



RG-S3760

RGOS 10.3(5b1)

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RGOS® 4 RGNOS® 4 实达网络锐捷® 4

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RGOS[®]10.3(5b1) 𐀀

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-
-

1.

5 𐀀

𐀀

𐀀 Courier New 5 𐀀

2.

Arial

𐀀

[] [] 𐀀
{ x | y | ... } 𐀀

[x|y|...]

Ш

//

Ш

3.

~

Ч

Ч

Ш



Ч

Ч

Ч

Ш



1)

2)

Ч

Ш

3)

Ш

1 CLI

1.1 alias

alias 卩

no
卩

alias *mode command-alias original-command*
no alias *mode [command-alias]*

└ A

mode 卩
command-alias 卩
original-command 卩

└ A

EXEC 卩

└ A

└ A

EXEC 卩

h	help
p	ping
s	show
u	undebug
un	undebug

no alias exec 卩

卩

卩

alias ?

Ruijie(config)# **alias ?**

```

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

「 A

CLI 1 "test" reload

⌚

Ruijie(config)# **enable secret level 1 0 test**

Ruijie(config)# **privilege exec level 1 reload**

1 CLI reload

Ruijie> **reload ?**

<cr>

reload 1 all

Ruijie(config)# **privilege exec all level 1 reload**

1 CLI reload

Ruijie> **reload ?**

at reload at a specific time/date

cancel cancel pending reload scheme

in reload after a time interval

<cr>

「 A

enable secret	CLI

1.3 show aliases

EXEC

show aliases ⌚

show aliases [mode]

「 A

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*]

Г А

privilege-level

Г А

Г А

Ш

Ш



disable

山

Г Д

Ruijie# **disable** 10

Г Д



pw10

		<i>password</i>	<i>line</i>	⌵					
		0 7	0	7	⌵				
		<i>encrypted-password</i>		⌵					
Г	Д								
		<i>line</i>							
Г	Д								
			<i>line</i>		⌵				
Г	Д								
		<i>line</i>	<i>red</i>						
		Ruijie(config)# line vty 0							
		Ruijie(config-line)# password red							
Г	Д								
		<table border="1"> <tr> <td></td><td></td></tr> <tr> <td>login</td><td>⌵</td></tr> </table>						login	⌵
login	⌵								

2.1.7 login

		<i>AAA</i>			
		login ⌵	no		⌵
		login			
		no login			
Г	Д				
		⌵			
Г	Д				
		<i>line</i>			
Г	Д				
		<i>AAA</i>			
		⌵	<i>VTY</i>	<i>console</i>	⌵
Г	Д				
		<i>VTY</i>			⌵
		Ruijie(config)# no aaa new-model			
		Ruijie(config)# line vty 0			
		Ruijie(config-line)# password 0 normatest			

```

r      A
      default
      list-name

r      A
      line

r      A
      AAA
      W

r      A
      VTY
      radius
      W

Ruijie(config)# aaa new-model
Ruijie(config)# aaa authentication login default radius
Ruijie(config)# line vty 0
Ruijie(config-line)# login authentication default

```

```

r      A

```

aaa new-model	AAA
aaa authentication login	

2.1.10 username

```

username W

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

username name privilege privilege-level

no username name

r      A
      name
      W
      password
      W
      0|7
      0
      7
      W
      encrypted-password
      W
      privilege-level
      W

r      A

```

г д

ш

~

7

ш

7ш

7ш

г д

15

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

г д

			line	
	lockable	line		⏏
Г	А			

```

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

```

Г	А		
	lockable		⏏

2.1.12 lockable

lock G!5B5 lockable

```

Again: <password>
Locked
Password: <password>
Ruijie#

```

```

r      A

```

lock	⏏

2.1.13 telnet

```

telnet EXEC
telnet ⏏
telnet host [port] [keyword]

```

```

r      A

```

```

Host      IP
Port      TCP      23
Keyword

```

/source-interface	telnet
/vrf	VRF

```

r      A

```

```

r      A

```

```

telnet ⏏

```

```

r      A

```

```

telnet 192.168.1.11
vlan 1      VRF      vpn1
Ruijie# telnet 192.168.1.11 /source-interface vlan 1
/vrf vpn1

```

```

r      A

```

--	--

Show session	TTY
exit	

clock set

clock set hh:mm:ss month day year

г

Д

hh:mm:ss

24

:

:

day

1-31

Ш

month

1-12

year

1993-2035

Ш

г

Д

г

Д

Ш

clock set

Ш

г

Д

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

show clock	

2.2.2 clock update-calendar

clock

clock

privileged EXEC

clock

clock

clock

update-calendar

clock

clock

Ш

clock update-calendar

г

Д

2-13

calendar

clock

clock

Ruijie# clock update-calendar

clock read-calendar	

2.2.3 exec-timeout

LINE

no exec-timeout

exec-timeout minutes [seconds]

no exec-timeout

minutes

seconds

10 min

LINE

LINE

line vty 0

5 30 :

Ruijie(config-line)# exec-timeout 5 30

2.2.4 hostname

「 A

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

2.2.6 show clock

show clock

show clock [detail]

「 A

detail

「 A

「 A

detail

「 A

show clock

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

「 A

clock set	

2.2.7 show running-config

show

running-config

show running-config

「 A

2.2.8 show startup-config

NVRAM

show startup-config **▮**

show startup-config

Г **Д**

Г **Д**

NVRAM

startup-config

▮

2.2.9 reload

reload **▮**

reload [*text* | **in** *mmm* | *hhh:mm* [*text*] | **at** *hh:mm month day year* [*text*] | **cancel**]

Г **Д**

text 1-255 **▮**

in *mmm* | *hhh:mm*

at *hh:mm month day year* 200

month 1 12

day %

▮ **Д**

▮

```

show reload

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

```

2.2.11 prompt

```

no prompt
prompt
prompt string
string 32

EXEC

rgos

Ruijie(config)# prompt rgos
Ruijie(config)# end
rgos

```

2.2.12 banner motd


```
Ruijie(config)# banner login $ enter your password $
```

2.2.14 speed

The diagram consists of several elements arranged horizontally and vertically:

- At the top right, the text "speed speed" is followed by a symbol that looks like a double vertical bar with a small triangle on top (≡).
- Below this, the text "no speed" is followed by a symbol that looks like a double vertical bar with a small triangle on top (≡).
- Below "no speed", the text "speed speed" is followed by a symbol that looks like a double vertical bar with a small triangle on top (≡).
- Below "speed speed", the text "Speed" is followed by a symbol that looks like a double vertical bar with a small triangle on top (≡).
- On the far left, there is a small "r" and a "D" symbol.

Г Д

Г Д

Ш

Г Д

console

Ruijie# **show line console 0**

CON Type speed Overruns

stop rx000 times0.7(459270TT5 1 Tf01.9780 0 10.97800 7409.823 Tm0

x

3 LINE

3.1 LINE

3.1.1 line

LINE

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

┌ ┐

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

┌ ┐

┌ ┐

┌ ┐

LINE

┌ ┐

LINE VTY 1 3 LINE

Ruijie(config)# line vty 1 3

┌ ┐

3.1.2 line vty

VTY VTY 3 no

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

┌ A

VTY 5 0--4

┌ A

┌ A

VTY

┌ A

VTY 20 VTY 0--19

Ruijie(config)# **line vty 19**

VTY 10 VTY 0—9

Ruijie(config)# **line vty 10**

┌ A

3.1.3 transport input

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

transport input {all | ssh | telnet | none}

default transport input

┌ A

all	Line
ssh	Line SSH
telnet	Line Telnet
none	Line

┌ A

```

                                VTY                TTY
                                NONE                TTY
                                default transport input
r      A
Line
r      A
Line
VTY                show running                Line
~
ut      default transport input  no transport inp
rt input none  LINE                transpo

r      A
line vty 0 4 telnet
Ruijie# configure terminal
Ruijie(config)# line vty 0 4
Ruijie(config-line)# transport input telnet
r      A
show running
r      A
RGOS10.1

```

3.1.4 access-class

```

Line      ACL                access-class acl-no
{ in | out } Line                no access-class
access-list-number {in | out} LINE ACL
[no] access-class access-list-number {in | out}

r      A

```

<i>access-list-number</i>	access-list ⌵
in	⌵
out	⌵

Г А

Line ⌵

Г А

Line

Г А

Line ⌵
⌵ **access-class**
access list ⌵ **show running**
Line ⌵

Г А

line vty 0 4 access-list 10

Ruijie# **configure terminal**

Ruijie(config)# **line vty 0 4**

Ruijie(config-line)# **access-class 10 in**

Г А

show running	⌵

Г А

RGOS10.1

4

4.1

- | | CLI | COPY | |
|----------|-----|--------------------|---|
| • Xmodem | | copy xmodem | Ш |
| • Tftp | | copy tftp | |

4.1.1 copy xmodem

xmodem	xmodem
Ш	
copy flash: filename xmodem	
copy xmodem flash: filename	
~	
copy xmodeam flash:"filename"	copy flash:"filename" xmodeam

Г	А				
		filename			
Г	А				
		Ш			
Г	А				
Г	А				
		Xmodem	Ш	Ш	ШXmodem
			Ш	Ч	
				xmodem	
		:		xmodem	Ш
Г	А				
		:			

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

r

A

5

5.1

```

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

```

```

r      A

```

```

      山

```

6

6.1

- interface aggregateport
- interface fastEthernet
- 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>				
Г	А					
		<i>port-number</i>	Aggregate port		▮	
Г	А					
Г	А					

Г Д

Г Д

<u>show interfaces</u>	⌵

6.1.2 interface fastEthernet

interface fastEthernet *mod-num/port-num*

Г Д

mod-num/port-num /

Г Д

Г Д

```
no show interfaces fastEthernet
```

Г Д

```
Ruijie(config)# interface fastEthernet 1/2
Ruijie(config-if)#
```

Г Д

show interfaces	⏏

6.1.3 interface giagbitEthernet

W

```
interface gigabitEthernet mod-num/port-num
r      A
      mod-num/port-num      /
```

show interfaces	Ш

Г Д

6.1.5 medium-type

Ш no .

medium-type { fiber | copper }
no medium-type

Г Д

fiber Ш
copper Ш

Г Д

Ш

Г Д

Ap SVI

Г Д

Ш

Ч Ч

Ш

Ш

Г Д

Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# medium-type copper

Г Д

show interfaces	Ш

Г Д

	no	.
description <i>string</i>		
no description		
<pre> r A string </pre>		
<pre> r A </pre>		
<pre> r A </pre>		
<pre> r A </pre>		
show interfaces		
<pre> r A Ruijie(config)# interface gigabitethernet 1/1 Ruijie(config-if)# description GBIC-1 </pre>		

6.1.7 shutdown

Ruijie(config-if)# **shutdown**

Ap 1

Ruijie(config)# **interface aggregateport 1**

Ruijie(config-if)# **no shutdown**

r

A

clear interface	山

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

```
r      A
```

show interfaces	⏏

6.1.9 duplex

⏏ no

```
duplex {auto | full | half}
```

```
no duplex
```

```
r      A
```

```
auto      ⏏
full      ⏏
half      ⏏
```

```
r      A
```

⏏

```
r      A
```

```
r      A
```

⏏ show interfaces

⏏

```
r      A
```

```
Ruijie(config-if)# duplex full
```

```
r      A
```

show interfaces	⏏

6.1.10 flowcontrol

W

flowcontrol {auto | off | on}

no flowcontrol

Г

auto

W

off

W

on

W

Г

W

Г

Г

show interfaces

W

Г

1/1

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

```
Ruijie(config-if)# flowcontrol on
```

Г

show interfaces	⌘

6.1.11 mtu

mtu

Mtu num

Г

```
num    64  9216(    65536    )
```

Г

1500山

Г

clear counters [*interface-id*]

Г Д

<i>interface-id</i>	⏏
---------------------	---

Г Д

Г Д

```
show interfaces
```

```
clear counters
```

Г Д

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

Г Д

show interfaces	⏏

clear interface *interface-id*

Г Д

<i>interface-id</i>	⏏
---------------------	---

Г Д

Г Д

	Switch Port,L2 Aggregate port	Routed port
L3 Aggregate port	⏏	
shutdown	no shutdown	⏏

Г Д

```
Ruijie# clear interface gigabitethernet 1/1
```

Г А

shutdown	Ш

6.1.15 switchport

switchport
no switchport

2 Ш

3

switchport
no switchport

Г А

2 Ш

Г А

Г А

Шswitchport

2 3 2 Ш

Г А

Ruijie(config-if)# switchport

Г А

show interfaces	Ш

Г А

6.1.16 switchport mode

switch port

access port trunk port, 802.1Q Ш no

Ш

switchport mode {access | trunk}

no switchport mode

Г А

access	switch port access port
trunk	switch port trunk port

r

A

switch port access

r

A

r

A

switch port access VLAN

Г А

Г А

VLAN ID Ⅲ VLAN ID Ⅲ
VLAN VLAN Ⅲ
VLAN ID VLAN Ⅲ
trunkport

Г А

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

Г А

switchport mode	switch port Ⅲ
switchport trunk	trunkport native VLAN Trunk VLAN Ⅲ

6.1.18 switchport trunk

trunkport native VLAN Trunk VLAN
Ⅲ no trunk Ⅲ

switchport trunk {allowed vlan {all | [add | remove | [Tc79Tw({}Tj/]TT2 1 TfD

6.1.19 snmp trap link-status

		Link	SNMP	LinkTrap	LinkTrap, SNMP
1	no snmp trap link-status				
2	snmp trap link-status				
3	no snmp trap link-status				
4	snmp trap link-status				
5	no snmp trap link-status				
6	snmp trap link-status				
7	no snmp trap link-status				
8	snmp trap link-status				
9	no snmp trap link-status				
10	snmp trap link-status				
11	no snmp trap link-status				
12	snmp trap link-status				
13	no snmp trap link-status				
14	snmp trap link-status				
15	no snmp trap link-status				
16	snmp trap link-status				
17	no snmp trap link-status				
18	snmp trap link-status				
19	no snmp trap link-status				
20	snmp trap link-status				
21	no snmp trap link-status				
22	snmp trap link-status				
23	no snmp trap link-status				
24	snmp trap link-status				
25	no snmp trap link-status				
26	snmp trap link-status				
27	no snmp trap link-status				
28	snmp trap link-status				
29	no snmp trap link-status				
30	snmp trap link-status				
31	no snmp trap link-status				
32	snmp trap link-status				
33	no snmp trap link-status				
34	snmp trap link-status				
35	no snmp trap link-status				
36	snmp trap link-status				
37	no snmp trap link-status				
38	snmp trap link-status				
39	no snmp trap link-status				
40	snmp trap link-status				
41	no snmp trap link-status				
42	snmp trap link-status				
43	no snmp trap link-status				
44	snmp trap link-status				
45	no snmp trap link-status				
46	snmp trap link-status				
47	no snmp trap link-status				
48	snmp trap link-status				
49	no snmp trap link-status				
50	snmp trap link-status				
51	no snmp trap link-status				
52	snmp trap link-status				
53	no snmp trap link-status				
54	snmp trap link-status				
55	no snmp trap link-status				
56	snmp trap link-status				
57	no snmp trap link-status				
58	snmp trap link-status				
59	no snmp trap link-status				
60	snmp trap link-status				
61	no snmp trap link-status				
62	snmp trap link-status				
63	no snmp trap link-status				
64	snmp trap link-status				
65	no snmp trap link-status				
66	snmp trap link-status				
67	no snmp trap link-status				
68	snmp trap link-status				
69	no snmp trap link-status				
70	snmp trap link-status				
71	no snmp trap link-status				
72	snmp trap link-status				
73	no snmp trap link-status				
74	snmp trap link-status				
75	no snmp trap link-status				
76	snmp trap link-status				
77	no snmp trap link-status				
78	snmp trap link-status				
79	no snmp trap link-status				
80	snmp trap link-status				
81	no snmp trap link-status				
82	snmp trap link-status				
83	no snmp trap link-status				
84	snmp trap link-status				
85	no snmp trap link-status				
86	snmp trap link-status				
87	no snmp trap link-status				</

Ruijie(config-if)# snmp trap link-status	link trap .
Ruijie(config-if)# no snmp trap link-status	link trap .

6.2

6.2.1 show interfaces

		show interfaces [<i>interface-id</i>] [counters description status switchport trunk]		
Г	А	<i>interface-id</i>	Ч aggregateport	Ч SVI Ч
		loopback		
		counters	Ш	
		description	link Ш	
		status	Ч Ш	
		switchport	Ш	
		trunk trunking port	Ч Aggregate port Ш	
Г	А			
		Ш		
Г	А			
Г	А		Ш	
Г	А	Ruijie# show interfaces gigabitEthernet 0/1 switchport Interface Switchport ModeAccess Native Protected VLAN lists ----- GigabitEthernet 0/1 enabled Access 11 Disabled ALL		
Г	А			

shutdown	⏏
speed	⏏
switchport priority	802.1q ⏏
switchport protected	⏏

7 Aggregate Port

7.1

7.1.1 port-group

Aggregate Port 山 no
Aggregate Port 山

port-group *port-group-number*

no port-group

г А

Aggregate Port

г А

Г Д

src-dst-ip	IP IP Ш IP— IP IP— IP Ш Ш
src-dst-mac	MAC MAC Ш MAC— MAC MAC— MAC Ш

load-balance	aggereaye 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

aggregateport load-balance	AP Ш

8 LACP

8.1

8.1.1 lacp port-priority

LACP	⏏	no	⏏
------	---	----	---

larp port-priority *port-priority*

no lacp port-priority

<i>port-priority</i>	Ш 0-65535
----------------------	-----------

32768山

— 33 —

;

8.1.2 port-group mode

LACP ID ☐ no
LACP ☐

port-group *key* **mode** **active** | **passive**

no port-group

Key	ID, key ☐
active	LACP ☐
passive	LACP ☐

LACP ☐

☐

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

lacp port-priority	LACP ☐

-	-

8.1.3 lacp port-priority

LACP ☐ no ☐

lacp port-priority *port-priority*

no lacp port-priority

LACP

1

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

port-group	key mode	active passive	
port-group	key mode		
lacp port-priority		LACP	ID
		1	

-	-

8.2

- show lacp summary

8.2.1 show lacp summary

LACP 1

show lacp summary

-	-

1

Ruijie# **show LACP summary**

Flags:S - Device is sending Slow LACPDUs F - Device is sending fast LACPDUs.

A - Device is in active mode. P - Device is in passive mode.

Aggregate port 3:

9 VLAN

9.1

9.1.1 vlan

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

Г Д

<i>vlan-id</i>	VLAN ID $\mathbb{W}$ VLAN VLAN 1 $\mathbb{W}$

Г Д

Г Д

end Ctrl+C 三

exit

Г Д

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

Г Д

show vlan	VLAN 3

Г Д

9.1.2 name

VLAN	no
------	----

name *vlan-name*

no name

┌ A

<i>vlan-name</i>	VLAN

┌ A

VLAN

┌ A

VLAN

┌ A

show vlan vlan

┌ A

Ruijie(config)# **vlan 10**

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

┌ A

show vlan	VLAN

9.1.3 switchport mode

access port trunk port, switch port
802.1Q no

switchport mode {access | trunk}

no switchport mode

┌ A

access	switch port access port
trunk	switch port trunk port

┌ A

switch port access

┌ A

VLAN

VLAN ID 11

VLAN 11

VLAN 11

VLAN ID 11

trunkport

1 11

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

1 11

switchport mode	switch port 11
switchport trunk	trunkport native VLAN Trunk VLAN 11

9.1.5 switchport trunk

trunkport native VLAN Trunk VLAN

11 no trunk 11

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

1 11

	Trunk VLAN 11
vlan-list	VLAN
VLAN	

allowed vlan *vlan-list*

VLAN							
1	1						
		VLAN	all	Native VLAN	VLAN 1		
1	1						
1	1						
		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						
1	1						
		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					
1	1						

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 supervlan

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

10.2

10.2.1 show supervlan

SuperVLAN SubVLAN Ⅲ

show supervlan

show supervlan id *vlan-id*

Г Д

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

Г Д

Г Д

Г Д

Ruijie# **show supervlan**

supervlan id supervlan arp-proxy subvlan id subvlan
arp-proxy subvlan ip range

```
-----
3                ON                4                ON
                                   5                ON
```

Г Д

Г Д

11 Protocol VLAN

11.1

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

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

type

profile

┌ ┐
└ ┘

num profile

type

┌ ┐
└ ┘

┌ ┐
└ ┘

┌ ┐
└ ┘

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

┌ ┐
└ ┘

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

┌ ┐
└ ┘

RGOS10.1

11.1.2 protocol-vlan profile num vlan id

profile

Г Д

num profile

id VLAN ID 1- VLAN

Г Д

Г Д

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

Г Д

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}

r      A
      community          community VLAN
      isolated          isolated VLAN
      primary          primary VLAN
      no          VLAN

r      A

r      A
      VLAN

r      A
      Ruijie(config)# vlan 22
      Ruijie(config-vlan)# private-vlan primary

r      A
      show vlan private-vlan

r      A
      RGOS10.1

```

12.1.2 private-vlan association

secondary VLAN primary VLAN

private-vlan association {*svlist* | **add** *svlist* | **remove** *svlist*}

no private-vlan association

┌ A

svlist secondary VLAN list

no primary VLAN secondary VLAN

┌ A

┌ A

Primary VLAN

┌ A

Ruijie(config)# **vlan 22**

Ruijie(config-vlan)# **private-vlan association add**
24-26

┌ A

show vlan private-vlan

┌ A

RGOS10.1

12.1.3 private-vlan mapping

secondary VLAN SVI

private-vlan mapping {*svlist* | **add** *svlist* | **remove** *svlist*}

no private-vlan mapping

┌ A

svlist secondary VLAN list

no

┌ A

┌ A

Primary VLAN

┌ A

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

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

r      A

show vlan private-vlan

r      A

RGOS10.1
```

12.1.4 switchport mode private-vlan

```
private VLAN

switchport mode private-vlan{host|promiscuous}
no switchport mode

r      A

host      VLAN
promiscuous      VLAN
no      VLAN

r      A

r      A

r      A

Ruijie(config)# interface gigabitEthernet0/2
Ruijie(config-if)# switchport mode private-vlan host

r      A

show vlan private-vlan

r      A

RGOS10.1
```

12.1.5 switchport private-vlan host-association

```
private VLAN      primary VLAN
secondary VLAN

switchport private-vlan host-association p_vid s_vid
no switchport private-vlan host-association

r      A
```

<i>p_vid</i>	primary VID
<i>s_vid</i>	

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

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

Ö

private VLAN

show vlan private-vlan [community | primary | isolated]

Г Д

primary primary VLAN

community community VLAN

isolated isolated VLAN

Г Д

Г Д

Г Д

Ruijie# **show vlan private-vlan**

Г Д

RGOS10.1

12.3 Hybrid

- **switchport mode hybrid**
- **switchport hybrid native vlan**
- **switchport hybrid allowed vlan**

12.3.1 switchport mode hybrid

switchport mode hybrid

no switchport mode

hybrid

Г Д

no hybrid

Г Д

Г Д

Г Д

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

```
r      A
```

```
RGOS10.1
```

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

r **A**

RGOS10.1

13 MAC

13.1

- mac-address-table aging-time
- clear mac-address-table dynamic
- clear mac-address-table filtering
- clear mac-address-table static
- mac-address-table static
- mac-address-table filtering
- mac-address-table notification
- snmp trap mac-notification
- address-bind
- address-bind uplink
- address-bind install
- address-bind ipv6-mode

13.1.1 mac-address-table aging-time

		⏏	no	⏏
		mac-address-table aging-time <i>seconds</i>		
		no mac-address-table aging-time		
└	└	<i>seconds</i>	⏏	⏏
└	└	300	⏏	
└	└			
└	└			
		show mac-address-table aging-time	⏏	
		show mac-address-table dynamic		⏏
└	└			

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

```

r      A

```

show mac-address-table aging-time	150
show mac-address-table dynamic	150

13.1.2 clear mac-address-table dynamic

```

150

```

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

```

r      A

```

dynamic	150
address mac-addr	150
interface interface-id	150
vlan vlan-id	VLAN 150

```

r      A

```

```

r      A

```

```
show mac-address-table dynamic
```

```

r      A

```

```
Ruijie# clear mac-address-table dynamic
```

```

r      A

```

show mac-address-table dynamic	150

13.1.3 clear mac-address-table filtering

MAC

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

└ A

└ A

show mac-address-table static

└ A

MAC 00d0.f800.073c

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

└ A

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

13.1.5 mac-address-table static

▮ **no** ▮

mac-address-table static *mac-addr* **vlan** *vlan-id* **interface** *interface-id*

no mac-address-table static *mac-addr* **vlan** *vlan-id* **interface**
interface-id

└ A

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

└ A

▮

┌ ┐

┌ ┐

┌

┌
 ss-table static
 ble static

┌ show mac-addre
 clear mac-address-ta

┌ ┐

00d0.f800.073c VLAN 4

gigabitethernet 1/1

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

┌ ┐

show mac-address-table static	┌
clear mac-address-table static	┌

┌ ┐

13.1.6 mac-address-table filtering

┌ no ┌

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

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

┌ ┐

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

┌ ┐

┌

┌ ┐

「 ㏿

⌘ **show mac-address-table filtering**
⌘

「 ㏿

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

「 ㏿

clear mac-address-table filtering	⌘
show mac-address-table filtering	⌘

13.1.7 mac-address-table notification

MAC ⌘ **no** ⌘

mac-address-table notification [interval *value* | size |

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

Г Д

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

13.1.8 snmp trap mac-notification

MAC Ш no Ш

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

Г Д

added	Ш
removed	Ш

Г Д

Ш

Г Д

Г Д

```
show mac-address-table notification interface Ш
```

Г Д

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

Г Д

--	--

mac-address-table notification	MAC Ш
show mac-address-table notification	MAC Ш

13.1.9 address-bind

ip mac .

address-bind *ip-address mac-address*

no address-bind *ip-address*

Г А

<i>ip-address</i>	IP Ш
<i>mac-address</i>	mac Ш

Г А

Г А

IP MAC IP

IP MAC IP

MAC

MAC

<i>intf-id</i>	

Г

А

Г

А

	IP		MAC	
IP	IP		MAC	IP
MAC				

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

Г А

show address-bind uplink	

Г А

RGOS10.1

13.1.12 address-bind ipv6-mode

ip IP

address-bind ipv6-mode compatible

address-bind ipv6-mode loose

address-bind ipv6-mode strict

Г А

Г А

Г А

Ш

Г А

Ш

	Ipv 4	IPV 6
--	----------	----------

		I F V 4 + M A C	i p v 6
		U	U
		I F V 4 + M A C	I P V 6
		U	U

			MAC
		IPV4 + MAC	MAC
		IPV6	IPV6

Г Д

IP 192.168.5.2 00d0.f822.33aa
IPV6 Ш

```
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
```

13.2

- **show mac-address-table address**

- **show mac-address-table aging-time**
- **show mac-address-table count**
- **show mac-address-table dynamic**
- **show mac-address-table filtering**
- **show mac-address-table interface**
- **show mac-address-table notification**
- **show mac-address-table static**
- **show mac-address-table vlan**
- **show address-bind**

13.2.1 show mac-address-table address

MAC

⏏

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

└ └

address <i>mac-addr</i>	MAC ⏏
interface <i>interface-id</i>	
vlan <i>vlan-id</i>	VLAN

└ └

└ └

```
Ruijie# show mac-address-table address 00d0.f800.1001
Vlan      MAC Address      Type      Interface
-----
1         00d0.f800.1001    STATIC    Gi1/1
```

└ └

show mac-address-table static	⏏
show mac-address-table filtering	⏏
show mac-address-table dynamic	⏏

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

13.2.2 show mac-address-table aging-time

▮

show mac-address-table aging-time

└ ┘

└ ┘

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

Aging time : 300

└ ┘

mac-address-table aging-time	▮

13.2.3 show mac-address-table count

▮

show mac-address-table count

└ ┘

└ ┘

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	Ш
show mac-address-table filtering	Ш
show mac-address-table dynamic	Ш
show mac-address-table address	Ш

show mac-address-table interface Ш

```

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 А

clear mac-address-table dynamic	Ш

13.2.5 show mac-address-table filtering

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

Г А

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

Г А

Г А

```

Ruijie# show mac-address-table filtering
Vlan      MAC Address      Type      Interface
-----
1         0000.2222.2222    FILTER   Not available

```

Г А

clear mac-address-table filtering	Ш
mac-address-table filtering	Ш

Г Д

<i>interface-id</i>	(AggregatePort)Щ
<i>vlan-id</i>	VLANЩ

Г Д

Г Д

Ruijie# **show mac-address-table interface**
gigabitethernet 1/1

Vlan	MAC Address	Type	Interface
-----	-----	-----	-----
1	00d0.f800.1001	STATIC	gigabitethernet 1/1
1	00d0.f800.1002	STATIC	gigabitethernet 1/1
1	00d0.f800.1003	STATIC	gigabitethernet 1/1
1	00d0.f800.1004	STATIC	gigabitethernet 1/1

Г Д

show mac-address-table static	Щ
show mac-address-table filtering	Щ
show mac-address-table dynamic	Щ
show mac-address-table address	Щ
show mac-address-table vlan	VLAN Щ

show mac-address-table count Щ

MAC

interface <i>interface-id</i>	Ш Ш	MAC
history	MAC	Ш

г

д

MAC

MAC

mac-addr

MAC

Ш

```

1      00d0.f800.1002    STATIC  gigabitethernet 1/1
1      00d0.f800.1003    STATIC  gigabitethernet 1/1

```

Г А

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

13.2.10 show address-bind

Ш

show address-bind

Г А

Г А

Г А

```

Ruijie# show address-bind
IP Address      Binding MAC Addr
-----
3.3.3.3         00d0.f811.1112
3.3.3.4         00d0.f811.1117

```

Г А

address-bind	Ш

14 DHCP Snooping

14.1 DHCP snooping

DHCP snooping

- **ip dhcp snooping**
- **ip dhcp snooping vlan**
- **ip dhcp snooping bootp-bind**
- **ip dhcp snooping ver7ty mac-address**
- **ip dhcp snooping information option**
- **ip dhcp snooping database write-delay**
- **ip dhcp snooping database write-to-flash**

14.1.1 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
Ruijie# configure terminal

```


Ruijie(config)# end

Г А

ip dhcp snooping	DHCP Snooping

14.1.3 ip dhcp snooping bootp-bind

DHCP Snooping Bootp

Ш no

DHCP snooping Bootp

Ш

[no] ip dhcp snooping bootp-bind

Г А

Г Ш

show ip dhcp snooping	DHCP snooping

14.1.4 ip dhcp snooping verify mac-address

```

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

r      A

r      A

r      A

MAC
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

```

show ip dhcp snooping	DHCP snooping

14.1.5 ip dhcp snooping information option


```

r      A

```

```

r      A

```

DHCP Snooping

FLASH W

```

r      A

```

DHCP

flash

```

Ruijie# configure terminal
Ruijie(config)# ip dhcp snooping database
write-to-flash
Ruijie(config)# end

```

```

r      A

```

14.2 DHCP snooping

DHCP snooping

- **ip dhcp snooping suppression**
- **ip dhcp snooping trust**
- **ip dhcp snooping limit rate**

14.2.1 ip dhcp snooping suppression

suppression

W

no

no suppression

W

[no] ip dhcp snooping suppression

```

r      A

```

```

r      A

```

```

r      A

```

```

r      A

```

```
Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/2
Ruijie(config-if)# ip dhcp snooping suppression
Ruijie(config-if)# end
```

Г Д

14.2.2 ip dhcp snooping trust

```

DHCP snooping      TRUST
UNTRUST
[no] ip dhcp snooping trust

Ruijie#
Ruijie#
UNTRUST
Ruijie#
Ruijie#
DHCP
TRUST
UNTRUST
DHCP
Ruijie#
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 Bootp bind status: ENABLE

Interface	Trusted	Rate limit (pps)
-----	-----	-----
FastEthernet0/1	YES	unlimited

r **A**

show ip dhcp snooping	DHCP snooping

```

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)
-----
FastEthernet0/1          NO      100

```

r A

show ip dhcp snooping	DHCP snooping

14.3 DHCP snooping

- show ip dhcp snooping
- show ip dhcp snooping binding

14.3.1 show ip dhcp snooping

DHCP Snooping

山

show ip dhcp snooping

r A

r A

r A

r A

DHCP Snooping

山

r A

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

Д



ip dhcp snooping

ip dhcp snooping binding	DHCP snooping
clear ip dhcp snooping binding	DHCP snooping

14.4 DHCP snooping

DHCP Snooping

- **clear ip dhcp snooping binding**
- **debug ip dhcp snooping**

14.4.1 clear ip dhcp snooping binding

DHCP Snooping

山

clear ip dhcp snooping binding

r A

r A

r A

r A

DHCP snooping

山

r A

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

r A

show ip dhcp snooping binding	DHCP snooping

14.4.2 debug ip dhcp snooping

DHCP Snooping

▮

debug ip dhcp snooping {event | packet}

г Д

г Д

г Д

г Д

DHCP snooping

▮

г Д

DHCP snooping

Ruijie# **debug ip dhcp snooping event**

Ruijie# **debug ip dhcp snooping packet**

г Д

15 IGMP Snooping

15.1

IGMP Snooping profile

III

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 dyn-mr-aging-time
- ip igmp snooping query-max-response-time
-

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

└─┘

└─┘

└─┘

└─┘

└─┘

IGMP Profiles

└─┘

└─┘

└─┘

└─┘ SVGL

└─┘ IGMP Filtering

profile

└─┘

profile

└─┘

1 profile profile └─┘

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

Ruijie(config-profile)#

└─┘

range	profile

15.1.2 range

profile

profile

profile

range

└─┘

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>	

└─┘

└─┘

└─┘

```

profile
└─ deny
    low-ip-address high-ip-address
    profile deny
└─ deny
    233.3.3.3 234.4.4.4 profile :
Ruijie(config)# ip igmp profile 1
Ruijie(config-profile)# range 233.3.3.3 234.4.4.4

```

```

└─ deny

```

ip igmp profile	profile
deny	profile deny
permit	profile permit

15.1.3 deny

```

profile
deny
deny
└─ deny
    profile deny
└─ deny
    profile
└─ deny
    profile range
└─ deny
    233.3.3.3 profile :
Ruijie(config)# ip igmp profile 1
Ruijie(config-profile)# range 233.3.3.3
Ruijie(config-profile)# deny

```

г д

ip igmp profile	profile
range	

15.1.4 permit

profile

ip igmp snooping svgl	igmp snooping svgl
ip igmp snooping ivgl-svgl	igmp snooping

ip igmp snooping dyn-mr-aging-time

no ip igmp snooping dyn-mr-aging-time

▮

ip igmp snooping dyn-mr-aging-time *num*

no ip igmp snooping dyn-mr-aging-time

Г Д

<i>num</i>	1-3600 ▮

Г Д

300s

Г Д

▮

Г Д

IGMP

PIM Hello

▮

Г Д

500s

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

Г Д

15.1.10 ip igmp snooping query-max-response-time

ip igmp snooping query-max-response-time

IGMP

-

Г

③
 VLAN
 VLAN
 no
 ③
 ③
 igmp
 snooping ③
 ③ ④

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

③ ④

ip igmp snooping vlan mrouter interface	

15.1.12 ip igmp snooping vlan mrouter interface

ip igmp snooping vlan
 mrouter interface③ no ③
 ip igmp snooping vlan *vid* mrouter interface *interface-id*
 no ip igmp snooping vlan *vid* mrouter interface *interface-id*

③ ④

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

③ ④

③

③ ④

③

③ ④

IP

③

③

Г Д

ip igmp snooping vlan mrouter interface	

15.1.14 ip igmp snooping fast-leave enable

```

igmp snooping fast-leave
snooping fast-leave enable
fast-leave
no

```

```

ip igmp
igmp snooping

```

```

ip igmp snooping fast-leave enable
no ip igmp snooping fast-leave enable

```

```

r
d

```

```

  W

```

```

r
d

```

```

Sa@@ 'WA_00 W

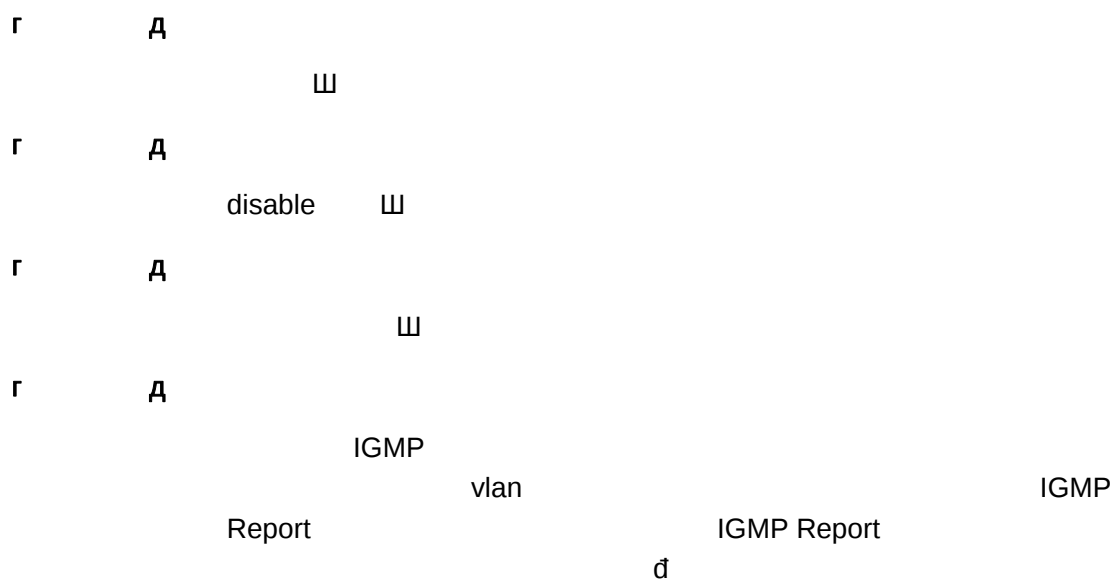
```

```

d

```

no ip igmp snooping suppression enable



Г Д

Ш

Г Д

Ш

Г Д

Г Д

IP Ш

```
Ruijie(config)# ip igmp snooping limit-ipmc vlan 1
address 233.3.3.3 server 1.1.1.2
```

Г Д

ip igmp snooping source-check default-server	IP IP

15.1.17 ip igmp snooping filter

profileШ 0132@809(n132(um0127(115)32(r)809()/TT10 1 Tf-1T1TT1/TT3 1

Г Д

0/1 profile 1

Ruijie(config)# **interface fastEthernet 0/1**

Ruijie(config-if)# **ip igmp snooping filter 1**

Г Д

ip igmp profile	profile

15.1.18 ip igmp snooping max-groups

igmp snooping max-groups Ш , ip Ш

ip igmp snooping max-groups *number*

no ip igmp snooping max-groups

Г Д

Number: 0 – 1024Ш

bèL\$ Ä

y ´r T õaNO @

15.2

15.2.1 show ip igmp snooping

```
igmp snooping          111
```

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

```
111      111
```

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

```
111      111
```

```
111
```

```
111      111
```

```
EXEC 111
```

```
111      111
```

```
111
```

```
111      111
```

```
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)

Г Д

15.2.2 show ip igmp profile

profile Ш

show ip igmp profile

show ip igmp profile *profile-number*

Г Д

	profile Ш
<i>profile-number</i>	profile

Г Д

Ш

Г Д

EXEC Ш

Г Д

profile Ш

Г Д

fa0/1 100

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

Profile 1

Permit

range 224.0.1.0, 239.255.255.255

Г Д

```

r      A
      W
r      A
      EXEC      W
r      A
      W
r      A
      Ruijie# clear ip igmp snooping gda-table
r      A
```

15.2.4 debug igmp-snp

```

      igmp      W      no      W
debug igmp-snp
debug igmp-snp event
debug igmp-snp packet
debug igmp-snp msf
debug igmp-snp warning
undebug igmp-snp
undebug igmp-snp event
undebug igmp-snp packet
undebug igmp-snp msf
undebug igmp-snp warning
r      A
```

	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			

16 MSTP

16.1

16.1.1 spanning-tree

MSTP		MSTP	MSTP
Ш	no	spanning-tree	no

16.1.2 spanning-tree bpdudfilter

16.1.3 spanning-tree bpduguard

Г Д Ш

「 ㏿

㏿

「 ㏿

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

「 ㏿

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

16.1.4 spanning-tree link-type

“ ”㏿ no

㏿

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

```
no spanning-tree link-type
```

「 ㏿

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

```
Shared
```

spanning-tree max-hops *hop-count*

no spanning-tree max-hops

Г	Д				
		<i>hop-count</i>	BPDU	1	40
Г	Д				
		<i>hop-count</i>	20		
Г	Д				
			.		

Г Д

.

Г Д

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

Г Д

show spanning-tree

revision	<i>version</i>	MST	0	65535
-----------------	----------------	-----	---	-------

```

Instance
┌
spanning-tree [mst instance-id] cost cost
no spanning-tree [mst instance-id] cost

r      A
      instance-id  Instance      0  64
      cost                1  200  000  000

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

r      A
      .

r      A
      cost

r      A
      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

r      A
      show spanning-tree mst      MSTP      ┌
      spanning-tree mst port-priority

```

spanning-tree [**mst** *instance-id*] **port-priority** *priority*

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

r

A

Instance-id Instance 0 64

priority

<i>instance-id</i>	Instance	0
--------------------	----------	---

16.1.12 spanning-tree tx-hold-count

STP	TxHoldCount		BPDU	Ш
	no			Ш

spanning-tree tx-hold-count *tx-hold-count*

no spanning-tree tx-hold-count

r

16.1.14 spanning-tree portfast

16.1.15 spanning-tree portfast bpduguard default

BPDU guard BPDU error-disabled
 ❸ **show spanning-tree** ❸

└─ ❸

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

└─ ❸

show spanning-tree interface STP ❸

16.1.16 spanning-tree portfast bpdufilter default

BPDU filter ❸ no BPDU
 filter ❸

spanning-tree portfast bpdufilter default

no spanning-tree portfast bpdufilter default

└─ ❸

❸

└─ ❸

BPDU filter

└─ ❸

❸

└─ ❸

BPDU Filter BPDU ❸ **show**
spanning-tree ❸

└─ ❸

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

└─ ❸

show spanning-tree interface STP ❸

16.1.17 spanning-tree portfast default

Portfast ❸ no
 Portfast ❸

spanning-tree portfast default

no spanning-tree portfast default

└ A

└

└ A

Portfast └

└ A

└

└ A

Ruijie(config)# **spanning-tree portfast default**

└ A

```

r      A

```

```

    W

```

```

r      A

```

```

    tc-guard    W

```

```

r      A

```

```

    W

```

```

r      A

```

```

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

```

16.1.20 spanning-tree tc-guard

```

    tc-guard    W          no          tc-guard    W
tc-guard      tc          W

```

```

spanning-tree tc-guard

```

```

no spanning-tree tc-guard

```

```

r      A

```

```

    W

```

```

r      A

```

```

    tc-guard    W

```

```

r      A

```

```

    W

```

```

r      A

```

```

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

```

16.1.21 spanning-tree guard root

```

    root guard    W          no          root guard    W
root guard
    W

```

```

spanning-tree guard root

```

```

no spanning-tree guard root

```

```

r      A

```

```

    W

```

MSTP

```

loop guard  1
Ruijie(config-if)# spanning-tree guard loop

```

16.1.24 spanning-tree guard none

```

guard 1 no guard 1
spanning-tree guard none
no spanning-tree guard none
Ruijie(config-if)# spanning-tree guard none

```

16.1.25 spanning-tree autoedge

```

Autoedge 1 disabled
Autoedge 1
spanning-tree autoedge [disabled]
disabled Autoedge 1
Ruijie(config-if)# spanning-tree autoedge

```

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

Г А

show spanning-tree interface STP Ш

16.1.26 bpdu src-mac-check

bpdu TJ3[m8


```
 Ruijie# Ruijie(config-if)#logging event status
```

```
 Ruijie#
```

16.2

16.2.1 show spanning-tree

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

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

```
 Ruijie#
```

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

```
 Ruijie# 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
```

16.2.2 show spanning-tree interface

STP

▮

▮

show spanning-tree interface *interface-id* [{**bpdufilter** | **portfast** |

Г Д

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

W

1.

1

gigabitEthernet 1/8

W

show monitor	SPAN	III

W

SPAN

session *session_number* SPAN

SPAN

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

r

A

monitor session	SPAN W

18 RSPAN

18.1

18.1.1 monitor session

RSPAN Ⅲ

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

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

Г Д

show monitor	Ш

Г Д

18.1.2 remote-span

RSPAN VLAN

[no] remote-span

Г Д

Г Д

Vlan

Г Д

end

Ctrl+C

Ш

exit

Г Д

```
Ruijie(config)# vlan 5
Ruijie(config)# remote-span
```

Г Д

--	--

19 IP

19.1

- ip address
- ip unnumbered

19.1.1 ip address

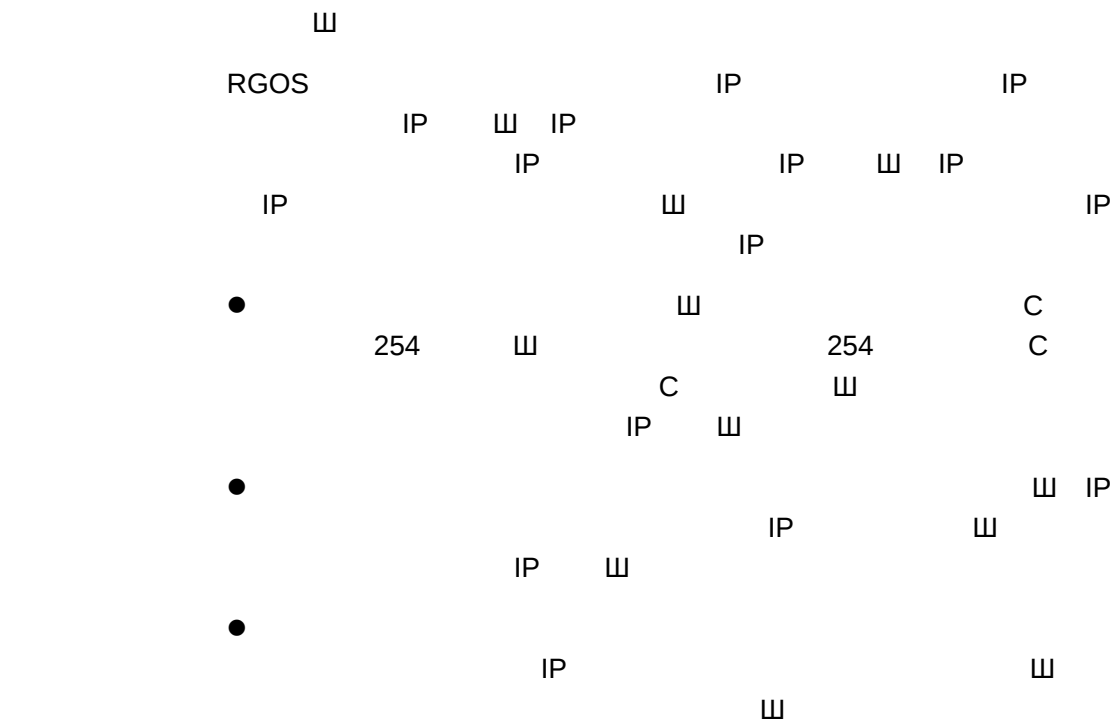
IP no IP Ш

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

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

Г А

--	--



Г Д

```

IP 10.10.10.1
255.255.255.0
ip address 10.10.10.1 255.255.255.0

```

Г Д

show interface	

Г Д

IP
secondary

19.1.2 ip unnumbered

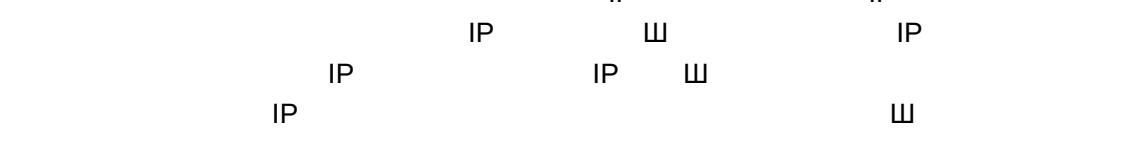
IP IP no
Ш

ip unnumbered *interface-type interface-number*

no ip unnumbered *interface-type interface-number*

Г Д

IP IP



-
- The diagram illustrates the relationship between various network protocols. It features four horizontal lines with dots on the left. Between these lines, several protocols are listed: X.25, SLIP, HDLC, PPP, LAPB, Frame-relay, IP, ping, SNMP, and others. Some protocols are grouped together with a bracket or a line, indicating they are related or part of a larger category.

FastEthernet 0/13

IP $\mathbb{W}$

```
ip unnumbered fastEthernet 0/1
```

--	--

show interface	

- arp
- arp retry interval
- arp retry times
- arp trusted NUM
- arp trusted aging
- arp unresolve
- arp gratuitous-send interval
- arp timeout
- ip proxy-arp
- service trustedarp

19.2.1 arp

`no` ARP IP MAC
`arp ip-address MAC-address type [ alias ]`
`no arp ip-address MAC-address type [ alias ]`

r A

<i>ip-address</i>	MAC IP
<i>MAC-address</i>	48
<i>type</i>	ARP ARP ARP
alias	RGOS IP

IP

APC C1A6Hm14

ARP

Ш

no

Ш

arp trusted *number***no arp trusted**

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

ARPIШ

arp trusted 1000

Г Д

service trusted arp	ARP

19.2.5 arp trusted aging

ARP

Ш

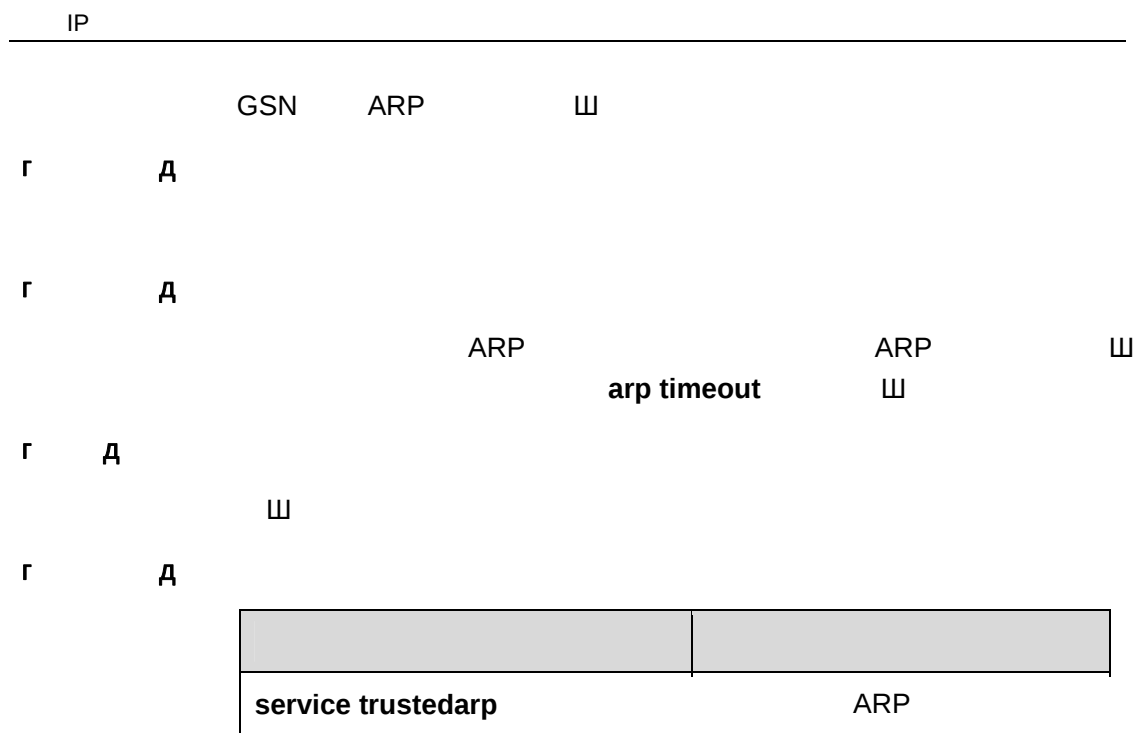
no

Ш

arp trusted aging**no arp trusted aging**

Г Д

Г Д



Г А

19.2.7 arp gratuitous-send interval

arp Ш no

arp gratuitous-send interval *seconds*

no arp gratuitous-send

Г А

<i>seconds</i>	ARP <1-3600>Ш

Г А

ARP Ш

Г А

Г А

ARP

Ш

Г А

SVI 1 ARP Ш

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

Г А

19.2.8 arp timeout

IP

ARP

IP		
	10.2(3)	ARPШ
г	д	
г	IP ARP ARP	ARP

3) tc

Г Д

service trustedarp Ш

config
service trustedarp

Г Д

s32 Ш

19.3

- ip broadcast-addresss
- ip directed-broadcast

19.3.1 ip broadcast-addresss

ip broadcast-addresss Ш

no Ш

ip broadcast-addresss *ip-address*

no ip broadcast-addresss *ip-address*

Г Д

<i>ip-address</i>	IP

Г Д

IP 255.255.255.255 Ш

Г Д

Г Д

IP 1 1 255.255.255.255 Ш
RGOS IP Ш
1 1

Г Д

IP 0.0.0.0 Ш

IP

ip broadcast-address 0.0.0.0

г Д

Ш

19.3.2 ip directed-broadcast

IP

ip

access-list-number	

г Д

1-199 1300 -

Ш

г Д

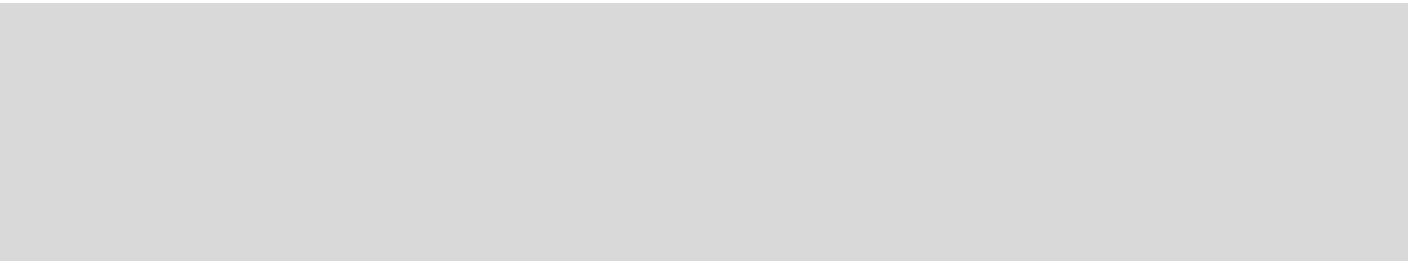
г Д

IP

IP

IP

172.16.16.255



FastEthernet 0/1

❏

```
interface fastEthernet 0/1
ip directed-broadcast
```

r A

❏

19.4 IP

IP

- clear arp-cache
- show arp
- show arp counter
- show arp timeout
- clear ip route
- show ip arp
- show ip interface
- show ip redirects

19.4.1 clear arp-cache

ARP

ARP

IP

clear arp-cache❏

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

r A

r A

ARP ❏

~

RNFP(Ruijie Network Foundation Protection,)

mac (IP) ARP

clear arp 1s

ARP ❏

Г Д

ARP Ш

clear arp-cache

ARP 1.1.1.1

clear arp-cache 1.1.1.1

SVI1 ARP

clear arp-cache interface Vlan 1

```

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
Age (min)	ARP
Hardware	IP
Type	ARPA
Interface	IP

```
show arp 192.168.195.68
```

```

Ruijie# show arp 192.168.195.68
Protocol Address Age(min) Hardware Type
Interface
Internet 192.168.195.68 1 0013.20a5.7a5f arpa
VLAN 1

```

```
show arp 192.168.195.0 255.255.255.0
```

```

Ruijie# show arp 192.168.195.0 255.255.255.0
Protocol Address Age(min) Hardware Type
Interface
Internet 192.168.195.64 0 0018.8b7b.9106 arpa
VLAN 1
Internet 192.168.195.2 1 00d0.f8ff.f00e arpa
VLAN 1
Internet 192.168.195.5 -- 00d0.f822.33b1 arpa
VLAN 1

```

```

Internet 192.168.195.1 0 00d0.f8a6.5af7 arpa
VLAN 1
Internet 192.168.195.51 1 0018.8b82.8691 arpa
VLAN 1

```

show arp 001a.a0b5.378d

```

Ruijie# show arp 001a.a0b5.378d
Protocol Address Age(min) Hardware Type
Interface
Internet 192.168.195.67 4 001a.a0b5.378d arpa
VLAN 1

```

Г Д

Ш

19.4.3 show arp counter

ARP arp

show arp counter

Г Д

Г Д

Г Д

show arp counter

```

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

```

ARP

Г Д

Ш

19.4.4 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
vrf <i>vrfname</i>	
<i>ip</i>	ip ip ARP
<i>ip mask</i>	ip mask ARP
<i>mac-address</i>	mac ARP
static	arp
complete	arp
incomplete	arp
trusted	ARP

ARP ARP 4 4 4 4

山

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	--	

VLAN 1

3600

ARP

ARP

Ш

show ip arp

г Д

г Д

г Д

show ip arpRuijie# **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
Internet 192.168.7.127 0       0060.97bd.ebee  ARPA
FastEthernet 0/0
Internet 192.168.7.195 57      0060.97bd.ef2d  ARPA
FastEthernet 0/0
Internet 192.168.7.183 --      00d0.f8fb.108b  ARPA
FastEthernet 0/0

```

ARP

Protocol	InternetШ
Address	IP Ш
Age (min)	ARP Ш “-” Ш
Hardware	IP Ш
Type	ARPAШ
Interface	IP Ш

Г Д

Ш

19.4.8 show ip interface

IP Ш

show ip interface [*interface-type interface-number*]

Г Д

<i>Interface-type</i>	
<i>Interface-number</i>	

Г Д

Г Д

RGOS Ш

RGOS Ш

RGOS Ш

Ш

↑ UP ↓

↑ UP ↓ Ш

Ш

Г Д

show ip interface Ш

```
Ruijie# show ip interface FastEthernet 0/1
IP interface state is: UP
IP interface type is: BROADCAST
IP interface metric is: 0
IP interface MTU is: 1500
IP address is:
192.168.5.133/24 (primary)
IP address negotiate is: OFF
Forward direct-boardcast is: ON
ICMP mask reply is: ON
Send ICMP redirect is: ON
Send ICMP unreachableled is: ON
```

DHCP relay is: OFF
Fast switch is: ON
Route horizontal-split is: ON
Help address is: 0.0.0.0
Proxy ARP is: ON
Outgoing access list is not set.
Inbound access list is not set.

IP	
г	д
г	д
Ш	
г	д

show ip redirects

г д

Ш

20.1.2 ip mask-reply

RGOS

ICMP

ICMP

ip mask-replyШ

no

ICMP

Ш

ip mask-reply

no ip mask-reply

г д

ICMP

Ш

г д

г д

ICMP

ICMP

Ш

г д

FastEthernet 0/1

ICMP

Ш

interface fastEthernet 0/1
ip mask-reply

г д

Ш

20.1.3 ip mtu

IP

MTU

ip mtuШ

no

Ш

ip mtu bytes

no ip mtu

г д




```

    Ш
    ICMP
    Ш
    Ш
    RGOS ICMP Ш
r   Д
    FastEthernet 0/1 ICMP Ш
interface fastEthernet 0/1
no ip redirects
r   Д
    Ш

```

20.1.5 ip source-route

```

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

```

R00P86ONUŠEŤVČ2.10CĚNOVAČŮér,VÉRŮSÜSRPVdnpš2619B

21 DHCP

21.1 DHCP

21.1.1 bootfile

		DHCP		DHCP		
	bootfile	Ш	no	Ш		
	bootfile	<i>file-name</i>				
	no bootfile					
Г	Д					
		<i>file-name</i>		Ш		
Г	Д					
		Ш				
Г	Д					
		DHCP				
Г	Д					
		DHCP	Ч	DHCP		
			DHCP			
		TFTP	Ш	next-server		
		Ш				
Г	Д					
		router.conf				
		bootfile router.conf				
Г	Д					
		ip dhcp pool	DHCP	DHCP		
			Ш			

next-server	DHCP IP
--------------------	------------

21.1.2 client-identifier

DHCP

DHCP

client-identifier**no** **client-identifier** *unique-identifier***no client-identifier**

r

A

--	--

г д

hardware-address	DHCP Ш
host	IP Ш DHCP Ш
ip dhcp pool	DHCP Ш DHCP Ш

21.1.3 client-name

DHCP DHCP client-name Ш
no DHCP Ш

client-name *client-name*

no client-name

г д

<i>client-name</i>	DHCP Ш ASCII Ш river DHCP river.i-net.com.cn Ш

г д

Ш

г д

DHCP

г д

DHCP DHCP
Ш Ш

г д

river Ш

client-name river

г д

host	IP Ш DHCP Ш

ip dhcp pool	DHCP DHCP	Ш
---------------------	--------------	---

21.1.4 default-router

DHCP
default-router Ш **no** DHCP Ш

default-router *ip-address* [*ip-address2...ip-address8*]

no default-router

Г Д

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

Г Д

Ш

Г Д

DHCP

Г Д

DHCP DHCP DHCP Ш
DHCP IP Ш

Г Д

192.168.12.1 Ш

default-router 192.168.12.1

Г Д

```

dns-server { ip-address [ ip-address2...ip-address8 ] |
use-dhcp-client interface-type interface-number }
no dns-server

```

Г А

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

Г А

DNS Ш

Г А

DHCP

Г А

DNS DHCP
DNS DNS Ш

RGOS DHCP DNS

DHCP Ш

Г А

DHCP DNS 192.168.12.3Ш

dns-server 192.168.12.3

Г А

domain-name	DHCP Ш
ip address dhcp	DHCP IP Ш
ip dhcp pool	DHCP DHCP Ш

21.1.6 domain-name

DHCP
noDHCP
no

domain-name no

domain-name domain-name
no domain-name

r A

domain-name	DHCP no

r A

no

r A

DHCP

r A

DHCP

no

r A

DHCP

i-net.com.cn no

domain-name i-net.com.cn

r A

dns-server	DHCP DNS
ip dhcp pool	DHCP no DHCP

21.1.7 hardware-address

DHCP

hardware-address no

DHCP

no

hardware-address hardware-address 080026
907JtET1cdd09e0>5.7<1e0b09e2>5.7<34d40db309e1>5.7<

<i>type</i>	DHCP	
	Ш	
	✧	ethernet
	✧	ieee802
	✧	1 10M ethernet
	✧	6 IEEE 802

г А

Ш

ethernetШ

г А

DHCP

г А

DHCP

Ш

г А

ethernet MAC 00d0.f838.bf3dШ

hardware-address 00d0.f838.bf3d

г А

client-identifier	DHCP Ш
host	IP Ш DHCP Ш

ip dhcp pool DHCP

<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 Ш
hardware-address	DHCP Ш
ip dhcp pool	DHCP Ш

21.1.9 ip address dhcp

PPP ЧHDLC ЧFR DHCP IP
ip address dhcpШ **no**
 Ш
ip address dhcp
no ip address dhcp

г д

DHCP IP Ш

г д

г д

```

RGOS          DHCP          IP          DHCP
          1 DHCP          1          2 DHCP
          3          3 DHCP          6 DNS
4 DHCP          15          DHCP          44 WINS          Ш
RGOS          PPP Ч FR Ч HDLC          dhcp

```

г д

FastEthernet 0 IP Ш

```

interface fastEthernet 0
ip address dhcp

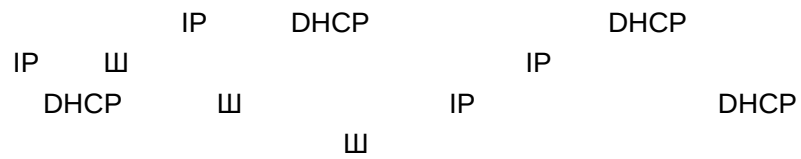
```

г д

dns-server	DHCP DNS
ip dhcp pool	DHCP DHCP Đ

cpD

г д



г д

DHCP 192.168.12.100~150
 IP W
 ip dhcp excluded-address 192.168.12.100 192.168.12.150

г д

ip dhcp pool	DHCP DHCP W
network DHCP	DHCP W

21.1.11 ip dhcp force-send-nak

DHCP NAK W
 no NAK W

ip dhcp force-send-nak
 no ip dhcp force-send-nak

г д

г д

W

г д

г д

RFC2131 DHCP Request
 NAK IP IP W Request

Г А

```

DHCP DHCP IP ping
DHCP ping
10 ping

```

Г А

```

ping 3 ping
ip dhcp ping packets 3

```

Г А

clear ip dhcp conflict	DHCP ping
ip dhcp ping timeout	DHCP ping ping
show ip dhcp conflict	DHCP ping

21.1.13 ip dhcp ping timeout

```

DHCP ping
ip dhcp ping timeout ping no

```

```

ip dhcp ping timeout milli-seconds
no ip dhcp ping timeout

```

Г А

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

Г А

500 ping

Г А

Г А

ping

Ш

Г Д

ping

600msШ

mypool0 DHCP

ip dhcp pool mypool0

г д

host	IP DHCP
ip dhcp excluded-address	DHCP IP
network DHCP	DHCP

21.1.15 lease

DHCP lease DHCP no

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

no lease

г д

<i>days</i>	
<i>hours</i>	
<i>minutes</i>	
infinite	

г д

г д

DHCP

г д

DHCP DHCP

г д

DHCP 1

```
lease 0 1
DHCP 1
lease 0 0 1
```

г А

ip dhcp pool	DHCP DHCP

21.1.16 netbios-name-server

```
DHCP NETBIOS WINS DHCP
netbios-name-server no WINS
netbios-name-server ip-address [ ip-res2...(padv)4.3d(es8s)T/T2 1 Tf121.44 0 TD0.0022
```

ip address dhcp	DHCP	IP	⏏
ip dhcp pool	DHCP ⏏	DHCP	

21.1.17 netbios-node-type

DHCP NetBIOS DHCP
netbios-node-type⏏ **no** NetBIOS
 ⏏

netbios-node-type *type*

no netbios-node-type

Г А

	NetBIOS ⏏
	0~FF
<i>type</i>	✧ 1 b-node ✧ 2 p-node ✧ 4 m-node ✧ 8 h-node⏏ ✧ b-node ✧ p-node ✧ m-node ✧ h-node ⏏

Г А

NetBIOS ⏏

Г А

DHCP

Г А

DHCP NetBIOS 1 Broadcast
 NetBIOS 2 Peer-to-peer
 WINS NetBIOS 3 Mixed
 WINS
 4 Hybrid WINS
 NetBIOS NetBIOS
 ⏏

show ip dhcp binding
show ip dhcp conflict

Г Д

DHCP 192.168.12.0
255.255.255.240
network 192.168.12.0 255.255.255.240

Г Д



ip dhcp excluded-address DHCP

```
next-server 192.168.12.4
```

Г А

bootfile	DHCP
ip dhcp pool	DHCP Ш
ip help-address	Helper
option	RGOS DHCP Ш

21.1.20 option

```

DHCP
no DHCP option Ш
option code { ascii string | hex string | ip ip-address }
no option

```

Г А



Г Д

21.1.21 service dhcp

Г Д

Г Д

Г Д

Г Д

Г Д

DHCP

Ш

service dhcp

Г Д

show ip dhcp server statistics	DHCP Ш

21.2

- clear ip dhcp binding
- clear ip dhcp conflict
- clear ip dhcp server statistics
- debug ip dhcp client
- debug ip dhcp server
- show dhcp lease
- show ip dhcp binding
- show ip dhcp conflict
- show ip dhcp server statistics

21.2.1 clear ip dhcp binding

DHCP

clear ip dhcp binding

Ш

clear ip dhcp binding { * | ip-address }

Г Д

*	DCHP Ш
ip-address	IP Ш

Г Д

Ш

Г Д

Г Д

dhcp pool

DHCP
Ш

DHCP

no ip

Г А

IP 192.168.12.100 DHCP Ш

clear ip dhcp binding 192.168.12.100

Г А

show ip dhcp binding	DHCP Ш

21.2.2 clear ip dhcp conflict

DHCP

clear ip dhcp conflict Ш

clear ip dhcp conflict { * | ip-address }

Г А

*	DHCP Ш
ip-address	IP Ш

Г А

Ш

Г А

Г А

DHCP

ping

DHCP

ARP Ш

clear ip dhcp conflict

Ш

Г А

Ш

clear ip dhcp conflict *

Г А

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

21.2.3 clear ip dhcp server statistics

		DHCP			clear ip dhcp
		server statistics	Ш		
		clear ip dhcp server statistics			
Г	А				
			Ш		
Г	А				
Г	А				
		DHCP		DHCP	У
				DHCP	У
		ip dhcp server statistics			clear
					Ш
Г	А				
		DHCP		Ш	
		clear ip dhcp server statistics			
Г	А				
		show ip dhcp server statistics		DHCP	Ш

21.2.4 debug ip dhcp client

		DHCP Client			debug ip dhcp client
		Ш			
		debug ip dhcp client			
		no debug ip dhcp client			
Г	А				
Г	А				
Г	А				

```

r      A

```

```

        dhcp client

```

```

        █

```

```

r      A

```

```

        dhcp

```

```

        █

```

```

        debug ip dhcp client

```

```

r      A

```

21.2.5 debug ip dhcp server

```

        DHCP Server

```

```

        debug ip dhcp server

```

```

        █

```

```

        debug ip dhcp server

```

```

        no debug ip dhcp server

```

```

r      A

```

```

r      A

```

```

r      A

```

```

r      A

```

```

        dhcp server

```

```

        █

```

```

r      A

```

```

        dhcp

```

```

        █

```

```

        debug ip dhcp server

```

```

r      A

```

21.2.6 show dhcp lease

```

        DHCP

```

```

        EXEC

```

```

        show dhcp lease █

```

```

        show dhcp lease

```

г д

ш

г д

г д

IP

ш

IP

IP

ш

г д

show dhcp lease

ш

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

IP IP IP IP

г А

show ip dhcp binding IP

Ruijie# show ip dhcp binding

IP address Client-Id/ Lease expiration Type
Hardware address
192.168.1.2 00d0.f866.4777 IDLE Manual
IP

IP address	DHCP IP IP
Client-Id/ Hardware address	DHCP client identifier
Lease expiration	IDLE Infinite DHCP IP
Type	Manual Automatic IP

г А

clear ip dhcp binding	DHCP

21.2.8 show ip dhcp conflict

DHCP EXEC show ip dhcp conflict IP

show ip dhcp conflict

г А

г А

IP

г А

г А

DHCP IP

Г А

show ip dhcp conflict Ш

Ruijie# **show ip dhcp conflict**

IP address Detection Method

192.168.12.1 Ping

dhcpd excluded ipaddress

192.168.12.100

Ш

IP address	DHCP IP Ш
Detection Method	Ш
dhcpd excluded ipaddress	Ш

Г А

clear ip dhcp conflict	DHCP

21.2.9 show ip dhcp server statistics

DHCP

EXEC

show ip dhcp

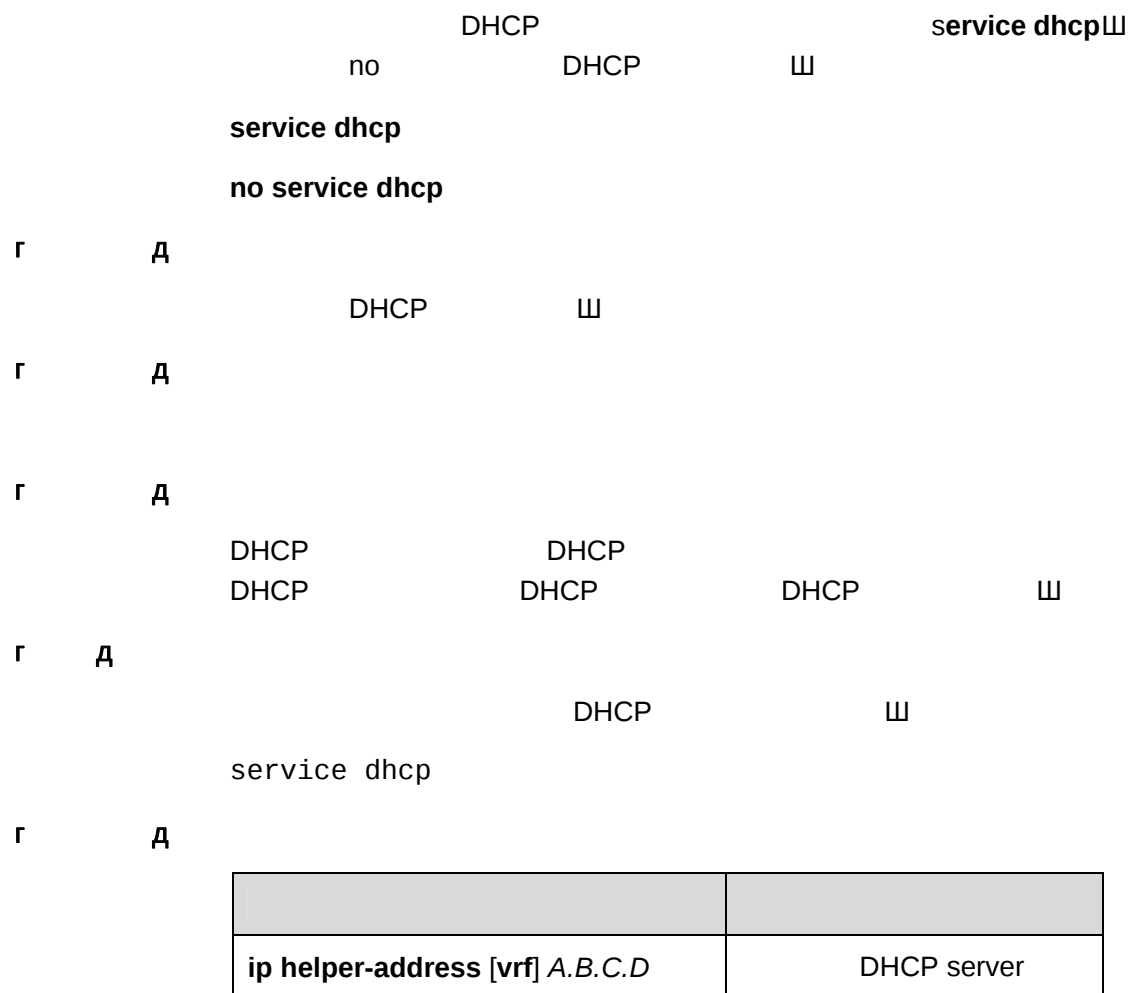
22 DHCP Relay

22.1 DHCP Relay

DHCP

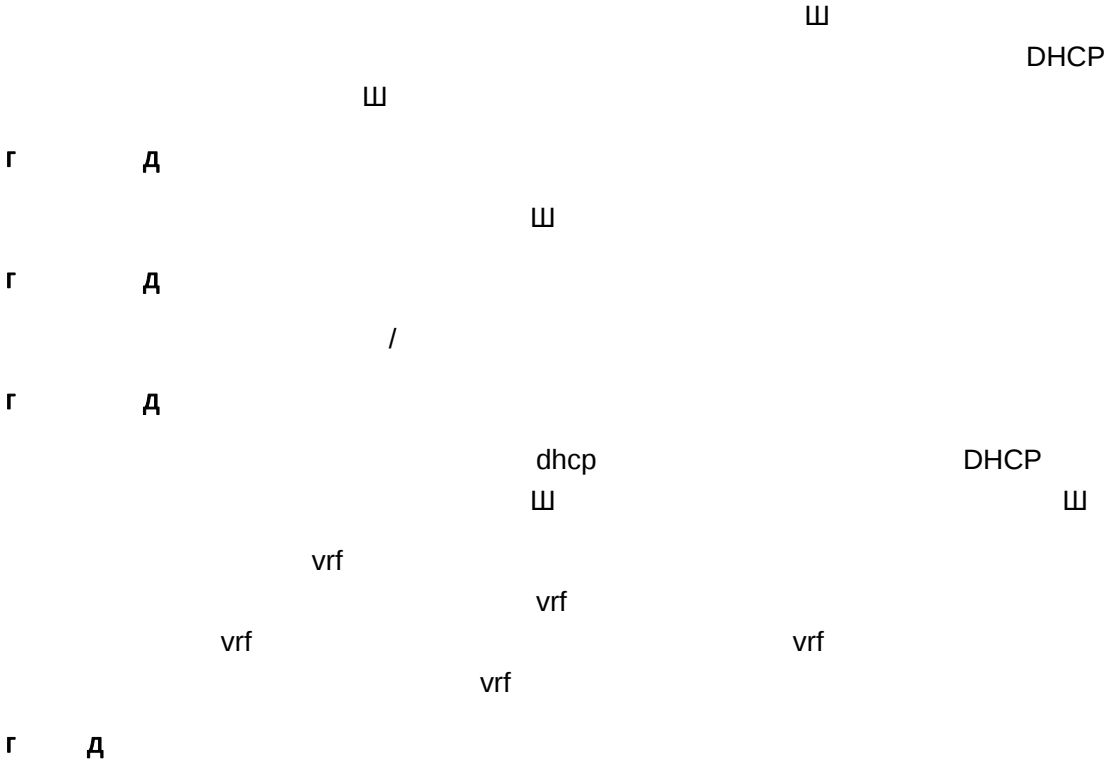
- **service dhcp**
- **ip helper-address**

22.1.1 service dhcp



22.1.2 ip helper-address

no
DHCP

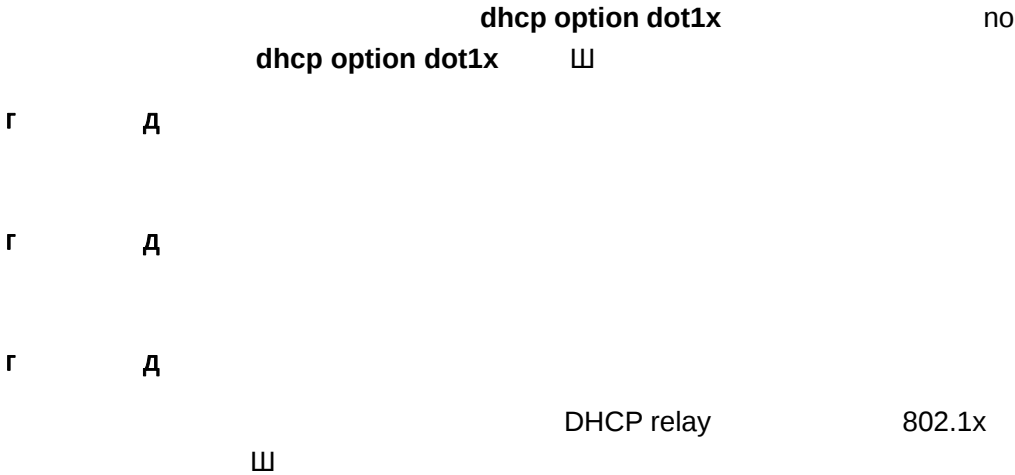


61.154.26.49 vrf local 192.168.197.1

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

service dhcp	DHCP

22.1.3 ip dhcp relay information option dot1x



г д

г д

server-id option DHCP REQUEST
server

г д

ш

Ip dhcp relay check server-id

г д

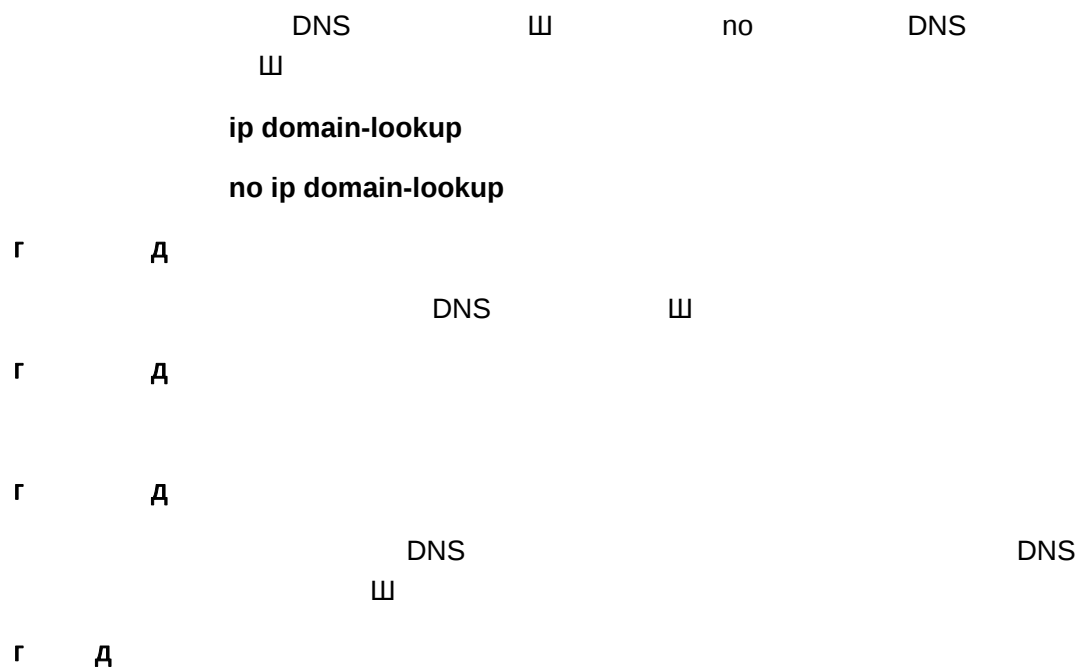
Service dhcp	DHCP

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

23 DNS

23.1

23.1.1 ip domain-lookup



no ip name-server [ip-address]

r
A

ip-address	IP

r
A

r
A

r
A

DNS Server
Server
Server

IP
DNS
6

Server
DNS Server
DNS
ip-address

DNS

r
A

Ruijie(config)# ip name-server 192.168.5.134

r
A

show hosts	DNS

r
A

RGOS10.1

23.1.3 ip host

IP
no

ip host host-name ip-address
no ip host host-name ip-address

r
A

host-name	

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

Г Д

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

RGOS10.1 Ш

23.1.4 clear host

Ш

clear host [*host-name*]

Г Д

<i>host-name</i>	Ш "*" Ш

Г Д

Г Д

DNS Ш 1 ip host 2
DNS Ш

Г Д

-IP

Ш

clear host *

Г А

show hosts	

Г А

RGOS10.1 Ш

23.1.5 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

RGOS10.1 Ш

24 SNTP

24.1

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

24.1.1 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

```

show sntp	SNTP
clock update-calendar	
clock set	

```

Ruijie# show sntp

```

RGOS10.0

24.1.2 sntp server

```

Server          SNTP Server          SNTP          NTP
                internet              NTP Server

sntp server A.B.C.D
no sntp server

r      A
      A.B.C.D  NTP/SNTP          IP

r      A
                NTP/SNTP

r      A

r      A
      show sntp          SNTP

r      A

Ruijie(config)# sntp server 192.168.4.12

r      A

```

show sntp	SNTP
sntp enable	SNTP

```

r      A
      RGOS10.0

```

24.1.3 sntp interval

```

                SNTP Client          NTP/SNTP Server
                W

sntp interval seconds
no sntp interval

r      A
      seconds          60  --65535  W

r      A
      1800s

```

Г Д

Г Д

show sntp SNTP Ш

Г Д

Ruijie(config)# sntp interval 3600

Г Д

sntp enable	SNTP
show sntp	SNTP
clock update-calendar	

Г Д

RGOS10.0

~

sntp enable Ш

24.2

:

- show sntp

24.2.1 show sntp

SNTP Ш

Г Д

Г Д

Г Д

show sntp SNTP

Г Д

```
Ruijie# show sntp
SNTP state      : Enable
SNTP server     : 192.168.4.12
SNTP sync interval : 60
Time zone      : +8
```

Г Д

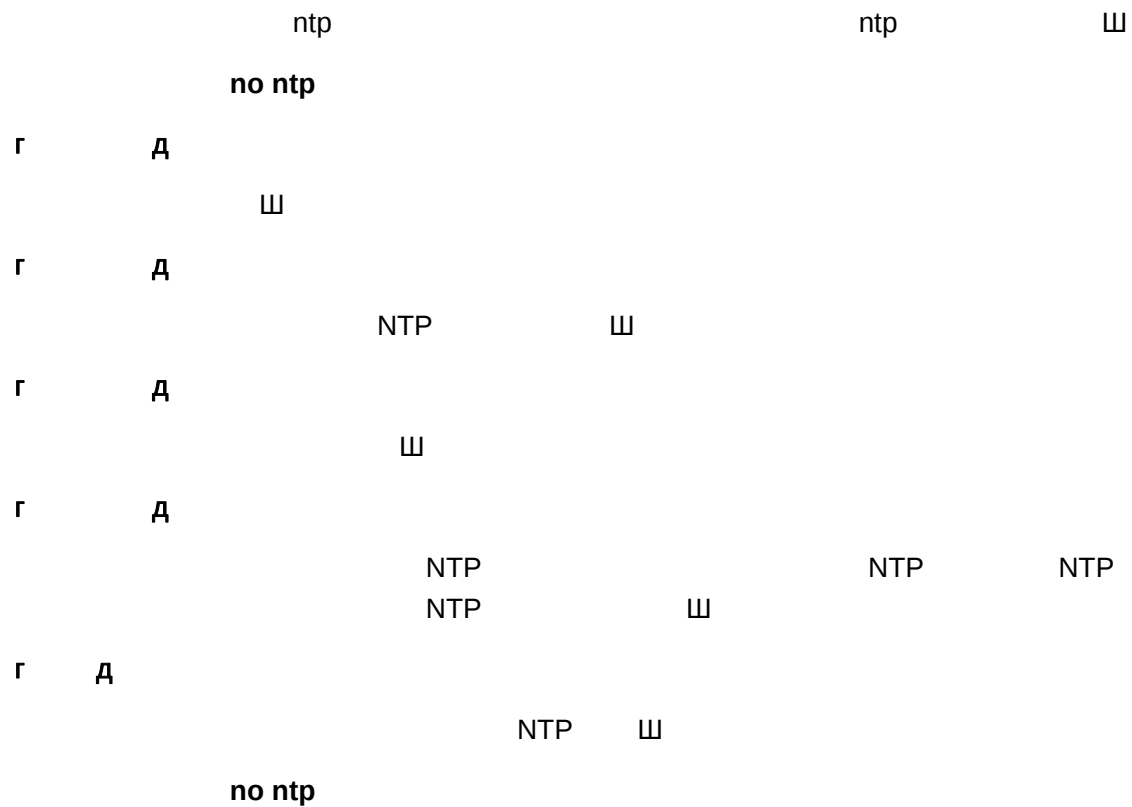
25 NTP

25.1 NTP

NTP

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

25.1.1 no ntp



Г Д

ntp server	NTP

25.1.2 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 Ш
serve	NTP Ш
serve-only	NTP Ш
query-only	NTP Ш
<i>access-list-number</i>	IP 1 99 1300 1999
<i>access-list-name</i>	IP Ш

Г Д

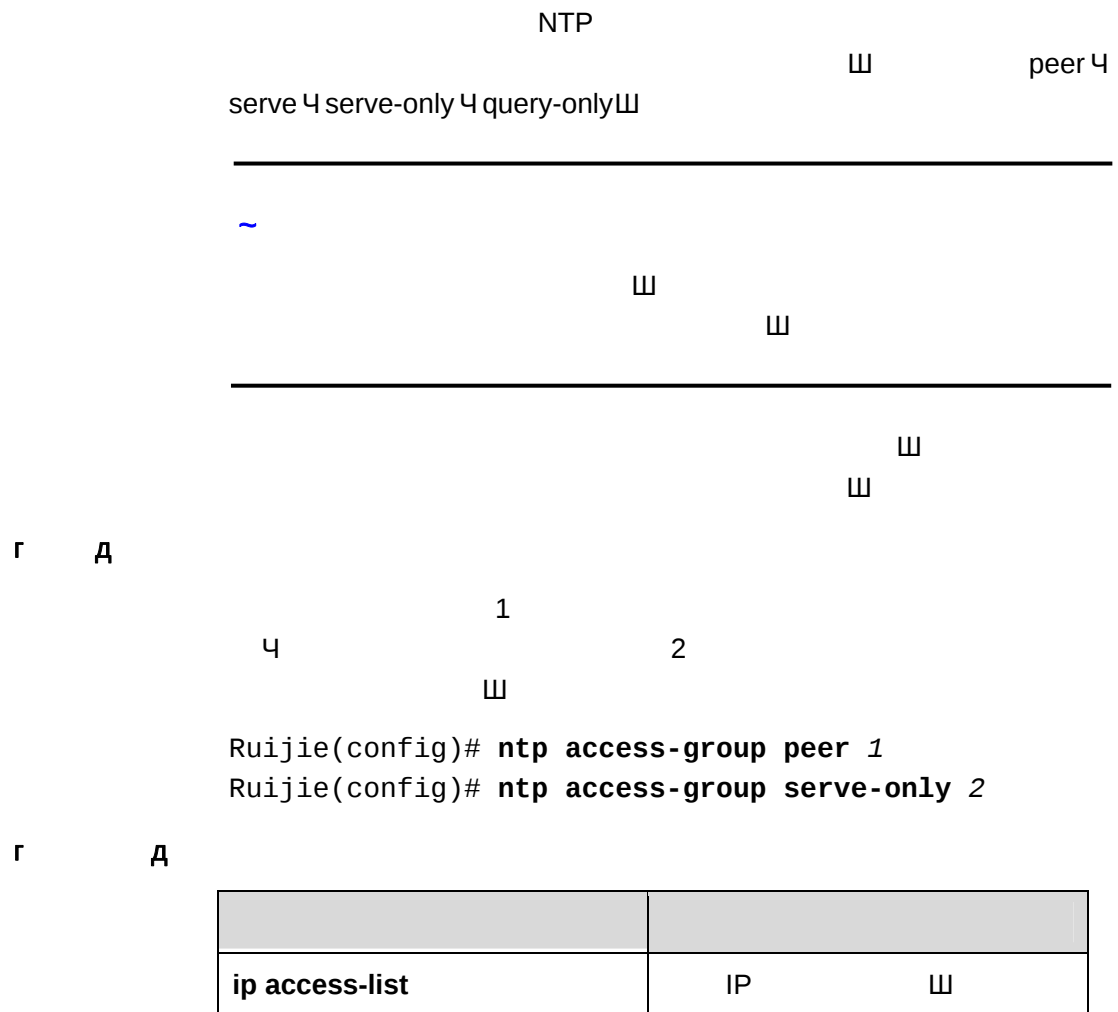
NTP Ш

Г Д

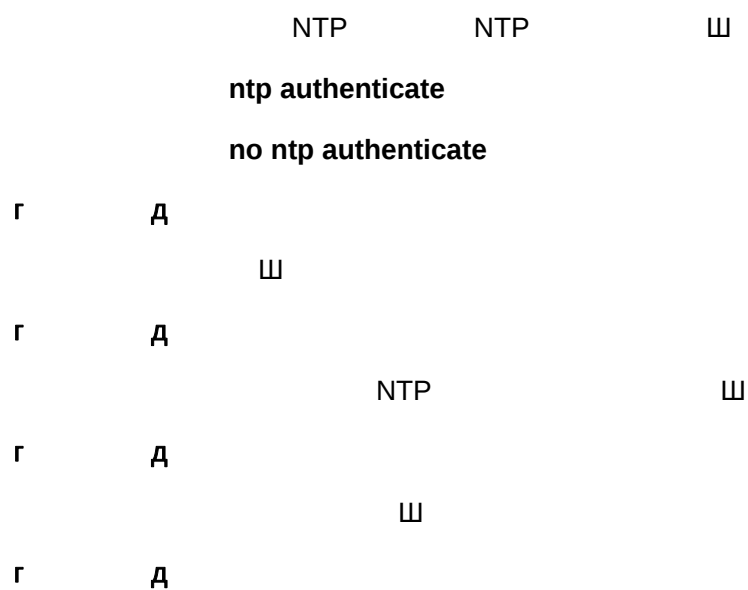
Ш

Г Д

NTP Ш
NTP Ш



25.1.3 ntp authenticate



md5key-idntp trusted-keykey-id

1024

гД

ID 6

ntp authentication-key 6 md5 woooooop

гД

ntp authenticate	
ntp trusted-key	
ntp server	NTP

25.1.5 ntp disable

NTP

ntp disable

гД

гД

NTP

гД

гД

NTP

NTP

~

IP

гД

NTP ▯

no ntp

г А

▯

25.1.6 ntp master

NTP

▯ no NTP ▯

ntp master [stratum]
no ntp master

г А

stratum	1518▯

г А

NTP ▯

г А

▯

г А

▯

▯

▯

~

▯

▯

▯

▯

Г Д

12Ш

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

Г Д

25.1.7 ntp server

NTP

NTP

Ш

ntp server

NTP
 IP NTP

NTP server

IPv4 Ruijie(config)# ntp server 192.168.210.222

1

no ntp	NTP

25.1.8 ntp trusted-key

ID

ntp trusted-key *key-id*

no ntp trusted-key *key-id*

1

<i>key-id</i>	ID

1

1

1

1

1

NTP

ID

1

1

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

1

--	--

ntp authenticate	Ш	
ntp authentication-key	NTP	Ш
ntp server	NTP	Ш

25.1.9 ntp update-calendar

NTP

Щ Г Ф /

NTP

NTP

NTP

Ш

Г Д

NTP Ш

show ntp status

Г Д

26 UDP-Helper

26.1

26.1.1 udp-helper enable

udp-helper enable

udp-helper enable

UDP

UDP

no

UDP

udp-helper enable

no udp-helper enable

г

А

г

А

UDP

г

А

г

А

UDP-Helper

69,53,37,137,138,49

UDP

г

А

UDP :

Ruijie(config)# **udp-helper enable**

г

А

ip forward-protocol	UDP

г

А

RGOS10.1

26.1.2 ip helper-address

UDP

⏏

no

UDP

⏏

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

r A

<i>address</i>	UDP ⏏ 20

r A

UDP

r A

r A

20

⏏

UDP-Helper

UDP

⏏

no ip helper-address

⏏

r A

UDP

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

r A

ip forward-protocol	UDP

r A

RGOS10.1

⏏

26.1.3 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]
```

r A

udp-helper enable	UDP
ip forward-protocol	UDP

Г

А

RGOS10.1

Ш

27 SNMP

27.1

SNMP

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

27.1.1 no snmp-server

		SNMP		no snmp-server 山
		no snmp-server		
г	А			
		SNMP		
г	А			
г	А		SNMP	山
		SNMP		
		Ruijie(config)# no snmp-server		

г Д

г Д

SNMP

i-net800@i-net.com.cn

Ruijie(config)# **snmp-server contact i-net800@i-net.com.cn**

г Д

show snmp-server	SNMP
no snmp-server	SNMP

27.1.5 snmp-server enable traps

SNMP

NMS

Trap

snmp-server enable traps 山

no

SNMP

NMS

Trap

山

snmp-server enable traps [snmp]

no snmp-server enable traps

г Д

snmp

SNMP

山

г Д

г Д

г Д

snmp-server

山

г Д

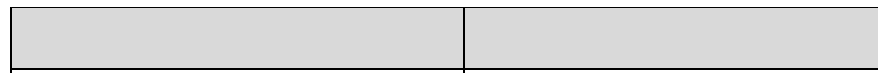
SNMP

Ruijie(config)# **snmp-server enable traps snmp**

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

г Д

SNMP



snmp-server host

SNMP

SNMP

SNMP

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

Г А

snmp-server enable traps	

27.1.7 snmp-server location

SNMP

location

no

SNMP

snmp-server

location

```
snmp-server location text
```

```
no snmp-server location
```

Г А

```
text
```

Г А

Г А

Г А

```
Ruijie(config)# snmp-server location start-technology
-city 4F of A Buliding
```

Г А

snmp-sever contact	SNMP

27.1.8 snmp-server packetsize

SNMP

packet-size

no

location

snmp-sever

```
snmp-server packet-size byte-count
```

```
no snmp-server packet-size
```

г	д				
		<i>byte-count</i>	484	17876	ш
г	д	1500			
г	д				
г	д				

snmp-server packetsize	SNMP

27.1.10 snmp-server system-shutdown

SNMP
system-shutdown no SNMP **snmp-server**
snmp-server system-shutdown
no snmp-server system-shutdown

Г А

SNMP

Г А

Г А

SNMP

RGOS

SNMP

IP

IP

SNMP

W

r A

0 IP

SNMP

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

r A

snmp-server enable traps	
snmp-server enable host	NMS

27.1.12 snmp-server trap-timeout

snmp-server

trap-timeout W no W

snmp-server trap-timeout *seconds*

no snmp-server trap-timeout

r A

seconds W

r A

30

r A

r A

60

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

r A

snmp-server queue-length	
snmp-server enable host	NMS

27.1.13 snmp-server user

SNMP		snmp-server user	
no			
snmp-server user <i>username groupname {v1 v2 v3 [encrypted]</i> <i>[auth {md5 sha} auth-password] [priv des56 priv-password]]</i> <i>[access {num name}]</i>			
no snmp-server user <i>username groupname {v1 v2c v3 }</i>			
<i>username</i> <i>groupname</i> v1 v2 v3 SNMP v3 encrypted MD5 16 SHA 20 16 auth md5 MD5 sha SHA <i>auth-password:</i> 32 priv des56 56 DES <i>priv-password</i> 32 			
snmpV3 md5 DES			
Ruijie(config)# snmp-server user <i>user-2 mib2user v3 auth</i> md5 authpassstr priv des56 despassstr			
show snmp user		SNMP	

27.1.14 snmp-server group

SNMP		snmp-server group	
no	SNMP		
snmp-server group <i>groupname</i> { v1 v2c v3 { auth noauth priv }} [read <i>readview</i>] [write <i>writeview</i>] [access { <i>num</i> <i>name</i> }]			
no snmp-server group <i>groupname</i> { v1 v2c v3 }			
г	Д	v1 v2c v3	SNMP
		auth	v3
		noauth	v3
		priv	v3
		<i>readview</i>	
		<i>writeview</i>	
г	Д		
г	Д		
г	Д		
Ruijie(config)# snmp-server group <i>mib2user</i> v3 priv read <i>mib2</i>			
г	Д		

show run	

27.2

27.2.1 show snmp

SNMP

show snmp¹

show snmp [mib | user | view | group]

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

r

A

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

28 RMON

28.1

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**

28.1.1 rmon collection stats

⌘ no ⌘

rmon collection stats *index* [**owner** *owner-string*]

no rmon collection stats *index*

⌈ ʌ

⌈ ʌ

⌈ ʌ

⌈ ʌ

1 ⌘

Ruijie(config)# **interface fast-Ethernet 0/1**

Ruijie(config-if)# **rmon collection stats 1 zhansan**

Г Д

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

28.1.2 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

Г Д

--	--

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

Г А

Г А

Г А

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

Г А

MIB ifInNUcastPkts.6

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

Г А

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

28.1.4 rmon event

no

rmon event *number [log] [trap community] [description-string]*
no rmon alarm *number*

Г А

Г А

Г А

Г Д

4 trap 山

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

Г Д

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

28.2

28.2.1 show rmon statistics

山

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

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

28.2.2 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

Г

А



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

r

A



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

29 VRF

29.1 VRF

VRF

- **show ip route vrf**
- **clear ip route vrf**
- **ip vrf**
- **ip vrf forwarding**
- **show ip vrf**

29.1.1 show ip route vrf

VRF

show ip route vrf *vrf-name* [*network* [*mask*]]

┌ ▽

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

┌ ▽

VRF

┌ ▽

┌ ▽

VRF

┌ ▽

Ruijie# **show ip route vrf redvrf**

┌ ▽

clear ip route vrf	VRF

┌ ▽

RGOS10.1

29.1.2 clear ip route vrf

VRF

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

Г Д

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

Г Д

Г Д

Ш

Г Д

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

Г Д

show ip route vrf

Г Д

RGOS10.1

29.1.3 ip vrf

VRF

VRF

no

ip vrf *vrf-name*

no ip vrf *vrf-name*

Г Д

vrf-name VRF

Г Д

Г Д

VRF

Г Д

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

Г Д

RGOS10.1

29.1.4 rd

```

rd rd_value
vrf rd VRF RD VRF
VRF RD 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 RD RD RD
RD RD RD RD RD RD
vrf RD RD RD RD RD RD
r A
Ruijie(config)# ip vrf vrf1
Ruijie (config-vrf)# rd 100:1
r A

```

```

import      vrf      import
export      vrf      export
both        vrf      import export

```

```
rt_value
```

```
● rt_value      as_num  nn
```

```
as_num                      ,nn
```

```
● rt_value      ip_addr:nn
```

```
ip_addr                      IP      ,nn
```

```
r      A
```

```
Route-Target  W
```

```
r      A
```

```
vrf
```

```
r      A
```

```

vrf      route-target.import      vrf      export
vrf

```

```
r      A
```

```

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

```

```
r      A
```

ip vrf	vrf

```
r      A
```

```
RGOS10.3(3)
```

29.1.6 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
          VRF
r      A
          VRF
r      A
Ruijie(config-if)# ip vrf forwarding redvrf
r      A
RGOS10.1

```

29.1.7 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
          VRF          interfaces
r      A
Ruijie# show ip vrf redvrf
r      A
RGOS10.1

```

30 RIP

30.1

30.1.1 address-family RIP

RIP

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

r A

vrf <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**
255.255.255.0

```

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▮

30.1.2 auto-summary (RIP)

```

RIP
no
auto-summary
no auto-summary
┌      ▴
┌      ▴
┌      ▴
┌      ▴
RIP
┌RIPv1  RIPv2
RIP
┌
●      RIP
●      RIP
●
RIPv1
RIPv2
┌      ▴

```

RIPv2

山

```
Ruijie(config)# router rip  
Ruijie(config-router)# version 2  
Ruijie(config-router)# no auto-summary
```

r

A

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

└ A

redistribute	┐

30.1.4 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 ┐
metric metric-value	metric-value 1-15┐
route-map map-name	route-map , route-map

└ A

metric 1┐

└ A

┐

└ A

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

```
always            RIP
```

┐

```
show ip rip database            RIP
```

┐

```

RIP
set metric
metric
route-map set metric metric
RIP

```

```

RIP
ip default-network
default-information originate
RIP

```

Г Д

RIP

```

Ruijie(config-router)# default-information originate
always

```

Г Д

ip rip default-information	
redistribute	RIP

30.1.5 distance

```

RIP
no
distance
distance distance [ ip-address wildcard ]
no distance [distance ip-address wildcard ]

```

Г Д

distance	RIP <1-255>
ip-address	IP
wildcard	IP

$\theta, \theta, \theta, \theta$

W

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

30.1.7 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
prefix <i>prefix-list-name</i>	Ш
<i>interface</i>	() Ш

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

access-list	Ш
prefix-list	Ш
redistribute	Ш

30.1.8 exit-address-family

exit-address-family

Ш

exit-address-family

г А

```
no
    3
r      4
    3
r      4
    3
r      4
    3
exit3
r      4
```

```
Ruijie(config-router)# address-family ipv4 vrf vpn1
```

RIPv1 RIP RIPv2 三

Г А

Serial 0 RIP ripchain三

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

Г А

ip rip authentication mode	RIP 三
ip rip authentication text-password	RIP 三
key chain	三

30.1.10 ip rip authentication mode

RIP ip rip authentication
mode三 no RIP 三

ip rip authentication mode {text | md5}

no ip rip authentication mode

Г А

text	RIP 三
md5	RIP MD5 三

Г А

三

Г А

三

Г А

RIP RIP RIP 三
RIPv1 RIP RIP RIPv2 三

Г А

Serial 0

RIP

MD5

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

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

Г А

ip rip authentication key-chain	RIP RIPv2
ip rip authentication text-password	RIP

30.1.11 ip rip authentication text-password

RIP

ip rip authentication

text-password

no

```
ip rip authentication text-password password-string
```

```
no ip rip authentication text-password
```

Г А

password-string	1 16

Г А

Г А

Г А

RIP

RIPv1

RIP

RIPv2

Г А

Serial 0

RIP

ruijie

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

```
Ruijie(config-if)# ip rip authentication text-password  
ruijie
```

Г А

ip rip authentication mode	RIP 丕
ip rip authentication key-chain	RIP RIP 丕 RIPv2 RIP 丕

30.1.12 ip rip default-information

default-information 丕 RIP **no** **ip rip** 丕

ip rip default-information only originate [**metric** *metric-value*]

no ip rip default-information

Г А

only	丕
originate	丕
metric <i>metric-value</i>	1-15 丕 m e t r i c

ethernet0/0

⏏

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

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

Г А

default-information originate	RIP

30.1.13 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

ip rip receive enable	RIP
passive-interface	RIP

30.1.16 ip rip send version

RIP

ip rip receive version┐

RIP

no

┐

ip rip send version [1] [2]

no ip rip send version

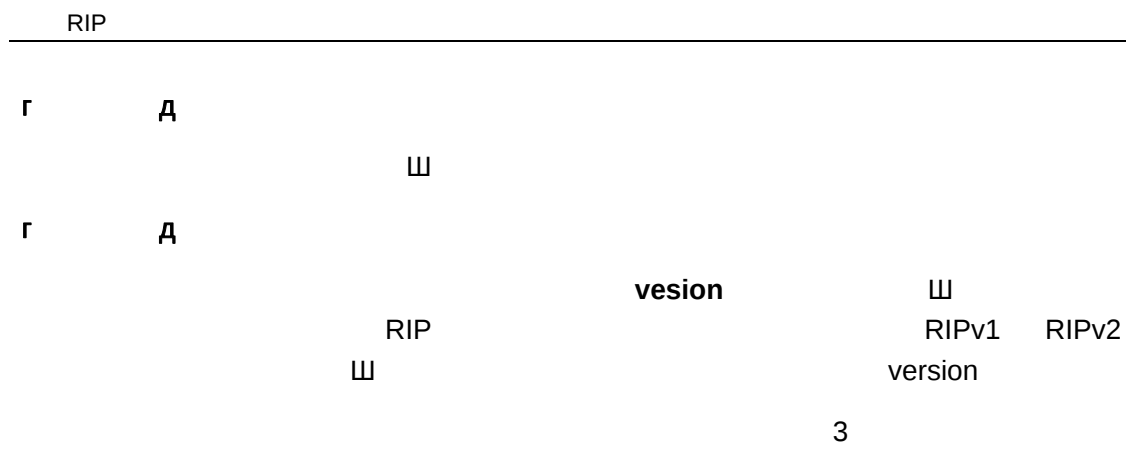
└ A

1	RIPv1 ┐
2	RIPv2 ┐

└ A

version

┐



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

Г А

version	RIP Ш

30.1.18 ip split-horizon (RIP)

RIP

ip split-horizon Ш А 5 " €

auto-summary	RIP

30.1.20 network (RIP)

```

RIP
network <IP> <mask>
no network <IP> <mask>
network <network-number> [<wildcard>]
no network <network-number> [<wildcard>]

```

Г Д

<i>network-number</i>	IP <mask>
<i>wildcard</i>	IP <mask> 0 1

Г Д

Г Д

<mask>

Г Д

```

network-number <wildcard>
RIP <mask>
wildcard <RGOS>
RIP <mask>
RIP <mask>
RIP <mask>

```

Г Д

```

RIP
192.168.12.0/24 172.16.0.0/24 RIP
Ruijie(config)# router rip
Ruijie(config-router)# network 192.168.12.0
Ruijie(config-router)# network 172.16.0.0 0.0.0.255

```

30.1.21 neighbor (RIP)

RIP IP neighbor
no no neighbor
neighbor ip-address
no neighbor

r

A



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

「 A

offset

「 A

」

「 A

RIP offset-list
offset-list RIP offset-list metric

「 A

acl 7 RIP metric 7

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

fastEthernet1/0 acl 8

RIP metric 7

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

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

30.1.23 output-delay

RIP

output-delay no

output-delay delay

no output-delay

「 A

--	--

delay

RIP 512 25
25
└─┘

└─┘ output-delay

└─┘

┌ ──┐

RIP 30

Ruijie(config)# **router rip**

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

30.1.24 passive-interface

passive-interface └─┘ **no**
└─┘

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

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

┌ ──┐

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

┌ ──┐

passive └─┘

┌ ──┐

└─┘

┌ ──┐

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

30.1.25 redistribute RIP

redistribute Ш

no Ш

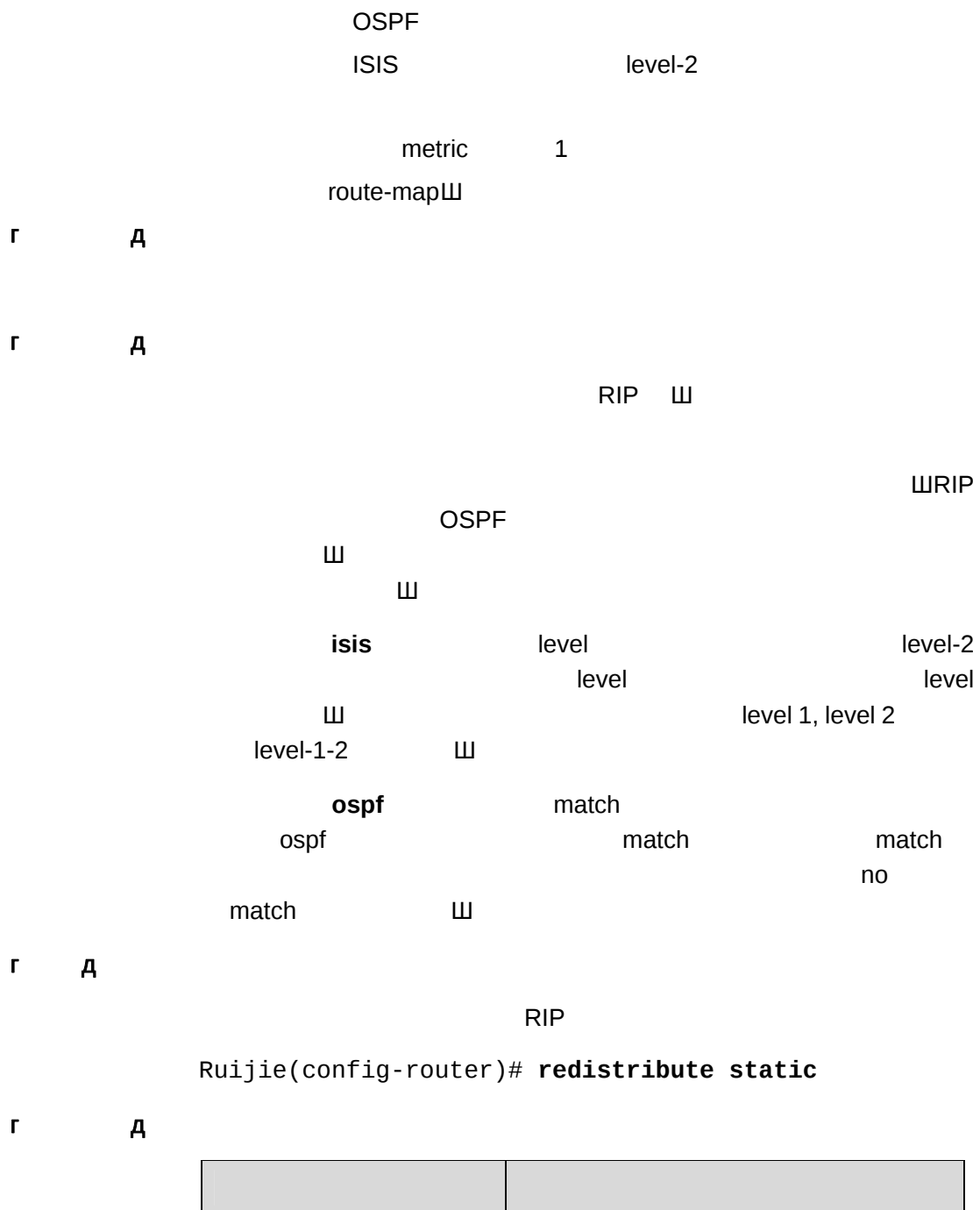
redistribute {**bgp** | **isis** [*process-name*] | **ospf** <1-65535> | **connected** | **static**}[**metric** *value*] [**route-map** *route-map-name*][**match** **internal** | **external** *type* | **nssa-external** *type*]

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
<i>process-name</i>	ISIS
<1-65535>	OSPF

Г Д



```

RIP
  1
  2
  3
  4
  5
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  8
  9
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 97
 98
 99
100

```

Ruijie(config)# **router rip**

```

R
A

```

network (RIP)	RIP

30.1.27 timers basic

```

RIP
timers basic
no
timers basic update invalid flush
no timers basic

```

```

R
A

```

update	update invalid Flush 30
invalid	invalid invalid invalid Invalid 180

30-26

RIP

г А

Ш

г А

Ш

г А

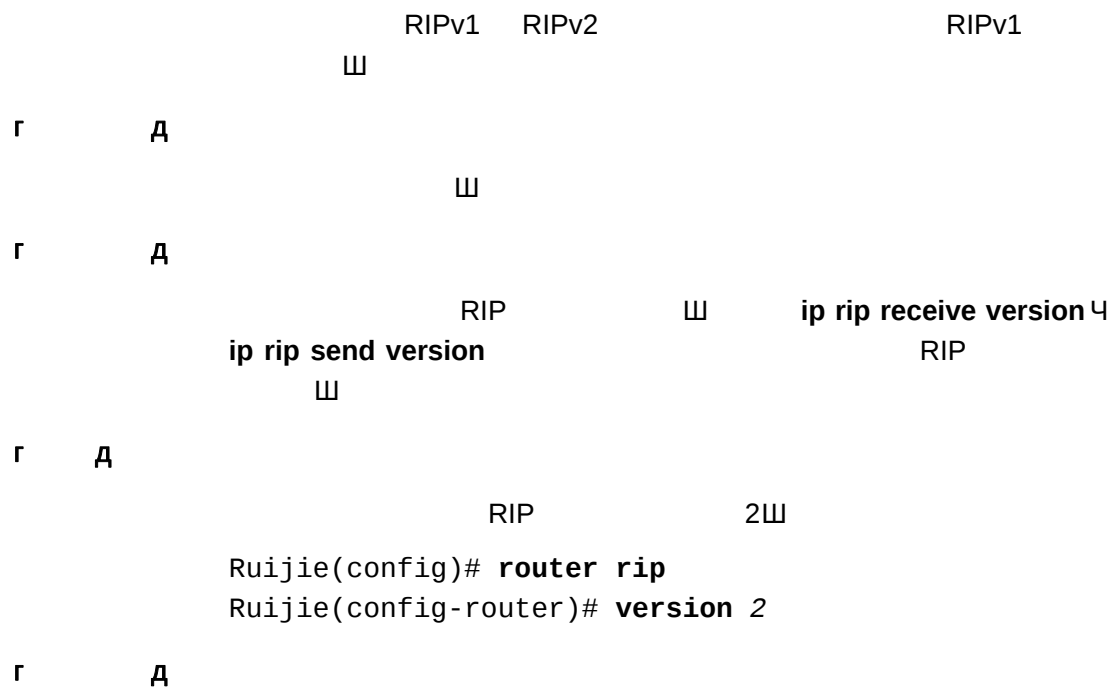
RIP
RIP

IP

Ш

Ш

51Ecc81b[3d403fe>



ip rip receive version	RIP RIP 2
ip rip send version	RIP RIP 2

┌ A

```

                                RIP
                                4      4
                                4 rip  4 metric  distance  4
                                VRF      VRF      VRF-id

```

┌ A

```

                                RIP
                                4
                                4

```

```

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
Outgoing update filter list for all interface is: not
set
Incoming update filter list for all interface is: not
set
Default redistribution metric is 2
Redistributing: connected
Default version control: send version 2, receive version
2
Interface          Send  Recv
FastEthernet 1/1    2     2
FastEthernet 1/0    2     2
Routing for Networks:
192.168.26.0 255.255.255.0
192.168.64.0 255.255.255.0
Distance: (default is 50)

```

vrf RIP

```

Ruijie(config-router)# sh ip rip vrf 1
VRF 1 VRF-id:1
Routing Protocol is "rip"
Sending updates every 30 seconds, next due in 4 seconds
Invalid after 180 seconds, flushed after 120 seconds
Outgoing update filter list for all interface is: not
set
Incoming update filter list for all interface is: not
set
Default redistribution metric is 1
Redistributing:
Default version control: send version 1, receive any
version
Routing for Networks:
Distance: (default is 120)

```

30.2.2 show ip rip database

RIP

show ip rip database

show ip rip database [vrf vrf-name] [network-number {network-mask}]

Г А

vrf vrf-name	VRF RIP
network-number	Ш
network-mask	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	⌵
-------------	---

30.2.3 show ip rip external

RIP

show ip rip external

⌵

show ip rip external [**bgp** | **connected** | **isis** [*process-name*] | **ospf** *<1-65535>* | **static**] [**vrf** *vrf-name*]

r

A

bgp connected isis ospf static	

vrf *vrf-name*

VRF

RIP

show ip rip	Ш

30.2.4 show ip rip interface

RIP

show ip rip interface Ш

show ip rip interface [vrf *vrf-name*]

r A

vrf <i>vrf-name</i>	VRF RIP

r A

Ш

r A

4

4

Ш

r A

r A

RIP

Ш

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

```

Г А

show ip rip	Ш

30.2.5 show ip rip peer

```

RIP      RIP      (RIP      )
      RIP      RIP
      show ip rip peerШ
show ip rip peer [ip-address] [vrf vrf-name]

```

Г А

ip-address	RIP
vrf vrf-name	VRF RIP

Г А

Ш

Г А

Ч

Ч

Ш

Г А

Г А

RIP Ш

Ruijie# **show ip rip peer**

Peer 192.168.3.2:

Local address: 192.168.3.1

Input interface: GigabitEthernet 0/2

Peer version: RIPv1

Received bad packets: 3

Received bad routes: 0

BFD session state up

Г А

show ip rip	Ш

Г А

Г А

31 OSPF

31.1

31.1.1 area

no OSPF 山

area area-id

no area area-id

Г Д

area-id	OSPF IP

Г Д

OSPF 山

Г Д

W

Г Д

no OSPF

area authentication **area default-cost** **area filter-list**

area nssa

W

OSPF

1.

W

W

2.

network area

W

W

Г Д

OSPF 2

```
Ruijie(config)# router ospf 2
```

```
Ruijie(config)# no area 2
```

Г Д

network area	OSPF OSPF

г А
г А

31.1.2 area authentication

OSPF area authentication
no OSPF
area *area-id* authentication [message-digest]
no area

OSPF 0 MD5
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
```

Г А

ip ospf authentication-key	OSPF
ip ospf message-digest-key	OSPF MD5
area virtual-link	

Г А

Г А

31.1.3 area default-cost

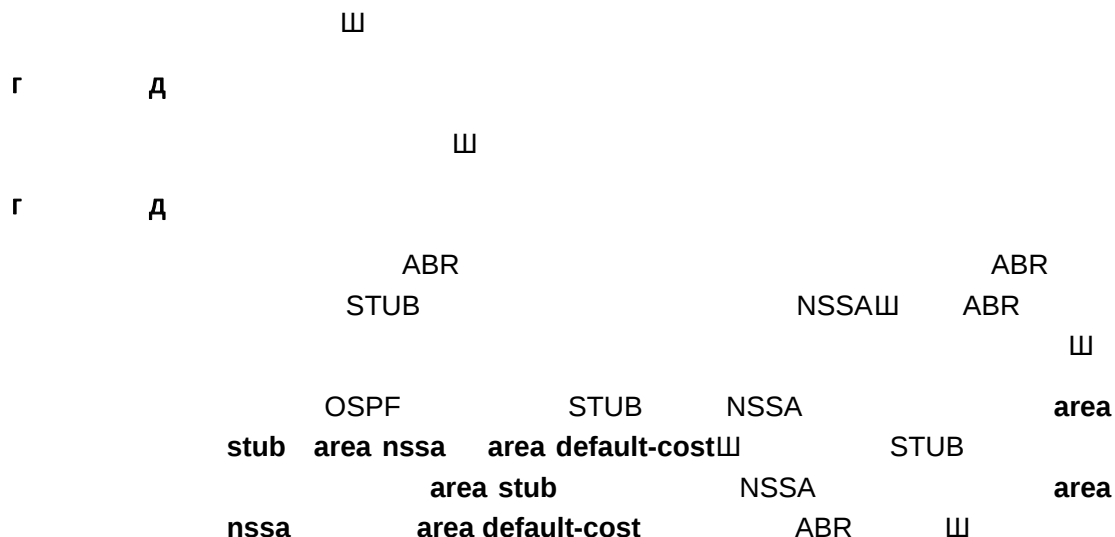
STUB NSSA OSPF
area default-cost no

```
area area-id default-cost cost
no area area-id default-cost
```

Г А

area-id	STUB NSSA
cost	STUB NSSA

Г А



R1 R2

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
```

R1 R2

area stub	OSPF	
area nssa	OSPF	NSSA

R1 R2

R1 R2

31.1.4 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]
```

R1 R2

area-id	NSSA Ⅲ
no-redistribution	ABR nssa Ⅲ
default-information-originate	nssa 7 LSA NSSA ABR ASBR Ⅲ
no-summary	nssa (ABR) LSA nssa Ⅲ

「 A

NSSA Ⅲ

「 A

Ⅲ

「 A

default-information-originate Type-7 LSA
nssa ABR ASBR ABR
Type-7 LSA ASBR (ABR)
Type-7 LSA Ⅲ

no-redistribution ASBR OSPF redistribute
NSSA Ⅲ NSSA
ASBR ABR nssaⅢ

NSSA LSA
ABR no-s mmary ABR NSSA
summary LSAs Type-3 LSA Ⅲ

area default-cost NSSA ABR
Ⅲ NSSA
Ⅲ NSSA 1Ⅲ

「 A

1

Ⅲ

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 nssa
```

Г А

area default-cost	NSSA OSPF Ш

Г А

Г А

31.1.6 area range

OSPF area
range Ш no no cost Ш

area area-id range ip-address net-mask [advertise | not-advertise]
[cost cost]
no area area-id range ip-address net-mask [cost]

Г А

area-id	OSPF Ш IP Ш
ip-address	Ш
advertise not-advertise	
cost cost	Ш

Г А

Ш

RFC1583

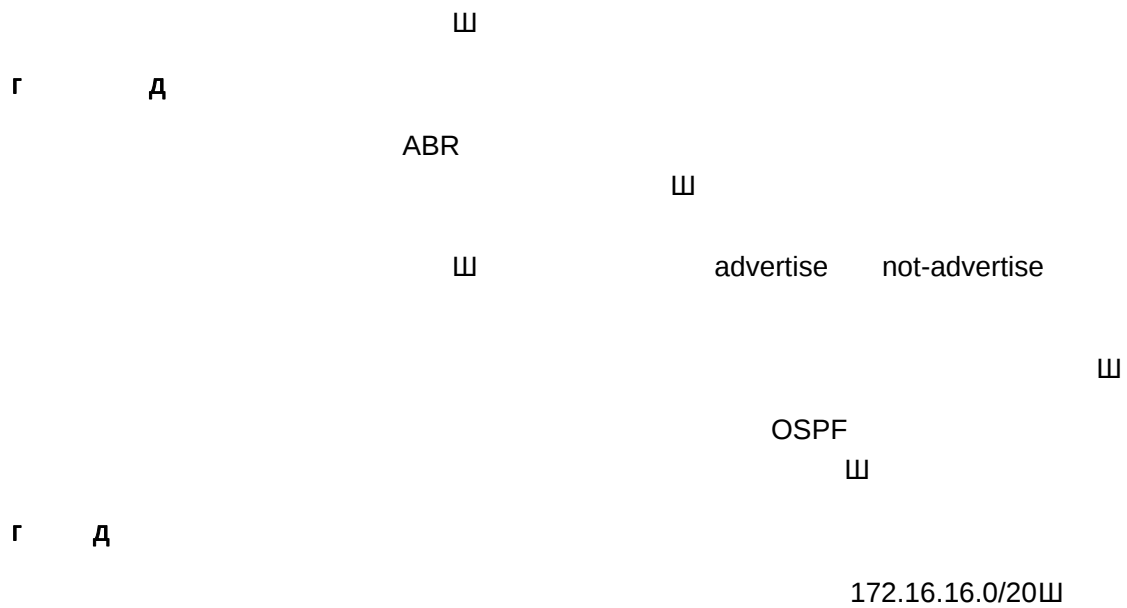
RFC1583

cost

cost

Ш

Г А



```
Ruijie(config)# router ospf 1
Ruijie(config-router)# network
```

```

r      A
      W

r      A
      OSPF
      (LSA) 1 1 1 LSA 2 2
      LSA 3 3 LSA W
      OSPF ABR
      W OSPF W
      ABR area stub
      no-summary W
      ABR W
      OSPF
      default-cost W
      area default-cost ABR
      area stub area
      area stub
      area default-cost
      W

r      A
      1
      W

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

r      A

```

mit-interval *seconds*] [**transmit-delay** *seconds*] [[**authentication-key** *key*] | [**message-digest-key** *key-id md5 key*]]
no area *area-id virtual-link router-id*

r

A

<i>area-id</i>	OSPF Ⅲ IP Ⅲ
<i>router-id</i>	Ⅲ show ip ospf Ⅲ
dead-interval <i>seconds</i>	40 Ⅲ Ⅲ
hello-interval <i>seconds</i>	OSPF Hello 10 Ⅲ Ⅲ
retransmit-interval <i>seconds</i>	OSPF LSA 5 Ⅲ Ⅲ
transmit-delay <i>seconds</i>	OSPF LSA 1 Ⅲ LSA LSA LSA Ⅲ
authentication-key <i>key</i>	OSPF Ⅲ service password-encryption Ⅲ
message-digest-key <i>key-id md5 key</i>	OSPF MD5 Ⅲ MD5 Ⅲ service password-encryption Ⅲ
authentication	Ⅲ

retransmit-interval 5

transmit-delay 1

;

area authentication	OSPF └─┘
show ip ospf	OSPF └─┘

 r A

 r A

31.1.9 auto-cost

no

└─┘

auto-cost [reference-bandwidth *ref-bw*]

no auto-cost [reference-bandwidth]

 r A

--	--

ref-bw

└─┘ Mbps

```
Ruijie(config-router)# auto-cost reference-bandwidth
10
```

```

r      A

```

show ip ospf	ospf

```

r      A

```

```

r      A

```

31.1.10 clear ip ospf process

OSPF ▮

```
clear ip ospf (process-id) process
```

```

r      A

```

<i>process-id</i>	OSPF ▮
	OSPF ▮

```

r      A

```

RFC2328 ▮

```

r      A

```

▮

```

r      A

```

OSPF

```

r      A

```

OSPF 1

```
Ruijie# clear ip ospf 1 process
```

```

r      A

```

```

r      A

```

```

r      A

```

31.1.11 compatible rfc1583

AS

RFC1583

RFC2328

Ш

commpatible rfc1583

no commpatible rfc1583

г А

г А

RFC1583

Ш

г А

Ш

г А

rfc 2328

Ш

Ruijie(config)# **router ospf 1**

Ruijie(config-router)# **no commpatible rfc1583**

г А

show ip ospf	ospf

г А

г А

always	OSPF └┐
metric <i>metric</i>	1└┐
metric-type <i>type</i>	└┐OSPF 1 2 └┐ 1 2 └┐ 2└┐
route-map <i>map-name</i>	route-map , route-map

┌ ┐

└┐

┌ ┐

└┐

┌ ┐

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 └┐

default-information originate

default-metric └┐

OSPF 1 2
└┐

1 1 2 **show ip route**
└┐

STUB └┐

┌ ┐

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 А

show ip ospf database	OSPF Ш
show ip route	IP Ш

г А

г А

31.1.13 default-metric

```
OSPF
default-metric Ш no Ш
default-metric metric
no default-metric
```

г А

metric	OSPF Ш

г А

20 Ш

г А

Ш

г А

```
default-metric redistribute Ш
default-metric default-information originate
OSPF Ш
```

г А

OSPF 50 Ш

```
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 Д

redistribute	Ш
show ip ospf	ospf

Г Д

Г Д

31.1.14 distance ospf

OSPF

```
distance ospf {intra-area <1-255> | inter-area <1-255> | external
<1-255>}
no distance ospf
```

Г Д

intra-area <1-255>	110
inter-area <1-255>	110
external <1-255>	110

Г Д

110Ш

Г Д

OSPF Ш

Г Д

OSPF Ш

Г Д

160

Г	Д
Г	Д
Г	Д

LSA

Г Д

<i>listname</i>	acl
gateway <i>plist-name</i>	gateway
prefix <i>plist-name</i>	prefix-list
interface-type <i>num</i>	LSA

Г Д

W

Г Д

W

Г Д

LSA

SPF

W

OSPF

W

ABR

ASBR

W

Г Д

```
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
```

```
r      A
```

```
r      A
```

```
r      A
```

31.1.16 distribute-list out

redistribute

distribute-list {*listname* | **gateway** *plist-name* | **prefix** *plist-name*} **out**
[bgp | connected | isis *area-tag* | **ospf** *process-id* | **rip** | **static**]
no 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
gateway <i>plist-name</i>	gateway
prefix <i>plist-name</i>	prefix-list
[bgp connected isis <i>area-tag</i> ospf <i>process-id</i> rip static]	

```
r      A
```

⏏

```
r      A
```

⏏

```
r      A
```

```
distribute-list out redistribute route-map
OSPF
redistribute ⏏ACL prefix-list
prefix-list ⏏ACL
```

```
r      A
```

```
Ruijie(config)# router ospf 1
Ruijie(config)# redistribute static subnets
Ruijie(config-router)# distribute-list 22 out static
Ruijie(config-router)# distribute-list prefix jjj
outstatic
% There already has filter configured. Please
re-configure.
```

```
r      A
r      A
r      A
```

31.1.17 enable mib-binding

show ip ospf	OSPF
enable traps	OSPF TRAP

error traps
error traps
ifauthfailure
ifconfigerror

error

lsa	lsa traps lsa traps lsdbapproach overflow lsdboverflow maxagelsa originatelsa L
	31-23

retransmit	retransmit traps retransmit traps iftxretransmit virtiftxretrans mit
-------------------	---

state-change	state-change traps
	state-change traps
	ifstatechange
	nbrstatechange
	virtifstatechange
	virtnbrstatechange

г д

TRAP Ш

г д

Ш

г д

snmp-server enable traps ospf Ш snmp-server

MIB TRAP Ш

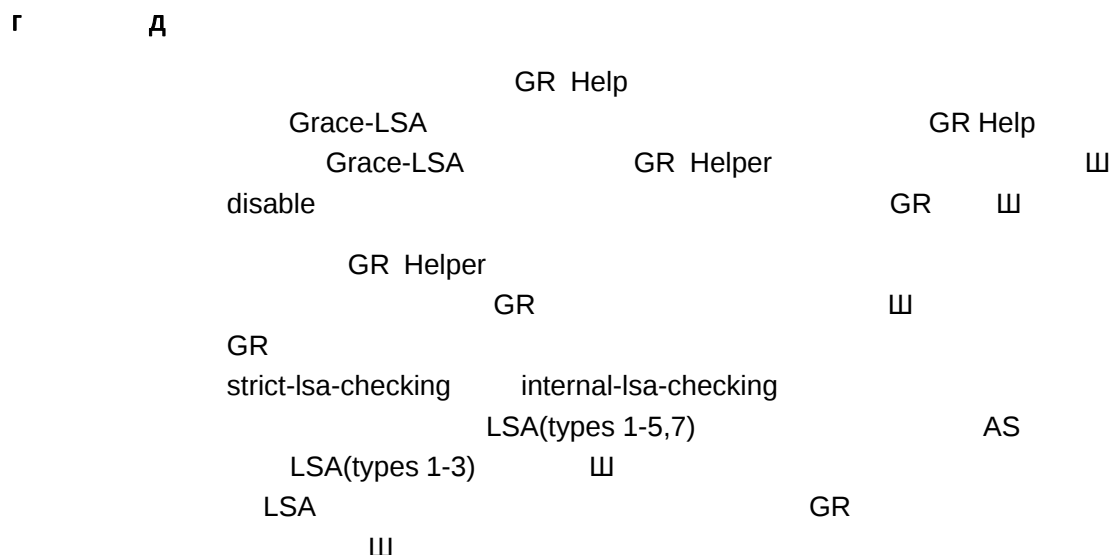
г д

OSPFv2 100 TRAP

```
Ruijie(config)# router ospf 100
Ruijie(config)# enable traps
```

r A

show ip ospf	OSPF		
enable mib-binding	OSPFv2	MIB	i, l •À¼



```

Ruijie(config)# router ospf 1
Ruijie(config-router)# graceful-restart helper disable
Ruijie(config-router)# no graceful-restart helper
disable
Ruijie(config-router)# graceful-restart helper
strict-lsa-checking
  
```

graceful-restart	OSPF

RGOS10.3(5b1),

31.1.20 ip ospf authentication

no

ip ospf authentication [message-digest | null]

no ip ospf authentication

message-digest	MD5	Ш
null	Ш	

г А

Ш

г А

Ш

г А

no

null

Ш

г А

FastEthernet 0/0

OSPF

MD5

Ш

```
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
```

г А

area authentication	OSPF Ш
ip ospf authentication-key	OSPF Ш
ip ospf message-digest-key	OSPF MD5 Ш

г А

г А

31.1.21 ip ospf authentication-key

OSPF
authentication-key Ш

no

Ш

ip ospf

ip ospf authentication-key *key*

no ip ospf authentication-key

r

A

└ A

└ A

31.1.23 ip ospf database-filter all out

LSA

LSA

no

ip ospf database-filter all out

no ip ospf database-filter

└ A

└ A

LSA

W

└ A

W

└ A

LSA

└ A

LSA

serial 1/0

W

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 database-filter all out**

└ A

└ A

31.1.24 ip ospf dead-interval

OSPF

ip

ospf dead-interval W

no

W

ip ospf dead-interval *seconds*

no ip ospf dead-interval

Г А

seconds	Ш

Г А

ip ospf hello-interval

Ш

Г А

Ш

Г А



●

hello

●

Ш

Г А

```

serial 1/0 OSPF
30Ш
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 dead-interval 30
  
```

Г А

ip ospf hello-interval	OSPF Hello Ш

Г А

Г А

31.1.25 ip ospf disable all

```

ospf
    ip ospf disable all
no ip ospf disable all

r      A

r      A
r      A

    10

r      A

    network area
    network      ospf
    OSPF          OSPF

r      A

Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip address 172.16.10.1
255.255.255.0
Ruijie(config-if)# ip ospf disable all

r      A
r      A
r      A

```

31.1.26 ip ospf hello-interval

```

    OSPF      Hello
hello-interval 10 no
ip ospf hello-interval seconds
no ip ospf hello-interval

r      A

seconds      OSPF      hello
r      A

    10
    PPP HDLC      10

```



```

r      A
      MD5
r      A
      OSPF
r      A
      ip ospf message-digest-key
      OSPF
      OSPF
      OSPF
      OSPF
      authentication
      ip ospf authentication
      area
      RGOS
      MD5
      OSPF
      MD5
      OSPF
      OSPF
r      A
      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

```

area authentication	OSPF	Ш
ip ospf authentication		

OSPF

ip ospf network

no

Ш

ip ospf network broadcast non-broadcast point-to-multipoint [non-broadcast] point-to-point

no ip ospf network broadcast non-broadcast point-to-multipoint [non-broadcast] point-to-point

г д

broadcast	OSPF Ш
non-broadcast	OSPF NBMA Ш
point-to-multipoint [non-broadcast]	OSPF , non-broadcast Ш
point-to-point	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

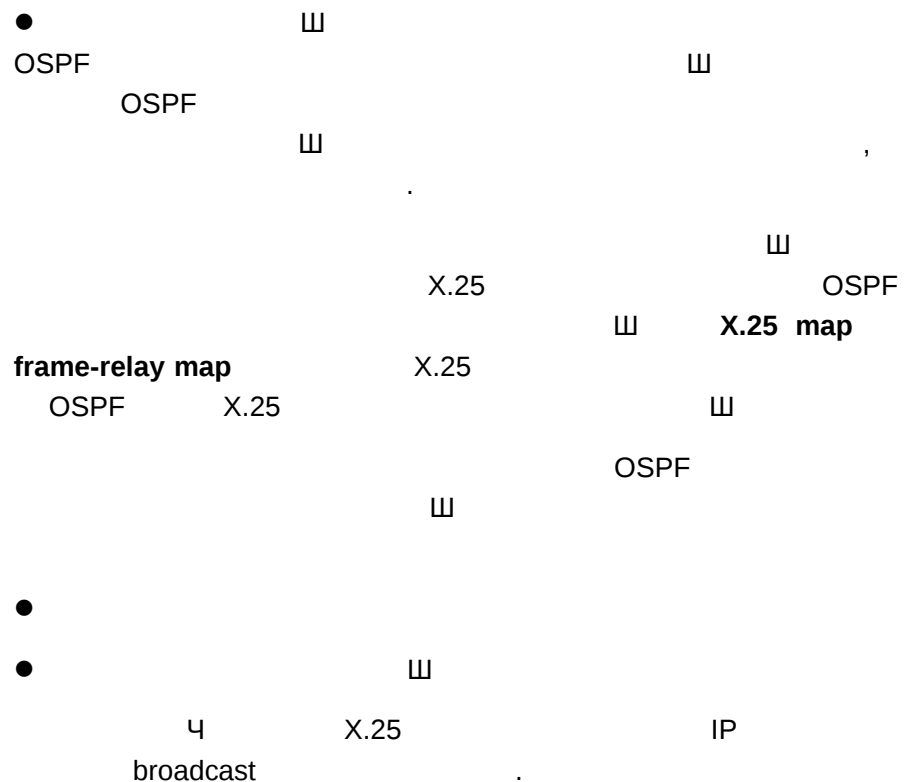
PVC

Ш OSPF NBMA

Designated Router

NBMA

Ш



```
Ruijie(config)# interface Serial1/0
Ruijie(config-if)# ip address 172.16.24.4
255.255.255.0
Ruijie(config-if)# encapsulation frame-relay
Ruijie(config-if)# ip ospf network broadcast
```

```
Ruijie(config)# interface Serial1/0
Ruijie(config-if)# ip address 172.16.24.4
255.255.255.0
Ruijie(config-if)# encapsulation frame-relay
Ruijie(config-if)# ip ospf network point-to-multipoint
```

DR/RDR

```
Ruijie(config)# interface Serial1/0
Ruijie(config-if)# ip address 172.16.24.4 255.255.255.0
Ruijie(config-if)# encapsulation frame-relay
Ruijie(config-if)# ip ospf network broadcast
Ruijie(config-if)# ip ospf priority 0
```

Г А

dialer map ip	IP Ш
frame-relay map	IP DLCI Ш
neighbor OSPF	IP NBMA Ш
X25 map	IP X.25 Ш

Г А

Г А

31.1.30 ip ospf priority

OSPF

ip ospf priorityШ

no Ш

ip ospf priority *priority*

no ip ospf priority

Г А

<i>Priority</i>	OSPF Ш

Г А

Ш

Г А

Ш

Г А

OSPF
DR/BDR

hello

Ш OSPF

DR BDRШ

DR BDRШ

DR

BDRШ

OSPF broadcast

non-broadcast

Ш

~ :

DR BDR
DR BDR .

Г Д

fastethernet 0/0

0Ш

Ruijie(config)# **interface fastethernet**

```

area
virtual-link
retransmit-interval
LSU

```

```

Ruijie

```

```

serial 1/0
LSU
10

```

```

Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip ospf retransmit-interval 10

```

```

Ruijie

```

area virtual-link	OSPF

```

Ruijie

```

```

Ruijie

```

31.1.32 ip ospf transmit delay

```

OSPF
LSU
ip ospf
transmit delay
no

```

```

ip ospf transmit delay seconds
no ip ospf transmit delay

```

```

Ruijie

```

Seconds	OSPF

```

Ruijie

```

```

1

```

```

Ruijie

```

```


```

```

Ruijie

```

```

LSU
LSAs
Age
ip ospf transmit delay

```

```

virtual-link
retransmit-interval
LSU
area

```

RGOS Age 3600 LSA
LSA 11

Г А

serial1/ 0 511

Ruijie(config)# **interface serial 1/0**
Ruijie(config-if)# **ip ospf transmit delay 10**

Г А

area virtual-link	OSPF 11

Г А

Г А

31.1.33 log-adj-changes

no default

11

log-adj-changes [detail]
no log-adj-changes [detail]

Г А

--	--

show ip ospf	ospf 1

1 A

1 A

31.1.34 max-concurrent-dd

DD 1

max-concurrent-dd <1-65535>

1 A

<1-65535>	DD

1 A

5

1 A

1

1 A

OSPF

DD

1

1 A

DD

4

Ruijie(config)# **router ospf 10**

Ruijie(config-router)# **max-concurrent-dd 4**

1 A

1 A

1 A

31.1.35 neighbor

OSPF

neighbor 1

no

1

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

cost]

no neighbor *ip-address*

Г А

<i>ip-address</i>	IP Ш
poll-interval <i>seconds</i>	ШNon-broadcast(NBMA) 120 Ш
priority <i>priority</i>	Non-broadcast(NBMA) Ш
Cost <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

Г Д

ip ospf priority	OSPF Ш
ip ospf network	OSPF

Г Д

Г Д

31.1.36 network area

OSPF OSPF
network area Ш no OSPF Ш

network *ip-address wildcard* **area** *area-id*
no network *ip-address wildcard* **area** *area-id*

Г Д

<i>ip-address</i>	IP Ш
<i>wildcard</i>	IP Д

```

0 1 172.16.16.0  IP
192.168.12.0/24      1  IP
172.16.16.0/20      172.16.16.0
0  IP

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

```

г А

router ospf	OSPF IP

г А

г А

31.1.37 overflow database

OSPF LSA IP

```

overflow database <0-4294967294> hard | soft
no overflow database

```

г А

<1-4294967294>	LSA
hard soft	hard LSA OSPF soft LSA IP

г А

г А

IP

г А

OSPF hard OSPF
soft

г А

LSA 10 OSPF 10 Ⅲ

```
Ruijie# config terminal
Ruijie(config)# router ospf 10
Ruijie(config-router)# overflow database 10 hard
```

└ A

└ A

└ A

31.1.38 overflow database external

external LSA

Ⅲ

overflow database external *max-dbsize wait-time*
no overflow database external

└ A

<i>max-dbsize</i>	external lsa AS 0-2147483647Ⅲ
<i>wait-time</i>	0-65535Ⅲ

└ A

external-LSA Ⅲ

external-LSA external-LSA

Ⅲ

└ A

Ⅲ

└ A

└ A

external-LSA *max-dbsize*

external-LSA

external-LSAⅢ

wait-time

external-LSAⅢ

```
Ruijie# config terminal
Ruijie(config)# router ospf 10
Ruijie(config-router)# overflow database external 10 3
```

```

r      A
r      A
r      A

```

31.1.39 overflow memory-lack

```

                                OSPF      OVERFLOW      W
no                                W
overflow memory-lack
no overflow memory-lack

```

```

r      A

```

no	OSPF OVERFLOW W

```

r      A

```

```

                                OSPF      OVERFLOW      W

```

```

r      A

```

```

                                W

```

```

r      A

```

```

OSPF      OVERFLOW
                                W
                                OSPF      OVERFLOW
                                W
                                NULL
                                OVERFLOW      W
                                clear ip ospf process
                                OSPF      OSPF
OVERFLOW      W
no      OSPF      OVERFLOW
                                OSPF
                                W

```

```

r      A

```

```

OSPF      OVERFLOW
Ruijie# config terminal
Ruijie(config)# router ospf 10
Ruijie(config-router)# no overflow memory-lack

```

```

r      A

```

--	--

clear ip ospf process	OSPF
show ip protocols ospf	OSPF

Г А

Г А

31.1.40 passive-interface

Ш

no Ш

passive-interface [default | *type number*]

no passive-interface [default | *type number*]

Г А

<i>type number</i>	Ш
default	Ш

Г А

, OSPF

Г А

Ш

Г А

Ш

Г А

serial 1/0 Ш

Ruijie(config)# **router ospf 30**

Ruijie(config-router)# **passive-interface serial1/0**

Г А

show ip ospf interface	

Г А

Г А

	BGP	metric 1	LSA
metric 20			
isis	level		level-2
	level		level
┌┐			level 1, level 2
level-1-2	┌┐	┌┐	
ospf	match		
ospf	match		match
			no
match	┌┐	┌┐	
	route-map	route-map	match
		OSPF	ISIS
	match	level	route-map
┌┐			

r A

OSPF

```

Ruijie(config-router)# redistribute static subnets
Ruijie(config)# router ospf 1
Ruijie(config-router)# redistribute ospf 2 subnets
Ruijie(config-router)# redistribute ospf 2 match
external 1 internal
Ruijie(config-router)# redistribute isis isis-001
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

31.1.42 router ospf

	OSPF		router ospf┌┐
no	OSPF	┌┐	
router ospf <i>process-id</i> [vrf <i>vrf-name</i>]			
no router ospf <i>process-id</i>			

Г Д

<i>process-id</i>	ospf
<i>vrf-name</i>	OSPF VRF VRF

Г Д

OSPF Ш

Г Д

Ш

Г Д

RGOS10.1 ospf Ш
ospf Ш

Г Д

vrf vpn_1 OSPF 10 Ш

Ruijie(config)# **router ospf 10 vrf vpn_1**

Г Д

show ip protocols	Ш
show ip ospf	ospf Ш

Г Д

Г Д

31.1.43 router-id

ID, no Router
ID Router ID Ш

router-id router-id

no router-id

Г Д

<i>router-id</i>	ID, IP Ш

```

Ruijie# show ip protocols
  OSPF
    ip
  summary-address
  loopback
  router-id 0.0.0.36

```

```

Ruijie(config)# router ospf 20
Ruijie(config-router)# router-id 0.0.0.36

```

show ip protocols	

```

Ruijie#
Ruijie#

```

31.1.44 summary-address

```

OSPF
summary-address
  no
summary-address ip-address net-mask [not-advertise | tag
<0-4294967295> | ]

```

ip-address	IP
net-mask	
not-advertise	

```

Ruijie#

```

```

r      A
      W

r      A
      W

      OSPF
      OSPF      W

      W

      area rang      area range      OSPF
summary-address      OSPF      W

      NSSA      summary-address      NSSA      ABR
      W

r      A

      100.100.0.0/16W

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
  
```

r A

area range	OSPF W

r A

r A

31.1.45 timers lsa-group-pacing

```

      LSA
      no      W

timers lsa-group-pacing seconds
no timers lsa-group-pacing
  
```

r A



<i>spf-delay</i>	OSPF	SPF	Ш
		SPF	Ш
<i>spf-holdtime</i>	Ш	SPF	

Г А

Г А

31.1.47 timers throttle spf

OSPF SPF 4

SPF 4

timers throttle spf 4 no 4

timers throttle spf *spf-delay spf-holdtime spf-max-waittime*

no timers throttle spf

Г А

<i>spf-delay</i>	SPF 1-600000 4 OSPF SPF 4 spf-delay 4
<i>spf-holdtime</i>	SPF 1-600000 4
<i>spf-max-waittime</i>	SPF 1-600000 4

Г А

spf-delay 1000

spf-holdtime 5000

spf-max-waittime 10000 4

Г А

4

Г А

spf-delay SPF 4

SPF SPF

spf-holdtime SPF

spf-max-waittime 4

SPF SPF

spf-holdtime 4

spf-delay *spf-holdtime*

spf-max-waittime SPF

4

	timers spf		SPF
		timers throttle spf	SPF ⏏
	~	:	
1	spf-holdtime spf-delay	spf-delay	spf-holdtime
2	spf-max-waittime	spf-holdtime spf-holdtime ⏏	spf-max-waittime
3	timers throttle spf	timers spf	⏏
4	timers spf		

OSPF

show ip ospf

show ip ospf [*process-id*]

r A

<i>process-id</i>	ospf

r A

W

r A

W

r A

OSPF

W

r A

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",
      0 -1.4457 7126 area cnform

```

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)

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

III



Incomming current DD exchange neighbors	incomming exstart
Outgoing current DD exchange neighbors	outgoing exstart
Number of external LSA	LSA
External LSA Checksum Sum	LSA
Number of opaque LSA	opaque-LSA
Opaque LSA Checksum Sum	opaque-LSA
Number of non-default external LSA	external-LSA
External LSA database limit	external-LSA
Exit database overflow state interval	overflow
Database overflow state	OSPF overflow
Number of LSA originated	LSA
Number of LSA received	LSA
Log Neighbor Adjency Changes	
Number of areas attached to this router	

Area type

,

NSSA Translator State	NSSA LSA LSA OSPF	External ABR
BFD is enabled	OSPF	BFD

r A

r A

31.2.2 show ip ospf border-routers

ABR/ASBR OSPF

show ip ospf border-routers

show ip ospf [process-id] border-routers

r A

process-id	ospf

r A

W

r A

W OSPF ABR ASBR OSPF
show ip route OSPF
 OSPF W

r A

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

W

Codes	W i I W
I	W

1.1.1.1	OSPF	W
[2]	cost	W
via 10.0.0.1		W
FastEthernet 0/1		W
ABR, ASBR	ASBR	ABR ASBRW
Area 0.0.0.1		W
select	ASBR	select
	W	

r A

r A

31.2.3 show ip ospf database

OSPF

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*]

show ip ospf [*process-id* *area-id*] **database** [**asbr-summary**]
[*link-state-id*] [**self-originate**]

show ip ospf [*process-id* *area-id*] **database** [**external**] [*link-state-id*]

show ip ospf [*process-id* *area-id*] **database** [**external**] [*link-state-id*]
[**adv-router** *ip-address*]

show ip ospf [*process-id* *area-id*] **database** [**external**] [*link-state-id*]
[**self-originate**]

show ip ospf [*process-id* *area-id*] **database** [**nssa-external**]
[*link-state-id*]

show ip ospf [*process-id* *area-id*] **database** [**nssa-external**]
[*link-state-id*] [**adv-router** *ip-address*]

show ip ospf [*process-id* *area-id*]**database** [**nssa-external**]
[*link-state-id*] [**self-originate** | **maxage**]

show ip ospf [*process-id* *area-id*]**database** [**database-summary**]

r A

Area-id

adv-router

link-state-id

nssa-external	OSPF ↳
opaque-area	LSA
opaque-as	LSA
opaque-link	LSA
database-summary	OSPF LSA

г А

↳

г А

↳

г А

OSPF

↳

OSPF

↳

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 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 ▯
LS age	▯
Options	▯
LS Type	▯
Link State ID	▯
Advertising Router	▯
LS Seq Number	▯
Checksum	▯

Length	3
Network Mask	255.255.255.0
TOS	TOS 0
Metric	20

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

3

Length	32
Network Mask	24
Metric Type	1
TOS	TOS 0
Metric	1
Forward Address	0.0.0.0
External Route Tag	0

show ip ospf database network

Ruijie# **show ip ospf database network**

OSPF Router with ID (1.1.1.1) (Process ID 1)

Network Link States (Area 0.0.0.0)

LS age: 572

Options: 0x2 (*|---|E|)

LS Type: network-LSA

Link State ID: 192.88.88.27 (address of Designated Router)

Advertising Router: 1.1.1.1

LS Seq Number: 80000001

Checksum: 0x5366

Length: 32

Network Mask: /24

Attached Router: 1.1.1.1

Attached Router: 3.3.3.3

show ip ospf database network

OSPF Router with ID	OSPF
Network Link States	1
LS age	1
Options	1
LS Type	1

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	▯
Options	
Flag	router
LS Type	▯

Link State ID	▯
Advertising Router	▯
LS Seq Number	▯
Checksum	▯
Length	▯
Network Mask	▯
TOS	TOS 0▯
Metric	▯

show ip ospf databa]unssa exutena

Options	W
LS Type	W
Link State ID	W
Advertising Router	W
LS Seq Number	W
Checksum	W
Length	W
Network Mask	W
Metric Type	W
TOS	TOS 0W
Metric	W
NSSA:Forward Address	W 0.0.0.0 IP W
External Route Tag	W OSPF 32 OSPF W

show ip ospf database external

```

Ruijie# show ip ospf database external
OSPF Router with ID (1.1.1.1) (Process ID 1)
AS External Link States
LS age: 1290
Options: 0x2 (*|-|-|-|-|E|-)
LS Type: AS-external-LSA
Link State ID: 20.0.0.0 (External Network Number)
Advertising Router: 1.1.1.1 ExtMask: / 0.xternal-LSA than any l1.

```

OSPF Router with ID	OSPF
Type-7 AS External Link States	
LS age	
Options	
LS Type	
Link State ID	
Advertising Router	
LS Seq Number	
Checksum	
Length	
Network Mask	
Metric Type	
TOS	TOS
Metric	
Forward Address	IP
External Route Tag	32

show ip ospf database database-summary

Ruijie# **show ip ospf database database-summary**

OSPF process 1:

Router Link States : 4

Network Link States : 2

Summary Link States : 4

ASBR-Summary Link States : 0

AS External Link States : 4

NSSA-external Link States: 2

show ip ospf database database-summary

OSPF Process	
Router Link	OSPF LSA Ⅲ
Network Link	OSPF LSA Ⅲ
Summary Link	OSPF LSA Ⅲ
ASBR-Summary Link	OSPFASBR LSA Ⅲ
AS External Link	OSPF LSA
NSSA-external Link	,OSPF NSSA LSA

1. 配置 OSPF 进程 ID
 2. 配置 OSPF 接口

31.2.4 show ip ospf interface

1. 查看 OSPF 接口信息
show ip ospf interface

show ip ospf interface [*interface-type interface-number*]

1. 配置 OSPF 进程 ID

<i>interface-type</i>	Ⅲ
<i>interface-number</i>	Ⅲ

2. 配置 OSPF 接口

Ⅲ

3. 配置 OSPF 进程 ID

Ⅲ

4. 配置 OSPF 接口

OSPF

OSPF

Ⅲ

5. 配置 OSPF 进程 ID

show ip ospf interface FastEthernet 1/0

Ruijie# **show ip ospf interface fa 1/0**

FastEthernet 1/0 is up, line protocol is up

Internet Address 192.88.88.27/24, Ifindex 4, Area
0.0.0.0, MTU 1500
Matching network config: 192.88.88.0/24
Process ID 1, Router ID 1.1.1.1, Network Type

FastEthernet 0/0 State	Down	UP	⏏
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	Retransmit	Hello	Dead Wait
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	

Г А neighbor-dh(T/T3 1 Tf12.7143 2 TD0 Tc<02c409c345dd02c51c122f0e1 04 re.0022 4d8

Г А

31.2.5 show ip ospf neighbor

OSPF show ip ospf neighbor

show ip ospf [process-id] neighbor [[detail] | [[interface-type interface-number] [neighbor-id]]]

Г А

detail	
interface-type	Pts
interface-number	

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	Ⅲ
Pri	DR
State	
Dead Time	Dead
Address	
Interface	
interface address	
In the area	
via interface	Ⅲ

Neighbor priority

OSPF

Ⅲ

BDR	(Hello BDR)
Options	Hello E 0

Ш

Г А

Г А

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	
100.0.0.0/24	Ш
[1]	cost
via	

Г А

Г А

Г А

31.2.7 show ip ospf summary-address

OSPF

show ip ospf summary-addressШ

show ip ospf summary-address

Г А

Ш

Г А

Ш

Г А

Ш

г д

NSSA ABR

Ш

г д

show ip ospf summary-address

Ruijie# **show ip ospf summary-address**

▮

└ 4

▮show ip ospf neighbor

▮

└ 4

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

▮



32

32.1

32.1.1 distribute-list in

distribute-list in **no**

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>	
prefix <i>prefix-list-name</i>	
gateway <i>prefix-list-name</i>	
<i>interface-type</i> <i>interface-number</i>	()

Г А

Г А

Г А

OSPF OSPF OSPF

Г А

RIP Fastethernet 0/0
172.16

```
router rip
network 200.168.23.0
distribute-list 10 in fastethernet 0/0
no auto-summary
!
access-list 10 permit 172.16.0.0 0.0.255.255
```

Г

А



Ш

OSPF

OSPF Ш

Г Д

RIP 192.168.12.0/24 Ш

```

router rip
network 200.4.4.0
network 192.168.12.0
distribute-list 10 out
version 2
access-list 10 permit 192.168.12.0

```

Г Д

access-list	
prefix-list	
redistribute	

32.1.3 ip community-list

Ш no Ш

ip community-list {[**standard** | **expanded**] *community-list-name* | *community-number* } {**permit** | **deny**} [*community-number*]

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

Г Д

<i>community-list-name</i>	32 Ш
standard	1..99
expanded	100
permit	
deny	

	Ⅲ) internet	AA:NN(Internet Ⅲ	/2 EBGP
<i>community-number</i>	no-export peersⅢ no-advertise BGP peersⅢ local-as		AS
	 1..255	Ⅲ Ⅲ	

no ip default-network network

Г Д

network	Ш

Г Д

0.0.0.0/0Ш

Г Д

Ш

Г Д

default-network

Ш

“*”

Ш

connected

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

Г Д

Ш

32.1.5 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** *de70.0022 Tc[Jj/TT5 1 Tf0.Tc0-5.2(64j/ Tf0.2 4 TfTw(Tj/TT14 1 Tf1.44 0 TD-C*

	minimum-prefix-length	maximum-prefix-length	ip-prefix
4	minimum-prefix-length	maximum-prefix-length	
ip-prefix	< minimum-prefix-length < maximum-prefix-length <=		
32			

1
 2

```

    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

```

32.1.6 ip prefix-list description

	ip prefix-list description	
no		

ip prefix-list *prefix-lis-name* description *descripton-text*

1
 2

<i>prefix-lis-name</i>	
<i>descripton-text</i>	

1
 2

1
 2

1
 2

1
 2

```

    OSPF
    RIP
    IP
    IP 201.1.1.0/24
  )

```

Ruijie# configure terminal

```
Ruijie(config)# ip prefix-list pre description Deny
routes from Net-A
```

32.1.7 ip prefix-list sequence-number

```

                                     ip prefix-list description  11
                                     11
no                                     11
ip prefix-list sequence-number

r      A

r      A

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
```

32.1.8 ip route

```

                                     ip route11      no
                                     11

ip route [vrf vrf_name] network net-mask {ip-address | interface
[ip-address]} [distance] [tag tag] [permanent] [weight number] [disable |
enable]
```

r A

vrf_name	VRF
network	

<i>net-mask</i>	
<i>ip-address</i>	
<i>interface</i>	
<i>distance</i>	
<i>tag</i>	Tag
permanent	
<i>number</i>	
disable/enable	

г

А

Ш

г

А

Ш

г

А

1

Ш

Ш

OSPF

125

OSPF

110

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

```

172.16.100.0/24
192.168.12.1      115
ip route 172.16.100.0 255.255.255.0 192.168.12.1 115

      172.16.100.0/24
      fastethernet 0/0
ip route 172.16.100.0 255.255.255.0 fastethernet 0/0
192.168.12.1

```

г д

show ip route	IP 172.16.100.0/24

32.1.10 ip static route-limit

The diagram illustrates the configuration of the `ip static route-limit` command. It includes a table for the command's syntax and a sequence of steps for configuring it.

no	
<code>ip static route-limit</code>	<code>number</code>
<code>ip static route-limit</code>	<code>number</code>

1000

show running config

900

`ip static route-limit 900`

32.1.11 ipv6 prefix-list

	IPv6	ipv6
prefix-list	⏏	⏏
ipv6 prefix-list <i>prefix-lis-name</i> [seq <i>seq-number</i>] { deny permit } <i>ipv6-prefix</i> [ge <i>minimum-prefix-length</i>] [le <i>maximum-prefix-length</i>] no ipv6 prefix-list <i>prefix-lis-name</i> [seq <i>seq-number</i>] { deny permit } <i>ipv6-prefix</i> [ge <i>minimum-prefix-length</i>] [le <i>maximum-prefix-length</i>]		

<i>prefix-lis-name</i>	Ш
<i>seq-number</i>	Ш 1 2147483647Ш Ш 5 5
deny	
permit	

```

                                RIP
                                OSPF
                                IPv6
                                IP
                                2222::/64
                                (
                                )

```

```

Ruijie# configure terminal
Ruijie(config)# ipv6 prefix-list pre permit 2222::/64
Ruijie(config)# ipv6 router rip
Ruijie(config-router)# distribute-list prefix pre out
ospf
Ruijie(config-router)# end

```

32.1.12 ipv6 prefix-list description

```

                                IPv6
                                description
                                no
                                ipv6 prefix-list
                                description
                                description-text
                                ipv6 prefix-list prefix-lis-name

```

```

r      d

```

prefix-lis-name	IPv6
descripton-text	IPv6

```

r      d

```

```

r      d

```

```

r      d

```

```

r      d

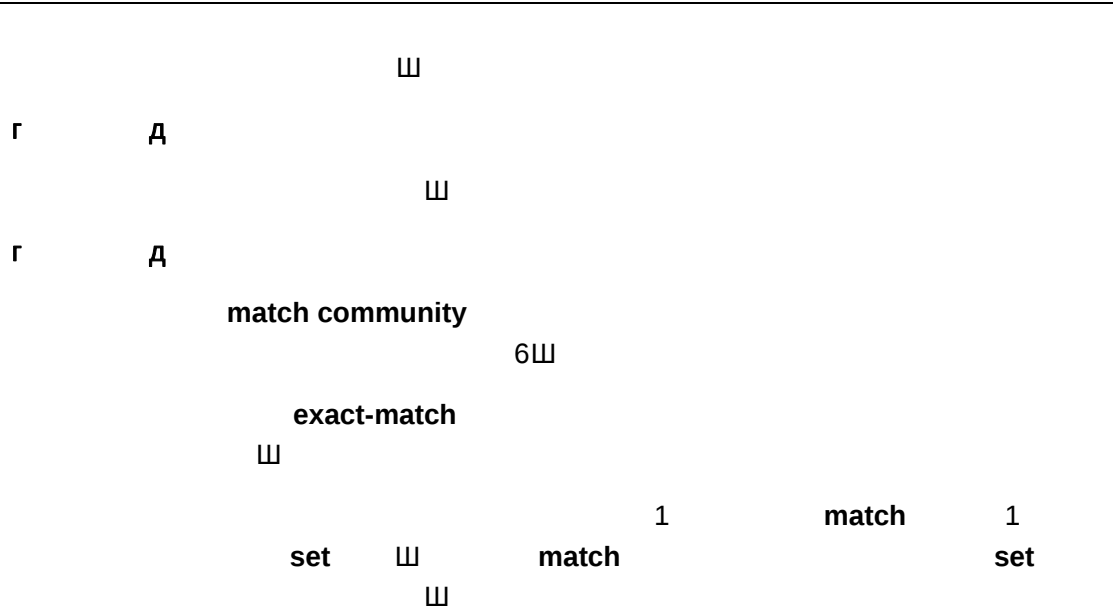
```

```

                                OSPF
                                RIP
                                IP
                                201.1.1.0/24
                                (
                                )

```

IPv6



```
ip community-list 1 permit 100:2 100:30
route-map set_lopref
match community 1 exact-match
set local-preference 20
```

match as-path	AS_PATH
match metric	
match origin	
set as-path prepend	AS_PATH
set metric	
set metric-type	

32.1.16 match interface



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

┌ ┐
 ┌

┌ ┐
 ┌

┌ ┐
 ┌

 match interface ┌

 OSPF RIP ┌ RIP

 OSPF ┌

 route maps

 ┌

 1 match 1

 set ┌ match

 RIP

match ip route-source	
match metric	
match route-type	
match tag	
set metric	
set metric-type	
set tag	

Г А

Г А

32.1.17 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>	
prefix-list <i>prefix-list-name</i>	

Г А



Г А



Г А

match ip address 

OSPF

IP

OSPF
Ш

RIP

Ш

Ш

RIP

set tag	

Г А

Г А

32.1.18 match ip next-hop

IP

match ip next-hop  **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...*]}

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>	
prefix-list <i>prefix-list-name</i>	

Г А



Г А



Г А

match ip next-hop 

OSPF
OSPF

IP

OSPF 


route maps


RIP






RIP

```

1
match 1
set 1
match 1
set 1

```

Г А

```

OSPF 10 20 OSPF
RIP 10 20 RIP
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

access-list	
match ip address	
match interface	
match ip route-source	
match metric	
match route-type	
match tag	
set metric	
set metric-type	
set tag	

Г А

Г А

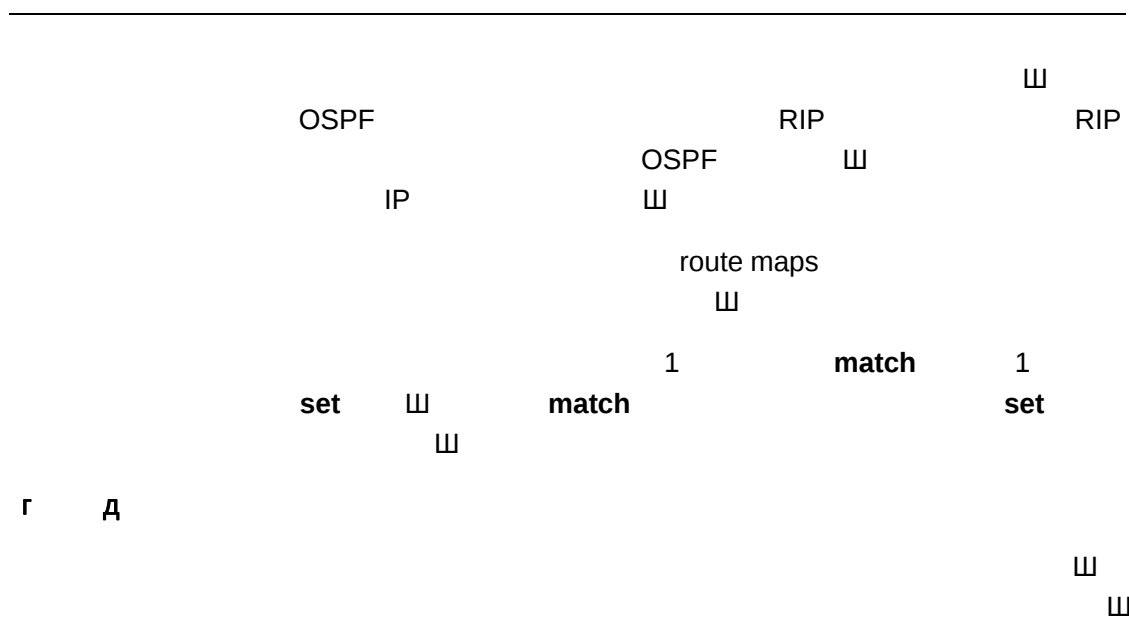
32.1.19 match ip route-source

```

IP
match ip route-source 10 20
no
match ip route-source {access-list-number [access-list-number... |

```

access-list-name...] | *access-list-name* [*access-list-name*



Г А

```

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 А

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	

Г Д
Г Д

32.1.21 match ipv6 next-hop

IPv6
match ipv6 address Ш no
Ш
match ipv6 next-hop { *access-list-name* | **prefix-list** *prefix-list-name* }
no match ipv6 next-hop

Г Д

	А
--	---

	OSPF	RIP
10	RIP	

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	

Г А

Г А

32.1.23 match length

length IP match
no

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

Ш

Г А

Ш

Г А

Ш

Ш

1

W

W

W

Г Д

serial 1/0

500

fastethernet 1/0

W

```
interface fastethernet 1/0
ip policy route-map smallpak
```

```
route-map smallpak permit 10
match length 0 500
set interface fastethernet 0/0
```

Г Д

route-map	
match ip address	
set default interface	
set interface	
set ip default next-hop	IP
set ip next-hop	IP
set ip precedence	IP

32.1.24 match metric

match metric

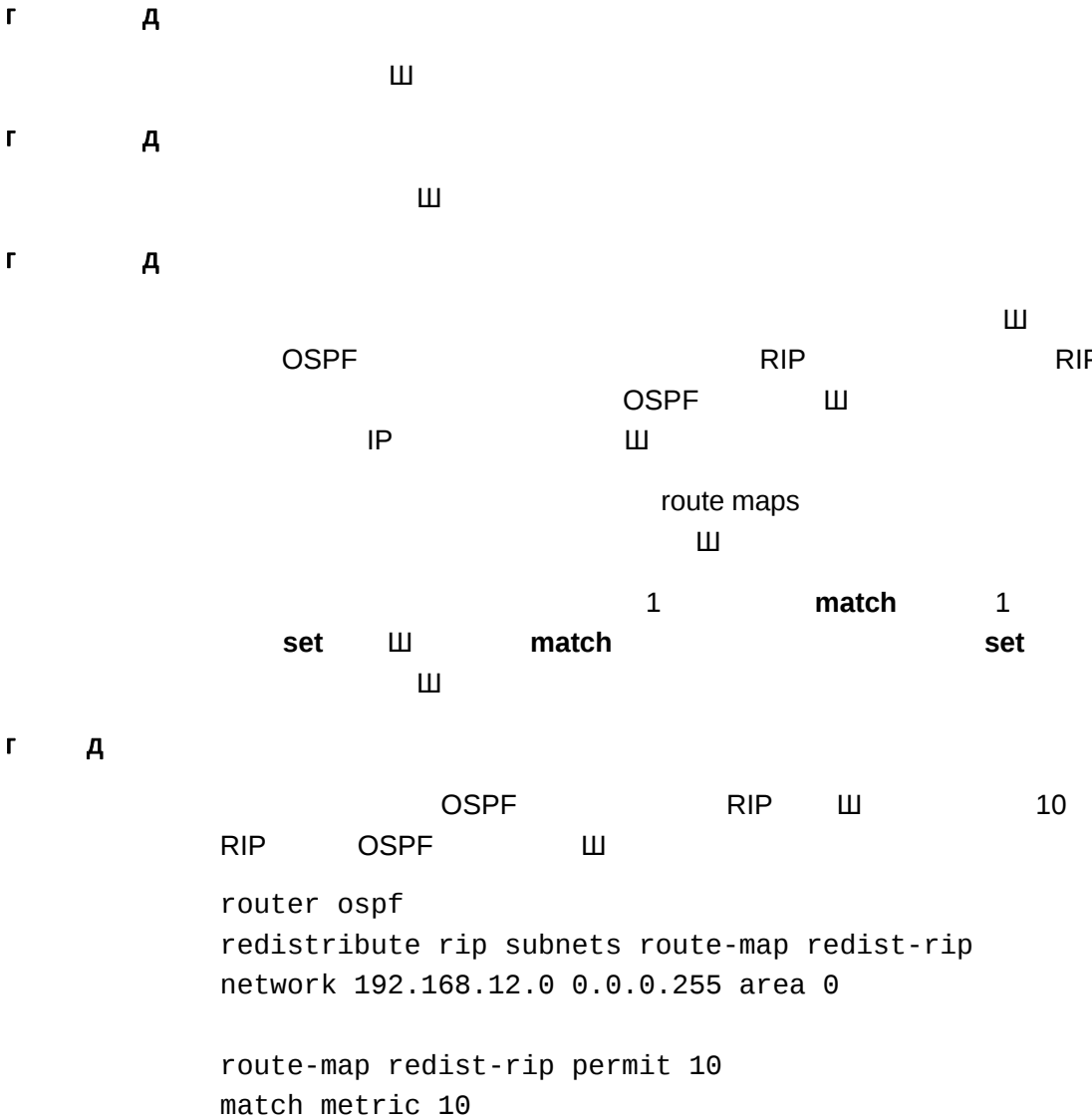
no W**match metric** *metric*

no match metric

Г Д

--	--

<i>Metric</i>	0-4294967295
---------------	--------------



access-list	
match ip address	
match interface	
match ip next-hop	
match ip route-source	
match route-type	
match tag	

set metric	
set metric-type	
set tag	

Г Д

Г Д

32.1.25 match origin

match

origin ☐ no ☐

match origin {egp | igp | incomplete}

no match origin {egp | igp | incomplete}

Г Д

egp	EGP
igp	IGP
Incomplete	

Г Д

☐

Г Д

☐

Г Д

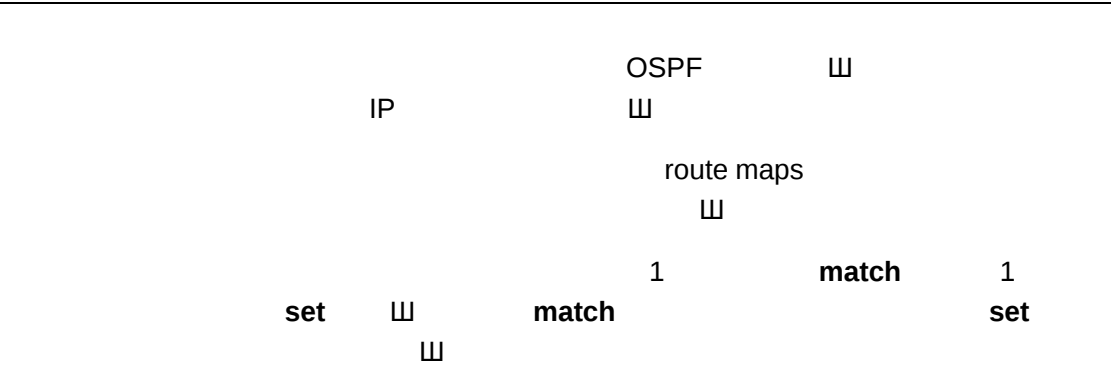
☐

☐

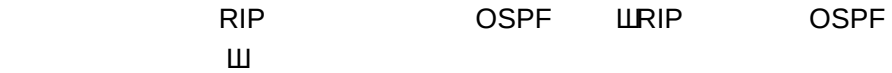
Г Д

```
route-map MY_MAP 10 permit
match origin egp
set community 109
```

```
route-map MAP20 20 permit
match origin incomplete
set community no-export
```

Г Д



```
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	

Г Д

Г Д

32.1.27 match tag

match ip address	
match interface	
match ip route-source	
match metric	
match ip next-hop	
match route-type	
set metric	
set metric-type	
set tag	

Г Д

Г Д

32.1.28 maximum-paths

maximum-paths

no

maximum-paths *number*

no maximum-paths *number*

Г Д

<i>number</i>	1-32

Г Д

32

Г Д

Г Д

maximum-paths

show running

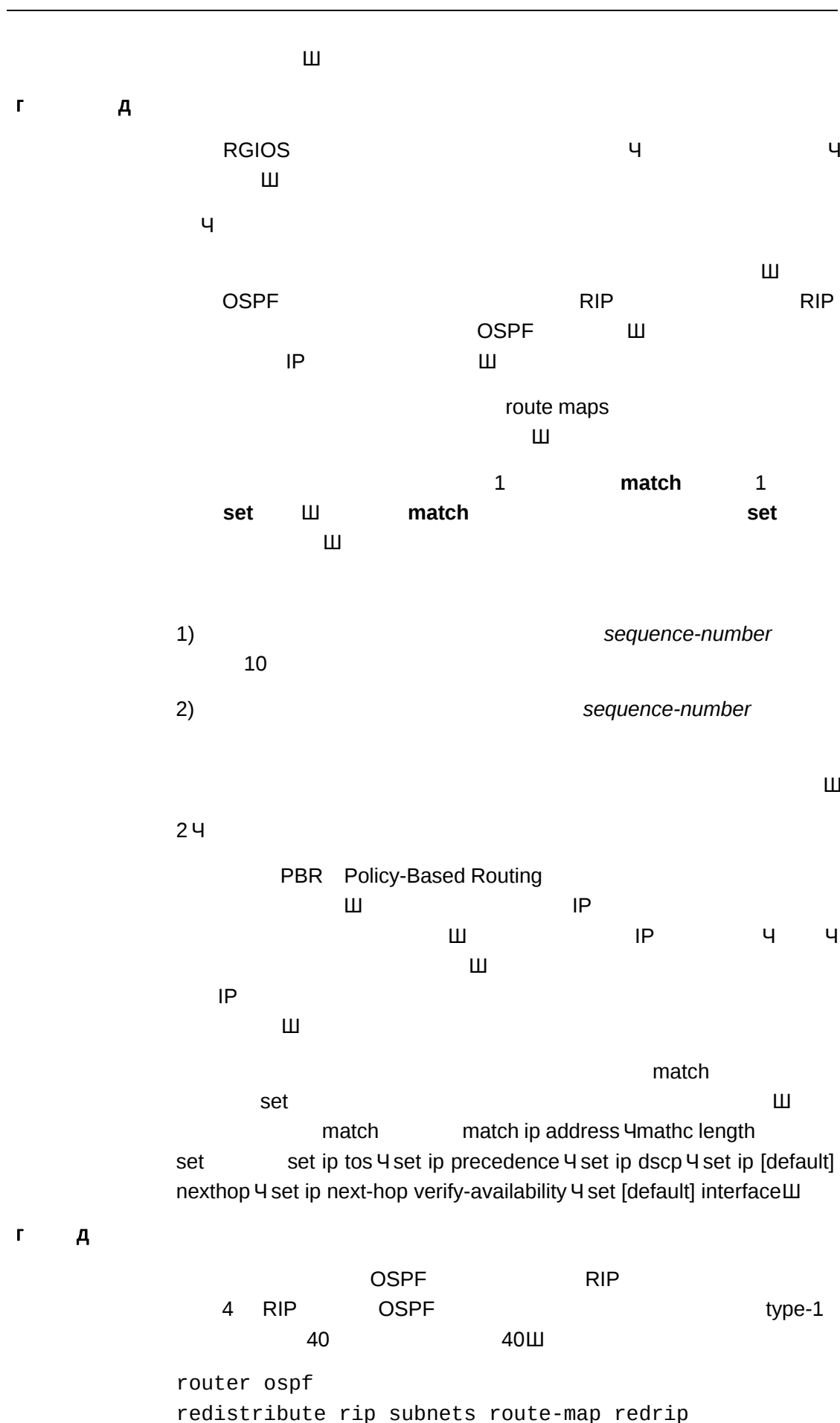
config

Г Д

			10	⏏
		maximum-paths 10		
		no maximum-paths		
Г	А			⏏

32.1.29 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 ⏏ ⏏ permit ⏏ match ⏏ set	
	deny	match	deny ⏏ ⏏ deny ⏏ match ⏏ set ⏏	
	sequence-number		⏏	⏏
Г	А		⏏	
Г	А			



```
network 192.168.12.0 0.0.0.255 area 0

route-map redrip permit 10
match metric 4
set metric 40
set metric-type type-1
set tag 40
```

r **A**

Redistribute	

r **A**

r **A**

32.1.30 set aggregator as

```
match
set aggregator as as-num ip_addr
no
AS

```

```
set aggregator as as-num ip_addr
no set aggregator as [as-num ip_addr]
```

r **A**

<i>as-number</i>	AS
<i>ip_addr</i>	

r **A**

W

r **A**

W

```
match as-path 1
set aggregator as 3 2.2.2.2
```

r

A



Г Д

match as-path	AS_PATH
match community	
match metric	
match origin	
set community	COMMUNITY
set metric	
set metric-type	

32.1.32 set comm-list delete

```
match COMMUNITY_LIST
community set comm-list delete
no
set comm-list community-list-number | community-list-name delete
no comm-list community-list-number | community-list-name delete
```

Г Д

community-list-number	
community-list-name	

Г Д

Ш

Г Д

Ш

Г Д

Ш

Г Д

```
router bgp 100
neighbor 172.16.233.33 remote-as 120
neighbor 172.16.233.33 route-map ROUTEMAPIN in
neighbor 172.16.233.33 route-map ROUTEMAPOUT out
```

```
ip community-list 500 permit 100:10
ip community-list 500 permit 100:20
```

```
ip community-list 120 deny 100:50
ip community-list 120 permit 100:.*
```

```
route-map ROUTEMAPIN permit 10
set comm-list 500 delete
```

```
route-map ROUTEMAPOUT permit 10
set comm-list 120 delete
```

r

A

--	--

match as-path

AS_Pr6e[4.0057f055-8 123215fb>-ccc07610

г д

ш

г д

ш

г д

ш

г д

```
route-map SET_COMMUNITY 10 permit
match as-path 1
set community 109:10
```

```
route-map SET_COMMUNITY 20 permit
match as-path 2
set community no-export
```

г д

match as-path	AS_PATH
match community	
match metric	
match origin	
set as-path prepend	AS_PATH
set origin	
set metric-type	

32.1.34 set dampening

match

<i>half-life</i>	1..45()	15
<i>reuse</i>	1..20000	750
<i>suppress</i>	1..20000	2000
<i>max-suppress-time</i>	1..255()	4* half-life

г д

Ш

г д

Ш

г д

Ш

г д

```
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 д

match as-path	AS_PATH
match community	
match metric	
match origin	
set as-path prepend	AS_PATH
set metric	
set local-preference	

32.1.35 set default interface

match

set default interface

no

interface-type	interface-number
interface-type	
interface-number	

set default interface interface-type interface-number [...interface-type interface-number]

no set default interface interface-type interface-number [...interface-type interface-number]

Г А

route-map	
match ip address	
match length	
set interface	
set ip default next-hop	IP
set ip next-hop	IP
set ip precedence	IP

Г А

32.1.36 set extcommunity

match
set extcommunity $\mathbb{W}$ no $\mathbb{W}$
 $\mathbb{W}$

set extcommunity {rt *extend-community-value* | soo
extend-community-value}
no set extcommunity {rt | soo}

Г А

Г

Г А

Ш

Г А

```
access-list 2 permit 192.168.78.0 255.255.255.0
route-map MAP_NAME permit 10
match ip-address 2
set extcommunity rt 100:2
```

Г А

match as-path	AS_PATH
match community	
match metric	
match origin	
set as-path prepend	AS_PATH
set metric	
set metric-type	

32.1.37 set interface

match set

interfaceШ **no** Ш

set interface *interface-type interface-number [...interface-type interface-number]*

no set interface *interface-type interface-number [...interface-type interface-number]*

Г А

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

Ш

32.1.38 set ip default next-hop

match IP
set ip next-hop 32

set ip default next-hop ip-address [weight] [...ip-address [weight]]
no set ip default next-hop ip-address [weight] [...ip-address [weight]]

1 1

ip-address	IP
weight	

1 1

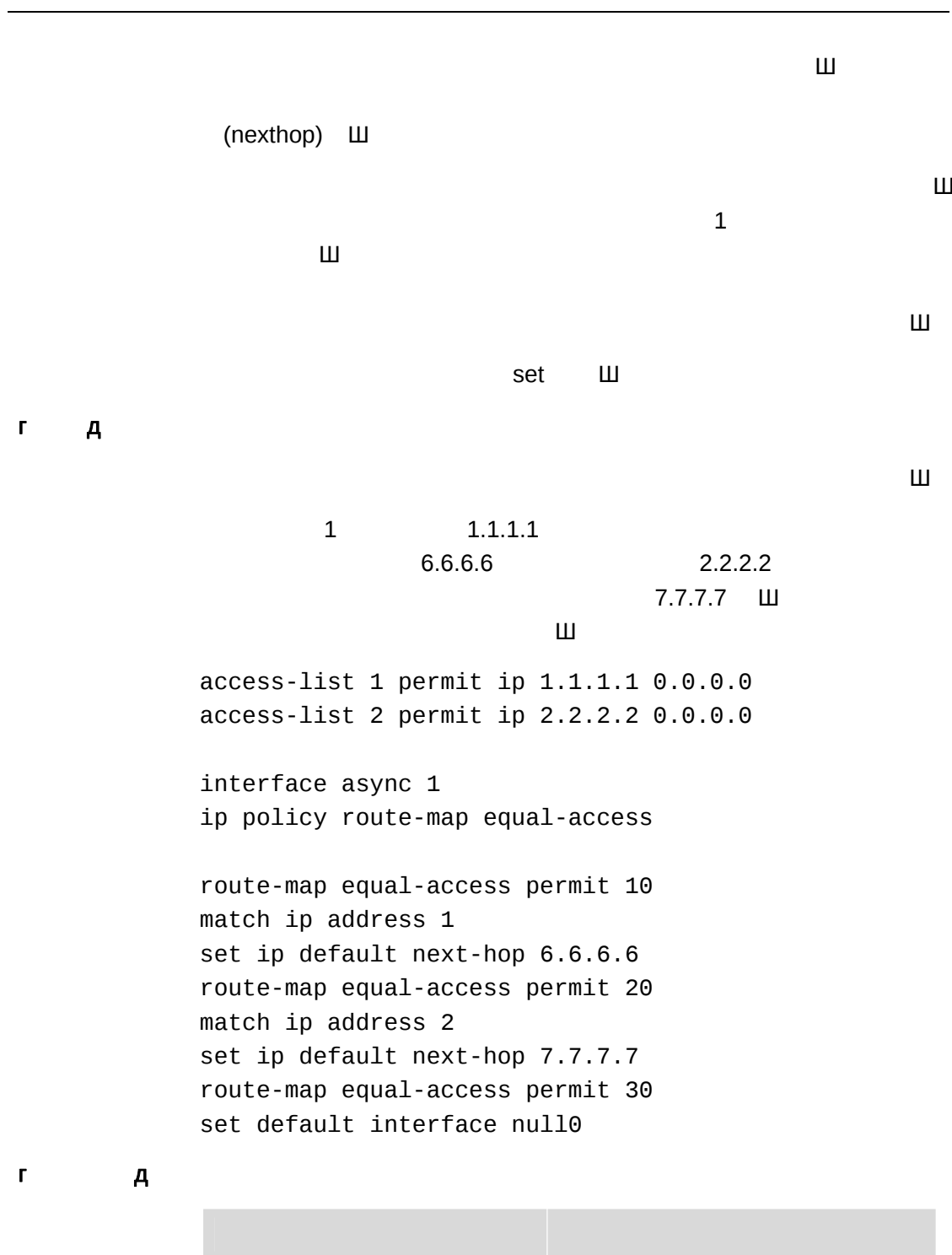
32

1 1

32

1 1

set WCMP WCMP weight
32
set ip default next-hop IP 32 32
ip address weight 4
next-hop 32
next-hop weight set
WCMP 32 WCMP
weight



Г А

32.1.40 set ip next-hop

match IP
set ip next-hop $\sqcup$ **no** $\sqcup$
 $\sqcup$

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>	

Г А

$\sqcup$

Г А

$\sqcup$

Г А

set $\sqcup$ WCMP WCMP
WCMP $\sqcup$ weight
set ip next-hop IP 32 $\sqcup$
I

Ш

set Ш

Г А

serial 1/0 Ш

10.0.0.0/8 192.168.100.1
172.16.0.0/16 172.16.100.1

Ш

```
interface serial 1/0
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

	Ш
--	---

32.1.41 set ip next-hop verify-availability

IP
next-hop verify-availability $\sqcup$ no $\sqcup$
 $\sqcup$

set ip next-hop verify-availability ip-address track track-object-num
no set ip next-hop ip-address [weight] [...ip-address [weight]]

Г Д

ip-address	IP
track-object-num	

Г Д

$\sqcup$

Г Д

$\sqcup$

Г Д

Г Д

serial 1/0 $\sqcup$
10.0.0.0/8 192.168.100.1
172.16.0.0/16 172.16.100.1
 $\sqcup$

interface serial 1/0
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
```

r A

route-map	
match ip address	
set default interface	
set default interface	
set interface	
set ip default next-hop	IP
set ip precedence	IP

r A

r A

32.1.42 set ip precedence

```
match                    IP            ,
set ip precedence
```

set ip precedence
IP

山

г Д

Ш

г Д

IP

TOS

IP

Ш

IP

TOS

Ш

г Д

fastEthernet 0/0

192.168.217.68

tos 4Ш

access-list 1 permit 192.168.217.68 0.0.0.0

route-map name

match ip address 1

set ip tos 4

interface fa 0/0

ip policy route-map name

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	
set ip precedence	IP

32.1.44 set level

match

set levelШ

no

Ш

set level {level 1 | level 2 | level 1-2 | stub-area | backbone}

no set level

```

r      A
                                     W
r      A
                                     W
r      A
r      A
                                     OSPF      RIP      backbone      W

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

```

r A

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	

32.1.45 set local-preference

```

match LOCAL_PREFERENCE
set local-preference W no W
set local-preference number
no set local-preference

```

r A

--	--

+	metric
-	metric
<i>metric-value</i>	

г А

Ш

г А

Ш

г А

Ш set metric Ч l' + L l' - L metric
Ш RIP metric
1-16Ш
OSPF OSPF RIP Ш RIP

match ip address	
match ip next-hop	
match ip route-source	
match metric	
match route-type	
match tag	
set metric-type	
set tag	

1
 A

1
 A

32.1.47
 set metric-type

match
 set metric-type
 no
 type
 set metric-type type
 no set metric-type

1
 A

type	

1
 A

OSPF
 type-2

1
 A

1

1
 A

OSPF
 RIP
 OSPF
 RIP
 IP
 route maps

set 1 match 1

Г Д

OSPF RIP

```
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 metric-type type-1
```

Г Д

match interface	
match ip address	
match ip next-hop	
match ip route-source	
match metric	
match route-type	
match tag	
set metric	
set tag	

Г Д

Г Д

32.1.48 set next-hop

```

      match
set next-hop  IP
      no
      IP

```

```
set next-hop ip-address
no set next-hop ip-address
```

Г Д

<i>ip-address</i>	IP

Г А

set tag	
---------	--

32.1.49 set origin

match
set origin $\sqcup$ no $\sqcup$

set origin {egp | igp | incomplete}
no set origin

Г А

egp	EGP
igp	IGP
Incomplete	

Г А

$\sqcup$

Г А

$\sqcup$

Г А

$\sqcup$

$\sqcup$

Г А

```
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 А

match as-path	AS_PATH
match metric	
match origin	

set as-path prepend	AS_PATH
set metric	
set local-preference	

32.1.50 set originator-id

```

match
set originator-id 10 10 10
no
set originator-id ip-addr
no originator-id [ip-addr]

```

Г А

ip-addr	

Г А

10

Г А

10

Г А

10

Г А

```

route-map SET_ORIGIN 10 permit
match as-path 1
set originator-id 5.5.5.5
route-map SET_ORIGIN 20 permit
match as-path 2
set originator-id 5.5.5.6

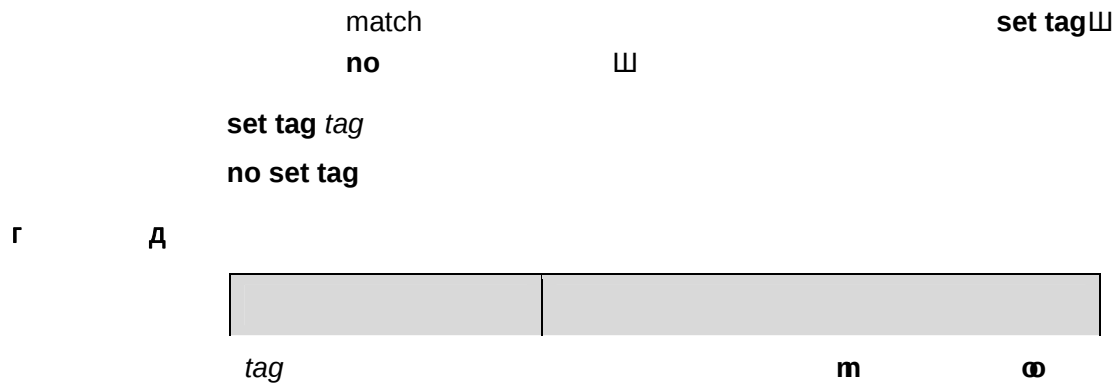
```

Г А

match as-path	AS_PATH
match metric	
match origin	
set as-path prepend	AS_PATH

set metric	
set local-preference	

32.1.51 set tag



match ip route-source	
match metric	
match route-type	
match tag	
set metric	
set metric-type	

Г А
Г А

32.1.52 set weight

match BGP
set weight Ш no Ш
set weight number
no set weight

Г А

number	Ш 0...65535

Г А

Ш

Г А

Ш

Г А

BGP Ш

neighbor weight
32768 Ш

BGP Ш

Г А

1.1.1.1 BGP in 100 Ш
router bgp 1

```

neighbor 1.1.1.1 route-map nei-rmap-in in
route-map nei-rmap-in permit 10
set weight 100

```

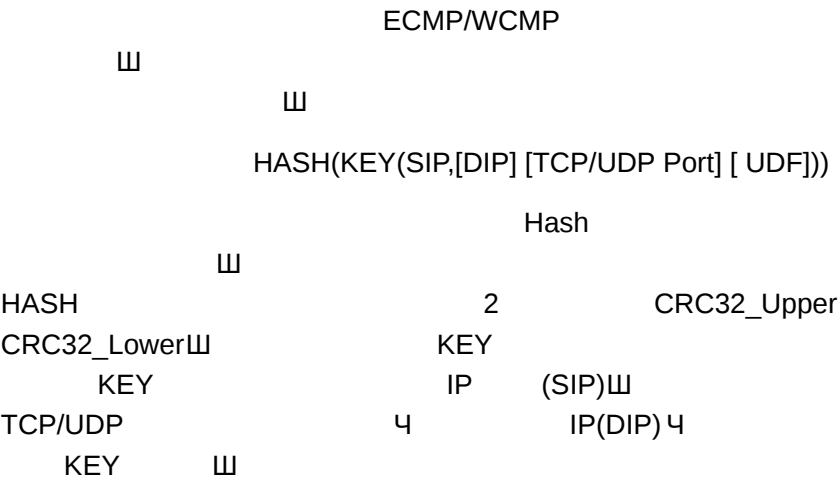
Г А

match as-path	AS_PATH
match community	
match metric	
match origin	
set community	COMMUNITY
set metric	
set metric-type	

Г А

Г А

32.1.53 ip ref ecmp load-balance source



```

ip ref ecmp load-balance
{[crc32_lower | crc32_upper] [dip] [port]
[udf number]}

```

```

no ip ref ecmp load-balance
{[crc32_lower | crc32 upper] [dip] [port]
[udf number]}

```

Г А

Ш

```

r      A
      DIP  Port  UDF      Key      W
CRC32_Lower  CRC32_Upper      Hash
no
Key      W
      SIP + DIP + Port W no ip ref ecmp route dip port
Key      SIP      W      no
W

```

```

r      A
      hash
Ruijie(config)# ip ref ecmp load-balance crc32_upper
      ip( ), ip,udp/tc 0,0

```

Ш

Г Д

```
Ruijie# show route-map
route-map AAA, permit, sequence 10
Match clauses:
ip address 2
Set clauses:
metric 10
```

```
Community-list standard local
permit local-AS
Community-list standard Red-Giant
permit 0:10
deny 0:20
```

```

r      A
r      A

```

32.2.3 show ip prefix-list

show ip prefix-list

▮

show ip prefix-list [*prefix-name*]

```

r      A

```

prefix-name	

```

r      A

```

▮

```

r      A

```

q q q q

```

r      A

```

▮

```

r      A

```

```
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
```

32.2.4 show ip route

IP

show ip route ▮

show ip route [[*vrf vrf_name*] [*network [mask]*] | **count** | **protocol** [*process-id*] | **weight**]]

г А

vrf vrf_name	VRF
<i>network</i>	
<i>mask</i>	
count	
protocol	connected, static bgp, isis, ospf, rip
<i>process-id</i>	
weight	

г А

Ш

г А

ч ч ч ч

г А

Ш

г А

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

--	--

Ш

C

O

Routing Descriptor		IP	4	4
Blocks	4	4	4	

show ip route count

```
Ruijie# show ip route count
----- route info -----
the num of active route: 5
```

show ip route weight

```
Ruijie# show ip route weight
-----[distance/metric/weight]-----
S   23.0.0.0/8 [1/0/2] via 192.1.1.20
S   172.0.0.0/16 [1/0/4] via 192.0.0.1
```

32.2.5 show ipv6 prefix-list

IPv6 show ipv6
prefix-list ▮

show ipv6 prefix-list [*prefix-name*]

г А

prefix-name	IPv6

г А

IPv6 ▮

г А

4 4 4 4

г А

▮

г А

```
Ruijie# show ipv6 prefix-list
ipv6 prefix-list p6: 2 entries
permit 13::/20
permit 14::/20
```

32.2.6 show ip ref

```

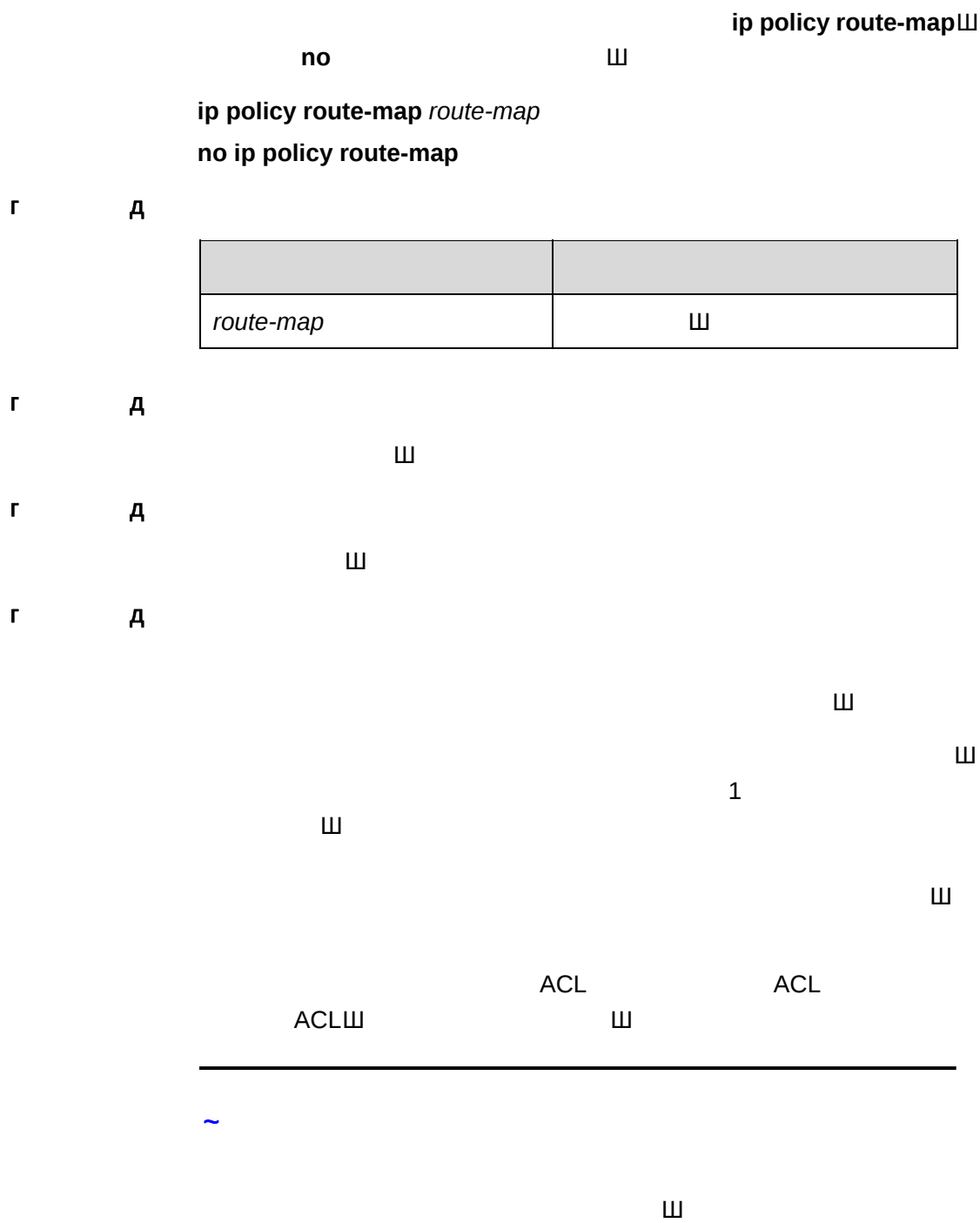
      4          REF          4          3
r      A
r      A
      REF
      3
r      A
```

```
Ruijie# show ip ref
-----statistic inforj..1220 TD0ef
```

33

33.1

33.1.1 ip policy route-map



Г Д

```

                                FE0
10.0.0.1                        196.168.4.6      20.0.0.1
                                196.168.5.6      III
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

load-balance redundance	

г А

Ш

г А

Ш

г А

set ip next-hop

4 ECMP 32 WCMP
 ARP Ш

г А

nexthop,

EF0

nexthop 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
set ip next-hop 196.168.4.7
set ip next-hop 196.168.4.8
exit
route-map lab1 permit 20
match ip address 2
set ip next-hop 196.168.5.6
set ip next-hop 196.168.5.7
set ip next-hop 196.168.5.8
exit
interface FastEthernet 0/0
ip policy route-map lab1
exit
ip policy redundancy
```

34 IPv6

34.1

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
- show ipv6 route
- show ipv6 neighbors
- show ipv6 interface
- clear ipv6 neighbors
- tunnel destination
- tunnel mode ipv6ip

- tunnel source
- tunnel ttl

34.1.1 ping ipv6

IPV6 Ш

ping ipv6 [*ipv6-address*]

г А

ipv6-address

г А

г А

Ш ping

!	
.	
U	
R	
F	
A	

D Down
IPV6 (

г д

		<i>interface-id</i>		Routed Port,L3 AP	
		SVI	Ш		
		<i>hardware-address</i>		XXXX.XXXX.XXXX	
		48	MAC	'X'	
Г	А				Ш
Г	А				
Г	А				
ARP					

Г Д

Г Д

0

IPv6

0

IPv6

Ш

Г Д

Ruijie(config)# **no ipv6 source-route**

34.1.7 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
prefix-length IPV6

RFC2373

'/'

ipv6-address

Ш

RFC2373

Ш

Ш

interface-id

Ш

Ш

Г Д

Г Д

,
Ш

Ш

Г Д

```
Ruijie(config)# ipv6 route 2001::/64 vlan 1 2005::1
```

```

r      A

```

show ipv6 route	IPv6

34.1.8 ipv6 ns-linklocal-src

```

    
```

```

    | no ipv6 ns-linklocal-src |
    
```

```

    
```

```

    ipv6 ns-linklocal-src

```

```

    no ipv6 ns-linklocal-src

```

```

r      A

```

```

    
```

```

r      A

```

```

r      A

```

```

r      A

```

```
Ruijie(config)# no ipv6 ns-linklocal-src
```

34.1.9 ipv6 nd ns-interval

```

(NS)

```

```

no

```

```

    
```

```

    ipv6 nd ns-interval milliseconds

```

```

    no ipv6 nd ns-interval

```

```

r      A

```

```

    milliseconds
    1000-429467295

```

```

r      A

```

```

(RA)      0(      )
           1000ms(1  )

```

```

r      A

```

Г Д

(RA)

Ш

Ш

Г Д

Ruijie(config-if)# **ipv6 nd ns-interval 2000**

Г Д

show ipv6 interface	

34.1.10 ipv6 nd reachable-time

NDP

no

ipv6 nd reachable-time *milliseconds*

no ipv6 nd reachable-time

Г Д

milliseconds
0-3600000

Г Д

(RA)

0()

30000ms(30)

Г Д

Г Д

Ч

Ш

Ш

(RA)

Ш

0

Ш

RFC4861

0.5

1.5

Ш

Г Д

Ruijie(config-if)# **ipv6 nd reachable-time 1000000**

Г Д

show ipv6 interface	

34.1.11 ipv6 nd prefix

(RA)

no

Ш

ipv6 nd prefix *ipv6-prefix/prefix-length* | **default** [[

Г Д

Г Д

(RA)

ipv6

address

Ш

ipv6 nd prefix default

ipv6 nd prefix default

Ш

Ш

ipv6 nd prefix default

Ш

at valid-date preferred-date

2

0Ш

Г Д

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**

Ш

Г Д

show ipv6 interface	ra-info

34.1.12 ipv6 nd ra-lifetime

(RA)

Г

Г

no

Ш

ipv6 nd ra-lifetime seconds

no ipv6 nd ra-lifetime

Г Д
seconds 0-9000s.

Г Д
1800

Г Д

Г Д
“ ” (RA) Ш
0 Ш 0 Ш
(RA) (ra-interval)Ш

Г Д
Ruijie(config)# **interface vlan 1**
Ruijie(config-if)# **ipv6 nd ra-lifetime 2000**

Г Д

show ipv6 interface	ra-info
ipv6 nd ra-interval	
ipv6 nd ra-hoplimit	ipv6 nd ra-interval

```

Ruijie(config)# interface vlan 1
Ruijie(config-if)# ipv6 nd ra-lifetime 200 200 20

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)# ipv6 nd ra-interval min-max

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)#

```

```

Ruijie(config)# interface vlan 1
Ruijie(config-if)# ipv6 nd ra-interval 110
Ruijie(config-if)# ipv6 nd ra-interval min-max 110 120

```

```

Ruijie(config-if)#

```

show ipv6 interface	ra-info
ipv6 nd ra-lifetime	
ipv6 nd ra-hoplimit	
ipv6 nd ra-mtu	MTU

34.1.14 ipv6 nd ra-hoplimit

```

Ruijie(config-if)#

```

```

Ruijie(config-if)# no ipv6 nd ra-hoplimit

```

```

Ruijie(config-if)# ipv6 nd ra-hoplimit value

```

```

Ruijie(config-if)# no ipv6 nd ra-hoplimit

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)# ipv6 nd ra-hoplimit value (RA)

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)#

```

```

Ruijie(config-if)#

```

Г Д

Ш

Г Д

```
Ruijie(config)# interface vlan 1
Ruijie(config-if)# ipv6 nd ra-hoplimit 110
```

Г Д

--	--

show ipv6 interface

ra-info

ipv6 nd ra-lifetime	
ipv6 nd ra-interval	
ipv6 nd ra-hoplimit	

34.1.16 ipv6 nd managed-config-flag

```

configuration"                                no          "managed address
ipv6 nd managed-config-flag
no ipv6 managed-config-flag

```

```

r      A

```

```

    W

```

```

r      A

```

```

r      A

```

```

    W

```

```

    W

```

```

r      A

```

```

Ruijie(config)# int vlan 1
Ruijie(config)# ipv6 nd managed-config-flag

```

```

r      A

```

show ipv6 interface	ra-info
ipv6 nd other-config-flag	

34.1.17 ipv6 nd dad attempts

```

(NS)                                IPV6
                                no          W
ipv6 nd dad attempts value
no ipv6 nd dad attempts

```

```

r      A

```

```

value (NS) 0
Ipv6 0-600

r A
1

r A

r A

IPV6
"tentative"( )
EUI-64

( IPV6 )
down/up
down up

```

```
r A
```

```
Ruijie(config)# interface vlan 1
Ruijie(config-if)# ipv6 nd dad attempts 3
```

```
r A
```

show ipv6 interface	

34.1.18 ipv6 nd suppress-ra

```

(RA) no
(RA)

ipv6 nd suppress-ra
no ipv6 nd suppress-ra

r A

IPV6

r A

r A

```

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

34.1.19 ipv6 redirects

IPV6

ICMPv6

no

ICMPv6

山

Г Д

Г Д

RDP

Ruijie(config-if)# **tunnel source** *vlan 1*

Г Д

tunnel source	
tunnel destination	
tunnel ttl	TTL

34.1.22 tunnel destination

, no

Ш

tunnel destination *ipv4-address*

no tunnel destination

Г Д

ipv4-address, IPv4

Г Д

Ш

Г Д

Г Д

Ч

Ш

~	
(6to4 isatap)	Ш

Г Д

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

34.2.1 show ipv6 route

IPV6 山

show ipv6 route [static] [local] [connected]

Г Д

static

local

connected

Г Д

Г Д

山

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
L  fe80::200:ff:fe00:1/128
    via ::, loopback 0
C  fe80::/64
    via ::, vlan 2
```

Г Д

--	--

ipv6 route	
------------	--

34.2.2 show ipv6 neighbors

IPV6 Ш

show ipv6 neighbors [**verbose**] [*interface-id*] [*ipv6-address*]

Г Д

verbose

interface-id

ipv6-addres

Г Д

ra-info

RA

r A

r A

IPV6

4ND

山

r A

Ruijie# show ipv6 interface vlan 1

Interface vlan 1 is Up, ifindex: 2001

address(es):

Mac Address: 00:00:00:00:00:01

INET6: fe80::200:ff:fe00:1 , subnet is fe80::/64

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]

INET6 []

ANYCAST	
TENTATIVE	(DAD),
DUPLICATED	
DEPRECATED	
NODAD	

!M

!M | M

35 OSPFv3

35.1

35.1.1 area default-cost

stub NSSA ABR stub
NSSA 1 no 1

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

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

r A

<i>area-id</i>	stub NSSA 1 IPv4 1
<i>cost</i>	stub NSSA 1-16777214 1

r A

default-cost 1 1

r

no

stub

Stub
Stub

no

▮

area *area-id* **virtual-link** *router-id*

- stub NSSA
- **hello-interval** **dead-interval**
- **instance**
- **no area** *area-id* ()

г д

```
ipv6 router ospf 1
area 1 virtual-link 192.1.1.1
```

г д

show ipv6 ospf	OSPFv3
show ipv6 ospf neighbor	OSPFv3
show ipv6 ospf virtual-links	OSPFv3

35.1.5 auto-cost

OSPF

no

auto-cost [

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

35.1.6 clear ipv6 ospf process

OSPF 10M

clear ipv6 ospf {process | process-id}

10M

process-id	ospf <1-65535>

10M

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

Г А

always	OSPF Ш
metric <i>metric</i>	1Ш
metric-type <i>type</i>	Ш OSPF 1 2 Ш 1 2 Ш
route-map <i>map-name</i>	route-map route-map ,

Г А

Ш

Г А

OSPFv3 Ш

Г А

redistribute **default-information** OSPF
ASBR Ш

redistribute OSPF
Ш ASBR **default-information originate**

Ш

always OSPF
Ш

show ipv6 ospf database OSPF
0.0.0.0 Ш OSPF

show ipv6 route Ш

default-information originate
default-metric Ш

OSPF 1 2
Ш

1 1 2 **show ipv6 route**

1 Ш

STUB Ш

Г Д

default-information originate always

Г Д

redistribute	Ш
show ipv6 ospf	OSPFv3 Ш
show ipv6 ospf database	OSPFv3 Ш

35.1.8 default-metric

no

Ш

default-metric *metric-value*

no default-metric

Г Д

<i>metric-value</i>	Ш 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

redistribute	Ш
show ipv6 ospf	OSPFv3 Ш

35.1.9 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
area <i>area-id</i>	OSPFv3 Ш IPv6 Ш
instance <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

Г Д

ipv6 ospf prefix-filter	Ш
ipv6 router ospf	OSPFv3 Ш

35.1.11 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()
instance <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
instance <i>instance-id</i>	OSPFv3

35.1.12 ipv6 ospf hello-interval

Hello

no

1

ipv6 ospf hello-interval *seconds* [**instance** *instance-id*]

no ipv6 ospf hello-interval [**instance** *instance-id*]

1

<i>seconds</i>	Hello 1-65535()
instance <i>instance-id</i>	OSPFv3

1

10

1

1

1

Hello

1

1

hello

20s

ipv6 ospf hello-interval 20

1

ipv6 ospf dead-interval	
show ipv6 ospf interface	OSPFv3
instance <i>instance-id</i>	OSPFv3

35.1.13 ipv6 ospf neighbor

OSPFv3

no

1

ipv6 ospf neighbor *ipv6-address* [[**cost** <1-65535>] [**poll-interval** <0-4294967295> | **priority** <0-255>]] [**instance** *instance-id*]

no ipv6 ospf neighbor *ipv6-address* [[**cost** <1-65535>] [**poll-interval** <0-4294967295> | **priority** <0-255>]] [**instance** *instance-id*]

г д

cost <1-65535>	costШ point-to-multipoint
poll-interval <0-4294967295>	120 Ш Non-broadcast(NBMA)
priority <0-255>	Ш Non-broadcast(NBMA)
instance <i>instance-id</i>	OSPFv3

г д

Ш

г д



OSPFv3

ipv6 ospf network point-to-point

1	2		
		show ipv6 ospf interface	OSPFv3

```

        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

```

ipv6 ospf network	
router-id	
show ipv6 ospf interface	OSPFv3
instance <i>instance-id</i>	OSPFv3

35.1.16 ipv6 ospf retransmit-interval

```

LSA no
no
ipv6 ospf retransmit-interval seconds [instance instance-id]
no ipv6 ospf retransmit-interval [instance instance-id]

```

```

r A

```

<i>seconds</i>	LSA 1-65535()
instance <i>instance-id</i>	OSPFv3

```

r A

```

```

5

```

```

r A

```

```


```

```

r A

```

LSA
 LSA

r A

LSA 10s
 ipv6 ospf retransmit-interval 10

r A

show ipv6 ospf interface	OSPFv3
instance <i>instance-id</i>	OSPFv3

35.1.17 ipv6 ospf transmit-delay

LSA no
 LSA

ipv6 ospf transmit-delay *seconds* [instance *instance-id*]
 no ipv6 ospf transmit-delay [instance *instance-id*]

r A

<i>seconds</i>	LSA LSA 1-65535()
instance <i>instance-id</i>	OSPFv3 0-255.

r A

1

r A

LSA

r A

LSA LSA

r A

LSA
 ipv6 ospf transmit-delay 2

Г Д

show ipv6 ospf interface	OSPFv3 Ш

35.1.18 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 CÃEO/È S*ÄQ,X ipv6 router ospf

no log-adj-changes [detail]

Г Д

detail	

Г Д

FULL

Г Д

Ш

Г Д

Ш

Ruijie(config)# **router ospf 1**

Ruijie(config-router)# **log-adj-changes detail**

Г Д

show ipv6 ospf	ospf Ш

35.1.20 max-concurrent-dd

DD

Ш

max-concurrent-dd *number*

no max-concurrent-dd

Г Д

<i>number</i>	1-65535

Г Д

Г Д

OSPFv3

Ш

Г Д

max-concurrent-dd

35.1.22 redistribute

OSPF

match

OSPF

OSPF

route-map

match

tag

metric

metric-type

route-map

set

r

A

route-map test

match

metric 20

set metric 30

redistribute connect metric 10 route-map test

metric 20

metric 30

metric

r

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default-information originate	
default-metric	
summary-prefix	
show ipv6 ospf	OSPFv3
show ipv6 ospf database	OSPFv3

35.1.23 router-id

(Router ID)

no

Router ID

Router ID

router-id router-id

no router-id

r

A

--	--

ID	OSPFv3	Router ID	Router
	IPv4		
	OSPFv2	OSPFv2	IPv4
	OSPFv3	Router-id	Router ID
	Router ID	OSPFv3	OSPFv3
		Router ID	
	OSPFv3		OSPFv3
	Router ID	OSPFv3	
	Router ID	Router ID	OSPFv3
	OSPF		
		Router ID	OSPFv3
	Router ID		

```
router-id 1.1.1.1
```

ipv6 ospf priority	≡
show ipv6 ospf	OSPFv3 ≡

<i>delay</i>	SPF 0-214748364 () 5
<i>holdtime</i>	SPF 0-214748364 () 10

```

Ruijie# show ipv6 ospf
          spf-delay 5
          spf-holdtime 10

Ruijie# show ipv6 ospf
          OSPFv3
          1

Ruijie# show ipv6 ospf
          spf-delay spf-holdtime OSPF
          1

Ruijie# show ipv6 ospf
          timers spf 2 4

Ruijie# show ipv6 ospf

```

clear ipv6 ospf	OSPFv3 1
show ipv6 ospf	OSPFv3 1

35.2

35.2.1 show ipv6 ospf

```

Ruijie# show ipv6 ospf
          OSPFv3
          1

Ruijie# show ipv6 ospf [process-id]

```

process- id	ospf , 1-65535.

```

Ruijie# show ipv6 ospf
          1

Ruijie# show ipv6 ospf
          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

default-metric		Ш
<i>router-id</i>	OSPFv3	Ш
timers spf	OSPFv3 SPF SPF	Ш

35.2.2 show ipv6 ospf database

OSPFv3 Ш

show ipv6 ospf [*process- id*] **database** [*lsa-type* [**adv-router** *router-id*]]

г А

<i>process- id</i>	OSPF , 1-65535.
<i>lsa-type</i>	lsa external Ч link Ч inter-prefix Ч inter-router Ч intra-prefix Ч network Ч router Ч te lsa
adv-router <i>router-id</i>	router LSA Ш

г А

Ш

г А

OSPFv3

Ruijie# **show ipv6 ospf database**

OSPFv3 Router with ID (1.1.1.1) (Process 1)

Link-LSA (Interface FastEthernet 1/0)

Link State ID	ADV Router	Age	Seq#	CkSum
Prefix				
0.0.0.2	1.1.1.1	197	0x80000001	0x7cd80

0.0.0.5	2.2.2.2	206	0x80000001	0x8c860
---------	---------	-----	------------	---------

Link-LSA (Interface Loopback 1)

Link State ID	ADV Router	Age	Seq#	CkSum
Prefix				
0.0.64.1	1.1.1.1	82	0x80000001	0xb7600

```
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
```

r A



ipv6 router ospf

OSPFv3

山

.A...!@TA@“8H...(TC*8HbR!Nc”,...D92W@-AX8hRDYSAQ.0

```
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
```

ipv6 router ospf	OSPFv3 Ш
ipv6 ospf area	OSPFv3 Ш

35.2.4 show ipv6 ospf neighbor

OSPFv3 Ш

show ipv6 ospf [process- id] neighbor [interface-type
interface-number [detail]] neighbor-id [detail]

Г А

process- id	OSPFv3 , 1-65535.
detail	Ш
interface-type	С/А

```

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

35.2.5 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

35.2.6 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

35.2.7 show ipv6 ospf virtual-links

```

OSPFv3      ▯

```

```

show ipv6 ospf [process- id] virtual-links

```

```

r      A

```

process- id	OSPFv3 , 1-65535.

```

r      A

```

ipv6 router ospf	OSPFv3	山	
area virtual-link	OSPFv3	山	OSPFv3

36 IGMP

36.1 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
- ip igmp last-member-query-interval
- ip igmp limit ()
- ip igmp query-interval
- ip igmp query-max-response-time
- ip igmp querier-timeout
- ip igmp robustness-variable
- ip igmp version
- ip igmp limit ()
- ip igmp prn6 Tw[(ip ig)5.7(mp prn6 Tw[(ip ig)5.7(mp prn6 Tw[(ip ig)5.7(mp prn6 T
-

clear ip igmp group[*group-address* | *interface-type interface-number*]

Г Д

<i>group-address</i>	32 IP D 8
<i>interface-type</i>	
<i>interface-number</i>	

Г Д

Г Д

IGMP

Ш IGMP

clear ip igmp group Ш

Г Д

Ruijie# **clear ip igmp group**

Г Д

show ip igmp groups

show ip igmp interface

36.1.2 clear ip igmp interface

IGMP Ш

Г Д

clear ip igmp interface *ifname*

Г Д

<i>ifname</i>	

Г Д

Г Д

Г Д

IGMP Ш ifname

Ш

Г Д

Ruijie# **clear ip igmp interface eth1**

36.1.3 ip igmp access-group

Ш no Ш

Г Д

ip igmp access-group *access-list*

no ip igmp access-group

Г Д

<i>access-list</i>	, <1-199> <1300-2699> WORD

Г Д

Г Д

Г Д

ip igmp access-group Ш

Г Д

Eth0 225.2.2.2.

Ruijie# **configure terminal**

Ruijie(config)# **access-list 1 permit 225.2.2.2 0.0.0.0**

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

Ruijie(config-if)# **ip igmp access-group 1**

36.1.4 ip igmp join-group

no Ⅲ

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

Ⅲ

Г А

Eth0 233.3.3.3Ⅲ.

Ruijie# **configure terminal**

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

Ruijie(config-if)# **ip igmp join-group 233.3.3.3**

Ruijie(config-if)# **exit**

36.1.5 ip igmp static-group

no

Ⅲ

Г А

ip igmp static-group *group-address*

no ip igmp static-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**

36.1.6 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

36.1.7 ip igmp last-member-query-count

Г Д

Г Д

Г Д

Г Д

Г Д

last-member-query-count

■

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3.

Ruijie# **configure terminal**Ruijie(config)# **interface ethernet 0**Ruijie(config-if)# **ip igmp last-member-query-count 3**

36.1.8 ip igmp last-member-query-interval

K

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**

36.1.11 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

IGMP

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д



Ethernet 0

▮

```
Ruijie(config-if)# no ip igmp query-timeout
```

36.1.13 ip igmp robustness-variable

no ▮

r A

```
ip igmp robustness-variable number
```

```
no ip igmp robustness-variable
```

r A

{1 | 2 | 3}

<1-3>

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
```

36.1.15 ip igmp limit ()

igmp

Ш

no Ш

Г Д

```
ip igmp limit number [except access-list]
```

```
no ip igmp limit number [except access-list]
```

Г Д

<i>number</i>	IGMP
except	<i>access-list</i> limit
<i>access-list</i>	

Г Д

65536Ш

Г Д

Г Д

IGMP
IGMP

f

г д

300

Ruijie config # **ip igmp limit 300**

36.1.16 ip igmp proxy-service

mroute-proxy
mroute-proxy

ip igmp proxy-service

no ip igmp proxy-service

г д

proxy-service

г д

г д

proxy-service 255 32
proxy-service
proxy-service mroute-proxy
switchport
mroute-proxy interface **ip igmp**

г д

proxy-service

Ruijie(config-if)# **ip igmp proxy-service**

36.1.17 ip igmp mroute-proxy

IGMP

36.1.19 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.**

36.1.20 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>	
-------------------------	--

detail

┌ A

show ip igmp interface [*interface-type interface-number*]

┌ A

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

┌ A

┌ A

┌ A

```
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
```

36.1.22 show ip igmp ssm-mapping

IGMP ssm-map

show ip igmp ssm-mapping [*A.B.C.D*]

┌ A

<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

37 PIM-DM

37.1 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**

37.1.1 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
```



PIM-DM
PIM-DM

PIM-DM IGMP
PIM-DM

Failed to enable PIM-DM on < >, resource temporarily unavailable, please try again
PIM-DM

PIM-DM Configure failed! VIF limit exceeded in NSM!!!

PIM-DM PIM-SM DVMRP PIM-DM
v4

37.1.2 ip pim neighbor-filter

ip pim neighbor-filter
PIM-DM

Peering
PIM-DM

no

ip pim neighbor-filter access-list
no ip pim neighbor-filter access-list

г А

access-list	

г А

г А

г А

```
Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/1
Ruijie(config-if)# ip pim neighbor-filter 14
```



ip pim neighbor-filter

1. ACL PIM
ACL PIM
2. peering PIM
PIM

37.1.3 ip pim query-interval

```
hello interval ip pim query-interval
no hello interval
```

ip pim query-interval *interval-seconds*

no ip pim query-interval

┌ A

<i>interval-seconds</i>	<1-65535>

┌ A

30

┌ A

┌ A

```
hello interval hello holdtime hello interval 3.5
```

┌ A

```
Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/1
Ruijie(config-if)# ip pim query-interval 123
```

37.1.4 ip pim state-refresh disable

	PIM-DM		ip pim
state-refresh disable	山	no	PIM-DM

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** ie#

50.50.50.50 VLAN 4 2 v2/D 1



Neighbor-Address	
Interface	
Uptime/Expires	
Ver	PIM

37.1.8 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	
Metric	
Pref	

37.1.9 show ip pim dense-mode mroute

```

PIM-DM                                     show ip pim dense-mode mroute
┌───┴───┐

```

show ip pim dense-mode mroute [A.B.C.D A.B.C.D] [summary]

Г Д

A.B.C.D A.B.C.D	
summary	

Г Д

/ /

Г Д

PIM-DM

```
Ruijie# show ip pim dense-mode mroute
PIM-DM Multicast Routing Table
(1.1.1.111, 229.1.1.1)
MRT lifetime expires in 205 seconds
RPF Neighbor: 50.50.50.1, Nexthop:50.50.50.1,VLAN 4
Upstream IF: VLAN 4
Upstream State: Pruned, PLT:200
Assert State: NoInfo
Downstream IF List:
FastEthernet 0/45:
Downstream State: NoInfo
Assert State: Loser, AT:170
```


- 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

38.1.1 clear ip mroute

Г Д

clear ip mroute { * | *group_address* [*source_address*] }

Г Д

*	Ш
<i>group_address</i>	Ш
<i>group_address</i> <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
```

38.1.2 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>	

г д

г д

Ш PIM-SM
 8B5mfrK QAFp]16rQDQD

[*hash-mask-length*][*priority-value*]

r

A

<i>interface-type interface-number</i>	
<i>hash-mask-length</i>	<0-32> RP HASH
	HASH

г д

<i>access-list</i>	access-list <1 99> 4 <1300 1999> acl group-list access-list Ш

г д

PIM cisco Ш PIM Ш

г д

г д

PIM Ш PIM Ш

Ш

г д

e i #) g r u f d e s u R

```

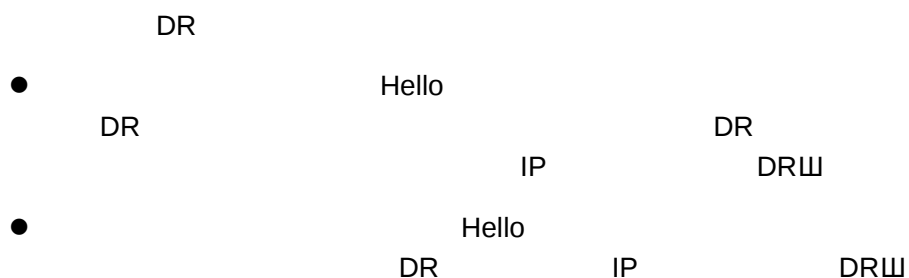
r      A

```

```

r      A

```



```

r      A

```

```

Ruijie# configure terminal
Ruijie(config)# interface g 0/3
Ruijie(config-if)# ip pim dr-priority 10000

```

38.1.9 ip pim ignore-rp-set-priority

```

r      A

```

```

ip pim ignore-rp-set-priority

```

```

r      A

```

```

r      A

```

```

RP-SET  RP

```

```

r      A

```

```

r      A

```

```

RP      RP

```

```

r      A

```

```

Ruijie# configure terminal
Ruijie(config)# ip pim ignore-rp-set-priority

```

38.1.10 ip pim jp-timer

```

r      A

```

```

ip pim jp-timer interval-seconds

```

```

r      A

```



<i>access_list</i>	access-list acl 1-99 acl

Г А

Г А

Г А

PIM Ш
PIM-SM peering
Ш

Г А

```
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 А

access-list

38.1.13 ip pim query-interval

Г А

ip pim query-interval *interval-seconds*

Г А

<i>interval-seconds</i>	<1-65535>

Г А

Hello 30s

Г А

Г А

Г Д

38.1.14 ip pim register-rate-limit

Г Д

Г Д

Г Д

Г Д

Г Д

W

DR RP

III

Г Д

38.1.15 ip pim register-rp-reachability

Г Д

Г Д

Г Д

RP

Г Д

Г Д

RP

Ш

Г Д

Ruijie# **configure terminal**

Ruijie(config)# **ip pim register-rp-reachability**

38.1.16 ip pim register-source

Г Д

ip pim register-source {*local_address* | *interface-type*
interface-number}

Г Д

<i>local_address</i>	IP
<i>interface-type</i> <i>interface-number</i>	IP IP

Г Д

IP

DR

Г Д

Г Д

IP Ш

Ш RP

IP

Register-Stop

Ш

~

PIM-SMШ

Г Д

```
Ruijie# configure terminal
Ruijie(config)# ip pim register-source 192.168.195.80
Ruijie(config)# ip pim register-source g 0/3
```

38.1.17 ip pim register-suppression

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
```

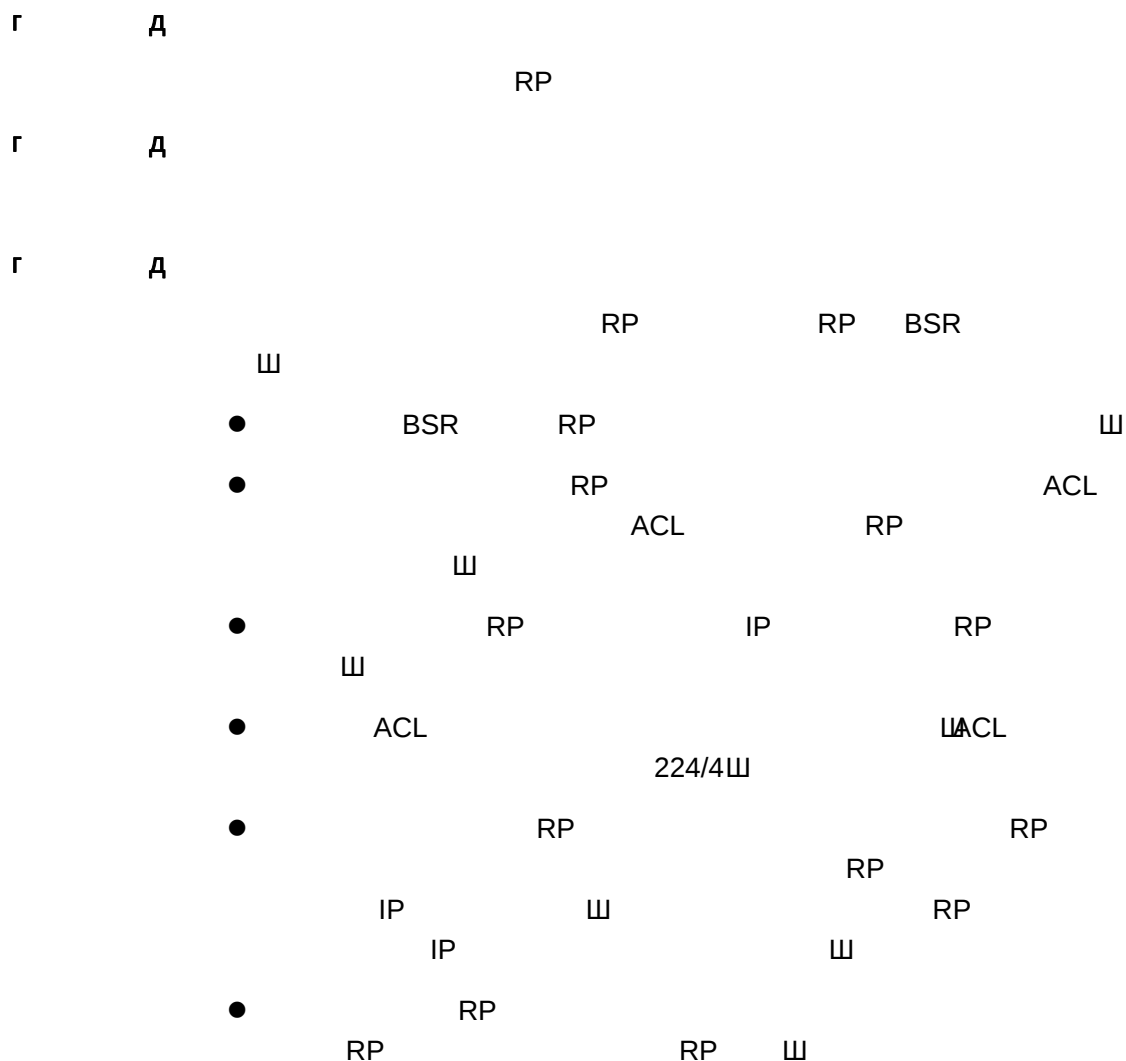
38.1.18 ip pim rp-address

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 <1300-1999> aclШ Ш



```

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

```

```

Ruijie# access-list

```

38.1.19 ip pim rp-candidate

```

ip pim rp-candidate interface-type interface-number [priority
priority-value][interval interval-seconds][group-list

```

<i>interface-type</i> <i>interface-number</i>	
<i>priority-value</i>	<0-255> priority priority-value 192
<i>Interval-seconds</i>	<1-16383> interval interval-seconds interval-seconds 60s
<i>access_list</i>	acl 1-99 acl group-list access_list

└ A

RP

└ A

└ A

```

PIM-SM          RPT          RP          ㄣ
BSR              C-RP        BSR          C-RP
BSR      PIM      ㄣ
          RP          ace          acl
          ㄣ          permit  ace          deny
ace          ㄣ

```

└ A

```

Ruijie# configure terminal
Ruijie(config)# ip pim rp-candidate g 0/3
Ruijie(config)# ip pim rp-candidate g 0/3 priority 200
group-list 3 interval 70
Ruijie(config)# access-list 3 permit 225.1.1.1
0.0.0.255

```

└ A

access-list

38.1.20 ip pim rp-register-kat

└ A

ip pim rp-register-kat seconds

└ A

seconds	KAT 210s <1-65535>

Ruijie#

RP KAT 210s

Ruijie#

Ruijie#

RP KAT

Ruijie#

Ruijie# **figure terminal**
Ruijie(TD1]g)# **ip pim rp-register-kat 250**

38.1.21 ip pim sparse-mode

Ruijie#

ip pim sparse-mode

Ruijie#

Ruijie#

PIM-SM

Ruijie#

Ruijie#

PIM-SM

Ruijie#

Ruijie# **figure terminal**
Ruijie(TD1]g)# **interface g 0/3**
Ruijie(TD1]g-if)# **ip pim sparse-mode**



PIM-SM
PIM-SM

```

PIM-SM      IGMP
└─┘

I: Failed to enable PIM-SM on <
>, resource temporarily unavailable, please try again
└─┘

I: PIM-SM Configure failed! VIF limit
exceeded in NSM!!!
└─┘
PIM-SM      PIM-DM      DVMRP      PIM-SM
└─┘      └─┘      └─┘      └─┘
v4      └─┘

```

38.1.22 ip pim spt-threshold

```

r      A

```

```

ip pim spt-threshold [group-list access-list]

```

```

r      A

```

access-list	access-list acl 1-99 4 1300-1999 acl└─┘ group-list access-list SPT

```

r      A

```

```

SPT

```

```

r      A

```

```

SPT

```

```

r      A

```

```

RPT      SPT

```

```

SPT r

```

```

r      A
      access-list

```

38.1.23 ip pim ssm

```

r      A
      ip pim ssm { default | range access_list}

```

```

r      A

```

default	232/8
access_list	acl 1-99 acl

```

r      A
      SSM

```

```

r      A

```

```

r      A
      PIM-SSM          PIM-SSM

```

```

r      A
      232/8          10
Ruijie# configure terminal
Ruijie(config)# ip pim ssm default
      10          10
Ruijie(config)# ip pim ssm range 10
Ruijie(config)# access-list 10 permit 232.0.0.1
0.0.0.255

```

```

r      A
      access-list

```

38.1.24 show debugging

Ruijie A

/ /

Ruijie A

Ruijie A

```
Ruijie #show debugging
PIM-SM Debugging status:
PIM packet debugging is on
```

38.1.25 show ip pim sparse-mode bsr-router

Ruijie A

```
show ip pim sparse-mode bsr-router
```

Ruijie A

Ruijie A

/ /

Ruijie A

BSR .

Ruijie 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
```

38.1.26 show ip pim sparse-mode interface

Ruijie A

show ip pim sparse-mode interface [*interface-type interface-number*]
[**detail**]]

Г Д

<i>interface-type</i>	
<i>interface-number</i>	
<i>detail</i>	

Г Д

/ /

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
```

38.1.27 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:

38.1.28 show ip pim sparse-mode mroute

Г А

show ip pim sparse-mode mroute {*group_address*| *source_address* }

Г А

<i>group_address</i>	A.B.C.D	Ш

38.1.30 show ip pim sparse-mode nexthop

Г А

Г Д

show ip pim sparse-mode rp-hash *group-address*

Г Д

<i>group-address</i>	

Г Д

/ /

Г Д

RP Ш

Г Д

Ruijie# **show ip pim sparse-mode rp-hash 225.1.1.1**
RP: 30.30.100.1
Info source: 30.30.100.1, via bootstrap

39

39.1

- clear ip mroute
- clear ip mroute statistics
- ip mroute
- ip multicast route-limit
- ip multicast ttl-threshold
- ip multicast-routing
- ip multicast-rpf
- ip multicast boundary
- ip multicast static
- show ip mroute
- show ip rpf
- show ip mvif

39.1.1 clear ip mroute

IP Ш

clear ip mroute { * | *group-address* [*source -address*] }

Г Д

*	Ш
<i>group-address</i>	Ш
<i>source -address</i>	Ш

Г Д

Ш

Г Д

Ш

Г Д

Ш

Г Д

230.0.0.1

Ruijie# **clear ip mroute 230.0.0.1**

Г Д

show ip mroute	Ш

Г Д

Ш

39.1.2 clear ip mroute statistics

IP

Ш

clear ip mroute statistics {*** | *group-address* [*source -address*]}

Г Д

<i>*</i>	Ш
<i>group-address</i>	Ш
<i>source -address</i>	Ш

Г Д

Ш

Г Д

Ш

Г Д

IP

Ш

Г Д

230.0.0.1

Ruijie# **clear ip mroute statistics 230.0.0.1**

Г Д

show ip mroute

clear ip mroute

Г А

Ш

39.1.3 ip mroute

Ш

no

Ш

ip mroute *source-address mask [protocol] {rpf-address | interface-type interface-number} [distance]*

no ip mroute *source-address mask [protocol] {rpf-address | interface-type interface-number} [distance]*

Г А

<i>source-address</i>	
<i>mask</i>	
<i>protocol</i>	
<i>rpf-address</i>	
<i>interface-type</i> <i>interface-number</i>	

III

W



v4

RPF W

```
no ip multicast-rpf
```

<i>rpf-mode</i>	routed-port Svi SVI 卩

SVI

Г Д

Г Д

W

RPF

routed-p

ort $\mathbb{W}$

S3760

SVI

RPF

W

39.1.8 ip multicast boundary

IP

IP

Ш

no

Ш

ip multicast boundary *access-list*

no ip multicast boundary *access-list*

г

А

<i>access-list</i>	IP access-list ACL

г

А

г

А

г

А

ACL

IP

IP

Ш

ACL

ACL

Ш

~

IP

IGMP

4PIMSM

Ш

г

А

svi1

IP

Ш

Ruijie(config)# **ip access-list** mul-boun

Ruijie(config-std-nacl)# **permit ip** 233.3.3.0 0.0.0.255

Ruijie(config-std-nacl)# **exit**

Ruijie(config)# **interface vlan 1**

Ruijie(config-if)# **ip multicast boundary** mul-boun

39.1.9 ip multicast static

Ш

no

Ш

ip multicast static *source-address group-address interface-type*
interface-number

no ip multicast static *source-address group-address interface-type*
interface-number

Г

А



source -address

Ш

```
show ip mroute [ group-address] [source-address] [dense][ sparse]
[summary] [count]
```

```
r      A
```

<i>group-address</i>	W
<i>source-address</i>	W
dense	PIMDM
sparse	PIMSM
summary	W
count	W

```
r      A
```

```
W
```

```
r      A
```

```
r      A
```

```
W
```

```
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- T- F-
Timers:Uptime/Stat Expiry	
Interface State	

Owner	
Incoming interface	
Outgoing interface list	
Forwarding Counts Pkt count/Byte count,	/
Other Counts: Wrong If pkts	

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
```

39.1.12 show ip mvif

▮

show ip mvif { *interface-type interface-number* }

┌ A

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

┌ A

▮

┌ A

▮

┌ A

▮

┌ A

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			

39.2 IP

IP

- debug nsm mcast all
- debug nsm mcast fib-msg
- debug nsm mcast vif
- debug nsm mcast register
- debug nsm mcast stats

39.2.1 debug nsm mcast all

⏏ no

debug nsm mcast all

Г А

⏏

Г А

Г А

Г А

⏏

Г А

Ruijie# debug nsm mcast all

Г А

⏏

Г А

⏏

39.2.2 debug nsm mcast fib-msg

|||

no

debug nsm mcast fib-msg

r

Г Д


```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport protected
```

г А

show interfaces	Ш

г А

S32 S37 acl

Ш

40.1.3 switchport port-security

Ш no

Ш

switchport port-security [violation {protect | restrict | shutdown}]

no switchport port-security [violation]

г А

--	--

/TT3 1 Tf10.5 0 0 TD-0TD0 Tc0 Twb74192353c1b8d1e1403e1FT2 1 Tf26 0 T()Tj/TT5 1

Ш

Г А

Gigabitethernet 1/1
shutdown

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport port-security
Ruijie(config-if)# switchport port-security
violation shutdown
```

Г А

show port-security	Ш

40.1.4 switchport port-security aging

Ш

Ш no
Ш

```
switchport port-security aging {static | time time }
no switchport port-security aging {static | time }
```

Г А

Static	Ш
time time	1440 Ш 0 0

Г А

Г А

Г А

```
no switchport port-security aging
time no switchport
```

port-security aging static

▮

show port-security

Г Д

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport port-security aging time
8
Ruijie(config-if)# switchport port-security aging
static
```

Г Д

show port-security	▮

40.1.5 switchport port-security mac-address

▮

no

▮

switchport port-security [**mac-address** *mac-address* [**ip-address** *ip-address*]] | [**maximum** *value*]

no switchport port-security [**mac-address** *mac-address* [**ip-address** *ip-address*]] | [**maximum**]

Г Д

mac-address <i>mac-address</i>	▮
ip-address <i>ip-address</i>	IP ▮
ip-address <i>ipv6-address</i>	IPV6 ▮
maximum <i>value</i>	▮

Г Д

Г Д

Г Д

```

      ACL          IP          MAC
ACL          ACL          802.1x          IP
      r      d
                                gigabitethernet 1/1
00d0.f800.073c          IP          192.168.12.202
Ruijie# configure terminal
Ruijie(config)# interface gigabitethernet 1/1
Switchport mode access

```

show port-security	Ш

40.2

- show storm-control
- show port-security

40.2.1 show storm-control

Ш

show storm-control [interface-id]

Г Д

interface-id	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

--	--

show port-security [address] [interface *interface-id*]

Г Д

address	Ш
interface <i>interface-id</i>	Ш

Г Д

Г Д

Ч

Ш

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	Ш
switchport port-security aging	Ш
switchport port-security mac-address	Ш

41 802.1X

41.1 dot1x

dot1x

- dot1x auto-req
- dot1x auto-req packet-num
- dot1x auto-req req-interval
- dot1x auto-req user-detect

41.1.1 dot1x auto-req

802.1X

no

▮

dot1x auto-req▮▮

[no] dot1x auto-req

r

Req-Interval: 30 Second

Г Д

show dot1x auto-req	

41.1.2 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

show dot1x auto-req

Г Д

802.1x

Ruijie# **configure terminal**

Ruijie(config)# **dot1x auto-req packet-num 0**

Ruijie(config)# **end**

Ruijie# **show dot1x auto-req**

Auto-Req: Enabled

User-Detect : Enabled

Packet-Num : 0

Req-Interval: 30 Second

Г Д

show dot1x auto-req	

41.1.3 dot1x auto-req req-interval

no

dot1x auto-req req-interval *interval*

no dot1x auto-req req-interval

r **A**

interval

S

r **A**

30

r **A**

W

r **A**

show dot1x auto-req

r **A**

802.1x

60s

Ruijie# configure terminal

Ruijie(config)# dot1x auto-req req-interval 60

Ruijie(config)# end

Ruijie#

Г А

Ш

Г А

show dot1x auto-req

Г А

```
Ruijie# configure terminal
Ruijie(config)# dot1x auto-req user-detect
Ruijie(config)# end
Ruijie# show dot1x auto-req
Auto-Req: Enabled
User-Detect : Enabled
Packet-Num : 0
Req-Interval: 60 Second
```

Г А

show dot1x auto-req	

41.2 dot1x

dot1x

- dot1x timeout quiet-period
- dot1x timeout re-authperiod
- dot1x timeout server-timeout
- dot1x timeout supp-timeout
- dot1x timeout tx-period

41.2.1 dot1x timeout quiet-period

Ш

no

dot1x timeout quiet-period

```

seconds
0 65535
r A
10
r A
show dot1x
r A

```

1000s

```

Ruijie# configure terminal
Ruijie(config)# dot1x timeout quiet-period 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:   3600 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

41.2.2 dot1x timeout re-authperiod

no

```

dot1x timeout re-authperiod seconds
no dot1x timeout re-authperiod

r      A
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

41.2.3 dot1x timeout server-timeout

no

山

山

show dot1x	802.1x
------------	--------

41.2.4 dot1x timeout supp-timeout

no

`dot1x timeout supp-timeout seconds`
`no dot1x timeout supp-timeout`

```

r      A

```

seconds

0

65535

```

r      A

```

3

```

r      A

```

`show dot1x`

```

r      A

```

show dot1x

802.1x

`show dot1x`

```

r      A

```

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

Г А

show dot1x	802.1x

41.2.5 dot1x timeout tx-period

Ш no Ш

dot1x timeout tx-period *seconds*

no dot1x timeout tx-period

Г А

seconds Ш 0 65535Ш

Г А

3 Ш

Г А

Ш

Г А

show dot1x 802.1x Ш

Г А

10s

Ruijie# **configure terminal**

Ruijie(config)# **dot1x timeout tx-period 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:    10 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

```

```

r      A

```

show dot1x	802.1x

41.3 dot1x

- dot1x re-authentication
- dot1x reauth-max

41.3.1 dot1x re-authentication

```

r      A
                                     W      no
                                     W
[no] dot1x re-authentication
r      A
                                     W
r      A
                                     W
r      A
                                     W
r      A
                                     W
                                     W      show dot1x      802.1x      W
r      A

```

```

Ruijie# configure terminal
Ruijie(config)# dot1x re-authentication
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: 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

41.3.2 dot1x reauth-max

```

    no

```

```

    no

```

```

dot1x reauth-max count
no dot1x reauth-max

```

```

r      A

```

```

count

```

```

r      A

```

```

3

```

```

r      A

```

```

    no

```

```

r      A

```

```

show dot1x 802.1x

```

```

r      A

```

```

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

41.4 dot1x

- dot1x probe-timer
- dot1x client-probe enable

41.4.1 dot1x probe-timer

```

dot1x probe-timer{interval | alive}interval
no dot1x probe-timer

```

```
r      A
```

```

no
interval hello
alive
interval

```

```

Hello 20
250

r      A

      W

r      A

                        show dot1x      802.1x

      W

r      A

      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

```

```

r      A

```

Show dot1x probe-timer	

41.4.2 dot1x client-probe enable

```

[no] dot1x client-probe enable

```

```

r      A

```

```

r      A

```

```

r      A

```

```

      W

```

```

r      A

```

```

r      A

```

```
Ruijie# configure terminal
Ruijie(config)# dot1x client-probe enable
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:  Enabled
Eapol Tag Enable:    Disabled
Authorization Mode:   Group Server
```

r A

show dot1x	dot1x

41.5 dot1x

dot1x

- dot1x authentication
- dot1x auth-address-table
- dot1x auth-mode
- dot1x default
- dot1x dynamic-vlan enable
- dot1x guest-vlan enable
- dot1x eapol-tag
- dot1x max-req
- dot1x private-supplicant-only
- dot1x port-control auto
- dot1x port-control-mode
- dot1x stationarity enable

⏏

show dot1x

⏏

VLAN

Ruijie# **configure terminal**

Ruijie(config)# **dot1x auth-fail max-attempt 5**

Ruijie(config)# **end**

Ruijie#write

show dot1x

802.1x

⏏

-

-

41.5.4 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

```


```

-

-

41.5.5 dot1x auth-mode

802.1x

```


```

```
dot1x auth-mode {eap-md5 | chap | pap}
no dot1x auth-mode
```

```
eap-md5 802.1x EAP-MD5
```

```
chap 802.1x CHAP
```

```
pap 802.1x PAP
```

```
EAP-MD5
```

```


```

```
show dot1x
```

802.1x

802.1x

```
Ruijie# configure terminal
Ruijie(config)# dot1x auth-mode chap
Ruijie(config)# end
Ruijie#
```

show dot1x	802.1x Ⅲ

41.5.6 dot1x default

```

802.1x
Ⅲ

dot1x default

r      A
      Ⅲ

r      A

r      A
      Ⅲ

r      A
      show dot1x      802.1x      Ⅲ

r      A
      802.1x

Ruijie# configure terminal
Ruijie(config)# dot1x default
Ruijie(config)# end
Ruijie# end

r      A

```

show dot1x	802.1x Ⅲ

41.5.7 dot1x dynamic-vlan enable

```

      vlan      Ⅲ      no
      Ⅲ

```

Г Д

Г Д

Ш

Г Д

show dot1x dynamic-vlan 802.1x Ш

Г Д

802.1x vlan

```
Ruijie# configure terminal
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# dot1x dynamic-vlan enable
Ruijie(config-if)# end
Ruijie#
```

Г Д

show dot1x	802.1x Ш

vlan

3. show running-config 802.1x

г д

802.1x guest vlan

```
Ruijie# configure terminal
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# dot1x guest-vlan 10
Ruijie(config)# end
Ruijie#
```

г д

show running-config	802.1x

41.5.9 dot1x eapol-tag

EAPOL TAG

dot1x eapol-tag
no dot1x eapol-tag

г д

г д

г д

г д

show dot1x 802.1x

г д

802.1X tag

```
Ruijie# configure terminal
Ruijie(config)# dot1x eapol-tag
Ruijie(config)# end
Ruijie#
```

г д



dot1x mac-auth-bypass timeout-activity *value*

no dot1x mac-auth-bypass timeout-activity

<i>value</i>	, 1-65535

▮

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 ▮

-	-

41.5.12 dot1x mac-auth-bypass violation

802.1x MAC ▮

dot1x mac-auth-bypass violation

no dot1x mac-auth-bypass violation

<i>v</i>	

⏏

show run 802.1x ⏏

802.1x MAC
Ruijie# **configure terminal**
Ruijie(config)# **interface fa 0/1**
Ruijie(config-if)# **dot1x mac-auth-bypass violation**
Ruijie(config-if)# **end**
Ruijie#write

show dot1x port-control interface	802.1x ⏏

-	-

41.5.13 dot1x max-req

DOT1X DOT1X DOT1X ⏏
DOT1X ⏏
no
⏏

dot1x max-req count
no dot1x ma87x-req

г А
count ⏏

г А
3 ⏏

г А
⏏

г А
show dot1x 802.1x ⏏

Г Д

802.1x 7

```
Ruijie# configure terminal
Ruijie(config)# dot1x max-req 7
Ruijie(config)# end
Ruijie#
```

Г Д

show dot1x	802.1x Ш

41.5.14 dot1x private-supplicant-only

no

Ш

```
dot1x private-supplicant-only
no dot1x private-supplicant-only
```

Г Д

Ш

Г Д

Ш

Г Д

Ш

Г Д

Е

41.5.15 dot1x port-control auto

III

no

```
dot1x port-control-mode {mac-based | {port-based [single-host]} }
no dot1x port-control-mode
```

```
r      A
```

```
mac-based      mac      802.1X
port-based      802.1X
single-host      802.1x
```

```
r      A
```

```
mac-based
```

```
r      A
```

```
┌
```

```
r      A
```

```
show dot1x port-control      802.1x      ┌
```

```
single-host      802.1x      show dot1x
port-control      port-based      show running-config
dot1x port-control-mode port-based single-host┌
```

```
single-host      default-user-limit
single-host      ┌      single-host
default-user-limit      single-host
┌
```

```
r      A
```

```
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#
```

```
r      A
```

show dot1x port-control	802.1x	Ш
Show running-config		Ш

41.5.17 dot1x stationarity enable

802.1x

802.1X

Ш

dot1x stationarity enable

no dot1x stationarity enable

r A

r A

r A

Ш

r A

Ш

r A

802.1x

Ruijie# **configure terminal**Ruijie(config)# **dot1x stationarity enable**Ruijie(config)# **end**

Ruijie#

r A

41.5.18 dot1x redirect url

802.1x

url url 11 no

url

dot1x redirect url [url-string]

[no] dot1x redirect url

url-string	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

-	-

41.5.19 dot1x redirect for special tcp-destination port

ip ip web
80 48080 16 TCP no dot1x

redirect for special tcp-destination port
port_num

[no] dot1x redirect for special tcp-destination port port num

	<i>port num</i>	TCP

tcp

1

5

Ruijie(config)# dot1x redirect time-out 5

dot1x redirect url	web ip ip
dot1x redirect for special tcp-destination port	
dot1x redirect num for special source-ip	
show dot1x	dot1x

-	-

41.5.21 dot1x redirect num for special source-ip

1

1-10

山

no

dot1x redirect num for special source-ip num

no dot1x redirect num for special source-ip

num	

1

	1	3	d2.012
	Ruijie(config)# dot1x redirect num for special source-ip 3		
	dot1x redirect url		
	dot1x redirect for special tcp-destination port	ip	ip

W

r A

W

r A

W

r A

W

r A

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#
```

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	⏏
dot1x timeout server-timeout	⏏
dot1x timeout supp-timeout	⏏
dot1x timeout tx-period	⏏

41.6.2 show dot1x auth-address-table

802.1X

⏏

show dot1x auth-address-table*[address mac-addr][interface interface]*

Г А

mac-addr

interface

Г А

⏏

Г А

⏏

Г А

⏏

Г А

Ruijie# **show dot1x auth-address-table**

interface:g3/1

mac addr: 00D0.F800.0001

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

41.6.3 show dot1x auto-req

802.1x

W

show dot1x auto-req

r A

r A

W

r A

W

r A

W

r A

Ruijie# show dot1x auto-req

Auto-Req: Disabled

User-Detect : Enabled

Packet-Num : 0

Req-Interval: 30 Seconds

Ruijie#

r A

--	--

dot1x auth-mode	802.1x	山
dot1x max-req		山
dot1x port-control auto		山
dot1x reauth-max		

dot1x auth-mode	802.1x Ⅲ
dot1x max-req	Ⅲ
dot1x port-control auto	Ⅲ
dot1x reauth-max	
dot1x re-authentication	Ⅲ
dot1x timeout quiet-period	Ⅲ
dot1x timeout re-authperiod	Ⅲ
dot1x timeout server-timeout	Ⅲ
dot1x timeout supp-timeout	Ⅲ
dot1x timeout tx-period	Ⅲ

41.6.5 show dot1x max-req

Ⅲ

show dot1x max-req

г А

г А

Ⅲ

г А

Ⅲ

г А

Ⅲ

г А

```
Ruijie# show dot1x max-req
max-req: 2 times
Ruijie#
```

Г Д

dot1x auth-mode	802.1x Ш
dot1x max-req	Ш
dot1x port-control auto	Ш
dot1x reauth-max	
dot1x re-authentication	Ш
dot1x timeout quiet-period	Ш
dot1x timeout re-authperiod	Ш
dot1x timeout server-timeout	Ш
dot1x timeout supp-timeout	Ш
dot1x timeout tx-period	Ш

41.6.6 show dot1x port-control

Ш

show dot1x port-control [*interface interface*]

Г Д

interface

Г Д

Ш

Г Д

Ш

Г Д

Ш

Г Д

```
Ruijie# show dot1x port-control
interface dyn-user static-user max-user qos
```

```
ctrl-mode status
-----
Gi0/1      0      1      6000      dscp: 0
mac-base Authed
Ruijie#
```

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	

41.6.7 show dot1x probe-timer

```
show dot1x probe-timer
```

r
A

r
A

r
A

r
A

Г Д

Г Д

Г Д

Ш

Г А

Г А

```
Ruijie# show dot1x reauth-max
reauth-max: 2 times
Ruijie#
```

Г А

dot1x auth-mode	802.1x Ш
dot1x max-req	Ш
dot1x port-control auto	Ш
dot1x reauth-max	
dot1x re-authentication	Ш
dot1x timeout quiet-period	Ш
dot1x timeout re-authperiod	Ш
dot1x timeout server-timeout	Ш
dot1x timeout supp-timeout	Ш
dot1x timeout tx-period	Ш

41.6.10 show dot1x summary

802.1X

show dot1x summary

Г А

Ш

Г А

Ш

Г Д

Ш

Г Д

Г Д

```
Ruijie# show dot1x summary
ID   MAC           Interface VLAN Auth-State
Backend-State Port-Status Type
-----
1 00d0f8000000 Gi0/1      1 Authenticated Idle
Authed      Static
Ruijie#
```

Г Д

dot1x auth-mode	802.1x Ш
dot1x max-req	Ш
dot1x port-control auto	Ш
dot1x reauth-max	
dot1x re-authentication	Ш
dot1x timeout quiet-period	Ш
dot1x timeout re-authperiod	Ш
dot1x timeout server-timeout	Ш
dot1x timeout supp-timeout	Ш
dot1x timeout tx-period	Ш

41.6.11 show dot1x user id

802.1X

```
show dot1x user id
```

r	A		
	<i>id</i>	show summary	id

dot1x timeout quiet-period	Ш
dot1x timeout re-authperiod	Ш
dot1x timeout server-timeout	Ш
dot1x timeout supp-timeout	Ш
dot1x timeout tx-period	Ш

41.6.12 show dot1x timeout

802.1X

```

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

```

Ш

```

r      A

```

Ш

```

r      A

```

Ш

```

r      A

```

```

r      A

```

```

Ruijie# show dot1x timeout quiet-period
quiet-period: 60 sec

```

```

r      A

```

dot1x auth-mode	802.1x Ш
dot1x max-req	Ш

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
u5luppout servout quiet-period	W

42 AAA

42.1

- **aaa authentication dot1x**
- **aaa authentication enable**
- **aaa authentication login**
- **aaa authentication ppp**
- **login authentication**

42.1.1 aaa authentication dot1x

```

AAA      802.1X
authentication dot1x      802.1X      aaa
                               no
                               802.1X

```

```
aaa authentication dot1x {default | list-name} method1 [method2...]
```

```
no aaa authentication dot1x {default | list-name}
```

г д

```
default      802.1X
      802.1X
```

```
list-name      802.1X
```

```
method      4
```

local	
none	
group	RADIUS

г д

г д

802.1X

г д

```

AAA 802.1X
└─ aaa authentication dot1x
    802.1X
    └─
        └─

```

Г Д

```

rds_d1x AAA 802.1X
RADIUS RADIUS
└─

```

```

Ruijie(config)# aaa authentication dot1x rds_d1x group
radius local

```

Г Д

aaa new-model	AAA
dot1x authentication	802.1X
username	

42.1.2 aaa authentication enable

```

AAA Enable
enable Enable
└─ no
    └─

```

```

aaa authentication enable default method1 [method2...]

```

```

no aaa authentication enable default

```

Г Д

```

default Enable
└─ Enable
    └─

```

```

method 4

```

local	
none	
group	TACACS+ RADIUS

Г Д

г д

Ш

г д

AAA Enable

AAA

Enable

Ш

aaa authentication enable

Enable

Ш

Ш

Enable

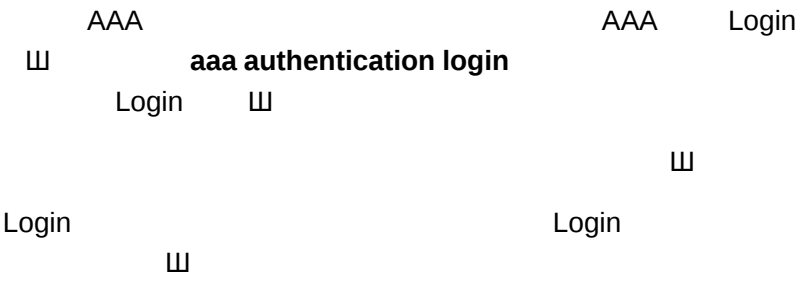
local	
none	
group	RADIUS TACACS+

г д

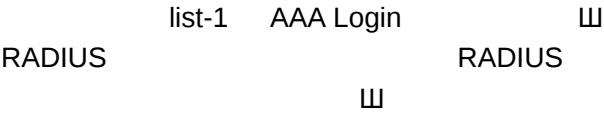
г д

Ш

г д



г д



```
Ruijie(config)# aaa authentication login list-1 group radius local
```

г д

aaa new-model	AAA
username	
login authentication	Login

42.1.4 aaa authentication ppp



```
aaa authentication ppp {default | list-name} method1 [method2...]
```

```
no aaa authentication ppp {default | list-name}
```

Г Д

```
default PPP
```

Ш

```
list-name PPP Ш
```

```
method 4
```

local	
none	
group	RADIUS

Г Д

Г Д

Ш

Г Д

AAA PPP

AAA PPP

Ш

```
aaa authentication ppp
```

PPP

Ш

Ш

Г Д

rds_ppp

AAA PPP

Ш

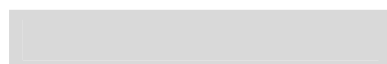
RADIUS

RADIUS

Ш

```
Ruijie(config)# aaa authentication ppp rds_ppp group
radius local
```

Г Д



- **aaa authorization commands**
- **aaa authorization config-commands**
- **aaa authorization console**
- **aaa authorization exec**
- **aaa authorization network**
- **authorization commands**
- **authorization exec**

42.2.1 aaa authorization commands

NAS	CLI	AAA	⏏
aaa authorization commands ⏏			no

AAA

AAA

Ш

14

14

Ш

no

1. Ruijie(config)# aaa authorization config-commands

2. Ruijie(config)# aaa authorization console

Ruijie(config)# aaa authorization config-commands

Ruijie(config)# aaa authorization console

aaa new-model	AAA
aaa authorization commands	AAA

42.2.3 aaa authorization console

AAA

aaa authorization console

no

AAA

1. Ruijie(config)# aaa authorization console

aaa authorization console

no aaa authorization console

2. Ruijie(config)# aaa authorization console

3. Ruijie(config)# aaa authorization console

4. Ruijie(config)# aaa authorization console

5. Ruijie(config)# aaa authorization console

6. Ruijie(config)# aaa authorization console

7. Ruijie(config)# aaa authorization console

8. Ruijie(config)# aaa authorization console

9. Ruijie(config)# aaa authorization console

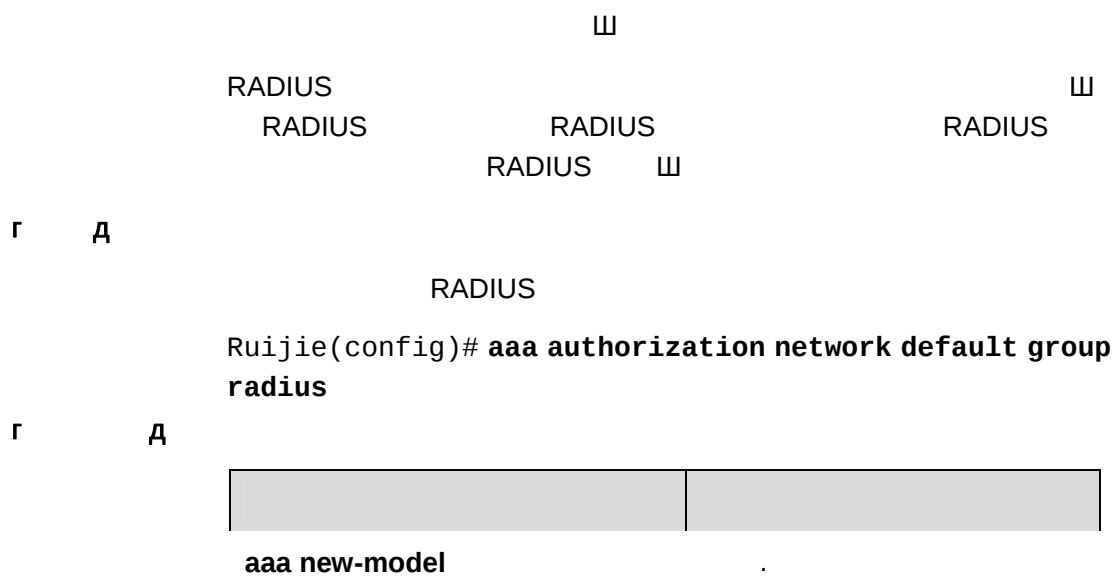
10. Ruijie(config)# aaa authorization console

11. Ruijie(config)# aaa authorization console

Ruijie(config)# aaa authorization console

Ruijie(config)# aaa authorization console





Г Д

aaa new-model	AAA
aaa authorization commands	AAA

<i>level</i>		0~15	
	⌘		
default			⌘
<i>list-name</i>			⌘
<i>method</i>		4	



AAA

Г

Д



aaa new-model

AAA

		<i>level</i>	0~15	
		Ш		
		default	Ш	
		<i>list-name</i>	Ш	
Г	Д			
Г	Д			
		Ш		
Г	Д			
				Ш
			Ш	
			Ш	
Г	Д			

```

AAA
  list-name
  Exec
  3

Ruijie(config)# aaa accounting exec exec-1 group radius
none
Ruijie(config)# line vty 0 4
Ruijie(config-line)# accounting exec exec-1

Ruijie(config)# exec-1 Exec
none 3 RADIUS
VTY
0 - 4
Ruijie(config)# aaa accounting exec exec-1 group radius
none
Ruijie(config)# line vty 0 4
Ruijie(config-line)# accounting exec exec-1

```

aaa new-model	AAA
aaa accounting commands	AAA Exec

42.4 AAA

- `aaa group server`
- `ip vrf forwarding`
- `server`
- `show aaa group`

42.4.1 aaa group server

```

AAA
  3
  no
  3

aaa group server {radius | tacacs+} name

```


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

```
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
```

Referred: 2
Server List:
IP Address: 192.168.217.64
Authentication Port: 1812
Accounting Port: 1813
Referred: 1

Г А

aaa group server	AAA

42.5 AAA

- **aaa local authentication attempts**
- **aaa local authentication logout-time**
- **aaa new-model**
- **clear aaa local user logout**
- **debug aaa**
- **show aaa method-list**
- **show aaa user logout**

42.5.1 aaa local authentication attempts

login

aaa local authentication attempts *max-attempts*

Г А

max-attempts 1~2147483647Щ

Г А

3

Г А

Щ

Г А

Login

Г А

Ruijie# **configure terminal**

```
Ruijie(config)# aaa local authentication attempts 6
```

```

r      A

```

show running-config	
show aaa logout	login

42.5.2 aaa local authentication logout-time

```
login
```

```
aaa local authentication logout-time logout-time
```

```

r      A

```

```
logout-time                                1~2147483647
```

```

r      A

```

```
15
```

```

r      A

```

```


```

```

r      A

```

```
login
```

```

r      A

```

```
Ruijie# configure terminal
```

```
Ruijie(config)# aaa local authentication logout-time
```

```
5
```

```

r      A

```

show running-config	
show aaa logout	login

42.5.3 aaa new-model

```
AAA
```

```
aaa new-model
```

		AAA	no	AAA	
		aaa new-model			
		no aaa new-model			
г	Д				
г	Д				
		AAA			
г	Д				
г	Д				
		AAA		AAA	
		aaa new-model	AAA		AAA
г	Д				
		AAA			
		Ruijie(config)# aaa new-model			
г	Д				
		aaa authentication			
		aaa authorization			
		aaa accounting			

42.5.4 clear aaa local user logout

		clear aaa local user logout {all user-name <word>}			
г	Д				
		<word>	ID		
г	Д				
г	Д				

1

2

3

Ruijie# clear aaa local user logout all

4

show running-config	
show aaa logout	login

42.5.5 debug aaa

AAA

1

no

2

debug aaa event

no debug aaa event

3

4

5

EXEC

6

42.5.6 show aaa method-list

AAA

1

show aaa method-list

2

3

4

5

6

7

AAA Ⅲ

Г Д

AAA Ⅲ

```
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	

42.5.7 show aaa user logout

Ⅲ

show aaa user logout {all | user-name <word>}

Г Д

<word> ID

Г Д

Г Д

Ⅲ

Г Д

Ⅲ

Г Д

```
Ruijie# show aaa user logout all
```

r d

show running-config	
show aaa logout	login


```
radius fastEthernet 0/0 ip
radius
Ruijie(config)#
```

「 A

radius-server host	RADIUS

43.1.3 radius-server host

RADIUS

radius-server

no

RADIUS

radius-server host { *ip-address* } [**auth-port** *port-number*] [**acct-port** *port-number*]

no radius-server host { *ip-address* }

「 A

ip-address: RADIUS IP

auth-port: RADIUS UDP

port-number: RADIUS UDP 0

acct-port: Radius UDP

port-number: RADIUS UDP 0

「 A

RADIUS

「 A

「 A

RADIUS AAA

RADIUS

radius-server

RADIUS

「 A

RADIUS

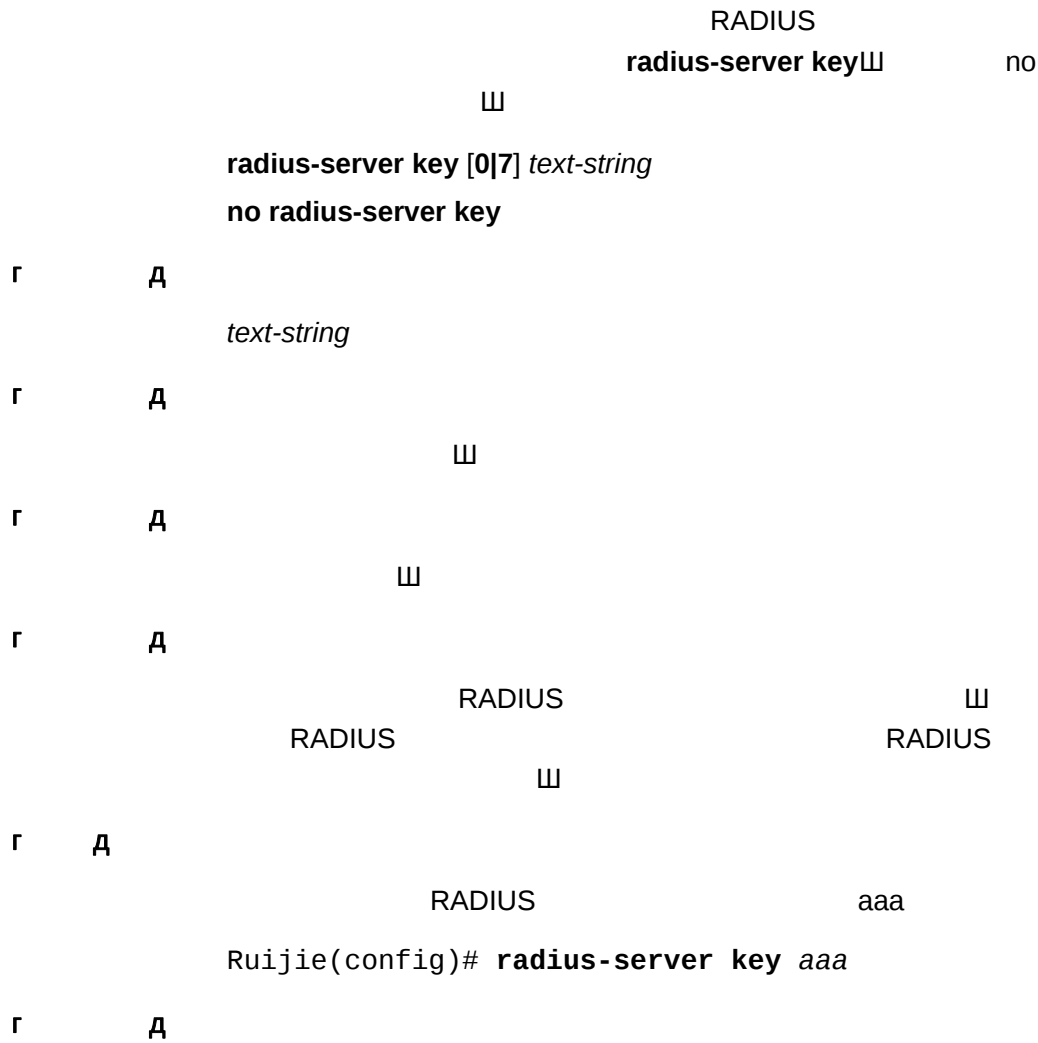
Ruijie(config)# **radius-server host** 192.168.12.1

「 A

aaa authentication	AAA

radius-server key	RADIUS
radius-server retransmit	RADIUS
radius-server timeout	RADIUS

43.1.4 radius-server key



radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server timeout	RADIUS

no

no radius-server retransmit

```
retries  RADIUS  W
```

3Ш

W

W

W

4

```
Ruijie(config)# radius-server retransmit 4
```

radius-server host	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

W

no radius-server timeout

seconds ▯ 1-1000 ▯

RADIUS

5

```
Ruijie(config)# radius-server deadtime 10
```

r **A**

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

43.1.8 radius attribute

radius attribute{*id* | down-rate-limit | dscp | mac-limit | up-rate-limit}
vendor-type *type*

no radius attribute {*id* | down-rate-limit | dscp | mac-limit |
up-rate-limit} **vendor-type**

r **A**

id id <1-255>

type type

r **A**

id		type
1	max down-rate	1
2	qos	2
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	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
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
24	limit to user number	50

radius

radius

radius

radius

radius

max up-rate 211

Ruijie(config)# radius attribute 16 vendor-type 211

radius

radius set qos cos	radius qos cos

43.1.9 radius set qos cos

radius qos cos

radius set qos cos

no radius set qos cos

radius

radius

qos dscp

radius

Г Д

Г Д

Г Д

radius vendor-specific extend	Radius id

radius vendor-specific extend

Г Д

Г Д

Г Д

Г Д

Г Д

Г Д

radius attribute	
radius set	qos cos

43.2 RADIUS

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

43.2.4 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
18	flux-max-high32	18
19	flux-max-low32	19
20	proxy-avoid	20
21	dailup-avoid	21
22	ip privilige	22
23	login privilige	42
24	limit to user number	50

r

A

--	--

44 TACACS+

44.1 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**

44.1.1 aaa group server tacacs+

```

TACACS+
TACACS+
aaa group server tacacs+ group-name
no aaa group server tacacs+ group-name
TACACS+
TACACS+
TACACS+
TACACS+
TACACS+
tac1 TACACS+
1.1.1.1 TACACS+
Ruijie(config)# aaa group server tacacs+ tac1
Ruijie(config-gs-tacacs)#server 1.1.1.1

```

Г Д

server	TACACS+ server
ip vrf forwarding	TACACS+ VRF

44.1.2 server(TACACS+)

TACACS+ Ш

server *ip-address*

no server *ip-address*

Г Д

ip-address TACACS+

Г Д

Г Д

TACACS+ Ш

Г Д

aaa group server tacacs+ TACACS+

Ш

TACACS+

tacacs-server host

Ш

TACACS+

Ш

Г Д

tac1 TACACS+

1.1.1.1 TACACS+

Ruijie(config)# **aaa group server tacacs+ tac1**

Ruijie(config-gs-tacacs+)# **server 1.1.1.1**

Г Д

aaa group server tacacs+	TACACS+
ip vrf forwarding	TACACS+ VRF

44.1.3 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

44.1.4 ip tacacs source-interface

```

TACACS+
ip tacacs source-interface interface
no ip tacacs source-interface

r      A
Interface TACACS+

r      A

```

```

TACACS+
r  A
    W
r  A
    TACACS+
    TACACS+
    TACACS+
    nas
    W
    W
    ip
r  A
    TACACS+
    fastEthernet 0/0
    ip
    TACACS+
Ruijie(config)# ip tacacs source-interface
fastEthernet 0/0

```

```

r  A

```

tacacs-server host	TACACS+
ip address	ip

44.1.5 tacacs-server host

```

TACACS+
IP
W

tacacs-server host ip-address [port integer] [timeout integer] [key
[0 | 7]string]
no tacacs-server host ip-address

```

```

r  A

```

```

ip-address    TACACS+
port integer  TACACS+
timeout integer TACACS+
key string    TACACS+ client
0 | 7         0      7

```

```

r  A

```

```

TACACS+
W

```

```

r  A

```

```

W

```

```

r  A

```

TACACS+ AAA TACACS+
 TACACS+
 tacacs-server
 TACACS+

Г Д

TACACS+

Ruijie(config)# **tacacs-server host 192.168.12.1**

Г Д

aaa authentication	AAA
tacacs-server key	TACACS+
tacacs-server timeout	TACACS+

44.1.6 tacas-server key

TACACS+ Ш

tacacs-server key [0 | 7] string

no tacacs-server key

Г Д

string

0 | 7 0 7 Ш

Г Д

Ш

Г Д

Ш

Г Д

TACACS+ Ш
 TACACS+ TACACS+
 Ш
 host key
 key keyШ

Г Д

TACACS+

aaa

Ruijie(config)#**tacacs-server key aaa**

Г Д

tacacs-server host	TACACS+
tacacs-server timeout	TACACS+

44.1.7 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

Ш

host
timeout

timeout

timeout Ш

Г Д

10

Ruijie(config)# **tacacs-server timeout 10**

Г Д

--	--

44.2.1 debug tacacs+

```

TACACS+          1
debug tacacs+
no debug tacacs+

Ruijie#
1
EXEC          1

```

44.2.2 show tacacs

```

TACACS+          1
show tacacs

Ruijie#
1
1
1
1
1
TACACS+          1
Ruijie#

```

```

Ruijie# show tacacs
Tacacs+ Server : 172.19.192.80/49
Socket Opens: 0
Socket Closes: 0
Total Packets Sent: 0
Total Packets Recv: 0
Reference Count: 0

```

```

Ruijie#

```

tacacs-server host	TACACS+

45 SSH

45.1 SSH

SSH

- **crypto key generate**
- **crypto key zeroize**
- **ip ssh version**
- **ip ssh time-out**
- **ip ssh authentication-retries**

45.1.1 crypto key generate

crypto key generate {rsa | dsa}

r A

rsa	RSA
dsa	DSA

r A

SSH Server **W**

r A

r A

SSH Server SSH SSH Server

W enable service ssh-server W

SSH 1 RSA SSH 2 RSA DSA W

RSA SSH1 SSH2

DSA SSH2 **W**

Г Д

Г Д

45.1.2 crypto key zeroize

Г Д

45-2

```
Ruijie# configure terminal
```

```
Ruijie(config)# crypto key zeroize rsa
```

r

A



ò

```
Ruijie# configure terminal
Ruijie(config)# ip ssh version 2
```

└ A

show ip ssh	SSH Server ▮

└ A

RGOS10.1

45.1.4 ip ssh time-out

SSH Server ▮ no
▮

```
ip ssh time-out time
no ip ssh time-out
```

└ A

time	▮

└ A

120s▮ no ip ssh
time-out ▮

└ A

└ A

SSH Server ▮
120s ▮
show ip ssh SSH server ▮

└ A

100s

```
Ruijie# configure terminal
Ruijie(config)# ip ssh time-out 100
```

└ A

--	--

show ip ssh	ssh-server	SSH
-------------	------------	-----

Ruijie#
 Ruijie#

RGOS10.1

45.1.5 ip ssh authentication-retries

SSH Server

SSH

no

SSH

ip ssh authentication-retries *retry times*

no ip ssh authentication-retries

Ruijie#
 Ruijie#

<i>retry times</i>	SSH

Ruijie#
 Ruijie#

3 SSH

no ip ssh

authentication-retries

SSH

Ruijie#
 Ruijie#

Ruijie#
 Ruijie#

SSH Server

SSH

SSH Server

SSH show

ip ssh

SSH Server

SSH

Ruijie#
 Ruijie#

2

Ruijie# **configure terminal**Ruijie(config)# **ip ssh ssh authentication-retries 2**

Ruijie#
 Ruijie#

show ip ssh	SSH Server SSH

Ruijie#
 Ruijie#

RGOS10.1

45.2 SSH

SSH

- show ip ssh
- show ssh
- show crypto key mypubkey
- disconnect ssh

45.2.1 show ip ssh

```

SSH Server
show ip ssh

r      A
r      A
r      A
r      A
SSH Server
Server  SSH
SSH
SSH
r      A

```

Ruijie# show ip ssh

```

r      A

```

ip ssh version {1 2}	SSH Server
ip ssh time-out time	SSH Server
ip ssh authentication-retries retry times	SSH Server

```

r      A

```

RGOS10.1

45.2.2 show ssh

SSH



```
show ssh
```

```
 Ruijie#
```

```
 Ruijie#
```

```
 Ruijie#
```

```
 Ruijie#
```

```
SSH 4 SSH 4 VTY 4
```

```
 Ruijie#
```

```
Ruijie# show ssh
```

```
 Ruijie#
```

```
 Ruijie#
```

RGOS10.1

45.2.3 show crypto key mypubkey

SSH Server



```
show crypto key mypubkey {rsaldsa}
```

```
 Ruijie#
```

rsa	RSA
dsa	DSA

```
 Ruijie#
```

Г А

Г А

SSH Server

Ч Ч Ш Ш

Г А

Ruijie# **show crypto key mypubkey rsa**

Г А

crypto key generate {rsa dsa}	DSA RSA Ш

Г А

RGOS10.1

45.2.4 disconnect ssh

SSH Ш

disconnect ssh [vty] session-id

Г А

<i>session-id</i>	SSH Ш

Г А

Г А

Г А

SSH

VTY SSH Ш SSH

Ш

Г А

Ruijie# **disconnect ssh 1**
 Ruijie# **disconnect ssh vty 1**

Г Д

show ssh	SSH Ш
Clear line vty <i>line_number</i>	VTY Ш

Г Д

RGOS10.1

46 CPU

46.1

- **cpu-protect type** *packet-type* **traffic-class** *traffic-class-num*
- **cpu-protect traffic-class id** *id_num* **bandwidth** *bandwidth_value*
- **cpu-protect traffic-class all** **bandwidth** *bandwidth_value*
- **cpu-protect cpu** **bandwidth** *bandwidth_value*
- **cpu-protect mac-address storm-control enable** *value*

46.1.1 cpu-protect type packet-type traffic-class

traffic-class-num

cpu-protect type { **bpdu** | **arp** | **igmp** | **dot1x** | **gvrp** | **dhcp** | **unicast** | **multicast** | **broadcast** | **error_ttl** | **other**} **traffic-class** *traffic-class-num*

Г А

traffic-class-num id 0 7Щ

Г А

show cpu-protect Щ

Г А

Щ

Г А

CPU BPDU

Ruijie(config)# **cpu-protect type bpdu traffic-class 5**

Ruijie(config)# **end**

Ruijie # **show cpu-protect type bpdu traffic-class**

```
%*****packet type      traffic-class*****
          bpdu           5
```

Г А

--	--

bandwidth_value

```
cpu-protect traffic-class id id_num bandwidth bandwidth_value
```

Г Д

<i>id_num</i>	ID	0 7
---------------	----	-----

<i>bandwidth_value</i>	32	131072(kbps)
------------------------	----	--------------

Г Д

```
show cpu-protect
```

Г Д

Г Д

7 312(kbps)

```
Ruijie#configure terminal
```

```
Ruijie(config)# cpu-protect traffic-class id 7  
bandwidth 213
```

```
bandwidth 312
Pwldio(config)#end
```

```
Ruijie# show cpu-protect traffic-class id 7
```

```
%*****traffic class      bandwidth(kbps)*****
7                          312
```

Г Д

--	--

cpu-protect type <i>packet-type</i>	
--	--

traffic-class traffic-class-num	
cpu-protect traffic-class all	

bandwidth <i>bandwidth</i> <i>value</i>	
---	--

cpu-protect	cpu	bandwidth	CPU
bandwidth_value			

46.1.3 cpu-protect traffic-class all bandwidth *bandwidth_value*

cpu-protect traffic-class **id** *id_num* **bandwidth** *bandwidth_value*

Г Д

<i>bandwidth_value</i>	32	131072(kbps)
------------------------	----	--------------

Г Д

```
show cpu-protect
```

Г Д

Г Д

312(kbps)

Ruijie#configure terminal

```
Ruijie(config)#      cpu-protect      traffic-class      all
bandwidth 312
Ruijie(config)#end
```

Г Д

--	--

bandwidth_value 64 1000000(kbps)

Г Д

show cpu-protect Ш

Г Д

Ш

Г Д

CPU 2000 kbps

```
Ruijie#configure terminal
Ruijie(config)#cpu-protect cpu bandwidth 2000
Ruijie(config)#end
Ruijie#show cpu-protect cpu
%cpu port bandwidth: 2000(kpbs)
```

Г Д

cpu-protect type <i>packet-type</i> traffic-class <i>traffic-class-num</i>	
cpu-protect traffic-class id <i>id_num</i> bandwidth <i>bandwidth_value</i>	
cpu-protect traffic-class all bandwidth <i>bandwidth_value</i>	

46.2

CPU

- show cpu-protect type *packet-type*
- show cpu-protect traffic-class id *id_num*
- show cpu-protect traffic-class all
- show cpu-protect cpu

46.2.1 show cpu-protect type packet-type

Ш

show cpu-protect type *packet-type*

Г Д

1

2

3

4

show cpu-protect type all

```

%*****packet type      traffic-class*****
      bpu             6
      arp             5
      igmp            3
      dot1x           3
      gvrp            3
      dhcp            2
      unicast         4
      multicast       1
      broadcast       0
      error_ttl       0
      co-operate      6
      other           0
  
```

5

show cpu-protect traffic-class	1
id id_num	id_num 0 7
show cpu-protect traffic-class all	
show cpu-protect cpu	CPU 1

46.2.2 show cpu-protect traffic-class id id_num

1

show cpu-protect traffic-class id id_num

2

idt_num 0-71

3

4

5

6

Г Д

1 CPU Ш

Ruijie#show cpu-protect traffic-class id 1

```
%*****traffic class      bandwidth(kbps)*****
          1                1000
```

Г Д

show cpu-protect type <i>packet-type</i>	
show cpu-protect traffic-class all	
show cpu-protect cpu	CPU Ш

46.2.3 show cpu-protect traffic-class all

show cpu-protect traffic-class all

Г Д

Ш

Г Д

Ш

Г Д

show cpu-protect traffic-class all

Ruijie# show cpu-protect traffic-class all

```
%*****traffic class      bandwidth(kbps)*****
          0                1000
          1                1000
          2                1000
          3                1000
          4                1000
          5                1000
          6                1000
          7               100000
```

Г Д

--	--

show cpu-protect type <i>packet-type</i>	
show cpu-protect traffic-class id <i>id_num</i>	id_num 0 7
show cpu-protect cpu	CPU

46.2.4 show cpu-protect cpu

```

CPU
show cpu-protect cpu

r      A

          0

r      A

          CPU          0

r      A

          CPU

Ruijie# show cpu-protect cpu
%cpu port bandwidth: 100000(kbps)

r      A

```

show cpu-protect type <i>packet-type</i>	
show cpu-protect traffic-class id <i>id_num</i>	id_num 0 7
show cpu-protect traffic-class all	

┌ ▴

Show system-guard	

47.1.2 system-guard isolate-time seconds

┌ no ┌

system-guard isolate-time *seconds*

no system-guard isolate-time

┌ ▴

<i>seconds</i>	┌ IP ┌second 30 3600 120

┌ ▴

120

┌ ▴

┌

┌ ▴

┌ IP second
 IP ┌

┌ ▴

100

Ruijie(config-if)# **system-guard isolate-time 100**

system-guard same-dest-ip-attack-packets *number*

no system-guard same-dest-ip-attack-packets

Г Д

<i>number</i>	Ш	IP	IP	
	20	0	2000	
	Ш	0		Ш

Г Д

20

Г Д

Ш

Г Д

Ш

Г Д

100

Ruijie(config-if)# **system-guard**
same-dest-ip-attack-packets *100*

Г Д

system-guard enable	

47.1.4 system-guard scan-dest-ip-attack-packets *number*

IP Ш no
Ш

system-guard scan-dest-ip-attack-packets *number*

<i>number</i>	IP	1000	10
	0		
	0		

г д

10

г д

Ш

г д

Ш

г д

100

Ruijie(config-if)# **system-guard**
scan-dest-ip-attack-packets 100

г д

system-guard enable	

47.1.5 system-guard detect-maxnum *number*

Ш no Ш

system-guard detect-maxnum *number*
no system-guard detect-maxnum

г д

<i>num</i>	IP
	1 500 10 Ш
	0 Ш

г д

100

г д

Ш

г д

і

/20 Ł

Ш

Ш

Ш

г д

200

Ruijie(config)# **system-guard detect-maxnum 200**

г д



system-guard enablefjuTj/TT5jF Trf0TD-5086 0 TD0 4572714 Tc049b7472135424c06

```
Ruijie(config-if)# system-guard exception
192.168.5.145 255.255.255.0
```

```

r      A

```

system-guard enable	

47.1.7 clear system-guard [interface interface-id [ip-address ip-address]]

IP

```
clear system-guard [interface interface-id [ip-address] ]
```

```

r      A

```

interface <i>interface-id</i>	
ip-address <i>ip-address</i>	IP

```

r      A

```

```

r      A

```

```

r      A

```

```

r      A

```

Fastethernet 0/1 IP

```
Ruijie(config)# clear system-guard interface
fastethernet 0/1
```

```

r      A

```

system-guard enable	

47.2

- **show system-guard** [interface *interface-id*]
- **show system-guard isolate-ip** [interface *interface-id*]
- **show system-guard detect-ip** [interface *interface-id*]
- **show system-guard exception-ip**

47.2.1 show system-guard [interface interface-id]

▮

show system-guard [interface *interface-id*]

Г А

interface <i>interface-id</i>	

Г А

Г А

▮

Г А

Г А

```
Ruijie# show system-guard
detect-maxnum number : 100      //
isolated host number  : 11       //
interface state isolate time same-attack-pkts
scan-attack-pkts
-----
Fa 0/1  ENABLE    120      20      10
Fa 0/2  DISABLE   110      21      11
.....
Ruijie# show system-guard interface Fa 0/1
detect-maxnum number : 100      //
isolated host number  : 11       //
interface state isolate time same-attack-pkts
scan-attack-pkts
-----
Fa 0/1  ENABLE    120      20      10
```

Г А

RGOS10.1

48.1.2 security community

smp

```
security { [ v1 | v2 ] community community | v3 user username }
```

```
no security { [ v1 | v2 ] community community | v3 user username }
```

```
┌      A
```

```
community community
```

```
username v3
```

```
┌      A
```

```
┌      A
```

```
┌      A
```

```

v3 , v3 snmp-server
SNMP III
```

```
┌      A
```

```
v1 community
```

```
Ruijie(config)# security v1 community public
```

```
v3 start
```

```
Ruijie(config)# security v3 user start
```

```
┌      A
```

```
┌      A
```

RGOS10.1

48.1.3 smp-server host

smp-server ip

```
smp-server host ip-address
```

```
no smp-server host
```

```

r      A
      ip-address      smp server      ip

r      A
      smp server

r      A

r      A
      ▮      show smp-server      ▮

r      A
      Ruijie(config)#smp-server host 192.168.4.243

r      A
      

|                                 |            |
|---------------------------------|------------|
|                                 |            |
| <a href="#">show</a> smp-server | smp server |



r      A
      RGOS10.1

```

48.1.4 security event interval

```

      security event interval interval
      no security event interval

r      A
      interval      ▮

r      A
      5s

r      A

r      A
      ▮      show security event interval      ▮

r      A

```

Ruijie(config)# **security event interval 10**

Г А

show security event interval	

Г А

RGOS10.1

48.1.5 security address-bind enable

security address-bind enable

no security address-bind enable

Г А

Г А

Г А

AP AP

Г А

Ш

GSN

Ш

Г А

Ruijie(config-if)# **security address-bind enable**

Г А

security gsn enable	GSN

Г А

RGOS10.1

48.2

```
show smp-server
show security event interval
```

48.2.1 show smp-server

```

smp server IP
r      A

r      A

r      A

smp server IP  W

r      A

Ruijie# show smp-server
SMP-Server IP 192.168.20.30

r      A



|                 |                  |
|-----------------|------------------|
|                 |                  |
| smp-server host | smp server ip  W |



r      A

RGOS10.1
```

48.2.2 show security event interval

```

W

r      A

r      A

r      A

W

r      A
```


49 DAI

49.1 VLAN DAI

- ip arp inspection vlan

49.1.1 ip arp inspection vlan vlan-id

no *vlan-id* VLAN DAI 
vlan-id VLAN DAI 
vlan-id VLAN DAI 

ip arp inspection vlan *vlan-id*
no ip arp inspection vlan [*vlan-id*]

└ A

<i>vlan-id</i>	vlan 

└ A

VLAN DAI 

└ A

└ A

DAI 

└ A

VLAN 1 ARP 

Ruijie(config)# ip arp inspection
Ruijie(config)# ip arp inspection vlan 1

└ A

show ip arp inspection vlan	VLAN DAI

- ip arp inspection limit-rate

49.3.1 ip arp inspection limit-rate limit-rate

ARP
 ip arp inspection limit-rate no ip arp
 ip arp inspection limit-rate {*limit-rate* | **none** }
 no ip arp inspection limit-rate

г д

none	
<i>limit-rate</i>	1 2048

г д

15 ARP / no
 0 no

г д

г д

DAI no
 (Network Foundation Protection Policy)
 no

г д

VLAN 2 gigabitEthernet 0/2
 10 ARP / no

Ruijie(config)# **ip arp inspection**
 Ruijie(config)# **interface gigabitEthernet 0/2**
 Ruijie(config-if)# **ip arp inspection limit-rate 10**

49.4 DHCP Snooping

VLAN DAI ARP
 ARP
 DHCP Snooping .
 no DHCP Snooping no DHCP Snooping
 Ю

50.1 IP Source Guard

- **ip source binding**

no

Г Д

Г Д

Г Д

Г Д

Г Д

50-1

Г Д

- **ip verify source**

no IP Source Guard

Г Д

Г Д

Г Д

Г Д

DHCP Snooping

Г Д

```
Ruijie# configure terminal
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# ip verify source
Ruijie(config-if)# end
Ruijie# show ip verify source
```


inactive-trust-port

DHCP Snooping

active

DHCP Snooping

⏏

r A

Ruijie # **show ip verify source**

Interface	Filter-type	Filter-mode
Ip-address	Mac-address	VLAN

FastEthernet 0/1	ip	active
00d0.f801.0101	1	192.168.4.243

r A

ip verify source	IP Source Guard

50.3.2 show ip source binding

IP

⏏

show ip source binding [*ip-address*] [*mac-address*]
 [*dhcp-snooping*] [*static*] [*vlan vlan-id*] [*interface interface-id*]

r A

ip-address ip
mac-address mac
 dhcp-snooping
 static
vlan-id vlan
interface-id

r A

⏏

r A

r A

r A

IP

```

Ruijie#show ip source binding
MacAddress      IpAddress      Lease(sec)  Type
VLAN  Interface
-----
00d0.f801.0101  192.168.4.243  infinite   static
1    FastEthernet 0/1
Total number of bindings: 1

```

Г А

ip source binding	

50.3.3 debug ip source bind

IP Source Guard



debug ip source bind

Г А

Г А

Г А

Г А

IP Source Guard



Г А

IP Source Guard

```

Ruijie# debug ip source bind

```

Г А

51 ACL

id	ACL IP ACL: 1-99,1300-1999 IP ACL: 100-199,2000-2699 MAC ACL: 700-799 ACL: 2700-2899
name	ACL
sn	ACL ()
start-sn	
inc-sn	
deny	
permit	
prot	IPv6 ipv6, icmp, tcp, udp 0-255 IPv4 eigrp, gre, ipinip, igmp, nos, ospf, icmp, udp, tcp, ip IP 0-255 icmp/tcp/udp
interface idx	
src	
src-wildcard	ACL 0.255.0.32
src-ipv6-pfix	IPv6
dst-ipv6-pfix	IPv6
pfix-len	
src-ipv6-addr	IPv6
addr	IPv6
dscp dscp	, 0-63
flow-label flow-label	0-1048575
dst	
dst-wildcard	ACL 0.255.0.32

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

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

- ip access-group
- mac access-group
- expert access-group
- ipv6 traffic-filter

51.1.1 access-list

no

111

1) IP 1 - 99 1300 - 1999

access-list *id* {deny | permit} {source source-wildcard | host source | any}

2) IP 100 - 199 2000 - 2699

access-list *id* {deny | permit} **protocol** {source source-wildcard | host source | any} {destination destination-wildcard | host destination | any} [precedence precedence] [tos tos] [fragments] [time-range time-range-name]

3) MAC 700 - 799

access-list *id* {deny | permit} {any | host source-mac-address} {any | host destination-mac-address} [ethernet-type] [cos [out]] [inner in]]

4) Expert 2700 - 2899

access-list *id* {deny | permit} [protocol | [ethernet-type] [cos [out]] 5.0(255) 10(10) 19(19) 20(20) 21(21) 22(22) 23(23) 24(24) 25(25) 26(26) 27(27) 28(28) 29(29) 30(30) 31(31) 32(32) 33(33) 34(34) 35(35) 36(36) 37(37) 38(38) 39(39) 40(40) 41(41) 42(42) 43(43) 44(44) 45(45) 46(46) 47(47) 48(48) 49(49) 50(50) 51(51) 52(52) 53(53) 54(54) 55(55) 56(56) 57(57) 58(58) 59(59) 60(60) 61(61) 62(62) 63(63) 64(64) 65(65) 66(66) 67(67) 68(68) 69(69) 70(70) 71(71) 72(72) 73(73) 74(74) 75(75) 76(76) 77(77) 78(78) 79(79) 80(80) 81(81) 82(82) 83(83) 84(84) 85(85) 86(86) 87(87) 88(88) 89(89) 90(90) 91(91) 92(92) 93(93) 94(94) 95(95) 96(96) 97(97) 98(98) 99(99) 100(100) 101(101) 102(102) 103(103) 104(104) 105(105) 106(106) 107(107) 108(108) 109(109) 110(110) 111(111) 112(112) 113(113) 114(114) 115(115) 116(116) 117(117) 118(118) 119(119) 120(120) 121(121) 122(122) 123(123) 124(124) 125(125) 126(126) 127(127) 128(128) 129(129) 130(130) 131(131) 132(132) 133(133) 134(134) 135(135) 136(136) 137(137) 138(138) 139(139) 140(140) 141(141) 142(142) 143(143) 144(144) 145(145) 146(146) 147(147) 148(148) 149(149) 150(150) 151(151) 152(152) 153(153) 154(154) 155(155) 156(156) 157(157) 158(158) 159(159) 160(160) 161(161) 162(162) 163(163) 164(164) 165(165) 166(166) 167(167) 168(168) 169(169) 170(170) 171(171) 172(172) 173(173) 174(174) 175(175) 176(176) 177(177) 178(178) 179(179) 180(180) 181(181) 182(182) 183(183) 184(184) 185(185) 186(186) 187(187) 188(188) 189(189) 190(190) 191(191) 192(192) 193(193) 194(194) 195(195) 196(196) 197(197) 198(198) 199(199) 200(200) 201(201) 202(202) 203(203) 204(204) 205(205) 206(206) 207(207) 208(208) 209(209) 210(210) 211(211) 212(212) 213(213) 214(214) 215(215) 216(216) 217(217) 218(218) 219(219) 220(220) 221(221) 222(222) 223(223) 224(224) 225(225) 226(226) 227(227) 228(228) 229(229) 230(230) 231(231) 232(232) 233(233) 234(234) 235(235) 236(236) 237(237) 238(238) 239(239) 240(240) 241(241) 242(242) 243(243) 244(244) 245(245) 246(246) 247(247) 248(248) 249(249) 250(250) 251(251) 252(252) 253(253) 254(254) 255(255) 256(256) 257(257) 258(258) 259(259) 260(260) 261(261) 262(262) 263(263) 264(264) 265(265) 266(266) 267(267) 268(268) 269(269) 270(270) 271(271) 272(272) 273(273) 274(274) 275(275) 276(276) 277(277) 278(278) 279(279) 280(280) 281(281) 282(282) 283(283) 284(284) 285(285) 286(286) 287(287) 288(288) 289(289) 290(290) 291(291) 292(292) 293(293) 294(294) 295(295) 296(296) 297(297) 298(298) 299(299) 300(300) 301(301) 302(302) 303(303) 304(304) 305(305) 306(306) 307(307) 308(308) 309(309) 310(310) 311(311) 312(312) 313(313) 314(314) 315(315) 316(316) 317(317) 318(318) 319(319) 320(320) 321(321) 322(322) 323(323) 324(324) 325(325) 326(326) 327(327) 328(328) 329(329) 330(330) 331(331) 332(332) 333(333) 334(334) 335(335) 336(336) 337(337) 338(338) 339(339) 340(340) 341(341) 342(342) 343(343) 344(344) 345(345) 346(346) 347(347) 348(348) 349(349) 350(350) 351(351) 352(352) 353(353) 354(354) 355(355) 356(356) 357(357) 358(358) 359(359) 360(360) 361(361) 362(362) 363(363) 364(364) 365(365) 366(366) 367(367) 368(368) 369(369) 370(370) 371(371) 372(372) 373(373) 374(374) 375(375) 376(376) 377(377) 378(378) 379(379) 380(380) 381(381) 382(382) 383(383) 384(384) 385(385) 386(386) 387(387) 388(388) 389(389) 390(390) 391(391) 392(392) 393(393) 394(394) 395(395) 396(396) 397(397) 398(398) 399(399) 400(400) 401(401) 402(402) 403(403) 404(404) 405(405) 406(406) 407(407) 408(408) 409(409) 410(410) 411(411) 412(412) 413(413) 414(414) 415(415) 416(416) 417(417) 418(418) 419(419) 420(420) 421(421) 422(422) 423(423) 424(424) 425(425) 426(426) 427(427) 428(428) 429(429) 430(430) 431(431) 432(432) 433(433) 434(434) 435(435) 436(436) 437(437) 438(438) 439(439) 440(440) 441(441) 442(442) 443(443) 444(444) 445(445) 446(446) 447(447) 448(448) 449(449) 450(450) 451(451) 452(452) 453(453) 454(454) 455(455) 456(456) 457(457) 458(458) 459(459) 460(460) 461(461) 462(462) 463(463) 464(464) 465(465) 466(466) 467(467) 468(468) 469(469) 470(470) 471(471) 472(472) 473(473) 474(474) 475(475) 476(476) 477(477) 478(478) 479(479) 480(480) 481(481) 482(482) 483(483) 484(484) 485(485) 486(486) 487(487) 488(488) 489(489) 490(490) 491(491) 492(492) 493(493) 494(494) 495(495) 496(496) 497(497) 498(498) 499(499) 500(500) 501(501) 502(502) 503(503) 504(504) 505(505) 506(506) 507(507) 508(508) 509(509) 510(510) 511(511) 512(512) 513(513) 514(514) 515(515) 516(516) 517(517) 518(518) 519(519) 520(520) 521(521) 522(522) 523(523) 524(524) 525(525) 526(526) 527(527) 528(528) 529(529) 530(530) 531(531) 532(532) 533(533) 534(534) 535(535) 536(536) 537(537) 538(538) 539(539) 540(540) 541(541) 542(542) 543(543) 544(544) 545(545) 546(546) 547(547) 548(548) 549(549) 550(550) 551(551) 552(552) 553(553) 554(554) 555(555) 556(556) 557(557) 558(558) 559(559) 560(560) 561(561) 562(562) 563(563) 564(564) 565(565) 566(566) 567(567) 568(568) 569(569) 570(570) 571(571) 572(572) 573(573) 574(574) 575(575) 576(576) 577(577) 578(578) 579(579) 580(580) 581(581) 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693(693) 694(694) 695(695) 696(696) 697(697) 698(698) 699(699) 700(700) 701(701) 702(702) 703(703) 704(704) 705(705) 706(706) 707(707) 708(708) 709(709) 710(710) 711(711) 712(712) 713(713) 714(714) 715(715) 716(716) 717(717) 718(718) 719(719) 720(720) 721(721) 722(722) 723(723) 724(724) 725(725) 726(726) 727(727) 728(728) 729(729) 730(730) 731(731) 732(732) 733(733) 734(734) 735(735) 736(736) 737(737) 738(738) 739(739) 740(740) 741(741) 742(742) 743(743) 744(744) 745(745) 746(746) 747(747) 748(748) 749(749) 750(750) 751(751) 752(752) 753(753) 754(754) 755(755) 756(756) 757(757) 758(758) 759(759) 760(760) 761(761) 762(762) 763(763) 764(764) 765(765) 766(766) 767(767) 768(768) 769(769) 770(770) 771(771) 772(772) 773(773) 774(774) 775(775) 776(776) 777(777) 778(778) 779(779) 780(780) 781(781) 782(782) 783(783) 784(784) 785(785) 786(786) 787(787) 788(788) 789(789) 790(790) 791(791) 792(792) 793(793) 794(794) 795(795) 796(796) 797(797) 798(798) 799(799) 800(800) 801(801) 802(802) 803(803) 804(804) 805(805) 806(806) 807(807) 808(808) 809(809) 810(810) 811(811) 812(812) 813(813) 814(814) 815(815) 816(816) 817(817) 818(818) 819(819) 820(820) 821(821) 822(822) 823(823) 824(824) 825(825) 826(826) 827(827) 828(828) 829(829) 830(830) 831(831) 832(832) 833(833) 834(834) 835(835) 836(836) 837(837) 838(838) 839(839) 840(840) 841(841) 842(842) 843(843) 844(844) 845(845) 846(846) 847(847) 848(848) 849(849) 850(850) 851(851) 852(852) 853(853) 854(854) 855(855) 856(856) 857(857) 858(858) 859(859) 860(860) 861(861) 862(862) 863(863) 864(864) 865(865) 866(866) 867(867) 868(868) 869(869) 870(870) 871(871) 872(872) 873(873) 874(874) 875(875) 876(876) 877(877) 878(878) 879(879) 880(880) 881(881) 882(882) 883(883) 884(884) 885(885) 886(886) 887(887) 888(888) 889(889) 890(890) 891(891) 892(892) 893(893) 894(894) 895(895) 896(896) 897(897) 898(898) 899(899) 900(900) 901(901) 902(902) 903(903) 904(904) 905(905) 906(906) 907(907) 908(908) 909(909) 910(910) 911(911) 912(912) 913(913) 914(914) 915(915) 916(916) 917(917) 918(918) 919(919) 920(920) 921(921) 922(922) 923(923) 924(924) 925(925) 926(926) 927(927) 928(928) 929(929) 930(930) 931(931) 932(932) 933(933) 934(934) 935(935) 936(936) 937(937) 938(938) 939(939) 940(940) 941(941) 942(942) 943(943) 944(944) 945(945) 946(946) 947(947) 948(948) 949(949) 950(950) 951(951) 952(952) 953(953) 954(954) 955(955) 956(956) 957(957) 958(958) 959(959) 960(960) 961(961) 962(962) 963(963) 964(964) 965(965) 966(966) 967(967) 968(968) 969(969) 970(970) 971(971) 972(972) 973(973) 974(974) 975(975) 976(976) 977(977) 978(978) 979(979) 980(980) 981(981) 982(982) 983(983) 984(984) 985(985) 986(986) 987(987) 988(988) 989(989) 990(990) 991(991) 992(992) 993(993) 994(994) 995(995) 996(996) 997(997) 998(998) 999(999) 1000(1000) 1001(1001) 1002(1002) 1003(1003) 1004(1004) 1005(1005) 1006(1006) 1007(1007) 1008(1008) 1009(1009) 1010(1010) 1011(1011) 1012(1012) 1013(1013) 1014(1014) 1015(1015) 1016(1016) 1017(1017) 1018(1018) 1019(1019) 1020(1020) 1021(1021) 1022(1022) 1023(1023) 1024(1024) 1025(1025) 1026(1026) 1027(1027) 1028(1028) 1029(1029) 1030(1030) 1031(1031) 1032(1032) 1033(1033) 1034(1034) 1035(1035) 1036(1036) 1037(1037) 1038(1038) 1039(1039) 1040(1040) 1041(1041) 1042(1042) 1043(1043) 1044(1044) 1045(1045) 1046(1046) 1047(1047) 1048(1048) 1049(1049) 1050(1050) 1051(1051) 1052(1052) 1053(1053) 1054(1054) 1055(1055) 1056(1056) 1057(1057) 1058(1058) 1059(1059) 1060(1060) 1061(1061) 1062(1062) 1063(1063) 1064(1064) 1065(1065) 1066(1066) 1067(1067) 1068(1068) 1069(1069) 1070(1070) 1071(1071) 1072(1072) 1073(1073) 1074(1074) 1075(1075) 1076(1076) 1077(1077) 1078(1078) 1079(1079) 1080(1080) 1081(1081) 1082(1082) 1083(1083) 1084(1084) 1085(1085) 1086(1086) 1087(1087) 1088(1088) 1089(1089) 1090(1090) 1091(1091) 1092(1092) 1093(1093) 1094(1094) 1095(1095) 1096(1096) 1097(1097) 1098(1098) 1099(1099) 1100(1100) 1101(1101) 1102(1102) 1103(1103) 1104(1104) 1105(1105) 1106(1106) 1107(1107) 1108(1108) 1109(1109) 1110(1110) 1111(1111) 1112(1112) 1113(1113) 1114(1114) 1115(1115) 1116(1116) 1117(1117) 1118(1118) 1119(1119) 1120(1120) 1121(1121) 1122(1122) 1123(1123) 1124(1124) 1125(1125) 1126(1126) 1127(1127) 1128(1128) 1129(1129) 1130(1130) 1131(1131) 1132(1132) 1133(1133) 1134(1134) 1135(1135) 1136(1136) 1137(1137) 1138(1138) 1139(1139) 1140(1140) 1141(1141) 1142(1142) 1143(1143) 1144(1144) 1145(1145) 1146(1146) 1147(1147) 1148(1148) 1149(1149) 1150(1150) 1151(1151) 1152(1152) 1153(1153) 1154(1154) 1155(1155) 1156(1156) 1157(1157) 1158(1158) 1159(1159) 1160(1160) 1161(1161) 1162(1162) 1163(1163) 1164(1164) 1165(1165) 1166(1166) 1167(1167) 1168(1168) 1169(1169) 1170(1170) 1171(1171) 1172(1172) 1173(1173) 1174(1174) 1175(1175) 1176(1176) 1177(1177) 1178(1178) 1179(1179) 1180(1180) 1181(1181) 1182(1182) 1183(1183) 1184(1184) 1185(1185) 1186(1186) 1187(1187) 1188(1188) 1189(1189) 1190(1190) 1191(1191) 1192(1192) 1193(1193) 1194(1194) 1195(1195) 1196(1196) 1197(1197) 1198(1198) 1199(1199) 1200(1200) 1201(1201) 1202(1202) 1203(1203) 1204(1204) 1205(1205) 1206(1206) 1207(1207) 1208(1208) 1209(1209) 1210(1210) 1211(1211) 1212(1212) 1213(1213) 1214(1214) 1215(1215) 1216(1216) 1217(1217) 1218(1218) 1219(1219) 1220(1220) 1221(1221) 1222(1222) 1223(1223) 1224(1224) 1225(1225) 1226(1226) 1227(1227) 1228(1228) 1229(1229) 1230(1230) 1231(1231) 1232(1232) 1233(1233) 1234(1234) 1235(1235) 1236(1236) 1237(1237) 1238(1238) 1239(1239) 1240(1240) 1241(1241) 1242(1242) 1243(1243) 1244(1244) 1245(1245) 1246(1246) 1247(1247) 1248(1248) 1249(1249) 1250(1250) 1251(1251) 1252(1252) 1253(1253) 1254(1254) 1255(1255) 1256(1256) 1257(1257) 1258(1258) 1259(1259) 1260(1260) 1261(1261) 1262(1262) 1263(1263) 1264(1264) 1265(1265) 1266(1266) 1267(1267) 1268(1268) 1269(1269) 1270(1270) 1271(1271) 1272(1272) 1273(1273) 1274(1274) 1275(1275) 1276(1276) 1277(1277) 1278(1278) 1279(1279) 1280(1280) 1281(1281) 1282(1282) 1283(1283) 1284(1284) 1285(1285) 1286(1286) 1287(1287) 1288(1288) 1289(1289) 1290(1290) 1291(1291)

destination-mac-address | **any**} [**precedence** *precedence*] [**tos** *tos*]
[**fragments**] [**time-range** *time-range-name*]

Expert

- urg
- ack
- psh
- rst
- syn
- fin

- ACL

- 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 - data ftp - data

72130c309b709e12fc4020

- pim-auto-rp
- rip
- snmp
- snmptrap
- sunrpc
- syslog
- tacacs
- talk
- tftp
- time
- who
- xdmcp

Ethernet-type

- aarp
- appletalk
- decnet-iv
- diagnostic
- etype-6000
- etype-8042
- lat
- lavc-sca
- mop-console
- mop-dump
- mumps
- netbios
- vines-echo
- xns-idp

Г Д

1) IP

IP

192.168.1.64 - 192.168.1.127

```
Ruijie(config)# access-list 1 permit 192.168.1.64  
0.0.0.63
```

2) IP

IP

DNS

ICMP


```
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 ┌┐ 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

51.1.3 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

51.1.4 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

51.1.5 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 extended v6-acl
Ruijie(config-ipv6-nacl)#
```

Г А

show access-lists	IPV6

Г А

RGOS10.0

51.1.6 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
inc-sn

Г А

start-sn 10
inc-sn 10

Г А

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

51.1.7 deny

ACL (deny) ACL III III

1) IP

[sn] **deny** {source source-wildcard | host source | any}

2) IP

[sn] **deny protocol** source source-wildcard destination
destination-wildcard [precedence precedence] [tos tos] [fragments]
[time-range time-range-name]

IP

Internet Control Message Protocol (ICMP)

```
[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}
[operator port [port]] [precedence precedence] [tos tos] [fragments]
[time-range time-range-name]
```

3) MAC

```
[sn] deny {any | host source-mac-address}{any | host
destination-mac-address} [ethernet-type][cos [out] [inner in]]
```

4) Expert

```
[sn] deny[protocol | [ethernet-type][ cos [out] [inner in]]] [[VID
[out][inner in]]] {
```

[sn] deny 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)

[sn] deny 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)

[sn] deny 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) 5 IPV6

[sn] deny protocol{source-ipv6-prefix/prefix-length | **any** | host source-ipv6-address} {destination-ipv6-prefix / prefix-length | **any** | host destination-ipv6-address} [dscp dscp] [flow-label flow-label] [fragments] [time-range time-range-name]

IPV6

Internet Control Message Protocol (ICMP)

[sn]deny icmp {source-ipv6-prefix / prefix-length | any source-ipv6-address | **host**} {destination-ipv6-prefix / prefix-length | **host** destination-ipv6-address | **any**} [icmp-type] [[icmp-type [icmp-code]] | [icmp-message]] [dscp dscp] [flow-label flow-label] [fragments] [time-range time-range-name]

Transmission Control Protocol (TCP)

[sn] deny tcp {source-ipv6-prefix / prefix-length | **host** 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] [match-all tcp-flag]

User Datagram Protocol (UDP)

[sn] deny udp {source-ipv6-prefix/prefix-length | **host**

```
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

ACL

IP ACL
TCP 100

IP 192.168.4.12
1W

```
Ruijie(config)# interface gigabitethernet 1/1  
Ruijie(config-if)# ipv6 traffic-filter v6-acl in
```

r **A**



[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**} [**time-range** time-range-name]

Protocol

[sn] **permit protocol** [**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]

Expert

Internet Control Message Protocol (ICMP)

[sn] **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)

[*sn*] **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)

[*sn*] **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) IPV6

[*sn*] **permit protocol** {*source-ipv6-prefix / prefix-length* | **any** | **host**
source-ipv6-address} {*destination-ipv6-prefix / prefix-length* | **any**
| *hostdestination-ipv6-address*} [**dscp** *dscp*] [**flow-label**
flow-label] [**fragments**] [**time-range** *time-range-name*]

IPV6

Internet Control Message Protocol (ICMP)

[*sn*] **permit icmp** {*source-ipv6-prefix / prefix-length* | **any**
source-ipv6-address | **host**} {*destination-ipv6-prefix / prefix-length*
| **host** *destination-ipv6-address* | **any**} [*icmp-type*] [[*icmp-type*
icmp-code]] | [*icmp-message*]] [**dscp** *dscp*] [**flow-label** *flow-label*]
[**fragments**] [**time-range** *time-range-name*]

Transmission Control Protocol (TCP)

[*sn*] **permit tcp** {*source-ipv6-prefix / prefix-length* | **host**
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*]
[**match-all tcp-flag**]

User Datagram Protocol (UDP)

[*sn*] **permit udp** {*source-ipv6-prefix / prefix-length* | **host**
source-ipv6-address | **any**} [*operator port* [*port*]]]
{*destination-ipv6-prefix / prefix-length* | **host**

ACL

expert access-list	ACL
ipv6 access-list	IPV6 ACL
deny	ACL

└── A

RGOS10.0

51.1.9 list-remark

ACL no

list-remark *text*

└── A

Text

└── A

ACL

└── A

ACL

└── A

```
Ruijie# ip access-list extended 102
Ruijie(config-ext-nacl)# list-remark this acl is to
filter the host 192.168.4.12
Ruijie(config-ext-nacl)# show access-lists
ip access-list extended 102
deny ip host 192.168.4.12 any
1000 hits
this acl is to filter the host 192.168.4.12
Ruijie(config-ext-nacl)#
```

Ruijie# **configure terminal**

```
Ruijie(config)# access-list 88 list-remark
last_comment
```

└── A

--	--

show access-lists

51.1.11 no sn

ACL

no sn

r A

sn ACL

r A

ACL

r A

ACL

ACL

r A

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)#

r A

show access-lists	
ip access-list	ip ACL
ipv6 access-list	IPv6 ACL
deny	ACL
permit	ACL

Г Д

51.1.13 MAC access-group

```

MAC ACL
no

mac access-group {id | name}{in | out}
no mac access-group {id | name} {in | out}

r      A
      id  MAC          700-799
      name  MAC
      in
      out

r      A
      ACL

r      A

r      A
      ACL  show running-config

r      A
      access-list accept_00d0f8xxxxxx_only  Gigabit
      1

Ruijie(config)# interface GigaEthernet 1/1
Ruijie(config-if)# mac access-group
accept_00d0f8xxxxxx_only in

r      A
      show access-group
      ACL

r      A
      RGOS10.0

```

51.1.14 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

Expert ACL

г А

г А

ACL

Ш

```
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

51.1.15 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

IPV6 ACL

г д

г д

ACL

Ш

show ipv6 traffic-filter

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

51.2

:

- **show access-lists**
- **show ip access-group**
- **show expert access-group**
- **show mac access-group**
- **show ipv6 traffic-filter**
- **show access-group**

51.2.1 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

51.2.2 show ip access-group

IP ACL

г д

IP ACL

IP

ACL

г д

```
Ruijie# show ip access-group interface gigabitethernet
0/1
ip access-group aaa in
Applied On interface GigabitEthernet 0/1.
```

г д

ip access-list	IP ACL Ⅲ

г д

RGOS10.0

51.2.3 show expert access-group

Expert Ⅲ

show expert access-group [interface <interface>]

г д

<interface R

Г Д

RGOS10.0

51.2.4 show mac access-group

MAC

show mac access-group[interface <interface>]

Г Д

<interface>

Г Д

Г Д

MAC ACL

MAC ACL

Г Д

Ruijie# **show mac access-group interface gigabitethernet 0/3**
mac access-group mm in
Applied On interface GigabitEthernet 0/3.

Г Д

mac access-list	MAC ACL

Г Д

RGOS10.0

51.2.5 show ipv6 traffic-filter

IPV6

show ipv6 traffic-filter [interface <interface>]

Г Д

<interface>

Г Д

Г Д

IPv6 ACL

IPv6

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

51.2.6 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

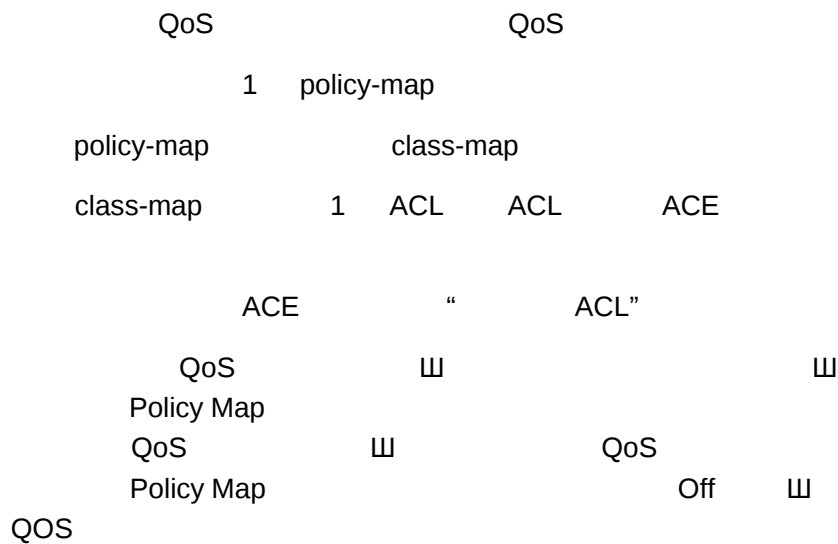
ip access-group	ip
mac access-group	MAC
expert access-group	Expert
ipv6 traffic-filter	IPV6

Г А

RGOS10.0

52 QoS

52.1



CoS	0
	8
	WRR
QueueWeight	1:1:1:1:1:1:1:1
WRR Weight Range	1:15
DRR Weight Range	1:15
	No Trust

Cos

CoS	0	1	2	3	4	5	6	7
	1	2	3	4	5	6	7	8

CoS to DSCP

CoS	0	1	2	3	4	5	6	7
DSCP	0	8	16	24	32	40	48	56

IP-Precedence to DSCP

IP-Precedence	0	1	2	3	4	5	6	7
			16	24	32	40	48	56

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
```

52.2.4 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

Г Д

policy-map-name policymap

no policy-map *policy-map-name* policy map

class-map-name class map

no class *class-map-name*

new-dscp DSCP

rate-bps kbps

burst-byte kbyte

drop

dscp-value DSCP

Ш

Г Д

Г Д

policy map, po

Ruijie(config)# **policy-map po**

class-map cm

Ruijie(config-pmap)# **class cm**

dscp 10

Ruijie(config-pmap-c)# **set ip dscp 10**

1M, 4096k, dscp 16

Ruijie(config-pmap-c)# **police 1000000 4096**

exceed-action dscp 16

Г Д

show policy-map

52.2.5 service-policy

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 0/1**

Ruijie(config-if)# **service-policy input po**

Ruijie(config)# **virtual-group 3**

Ruijie(config-if)# **service-policy input po**

Г Д

show mls qos interface

Г Д

virtual-group output

52.2.6 priority-queue

[no] priority-queue

Г Д

priority-queue SP

no priority-queue WRR

Г Д

WRR

Г Д

Г Д

Ruijie(config)# **no priority-queue**

Г Д

show mls qos queueing

52.2.7 priority-queue cos-map

CoS

```
priority-queue cos-map qid cos0 [cos1 [cos2 [cos3 [cos4 [cos5 [cos6 [cos7]]]]]]]
```

```
no priority-queue cos-map
```

Г Д

qid id

cos0 ... cos7 CoS

no Ш

Г Д

Г Д

Г Д

```
Ruijie(config)# priority-queue cos-map 1 0 1
```

Г Д

```
show mls qos queueing
```

Г Д

52.2.8 wrr-queue bandwidth

WRR

```
wrr-queue bandwidth weight1 ... weightn
```

```
no wrr-queue bandwidth
```

Г Д

weight1...weightn n n

no Ш

Г Д

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
```

Г Д

52.2.9 mls qos map cos-dscp

P C 5B CoS D DSCP

```
mls qos map cos-dscp
```

dscp-list

cos 0 7

no

г А

•5 ,ÖG!5B
•e ,ÖG!5B

mls qos scheduler [sp | wrr | drr]

no mls qos scheduler

r A

sp

wrr

drr

no

r A

wrr

r A

r A

Ruijie(config)# mls qos scheduler sp

r A

show mls qos scheduler

52.2.13 drr-queue bandwidth

DRR

drr-queue bandwidth *weight1...weight8*

no drr-queue bandwidth

r A

weight1...weight8

no

r A

r A

r A

Ruijie(config)# drr-queue bandwidth 1 2 3 4 5 6 7 8

Г Д

show mls qos queueing

Г Д

86

52.2.14 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

buffer management qos queue

buffer management qos queue *queue-number*

Г Д

<i>queue-number</i>	

Г Д

Г Д

Г Д

AP

queue-number 1

Г Д

0/52

3

Ruijie(config)# **interface gigabitethernet 0/52**

Ruijie(config-if)# **buffer management qos queue 8**

Г Д

show buffer management queue	

Г Д

RGOS10.35

virtual-group

Aggregate Port

Ш

no

Ш

virtual-group *virtual-group-number*

no virtual-group *virtual-group-number*

Г Д

<i>virtual-group-number</i>	128

Г Д

Г Д

Г Д


```

class-name class map
r      A
policy name
r      A
r      A
Ruijie# show policy-map
```

52.3.3 show mls qos interface

```

QoS
show mls qos interface interface-id [policers]
r      A
interface-id
policers police
r      A
QoS
r      A
r      A
Ruijie# show mls qos interface fastEthernet 0/1
```

52.3.4 show mls qos virtual-group

```

police
show mls qos virtual-group [virtual-group-number | policers]
r      A
virtual-group-number
policers police
r      A
police
r      A
```

Ruijie#

```
show mls qos virtual-group 1
```

```
show mls qos virtual-group policers
```

52.3.5 show mls qos queueing

QoS (cos-to-queue map, wrr weight, drr weight)

```
show mls qos queueing
```

Ruijie#

Ruijie#

```
show mls qos queueing
```

52.3.6 show mls qos scheduler

```
show mls qos scheduler
```

Ruijie#

Ruijie#

```
show mls qos scheduler
```

52.3.7 show mls qos maps

dscp-cos maps, dscp-cos maps ip-prec-dscp maps

```
show mls qos maps [cos-dscp | dscp-cos | ip-prec-dscp]
```

Ruijie#

```
cos-dscp cos-dscp maps
```

```
dscp-cos dscp-cos maps
```

```
ip-prec-dscp ip-prec-dscp maps
```

Ruijie#

```
dscp-cos maps dscp-cos maps ip-prec-dscp maps
```

Г Д

Г Д

```
Ruijie# show mls qos maps
```

52.3.8 show mls qos rate-limit

```
show mls qos rate-limit [interface interface-id]
```

Г Д

```
interface interface-id rate-limit
```

Г Д

Г Д

```
Ruijie# show mls qos rate-limit
```

52.3.9 how buffer management qos queue

```
show buffer management qos queue
```

Г Д

Г Д

Г Д

```
Ruijie#show buffer management qos queue
```

```
Interface Status Queue
```

```
-----
```

```
FastEthernet 0/1 Auto 8
```

```
FastEthernet 0/2 Admin 8
```

```
....
```

```
GigabitEthernet 0/52 Auto 8
```

52.3.10 show virtual-group

show virtual-group [*virtual-group-number* | **summary**]

Г Д

virtual-group-number
128

summary

Г Д

Г Д

Ruijie# **show virtual-group 1**

Ruijie# **show virtual-group summary**

53 VRRP

53.1

VRRP

- **vrrp authentication**
- **vrrp delay**
- **vrrp description**
- **vrrp ip**
- **z z 8d950604195087336d102c8074a**

```
vrrp 1 authentication x30dn78k
```

```

r      A

```

Ruijie(config-if)# vrrp group ip ipaddress [secondary]	VRRP IP

53.1.2 vrrp delay

```
VRRP      3
```

```
vrrp delay { minimum min-seconds | reload reload-seconds }
```

```
no vrrp delay
```

```

r      A

```

```
min-seconds      VRRP      min-seconds
```

```

reload-seconds      VRRP      3
min-seconds      reload-seconds      VRRP
min-seconds3

```

```

r      A

```

```
VRRP      3
```

```

r      A

```

```

r      A

```

```

      4      UP      VRRP
      4
VRRP      3      0~60      3

```

```

r      A

```

```

      UP      E0      VRRP      10
      UP      VRRP      1      10

```

```

interface FastEthernet 0/0
shutdown
ip address 10.0.1.1 255.255.255.0
vrrp delay minimum 10
vrrp 1 ip 10.0.1.20
no shutdown
show vrrp 1

```

```

r      A

```

Ruijie(config-if)# vrrp group ip <i>ipaddress [secondary]</i>	VRRP IP

Г А

RGOS10.3(4) Ш

53.1.3 vrrp description

VRRP no 0#T BBQ@14985B70CB981A5B7

53.1.4 vrrp ip

```

    VRRP
    VRRP
    IP
    IP
    no
    vrrp group ip ipaddress [secondary]
    no vrrp group ip ipaddress [secondary]
r      A
    group
    VRRP
    ipaddress
    IP
    secondary
    IP
    3
r      A
    VRRP
    3
r      A
r      A
    secondary
    VRRP
    3
    IP
    65?<W01
```

```

    vrrp group preempt [delay seconds]
    no vrrp group preempt [delay]

r      A
      group VRRP
      delay seconds
      0
      Master

r      A
      VRRP
      VRRP
      VRRP

r      A
      VRRP
      Master
      VRRP
      VRRP

```

```

group VRRP
level VRRP

r A
VRRP 100
VRRP
VRRP

r A
VRRP

r A
VRRP

r A
VRRP 1 254
vrrp 1 priority 254

```

```

r A

```

Ruijie(config-if)# vrrp group ip <i>ipaddress [secondary]</i>	VRRP IP
Ruijie(config-if)# vrrp group preempt <i>[delay seconds]</i>	VRRP

53.1.7 vrrp timers advertise

```

VRRP no
VRRP

vrrp group timers advertise interval
no vrrp group timers advertise

r A
group VRRP
interval VRRP ( )

r A
VRRP VRRP
1

r A

```

Г А

VRRP

VRRP

VRRP

4

Ш

Г А

VRRP

4 Ш

vrrp 1 timers advertise 4

Г А

Ruijie(config-if)# vrrp group ip <i>ipaddress</i> [secondary]	VRRP IP
Ruijie(config-if)# vrrp group timers learn	

53.1.8 vrrp timers learn

no

Ш

vrrp group timers learn

no vrrp group timers learn

Г А

group VRRP

Г А

VRRP

Ш

VRRP

Ш

Г А

Г А

VRRP

VRRP

VRRP

Master

VRRP

Ш

Master

VRRP

Ш

Г А

VRRP 1

Ш

vrrp 1 timers learn

Г А

Ruijie(config-if)# vrrp group ip <i>ipaddress [secondary]</i>	VRRP IP
Ruijie(config-if)# vrrp group timers advertise [msec] interval	VRRP

53.1.9 vrrp track

VRRP **vrrp group track interface-type number**
VRRP IP **vrrp group track ip-address**
vrrp group track bfd BFD IP **no**
↳

vrrp 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 А

group VRRP

interface-type

number

ipv4-addres

IPv4

bfd

interval-value

↳

3

timeout-value

4

↳

1

priority

↳

10

VRRP

Г А

VRRP
IP ↳

↳

VRRP

Г А

Г А

(Routed Port SVI Loopback Tunnel)
 IP ping 11

r d

VRRP 1 Routed Port Fa1/1 11 Fa1/1
 VRRP 30 Fa1/1 VRRP
 1 11

vrrp 1 track FastEthernet 1/1 30

VRRP BFD 192.168.1.3

Ruijie#

- debug vrrp events
- debug vrrp packets
- debug vrrp state

53.2.1 debug vrrp

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

53.2.3 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

53.2.4 debug vrrp packets

VRRP no ⌋


```
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
```

53.3

53.3.1 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 д


```
Ruijie(config-if)# bfd interval 100 min_rx 100 multiplier 3
```

Г А

bfd all-interfaces	BFD Ш
clear bfd	BFD Ш
ip ospf bfd	OSPF BFD Ш
ip rip bfd	RIP BFD

1. 配置 BFD


```

    Ruijie(config)# router ospf 123
    Ruijie(config-router)# bfd all-interface
    
```

bfd	BFD
ip ospf bfd	OSPF BFD

```
# BFD
Ruijie(config)# bfd cpp
```

г	Д
-	-

54.1.4 bfd echo

```
bfd echo
no bfd echo
```

г	Д
-	-

```
г Д
BFD echo
```

```
г Д
```

```
г Д
BFD echo echo
Interval milliseconds min_rx milliseconds
L3 AP
BFD ECHO , BFD no ip
redirects ICMP no ip deny land
DDOS ( Land-based )
Echo BFD
```

```
Ruijie(config)# no switchport
```

```
Ruijie(config-if)# bfd echo
```

```
└─┬─┐
   │A│
```

bfd	BFD 卩
ip redirects	ICMP 卩
ip deny land	Land-based 卩
bfd slow-timer	

```
└─┬─┐
   │A│
```

54.1.5 bfd slow-timer

```
bfd slow-timer
```

BFD

ECHO

BFD

BFD

卩

no

卩

```
bfd slow-timer [milliseconds]
```

```
no bfd slow-timer
```

```
└─┬─┐
   │A│
```

<i>milliseconds</i>	()BFD 卩 1000 30000, 1000卩

```
└─┬─┐
   │A│
```

1000ms

```
└─┬─┐
   │A│
```

```
└─┬─┐
   │A│
```

```
└─┬─┐
   │A│
```

```
#    slow-timer    14000    卩
```

```
Ruijie(config)# bfd slow-timer 14000
```

```

r      A

```

bfd echo	BFD Echo

```

r      A

```

54.1.6 ip ospf bfd

```

      ip ospf bfd      OSPF      BFD
      disable      no      山

```

```
ip ospf bfd [disable]
```

```
no ip ospf bfd
```

```

r      A

```

disable	() OSPF BFD 山

```

r      A

```

```

      disable      OSPF      BFD

```

```

r      A

```

```

r      A

```

```

      OSPF      BFD

```

```

      OSPF      [no] bfd all-interfaces

```

```

      BFD

```

```

      ip ospf bfd [disable]

```

```

      OSPF      BFD

```

```

r      A

```

```

# Routed Port      FastEthernet 0/2      OSPF      BFD      .

```

```
Ruijie(config)# interface FastEthernet 0/2
```

```
Ruijie(config-if)# no switchport
```

1

2

Ruijie(config-if)# ip ospf bfd disable

bfd

BFD

3

Ruijie(config-if)# **ip rip bfd disable**

Г А

bfd	BFD Ш
bfd all-interfaces	BFD

Г А

54.1.8 ip route static bfd

ip route static bfd BFD **no**
Ш

ip route static bfd [**vrf** *vrf-name*] *interface-type interface-number*
gateway [**source** *ip-address*]

no ip route static bfd [**vrf** *vrf-name*] *interface-type interface-number gateway*
[**source** *ip-address*]

Г А

vrf <i>vrf-name</i>	() VRF Ш
<i>interface-type</i> <i>interface-number</i>	Ш
<i>gateway</i>	IP BFD IP Ш BFD Ш
source <i>ip-address</i>	() BFD IP , IP Ш

Г А

BFD

Г А

Г А

~	BFD
---	-----

Г А

┌ A

BFD

┌ A

┌ A

~	IP	BFD
---	----	-----

┌ 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**

┌ A

bfd	BFD

┌ A

54.1.10 vrrp bfd

	vrrp bfd	VRRP	BFD
master	no		

vrrp group-number bfd ip-address

no vrrp group-number bfd ip-address

┌ A



bfd up-dampening [milliseconds]

no bfd up-dampening

<i>milliseconds</i>	() UP UP DOWN 0 300000, DOWN UP DOWN

0ms

0

UP

#

UP

UP

60,000

Ruijie(config-if) bfd **up-dampening** 60000

bfd	BFD DOWN

10.3(5)

54.2

BFD

- [show bfd neighbors](#)

54.2.1 show bfd neighbors

BFD

show bfd neighbors [**vrf** *vrf-name*]

Int

172.16.11.1 172.16.11.2 1/2 1 532 (3) Up
Ge2/1

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

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

S3760 BGP BFD

55 RLDP

55.1

RLDP 4 Ⅲ

- .rldp detect-interval
- .rldp detect-max
- .rldp enable
- rldp loop-detect enable

55.1.1 rldp loop-detect enable

RLDP Ⅲ

rldp loop-detect enable
no rldp loop-detect enable

--

Ⅲ

--

Ⅲ

--

RLDP RLDP Ⅲ

--

Ruijie(config)# rldp loop-detect enable

rldp port	RLDP

55.1.3 rldp detect-max

RLDP

山

rldp detect-max *num*

no rldp detect-max

--	--	--

55.1.5 rldp loop-detect enable

	RLDP	⏏
	rldp loop-detect enable	
	no rldp loop-detect enable	
	⏏	
		⏏
	RLDP	RLDP ⏏
	Ruijie(config)# rldp loop-detect enable	

RLDP

RLDP

55.1.7 rldp re

rldp rese

-	-

-	-

56 DLDAP

56.1

DLDAP

- [dldap](#)
- [dldap passive](#)
- [clear dldap](#)

56.1.1 dldap

DLDAP no IP DLDAP

dldap *ip-address* [**next-hop** *ipv4-address*] [**interval** *tick* | **retry** *retry-num* | **resume** *resume-num*]
no dldap *ip-address*

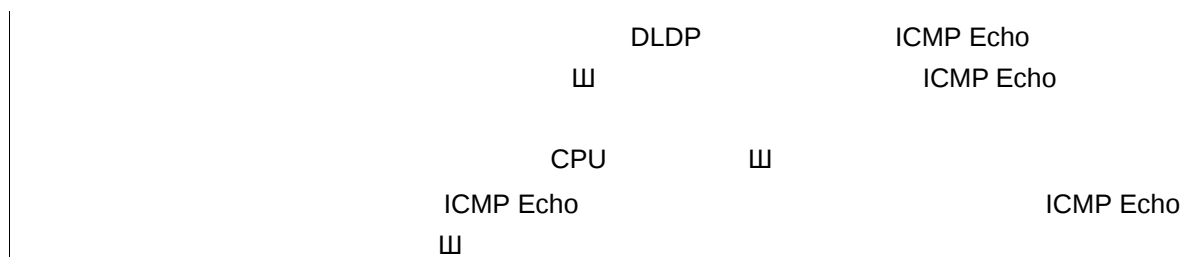
<i>ip-address</i>	IP
<i>ipv4-address</i>	IP
<i>tick</i>	5~6000 tick 5 1tick= 10ms
<i>retry-num</i>	1~3600
<i>resume-num</i>	DOWN UP DLDAP 1~200

tick 100tick=1s retry-num 3 resume-num 3

DLDAP

1 10.83.132.10 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 10.83.132.10
    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
```



```

1      DLDP
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)#dldp passive

```



-

-

statistic

W

W

1

Ruijie#show dldp

10.3(5)

⌘

-

-

56.3

56.3.1 clear dldp

dldp

up/down

⌘

clear dldp [**interface** *interface-name* [*ip-address*]]

*interface-name**ip-address*

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)

⌘

	-	-

57 **TPP**

57.1

57.1.1 topology guard

		no	topology guard
	[no] topology guard		
r	d		
r	d		
r	d		
r	d		
			cpu topology-limit
r	d		
	Ruijie(config)# topology guard		
	Ruijie(config)# no topology guard		
r	d		
	tp-guard port enable		
	cpu topology-limit CPU		

57.1.2 tp-guard port enable

xs6A.8A

Г Д

Г Д

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

57.2 TPP

Г Д

Г Д

Г

```
Ruijie# show tpp
r      A
       topology guard
```

58

58.1

- cd
- cp
- ls
- makefs
- mkdir
- mv
- pwd
- rm
- rmdir

58.1.1 cd

cd *DIRECTORY*

└─┬─┐

DIRECTORY

└─┬─┐

└─┬─┐

└─┬─┐

└─┬─┐

└─┬─┐

“ ”
..

“ ”
.

└─┬─┐

ls

└─┬─┐

└─┬─┐

tmp

Ruijie# **cd tmp**

└─┬─┐

		ls <i>PATHNAME</i>	
Г	Д	<i>PATHNAME</i>	
Г	Д		
		Ш	
Г	Д		
		Ш	
Г	Д		
		Ш	
		.	
Г	Д		
		Ruijie# ls	
		tmp	
		Ruijie# ls tmp	
Г	Д		

58.1.4 makefs

		makefs dev <i>DEVNAME</i> fs <i>FSNAME</i>	
		makefs fs <i>FSNAME</i> dev <i>DEVNAME</i>	
Г	Д		
		<i>DEVNAME</i> ()	
		<i>FSNAME</i>	
Г	Д		
		Ш	
Г	Д		
		Ш	

г д

а ч

б ч

ш

г д

jffs2

dev/mtdblock/1

Ruijie# **makefs dev /dev/mtdblock/1 fs jffs2**

г д

58.1.5 mkdir

mkdir *DIRECTORY*

г д

DIRECTORY

г д

ш

г д

ш

г д

()ш

ш

г д

test

Ruijie# **mkdir test**

г д

58.1.6 mv

```

mv sour SOURCE_FILE dest {DESTINE_FILE | DIRECTORY}
mv dest {DESTINE_FILE | DIRECTORY} sour SOURCE_FILE

r      A
SOURCE_FILE
DESTINE_FILE/DIRECTORY

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

r      A

```

58.1.7 pwd

```

pwd

r      A

```

pwd	

```

r      A

```

```

        ❷

r      A

        ❷

r      A

        ❷

r      A

        ❷

Ruijie# pwd

r      A

```

58.1.8 rm

```

        ❷

rm FILE

r      A

FILE      (      )

r      A

        ❷

r      A

        ❷

r      A

        ,

        ❷
        ❷

r      A

log.txt

Ruijie# rm log.txt

r      A

```

rmdir	, rm

58.1.9 rmdir

59

59.1 CPU-LOG

- show cpu
- cpu-log

59.1.1 show cpu

CPU		show cpu		show cpu	
г	д				
г	д				
г	д				
		ш			
г	д				
				CPU	5
		ч	5	CPU	4
		ч	1	ч	1
				5	5
				CPU	

TM

3	0%	0%	0%	atimer
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%	dhcpa_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

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
          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

```

59.1.2 cpu-log

```

CPU , cpu-logW

```

```

cpu-log log-limit low_num high_num

```

r A

```

log-limit

```

```

low_num CPU

```

```

high_num CPU

```

г	д		
		100%	90%Ш
г	д		
		Ш	
г	д		
		CPU	

г д

г д

г д

ш

г д

ч

ш

г д

show memory

ш

Ruijie#**show memory**

System Memory Statistic:

32cd54192>

59.2.2 memory-lack exit-policy

worsen

Ш

show memory protocols

Г Д

Г Д

Г Д

Ш



BGP,OSPF,RIP,LDP,PIM,ISIS Ш

Г Д

1 show memory protocols

Ruijie(config)# **show memory protocols**

=====

59.3.1.1 threshold set

MIB 4 3 CPU 4

 4 CPU syslog4

 CPU syslog4

 no 4

```
2 CPU
Ruijie(config)# threshold set cpu member 2 70 90

r A
show threshold

r A
S3760
```

59.3.2

- [show threshold](#)

59.3.2.1 show threshold

```
show threshold {cpu | memory | temperature} [M1 | M2 | slot n | member n]

r A
cpu | memory | temperature
memory
temperature
M1 | M2 | slot n
member n

r A
r A
r A
r A
1 M1 CPU
Ruijie# show threshold cpu M1

2
```

Ruijie# show threshold memory

r	A		
		threshold set	
r	A	S3760	

```

Г      Д
      buffer-size          4K  128K BytesШ
      levell              0  7Ш              Ш

Г      Д
      4k BytesШ
      7Ш

Г      Д

Г      Д

      Ш                                show loggingШ
      logging                     Ш                                clear
      Ğ                                FLASH

```

```
Ruijie(config)# logging server ipv6 AAAA:BBBB::FFFF
```

```
└      Д
```




```

        1
        show logging
        1
        6

```

```

Ruijie(config)# logging console informational
        1
        1

```

logging on	
show logging	

60.1.7 logging monitor

```

        VTY      telnet      4 SSH
        1        1        no        VTY      1
        logging monitor level
        no logging monitor
        1        1
        level      1        1
        1        1
        Debugging (7)
        1        1
        1        1
        VTY      terminal monitor
        VTY      logging monitor
        1
        Logging monitor        VTY      1
        1        1

```

```
Ruijie(config)# logging monitor informational
```

```
└─┬─┐
   │  A
```

logging on	
show logging	

60.1.8 logging trap

Syslog Server

no

Syslog Server

```
logging trap level
```

```
no logging trap
```

```
└─┬─┐
   │  A
```

level

no

no

1

```
└─┬─┐
   │  A
```

Informational(6)

```
└─┬─┐
   │  A
```

```
└─┬─┐
   │  A
```

```
Server Syslog Server
logging trap
```

```
logging Syslog
no
```

```
show logging
```

no

```
└─┬─┐
   │  A
```

6

202.101.11.22 Syslog

Server

```
Ruijie(config)# logging 202.101.11.22
```

```
Ruijie(config)# logging trap informational
```

```
└─┬─┐
   │  A
```


60.1.10 logging source ip| ipv6

no

W

logging source {**ip** *ip-address* | **ipv6** *ipv6-address*}

no logging source {ip | ipv6}

Г Д

<i>ip-address</i>	IPV4	IPV4
-------------------	------	------

<i>ipv6-address</i>	IPV6	IPV6
---------------------	------	------

Г Д

Г Д

Г Д

Syslog Server

W

W

Г Д

Loopback 0

Syslog

```
Ruijie(config)# logging source ip 192.168.1.1
```

Г Д

logging	Syslog server

60.1.11 logging facility

no

(23) 山

logging facility *facility-type*

no logging facility

Г Д

		<i>facility-type</i>	Syslog	Ш
г	А			
			Local7(23)	
г	А			
г	А			
		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

1.

Syslog kernel

Ruijie(config)# logging facility kern

1.

logging console	

60.1.12 logging count

1.

no

logging count

Г Д

Г Д

Г Д

Г Д

no logging count

Г Д

Г Д

show logging count	
show logging	

☐ yes ☐ no ☐

no logging rate-limit

Г Д

<i>number</i>	Đ t	đ
---------------	-----	---

Щ
Щ
Г Д

Ruijie(config)# **service sequence-numbers**

Г Д

logging on	
service timestamps	

60.1.16 service timestamps

Щ no
Щdefault
Щ
service timestamps *message-type* [*uptime* | *datetime* [*msec* | *year*]]
no service timestamps *message-type*
default service timestamps *message-type*
Г Д
message-type log debugЩlog 0
6 debug 7 Щ
uptime * * * * 07:00:10:41
datetime Jul 27 16:53:07
msec : : . Jul 27
16:53:07.299
year : : 2007 Jul 27
16:53:07
Г Д
Щ RTC
Щ
Г Д

Г Д

Uptime	Ш
Datetime	Ш

Г Д

Log	Debug	Datetime
-----	-------	----------

```
Ruijie(config)# service timestamps debug datetime msec
Ruijie(config)# service timestamps log datetime msec
Ruijie(config)# end
Ruijie(config)# Oct 8 23:04:58.301 %SYS-5-CONFIG_I:
Configured from console by console
```

Г Д

Г Д

```
Mar 22 15:28:02 %SYS-5-CONFIG: Configured from console by
console
Ruijie# config terminal
Enter configuration commands, one per line. End with CNTL/Z.
Ruijie(config)# service sysname
Ruijie(config)# end
Ruijie#
Mar 22 15:35:57 S3250 %SYS-5-CONFIG: Configured from console
by console
```

Г Д

show logging	

60.1.18 more flash

FLASH

more flash:filename

Г Д

Filename

Г Д

Console logging	
Monitor logging	VTY
Buffer logging	
Timestamp debug messages	Debug
Timestamp log messages	Log
Sequence log messages	
Trap logging	Syslog Server
Log Buffer	

г А

logging on	

clear logging	
---------------	--

60.2.2 show logging count

```

                                     111
show logging count

r      A

r      A

r      A

                                     logging count  111

show logging count
                                     111

show logging                                     111

r      A

```

```

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

r      A

```

logging count	
show logging	
clear logging	

60.2.3 show logging reverse

show logging
