldp discovery

Local LDP Identifier:

8.8.8.8:0

Discovery Sources:

Interfaces:

GigabitEthernet 2/1 (ldp): xmit/recv

LDP Ident: 10.30.10.10:0

GigabitEthernet 2/2 (ldp): xmit

Targeted Hellos:

8.8.8.8 -> 10.5.0.1 (ldp): active, xmit

8.8.8.8 -> 10.30.10.10 (ldp): active/passive,

xmit

2.2.2.2 -> 10.30.10.10 (ldp): passive, xmit/recv

LDP Ident: 10.30.10.10:0

| Local LDP Identifier | LDP                                         |
|----------------------|---------------------------------------------|
| Interfaces           | LDP                                         |
| xmit                 | LDP Hello                                   |
| recv                 | LDP Hello                                   |
| Targeted Hellos      | targeted Hello                              |
| active               | LSR targeted Hello                          |
| passive              | LSR targeted Hello<br>LSR Targeted<br>Hello |

Г А

| <b>show mpls ldp interface</b> | LDP |
|--------------------------------|-----|

## 44.36 show mpls ldp neighbor

LDP

Ш

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–

D Ž õ – á ´ C I

Addresses bound to peer LDP Ident:

10.20.10.10 192.168.201.220 192.168.198.1  
10.5.0.1

|  |  |
|--|--|
|  |  |
|--|--|

Targeted Session Keepalive HoldTime/Interval:  
180/60 sec  
Targeted Hello HoldTime/Interval: 90/10 sec

r A  
[REDACTED]  
[REDACTED]

Session attach socket FD[2572], read thread is 0xc6019c0,  
write thread is (nil)

LDP Peer Address:

192.168.4.1

192.168.0.2

192.168.3.2

## 44.39 show mpls summary

MPLS

Ш

show mpls summary

г А

г А

MPLS

Ч

Ч

MPLS

Ш

г А

Ruijie# show mpls summary

Per label-space information: //

0

Label-space 0 is using minimum label: 16 and maximum  
label: 1048575 //

Label-switching Interface: //

| Interface           | Label space |
|---------------------|-------------|
| GigabitEthernet 4/1 | 0           |
| GigabitEthernet 4/2 | 0           |

Total number of mpls interface is 2

г А

| label-switching |  |
|-----------------|--|

## 44.40 targeted-session holdtime

keepalive

no

Ш

targeted-session holdtime <15-65535>

г А

|          |   |
|----------|---|
|          |   |
| 15-65535 | Ш |

г А

LDP LDP 180

keepalive 60 LDP 1/3Ш

г А

**config-mpls-router**

г А

LDP Ш LDP Ш

г А

Ш

Ruijie(config)# **mpls router ldp**

Router(config-mpls-router)# **targeted-session holdtime**

90

г А

|                                 |     |
|---------------------------------|-----|
|                                 |     |
| <b>show mpls ldp parameters</b> | LDP |

---

|             |             |
|-------------|-------------|
| <div></div> | <div></div> |
|             |             |
|             |             |

---

vpn 山

r A

Router

r A

PE VPN address-  
family VPN 山 exit-address-family address  
s-family VPN 山

r A

Ruijie(config)# **router bgp 100**  
Ruijie(config-router)# **address-family vpnv4**

r A

|                   |  |
|-------------------|--|
|                   |  |
| neighbor activate |  |

Ruijie#

Ruijie#

Ruijie#

vrf BGP

Ruijie#

Ruijie# **clear ip bgp vrf my-vrf in**

## 45.4 exit address-family

**exit address-family**

VRF vpn

Ruijie#

Ruijie#

Ruijie(config)# **router bgp 100**  
Ruijie(config-router)# **address-family vpnv4 unicast**  
Ruijie(config-router-af)# **exit address-family**

## 45.5 ip route static inter-vrf

**[no] ip route static inter-vrf**

VRF

Ruijie#

VRF

Ruijie#

Ruijie#

**no ip route static inter-vrf** vrf  
 vrf  
 vrf

\*Aug 7 10:58:34: %NSM-6-ROUTESACROSSVRF: Un-installing route [x.x.x.x/8] from global routing table with outgoing interface x/x.

Ruijie

Ruijie(config)# no ip route static inter-vrf

45.6 ip route vrf

[no] ip route vrf vrf\_name ip\_addr mask interface next-hop-address [global]

VRF no

Ruijie

| vrf_name  | VRF |
|-----------|-----|
| ip_addr   |     |
| mask      |     |
| interface |     |
| next_hop  |     |
| global    | VRF |

Ruijie

Ruijie

Ruijie

|        |        |     |     |     |
|--------|--------|-----|-----|-----|
|        | global | vrf | VRF | VRF |
| global |        |     | vrf |     |
| vrf    |        |     |     |     |

global VRF no ip route static inter-vrf

Ruijie

```
Ruijie(config)# ip route vrf vrf1 10.10.10.0 255.255.255.0 gi3/1 192.168.18.1
```

## 45.7 ip vrf

```
[no] ip vrf vrf_name
```

VRF

```
└─┬─┘
```

```
vrf_name VRF
```

```
└─┬─┘
```

VRF

```
└─┬─┘
```

```
└─┬─┘
```

```
Ruijie(config)# ip vrf vrf1
```

```
└─┬─┘
```

| ip vrf forwarding | VRF    |
|-------------------|--------|
| show ip vrf       | VRF    |
| rd                | VRF rd |
| route-target      | VRF rt |

## 45.8 ip vrf forwarding

```
[no] ip vrf forwarding vrf_name
```

VRF

no

```
└─┬─┘
```

```
└─┬─┘, └─┬─┘ r └─┬─┘
```



no

no

**neighbor {peer-address | peer-group-name} activate**

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

└─┬─┘

| peer-address    | IPv4 |
|-----------------|------|
| peer-group-name | 32   |

└─┬─┘

ipv4

└─┬─┘

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

BGP VPNv4

└─┬─┘

ipv4

no

└─┬─┘

Ruijie(config)# **router bgp 60**

Ruijie(config-router)# **neighbor 10.0.0.1 remote-as 100**

Ruijie(config-router)# **address-family vpnv4**

Ruijie(config-router-af)# **neighbor 10.0.0.1 activate**

└─┬─┘

| router bgp         | BGP |
|--------------------|-----|
| neighbor remote-as | BGP |

## 45.11 neighbor allowas-in

PE

no

PE

AS

AS

**neighbor** {peer-address | peer-group-name} **allowas-in** number

**no neighbor** {[peer-address | peer-group-name] **allowas-in**

└

┐

|                 |                   |
|-----------------|-------------------|
|                 |                   |
| peer-address    |                   |
| peer-group-name | 32                |
| number          | AS<br>3<br>[1 10] |

└

┐

allowas-in

└

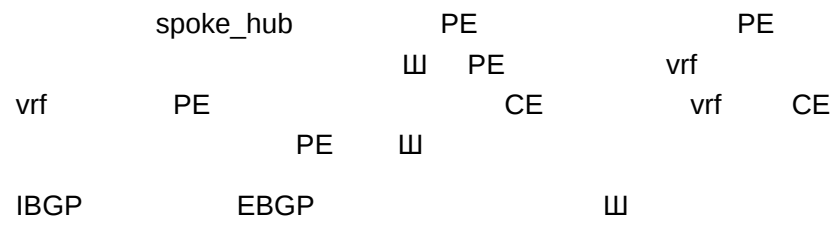
┐

BGP VPN

BGP IPv4 VRF

└

┐



└

┐

Ruijie(config)# **router bgp 60**

Ruijie(config-router)# **neighbor 10.0.0.1 remote-as 100**

Ruijie(config-router)# **address-family ipv4 vrf vpn1**

Ruijie(config-router-af)# **neighbor 10.0.0.1 allowas-in**

└

┐



( )      no

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

**no neighbor** {*peer-address* | *peer-group-name*} **description**

г      д

| <i>peer-address</i>    |           |
|------------------------|-----------|
| <i>peer-group-name</i> | 32        |
| <i>text</i>            | ( )<br>80 |

г      д

г      д

BGP

BGP IPV4 vrf

г      д

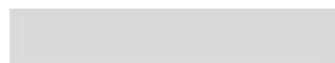
г      д

Ruijie(config)# **router bgp 60**

Ruijie(config-router)# **neighbor 10.1.1.1 remote-as 80**

Ruijie (config-router)# **neighbor 10.1.1.1 description xyz.com**

г      д



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

Г Д

| <i>peer-address</i>    | IPv4<br>IPv6         |
|------------------------|----------------------|
| <i>peer-group-name</i> | 32                   |
| <i>as-number</i>       | BGP ( )<br><1-65535> |

Г Д

BGP Ш

Г Д

BGP  
BGP IPv4  
BGP IPv6  
BGP IPv4 VRF

Г Д

9 π S

配置命令

| <i>peer-address</i>    | IPv4<br>IPv6 32 |
|------------------------|-----------------|
| <i>peer-group-name</i> | 32              |

配置命令

配置命令

```
BGP
BGP IPv4
BGP IPv6
BGP IPv4 VRF
```

配置命令

```
()
32 () 32
BGP
32
```

配置命令

```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.0.0.1 shutdown
```

配置命令

| <b>router bgp</b>          | BGP |
|----------------------------|-----|
| <b>neighbor remote-as</b>  | BGP |
| <b>show ip bgp summary</b> | BGP |

## 45.16 neighbor soo

```
no
32
```

```
neighbor [peer-addressor
```

**no neighbor** [*peer-address* | *peer-group-name*] **soo**

Г А

| <i>peer-address</i>    |                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------|
| <i>peer-group-name</i> | 32                                                                                                    |
| <i>soo-value</i>       | soo<br>soo_value<br>1 soo_value as_num nn<br>an_num nn<br><br>2 soo_value ip_addr nn<br>ip_addr IP nn |

Г А

soo

Г А

BGP IPv4VRF

Г А

CE CE PE  
CE Ш

Г А

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# address-family ipv4 vrf vpn1
Ruijie(config-router-af)# neighbor 10.0.0.1 remote-as
100
Ruijie(config-router-af)# neighbor 10.0.0.1 soo
100:100
```

Г А

| <b>router bgp</b> | BGP |
|-------------------|-----|

## 45.17 rd

VRF rd Ш

|                    |     |
|--------------------|-----|
|                    |     |
| <b>ip vrf</b>      | VRF |
| <b>show ip vrf</b> | VRF |

|                                 |                                      |
|---------------------------------|--------------------------------------|
|                                 |                                      |
| <i>protocol-type</i>            | connected 4 static 4 rip             |
| <b>route-map</b> <i>map-tag</i> | <b>route-map</b><br><b>route-map</b> |

|                                   |                     |
|-----------------------------------|---------------------|
| <b>metric</b> <i>metric-value</i> | metric $\downarrow$ |
|-----------------------------------|---------------------|

Ruijie(config-router)#

$\downarrow$

Ruijie(config-router)#

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

Ruijie(config-router)#

$\downarrow$

$\downarrow$

IP

$\downarrow$

no

no

$\downarrow$

redistribute

no  $\downarrow$

metric

route-map

route-map

route-map

route-map

metric

metric

$\downarrow$

Ruijie(config-router)#

Ruijie(config-router)# **redistribute static route-map static-rmap**

Ruijie(config-router)# **no redistribute static route-map static-rmap**

Ruijie(config-router)# **no redistribute static**

Ruijie(config-router)#

|                          |  |
|--------------------------|--|
|                          |  |
| <b>show ip protocols</b> |  |

## 45.19 redistribute ospf

OSPF

BGP

no

$\downarrow$

```
metric-value] [match {internal|external [1|2]|nssa-external [1|2]}]
```

Г Д

Г Д

BGP IPv4 VRF

W

---

---

Г Д

## 45.20 route-target

Г Д

Г Д

---

45-17

Г А

VRF

Г А

VRF

RT

Ш

Г А

```
Ruijie(config)# ip vrf vrf1
Ruijie(config-vrf)# route-target import 100:1
Ruijie(config-vrf)# route-target export 100:2
Ruijie(config-vrf)# route-target both 100:4
```

Г А

|        |     |
|--------|-----|
|        |     |
| ip vrf | vrf |

## 45.21 show ip bgp vpnv4

VPN

Ш

```
show ip bgp vpnv4 all [network | neighbor [address] | summary |
label]
```

```
show ip bgp vpnv4 vrf vrf_name [network | summary | label]
```

```
show ip bgp vpnv4 rd rd_value [network | neighbor [address] |
summary | label]
```

Г А

|          |    |
|----------|----|
|          |    |
| network  |    |
| neighbor | or |



|          |                |
|----------|----------------|
| Metric   |                |
| Localprf |                |
| Path     | AS-path        |
| i        | ORIGIN IGP     |
| e        | ORIGIN EGP     |
| ?        | ORIGIN IGP EGP |

## 45.22 show ip route vrf

VRF 

**show ip route vrf** *vrf\_name* [*A.B.C.D mask*] **bgp** | **connected** | **isis** | **ospf** | **rip** | **static**

└─┬─┐  
A

| <i>vrf_name</i>     | VRF  |
|---------------------|------|
| <i>A.B.C.D mask</i> |      |
| <b>bgp</b>          | BGP  |
| <b>connected</b>    |      |
| <b>isis</b>         | ISIS |
| <b>ospf</b>         | OSPF |
| <b>rip</b>          | RIP  |
| <b>static</b>       |      |

└─┬─┐  
A

└─┬─┐  
A

```
Ruijie# show ip route vrf vrf1
Codes: C - connected, S - static, R - RIP, B - BGP
O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
```

```

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2 ia
- IS-IS inter area
* - candidate default
B 192.168.0.1/32 , [200/0] via 192.168.0.2, 01:02:33
B 192.168.0.3/32 , [200/0] via 192.168.4.1 , 01:02:33
C 192.168.4.0/24 is directly connected ,eth1

```

└─┬─┐ A

| show ip vrf | vrf |
|-------------|-----|

## 45.23 show ip vrf

VRF      山

**show ip vrf** [vrf-name]

└─┬─┐ A

vrf-name                  VRF

└─┬─┐ A

└─┬─┐ A

RF                  VRF                  VRF                  V  
                          VRF                  山

└─┬─┐ A

```

Ruijie# show ip vrf vrf1
VRF pe1 default RD 100 2
Interfaces
Eth0
Export VPN route-target communities
RT 100 30
No import VPN route-target community
No import route-map

```

└─┬─┐ A

| ip vrf       | VRF |
|--------------|-----|
| rd           | RD  |
| route-target | RT  |

|                          |     |
|--------------------------|-----|
| <b>ip vrf forwarding</b> | VRF |
|--------------------------|-----|





show interfaces

Г Д

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport protected
```

Г Д

|                 |   |
|-----------------|---|
|                 |   |
| show interfaces | ⏏ |

### 46.1.3 switchport port-security

$\mathbb{W}$ 
no  
 $\mathbb{W}$

**switchport port-security [violation {protect | restrict | shutdown}]**

```
no switchport port-security [violation]
```

Г Д

|                           |          |
|---------------------------|----------|
|                           |          |
| <b>port-security</b>      |          |
| <b>violation protect</b>  | ⏏        |
| <b>violation restrict</b> | trap⏏    |
| <b>violation shutdown</b> | ⏏ 4 Trap |

Г Д

W

Г Д

Г Д

IP( )                      MAC  
                                        (

W

1

---

---

**port-security aging static**

▮

**show port-security**

Г     А

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport port-security aging time
8
Ruijie(config-if)# switchport port-security aging
static
```

Г             А

|                    |   |
|--------------------|---|
|                    |   |
| show port-security | ▮ |

### 46.1.5 switchport port-security mac-address

▮

no

▮

**switchport port-security** [**mac-address** *mac-address* [**ip-address** {*ip-address* | *ipv6-address*}]] | [**maximum** *value*]

**no switchport port-security** [ **mac-address** *mac-address* [**ip-address** {*ip-address* | *ipv6-address*}]] | [**maximum**]

Г             А

|                                       |   |           |
|---------------------------------------|---|-----------|
|                                       | ° |           |
| <b>mac-address</b> <i>mac-address</i> | ° | ▮         |
| <b>ip-address</b> <i>ip-address</i>   | ° | IP<br>▮   |
| <b>ip-address</b> <i>ipv6-address</i> | ° | IPV6<br>▮ |

**maximum**

г Д

ACL IP MAC  
ACL 802.1x IP  
IP

г Д

gigabitethernet 1/1  
00d0.f800.073c IP 192.168.12.202  
Ruijie# **configure terminal**  
Ruijie(config)# **interface gigabitethernet 1/1**  
Ruijie(config-if)# **switchport mode access**  
Ruijie(config-if)# **switchport port-security**  
Ruijie(config-if)# **switchport port-security**  
**mac-address 00d0.f800.073c ip-address 192.168.12.202**

г Д

|                    |   |
|--------------------|---|
|                    |   |
| show port-security | Ш |

г Д

S8600 IP 1K IP  
84

### 46.1.6 arp-check

ARP no Ш default  
Ш  
[no | default] **arp-check**

cpu CPU  
auto :

Ш

Ш

г Д

---

Arp-check

Arp

Ш

Ш

arp

Ш

Ш

Г Д

Ruijie(config-if)# **arp-check**

Г Д

|                           |   |
|---------------------------|---|
|                           |   |
| <b>show port-security</b> | Ш |

## 46.2

- **show storm-control**
- **show port-security**

### 46.2.1 show storm-control

Ш

**show storm-control** [*interface-id*]

Г Д

|                     |     |
|---------------------|-----|
|                     | ◦   |
| <i>interface-id</i> | ◦ Ш |

Г Д

Г Д

Г Д

```
Ruijie# show storm-control gigabitethernet 1/1
Interface Broadcast Control Multicast Control Unicast
Control

Gi1/1 Disabled Disabled Disabled
```

Г Д

|               |   |
|---------------|---|
| o             | o |
| storm-control | o |

### 46.2.2 show port-security

⌵

show port-security [address] [interface *interface-id*]

Г     Д

| address                       | ⌵ |
|-------------------------------|---|
| interface <i>interface-id</i> | ⌵ |

Г     Д

Г     Д

Ч

⌵

Г     Д

```
Ruijie# show port-security
Secure Port MaxSecureAddr(count) CurrentAddr(count)
Security Action

Gi1/1 128 1 Restrict
Gi1/2 128 0 Restrict
Gi1/3 8 1 Protect
```

Г     Д

| switchport port-security             | ⌵ |
|--------------------------------------|---|
| switchport port-security aging       | ⌵ |
| switchport port-security mac-address | ⌵ |

## 47 802.1X

### 47.1 dot1x

dot1x

- **dot1x auto-req**
- **dot1x auto-req packet-num**
- **dot1x auto-req req-interval**
- **dot1x auto-req user-detect**

#### 47.1.1 dot1x auto-req

```

802.1X dot1x auto-req
no 1
[no] dot1x auto-req

r A

r A

 1

r A

802.1x show dot1x auto-req

r A

```

802.1x

```

Ruijie# configure terminal
Ruijie(config)# dot1x auto-req
Ruijie(config)# end
Ruijie(config)# show dot1x auto-req
Auto-Req: Enabled
User-Detect : Enabled
Packet-Num : 0
Req-Interval: 30 Second

```

r A



|                     |  |
|---------------------|--|
| show dot1x auto-req |  |
|---------------------|--|

## 47.1.2 dot1x auto-req packet-num

no

**dot1x auto-req packet-num** *num*

**no dot1x auto-req packet-num**

Г Д

*num*

Г Д

num = 0;

Г Д

Ш

Г Д

*interval*

S

Г Д

30

Г Д

Ш

Г Д

**show dot1x auto-req**

Г Д

```

r d
show dot1x auto-reg

```

Г Д

```
Ruijie# configure terminal
Ruijie(config)# dot1x auto-reg user-detect
Ruijie(config)# end
Ruijie# show dot1x auto-reg
Auto-Req: Enabled
User-Detect : Enabled
Packet-Num : 0
Req-Interval: 60 Second
```

Г Д

|                     |  |
|---------------------|--|
|                     |  |
| show dot1x auto-req |  |

## 47.2 dot1x

dot1x

- ```

0 dot1x timeout quiet-period
0 dot1x timeout re-authperiod
0 dot1x timeout server-timeout
0 dot1x timeout supp-timeout
0 dot1x timeout tx-period

```

47.2.1 dot1x timeout quiet-period

☐ no

dot1x timeout quiet-period *seconds*
no dot1x timeout quiet-period

Г Д

seconds W

0 65535W s

Г Д

10 Ш

Г Д

Ш

Г Д

Ш

show dot1x 3 3.4

```

seconds                               0 65535s
r      A
3600
r      A
show dot1x                           802.1x
r      A
1000s
Ruijie# configure terminal
Ruijie(config)# dot1x timeout re-authperiod 1000
Ruijie(config)# end
Ruijie# show dot1x
802.1X Status:      Enabled
Authentication Mode: EAP-MD5
Authed User Number: 0
Re-authen Enabled:  Disabled
Re-authen Period:   1000 sec
Quiet Timer Period: 1000 sec
Tx Timer Period:    3 sec
Supplicant Timeout: 3 sec
Server Timeout:     5 sec
Re-authen Max:      3 times
Maximum Request:    3 times
Filter Non-RG Supp: Disabled
Client Oline Probe: Disabled
Eapol Tag Enable:   Disabled
Authorization Mode:  Group Server

```

```

r      A

```

show dot1x	802.1x

47.2.3 dot1x timeout server-timeout

```

no                                     s
dot1x timeout server-timeout seconds

```

```

r      A
      seconds
      65535
r      A
      5
r      A
      10
r      A
      show dot1x      802.1x      10s
r      A
      10s
Ruijie# configure terminal
Ruijie(config)# dot1x timeout server-timeout 10
Ruijie(config)# end
Ruijie# show dot1x
```

no

dot1x timeout supp-timeout *seconds*

no dot1x timeout supp-timeout

seconds

0

65535

3

show dot1x

802.1x

10s

Ruijie# **configure terminal**

Ruijie(config)# **dot1x timeout supp-timeout 10**

Ruijie(config)# **end**

Ruijie# **show dot1x**

802.1X Status: Enabled

Authentication Mode: EAP-MD5

Authed User Number: 0

Re-authen Enabled: Disabled

Re-authen Period: 1000 sec

Quiet Timer Period: 1000 sec

Tx Timer Period: 3 sec

Supplicant Timeout: 10 sec

Server Timeout: 10 sec

Re-authen Max: 3 times

Maximum Request: 3 times

Filter Non-RG Supp: Disabled

Client Oline Probe: Disabled

Eapol Tag Enable: Disabled

Authorization Mode: Group Server

show dot1x	802.1x

47.2.5 dot1x timeout tx-period

山


```

Supplicant Timeout: 10 sec
Server Timeout:    10 sec
Re-authen Max:     3 times
Maximum Request:   3 times
Filter Non-RG Supp: Disabled
Client Oline Probe: Disabled
Eapol Tag Enable:  Disabled
Authorization Mode: Group Server

```

└─┬─┘

show dot1x	802.1x

47.3.2 dot1x reauth-max

└─┬─┘ no

└─┬─┘

```

dot1x reauth-max count
no dot1x reauth-max

```

└─┬─┘

count └─┬─┘

└─┬─┘

3

└─┬─┘

└─┬─┘

└─┬─┘

└─┬─┘

show dot1x 802.1x └─┬─┘

└─┬─┘

```

Ruijie# configure terminal
Ruijie(config)# dot1x reauth-max 5
Ruijie(config)# end
Ruijie# show dot1x

```

```

802.1X Status:      Enabled
Authentication Mode: EAP-MD5
Authed User Number: 0

```

```
Re-authen Enabled:    Enabled
Re-authen Period:     1000 sec
Quiet Timer Period:   1000 sec
Tx Timer Period:      10 sec
Supplicant Timeout:   10 sec
Server Timeout:       10 sec
Re-authen Max:        5 times
Maximum Request:      3 times
Filter Non-RG Supp:   Disabled
Client Oline Probe:   Disabled
Eapol Tag Enable:     Disabled
Authorization Mode:    Group Server
```

r **A**

show dot1x	802.1x

47.4 dot1x

- **dot1x probe-timer**
- **dot1x client-probe enable**

47.4.1 dot1x probe-timer

```
dot1x probe-timer{interval | alive}interval
no dot1x probe-timer
```

r **A**

```
no
interval hello
alive
interval
```

r **A**

```
Hello            20
                 250
```

r **A**

▮

Г А

show dot1x 802.1x

▮

Г А

hello 30 , 120

Ruijie# **configure terminal**

Ruijie(config)# **dot1x probe-timer interval 30**

Ruijie(config)# **dot1x probe-timer alive 120**

Ruijie(config)# **end**

Ruijie# **show dot1x probe-timer**

Hello Interval: 30 Seconds

Hello Alive: 120 Seconds

Г А

Show dot1x probe-timer	

Ruijie# **show dot1x**

AAA

AAA

▮

no

▮

dot1x authentication {default | *list-name*}**no dot1x authentication {default | *list-name*}**

```

r      A
      mac-addr
      Interface
r      A
      802.1X
r      A
      802.1X
r      A
      802.1X
      show dot1x
      auth-address table
r      A
      802.1X
```

```
Ruijie# configure terminal
Ruijie(config)# dot1x auth-address-table address
00d0f8000000 interface ethernet 1/1
Ruijie(config)# end
Ruijie#
```

show dot1x auth-address-table	802.1X

47.5.3 dot1x auth-fail max-attempt

VLAN

dot1x auth-fail max-attempt num

no dot1x auth-fail max-attempt

num	VLAN , 1-3

3

show dot1x

⌵

VLAN

Ruijie# **configure terminal**

Ruijie(config)# **dot1x auth-fail max-attempt 5**

Ruijie(config)# **end**

Ruijie#write

show dot1x	802.1x ⌵

-	-

47.5.4 dot1x auth-fail vlan

802.1x

vlan⌵

dot1x auth-fail vlan vid

no dot1x auth-fail vlan

vid	vlan vid

vlan

⌵

show dot1x interface

⌵

802.1x

vlan

Ruijie# **configure terminal**

Ruijie(config)# **interface fa 0/1**

Ruijie(config-if)# **dot1x auth-fail vlan 2**

Ruijie(config-if)# **end**

Ruijie#write

	show dot1x interface	802.1x Ⅲ
	-	-

47.5.5 dot1x auth-mode

		802.1x Ⅲ
		dot1x auth-mode {eap-md5 chap pap}
		no dot1x auth-mode
г	Д	
		eap-md5 802.1x EAP-MD5
		chap 802.1x CHAP
		pap 802.1x PAP
г	Д	
		EAP-MD5
г	Д	
		Ⅲ
г	Д	
		show dot1x 802.1x
г	Д	
		802.1x
		Ruijie# configure terminal
		Ruijie(config)# dot1x auth-mode chap
		Ruijie(config)# end
		Ruijie#
г	Д	
		show dot1x 802.1x Ⅲ

47.5.6 dot1x default

802.1x

dot1x default

└

└

└

show dot1x

802.1x

Ruijie# configure terminal
Ruijie(config)# dot1x default
Ruijie(config)# end
Ruijie# end

show dot1x

802.1x

47.5.7 dot1x dynamic-vlan enable

no

show dot1x dynamic-vlan

802.1x

Ш

Г А

802.1x vlan

Ruijie# **configure terminal**Ruijie(config)# **interface** *gigabitEthernet 4/5*Ruijie(config-if)# **dot1x dynamic-vlan enable**Ruijie(config)# **end**

Ruijie#

Г А

show dot1x	802.1x Ш

47.5.8 dot1x guest-vlan**guest vlan** Ш**no**

Ш

dot1x guest-vlan *vid***no dot1x guest-vlan**

Г А

vid <1 - 4094>

Г А

Г А

Г А

1. guest vlan **dot1x dynamic-vlan enable**

guest vlan Ш

2. guest vlan

vlanШ

3. **show running-config** 802.1x Ш

Г А

802.1x guest vlan

Ruijie# **configure terminal**Ruijie(config)# **interface** *gigabitEthernet 4/5*Ruijie(config-if)# **dot1x guest-vlan 10**

```
Ruijie(config)# end
Ruijie#
```

Г А

show running-config	802.1x Ш

47.5.9 dot1x eapol-tag

EAPOL TAG Ш

```
dot1x eapol-tag
no dot1x eapol-tag
```

Г А

Ш

Г А

Г А

Ш

Г А

show dot1x 802.1x Ш

Г А

802.1X tag

```
Ruijie# configure terminal
Ruijie(config)# dot1x eapol-tag
Ruijie(config)# end
Ruijie#
```

Г А

show dot1x	802.1x Ш

47.5.10 dot1x mac-auth-bypass

MAC Ш

```
dot1x mac-auth-bypass
```

no dot1x mac-auth-bypass



▮

show run 802.1x ▮

802.1x MAC

Ruijie# **configure terminal**

Ruijie(config)# **interface fa 0/1**

Ruijie(config-if)# **dot1x mac-auth-bypass timeout-activity 3600**

Ruijie(config-if)# **end**

Ruijie#write

show dot1x port-control interface	802.1x ▮

```
Ruijie(config-if)# dot1x mac-auth-bypass violation
Ruijie(config-if)# end
Ruijie#write
```

```
show dot1x port-control interface
```

802.1x

```


```

```

DOT1X
DOT1X

```

DOT1X

```


```

```


```

no

```


```

```
dot1x max-req count
```

```
no dot1x ma87x-req
```

```

r      A

```

```
count
```

```


```

```

r      A

```

```
3

```

```

r      A

```

```


```

```

r      A

```

```
show dot1x
```

802.1x

```


```

```

r      A

```

802.1x

7

```
Ruijie# configure terminal
```

```
Ruijie(config)# dot1x max-req 7
```

```
Ruijie(config)# end
```

```
Ruijie#
```

```

r      A

```

show dot1x	802.1x ❸

47.5.14 dot1x private-supplicant-only

```

Ruijie# show dot1x private-supplicant-only
Ruijie# no dot1x private-supplicant-only

Ruijie# show dot1x private-supplicant-only
Ruijie# no dot1x private-supplicant-only

Ruijie# show dot1x private-supplicant-only
Ruijie# no dot1x private-supplicant-only

Ruijie# show dot1x private-supplicant-only
Ruijie# no dot1x private-supplicant-only

Ruijie# show dot1x private-supplicant-only
Ruijie# no dot1x private-supplicant-only

```

```

Ruijie# configure t
Ruijie(config)# dot1x private-supplicant-only
Ruijie(config)# end
Ruijie#

```

```

Ruijie#

```

show dot1x private-supplicant-only	❸

47.5.15 dot1x port-control auto

```

Ruijie# show dot1x port-control auto
Ruijie# no dot1x port-control

Ruijie# show dot1x port-control auto
Ruijie# no dot1x port-control

```

г А

Ш

г А

802.1x Ш

г А

Ш

г А

show dot1x 802.1x Ш

г А

802.1x

```
Ruijie# configure terminal
Ruijie(config)# interface g0/1
Ruijie(config-if)# dot1x port-control auto
Ruijie(config-if)# end
Ruijie#
```

г А

show dot1x	802.1x Ш

47.5.16 dot1x port-control-mode

802.1x

MAC

Ш

Ш

Ш

dot1x port-control-mode {mac-based | {port-based [single-host]} }
no dot1x port-control-mode

г А

mac-based mac 802.1X
port-based 802.1X
single-host 802.1x

Г А

mac-based

Г А

Ш

Г А

show dot1x port-control

802.1x

Ш

single-host

802.1x

show dot1x

port-control

port-based

show running-config

dot1x port-control-mode port-based single-hostШ

single-host

default-user-limit

single-host

Ш

single-host

default-user-limit

single-host

Ш

Г А

802.1x

Ruijie(config)# **interface g 0/1**

Ruijie(config-if)# **dot1x port-control auto**

Ruijie(config-if)# **dot1x port-control-mode**
port-based

Ruijie(config-if)# **end**

Ruijie#

802.1x

Ruijie(config)# **interface g 0/1**

Ruijie(config-if)# **dot1x port-control auto**

Ruijie(config-if)# **dot1x port-control-mode**
port-based single-host

Ruijie(config-if)# **end**

Ruijie#

Г А

port-based single-host

802.1x

802.1X

1.

dot1x stationarity enable

no dot1x stationarity enable

1.

1.

1.

1.

1.

1.

1.

802.1x

Ruijie# **configure terminal**

Ruijie(config)# **dot1x stationarity enable**

Ruijie(config)# **end**

Ruijie#

1.

47.5.18 dot1x redirect url

802.1x

URL

URL http:// https:// http://ruijie.net/web

http:// https:// 1

url url 1 no

url

dot1x redirect url [url-string]

[no] dot1x redirect url

<i>url-string</i>	URL

1 ruijie.net/web
Ruijie(config)# **dot1x redirect url** http://ruijie.net/web

		dot1x redirect for special tcp-destination port	ip ip web
		dot1x redirect time-out	
		dot1x redirect num for special source-ip	
		show dot1x	dot1x



1

dot1>

no do

4

dot1x redirect url

web

ip

ip

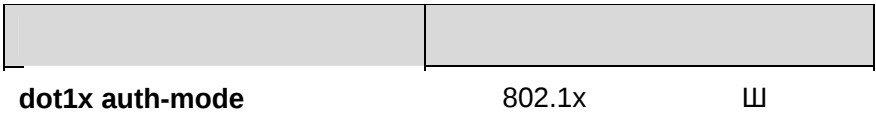
	dot1x redirect time-out	
	show dot1x	dot1x

三

Г А

```
Ruijie# show dot1x
802.1X Status:      Enabled
Authentication Mode: EAP-MD5
Authed User Number: 0
Re-authen Enabled:  Disabled
Re-authen Period:   3600 sec
Quiet Timer Period: 10 sec
Tx Timer Period:    3 sec
Supplicant Timeout: 3 sec
Server Timeout:     5 sec
Re-authen Max:      3 times
Maximum Request:    3 times
Filter Non-RG Supp: Disabled
Client Oline Probe: Disabled
Eapol Tag Enable:   Disabled
Authorization Mode:  Group Server
Ruijie#
```

Г А



47.6.2 show dot1x auth-address-table

802.1X

⌵

show dot1x auth-address-table [address mac-addr] [interface interface-id]

⌵

mac-addr

interface

⌵

⌵

⌵

⌵

⌵

```
Ruijie# show dot1x auth-address-table
interface:g3/1
-----
mac addr: 00D0.F800.0001
Ruijie#
```

⌵

⌵

dot1x auth-mode	802.1x ⌵
dot1x max-req	⌵

dot1x timeout server-timeout	∞
dot1x timeout supp-timeout	∞
dot1x timeout tx-period	∞

47.6.3 show dot1x auto-req

802.1x ∞

show dot1x auto-req

Г А

Г А

∞

Г А

∞

Г А

∞

Г А

Ruijie# **show dot1x auto-req**

Auto-Req: Disabled

User-Detect : Enabled

Packet-Num : 0

Req-Interval: 30 Seconds

Ruijie#

Г А

dot1x auth-mode	802.1x ∞
dot1x max-req	∞
dot1x port-control auto	∞
dot1x reauth-max	

dot1x re-authentication	W
dot1x timeout quiet-period	W
dot1x timeout re-authperiod	W
dot1x timeout server-timeout	W
dot1x timeout supp-timeout	W
dot1x timeout tx-period	W

47.6.4 show dot1x private-supPLICANT-only

W

show dot1x private-supPLICANT-only

r A

r A

W

r A

W

r A

W

r A

Ruijie# show dot1x private-supPLICANT-only
private-supPLICANT-only:: disabled

r A

dot1x auth-mode	802.1x W
dot1x max-req	W
dot1x port-control auto	W

dot1x reauth-max	
dot1x re-authentication	W
dot1x timeout quiet-period	W
dot1x timeout re-authperiod	W
dot1x timeout server-timeout	W
dot1x timeout supp-timeout	W
dot1x timeout tx-period	W

47.6.5 show dot1x max-req

W

show dot1x max-req

r A

r A

W

r A

W

r A

W

r A

```
Ruijie# show dot1x max-req
max-req: 2 times
Ruijie#
```

r A

dot1x auth-mode	802.1x W
dot1x max-req	W

dot1x port-control auto	▮
dot1x reauth-max	
dot1x re-authentication	▮
dot1x timeout quiet-period	▮
dot1x timeout re-authperiod	▮
dot1x timeout server-timeout	▮

dot1x timeout supp-timeout

o	o
o dot1x auth-mode	o 802.1x W
o dot1x max-req	o W
o dot1x port-control auto	o W
o dot1x reauth-max	o
o dot1x re-authentication	o W
o dot1x timeout quiet-period	o W
o dot1x timeout re-authperiod	o W
o dot1x timeout server-timeout	o W
o dot1x timeout supp-timeout	o W
o dot1x timeout tx-period	o W

47.6.7 show dot1x probe-timer

show dot1x probe-timer

r A

W

r A

r A

Ruijie# show dot1x probe-timer

Hello Interval: 20 Seconds

Hello Alive: 250 Seconds

Ruijie#

r A

--	--

dot1x auth-mode	802.1x	W
dot1x max-req		W
dot1x port-control auto		W
dot1x reauth-max		
dot1x re-authentication		W
dot1x timeout quiet-period	W	
dot1x timeout re-authperiod		W
dot1x timeout server-timeout	W	
dot1x timeout supp-timeout	W	
dot1x timeout tx-period	W	

47.6.8 show dot1x re-authentication

show dot1x re-authentication

Г Д

W

Г Д

Г Д

Ruijie# **show dot1x re-authentication**

reauth-enabled: disabled

Ruijie#

Г Д

dot1x auth-mode	802.1x W

1

◦ dot1x max-req	◦ Ш
◦ do dot1x port-auth auto	◦ A'5B y ·hp>Gi „AxA• õ ,át-q @H ‡
◦ dot1x reauth-max	◦

z ,D „ G ` .át-q @h

Authed Static
Ruijie#

r A

dot1x auth-mode	802.1x	W
dot1x max-req		W
dot1x port-control auto		W

```

Ruijie# show dot1x user id 1
User name: caikov
id: 1
Type: static
Mac address is 0013.2049.8272
Vlan id is 217
Access from port Gi0/13
User ip address is 192.168.217.64
Max user number on this port is 6000
COS on this port is 5
Up-bandwidth is 1024 kbps
Down-bandwidth is 1024 kbps
Authorization vlan is dep7
Authorization session time is 1000000 seconds
Authorization ip address is 192.168.217.64
Start accounting
Permit proxy user
Permit dial user
IP privilege is 2

```

r

A

dot1x auth-mode	802.1x ▮
dot1x max-req	▮
dot1x port-control auto	▮
dot1x reauth-max	
dot1x re-authentication	▮
dot1x timeout quiet-period	▮
dot1x timeout re-authperiod	▮
dot1x timeout server-timeout	▮
dot1x timeout supp-timeout	▮
dot1x timeout tx-period	▮

47.6.12 show dot1x timeout

```

show dot1x timeout quiet-period
show dot1x timeout re-authperiod
show dot1x timeout server-timeout
show dot1x timeout supp-timeout
show dot1x timeout tx-period

```

```

r      A

```

```

    W

```

```

r      A

```

```

    W

```

```

r      A

```

```

    W

```

```

r      A

```

```

r      A

```

```

Ruijie# show dot1x timeout quiet-period
quiet-period: 60 sec

```

```

r      A

```

dot1x auth-mode	802.1x W
dot1x max-req	W
dot1x port-control auto	W
dot1x reauth-max	
dot1x re-authentication	W
dot1x timeout quiet-period	W
dot1x timeout re-authperiod	W
dot1x timeout server-timeout	W
dot1x timeout supp-timeout	W
dot1x timeout tx-period	W

48 AAA

48.1

- **aaa authentication dot1x**
- **aaa authentication enable**
- **aaa authentication login**
- **aaa authentication ppp**
- **login authentication**

48.1.1 aaa authentication dot1x

AAA	802.1X			aaa
authentication dot1x	802.1X		⏏	no
802.1X		⏏		

aaa authentication dot1x {default | *list-name*} *method1* [*method2*...]

no aaa authentication dot1x {default}

```

AAA 802.1X
└─ aaa authentication dot1x
    802.1X
└─
└─

```

└─ A

```

rds_d1x AAA 802.1X
RADIUS RADIUS
└─

```

```

Ruijie(config)# aaa authentication dot1x rds_d1x group
radius local

```

└─ A

aaa new-model	AAA
dot1x authentication	802.1X
username	

48.1.2 aaa authentication enable

```

AAA Enable
enable Enable
└─
└─
aaa authentication
no

```

```

aaa authentication enable default method1 [method2...]

```

```

no aaa authentication enable default

```

└─ A

```

default Enable
└─ Enable
└─

```

```

method 4

```

local	
none	

```

group RADIUS

```

AAA

AAA

AAA

AAA Enable AAA Enable
 AAA authentication enable
 Enable AAA

AAA

Enable

Enable

AAA

AAA

AAA Enable

AAA

RADIUS

RADIUS

AAA

Ruijie(config)# **aaa authentication enable default group radius local**

AAA

aaa new-model	AAA
enable	
username	

48.1.3 aaa authentication login

AAA Login AAA
authentication login Login AAA no
 AAA

aaa authentication login {default | list-name} method1 [method2...]

no aaa authentication login {default | list-name}

AAA

default Login
 AAA

list-name Login AAA

method 4

local	
none	
group	RADIUS TACACS+

г д

г д

Ш

г д

AAA AAA Login
 Ш **aaa authentication login**
 Login Ш
 Login Login
 Ш

г д

list-1 AAA Login Ш
 RADIUS RADIUS
 Ш

Ruijie(config)# **aaa authentication login list-1 group radius local**

г д

aaa new-model	AAA
username	
login authentication	Login

48.1.4 aaa authentication ppp

AAA PPP aaa
authentication ppp PPP Ш no
 Ш

```
aaa authentication ppp {default | list-name} method1 [method2...]
```

```
no aaa authentication ppp {default | list-name}
```

Г Д

```
default PPP
```

```
└─┘
```

```
list-name PPP └─┘
```

```
method 4
```

local	
none	
group	RADIUS

Г Д

Г Д

```
└─┘
```

Г Д

```
AAA PPP AAA PPP
```

```
└─┘ aaa authentication ppp
```

```
PPP └─┘
```

```
└─┘
```

Г Д

```
rds_ppp AAA PPP └─┘
```

```
RADIUS RADIUS
```

```
└─┘
```

```
Ruijie(config)# aaa authentication ppp rds_ppp group  
radius local
```

Г Д

aaa new-model	AAA
ppp authentication	PPP
username	

- **aaa authorization commands**
- **aaa authorization config-commands**
- **aaa authorization console**
- **aaa authorization exec**
- **aaa authorization network**
- **authorization commands**
- **authorization exec**

48.2.1 aaa authorization commands

	NAS	CLI	AAA	
				⏏
		aaa authorization commands	⏏	no
AAA		⏏		
		aaa authorization commands <i>level</i> { default <i>list-name</i> } <i>method1</i> [<i>method2...</i>]		
		no aaa authorization commands <i>level</i> { default <i>list-name</i> }		
Г	Д			
		<i>level</i>		0~15
		⏏		
		default		⏏
		<i>list-name</i>		⏏
		<i>method</i>		4
		none		
		group		TACACS+
Г	Д			
		AAA		⏏
Г	Д			
		⏏		
Г	Д			

AAA

14

14

14

14

14

TACACS+ 15

Ruijie(config)# **aaa authorization commands 15 default group tacacs+**

14

aaa new-model	AAA
authorization commands	

48.2.2 aaa authorization config-commands

AAA

aaa authorization config-commands

no AAA

14

aaa authorization config-commands

no aaa authorization config-commands

14

14

14

14

14

14

14

no

1.

2.

Ruijie(config)# **aaa authorization config-commands**

3.

aaa new-model	AAA
aaa authorization commands	AAA

48.2.3 aaa authorization console

AAA

aaa authorization console

no

AAA

1.

aaa authorization console

no aaa authorization console

2.

3.

4.

5.

6.

7.

8.

9.

10.

11.

Ruijie(config)# **aaa authorization console**

12.



Г Д

RADIUS Exec

Ruijie(config)# **aaa authorization exec default group radius**

Г Д

aaa new-model	AAA
authorization exec	
username	

48.2.5 aaa authorization network

AAA

PPP 4 SLIP

aaa authorization network AAA no

AAA

aaa authorization network {default | list-name} method1 [method2...]

no aaa authorization network {default | list-name}

Г Д

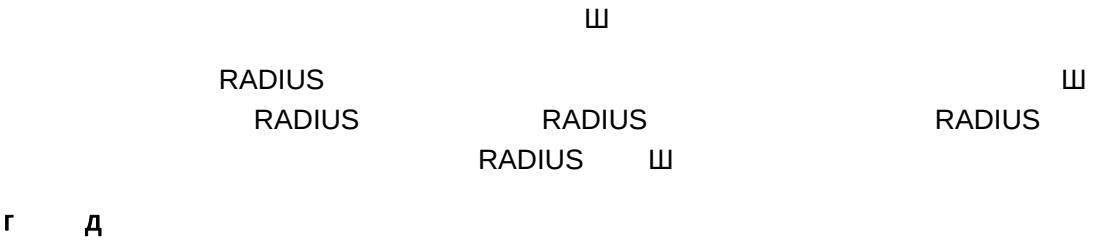
default Network

AAA

method 4

none	
group	RADIUS

Г Д



```
Ruijie(config)# aaa authorization network default group
radius
```

aaa new-model	AAA
aaa accounting	AAA
aaa authentication	AAA
username	

Ш

Ш

Ш

Г Д

cmd

cmd4{ŃC àóâ ÍHj] 2Àià_{cmd}

Exec Exec Exec

AAA

exec-1 Exec RADIUS

none VTY

0 – 4

Ruijie(config)# **aaa authorization exec exec-1 group radius none**

Ruijie(config)# **line vty 0 4**

Ruijie(config-line)# **authorization exec exec-1**

AAA

aaa new-model	AAA
aaa authorization commands	AAA Exec

48.3

RADIUS

- **aaa accounting commands**
- **aaa accounting exec**
- **aaa accounting network**
- **aaa accounting update**
- **aaa accounting update periodic**
- **accounting commands**
- **accounting exec**

48.3.1 aaa accounting commands

NAS

aaa accounting commands no

no

aaa accounting commands level {default | list-name} start-stop method1 [method2...]

no aaa accounting commands level {default | list-name}

		NAS		
	aaa accounting exec		no	Exec
山				

Г Д

aaa new-model	AAA
aaa authorization network	AAA
aaa authentication	AAA
username	

48.3.4 aaa accounting update

aaa accounting update

Щ no

Щ

aaa accounting update

no aaa accounting update

Г Д

Г Д

Щ

Г Д

Щ

Г Д

AAA

Щ

AAA

Щ

Г Д

Щ

Ruijie(config)# aaa new-model

Ruijie(config)#

Г Д

aaa new-model	AAA
aaa accounting network	

```

    level                                0~15
    ㄣ
    default                             ㄣ
    list-name                           ㄣ
r      A
r      A
    ㄣ
r      A
    ㄣ
    ㄣ
    ㄣ
r      A
    cmd                                15
    TACACS+                           none ㄣ
    VTY 0 – 4
Ruijie(config)# aaa accounting commands
```

list-name

no aaa group server {radius | tacacs+} name

┌ ▴

name

└ radius ─┘ └ tacacs+ ─┘

RADIUS TACACS+

└┘

┌ ▴

└┘

┌ ▴

AAA

RADIUS TACACS+

└┘

┌ ▴

└┘

Ruijie(config)# **aaa group server radius ss**

Ruijie(config-gs-radius)# **end**

Ruijie# show aaa group

Group Name: ss

Group Type: radius

Referred: 1

Server List:

┌ ▴

show aaa group	aaa

48.4.2 ip vrf forwarding

AAA vrf no └┘

ip vrf forwarding vrf-name

no ip vrf forwarding

┌ ▴

vrf-name vrf

┌ ▴

┌ ▴

└┘

Г Д

vrf

Г Д

Ш

```
Ruijie(config)# aaa group server radius ss
Ruijie(config-gs-radius)# server 192.168.4.12
Ruijie(config-gs-radius)# server 192.168.4.13
Ruijie(config-gs-radius)# ip vrf forwarding vrf-name
Ruijie(config-gs-radius)# end
```

Г Д

aaa group server	aaa
show aaa group	aaa

48.4.3 server

AAA

no

Ш

```
server ip-address [auth-port port1] [acct-port port2]
no server ip-address [auth-port port1] [acct-port port2]
```

Г Д

```
ip-address          ip
port1                RADIUS
port2                RADIUS
```

Г Д

Г Д

Ш

Г Д

Ш

Г Д

Ш

```
Ruijie(config)# aaa group server radius ss
Ruijie(config-gs-radius)#      server      192.168.4.12
acct-port 5 auth-port 6
Ruijie(config-gs-radius)# end
Ruijie# show aaa group
Group Name:  ss
Group Type:  radius
Referred:    2
Server List:
IP Address:  192.168.4.12
Authentication Port: 6
Accounting Port: 5
Referred:    1
```

Г Д

aaa group server	aaa
show aaa group	aaa

48.4.4 show aaa group

AAA Ш

show aaa group

Г Д

Referred: 2
Server List:
IP Address: 192.168.217.64
Authentication Port: 1812
Accounting Port: 1813
Referred: 1

r A

aaa group server	AAA

48.5 AAA

- **aaa local authentication attempts**
- **aaa local authentication lockout-time**
- **aaa new-model**
- **clear aaa local user lockout**
- **debug aaa**
- **show aaa method-list**
- **show aaa user lockout**

48.5.1 aaa local authentication attempts

login

48.5.1.1 aaa local authentication attempts (shp)4(ticationed: 1 .12 ref 0 g BT /

```
Ruijie# configure terminal
Ruijie(config)# aaa local authentication attempts 6
```

```
└      4
```

show running-config	
show aaa logout	login

48.5.2 aaa local authentication logout-time

```
login
```

```
aaa local authentication logout-time logout-time
```

```
└      4
```

```
logout-time                                1~2147483647
```

```
└      4
```

```
15
```

```
└      4
```

```
┌
```

```
└      4
```

```
login
```

```
└      4
```

```
Ruijie# configure terminal
Ruijie(config)# aaa local authentication logout-time
5
```

```
└      4
```

show running-config	
show aaa logout	login

48.5.3 aaa new-model

aaa authentication	
aaa authorization	
aaa accounting	

48-27

1

2

3

Ruijie# clear aaa local user lockout all

4

show running-config	
show aaa lockout	login

48.5.5 debug aaa

AAA

1

no

2

debug aaa event

no debug aaa event

3

4

5

EXEC

6

48.5.6 show aaa method-list

AAA

1

show aaa method-list

2

3

4

5

6

7

AAA 三

Г Д

AAA 三

Ruijie# **show aaa method-list**

Authentication method-list

aaa authentication login default group radius

aaa authentication ppp default group radius

aaa authentication dot1x default group radius

aaa authentication dot1x san-f local group angel group
rain none

aaa authentication enable default group radius

Accounting method-list

aaa accounting network default start-stop group radius

Authorization method-list

aaa authorizing network default group radius

Г Д

aaa authentication	
aaa authorization	
aaa accounting	

48.5.7 show aaa user logout

三

show aaa user logout {all | user-name <word>}

Г Д

<word> ID

Г Д

Г Д

三

Г Д

三

Г Д

Ruijie# **show aaa user logout all**

r d

show running-config	
show aaa logout	login

49 RADIUS

49.1 RADIUS

RADIUS

- **ip radius radius source-interface**
- **radius-server attribute 31**
- **radius-server host**
- **radius-server key**
- **radius-server retransmit**
- **radius-server timeout**
- **radius-server dead-time**
- **radius attribute**
- **radius set qos cos**
- **radius vendor-specific extend**

49.1.1 ip radius source-interface

		radius			ip radius	
		source-interface	▯▯▯	no	RADIUS	▯▯▯
		ip radius source-interface	<i>interface</i>			
		no radius source-interface				
Г	А					
		<i>Interface</i>	radius			
Г	А					
		radius		▯▯▯		
Г	А					
			▯▯▯			
Г	А					
		radius			nas	
		radius		▯▯▯		ip
		radius			▯▯▯	
Г	А					

radius fastEthernet 0/0 ip

radius

Ruijie(config)# **ip radius source-interface**
fastEthernet 0/0

r A

radius-server host	RADIUS
ip address	ip

49.1.2 radius-server attribute 31

RADIUS Calling-Station-ID MAC
radius-server attribute 31 **no**

W

radius-server attribute 31 mac format {ietf | normal | unformatted}
no radius-server attribute 31 mac format

r A

ietf: ETF RFC3580 I - L W
00-D0-F8-33-22-ACW

normal: MAC
I . L W 00d0.f833.22acW

unformatted: W
00d0f83322acW

r A

unformatted W

r A

W

r A

RADIUS 802.1x IETF
Calling-Station-ID

配置命令

radius-server host	RADIUS

49.1.3 radius-server host

RADIUS

radius-server

no

RADIUS

配置命令

radius-server host *ip-address* [**auth-port** *port-number*] [**acct-port** *port-number*]

no radius-server host *ip-address*

配置命令

ip-address RADIUS IP

auth-port RADIUS UDP

port-number RADIUS UDP 0

acct-port Radius UDP

port-number RADIUS UDP 0

配置命令

RADIUS

配置命令

配置命令

配置命令

RADIUS AAA

RADIUS

radius-server

RADIUS

配置命令

RADIUS

Ruijie(config)# **radius-server host** 192.168.12.1

配置命令

aaa authentication	AAA

no

no radius-server retransmit

3Ш

W

W

W

4

Г Д

radius-server host	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

W

no radius-server timeout

seconds ▯ 1-1000 ▯

Г Д

5

```

r      A

```

```

    W

```

```

r      A

```

```

    W

```

```

r      A

```

10

```

Ruijie(config)# radius-server timeout 10

```

```

r      A

```

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS

49.1.7 radius-server deadtime

```

t      t      RGOS      RADIUS
      deadtime
      radius-server deadtime W

```

no

W

```

radius-server deadtime minnutes

```

```

no radius-server deadtime

```

```

r      A

```

```

minnutes

```

W

1-1000 W

```

r      A

```

5

```

r      A

```

```

    W

```

```

r      A

```

```

    W

```

```

r      A

```

10

12	file-name-1	12
13	file-name-2	13
14	file-name-3	14
15	file-name-4	15
16	max up-rate	16
17	version to server	17
18	flux-max-high32	18
19	flux-max-low32	19
20	proxy-avoid	20
21	dailup-avoid	21
22	ip privilege	22
23	login privilege	42

id		type
1	max down-rate	76
2	qos	77
3	user ip	3
4	vlan id	4
5	version to client	5
6	net ip	6
7	user name	7
8	password	8
9	file-diractory	9
10	file-count	10
11	file-name-0	11
12	file-name-1	12
13	file-name-2	13
14	file-name-3	14
15	file-name-4	15

16	max up-rate	75
17	version to server	17

1

Ruijie(config)#

qos cos dscp

Ruijie(config)#

Ruijie(config)# radius set qos cos

Ruijie(config)#

radius vendor-specific extend	Radius id

49.1.10 radius vendor-specific extend

id

radius vendor-specific extend

no radius vendor-specific extend

Ruijie(config)#

Ruijie(config)#

id

Ruijie(config)#

1

Ruijie(config)#

id

Ruijie(config)#

Ruijie(config)# radius vendor-specific extend

Ruijie(config)#

radius attribute	
radius set	qos cos

49-11

```

server state: ready
server ip : 192.168.4.13
acct port: 45
authen port: 74
server state: ready

```

└───┐
A

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

49.2.3 show radius parameter

RADIUS ┘

show radius parameter

└───┐
A

└───┐
A

└───┐
A

┘

└───┐
A

radius ┘

└───┐
A

```

Ruijie# show radius parameter
Server Timeout: 5 Seconds
Server Deadtime: 5 Minutes
Server Retries: 3
Server Key: *****

```

└───┐
A

--	--

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

49.2.4 show radius vendor-specific

RADIUS

W

show radius vendor-specific

r A

W

r A

r A

W

r A

radius

r A

```
Ruijie# show radius vendor-specific
id      vendor-specific      type-value
-----
1       max down-rate           76
2       qos                     77
3       user ip                 3
4       vlan id                 4
5       version to client      5
6       net ip                 6
7       user name              7
8       password              8
9       file-directory         9
10      file-count            10
11      file-name-0            11
12      file-name-1            12
13      file-name-2            13
14      file-name-3            14
15      file-name-4            15
16      max up-rate           75
```

17 version to server 17

50 TACACS+

50.1 TACACS+

TACACS+

- **aaa group server tacacs+**
- **server(TACACS+)**
- **ip vrf forwarding(TACACS+)**
- **ip tacacs source-interface**
- **tacacs-server host**
- **tacacs-server key**
- **tacacs-server timeout**

50.1.1 aaa group server tacacs+

TACACS+

TACACS+

山

aaa group server tacacs+ *group-name*

no aaa group server tacacs+ *group-name* nam 27TT0 1up s663498023 0F0 T61B44410

50.1.3 ip vrf forwarding(TACACS+)

```

TACACS+          vrf ( VRF
)
ip vrf forwarding vrf-name
no ip vrf forwarding

r      A
vrf-name vrf

r      A

r      A
TACACS+
r      A
TACACS+ vrf
r      A
TACACS+ VRF vpn1
Ruijie(config)# aaa group server tacacs+ tac1
Ruijie(config-gs-radius)# server 1.1.1.1
Ruijie(config-gs-radius)# ip vrf forwarding vpn1
r      A

```

aaa group server tacacs+	TACACS+
server	TACACS+ server

50.1.4 ip tacacs source-interface

```

TACACS+
ip tacacs source-interface interface
no ip tacacs source-interface

r      A
Interface TACACS+

r      A

```

W

S

ip

W

ACCACS+]

TACACS+

	TACACS+	AAA	TACACS+
山			

Г Д

tacacs-server host	TACACS+
tacacs-server timeout	TACACS+

50.1.7 tacacs-server timeout

TACACS+

Ш

tacacs-server timeout *seconds*

no tacacs-server timeout

Г Д

seconds

Ш

1-1000 Ш

Г Д

5

Г Д

Ш

Г Д

EÝNM 6~AÄEijμ>Â đđÄÖáð ðÃ5@Â`μ'5'¼† B Â Rd5

50.2.1 debug tacacs+

TACACS+	Ш	no	TACACS+	Ш
debug tacacs+				
no debug tacacs+				

51 SSH

51.1 SSH

SSH

- **crypto key generate**
- **crypto key zeroize**
- **ip ssh version**
- **ip ssh time-out**
- **ip ssh authentication-retries**

51.1.1 crypto key generate

crypto key generate {rsa | dsa}

r A

rsa	RSA
dsa	DSA

r A

SSH Server ▮

r A

r A

SSH Server SSH
▮ **enable service ssh-server** SSH Server
▮SSH 1 RSA SSH 2 RSA DSA ▮
RSA SSH1 SSH2
DSA SSH2 ▮

key zeroize

no crypto key generate

crypto

└ ┐

Ruijie# **configure terminal**
Ruijie(config)# **crypto key generate rsa**

└ ┐

show ip ssh

```
Ruijie# configure terminal
```

```
Ruijie(config)# crypto key zeroize rsa
```

```
r
```

```
A
```



```
Ruijie# configure terminal
Ruijie(config)# ip ssh version 2
```

Г А

show ip ssh	SSH Server Ш

Г А

RGOS10.1

51.1.4 ip ssh time-out

SSH Server Ш no
Ш

```
ip ssh time-out time
no ip ssh time-out
```

Г А

<i>time</i>	Ш

show ip ssh	ssh-server	W
-------------	------------	---

r

A

RGOS10.1

51.1.5 ip ssh authentication-retries

SSH Server

51.2 SSH

SSH

- **show ip ssh**
- **show ssh**
-

RGOS10.1

51.2.2 show ssh

SSH



show ssh

```

r      A

```

```

r      A

```

```

r      A

```

```

r      A

```

```

SSH      SSH      VTY
SSH      SSH      SSH      SSH      SSH

```

```

r      A

```

Ruijie# show ssh

```

r      A

```

```

r      A

```

RGOS10.1

51.2.3 show crypto key mypubkey

SSH Server



show crypto key mypubkey {rsaldsa}

```

r      A

```



Г Д

Г Д

SSH Server

Ч Ч Ш

Г Д

Ruijie# **show crypto key mypubkey rsa**

Г Д

crypto key generate {rsa dsa}	DSA RSA Ш

Г Д

RGOS10.1

51.2.4 disconnect ssh

\$

200W02+(A604HQp8B(mprQh.Vq0MAc1M

Г Д

show ssh	SSH Ш
Clear line vty <i>line_number</i>	VTY Ш

Г Д

RGOS10.1

52 CPU

52.1

- **cpu-protect type** *packet-tpye* **pps** *pps_value*
- **cpu-protect type** *packet-tpye* **pri** *pri_value*

52.1.1 cpu-protect type packet-type pps pps_value

CPU

cpu-protect type { arp | bpdudhcp | ipv6mcnCPU
-0.0026 Tc -0.0181 Td(|)Tj/9T1 1 Tf0.00

г Д

pri_num ID 0 7

г Д

0Щ

г Д

Щ

г Д

BPDU 7

Ruijie(config)# **cpu-protect type bpdu pri 7**
Set packet type bpdu pri 7.

г Д

cpu-protect type packet-type pps <i>pps_value</i>	

52.2

CPU

- **show cpu-protect mboard**
- **show cpu-protect slot** *slot-id*
- **show cpu-protect type** *packet-type*

52.2.1 show cpu-protect mboard

CPU

Щ

show cpu-protect mboard

г Д

Щ

г Д

CPU

Щ

г Д

S9610

CPU

Щ

Ruijie# **show cpu-protect mboard**

Type Pps Total Drop

```

-----
arp          500      19      0
bpdu         200      24      0
dhcp          0        0      0
gvrp          0        0      0
ipv6-mc       0        0      0
dvmrp         0        0      0
igmp          0        0      0
ospf          0        0      0
pim           0        0      0
rip           0        0      0
vrrp          0        0      0
unknow-ipmc   0        0      0
ttl1          0        0      0
...

```

Г Д

show cpu-protect slot <i>slot-num</i>	CPU

52.2.2 show cpu-protect slot

CPP Ш

show cpu-protect slot *slot_num*

Г Д

slot_num 1-16Ш

Г Д

Ш

Г Д

CPP Ш

Г Д

2 CPU Ш

Ruijie(config)# **show cpu-protect slot** 2

```

Type      Pps      Total      Drop
-----
arp        200      200       15
bpdu       200        8        0
dhcp       200        0        0

```

```

gvrp      200      0      0
ipv6-mc   200      0      0
dvmrp     200      0      0
igmp      200      0      0
ospf      200      0      0
pim       200      0      0
rip       200      0      0
vrrp      200      0      0
unknow-ipmc 200      0      0
ttl1      20       3      0

```

Г Д

show cpu-protect mboard	CPU

52.2.3 show cpu-protect type

```

show cpu-protect type { arp | bpdu | dhcp | ipv6mc | igmp | rip |
ospf | vrrp | pim | ttl1 | unknown-ipmc | dvmrp } dvmrp

```

Г Д

Ш

Г Д

Ш

Г Д

show cpu-protect type bpdu BPDU

```

Ruijie(config)# show cpu-protect type arp
Slot      Type      Pps      Total      Drop
-----
MainBoard bpdu      100       30        0
Slot-2    bpdu      100       30        0

```

Г Д

show cpu-protect type packet-type	CPU

53

53.1

- **system-guard enable**
- **system-guard isolate-time** *seconds*
- **system-guard same-dest-ip-attack-packets** *number*
- **system-guard scan-dest-ip-attack-packets** *number*
- **system-guard detect-maxnum** *number*
- **system-guard exception-ip** *ip mask*
- **clear system-guard** [**interface** *interface-id* [**ip-address** *ip-address*]]

system-guard same-dest-ip-attack-packets *number*

no system-guard same-dest-ip-attack-packets

r

A

--	--

number

		IP		10
<i>number</i>		0	1000	
	10	0		

г д

10

г д

10

г д

10

г д

100

Ruijie(config-if)# **system-guard**
scan-dest-ip-attack-packets 100

г д

system-guard enable	

53.1.5 system-guard detect-maxnum number

no 100

system-guard detect-maxnum *number*
no system-guard detect-maxnum

г д

		IP		100
<i>number</i>		1	500	
	100	0		

г д

100

г д

③
 1. 配置接口 IP 地址和掩码，并配置接口为三层接口。
 Ruijie(config)# interface *ip*
 Ruijie(config-if-*ip*)# ip address *ip* *mask*
 Ruijie(config-if-*ip*)# no shutdown

2. 配置系统守护检测最大失败次数。
 Ruijie(config)# system-guard detect-maxnum *200*

3. 配置系统守护功能。
 Ruijie(config)# system-guard enable

system-guard enable	

53.1.6 system-guard exception-ip ip mask

1. 配置系统守护异常 IP 地址和掩码。
 Ruijie(config)# system-guard exception-ip *ip* *mask*
 Ruijie(config)# no system-guard exception-ip *ip* *mask* [all-eip]

2. 配置系统守护异常 IP 地址和掩码。
 Ruijie(config)# system-guard exception-ip *ip* *mask*

<i>ip</i>	<i>ip</i>

```
Ruijie(config)# system-guard exception-ip  
192.168.5.145/24
```

r

A

--	--

53.2.1 show system-guari2 418.62 0.72 refBT/TT1Qterface 1Qterface-id]

system-guard enable	
---------------------	--

53.2.4 show system-guard exception-ip [interface interface-id]

IP

show system-guard exception-ip [interface interface-id]

1
 2

interface interface-id	

3
 4

5
 6

7

8
 9

10
 11

```

Ruijie# show system-guard exception-ip
Exception IP Address      Exception Mask
-----
255.255.255.0
192.168.4.11             255.255.255.0

```

12
 13

system-guard enable	

54 DAI

54.1 VLAN DAI

- ° ip arp inspection vlan

54.1.1 ip arp inspection vlan vlan-id

```

no          vlan-id          VLAN  DAI      1
          vlan-id          VLAN  DAI      1
          vlan-id          VLAN  DAI      1

```

ip arp inspection vlan *vlan-id*

no ip arp inspection vlan [*vlan-id*]

1 A

<i>vlan-id</i>	vlan 1

1 A

VLAN DAI 1

1 A

1 A

DAI 1

1 A

VLAN 1 ARP 1

Ruijie(config)# **ip arp inspection**

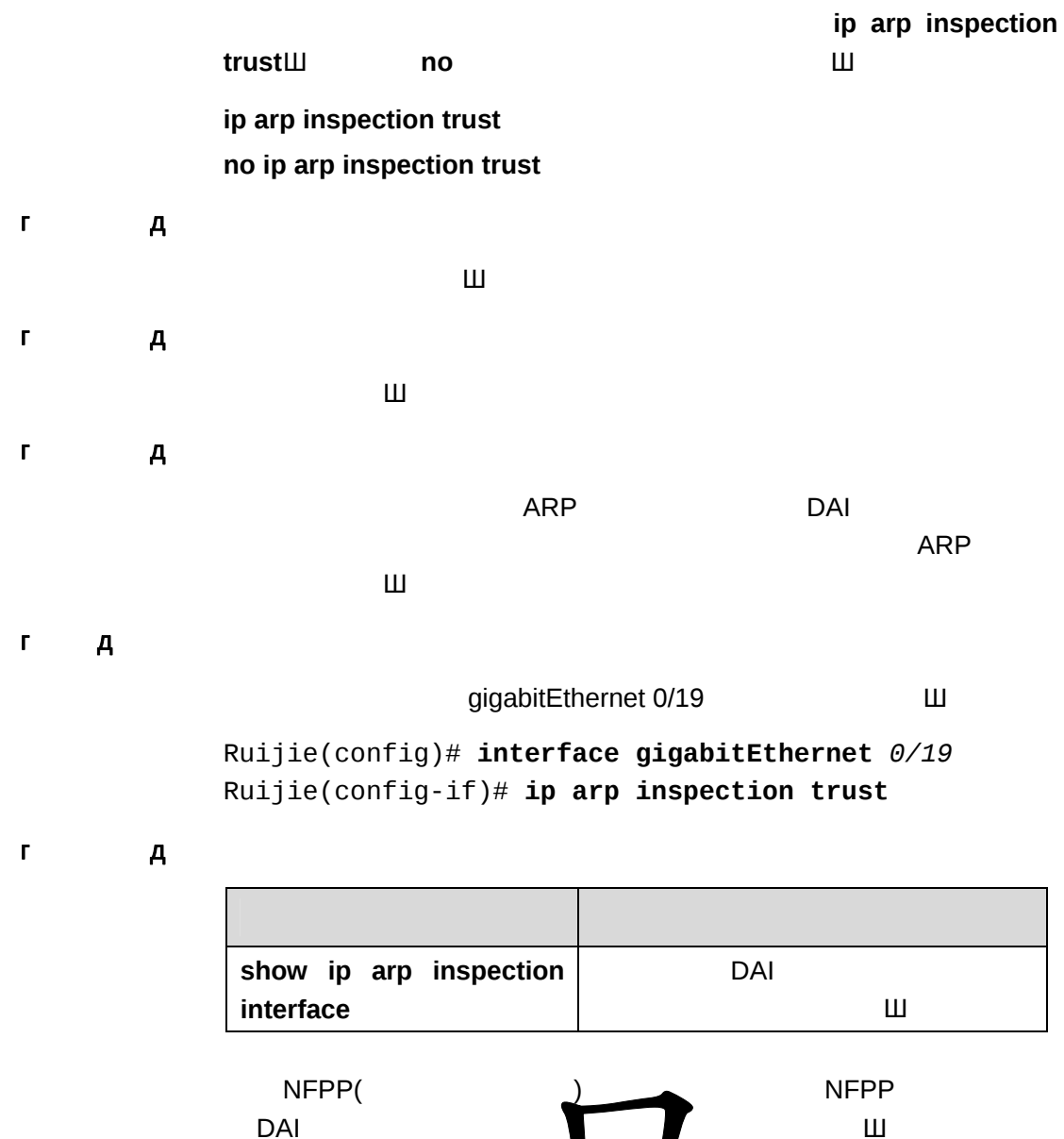
Ruijie(config)# **ip arp inspection vlan 1**

1 A

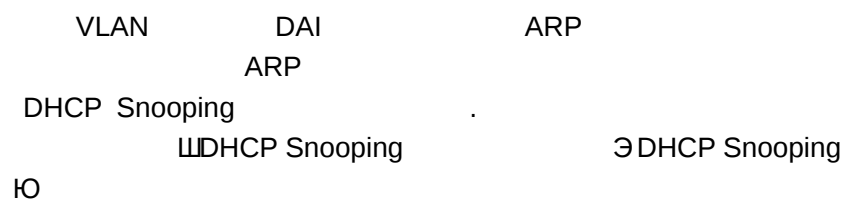
show ip arp inspection vlan	VLAN DAI

54.2

54.2.1 ip arp inspection trust



54.3 DHCP Snooping



55 IP Source Guard

55.1 IP Source Guard

IP Source Guard

- **ip source binding**

55.1.1 ip source binding

山

show ip source binding	IP

0 in verify con

```

FastEthernet          0/1 ip          active
192.168.4.243         00d0.f801.0101 1

```

```

r      A

```

show ip verify source	IP Source Guard

55.3 IP Source Guard

- IP Source Guard
- **show ip verify source**
 - **show ip source binding**
 - **debug ip source bind**

55.3.1 show ip verify source

IP Source Guard III

show ip verify source [**interface** *interface-id*]

```

r      A

```

interface-id

```

r      A

```

```

r      A

```

IP Source Guard

“IP source guard is not configured on the interface FastEthernet 0/10”

IP Source Guard

inactive-no-snooping-vlan DHCP Snooping
VLAN

inactive-trust-port DHCP Snooping

active DHCP Snooping III

```

r      A

```

Ruijie # **show ip verify source**

Interface	Filter-type	Filter-mode
Ip-address Mac-address VLAN		
-----	-----	-----
FastEthernet 0/1 ip active 192.168.4.243		
00d0.f801.0101 1		

IP Source Guard

ip verify source	IP Source Guard

55.3.2 show ip source binding

IP Source Guard

show ip source binding [ip-address] [

Г Д

ip source binding	

55.3.3 debug ip source bind

IP Source Guard

Ш

debug ip source bind

Г Д

Г Д

Г Д

Г Д

IP Source Guard

Ш

Г Д

IP Source Guard

Ruijie# **debug ip source bind**

56 NFPP

56.1

NFPP

- **cpu-protect sub-interface {manage|protocol|route} pps**
- **cpu-protect sub-interface {manage|protocol|route} percent**

ARP

- **arp-guard isolate timeout**
- **arp-guard rate-limit**
- **arp-guard attack-threshold**
- **arp-guard scan-threshold**
- **clear arp-guard users**
- **clear arp-guard scan**

56.1.1 cpu-protect sub-interface {manage|protocol|route} pps

▮

cpu-protect sub-interface {manage | protocol | route} pps
pps_vaule

Г Д

pps_vaule 1-8192

Г Д

(manage) 3000 (route)
 3000 (protocol) 3000▮

Г Д

Г Д

Ruijie(config)# **cpu-protect sub-interface manage pps**
200

Г Д



cpu-protect sub-interface {manage protocol route} percent

56.1.2 cpu-protect sub-interface {manage|protocol|route}

percent

▮

cpu-protect sub-interface {manage | protocol | route} percent

percent_vaule

Г Д

percent_vaule 1 100

Г Д

(manage) 30 (route)
25 (protocol) 45▮

Г Д

Г Д

Г Д

Ruijie(config)# **cpu-protect sub-interface manage**
percent 60

Г Д

cpu-protect sub-interface {manage protocol route} pps	

56.1.3 arp-guard isolate timeout

▮

arp-guard isolate timeout [seconds | permanent]

Г Д

seconds 0 [180, 86400] 0

permanent

Г Д

0 Ш
Ш

Г Д

Г Д

Ш

Ш

Г Д

```
Ruijie(config)# arp-guard isolate timeout 180
Ruijie(config)# interface g 0/1
Ruijie(config-if)# arp-guard isolate timeout permanent
```

Г Д

show arp-guard configuration	

56.1.4 arp-guard rate-limit

Ш

arp-guard rate-limit pps {per-src-ip | per-src-mac | per-port}

Г Д

pps
per-src-ip IP
per-src-mac MAC
per-port

Г Д

IP MAC 4
100 Ш

Г Д

Г Д

Г Д

```
Ruijie(config)# arp-guard rate-limit 2 per-src-ip
Ruijie(config)# arp-guard rate-limit 3 per-src-mac
Ruijie(config)# arp-guard rate-limit 50 per-port
```

Г Д

show arp-guard configuration	

56.1.5 arp-guard attack-threshold

Ш

arp-guard attack-threshold

User<IP=N/A,MAC=0000.0000.0004,port=Gi4/1,VLAN=1> is isolated.

T

RAP

Failed to isolate

user<IP=N/A,MAC=0000.0000.0004,port=Gi4/1,VLAN=1>.

- 1) 127 ARP 111
- 2) 1MB
I: %ARPGUARD-4-MEM_LIMIT:user table's size reached limit 1MB. 111
- 3) I: %ARPGUARD-4-ISOLATE_FAILED:
failed to isolate ARP DoS attacker. 111
- 4) I: %ARPGUARD-4-NO_MEMORY: failed to alloc memory.. 111
- 5) CPU 30
111 TRAP 111

Г Д

```
Ruijie(config)# arp-guard attack-threshold 2 per-src-ip
Ruijie(config)# arp-guard attack-threshold 3 per-src-mac
Ruijie(config)# arp-guard attack-threshold 50 per-port
```

Г Д

show arp-guard configuration	
clear arp-guard users	
show arp-guard users	

56.1.6 arp-guard scan-threshold

111

arp-guard scan-threshold pkt-cnt

Г Д

pkt-cnt

clear arp-guard users [**vlan** *vid*] [**interface** *interface-id*] [*ip-address* | *mac-address*]

Г А

vid

interface-id

ip-address IP

mac-address MAC

Г А

Г А

Ш

Г А

VLAN 1 g 0/1 Ш

Ruijie# **clear arp-guard users vlan 1 interface g 0/1**

Г А

arp-guard attack-threshold	
show arp-guard users	

56.1.8 clear arp-guard scan

ARP Ш

Г Д

arp-guard scan-threshold	
show arp-guard scan	ARP

56.2

56.2.1 show arp-guard configuration

Ш

show arp-guard configuration

Г Д

Г Д

Г Д

Ш

Г Д

```
Ruijie# show arp-guard configuration
Rate limit: 10000 pps per-src-ip, 1 pps per-src-mac, 100
pps per-port
Attack threshold:10000 pps per-src-ip, 1 pps per-src-mac,
200 pps per-port
Scan threshold:15 packets per 10 seconds
Global isolate timeout:10800 seconds
Local isolate timeout(second):Gi4/1    permanent
```

Г Д

arp-guard isolate timeout	
arp-guard rate-limit	
arp-guard attack-threshold	
arp-guard scan-threshold	

56.2.2 show arp-guard users

```
show arp-guard users [statistics | [[vlan vid] [interface interface-id]  
[ip-address | mac-address]]]
```

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statistics

vid

interface-id

ip-address IP

arp-guard attack-threshold	
clear arp-guard users	

56.2.3 show arp-guard scan

ARP Ш

show arp-guard scan [**statistics** | [[**vlan** *vid*] [**interface** *interface-id*] [*mac-address*]]]

Г А

statistics ARP

vid

interface-id

mac-address

Ї – DAÈ â Ð

Г Д

arp-guard scan-threshold	
clear arp-guard scan	ARP

57 ACL

id	ACL 1-99,1300-1999 100-199,2000-2699 700-799 2700-2899
name	ACL
sn	ACL ()
start-sn	
inc-sn	
deny	
permit	
prot	IPv6 icmp, tcp, udp eigrp, gre, ipinip, igmp, nos, ospf, icmp, udp, tcp, ip IP icmp/tcp/udp ipv6, 0-255 IPv4 0-255 'n

fragment	
precedence precedence	0-7
time-range tm-rng-name	tm-rng-name
tos tos	0-15
cos cos	cos (0-7)
cos inner cos	tag cos
icmp-type	ICMP 0-255
icmp-code	ICMP 0-255
icmp-message	ICMP
operator port[port]	Operator lt- eq- gt- neq- range- port
src-mac-addr	
dst-mac-addr	
VID vid	vlan id
VID inner vid	tag vid
ethernet-type	0x
match-all tcpf	tcp flag
text	
in	
out	
{rule mask offset}+	rule mask offset “+”

AA AA AA AA AA AA BB BB BB BB BB BB CC CC DD DD
DD DD EE FF GG HH HH HH II II JJ KK LL LL MM MM
NN NN OO PP QQ QQ RR RR RR RR SS SS SS SS TT TT
UU UU VV VV VV VV WW WW WW WW XY ZZ aa aa bb bb

A	MAC	0	O	TTL	34
B	MAC	6	P		35

C		12	Q	IP	36
D	VLAN tag	14	R	ip	38
E	DSAP()	18	S	ip	42
F	SSAP()	19	T	TCP	46
G	Ctrl	20	U	TCP	48
H	Org Code	21	V		50
I		24	W		54
J	IP	26	XY	IP	58
K	TOS	27	Z	flags	59
L	IP	28	a	Windows size	60
M	ID	30	b		62
N	Flags	32			

- ### 57.1.1 access-list

destination-mac-address | **any** } [**precedence** *precedence*] [**tos** *tos*]
[fragments] [**time-range** *time-range-name*]

Expert

Internet Control Message Protocol (ICMP)

access-list *id* {**deny** | **permit**} **icmp** [**VID** [*out*][*inner in*]] {*source source-wildcard* | **host** *source* | **any**} {**host** *source-mac-address* | **any** }
 {*destination destination-wildcard* | **host** *destination* | **any**} {**host**
destination-mac-address | **any**} [*icmp-type*] [[*icmp-type* [*icmp-code*]]
 | [*icmp-message*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**]
[time-range *time-range-name*]

Transmission Control Protocol (TCP)

access-list *id* {**deny** | **permit**} **tcp** [**VID** [*out*][*inner in*]] {*source source-wildcard* | **host** *Source* | **any**} {**host** *source-mac-address* | **any** }
[operator *port* [*port*]] {*destination destination-wildcard* | **host**
destination | **any**} {**host** *destination-mac-address* | **any**} [**operator** *port*
 [*port*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**] [**time-range**
time-range-name] [**match-all** *tcp-flag*]

User Datagram Protocol (UDP)

access-list *id* {**deny** | **permit**} **udp** [**VID** [*out*][*inner in*]] {*source source-wildcard* | **host** *source* | **any**} {**host** *source-mac-address* | **any** }
 [**operator** *port* [*port*]] {*destination destination-wildcard* | **host**
destination | **any**} {**host** *destination-mac-address* | **any**} [**operator** *port*
 [*port*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**] [**time-range**
time-range-name]

5)

access-list *list-remark text*

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山

<i>id</i>	山	1-99	100-199	1300-1999	2000-2699
2700 – 2899	700 - 799	山			
Deny		ACE		山	

Destination

destination-wildcard

- **urg**
- **ack**
- **psh**
- **rst**
- **syn**
- **fin**

- **critical**
- **flash**
- **flash-override**
- **immediate**
- **internet**
- **network**
- **priority**
- **routine**

- **max-reliability**
- **max-throughput**
- **min-delay**
- **min-monetary-cost**
- **normal**

ICMP

- **administratively-prohibited**
- **dod-host-prohibited**
- **dod-net-prohibited**
- **echo**
- **echo-reply**
- **fragment-time-exceeded**
- **general-parameter-problem**
- **host-isolated**
- **host-precedence-unreachable**
- **host-redirect**
- **host-tos-redirect**
- **host-tos-unreachable**
- **host-unknown**
- **host-unreachable**
- **information-reply**

- **information-request**
- **mask-reply**
- **mask-request**
- **mobile-redirect**
- **net-redirect**
- **net-tos-redirect**
- **net-tos-unreachable**
- **net-unreachable**
- **network-unknown**
- **no-room-for-option**
- **option-missing**
- **packet-too-big**
- **parameter-problem**
- **port-unreachable**
- **precedence-unreachable**
- **protocol-unreachable**
- **redirect**
- **router-advertisement**
- **router-solicitation**
- **source-quench**
- **source-route-failed**
- **time-exceeded**
- **timestamp-reply**
- **timestamp-request**
- **ttl-exceeded**
- **unreachable**

TCP

TCP

- **bgp**
- **chargen**
- **cmd**
- **daytime**
- **discard**
- **domain**
- **echo**
- **exec**
- **finger**
- **ftp**

- **ftp-data**
- **gopher**
- **hostname**
- **ident**
- **irc**
- **klogin**
- **kshell**
- **login**
- **nntp**
- **pim-auto-rp**
- **pop2**
- **pop3**
- **smtp**
- **sunrpc**
- **syslog**
- **tacacs**
- **talk**
- **telnet**
- **time**
- **uucp**
- **whois**
- **www**

UDP

UDP

- **biff**
- **bootpc**
- **bootps**
- **discard**
- **dnsix**
- **domain**
- **echo**
- **isakmp**
- **mobile-ip**
- **nameserver**
- **netbios-dgm**
- **netbios-ns**
- **netbios-ss**
- **ntp**

- **pim-auto-rp**
- **rip**
- **snmp**
- **snmptrap**
- **sunrpc**
- **syslog**
- **tacacs**
- **talk**
- **tftp**
- **time**
- **who**
- **xmcp**

Ethernet-type

```
Ruijie(config)# access-list 102 permit tcp any any eq domain
Ruijie(config)# access-list 102 permit udp any any eq domain
Ruijie(config)# access-list 102 permit icmp any any echo
Ruijie(config)# access-list 102 permit icmp any any echo-reply
```

3) MAC

```
MAC 00d0f8000c0c
100 1

Ruijie(config)# access-list 702 deny host 00d0f8000c0c any aarp
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# mac access-group 702 in
```

4) Expert

```
Expert Extended ACL ACL
IP 192.168.12.3 MAC 00d0.f800.0044
TCP 1

Ruijie(config)# access-list 2702 deny tcp host 192.168.12.3 mac 00d0.f800.0044 any any
Ruijie(config)# access-list 2702 permit any any any any
Ruijie(config)# show access-lists
expert access-list extended 2702
10 deny tcp host 192.168.12.3 mac 00d0.f800.0044 any any
10 permit any any any any
```

Г А

show access-lists	
mac access-group	MAC

Г А

RGOS10.0

57.1.2 ip access-list

```
no IP ACL IP ACL 1
ACL
```

```
ip access-list {extended | standard} {id | name}
no ip access-list {extended | standard} {id | name}
```

Г Д

```
id IP 1-99 1300-1999 100-199
2000-2699
name IP
```

Г Д

Г Д

Г Д

```
ACL
┌┐ deny permit ACL
access-lists ACL ┌┐ show ip
```

Г Д

```
ACL
Ruijie(config)# ip access-list extended 123
Ruijie(config-ext-nacl)# show ip access-lists
ip access-list extended 123
Ruijie(config-ext-nacl)#
```

```
ACL
Ruijie(config)# ip access-list standard std-acl
Ruijie(config-std-nacl)# show ip access-lists
ip access-list standard std-acl
Ruijie(config-std-nacl)#
```

Г Д

show ip access-lists	IP

Г Д

RGOS10.0

57.1.3 MAC access-list

MAC ACL Ⅲ no
ACL

mac access-list extended {*id* | *name*}
no mac access-list extended {*id* | *name*}

Г А

Id MAC 700-799
Name MAC

Г А

Г А

Г А

Ⅲ **show mac access-lists** ACL Ⅲ

Г А

MAC ACL

Ruijie(config)# **mac access-list extended** *mac-acl*
Ruijie(config-mac-nacl)# **show mac access-lists**
mac access-list extended *mac-acl*
Ruijie(config-mac-nacl)#

MAC ACL

Ruijie(config)# **mac access-list extended** 704
Ruijie(config-mac-nacl)# **show mac access-lists**
mac access-list extended 704
Ruijie(config-mac-nacl)#

Г А

show mac access-lists	mac

Г А

RGOS10.0

57.1.4 expert access-list

ACL ACL Ⅲ no
ACL

```
expert access-list extended {id | name}
no expert access-list extended {id | name}
```

Г А

```
Id Expert 2700-2899
Name ACL
```

Г А

Г А

Г А

⌚ show expert access-lists ACL ⌚

Г А

ACL

```
Ruijie(config)# expert access-list extended exp-acl
Ruijie(config-exp-nacl)# show expert access-lists
expert access-list extended exp-acl
Ruijie(config-exp-nacl)#
```

ACL

```
Ruijie(config)# expert access-list extended 2704
Ruijie(config-exp-nacl)# show expert access-lists
expert access-list extended 2704
Ruijie(config-exp-nacl)#
```

Г А

show expert access-lists	

Г А

RGOS10.0

57.1.5 ipv6 access-list

IPV6 ACL ⌚ no
ACL

```
ipv6 access-list name
no ipv6 access-list name
```

Г А

Name ACL

Г А

Г А

Ш show access-lists ACL Ш

Г А

IPV6 ACL

```
Ruijie(config)# ipv6 access-list v6-acl
Ruijie(config-ipv6-nacl)# show access-lists
ipv6 access-list v6-acl
Ruijie(config-ipv6-nacl)#
```

Г А

show access-lists	IPV6

Г А

RGOS10.0

57.1.6 ip access-list resequence

ip ACL IPV6 ACL
Ш no

```
ip access-list resequence {id | name} start-sn inc-sn
no ip access-list resequence {id | name}
```

Г А

Id ACL
Name ACL
start-sn

Г А

III show access-lists ACL III

Г А

ACL

```
Ruijie# show access-lists
ip access-list standard 1
10 permit host 192.168.4.12
20 deny any any
Ruijie# config
Ruijie(config)# ip access-list resequence 1 21 43
Ruijie(config)# exit
Ruijie# show access-lists
ip access-list standard 1
21 permit host 192.168.4.12
64 deny any any
Ruijie#
```

Г А

show access-lists	

Г А

RGOS10.0

57.1.7 deny

ACL0ACL0A'5BÄ0 wy

```
[sn] deny icmp {source source-wildcard | host source | any}  
{destination destination-wildcard | host destination | any} [icmp-type]  
[[icmp-type [icmp-code]] | [icmp-message]] [precedence precedence]  
[tos tos] [fragments] [time-range time-range-name]
```

Transmission Control Protocol (TCP)

```
[sn] deny tcp {source source-wildcard | host Source | any} [operator  
port [port]] {destination destination-wildcard | host destination | any}  
[operator port [port]] [precedence precedence] [tos tos] [fragments]  
[time-range time-range-name] [match-all tcp-flag]
```

User Datagram Protocol (UDP)

```
[sn] deny udp {source source-wildcard | host Source | any} [operator  
port [port]] {destination destination-wildcard | host destination | any}
```



```

source-ipv6-address | any} [operator port [port]]
{destination-ipv6-prefix /prefix-length | host destination-ipv6-address |
any}[operator port [port]] [dscp dscp] [flow-label flow-label]
[fragments] [time-range time-range-name]

```

Г А

access-list

```

Sn ACL
source-ipv6-prefix IPv6 .
destination-ipv6-prefix IPv6
prefix-length
source-ipv6-address IPv6
destination-ipv6-address IPv6
dscp
dscp 0-63.
flow-label
flow-label 0-1048575.
protocol IPV6 IPV6 | icmp | tcp | udp <0-255>

```

Г А

Г А

ACL

Г А

ACL ACL

Г А

```

Expert Extended ACL ACL
IP 192.168.4.12 MAC 001300498272
TCP Ш

```

```

Ruijie(config)# expert access-list extended 2702
Ruijie(config-exp-nacl)# deny tcp host
192.168.4.12 host 0013.0049.8272 any any
Ruijie(config-exp-nacl)# permit any any any any
Ruijie(config-exp-nacl)# show access-lists
expert access-list extended 2702
10 deny tcp host 192.168.4.12 host 0013.0049.8272 any
any
20 permit any any any any
Ruijie(config-exp-nacl)#

```

IP ACL
TCP 100

IP 192.168.4.12
100

```
Ruijie(config)# ip access-list extended ip-ext-acl
Ruijie(config-ext-nacl)# deny tcp host 192.168.4.12 eq
100 any
Ruijie(config-ext-nacl)# show access-lists
ip access-list extended ip-ext-acl
10 deny tcp host 192.168.4.12 eq 100 any
Ruijie(config-ext-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# ip access-group ip-ext-acl in
Ruijie(config-if)#
```

MAC ACL
 100

MAC 0013.0049.8272

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# ipv6 traffic-filter v6-acl in
```

r A

show access-lists	
ipv6 traffic-filter	IPV6
ip access-group	IP ACL
mac access-group	MAC ACL
ip access-list	IP ACL

[icmp-type] [[icmp-type [icmp-code]] | [icmp-message]] [precedence precedence] [tos tos] [fragments] [time-range time-range-name]

Transmission Control Protocol (TCP)

[sn] **permit tcp** {source source-wildcard | **host** Source | **any**} [operator port [port]] {destination destination-wildcard | **host** destination | **any**} [operator port [port]] [precedence precedence] [tos tos] [fragments] [time-range time-range-name] [match-all tcp-flag]

User Datagram Protocol (UDP)

[sn] **permit udp** {source source-wildcard|**host** source |**any**} [operator port [port]] {destination destination-wildcard |**host** destination | **any**} [operator port [port]] [precedence precedence] [tos tos] [fragments] [time-range time-range-name]

3) MAC

[sn] **permit** {**any** | **host** source-mac-address} {**any** | **host** destination-mac-address} [ethernet-type][cos [out] [inner in]]

4) Expert

[sn] **permit** [**protocol** | [ethernet-type][cos [out] [inner in]]] [VID [out][inner in]] {source source-wildcard | **host** source | **any**} {**host** source-mac-address | **any** } {destination destination-wildcard | **host** destination | **any**} {**host** destination-mac-address | **any**} [precedence precedence] [tos tos][fragments] [time-range time-range-name]

Ethernet-type cos

[sn] **permit** {ethernet-type| cos [out] [inner in]} [VID [out][inner in]] {source source-wildcard | **host** source | **any**} {**host** source-mac-address | **any** } {destination destination-wildcard | **host** destination | **any**} {**host** destination-mac-address | **any**} [precedence precedence] [tos tos][fragments] [time-range time-range-name]

destination-mac-address | **any**][*icmp-type*] [[*icmp-type* [*icmp-code*]] |
[*icmp-message*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**]
[**time-range** *time-range-name*]

Transmission Control Protocol (TCP)

[*sn*] **permit tcp** [**VID** [*out*][*inner in*]][*source source-wildcard* | **host**
Source | **any**] {**host** *source-mac-address*

destination-ipv6-address | **any** } [*operator* **port** [**port**]] [**dscp**

```
Ruijie(config)# mac access-list extended 702
Ruijie(config-mac-nacl)# permit host 0013.0049.8272
any aarp
Ruijie(config-mac-nacl)# show access-lists
mac access-list extended
10 permit host 0013.0049.8272 any aarp702
Ruijie(config-mac-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# mac access-group 702 in
```

ip	ACL	IP
----	-----	----



expert access-list

ACL

ip access-list	IP
----------------	----

Г А

RGOS10.0 Ш

57.1.10 remark

ACL ACE no

remark *text*

Г А

Text

Г А

ACL

Г А

ACL

Г А

```
Ruijie# ip access-list extended 102
Ruijie(config-ext-nacl)# remark first_remark
Ruijie(config-ext-nacl)# permit tcp 1.1.1.1 0.0.0.0
2.2.2.2 0.0.0.0
Ruijie(config-ext-nacl)# remark second_remark
Ruijie(config-ext-nacl)# permit tcp 3.3.3.3 0.0.0.0
4.4.4.4 0.0.0.0
Ruijie(config-ext-nacl)# end
```

Ruijie# **configure terminal**

Ruijie(config)# **access-list 80 remark test_remark**

Г А

show access-lists	

57.1.11 no sn

ACL

no sn

г д

sn ACL

г д

ACL

г д

ACL

ACL

г д

```
Ruijie(config)# ipv6 access-list extended v6-acl
Ruijie(config-ipv6-nacl)# permit ipv6
host ::192.168.4.12 any
Ruijie(config-ipv6-nacl)# 12 deny ipv6 host any any
Ruijie(config-ipv6-nacl)# show access-lists
ipv6 access-list extended v6-acl
10 permit ipv6 host ::192.168.4.12 any
12 deny ipv6 any any
Ruijie(config-ipv6-nacl)# no 12
Ruijie(config-ipv6-nacl)# show access-lists
ipv6 access-list extended v6-acl
10 permit ipv6 host ::192.168.4.12 any
Ruijie(config-ipv6-nacl)#
```

г д

show access-lists	
ip access-list	ip ACL
ipv6 access-list	IPV6 ACL
deny	ACL
permit	ACL

г д

RGOS10.0

MAC ACL



no



mac access-group {*id* | *name*}{**in** | **out**}

no mac access-group {*id* | *name*}{**in** | **out**}

Г Д

id MAC 700-799

name MAC

in

out

Г Д

Г Д

Г Д

ACL



show running-config



Г Д

access-list accept_00d0f8xxxxxx_only

Gigabit

1

Ruijie(config)# **interface GigaEthernet 1/1**

Ruijie(config-if)# **mac access-group**

accept_00d0f8xxxxxx_only in

Г Д

show access-group	ACL

Г Д

RGOS10.0

57.1.14 expert access-group

EXPERT ACL



no



expert access-group {*id* | *name*}{**in** | **out**}

no expert access-group {*id* | *name*}{**in** | **out**}

г А

```

id Expert 2700-2899
name Expert
in
out

```

г А

г А

г А

```

ACL
show access-group

```

г А

```

access-list accept_00d0f8xxxxxx_only Gigabit
1
Ruijie(config)# interface GigaEthernet 0/1
Ruijie(config-if)# expert access-group
accept_00d0f8xxxxxx_only in

```

г А

show access-group	ACL Ш

г А

RGOS10.0

57.1.15 ipv6 traffic-filter

IPV6 ACL Ш no

Ш

```

ipv6 traffic-filter name {in | out}
no ipv6 traffic-filter name {in | out}

```

г А

```

name IPV6
in
out

```

Г Д

Г Д

Г Д

ACL
show ipv6 traffic-filter

Ш

Г Д

access-list v6-acl Gigabit 1

Ruijie(config)# interface GigaEthernet 0/1

Ruijie(config-if)# ipv6 traffic-filter v6-acl in

Г Д

show access-group	ACL Ш

Г Д

RGOS10.0

57.2

:

- show access-lists
- show ip access-group
- show expert access-group
- show mac access-group
- show ipv6 traffic-filter
- show access-group

57.2.1 show access-lists

ACL

ACL

show access-lists [*id* | *name*]

Г Д

id

name

Г А

Г А

acl id name ACL

Г А

```
Ruijie# show access-lists n_acl
ip access-list standard n_acl
Ruijie# show access-lists 102
ip access-list extended 102
Ruijie# show access-lists
ip access-list standard n_acl
ip access-list extended 101
mac access-list extended mac_acl
expert access-list extended exp_acl
ipv6 access-list extended v6_acl
```

Г А

ip access-list	IP ACL Ш
mac access-list	MAC ACL
expert access-list	Expert ACL
ipv6 access-list	IPv6 ACL

Г А

RGOS10.0

57.2.2 show ip access-group

IP ACL

show ip access-group[interface <interface>]

Г А

<interface>

Г А

Г А

ACL

r A

```
Ruijie# show ip access-group interface gigabitethernet
0/1
ip access-group aaa in
Applied On interface GigabitEthernet 0/1.
```

r A

ip access-list	IP ACL 山

r A

RGOS10.0

57.2.3 show expert access-group

/ E- "ŽHE I ~3ãÀ @xpert 山

RGOS10.0

57.2.4 show mac access-group

MAC

show mac access-group[interface <interface>]

┌ ┐

<interface>

┌ ┐

┌ ┐

MAC ACL

MAC ACL

┌ ┐

Ruijie# **show mac access-group interface gigabitethernet**
0/3
 mac access-group mm in
 Applied On interface GigabitEthernet 0/3.

┌ ┐

mac access-list	MAC ACL

┌ ┐

RGOS10.0

57.2.5 show ipv6 traffic-filter

IPV6

show ipv6 traffic-filter [interface <interface>]

┌ ┐

<interface>

┌ ┐

┌ ┐

ACL

г д

```
Ruijie# show ipv6 traffic-filter interface
gigabitethernet 0/4
ipv6 traffic-filter v6 in
Applied On interface GigabitEthernet 0/4.
```

г д

ipv6 access-list	IPV6 ACL

г д

RGOS10.0

57.2.6 show access-group

ACL

show access-group [interface <interface>]

г д

<interface>

г д

г д

ACL

ACL

г д

```
Ruijie# show access-group
ip access-list standard ipstd3
Applied On interface GigabitEthernet 0/1.
ip access-list standard ipstd4
Applied On interface GigabitEthernet 0/2.
ip access-list extended 101
Applied On interface GigabitEthernet 0/3.
ip access-list extended 102
Applied On interface GigabitEthernet 0/8.
```

г д

show secu-acl	

Г А

RGOS10.2

57.3.2 security access-group

security access-group {*id*|*name*}

no security access-group

Г А

id ACL id

name ACL

Г А

Г А

Г А

Ruijie(config-if)#**security access-group 1**

Г А

show secu-acl	

Г А

RGOS10.2

57.3.3 security uplink enable

security uplink enable

no security uplink enable

Г А

Г Д

Г Д

Г Д

Ruijie(config-if)#**security uplink enable**

Г Д

show secu-acl	

Г Д

RGOS10.2

58 **VACL**

58.1

```

Vlan access map                                map_name
map_sn                                         map
                                             map
map
o      vlan access map                        map
map_sn          map                          map    map
map_sn          10
o      map_sn          vlan access map        map_name
Map_name              map
o      map_sn          vlan access map
map          map          map          map          map
o      map          6553          map

```

58.1.1 vlan access-map

	map	$\sqcup$	map
no	$\sqcup$		

```
vlan access-map map_name [ map_sn ]
no vlan access-map map_name [ map_sn ]
```

Г	Д		
	<i>map_name</i>	map	100
	<i>map_sn</i>	map	[0 - 65535]

Г	Д
Г	Д

Г Д
Г Д

```
vlan access map
Ruijie(config)# vlan access-map ddd 20
Ruijie(config-access-map)#
```

Г Д

58.1.2 match ip/mac address

ip acl *mac acl* **vlan access map**
ip acl *mac acl* **vlan access map**
 no Ш

match ip address { *acl_name* | *acl_id* }+
no match ip address { *acl_name* | *acl_id* }+
match mac address { *acl_name* | *acl_id* }+
no match mac address { *acl_name* | *acl_id* }+

+ acl, 8 aclШ

Г Д

acl_name acl;
acl_id numbered acl;

Г Д

Config-access-map vacl

Г Д

&

- 1) map ip acl map acl
 - 2) map 8 acl
 - 3) map acl
 - 4) map ace acl acl
 - 5) map ip acl (mac acl) ip
 acl (mac acl) ip acl (mac acl) ip acl
 (mac acl)
 - 6) map ip acl (mac acl)
 mac acl (ip acl) ip acl (mac acl)
 mac acl (ip acl)
-

Г Д

map match

```

Ruijie(config)# vlan access-map dd
Ruijie(config-access-map)# match ip address 10 20 sp1
30 sp2
Ruijie(config-access-map)# exit
Ruijie(config)# vlan access-map dd 20
Ruijie(config-access-map)# match mac address 710 720 m1
760
Ruijie(config-access-map)# exit
Ruijie(config)#

```

58.1.3 action forward/drop/redirect

```

          map  actions          vac!          111
no          map          actions          forward111

```

```

action forward
no action forward

```

```

          map  actions          vac!          111
no          map          actions          forward111

```

```

action drop
no action drop

```

```

          map  actions          vac!          111
no          map          actions          forward111

```

```

action redirect { GigabitEthernet | Aggregateport } {port_id}
no action redirect { GigabitEthernet | Aggregateport } {port_id}

```

```

r      A

```

```

action forward

```

```

action drop

```

```

action redirect

```

```

r      A

```

```

          map          forward111          map
          111

```

```

r      A

```

```

vac!

```

```

r      A

```

```

Ruijie(config-access-map)# action forward
Ruijie(config-access-map)# action drop
Ruijie(config-access-map)# action redirect
gigabitEthernet 0/50

```

58.1.4 vlan filter

map vlan $\mathbb{W}$ map vlan
no $\mathbb{W}$

vlan filter *map_name* **vlan-list** *vlan_id*
no vlan filter *map_name* **vlan-list** *vlan_id*

Г А

map_name map
vlan_id vlan id $\mathbb{W}$

Г А

Г А

```

Ruijie(config)# show vlan access-map
Vlan access-map aa 10
match mac address: 700, 710, m1, 720,
action: forward
Vlan access-map aa 20
match ip address: 10, 20, 30, sp1, sp2, 60, 50, 80,
action: drop
Vlan access-map dd 20
match mac address: 710, 720, m1, 760,
action: forward
Ruijie(config)#

```

show vlan access map { map_name }

```

Ruijie(config)# show vlan access-map dd
Vlan access-map dd 20
match mac address: 710, 720, m1, 760,
action: forward
Ruijie(config)#

```

58.2.2 show vlan filter

map vlan

山

show vlan filter

r A

r A

r A

r A

Show vlan filter <i>access-map</i>	map vlan
<i>map_name</i>	

show vlan filter vlan *vlan>015.874 1.446 Td<1DB9233-2.86 Tw 8.5836-1.44 0 371DB92*

Configured on VLANs: 1, 5, 6,

Ruijie(config)#

IP-Precedence	0	1	2	3	4	5	6	7
DSCP	0	8	16	24	32	40	48	56

DSCP to CoS

CoS

mls qos cos *default-cos*

no mls qos cos

Г А

default-cos 0 7

no

Г А

CoS 0

Г А

Г А

Ruijie(config)# **interface** **gigabitethernet** 1/1

Ruijie(config-if)# **mls qos cos** 7

Г А

show mls qos interface *interface-id*

59.2.3 Class Maps

ACL

ip access-list {**extended** | **standard**} { *acl-id* | *acl-name* }

mac access-list extended {*acl-id* | *acl-name*}

expert access-list extended {*acl-id* | *acl-name*}

ipv6 access-list extended *acl-name*

access-list *acl-id* ACL

class map class map

[**no**] **class-map** *class-map-name*

class map

[**no**] **match access-group** *acl-name* | *acl-id*

Г А

acl-name ACL

acl-id ACL id

class-map-name class map

no class-map *class-map-name* class map

no match access-group *acl-name|acl-id*

Г Д

Г Д

MAC ACL, me

Ruijie(config)# **mac access-list extended** me

ACL

Ruijie(config-ext-macl)# **permit host 1111.2222.3333**
any

ACL

Ruijie(config-ext-macl)# **exit**

class-map, cm

Ruijie(config)# **class-map cm**

ACL

Ruijie(config-cmap)# **match access-group me**

class-map

Ruijie(config-cmap)# **exit**

Г Д

show mac access-lists

show ip access-lists

show class-map

59.2.4 Policy Maps

policy map policymap

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

policy map class-map ,

[no] **class** *class-map-name*

IP ipdscp IP

set ip dscp *new-dscp*

no set ip dscp

police *rate-bps burst-byte* [**exceed-action** {**drop** | **dscp** *dscp-value*}]

no police

r

A

policy-map-name **policy-map**

no policy-map *policy-map-name* **policy map**

class-map-name **class map**

no class *class-map-name*

~~new- **class** *class-map-name* **police** *rate-bps burst-byte* [**exceed-action** {**drop** | **dscp** *dscp-value*}]~~

policy map

policy map

service-policy {input | output} *policy-map-name*

no service-policy {input | output}

Г Д

policy-map-name policymap

no policy map

Г Д

Г Д

Ruijie(config)# **interface fastEthernet**

「 A

show mls qos queueing

59.2.7 priority-queue cos-map

CoS

priority-queue cos-map *qid cos0 [cos1 [cos2 [cos3 [cos4 [cos5 [cos6 [cos7]]]]]]]*

no priority-queue cos-map

「 A

qid id
cos0 ... cos7 CoS
no 山

「 A

「 A

「 A

Ruijie(config)# **priority-queue cos-map 1 0 1**

「 A

show mls qos queueing

59.2.8 wrr-queue bandwidth

WRR

wrr-queue bandwidth *weight1 ... weightn*

no wrr-queue bandwidth

「 A

weight1...weightn n n

no 山

「 A

weight1: ...: weightn = 1:...:1

Г Д

Г Д

Ruijie(config)# wrr-queue bandwidth 1 2 3 4 5 6 7 8

Г Д

show mls qos queueing

59.2.9 mls qos map cos-dscp

CoS DSCP

mls qos map cos-dscp *dscp1...dscp8*

no mls qos map cos-dscp

Г Д

dscp

no

Г Д

Г Д

Г Д

Ruijie(config)# **mls qos map cos-dscp** 8 10 16 18 24 26 32 34

Г Д

show mls qos maps dscp-cos maps,dscp-cos maps
ip-prec-dscp maps

59.2.10 mls qos map dscp-cos

DSCP CoS

mls qos map dscp-cos *dscp-list to cos*

no mls qos map dscp-cos

Г Д

dscp-list

cos

0 7

no

г д

г д

г д

д

00,GGÉpN!İ _< 1 @ pÍÊÂ ðÁ ô~À Ą ,G5 r!>úîşáyQđ "Â\$ p Á `ĐFw€¥ C 0>t_2•'Â@€ċÅfÿđ ã Đ ã Đ

```
mls qos scheduler [sp | rr | wrr | drr]
```

```
no mls qos scheduler
```

```
└──┬──┐  
A
```

```
sp
```

```
rr
```

```
wrr
```

```
drr
```

```
no
```

```
└──┬──┐  
A
```

```
wrr
```

```
└──┬──┐  
A
```

```
└──┬──┐  
A
```

```
Ruijie(config)# mls qos scheduler sp
```

```
└──┬──┐  
A
```

```
show mls qos scheduler
```

59.2.13 drr-queue bandwidth

```
DRR
```

```
drr-queue bandwidth weight1...weight8
```

```
no drr-queue bandwidth
```

```
└──┬──┐  
A
```

```
weight1...weight8
```

```
no
```

```
└──┬──┐  
A
```

```
└──┬──┐  
A
```

```
└──┬──┐  
A
```

```
Ruijie(config)# drr-queue bandwidth 1 2 3 4 5 6 7 8
```

г Д

show mls qos queueing

59.2.14 mls qos map ip-prec-dscp

ipprec DSCP

mls qos map ip-prec-dscp dscp1...dscp8

no mls qos map ip-prec-dscp

г Д

dscp

no

г Д

г Д

г Д

Ruijie(config)# mls qo map ip-prec -dscp 8 10 16 18 24
26 32 34

г Д

show mls qos maps dscp-cos maps,dscp-cos maps
ip-prec-dscp maps

wfq-queue bandwidth

wfq

Ш

wfq-queue *queue-id* bandwidth *min max*

no wfq-queue *queue-id* bandwidth

г Д

queue-id

min

max

г Д

min kbps

max kbps

Г А

Г А

wfq
Ш

Г А

wfq

```
Ruijie(config)# mls qos scheduler wfq
Ruijie(config)# show mls qos scheduler
```

```
Ruijie(config-if)# wfq-queue 2 bandwidth 10 10240
Ruijie(config-if)# wfq-queue 4 bandwidth 7 10240
Ruijie(config-if)# show running
```

Г А

show mls qos scheduler	QOS

Г А

RGOS10.1

wfq-queue sp

wfq

(sp)Ш

wfq-queue queue-id sp

no wfq-queue queue-id sp

Г А

queue-id
sp:

Г А

sp

Г А

Г Д

wfq sp+wfq
Ш

Г Д

wfq

```
Ruijie(config)# mls qos scheduler wfq
Ruijie(config)# show mls qos scheduler
```

1 3

```
Ruijie(config)# wfq-queue 1 sp
Ruijie(config)# wfq-queue 3 sp
Ruijie(config)# show running
```

Г Д

show mls qos scheduler	QOS

Г Д

RGOS10.1

virtual-group

Aggregate Port Ш
no Ш

```
virtual-group virtual-group-number
no virtual-group virtual-group-number
```

Г Д

virtual-group-number	128

Г Д

Г Д

Г Д

Aggregate PortШ

24 48 24

Г Д

1/3 3

```
Ruijie(config)# interface gigabitethernet 1/3
Ruijie(config-if)# virtual-group 3
```

Г Д

show virtual-group	

Г Д

RGOS10.1

59.3

ИГQ •

59.3.1 show class-map

policy-name policy name

class-name class map

Г Д

policy name

Г Д

Г Д

Ruijie# **show policy-map**

59.3.3 show mls qos interface

QoS

show mls qos interface *interface-id* [**policers**]

Г Д

interface-id

policers police

Г Д

QoS

Г Д

Г Д

Ruijie# **show mls qos interface fastEthernet 0/1**

59.3.4 show mls qos virtual-group

police

show mls qos virtual-group [*virtual-group-number* | **policers**]

Г Д

virtual-group-number

policers police

Г Д

police

г

д

```

      ip-prec-dscp      ip-prec-dscp maps

r      A
      dscp-cos maps    dscp-cos maps    ip-prec-dscp maps

r      A

r      A

      Ruijie# show mls qos maps

r      A

      S8600      cos-dscp dscp-cos ip-prec-dscp

```

59.3.8 show mls qos rate-limit

```

      show mls qos rate-limit [interface interface-id]

r      A

      interface      interface-id      rate-limit

r      A

r      A

      Ruijie# show mls qos rate-limit

      .14375 173.88 50509 /C2_0 1summaryc 4.16 0 Td ( )

```

rat 89.1 T

Ruijie# **show virtual-group 1**

Ruijie# **show virtual-group summary**

60 WRED

60.1 WRED

Queue1	Threshold1	CoS	0	1	2	3	4	5	6	7	
		WRED-drop	100%low			100%high					
		random-detectprobability	100%								
	Threshold2	CoS	NONE								
		WRED-drop	80% low			100%high					
		random-detectprobability	80%								
	Threshold3	CoS	S86								
		WRED-drop	S86								
		random-detectprobability	S86								
	Queue2	Threshold1	CoS	S86							
WRED-drop			S86								
random-detectprobability			S86								
Threshold2		CoS	S86								
		WRED-drop	S86								
		random-detectprobability	S86								
hreshold3		CoS	S86								
		WRED-drop	S86								
		random-detect probability	S86								

&

no $\mathbb{W}$ $\mathbb{W}$ $\mathbb{W}$

wrr-queue random-detect min-threshold *queue_id* *thr1* [*thr2* *thr3*]

no wrr-queue random-detect min-threshold *queue_id*

Г Д

<i>queue_id</i>	
<i>thr1</i>	
<i>thr2</i>	
<i>thr3</i>	

Г Д

Г Д

Г Д

WRED $\mathbb{W}$ WRED WRED

WRED $\mathbb{W}$ $\mathbb{W}$ WRED

S86 $\mathbb{W}$

S86 2

Г Д

1

Ruijie(config-if)# **wrr-queue random-detect min-threshold** 1 68 69 70

Г Д

-	-

Г Д

Г Д

-	-

60.2.3 wrr-queue random-detect probability

no $\mathbb{W}$ $\mathbb{W}$

wrr-queue random-detect min-threshold *queue_id* *prob1* [*prob2* *prob3*]

no wrr-queue random-detect min-threshold *queue_id*

Г	Д
<i>queue_id</i>	
<i>prob1</i>	
<i>prob2</i>	
<i>prob3</i>	S86

Г Д

Г Д

Г Д

WRED WRED WRED WRED
WRED WRED WRED WRED
S86 S86 S86 S86
S86 2 S86 S86

Г Д

1
Ruijie(config-if)#wrr-queue random-detect probability 1 61 62 63

Г Д

	Đ
--	---

		queue_id			
		cos_value			
		cos	1	8	0~7
г	Д				
		cos	Ш		
г	Д				
г	Д				
		Ш	DSCP-CoS	CoS-threshold	DSCP threshold
			CoS	threshold	WRED
		REDШ			
г	Д				
		cos	1 46	cos	
		priority-queue cos-map			
		Ruijie(config-if)#wrr-queue cos-map 2 1 6			
г	Д				
		-		-	

Г А

Г А

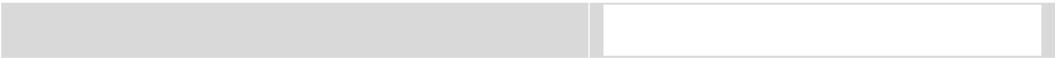
Г А

show queueing wred interface g0/1

qid	max_1	min_1	prob_1	max_2	min_2	prob_2	max_3	min_3	prob_3

1	0	0	90	0	0	91	0	0	92
2	88	66	90	87	55	91	86	66	92
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	88	66	0	89	67	0	90	68	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
cos qid threshold_id									
--- --- -----									
0	1	1							
1	2	1							
2	3	1							
3	4	2							
4	5	1							
5	6	3							
6	7	2							
7	8	1							

Г А



vrrp 1 authentication x30dn78k

r **A**



Ruijie(config-if)# **vrrp** group *ip*
ipaddress [**secondary**]



Ruijie(config-if)# **vrrp group ip**


```

vrp group preempt [delay seconds]
no vrrp group preempt [delay]

group VRRP
delay seconds Master
0

VRRP VRRP VRRP
VRRP

VRRP Master VRRP Master IP
VRRP VRRP
VRRP

VRRP (200)
15

vrp 1 preempt delay 15
vrp 1 priority 200

```

```
vrp A
```

Ruijie(config-if)# vrp group ip <i>ipaddress [secondary]</i>	VRRP IP
Ruijie(config-if)# vrp group priority <i>level</i>	VRRP

61.1.6 vrrp priority

```

VRRP no

vrp group priority level
no vrrp group priority

vrp A

```



```

r      A
                                     VRRP
                                     VRRP  4      3      VRRP

r      A
                                     VRRP      4  3

vrrp 1 timers advertise 4
  
```

```

r      A
  
```

Ruijie(config-if)# vrrp group ip <i>ipaddress</i> [secondary]	VRRP IP
Ruijie(config-if)# vrrp group timers learn	

61.1.8 vrrp timers learn

```

                                     no      3

vrrp group timers learn
no vrrp group timers learn

r      A
group  VRRP

r      A
                                     VRRP  3      VRRP
                                     3

r      A

r      A
                                     VRRP
                                     VRRP      VRRP
Master 3      Master  VRRP
VRRP      3      Master  VRRP
3

r      A
                                     VRRP  1      3

vrrp 1 timers learn

r      A
  
```

Ruijie(config-if)# vrrp group ip <i>ipaddress [secondary]</i>	VRRP IP
Ruijie(config-if)# vrrp group timers advertise [msec] interval	VRRP

61.1.9 vrrp track

```

VRRP          vrrp group track interface-type number
      VRRP    IP          vrrp group track ip-address
vrrp group track bfd      BFD          IP      no
  11

```

```
vrp group track [interface-type number] bfd interface-type  
interface-number ipv4-address ] [priority ]
```

```
vrrp group track ip-address [[[ interval interval-value ]  
                                timeout timeout-value ] priority ]
```

```
vrrp group track [interface-type number] bfd interface-type  
interface-number ipv4-address [ip-address]
```

Г Д

<i>group</i>	VRRP
--------------	------

interface-type

number

<i>ipv4-address</i>	IPv4	bfd
---------------------	------	-----

interval-value ⊔
3

<i>timeout-value</i>	4	W
1		

priority

10

VRRP

Г Д

VRRP 三 VRRP

	(Routed Port)	SVI	Loopback	Tunnel
IP			ping	山

VRP(0) VRP(0,0,0)

61.2.1 debug vrrp

```

VRRP          VRRP          VRRP
no             W           W

debug vrrp
no debug vrrp

R      A

                                     W

R      A

R      A

                                   VRRP       W

Ruijie# debug vrrp
Ruijie#
VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213
VRRP: Grp 1 Event - Advert higher or equal priority
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 1 state Master
-> Backup
VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 1 state Backup
-> Master
Ruijie#
```

Ruijie# debug vrrp errors	VRRP
Ruijie# debug vrrp events	VRRP
Ruijie# debug vrrp state	VRRP

61.2.2 debug vrrp errors

VRRP	no	W
------	----	---

debug vrrp errors

no debug vrrp errors

┌ A

VRRP

┌ A

┌ A

VRRP

Ruijie# **debug vrrp errors**

Ruijie#

VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1

VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1

VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1

61.2.3 debug vrrp events

VRRP no

debug vrrp events

no debug vrrp events

┌ A

VRRP

┌ A

┌ A

VRRP

Ruijie# **debug vrrp events**

VRRP: Grp 1 Event - Advert higher or equal priority

VRRP: Grp 1 Event - Advert higher or equal priority

VRRP: Grp 1 Event - Advert higher or equal priority

61.2.4 debug vrrp packets

VRRP no

debug vrrp packets
no debug vrrp packets

Г А

VRRP Ш

Г А

Г А

VRRP

VRRP 1 Ш

Ruijie# **debug vrrp packets**

Ruijie#

VRRP: Grp 2 sending Advertisement checksum DD4D

VRRP: Grp 2 sending Advertisement checksum DD4D

VRRP: Grp 2 sending Advertisement checksum DD4D

VRRP

VRRP 1 IP VRRP 1 Ш

Ruijie# **debug vrrp packets**

Ruijie#

VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213

VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213

VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213

61.2.5 debug vrrp state

VRRP no Ш

debug vrrp state

no debug vrrp state

Г А

VRRP Ш

Г А

Г А

VRRP Ш

```
Ruijie# debug vrrp state
Ruijie#
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 2 state Master
-> Backup
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 2 state Backup
-> Master

Ruijie# config terminal
Enter configuration commands, one per line. End with
CNTL/Z.

Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# no shutdown
Ruijie(config-if)# end
Ruijie#
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 2 state Master
-> Init
```

61.3

61.3.1 show vrrp

```

                                VRRP                III
show vrrp [ brief | group ]

r      A
      brief                VRRP
      group                VRRP

r      A

r      A
                                VRRP                III

r      A
                                VRRP

Ruijie# show vrrp
FastEthernet 0/0 - Group 1
State is Backup
Virtual IP address is 192.168.201.1 configured
Virtual MAC address is 0000.5e00.0101
Advertisement interval is 3 sec
Preemption is enabled
```


Г А

Г А

E1/0 VRRP

```
Ruijie# show vrrp interface fastethernet 0/0
FastEthernet 0/0 - Group 1
State is Backup
Virtual IP address is 192.168.201.1 configured
Virtual MAC address is 0000.5e00.0101
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 100
Master Router is 192.168.201.213 , pritority is 120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec
FastEthernet 0/0 - Group 2
State is Master
Virtual IP address is 192.168.201.2 configured
Virtual MAC address is 0000.5e00.0102
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 120
Master Router is 192.168.201.217 (local), priority is
120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec
```

Г А

Ruijie(config-if)# vrrp group ip <i>ip address [secondary]</i>	VRRP IP

62 BFD

62.1

62.1.1 bfd

bfd **no**
interval *milliseconds* **min_rx** *milliseconds* **multiplier** *multiplier-value*
no bfd interval *milliseconds* **min_rx** *milliseconds* **multiplier** *multiplier-value*

```
Ruijie(config-if)# bfd interval 100 min_rx 100 multiplier 3
```

└ ┘

bfd all-interfaces	BFD ┘
clear bfd	BFD ┘
ip ospf bfd	OSPF BFD ┘
ip rip bfd	RIP BFD

└ ┘

62.1.2 bfd all-interfaces

```
router (RIP,OSPF)   bfd all-interfaces
          BFD       no               ┘
```

bfd all-interfaces

no bfd all-interfaces

└ ┘

-	-

└ ┘

BFD

└ ┘

└ ┘

BFD

OSPF RIP

[no] bfd all-interfaces

BFD

ip ospf bfd [disable]

ip rip bfd [disable]

OSPF

RIP

BFD

Г Д

Г Д

Г Д

Г Д

Г Д

Г Д

Г Д

```
# BFD
Ruijie(config)# bfd cpp

Ruijie#
```

-	-

```
Ruijie#
```

62.1.4 bfd echo

```
bfd echo echo no echo

bfd echo
no bfd echo

Ruijie#

Ruijie# BFD echo

Ruijie#

Ruijie# BFD echo echo
Interval milliseconds min_rx milliseconds

Ruijie#

L3 AP
BFD ECHO , BFD no ip
redirects ICMP no ip deny land
DDOS ( Land-based )
Echo BFD

Ruijie#

# Routed Port FastEthernet 0/2 echo
Ruijie(config)# interface fastEthernet 0/2
```

```
Ruijie(config)# no switchport
```

```
Ruijie(config-if)# bfd echo
```

```

r      A

```

bfd	BFD 卐
ip redirects	ICMP 卐
ip deny land	Land-based 卐
bfd slow-timer	

```

r      A

```

62.1.5 bfd slow-timer

```

bfd slow-timer      BFD      ECHO
                    BFD      卐

```

```
Ruijie(config)# bfd slow-timer 14000
```

```
└─┬─┘
```

bfd echo	BFD Echo

```
└─┬─┘
```

62.1.6 bfd up-dampening

```
no , UP UP
```

bfd up-dampening *[milliseconds]*

no bfd up-dampening



10.3(5)	

62.1.7 ip ospf bfd

disable **ip ospf bfd** **no** OSPF BFD

ip ospf bfd [disable]

no ip ospf bfd

disable	() OSPF BFD

disable OSPF BFD

OSPF BFD

OSPF BFD

[no] bfd all-interfaces

ip ospf bfd [disable]

OSPF BFD

Routed Port FastEthernet 0/2 OSPF BFD

Ruijie(config)# **interface** FastEthernet 0/2

Ruijie(config-if)# **no switchport**

Ruijie(config-if)# **ip ospf bfd disable**

bfd	BFD 山
bfd all-interfaces	BFD

Г А

62.1.8 ip rip bfd

ip rip bfd RIP BFD
disable no 山

ip rip bfd [disable]

no ip rip bfd

Г А

disable	() RIP BFD 山

Г А

disable RIP BFD

Г А

Г А

RIP BFD

RIP **[no] bfd all-interfaces**

BFD

ip rip bfd [disable]

RIP BFD

Г А

Routed Port FastEthernet 0/2 RIP BFD 山

Ruijie(config)# **interface** FastEthernet 0/2

Ruijie(config-if)# **no switchport**

Ruijie(config-if)# **ip rip bfd disable**

Г А


```

Ruijie(config-if)# ip address 172.16.0.1 255.255.255.0
Ruijie(config-if)# bfd interval 50 min_rx 50 multiplier 3
Ruijie(config-if)# ip route static bfd FastEthernet 0/1 172.16.0.2

Ruijie(config-if)# ip route 10.0.0.0 255.0.0.0 FastEthernet
0/1 172.16.0.2

```

Г А

bfd	BFD Ш

Г А

62.1.10 neighbor fall-over bfd

```

router address-family , neighbor fall-over BGP
BFD BGP , no

```

neighbor ip-address fall-over bfd

no neighbor ip-address fall-over bfd

Г А

ip-address	BGP Ш

Г А

BGP BFD

Г А

Г А

IP	BFD
----	-----

Г А

```
# BGP BFD BFD 172.16.0.2
```

```
Ruijie(config)# router bgp 44000
```

```
Ruijie(config-router)# bgp log-neighbors-changes
```

```
Ruijie(config-router)# neighbor 172.16.0.2 remote-as 45000
```

```
Ruijie(config-router)# neighbor 172.16.0.2 fall-over bfd
```

```
Ruijie(config-router)# end
```

```

r      A

```

bfd	BFD Ⅲ

```

r      A

```

62.1.11 set ip next-hop verify-availability

```

Route-map          set ip next-hop verify-availability
BFD      TRACK      IP                               Ⅲ      no
                Ⅲ

```

set ip next-hop verify-availability [*next-hop-address* [**track** *number*|**bfd** [**vrf** *vrf-name*]] *interface-type interface-number gateway*]]

no set ip next-hop verify-availability [*next-hop-address* [**track** *number*|**bfd** [**vrf** *vrf-name*]] *interface-type interface-number gateway*]]

```

r      A

```

vrf <i>vrf-name</i>	() VRF
<i>next-hop-address</i>	() IP
track	() Track
<i>number</i>	() track
bfd	() BFD
<i>interface-type</i> <i>interface-number</i>	()
<i>gateway</i>	() IP BFD IPⅢ BFD Ⅲ

```

r      A

```

BFD

```

r      A

```

```

r      A

```

		IP	BFD	
r	A			
		#	BFD	BFD 172.16.0.2

Ruijie#**configure terminal**

Enter configuration commands, one per line. End with CNTL/Z.

Ruijie(config)# **route-map** Example1 **permit** 10

Ruijie(config-route-map)# **match ip address** 1

Ruijie(config-route-map)# **set ip precedence priority**

Ruijie(config-route-map)#**set ip next-hop**
verify-availability 172.16.0.2 **bfd** FastEthernet 0/1
172.16.0.2

Ruijie(config-route-map)#**end**

r A



┌ A

┌ A

VRRP		IP	BFD
		IP	

┌ A

VRRP BFD BFD

Ruijie#**configure terminal**

Enter configuration commands, one per line. End with CNTL/Z.

Ruijie(config)#**interface** FastEthernet 0/1

Ruijie(config-if)#**no switchport**

Ruijie(config-if)#**ip address** 192.168.201.11 255.255.255.0

Ruijie(config-if)#**bfd interval** 50 **min_rx** 50 **multiplier** 3

Ruijie(config-if)#**vrrp 1 priority** 120

Ruijie(config-if)#**vrrp 1 ip** 192.168.201.1

Ruijie(config-if)#**vrrp 1 bfd** 192.168.201.12

Ruijie(config-if)#**end**

┌ A

bfd	BFD 山

┌ A

62.2

BFD

Ä [show bfd neighbors](#)

62.2.1 show bfd neighbors

BFD

show bfd neighbors [vrf *vrf-name*] [ipv4 *ip-address* [details]] [ipv6
ip-address [details]] | client {bgp|ospf|rip|vrrp|static-route} [ipv4
ip-address [details]] | ipv6 *ip-address* [details]] details]]

Г Д

vrf <i>vrf-name</i>	() VRF Ш
client	()
bgp	BGP BFD
ospf	OSPF BFD
rip	RIP BFD
vrrp	VRRP BFD
static-route	StaticRoute BFD
pbr	PBR BFD
ipv4 <i>ip-address</i>	IPv4
ipv6 <i>ip-address</i>	IPv6
details	

Г Д

Г Д

Ш

Г Д

Г Д

show bfd neighbors

Ruijie# **show bfd neighbors**

OurAddr Int	NeighAddr	LD/RD	RH	Holdown(mult)	State
172.16.11.1 Ge2/1	172.16.11.2	1/2	1	532 (3)	Up

show bfd neighbors details

Ruijie# **show bfd neighbors details**

OurAddr Int	NeighAddr	LD/RD	RH	Holdown(mult)	State
172.16.11.1 Ge2/1	172.16.11.2	1/2	1	532 (3)	Up

Local Diag: 0, Demand mode: 0, Poll bit: 0

MinTxInt: 200000, MinRxInt: 200000, Multiplier: 5

Received MinRxInt: 50000, Received Multiplier: 3

Holdown (hits): 600(22), Hello (hits): 200(84453)

Rx Count: 49824, Rx Interval (ms) min/max/avg: 208/440/332

Tx Count: 84488, Tx Interval (ms) min/max/avg: 152/248/196

Registered protocols: BGP

Uptime: 02:18:49

Last packet: Version: 1 - Diagnostic: 0

I Hear You bit: 1 - Demand bit: 0

Poll bit: 0 - Final bit: 0

Multiplier: 3 - Length: 24

My Discr.: 2 - Your Discr.: 1

Min tx interval: 50000 - Min rx interval: 50000

Min Echo interval: 0

OurAddr	IP
NeighAddr	IP
LD/RD	
RH	
Holdown(mult	hello
State	
Int	
Session state	echo
is UP and	echo (
using	Echo
Local Diag	
Demand	
Poll bit	
MinTxInt	
MinRxInt	
Multiplier	
Received	
Received	
Received	
Holdown (hits)	
Hello (hits)	hello
Rx Count	BFD
Rx Interval	
Tx Count	BFD
Tx Interval	

		Registered	Uptime	UP	Last packet	BFD
Г	Д					
Г	Д					

63 RERP

63.1

RERP

4 RERP

Ш

- **rerp enable**
- **rerp hello-interval**
- **rerp fail-interval**
- **rerp region**

RERP

- **ring**
- **edge-ring**
- **major-ring**

63.1.1 rerp enable

RERP

Ш

rerp enable**no rerp enable**

r A

Ш

r A

disableШ

r A

Ш

r A

RERP

Ш

r A

RERP

Ruijie(config)# **rerp enable**

г д

rerp region	RERP

63.1.2 rerp hello-interval

RERP

Ш

rerp hello-interval *interval*

no rerp hello-interval

г д

interval

1-6 Ш

г д

1 Ш

г д

Ш

г д

г Д

3 Ш

г Д

Ш

г Д

Ш

г Д

6

Ruijie(config)# **rerp fail-interval 6**

г Д

rerp hello- interval	

63.1.4 rerp region

RERP

RERP

Ш

rerp region *num*

no rerp region *num*

г Д

num , 1-64

г Д

Ш

г Д

Ш

г Д

Ш

г Д

Ruijie# **rerp region 1**

г Д

--	--

rerp enable	RERP
-------------	------

63.1.5 ring

RERP

4

vlan

W

ring *num* **role** [**master** | **backup** | **transit**] **ctrl-vlan** *vid* **primary-port**
interface *interface-id* **secondary-port interface** *interface-id*
no ring *num*

Г А

num *id*

master | **backup** | **transit**

4

vid *vlan*

interface-id

Г А

W

Г А

RERP

W

Г А

RERP

,

RERP

Master
native vlan

Backup

RERP

vlan W

trunk

Г А

Ruijie(config)# **rerp region 1**

Ruijie(config-rerp)# **ring 1 role master ctrl-vlan 100**

primary-port interface *GigabitEthernet 0/1*

secondary-port interface *GigabitEthernet 0/2*

Г А

rerp region	RERP

63.1.6 edge-ring

RERP ring W

```

edge-ring num role [primary-edge|secondary-edge] ctrl-vlan vid
shared-port interface interface-id sub-port interface
interface-id
no ring num

```

```

r      A

```

```

num id
primary-edge|secondary-edge
vid vlan
interface-id

```

```

r      A

```

```

    W

```

```

r      A

```

```

RERP      W

```

```

r      A

```

```

RERP
RERP ringW

```

```

r      A

```

```

Ruijie(config)# rerp region 1
Ruijie(config-rerp)# edge-ring 2 role primary-edge
ctrl-vlan 200 shared-port interface GigabitEthernet 0/1
sub-port interface GigabitEthernet 0/3

```

```

r      A

```

rerp region	RERP
ring	rerp

63.1.7 major-ring

```

    W

```

```

major-ring num edge-ring-vlan vid

```

```

r      A

```

```

num id

```

vid *vlan r* *Д* *Ш r* *Д RERP* *Ш r* *Д*



rerp region RERP *vid ĩ Â)€ wÂ –H €Q"ĩ TD•R `H^óB/P).ñuDP5!6 EnóB/ ...).ñu*

```
Ruijie# show rerp
rerp state : enable
rerp admin hello interval : 1(*1s)
rerp admin fail interval : 3(*1s)
rerp edge interval : 1(*300 ms)
rerp local bridge : 001a.a902.fe0b
-----
region 1
ring : 1
rerp oper hello interval : 1
rerp oper fail interval : 3
ring master : 001a.a902.fe0b
ctrl-vlan : 100
edge-vlan :
role : master
primary-port : Gi 0/4(forwarding)
secondary-port : Gi 0/21(down)
```

63.2.2 show rerp statistics

RERP

山

show rerp statistics region *num* ring *ring_id*

r A

EXEC

r A

:

```
Ruijie# sh rerp statistics region 1 ring 1
The statistics for region 1 ring 1 GigabitEthernet 0/4
TX hello packets      23, RX hello packets      0
TX edge-hello packets 0, RX edge-hello packets  0
TX flush packets      0, RX flush packets      0
TX down packets       0, RX down packets       0
TX up packets         0, RX up packets         0
TX major fail packets 0, RX major fail packets  0
TX major resume packets 0, RX major resume packets 0
TX sub complete packets 0, RX sub complete packets 0
```

```
The statistics for region 1 ring 1 GigabitEthernet 0/5
TX hello packets      23, RX hello packets      0
TX edge-hello packets 0, RX edge-hello packets  0
TX flush packets      0, RX flush packets      0
```

TX down packets	0,	RX down packets	0
TX up packets	0,	RX up packets	0
TX major fail packets	0,	RX major fail packets	0
TX major resume packets	0,	RX major resume packets	0
TX sub complete packets	0,	RX sub complete packets	0

63.2.3 clear rerp statistics

RERP 𐄌

clear rerp statistics

Г А

EXEC

63.2.4 debug rerp

RERP 𐄌 no

64 REUP

64.1

REUP

4

Ⅲ

- **mac-address-table** move update receive
- **mac-address-table** move update transmit
- **switchport backup interface** *interface-id* [**preemption** {mode { **forced** | **bandwidth** | **off** } | **delay** *delay-time*}]
- **mac-address-table** update group

64.1.1 switchport backup interface *interface-id*

REUP

Ⅲ

switchport backup interface *interface-id***no switchport backup**

r A

interface-id

IDⅢ

r A

Ⅲ

r A

Ⅲ

r A

interface-id

Ⅲ

Ⅲ

r A

fa 0/1

fa 0/2

Ruijie(config)# **interface** *fa 0/1*Ruijie(config-if)# **switchport backup interface** *fa 0/2*

Г А

show interface switchport backup	Ш

64.1.2 switchport backup interface *interface-id* preemption

REUP

Ш

switchport backup interface *interface-id* preemption mode { forced | bandwidth | off }

no switchport backup interface *interface-id* preemption mode { forced | bandwidth | off }

switchport backup interface *interface-id* preemption delay *delay-time*

no switchport backup interface *interface-id* preemption delay

Г А

interface-id IDШ

delay-time Ш

Г А

Ш

35 Ш

Г А

Ш

Г А

Ч

~

Á x

Ш

show interface switchport backup	⏏

64.1.3 mac-address-table move update receive

```

REUP      MAC      ⏏
mac-address-table move update receive
no mac-address-table move update receive

r      d
      ⏏

r      d
disable⏏

r      d
      ⏏

r      d
      MAC
      ⏏
      ⏏
      MAC
      ⏏
      MAC

r      d
      MAC
Ruijie(config)# mac-address-table move update receive

r      d

```

mac-address-table move update transit	MAC ⏏

64.1.4 mac-address-table move update transit

```

REUP      MAC      ⏏
mac-address-table move update transit
no mac-address-table move update transit

r      d

```

1

2

3

4

5

6

7

8

9

10

Ruijie(config)# **mac-address-table move update transit**

11

mac-address-table move update transit	MAC 12

64.1.5 mac-address-table update group

13

14

mac-address-table update group [*group-num*]

no mac-address-table update group

15

group-num : MAC ID
 16

17

г д

MAC

Ruijie(config-if)# **mac-address-table update group 2**

г д

show mac-address-table update group detail	MAC Ш

64.2

- × **show interfaces** [*interface-id*] **switchport backup** [detail]
- × **show mac-address-table update group** [detail]

64.2.1 show mac-address-table update group [detail]

г д MAC Ш

detail : MAC

г д MAC Ш

г д EXEC

г д

```
Ruijie# show mac-address-table update group detail
Mac-address-table Update Group:1
Received mac-address-table update message count:0
Group member  Receive Count    Last Receive Switch-ID
Receive Time
-----
Gi0/1          0                0000.0000.0000
Gi0/2          0                0000.0000.0000
```

64.2.2 show interfaces [*interface-id*] switchport backup [detail]

Г А

interface-id : ID

detail : Ш

65 RLDP

65.1

RLDP 4 3

- Ä rldp detect-interval
- Ä rldp detect-max
- Ä rldp enable
- Ä rldp loop-detect enable

65.1.1 rldp loop-detect enable

RLDP 3

rldp loop-detect enable
no rldp loop-detect enable

--

3

--

3

--

RLDP RLDP 3

--

Ruijie(config)# rldp loop-detect enable

rldp port	RLDP



65.1.3 rldp detect-max

RLDP

⌘

rldp detect-max *num*

no rldp detect-max

	<i>num</i>	, 2-10

2

⌘

⌘

5
Ruijie(config)# **rldp detect-max 5**

	rldp detect-interval	

	-	-

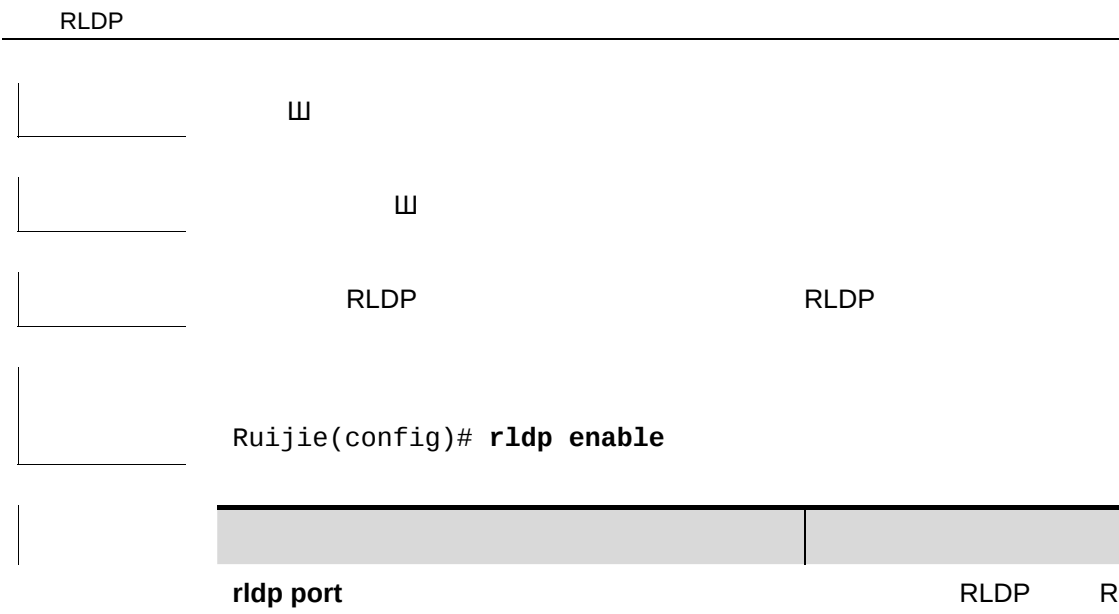
65.1.4 rldp enable

RLDP

⌘

rldp enable

no rldp enable



rldp Ш

```
no rldp port { unidirection-detect | bidirection-detect | loop-detect }
```

unidirection-detect	
bidirection-detect	
loop-detect	
warning	
shutdown-svi	shutdown svi
shutdown-port	shutdown
block	

100



--	--	--

rldp reset



```
Ä show rldp
Ä debug rldp
```


RLDP

66 DLDP

66.1

DLDP

- Ä [dldp](#)
- Ä [dldp passive](#)
- Ä [clear dldp](#)

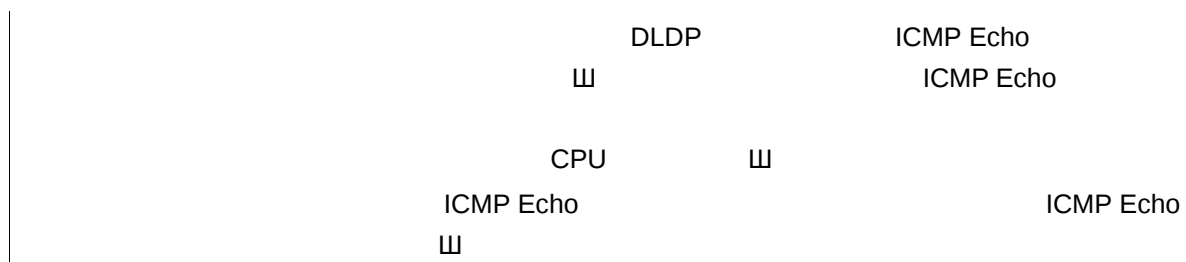
66.1.1 dldp

DLDP Ⅲ no IP DLDP
Ⅲ

dldp *ip-address* [**next-hop** *ipv4-address*] [**interval** *tick* | **retry** *retry-num* |
resume *resume-num*]

no dldp *ip-address*

```
Ruijie(config)#interface vlan 1
Ruijie(config-if-VLAN 1)#ip address 10.83.132.1 255.255.255.0 //
    vlan1  IP
Ruijie(config-if-VLAN 1)#dldap 10.83.132.10
    2                10.83.131.10  DLDAP
Ruijie#config
Ruijie(config)#interface vlan 1
Ruijie(config-if-VLAN 1)#ip address 10.83.132.1 255.255.255.0 //
    vlan1  IP
Ruijie(config-if-VLAN 1)#dldap 10.83.131.10 next-hop 10.83.132.2 //
    IP
    3                10.83.132.10  DLDAP
Ruijie#config
Ruijie(config)#interface vlan 1
Ruijie(config-if-VLAN 1)#no dldap 10.83.132.10
```



10.3(5)

⌘

-	-

66.3

66.3.1 clear dldp

dldp up/down

⌘

clear dldp [**interface** *interface-name* [*ip-address*]]

<i>interface-name</i>	
<i>ip-address</i>	IP

DLDP up/down
 up/down ⌘ IP
 up/down ⌘
 IP up/down ⌘

1 up/down
 Ruijie#**clear dldp**
 2 interface vlan 1 up/down
 Ruijie#**clear dldp interface vlan 1**
 3 interface vlan 1 10.83.132.1 up/down
 Ruijie# **clear dldp interface vlan 1 10.83.132.1**

-	-

10.3(5)

⌘

	-	-

67

Г Д

CPU
Ш (AP)
Ш

Г Д

Ruijie(config-if)# **tp-guard port enable**
Ruijie(config-if)# **no tp-guard port enable**

Г Д

topology guard

看

67.2 TPP

67.2.1 show tpp

Ш

show tpp

Г Д

Г Д

Г Д

tpp Ш

Г Д

Ruijie# **show tpp**

Г Д

topology guard

68

68.1

☐

- **redundancy**
- **auto-sync**
- **auto-sync time-period**
- **switchover timeout**
- **redundancy reload**
- **redundancy forceswitch**

68.1.1 redundancy

redundancy

☐

redundancy

Г А

Г А

auto-sync ☐ auto-sync time-period ☐ switchover timeout

☐

Г А

```
Ruijie# config terminal
Ruijie(config)# redundancy
Ruijie(config-red)# exit
Ruijie(config)#
```

68.1.2 auto-sync

		running-config startup-config	
		auto-sync { standard running-config startup-config } no auto-sync { standard running-config startup-config }	
r	A	standard running-config startup-config	
		auto-sync standard	
		standard	
		startup-config Ruijie(config)# redundancy Ruijie(config-rdnd)# auto-sync startup-config Ruijie(config-rdnd)# exit Ruijie(config)#	
r	A	starup-config Ruijie(config)# redundancy Ruijie(config-rdnd)# no auto-sync startup-config Ruijie(config-rdnd)# exit Ruijie(config)#	

68.1.3 auto-sync time-period

		running-config startup-config	
		auto-sync time-period <i>value</i> no auto-sync time-period	
r	A	<i>value</i>	

Г Д

```
Ruijie# config terminal
Ruijie(config)# redundancy
Ruijie(config-red)# switchover timeout 4000
Ruijie(config-red)# exit
Ruijie(config)#
```

68.1.5 redundancy reload

privileged EXEC redundancy reload Slave
Master Slave

redundancy reload {peer | shelf}

) N > « Б " „

г А

г А

г А

Ш

г А

Ruijie# **redundancy forceswitch**

Proceed with switchover to standby PRE? [confirm] **y**

г А

```
peer state = 37 -Standby Hot
```

```
...
```

68.2.2 show redundancy auto-sync

```
user EXEC      privileged EXEC      show redundancy
auto-sync      redundancy           W(
auto-sync      )
```

```
r      A
```

```
r      A
```

```
r      A
```

```
Ruijie> enable
Ruijie# show redundancy auto-sync
Redundancy auto-sync mode: auto-sync standard.
...
```

68.2.3 show redundancy switchover

```
user EXEC      privileged EXEC      show redundancy
switchover      redundancy           W
W
```

```
r      A
```

```
r      A
```

```
r      A
```

```
Ruijie> enable
Ruijie# show redundancy switchover
Redundancy switch timeout is : 4000 ms.
...
```

69

69.1

- **cd**
- **cp**
- **ls**
- **makefs**
- **mkdir**
- **mv**
- **pwd**
- **rm**
- **rmdir**

69.1.1 cd

cd *DIRECTORY*

Г Д

DIRECTORY

Г Д

Ш

Г Д

Ш

Г Д

“ ”
..

“ ”
.

Ш

ls

Ш

Г Д

tmp

Ruijie#

PATHNAME

г А

Ш

г А

Ш

г А

Ш

г А

Ruijie# **ls**

tmp

Ruijie# **ls tmp**

г А

69.1.4 makefs

makefs dev *DEVNAME* **fs** *FSNAME*

makefs fs *FSNAME* **dev** *DEVNAME*

г А

DEVNAME ()

FSNAME

г А

Ш

г А

Ш

г А


```

r      A
      W

r      A
      W

r      A
      W

aЧ      ( type file); bЧ'?
      '?'

,      W

r      A

log.txt      ,      config.txt,

,

Ruijie# mv sour tmp/log.txt dest ../config.txt

log.txt      tmp

Ruijie# mv dest /mnt/tmp sour tmp/log.txt

```

69.1.7 pwd

```

      pwd

r      A


```

pwd	

```

r      A

      W

r      A

      W

r      A

      W

r      A

      W

```

Ruijie# pwd

гД

69.1.8 rm

Ш

rm FILE

гД

FILE ()

гД

Ш

гД

Ш

гД

,

Ш

Ш

гД

log.txt

Ruijie# rm log.txt

гД

rmdir	rm , ,

69.1.9 rmdir

Ш

rmdir directory

гД

directory ,

гД

Ш

69-6

r A

W

r A

rm

,

W

,

W

r A

tmp

W

Ruijie# **rmdir** tmp

Ruijie# **ls**

70

70.1 CPU-LOG

- show cpu
- cpu-log

70.1.1 show cpu

```

CPU
show cpu
r      A

r      A

r      A

      W

r      A

      CPU      5      4      1
      4      5      CPU      5
      4      1      4      5      CPU      W

r      A

      show cpu      W

Ruijie# show cpu
=====
      CPU Using Rate Information
CPU utilization in five seconds: 25%
CPU utilization in one minute : 20%
CPU utilization in five minutes: 10%
NO   5Sec   1Min   5Min   Process
0     0%    0%    0%    LISR INT
1     7%    2%    1%    HISR INT
```

4	0%	0%	0%	printk_task
5	0%	0%	0%	waitqueue_process
6	0%	0%	0%	tasklet_task
7	0%	0%	0%	kevents
8	0%	0%	0%	snmpd
9	0%	0%	0%	snmp_trapd
10	0%	0%	0%	mtdblock
11	0%	0%	0%	gc_task
12	0%	0%	0%	Context
13	0%	0%	0%	kswapd
14	0%	0%	0%	bdflush
15	0%	0%	0%	kupdate
16	0%	3%	1%	ll_mt
17	0%	0%	0%	ll main process
18	0%	0%	0%	bridge_relay
19	0%	0%	0%	d1x_task
20	0%	0%	0%	secu_policy_task
21	0%	0%	0%	dhcpc_task
22	0%	0%	0%	dhcpsnp_task
23	0%	0%	0%	igmp_snp
24	0%	0%	0%	mstp_event
25	0%	0%	0%	GVRP_EVENT
26	0%	0%	0%	rldp_task
27	0%	2%	1%	rerp_task
28	0%	0%	0%	reup_event_handler
29	0%	0%	0%	tpp_task
30	0%	0%	0%	ip6timer
31	0%	0%	0%	rtadvd
32	0%	0%	0%	tnet6
33	2%	0%	0%	tnet
34	0%	0%	0%	Tarptime
35	0%	0%	0%	gra_arp
36	0%	0%	0%	Ttcptimer
37	8%	1%	0%	ef_res
38	0%	0%	0%	ef_rcv_msg
39	0%	0%	0%	ef_inconsistent_daemon
40	0%	0%	0%	ip6_tunnel_rcv_pkt
41	0%	0%	0%	res6t
42	0%	0%	0%	tunrt6
43	0%	0%	0%	ef6_rcv_msg
44	0%	0%	0%	ef6_inconsistent_daemon
45	0%	0%	0%	imid
46	0%	0%	0%	nsmd
47	0%	0%	0%	ripd
48	0%	0%	0%	ripngd
49	0%	0%	0%	ospfd

50	0%	0%	0%	ospf6d
51	0%	0%	0%	bgpd
52	0%	0%	0%	pimd
53	0%	0%	0%	pim6d
54	0%	0%	0%	pdmd
55	0%	0%	0%	dvmrpd
56	0%	0%	0%	vty_connect
57	0%	0%	0%	aaa_task
58	0%	0%	0%	Tlogtrap
59	0%	0%	0%	dhcp6c
60	0%	0%	0%	sntp_recv_task
61	0%	0%	0%	ntp_task
62	0%	0%	0%	sla_daemon
63	0%	3%	1%	track_daemon
64	0%	0%	0%	pbr_guard
65	0%	0%	0%	vrrpd
66	0%	0%	0%	psnpd
67	0%	0%	0%	igsnpd
68	0%	0%	0%	coa_recv
69	0%	0%	0%	co_oper
70	0%	0%	0%	co_mac
71	0%	0%	0%	radius_task
72	0%	0%	0%	tac+_acct_task
73	0%	0%	0%	tac+_task
74	0%	0%	0%	dhcpd_task
75	0%	0%	0%	dhcps_task
76	0%	0%	0%	dhcpping_task
77	0%	0%	0%	dhcpc_task
78	0%	0%	0%	uart_debug_file_task
79	0%	0%	0%	ssp_init_task
80	0%	0%	0%	rl_listen
81	0%	0%	0%	ikl_msg_operate_thread
82	0%	0%	0%	bcmDPC
83	0%	0%	0%	bcmL2X.0
84	3%	3%	3%	bcmL2X.0
85	0%	0%	0%	bcmCNTR.0
86	0%	0%	0%	bcmTX
87	0%	0%	0%	bcmXGS3AsyncTX
88	0%	2%	1%	bcmLINK.0
89	0%	0%	0%	bcmRX
90	0%	0%	0%	mngpkt_rcv_thread
91	0%	0%	0%	mngpkt_recycle_thread
92	0%	0%	0%	stack_task
93	0%	0%	0%	stack_disc_task
94	0%	0%	0%	redun_sync_task
95	0%	0%	0%	conf_dispatch_task

96	0%	0%	0%	devprob_task
97	0%	0%	0%	rdp_snd_thread
98	0%	0%	0%	rdp_rcv_thread
99	0%	0%	0%	rdp_slot_change_thread
100	4%	2%	1%	datapkt_rcv_thread
101	0%	0%	0%	keepalive_link_notify
102	0%	0%	0%	rerp_msg_rcv_thread
103	0%	0%	0%	ip_scan_guard_task
104	0%	0%	0%	ssp_ipmc_hit_task
105	0%	0%	0%	ssp_ipmc_trap_task
106	0%	0%	0%	hw_err_snd_task
107	0%	0%	0%	rerp_packet_send_task
108	0%	0%	0%	idle_vlan_proc_thread
109	0%	0%	0%	cmic_pause_detect
110	1%	1%	1%	stat_get_and_send
111	0%	1%	0%	rl_con
112	75%	80%	90%	idle

```

          5          3          5    4    1    4
          CPU          LISR 4 HISR          W
          CPU          W
° No
° 5Sec          5          CPU
° 1Min          1          CPU
° 5Min          5          CPU
          2          LISR    CPU          HISR
          CPU          3          CPU          W
          idle          CPU    Windows    I System Idle Process L
          75%          CPU    75%          idle    5          CPU

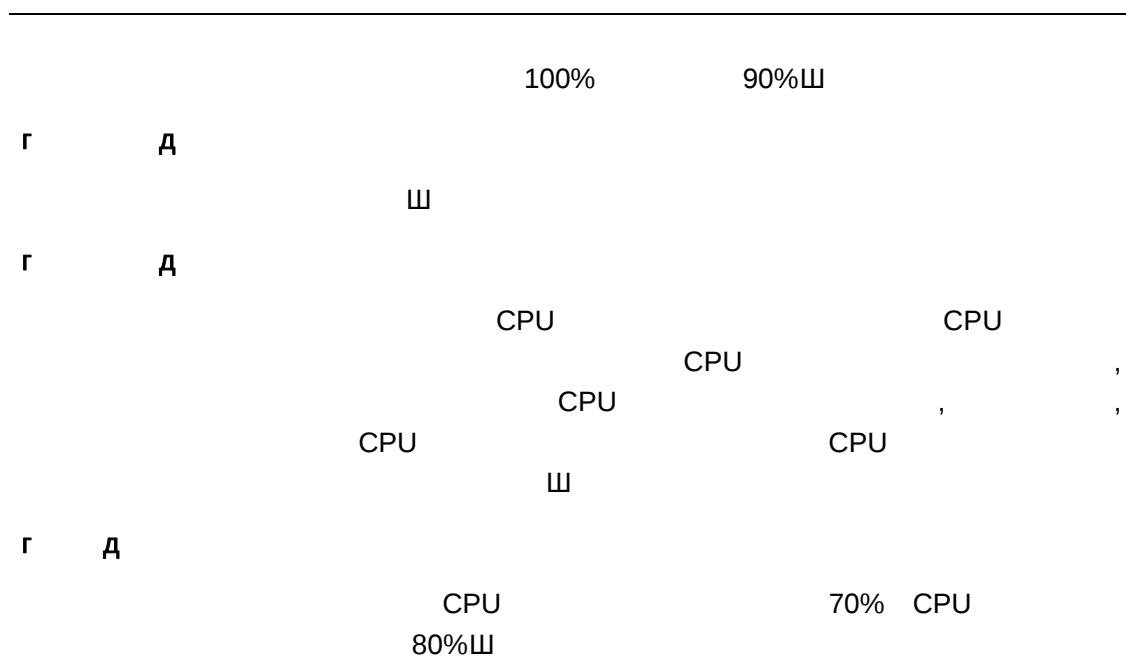
```

70.1.2 cpu-log

```

          CPU          ,          cpu-log W
cpu-log log-limit low_num high_num
r      A
log-limit
low_num CPU
high_num CPU
r      A

```



```
ruijie(config)# cpu-log log-limit 70 80
```

```
CPU 80%
```

```
Oct 20 15:47:01 %SYSCHECK-5-CPU_USING_RATE: CPU
utilization in one minute : 95% Using most cpu's task
is ktimer : 94%
```

```
CPU 70%
```

```
Oct 20 15:47:01 %SYSCHECK-5-CPU_USING_RATE: CPU
utilization in one minute :68% Using most cpu's task
is ktimer : 60%
```

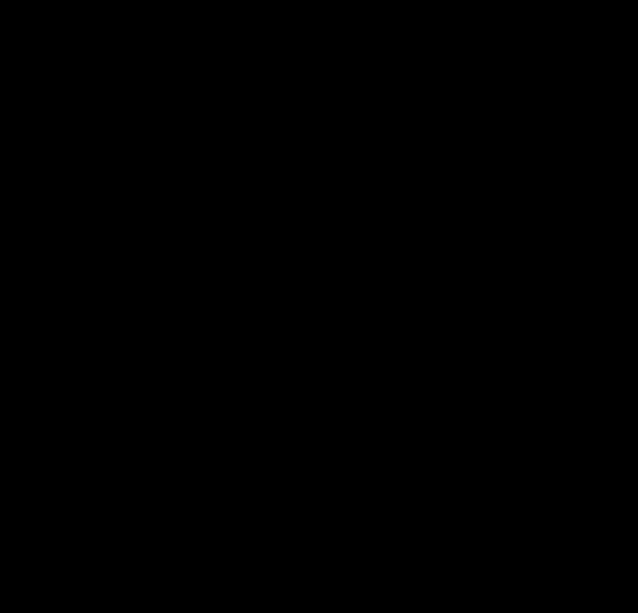
```
Oct 20 15:47:01 %SYSCHECK-5-CPU_USING_RATE: The CPU
using rate has down!
```

70.2

```
show memory
memory-lack exit-policy
show memory protocols
```

70.2.1 show memory

```
show
memory
show memory
```



worsen
4 OSPF 4 RIP 4 PIM-SM
policy (bgp|ospf|pim-sm|rip)
exit-policy

p	BGP OSPF PIM RIP

Г

show memory protocols

г	д		
г	д		
г	д	ш	ш
		&	

r	A		
		show threshold	
r	A		

70.3.2

Ä [show threshold](#)

show threshold

Ш
show threshold {cpu | memory | temperature} [M1 | M2 | slot *n* | member *n*]

r	A		
		cpu memory temperature	cpu CPU memory temperature
		M1 M2 slot <i>n</i>	<i>n</i>
		member <i>n</i>	<i>n</i>

r A

r A

Ш

r A

r A

1 M1 CPU Ш
Ruijie# show threshold cpu M1

2 Ш
Ruijie# show threshold memory

r A

threshold set	

Г

А

71

71.1

71.1.1 logging on

The diagram illustrates a network configuration with various components and their interconnections. Key elements include:

- Top Section:** A 'no' label is positioned above a 'U' icon. Below this, the text 'logging on' and 'no logging on' are displayed.
- Left Column:** A vertical stack of four 'U' icons, each accompanied by a 'D' label to its right.
- Bottom Left:** A 'U' icon with a 'D' label to its right.
- Bottom Center:** A 'U' icon with a '1' label to its right, and a 'Log' label below it.
- Bottom Right:** A 'U' icon with a '1' label to its right, and a 'Log' label below it.
- Central Area:** A 'U' icon is located in the center, with a 'U' icon to its right.
- Bottom Right Area:** A 'U' icon is located in the bottom right, with a 'U' icon to its right.
- Labels and Text:**
 - 'no' (top center)
 - 'logging on' (top center)
 - 'no logging on' (top center)
 - 'RGOS' (bottom left)
 - 'Console' (bottom center)
 - 'VTY' (bottom center)
 - 'FLASH' (bottom center)
 - 'Syslog Server' (bottom center)
 - 'Log' (bottom center)
 - '1' (bottom center)
 - 'D' (multiple locations on the left)
 - 'U' (multiple locations throughout the diagram)

```
Ruijie(config)# no logging on
```

Г Д

logging buffered	
logging	Syslog Server
logging file flash:	FLASH
logging console	

no logging buffered

6

6

10000

```
Ruijie(config)# logging buffered 10000 6
```

```

r      A

```

logging on	
show logging	
clear logging	

71.1.4 logging server

Syslog Sever

山

Syslog server

Syslog Server

no 山

```
logging server {ip-address [vrf vrf-name] | ipv6 ipv6-address}
```

```
no logging server {ip-address [vrf vrf-name] | ipv6 ipv6-address}
```

```

r      A

```

ip-address IP

vrf vrf-name VRF VPN

ipv6 ipv6-address IPV6

```

r      A

```

syslog server

```

r      A

```

```

r      A

```

Syslog server

山RGOS

5 Syslog Server山

Syslog Server山

```

r      A

```

202.101.11.1 syslog server

```
Ruijie(config)# logging server 202.101.11.1
```

IPV6 AAAA:BBBB::FFFF

```
Ruijie(config)# logging server ipv6 AAAA:BBBB::FFFF
```

Г А

logging on	
show logging	
logging trap	syslog server

71.1.5 logging file flash

FLASH FLASH no

logging file flash:*filename* [*max-file-size*] [*level*]

no logging file

Г А

filename txt
max-file-size 128K 6M bytes
128K
level FLASH 6
1

Г А

FLASH

Г А

Г А

Syslog Server

FLASH

txt

```

1.
2.
   txt
3.      15
           FLASH
16              FLASH

```

```

r      A

```

```

           FLASH      trace.txt
64K,      6M
Ruijie(config)# logging file flash:trace

```

```

r      A

```

logging on	
show logging	
more flash	FLASH

71.1.6 logging console

```

no
logging console level
no logging console

```

```

r      A

```

```

level      0  7M
           M      1M

```

```

r      A

```

```

Debugging (7)

```

```

r      A

```

```

r      A

```


Г Д

logging on	
show logging	

```

Syslog Server
no
Syslog Server
logging trap level
no logging trap
level
1
Informational(6)
Syslog Server
logging
Syslog Server
logging trap
show logging
6
202.101.11.22
Syslog Server
Ruijie(config)# logging 202.101.11.22
Ruijie(config)# logging trap informational

```

logging on	
------------	--

Local7(23)

r A

r A

2 Syslog

2

Numerical Code	Facility
0	kernel messages
1	user-level messages
2	mail system
3	system daemons
4	security/authorization messages
5	messages generated internally by syslogd
6	line printer subsystem
7	network news subsystem
8	UUCP subsystem
9	clock daemon
10	security/authorization messages
11	FTP daemon
12	NTP subsystem
13	log audit
14	log alert
15	clock daemon
16	local use 0 (local0)
17	local use 1 (local1)
18	local use 2 (local2)

```

19                                local use 3  (local3)
20                                local use 4  (local4)
21                                local use 5  (local5)
22                                local use 6  (local6)
23                                local use 7  (local7)

```

```

RGOS                                (local7)  23

```

```

r      A

```

```

                                Syslog        kernel

```

```

Ruijie(config)# logging facility kern

```

```

r      A

```

logging console	

71.1.12 logging count

```

no

```

```

logging count
no logging count

```

```

r      A

```

```

r      A

```

```

r      A

```

```

r      A

```

```

count                                no logging

```

```

r      A

```

```
Ruijie(config)# logging count
```

Г Д

show logging count	
show logging	

71.1.13 logging rate-limit

W

no

```
Ruijie(config)#logging rate-limit all 10 except
warnings
```

```
r      A
```

show logging count	
show logging	

71.1.14 logging synchronous

```
no logging synchronous
```

```
logging synchronous
```

```
no logging synchronous
```

```
r      A
```

```
r      A
```

```
    
```

```
r      A
```

```
r      A
```

```
    
```

```
r      A
```

```
Ruijie(config)#
Ruijie(config)#line console 0
Ruijie(config-line)#logging synchronous
```

```
UP-DOWN
```

```
Ruijie#configure terminal
Oct  9  23:40:55  %LINK-5-CHANGED: Interface
GigabitEthernet 0/1, changed state to down
Oct  9 23:40:55 %LINEPROTO-5-UPDOWN: Line protocol on
Interface GigabitEthernet 0/1, changed state to DOWN
```

71.1.18 more flash

FLASH

more flash:filename

Г Д

Filename

Г Д

Г Д

FLASH

"//f2/" "//f3/" Ш

Ш

Г Д

FLASH

Ruijie# **more flash://f2/log.txt**

look up file in the extended flash://f2/log.txt

00004 2004-11-17 4:1:32 Ruijie: %5:Reload.2]TJuestd fb-6(ey-6(e)]TJ0

Ruijie# **clear logging**

r

A

--	--

```
00002 2004-11-17 10:20:59 Ruijie: %7:%LINE PROTOCOL
CHANGE: Interface FastEthernet 0/0, changed state to UP
00003 2004-11-17 10:57:18 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/1, changed state to
administratively down
00004 2004-11-17 10:57:21 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/1, changed state to down
00005 2004-11-17 10:57:41 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/1, changed state to
administratively down
00006 2004-11-17 10:57:43 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/1, changed state to down
```

2BÖ

Syslog logging

Trap logging

Log Buffer

Г А

logging on	
clear logging	

71.2.2 show logging count

Ш

show logging count

Г А

Г А

Г А

logging

count Шshow logging count

Ш

show logging

Ш

Г А

show logging count

```
Ruijie# show logging count
Module Name  Message Name Sev Occur      Last Time
=====
SYS          CONFIG_I      5  1      Jul 6 10:29:57
-----
SYS TOTAL                    1
```

00003 2004-11-17 10:57:18 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/1, changed state to
administratively down
00002 2004-11-17 10:20:59 Ruijie: %7:%LINE PROTOCOL
CHANGE: Interface FastEthernet 0/0, changed state to UP
00001 2004-11-17 10:20:59 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/0, changed state to up

r A

logging on	
clear logging	
show logging	

72

72.1

- **install**

Slot : 2
User Status : installed
Software Status:87693e

```

Ruijie# show version module detail 2
Device   : 1
Slot     : 2
User Status : none
Software Status: none
Online Module :
Type     :
Ports    : 0
Version  :
Configured Module :
Type     :
Ports    :
Version  :
Ruijie#

```

```

r      A

```

install slot-num moduletype	
show version slots	

72.1.3 remove configuration module slot-num

▮

remove configuration module *slot-num*

```

r      A

```

slot-num

```

r      A

```

```

r      A

```

▮

```

r      A

```

```

Ruijie(config)# remove configure module 4

```

72.1.4 reset module slot-num

▮

reset module *slot-num*

└───┐
└───┐
slot-num

└───┐
└───┐

└───┐
└───┐
Ruijie# reset module 4

72.2

72.2.1 show version module detail [module-num]

└───┐
└───┐
show version module detail [module-num]

└───┐
└───┐
module-num

└───┐
└───┐

└───┐
└───┐
Ruijie# show version module detail 2
Device : 1
Slot : 2
User Status : none
Software Status: none
Online Module :
Type :
Ports : 0
Version :
Configured Module :
Type :
Ports :
Version :
Ruijie#

└───┐
└───┐

show version slots	

72.2.2 show version slots [slot-num]

☐

show version slots [*slot-num*]

Г А

num ☐

Г А

Г А

```
Ruijie# show version slots
Dev Slot  Configured Module Online Module  User Status
Software Status
-----
1 1      none          none
1 2 M8606-24SFP/12GT M8606-24SFP/12GT installed none
1 3 M8606-2XFP M8606-2XFP uninstalled cannot startup
1 4 M8606-24GT/12SFP M8606-24GT/12SFP installed ok
1 M1 M8606-CM M8606-CM                master
1 M2                                     none
```

Г А

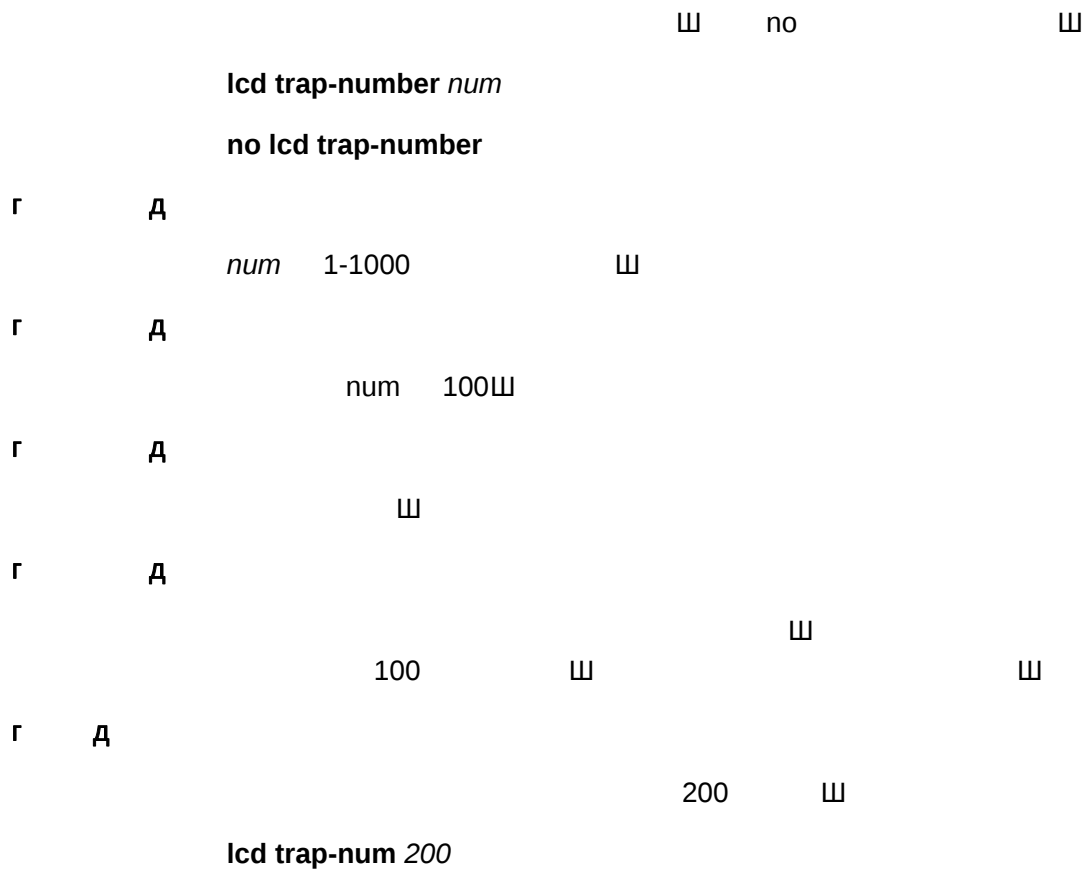
show version moduel detail	

73

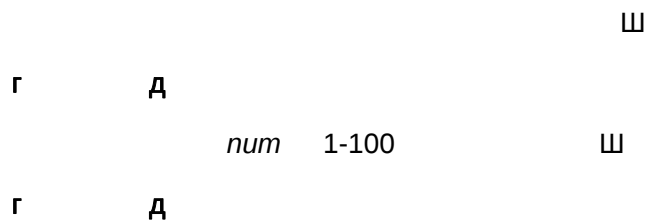
73.1

- **lcd trap-number** *num*
- **memory-rate rising-threshold** *num*

73.1.1 lcd trap-number num



73.1.2 memory-rate rising-threshold num



```
num 80
r  A
    W
r  A
    num 80 show running-config memory-rate
    rising-threshold 80
r  A
    Ruijie(config)# memory-rate rising-threshold 60
```

74

```
Disk Partitions      ㄐ
    /dev/uba/disc0/part1    /mnt/ubaㄐ
    cd /mnt/uba            ㄐ
```

74.1.2 usb remove

```
usb remove Device_ID

r      A
      Device_ID      USB

r      A
      ㄐ

r      A

r      A

      usb
      ㄐ                      ㄐ
      USB

      ㄐ

r      A

      usb      ㄐ

Ruijie# usb remove 778
OK, now you can pull out the device 778.
0:1:1:38 Ruijie: USB-5-USB_DISK_REMOVED: USB Device
<USB Mass Storage Device> Removed!

      usb      ㄐ
```

75 POE

POE

- **Poe enable**
- **Poe-power lower lower**
- **Poe-power upper upper**
- **Poe disconnect-mode mode**

75.1

75.1.1 poe enable

▮ no

▮

poe enable

no poe enable

Г Д

Г Д

Ruijie(config-if)# **poe enable**

Ruijie(config-if)# **no poe enable**

75.1.2 poe-power lower lower

▮ no

▮

poe-power lower *lower*

no poe-power lower

Г Д

lower

45-47

Г Д

Г Д

POE

46

```
Ruijie# configure
Ruijie(config)# poe-power lower 46
Ruijie(config)# end
Ruijie#
```

75.1.3 poe-power upper upper

no

no

poe-power upper *upper*

no poe-power upper

Г Д

upper

55-57

Г Д

Г Д

POE

56

```
Ruijie# configure
Ruijie(config)# poe-power upper 56
Ruijie(config)# end
```

75.1.4 poe disconnect-mode mode

no

no

poe disconnect-mode *mode*

no poe disconnect-mode

Г Д

mode

[ac/dc]

Г Д

Г Д

POE

dc

```
Ruijie# configure
```

```
Ruijie(config)# poe disconnect-mode dc
Ruijie(config)# end
```

75.2

POE

- **show poe interfaces**
- **show poe powersupply**

75.2.1 show poe interfaces

POE Ⅲ

show poe interfaces *interface-id*

Г Д

Г Д

poe

Г Д

```
Ruijie# show poe interface gigabitethernet 0/2
Interface : Gi0/2
Port power enabled : ENABLE
Port connect status : OFF
Port PD Class : no PD devices
Port max power : 15.4 W
Port current power : 0 W
Port peak power : 0 W
Port current : 0 mA
Port voltage : 48 V
Port trouble cause : normal
```

75.2.2 show poe powersupply

POE Ⅲ

show poe powersupply

Г Д

Г Д

Ruijie# **show poe powersupply**

PSE Total Power :1200.0 W

PSE Total Power Consumption : 0 W

PSE Available Power : 1200.0 W

PSE Peak Value : 0 W