



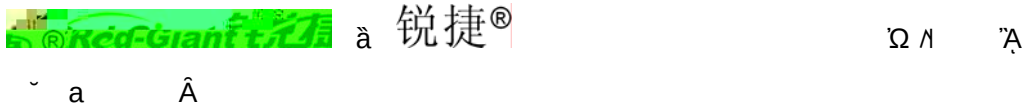
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RG-S5750S

RGOS 10.4(2b11)

Ω Ⅱ ©2000-2011

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& ă ă ă 'l

[illegible]

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1 CLI

1.1

1.1.1 alias

alias - команда, позволяющая создавать собственные команды, которые будут выполняться в режиме командной строки. Синтаксис команды alias следующий:

alias *mode command-alias original-command*

no alias *mode [original-command]*

<i>mode</i>	alias
<i>command-alias</i>	alias
<i>original-command</i>	alias

EXEC - команда, позволяющая выполнять команды в режиме командной строки.

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EXEC - команда, позволяющая выполнять команды в режиме командной строки. Синтаксис команды EXEC следующий:

alias no alias exec alias

ш 3f * i

show aliases $\{ \downarrow \cup$ $\downarrow$ $\hat{A}$

```
def-route      ip route 0.0.0.0 0.0.0.0 192.168.1.1
```

↓


```
Ruijie(config)# enable secret level 1 0 test
Ruijie(config)# privilege exec level 1 reload
~          1      CLI      ~          ↓↵ reload 3'
```

```
Ruijie> reload ?
```

```
<cr>
```

```
reload          3          1      ~      ‡ ↓↵ all      '
Ruijie(config)# privilege exec all level 1 reload
~          1      CLI      ~          ↓↵ reload          3'
```

```
Ruijie> reload ?
```

```
at              reload at a specific time/date
```

```
cancel          cancel pending reload scheme
```

```
in              reload after a time interval
```

```
<cr>
```

3	
secret	CLI 3


```
ルロ ~ EXEC ヨ 3 1'
```

```
Ruijie# show aliases exec
```

```
exec mode alias:
```

h	help
p	ping
s	show
u	undebug
un	undebug

2

2.1

2.1.1 disable

IO æ ~ 3 disable Å

disable [*privilege-level*]

<i>privilege-level</i>	

3

æ 3 ÿ Å ¶ Æ ~ ‡
& disable 3 1 Å

IO æ ' Ruijie# disable 10	
enable	ÿ Å ~

3	
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The diagram illustrates the configuration process for enabling the SSH service on a Ruijie switch through four sequential steps:

- Step 1:** Accessing the configuration mode by entering the command `configure terminal`.
- Step 2:** Entering the command `no enable service` to disable the default enable service.
- Step 3:** Enabling the SSH service by entering the command `enable service ssh-server`. The output shows "SSH Server" being enabled.
- Step 4:** Verifying the configuration by entering the command `show service`, which displays the status of various services, including "ssh" as "enable".

```
execute {[flash:] filename}
```

flash:	∅
<i>filename</i>	↓

```

line tty 1 16
transport input all
no exec
end

Ruijie# execute flash:line_rcms_script.text
executing script file line_rcms_script.text .....
executing done
Ruijie# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Ruijie(config)# line vty 1 16
Ruijie(config-line)# transport input all
Ruijie(config-line)# no exec
Ruijie(config-line)# end

```

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2.1.7 ip http authentication

Http Server A~ Web Â Web
 Ю~ √ √ **ip http authentication** 3'

ip http authentication { enable | local }

enable password enable secret 3	
enable 3	

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enablg BT /TT0

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3 Web Â no ip http authentication 3
й Â
Ю D ж Web

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2.1.9 ip telnet source-interface

Э IP й Telnet ю ↓л ip
telnet source-interface 3'

ip telnet source-interface *interface-name*

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y

u

~

lockable

no lockable

	-	-

3

line

	3	Э	В	~	В	↓/	EXEC	Ю
	lock	3	Â					

```

Ю      8 ↓ Э      В      П      ~      В      8 ↓'
Ruijie(config)# line console 0
Ruijie(config-line)# lockable
Ruijie(config-line)# end
Ruijie# lock
Password: <password>
Again: <password>
Locked
Password: <password>

```

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3	
lock	В Â

↓

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2.1.12 login

AAA Ю Э 3 ~ 3
login Â 3 **no** ↓ 3 Â
login
no login

3

	-	-

3

line

AAA 4 3 3 3
VTY console 3 3

10 VTY 3 3 3
Ruijie(config)# **no aaa new-model**
Ruijie(config)# **line vty 0**
Ruijie(config-line)# **password 0 normatest**
Ruijie(config-line)# **login**

3

3	
password	line 3 3

1

3

1	
-	-

2.1.13 login authentication

AAA 10 AAA 4 3
3 3 **no** 3

login authentication {default | list-name}

no login authentication {default | list-name}

default		1
list-name	1	1

3 line

AAA 8 Â

IO VTY 3 radius Â
 Ruijie(config)# **aaa new-model**
 Ruijie(config)# **aaa authentication login default radius**
 Ruijie(config)# **line vty 0**
 Ruijie(config-line)# **login authentication default**

3	
3	aaa new-model AAA 8
	aaa authentication login

4

3	1	
	-	-

2.1.14 login local

AAA 3 no 10 3 login local Â

login local

no login local

-	-

3 line

AAA 8 Â
 username 3 Â

IO VTY 3 Â

```

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

```

3

3	
username	Â

4

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2.1.15 privilege mode

2.1.16 password

line 3 line 3 password 3 no line
 3

password {password | [0]7 encrypted-password}

no password

<i>password</i>				line 3 Â									
1 7 x				7 i k									
0 7				3 7 ~ 0 7 ~ 7 7 Â									

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5 0

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↑ 1 Ÿ ~ ‡ Â

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Ruijie(config)
Ruijie(config)# **banner login** \$ *enter your password* \$

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2.2.2 banner motd

no banner motd 3 Â

banner motd *c message c*

c	↑ ~ a
message	

3

3 1/2 ~ ~ Â
↑ 1 Ÿ ~ ‡ Â

Ю
Ruijie(config)# **banner motd** \$ *hello,world* \$

3

-

-

```

399 2006-01-01 08:01:37 config.text
33,030,144 bytes total. (10,590,592 bytes free)

```

```
Ruijie(config)# boot system s5750_10_4.bin
```

```
Ruijie(config)# show boot system
```

```
system boot file: flash:/ s5750_10_4.bin
```

```

      ||      ^      s5750_10_4.bin      ^

```

3

3	
show boot system	^

1

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3

1	
-	-

2.2.4 clock set

~ 1/2

3 clock set 4

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

<i>hh:mm:ss</i>	~ ^ 24 8 ~ : :
<i>day</i>	^ 1-31 ~ ^
<i>month</i>	^ 1-12 ~ ^
<i>year</i>	Ω ^ 1993-2035 ~ ~ a ^

3

3

~

^

clock set

Э

Ю

1~

^

```

Ю                               й 2003   3   17   Э ' 10   20  30   '
Ruijie# clock set 10:20:30 3 17 2003
Ruijie# show clock
clock: 2003-3-17 10:20:32

```

3

3	
show clock	

1

3

1

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2.2.5 clock update-calendar

~ й ~ Â

clock update-calendar

3

```

1   ~   é   ^   calendar~   Â   ~   ||~
      Ю ≠      Â
      ~   ~   a  1  ~   ~   й   ~
3   ~   ~   8   ~   Â

```

Ю 3 17 8 ~ Â

Ruijie# clock update-calendar

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1	-				
3	<table> <tr> <th>1</th><th></th></tr> <tr> <td>-</td><td>-</td></tr> </table>	1		-	-
1					
-	-				

2.2.6 exec-timeout

LINE Ю	exec-timeout 3 1	no exec-timeout
3 LINE Ю	a 1	
exec-timeout <i>minutes</i> [<i>seconds</i>]		
no exec-timeout		

minutes	1
seconds	^ 1 ~

	1 10 min 1
--	------------

3	LINE
	LINE 1
	1 1

Ю	line vty 0	1 5 30
Ruijie(config-line)#	exec-timeout 5 30	

3	3
-	-

1	
---	--

3	1
-	-

2.2.7 hostname

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ÿ 1~

3 hostnameÂ

hostname name

name	ÿ 1~ 4 à 7 Â ÿ 63 Â

ÿ 1 ÿ RuijieÂ

3

ÿ 1 ÿ 7 1 CHAP ÿ 1 Â

Ю ÿ 1 ÿ BeiJingAgenda'
Ruijie(config)# **hostname** BeiJingAgenda
BeiJingAgenda(config)#

3

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-	-

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-	-

2.2.8 prompt

3 ~
no prompt 3 Â

Ю 3 promptÂ 4 3 ~

prompt string

string	3 ~ 17 32

3


```

    EXEC
    EXEC

```

```

    RGOS
    Ruijie(config)# prompt RGOS
    Ruijie(config)# end
    RGOS

```

3	
-	-

```

    1

```

3	1
-	-

2.2.9 reload

3 reload ^

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

<i>text</i>	1-255 ^
in [<i>hh:</i>] <i>mm</i>	1 ^ ÿ 24 ^
at <i>hh:mm</i>	
<i>month</i>	3 ^ Mar
<i>day</i>	1 31 ^
cancel	1

```


```

```

    3

```

```

    3 10
    10

```

```

    10
    10

```

Ruijie# **reload in 10**

Router will reload in 600 seconds.

3

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2.2.10 session-timeout

LINE 3

no session-timeout

3 1

LINE 10

session-timeout 3 1

a 1

session-timeout *minutes* [output]

no session-timeout

minutes

output

?

	-	-

2.2.11 speed

no speed ? Â

speed speed

	Speed	115200 9600 19200 38400 57600 9600

9600

?

? Â

Ю 57600 bps'
 Ruijie(config)# **line console 0**
 Ruijie(config-line)# **speed 57600**

	-	-

1

	-	-

2.2.12 write

^ running-config~ Æ Â

write [memory | network | terminal]

memory	NVRAM ↴ copy running-config startup-config ↵
network	TFTP ↵ ↵ ↵ copy running-config tftp ↵
terminal	↵ ↵ show135?u35?unning-config

3

	boot config	7 1
	copy	7 8
	show running-config	

1

3	1	
	-	-

2.3

2.3.1 show clock

~

3 show clock ^

show clock

	-	-

3

RtAT

3 10

3

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2.3.3 show reload

||

Ю

3 show reload ^

show reload

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-

3

3 1/2

||

^

Ю

||

Ruijie# show reload

Reload scheduled in 595 seconds.

At 2003-12-29 11:37:42

Reload reason: test.

3

3

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3

3	3	
	-	-

1

3	1	
	-	-

3 LINE

3.1 LINE

3.1.1 access-class

Line IO ACL ^ 8 ~ Â **access-class** *acl-no* { **in** | **out** } 3
Line IO 8 Â no **access-class** *access-list-number* { **in** | **out** } 3 ✓
LINE IO ACL Â
[no] **access-class** *access-list-number* { **in** | **out** }

LINE 3

3	1	
	-	-

3.1.2 line

LINE ~ ЛЮ 3'

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

	aux	~ 3
	console	8
	tty	~ 3
	vty	~ telnet/ssh
	First-line	first-line 1
	Last-line	last-line 1

--

3

--

LINE Â

--

LINE VTY 1 3 LINE '
Ruijie(config)# **line vty 1 3**

3	3	
	-	-

1

3	1	
	-	-

3.1.3 line vty

3 1/2 7 1/2 VTY 4 3 no 1/2 1/2
VTY 4

line vty *line-number*

no line vty *line-number*

	-	-

	Ю 1 VTY 5 1 0-4 4	
--	-------------------	--

3		
---	--	--

	7 1 VTY 1 1/2 3 4	
--	-------------------	--

	1' 1 VTY 20' 1 VTY 1 1 0-19 4 Ruijie(config)# line vty 19 2' 1 VTY 10' 1 VTY 1 1 0-9 4 Ruijie(config)# line vty 10	
--	---	--

3	3	
	-	-

4		
---	--	--

3	1	
	-	-

3.1.4 transport input

Line Ю 1/2 ~ **transport input** 3 Line Ю 1/2 4
default transport input 1 LINE Ю 1 4

transport input {all | ssh | telnet | none}

default transport input

all	Line Ю 4 4	
ssh	Line Ю 1 SSH 4	

telnet	Line Ю ↓ Telnet Â
none	Line Ю a Â

~ VTY Â è TTY ì NONE a
 Â ↓ √ ↓ √ **default transport input**
 3 ì Â

3 Line

3 Line Ю Â VTY Ю Â
 ↓ √ ↓ √ VTY Э ∟ Â **show**
running 3 Line Ю Â
& input 3 **default transport input** 3 Â **no transport**
transport input none ↓ Â 6

line vty 0 4 Ю ↓ telnet
 Ruijie# **configure terminal**
 Ruijie(config)# **line vty 0 4**
 Ruijie(config-line)# **transport input telnet**

3	
show running	Â

4 RGOS10.1 √ Э

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4

4.1

4.1.1 ping

3 ~ ↓ ∪ || ã Æ Â 3
 Ю'

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

--	--	--

É DNS ↑ Â

```

1' ping '
Ruijie# ping 192.168.5.1
Sending 5, 100-byte ICMP Echoes to 192.168.5.1, timeout is 2 seconds:
 < press Ctrl+C to break >
!!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 1/2/10
ms

2' ping '
Ruijie# ping 192.168.5.197 length 1500 ntimes 100 timeout 3 data ffff
source 192.168.4.10
Sending 100, 1000-byte ICMP Echoes to 192.168.5.197, timeout is 3
seconds:
 < press Ctrl+C to break >
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Success rate is 100 percent (100/100), round-trip min/avg/max = 2/2/3
ms
    
```

3

3	
-	-

4

3 3 Â

3

4	
-	-

4.1.2 traceroute

traceroute 3~ ↓ ∪ ÿ .

traceroute [**vrf**] [**vrf-name**] [**ip ip-address**][**ip-adress** [**probe number**] [**source source**]
[**timeout seconds**] [**ttl minimum maximum**]]

<i>vrf-name</i>	VRF 4
<i>ip-address</i>	IPv4 Â


```

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

```

```

ÿ 3      ~  ↓Л      ~  ÿ      IP      ÿ 202.108.37.42  ÿ ~
              ^ 1 17~ ~      3      4      Å

```

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

```

3	3	
	-	-

1

-

3	1	
	-	-

5

5.1

5.1.1 carrier-delay

Ю

3 carrier-delay

~

3 no

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2 Â

3

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--	---	---

5.1.2 clear counters

clear counters [*interface-id*]

<i>interface-id</i>	1 1	1 1

--

3

1

	show interfaces	clear
counters	1 1	1 1
1	1	1

--

Ruijie# **clear counters gigabitethernet 1/1**

3	1	1
show interfaces	1	1

1

3	1	1
-	-	-

5.1.3 clear interface

1 1

clear interface *interface-id*

<i>interface-id</i>	1 1	1 1

--

3

shutdown no shutdown $\{ \hat{A}$

3

3	
shutdown	

✓

3

Λ	
-	-

-

5.1.4 description

no description

<i>string</i>	$\downarrow \hat{A}$

1

3

1

1. *Journal of the American Medical Association*, 2000; 284: 2689-2695.

3

show interfaces	Â
-----------------	---

show interfaces	Â
-----------------	---

1

3

1

-

-

5.1.5 duplex

но 3 1 Â 3 no
и Â

duplex {auto | full | half}

no duplex

auto	1 1 Â
full	1 Â
half	1 Â

1 1 Â

3

1 6 Â 1 show interfaces 3 1
Â

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

3

3 8 Â 3 no ì Â

flowcontrol {auto | off | on}

no flowcontrol

auto	8 Â
off	8 Â
on	8 Â

8 Â

3

show interfaces 8 8 Â

”l 1/1 8 ‘
 Ruijie(config)# **interface gigabitethernet 1/1**
 Ruijie(config-if)# **flowcontrol on**

3	
show interfaces	Â

1

1	
-	-

5.1.7 interface aggregateport

3 3~ ... ~ Â 3
 no Â

interface aggregateport port-number

<i>port-number</i>	Aggregate port 1~ ã Â

$\mathfrak{z}$

$\mathfrak{z}$

$\mathfrak{z}^\sim \dots$

$\parallel$

$\wedge$

```

start cable-diagnoses,please wait...
cable-daignoses end!this is result:
4 pairs
pair state      length(meters)
-----
A   Ok          1
pair state      length(meters)
-----
B   Ok          2
pair state      length(meters)
-----
C   Short       1
pair state      length(meters)
-----
D   Short       1

```

pairs	~ ~ ~ ~ ~
state	~ ~ ~ ~ ~ Short~ ~ ~ ~ ~ ~ ~ ~ ~ ~
length	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

3	
-	-


```

86/96 ~ ~ ~ ~ ~
M8600_48GT_4SFP_POE_II M9600_48GT_4SFP_POE_II
M8600_48GT_4SFP_E M9600_48GT_4SFP_E
M8600_48GT_4SFP_E_II M9600_48GT_4SFP_E_II

```

5.1.12 medium-type

$\hat{A}$ $\{$ no $\hat{A}$
medium-type { fiber | copper }

no medium-type

fiber	"l
copper	

Â

3

^ ~ a Ap SVI~

↓ ↓Л "l ч ~ ↓ è Â
 Л ~ à ↓ à 8 ~
 Â ↓ Л ÿ è ~ ↓Л
 Â

Ruijie(config)# interface gigabitethernet 1/1

Ruijie(config-if)# medium-type copper

3

3	
show interfaces	Â

Л

24SFP/12GT ' 12 SFP 12 10/100/1000M BASE-T || ↑ Â
 a || SFP 10/100/1000M BASE-T Â

3

Л	
-	-

5.1.13 mtu

mtu

Mtu num

<i>num</i>	64 9216(65536 a ↓ a ↓)

ÿ 1500 Â

3

100

1

3

✓

Λ	
---	--

—

3

Ruijie(config-if)# no shutdown

3

	3	
	clear interface	" Æ Â
	show interfaces	Â

3	3	
	Ruijie(config-if)# snmp trap link-status	link trap 11 Â
	Ruijie(config-if)# no snmp trap link-status	link trap 11 Â

1

3	11	
	-	-

5.1.16 speed

Â 3 no

10	й 10Mbps Â
100	й 100Mbps Â
1000	й 1000Mbps Â
10G	й 10Gbps Â
auto	й Â

Â

3

Ap ~ ‡ Ap ~ 11
 a Â Ap Â show interfaces 3 Â
 a 11 a 11 SFP a
 й È

switchport trunk {allowed vlan {all | [add | remove | except] *vlan-list* }} native vlan *vlan-id*}

no switchport trunk {allowed vlan | native vlan}

allowed vlan <i>vlan-list</i>	Trunk ↓ VLAN ^ <i>vlan-list</i> ↓ VLAN ≠ ↓ VLAN VLAN VLAN ID ~ VLAN ID ^ ~ 11 ^ ' 10-20 ^ ↓ VLAN ^ , ~ 11 ~ ' 1-10,20-25,30,33 all 11 ↓ VLAN VLAN add VLAN 11 ↓ VLAN ' remove VLAN 11 ↓ VLAN except VLAN VLAN 11 ↓ VLAN '
native vlan <i>vlan-id</i>	Native VLAN ^

↓ VLAN all Native VLAN ≠ VLAN 1

Access vlan is 1, Native vlan is 1
Protected is disabled
Vlan lists is
1,3-4094

3

3	
show interfaces	Â
switchport access	accessport ÿ statics ÿ VLAN Â

4

3

1	
-	-

5.2

5.2.1 show interfaces

~ 11 "1 Â

show interfaces [*interface-id*] [**counters** | **description** | **status** | **switchport** | **trunk** | **transceiver** [**alarm** | **diagnosis**]]

<i>interface-id</i>	^ 11 à aggregateport à SVI à loopback ~ Â
counters	Â
description	~ link Â
status	Y ~ à 1 Â
switchport	Y ~ 1 Y Â
trunk	trunking port ~ à Aggregate port Â
transceiver	"1 Â
alarm	"1 ~ ! None L Â

	diagnosis	"I	Â
--	-----------	----	---

	Â
--	---

3

a ¶ ~ ‡ Â

Ruijie# **show interfacesgigabitEthernet**

6 Aggregate Port

6.1

6.1.1 aggregateport load-balance

AP $\hat{A}$ 3 no $\hat{A}$

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

no aggregateport load-balance

dst-mac	MAC ↑ $\hat{A}$ AP ~ MAC ↓ ↓ ~ MAC a ↓ ↑ a ↓ $\hat{A}$
src-mac	MAC ↑ $\hat{A}$ AP ~ a ↓ MAC ↑ a ↓ ~ ↓ MAC ↓ $\hat{A}$
src-dst-ip	IP 6 IP ↑ $\hat{A}$ a ↓ IP—— IP a ↓ ~ ↓ IP—— IP ↓ $\hat{A}$ б ~ Ю $\hat{A}$
dst-ip	IP ↑ $\hat{A}$ AP ~ IP ↓ ↓ ~ IP a ↓ ↑ a ↓ $\hat{A}$
src-ip	IP ↑ $\hat{A}$ AP ~ a ↓ IP ↑ a ↓ ~ ↓ IP ↓ $\hat{A}$
src-dst-mac	MAC 6 MAC ↑ $\hat{A}$ a ↓ MAC—— MAC a ↓ ~ ↓ MAC—— MAC ↓ $\hat{A}$

MAC ↑ $\hat{A}$

3

$\hat{A}$

```
show aggregateport load-balance 3 1
```

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

3

```
show aggregateport load-balance
```

```
aggregateport 1
```

1

3

1

-

-

6.1.2 port-group

Aggregate Port 1 Aggregate Port 1 no
Aggregate Port 1

port-group *port-group-number*

no port-group

```
port-group-number
```

```
Aggregate Port 1 Aggregate  
Port 1 1
```

```
a Aggregate Port 1
```

3

1

```
VLAN 1 AP 1 VLAN 1 trunk port 1 a 1 native  
VLAN 1 a AP 1
```

```
10 1 1/3 AP 3  
Ruijie(config)# interface gigabitethernet 1/3  
Ruijie(config-if)# port-group 3
```

3

-

-

1

3

1

-

-

6.2

6.2.1 show aggregateport

aggregateport 1

<i>aggregate-port-number</i>	Aggregate Port 1 1
load-balance	aggereaye port 1
summary	aggregate port 1

3

aggregate port 1 ~ ± aggregate port 1

Ruijie# show aggregateport 1 summary

AggregatePort	MaxPorts	SwitchPort Mode	Ports
-----	-----	-----	-----
Ag1	8	Enabled	ACCESS

3

3	
aggregateport load-balance	AP 1

1

3

1

-

-

switchport access vlan *vlan-id*

no switchport access vlan

	access	switch port ñ access port Â
	trunk	switch port ñ trunk port Â
	hybrid	switch port ñ hybrid port Â

no switchport trunk {allowed vlan | native vlan }

allowed vlan <i>vlan-list</i>	Trunk ↓ VLAN ^ vlan-list ↓ VLAN ≠ ↓ VLAN VLAN VLAN ID ~ VLAN ID ^ ~ 1 ^ ' 10-20 ^ ↓ VLAN ^ , ~ 1 ~ ' 1-10,20-25,30,33 all 100 ↓ VLAN VLAN add VLAN 1 ↓ VLAN ' remove VLAN 2 ↓ VLAN except VLAN VLAN 1 ↓ VLAN '
native vlan <i>vlan-id</i>	Native VLAN ^

↓ VLAN all Native VLAN ≠ VLAN 1

3

Native VLAN

Trunk native VLAN ^ native VLAN 3

UNTAG ~ 1 VLAN ^ ~ VLAN ID

IEEE 802.1Q PVID ~ native VLAN VLAN ID ^ ↓ ~ Trunk 3

native VLAN ≠ UNTAG ^

↓ VLAN '

Trunk ↓ VLAN VLAN 1 4094 ^ ~ ≠ ↓ VLAN

Trunk ↓ VLAN 8 VLAN a Trunk ^

show interfaces switchport 3 ^

```

Ruijie# show interfaces fastEthernet1/15 switchport
Interface  Switchport Mode  Access Native Protected VLAN lists
-----
FigabitEthernet 1/15  enabled TRUNK 1 1 Disabled 1,3-4094

```

	3	
--	---	--

VLAN 3

	-	-
--	---	---

7.2

7.2.1 show vlan

VLAN 1

show vlan [id vlan-id]

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

--

3

--

end 3 Ctrl+C

exit 3

Ruijie# **show vlan id 1**

VLAN Name	Status	Ports
1 VLAN0001	STATIC	Fa0/1, Fa0/2

	3	
3	name	VLAN 1
	switchport access	Vlan 1

1

	1	
3	-	-

8 Super-vlan

8.1

8.1.1 subvlan

3 super vlan subvlan subvlan ^

subvlan *vlan-id-list*

no subvlan [*vlan-id-list*]

	Vlan-id-list	VLAN	subvlan	ID, ^	vlan

--

3	VLAN
---	------

	no subvlan	supervlan	subvlan
--	-------------------	-----------	---------

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

3	3	
	show supervlan	supervlan ^

^

3	^	
	-	-

8.1.2 subvlan-address-range

3 subvlan ip 4

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

no subvlan-address-range

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

3	VLAN				
	end 3 Ctrl+C ^ exit 3				
	Ruijie(config)# vlan 3 Ruijie(config-vlan)# supervlan				
3	<table><tr><td>3</td><td></td></tr><tr><td>show supervlan</td><td>supervlan</td></tr></table>	3		show supervlan	supervlan
3					
show supervlan	supervlan				
1					
3	<table><tr><td>1</td><td></td></tr><tr><td>-</td><td>-</td></tr></table>	1		-	-
1					
-	-				

8.1.4 proxy-arp

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

	show supervlan	supervlan 4
--	-----------------------	-------------

9 Protocol VLAN

9.1

9.1.1 protocol-vlan ipv4 addr mask addr vlan id

IP à 儿 VLAN†

<i>addr</i>	IP 儿 儿 x.x.x.x
<i>id</i>	VLAN ID 1- VLAN

3

```
Ruijie(config)# protocol-vlan ipv4 192.168.100.3 mask 255.255.255.0 vlan 100
```

	3
show protocol-vlan ipv4	-
no protocol-vlan ipv4 <i>addr mask addr</i>	-
no protocol-vlan ipv4	-

RGOS10.1 儿 3

√	S2900	a	ip	vlan†
√	S3760	a	ip	vlan†

	1
-	-

9.1.2 protocol vlan ipv4

Э IP à Л VLAN↑

	-		-

3

Ruijie(config-if)# **protocol vlan ipv4**

3			
	no protocol vlan ipv4		-

4

RGOS10.1 Л Э

3			
	-		-

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

Л profile

	num		profile
	type		Л

3

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

3	1	
	-	-

9.2

9.2.1 show protocol-vlan

Protocol VLAN

show vlan protocol-vlan

	-	-

--

3

--

--

Ruijie# show protocol-vlan

3	3	
	-	-

1

RGOS10.1 3

3	1	
	-	-

10 Private VLAN

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

no private-vlan mapping

	<i>svlist</i>	secondary VLAN list
	no	

--	--

3	Primary VLAN
---	--------------

--	--

```
Ruijie(config)# interface vlan 22
Ruijie(config-if)# private-vlan mapping add 24-26
```

3	3	
	show vlan private-vlan	-

4	RGOS10.1 7 9
---	--------------

3	1	
	-	-

10.1.3 private-vlan type

VLAN ы VLAN

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

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

	<i>community</i>	ы community VLAN
	<i>isolated</i>	ы isolated VLAN
	<i>primary</i>	ы primary VLAN
	no	VLAN

3	3	
	show vlan private-vlan	-
1	RGOS10.1 10.3	
3	1	
	-	-

10.1.5 switchport private-vlan host-association

private VLAN 3 primary VLAN secondary VLAN

switchport private-vlan host-association *p_vid s_vid*

no switchport private-vlan host-association

	<i>p_vid</i>	... primary VID
	<i>s_vid</i>	... secondary VID
	no	3 VLAN 3

--

3

Private VLAN 3

-

-

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

	primary	primary VLAN
	community	community VLAN
	isolated	isolated VLAN

private VLAN

3

Ruijie# **show vlan private-vlan**

3	3	
	-	-

4 * RGOS10.1 3 3

3	1	
	-	-

10.3 Hybrid

10.3.1 switchport hybrid allowed vlan

switchport hybrid allowed vlan[[add][tagged | untagged] | remove] vlist

no switchport hybrid allowed vlan

hybrid ‡

	no	hybrid ‡

3

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

3

-

-

4

RGOS10.1 10.3

3

11

-

-

10.3.2 switchport hybrid native vlan

```
switchport hybrid native vlan vid
```

```
no switchport hybrid native vlan
```

hybrid

vlan

no

hybrid

VLAN

3

```
Ruijie(config-if)# switchport hybrid native vlan 3
```

3

-

-

4

RGOS10.1 10.3

3	1	
---	---	--

11 QinQ

11.1

11.1.1 dot1q outer-vid vid register inner-vid v_list

tunnel

	-	-

dot1q relay-vid vid translate inner-vid v-list

no dot1q relay-vid vid translate inner-vid v-list

<i>v-list</i>	vid
<i>vid</i>	/ tag vid
no	✓

--

3

--

Ю	tag vid й 10-20 ~	vid й 100
ruijie(config)#	interface gigabitEthernet 0/1	
ruijie(config-if)#	switchport mode access	
ruijie(config-if)#	dot1q relay-vid 100 translate inner-vid 10-20	
ruijie(config-if)#	end	

3	3	
show translation-table [interface intf-id]		-

✓

RGOS10.4 ЮЭ

3	/	
	-	-

11.1.4 dot1q-Tunnel cos inner-cos-value remark-cos outer-cos-value

/ ✓ tag "l tag

dot1q-Tunnel cos inner-cos-value remark-cos outer-cos-value

no dot1q-Tunnel cos inner-cos-value remark-cos outer-cos-value

no	✓ "l


```
ruijie(config-if)# frame-tag tpid 0x9100
ruijie(config-if)# end
ruijie# show frame-tag tpid
Ports  tpid
-----
Gi0/3   0x9100
```

3

show frame-tag tpid	
	-

-

4

RGOS10.1 3.0

3

-	-
---	---

-

11.1.6 inner-priority-trust enable

/ 4 tag "l tag 8

inner-priority-trust enable

no inner-priority-trust enable

no			
4	tag "l	tag 8	

4

tag "l

tag 8

3

```
IO tag "l tag 8
ruijie#configure
ruijie(config)# interface gigabitEthernet 0/2
ruijie(config-if)# inner-priority-trust enable
ruijie(config-if)#end
```

3

	show inner-priority-trust	-
1	RGOS10.1 23 S23/S37 a 11	
3	11	
	-	-

11.1.7 mac-address-mapping x source-vlan src-vlan-list

destination-vlan dst-vlan-id

vlan 1 mac 8 vlan

mac-address-mapping x destination-vlan dst-vlan-id source-vlan src-vlan-list

no mac-address-mapping x destination-vlan dst-vlan-id source-vlan src-vlan-list

no	1 23 8 vlan	vlan

3

10 tag

3	1	
	-	-

	no	√ uplink
	uplink	
3		
	Ю й uplink ruijie(config)# interface gigabitEthernet 0/1 ruijie(config-if)# switchport mode uplink ruijie(config)# end	
3		
	show vlan	-
√	RGOS10.1 703	
3		
	-	-

11.1.10 switchport dot1q-tunnel allowed vlan

dot1q-tunnel ↓ vlan

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

switchport dot1q-tunnel allowed vlan remove v_list

no switchport dot1q-tunnel allowed vlan

	tagged	tag
	untagged	a tag
	<i>v_list</i>	vlan id
	no	√
	↓ vlan 1~ untagged	

3


```
ruijie(config)#end
```

3

```
show interface dot1q-tunnel
```

-

4

RGOS10.3 8.9

3

1

-

-

11.1.12 traffic-redirect access-group acl outer-vlan

access,trunk,hybrid, uplink

vid

traffic-redirect access-group *acl* outer-vlan *vid* in

no traffic-redirect access-group *acl* outer-vlan

<i>acl</i>	7 acl
<i>vd</i>	1 vid
no	4 vid

3

Ю 1.1.1.1 vid 3

```
ruijie#configure
```

```
ruijie(config)#ip access-list standard 2
```

```
ruijie(config-acl-std)#permit host 1.1.1.1
```

```
ruijie(config-acl-std)#exit
```

```
ruijie(config)# interface gigabitEthernet 0/1
```

```
ruijie(config-if)# switchport mode trunk
```

```
ruijie(config-if)# traffic-redirect access-group 2 outer-vlan 3 in
```

```
ruijie(config-if)# end
```

3	3	
	show traffic-redirect	-

4 RGOS10.3 7 9

3	1	
	-	-

11.1.13 traffic-redirect access-group acl inner-vlan

access,trunk,hybrid, uplink

vid

traffic-redirect access-group *acl* inner-vlan *vid* out

no traffic-redirect access-group *acl* inner-vlan

	<i>acl</i>	7 acl
	<i>vid</i>	1 vid
	no	1 vid

3

```

Ю          7 1.1.1.2          vid          7 6
ruijie#configure
ruijie(config)#ip access-list standard to_6
ruijie(config-acl-std)#permit host 1.1.1.2
ruijie(config-acl-std)#exit
ruijie(config)# interface gigabitEthernet 0/1
ruijie(config-if)# switchport mode trunk
ruijie(config-if)#traffic-redirect access-group to_6 inner-vlan 6
out
ruijie(config-if)# end

```

3	3	
	show traffic-redirect	-

4 RGOS10.3 3

3	1	
	-	-

11.1.14 traffic-redirect access-group acl nested-vlan

dot1q-tunnel ~ vid 7

traffic-redirect access-group *acl* nested-vlan *vid* in

no traffic-redirect access-group *acl* nested -vlan

	<i>acl</i>	7 acl
	<i>vid</i>	7 vid
	no	7 vid 7

3

Ю

н 1.1.1.3

7 vid н

3		3	
	show traffic-redirect		-
4	RGOS10.1 3		
3	1		
	-		-

11.1.15 l2protocol-tunnel

dot1q-tunnel 3

l2protocol-tunnel {stp|gvrp}

no l2protocol-tunnel {stp|gvrp}

	stp	stp
	gvrp	gvrp
	no	4

--

3

--

Ю 3 gvrp stp
ruijie#configure

ET 6 Tf 12198 3.407 Td [

3	1	
	-	-

11.1.16 l2protocol-tunnel *proto-type* enable

Y П

l2protocol-tunnel { stp|gvrp } enable

no l2protocol-tunnel { stp|gvrp } enable

	stp	stp
	gvrp	gvrp
	no	√

--

3

--

Ю Э Y П

```

ruijie# configure
ruijie(config)# interface fa 0/1
ruijie(config-if)# l2protocol-tunnel gvrp enable
ruijie(config-if)# end

```

3	3	
	show l2protocol-tunnel { gvrp stp }	-

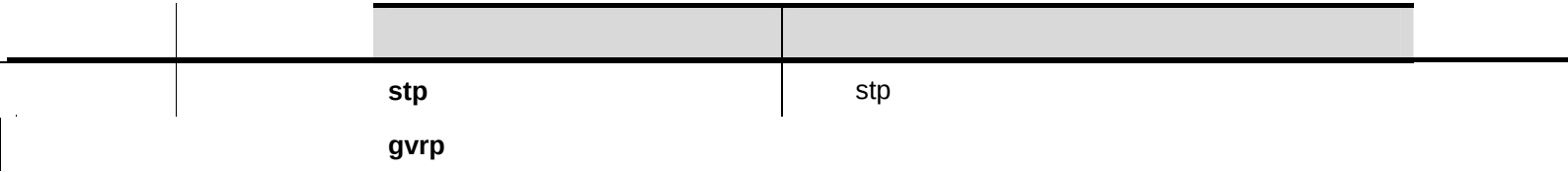
1	RGOS10.3 Ю Э
---	--------------

3	1	
	-	-

11.1.17 l2protocol-tunnel *proto-type* tunnel-dmac *mac-address*

l2protocol-tunnel { stp|gvrp } tunnel-dmac *mac-address*

no l2protocol-tunnel { stp|gvrp } tunnel-dmac *mac-address*



	<i>intf-id</i>	
3		
	<pre> ruijie# show dot1q-tunnel Ports Dot1q-tunnel ----- Gi0/1 Enable </pre>	
3	3	
	-	-
4	RGOS10.3 版本	
3	1	
	-	-

11.2.2 show frame-tag tpid

tpid

	Gi0/1 0x9100
3	
	-
4	RGOS10.1 80
3	11
	-

11.2.3 show inner-priority-trust

1 8

show inner-priority-trust

-	-

a 8

3

ruijie# show inner-priority-trust

Ports inner-priority-trust

ple

3	
-	-

5 0 r N D 3

	-	-
--	---	---

11.2.4 show interface dot1q-tunnel

dot1q-tunnel

show interface [intf-id] dot1q-tunnel

	intf-id	

--

3

--

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

3	3	
	-	-

1	RGOS10.3 版本
---	-------------

3	1	
	-	-

11.2.5 show interface intf-name remark

1

show interface intf-name remark

	-	-

a

3

```
Ruijie# show interface intf-name remark
Ports          Type          From value  To value
-----
Gi0/1          Cos-To-Cos  3           5
```

3

3	
-	-

1

RGOS10.1 8

3

1	
-	-

11.2.6 show interface mac-address-mapping x

MAC 8

show mac-address-mapping x

-	-

a 8

3

```
ruijie# show mac-address-mapping 1
Ports          Destination-VID  Source-VID-list
-----
```


11.2.8 show traffic-redirect

vid ↓ 71

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

<i>intf-id</i>	

3

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

3



```
ruijie# show l2protocol-tunnel stp
Destination mac      : 01d0f8000005
L2protocol-tunnel : Stp Enable
ruijie# show l2protocol-tunnel gvrp
Destination mac      : 01d0f8000006
L2protocol-tunnel : gvrp Disable
```

12 Share VLAN

12.1

12.1.1 share

3 share vlan

13 MAC

13.1

13.1.1 address-bind

ip mac ˆ

address-bind *ip-address mac-address*

no address-bind *ip-address*

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

3

IP MAC ~ ‡ IP ˆ IP
MAC a ˆ IP MAC ~
ˆ

Ю ip ˆ 3.3.3.3 mac 00d0.f811.1112
Ruijie(config)# **address-bind** 3.3.3.3 00d0.f811.1112

3	
---	--

/

address-bind install

no address-bind install



MAC	3				
3					
	IP MAC ~ ‡ IP й IP MAC а й IP MAC ~ Â				
	Ю ip й 3.3.3.3 mac 00d0.f811.1112 Ruijie(config)# address-bind 3.3.3.3 00d0.f811.1112				
3	<table> <tr> <td>3</td><td></td></tr> <tr> <td>show address-bind</td><td></td></tr> </table>	3		show address-bind	
3					
show address-bind					
1					
3	<table> <tr> <td>1</td><td></td></tr> <tr> <td>-</td><td>-</td></tr> </table>	1		-	-
1					
-	-				

13.1.4 address-bind uplink

` ,XăCý XC9 ÔE&v „H...@\$ Ž3½5e† !94> R 41U 7' R sd‰V BA–#(¼ Â #b " 6IW@2•Á

3	3	
	show address-bind uplink	
4	RGOS10.1 30	
3	1	
	-	-

13.1.5 clear mac-address-table dynamic

|| Â

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

1		
	dynamic	Â
	address <i>mac-addr</i>	' Â n = 1
	interface <i>interface-id</i>	Â

interface <i>interface-id</i>	Â
vlan <i>vlan-id</i>	VLAN Â

3

↓ 显示 **show mac-address-table static** 3 Â

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

3	
mac-address-table static	Â
show mac-address-table static	Â

↓

3	1
-	-

13.1.8 mac-address-table aging-time

|| Â 3 no Â

mac-address-table aging-time *seconds*

no mac-address-table aging-time

<i>seconds</i>	~ 10 ы æ Â ã

300 Â

3

show mac-address-table aging-time 3 Â

MAC	3		
		show mac-address-table dynamic 3 ^	
		Ruijie(config)# mac-address-table aging-time 150	
	3		
		show mac-address-table aging-time	^
		show mac-address-table dynamic	^
	4		
	3	11	
		-	-

13.1.9 mac-address-table filtering

		^	3	no	^
		mac-address-table filtering mac-address vlan vlan-id			
		no mac-address-table filtering mac-address vlan vlan-id			
		mac-address	^		
		vlan vlan-id	VLAN ID	α	^
		^			
	3				

1	
-	-

13.1.10 mac-address-table notification

MAC $\perp$ $\hat{A}$ } **no** $\perp$ $\hat{A}$

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

no mac-address-table notification [interval | history-size]

interval <i>value</i>	MAC Trap ~ 1 Å
history-size <i>value</i>	MAC ~ 50 Å

≈ 1 $\approx 50 \text{ Å}$

MAC π $\parallel$ $\sim$ $\downarrow$ a Trap

$\hat{A} \downarrow \mathcal{L}$ $\mathcal{Y}$ $\{$ **snmp-server enable traps mac-notification**

MAC Trap π $\hat{A}$

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

3		
	snmp-server enable traps	trap
	show mac-address-table notification	MAC Â
	snmp trap mac-notification	MAC Â

1	
---	--

	-	-
--	---	---

$\hat{A}$ $\hat{A}$

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

3

13.1.12 snmp trap mac-notification

MAC 11 12 3 no 11 12

snmp trap mac-notification {added | removed}

no snmp trap mac-notification {added | removed}

added	11 12
removed	12

11 12

3

show mac-address-table notification interface 3 12

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

	3	
mac-address-table notification	MAC	11 12
show mac-address-table notification	MAC 12	11

1

	11	
-		

	11	
-		

13.1.13 mac-address-learning

11 /

	mac-address-learning	
3		
	a	MAC a
	1'	
	Ruijie(config-if)# no mac-address-learning	
4		

13.2

13.2.1 show address-bind

	show address-bind	
3		
	Ruijie# show address-bind	
	IP Address	Binding MAC Addr
	-----	-----
	3.3.3.3	00d0.f811.1112
	3.3.3.4	00d0.f811.1117

MAC	3		
3	3		
	address-bind	Â	
4			
3	11		
	-	-	

13.2.2 show address-bind uplink

Â		
show address-bind uplink		

13.2.3 show mac-address-table address

MAC ^ || ~ Â

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

	-	-
--	---	---

[illegible]

3

Aging time : 300

3

✓

3

3	
mac-address-table aging-time	Â

λ	
-----------	--

3

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

3

3	
show mac-address-table static	^
show mac-address-table filtering	^
show mac-address-table dynamic	^
show mac-address-table address	
show mac-address-table interface	
show mac-address-table vlan	VLAN ^

4

3

4	
-	-

13.2.6 show mac-address-table dynamic

|| ^

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

<i>mac-addr</i>	MAC ^
<i>vlan-id</i>	VLAN ^
<i>interface-id</i>	(1 2 AggregatePort)

3

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

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

3

clear mac-address-table dynamic

|| Â

1

3

11

-

-

13.2.7 show mac-address-table filtering

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

<i>mac-addr</i>	MAC Â
<i>vlan-id</i>	VLAN Â

3

Ruijie# show mac-address-table filtering

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

3

```

1      00d0.f800.1002  STATIC  gigabitethernet 1/1
1      00d0.f800.1003  STATIC  gigabitethernet 1/1
1      00d0.f800.1004  STATIC  gigabitethernet 1/1

```

3

3	
show mac-address-table static	Â
show mac-address-table filtering	Â
show mac-address-table dynamic	Â
show mac-address-table address	
show mac-address-table vlan	VLAN Â
show mac-address-table count	Â

1

3

1	
-	-

13.2.9 show mac-address-table notification

MAC 11 Â

show mac-address-table notification [interface[*interface-id*] | history]

interface <i>interface-id</i>	1 Â 3 MAC 11 Â
history	MAC Â

GigabitEthernet1/14 Disabled Disabled

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

MAC Notification Feature : Disabled

Interval between Notification Traps : 1 secs

79j-0.00address-table notification

```
Ruijie# show mac-address-table static
```

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

3

```
mac-address-table static
```

^

```
clear mac-address-table static
```

^

1

3

1

-

-

13.2.11 show mac-address-table vlan

VLAN ^

```
show mac-address-table vlan [vlan-id]
```

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

3

```
Ruijie# show mac-address-table vlan 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

14 DHCP Snooping

14.1 DHCP snooping

14.1.1 ip dhcp snooping

```

DHCP Snooping  1  ~
DHCP Snooping  1  ^

```

[no] ip dhcp snooping

-	-

1

3

```

DHCP Snooping  1  ~  1  1  show ip dhcp snooping  3  DHCP
snooping  1  ^
~ DHCP Snooping 6 Private VLAN  1  a  ^

```

```

IO DHCP snooping  1  '
Ruijie# configure terminal
Ruijie(config)# ip dhcp snooping
Ruijie(config)# end
Ruijie# show ip dhcp snooping
Switch DHCP snooping status ' ENABLE
Verification of hwaddr field status ' DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
0.9T2 09.22d( )62 357W* n3>T8 Tcg714.48r9j/T610 18T 0 315357fQ3>T8 Tcg71416

```

	show ip dhcp snooping	DHCP snooping	Â
1			
3	1		
	-	-	

14.1.2 ip dhcp snooping bootp-bind

DHCP Snooping Bootp 1 ~ IO 3 Â
 3 no ~ DHCP snooping Bootp 1 Â

[no] ip dhcp snooping bootp-bind

--	--	--

3	3	
	show ip dhcp snooping	DHCP snooping
4		
3	1	
	-	-

14.1.4 ip dhcp snooping database write-to-flash

	IO	DHCP Snooping		FLASH	3
	3	^			
	ip dhcp snooping database write-to-flash				
	-		-		
3	^				
	3	^	DHCP Snooping		FLASH 3 ^
	IO	DHCP		flash	3
	Ruijie# configure terminal				
	Ruijie(config)# ip dhcp snooping database write-to-flash				
	Ruijie(config)# end				
3	3				
	-		-		
4					
3	1				

	-	-
--	---	---

14.1.5 ip dhcp snooping information option

DHCP option82 ~ IO 3 Å
 3 no ~ Å

[no] ip dhcp snooping information option

	-	-

Å

3

3 DHCP option82 ~ DHCP Å option82
 Å

```

IO DHCP option82
Ruijie# configure terminal
Ruijie(config)# ip dhcp snooping information option
Ruijie(config)# end
Ruijie# show ip dhcp snooping
Switch DHCP snooping status ' ENABLE
Verification of hwaddr field status ' DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE

```


no DHCP 8 10 3 3

[no] ip dhcp snooping limit rate *rate-value*

<i>rate-value</i>	~ PPS[Packet Per Second]

8

3

show ip dhcp snooping

```

Ю          1          8  ñ 100pps'
Ruijie# configure terminal
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# ip dhcp snooping limit rate 100
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                          NO           100

```

3	3		
	show ip dhcp snooping	DHCP snooping	Â

✓

3	1	
	-	-

14.2.2 ip dhcp snooping suppression

ip suppression ~ Ю 3 ^ 3 no ~
 ip no suppression ^

[no] ip dhcp snooping suppression

	-	-

	11	^
--	----	---

3		^
---	--	---

	3 ~ 1 Ю DHCP ~ Ю
	DHCP ^

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

3	3	
	-	-

1		
---	--	--

3	1	
	-	-

14.2.3 ip dhcp snooping trust

DHCP snooping ò TRUST ò
 3 no ò UNTRUST Â

[no] ip dhcp snooping trust

-	-

ò ò UNTRUST Â

3 Â

DHCP 3 DHCP ò TRUST ÂTRUST
 ~ UNTRUST DHCP Â

```

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
  
```

14.3 DHCP snooping

14.3.1 show ip dhcp snooping

DHCP Snooping

IO

3 Å

show ip dhcp snooping

-	-

3

3 4

DHCP Snooping

Å

IO

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)

ip dhcp snooping	DHCP snooping Å
ip dhcp snooping verify mac-address	DHCP snooping mac Å
ip dhcp snooping write-delay	flash

1

3

1	
-	-

14.3.2 show ip dhcp snooping binding

DHCP Snooping ~ Ю 3 Â

show ip dhcp snooping binding

-	-

3

3 ~ 10 DHCP Snooping Â

14.4 DHCP snooping

14.4.1 clear ip dhcp snooping binding

DHCP Snooping 3 10 3

clear ip dhcp snooping binding

-	-

--

3

--

3 DHCP snooping 1

--

10 DHCP snooping 1
 Ruijie# **clear ip dhcp snooping binding**
 Ruijie# **show ip dhcp snooping binding**
 Total number of bindings: 0
 MacAddress IpAddress Lease(sec) Type VLAN Interface

3	
show ip dhcp snooping binding	DHCP snooping 1

1

3	1
-	-

14.4.2 debug ip dhcp snooping

3 DHCP Snooping 1 10 3

debug ip dhcp snooping {event | packet}



15 IGMP Snooping

15.1

15.1.1 deny

	profile	~	profile	Ю	3 deny ^
deny					
	deny		profile		
	profile	deny	^		
3	profile	^			
	"l profile Ю range 3	^1 ~ ì	profile	~	
	profile	3 ^			
	Ю ... 224.2.2.2 profile				
	Ruijie(config)# ip igmp profile 1				
	Ruijie(config-profile)# range 224.2.2.2				
	Ruijie(config-profile)# deny				
3	3				
	ip igmp profile	...	profile		
	range				
1					
3	1				
	-				

15.1.2 permit

IGMP Snooping		
	profile	prof
	↓	Â
	permit	
	permit	
	profile	deny Â
	profile	Â
	"l profile IO range	
	profile	3
	IO ... ↓ 224.2.	
	Ruijie(config)# ip igmp p	
	Ruijie(config-profile)# r	
	Ruijie(config-profile)# p	
		3
	ip igmp profile	
	range	
		11
	-	-

15.1.3 range

profile	profile	IO	3 range	↓ 3	Â
≠ ↓ 3	Â	3	no		
range low-ip-address [high-ip-address]					
no range low-ip-address [high-ip-address]					

	<i>high-ip-address</i>	
	Â	
3	profile	Â
	й profile 1~ profile й deny Â 1 ~	Э Â
	Ю ... й 224.2.2.2~224.2.2.244 profile ' Ruijie(config)# ip igmp profile 1 Ruijie(config-profile)# range 224.2.2.2 224.2.2.244	
3	3	
	ip igmp profile	... profile
	deny	profile й й deny
	permit	profile й й permit
1		
3	1	
	-	-

15.1.4 ip igmp profile

IGMP profile 8 Â profile ~ "l Ю
 profile Â 3 3~ profile-number igmp profile Â

ip igmp profile *profile-number*

no ip igmp profile *profile-number*

	<i>profile-number</i>	profile 1~ 1-65535
	Â	
3	Â	

IGMP Profiles 3 I SVGL
 E à I' IGMP Filtering L 11 Â 3 ì profile
 profile 11 Â

Ю ... 11 ì 1 profile profile Â
 Ruijie(config)# **ip igmp profile 1**
 Ruijie(config-profile)#

3	
range	profile Â
permit	profile ì ì permit
deny	profile ì ì deny

1

3

11	
-	-

15.1.5 ip igmp snooping ivgl

igmp snooping ivgl 3 ip igmp snooping ivgl Â
 3 no igmp snooping Â

ip igmp snooping ivgl

no ip igmp snooping

-	-

disable Â

3

Â

Ю VLAN , Â 3 1 6 1 VLAN
 1 VLAN Â 1

	pim snooping	igmp snooping	IVGL	IVGL-SVGL
~	no ip igmp snooping	igmp snooping	1	3
	pim snooping	igmp snooping	1	3
	a 1 2			

Ю 3 igmp snooping ivgl '

 Ruijie(config)# **ip igmp snooping ivgl**

3		
ip igmp snooping svgl	igmp snooping	svgl 2
ip igmp snooping ivgl-svgl	igmp snooping	2

1

3	1	
-	-	

15.1.6 ip igmp snooping vlan

vlan 3 igmp snooping ivgl ~ 3 ip igmp

snooping vlan 2 3 no igmp snooping 2

ip igmp snooping vlan vid

no ip igmp snooping vlan vid

vid	vlan id	

disable 2

3 2

3 2	Ю	vlan 3	IGMP Snooping 1
~	vlan 3	pim snooping	igmp snooping
	no ip igmp snooping vlan	vlan 3	igmp snooping
	pim snooping	VLAN	1
	3	a 1 2	pim snooping

{	1	
	-	-

15.1.8 ip igmp snooping svgl profile

profile

SVGL

~

'

Â

77 ID806 Td()Tj/C Td(8.796 1 Tf-E3>]T<350E2CD516/T1 1 Tf0 Tr 4.01j/C)5fb1G4jw 14018 Tc 5.239	
@q17...U6	

Ю NJ Ä Ö a

5

no ip igmp snooping dyn-mr-aging-time

	<i>time</i>	~ ; √ <1-3600> Â	

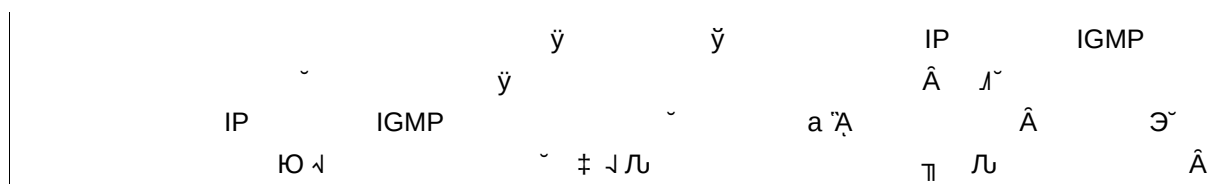
300s

3 Â

|| è IGMP PIM
Hello ~ ŷ Â || ~
Ю √ 3 || ~
√ ∇ Â

Ю || ~ ñ 100s'
Ruijie(config)# ip igmp snooping dyn-mr-aging-time 100





```
Ruijie(config)# ip igmp snooping fast-leave enable
```

0 [REDACTED]

Ю || " ñ 100s'
 Ruijie(config)# **ip igmp snooping query-max-response-time 100**

address	server <i>saddress</i>
<i>vid</i> address	server

```

ip
Ruijie(config)# ip snooping limit-ipmc vlan 1          224.0.0.1
server 192.168.4.243

```

3	IP IP Â

3	1	
	-	-

15.1.14 ip igmp snooping source-check port

8 4 Â igmp snooping
 3 ip igmp snooping source-check port Â 3 no
 11 Â

ip igmp snooping source-check port

no ip igmp snooping source-check port

	-	-

	11 Â
--	------

3	Â
---	---

IGMP SNOOPING	ш	Â	ÿ
	γ	IGMP Sooping	
Ä	Э Â	IGMP SNOOPING	ÿ
	γ	Ä	ÿ
й		Â	‡
Â			
1~	VLAN a	π	a Â

Ю	igmp snooping	11 Â
Ruijie(config)# ip igmp snooping source-check port		

3	3	

4	
---	--

3	1	
	-	-

15.1.15 ip igmp snooping suppression enable

igmp snooping Report 8 7 ~ 3 ip igmp snooping suppression enable 3 no igmp snooping suppression

ip igmp snooping suppression enable

no ip igmp snooping suppression enable

	-	-

	disable	Â
--	---------	---

3	Â	
---	---	--

	IGMP	8 7 1~	4	~ 1
vlan	IGMP Report	a	IGMP Report	~ 1
	IGMP Report	a	~ 1	Â
	3 1~ suppression 7	~	IGMPv1/v2 report	
8~	a	IGMPv3 report	8 Â	

IO	3	igmp snooping suppression
Ruijie(config)#	ip igmp snooping suppression	

3	3	
	-	-

1		
---	--	--

3	1	
	-	-

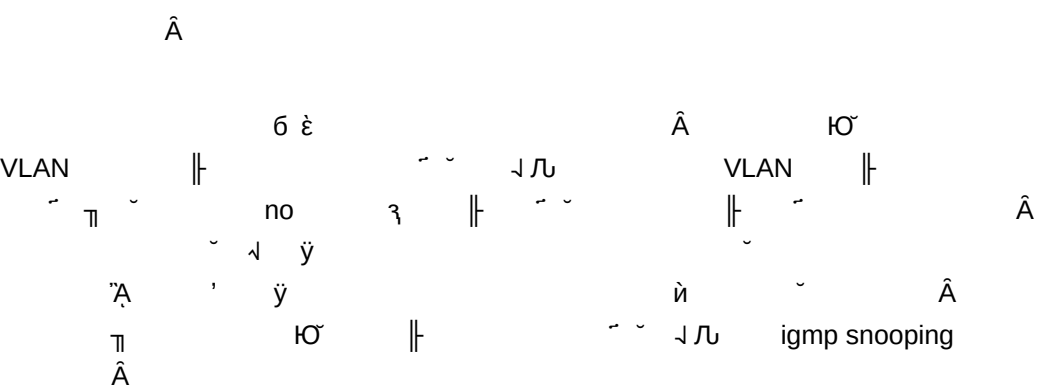
15.1.16 ip igmp snooping mrouter learn pim-dvmrp

|| IGMP Query/Dvmrp/PIM Hello ~ 7 || ~
3 ip igmp snooping mrouter learn Â 3 no

vid

vlan id Â

3



Ю

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

3

3	
ip igmp snooping mrouter learn pim-dvmrp	

1

3	Â
↓	Â
Ю	Э
Ruijie(config)#	ip igmp snooping vlan 1 static 224.0.0.2 interface fastEthernet 0/1
3	3
	ip igmp snooping vlan mrouter interface
↓	
3	1
	-

15.1.20 ip igmp snooping filter

profile Â	3	no	profile Â	Ю	3
ip igmp snooping filter profile-number					
no ip igmp snooping filter profile-number					
profile-number	profile	1	↓	<1-65536>	
Â					
3	Â				
IGMP Profile	Ю	IGMP Report	+		
1	1	1	+		
Â	"1...	profile	1	filter	Â
Ю	"1	0/1	Э	profile 1'	
Ruijie(config)#	interface fastEthernet 0/1				
Ruijie(config-if)#	ip igmp snooping filter 1				



3

	-	-
--	---	---

15.2

15.2.1 show ip igmp snooping

igmp snooping ^

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

	igmp snooping ¶ ^	
gda-table	‡ ^	
interfaces	igmp snooping filtering ^	
mrouter	^	
statistics [vlan <i>vlan-id</i>]	snooping ^	
vlan	vlan ID	snooping

--

3	EXEC
---	------

--

--

3	3	
	-	-

1

3	1	
	-	-

15.2.2 show ip igmp profile [profile-number]

	IGMP Snooping
event	IGMP Snooping Y [*]
packet	IGMP Snooping
msf	IGMP Snooping 6
warning	IGMP Snooping

16 MSTP

16.1

16.1.1 bpdu src-mac-check

bpdu mac $\hat{A}$ ↓ no bpdu mac
 π $\hat{A}$

bpdu src-mac-check *H.H.H*

no bpdu src-mac-check

<i>H.H.H</i>	↓ mac $\hat{A}$ bpdu $\hat{A}$
no	bpdu $\hat{A}$

$\hat{A}$

3 $\hat{A}$

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

3	
-	-

↓

8 RSTP BPDU BPDU 8 ^

clear spanning-tree detected-protocols [interface *interface-id*]

	<i>interface-id</i>	

^

3

Ruijie# **clear spanning-tree detected-protocols**

3	3	
	show spanning-tree interface	STP ^

1

3	1	
	-	-

16.1.3 spanning-tree

MSTP ^ MSTP ^ ~ MSTP ^ 3
 no spanning-tree ^ no 3 ^
 a spanning tree ^

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

no spanning-tree [forwa Td[(no spannin)5(g)-10.001 Tc 0.0032 Tw 5.251 0 Td<01C4>Tj/TT1 1 Tf-0.00

3

A

forward-time A **hello-time** A **max-age** B
 E 4 A B 8 ' E
 $2 * (\text{Hello Time} + 1.0\text{snd}) \leq \text{Max-Age Time} \leq 2 * (\text{Forward-Delay} - 1.0\text{snd})$
 a ' ≠ a A

1' spanning-tree A '
 Ruijie(config)# **spanning-tree**
 2' BridgeForwardDelay
 Ruijie(config)# **spanning-tree forward-time 10**

3

3	
show spanning-tree	STP A
spanning-tree mst cost	STP PathCost A
spanning-tree tx-hold-count STP	TxHoldCount A

4

3

1	
-	-

16.1.4 spanning-tree autoedge

A Autoedge A 3 disabled Autoedge

spanning-tree autoedge [disabled]

disabled	Autoedge A

A

3

A

	-	-
--	---	---

16.1.6 spanning-tree bpduguard

BPDU Guard $\hat{A}$ $\downarrow \uparrow$ 3 enabled disabled

BPDU Guard $\hat{A}$

spanning-tree bpduguard { $\hat{A}$ disabled }

	$\hat{A}$	EA 7
enabled		
disabled		BPDU Guard $\hat{A}$

	$\hat{A}$
--	-----------

3	$\hat{A}$
---	-----------

Bây giờ ta sẽ đi vào chi tiết của BPDU Guard. Khi BPDU Guard được bật trên một cổng, nếu cổng đó nhận được một BPDU mà nó không phải là chủ của cây, thì cổng sẽ bị khóa. Điều này giúp ngăn chặn các cuộc tấn công bằng BPDU giả mạo.

3	3	
	-	-

4

root guard

3

^

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

3

3	
show spanning-tree interface	STP

4

3

11	
-	-

16.1.12 spanning-tree loopguard default

loop guard ^ 3 no loop guard ^ loop guard 7
a bpdu 4 ^

spanning-tree loopguard default
no spanning-tree loopguard default

-	-

loop guard 7 ^

3

```
Ruijie(config)# spanning-tree loopguard default
```

3

3	
-	-

1

16.1.14 spanning-tree mode

Ю 3 STP Â no ↓ √ Â

spanning-tree mode [stp | rstp | mstp]

no spanning-tree mode

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

MSTP

3 .

Ruijie(config)# spanning-tree mode stp

3	3	
	show spanning-tree	

√

3	√	
	-	-

VLAN 3 Instance 1 MST IO

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

Instance 1 IO

Ruijie(config-mst)# no instance 1

↓ MST 3 show 3 A

3	
---	--

MSTP

MSTP

Region

Â "l ↓ ~ л

↓ ~ л 20 Gigabitethernet 1/1 "l ÿ 10
Ruijie(config)# **interface gigabitethernet 1/1**
Ruijie(config-if)# **spanning-tree mst 20 port-priority 0**
↓ ~ л **show spanning-tree mst instance interface interface-id** ¿ Ñ
Â

Ю Instance 20 "l ÿ 8192'

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

↓ √ **show spanning-tree mst instance interface interface-id** 3 3
Â

	show spanning-tree interface	STP	Â
1			
3	1		
	-		-

16.1.20 spanning-tree portfast

	Portfast	Â	↓ ∪	3	disabled	Portfast	Â
	spanning-tree portfast [disabled]						
	disabled				Portfast	Â	
		Â					
3		Â					
	-						
	Ruijie(config)# interface gigabitethernet 1/1 Ruijie(config-if)# spanning-tree portfast						
3		3					
	show spanning-tree interface				STP	Â	
1							
3		1					
	-					-	

16.1.21 spanning-tree portfast bpdupfilter default

	BPDU filter	Â	↓ ∪	3	no	BPDU filter	Â
	spanning-tree portfast bpdupfilter default						

no spanning-tree portfast bpdupfilter default

	-	-

BPDU filter

3

^

BPDU Filter 1~

a ≠ a

BPDU ^

show spanning-tree

3 ^

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

	3	
3	show spanning-tree interface	STP ^

1

	1	
3	-	-

16.1.22 spanning-tree portfast bpduguard default

BPDU guard ^ 1 1

3 no

BPDU guard ^

spanning-tree portfast bpduguard default**no spanning-tree portfast bpduguard default**

	-	-

BPDU Guard.

3

^

Ruijie(config)# spanning-tree portfast bpduguard default

3	3	
	show spanning-tree interface	STP

1

3	1	
	-	-

16.1.23 spanning-tree portfast default

Portfast 1 3 no Portfast 1

spanning-tree portfast default

no spanning-tree portfast default

	-	-

Portfast 1

16.1.24 spanning-tree reset

spanning-tree 1 2 3 no 4

spanning-tree reset

	-	-

3 4

Ruijie(config)# spanning-tree reset

	3	
3	show spanning-tree	STP 4
	show spanning-tree interface	STP 4

4

	1	
3	-	-

16.1.25 spanning-tree tc-guard

tc- guard 1 3 no tc- guard 4 tc-guard 5
tc 6

spanning-tree tc-guard

no spanning-tree tc-guard

	-	-

tc- guard 4

3

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

3

3

-

-

1

3

1

-

-

16.1.26 spanning-tree tc-protection

tc- protection 3 no

tc- protection 3

spanning-tree tc- protection**no spanning-tree tc- protection**

-

-

tc- protection 3

3

3	1	
	-	-

16.1.27 spanning-tree tc-protection tc-guard

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

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

	-	-

tc-guard 1

1 1

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

3	3	
	-	-

1

3	1	
	-	-

16.1.28 spanning-tree tx-hold-count

STP TxHoldCount

	<i>tx-hold-count</i>	TxHoldCount 1 10
	3	
3		
	Ruijie(config)# spanning-tree tx-hold-count 5	
3	3	
	show spanning-tree	

	tx-hold-count	TxHoldCount
	pathcost method	

3

Ruijie# show spanning-tree hello-time

3

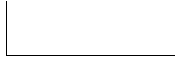
	link-type	linktype
3	Â	
	Ruijie# show spanning-tree interface gigabitethernet 1/5	
	3	
	spanning-tree bpdupfilter	BPDU filter Â
3	spanning-tree portfast	portfast Â
	spanning-tree bpduguard	BPDU guard Â
	spanning-tree link-type	a " Â
1		
	1	
3	-	-

16.2.3 show spanning-tree mst

Ю 3 1/1 MST ~ Instance Â

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

	configuration	mst
	instance-id	Instance 1
	interface-id	1
	Instance Â	
3	.	



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

17 SPAN

17.1

17.1.1 monitor session

... SPAN ^ ~ ^ ~ . { no
Â

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

3

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

3

3	
monitor session	... SPAN ^ ~ ^ ~ ^

1

3

1	
-	-

18

```
1/2 // a ↵
Ruijie(config)# monitor session 2 destination remote vlan 7
interface gigabitEthernet 1/3 switch // ↵
Ruijie(config)# monitor session 2 destination remote vlan 7
reflector-port interface gigabitEthernet 1/1 switch
2
Ruijie(config)# monitor session 2 remote-destination
Ruijie(config)# monitor session 2 destination remote vlan 7
interface gigabitEthernet 1/1 switch
```

3		
	show monitor	Â

4	a ↵	reflector-port Â
---	-----	------------------

3	1	
	-	-

18.1.2 remote-span

3 RSPAN VLAN

[no] remote-span

	-	-

--

3	VLAN
---	------

	~ end 3~ Ctrl+C Â
	~ exit 3

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

3	3	
---	---	--

	show vlan	Vlan 1
1		
3	1	
	-	-

19 IP

19.1

19.1.1 ip address

3 IP ~ ↓ ∪ no IP Â 3 Ю'

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

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

<i>ip-address</i>	32 Æ IP ~ 8 Æ ~ ∪ 8 ~ Â
<i>network-mask</i>	32 Æ ~ "1" Æ "0" ÿ Æ Â 8 Æ ~ ∪ 8 ~ Â
secondary	IP Â

IP Â

Â

↓ IP ~ ↓ ∪ IP ~ IP ~
IP Â

≠ 32 Æ ~ IP ÿ ↑ Â
~ ÿ ∫ 1 ∟ IP Æ ÿ ↑ ~ ÿ ∫ 0 ∟
IP Æ ÿ ↑ Â A ÿ ∫ 255.0.0.0 ∟ Â
↓ ∪ ↑ ~ ↑ ÿ ↑
Æ ≠ ÿ ↑ ~ ÿ ~ ∫ ~ ÿ
Â IP ' Ů!'(M! 2d J Fý 4'9 Â ðÁ't•5 Cx(M! à €t ĐsÁ 0@ðk!& '9

Æ k

1. $\hat{A}$ $\sim$ γ $\sim$ $\hat{A}$ IP $\sim$ $\hat{A}$ IP $\sim$ $\hat{A}$
 $\hat{A}$ ч γ $\sim$ $\hat{A}$ $\sim$ $\hat{A}$ IP $\sim$ $\hat{A}$
 IP $\sim$ $\hat{A}$ а ч ч
 ЛЭ $\hat{A}$

Лю $\sim$ γ IP $\sim$ 10.10.10.1 $\sim$ 255.255.255.0 $\hat{A}$
 ip address 10.10.10.1 255.255.255.0

А Л а Л А
 А SLIP ă HDLC ă PPP ă LAPB ă Frame-relay ă Л А
 ă Л А X.25 а
 Л А
 А а ping ă Л ă Л IP А
 SNMP Л А
 А а Л А

ЛЮ ă Л ă FastEthernet 0/1 А
 IP А
 ip unnumbered fastEthernet 0/1

3	Â
	RGOS ARP 32 48 MAC Â ARP ARP Â clear arp-cache ARP Â
	ЛЮ ARP Â arp 1.1.1.1 4e54.3800.0002 arpa
3	
	clear arp-cache ARP 3
1	
3	

19.2.2 arp gratuitous-send interval

3	arp Â 3 no 3
Â	
	arp gratuitous-send interval seconds
	no arp gratuitous-send
	seconds ARP <1-3600> Â
	ARP 2 Â
3	Â
	Ю ARP 2 Ю 1 3 4
	ARP 2 Â
	1' ЛЮ SVI 1 ARP Â
	Ruijie(config)# interface vlan 1

IP	3
1	
3	1
	-

19.2.4 arp retry times

3	1	arp	5	IP	ARP
1	no	1	5	ARP	1
arp retry times number					
no arp retry times					
number	1	ARP	a	ARP	1
	ARP	ARP	5	1	1
3	1				
		ARP	a	ARP	1
1' 100	arp retry times 1	ARP	a	1	1
2' 100	arp retry times 2	ARP	1	1	1

19.2.5 arp timeout

ARP ă ʍ ARP ~ ↓ ʌ 3 Â 3 no ↓
ʌ Â

arp timeout

3

ǎǎ í

Ö 6ñ 11 f = í

↓ル

3 9

ARP

Â

Â NFPP(Network Foundation Protection Policy ,)

~

Э

mac

(

IP) ↓

ARP

~

ч

clear arp

1s

~ ↓

γ

ARP

a

Â

<i>mask</i>	IP ARP ; trusted ~ ± ↓ ARP ~ ± ↓ ARP Â
static	arp Â
<i>mac-address</i>	mac ARP Â
complete	arp Â
incomplete	arp Â
oob	(interface of mgmt) ARP Â

3

Â

1' Люй show arp '

Ruijie# show arp

Total Numbers of Arp: 7

Protocol Address Age(min) Hardware

Type Interface

```

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 щ лж Ю'

Protocol	~ й Internet Â
Address	б ° IP Â
Age (min)	ARP щ ~ Люй Â ~ " " Â
Hardware	б IP ° Â
Type	° ~ Люй й ARPA Â
Interface	б IP Â

```

2' 儿Ю 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

3' 儿Ю 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

4' 儿Ю 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

```

3	3	
	-	-

4

3	11	
	-	-

19.3.3 show arp counter

ARP arp Â

show arp counter

	-	-

3

ЛЮ й **show arp counter**

Ruijie# **show arp counter**

The Arp Entry counter:0

The Unresolve Arp Entry:0

3

3	
-	-

1

3

1	
-	-

19.3.4 show arp detail

ARP

Â

show arp detail [*interface-type interface-number*] *ip [mask]* | *mac-address* | **static** | **complete** | **incomplete**

<i>interface-type interface-number</i>	b	y	ARP
<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		

3

γ ARP ~ ARP ^ || ä ä ä ↓ ~ ä

3 Â

ЛЮ й **show arp detail**

Ruijie# **show arp detail**

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

ARP ă ĩŃ Ю'

IP Address	б " IP Â
MAC Address	б IP " Â
Type	ARP " à à ↓ à
Age	ARP " " æ Â
Interface	б IP б Â
Port	б ARP γ Â

3

4

IP 3

3	1	
	10.4	10.4

19.3.5 show arp timeout

|| ARP

show arp timeout

	-	-

--

3

--

ЛЮ й show arp timeout	
Ruijie# show arp timeout	
Interface	arp timeout(sec)

VLAN 1	3600

3	3	
	-	-

1

3	1	
	-	-

19.3.6 show ip arp

^ ARP

IP 3

	-	-
--	---	---

--

3

	-	-
--	---	---

19.3.7 show ip interface

3 ↓ Л IP Â 3 Ю'

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

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

--

3

RGOS	↓	RGOS	...	Â ↓
RGOS	↓	↓ Л	Â	ÿ ↓
ÿ			Â	↓ ÿ а ↓
	↓	↓		RGOS
	↓		↑ UP L' Â	
а ↓	↓	а	ÿ	Â

```

ЛЮЙ show ip interface Â
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 unreachable 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.

Ю'

IP interface state is:	↓ ~ è ~ й "UP" Â
IP interface type is:	~ ~ Â
IP interface MTU is:	MTU Â
IP address is:	IP Â
IP address negotiate is:	IP Â
Forward direct-boardcast is:	Â
ICMP mask reply is:	ICMP Â
Send ICMP redirect is:	ICMP Â
Send ICMP unreachable is:	ICMP a ↓ Â
DHCP relay is:	DHCP Â
Fast switch is:	IP π Â
Route horizontal-split is:	↑ ~ й Â
Help address is:	helper IP Â
Proxy ARP is:	3 ARP Â
Outgoing access list is	Â
Inbound access list is	Â

3

3	
-	-

4

19.4.1 ip default-gateway

Y 3 ~ 3 ip default-gateway ^ 3 no
 ^

ip default-gateway

no ip default-gateway

	-	-

3

a

↓ 0

↘ Ж

20 DHCP

20.1 DHCP

20.1.1 bootfile

DHCP
 1
 DHCP
 bootfile
 no
 bootfile
 no bootfile

	DHCP
file-name	

3

20.1.2 client-identifier

И DHCP ^ Л Ω 8 ~ ~ DHCP
3 client-identifier Â 3 no ↓ Л Â

client-identifier *unique-identifier*

no client-identifier

<i>unique-identifier</i>	DHCP ~ Л Ω 8 Â ' 0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31 Â

Â

3 DHCP Â

DHCP DHCP Е ↑ IP ~ ~
3 Â à MAC ↓ ~ MAC ì
00d0.f822.33b4 à ↓ ì GigabitEthernet 0/1 ì
0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31 è 01 3 Л
~
67.6967.6162.6974.4574.6865.726e.6574.302f.31 ì GigabitEthernet0/1 Ω 8
Â 3 И ↓ Л RFC1700 I Address Resolution Protocol
Parameters L Â
↓ DHCP И ~ ↓ Л 3 Â

ЛЮ ~ И MAC ì 00d0.f822.33b4 Л DHCP
Â
client-identifier
0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31

	3
hardware-address	И DHCP Â
host	И IP Â DHCP Â
ip dhcp pool	И DHCP ↓ ~ DHCP Â

1

3	1	
	-	-

20.1.3 client-name

DHCP 1 ~ DHCP 3 client-name ^ 3 no
DHCP 1 ^

client-name *client-name*

no client-name

	client-name	DHCP 1 ^ 1/2 ASCII ^ 1 a 1 ~ DHCP river 1 DHCP 1 ~ a 1 river.i-net.com.cn ^

1 ^

3

DHCP ^

1 DHCP 1 ^ 1/2 3 DHCP 1 ^ 1
a 1 1 ^

1/2 ~ 1 river 1 1 ^
client-name river

3	3	
	host	IP ^ DHCP ^
	ip dhcp pool	DHCP 1 ~ DHCP ^

1

3	1	
	-	-

20.1.4 default-router

И DHCP ~ DHCP 3 default-router ^ 3 no
↓ Л И ^

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

no default-router

<i>ip-address</i>	И IP ^ ^
<i>ip-address2...ip-address8</i>	^ ↓ ~ ↓ Л 8 ^

И ^

3 DHCP ^

Ю DHCP ÿ DHCP Л ^DHCP Л
И IP ~ б† ↓ ^

ЛЮ ~ И 192.168.12.1 И ^
default-router 192.168.12.1

<i>ip-address</i>	И DNS Е IP Â Â
<i>ip-address2...ip-address8</i>	^ ↓ ~ ↓ √ 8 DNS Е Â
use-dhcp-client <i>interface-type</i> <i>interface-number</i>	RGOS √ DHCP DNS Е ~ И DHCP DNS Е Â

И DNS Е Â

3 DHCP Â

И DNS Е ~ "I ~ DHCP ↓ 6 DNS
Е ~ Ю DNS Е Â
RGOS √ ↓ ≠ DHCP ~ ↓ √ DNS Е ~
DHCP Â

∇Ю ~ И DHCP DNS Е 192.168.12.3 Â
dns-server 192.168.12.3

9 [REDACTED] 02 8

<i>domain-name</i>	DHCP 1 1 Â

1 1 Â

3 DHCP Â

DHCP 1 1 1 ~ é 1 1 1 ŷ ~ ŷ
1 1 1 Â

1 1 DHCP 1 1 i-net.com.cn Â
domain-name i-net.com.cn

	3	
3	dns-server	DHCP DNS 1
	ip dhcp pool	DHCP 1 ~ DHCP Â

1

	1	
3	-	-

20.1.7 hardware-address

DHCP ~ ~ DHCP 3 hardware-address Â 3
no 1 1 1 Â

hardware-address *hardware-address type*

no hardware-address

<i>hardware-address</i>	DHCP MAC Â



a DHCP IP Â

3

RGOS DHCP IP DHCP
 1~ DHCP 1 2~ DHCP 3~ 4
 3~ DHCP 6 DNS 4~ DHCP 15 DHCP
 44 WINS Â

FastEthernet 0 IP Â
 interface fastEthernet 0
 ip address dhcp

3

3	
dns-server	DHCP DNS
ip dhcp pool	DHCP Â

4

3 E

-	-

20.1.10 ip dhcp excluded-address

IP DHCP a DHCP 3 ip
dhcp excluded-address Â 3 **no** B Â

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

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

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

DHCP IP Â

3

Â

IP ~ DHCP E ħ DHCP IP Â
 3 ↓ √ Ÿ IP ~ ħ DHCP Â
 √ IP ~ ≠ ↓ √ DHCP E ħ Ÿ ħ Â

√ DHCP E a ħ 192.168.12.100~150 IP Â
 ip dhcp excluded-address 192.168.12.100 192.168.12.150

3

ip dhcp pool

√ DHCP ↓ ~
 DHCP Â

network DHCP~

√ DHCP √
 Â

ЛЮ ~ ping и 3 Â
ip dhcp ping packets 3

3

ip dhcp excluded-address	ℙ DHCP ℒ a ℑ IP Â
network DHCP~	ℙ DHCP ℒ Â

✓

ℒ

3		
	ip dhcp pool	W DHCP 1 ~ DHCP A
1		
3	1	
	-	-

20.1.15 netbios-name-server

DHCP NETBIOS WINS 1 ~ DHCP 3
netbios-name-server A 3 no 1/2 WINS E A

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

no netbios-name-server

<i>ip-address</i>	W WINS E IP A	A
<i>ip-address2...ip-address8</i>	^ 1 ~ 1/2 8 WINS E A	

W WINS E A

3 DHCP

W WINS E ~ "1 ~ DHCP 1 6 WINS
 E ~ IO WINS E A

1/2 ~ ÿ DHCP WINS E 192.168.12.3 A
netbios-name-server 192.168.12.3

3		
	ip address dhcp	DHCP 1 IP A
3	ip dhcp pool	W DHCP 1 ~ DHCP A

1

3	1	
	-	-

20.1.16 netbios-node-type

NetBIOS DHCP 3 netbios-node-type 1 NetBIOS DHCP 3

netbios-node-type type

no netbios-node-type

type		NetBIOS 4 1
	0-FF 8 1 1	
	10	
	1 b-node	
	1 p-node	
	1 m-node	
	8 1 h-node 1	
	1	
	1 b-node	
	1 p-node	
	1 m-node	
	1 h-node	1

NetBIOS 1

3 DHCP 1

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

	лю	~	DHCP	NetBIOS	й	Â
	netbios-node-type h-node					
3						
	ip dhcp pool			DHCP		
	netbios-name-server			DHCP NETBIOS		
4						
3	1					
	-			-		

20.1.17 network DHCP

3

✓

3

20.1.18 next-server

```

DHCP
next-server {
    no
    next-server ip-address [ ip-address2...ip-address8 ]
no next-server

```


IP Â
option 19 hex 1
2 Ю ~ 3 33 8 DHCP
 ~ DHCP 4 '

```
service dhcp
```

3

```
show ip dhcp server statistics
```

DHCP 4 5

4

3

1

-

-

20.2

20.2.1 clear ip dhcp binding

DHCP 6

clear ip dhcp binding 3 5

```
clear ip dhcp binding { * | ip-address }
```

*

DHCP 5

ip-address

IP 5

5 5

3

```
3 4 DHCP || 6 DHCP 4 5 no ip dhcp pool
3 5
```

```
лю 6 IP 5 192.168.12.100 DHCP 5
clear ip dhcp binding 192.168.12.100
```

3

```
show ip dhcp binding
```

DHCP 4 5

4

3	1	
	-	-

20.2.2 clear ip dhcp conflict

DHCP 3

clear ip dhcp conflict 3

clear ip dhcp conflict { * | ip-address }

	*	DCHP 3
	ip-address	IP 3

3

3

DHCP 3 ping 3 DHCP 3

Æ DHCP L ~

3

✓

3

DHCP Server

```
debug ip dhcp server { A
```

```
debug ip dhcp server
```

no debug ip dhcp server

3

3

✓

3	1	
	-	-

20.2.6 show dhcp lease

DHCP EXEC 3 show dhcp lease ^

show dhcp lease | 5/gàVbà..!Ag@YX%Nă.!G6ttA-.ôC-||SôDâaT dâ-vTvbBbà."-t•,T dR0#GAPA!-.0

20.2.7 show ip dhcp binding

DHCP EXEC 3 **show ip dhcp binding** ^

show ip dhcp binding [*ip-address*]

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

й ^

3

^

й IP ~

^

й IP ~ ~

IP

^

Лю й **show ip dhcp binding** ^

Ruijie# **show ip dhcp binding**

IP address Client-Id/ Lease expiration Type
Hardware address

192.168.1.2 00d0.f866.4777 IDLE Manual

й Ю ^

IP address	↑ DHCP IP ^
Client-Id/Hardware address	DHCP client identifier "
Lease ex/TT0 1 Tf	^Infinite 8' IDLE ~ DHCP ы ^
Type	^AutomT0 c ↑ ' Manual ↑ ^

3

clear ip dhcp binding	DHCP

↓

3

//

	Manual bindings	Â		
	Expired bindings	Â		
	Malformed messages	DHCP	↓ a	Â
	Message Received or Sent	DHCP	↳	Â

3	3			
	clear ip dhcp server statistics	DHCP	↳	Â

√

3	1			
	-	-		

21 DHCP Relay

DHCP Relay option dot1x 1 3 1 3 no
1 1

[no] ip dhcp relay information option dot1x

-		-

3

3 "l DHCP 1 802.1x 1

100 1 DHCP 3 option dot1x 1 1
Ruijie# **configure terminal**
Ruijie(config)# **ip dhcp relay information option dot1x**

	3	
3	service dhcp	DHCP
	ip dhcp relay information option dot1x access-group <i>acl-name</i>	option dot1x acl

1

	1	
3	-	-

21.1.3 ip dhcp relay information option dot1x access-group

DHCP Relay option dot1x ACL 1 3 1 3 no
DHCP Relay option dot1x ACL 1

[no] ip dhcp relay information option dot1x access-group *acl-name*

-		-

a ACL

3

3

ACL 6

3

ACL

ACE a 1

3

3

лю

~

dhcp option dot1x acl 3

Ruijie#

	ip dhcp relay information option dot1x	DHCP option dot1x 1
1		
3	1	
	-	-

21.1.4 ip dhcp relay information option82

DHCP Relay option82 1 ~ 1 3 1 no
1 1

[no] ip dhcp relay information option82

	-	-

3

1 6 option dot1x 1 ~ a 1 1 1

1 1 DHCP 3 option82 1

Ruijie# **configure terminal**

Ruijie(config)# **Ip dhcp relay information option82**

3	
---	--

DHCP Relay
{ no

DHCP Relay Aware VRF {
{ A

~ ↓ ∪

{

A

3 1~ 3 DHCP 4

лю 3 1 3 DHCP relay 8 11 4
Ruijie# **configure terminal**
Ruijie(config)# **interface fastEthernet 0/1**
Ruijie(config-if)# **ip dhcp relay suppression**
Ruijie(config-if)# **exit**
Ruijie(config)#

3

3	
service dhcp	DHCP 3

4

```
люЮ      ~      ч      Ё      '
1'      Ё      192.168.1.1'
2'      vrf      й dep1      Ё      192.168.2.1'
Ruijie# configure terminal
Ruijie(config)# ip helper-address 192.168.1.1
Ruijie(config)# ip helper-address vrf dep1 192.168.2.1
```

3

3

1

3	1	
	-	-

22 DNS

22.1

22.1.1 ip domain-lookup

|| DNS 1 Â 3 no ± DNS 1 π Â

ip domain-lookup

no ip domain-lookup

	-	-

|| DNS 1 π Â

3

3 || DNS 1 π ~ 3 ± || DNS 1 Â

Ю DNS 1 π ' Ruijie(config)# **ip domain-lookup**

3	3	
show hosts	DNS	Â

1

3	1	
-	-	-

22.1.2 ip name-server

3 1 1 IP Â 1 1 1 || 1 Â 3 no 1 1 Â

S6Q2GPO%E@pW]]%E=a]ZMF0hQ\$W]]x0m]]%0Z]]0Q000qy'Q-dAg'rgDMbÍ.. Af—(Q-d0f—DÁ @0E#G@000@0e†9B0)q†u1

3

```
no ip host host-name ip-address 3 Â
```

```
Ruijie(config)# ip host switch 192.168.5.243
```

3

3	
show hosts	DNS Â

1

3

1	
-	-

22.2

22.2.1 clear host

```
|| ŷ 1 ă ~ ↓Л 3 Â
```

```
clear host [host-name]
```

host-name	↓Л ŷ 1 ă Â“*” 3 ŷ 1 ă Â

3

```
ŷ 1 ă ~ ч ' 1~ ip host '
2~ DNS || " Â 3~ DNS || " ŷ 1 Â
```

```
ЛЮ ~ ŷ 1-IP ă || " Â
clear host *
```

3	3	
	show hosts	Ÿ ı ă Â

4

3	1	
	-	-

22.2.2 show hosts

DNS Â

show hosts [hostname]

	-	-

--

3

--

DNS Â

```

Ruijie# show hosts
Name servers are:
static
host          type          address
switch        static        192.168.5.243
www.ruijie.com dynamic      192.168.5.123

```

3	3	
	ip host	Ÿ ı IP
	ip name-server	DNS ı

4

3	1	
---	---	--

DNS

3

	-	-
--	---	---

23

3

show snmp 3 SNTP

Ruijie(config)# snmp server 192.168.4.12

	3	
3	show snmp	SNTP

3		
	3	
	sntp enable	SNTP
	show sntp	SNTP

4 * RGOS10.0 7 9

3	1	
	-	-

24 NTP

24.1 NTP

24.1.1 no ntp

ntp ? ? 6 ? ? ~ ntp ?

no ntp

	-	-

Ю NTP ? ?

?

?

Ю NTP ? ? ? ? NTP ? NTP ?
NTP ? ? ?

лю ? NTP ? ?
no ntp

?

	?	
ntp server		NTP ?

?

?

	?	
-		-

24.1.2 ntp access-group

NTP ? ? ? ? no ? ? ?

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

Ю	NTP	8	± Â
---	-----	---	-----

 $\hat{A}$

```

Ruijie(config)# ntp access-group peer 1
Ruijie(config)# ntp access-group serve-only 2

```

```
Ruijie(config)# ntp access-group peer 1
Ruijie(config)# ntp access-group serve-only 2
```

✓

3	11	
	-	-

24.1.3 ntp authenticate

NTP L NTP 8 A

ntp authenticate

no ntp authenticate

	- D	EEÄ
	-	-

	IO NTP	8	A
--	--------	---	---

3	A
---	---

8~ ‡ a J 71 A 8~
J é ~ J L 71 A
ntp authentication-key à ntp trusted-key A

й NTP ь NTP Â

ntp authentication-key *key-id* **md5** *key-string* [*enc-type*]

no ntp authentication-key *key-id* **md5** *key-string* [*enc-type*]

<i>key-id</i>	ID'
<i>key-string</i>	,
<i>enc-type</i>	^ ↓ ~ 7l ~ 0

	-	-
	!	Ю √ √

Ю	б	А
б	А	А
й ё	А	А
а б ё		А
æ	А	й ё ^ ё
~	А	А
а	А	А
а	А	А
й ё	А	А
А	А	А

Лю А ё й 12А
Ruijie(config)# ntp master 12

3	3	
-	-	

А	
---	--

3

Â

б Ё ꞑ ~ " ꞑ Ё Э й 20 Â
 й Ё ꞑ ~ ꞑ Ё ꞑ Ё ꞑ
 Ё ꞑ ꞑ б
 ꞑ ^ ~ Ю " prefer ꞑ
 NTP А Ю й IP ꞑ
 Ё NTP Ё Â

Лю ~ Э й NTP server Â
 IPv4 ' Ruijie(config)# **ntp server 192.168.210.222**

3

3	
no ntp	NTP Ё ꞑ Â

1

3

1	
-	-

24.1.8 ntp synchronize

NTP 1

ntp synchronize

no ntp synchronize

--	--

лю ~ NTP ↓ Â
Ntp synchronize

{

{	
ntp server	NTP Е ↓

↓

{

л	
-	-

24.1.9 ntp trusted-key

ID и

ntp trusted-key *key-id*no ntp trusted-key *key-id*

<i>key-id</i>	ID Â

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Б'Р'у I

	ntp server	NTP	⌘	⌘
1				
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	-			-

24.1.10 ntp update-calendar

no NTP

ntp update-calendar

```
no ntp update-calendar
```

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$$\mathbb{V} \quad \mathbb{T} \quad \hat{A}$$

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$\hat{A}$ π $\downarrow \uparrow$ NTP $\ddot{y}$ $\downarrow$ Æ $\text{Ю } \ddot{y}$ $\parallel \hat{A}$
 $\downarrow$ π $\neq \downarrow$ $\hat{A}$ $\downarrow \sim$ NTP 6

```
Ruijie(config)# ntp update-calendar
```

3	3	
	-	-

3	11	
	-	-

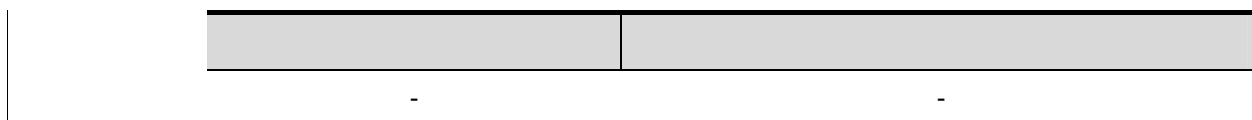
24.2

24.2.1 debug ntp

NTP Â

debug ntp

no debug ntp



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3 а NTP Е ~ NTP ~ 71 1 Е

лю ~ NTP Â
show ntp status

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25 FTP Server

25.1

25.1.1 debug ftpserver

FTP 1 ~ 3 no 4

debug ftpserver

no debug ftpserver



$$\text{FTP} \models \sim \{ \text{no} \} \quad \text{FTP} \models \hat{A}$$

no ftp-server enable

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FTP	↳	~	FTP	↓	↓	~	~	Э	Ю	Â
~		↓	↓	ftp-server	topdir	↓		FTP		
		FTP	↳	Э	~	Â				

FTN68.36 366.5003 TmD1 430.7 63.1 4TC>]TJ/TT0 1 Tf-0.006<472135CTm

ftp-server password [*type*] *password*

no ftp-server password

<i>type</i>	0 7 0 3 ^ 7 3 й 7 Â
<i>password</i>	£

Â

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FTP £	Л	Л	~	↓
Â				
~	Л ↓ Л	~	,	й
↑ Â				
й 1	ã	й 25	,	й 4
à	й 52	Â		
~	FTP £ a	~		
£	Â			

1' ЛЮ	й pass'
Ruijie(config)# ftp-server password <i>pass</i>	
2' ЛЮ	й 8001'
Ruijie(config)# ftp-server password 0 <i>pass</i>	
3' ЛЮ	↓
Ruijie(config)# no ftp-server password	

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-	-	

↓

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-	-	

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FTP £ ¥ K€

26 UDP-Helper

26.1

26.1.1 ip forward-protocol

3 UDP Â 3 no ± √ UDP
π Â

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**]



11/11/2016

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26.1.2 ip helper-address

ip hel

no ip

3

3

1

3	1	
	-	-

26.1.3 udp-helper enable

udp-helper enable 3 || UDP 11 ^ no udp-helper enable
3 UDP 11 ^
10 UDP ^

udp-helper enable
no udp-helper enable

	-	-

UDP

3

UDP-Helper 11 ~ — 11 ~

no snmp-server chassis-id

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<i>aclnumber</i>	1^ 1-99 ~
	MIB ipv4 NMS Â
<i>aclname</i>	1 ~
	MIB ipv4 NMS Â
<i>ipaddr</i>	NMS ~ MIB NMS Â

~ ↓

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3 ñ SNMP 3 π 3 ã

MIB NMS Â

SNMP 3 π ~ **no snmp-server** 3 ↓ Â

й Â

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

3

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

3	3	
	snmp-server host	SNMP ý

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	-	-

27.1.6 snmp-server group

SNMP 3 snmp-server group 3 no

snmp-server group *groupname* {**v1** | **v2c** | **v3** {**auth** | **noauth** | **priv**}} [**read** *readview*][**write** *writeview*] [**access** {[*aclnum* | *aclname*]*num* | *name*}]

no snmp-server group *groupname* {**v1** | **v2c** | **v3**}

--	--

v1 | -0.0c 2.349 0 Td ()Tj /TT1 Tf 0.0011 Tc 0.5096 -0.036 Td [96.63 1 Tf 0 Tc 1.10900 Td ()Tj /TT08

SNMP

27.1.10 snmp-server queue-length

3 snmp-server queue-length 4

snmp-server queue-length length

length	1	1000 4

10

3

4 8

Ю 4
Ruijie(config)# snmp-server queue-length 4

3	3	
snmp-server packetsize		SNMP

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27.1.11 snmp-server system-shutdown

SNMP 3 no 4 SNMP 1 4 3 snmp-server system-shutdown 4

snmp-server system-shutdown

no snmp-server system-shutdown

-		-

SNMP 11

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3 SNMP 11 ~ RGOS reload/reboot 10 NMS
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Ruijie(config)#

SNMP 11 '
snmp-server system-shutdown

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	snmp-server enable traps	Ÿ
	snmp-server enable host	NMS Ÿ

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27.1.13 snmp-server trap-timeout

no snmp-server trap-timeout *seconds*

seconds

no snmp-server trap-timeout

	seconds	1 – 1000

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

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

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	show snmp view	SNMP
1		
3	1	
	-	-

27.1.16 snmp trap link-status

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27.2

27.2.1 show snmp

SNMP 3 show snmp Â

show snmp [mib | user | view | group| host]

	-	-

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show snmp 3	SNMP	,
show snmp mib	snmp mib	,
show snmp user	snmp	,
show snmp view	snmp	,
show snmp group	snmp	,
show snmp host		,

IO	SNMP	,
Ruijie# show snmp		
Chassis: 60FF60		
0 SNMP packets input		
0 Bad SNMP version errors		

0 Unknown community name
0 Illegal operation for community name supplied
0 Encoding errors
0 Number of requested variables
0 Number of altered variables
0 Get-request PDUs
0 Get-next PDUs
0 Set-request PDUs
0 SNMP packets output
0 Too big errors (Maximum packet size 1500)
0 No such name errors
0 Bad values errors
0 General errors
0 Response PDUs
0 Trap PDUs
SNMP global trap: disabled
SNMP logging: disabled
SNMP agent: enabled

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3	
snmp-server chassis-id	SNMP 1

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-	-

28.1.2 rmon collection history

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 $\mathfrak{z}$ $\hat{A}$
no
 $\mathcal{V}$
 $\hat{A}$

rmon collection history *index* [**owner** *ownername*] [**buckets** *bucket-number*] [**interval** *seconds*]

no rmon collection history *index*



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Ruijie(config)# **rmon event**


```

Event type : log-and-trap
Community : public
Last time sent : 0d:0h:0m:0s
Owner : zhangsan
Log : 1
Log time : 0d:0h:37m:47s
Log description : ipttl
Log : 2
Log time : 0d:0h:38m:56s
Log description : ipttl
    
```

| | |
|---|--|
| 3 | |
|---|--|

rmon alarm

3

```
Ruijie# show rmon event
Alarm : 1
Interval : 1
Variable : 1.3.6.1.2.1.4.2.0
Sample type : absolute
Last value : 64
Startup alarm : 3
Rising threshold : 10
Falling threshold : 22
Rising event : 0
Falling event : 0
Owner : zhangsan
```

3 rmon event *number* [log] [

700 ~ '
 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

| | | | |
|---|--|--|--------------------------|
| | | | |
| | | | |
| 3 | rmon collection history index [owner
ownername] [buckets bucket-number]
[interval seconds] | | 71 8 |
| 4 | | | |
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| |
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ルЮ ~ '
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

| | | |
|---|--|----|
| | 3 | |
| 3 | rmon collection stats index [owner owner-string] | 71 |

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|---|---|---|
| 3 | 1 | |
| | - | - |

29 TCP

29.1 TCP

29.1.1 ip tcp path-mtu-discovery

TCP (PMTU) 11 ~ 10 ip tcp
62.34 631.340y

| | | | | |
|---|---------------|-----------|-----|------|
| | show tcp pmtu | | TCP | PMTU |
| 1 | 1 | Â | | |
| 3 | 1 | | | |
| | RGOS 10.4 | RGOS 10.4 | Â | |

29.2 TCP

29.2.1 show tcp pmtu

TCP PMTU ~ IO 3'

show tcp pmtu

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|--|

TCP PMTU ~ 1/2 show tcp pmtu 3 Â

show tcp pmtu 3 IO'

Ruijie# show tcp pmtu

| No. | Local Address | Foreign Address | PMTU |
|-----|--------------------|-----------------------|------|
| [1] | 2002::1.18946 | 2002::2.23 | 1440 |
| [2] | 192.168.195.212.23 | 192.168.195.112.13560 | 1440 |

IO'

| | |
|---------------|-------|
| | |
| No. | 1 |
| Local Address | 6 > 0 |
| | |

| | |
|-----------------|--|
| Foreign Address | 6 11 Â 11 “.” 11 11 Â
“2002::2.23” 6 “192.168.195.212.23” “23” 11 Â |
| PMTU | PMTU |

| | |
|---------------------------|-------------|
| 3 | |
| 3 | |
| Ip tcp path-mtu-discovery | TCP PMTU 11 |

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| 11 | 11 Â |
|----|------|

| | |
|------|----|
| 3 | 11 |
| 10.4 | 3 |

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|---|---------|---|
| 3 | | |
| | 3 | |
| 3 | version | 100 RIP 1 2 3 4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
v1 v2 4
v1&v2 1 |
| | | |
| 1 | | |
| 3 | 1 | |
| | - | - |

30.1.2 bfd all-interfaces (RIP)

RIP BFD 100 RIP 100 bfd
 all-interfaces 1 2 3 no 1
 bfd all-interfaces
 no bfd all-interfaces

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

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

0A 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 1

RIP 3 100 BFD 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 (RIP 100)

| | | | |
|---|----------------------|------------|-------|
| | ip rip bfd [disable] | RIP
BFD |
Â |
| 1 | | | |
| 3 | 1 | | |
| | - | | - |

30.1.3 default-metric (RIP)

✕ RIP ~ 3 default-metric Â 3 no
Â

default-metric *metric-value*

no default-metric

| | | | | | |
|--|---------------------|---------|--------|---------------------|--|
| | | | | | |
| | <i>metric-value</i> | ~ | 1 16 Â | <i>metric-value</i> | |
| | | 16 RGOS | 1 | a 1 Â | |

1 1 Â

3 Â

3 6 3 redistribute Â 1 1
~ 1 RIP ~ a 1 8 a ~
Â ~ 1 1 RIP Â
1 ~ 1 1 RIP default-metric 1
, 1 ~ default-metric 1 Â a 3
‡ default-metric 1 1 Â

ЛЮ ~ RIP OSPF 1 ~
1 RIP 1 3 Â
Ruijie(config)# **router rip**
Ruijie(config-router)# **default-metric 3**
Ruijie(config-router)# **redistribute ospf 100**

| | | |
|---|---|--|
| 3 | 3 | |
|---|---|--|

| | | | |
|---|--------------|--------|--------|
| | redistribute | ÿ
Â | †
1 |
| 1 | | | |
| 3 | 1 | | |
| | - | | - |

30.1.4 default-information originate (RIP)

RIP
originate 3~ 3 no 1 Â 3 default-information

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

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

| | |
|----------------------------|---|
| | |
| always | ^ 1 ~ RIP " ~ a
Â |
| metric <i>metric-value</i> | ^ 1 ~ ~ <i>metric-value</i> 1
' 1-15 Â |
| route-map <i>map-name</i> | ^ 1 ~ route-map 1 ,
route-map |

' metric ÿ 1 Â

3

~ RIP a ~
default-information originate 3 ~ Â

~ always ~ RIP a ~
~ a Â ~ 1 3 show

ip rip database RIP Â

RIP 8~ 1 3 route-map ~ ' set

metric ‡ Â

1 3 metric ~ "1 æ route-map

set metric ‡' metric ~ ‡ RIP Â

RIP

3

~

æ RIP

a "A "

Â

~

~ ‡ ~ ‡ RIP Â

Лю ~ RIP й 160, ÿ 192.168.12.1 ~
й 123

Ruijie(config)# **router rip**

Ruijie(config-router)# **distance 160**

Ruijie(config-router)# **distance 123 192.168.12.1 0.0.0.0**

3

| | | | |
|------------------------|---|-----|--------------------|
| | Â | ~ | Â |
| №Ю | ~ | RIP | ÿ Fastethernet 0/0 |
| 172.16 | Â | | 8 ~ ↓ |
| 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 | | |

| | | |
|--------------------|---|-----|
| 3 | | |
| access-list | № | ± Â |
| prefix-list | № | Â |

↓

| | | |
|---|---|--|
| 3 | 1 | |
| - | - | |

30.1.7 distribute-list out RIP

8 ~ № ~ 3 **distribute-list out** Â

3 **no** № Â

distribute-list {[*access-list-number* | *name*] | **prefix** *prefix-list-name*} **out** [**interface** | [**bgp** | **connected** | **isis** [*area-tag*] | **ospf** *process-id* | **rip** | **static**]]

no distribute-list {[*access-list-number* | *name*] | **prefix** *prefix-list-name*} **out** [**interface** | [**bgp** | **connected** | **isis** [*area-tag*] | **ospf** *process-id* | **rip** | **static**]]

| | |
|---|---------------|
| | |
| <i>access-list-number</i> <i>name</i> | Â ↓ ~ ↓ № |
| prefix <i>prefix-list-name</i> | Â |
| <i>interface</i> | (↓) ↑ ~ 8 ↓ |
| bgp | (↓) ↑ ~ 8 ↓ ÿ |
| | bgp Â |

| | |
|---------------------------------|--|
| connected | (↓) ↑ ~ 8 ↓ ÿ
Â |
| isis [<i>area-tag</i>] | (↓) ↑ ~ 8 ↓ ÿ isis
~ <i>area-tag</i> é isis Â |
| ospf <i>process-id</i> | (↓) ↑ ~ 8 ↓ ÿ
ospf ~ <i>process-id</i> é ospf Â |
| rip | (↓) ↑ ~ 8 ↓ rip
Â |
| static | (↓) ↑ ~ 8 ↓ ÿ
Â |

8 Â

3

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3 a ↓ ~ 8 , ~
8 ↓ ~ é ~ ‡
8 ↓ Â

```

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

```

3

| 3 | |
|---------------------|-------|
| access-list | ℙ ± Â |
| prefix-list | ℙ Â |
| redistribute | ↑ Â |

↓

3

| ℙ | |
|---|---|
| - | - |

30.1.8 exit-address-family

exit-address-family 3 A

exit-address-family

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

3 й

3 A

Ю 3 A
3 Л й exit A

ЛЮ
Ruijie(config-router)# **address-family ipv4 vrf vpn1**
Ruijie(config-router-af)# **exit-address-family**

3

Â

3

Â

key chain

3

RIPv1 a RIP Â
RIPv2 Â

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

3

ip rip authentication mode

RIP Â

ip rip authentication text-password

RIP Â
RIPv2

RIP 0.0.0.0 Tm()Tj/TT0 1 T

| | |
|-------------|-------------|
| text | RIP и Â |
| md5 | RIP и MD5 Â |

и Â

3 Â

RIP ~ RIP ~ RIP
 ~ ‡ RIP Â ~
 ~ ~ a и Â ~ MD5 ~
 ~ ~ ≠ a и Â
 RIPv1 a RIP ~ ↓ RIPv2 Â

Лю ~ Serial 0 RIP и MD5 Â
 Ruijie(config)# **interface serial 0/0**
 Ruijie(config-if)# **ip rip authentication mode md5**

| | |
|--|---------------------------------|
| 3 | |
| ip rip authentication key-chain | RIP ~ RIP
Â ↓ RIPv2 RIP
Â |
| ip rip authentication text-password | RIP ~ RIP
Â ↓ RIPv2 RIP
Â |
| key chain | ... ~ Â |

4

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|---|---|
| 3 | 1 |
| - | - |

30.1.11 ip rip authentication text-password

RIP ~ RIP ~ 3 ip rip authentication
text-password Â 3 **no** Â
ip rip authentication text-password *password-string*

| | | |
|---|---|---|
| | no ip rip authentication text-password | |
| | password-string | 1 16 ^ |
| | ^ | |
| 3 | ^ | |
| | RIP 11 ^ ↓ 11 3 ^ ≠ ↓ 11
↓ ^ ↓ 11 11 ^
RIPv1 a RIP ^ ↓ RIPv2 ^ | |
| | 110 ^ Serial 0 RIP ^ 11 ruijie ^
Ruijie(config)# interface serial 0/0
Ruijie(config-if)# ip rip authentication text-password ruijie | |
| 3 | | |
| | ip rip authentication mode | 11 RIP ^ |
| | ip rip authentication key-chain | RIP ^ RIP
^ ↓ RIPv2 RIP
^ |
| 1 | | |
| 3 | | |
| | 11 | |
| | 10.4(1) | 3 |

30.1.12 ip rip bfd

| RIP | BFD | ip rip |
|-----------------------------|-----------|-----------|
| bfd [disable] | no | no |
| ip rip bfd [disable] | no | no |
| no ip rip bfd | no | no |

[illegible]

~ Л RIP Ю BFD ÿ Â

3

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~l Ю bfd all-interfaces 3 Â
 ↓Л ~ ip rip bfd 3 BFD ~ ≠
 ↓Л RIP Ю 3 bfd all-interfaces 6 RIP
 BFD ~ ip rip bfd disable BFD 11 Â

3

| 3 | |
|--------------------|--------------|
| router rip | RIP
Â |
| bfd all-interfaces | RIP
Â BFD |

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

30.1.13 ip rip default-information

no RIP ~ 3 default-information Â 3
 √ Â

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

no ip rip default-information

| only | ~ a è |
|----------------------------|------------|
| originate | ~ ≠ è |
| metric <i>metric-value</i> | ~ √ ' 1-15 |

Â *metric* ÿ 1 Â

3

A

Ю 3 1~ ~ ÿ A 1
 ip rip default-information RIP default-information
 originate 1 A
 ~ 1 ip rip default-information RIP a "A ~
 A

ЛуЮ ~ ethernet0/0 Э... ~ 1 A
 Ruijie(config)# **interface ethernet 0/0**
 Ruijie(config-if)# **ip rip default-information only**

3

default-information originate

RIP

1

~ Fastethernet 0/0 RIP Â
Ruijie(config)# **interface fastethernet 0/0**
Ruijie(config-if)# **no ip rip receive enable**

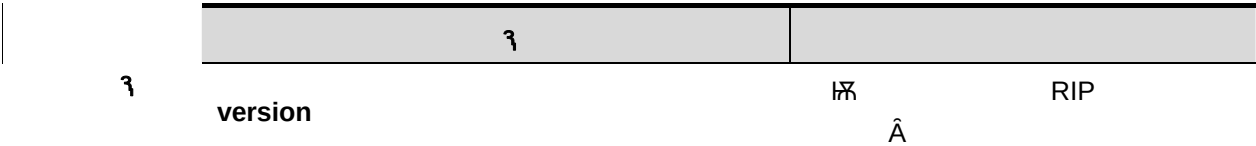
3

| 3 | |
|--------------------|-----|
| ip rip send enable | RIP |
| passive-interface | RIP |

4

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



| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

30.1.17 ip rip send supernet-routes

RIP 3
 supernet-routes 1 no
 RIP 3 ip rip send
 RIP 3

ip rip send supernet-routes

no ip rip send supernet-routes

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

30.1.18 ip rip send version

配置 RIP 时，通过 `no ip rip send version` 命令可以禁止发送指定版本的 RIP 报文。

ip rip send version [1] [2]

no ip rip send version

| 1 | ^ ~ ^ ~ ^ RIPv1 ^ |
|----------|-------------------|
| 2 | ^ ~ ^ ~ ^ RIPv2 ^ |

| | |
|---|------------------------------------|
| | 命令 <code>version</code> 可以配置发送的版本。 |
| 3 | ^ |

| | |
|---|---|
| | 配置 <code>ip rip send version</code> 命令可以禁止发送指定版本的 RIP 报文。 |
| 4 | ^ |

| | |
|---|---|
| | 配置 <code>ip rip send version</code> 命令可以禁止发送指定版本的 RIP 报文。 |
| 5 | ^ |

| | |
|---|---|
| | 配置 <code>ip rip send version</code> 命令可以禁止发送指定版本的 RIP 报文。 |
| 6 | ^ |

| | |
|---|---|
| | 配置 <code>ip rip send version</code> 命令可以禁止发送指定版本的 RIP 报文。 |
| 7 | ^ |

| | |
|---|---|
| | 配置 <code>ip rip send version</code> 命令可以禁止发送指定版本的 RIP 报文。 |
| 8 | ^ |

30.1.19 ip rip split-horizon (RIP)

配置 RIP 时，通过 `ip rip split-horizon` 命令可以禁止发送指定版本的 RIP 报文。

ip rip split-horizon

| <i>ip-address</i> | IP |
|------------------------|------|
| <i>ip-network-mask</i> | й IP |

RIP ||

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3 ip rip summary-address

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ÂRIP ||

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RIPv2

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FastEthernet 1/0

1 172.16.0.0/16 Â

Ruijie(config)#

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

й џ ā version 3 Â

3

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3 ~ џ џ vesion 3 Â 3 џ RIP
 й џ џ џ џ RIPv1 RIPv2 Â 3 a
 ‡ й џ ā version Â

џџ ~ Fastethernet 0/0 џ RIPv2 Â

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

Ruijie(config-if)# **ip rip v2-broadcast**



3

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```

        ↓ 儿 ↓      network-number  wildcard  ~
6 RIP      Â
        wildcard  ~  RGOS
        6 RIP      Â
        ↓
        RIP      儿
        RIP      Â
        ↓ 儿      RIP

```

```

儿Ю      ~  儿 6 RIP      4      儿~      192.168.12.0/24
172.16.0.0/24      6 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

```

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3

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11

10.4(1)

71 wildcard

30.1.23 neighbor (RIP)

```

儿 RIP      IP      ~  ↓ 儿      3 neighbor Â      3 no
儿 Â

```

neighbor *ip-address*

no neighbor

ip-address

IP

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儿 Â

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RIPv1 IP ^ 255.255.255.255 ~ RIPv2
 ^ 224.0.0.9 ~ ^ a ~
 ↓ ~ ↓ ∪ 3 **passive-interface** й
 || ~ ∩ ↓ ∩ ∩ ↓ ∪ ^ 3 a RIP
 ^ passive ~ ∩ ≠ a ^

3 ^ ∪ ∪ ~ ∩ RIP ↓ 192.168.1.2 ^
 Ruijie(config)# **router rip**
 Ruijie(config-router)# **passive-interface default**
 Ruijie(config-router)# **neighbor 192.168.1.2**

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| 3 | |
|--------------------------|-----------|
| passive-interface | й passive |

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w36 419.7203 Tm[<

1

offset 1

3

1

RIP 1 offset-list 1 offset-list 1
RIP 1 offset-list metric 1 1

1 1 acl 1 RIP metric 1 1
Ruijie(config-router)# **offset-list 1 out 1**
1 1 fastEthernet1/0 1 acl 1 RIP
metric 1 1
Ruijie(config-router)# **offset-list 1 in 1**
Ruijie(config-router)# **offset-list 1 in 1 fastEthernet 1/0**

3

3

-

-

1

3

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30.1.25 output-delay

1 RIP 1 3

output-delay 3 **no** 1 1

output-delay delay

no output-delay

delay

1 1

<8-50>

1 1

3

1

1 RIP

1 512

1 1

25

25

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output-delay

3

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RIP

й 30

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

3

```
rip receive enable 8 A
```

```
Лю Ю и passive ~ Л ethernet0/0 и passive
Ruijie(config-router)# passive-interface default
Ruijie(config-router)# no passive-interface ethernet 0/0
```

3

| 3 | |
|------------------------------|-----|
| ip rip receive enable | RIP |
| ip rip send enable | RIP |

Л

3

| Л | |
|---|---|
| - | - |

30.1.27 redistribute RIP

```
↑ ~ Ю redistribute 3 A √ ↑
~ 3 no A
```

redistribute {bgp | connected | isis [*area-tag*] | ospf *process-id* | static} [{level-1 | level-1-2 | level-2} | match {internal | external [1|2] | nssa-external [1|2]} | metric *metric-value*] **route-map** *route-map-name*]

no redistribute {bgp | connected | isis [*area-tag*] | ospf *process-id* | static} [{level-1 | level-1-2 | level-2} | match {internal | external [1|2] | nssa-external [1|2]} | metric *metric-value*] **route-map** *route-map-name*]

30.1.28 router rip

... RIP

RIP

validate-update-source $\hat{A}$ $\{$ no $\hat{A}$ $\}$

validate-update-source

no validate-update-source

[illegible]

3

 $\downarrow \cup$ RIP $\hat{A}$

Й

RIP

30.2.1 show ip rip

RIP

show ip rip

show ip rip [vrf vrf-name]

| vrf vrf-name | | VRF | RIP |
|--------------|--|-----|-----|

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↓ RIP b à ↑ à ↑ à rip
 à rip 6 à metric 6 distance À
 VRF VRF ↓ VRF-id

1' 儿Ю

RIP

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Ruijie# show ip rip

Routing Protocol is "rip"

Sending updates every 10 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)

2' 儿Ю

vrf

RIP

Ruijie(config-router)# sh ip rip vrf 1

VRF 1 VRF-id:1

Routing Protocol is "rip"

Sending updates every 30 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)

3

| 3 | |
|---|---|
| - | - |

4

```
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
  2' 路由          ~          RIP          192.168.121.0/24
  ^
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
  3' 路由          ~          RIP
Ruijie# show ip rip database count
           All      Valid  Invalid
database      5        5        0
auto-summary   5        5        0

connected      1        1        0
rip            4        4        0
```

| | | | |
|---|-------------|---|---|
| 3 | | 3 | |
| | show ip rip | | ^ |

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|---|--|--|--|
| 4 | | | |
| | | | |

| | | | |
|---|---|---|---|
| 3 | | 1 | |
| | - | | - |

30.2.3 show ip rip external

```
RIP 1 ~ show ip rip external 3 ^
```

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

| | |
|--|---------|
| | |
| bgp connected isis ospf static | ^ ↓ ~ ↑ |

| vrf vrf-name | ^ ↓ ~ | VRF | RIP |
|---------------------|-------|------|-----|
| <i>process-name</i> | | ISIS | ↓ |
| <1-65535> | | OSPF | ∧ |

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ルЮ ~ RIP ↑ Â

Ruijie# **show ip rip external connected**

Protocol connected route:

[connected] 1.0.0.0/8 metric=0
nhop=0.0.0.0, if=2

[connected] 3.0.0.0/8 metric=0
nhop=0.0.0.0, if=16391

[connected] 4.4.0.0/16 metric=0
nhop=0.0.0.0, if=16388

[connected] 5.0.0.0/8 metric=0
nhop=0.0.0.0, if=16386

[connected] 192.168.195.0/24 metric=0
nhop=0.0.0.0, if=1

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|--------------------|---|
| show ip rip | Â |

↓

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| ∧ | |
|---|---|
| - | - |

30.2.4 show ip rip interface

RIP ~ show ip rip interface Â

show ip rip interface [vrf vrf-name]

| vrf vrf-name | ^ ↓ ~ VRF RIP |
|---------------------|---------------|

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RIP

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RIP

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ルЮ ~ RIP Â

Ruijie# **show ip rip 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 registe: 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, next update due in 14 seconds

2.2.1.1/24, next update due in 24 seconds

neighbor 2.2.1.6, next update due in 3 seconds

neighbor 2.2.1.77, next update due in 13 seconds

2.2.2.57/24, next update due in 16 seconds

RIP 6 BFD ||~ ≠ ¶ 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, next update due in 14 seconds

```

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| 3 | |
|-------------|--|
| show ip rip | |

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

30.2.5 show ip rip peer

RIP и " RIP (RIP)
 Лу ~ и RIP ~ RIP ~

show ip rip peer ^

show ip rip peer [*ip-address*] [**vrf** *vrf-name*]

| <i>ip-address</i> | ^ ↓ ~ RIP |
|----------------------------|---------------|
| vrf <i>vrf-name</i> | ^ ↓ ~ VRF RIP |

3

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3 RIP ~ a RIP ~ ‡ a Â

配置完 RIP 后

```
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
```

| | | |
|---|-------------|---|
| 3 | 3 | |
| | show ip rip | |
| 1 | | |
| 3 | 1 | |
| | - | - |

31 OSPF

31.1

31.1.1 area

OSPF 3 no OSPF 2

area area-id

no area area-id

| area-id | OSPF 2 1 2 1 2 8 2 |
|---------|--------------------|
| area-id | OSPF 2 1 2 1 2 8 2 |

OSPF 2

3

2

OSPF 2 no OSPF 2

area authentication 2 area default-cost 2 area filter-list 2 area nssa 2

3 2

1. 2

OSPF 2

1. 2 2 2 2 2 2

2. 2 2 2

2. 2 network area 2 2 2 2

3 2 2 2

2 OSPF 2 2

Ruijie(config)# router ospf 2

Ruijie(config-router)# no area 2

| 3 | 6 OSPF 2 |
|---|----------|
|---|----------|

3

network area

6 OSPF 2

| | |
|-----------------------------------|------------|
| ip ospf authentication-key | OSPF 3 |
| ip ospf message-digest-key | OSPF MD5 3 |
| area virtual-link | 3 |

1

| | | |
|---|---|--|
| 3 | 1 | |
| - | - | |

31.1.3 area default-cost

OSPF 3 **area default-cost** **no**

area area-id default-cost cost

no area area-id default-cost

| | |
|----------------|----------------------|
| | |
| area-id | STUB NSSA 1 |
| cost | STUB NSSA 1-16777214 |

1

3

| | |
|--------------------------------|--|
| 3 1 ABR 1 NSSA ABR 3 ABR STUB | |
| 1 NSSA ABR | |
| 1 NSSA ABR | |
| ABR stub NSSA LSA 1 | |
| area default-cost 3 LSA | |

```

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

```

| 3 | 3 | |
|---|-----------|-----------------|
| | area stub | OSPF 3 ñ Â |
| | area nssa | OSPF 3 ñ NSSA 3 |

| |
|---|
| 4 |
|---|

OSPF Ψ NSSA $\hat{A}$ $\{$ area nssa $\hat{A}$ $\}$ no

NSSA Ψ NSSA Ψ $\hat{A}$

area *area-id* **nssa** [**no-redistribution**] [default-information-originate [metric *value* | metric-type <1-2>]] [no-summary]

no area *area-id* **nssa** [**no-redistribution**] [default-information-originate] [no-summary]

| | |
|--------------------------|---|
| <i>area-id</i> | NSSA Ψ Ψ $\wedge$ $\hat{A}$ |
| no-redistribution | $\wedge$ $\downarrow$ $\sim$ NSSA ABR $\sim$
$\downarrow$ $\uparrow$ $\{$ Ψ a |

| | | | | | |
|----------------------------|----------|--------|-------------|------------|------|
| a | NSSA ʘ Â | NSSA | ASBR | ABR | Â |
| ↓ √ | | NSSA Â | | | |
| й | NSSA ʘ | | ^ LSA | ↓ √ ABR ʘ | |
| no-summary | ABR | NSSA ʘ | summary LSA | Type-3 LSA | Â |
| 1 area default-cost | | NSSA ʘ | ABR ʘ Â | 3 | |
| ʘ | NSSA ʘ | | Â | Ю | NSSA |
| | й 1 Â | | | | |

```

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

```

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|-------------------|-----------------------|
| 3 | |
| area default-cost | НН NSSA
^ OSPF ~ Â |

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| 3 | 1 |
| - | - |

31.1.6 area range

OSPF ʘ ~ **no** б cost ↓ √ 3 **area range** Â 3 **no**
Â ~ a

area area-id range ip-address net-mask [advertise | not-advertise] [cost cost

```
6 RFO3FCCTLVN"0E61CC16D"2R4P!xXTG1C1
```

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


```
dead-interval ' 40 '
hello-interval ' 10 '
retransmit-interval ' 5 '
transmit-delay ' 1 '
```

$$a \quad , \quad \hat{A}$$

3

```

OSPF
  ^ ABR ~
  NSSA a
  router-id OSPF
  neighbor {
    area virtual-link {
      area authentication
    }
  }
  Stub Area ~
  Loopback
  show ip ospf
  OSPF
  
```

```

1'  ЛЮ      ~   ЛШ   1   й     Ш   ~   6       2.2.2.2           Â
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.0.0 0.0.15.255 area 0
Ruijie(config-router)# network 172.16.17.0 0.0.15.255area 1
Ruijie(config-router)# area 1 virtual-link 2.2.2.2

2'  ЛЮ      ~   ЛШ   1   й     Ш   ~   6       1.1.1.1           Â
        Ш   10         Ш   ~               OSPF             ÿ MD5Â
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.17.0 0.0.15.255area 1
Ruijie(config-router)# network 172.16.252.0 0.0.0.255area 10
Ruijie(config-router)# area 0 authentication message-digest
Ruijie(config-router)# area 1 virtual-link 1.1.1.1
message-digest-key 1 md5 hello

```

| | |
|---------------------|-----------|
| | |
| area authentication | OSPF
^ |
| show ip ospf | OSPF
^ |

✓

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

31.1.9 auto-cost

3 || 3' π 1 ~ || 3' ~
3 no ↓ √ || 3' π ~ ↓ √ Â

auto-cost [reference-bandwidth ref-bw]

no auto-cost [reference-bandwidth]

| | | |
|--|--------|-----------------------------|
| | | |
| | ref-bw | Â √ Mbps ÿ æ
: 1-4294967 |

| | |
|--|-------------|
| | ÿ 100Mbps Â |
|--|-------------|

| | |
|---|---|
| 3 | Â |
|---|---|

| | |
|---|--|
| 3 | 3' , a ↓ 3' π ,
∅ ↓ ± 3' () ↓
default auto-cost no auto-cost a ↓ 3'
π ~ 1 3' π Â
3 ip ospf cost cost ± 3' cost Â |
| | |

| | |
|--|---|
| | √ ÿ 10M Â
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.10.0 0.0.0.255 area 0
Ruijie(config-router)# auto-cost reference-bandwidth 10 |
|--|---|

| | | |
|---|--------------|------|
| 3 | 3 | |
| | show ip ospf | ospf |

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

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

31.1.10 bfd all-interfaces (OSPF)

OSPF BFD
all-interfaces ^ 3 no ^ OSPF Ю bfd

bfd all-interfaces

no bfd all-interfaces

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

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

| |
|---|
| 3 |
|---|

^

OSPF Hello || ~ OSPF || BFD || 1 ~ й
FULL BFD ~ BFD 8 ~ BFD
OSPF ^
≠ 1/2 3 ip ospf bfd [disable] || BFD
π ~ "I Ю bfd all-interfaces 3 ^

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

| | 3 | |
|---|---------------------------------------|--------------------|
| 3 | router ospf process-id [vrf vrf-name] | ... OSPF OSPF
Â |
| | ip ospf bfd [disable] | OSPF
BFD Â |

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

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

| | |
|------------|---|
| | |
| process-id | OSPF 1
~
OSPF 2
OSPF 3
OSPF 4 |

RFC2328 2 2

3 2

Æ OSPF ~ ~ ' 2 3 ~
%•#ÛL8 JGi OSPF

OSPF {

~

{ default-metric 1 }

discard 7 no 7 discard 7 A

discard-route {internal|external}

no discard-route {internal|external}

| | |
|----------|----------------------------------|
| | |
| internal | 7 7 7 area range
discard A |
| external | 7 7
summary-address discard A |

7 discard A

3 A

7 7 7 7 7
A disr A

| | |
|----------------------------|-------|
| | |
| <i>distance</i> | 1-255 |
| intra-area distance | 1-255 |
| inter-area distance | 1-255 |
| external distance | 1-255 |

| |
|------|
| 110' |
| 110' |
| 110' |
| 110' |

| | | |
|---|------|---|
| 3 | OSPF | Â |
|---|------|---|

| | | |
|--------|---|-----|
| OSPF a | a | 3 Â |
|--------|---|-----|

```

Ruijie(config)# router ospf 1
Ruijie(config-router)# distance ospf external 160

```

| | |
|---|---|
| 3 | |
| - | - |

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

| | |
|---|---|
| 3 | 1 |
| - | - |

31.1.17 distribute-list in

LSA

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*]

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

| | |
|--|---------------|
| <i>access-list-number name</i> | acl ‡ |
| gateway <i>prefix-list-name</i> | gateway ‡ |
| prefix <i>prefix-list-name</i> | prefix-list ‡ |
| <i>interface-type interface-number</i> | ↵ LSA |

↵ ~ Â

3 Â

LSA ~ ~ 6 SPF ~ ~ Â a
 ~ ~ ≠ a ~ ↵ OSPF
 Â ABR ASBR 3 8 Â

```
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
```

3

| | |
|----------------------------|-----|
| 3 | |
| distribute-list out | ↑ Â |

↵

3

| | |
|---|---|
| ↵ | |
| - | - |

31.1.18 distribute-list out

↑ ~ π **redistribute** 3

distribute-list {[*access-list-number | name*] | **prefix** *prefix-list-name*} **out** [**bgp** | **connected** | **isis** [*area-tag*] | **ospf** *process-id* | **rip** | **static**]

no distribute-list {[*access-list-number | name*] | **prefix** *prefix-list-name*} **out** [**bgp** | **connected** | **isis** [*area-tag*] | **ospf** *process-id* | **rip** | **static**]

| | |
|---------------------------------------|---------------|
| | |
| <i>access-list-number name</i> | acl ‡ |
| prefix <i>prefix-list-name</i> | prefix-list ‡ |

bgp | connected | isis
, [area-tag] | ospf process-id |

| | | |
|---|--|--|
| | - | - |
| | Ю MIB | 1 OSPFv2 Э Â |
| 3 | Â | |
| | OSPFv2 MIB | OSPFv2 ~ Л SNMP OSPFv2 ~
↓ Â Ю OSPFv2 MIB 1 OSPFv2 Э
Â
SNMP OSPFv2 ~ ↓ Л 3 MIB
Э Â |
| | ЛЮ ~ SNMP 1 й 100 OSPFv2 | |
| | Ruijie(config)# router ospf 100
Ruijie(config-router)# enable mib-binding | |
| 3 | 3 | |
| | show ip ospf | OSPF |
| с | enable traps | OSPF TRAP 11 |
| 1 | | |
| 3 | 1 | |
| | 10.4(1) | 3 |

31.1.20 enable traps

OSPFv2 16 TRAP ~ ↑ й 4 ~ Ю 3 ↓ Л ||
TRAP Â 3 no ↓ Л TRAP Â

enable traps [error [IfAuthFailure | IfConfigError | IfRxBadPacket |
VirtIfAuthFailure | VirtIfConfigError | VirtIfRxBadPacket] | Isa
[LsdbApproachOverflow | LsdbOverflow | MaxAgeLsa | OriginateLsa] |
retransmit [IfTxRetransmit | VirtIfTxRetransmit] | state-change
[IfStateChange | NbrRestartHelperStatusChange | NbrStateChange |
RestartStatusChange | VirtIfStateChange |
VirtNbrRestartHelperStatusChange | VirtNbrStateChange]]

no enable traps [error [IfAuthFailure | IfConfigError | IfRxBadPacket |
VirtIfAuthFailure | VirtIfConfigError | VirtIfRxBadPacket] | Isa

[LsdbApproachOverflow | LsdbOverflow | MaxAgeLsa | OriginateLsa] |
 retransmit [IfTxRetransmit | VirtIfTxRetransmit] | state-change
 [IfStateChange | NbrRestartHelperStatusChange | NbrStateChange |
 RestartStatusChange | VirtIfStateChange |
 VirtNbrRestartHelperStatusChange | VirtNbrStateChange]]

| error | 6 error traps ~ √ √
Ю error traps '
IfAuthFailure
IfConfigError
IfRxBadPacket
VirtIfAuthFailure
VirtIfConfigError
VirtIfRxBadPacket |
|---------------------|---|
| lsa | 6 lsa traps ~ √ √
Ю lsa traps '
LsdbApproachOverflow LSA Э
LsdbOverflow LSA Э
MaxAgeLsa LSA
OriginateLsa LSA |
| retransmit | 6 retransmit traps ~ √ √
√ √ Ю retransmit traps '
IfTxRetransmit Э
VirtIfTxRetransmit Э |
| state-change | 6 state-change traps ~ √ √
√ √ Ю state-change traps '
IfStateChange √
NbrRestartHelperStatusChange GR √ '
NbrStateChange √
RestartStatusChange GR Restarter √ '
VirtIfStateChange √
VirtNbrRestartHelperStatusChange GR √
VirtNbrStateChange √ |

traps

^

3

^

3 11 3 snmp-server 3 8~ "I snmp-server enable
traps ospf 7A enable traps 10 1~ ospf trap ^
3 a 1 MIB 8~ a 1 1 TRAP ^

100 ~ OSPFv2 100 TRAP '
Ruijie(config)# router ospf 100
Ruijie(config-router)# enable traps

3

| 3 | |
|-------------------------------|------------|
| show ip ospf | OSPF |
| enable mib-binding | OSPFv2 MIB |
| snmp-server enable traps ospf | OSPF TRAP |

1

```

~
й null 8 й а , Э
, "l Э Â

```

```

Лю ~ FastEthernet 0/0 OSPF й MD5 Â
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

```

❏

OSPF


```
Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip ospf cost 100
```

| | { | |
|---|--------------|-----------------|
| { | bandwidth | Â a
Â |
| | show ip ospf | Ospf |

GÄÈULIC-y[È] "Q ðÂÍ± ¬ hñ à |á±• [È

| | | | | | | | | | | | | | | |
|---|--------|-------|----------|-----------|----------|--------|-----|--------|--------|-----|-----------|-----------|------|------|
| 2 | 345.20 | TT0.1 | Tf0.0023 | Tc 7.9414 | Tw 10.02 | 358.82 | 0.2 | 135.36 | 527.06 | 0.3 | Tm 358.82 | -11156(-) | JTET | 66.8 |
|---|--------|-------|----------|-----------|----------|--------|-----|--------|--------|-----|-----------|-----------|------|------|

out

a Э LSA , }

dAiE1TV")!-."—ñ@@9lbAÀ\$xe

| | | |
|---|---|---|
| 3 | 3 | |
| | - | - |

| |
|---|
| 4 |
|---|

| | | |
|---|----|---|
| 3 | 11 | |
| | - | - |

31.1.26 ip ospf dead-interval

OSPF ~ 3 ip ospf dead-interval ^

3 no ^

ip ospf dead-interval seconds

no ip ospf dead-interval

| | | |
|--|---------|-----------|
| | | |
| | seconds | 1-65535 ^ |

3 ip ospf hello-interval 4 ^

3 ^

OSPF Hello ~ Hello ~ OSPF ^ ~
 Hello ~ 4 ~ hello ~ || ^ ~
 3 4 OSPF ~ ^ ~
 ^ ~ a hello ~
 ^ ~ ^ ~ ^

| | | | |
|---|------------------------|------------|---|
| | ip ospf hello-interval | OSPF Hello | Â |
| ↓ | | | |

OSPF Hello ~
 { **no** ~
 { **ip ospf hello-interval** ~

ip ospf hello-interval *seconds*

no ip ospf hello-interval

| <i>seconds</i> | OSPF hello ~ 1-65535 ~ |
|----------------|------------------------|

~ 10 ~
 PPP à HDLC 10 ~
 10 ~
 à X.25 30 ~

{ ~

hello ~ hello ~ OSPF ~ #
 ~ ~ ~
 ~ ~ hello a
 ~

~ serial 1/0 OSPF Hello ~ 15 ~
 Ruijie(config)# **interface serial 1/0**
 Ruijie(config-if)# **ip address 172.16.10.1 255.255.255.0**
 Ruijie(config-if)# **encapsulation ppp**
 Ruijie(config-if)# **ip ospf hello-interval 15**

{

OSPF MD5 ~ { ip ospf message-digest-key ^
{ no OSPF MD5 ^

ip ospf message-digest-key key-id md5 key

no ip ospf message-digest-key

| | |
|--------|-----------|
| | |
| key | ~ 16 ^ |
| key-id | ~ 1 255 ^ |

MD5

| | | | |
|--|------------------------|--------|----|
| | area authentication | OSPF 2 | 10 |
| | ip ospf authentication | 3 | 10 |

1

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

31.1.30 ip ospf mtu-ignore

1 mtu 2 3 4 no

5

ip ospf mtu-ignore

no ip ospf mtu-ignore

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

mtu 5

3

5

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

31.1.31 ip ospf network

OSPF 3 ip ospf network 3 no

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*}

| <i>broadcast</i> | OSPF 3 3 |
|--|---------------------------|
| <i>non-broadcast</i> | OSPF 3 NBMA 3 |
| <i>point-to-multipoint</i>
[<i>non-broadcast</i>] | OSPF 3 3, non-broadcast 3 |
| <i>point-to-point</i> | OSPF 3 3 |

3 PPP 3 SLIP 3 3 X.25 3
NBMA 3 3 3 X.25 3 3
3 3 3 3

3 3

3 a 3 OSPF 3 3 3
3 3 3 3 FDDI 3
3 3 3 X.25 3
3 3 HDLC 3 PPP 3 SLIP 3 3
3 3 OSPF 3 a 3 3 3
3 (NBMA) 3 NBMA 3
3 3 SVC 3 X.25 3
3 PVC 3 3 3 OSPF 3 NBMA 3 3 3
3 3 3 Designated Router 3
3 NBMA 3 3
3 3 a 3 OSPF

| | | |
|---|---------|------------------|
| | X25 map | И IP 6 X.25
Â |
| ✓ | | |
| 3 | 1 | |
| | - | - |

31.1.32 ip ospf priority

OSPF "I ~ 3 ip ospf priority Â 3 no
Â

ip ospf priority priority

no ip ospf priority

| | | |
|----------|-----------------------|--|
| | | |
| priority | OSPF "I ~ ✓ ' 0-255 Â | |

| | |
|---------|--|
| "I й" Â | |
|---------|--|

| | | |
|---|---|--|
| 3 | Â | |
|---|---|--|

| | | |
|---|--|--|
| OSPF "I hello Â OSPF DR/BDR
~ ~ "I й DR BDR Â
"I ~ й DR BDR Â "I й°
~ a 6 DR/BDR Â 3 ✓ OSPF broadcast non-broadcast
Â | | |
| ~ DR BDR ж "I a
~ ✓ Ю DR BDR "I Â | | |

| | | |
|---|--|--|
| Лю ~ fastethernet 0/0 "I й 0 Â
Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# ip ospf priority 0 | | |
|---|--|--|

| | | |
|-----------------|--------|--|
| 3 | 3 | |
| ip ospf network | OSPF Â | |

| | | |
|---|--|--|
| ✓ | | |
|---|--|--|

31.1.34 ip ospf transmit delay

OSPF LSU 3 ip ospf transmit delay 1

ip ospf transmit delay seconds

no ip ospf transmit delay

| seconds | OSPF LSU 1-65535 |
|---------|------------------|

1

LSAs transmit delay 1 Age 1
 3 transmit-delay 1 LSU
 9

5

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

3

log-adj-changes [detail]

no log-adj-changes [detail]

| | | |
|--|--------|---|
| | | |
| | detail | ↓ |

| | |
|--|-------------------------|
| | 11 a detail ↓ Full Full |
|--|-------------------------|

| | |
|---|---|
| 3 | Â |
|---|---|

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

```

Ruijie(config)# router ospf 1
Ruijie(config-router)# log-adj-changes detail
    
```

| | | |
|---|--------------|--------|
| 3 | 3 | |
| | show ip ospf | ospf Â |

| |
|---|
| ↓ |
|---|

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

31.1.36 max-concurrent-dd

↓ DD Â

max-concurrent-dd <1-65535>

no max-concurrent-dd

| | | |
|--|-----------|----|
| | | |
| | <1-65535> | DD |

| | |
|--|-----|
| | 5 Â |
|--|-----|

| | |
|---|---|
| 3 | Â |
|---|---|

```

        6      ↓      ~ È      ↓      ~      3 ~ ↓      8      OSPF
        ↓      DD      Â

```

```

        Лю      ~      DD      ~ 4 Â
Ruijie(config)# router ospf 10
Ruijie(config-router)# max-concurrent-dd 4

```

| | | |
|---|---|---|
| 3 | | |
| | - | - |

↓

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

31.1.37 neighbor

⌘ OSPF ~ 3 neighbor Â 3 no Â

neighbor *ip-address* {[**poll-interval** *seconds* | **priority** *priority*] | [**cost** *cost*]}

no neighbor *ip-address*

| <i>ip-address</i> | IP Â |
|-------------------------------------|---|
| poll-interval <i>seconds</i> | ~ ↓ ~ ~ Лю ~ Æ ~ ↓ ~
1-2147483647 Â
(NBMA) |
| priority <i>priority</i> | ~ ↓ ~ ~ "l ~ ↓ ~
0-255 Â
(NBMA) |
| cost <i>cost</i> | ~ ↓ ~ ~ Æ ~ Æ ~ cost ~ ↓ ~
1-65535 Â
Â
(point-to-multipoint) |

```

        ⌘ ~
        ~ ~ 120 ~
        "l ~ ~ ~ 0 Â

```

3

Â

RGOS ˘ ÿ Â IP ˘ ÿ
 ˘ IP Â
 NBMA Э ˘ ÿ a ˘
 Hello ˘ OSPF Hello ˘ Hello ÿ
 Â OSPF ˘ ˘ "I a ÿ 0 Hello ˘
 "I ÿ 0 a б DR/BDR Â DR/BDR Л Л˘ DR/BDR
 Hello Â
 Э, ÿ a é Л || ,
 3 ÿ è , ˘ ˘ Л cost
 Â

ЛЮ ˘ OSPF ˘ ÿ a ° ξ

| | |
|-----------------|-------------------------------------|
| <i>wildcard</i> | IP 0 1 a
Â |
| <i>area-id</i> | OSPF 2000 OSPF 2000
OSPF
OSPF |

OSPF 2000

3

Â

| | | | | | |
|-------------------|-----------------|--------------|------|------|------|
| <i>ip-address</i> | <i>wildcard</i> | 4 | IP | 3 | 2000 |
| OSPF 2000 | Â | 2000 | OSPF | 2000 | IP |
| IP | Â | network area | IP | 2000 | IP |
| a | OSPF | Â | | | |
| 2000 | OSPF | network | 3 | IP | 2000 |
| 2000 | OSPF | Â | | | |

```

Ruijie(config)# router ospf 2000
Ruijie(config-router)# network 172.16.16.0 0.0.15.255 area 1
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

```

| | | |
|-------------|----------|---|
| 3 | 3 | |
| router ospf | ... OSPF | Â |

4

| | | |
|---|---|--|
| 3 | 1 | |
| - | - | |

31.1.39 overflow database

3

OSPF

LSA

Â

overflow database <1-4294967294> hard | soft

no overflow database



a 8 external-LSA Â
8 external-LSA external-LSA 1~ a 1~
Â

3 Â

| external-LSA | | max-dbsize | | wait-time | | IO a | |
|--------------|--------------|-----------------|--------------|--------------|--------------|--------------|--------------|
| external-LSA | external-LSA | external-LSA | external-LSA | external-LSA | external-LSA | external-LSA | external-LSA |
| | | OSPF | | | | | |
| | | max-dbsize | | | | | |
| 1~ | | | | | | Full | |
| 2~ | | | | | | | |
| 3~ | | AS-External-LSA | | | | | |

IO 3 external lsa ñ 10 ð 1 ñ overflow ÿ overflow
ñ 3
Ruijie# config terminal
Ruijie(config)# router ospf 10
Ruijie(config-router)# overflow database external 10 3

| | |
|---|---|
| 3 | |
| - | - |

1

| | |
|---|---|
| 3 | 1 |
| - | - |

31.1.41 overflow memory-lack

3 a OSPF OVERFLOW Â 3 no
11 Â
overflow memory-lack
no overflow memory-lack

| no | a OSPF OVERFLOW |
|----|-----------------|
| | π Â |

a Ю OSPF OVERFLOW Â

3

OSPF OVERFLOW ŷ ÿ a
 "À Â
 π ~ OSPF OVERFLOW ~ ↓
 Â ÿ ~ OSPF NULL
 ~ ŷ æ ~ OVERFLOW Ю Â
 ↓Л clear ip ospf process 3 Æ OSPF ~ OSPF
 OVERFLOW Â
 no a OSPF a OVERFLOW ~ ↓
 ~ OSPF ~
 Â

1' OSPF a Ю a OVERFLOW
 Ruijie(config)# **router ospf 1**
 Ruijie(config-router)# **no overflow memory-lack**

3

no passive-interface [default | type number]

| type number | й Â |
|--------------------|--------|
| default | й Â |

Юй || OSPF Â

3 Â

й è || ~ ↓Л
й || Â

ЛЮ ~ serial 1/0 й || Â
Ruijie(config)# **router ospf 30**
Ruijie(config-router)# **passive-interface serial1/0**

| | |
|---|--|
| 3 | |
|---|--|

| | |
|---------------------------------|--|
| isis [<i>area-tag</i>] | ý isis ↑ ~ <i>area-tag</i> é isis |
| ospf <i>process-id</i> | ý ospf ↑ ~ <i>process-id</i> é ospf
~ ↓ ' 1-65535 |
| rip | |


```

a OSPF
3
RGOS10.1
~ 10.1.1.1 OSPF
~ 10.1.1.1 OSPF

```

```

vrf vpn_1 ... OSPF 10
Ruijie(config)# router ospf 10 vrf vpn_1

```

| 3 | |
|-------------------|------|
| show ip protocols | |
| show ip ospf | ospf |

1

| 3 | 1 |
|---|---|
| - | - |

31.1.45 router-id

ID, 3 no 10 Router ID

Router ID

router-id router-id

no router-id

| router-id | ID, 10 IP |
|-----------|-----------|
|-----------|-----------|

```

OSPF
IP loopback~ IP
~ loopback~ OSPF
~ IP

```

3

```

10 IP
~ IP
~ 10

```

router-id $\hat{A}$ LSA "I

router-id $\hat{A}$ 0.0.0.36 $\hat{A}$

Ruijie(config)# **router ospf 20**

Ruijie(config-router)# **router-id 0.0.0.36**

3

| 3 | |
|-------------------|-----------|
| show ip protocols | $\hat{A}$ |

1

3

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

31.1.46 summary-address

OSPF

3 no

18 $\hat{A}$ 3 summary-address $\hat{A}$

summary-address *ip-address net-mask* {**not-advertise** | **tag value**}

no summary-address *ip-address net-mask* {**not-advertise** | **tag value**}

| <i>ip-address</i> | IP $\hat{A}$ |
|----------------------|--|
| <i>net-mask</i> | $\hat{A}$ |
| not-advertise | a Ω $\sim$ $\ddagger$ $\hat{A}$ |
| tag value | tag $\sim$ $\downarrow$ ' 0-4294967295 |

 $\hat{A}$

3

 $\hat{A}$ $\ddot{y}$ $\hat{e}$

OSPF

OSPF

 $\hat{A}$ $\uparrow$ $\mathcal{L}$ $\downarrow \mathcal{L} \downarrow$ $\sim$ $\ddot{y}$ $\hat{A}$

6 **area range** 3 a $\downarrow \sim$ area range

OSPF ψ

summary-address

OSPF

 $\hat{A}$

NSSA ƒ summary-address 3 4 NSSA ABR 3 ƒ 3 4
 † Â

ЛЮ 3 100.100.0.0/16 Â
 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

3

| 3 | |
|--------------|---------------|
| area range | OSPF ƒ 3
Â |
| redistribute | † è Â |

4

↑ и ЛЮ ч '

1 à RGOS 10.4 ~ a timers throttle spf 3 Â и

timers spf 5 10

2 à RGOS 10.4 ~ timers throttle spf 3 Â Ю timers spf

3 a ~ SPF Л timers throttle spf 3 и ~ timers

throttle spf 3 Â

```
spf-delay' 1000      '
spf-holdtime' 5000    '
spf-max-waittime' 10000  Â
```

| | | | | | | |
|----------------------------|---|--|---------------------|--------------------------------|-----------------------------------|----------------------|
| <i>spf-delay</i> | $\ddot{y}$ | $\downarrow$ | SPF | $\sim$ | $\hat{A}$ | SPF |
| | γ | SPF | | $\dot{y}$ <i>spf-holdtime</i> | λ | SPF |
| | | $\dot{y}$ Θ | | $\dot{y}$ | <i>spf-max-waittime</i> | λ |
| a $\hat{A}$ | η $\hat{A}$ | $\dot{y}$ SPF | | | $\sim$ π SPF | |
| | $\ddot{y}$ <i>spf-holdtime</i> | | $\hat{A}$ | | | |
| <i>spf-delay</i> | <i>spf-holdtime</i> | $\downarrow \lambda$ | $\lambda \eta$ | | $\dot{y}$ <i>spf-max-waittime</i> | $\downarrow \lambda$ |
| λ | SPF | $\sim \downarrow \lambda$ | | $\downarrow$ | $\hat{A}$ | |
| δ timers spf | $\dot{y}$ | $\sim$ | $\dot{y}$ | $\sim$ | $\downarrow \lambda \eta$ SPF | $\sim$ |
| $\downarrow \lambda$ | $\downarrow$ | | SPF | | λ | timers |
| throttle spf | $\dot{y}$ | $\hat{A}$ | | | | |
| <hr/> | | | | | | |
| | 1' <i>spf-holdtime</i> | a | <i>spf-delay</i> | $\ddagger$ <i>spf-holdtime</i> | | |
| | $\parallel$ $\dot{y}$ δ <i>spf-delay</i> | | $\dot{y}$ | | | |
| | 2' <i>spf-max-waittime</i> | a | <i>spf-holdtime</i> | $\ddagger$ | | |
| $\sim$ | <i>spf-max-waittime</i> | $\parallel$ $\dot{y}$ δ <i>spf-holdtime</i> | $\hat{A}$ | | | |
| | 3' timers throttle spf | δ timers spf | | $\hat{A}$ | | |
| | 4' timers spf | δ timers throttle spf | $\sim$ | | timers | |
| | throttle spf | | | | | |

```

        1000 90000 5 1000 90000
        OSPF SPF 5 1000 90000
        Ruijie(config)# router ospf 20
        Ruijie(config-router)# timers spf 5 1000 90000

```

| | | |
|---|---|--|
| 3 | 3 | |
|---|---|--|

| | | |
|---|--------------|---|
| | show ip ospf | ospf |
| | timers spf | SPF 10.4
RGOS ~ SPF
3 ^ timers
throttle spf 4 3 timers spf |
| 1 | | |
| 3 | 1 | |
| | 10.4(1) | 3 |

31.2

31.2.1 show ip ospf

| | | |
|---------------------------|------------|------------------|
| OSPF ~ | | 3 show ip ospf ^ |
| show ip ospf [process-id] | | |
| | | |
| | process-id | ospf 1 |

| | |
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3 ^

```

This router is an ASBR (injecting external routing information)
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
LsaGroupPacing: 240 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 4. Checksum 0x0278E0
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 4
External LSA database is unlimited.
Number of LSA originated 6
Number of LSA received 2
Log Neighbor Adjacency Changes : Enabled
Graceful-restart disabled
Graceful-restart helper support enabled
Number of areas attached to this router: 1
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 6 BFD ||,          3  ¶ "BFD enabled",      10
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 is enabled
Supports only single TOS(TOS0) routes
Supports opaque LSA

```

Supports Graceful Restart

This router is an ASBR (injecting external routing information)

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

LsaGroupPacing: 240 secs

Number of incoming current DD exchange neighbors 0/5

Number of outgoing current DD exchange neighbors 0/5

Number of external LSA 4. Checksum 0x0278E0

Number of opaque AS LSA 0. Checksum 0x000000

Number of non-default external LSA 4

External LSA database is unlimited.

Number of LSA originated 6

Number of LSA received 2

Log Neighbor Adjacency Changes : Enabled

Graceful-restart disabled

Graceful-restart helper support enabled

Number of areas attached to this router: 1

BFD 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

| | |
|---|-------------------------------------|
| Conforms to RFC2328 | 6 RFC2328 |
| RFC1583Compatibility flag | RFC2328 RFC1583 ASBR |
| Support Tos | TOS0 |
| Supports opaque LSA | opaque-LSA |
| Graceful-restart | RFC3623 Graceful Restart GR Restart |
| Graceful-restart helper | RFC3623 Graceful Restart GR Help |
| Router Type | OSPF normal ABR ASBR |
| SPF Delay | SPF |
| SPF-holdtime | SPF |
| LsaGroupPacing | LSA |
| Incomming current DD exchange neighbors | exstart incomming |
| Outgoing current DD exchange neighbors | exstart outgoing |
| 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 | , Default, Stub,NSSA |

| | | | | |
|--|--|------|--------------------------|--------|
| Number of interfaces in this area | Ψ Â | | | |
| Number of fully adjacent neighbors in this area | Ψ | Full | Â | |
| Number of fully adjacent virtual neighbors through this area | Ψ | Full | Ψ Â | ' ↓ |
| Area authentication | Ψ | Â | | |
| SPF algorithm last executed | ∅ | SPF | Â | |
| SPF algorithm executed times | SPF | Â | | |
| Number of LSA | Ψ | LSA | Â | |
| Checksum Sum | Ψ | LSA | Â | |
| NSSA Translator State | NSSA LSA ñ External LSA'
NSSA Ψ 3 ABR OSPF Â | | | |
| BFD enabled | OSPF 6 BFD | | | |

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31.2.2 show ip ospf border-routers

ABR/ASBR OSPF ~ 3 show ip ospf border-routers Â

show ip ospf [process-id] border-routers

| | | |
|------------|------|---|
| | | |
| process-id | ospf | 1 |

3

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| | | | | | |
|-----|----------------------|------|------|------|------|
| | 3 4 5 | ABR | ASBR | OSPF | OSPF |
| a 4 | show ip route | OSPF | | | OSPF |
| ~ | a | Â | | | |

ЛЮЮ ò **show ip ospf border-routers** 3

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, 422.8-1338.4.02.8 3E T14

3 a ↓ a ↓ ^ LSAs~ Â

show ip ospf [*process-id area-id*] **database** [**adv-router** *ip-address* | {**asbr-summary** | **external** | **network** | **nssa-external** | **opaque-area** | **opaque-as** | **opaque-link** | **router** | **summary**} [*link-state-id*] [{**adv-router** *ip-address* | **self-originate**}] | **database-summary** | **max-age** | **self-originate**]

| <i>area-id</i> | ^ ↓ ~ Ψ /1 Â | |
|-----------------------|-------------------|-------|
| adv-router | ^ ↓ ~ Ω
Â | |
| <i>link-state-id</i> | ^ ↓ ~ ↓ OSPF
Â | |
| self-originate | ^ ↓ ~
Â | |
| max-age | ^ ↓ ~ | LSA] |

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 | 0x800000011 | 0x6f39 | 2 |
| 3.3.3.3 | 3.3.3.3 | 120 | 0x800000002 | 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 | 0x800000001 | 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 | 0x800000003 | 0x350d | 10.0.0.0/24 |
| 100.0.0.0 | 1.1.1.1 | 2 | 0x80000000c | 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 | 0x800000001 | 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 | 0x800000001 | 0x52a4 | 100.0.0.0/16 |
| 192.88.88.0 | 1.1.1.1 | 2 | 0x800000001 | 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 | 0x800000001 | 0x033c | E2 20.0.0.0/24 | 0 |
| 100.0.0.0 | 1.1.1.1 | 1 | 0x800000001 | 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 | 0x80000000a | 0x7627 | E2 20.0.0.0/24 | 0 |
| 100.0.0.0 | 1.1.1.1 | 620 | 0x80000000a | 0x0854 | E2 100.0.0.0/28 | 0 |

show ip ospf database 3

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| OSPF Router with ID | OSPF 6
OSPF 1 |
|---------------------------|------------------|
| Router Link States | ЛЮ и Â |
| Net Link States | ЛЮ и Â |
| Summary 3028 Link States | ЛЮ и Â |
| NSSA-external Link States | ЛЮ и 1 |

| | |
|--------------|-------------|
| Network Mask | Â |
| TOS | TOS ~ ì 0 Â |
| Metric | Â |

3' ÌÜÖ ì **show ip ospf database external** 3

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 Ю Â

| OSPF Router with ID | ÌÜÖ 6 OSPF
ì Â Â |
|--------------------------------|---------------------|
| Type-5 AS External Link States | ÌÜÖ ì Â |
| LS age | Â |
| Options | Â |
| LS Type | Â |
| Link State ID | Â |
| Advertising Router | Â |
| LS Seq Number | ì Â |
| Checksum | Â |
| Length | ~ Ì ì Æ Â |
| Network Mask | Â |
| Metric Type | Â |

| | |
|--------------------|----------------------------------|
| TOS | TOS ~ и 0 Â |
| Metric | Â |
| Forward Address | ~ IP Â
и 0.0.0.0 ±
Â |
| External Route Tag | ~ 32
Â OSPF a ~ è
↑ OSPF Â |

4' Лю и **show ip ospf database network** 3

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 3 Ю Â

| | |
|---------------------|------------------|
| | |
| OSPF Router with ID | Лю 6 OSPF
л Â |
| Network Link States | Лю и Â |
| LS age | Â |
| Options | Â |
| LS Type | Â |
| Link State ID | Â |
| Advertising Router | Â |
| LS Seq Number | л Â |
| Checksum | Â |
| Length | ~ л и æ Â |

| | |
|-----------------|--|
| Network Mask | |
| Attached Router | |

5' 7ЮЮ ÿ show ip ospf database router 3

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 3 ЮÃ

| | |
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OSPF Router with ID

7ЮЮ

6 OSPF

| | | |
|-------------------|--|--|
| Link connected to | | |
|-------------------|--|--|


```

7  ЛЮЙ show ip ospf database nssa-external 3
Ruijie# show ip ospf database nssa-external
OSPF Router with ID (1.1.1.1) (Process ID 1)
NSSA-external Link States (Area 0.0.0.1 [NSSA])
LS age: 1
Options: 0x0 (*|---|---|---|)
LS Type: AS-NSSA-LSA
Link State ID: 20.0.0.0 (External Network Number For NSSA)
Advertising Router: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0x033c
Length: 36
Network Mask: /24
Metric Type: 2 (Larger than any link state path)
TOS: 0
Metric: 20
NSSA: Forward Address: 100.0.2.1
External Route Tag: 0

```

show ip ospf database nssa-external 3 ЮА

| OSPF Router with ID | ЛЮ б OSPF
л А |
|---------------------------|------------------|
| NSSA-external Link States | ЛЮ й
А |
| LS age | А |
| Options | А |
| LS Type | А |
| Link State ID | А |
| Advertising Router | А |
| LS Seq Number | л А |
| Checksum | А |
| Length | ~ Л й æ А |
| Network Mask | А |
| Metric Type | А |
| TOS | TOS ~ ↓ й 0 А |
| Metric | А |

| | | |
|----------------------|---------|----|
| NSSA:Forward Address | 0.0.0.0 | IP |
| External Route Tag | 32 | |

```

8  Ruijie# show ip ospf database external
OSPF Router with ID (1.1.1.1) (Process ID 1)
AS External Link States

```

Length

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

31.2.4 show ip ospf interface

6 OSPF 3 show ip ospf interface ^

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

| | | |
|----------------|-------|---|
| | | |
| interface-type | ^ ↓ ~ | ^ |

Matching network config: 192.88.88.0/24

Process ID 1, Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1

Transmit Delay is 1 sec, State DR, Priority 1, **BFD enabled**

Designated Router (ID) 1.1.1.1, Interface Address 192.88.88.27

Backup Designated Router (ID) 3.3.3.3, Interface Address 192.88.88.72

Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

Hello due in 00:00:03

Neighbor Count is 1, Adjacent neighbor count is 1

Crypt Sequence Number is 70784

Hello received 1786 sent 1787, DD received 13 sent 8

LS-Req received 2 sent 2, LS-Upd received 29 sent 53

LS-Ack received 46 sent 23, Discarded 1

show ip ospf interface serial 1/0 3 IO Â

| FastEthernet 0/0 State | UP Down |
|------------------------------|---------------------------------------|
| Internet Address | IP Â |
| Area | OSPF 0 Â |
| MTU | MTU |
| Matching network config | OSPF network area |
| Process ID | 1 |
| Router ID | OSPF Â |
| Network Type | OSPF Â |
| Cost | OSPF Â |
| Transmit Delay is | OSPF Â |
| State | DR/BDR Â |
| Priority | 1 |
| Designated Router(ID) | DR |
| DR's Interface address | DR |
| Backup designated router(ID) | BDR |
| BDR's Interface address | BDR |
| Time intervals configured | Hello 10 Dead 40 Wait 40 Retransmit 5 |
| Hello due in | 3 HELLO |

| | |
|-------------------------|--------------|
| Neighbor count | |
| Adjacent neighbor count | Full |
| Crypt Sequence Number | md5 1 |
| Hello received send | 6 HELLO 1 |
| DD received send | 6 DD 1 |
| LS-Req received send | 6 LS 1 |
| LS-Upd received send | 6 LS 1 |
| LS-Ack received send | 6 LS 1 |
| Discard | OSPF 1 |
| BFD enabled | OSPF 6 BFD 1 |

```

ЛюЮЙ show ip ospf neighbor 3
Ruijie# show ip ospf neighbor
OSPF process 1, 1 Neighbors, 1 is Full:
Neighbor ID      Pri      State      BFD State      Dead Time
Address          Interface
3.3.3.3          1        Full/BDR    Up              00:00:32
192.88.88.72 FastEthernet 1/0
Ruijie# show ip ospf neighbor detail
Neighbor 3.3.3.3, interface address 192.88.88.72
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 11 state changes
DR is 192.88.88.27, BDR is 192.88.88.72
Options is 0x52 (*|0|-|EA|-|-|E|-)
Dead timer due in 00:00:32
Neighbor is up for 05:11:27
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
Crypt Sequence Number is 0
Thread Inactivity Timer on
Thread Database Description Retransmission off
Thread Link State Request Retransmission off
Thread Link State Update Retransmission off
Thread Poll Timer on
Graceful-restart helper disabled
        Б BFD      ~      ж      7      Ю      " BFD session state up"
Ruijie# show ip ospf neighbor
OSPF process 1, 1 Neighbors, 1 is Full:
Neighbor ID      Pri  State      Dead Time      Address      Interface
3.3.3.3  1  Full/BDR  00:00:32  192.88.88.72  FastEthernet 1/0
Ruijie# show ip ospf neighbor detail
Neighbor 3.3.3.3, interface address 192.88.88.72
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 11 state changes
DR is 192.88.88.27, BDR is 192.88.88.72
Options is 0x52 (*|0|-|EA|-|-|E|-)
Dead timer due in 00:00:32
Neighbor is up for 05:11:27

```

```

Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
Crypt Sequence Number is 0
Thread Inactivity Timer on
Thread Database Description Retransmission off
Thread Link State Request Retransmission off
Thread Link State Update Retransmission off
Thread Poll Timer on
Graceful-restart helper disabled
BFD session state up

```

```
show ip ospf neighbor 3 Ю'
```

| Neighbor ID | Â |
|---------------------|--|
| Pri | "l ^ DR ~ |
| State | |
| Dead Time | Dead |
| Address | |
| Interface | |
| interface address | |
| In the area | " ѱ |
| via interface | Â |
| Neighbor priority | OSPF "l Â |
| State | OSPF ÂFULL '
DR ñ ' BDR
ñ ' DROTHER a
DR/BDR Â DR BDR Â |
| State changes times | ↓ |
| Dead Time | ' |
| DR | DR (Hello
DR) |
| BDR | BDR (Hello
BDR) |
| Options | Hello E ~ 0 ѱ ñ STUB'
~ ѱ a STUB ѱ Â |
| Dead timer due in | Â |

| | |
|--|--------------|
| Neighbor up time | |
| Database Summary List | DD |
| Link State Request List | LS |
| Link State Retransmission List | |
| Crypt Sequence Number | ψ MD5 |
| Thread Inactivity Timer | |
| Thread Database Description Retransmission | DD |
| Thread Link State Request Retransmission | LS |
| Thread Link State Update Retransmission | LS |
| Thread Poll Timer | ~ Poll Timer |
| Graceful-restart helper | й GR Helper |

| | | |
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| 1 |
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| 3 | 1 | |
| - | - | |

31.2.6 show ip ospf route

OSPF Â

show ip ospf [process-id] route[count]

| | |
|------------|--------------|
| | |
| process-id | OSPF 1~ OSPF |
| count | OSPF |

| |
|--|
| |
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| 3 | Â |
|---|---|

3 OSPF ~ count OSPF Â

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 3 Ю'

| codes | Ю |
|--------------|------|
| 100.0.0.0/24 | Â |
| [1] | cost |
| via | Ю б |

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1

3

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

31.2.7 show ip ospf summary-address

OSPF ↑ ~ 3 **show ip ospf**
summary-address Â |#&)0"v1560'n6g)r@ ~Crâ1w!BA-.R1hRsdW#"5A "4s?-A fSe1w.YBüv.)C1w!'bà."—

3

Â

3 4

NSSA ABR 3

3 4

Â

Лю й **show ip ospf summary-address** 3

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

Summary Address Summary Mask Advertise Status Aggregated subnets

202.101.0.0 255.255.0.0 advertise Inactive 0

| Summary Address | |
|--------------------|---|
| Summary Mask | Â |
| Advertise | Ω |
| Status | |
| Aggregated subnets | |

3

Â

ospf neighbor 3 a 3 Â 3 7 8 Â show ip

32

```

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

```

3

| 3 | |
|--------------------|------|
| access-list | 10 1 |
| prefix-list | 10 |

1

3

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

32.1.2 distribute-list out

8 10 3 **distribute-list out** 10

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

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

| <i>access-list-number</i> | 10
10 ' 1-99 1300-1999
10 ' 100-199 2000-2699 |
|---------------------------------------|---|
| <i>access-list-name</i> | 1 |
| prefix <i>prefix-list-name</i> | |
| <i>Interface</i> | (1) 1 8 1 |
| <i>protocol</i> | (1) 1 1 |

8

10

3

10

```

      3 a      ↓      ~      8      '      ~
      8 ↓      '      è      ~      ‡
      ↑      ~      è      a      8      Â
OSPF      8 ~ a      ~      3 ↓      OSPF
      Â

```

```

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-router)# exit
Ruijie(config)# access-list 10 permit 192.168.12.0 0.0.0.255

```

3

| 3 | |
|--------------|-----|
| access-list | № ‡ |
| prefix-list | № |
| redistribute | ↑ |

4

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| 4 | |
|---|---|
| - | - |

32.1.3 ip community-list

```

3 № ~ 8 Â no 3 è Â

```

```

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

```

```

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

```

| standard | |
|----------|--|
| expanded | |

| | |
|------------------------------|---|
| <i>community-list-name</i> | 1
1 a 80 |
| <i>community-list-number</i> | 1
' 1 1-99
' 1 100-199 |
| permit | |
| deny | |
| <i>community-number</i> | ^
1 AA:NN(1' 2)
~ 0-4294967295 100 100
internet Internet ~
^
local-as a AS ~
~ a e
^
no-advertise a BGP
peers ^
no-export a EBGP peers ^
' 1..255 ^
' 32
^ |

100

3

^

3 100 BGP ^

```
Ruijie(config)# ip community-list standard test deny 100:20 200:20
Ruijie(config)# ip community-list standard test2 permit internet
```

| | |
|------------------------|---|
| 3 | |
| match community | 7 |

1




```

geǎ ǎ ǎ minimum-prefix-length 32 ǎ lǎ ǎ ǎ ip-prefix
maximum-prefix-length ǎ ǎ ǎ ǎ ǎ
minimum-prefix-length maximum-prefix-length ǎ ǎ ip-prefix ǎ
minimum-prefix-length maximum-prefix-length ǎ ip-prefix <
minimum-prefix-length < maximum-prefix-length <= 32 ǎ

```

```

ǎǎǎ ǎ ǎ OSPF ǎ RIP
ǎ IP ǎ ǎ IP ǎǎ( ǎ
IP 201.1.1.0/24 ǎ ǎ ǎ ǎ
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

```

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|----|---|
| 3 | |
| -- | - |

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|---|---|
| ǎ | |
| - | - |

32.1.6 ip prefix-list description

```

ǎ ǎ ǎ ip prefix-list description ǎ ǎ ǎ no
ǎ

```

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

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

ǎ

3

3

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

32.1.8 ip route

~

3 ip route ^

3

no

^

ip route [**vrf** *vrf_name*] *network net-mask* {*ip-address* |

| | | | | | | | | | |
|---|---|----|---|--------|---|------|------|---|----|
| ✓ | й | ✓ | ✓ | й VOIP | ✓ | ↓Л а | RGOS | ✓ | IP |
| П | Â | ↓Л | | RGOS | | | | | |

| | | |
|---|---------|---|
| | | |
| | - | - |
| 1 | 3 y 3 a | |
| 3 | 1 | |
| | - | - |

32.1.11 match as-path

↑ AS_PATH ~ 3 match as-path ^
3 no ^

match as-path *as-path-acl-list-num as-path-acl-list-num.....*

no match as-path *as-path-acl-list-num.....*

| | | |
|-----------------------------|---------------|--|
| | | |
| <i>as-path-acl-list-num</i> | 1 ^ 1 1...500 | |

| | | |
|--|---|--|
| | ^ | |
|--|---|--|

| | | |
|---|---|--|
| 3 | ^ | |
|---|---|--|

| | |
|--------------------------------|---------------------------------|
| match as-path 3 1 1 1 ^ | |
| ‡ ~ 1 1 | match 3 1 set 3 ^ |
| match 3 ‡ 1 | set 3 ‡ a ^ |

| | |
|--|--|
| Ruijie(config)# route-map ROUTEMAP2IBGP | |
| Ruijie(config-route-map)# match as-path 20 30 | |

| | | |
|----------------------------|-----------|--|
| | 3 | |
| match community | 7 | |
| match metric | 7 | |
| match origin | 7 | |
| set as-path prepend | ↑ AS_PATH | |
| set metric | ↑ | |
| set metric-type | ↑ | |

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...*]}

| <i>access-list-number</i> | /
/ ' 1-99' 1300-1999
/ ' 100-199' 2000-2699 |
|--|--|
| <i>access-list-name</i> | ↓ |
| prefix-list <i>prefix-list-name</i> | ↵ ↵ |

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```
Ruijie(config-route-map)# set metric 40
```

```
Ruijie(config-route-map)# set metric-type type-1
```

3

| 3 | |
|-----------------------|-----|
| access-list | № ‡ |
| match interface | 7 Ю |
| match ip next-hop | 7 Ю |
| match ip route-source | 7 |
| match metric | 7 |
| match route-type | 7 |
| match tag | 7 |
| set metric | ↑ |
| set metric-type | ↑ |
| set tag | ↑ |

4

3

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

32.1.15 match ip next-hop

↑ Ю IP

| | | |
|--|-----------------|---|
| | set metric-type | ↑ |
| | set tag | ↑ |

↓

| | | |
|---|---|---|
| ↑ | ↓ | |
| | - | - |

32.1.16 match ip route-source

↑ IP ‡ ~ 3
match ip route-source ^ 3 no ^ 3

match ip route-source {access-list-number [access-list-number... |access-list-name...]
|access-list-name [access-list-number... | access-list-name] | **prefix-list** prefix-list-name
[prefix-list-name...]}

no match ip route-source {access-list-number [access-list-number... | access-list-name...]
| access-list-name [access-list-number... | access-list-name] | **prefix-list** prefix-list-name
[prefix-list-name...]}

| | |
|-------------------------------------|-----|
| | |
| access-list-number | ↓ |
| access-list-name | ↓ |
| prefix-list prefix-list-name | ↑ ↓ |

^

3

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| | |
|--------------------------------------|----------------------|
| match ip route-source 3 ↓ ↓ ↓ | ↓ ^ |
| ↓ ↓ ÿ | ↑ ↓ |
| ↑ ↓ | RIP ~ ≠ ↓ ↓ RIP |
| OSPF ^ | ↑ ↓ ↓ IP ^ |
| ↑ ~ | ^ route maps~ ~ 4 |
| ↑ ~ 8 ^ | |
| ‡ ~ ↓ ↓ 1 | match 3 1 |
| match 3 ~ ‡ 7 | set 3 ~ ‡ a ^ |
| ↓ ↓ ~ OSPF | ↑ RIP ^ ↓ RIP IP |

```

5 OSPF      è  ĩ  Â
Ruijie(config)# router ospf
Ruijie(config-router)# redistribute      rip      subnets
Ruijie(config-router)# route-map redrip
Ruijie(config-router)# network 192.168.12.0 0.0.0.255 area 0
Ruijie(config-router)# exit
Ruijie(config)# access-list 5 permit host 192.168.100.1
Ruijie(config)# route-map redrip permit 10
Ruijie(config-route-map)# match ip route-source 5

```

3

| 3 | |
|-------------------|------|
| access-list | ⌘ ‡ |
| match ip address | 7 |
| match interface | 7 IO |
| match ip next-hop | 7 IO |
| match metric | 7 |
| match route-type | 7 |
| match tag | 7 |
| set metric | ĩ |
| set metric-type | ĩ |
| set tag | ĩ |

4

3

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

32.1.17 match length

IP ~ > 3

| | | |
|--|-------------------|----|
| | <i>min-length</i> | IP |
| | <i>max-length</i> | IP |

1

3

1

-

-

32.1.18 match metric

7

~

3 match metric ^

3

no

^

match metric metric

no match metric

metric

1

' 0-4294967295

^

3

^

↓ √ y

↑

1

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^

↓ √

OSPF

↑

1

RIP

~

≠ ↓ √

RIP

↑

1

OSPF

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↓ √

IP

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↑

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route maps~

~

4

↑

~

8 ^

±

~ ↓ √

1

match

3

1

set 3 ^

match 3~ ± 7

'

set 3~ ± a

^

√ √

~

OSPF

↑

RIP

^

10

RIP

~ OSPF

↑

^

Ruijie(config)# router ospf

Ruijie(config-router)# redistribute rip subnets route-map
redist-rip

Ruijie(config-router)# network 192.168.12.0 0.0.0.255 area 0

Ruijie(config-router)# exit

Ruijie(config)# route-map redist-rip permit 10

Ruijie(config-route-map)# match metric 10

| | | | | |
|---|-----------------------|-----|----|---|
| | | | | |
| | access-list | 100 | 10 | |
| | match ip address | 1 | | |
| | match interface | 1 | 10 | |
| | match ip next-hop | 1 | 10 | |
| 3 | match ip route-source | 1 | | |
| | match route-type | 1 | | |
| | match tag | 1 | | |
| | set metric | | 1 | |
| | set metric-type | | 1 | |
| | set tag | | 1 | |
| 1 | | | | |
| 3 | | 1 | | |
| | | - | | - |

32.1.19 match origin

no match origin $\hat{A}$

match origin {egp | igp | incomplete}

no match origin {egp | igp | incomplete}

| | | | |
|--|------------|-----|--|
| | | | |
| | egp | EGP | |
| | igp | IGP | |
| | Incomplete | a | |

$\hat{A}$

3

$\hat{A}$

1 1
3 1

1 a 1 1
1 $\hat{A}$

$\hat{A}$

```

Ruijie(config)# route-map MY_MAP 10 permit
Ruijie(config-route-map)# match origin egp
Ruijie(config-route-map)# set community 109
Ruijie(config-route-map)# exit
Ruijie(config)# route-map MAP20 20 permit
Ruijie(config-route-map)# match origin incomplete
Ruijie(config-route-map)# set community no-export

```

3

| 3 | |
|---------------------|-----------|
| match as-path | 7 AS_PATH |
| match metric | 7 |
| match origin | 7 |
| set as-path prepend | ↑ AS_PATH |
| set metric | ↑ |
| set origin | ↑ |

4

3

| 4 | |
|---|---|
| - | - |

32.1.20 match route-type

7

~

3 match route-type ^ 3 no

^

match route-type {local | internal | external [type-1 | type-2] | level-1 | level-2}

no match route-type {local | internal | external [type-1 | type-2] | level-1 | level-2}

| local | |
|-------------------|-------------|
| Internal | OSPF |
| external | (BGP OSPF) |
| type-1 type-2 | OSPF 1 2 |
| level-1 level-2 | ISIS 1 2 |

^

3

A

```

      ↓ ∪ ŷ      ↑ 1      ∏ A      ↓ ∪ OSPF
      ↑ 1      RIP      ~ ≠ ↓ ∪ RIP      ↑ 1
      OSPF      A      ↑ ↓ ∪      IP      A
      ↑ ~      ^ route maps~      ~ 4
      ↑ ~      8 A
      ‡ ~ ↓ ∪ 1      match 3 1      set 3 A
      match 3 ~ ‡ 1      set 3 ~ ‡ a      A

```

```

∪ ∪      ~ RIP      ↑ OSPF      A RIP ↓ ↑ OSPF
A

```

```

Ruijie(config)# router rip
Ruijie(config-router)# redistribute ospf route-map redrip
Ruijie(config-router)# network 192.168.12.0
Ruijie(config-router)# exit
Ruijie(config)# route-map redrip permit 10
Ruijie(config-route-map)# match route-type internal

```

| 3 | |
|-----------------------|-------|
| access-list | ∪ ∪ ‡ |
| match ip address | ∪ |
| match interface | ∪ ∪ |
| match ip next-hop | ∪ ∪ |
| match ip route-source | ∪ |
| match metric | ∪ |
| match tag | ∪ |
| set metric | ↑ |
| set metric-type | ↑ |

32.1.21 match tag

| | match tag | no |
|---|-----------|----|
| match tag <i>tag</i> [... <i>tag</i>] | | |
| no match tag <i>tag</i> [... <i>tag</i>] | | |

| | | | |
|--|-------------------|---|---|
| | match ip next-hop | 7 | Ю |
| | match route-type | 7 | |
| | set metric | | 7 |
| | set metric-type | | 7 |
| | set tag | | 7 |

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

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

| | | | | | |
|----------------|-----------|----------------|-----------|----------------------------------|-------------------|
| $\mathbb{H}^n$ | $\sim$ | $\mathbb{H}^n$ | $\sim$ | $\{ \text{route-map} \hat{A} \}$ | $\{ \text{no} \}$ |
| $\mathbb{H}^n$ | $\hat{A}$ | $\mathbb{H}^n$ | $\hat{A}$ | $\{ \text{route-map} \hat{A} \}$ | $\{ \text{no} \}$ |

no route-map *route-map-name* [**permit** | **deny**] [*sequence-number*]

32-27

| | | | | |
|--|------------------------|---|---------|---|
| | <i>sequence-number</i> | ˆ | ˆ ˆ æ ˆ | ˆ |
| | | ˆ | ˆ | ˆ |

| | |
|--|---|
| | ˆ |
|--|---|

| | |
|---|---|
| 3 | ˆ |
|---|---|

RGIOS ˆ ˆ ˆ ˆ ˆ ˆ ˆ ˆ ˆ ˆ

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

32.1.23 set aggregator as

```

3 match 1
aggregator as 1 3 no AS 1 3 set
set aggregator as as-num ip_addr
no set aggregator as [as-num ip_addr]

```

| | |
|-----------|------|
| | |
| as-number | AS 1 |
| ip_addr | |

1

3 1

```

3 BGP 1
3 ^ as,ip-addr~ a 1

```

```

Ruijie(config)# route-map set-as-path
Ruijie(config-route-map)# match as-path 1
Ruijie(config-route-map)# set aggregator as 3 2.2.2.2

```

| | |
|---------------|---------|
| 3 | |
| match as-path | AS_PATH |

1

3

1

-

-

32.1.24 set as-path prepend

1 match 2 3 AS_PATH 4 5 set
as-path prepend 6 7 **no** 8 9 10 11
set as-path prepend *as-number*
no set as-path prepend [*as-number*]

| | |
|------------------|----------------|
| | |
| <i>as-number</i> | 1 AS_PATH AS 1 |

1

3

1 2 3 4 AS_PATH 5 6 as-path
 7 15 as 1

```

Ruijie(config)# route-map set-as-path
Ruijie(config-route-map)# match as-path 1
Ruijie(config-route-map)# set as-path prepend 100 101 102
  
```

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

32.1.25 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**

| | |
|------------------------------|------------------------------|
| | |
| <i>community-list-number</i> | 1
' 1 1-99
' 1 100-199 |
| <i>community-list-name</i> | 1
1 a 80 |

^

3 ^

3 7 ^

```

Ruijie(config)# router bgp 100
Ruijie(config-router)# neighbor 172.16.233.33 remote-as 120
Ruijie(config-router)# neighbor 172.16.233.33 route-map ROUTEMAPIN
in
Ruijie(config-router)# neighbor 172.16.233.33 route-map
ROUTEMAPOUT out
Ruijie(config-router)# exit
Ruijie(config)# ip community-list 500 permit 100:10
Ruijie(config)# ip community-list 500 permit 100:20
Ruijie(config)# ip community-list 120 deny 100:50
Ruijie(config)# ip community-list 120 permit 100:.*
Ruijie(config)# route-map ROUTEMAPIN permit 10

```

```
Ruijie(config-route-map)# set comm-list 500 delete
Ruijie(config-route-map)# exit
Ruijie(config)# route-map ROUTEMAPOUT permit 10
Ruijie(config-route-map)# set comm-list 120 delete
```

| 3 | |
|-------------------|-----------|
| ip community-list | |
| match as-path | 7 AS_PATH |

| | |
|-------------------------|---|
| | ˆ ^ˆ
ˆ AA:NN(1:2)
0-4294967295 ˆ ˆ
internet Internet
ˆ ^ˆ
local-as a AS
a ˆ ^ˆ
ˆ ^ˆ
no-advertise a BGP
peers ˆ ^ˆ
no-export a EBGP peers ˆ ^ˆ |
| community-number | |
| additive | community ˆ ˆ |
| none | ˆ |

ˆ

3

ˆ

ˆ

ˆ

```

Ruijie(config)# route-map SET_COMMUNITY 10 permit
Ruijie(config-route-map)# match as-path 1
Ruijie(config-route-map)# set community 109:10
Ruijie(config-route-map)# exit
Ruijie(config)# route-map SET_COMMUNITY 20 permit
Ruijie(config-route-map)# match as-path 2
Ruijie(config-route-map)# set community no-export

```

3

| 3 | |
|----------------------------|-----------|
| match as-path | ˆ AS_PATH |
| match community | ˆ |
| match metric | ˆ |
| match origin | ˆ |
| set as-path prepend | ˆ AS_PATH |
| set origin | ˆ |
| set metric-type | ˆ |

| | | |
|---|---|---|
| | ၃ | |
| ၁ | | |
| ၃ | ၈ | |
| | - | - |

32.1.27 set dampening

၇ match —

Ruijie(config)# **ip** **policy** **route-map** *smallpak*
 Ruijie(config-if)# **exit**
 Ruijie(config)# **route-map** *smallpak* **permit** *10*
 Ruijie(config-route-map)# **match** **length** *0 500*
 Ruijie(config-route-map)# **set** **default** **interface** *fastethernet 1/0*

```

Ruijie# show running-config
Building configuration...

Current configuration:
!
interface serial 1/0
 ip address 10.1.1.1 255.255.255.0
 ip policy route-map smallpak
!
route-map smallpak permit 10
 match length 0 500
 set default interface fastethernet 1/0
!

```

3

| 3 | |
|-------------------------|-------|
| route-map | 10 |
| match ip address | 10 |
| match length | 10 |
| set interface | |
| set ip default next-hop | 10 IP |
| set ip next-hop | 10 IP |
| set ip precedence | IP 10 |

1

a 3

3

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

32.1.29 set extcommunity

7 match 10

•NO•HCL 10 10

3

| | |
|-------------------------------|-----|
| rt | RT |
| soo | SOO |
| <i>extend-community-value</i> | |

Â

3

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7

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

3

| 3 | |
|----------------------------|-----------|
| match as-path | 7 AS_PATH |
| match community | 7 |
| match metric | 7 |
| match origin | 7 |
| set as-path prepend | ↑ AS_PATH |
| set metric | ↑ |
| set metric-type | ↑ |

4

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| 11 | |
|----|---|
| - | - |

32.1.30 set ip default next-hop

7 match ‡ IO IP ~ 3 set ip
 next-hop Â 3 no Â

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



```

Ruijie(config)#route-map equal-access permit 20
Ruijie(config-route-map)#match ip address 2
Ruijie(config-route-map)#set ip default next-hop 7.7.7.7
Ruijie(config)#route-map equal-access permit 30
Ruijie(config-route-map)#set default interface null 0

```

3

| 3 | |
|-----------------------|---------|
| route-map | 18 |
| match ip address | 7 |
| set default interface | ~ |
| set default interface | ~ |
| set interface | |
| set ip next-hop | IO IP ~ |
| set ip precedence | IP "I |

4

-

3

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

32.1.31 set ip dscp

7 match ‡ DSCP ~ 3 set ip dscp Â 3

no Â

set ip dscp dscp_value

no set ip dscp

| dscp_value | IP IP DSCP |
|------------|------------|

Â

3

Â

3

3

| 3 | |
|-------------------------|--------|
| route-map | 18 |
| match ip address | 7 |
| set default interface | ~ |
| set default interface | ~ |
| set interface | |
| set ip default next-hop | Ю IP ~ |
| set ip precedence | IP "I |

4

3

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

32.1.32 set vrf

И 7 match ‡ IP VRF ~
 3 set vrf Â 3 no Â 3 Â

set vrf name

no set vrf name

| name | VRF 1 Â |
|------|---------|

Â

3

Â

3 17 7 a 1 match ‡ IP a 1 VRF 1 Â

```

1 à      set vrf 3 ~ VRF      Â set VRF
a ~ ‡      Â VRF      √ √
      VRF      set ≠      Â
Â      set vrf      VRF a ~ ‡ '
      % route-map' VRF table vrf-name does not exist.
Â VRF      √      route-map      set vrf ~      Ю'
      % route-map' set vrf vrf-name configuration removed from all
      route-maps.

2 à      √      ~ a √      set vrf set ip
next-hop à set ip next-hop verify-availability √ √ √ set
vrf set ip tos à set ip precedence à set ip dscp Â
∫      set vrf 3 ~ ∞ √
      a      Â
      √      '
Â "I set ip next-hop "A

```

| | |
|-------------------------|----------------|
| route-map | ᄇ |
| match ip address | ᄇ |
| match length | ᄇ IP |
| ip vrf receive | vrf_name ᄇ VRF |

ᄇ ᄇ ᄇ ᄇ

| | | |
|-----------|-----------|-----|
| ᄇ | ᄇ | ᄇ ᄇ |
| RGOS 10.4 | RGOS 10.4 | ᄇ ᄇ |

32.1.33 set ip next-hop

ᄇ match ᄇ ᄇ IP ᄇ ᄇ **set ip next-hop** ᄇ

ᄇ **no** ᄇ ᄇ ᄇ ᄇ

set ip next-hop *ip-address* [*weight*] [...*ip-address* [*weight*]]

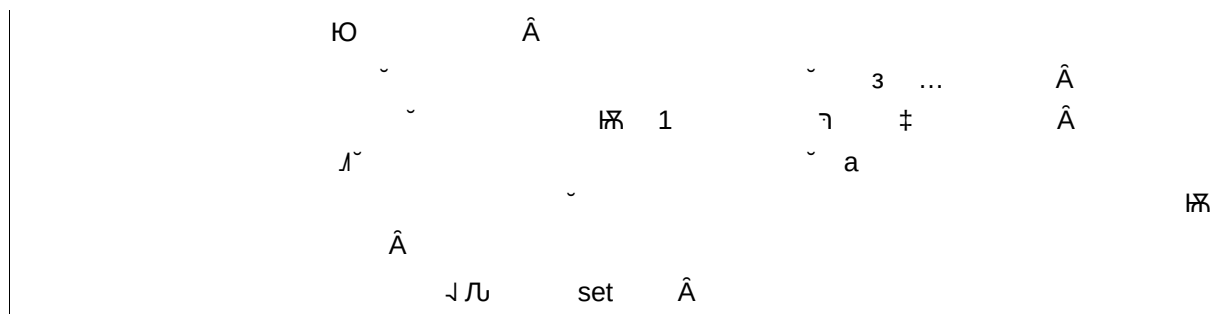
no set ip next-hop *ip-address* [*weight*] [...*ip-address* [*weight*]]

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

ᄇ ᄇ

ᄇ ᄇ

| | | |
|-----------------------------------|----------------------------------|-------------|
| set ᄇ ᄇ | ᄇ WCMP | ᄇ WCMP |
| ᄇ | ᄇ | weight WCMP |
| ᄇ | | |
| set ip next-hop ᄇ ᄇ ᄇ IP ᄇ | a 32 ᄇ | |
| ip address ᄇ ᄇ weight ᄇ ᄇ | a 4 nexthop ᄇ | |
| | next-hop ᄇ weight ᄇ set ᄇ | |
| ᄇ | ᄇ WCMP | ᄇ WCMP |
| ᄇ | weight nexthop ᄇ ᄇ weight | |
| ᄇ 1 ᄇ | | |
| | ᄇ ᄇ | ᄇ ᄇ |
| | ᄇ | ᄇ |



Ruijie(config)#**interface serial 1/0**
 Ruijie(config-if)#**ip policy route-map load-balance**
 Ruijie(config)#**access-list 10 permit 10.0.0.0 0.255.255.255**
 Ruijie(config)#**access-list 20 permit 172.16.0.0 0.0.255.255**
 Ruijie(config)#**route-map load-balance permit 10**
 Ruijie(config-route-map)#**match ip address 10**
 Ruijie(config-route-map)#**set ip next-hop 192.168.100.1**
 Ruijie(config)#**route-map load-balance**

7020-30

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

32.1.34 set ip next-hop verify-availability

Ю IP ↓ ~ 3 set ip next-hop
verify-availability ^ 3 no ^ 3 ^

set ip next-hop verify-availability *ip-address* track *track-obj-num*

no set ip next-hop verify-availability *ip-address* track *track-obj-num*

| | |
|----------------------|------|
| | |
| <i>ip-address</i> | Ю IP |
| <i>track-obj-num</i> | 1 |

^

3

^

ЛуЮ ~ serial 1/0 Э ^ 10.0.0.0/8
~ 192.168.100.1' и 172.16.0.0/16
~ 172.16.100.1' ё ^

```
Ruijie(config)#interface serial 1/0
Ruijie(config-if)#ip policy route-map load-balance
Ruijie(config)#access-list 10 permit 10.0.0.0 0.255.255.255
Ruijie(config)#access-list 20 permit 172.16.0.0 0.0.255.255
Ruijie(config)#route-map load-balance permit 10
Ruijie(config-route-map)#match ip address 10
Ruijie(config-route-map)#set ip next-hop 192.168.100.1
Ruijie(config)#route-map load-balance permit 20
Ruijie(config--route-map)#match ip address 20
Ruijie(config-route-map)#set ip next-hop 172.16.100.1
Ruijie(config)#route-map load-balance permit 30
Ruijie(config-route-map)#set interface Null 0
```

| | | |
|---|---|--|
| 3 | 3 | |
|---|---|--|

| | |
|--------------------------------|--------|
| route-map | № |
| match ip address | 7 |
| set default interface | ~ |
| set default interface | ~ |
| set interface | |
| set ip default next-hop | Ю IP ~ |
| set ip precedence | IP "I |

A

| | | |
|---|---|---|
| 3 | И | |
| | - | - |

32.1.35 set ip precedence

7 match ± IP "I , 3 set ip precedence Â 3 no ~ "I Â

set ip precedence {<0-7> | *critical* | *flash* | *flash-override* | *immediate* | *internet* | *network* | *priority* | *routine* }

no set ip precedence {<0-7> | *critical* | *flash* | *flash-override* | *immediate* | *internet* | *network* | *priority* | *routine* }

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

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| | |
|---------|--------------------------------|
| IP "I | IP a J "I Â |
| ± ~ J Ю | set ip precedence 3 ~ J |
| ~ 3 J | IP "I Â |

Ю ~ ÿ FastEthernet 0/0

```

precedence 4
Ruijie(config)#access-list 1 permit 192.168.217.68 0.0.0.0
Ruijie(config)#route-map name
Ruijie(config-route-map)#match ip address 1
Ruijie(config-route-map)#set ip precedence 4
Ruijie(config)#interface FastEthernet 0/0
Ruijie(config-if)#ip policy route-map name

```

3

| 3 | |
|-----------------------|--------|
| match interface | 7 IO |
| match ip address | 7 |
| match ip next-hop | 7 IO |
| match ip route-source | 7 |
| match metric | 7 |
| match route-type | 7 |
| match tag | 7 |
| set metric-type | ↑ |
| set tag | ↑ |
| set ip tos | IP tos |

4

3

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

32.1.36 set ip tos

```

7 match 3 IP TOS, 3 set ip tos
3 no ~ tos

```

```

set ip tos {<0-15> | max-reliability | max-throughput | min-delay | min-monetary-cost |
normal }

```

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| | - | - |
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| 3 | Â |
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|---|----|-----|----|-----|---|
| | IP | TOS | IP | a ↓ | ↳ |
| ↓ | Â | | | | |
| | ↑ | IP | Э | TOS | Â |

Лю ~ ÿ fastEthernet 0/0 ÿ 192.168.217.68

tos ÿ 4Â

Ruijie(config)#**access-list 1 permit 192.168.217.68 0.0.0.0**

Ruijie(config)#**route-map name**

Ruijie(config-route-map)#**match ip address 1**

Ruijie(config-route-map)#**set ip tos 4**

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

Ruijie(config-if)#**ip policy route-map SD4** #00.59.01.98.4 87629A71440D.94 re4

32.1.37 set level

7 match 4
 3 no 4 set level 4

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

no set level

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

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| | | 4 |
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| 3 | | 4 |
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| | | |
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7Ю 4 OSPF 7 RIP backbone 4 4

Ruijie(config)# **router ospf**

Ruijie(config-router)# **redistribute rip subnets route-map redrip**

Ruijie(config-router)# **network 192.168.12.0 0.0.0.255 area 0**

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

Ruijie(config)# **route-map redrip permit 10**

Ruijie(config-route-map)# **set level backbone**

| | | |
|-----------------------|---|---|
| | 3 | |
| match interface | 7 | Ю |
| match ip address | 7 | |
| match ip next-hop | 7 | Ю |
| match ip route-source | 7 | |
| match metric | 7 | |
| match route-type | 7 | |
| match tag | 7 | |
| set metric-type | | 7 |
| set tag | | 7 |

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|---|--|--|
| 4 | | |
|---|--|--|

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

32.1.38 set local-preference

3 match 3 LOCAL_PREFERENCE 3 set
 local-preference 3 no 3

set local-preference *number*

no set local-preference

| | | |
|--|---------------|---------------------|
| | | |
| | <i>number</i> | "1 3 ' 0-4294967295 |

| | |
|--|---|
| | 3 |
|--|---|

| | |
|---|---|
| 3 | 3 |
|---|---|

| | | | |
|--|---|----------------------|--------------------|
| | 3 | local-preference 3 a | local-preference 3 |
| | 3 | 3 | "1 3 |

```
Ruijie(config)# route-map SET_PREF permit 10
Ruijie(config-route-map)# match as-path 1
Ruijie(config-route-map)# set local-preference 6800
Ruijie(config-route-map)# exit
Ruijie(config)# route-map SET_PREF permit 20
Ruijie(config-route-map)# match as-path 2
Ruijie(config-route-map)# set local-preference 50
```

| | | |
|---|---------------------|-----------|
| 3 | 3 | |
| | match as-path | 3 AS_PATH |
| | match metric | 3 |
| | match origin | 3 |
| | set as-path prepend | 3 AS_PATH |
| | set metric | 3 |
| | set metric-type | 3 |

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32.1.39 set metric

match $\neq$ $\sim$ **set metric** $\hat{A}$ $\{$
no $\hat{A}$

set metric [+ *metric-value* | - *metric-value* | *metric-value*]

no set metric

| + | $\uparrow^{\wedge}$ metric $\exists$ $\uparrow^{\sim}$ |
|---------------------|--|
| - | $\wedge$ metric $\exists$ $\sim$ |
| <i>metric-value</i> | $\uparrow$ |

a 1

 $\uparrow$

a

 $\hat{A}$

3

 $\hat{A}$

set metric $\hat{A}$ $\{$ + $\uparrow^{\wedge}$ | - $\uparrow^{\sim}$ metric $\exists$ $\uparrow^{\sim}$ $\hat{A}$ $\}$
 RIP $\uparrow^{\sim}$ $\hat{A}$ $\sim$ metric $\uparrow$ $\hat{A}$ $\{$ 1-16 $\hat{A}$
 $\downarrow$ $\hat{A}$ $\uparrow$ $\hat{A}$ $\downarrow$ OSPF $\uparrow$ $\hat{A}$
 OSPF $\hat{A}$ $\uparrow$ $\downarrow$ RIP $\neq$ $\downarrow$ RIP $\uparrow$ $\hat{A}$
 $\uparrow$ $\sim$ $\wedge$ route maps $\sim$ $\sim$ 4
 $\uparrow$ $\neq$ $\hat{A}$
 $\neq$ $\sim$ $\downarrow$ 1 **match** $\{$ 1 **set** $\{$ $\hat{A}$
match $\{$ $\neq$ $\neq$ $\hat{A}$

100

 $\sim$ OSPF $\uparrow$ RIP $\sim$ $\uparrow$ $\hat{A}$ 40 $\hat{A}$

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

```
Ruijie(config-router)# redistribute rip subnets route-map redrip
```

```
Ruijie(config-router)# network 192.168.12.0 0.0.0.255 area 0
```

```
Ruijie(config-router)# exit
```

```
Ruijie(config)# route-map redrip permit 10
```

```
Ruijie(config-route-map)# set metric 40
```

| 3 | |
|-------------------|------|
| match interface | 7 10 |
| match ip address | 7 |
| match ip next-hop | 7 10 |

↑ ~ ^ route maps~ ~ 4
↑ v 8 Â

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

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7 match 4
3 no 4 3 set origin 4

set origin {egp | igp | incomplete}

no set origin

| egp | EGP |
|------------|-----|
| igp | IGP |
| incomplete | a |

4

3

4

4

4

3

7

4

```
Ruijie(config)# route-map SET_ORIGIN 10 permit
Ruijie(config-route-map)# match as-path 1
Ruijie(config-route-map)# set origin igp
Ruijie(config-route-map)# exit
Ruijie(config)# route-map SET_ORIGIN 20 permit
Ruijie(config-route-map)# match as-path 2
Ruijie(config-route-map)# set origin egp
```

3

| 3 | |
|----------------------|-----------|
| match as-path | 7 AS_PATH |
| match metric | 7 |
| match origin | 7 |
| set as-path prepend | 7 AS_PATH |
| set metric | 7 |
| set local-preference | 7 7 |

4

3

7

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|---|---|---|
| 3 | | |
| | - | - |

32.1.43 set originator-id

7 match 4
 3 no 1 set originator-id 1

set originator-id *ip-addr*

no originator-id [*ip-addr*]

| | | |
|--|----------------|--|
| | | |
| | <i>ip-addr</i> | |

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

| | |
|---|---|
| 3 | 1 |
|---|---|

| | | | |
|--|---|---|---|
| | 3 | 7 | 1 |
|--|---|---|---|

| | |
|--|--|
| | Ruijie(config)# route-map SET_ORIGIN 10 permit |
| | Ruijie(config-route-map)# match as-path 1 |
| | Ruijie(config-route-map)# set originator-id 5.5.5.5 |
| | Ruijie(config-route-map)# exit |
| | Ruijie(config)# route-map SET_ORIGIN 20 permit |
| | Ruijie(config-route-map)# match as-path 2 |
| | Ruijie(config-route-map)# set originator-id 5.5.5.6 |

| | | |
|---|-----------------------------|-----------|
| | 3 | |
| 3 | match as-path | 7 AS_PATH |
| | match metric | 7 |
| | match origin | 7 |
| | set as-path prepend | 7 AS_PATH |
| | set metric | 7 |
| | set local-preference | 7 7 |

| |
|---|
| 4 |
|---|

| | | |
|---|----|---|
| 3 | 11 | |
| | - | - |

```

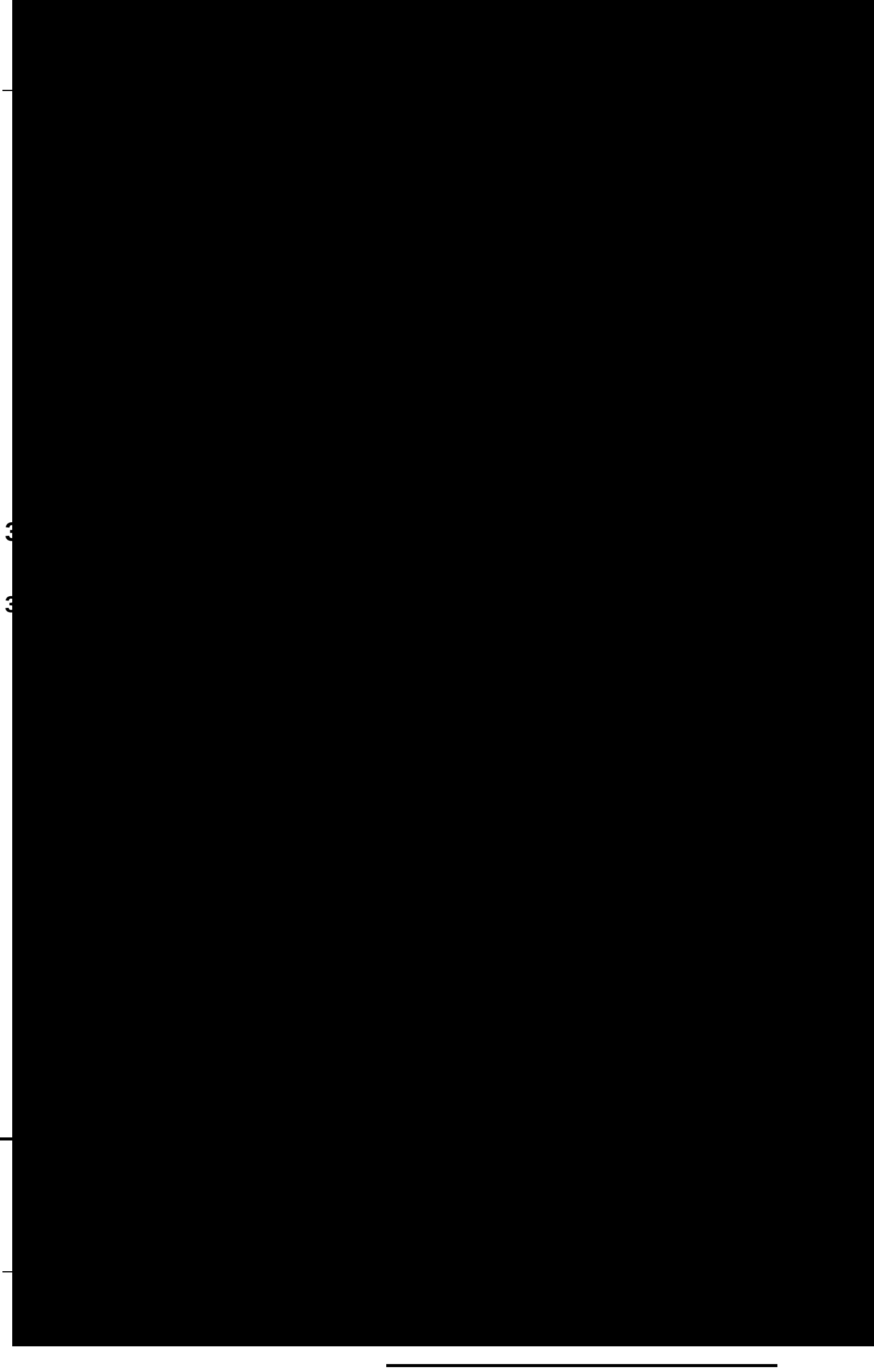
      7  match  ‡
          Â
      3  set tagÂ  3  no

```

| | | |
|--|------------|---|
| | | |
| | <i>tag</i> | x |

$$\{ \downarrow \quad \uparrow \quad \hat{A} \quad \tilde{\downarrow} \quad \hat{A}$$

| | |
|---|--|
| 3 | |
|---|--|



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```
permit 0:10
deny 0:20
```

3

| 3 | |
|----------------------|-----|
| match community | 7 |
| set comm-list delete | BGP |

1

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

32.2.2 show ip prefix-list

show ip prefix-list 3 ^

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

| <i>prefix-name</i> | 1 |
|--------------------|---|

^

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```
Ruijie# show ip prefix-list
ip prefix-list pre: 2 entries
seq 5 permit 192.168.64.0/24
seq 10 permit 192.2.2.0/24
```

3




```

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 3

Ю'

| | <p>Â ↓ ↓ ÿ'</p> <p>C' ,</p> <p>S' ,</p> <p>R' RIP ,</p> <p>B' BGP ,</p> <p>O' OSPF ,</p> <p>ī IS-IS Â</p> |
|--------------|---|
| O | |
| | <p>Â ↓ ↓ ÿ'</p> <p>E1' OSPF " ,</p> <p>E2' OSPF ~ ,</p> <p>N1' OSPF NSSA 1'</p> <p>N2' OSPF NSSA 2'</p> <p>IA' OSPF ,</p> <p>su' IS-IS ,</p> <p>L1' IS-IS 1 ,</p> <p>L2' IS-IS 2 ,</p> <p>ia' IS-IS Â</p> |
| E2 | |
| 20.0.0.0/8 | |
| [1/0] | , |
| Via 20.0.0.1 | Ю IP |
| 00:00:06 | |
| VLAN 1 | Ю |

2' ЛЮ ÿ **show ip route network** 3

Ruijie# **show ip route 30.0.0.0**

Routing entry for 30.0.0.0/8

Distance 110, metric 20

Routing Descriptor Blocks:

*192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF, extern 2

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

Routing Descriptor
Blocks

à

Ю

IP

à

à

```
metric 10
```

33

33.1

ЛЮ 3'

33.1.1 protected-ports route-deny

Ю 3 3 Â

protected-ports route-deny

no protected-ports route-deny

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

б

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а 3 Â show running-config 3 Â

Ruijie(config)# **protected-ports route-deny**

| | | |
|---------------------|-----|-----|
| 3 | | |
| show running-config | 3 3 | 3 Â |

1

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

8 Â 3 no

8 П Â

storm-control {**broadcast** | **multicast** | **unicast**} [{**level percent** | **pps packets** | **rate-bps**}]**no storm-control** {**broadcast** | **multicast** | **unicast**} [{**level percent** | **pps packets** | **rate-bps**}]

| broadcast | 8 П Â |
|------------------|------------------------------|
| multicast | ↓ 8 П Â |
| unicast | ↓ 8 П Â |
| <i>percent</i> | Л 1 20 20% |
| <i>packets</i> | Л pps й æ packets per second |
| <i>Rate-bps</i> | Â |
| <i>64k-2M</i> | Л 64k й æ Â |
| <i>2-100M</i> | Л 1M й æ Â |
| <i>100M Л Э</i> | Л 8M й æ Â |

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|---|---|---|
| 3 | 1 | |
| | - | - |

33.1.3 switchport protected

3 5 1 3 no 1

switchport protected

no switchport protected

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

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3 5 1 Ю а γ 1/1
3 6 1/1 1 show interfaces 3
1

Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport protected

| | | |
|---|-----------------|---|
| 3 | 3 | |
| | show interfaces | 1 |

1 -

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

33.1.4 switchport port-security

П ~ Â 3 no ~
Â

switchport port-security [violation {protect | restrict | shutdown}]

no switchport port-security [violation]

| port-security | |
|---------------------------|----------------|
| violation protect | ~ ‡ Â |
| violation restrict | ~ ‡ 3 trap Â |
| violation shutdown | ~ ‡ à Trap 3 Â |

Â

3

~ ↓Л 8 Э MAC Л IP(↓
) ш 8 Â й (П)
Л ~ ‡ й а è Â
~ ↓Л 8 Э й 1
3 й ~ ‡ ^ è й М ~
Â

Ю Gigabitethernet 1/1 Э П ~ й
shutdown'
Ruijie(config)# **interface gigabitethernet 1/1**
Ruijie(config-if)# **switchport port-security**
Ruijie(config-if)# **switchport port-security violation shutdown**

| 3 | |
|---------------------------|---|
| show port-security | Â |

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| - | - |

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33.1.5 switchport port-security aging

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|---|--------------------------------|---|
| | switchport port-security aging | |
| | show port-security | |
| 1 | | |
| 3 | 1 | |
| | - | - |

33.1.8 switchport port-security maximum

no 1

switchport port-security maximum *value*

[no] switchport port-security maximum

| | | |
|--|-------|-------|
| | | |
| | value | 1-128 |

128

3

|| 128

1' 10 12'

```
Ruijie(config)#inter g0/10
Ruijie(config-if)# switchport port-security maximum 2
```

| | | |
|---|--------------------------------------|---|
| 3 | 3 | |
| | switchport port-security | |
| | switchport port-security binding | |
| | Switchport port-security mac-address | Ю |
| | switchport port-security aging | |

| | | |
|---|--------------------|---|
| | show port-security | |
| ✓ | | |
| 3 | 11 | |
| | - | - |

33.1.9 switchport port-security mac-address

Ю ~ no

[no] switchport port-security mac-address *mac-address* [*vlan vlan-id*]

| | |
|--------------------|-------------------------------|
| | |
| <i>mac-address</i> | |
| <i>vlan-id</i> | MAC VID
' TRUNK IO vlan-id |

3

```

1'      TRUNK      10      00d0.f800.5555 VID=2'
Ruijie(config)#inter g0/10
Ruijie(config-if)#      switchport      port-security      mac-address
00d0.f800.5555 vlan 2

```

| | | |
|---|--|----|
| 3 | 3 | |
| | switchport port-security | |
| | switchport port-security binding | |
| | switchport port-security mac-address interface | 10 |
| | switchport port-security aging | |

| | | |
|---|---------------------------|---|
| | show port-security | |
| 1 | | |
| 3 | 1 | |
| | - | - |

33.1.11 switchport port-security sticky mac-address

IO Sticky MAC no

[no] **switchport port-security mac-address sticky *mac-address* [vlan *vlan-id*]**

a Sticky MAC no Sticky MAC

[no] **switchport port-security mac-address sticky**

| | | | | | |
|--------------------|-----|-------|----|--|---------|
| | | | | | |
| <i>mac-address</i> | | | | | |
| <i>vlan-id</i> | MAC | VID | | | |
| | | TRUNK | IO | | vlan-id |

Sticky MAC IO

3

```

1 10 Sticky MAC
Ruijie(config)#inter g0/10
Ruijie(config-if)# switchport port-security
Ruijie(config-if)# switchport port-security sticky mac-address
Ruijie(config-if)# end
2 TRUNK 10 Sticky 00d0.f800.5555 VID=2
Ruijie(config)#inter g0/10
Ruijie(config-if)# no switchport port-security sticky mac-address

```

| | | |
|---|--|---|
| 3 | | |
| | switchport port-security | |
| | switchport port-security binding | |
| | Switchport port-security mac-address | Ю |
| | switchport port-security mac-address interface | Ю |
| | switchport port-security aging | |
| | show port-security | |

4

| | | |
|---|--------------|-----------------------|
| 3 | 11 | |
| | RGOS 10.4(3) | Sticky MAC 11 10.4(3) |

33.2

33.2.1 show storm-control

8 Â

show storm-control [*interface-id*]

| | | |
|---------------------|-----|--|
| | | |
| <i>interface-id</i> | 8 Â | |

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```
Ruijie# show storm-control gigabitethernet 1/1
Interface Broadcast Control Multicast Control Unicast Control
-----
Gi1/1 Disabled Disabled Disabled
```

| | | |
|---|---------------|-----|
| 3 | 3 | |
| | storm-control | 8 Â |
| 1 | | |
| 3 | 11 | |
| | - | - |

33.2.2 show port-security

Â

show port-security [address] [interface *interface-id*] [all]

| | | |
|--|-------------------------------|---|
| | | |
| | address | Â |
| | interface <i>interface-id</i> | Â |
| | all | Â |

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```

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

```

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| | switchport port-security | À |
| | switchport port-security aging | Ï Æ |
| | switchport port-security mac-address | À |

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34.1.3 dot1x auto-req req-interval

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dot1x auto-req req-interval interval

no dot1x auto-req req-interval

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| | | |
| | interval | 3 5 S |

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3 || 5 show dot1x auto-req 3 7
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Ю 802.1x 5 60s
Ruijie# **configure terminal**
Ruijie(config)# **dot1x auto-req req-interval 60**
Ruijie(config)# **end**
Ruijie# **show dot1x auto-req**
Auto-Req: Enabled
User-Detect : Enabled
Packet-Num : 0
Req-Interval: 60 Second

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| 3 | 3 | |
| | show dot1x auto-req | 3 Â |

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34.1.4 dot1x auto-req user-detect

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dot1x auto-req user-detect

no dot1x auto-req user-detect

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Ÿ || ~ √ √ show dot1x auto-req 3 π
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Ю Ÿ Э √
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

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|----------------------------|--------|
| 3 | |
| show dot1x auto-req | Ÿ Â |

34.2.1 dot1x timeout quiet-period

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dot1x timeout quiet-period *seconds*

no dot1x timeout quiet-period

| <i>seconds</i> | Å 0 65535 Å Æ s |
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Å a ~ Å ¼ **show dot1x**

```

Ю ì 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
```

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| | show dot1x | 802.1x Â |
| 4 | | |
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34.2.2 dot1x timeout re-authperiod

Â 3 no Ñ 3 Â

dot1x timeout re-authperiod *seconds*

no dot1x timeout re-authperiod

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|--|---------|-----------------|
| | | |
| | seconds | Â 0 65535Â Æ sÂ |

3600

3 Â

↓ 3 show dot1x 3 802.1x Â

```

Ю Ñ 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 2Request: 3 times
Filter Non-RG Supp: Disabled
Client Oline Probe: Disabled
Eapol Tag Enable: Disabled
Authorization Mode: Group Server

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| 3 | 3 | |
| | show dot1x | 802.1x |

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34.2.3 dot1x timeout server-timeout

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| | |
| seconds | 0 65535 A |

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↓ 3 show dot1x 3 802.1x A

Ю L ñ 10s
Ruijie# configure terminal


```
Ruijie(config)# dot1x timeout server-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:    3 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
```

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| | | |
| 3 | 3 | |
| | show dot1x | 802.1x |

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| 3 | 11 | |
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34.2.4 dot1x timeout supp-timeout

$\hat{A}$ $\hat{A}$ no $\hat{A}$

dot1x timeout supp-timeout *seconds*

no dot1x timeout supp-timeout

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| | |
| <i>seconds</i> | 0 65535 Å |

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34.2.5 dot1x timeout tx-period

3 no 10 3 10

dot1x timeout tx-period seconds

no dot1x timeout tx-period

| seconds | 0 65535 |
|---------|---------|

3 10

3 10

↓ 802.1X **show dot1x** 3 802.1X 10

```

Ю 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

```

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| 3 | 3 | |
| | show dot1x | 802.1x Â |

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| 3 | 1 | |
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34.3 dot1x

34.3.1 dot1x re-authentication

Â 3 Â 3 no

[no] dot1x re-authentication

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

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| 3 | |
| show dot1x | 802.1x Â |

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```
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
```

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| | show dot1x | 802.1x Å |
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34.4 dot1x

34.4.1 dot1x probe-timer

| | | |
|---|--|-------|
| | interval | hello |
| | alive | |
| | interval | |
| | Hello 30 ' 250 ^ | |
| 3 | ^ | |
| | ~ ↓ 802.1x ^ | |
| | 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 | |
| 3 | 3 | |
| | Show dot1x probe-timer | ^ |
| 4 | | |
| 3 | 1 | |
| | - | - |

34.4.2 dot1x client-probe enable

```

[no] dot1x client-probe enable

```

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```
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
```

```
Client Oline Probe:  Enabled
Eapol Tag Enable:    Disabled
Authorization Mode:   Group Server
```

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show dot1x

dot1x ^

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34.5.1 dot1x authentication

```
AAA <CR> <CR> AAA <CR>
  ^      3 no      ^      3
```

dot1x authentication {default | list-name}

no dot1x authentication {default | list-name}

| default | 1 ^ |
|------------------|-----|
| <i>list-name</i> | 1 ^ |

```
AAA <CR> AAA <CR>
```

```
3 ^
```

```
AAA <CR> 3 dot1x 8 ^
```

```
IO      3      group radius ^
Ruijie# configure terminal
Ruijie(config)# aaa new-model
Ruijie(config)# aaa authentication dot1x default group radius
Ruijie(config)# interface fastEthernet0/1
Ruijie(config-if)# dot1x authentication default
Ruijie(config-if)# end
```

| 3 | |
|---------------------------------|----------|
| aaa new-model | AAA <CR> |
| aaa authentication dot1x | |

```
1
```

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3 802.1X ^ 3 no ↓ ^

dot1x auth-address-table address *mac-addr* **interface** *interface*

no dot1x auth-address-table address *mac-addr* **interface** *interface*

| | |
|------------------|-----|
| | |
| <i>mac-addr</i> | ↓ ^ |
| <i>Interface</i> | ^ ^ |

↓ ^

3 ^

↓ 802.1X ^ **show dot1x auth-address**
table 3 ^

Ю 3 7 ^
Ruijie# **configure terminal**
Ruijie(config)# **dot1x auth-address-table address**
00d0f8000000 **interface ethernet 1/1**
Ruijie(config)# **end**
Ruijie#

| | |
|--------------------------------------|----------|
| 3 | |
| show dot1x auth-address-table | 802.1X ^ |

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↓ ∪ **show dot1x** } Â

```
Ruijie# configure terminal
```

```
Ruijie(config)# dot1x auth-fail max-attempt E9Bù
```

↓ル show dot1x interface 3 ^

Ю 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

| | | |
|---|----------------------|----------|
| 3 | 3 | |
| | show dot1x interface | 802.1x ^ |

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|---|---------|---|
| 3 | 11 | |
| | 10.3(5) | 3 |

34.5.5 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

3 ^

↓ル show dot1x 3 802.1x ^

Ю 802.1x '

```
Ruijie# configure terminal
Ruijie(config)# dot1x auth-mode chap
Ruijie(config)# end
Ruijie#
```

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| 3 | 3 | |
| | show dot1x | 802.1x Â |

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| 3 | 11 | |
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34.5.6 dot1x default

802.1x ↑ Â

dot1x default

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↓ 3 show dot1x 3 802.1x Â

```
IO    802.1x    '
Ruijie# configure terminal
Ruijie(config)# dot1x default
Ruijie(config)# end
Ruijie# end
```

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|---|------------|-------------|
| 3 | 3 | |
| | show dot1x | 802.1x Â |

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| 3 | 1 | |
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dot1x dynamic-vlan <1 - 4094>

no dot1x guest-vlan

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| | | |
| | vid | <1 - 4094> |

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| | Â | ' | guest vlan | π | ~ | "l | dot1x dynamic-vlan enable | 3~ | | | |
| | | ‡ | guest vlan a | Â | | | | | | | |
| | Â | γ | ' | guest vlan | π | ~ | a | γ | ~ | è | |
| | | | π | vlan Â | | | | | | | |
| | Â | б | ' | ↓л | show running-config | 3 | 802.1x | Â | | | |

| | | | | |
|--|-----------------|----------------------------|------------|---|
| | Ю | 802.1x | guest vlan | ' |
| | Ruijie# | configure terminal | | |
| | Ruijie(config)# | dot1x guest-vlan 10 | | |
| | Ruijie(config)# | end | | |
| | Ruijie# | | | |

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|---|----------------------------|--------|---|
| 3 | | 3 | |
| | show running-config | 802.1x | Â |

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34.5.9 dot1x eapol-tag

EAPOL TAG π Â

dot1x eapol-tag

no dot1x eapol-tag

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| | й | |
| 3 | Â | |
| | ↓ √ show dot1x 3 802.1x Â | |
| | Ю 802.1X tag '
Ruijie# configure terminal
Ruijie(config)# dot1x eapol-tag
Ruijie(config)# end
Ruijie# | |
| 3 | 3 | |
| | show dot1x | 802.1x Â |
| √ | | |
| 3 | ∕ | |
| | - | - |

34.5.10 dot1x mac-auth-bypass

MAC Â

dot1x mac-auth-bypass**no dot1x mac-auth-bypass**

| | | |
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| | | |
| | | |
| | a MAC | |
| 3 | Â | |
| | ↓ √ show dot1x port-control interface 3 Â | |


```
IO      802.1x MAC
Ruijie# configure terminal
Ruijie(config)# interface fa 0/1
Ruijie(config-if)# dot1x mac-auth-bypass
Ruijie(config-if)# end
Ruijie#write
```

| | | | |
|---|-----------------------------------|--|-----------|
| 3 | 3 | | |
| | show dot1x port-control interface | | 802.1x Â |
| 1 | | | |
| 3 | 1 | | |
| | 10.3(5) | | 3 |

34.5.11 dot1x mac-auth-bypass timeout-activity

802.1x MAC Â

dot1x mac-auth-bypass timeout-activity value

no dot1x mac-auth-bypass timeout-activity

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| 3 | | |
| | show dot1x port-control interface | 802.1x ^ |
| 4 | | |
| 3 | 1 | |
| | 10.3(5) | 3 |

34.5.12 dot1x mac-auth-bypass violation

802.1x MAC ^

dot1x mac-auth-bypass violation
no dot1x mac-auth-bypass violation

| | | |
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| | | |
| | | |
| 3 | ^ | |
| | ↓ 3 show run 3 802.1x ^ | |
| | IO 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 | |
| 3 | | |
| | show dot1x port-control interface | 802.1x ^ |
| 4 | | |

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|---|---------|---|
| 3 | 1 | |
| | 10.3(5) | 3 |

34.5.13 dot1x max-req

DOT1X 1 2 DOT1X 1 2 3
 DOT1X 1 2 3 4 5 6 7 8
 3 no 4

dot1x max-req *count*

no dot1x max-req

| | | |
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| | | |
| | count | 4 |

3 4

3 4

↓ 3 **show dot1x** 3 802.1x 4

Ю 802.1x 7
 Ruijie# **configure terminal**
 Ruijie(config)# **dot1x max-req 7**
 Ruijie(config)# **end**
 Ruijie#

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| | show dot1x | 802.1x 4 |

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34.5.14 dot1x private-suppllicant-only

no

dot1x private-supplicant-only

no dot1x private-supplicant-only

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|------------------------------------|---|--------|--|
| show dot1x private-supplicant-only | 3 | 802.1x | |
|------------------------------------|---|--------|--|

| | |
|---|--|
| Ruijie# configure t | |
| Ruijie(config)# dot1x private-supplicant-only | |
| Ruijie(config)# end | |
| Ruijie# | |

| | | |
|------------------------------------|---|--|
| 3 | 3 | |
| show dot1x private-supplicant-only | | |

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34.5.15 dot1x port-control auto

no

dot1x port-control auto

no dot1x port-control

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a 7 802.1x ^

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↓ 7 **show dot1x** 3 802.1x ^

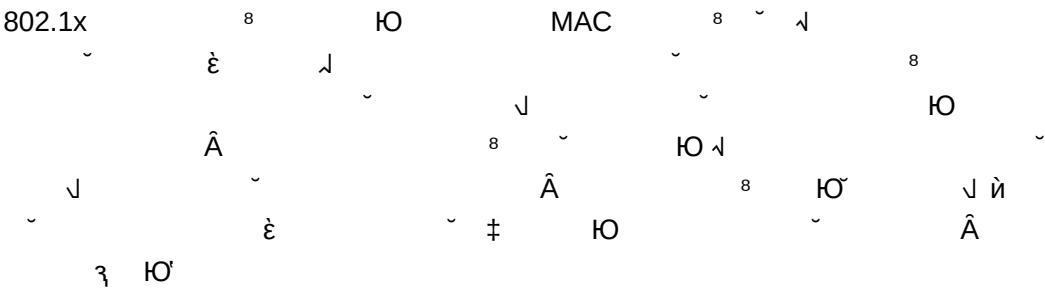
Ю 802.1x 6
Ruijie# **configure terminal**
Ruijie(config)# **interface g0/1**
Ruijie(config-if)# **dot1x port-control auto**
Ruijie(config-if)# **end**
Ruijie#

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| 3 | 3 | |
| | show dot1x | 802.1x ^ |

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34.5.16 dot1x port-control-mode



dot1x port-control-mode {mac-based | {port-based [single-host]} }

no dot1x port-control-mode

| | |
|-------------------|--------------|
| | |
| mac-based | mac 802.1X 8 |
| port-based | 802.1X 8 |

| | | |
|--|--------------------|----------|
| | single-host | 802.1x 8 |
|--|--------------------|----------|

й mac-based 8

3 Â

↓ Л show dot1x port-control 3 802.1x Â
 s26 Э 802.1X a ↓
 Ю 802.1X Э й Â
 single-host 802.1x 8~ **show dot1x port-control Э**
 й port-based **show running-config** й **dot1x port-control-mode**
port-based single-host Â
 single-host ↓ ~ || default-user-limit single-host
 Â single-host 1~ Ю default-user-limit
 single-host ~ ↓ Э Â

1' Ю 802.1x 6 '
 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#
 2' Ю 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#

| | | |
|---|--------------------------------|----------|
| 3 | 3 | |
| | show dot1x port-control | 802.1x Â |
| | Show running-config | Â |

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34.5.17 dot1x stationarity enable

802.1X 8 Ю Ю || √Л ~
 Ю и a ÿ 802.1X è ~ √Л ЛЮ 3
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dot1x stationarity enable

no dot1x stationarity enable

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| | и √Л Â | |
| 3 | Â | |
| | 3 ~ ‡ Â | |
| | Ю 802.1X 6 '
Ruijie# configure terminal
Ruijie(config)# dot1x stationarity enable
Ruijie(config)# end
Ruijie# | |
| 3 | 3 | |
| | - | - |
| √ | | |
| 3 | Л | |
| | - | - |

34.5.18 dot1x redirect url

~ 802.1X π ^ ~ ~
 ~ URL ~ ~ URL ~ Л http:// ~
 http://ruijie.net/web ~ √ http:// ~ a https:// Â √

url url no 3
url

dot1x redirect url [url-string]

[no] **dot1x redirect url**

| | |
|------------|-----|
| | |
| url-string | URL |

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1' ' ruijie.net/web'
Ruijie(config)# **dot1x redirect url** http://ruijie.net/web

| | |
|--|-------|
| | |
| dot1x redirect for special tcp-destination port | ip ip |
| dot1x redirect time-out | |
| dot1x redirect num for special source-ip | |
| show dot1x | dot1x |

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| | |
| ... | с |

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1' 5'

Ruijie(config)# **dot1x redirect time-out 5**

3

| 3 | |
|--|---------------|
| dot1x redirect url | web 5 ip 5 ip |
| dot1x redirect for special tcp-destination port | |
| dot1x redirect num for special source-ip | 1 |
| show dot1x | dot1x |

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

34.5.21 dot1x redirect num for special source-ip

1 1-10 1 no 1

3

dot1x redirect num for special source-ip num**no dot1x redirect num for special source-ip**

| num | |
|-----|--|

1

1' 3
Ruijie(config)# dot1x redirect num for special source-ip 3

3

| 3 | |
|---|---------------|
| dot1x redirect url | |
| dot1x redirect for special tcp-destination port | web 3 ip 3 ip |
| dot1x redirect time-out | |
| show dot1x | dot1x |

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

34.6 dot1x

34.6.1 show dot1x

802.1x 3

show dot1x

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

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```
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#
```



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34.6.2 show dot1x auth-address-table

3 802.1X ^

show dot1x auth-address-table[addressmac-addr][interface interface]

| | |
|-----------|---|
| | |
| mac-addr | ↓ |
| interface | ∧ |

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Ruijie# show dot1x auth-address-table
interface:g3/1

mac addr: 00D0.F800.0001
Ruijie#

| | |
|-------------------------|----------|
| 3 | |
| dot1x auth-mode | 802.1x ^ |
| dot1x max-req | ^ |
| dot1x port-control auto | ¶ ^ |
| dot1x reauth-max | |
| dot1x re-authentication | ^ |

dot1x timeout quiet-period

| | | |
|--|----------------------------|---|
| | dot1x timeout supp-timeout | Â |
| | dot1x timeout tx-period | Â |

4



| | |
|-------------------------------------|---|
| dot1x re-authentication | Â |
| dot1x timeout quiet-period | Â |
| dot1x timeout re-authperiod | Â |
| dot1x timeout server-timeout | Â |
| dot1x timeout supp-timeout | Â |

| | | |
|-------------------------------------|--------|---|
| dot1x auth-mode | 802.1x | Â |
| dot1x max-req | | Â |
| dot1x port-control auto | ¶ | Â |
| dot1x reauth-max | | |
| dot1x re-authentication | | Â |
| dot1x timeout quiet-period | Â | ¶ |
| dot1x timeout re-authperiod | | Â |
| dot1x timeout server-timeout | Â | £ |
| dot1x timeout supp-timeout | Â | |
| dot1x timeout tx-period | Â | ~ |

¶

max-req: 2 times

Ruijie#

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| 3 | |
|------------------------------|----------|
| dot1x auth-mode | 802.1x Â |
| dot1x max-req | Â |
| dot1x port-control auto | ¶ Â |
| dot1x reauth-max | |
| dot1x re-authentication | Â |
| dot1x timeout quiet-period | Â ¶ |
| dot1x timeout re-authperiod | Â |
| dot1x timeout server-timeout | Â ¶ |
| dot1x timeout supp-timeout | Â |
| dot1x timeout tx-period | Â |

¶

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| ¶ | |
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| - | - |

34.6.6 show dot1x port-control

6

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show dot1x port-control [interface *interface*]

```

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#

```

| 3 | |
|------------------------------|----------|
| dot1x auth-mode | 802.1x ^ |
| dot1x max-req | ^ |
| dot1x port-control auto | 71 ^ |
| dot1x reauth-max | |
| dot1x re-authentication | ^ |
| dot1x timeout quiet-period | 1
^ |
| dot1x timeout re-authperiod | ^ |
| dot1x timeout server-timeout | 4
^ |
| dot1x timeout supp-timeout | ^ |
| dot1x timeout tx-period | ^ |

1

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| 11 | |
|----|---|
| - | - |

34.6.7 show dot1x probe-timer

```
show dot1x probe-timer
```

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

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IO
Ruijie# **show dot1x probe-timer**
Hello Interval: 20 Seconds
Hello Alive: 250 Seconds
Ruijie#

| 3 | |
|----------------------------|----------|
| dot1x auth-mode | 802.1x Â |
| dot1x max-req | Â |
| dot1x port-control auto | 71 Â |
| dot1x reauth-max | |
| dot1x re-authentication | Â |
| dot1x timeout quiet-period | 1 |

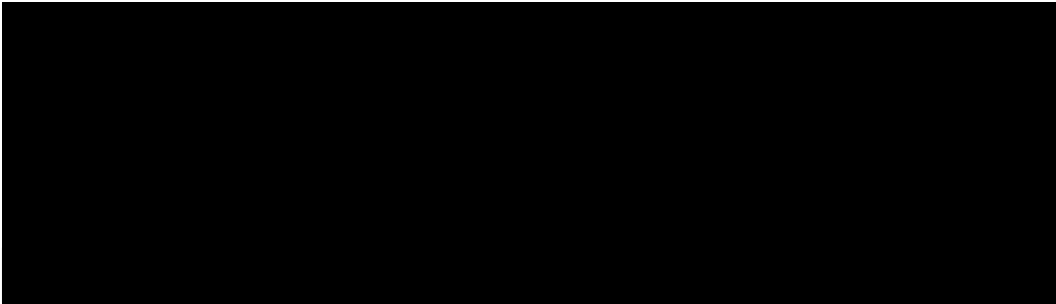
34.6.8 show dot1x re-authentication

show dot1x re-authentication

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| | - | - |

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|-----------------|--------|---|
| dot1x auth-mode | 802.1x | Â |
| dot1x max-req | | Â |

dot1x (port) control auto 5(ontrol au)6(to)Tf0 Tw 213F552/C2741C2_0Â T Tc 016E0 1 TF3 0.0741

dot1x reauth-max

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

34.6.9 show dot1x reauth-max

show dot1x reauth-max

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

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```

Ruijie# show dot1x reauth-max
reauth-max: 2 times
Ruijie#

```

| | | |
|---|------------------------------|----------|
| 3 | 3 | |
| | dot1x auth-mode | 802.1x Â |
| | dot1x max-req | Â |
| | dot1x port-control auto | 71 Â |
| | dot1x reauth-max | |
| | dot1x re-authentication | Â |
| | dot1x timeout quiet-period | 1
Â |
| | dot1x timeout re-authperiod | Â |
| | dot1x timeout server-timeout | 1
Â |

| | | |
|---|-----------------------------------|---|
| | dot1x timeout supp-timeout | Â |
| | dot1x timeout tx-period | Â |
| 1 | | |
| 3 | 1 | |
| | - | - |

34.6.10 show dot1x summary

3 802.1X

show dot1x summary

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| |
|--|

```

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#

```

| | | |
|---|------------------------|----------|
| 3 | 3 | |
| | dot1x auth-mode | 802.1x Â |
| | dot1x max-req | Â |

Mac address is 0013.2049.8272
 Vlan id is 217
 Access from port Gi0/13
 User ip address is 192.168.217.64
 Max user number on this port is 6000
 COS on this port is 5
 Up-bandwidth is 1024 kbps
 Down-bandwidth is 1024 kbps
 Authorization vlan is dep7
 Authorization session time is 1000000 seconds
 Authorization ip address is 192.168.217.64
 Start accounting
 Permit proxy user
 Permit dial user
 IP privilege is 2

3

| 3 | |
|-------------------------------------|---------------|
| dot1x auth-mode | 802.1x Â |
| dot1x max-req | Â |
| dot1x port-control auto | 71 Â |
| dot1x reauth-max | |
| dot1x re-authentication | Â |
| dot1x timeout quiet-period | 1
Â |
| dot1x timeout re-authperiod | Â |
| dot1x timeout server-timeout | 1
Â |
| dot1x timeout supp-timeout | Â |
| dot1x timeout tx-period | Â |

1

3

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

34.6.12 show dot1x timeout

3 802.1X

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

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| | |
| - | - |

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Ruijie# **show dot1x timeout quiet-period**

quiet-period: 60 sec

Ruijie#

| | | |
|-------------------------------------|--------|---|
| 3 | 3 | |
| dot1x auth-mode | 802.1x | Â |
| dot1x max-req | | Â |
| dot1x port-control auto | ¶ | Â |
| dot1x reauth-max | | |
| dot1x re-authentication | | Â |
| dot1x timeout quiet-period | Â | ∕ |
| dot1x timeout re-authperiod | | Â |
| dot1x timeout server-timeout | Â | £ |
| dot1x timeout supp-timeout | Â | |

| | | |
|---|-------------------------|---|
| | dot1x timeout tx-period | Â |
| ✓ | | |
| 3 | 1 | |
| | - | - |

34.7

34.7.1 dot1x redirect

Ю П ~ 3 dot1x redirect Â 3 no
Ю П Â

dot1x redirect

no dot1x redirect

| | | |
|---|---|---|
| | | |
| | - | - |
| | | |
| 3 | | |
| | | |
| | Ю Ю П ' Ruijie# configure terminal Ruijie(config)# dot1x redirect | |
| 3 | 3 | |
| | | |
| ✓ | | |

| | | |
|---|---------|---|
| 3 | 11 | |
| | 10.2(5) | 3 |

34.7.2 http redirect

no HTTP IP π $\hat{A}$ { http redirect $\hat{A}$ }

http redirect *ip-address*

no http redirect

[illegible]

HTTP IP

3

π $\parallel$ $\vee$ π $\sim$ HTTP IP $\hat{A}$
 HTTP $\sim$
 $\cup$ $\cup$ $\cup$ $\hat{A}$

```
Ruijie# configure terminal
Ruijie(config)# http redirect 172.16.0.1
Ruijie(config)# end
```

[illegible]

✓

| | | |
|---|---------|---|
| 3 | 1 | |
| | 10.2(5) | 3 |

34.7.3 http redirect direct-site

http redirect homepage *url-string*

no http redirect homepage

| | |
|-------------------|-----------------------------|
| | |
| <i>url-string</i> | Ю Ё ѣ ñ <i>url-string</i> Љ |

| | | |
|---|---|------------------------------|
| | port-session-num | ^ ~ Ю HTTP ~
√ 1-300 Â |
| | HTTP ~ 300 Â | HTTP ~ 255 Ю
HTTP ~ 300 Â |
| ? | | |
| | ~ Э 8 HTTP ~ TCP ~
HTTP Â
~ HTTP ~ È # √ ' HTTP
~ a HTTP ~ 1 Â | |
| | Ю HTTP ~ 4' | |
| | Ruijie# configure terminal
Ruijie(config)# http redirect session-limit 4 | |
| ? | | |
| | show http redirect | HTTP |
| ✓ | | |
| ? | Л | |
| | 10.2(5) | ? |

34.7.7 http redirect timeout

| | no | 3 s | 10 s | 30 s | 60 s |
|-------------------------------|------|------|------|------|------|
| http redirect timeout seconds | 0.98 | 0.97 | 0.96 | 0.95 | 0.94 |
| no http redirect timeout | 0.98 | 0.97 | 0.96 | 0.95 | 0.94 |

3

GET/HEAD HTTP TCP

Ruijie# **configure terminal**
 Ruijie(config)# **http redirect timeout 4**

3

show http redirect

HTTP

1

3

10.2(5)

3

34.7.8 show http redirect

HTTP

show http redirect

-

-

3

Ruijie# **show http redirect**
 HTTP redirection settings:
 server: 192.168.32.123
 port: 80 8000
 homepage: http://192.168.32.123:8888/ePortal/index.jsp


```
session-limit: 10
```

```
timeout:      5
```

Direct sites:

| Address | MASK | ARP Binding |
|---------------|-----------------|-------------|
| 61.233.3.215 | 255.255.255.255 | On |
| 61.233.3.220 | 255.255.255.255 | Off |
| 192.168.5.140 | 255.255.255.255 | Off |
| 218.30.66.101 | 255.255.0.0 | Off |
| 218.30.66.101 | 255.255.255.255 | Off |

3

| 3 | |
|-----------------------------|---------|
| http redirect | HTTP IP |
| http redirect direct-site | |
| http redirect homepage | Ю Е ъ |
| http redirect port | HTTP 1 |
| http redirect session-limit | 1 HTTP |
| http redirect timeout | |

1

3

| 1 | |
|---------|---|
| 10.2(5) | 3 |

35 Web

35.1 Web

35.1.1 http redirect

HTTP IP 11 ~ 3 http redirect 1 3 no

http redirect *ip-address*

no http redirect

| | |
|-------------------|------------|
| | |
| <i>ip-address</i> | HTTP IP 11 |

HTTP IP 11

3 11

11 Web 11 ~ HTTP IP 11

1' HTTP IP 11 172.16.0.1 11
Ruijie(config)# **http redirect 172.16.0.1**

| | |
|---|------------------------|
| | |
| 3 | show http redirect |
| | HTTP 11 |
| | http redirect homepage |
| | 11 11 |

11

| | |
|---|---------|
| | |
| 3 | 11 |
| | 10.2(5) |
| | 3 |

35.1.2 http redirect direct-site

Â ↓ ∪ 3 no Â

http redirect direct-site *ip-address* [*ip-mask*] [**arp**]

no http redirect direct-site *ip-address* [*ip-mask*]

| <i>ip-address</i> | IP Â |
|-------------------|---|
| <i>ip-mask</i> | IP Â |
| arp | ARP CHECK 11 ~ 8
ARP ~ arp
Â |

Â

3 Â

|| Web 11 "1 Web ~ Â
~ ≠ ↓ ∪ ~ 3 Â
~ 8 ↓ ∪ Â
50

1' IP ы 172.16.0.1 ы Â
Ruijie(config)# **http redirect direct-site** 172.16.0.1

| 3 | |
|---------------------------|--------|
| show http redirect | HTTP Â |

↓

| 3 | 11 |
|---------|----|
| 10.2(5) | 3 |

35.1.3 http redirect homepage

ŷ Â ↓ ∪ 3 no ŷ Â

http redirect homepage *url-string*

no http redirect homepage

| <i>url-string</i> | Ÿ ~ Л“http://” “https://” ~ ‡
a П ÿ 255 Â |
|-------------------|--|

Ÿ Â

3 Â

П Web П ~ Ÿ Â

1' Ÿ ÿ http://www.web-auth.net/login Â
 Ruijie(config)#
http redirect homepage http://www.web-auth.net/login

| 3 | |
|---------------------------|--------|
| show http redirect | HTTP Â |
| http redirect | Л IP Â |

√

| 3 | Л |
|---------|---|
| 10.2(5) | 3 |

35.1.4 http redirect port

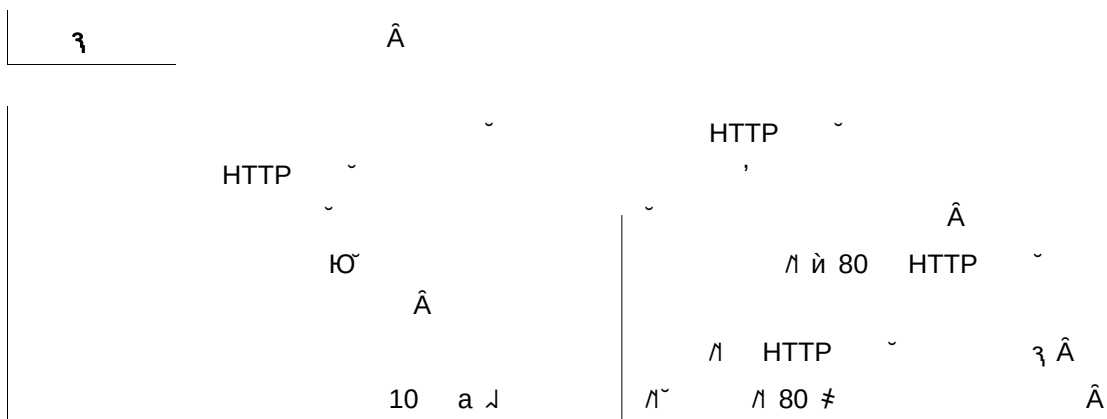
port 3 Â √Л 3 Л HTTP WEB ~ **http redirect**
 Л HTTP WEB

http redirect port *port-num*

no http redirect port *port-num*

| <i>port-num</i> | HTTP WEB Л Â |
|-----------------|--------------|

80 HTTP Â



HTTP и 255 Ю
HTTP и 300 А

$$\mathfrak{z} \quad \hat{A}$$

Итого: 100% (100%)

```
1' HTTP 4
Ruijie(config)# http redirect session-limit 4
```

GET/HEAD HTTP Â 8 ↓ √
a GET/HEAD TCP Â

| | | |
|---|--------------------------|-----------------|
| 3 | | |
| | show web-auth allow-vlan | VLAN Web VLAN ^ |
| 4 | - | |
| 3 | | |
| | 10.4(2b2) | 3 |

35.1.8 web-auth direct-host

IP ^ 3 no 4 ^

web-auth direct-host *ip-address* [*ip-mask*] [**port** *interface-name*] [**arp**]

no web-auth direct-host *ip-address*

| | |
|-----------------------------------|--|
| | |
| <i>ip-address</i> | IP ^ |
| <i>ip-mask</i> | IP ^ |
| port <i>interface-name</i> | IP 6 ^ |
| arp | ARP CHECK 7 ^ 8
IP ARP ^ arp |

| | |
|--|--------------|
| | ^ "l Web ^ 4 |
|--|--------------|

| | |
|---|---|
| 3 | ^ |
|---|---|

| | |
|--|------|
| | 50 ^ |
|--|------|

| | |
|--|--|
| | 1' IP 5 172.16.0.1 5 ^
Ruijie(config)# web-auth direct-host 172.16.0.1 |
|--|--|

| | | |
|---|---------------------------|-------|
| 3 | | |
| | show web-auth direct-host | web ^ |

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|---|---------|---|
| { | 1 | |
| | 10.2(5) | } |

35.1.9 web-auth offline-detect-mode flow

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Ю Â

web-auth offline-detect-mode flow

no web-auth offline-detect-mode flow

| | | |
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| | | |
| | | |

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

| | | |
|---|-----------|--------------|
| 3 | 1 | |
| | 10.2(5) | 3 |
| | 10.4(2b2) | ip-only-mode |

35.1.11 web-auth portal key

6 L 1 WEB 6 L 3 no 1

HTTP WEB 1 WEB 6 L 1

web-auth portal key *key-string*

no web-auth portal key

| | | |
|--|-------------------|-------|
| | | |
| | <i>key-string</i> | 6 L 1 |

| |
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| |
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11 Web 11 6 L 1

35.1.12 web-auth update-interval

Â ↓ ∪ 3 no

∪ 60 Â

web-auth update-interval *seconds*

no web-auth update-interval

| <i>seconds</i> | ~ ∅ ~ ∪ 30-3600 Â |
|----------------|-------------------|

∪ 60 Â

3 Â

∪ ~ ~ ~ ~ ~
 ∪ ~ ~ ~ ~ ~
 3 Â

1' ∪ 30 Â

Ruijie(config)# **web-auth update-interval 30**

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| - | - |

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| 3 ∪ | |
|---------|---|
| 10.2(5) | 3 |

35.2

35.2.1 show http redirect

HTTP Â

show http redirect

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1' HTTP ^

Ruijie# **show http redirect**

HTTP redirection settings:

server: 192.168.32.123

port: 80 8000

homepage: http://192.168.32.123:8888/ePortal/index.jsp

session-limit: 10

timeout: 5

Direct sites:

| Address | MASK | ARP Binding |
|---------------|-----------------|-------------|
| 61.233.3.215 | 255.255.255.255 | On |
| 61.233.3.220 | 255.255.255.255 | Off |
| 192.168.5.140 | 255.255.255.255 | Off |
| 218.30.66.101 | 255.255.0.0 | Off |
| 218.30.66.101 | 255.255.255.255 | Off |

Direct hosts:

| Address | Mask | Port | ARP Binding |
|---------|------|------|-------------|
|---------|------|------|-------------|

1' Â
Ruijie# show web-auth direct-host
Direct hosts:

| Address | Mask | Port | ARP Binding |
|--------------|-----------------|--------|-------------|
| ----- | | | |
| 192.168.0.1 | 255.255.255.255 | Fa0/2 | On |
| 192.168.4.11 | 255.255.255.255 | Fa0/10 | On |
| 192.168.5.0 | 255.255.255.0 | Fa0/16 | Off |

| Address | IP Â |
|-------------|------------------------------|
| Mask | IP Â |
| Port | 6 IP Â |
| ARP Binding | ARP Â |

| 3 | |
|----------------------|---------|
| web-auth direct-host | IP Â |

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| 10.2(5) | |

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35.2.4 show web-auth port-control

Ruijie# show web-auth user

Current user num : 4

| Address | Online | Time Limit | Time Used | Status |
|--------------|--------|-------------|-------------|---------|
| 192.168.0.11 | On | 0d 01:00:00 | 0d 00:15:10 | Active |
| 192.168.0.13 | On | 0 | 0d 00:00:59 | Active |
| 192.168.0.25 | Off | 0 | 0 | Create |
| 192.168.0.46 | Off | 0d 01:00:00 | 0d 01:00:00 | Destroy |

Ruijie# show web-auth user 192.168.0.11

Address : 192.168.0.11

Mac : 00d0.f800.2233

Port : Fa0/2

Online : On

Time Limit : 0d 01:00:00

Time Used : 0d 00:15:10

Time Start : 2009-02-22 20:05:10

Status : Active

9.18-6(show 3 TmW* n[<486(gm2 -166 2 51.7229BT)6 : 3 TmfQ[<486(gm30f766 2

| | | |
|--|---------|---|
| | 10.2(5) | 3 |
|--|---------|---|

36 AAA

36.1

36.1.1 aaa authentication dot1x

| | | |
|---|----------------------|----------|
| 3 | | |
| | aaa new-model | AAA E |
| | dot1x authentication | 802.1X 3 |
| | username | ✕ |

IO 10 AAA Enable 11 12 RADIUS 13 14 15

16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 1325 1326 1327 1328 1329 1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1340 1341 1342 1343 1344 1345 1346 1347 1348 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374 1375 1376 1377 1378 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1390 1391 1392 1393 1394 1395 1396 1397 1398 1399 1400 1401 1402 1403 1404 1405 1406 1407 1408 1409 1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1420 1421 1422 1423 1424 1425 1426 1427 1428 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439 1440 1441 1442 1443 1444 1445 1446 1447 1448 1449 1450 1451 1452 1453 1454 1455 1456 1457 1458 1459 1460 1461 1462 1463 1464 1465 1466 1467 1468 1469 1470 1471 1472 1473 1474 1475 1476 1477 1478 1479 1480 1481 1482 1483 1484 1485 1486 1487 1488 1489 1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1500 1501 1502 1503 1504 1505 1506 1507 1508 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519 1520 1521 1522 1523 1524 1525 1526 1527 1528 1529 1530 1531 1532 1533 1534 1535 1536 1537 1538 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1550 1551 1552 1553 1554 1555 1556 1557 1558 1559 1560 1561 1562 1563 1564 1565 1566 1567 1568 1569 1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1580 1581 1582 1583 1584 1585 1586 1587 1588 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599 1600 1601 1602 1603 1604 1605 1606 1607 1608 1609 1610 1611 1612 1613 1614 1615 1616 1617 1618 1619 1620 1621 1622 1623 1624 1625 1626 1627 1628 1629 1630 1631 1632 1633 1634 1635 1636 1637 1638 1639 1640 1641 1642 1643 1644 1645 1646 1647 1648 1649 1650 1651 1652 1653 1654 1655 1656 1657 1658 1659 1660 1661 1662 1663 1664 1665 1666 1667 1668 1669 1670 1671 1672 1673 1674 1675 1676 1677 1678 1679 1680 1681 1682 1683 1684 1685 1686 1687 1688 1689 1690 1691 1692 1693 1694 1695 1696 1697 1698 1699 1700 1701 1702 1703 1704 1705 1706 1707 1708 1709 1710 1711 1712 1713 1714 1715 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726 1727 1728 1729 1730 1731 1732 1733 1734 1735 1736 1737 1738 1739 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1750 1751 1752 1753 1754 1755 1756 1757 1758 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1770 1771 1772 1773 1774 1775 1776 1777 1778 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1790 1791 1792 1793 1794 1795 1796 1797 1798 1799 1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922

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AAA
aaa authentication login 3

AAA Login Â
Login Â

Login Login 3 a
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Ю RADIUS 1 1 list-1 AAA Login Â
RADIUS RADIUS 1
‡ Â
Ruijie(config)# **aaa authentication login list-1 group radius local**

| 3 | |
|-----------------|---------|
| aaa new-model 3 | AAA 1 7 |
| username | 13 |

AAA 3

| | | | | |
|--|-------|---------|---|--------|
| | local | 1 | | |
| | none | a | | |
| | group | 1 | 1 | RADIUS |
| | | TACACS+ | 1 | |

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AAA PPP

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AAA

PPP PPP

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|------------------|---------|---|
| default | ~ Login | Â |
| <i>list-name</i> | ⌘ Login | Â |

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Login Login ~ 3 Login a ~ Login

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Ю ⌘ 1 à list-1 AAA Login Â

Â 1 VTY 0 - 4 3 Â

~~Ruijie(config)# aaa authentication login list-1 local~~

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

Ruijie(config-line)# **login authentication list-1**

3

no aaa authorization commands level {default | list-name}

| <i>level</i> | 3 ~ 0~15 ̑
3 1 Â |
|------------------|-----------------------|
| default | ~ ‡ 1 ̑ ̑ ̑ ̑ ̑ |
| <i>list-name</i> | ̑ ̑ ̑ ~ 1 1 ̑ Â |
| <i>method</i> | ! none à group 1
4 |
| none | a |
| group | 1 ~ TACACS+ 1 |

AAA 3 1 ̑

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RGOS 1 ̑ ~ ̑ ~ AAA
 ̑ 1 ̑ ̑ ̑ ̑ ̑ ̑ ̑ ̑ ̑
 ̑ a ~ ̑ ̑ Â
 ̑ ̑ ̑ ̑ ~ ̑ ̑ ̑ ̑
 14 1 ̑ ̑ ~ ̑ ̑ 14 ~ Â
 ̑ ̑ ̑ ̑ ̑ ̑ ̑ ̑ ̑ a
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10 TACACS+ 1 15 ̑
 Ruijie(config)# **aaa authorization commands 15 default group tacacs+**

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|-------------------------------|-------|
| aaa new-model | AAA 1 |
| authorization commands | ̑ ̑ |

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| 1 | |
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| - | - |

36.2.2 aaa authorization config-commands

AAA ^ é ~ IO 3 ~
 3 aaa authorization config-commands Â 3 no AAA IO
 3 11 Â

aaa authorization config-commands

no aaa authorization config-commands

| | | |
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a IO 3 Â

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| | |
| - | - |
| a | 8 1 3 A |
| 3 | A |
| RGOS | W 8 1 e ~ 1 8 1 ~
3 A 8 1 3 1 3
3 a A |
| IO | 8 1 3 1 |
| Ruijie(config)# | aaa authorization console |
| | |
| 3 | |
| aaa new-model | AAA E |
| aaa authorization commands | AAA 3 |
| authorization commands | 3 3 |
| | |
| 1 | |
| | |
| 3 | |
| - | - |

36.2.4 aaa authorization exec

| AAA | NAS | CLI | Exec | ε | ε |
|-----|-------------------|------|------|---|----------|
| 3 | aaa authorization | exec | Â | 3 | no |
| | | | | | AAA Exec |
| | | | | | π |
| | | | | | Â |

```
aaa authorization exec {default | list-name} method1 [method2...]
```

no aaa authorization exec {default | *list-name*}

| | |
|------------------|---|
| | |
| default | <div> <div> ~ † J </div> <div> Exec </div> </div> |
| <i>list-name</i> | <div> <div> Exec </div> <div> ~ J L </div> </div> |

| | |
|---------------|--------------------------------|
| <i>method</i> | l' local à none à group L
4 |
| local | 1 |
| none | a |
| group | L ~
TACACS+ L RADIUS |

AAA Exec 11 Â

3 Â

RGOS NAS CLI ~ è CLI ^ 0~15 ~ Â
Login ~ Exec Â Exec ~ ‡
CLI Â
Exec 1~ è Exec 3~ ‡ a
Â

IO RADIUS L Exec '
Ruijie(config)# **aaa authorization exec default group radius**

| | |
|---------------------------|-------|
| 3 | |
| aaa new-model | AAA L |
| authorization exec | 3 |
| username | 18 |

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|---|---|--|
| 3 | 1 | |
| - | - | |

36.2.5 aaa authorization network

AAA L ^ PPP à SLIP ~ ~
3 **aaa authorization network** Â 3 no AAA 11 Â
aaa authorization network {default | list-name} method1 [method2...]
no aaa authorization network {default | list-name}

| default | ' ~ ‡ J Hÿ ÿ Network
Â |
|----------------|---------------------------|
| <i>method</i> | l' none à group L ~
4 |
| none | a |
| group | L ~ RADIUS
TACACS+ L |

AAA Network π Â

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RGOS L PPP ŠSLIP Â ~
 ‡ || Â
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 ↓ ~ ‡ a "A è ↓
 Â
 RADIUS TACACS+ L Â


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3 authorization exec^ 3

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The first part of the paper discusses the importance of the research and the need for a new approach to the study of the history of the world. The second part of the paper discusses the importance of the research and the need for a new approach to the study of the history of the world. The third part of the paper discusses the importance of the research and the need for a new approach to the study of the history of the world. The fourth part of the paper discusses the importance of the research and the need for a new approach to the study of the history of the world. The fifth part of the paper discusses the importance of the research and the need for a new approach to the study of the history of the world.

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| 3 | 11 | |
| | - | - |

36.3.2 aaa accounting exec

| | |
|----------------------------|--------|
| aaa new-model | AAA 4 |
| aaa authentication | AAA |
| accounting commands | 3 Exec |

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|---|---|--|
| 3 | 1 | |
| - | - | |

36.3.3 aaa accounting network

3 **aaa accounting network** *list-name* **start-stop** *method1* [*method2*...]
no aaa accounting network {**default** | *list-name*}

| | | |
|-------------------|-------------------|----------|
| | | |
| default | 3 1 AAA 5 Network | |
| <i>list-name</i> | | |
| start-stop | | |
| <i>method</i> | Ю - 3 - | |
| group | TACACS+ 4 | RADIUS 5 |

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Ruijie(config)# **aaa accounting network default start-stop group radius**

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| 3 | |
|---------------------------|-------|
| aaa new-model | AAA 4 |
| aaa authorization network | AAA |
| aaa authentication | AAA |
| username | AAA |

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36.3.4 aaa accounting update

aaa accounting update 3 3
no 4

aaa accounting update
no aaa accounting update

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AAA 4 a 4 AAA 4
3 4

IO 4
Ruijie(config)# **aaa new-model**
Ruijie(config)#

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|--|------------------------|-------|
| | aaa new-model | AAA E |
| | aaa accounting network | 17 |

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| 1 | |
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| 1 | |
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```
aaa domain {default | domain-name}
```

```
no aaa domain {default | domain-name}
```

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

36.4.2 aaa domain enable

1 AAA 4 Ю ñ Â A° "I
1 AAA 4 Â 3 no Â

aaa domain enable

no aaa domain enable

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1 AAA 4 Â

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AAA 4 r - 3 # R

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3 8 Â

Ю 1 ò ruijie.com ò 20'
Ruijie(config)# **aaa domain ruijie.com**
Ruijie(config-aaa-domain)# **access-limit 20**

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| 3 | |
|-------------------|---------|
| aaa new-model | AAA ƚ |
| aaa domain enable | 1 AAA ƚ |
| show aaa domain | |

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36.4.4 accounting network

Ю Network ~ 3 no 1 3 Â

accounting network {default | list-name}
no accounting network

| | | |
|---|-------------------|---------|
| { | | |
| | aaa new-model | AAA E |
| | aaa domain enable | ↓ AAA E |
| | show aaa domain | |

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|---|
| ↓ |
|---|

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| { | Λ | |
| | - | - |

36.4.6 authorization network

IO Network ~ { no ↓ { Â

authorization network {default | list-name}

no authorization network

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|--|-----------|---|
| | | |
| | default | ~ |
| | list-name | ↓ |

~

~

default

42 634

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36.4.7 state

no $\hat{A}$

state {block | active}

no state

block

active

Ю ÿ $\hat{A}$

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 $\hat{A}$ $\hat{A}$

Ю $\hat{A}$
 Ruijie(config)# **aaa domain ruijie.com**
 Ruijie(config-aaa-domain)# **state block**

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aaa new-model

AAA 1

aaa domain enable

1 AAA 1

show aaa domain

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3Tq536.58 24908 -174.4/C 14D4

| | |
|--------------------|---|
| | |
| default | ~ |
| <i>domain-name</i> | ↓ |

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```
Ruijie# show aaa domain domain.com
```

State: Active

Username format: Without-domain

Access limit: No limit

```
802.1X Access statistic: 0
```

Selected method list:

```
authentication dot1x default
```

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| | 3 | |
|--|---|--|

36.4.9 username-format

IO NAS 6 L J ~ { no
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username-format {without-domain | with-domain}

no username-format

06 re 6 48 BT /6.5 m 21964403

DT0 1 Tf0 Tc 5.903 0 Td()Tj-0.0004

aaa group server {radius | tacacs+


```


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```

```

Ruijie#
Ruijie(config)# aaa group server radius ss
Ruijie(config-gs-radius)# server 192.168.4.12
acct-port 5 authen-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

```

```


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| aaa group server | aaa 1 |
| show aaa group | aaa 1 |

```


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36.5.4 show aaa group

AAA 1 1

show aaa group

```


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3 AAA 8 L ^

IO ^
Ruijie# **show aaa group**
Group Name: ss
Group Type: radius
Referred: 2
Server List:
IP Address: 192.168.217.64
Authentication Port: 1812
Accounting Port: 1813
Referred: 1

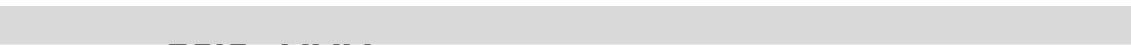
3

| | |
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| 3 | |
| aaa group server | AAA L |

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| 1 | |
| - | - |



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Login

Ю
Ruijie#
Ruijie(config)#

configure terminal
aaa local authentication attempts 6

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| 3 | |
|---------------------|-------|
| Show running-config | |
| Show aaa logout | login |

✓

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

36.6.2 aaa local authentication logout-time

login ~

aaa local authentication logout-time logout-time

logout-time

| logout-time | ^ Æ' ~ ~ ✓ 1~2147483647 |
|-------------|-------------------------|

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login

Ю
Ruijie#
Ruijie(config)#

configure terminal
aaa local authentication logout-time 5

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| | | |
|--|---------------------|-------|
| | Show running-config | |
| | Show aaa logout | login |

| |
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| ✓ |
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| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

36.6.3 aaa new-model

RGOS AAA 1 2 3
 3 no AAA 1 2 3
 3 aaa new-model AAA 1 2 3

aaa new-model

no aaa new-model

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

| |
|-----------|
| AAA 1 2 3 |
|-----------|

| |
|---|
| 3 |
|---|

AAA 1 2 3

1 2 3

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

36.6.4 clear aaa local user logout

clear aaa local user logout {all | user-name <word>}





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```
aaa authentication dot1x san-f local group angel group rain none
aaa authentication enable default group radius
Accounting method-list
```


| | | |
|--|-----------------|-------|
| | show aaa logout | login |
|--|-----------------|-------|

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



37.1.2 radius attribute

radius ttribute{<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

| <i>id</i> | 1 id <1-255> |
|-------------|--------------|
| <i>type</i> | type |

| id | 1 | 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 |

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max up-rate

5

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|---|--------------------|--------------------|
| { | { | |
| | radius set qos cos | radius Ю qos й cos |
| ✓ | | |
| { | 1 | |
| | - | - |

37.1.3 radius-server attribute 31

RADIUS Calling-Station-ID ^ MAC~ ~ {

radius-server attribute 31 ^ { no й ^

radius-server attribute 31 mac format {ietf | normal | unformatted}

no radius-server attribute 31 mac format

| | | |
|--|------|----------------------|
| | | |
| | ietf | ETF RFC3580~ ~ - L |

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10.3(5)

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37.1.4 radius-server deadtime

deadtime ~ RGOS RADIUS 3
radius-server deadtime $\hat{A}$ 3 **no** $\hat{A}$ 3
radius-server deadtime *minutes*
no radius-server deadtime

| | |
|----------------|------------------|
| <i>minutes</i> | $\hat{A}$ 1-1000 |
|----------------|------------------|

5†

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Ю 10† '
 Ruijie(config)# **radius-server deadtime** 10

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| | |
|---------------------------------|------------|
| 3 | |
| radius-server host | ⌘ RADIUS ы |
| radius-server retransmit | ⌘ RADIUS |
| radius-server key | ⌘ RADIUS 3 |
| radius-server timeout | ⌘ RADIUS |

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37.1.5 radius-server host

RADIUS server

radius-server **no**

RADIUS

| <i>ipv4-address</i> | IPv4 | | |
|---------------------|------|--|--|
| <i>ipv6-address</i> | IPv6 | | |
| <i>auth-port</i> | UDP | | |
| <i>port-number</i> | UDP | | |
| <i>acct-port</i> | UDP | | |

RADIUS 3

RADIUS 3

й RADIUS

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RADIUS 3

| | | | |
|--|----------------|--|-----------------------|
| | <i>seconds</i> | $\hat{A} \in \mathbb{N} \sim \hat{A} \downarrow$ | $\mathbb{N} \ 1-1000$ |
|--|----------------|--|-----------------------|

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3 $\hat{A}$

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Ruijie(config)# radius set qos cos

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| 3 | |
|-------------------------------|-----------------|
| radius vendor-specific extend | Radius ñ a ѱ id |

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| - | - |

37.1.10 radius vendor-specific extend

ñ a ѱ id Â

radius vendor-specific extend

no radius vendor-specific extend

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|---|---|

4 1 id

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3 4 id Â

Ю
Ruijie(config)#

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| RADIUS 3 | | |
| 3 | 1 | |
| | - | - |

37.2 RADIUS

37.2.1 debug radius

| | | | | | | | |
|----------------------------------|--|---|---|----|--------|--|----|
| RADIUS | | Â | 3 | no | RADIUS | | Â |
| debug radius [event detail] | | | | | | | |
| no debug radius [event detail] | | | | | | | |
| | | | | | no | | no |

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| | 3 radius 4 | Â |
|--|------------|---|

| | |
|--|---|
| | <pre> Ruijie# show radius parameter Server Timeout: 5 Seconds Server Deadtime: 5 Minutes Server Retries: 3 Server Key: ***** </pre> |
|--|---|

| | | |
|---|--------------------------|--------------|
| | 3 | |
| | radius-server host | 3 RADIUS 4 5 |
| 3 | radius-server retransmit | 3 RADIUS |
| | radius-server key | 3 RADIUS 3 |
| | radius-server timeout | 3 RADIUS |

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| 4 |
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37.2.3 show radius server

RADIUS 4 Â

show radius server

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| 3 | Â |
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3 radius 4 ^

Ruijie# **show radius server**
server ip : 192.168.4.12
acct port: 23
authen port: 77
server state: ready
server ip : 192.168.4.13
acct port: 45
authen port: 74
server state: ready

| 3 | 3 | |
|---|--------------------------|----------------|
| | radius-server host | 168 RADIUS 4 y |
| | radius-server retransmit | 168 RADIUS |
| | radius-server key | 168 RADIUS 3 |
| | radius-server timeout | 168 RADIUS |

4

| 3 | 1 | |
|---|---|---|
| | - | - |

37.2.4 show radius vendor-specific

RADIUS ^

show radius vendor-specific

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

3 ^

3 radius ^

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-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 privilige | 22 |
| 23 | login privilige | 42 |
| 24 | limit to user number | 50 |

3

| 3 | |
|--------------------------|--------------|
| radius-server host | ✂ RADIUS 4 5 |
| radius-server retransmit | ✂ RADIUS |
| radius-server key | ✂ RADIUS 3 |
| radius-server timeout | ✂ RADIUS |

RADIUS 3

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| | | |

38 TACACS+

38.1 TACACS+

38.1.1 aaa group server tacacs+

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TACACS+ 1 ~ a 1 TACACS+ 1 1 a 1 ^

aaa group server tacacs+ group-name

no aaa group server tacacs+ group-name

| | |
|------------|-------------|
| | |
| group-name | TACACS+ 1 1 |

TACACS+ 1 ^

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TACACS+ 1 1 ~ à à 1 1 a 1 1 ^

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1 1 tac1 TACACS+ 1 ~ 3 1.1.1.1

TACACS+ 1 1

Ruijie(config)#

38.1.2 ip tacacs source-interface

3 TACACS+ ^

ip tacacs source-interface interface

no ip tacacs source-interface

| Interface | TACACS+ |
|-----------|---------|

TACACS+ ^

3 ^

й TACACS+ Ё Э nas ~ ↓Л ~ 3
TACACS+ ^ 3 ip й TACACS+
~ 3 Ё ^

Ю TACACS+ ÿ fastEthernet 0/0 √ ip й TACACS+

Ruijie(config)# ip tacacs source-interface fastEthernet 0/0

s [REDACTED] 52 gT66.84 641420.784 2[<0996>-6<1Q3 -852 gT67

TACACS+ {

| | | |
|--|-----------------|-------|
| | <i>vrf-name</i> | vrf ↓ |
|--|-----------------|-------|

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| |
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й TACACS+ AAA Ё TACACS+ Ё Â ¼
tacacs-server 3 Ё TACACS+ Ё Â

Ю Ё TACACS+ Ё ŷ '
Ruijie(config)# **tacacs-server host** 192.168.12.1
Ruijie(config)# **tacacs-server host** 2001::1

3

| 3 | |
|------------------------------|------------------|
| aaa authentication | Ё AAA |
| tacacs-server key | Ё TACACS+ Ё
3 |
| tacacs-server timeout | Ё TACACS+ Ё |

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

alCwVA2B@65BX

Используется для задания ключа шифрования для TACACS+ сервера. Задается в режиме конфигурации TACACS+ сервера. Значение должно быть строкой длиной от 1 до 16 символов.

Пример конфигурации TACACS+ сервера:

```
Ruijie(config)#tacacs-server key aaa
```

| Параметр | Значение |
|------------------------------|--------------------------------|
| tacacs-server host | Имя TACACS+ сервера и порт |
| tacacs-server timeout | Время ожидания TACACS+ сервера |

4

| Параметр | Значение |
|----------|----------|
| - | - |

38.1.7 tacacs-server timeout

Параметр задает время ожидания TACACS+ сервера. Значение должно быть числом от 1 до 1000.

tacacs-server timeout seconds

no tacacs-server timeout

| Параметр | Значение |
|----------------|--|
| seconds | Время ожидания TACACS+ сервера в секундах. Значение должно быть числом от 1 до 1000. |

5

3

Параметр задает время ожидания TACACS+ сервера. Значение должно быть числом от 1 до 1000. Задается в режиме конфигурации TACACS+ сервера.

Пример конфигурации TACACS+ сервера:

```
Ruijie(config)# tacacs-server timeout 10
```

| Параметр | Значение |
|----------|----------|
|----------|----------|

| | | |
|--|---------------------------|-----------------------|
| | tacacs-server host | 配置 TACACS+ 服务器的 IP 地址 |
| | tacacs-server key | 配置 TACACS+ 服务器的密钥 |

✓

| | | |
|---|---|--|
| | 1 | |
| 2 | - | |

38.2 TACACS+

38.2.1 debug tacacs+

TACACS+ 命令用于配置 TACACS+ 服务器的 IP 地址和密钥。
debug tacacs+ 用于启用 TACACS+ 调试。
no debug tacacs+ 用于禁用 TACACS+ 调试。

| | |
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|--|--|

38.2.2 show tacacs

TACACS+ 4 5

show tacacs

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

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3 TACACS+ 4 5

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

3

| | |
|--------------------|--------------------|
| 3 | |
| tacacs-server host | 6 TACACS+ 4
4 5 |

4

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| 1 | |
| - | - |

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

39.1.2 crypto key zeroize

SSH 4 Ω ~ Ю 3'

crypto key zeroize {rsa | dsa}

| | | |
|------------|-----|--|
| | | |
| rsa | RSA | |
| dsa | DSA | |

| |
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| |
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|---|
| 3 |
|---|

| | |
|--|---|
| | 3 4 Ω Â 1~ SSH Server ì ì DISABLE Â |
| | SSH Server' no enable service ssh-server 3 Â |

Ruijie# **configure terminal**
 Ruijie(config)# **crypto key zeroize rsa**

| | | |
|--------------------------------------|------------|---|
| | 3 | |
| show ip ssh | SSH Server | Â |
| crypto key generate {rsa dsa} | DSA 6 RSA | Â |

| | |
|---|--------------|
| 1 | RGOS10.1 103 |
|---|--------------|

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

39.1.3 ip ssh authentication-retries

SSH Server Â 3 no
 ì Â

ip ssh authentication-retries *retry times*

no ip ssh authentication-retries

2

Ruijie# **configure terminal**

Ruijie(config)# **ip ssh version 2**

3

| 3 | |
|--------------------|--------------|
| show ip ssh | SSH Server 4 |

4

RGOS10.1 5 3

| | | | |
|---|----------------------------|-----|---|
| | Clear line vty line_number | VTY | Â |
| 1 | RGOS10.1 3 | | |
| 3 | 1 | | |
| | - | - | |

39.2.2 show crypto key mypubkey

SSH Server 2 2 1 Â

show crypto key mypubkey {rsa|dsa}

| | | | |
|-----|-----|---|---|
| | | | |
| rsa | RSA | 2 | 1 |
| dsa | DSA | 2 | 1 |

3

SSH Server 2 2 1 Â ' à
1 à 2 1 Â

Ruijie# show crypto key mypubkey rsa

| | | |
|---------------------------------|-----------|---|
| 3 | 3 | |
| crypto key generate {rsa dsa} | DSA 6 RSA | Â |

1 2 RGOS10.1 3

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

39.2.3 show ip ssh

SSH Server Â

show ip ssh

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

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| | | | | | | |
|------------|-----|---|---|------------|---|---|
| SSH Server | Â | ' | ă | SSH Server | ă | ă |
| Â | | | | | | |
| ~ | SSH | ÿ | ÿ | ÿ | ÿ | ÿ |
| SSH | ÿ | a | ÿ | Â | | |

Ruijie# **show ip ssh**

| | | |
|---|------------|---|
| 3 | | |
| ip ssh version {1 2} | SSH Server | Â |
| ip ssh time-out time | SSH Server | Â |
| ip ssh authentication-retries retry times | SSH Server | Â |

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RGOS10.1 8 9

| | | |
|---|---|---|
| 3 | 1 | |
| - | | - |

39.2.4 show ssh

SSH Â

show ssh

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

40 CPU

40.1

40.1.1 cpu-protect type packet-type pps pps_value

CPU Â

**cpu-protect type { arp | bpdu | dhcp | ipv6mc | igmp | rip | ospf | vrrp | pim | ttl1 |
unknown-ipmc | dvmrp | ...} pps pps_value**

CPU

3

^

3

CPU

^

```

Ruijie# show cpu-protect mboard

```

| IO | S9610 | CPU | ^ |
|--------------|-------|-------|------|
| type | Pps | Total | Drop |
| arp | 500 | 19 | 0 |
| bpdu | 200 | 24 | 0 |
| dhcp | 0 | 0 | 0 |
| gvrp | 0 | 0 | 0 |
| ipv6-mc | 0 | 0 | 0 |
| dvmrp | 0 | 0 | 0 |
| igmp | 0 | 0 | 0 |
| ospf | 0 | 0 | 0 |
| pim | 0 | 0 | 0 |
| rip | 0 | 0 | 0 |
| vrrp | 0 | 0 | 0 |
| unknown-ipmc | 0 | 0 | 0 |
| ttl1 | 0 | 0 | 0 |
| ... | | | |

3

show cpu-protect slot slot-num

CPU

^

1

3

11

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40.2.2 show cpu-protect type

3

```

show cpu-protect type { arp | bpdu | dhcp | ipv6mc | igmp | rip | ospf | vrrp | pim | ttl1 |
unknown-ipmc | dvmrp | ... } dvmrp

```


no ip deny invalid-tcp

```
1'      3      Land  7  '  
Ruijie(config)# ip deny land  
2'      3      Land  7  '  
Ruijie(config)# no ip deny land
```

```
3
```

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

41.2.2 show ip deny invalid-tcp

TCP ^

show ip deny invalid-tcp

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

^

3

```
Ruijie# show ip deny invalid-tcp
DoS Protection Mode                               State
-----
protect against invalid tcp attack                On
```

| | | |
|---|--------------------------|--------|
| 3 | 3 | |
| | (no) ip deny invalid-tcp | TCP 11 |

1

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

41.2.3 show ip deny land

Land ^

show ip deny land

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

| | | | |
|-----|---|-------------------|---------|
| DoS | 3 | | |
| | | - | - |
| | | | |
| | | | |
| 3 | Â | | |
| | | | |
| | Ruijie# show ip deny land
DoS Protection Mode State

protect against land attack On | | |
| 3 | | 3 | |
| | | (no) ip deny land | Land 11 |
| 1 | | | |
| | | | |
| 3 | | 11 | |
| | | - | - |

42 DAI

42.1 VLAN DAI

42.1.1 ip arp inspection vlan

3 1 2 *vlan-id* VLAN DAI 1 2 3 no 1 2
vlan-id VLAN DAI 1 2 *vlan-id* 3 VLAN
 3 DAI 1 2

ip arp inspection vlan *vlan-id*

no ip arp inspection vlan [*vlan-id*]

| | | |
|----------------|----------|--|
| | | |
| <i>vlan-id</i> | vlan 1 2 | |

VLAN 3 DAI 1 2

3 2

3 1 2 DAI 1 2 3 2

1 2 3 VLAN 1 3 ARP 2
 Ruijie(config)# **ip arp inspection**
 Ruijie(config)# **ip arp inspection vlan 1**

| | | |
|------------------------------------|--------------|--|
| 3 | | |
| show ip arp inspection vlan | VLAN DAI 1 2 | |

1 2

| | | |
|---|---|--|
| 3 | 1 | |
| - | - | |

42.2

42.2.1 ip arp inspection trust

Y J ~ 3 ip arp inspection trust ^ 3 no
 γ ñ a Â

ip arp inspection trust

no ip arp inspection trust

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| | | |
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3 Â

| | | | | | | |
|---|-------|---|-----|---|-------|------------------------------------|
| | ARP | ~ | DAI | ~ | ↓ √ ε | ↓ |
| | a | | ARP | ~ | Â | |
| | NFPP(|) | ~ | 8 | NFPP | ~ a "A |
| & | DAI | ~ | | | | 3 show ip arp inspection interface |
| | ↓ | | Â | | | |

| | | | | | |
|----------|-------|-----|----------------|-----|--------|
| VLAN | DAI 3 | ARP | Y | a v | ~ |
| ARP | ‡ | | DHCP Snooping | | . |
| | | ~ ‡ | ÂDHCP Snooping | | ê DHCP |
| Snooping | Ï Â | | | | |

43

arp

ЮarpÂ

show anti-arp-spoofing

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

}

Ruijie#show anti-arp-spoofing

| | |
|-------|-------------|
| port | ip |
| ----- | ----- |
| Fa0/1 | 192.168.1.1 |

| | | |
|---|----------------------|-------|
| } | | |
| | anti-arp-spoofing ip | arp } |

1

| | | |
|---|---|---|
| } | 1 | |
| | - | - |

44 IP Source Guard

44.1 IP Source Guard

44.1.1 ip source binding

IP 1 no 2

[no] ip source binding *mac-address* *vlan* *vlan-id* *ip-address* *interface* *interface-id*

| <i>mac-address</i> | 1 | MAC 2 |
|---------------------|---|-----------|
| <i>vlan-id</i> | 1 | vlan id 2 |
| <i>ip-address</i> | 1 | IP 2 |
| <i>interface-id</i> | 1 | 2 |

1 2

3 2

3 1 1 IP Source Guard 2 a DHCP

```

Ruijie# configure terminal
Ruijie(config)# ip source binding 0000.0000.0001 vlan 1 1.1.1.1
interface FastEthernet 0/1
Ruijie(config)# end
Ruijie# show ip source binding
MacAddress    IpAddress    Lease(sec)   Type         VLAN    Interface
-----
0000.0000.0001 1.1.1.1     infinite     static       1      FastEthernet 0/1
Total number of bindings: 1

```

3 3

| | | |
|---|------------------------|----|
| | show ip source binding | IP |
| 1 | | |
| 3 | 1 | |
| | - | - |

44.2 IP Source Guard

44.2.1 ip verify source

3 IP Source Guard 1 ~ no 1 Â

[no] ip verify source [port-security]

| | | |
|---------------|-------------------|----------|
| | | |
| port-security | IP Source Guard 1 | IP+MAC Â |

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3 Â

3

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| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

44.3 IP Source Guard

44.3.1 show ip source binding

3 IP ^

show ip source binding [*ip-address*] [*mac-address*] [**dhcp-snooping**] [**static**] [**vlan** *vlan-id*] [**interface** *interface-id*]

| | |
|---------------------|--------|
| | |
| <i>ip-address</i> | ip , |
| <i>mac-address</i> | mac , |
| dhcp-snooping | , |
| static | , , |
| <i>vlan-id</i> | vlan , |
| <i>interface-id</i> | ^ |

^

3 ^

^

```

IO
Ruijie# show ip source binding static
MacAddress  IpAddress  Lease(sec)  Type   VLAN  Interface
-----
0000.0000.0001 1.0.0.1   infinite   static    1   FastEthernet 0/1
Total number of bindings: 1

```

| | | |
|---|-------------------|------|
| 3 | 3 | |
| | ip source binding | IP ^ |

1

3

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

1

3

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

3 ' 1 Â

cpu-protect sub-interface {*manage|protocol|route*} **percent** *percent_vaule*

| | |
|----------------------|---------|
| | |
| <i>percent_vaule</i> | 1 ~ 100 |

| | | | | | | |
|---|--|-----|---|---|---|------------|
| | pps | ~ | Æ | ~ | √ | [1,9999] Å |
| | IP | MAC | 8 | ~ | | |
| | 200 | Â | | | | |
| 3 | NFPP | | | | | |
| | a | Â | | | | |
| | Ruijie(config)# nfpp
Ruijie(config-nfpp)# arp-guard attack-threshold per-src-ip 2
Ruijie(config-nfpp)# arp-guard attack-threshold per-src-mac 3
Ruijie(config-nfpp)# arp-guard attack-threshold per-port 50 | | | | | |
| 3 | 3 | | | | | |
| | nfpp arp-guard policy | | | | | |
| | show nfpp arp-guard summary | | | | | |
| | show nfpp arp-guard hosts | | √ | ÿ | | |
| | clear nfpp arp-guard hosts | | | ÿ | | |
| √ | | | | | | |
| 3 | 1 | | | | | |
| | - | | - | | | |

45.3.2 arp-guard enable

| | | | | | |
|--|--|------------------|-----|---|---|
| | | 3 | ARP | π | Â |
| | | arp-guard enable | | | |
| | | | | | |
| | | - | | - | |
| | | ARP | | π | |
| | | NFPP | | | |

```
Ruijie(config)# nfpp
Ruijie(config-nfpp)# arp-guard enable
```

| | |
|------------------------------|----------|
| 3 | |
| nfpp arp-guard enable | 3 ARP 11 |

| | | |
|---|---|---|
| 1 | | |
| 3 | 1 | |
| | - | - |

45.3.4 arp-guard monitor-period

3 Â

arp-guard monitor-period seconds

| | | |
|---------------------|---------|----------------|
| | | |
| seconds | ~ Æ ~ √ | [180, 86400] Â |
| Â, X5, 0 - E# < X10 | ó « | |

45.3.5 arp-guard monitored-host-limit

3 ↓ Ÿ Â

arp-guard monitored-host-limit *number*

| | |
|---------------|---------------------------|
| | |
| <i>number</i> | ↓ Ÿ ~ ↓ ñ 1
4294967295 |

↓ Ÿ ñ 1000 Â

3 NFPP

↓ Ÿ 1000 ~ ↓ Ÿ
1000 a ↓ Ÿ ~ I' %ERROR' The value that you
configured is smaller than current monitored hosts 1000
please clear a part of monitored hosts. L
Ÿ Â
↓ Ÿ ~ I' % NFPP_ARP_GUARD-4-SESSION_LIMIT: Attempt
to exceed limit of 1000 ↓ Ÿ ~ monitored hosts. L Â

Ruijie(config)# **nfpp**

Ruijie(config-nfpp)# **arp-guard monitored-host-limit 200**

3
show nfpp arp-guard summary

↓

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11

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45.3.6 arp-guard rate-limit

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arp-guard rate-limit {per-src-ip | per-src-mac | per-port} *pps*

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| | |
|--|--|

| | |
|--------------------|----------------|
| per-src-ip | IP |
| per-src-mac | MAC |
| per-port | |
| <i>pps</i> | ~ 4 [1,9999] Å |

| | | |
|-------|-----|-----|
| IP | MAC | 4 ~ |
| 100 Å | | |

3 NFPP

```
Ruijie(config)# nfpp
Ruijie(config-nfpp)# arp-guard rate-limit per-src-ip 2
Ruijie(config-nfpp)# arp-guard rate-limit per-src-mac 3
Ruijie(config-nfpp)# arp-guard rate-limit per-port 50
```

| | |
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| 3 | |
| nfpp arp-guard policy | |
| show nfpp arp-guard summary | |

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|---|----|
| 3 | 11 |
| - | - |

45.3.7 arp-guard scan-threshold

Å

arp-guard scan-threshold *pkt-cnt*

| | |
|----------------|----------------|
| | |
| <i>pkt-cnt</i> | ~ 4 [1,9999] Å |

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NFPP

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MAC

IP

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MAC

IP

IP

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Ruijie(config)# **nfpp**Ruijie(config-nfpp)# **arp-guard scan-threshold 20**

3

| 3 | |
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| nfpp arp-guard scan-threshold | Э |
| show nfpp arp-guard summary | |
| show nfpp arp-guard scan | ARP |
| clear nfpp arp-guard scan | ARP |

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| - | - |

45.3.8 clear nfpp arp-guard hosts

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clear nfpp arp-guard hosts [vlan *vid*] [interface *interface-id*] [*ip-address* | *mac-address*]

| <i>vid</i> | Λ |
|------------|---|

interface-id

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VLAN 1 g 0/1 Ÿ Â
Ruijie# **clear nfpp arp-guard hosts vlan 1 interface g0/1**



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| 3 | 1 | |
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45.3.10 nfpp arp-guard enable

3 3 ARP 11 Â

nfpp arp-guard enable

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| | ARP | ~ | Â |
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| | ARP | "I | ARP | Â |
|--|-----|----|-----|---|

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|--|---|--|--|
| | Ruijie(config)# interface G0/1 | | |
| | Ruijie(config-if)# nfpp arp-guard enable | | |

| | | |
|---|-----------------------------|--------|
| 3 | 3 | |
| | arp-guard enable | ARP 11 |
| | show nfpp arp-guard summary | |

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| 3 | 1 | |
| | 10.4 | 3 |

45.3.11 nfpp arp-guard isolate-period

3 3 Â

nfpp arp-guard isolate-period {seconds | permanent}

| | | |
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| <i>seconds</i> | 0 1000 10000 [30, 86400] |
| permanent | |

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```
Ruijie(config)# interface G 0/1
Ruijie(config-if)# nfpp arp-guard isolate-period 180
```

| | |
|------------------------------------|--|
| 3 | |
| arp-guard isolate-period | |
| show nfpp arp-guard summary | |

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| | | |
|------|---|--|
| 3 | 1 | |
| 10.4 | 3 | |

45.3.12 nfpp arp-guard policy

⊖ ^

nfpp arp-guard policy {per-src-ip | per-src-mac | per-port} *rate-limit-pps*
attack-threshold-pps

| | |
|-----------------------------|------------|
| | |
| per-src-ip | IP ^ |
| per-src-mac | MAC ^ |
| per-port | ^ |
| <i>rate-limit-pps</i> | ~ 1 9999 ^ |
| <i>attack-threshold-pps</i> | ~ 1 9999 ^ |

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| NFPP 3 | | |
| 3 | | |
| | a | Â |
| | | |
| | Ruijie(config)# interface G 0/1 | |
| | Ruijie(config-if)# nfpp arp-guard policy per-src-ip 2 10 | |
| | Ruijie(config-if)# nfpp arp-guard policy per-src-mac 3 10 | |
| | Ruijie(config-if)# nfpp arp-guard policy per-port 50 100 | |
| | | |
| 3 | arp-guard attack-threshold | |
| | arp-guard rate-limit | |
| | show nfpp arp-guard summary | |
| | show nfpp arp-guard hosts | √ Ÿ |
| | clear nfpp arp-guard hosts | Ÿ |
| 4 | | |
| | | |
| | | |

```
Ruijie(config)# interface G 0/1
Ruijie(config-if)# nfpp arp-guard scan-threshold 20
```

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| 3 | |
|-----------------------------|-----|
| arp-guard scan-threshold | |
| show nfpp arp-guard summary | |
| show nfpp arp-guard scan | ARP |
| clear nfpp arp-guard scan | ARP |

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| 10.4 | 3 |

45.4 DHCP

45.4.1 dhcp-guard attack-threshold

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dhcp-guard attack-threshold { per-src-mac | per-port} pps

| per-src-mac | MAC Â |
|-------------|--------------------|
| per-port | Â |
| pps | ~ Æ ~ √ [1,9999] Â |

MAC

10 ~

300 Â

3

NFPP

```
Ruijie(config)# nfpp
Ruijie(config-nfpp)# dhcp-guard attack-threshold per-src-mac 15
Ruijie(config-nfpp)# dhcp-guard attack-threshold per-port 200
```


| | | |
|---|-------------------------------------|-----|
| 3 | | |
| | nfpp dhcp-guard policy | |
| | show nfpp dhcp-guard summary | |
| | show nfpp dhcp-guard hosts | √ Ÿ |
| | clear nfpp dhcp-guard hosts | √ Ÿ |

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| 3 | 1 | |
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45.4.2 dhcp-guard enable

3 DHCP 11 Â

dhcp-guard enable

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

DHCP ~ Â

3 NFPP

Ruijie(config)# **nfpp**
 Ruijie(config-nfpp)# **dhcp-guard enable**

| | | |
|---|-------------------------------------|-----------|
| 3 | | |
| | nfpp dhcp-guard enable | ∅ DHCP 11 |
| | show nfpp dhcp-guard summary | |

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| 3 | 1 | |
| | | |

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| | - | - |
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45.4.3 dhcp-guard isolate-period

3 Â

dhcp-guard isolate-period {seconds | permanent}

| | |
|-----------|---|
| | |
| seconds | 0 0 [30, 86400] |
| permanent | |

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| 3 | NFPP |
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| | Â |

Ruijie(config)# **nfpp**
 Ruijie(config-nfpp)# **dhcp-guard isolate timeout 180**

| | | |
|---|---------------------------------------|---|
| 3 | | |
| | nfpp dhcp-guard isolate-period | ∅ |
| | show nfpp dhcp-guard summary | |

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| 4 |
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| 3 | 1 | |
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45.4.4 dhcp-guard monitor-period

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dhcp-guard monitor- period seconds

| | | |
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| | | |
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```
Ruijie(config)# nfpp
Ruijie(config-nfpp)# dhcp-guard rate-limit per-src-mac 8
Ruijie(config-nfpp)# dhcp-guard rate-limit per-port 100
```

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| 3 | |
|------------------------------|--|
| nfpp dhcp-guard policy | |
| show nfpp dhcp-guard summary | |

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| - | - |

45.4.7 clear nfpp dhcp-guard hosts

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clear nfpp dhcp-guard hosts [*vlan vid*] [*interface interface-id*] [*mac-address*]

| <i>vid</i> | 1 |
|---------------------|-----|
| <i>interface-id</i> | 1 |
| <i>mac-address</i> | MAC |

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```
VLAN 1 g 0/1 Â
Ruijie# clear nfpp dhcp-guard hosts vlan 1 interface g0/1
```

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| 3 | |
|-----------------------------|--|
| dhcp-guard attack-threshold | |
| nfpp dhcp-guard policy | |

| | | |
|---|----------------------------|---|
| | show nfpp dhcp-guard hosts | ŷ |
| ✓ | | |
| 3 | 1 | |
| | - | - |

45.4.8 nfpp dhcp-guard enable

3 3 DHCP 11 Â

nfpp dhcp-guard enable

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

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|--|------|---|---|
| | DHCP | ~ | Â |
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|--|------|----|------|---|
| | DHCP | "I | DHCP | Â |
|--|------|----|------|---|

| | |
|--|--|
| | Ruijie(config)# interface G0/1 |
| | Ruijie(config-if)# nfpp dhcp-guard enable |

| | | |
|---|------------------------------|---------|
| 3 | 3 | |
| | dhcp-guard enable | DHCP 11 |
| | show nfpp dhcp-guard summary | |

| | | |
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| ✓ | | |
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| | 10.4 | 3 |

45.4.9 nfpp dhcp-guard isolate-period

3 3 Â

nfpp dhcp-guard isolate-period {seconds | permanent}

| <i>seconds</i> | 0 to 86400 [30, 86400] |
|------------------|------------------------|
| permanent | |

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```
Ruijie(config)# interface G 0/1
Ruijie(config-if)# nfpp dhcp-guard isolate-period 180
```

| 3 | |
|-------------------------------------|--|
| dhcp-guard isolate-period | |
| show nfpp dhcp-guard summary | |

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| 10.4 | 3 |

45.4.10 nfpp dhcp-guard policy

3 1

nfpp dhcp-guard policy { per-src-mac | per-port} rate-limit-pps attack-threshold-pps

| per-src-mac | MAC 1 |
|-----------------------------|----------|
| per-port | 1 |
| <i>rate-limit-pps</i> | 1 9999 1 |
| <i>attack-threshold-pps</i> | 1 9999 1 |

| | |
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| | |
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Ruijie(config)# **interface** *G 0/1*Ruijie(config-if)# **nfpp dhcp-guard policy per-src-mac** *3 10*Ruijie(config-if)# **nfpp dhcp-guard policy per-port** *50 100*

3

| 3 | |
|-------------------------------------|--------|
| dhcp-guard attack-threshold | |
| dhcp-guard rate-limit | |
| show nfpp dhcp-guard summary | |
| show nfpp dhcp-guard hosts | √ Ÿ |
| clear nfpp dhcp-guard hosts | Ÿ |

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| 10.4 | 3 |

45.5 ICMP

45.5.1 icmp-guard attack-threshold

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icmp-guard attack-threshold { per-src-ip | per-port } pps

| per-src-ip | IP Â |
|-------------------|------------------------------------|
| per-port | Â |
| <i>pps</i> | ~ Æ ~ √ [1,9999] Â |

IP

1200 ~

1500

Â

3

NFPP

Ruijie(config)# **nfpp**
Ruijie(config-nfpp)# **icmp-guard attack-threshold per-src-ip 600**
Ruijie(config-nfpp)# **icmp-guard attack-threshold per-port 1200**

3

| 3 | |
|------------------------------|--------|
| nfpp icmp-guard policy | |
| show nfpp icmp-guard summary | |
| show nfpp icmp-guard hosts | √ Ÿ |
| clear nfpp icmp-guard hosts | Ÿ |

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| - | - |

45.5.2 icmp-guard enable

3 ICMP 11 Å

icmp-guard enable

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

ICMP 11

3

NFPP

Ruijie(config)# **nfpp**
Ruijie(config-nfpp)# **icmp-guard enable**

icmp-guard monitor-period *seconds*

| | |
|----------------|---|
| | |
| <i>seconds</i> | $\sim \frac{1}{\Lambda^2} \sim \sqrt{\frac{1}{\Lambda^2}} \sim \sqrt{[180, 86400] \text{ \AA}}$ |

600 Å

| | |
|---|------|
| 3 | NFPP |
|---|------|

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```
Ruijie(config)# nfpf
Ruijie(config-nfpf)# icmp-guard monitor-period 180
```

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| | | | |
|---|---|-------|------------|
| | <i>pps</i> | ~ 1 | [1,9999] Å |
| | IP | 900 ~ | 1000 Å |
| 3 | NFPP | | |
| | | | |
| | Ruijie(config)# nfpp
Ruijie(config-nfpp)# icmp-guard rate-limit per-src-ip 500
Ruijie(config-nfpp)# icmp-guard rate-limit per-port 800 | | |
| 3 | | | |
| | | | |
| 1 | | | |
| 3 | | | |

45.5.7 icmp-guard trusted-host

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icmp-guard trusted-host *ip mask*

no icmp-guard trusted-host {**all** | *ip mask*}

| | | | |
|---|-------------|------|-----|
| | | | |
| | <i>ip</i> | IP | |
| | <i>mask</i> | IP | |
| | all | no ~ | ~ ỹ |
| | | | |
| | | | |
| 3 | NFPP | | |

↓ ŷ CPU ICMP ŷ CPU a 3 Â
 ↓ 3
 500 ↓ ŷ Â

Ruijie(config)# **nfpp**

Ruijie(config-nfpp)# **icmp-guard trusted-host 1.1.1.0 255.255.255.0**

3

show nfpp icmp-guard trusted-host

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| | | |
|--|-----------------------------------|---|
| | nfpp icmp-guard policy | |
| | show nfpp icmp-guard hosts | ÿ |

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45.5.9 nfpp icmp-guard enable

3 3 ICMP 11 Â

nfpp icmp-guard enable

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| | ICMP | "1 | ICMP | Â |
|--|------|----|------|---|

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| | Ruijie(config)# interface G0/1 |
| | Ruijie(config-if)# nfpp icmp-guard enable |
| | 3 |

NFPP

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

Ruijie(config-if)# **nfpp icmp-guard policy per-src-ip 5 10**

Ruijie(config-if)# **nfpp icmp-guard policy per-port 100 200**

3

| 3 | |
|------------------------------|-----|
| icmp-guard attack-threshold | |
| icmp-guard rate-limit | |
| show nfpp icmp-guard summary | |
| show nfpp icmp-guard hosts | √ ỹ |
| clear nfpp icmp-guard hosts | ỹ |

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| 10.4 | 3 |

45.6 IP

IP

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Â ip-guard attack-threshold

Â ip-guard enable

Â ip-guard isolate-period

Â ip-guard monitor-period

Â ip-guard monitored-host-limit

Â ip-guard rate-limit

Â ip-guard scan-threshold

Â ip-guard trusted-host

Â clear nfpp ip-guard hosts

Â nfpp ip-guard enable

Â nfpp ip-guard isolate-period

Â nfpp ip-guard policy

nfpp ip-guard scan-threshold

~

| ~ IP | IP | a | IP | IP | ~ | IP | IP | ~ |
|------|----|----|----|----|---|-----|--------------------|---|
| IP | IP | IP | IP | ~ | ~ | CPP | CPU Protect Policy | ~ |
| Y | a | IP | ~ | ~ | ~ | IP | ~ | ~ |

45.6.1 ip-guard attack-threshold

~

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~ ð

ip-guard attack-threshold {per-src-ip | per-port} pps

| per-src-ip | IP ð |
|------------|----------------|
| per-port | ~ ð |
| pps | ~ ð [1,9999] ð |

IP 20 ~ 200 ð

3

NFPP

a ð

Ruijie(config)# **nfpp**
Ruijie(config-nfpp)# **ip-guard attack-threshold per-src-ip 2**
Ruijie(config-nfpp)# **ip-guard attack-threshold per-port 50**

3

| 3 | |
|----------------------------|-----|
| nfpp ip-guard policy | |
| show nfpp ip-guard summary | |
| show nfpp ip-guard hosts | ~ ð |
| clear nfpp ip-guard hosts | ~ ð |

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| 10.4 | 3 |



45.6.7 ip-guard scan-threshold

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ip-guard scan-threshold *pkt-cnt*

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| | | | | | |
| 3 | NFPP | | | | |
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↓ ý CPU IP CPU a Â
500 ↓ ý Â | | | | |
| | 1.1.1.0/24 ý ñ ↓ ý Â
Ruijie(config)# nfpp
Ruijie(config-nfpp)#ip-guard trusted-host 1.1.1.0 255.255.255.0 | | | | |
| 3 | <table><tr><td>3</td><td></td></tr><tr><td>show nfpp ip-guard trusted-hosts</td><td>↓ ý</td></tr></table> | 3 | | show nfpp ip-guard trusted-hosts | ↓ ý |
| 3 | | | | | |
| show nfpp ip-guard trusted-hosts | ↓ ý | | | | |
| ↓ | | | | | |
| 3 | <table><tr><td>∏</td><td></td></tr><tr><td>10.4</td><td>3</td></tr></table> | ∏ | | 10.4 | 3 |
| ∏ | | | | | |
| 10.4 | 3 | | | | |

45.6.9 clear nfpp ip-guard hosts

| | | | | | | | | | |
|--------------|--|--|--|-----|---|--------------|---|------------|----|
| | ↓ ý ~ ý ~ Â | | | | | | | | |
| | clear nfpp ip-guard hosts [vlan vid] [interface interface-id] [ip-address] | | | | | | | | |
| | <table><tr><td></td><td></td></tr><tr><td>vid</td><td>∏</td></tr><tr><td>interface-id</td><td>↓</td></tr><tr><td>ip-address</td><td>IP</td></tr></table> | | | vid | ∏ | interface-id | ↓ | ip-address | IP |
| | | | | | | | | | |
| vid | ∏ | | | | | | | | |
| interface-id | ↓ | | | | | | | | |
| ip-address | IP | | | | | | | | |
| | | | | | | | | | |
| 3 | | | | | | | | | |
| | a ~ ý Â | | | | | | | | |
| | VLAN 1 g 0/1 ý Â | | | | | | | | |


```
Ruijie# clear nfpp ip-guard hosts vlan 1 interface g0/1
```

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| 3 | |
|---------------------------|-----|
| ip-guard attack-threshold | |
| nfpp ip-guard policy | |
| show nfpp ip-guard hosts | √ ỹ |

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| 10.4 | 3 |

45.6.10 nfpp ip-guard enable

3 3 IP 11 Â

nfpp ip-guard enable

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IP ~ Â

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IP "I Â

```
Ruijie(config)# interface G0/1
```

```
Ruijie(config-if)# nfpp ip-guard enable
```

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| 3 | |
|----------------------------|-------|
| ip-guard enable | IP 11 |
| show nfpp ip-guard summary | |

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

| <i>seconds</i> | 0 [30, 86400] |
|------------------|---------------|
| permanent | |

| | | | |
|------|----------------------|---|--------|
| NFPP | | | |
| | per-port | Â | |
| | rate-limit-pps | 1 | 9999 Â |
| | attack-threshold-pps | 1 | 9999 Â |
| | | | Â |
| | | | |
| | | | |

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```
Ruijie(config)# interface G 0/1
Ruijie(config-if)# nfpp ip-guard scan-threshold 20
```

3

| 3 | |
|----------------------------|--|
| ip-guard scan-threshold | |
| show nfpp ip-guard summary | |

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| 10.4 | 3 |

45.7 ND

45.7.1 nd-guard attack-threshold

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nd-guard attack-threshold per-port {ns-na | rs | ra-redirect} pps

| ns-na | Ω |
|-------------|--------------------|
| rs | |
| ra-redirect | Ω |
| pps | ~ Æ ~ √ [1,9999] Â |

/Ω

30 ~

30 ~

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30 Â

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NFPP

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```
Ruijie(config)# nfpp
```

```
Ruijie(config-nfpp)# nd-guard attack-threshold per-port ns-na 20
```

```
Ruijie(config-nfpp)# nd-guard attack-threshold per-port rs 10
```

```
Ruijie(config-nfpp)# nd-guard attack-threshold per-port ra-redir  
ect 10
```

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|----------------------------|--|
| nfpp nd-guard policy | |
| show nfpp nd-guard summary | |

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| 10.4 | 3 |

45.7.2 nd-guard enable

3 ND 11 Â

nd-guard enable

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

ND 11

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NFPP

```
Ruijie(config)# nfpp
```

```
Ruijie(config-nfpp)# nd-guard enable
```

3

| 3 | |
|----------------------------|---------|
| nfpp nd-guard enable | 3 ND 11 |
| show nfpp nd-guard summary | |

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| 3 | 1 | |
| | 10.4 | 3 |

45.7.3 nd-guard rate-limit

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nd-guard rate-limit per-port {ns-na | rs | ra-redirect} pps

| | | |
|--|-------------|-----------------|
| | | |
| | ns-na | Ω |
| | rs | |
| | ra-redirect | Ω |
| | pps | ~ 15 [1,9999] Â |

| | | | | |
|--|------|-----|------|------|
| | 15 ~ | Ω / | 15 ~ | 15 Â |
| | | | | |

3 NFPP

```
Ruijie(config)# nfpp
Ruijie(config-nfpp)# nd-guard rate-limit per-port ns-na 10
Ruijie(config-nfpp)# nd-guard rate-limit per-port rs 5
Ruijie(config-nfpp)# nd-guard rate-limit per-port ra-redirect 5
```



45.7.4 nfpp nd-guard enable

3 3 ND 11 Â

nfpp nd-guard enable

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| | ND | ~ | Â |
|--|----|---|---|

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| 3 | | | |
|---|--|--|--|

| | | | |
|--|----|----|---|
| | ND | "1 | Â |
|--|----|----|---|

```
Ruijie(config)# interface G0/1
Ruijie(config-if)# nfpp nd-guard enable
```

| | | |
|---|----------------------------|-------|
| | 3 | |
| 3 | nd-guard enable | ND 11 |
| | show nfpp nd-guard summary | |

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

| | | |
|---|------|---|
| | 11 | |
| 3 | 10.4 | 3 |

45.7.5 nfpp nd-guard policy

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**nfpp nd-guard policy per-port {ns-na | rs | ra-redirect} rate-limit-pps attack-thresh
old-pps**

| | | |
|--|-------------|---|
| | | |
| | ns-na | Ω |
| | rs | |
| | ra-redirect | |

| |
|--|
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|--|

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1000000

```
Ruijie(config-if)# nfpp nd-guard policy per-port ns-na 50 1001.76 0.2
```


NFPP ŏ ʘ Â

clear nfpp log

```

NFPP 3 50
Ruijie(config)# nfpp
Ruijie(config-nfpp)# log-buffer entries 50

```

3

| 3 | |
|--|----------------|
| log-buffer logs number_of_message interval
length_in_seconds | NFPP 3 50
3 |
| show nfpp log | NFPP 3 |

4

3

| 1 | |
|------|---|
| 10.4 | 3 |

45.8.3 log-buffer logs

NFPP 3 50 3

log-buffer logs number_of_message interval length_in_seconds

| number_of_message
a | 0-1024 ж 3
3 |
|------------------------|-----------------|
| length_in_seconds | 0-86400 |

number_of_message 1 length_in_seconds 30

3

NFPP

```

Ruijie(config)# nfpp
Ruijie(config-nfpp)# log-buffer logs 2 interval 12

```

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

log-buffer entries

| | | |
|---|-----------------------|------------|
| 3 | | |
| | show nfpp log summary | NFPP ǎ ѡ Â |
| 1 | | |
| 3 | 11 | |
| | 10.4 | 3 |

45.8.5 show nfpp log

NFPP Â

show nfpp log summary

NFPP ǎ ѡ Â

show nfpp log buffer [statistics]

| | | |
|--|------------|----------|
| | | |
| | statistics | NFPP ǎ ѡ |

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```

      ǎ ѡ  ~ 1      ~ 1      ǎ ѡ
  ǎ"-  Â      ǎ ѡ      Â
  Ÿ      ǎ ѡ  ǎ ѡ      Y  ~  ǎ ѡ
%NFPP_ARP_GUARD-4-DOS_DETECTED: Host<IP=N/A,MAC=0000.0000.0004,por
t=Gi4/1,VLAN=1> was detected.(2009-07-01 13:00:00)

```

```

      NFPP      Â
Ruijie#show nfpp log summary
Total log buffer size : 10
Syslog rate : 1 entry per 2 seconds
Logging:
  VLAN 1-3, 5
  interface Gi 0/1
  interface Gi 0/2

```

NFPP ǎ ʘ Â

Ruijie#**show nfpp log buffer statistics**

There are 6 logs in buffer.

NFPP ǎ ʘ Â

Ruijie#**show nfpp log buffer**

Protocol VLAN Interface IP address MAC address Reason

Timestamp

----- ---- 4J/0- --Times--JJJ/0-0047 Tc -0.1018 0958 Ts 13 Td8(-----ARP0

| | | |
|---|----------------|----------|
| 3 | | |
| | clear nfpp log | NFPP ǎ ʘ |
| ǎ | | |
| 3 | 11 | |
| | 10.4 | 3 |

45.9 ARP

45.9.1 show nfpp arp-guard hosts

ǎ ǎ Â

show nfpp arp-guard hosts [**statistics** | [[*vlan vid*] [*interface interface-id*] [*ip-address* | *mac-address*]]]

| | |
|---------------------|-----|
| | |
| statistics | ǎ ǎ |
| <i>vid</i> | 11 |
| <i>interface-id</i> | ǎ |
| <i>ip-address</i> | IP |
| <i>mac-address</i> | MAC |

3

```

1' ǎ ǎ Â
Ruijie# show nfpp arp-guard hosts statistics
success  fail  total
-----  ----  -----
100      20     120
          120 ǎ ǎ      ~ è 100 ǎ ǎ      ~ 20 ǎ ǎ
^          a ~      a ~ Â

```

2

Ruijie# **show nfpp arp-guard scan statistics**

ARP scan table has 4 record(s).

┌───┐ ARP 4 ┌───┐

Ruijie# **show nfpp arp-guard scan**

| VLAN | interface | IP address | MAC address | timestamp |
|------|-----------|------------|----------------|------------------------|
| ---- | ----- | ----- | ----- | ----- |
| 1 | Gi0/1 | N/A | 0000.0000.0001 | 2008-01-23
16:23:10 |
| 2 | Gi0/2 | 1.1.1.1 | 0000.0000.0002 | 2008-01-23
16:24:10 |
| 3 | Gi0/3 | N/A | 0000.0000.0003 | 2008-01-23
16:25:10 |
| 4 | Gi0/4 | N/A | 0000.0000.0004 | 2008-01-23
16:26:10 |

Total: 4 record(s)

┌───┐ timestamp ┌───┐ ARP ┌───┐ 2008-01-23 16:23:10 ┌───┐
2008 1 23 16 23:10 ARP

Ruijie# **show nfpp arp-guard scan vlan 1 interface G 0/1**

0000.0000.0001

| VLAN | interface | IP address | MAC address | timestamp |
|------|-----------|------------|----------------|------------------------|
| ---- | ----- | ----- | ----- | ----- |
| 1 | Gi0/1 | N/A | 0000.0000.0001 | 2008-01-23
16:23:10 |

Total: 1 record(s)

45.9.3 show nfpp arp-guard summary

^

show nfpp arp-guard summary

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

3

3 1/2

^

Ruijie# show nfpp arp-guard summary

^ Format of column Rate-limit and Attack-threshold is per-src-ip /per-src-mac/per-port.~

Interface Status Isolate-period Rate-limit Attack-threshold Scan-threshold

| | | | | | |
|--------|---------|-----|--------|----------|----|
| Global | Enable | 300 | 4/5/60 | 8/10/100 | 15 |
| Gi 0/1 | Enable | 180 | 5/-/- | 8/-/- | - |
| Gi 0/2 | Disable | 200 | 4/5/60 | 8/10/100 | 20 |

Maximum count of monitored hosts: 1000

Monitor period 300s

,

^ 1~ Interface

| | | |
|--|-------------------------------|---------|
| | arp-guard rate-limit | |
| | arp-guard scan-threshold | |
| | nfpp arp-guard enable | ☐ ARP ☐ |
| | nfpp arp-guard isolate-period | |
| | nfpp arp-guard policy | |
| | nfpp arp-guard scan-threshold | |

↓

| | | |
|---|---|---|
| 3 | 1 | |
| | - | - |

45.10 DHCP

45.10.1 show nfpp dhcp-guard hosts

↓ Ÿ Â

show nfpp dhcp-guard hosts [**statistics** | [[**vlan** *vid*] [**interface** *interface-id*] [*mac-address*]]]

| | | |
|---------------------|--------|--|
| | | |
| statistics | ↓ Ÿ | |
| <i>vid</i> | 1 | |
| <i>interface-id</i> | ↓ | |
| <i>mac-address</i> | MAC | |

↓

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↓ Ÿ Â

Ruijie#

```
-----
100      20      120
      120 ↓ Ÿ      ~ è 100 ↓ Ÿ      ~ 20 ↓ Ÿ
^      a ~      a ~ Â

      ↓ Ÿ ~      | remain-time(seconds) L      Â

Ruijie# show nfpp dhcp-guard hosts
If column 1 shows '*', it means "hardware failed to isolate host".
VLAN   interface   MAC address   remain-time(seconds)
----   -
1      gi0/2       0000.0000.0001  10
*2     gi0/1       0000.0000.0002  20
Total  2 host(s)
```

| | |
|-----------------------------|-----|
| 3 | |
| clear nfpp dhcp-guard hosts | ↓ Ÿ |

↓

| | |
|------|----|
| 3 | 11 |
| 10.4 | 3 |

45.10.2 show nfpp dhcp-guard summary

```
Â

show nfpp dhcp-guard summary

-
```

3

3 ↓ 11 Â

Ruijie# show nfpp dhcp-guard summary

^ Format of column Rate-limit and Attack-threshold is per-src-ip /per-src-mac/per-port.~

| Interface | Status | Isolate-period | Rate-limit | Attack-threshold |
|-----------|---------|----------------|------------|------------------|
| Global | Enable | 300 | -/5/150 | -/10/300 |
| Gi 0/1 | Enable | 180 | -/6/- | -/8/- |
| Gi 0/2 | Disable | 200 | -/5/30 | -/10/50 |

Maximum count of monitored hosts: 1000

Monitor period 300s

^ 1~ Interface ñ Global Â

^ 2~ Status ¶ Â

^ 3~ Rate-limit ñ IP / MAC

 / ~ ~ Attack-threshold Â ¶ - L

 Â

3

| 3 | |
|---------------------------------|----------------|
| dhcp-guard attack-threshold | |
| dhcp-guard enable | DHCP ¶ |
| dhcp-guard isolate-period | |
| dhcp-guard monitor-period | |
| dhcp-guard monitored-host-limit | √ ÿ |
| dhcp-guard rate-limit | |
| nfpp dhcp-guard enable | ∅ DHCP ¶ |
| nfpp dhcp-guard isolate-period | |
| nfpp dhcp-guard policy | |

4

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|------|---|
| 10.4 | 3 |

↓ Ÿ Â

show nfpp icmp-guard hosts [**statistics** | [[**vlan** *vid*] [**interface** *interface-id*] [*ip-address*]]]

| | |
|---------------------|----------|
| | |
| statistics | ↓ Ÿ |
| <i>vid</i> | ^ |
| <i>interface-id</i> | ↓ |

45.11.2 show nfpp icmp-guard summary

^

show nfpp icmp-guard summary

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

3

3 4/6

^

Ruijie# show nfpp icmp-guard summary

^ Format of column Rate-limit and Attack-threshold is per-src-ip /per-src-mac/per-port.~

Interface Status Isolate-period Rate-limit Attack-threshold

| | | | | |
|--------|---------|-----|--------|---------|
| Global | Enable | 300 | 4/-/60 | 8/-/100 |
| Gi 0/1 | Enable | 180 | 5/-/- | 8/-/- |
| Gi 0/2 | Disable | 200 | 4/-/60 | 8/-/100 |

Maximum count of monitored hosts: 1000

Monitor period 300s

^ 1~ Interface ~ Global ^

^ 2~ Status ~ ^

^ 3~ Rate-limit ~ IP / MAC /

~ ~ Attack-threshold ^ - - ^

3

| | | |
|--|--------------------------------|----------|
| | icmp-guard rate-limit | |
| | nfpp icmp-guard enable | Э ICMP П |
| | nfpp icmp-guard isolate-period | |
| | nfpp icmp-guard policy | |

↓

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|---|------|---|
| 3 | П | |
| | 10.4 | 3 |

45.11.3 show nfpp icmp-guard trusted-host

a ↓ Ÿ Â

show nfpp icmp-guard trusted-host

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

|

| | | |
|---|------|---|
| 3 | 1 | |
| | 10.4 | 3 |

45.12 IP

- ^ show nfpp ip-guard hosts
- ^ show nfpp ip-guard summary
- ^ show nfpp ip-guard trusted-host

45.12.1 show nfpp ip-guard hosts

√ Ÿ ^

show nfpp ip-guard hosts [statistics | [[vlan vid] [interface interface-id] [ip-address]]]

| | |
|--------------|-----|
| | |
| statistics | √ Ÿ |
| vid | 1 |
| interface-id | 1 |
| ip-address | IP |

3

Ruijie#show nfpp ip-guard hosts statistics

| | | |
|---------|------|-------|
| success | fail | total |
| ----- | ---- | ----- |
| 100 | 20 | 120 |

 ' 1 120 1 Ÿ ~ è 100 1 Ÿ π 20 1 Ÿ L ^

Ruijie#show nfpp ip-guard hosts

If column 1 shows '*', it means "hardware do not isolate host" .

| | | | | |
|------|-----------|------------|--------|----------------|
| VLAN | interface | IP address | Reason | remain-time(s) |
|------|-----------|------------|--------|----------------|

| | | | | | |
|---|---------------------------|-------|---------|--------|-----|
| | | | | | |
| | 1 | Gi0/1 | 1.1.1.1 | ATTACK | 110 |
| | 2 | Gi0/2 | 1.1.2.1 | SCAN | 61 |
| | Total 2 host(s) | | | | |
| | | | Reason | ATTACK | |
| | | IP | SCAN | | |
| 3 | | | | | |
| | clear nfpp ip-guard hosts | | | | |
| 4 | | | | | |
| 3 | | | | | |
| | 10.4 | | | | |

45.12.2 show nfpp ip-guard summary

^

show nfpp ip-guard summary

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

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| 3 |
|---|

| | | | | | |
|--|---------|----------------|------------|------------------|----------------|
| | | | | | |
| Ruijie# show nfpp ip-guard summary | | | | | |
| ^ Format of column Rate-limit and Attack-threshold is per-src-ip/per-src-mac/per-port. | | | | | |
| Interface | Status | Isolate-period | Rate-limit | Attack-threshold | Scan-threshold |
| Global | Enable | 300 | 4/-/60 | 8/-/100 | 15 |
| Gi 0/1 | Enable | 180 | 5/-/- | 8/-/- | - |
| Gi 0/2 | Disable | 200 | 4/-/60 | 8/-/100 | 20 |
| Maximum count of monitored hosts: 1000 | | | | | |
| Monitor period 300s | | | | | |

↓ Ÿ Â

Ruijie# show nfpp ip-guard trusted-host

IP address mask

1.1.1.0 255.255.255.0

1.1.2.0 255.255.255.0

Total: 2 record(s)

3

| 3 | |
|-----------------------|-------|
| ip-guard trusted-host | a ↓ Ÿ |

↓

3

| 1 | |
|------|---|
| 10.4 | 3 |

46 ACL

ЛЮ 3 ↓ ЛЮ 3

3

| | ИЖ |
|------------------------|---|
| id | <p>Л Ä ↓</p> <p>IP ACL' 1-99 1300-1999</p> <p>IP ACL' 100-199 2000-2699</p> <p>MAC ACL' 700-799</p> <p>ж ACL' 2700-2899</p> |
| name | ACL ↓ |
| sn | ACL Л ("l) |
| start-sn | Л |
| inc-sn | Л |
| deny | г ~ ‡ |
| permit | г ~ ‡ |
| prot | <p>Л IPv4 ↓ Л eigrp gre ipinip igmp</p> <p>nos ospf icmp udp tcp ip ~ ≠ ↓ Л</p> <p>3 IP 0-255 Л</p> <p>icmp/tcp/udp</p> |
| interface idx | г |
| src | ^ ý ~ |
| src-wildcard | Ä ↓ Л a ~ 0.255.0.32 |
| pfix-len | Æ Æ |
| dscp dscp | £ , ~ 0-63 |
| flow-label flow-label | ~ 0-1048575 |
| dst | ^ ý ~ |
| dst-wildcard | Ä ↓ Л a ~ 0.255.0.32 |
| fragment | † |
| precedence precedence | "l ^ 0-7~ |
| range | Л |
| time-range tm-rng-name | щ ↓ ì 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 3 ^ 0-255~ |
| icmp-message | ICMP ↓ |
| operator port[port] | Operator ñ ^ lt- ~ eq- ~ gt- ~ neq-
a ~ range- ~
port /~ γ ч /~ ~ è
↓ / |
| src-mac-addr | ŷ |
| dst-mac-addr | ŷ |
| VID vid | vlan id |
| VID inner vid | tag vid |
| ethernet-type | ЛУ ~ ↓ЛУ 0x |
| match-all tcpf | т tcp flag Æ |
| text | |
| in | |
| out | ŷ |
| {rule mask offset}+ | rule Ω 8 ~ mask Ω 8
offset ñ ~ ↓
“+” / |

Ю'

AA AA AA AA AA AA BB BB BB BB BB BB CC CC DD DD
DD DD EE FF GG HH HH HH II II JJ KK LL LL MM MM
NN NN OO PP QQ QQ RR RR RR RR SS SS SS SS TT TT
UU UU VV VV VV VV WW WW WW WW XY ZZ aa aa bb bb

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| | ИИ | | | ИИ | |
|---|----------|----|---|-----|----|
| A | MAC | 0 | O | TTL | 34 |
| B | MAC | 6 | P | / | 35 |
| C | | 12 | Q | IP | 36 |
| D | VLAN tag | 14 | R | ip | 38 |

| | | | | | |
|---|----------|----|----|--------------|----|
| E | DSAP() | 18 | S | ip | 42 |
| F | SSAP() | 19 | T | TCP | 46 |
| G | Ctrl | 20 | U | TCP | 48 |
| H | Org Code | 21 | V | /1 | 50 |
| I | | 24 | W | | 54 |
| J | IP /1 | 26 | XY | IP
Æ | 58 |
| K | TOS | 27 | Z | Æ flags
Æ | 59 |
| L | IP | 28 | a | Windows size | 60 |
| M | ID /1 | 30 | b | è | 62 |
| N | Flags | 32 | | | |

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SNAP tag 802.3

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46.1

46.1.1 access-list

3 ... 4~ Â 3 **no**
Â

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**] [**range lower upper**] [**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*][**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**] [**range**
lower upper] [**time-range** *time-range-name*]

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ル

ACL

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```

    1 access-list 100 permit ip 10.1.1.0 0.0.0.255 10.2.1.0 0.0.0.255
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^A net-test is reachable

^ cmd
^ daytime
^ discard
^ domain
^ echo
^ exec
^ finger
^ ftp
^ ftp-data
^ gopher
^ hostname
^ ident
^ irc
^ klogin
^ kshell
^ login
^ nntp
^ pim-auto-rp
^ pop2
^ pop3
^ smtp
^ sunrpc
^ syslog
^ tacacs
^ talk
^ telnet
^ time
^ uucp
^ whois
^ www
Ю UDP 1 ~ UDP 1 1 1 1
^ biff
^ bootpc
^ bootps
^ discard
^ dnsix
^ domain
^ echo

```

      ^ isakmp
      ^ mobile-ip
      ^ nameserver
      ^ netbios-dgm
      ^ netbios-ns
      ^ netbios-ss
      ^ ntp
      ^ pim-auto-rp
      ^ rip
      ^ snmp
      ^ snmptrap
      ^ sunrpc
      ^ syslog
      ^ tacacs
      ^ talk
      ^ tftp
      ^ time
      ^ who
      ^ xdmcp
  10      Ethernet-type 10
      ^ aarp
      ^ arp
      ^ appletalk
      ^ decnet-iv
      ^ diagnostic
      ^ etype-6000
      ^ etype-8042
      ^ lat
      ^ lavc-sca
      ^ mop-console
      ^ mop-dump
      ^ mumps
      ^ netbios
      ^ vines-echo
      ^ xns-idp

```

```

      1' IP
  10      IP                               192.168.1.64 - 192.168.1.127

```


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**] [**range** lower upper] [**time-range** time-range-name]

IP 8 1

Â 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]

Â 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**] [**range** lower upper] [**time-range** time-range-name] [**match-all** tcp-flag]

Â 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**] [**range** lower upper] [**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]]] {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**] [**range** lower upper] [**time-range** time-range-name]

a) 10 ethernet-type cos

[sn] **deny** {[**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]

b) protocol

```
[sn] deny protocol [[VID [out][inner in]]] {source source-wildcard | host source | any}
{host source-mac-address | any } {ip 10.31 ce-mac-addressTnC4TnPf-0.0C4TnPf-0-wil6 Tc 0.1876 Tw 6
```



```

10 deny host 0013.0049.8272 any arp
Ruijie(config-mac-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# mac access-group mac1 in
" ' Ю IP ACL ~ IP ì 192.168.4.12 ÿ ~
1Â '
Ruijie(config)# ip access-list standard 34
Ruijie(config-ext-nacl)# deny host 192.168.4.12
Ruijie(config-ext-nacl)# show access-lists
ip access-list standard 34
10 deny host 192.168.4.12
Ruijie(config-ext-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# ip access-group 34 in

```

3

| 3 | |
|--------------------|-----------|
| show access-lists | |
| ip access-group | IP ACL |
| mac access-group | MAC ACL |
| ip access-list | IP ACL № |
| mac access-list | MAC ACL № |
| expert access-list | ж ACL № |
| permit | № 3 |

4

3

| 1 | |
|----------|--|
| V10.0 | V10.0 ЛЭ arp |
| V10.2(3) | ЛЭ Â 6XABig"PE5")g#e9A547#A%@4V1B D1aU |

| <i>id</i> | Expert 1^ 2700-2899~ |
|-------------|----------------------|
| <i>name</i> | Expert 1 |
| in | |
| out | ÿ |

Expert ACL

3

ACL 3 3 8 Â show
access-group 3

IO access-list accept_00d0f8xxxxxx_only Gigabit 1 3'
 Ruijie(config)# **interface GigaEthernet 0/1**
Ruijie(config-if)# expert access-group accept_00d0f8xxxxxx_only in

3

| 3 | |
|--------------------------|---------|
| show access-group | 3 ACL Â |

1

3

| 1 | |
|-------|--------------|
| V10.0 | ~ V10.0 10 3 |

46.1.4 expert access-list

3 ... ж ACL~ Â 3 **no** ACL

expert access-list extended {*id* | *name*}

no expert access-list extended {*id* | *name*}

| <i>id</i> | Expert 1^ 2700-2899~ |
|-------------|----------------------|
| <i>name</i> | ACL 1 |

Expert ACL

3

3 ↓ ʌ show expert access-lists 3 Â

1' ... ж 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)#
```

2' ... ж 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)#
```

3

| 3 | |
|--------------------------|---|
| show expert access-lists | ж |

↓

3

| ʌ | |
|-------|-------------|
| V10.0 | ˘ V10.0 ʌ 3 |

46.1.5 ip access-group

é ~ 3 ip access-group Â 3 no
↓ Â

ip access-group {*id* | *name*} {*in* | *out*}

no ip access-group { *id* | *name*} {*in* | *out*}

| <i>id</i> | IP ʌ˘ 1-199˘ 1300-2699˘ |
|-------------|-------------------------|
| <i>name</i> | IP ↓ |
| <i>in</i> | |
| <i>out</i> | Ÿ |

ACL

3

ip access-group 3 ~ ^

IO fastEthernet0/0 3 120
 Ruijie(config)# **interface fastEthernet 0/0**
 Ruijie(config-if)#**ip access-group 120 in**

3

| 3 | |
|----------------------------|-------------------------------------|
| access-list | ~ ^ |
| show access-lists | |
| show ip access-list | IP 1 1-99 1300
- 2699 3000 3199~ |

1

3

| 1 | |
|-------|--------------|
| V10.0 | ~ V10.0 10 3 |

46.1.6 ip access-list

3 ... IP ACL IP ACL~ ^ 3 **no**

ACL

ip access-list {extended | standard} {id | name}

no ip access-list {extended | standard} {id | name}

| <i>id</i> | IP 1~ ^ 1-99 1300-1999~
^ 100-199 2000-2699~ |
|-------------|---|
| <i>name</i> | IP 1 |

ACL

ACL deny permit 3 a 4~ ACL 71 Â show ip access-lists 3 ACL Â

1' ... 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)#
 2' ... ACL'
 Ruijie(config)# **ip access-list extended 123**
 Ruijie(config-ext-nacl)# **show ip access-lists**
 ip access-list extended 123

3

| 3 | |
|----------------------|----|
| show ip access-lists | IP |

4

3

| 11 | |
|-------|------------|
| V10.0 | V10.0 11 3 |

46.1.7 ip access-list resequence

3 ip ACL ~ ... IPV6 ACL~ Â 3
 no

ip access-list resequence {id | name} start-sn inc-sn

no ip access-list resequence {id | name}

| <i>id</i> | ACL 11 |
|-----------------|--------|
| <i>name</i> | ACL 1 |
| <i>start-sn</i> | 11 |
| <i>inc-sn</i> | 11 |

3

3 1/2 show access-lists 3 Â

```

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

```

3

| | |
|-------------------|--|
| 3 | |
| show access-lists | |

1

3

| | |
|-------|-----------|
| 1 | |
| V10.0 | V10.0 1/2 |

46.1.8 list-remark text

ACL 1 no

list-remark text

| | |
|------|--|
| | |
| Text | |

3

ACL


```
Ruijie(config-mac-nacl)# show mac access-lists  
mac access-list extended 704
```

| | |
|---|--|
| 3 | |
|---|--|

| | | |
|---|--------------------------|--------------|
| 3 | | |
| | show access-lists | |
| | ip access-list | ip ACL 100 |
| | ipv6 access-list | IPV6 ACL 100 |
| | deny | 100 100 ACL |
| | permit | 100 100 ACL |
| 4 | | |
| 3 | | |
| | V10.0 | * V10.0 100 |

46.1.12 permit

(permit) * 100 100 100

1) IP

[sn] **permit** {source source-wildcard | **host** source | **any**}

2) IP

[sn] **permit protocol** source source-wildcard destination destination-wildcard [**precedence** precedence] [**tos** tos] [**fragments**] [**range** lower upper] [**time-range** time-range-name]

IP 100 100 100

100 Internet Control Message Protocol (ICMP)

[sn] **permit 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]

100 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**] [**range** lower upper] [**time-range** time-range-name] [**match-all** tcp-flag]

100 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**] [**range** *lower upper*] [**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*][
source *low.96 0 Tds**source* **precedence**
[*sn* | *sn*]

[precedence precedence] [tos tos] [fragments] [range lower upper] [time-range time-range-name]

Â Address Resolution Protocol (ARP)

[sn] **permit arp** {vid vlan-id} [host source-mac-address | any] [host destination-mac-address | any] {sender-ip sender-ip-wildcard | host sender-ip | any} {sender-mac sender-mac-wildcard | host sender-mac | any} {target-ip target-ip-wildcard | host target-ip | any}

Â 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]

Â 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] [range lower upper] [time-range time-range-name] [match-all tcp-flag]

Â 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 destination-ipv6-address | any} [operator port [port]] [dscp dscp] [flow-label flow-label] [fragments] [range lower upper] [time-range time-range-name]

| | | |
|----|------|---|
| | | |
| ЛЮ | deny | - |

3

ACL Ю

ACL Ю ACL *

```

1' Ю ... Expert Extended ACL ж ACL IP
й 192.168.4.12 3 MAC й 001300498272 TCP Â
Ruijie(config)# expert access-list extended exp-acl
Ruijie(config-exp-nacl)# permit tcp host 192.168.4.12 host
0013.0049.8272 any any
Ruijie(config-exp-nacl)# deny any any any any

```

```

Ruijie(config-exp-nacl)# show access-lists
expert access-list extended exp-acl
10 permit tcp host 192.168.4.12 host 0013.0049.8272 any any
20 deny any any any any
Ruijie(config-exp-nacl)#
2' Ю IP ACL ~ IP ñ 192.168.4.12 ÿ TCP
ñ 100 Ì 1Â
Ruijie(config)# ip access-list extended 102
Ruijie(config-ext-nacl)# permit tcp host 192.168.4.12 eq 100 any
Ruijie(config-ext-nacl)# show access-lists
ip access-list extended 102
10 permit tcp host 192.168.4.12 eq 100 any
Ruijie(config-ext-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# ip access-group 102 in
Ruijie(config-if)#
3' Ю MAC ACL ~ MAC ñ 0013.0049.8272 ÿ
ñ 100 Ì 1Â
Ruijie(config)# mac access-list extended 702
Ruijie(config-mac-nacl)# permit host 0013.0049.8272 any aarp
Ruijie(config-mac-nacl)# show access-lists
mac access-list extended
10 permit host 0013.0049.8272 any aarp702
Ruijie(config-mac-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# mac access-group 702 in
4' Ю ip ACL ~ IP ñ 192.168.4.12 ÿ ~
1Â '
Ruijie(config)# ip access-list standard std-acl
Ruijie(config-std-nacl)# permit host 192.168.4.12
Ruijie(config-std-nacl)# show access-lists
ip access-list standard std-acl
10 permit host 192.168.4.12
Ruijie(config-std-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# ip access-group std-acl in
5' Ю IPV6 ACL ~ IP ñ 192.168.4.12 ÿ ~
1Â '
Ruijie(config)# ipv6 access-list extended v6-acl

```

```
Ruijie(config-ipv6-nacl)# 11 permit ipv6
host ::192.168.4.12 any
Ruijie(config-ipv6-nacl)# show access-lists
ipv6 access-list extended v6-acl
11 permit ipv6 host ::192.168.4.12 any
Ruijie(config-ipv6-nacl)# exit
```



```
Ruijie# show expert access-group interface gigabitethernet 0/2
expert access-group ee in
Applied On interface GigabitEthernet 0/2.
```

3

| 3 | |
|--------------------|---------------|
| expert access-list | Expert ACL 18 |

1

3

| 1 | |
|-------|------------|
| V10.0 | * V10.0 10 |

46.2.4 show ip access-group

IP ACL

show ip access-group[interface <interface>]

<interface>

3

IP ACL

~ ‡

IP ACL

```
Ruijie# show ip access-group interface gigabitethernet 0/1
ip access-group aaa in
Applied On interface GigabitEthernet 0/1.
```

3

| 3 | |
|----------------|-------------|
| ip access-list | IP ACL 18 A |

1

| 3 | 1 | |
|---|-------|---------|
| | V10.0 | V10.0 3 |

46.2.5 show mac access-group

MAC

show mac access-group[interface <interface>]

| | <interface> | |
|--|-------------|--|

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

| |
|---|
| 3 |
|---|

| | | | |
|--|---------|-----|---------|
| | MAC ACL | ~ ‡ | MAC ACL |
|--|---------|-----|---------|

```
Ruijie# show mac access-group interface gigabitethernet 0/3
mac access-group mm in
Applied On interface GigabitEthernet 0/3.
```

| 3 | 3 | |
|---|-----------------|-----------|
| | mac access-list | MAC ACL 3 |

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

| 3 | 1 | |
|---|-------|---------|
| | V10.0 | V10.0 3 |

47 VACL

47.1

Vlan access map *map_name* *map_sn*
 1~ ... **vlan access map** *map_name* *map_sn* *map_sn* 10
 2~ *map_name* *map_sn* *map_name* *map_sn*
 3~ *map_name* *map_sn* *map_name* *map_sn*
 4~ *map_name* *map_sn* 6553 *map_name*

47.1.1 action forward/drop/redirect

map actions *map_name* *map_sn* *map_name* *map_sn*
actions *map_name* *map_sn* *map_name* *map_sn*

action forward

no action forward

map actions *map_name* *map_sn* *map_name* *map_sn*
actions *map_name* *map_sn* *map_name* *map_sn*

action drop

no action drop

map actions *map_name* *map_sn* *map_name* *map_sn*
actions *map_name* *map_sn* *map_name* *map_sn*

action redirect { GigabitEthernet | Aggregateport | FastEthernet } { port_id }

no action redirect{GigabitEthernet | Aggregateport | FastEthernet } {port_id }

| actions forward | { ' } |
|------------------|-------|
| actions drop | { ' } |
| actions redirect | { ' } |

| | |
|-----------------|---------------------|
| | |
| <i>map_name</i> | map ý a 100 a ↓ ' |
| <i>map_sn</i> | map [0 - 65535] ↓ ' |

3

IO ... **vlan access map**
 Ruijie(config)# **vlan access-map ddd 20**
 Ruijie(config-access-map)#

| | |
|---|---|
| 3 | 3 |
| - | - |

↓

| | |
|---|---|
| 3 | 1 |
| - | - |

```

vlan access map          vlan 3 ~      /1 ~      vlan ~      ' vlan
filter aa vlan-list 1-33 map          1-33      vlan 3 ^

```

```

Ю      ÿ map ñ ff      vlan access map          vlan 5 3 ^
Ruijie(config)# vlan filter ff vlan-list 5

```

3

| | |
|---|---|
| 3 | |
| - | - |

1

3

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

47.2

47.2.1 show vlan access map

```

ÿ map ~      3 ^

```

show vlan access map

```

ÿ map ~      3 ^

```

show vlan access map *map_name*

| | |
|-----------------|---------|
| | |
| <i>map_name</i> | ÿ map ' |

3

```

1' Ю      show vlan access map '
Ruijie(config)# show vlan access-map
Vlan access-map aa 10
match mac address: 700, 710, m1, 720,

```

```

action: forward
Vlan access-map aa 20
match ip address: 10, 20, 30, sp1, sp2, 60, 50, 80,
action: drop
Vlan access-map dd 20
match mac address: 710, 720, m1, 760,
action: forward
Ruijie(config)#
2' Ю show vlan access map { map_name }
Ruijie(config)# show vlan access-map dd
Vlan access-map dd 20
match mac address: 710, 720, m1, 760,
action: forward
Ruijie(config)#

```

3

| | |
|---|---|
| 3 | |
| - | - |

1

3

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

47.2.2 show vlan filter

ŷ map vlan 3 ~ Ю 3 Â

show vlan filter

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

3

48 QoS

48.1

QoS ~ QoS ЛЮ '
Â 1 policy-map'
Â policy-map ↓ Л class-map'
Â class-map 1 ACL~ ACL ACE é ↓
,
Â э ACE ÿ“ ACL” 8 Â
Ю QoS П Â ↓ Â Policy Map
э ~ QoS П Â
QoS П ~ ã Policy Map ~ QoS П ì Off
↓ Â ЛЮ й QoS ,

| | |
|------------------|---------------|
| CoS | 0 |
| | 8 |
| | WRR |
| QueueWeight | 1:1:1:1:1:1:1 |
| WRR Weight Range | 1:15 |
| DRR Weight Range | 1:15 |
| | No Trust |

Cos

| Cos | CoS | |
|-----|-----|---|
| | 0 | 1 |
| | 1 | 2 |
| | 2 | 3 |
| | 3 | 4 |
| | 4 | 5 |
| | 5 | 6 |
| | 6 | 7 |
| | 7 | 8 |

CoS to DSCP

| CoS to DSCP | CoS | DSCP |
|-------------|-----|------|
| | 0 | 0 |
| | 1 | 8 |
| | 2 | 16 |
| | 3 | 24 |
| | 4 | 32 |
| | 5 | 40 |
| | 6 | 48 |
| | 7 | 56 |

IP-Precedence to DSCP

| IP-Precedence to DSCP | IP-Precedence | DSCP |
|-----------------------|---------------|------|
| | 0 | 0 |
| | 1 | 8 |
| | 2 | 16 |
| | 3 | 24 |
| | 4 | 32 |
| | 5 | 40 |
| | 6 | 48 |
| | 7 | 56 |

DSCP to CoS

| DSCP to CoS | DSCP | CoS |
|-------------|------|-----|
| | 0 | 0 |
| | 8 | 1 |
| | 16 | 2 |
| | 24 | 3 |
| | 32 | 4 |
| | 40 | 5 |
| | 48 | 6 |
| | 56 | 7 |

48.2

48.2.1 class maps

... ACL

ip access-list {**extended** | **standard**} { *acl-id* | *acl-name* }

mac access-list extended {*acl-id* | *acl-name*}

expert access-list extended {*acl-id* | *acl-name*}

access-list *acl-id* { 1 ~ 9999 } *ACL* { 1 ~ 9999 }

... class map { 1 ~ 9999 } class map { 1 ~ 9999 }

[no] class-map *class-map-name*

... class map { 1 ~ 9999 } { 1 ~ 9999 }

[no] match access-group *acl-name* | *acl-id*

| <i>acl-name</i> | ... ACL { 1 ~ 9999 } |
|--|----------------------------|
| <i>acl-id</i> | ... ACL { 1 ~ 9999 } id |
| <i>class-map-name</i> | ... class map { 1 ~ 9999 } |
| no class-map <i>class-map-name</i> | class map |
| no match access-group <i>acl-name</i> <i>acl-id</i> | { 1 ~ 9999 } |

3

```

1' ... MAC ACL, { 1 ~ 9999 } me
Ruijie(config)# mac access-list extended me
2' ... ACL { 1 ~ 9999 }
Ruijie(config-ext-macl)# permit host 1111.2222.3333 any
3' ... ACL
Ruijie(config-ext-macl)# exit
4' ... class-map, { 1 ~ 9999 } cm

```

QOS

48.2.4 mls qos cos

CoS

mls qos cos default-cos

no mls qos cos

| | | |
|--|--------------------|-----|
| | | |
| | <i>default-cos</i> | 0 7 |
| | no | |

CoS 0

3

Ruijie(config)# **interface gigabitethernet 1/1**
 Ruijie(config-if)# **mls qos cos 7**

| | | |
|--|--|---|
| | 3 | |
| | show mls qos interface interface-id | - |

4



```


```

```


```

```


```

```


```

```
Ruijie(config)# mls qos map cos-dscp 8 10 16 18 24 26 32 34
```

```


```

| show mls qos maps | dscp-cos maps,dscp-cos maps
ip-prec-dscp maps |
|-------------------|--|

```


```

```


```

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

48.2.6 mls qos map dscp-cos

DSCP CoS

mls qos map dscp-cos *dscp-list to cos*

no mls qos map dscp-cos

```


```

| <i>dscp-list</i> | ✓ a 1 a 1 |
|------------------|-----------|
| cos | ✓ 0 7 |
| no | |

```


```

```


```

```


```

```


```

```
Ruijie(config)# mls qos map dscp-cos 8 10 16 18 to 0
```


| | | |
|---|---|---|
| 3 | 3 | |
| | - | - |

4 **show mls qos maps** dscp-cos maps,dscp-cos maps ip-prec-dscp maps

| | | |
|---|----|---|
| 3 | 11 | |
| | - | - |

48.2.7 mls qos map ip-prec-dscp

ippre DSCP

mls qos map ip-prec-dscp dscp1...dscp8

no mls qos map ip-prec-dscp

| | | |
|--|------|-----------|
| | | |
| | dscp | 4 a 4 a 4 |
| | no | |

3

Ruijie(config)# **mls qos map ip-prec -dscp 8 10 16 18 24 26 32 34**

| | | |
|---|--------------------------|--|
| 3 | 3 | |
| | show mls qos maps | dscp-cos maps,dscp-cos maps
ip-prec-dscp maps |

4

| | | |
|---|----|---|
| 3 | 11 | |
| | - | - |

48.2.8 mls qos scheduler

mls qos scheduler [sp | rr | wrr | drr]

no mls qos scheduler

| | |
|-----|----------|
| Qos | и IP-PRE |
| | |

```
! gigabitethernet 1/1
! s trust cos
```

| | |
|---------------------------------------|------------------|
| <i>class-map-name</i> | ... class map ↓ |
| no class <i>class-map-name</i> | ↑ |
| <i>new-dscp</i> | DSCP ' ↓ a ↓ a ↓ |
| <i>rate-bps</i> | 8 ~ Æ kbps |
| <i>burst-byte</i> | 8 ~ Æ kbyte |
| <i>drop</i> | ↑ |
| <i>dscp-value</i> | ↑ DSCP ↓ a |

3

```

1' ... policy map, ↓ po
Ruijie(config)# policy-map po
2' class-map class-map-name

```



```
Ruijie(config)# priority-queue cos-map 1 0 1
```

3

```
show mls qos queueing
```

-

1

a 1

a 1~

3

11

-

-

48.2.13 service-policy

policy map 3

service-policy {input | output} *policy-map-name*

no service-policy {input | output}

policy-map-name

... policymap 1

no

policy map

3

3

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

```
Ruijie(config-if)# service-policy input po
```

3

3

WRR

wrr-queue bandwidth *weight1 ... weightn***no wrr-queue bandwidth**

| | | | |
|--|--------------------------|---|---------|
| | | | |
| | <i>weight1...weightn</i> | й | n ~ n √ |
| | no | | |

weight1: ...: weightn = 1:...:1

{

Ruijie(config)# **wrr-queue bandwidth** 1 2 3 4 5 6 7 8

| | | |
|--|------------------------------|---|
| | { | |
| | show mls qos queueing | - |

√

a √ a √ Â

| | | |
|--|---|---|
| | ∏ | |
| | - | - |

48.3

48.3.1 show class-map

class map

show class-map [*class-name*]

| | | |
|--|-------------------|-------------|
| | | |
| | <i>class-name</i> | class map ∏ |

3

Ruijie# show class-map

| | |
|---|--|
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Ruijie# show mls qos maps

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48.3.5 show mls qos queueing

QoS (cos-to-queue map, wrr weight, drr weight)

show mls qos queueing

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Ruijie# show mls qos queueing

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Ruijie# show mls qos scheduler

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| 3 | 11 | |
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49 Voice VLAN

49.1

49.1.1 voice vlan

Voice VLAN ʘ VLAN ʘ Voice VLAN ʘ ʘ ʘ **no**
Voice VLAN ʘ ʘ

voice vlan *vlan-id*

no voice vlan

| <i>vlan-id</i> | Voice VLAN ID ʘ |
|----------------|-----------------|

ʘ

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| ʘ | Voice VLAN ʘ ʘ ʘ | Voice VLAN ID ʘ |
|----|--------------------------------------|-------------------------|
| 1~ | Voice VLAN ʘ ʘ "I ... | VLAN ʘ |
| 2~ | VLAN 1 VLAN ʘ ... ʘ | VLAN 1 a ʘ Voice VLAN ʘ |
| 3~ | a VLAN ʘ ʘ Voice VLAN ʘ Super VLAN ʘ | |
| 4~ | ʘ ʘ 802.1x VLAN ʘ ʘ ʘ ʘ | ʘ ʘ ʘ ʘ |
| 5~ | a RSPAN Remote VLAN ʘ Voice VLAN ʘ 1 | VLAN ʘ ʘ Voice VLAN ʘ ʘ |

1' Voice VLAN ʘ ʘ VLAN2 ʘ Voice VLAN ʘ

```
Ruijie(config)# vlan 2
Ruijie(config-vlan)# exit
Ruijie(config)# voice vlan 2
```

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49.1.3 voice vlan cos

Voice VLAN CoS 6 10.4 3 no

voice vlan cos *cos-value*

no voice vlan cos

| | | |
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| | | |
| <i>cos-value</i> | Voice VLAN | CoS 6 |

cos-value 6 10.4

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Voice VLAN CoS 6 DSCP 10.4

1' Voice VLAN 10.4 CoS 6 5
Ruijie(config)# **voice vlan cos 5**

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| 3 | | |
| show voice vlan | Voice VLAN | 6 |

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| 3 | 10.4 | 3 |
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49.1.4 voice vlan dscp

Voice VLAN DSCP 6 10.4 3 no

voice vlan dscp *dscp-value*

no voice vlan dscp

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| | dscp-value | Voice VLAN | DSCP | Â |
| | dscp-value | ÿ 46 Â | | |
| 3 | | | | |
| | Â | Voice VLAN | CoS 6 DSCP | "l ~ |
| | 1' | Voice VLAN | "l ~ DSCP ÿ 40 Â | |
| | Ruijie(config)# voice vlan dscp 40 | | | |
| 3 | | | | |
| | show voice vlan | Voice VLAN | 6 | Â |
| 4 | | | | |
| 3 | 11 | | | |
| | 10.4 | 3 | | |

49.1.5 voice vlan enable

Ю 3 Voice VLAN 11 Â 111 3 **no**
Voice VLAN 11 Â

voice vlan enable

no voice vlan enable

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Ю Voice VLAN 11 Â

1' OUI 0012.3400.0000 ñ Voice VLAN ñ Company A Â
Ruijie(config)# **voice vlan mac-address 0012.3400.0000 mask**
ffff.ff00.0000 description Company A

1~ Voice VLAN ~
 1 Voice VLAN Voice VLAN 11 A
 2~ 11 ~ 11 ~ a
 native VLAN 11 Voice VLAN A
 3~ Trunk Port/Hybrid Port 11 11 VLAN ~
 11 Voice VLAN 11 VLAN 11 11 Voice
 VLAN 11 11 a 11 Voice VLAN
 a

| MAC | MAC |
|----------------|--|
| Voice VLAN OUI | Voice VLAN |
| ~ | <div> Voice VLAN Voice VLAN </div> |
| | |
| | |
| | <div> Voice VLAN tag Voice VLAN tag </div> |
| | |
| | |

1' Voice VLAN
Ruijie(config)# voice vlan security enable

| 3 | <div> Voice VLAN </div> |
|-----------------|-------------------------|
| show voice vlan | <div> Voice VLAN </div> |

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| 4 | |
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3 4 Voice VLAN 6 5 Voice VLAN 7
8

1' Voice VLAN
Ruijie(config)# **show voice vlan**
Voice VLAN status: ENABLE //Voice VLAN
Voice VLAN ID: 2 //Voice VLAN ID
Voice VLAN security mode: Security //
Voice VLAN aging time: 5 minutes //
Voice VLAN cos: 6 // CoS
Voice VLAN dscp: 46 // DSCP
Current voice vlan enabled port mode: // Voice VLAN 6
PORT MODE

Fa0/1 Auto

3

| 3 | |
|--|-----------------------------------|
| voice vlan <i>vlan-id</i> | Voice VLAN
VLAN 8 Voice VLAN 8 |
| voice vlan aging <i>minutes</i> | Voice VLAN 8 |
| voice vlan cos <i>cos-value</i> | Voice VLAN CoS 8 |
| voice vlan dscp <i>dscp-value</i> | Voice VLAN DSCP 8 |
| voice vlan enable | Voice VLAN 7 8 |
| voice vlan mode auto | Voice VLAN 8 |
| voice vlan security enable | Voice VLAN 8 |

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| 10.4 | 3 |

49.2.2 show voice vlan oui

OUI 8 OUI 8

show voice vlan oui

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50.1

50.1.1 rgos-security compatible

Ю' П Й RGOS ~ } **rgos-security**
compatible , RGOS ~ no }

rgos-security compatible

no rgos-security compatible

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Ю' П Й RGOS

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~ } Л'

1' П Й RGOS '
Ruijie(config)#**no gos-security compatible**

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| З | 10.4 | З |

51.1.2 vrrp description

3 ì VRRP ~ è no Â

vrrp group description text

no vrrp group description

| <i>group</i> | VRRP 1 |
|--------------|--------|
| <i>text</i> | VRRP |

Ю VRRP Э VRRP 1 Â VRRP 1 ~ #
VRRP Â

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ì VRRP ~ ↓ √ √ VRRP Â

Ю √ E0 Э VRRP 1 ì Building A – Marketing and
Administration Â
interface FastEthernet 0/0
ip address 10.0.1.1 255.255.255.0
vrrp 1 ip 10.0.1.20
vrrp 1 description “Building A - Marketing and Administration”

| 3 | |
|---|---|
| 3 | Ruijie(config-if)# vrrp group ip |

vrrp group ip ipaddress [secondary]

no vrrp group ip ipaddress [secondary]

| <i>group</i> | VRRP 1 |
|------------------|--------|
| <i>ipaddress</i> | IP |
| secondary | IP |

Ю Э VRRP 1 1

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a secondary ~ ж IP и ы IP 1
 ~ VRRP Л IP ~ no 3 4 VRRP IP
 ~ и ~ и Э ч 1 IP 1

Ю ~ Л 0 Э VRRP 1 1 VRRP 1 и 1
 ы IP и 10.0.1.20 IP и 10.0.2.20 1
 interface FastEthernet 0/0
 no switchport
 ip address 10.0.1.1 255.255.255.0
 ip address 10.0.2.1 255.255.255.0 secondary
 vrrp 1 ip 10.0.1.20
 vrrp 1 ip 10.0.2.20 secondary

3 61 Tf220.64 re142C5.1324.5 mh355.945424.02 -201.92 -19.62 reW*0.85

no vrrp group preempt [delay]

| group | VRRP 1 |
|---------------|-----------------------|
| delay seconds | ↓ ~ 0 Master
Â 0 Â |

Ю Э VRRP 1 Â VRRP 1 ~ VRRP
Ю Â

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VRRP Ю "I Master "I ~
й VRRP й Â VRRP Ю
"I Master "I ~ ≠ a й VRRP й Â VRRP
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[illegible]

51.1.6 vrrp timers advertise

3 Ÿ VRRP ~ è no Â

vrrp group timers advertise interval

no vrrp *group* timers advertise

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| | VRRP | л |
| group | VRRP | (л и æ) |
| interval | VRRP | |

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| Ю | Э | VRRP л Â | VRRP л ~ | ÿ |
| | й 1 Ä | | | |

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VRRP 3 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Ю VRRP 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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| 3 | |
|---|---|
| Ruijie(config-if)# vrrp group ip <i>ipaddress</i> [secondary] | VRRP 1 IP |
| Ruijie(config-if)# vrrp group timers learn | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 |

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51.1.7 vrrp timers learn

3 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

vrrp group timers learn

no vrrp group timers learn

| <i>group</i> | VRRP 1 |
|--------------|--------|

Ю 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

3

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

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| 3 | 1 | |
| | RGOS 10.4 | - |

51.2 VRRP

51.2.1 debug vrrp

3 VRRP à VRRP Y* à VRRP 70 ~ è no
 11 Â

debug vrrp

no debug vrrp

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| | Ruijie# debug vrrp state | VRRP |
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| 3 | 1 | |
| | - | - |

51.2.2 debug vrrp errors

3 VRRP ~ è no Â

debug vrrp errors

no debug vrrp errors

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| | IO | VRRP | Â |
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| | IO ~ VRRP Â |
| | 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 |

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51.2.3 debug vrrp events

3 VRRP Y" ~ è no Â

debug vrrp events

no debug vrrp events

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| | IO ~ VRRP Y" Â |
| | Ruijie# debug vrrp events |
| | Ruijie# |
| | 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 |

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51.2.4 debug vrrp packets

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VRRP 3

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3 VRRP Â

show vrrp [brief | group]

| brief | ↓ ~ VRRP |
|--------------|----------|
| <i>group</i> | VRRP /1 |

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a ↓ ~ VRRP Â

1' 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

min delay is 0 sec

Priority is 100

Master Router is 192.168.201.213 , pritority is 120

Master Advertisement interval is 3 sec

Master Down interval is 9 sec

FastEthernet 0/0 - Group 2

State is Master

Virtual IP address is 192.168.201.2 configured

Virtual MAC address is 0000.5e00.0102

Advertisement interval is 3 sec

Preemption is enabled

min delay is 0 sec

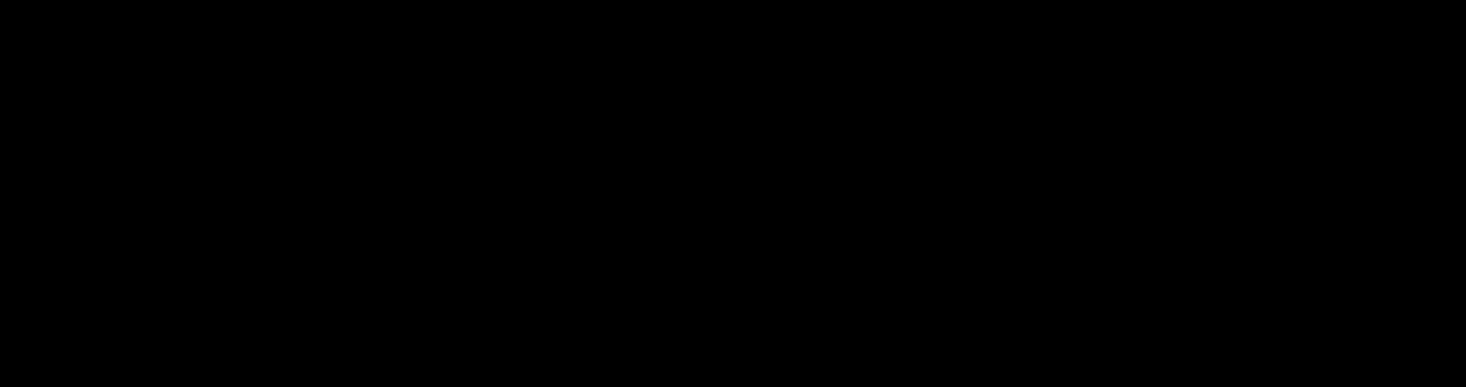
Priority is 120

Master Router is 192.168.201.217 (local), priority is 120

Master Advertisement interval is 3 sec

Master Down interval is 9 sec

2' VRRP



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|--|---|
| | FastEthernet 0/0 2 120 - - P Master 192.168.201.217
192.168.201.2 |
|--|---|

| | | | |
|---|---|---|------------|
| 3 | | | |
| | | | |
| 3 | <table border="1"><tr><td>Ruijie(config-if)# vrrp group ip ip02fress
[secondary]</td><td>VRRP 11 IP</td></tr></table> | Ruijie(config-if)# vrrp group ip ip02fress
[secondary] | VRRP 11 IP |
| Ruijie(config-if)# vrrp group ip ip02fress
[secondary] | VRRP 11 IP | | |

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Virtual MAC address is 0000.5e00.0101
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 100
Master Router is 192.168.201.213 , pritority is 120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec
FastEthernet 0/0 - Group 2
State is Master
Virtual IP address is 192.168.201.2 configured
Virtual MAC address is 0000.5e00.0102
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 120
Master Router is 192.168.201.217 (local), priority is 120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec

| |
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3 Ruijie(config-if)# **vrrp group ip ip address**
c [ehdary(v)1] RP

52 RLDP

52.1

52.1.1 rldp detect-interval

3 RLDP 3 Â

rldp detect-interval *interval*

no rldp detect-interval

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| | | |
| <i>interval</i> | ~ √ | й 2-15 |

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Ю й 5s :
Ruijie(config)# **rldp detect-interval 5**

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rldp detect-max num**no rldp detect-max**

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| | <i>num</i> | , 2-10 |

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Ruijie(config)#

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rldp detect-max 5

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rldp detect-interval

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52.1.3 rldp enable

3 8 RLDP

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rldp enable**no rldp enable**

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RLDP 3

Ruijie(config)# **rldp enable**

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| rldp port | | RLDP 11 |

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52.1.4 rldp port

3 rldp 3 11

rldp port {unidirection-detect | bidirection-detect | loop-detect } {warning | shutdown-svi | shutdown-port | block}

no rldp port { unidirection-detect | bidirection-detect | loop-detect }

| unidirection-detect | |
|---------------------|--------------|
| bidirection-detect | 3 |
| loop-detect | |
| warning | |
| shutdown-svi | shutdown svi |
| shutdown-port | shutdown |
| block | - |

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Ruijie# **interface fas 0/1**
Ruijie(config-if)# **rldp port loop-detect block**

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| rldp enable | rldp 3 |

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52.1.5 rldp reset

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rldp shutdown disable rldp ^

rldp reset

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IO 3 '
Ruijie# **rldp reset**

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| rldp enable | Rldp 3 |

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52.2

52.2.1 show rldp

rldp Â

show rldp [**interface** *interface-id*]

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53 TPP

53.1

53.1.1 topology guard

3 Ю topology guard 3 П Â
3 no П Â

[no] topology guard

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| | Â П б 3 cpu topology-limit Â П Л Л | |
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| | Ю
Ruijie(config)# topology guard
Ruijie(config)# no topology guard | П ' |
|--|--|-----|

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| | 3 | |
| 3 | tp-guard port enable | П Â |
| | cpu topology-limit | CPU Â |

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53.1.2 tp-guard port enable

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[no] tp-guard port enable



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tpp

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Ruijie# show tpp

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| topology guard | П |

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54

54.1

54.1.1 cd

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cd [*filesystem:*][*directory*]

54.1.2 copy

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copy *source-url destination-url*

| <i>source-url</i> | ¨ URL Â ¨ Ñ Ю ¨
↓ √ Â |
|------------------------|----------------------------|
| <i>destination-url</i> | ¨ URL Â ¨ Ñ Ю ¨ ¨
↓ √ Â |

ÿ

copy ÿ ↓ √ √ ¨

Â

¨ URL ¨

| flash: | flash Â Ñ ↓ √ Â
URL a A~ flash Â
¨ Ÿ flash Ñ Â |
|----------------|--|
| tftp: | TFTP ¨ |
| xmodem: | xmodem ¨ |
| slave: | ÿ Ñ flash |
| usb0: | usb |
| usb1: | γ usb |
| sd0: | sd ´ |

~ a .

& URL ‡ ¨

1' ÿ tftp ¨ ÑЮ ¨

```
Ruijie#copy tftp://192.168.201.54/rgos.bin flash:/
2' 3' tftp
Ruijie#copy flash:/rgos.bin tftp://192.168.201.54/rgos.bin
3' xmodem IO
Ruijie# copy xmodem: flash:/config.text
4' U
Ruijie#copy flash:/config.text usb0:/config.text
5' y
Ruijie#copy flash:/config.text slave:/config.text
6' y flash sd'
Ruijie#copy flash:/rgos.bin sd0:/rgos.bin
7' y U sd'
Ruijie#copy usb0:/config.text sd0:/config.text
8' y sd' U
Ruijie#copy sd0:/config.text usb0:/config.text
```

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| 3 | |
|--------|--|
| del | |
| rename | |
| dir | |

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54.1.3 delete

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delete url

| url | url |
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url

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```
Ruijie# dir slave0:/
```

```
Directory of slave:/
```

| Mode | Link | Size | MTime | Name |
|------|------|------|-------|------|
|------|------|------|-------|------|

```
1 10838016 2008-01-01 00:01:53 rgos.bin
```

```
1      399 2008-01-01 00:01:37 config.text
```

```
1      399 2008-01-01 00:17:58 cfg.txt
```

3 Files (Total size 11210782 Bytes), 0 Directories.

Total 33030144 bytes (31MB) in this device, 20463616 bytes (19MB) available.

2^t Ю

Ruijie# dir

Directory of temp:/

| Mode | Link | Size | MTime | Name |
|------|------|------|-------|------|
|------|------|------|-------|------|

```
1      399 2008-01-01 00:17:58 a.dat
```

```
1 Files (Total size 399 Bytes), 0 Directories.
```

Total 33030144 bytes (31MB) in this device, 20463616 bytes (19MB) available.

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pwd

cd

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| | | |

54.1.5 mkdir

...

mkdir *directory*

[illegible]

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$$\dots \quad \downarrow \quad \downarrow (\quad) \hat{A}$$

[illegible]

```
rename url1 url2
```

| | | |
|-------------|--|-----|
| | | |
| <i>url1</i> | | URL |
| <i>url2</i> | | URL |

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pwd



55

55.1 CPU

55.1.1 cpu-log

CPU , ↓ ∪ **cpu-log** $\hat{A}$
cpu-log *log-limit low_num high_num*

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55.1.2 show cpu

CPU 3 show21 2 397Tj7 Tf291.6 668.113.98 62.34 575

| | | | | |
|-------------|----|----|----|------------------------|
| 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 |
| 4t_daemon | | | | |
| 4t_daemon | | | | |
| 4t_dvmp_snp | 17 | 0% | 39 | 0% |

| | | | | |
|----|----|----|----|-------------------------|
| 44 | 0% | 0% | 0% | ef6_inconsistent_daemon |
| 45 | 0% | 0% | 0% | imid |
| 46 | 0% | 0% | 0% | nsmd |
| 47 | 0% | 0% | 0% | ripd |
| 48 | 0% | 0% | 0% | ripngd |
| 49 | 0% | 0% | 0% | ospfd |
| 50 | 0% | 0% | 0% | ospf6d |
| 51 | 0% | 0% | 0% | bgpd |
| 52 | 0% | 0% | 0% | pimd |
| 53 | 0% | 0% | 0% | pim6d |
| 54 | 0% | 0% | 0% | pdmd |
| 55 | 0% | 0% | 0% | dvmrpd |
| 56 | 0% | 0% | 0% | vtty_connect |
| 57 | 0% | 0% | 0% | aaa_task |
| 58 | 0% | 0% | 0% | Tlogtrap |
| 59 | 0% | 0% | 0% | dhcp6c |
| 60 | 0% | 0% | 0% | sntp_recv_task |
| 61 | 0% | 0% | 0% | ntp_task |
| 62 | 0% | 0% | 0% | sla_daemon |
| 63 | 0% | 3% | 1% | track_daemon |
| 64 | 0% | 0% | 0% | pbr_guard |
| 65 | 0% | 0% | 0% | vrrpd |
| 66 | 0% | 0% | 0% | psnpg |
| 67 | 0% | 0% | 0% | igsnpg |
| 68 | 0% | 0% | 0% | coa_recv |
| 69 | 0% | 0% | 0% | co_oper |
| 70 | 0% | 0% | 0% | co_mac |
| 71 | 0% | 0% | 0% | radius_task |
| 72 | 0% | 0% | 0% | tac+_acct_task |
| 73 | 0% | 0% | 0% | tac+_task |
| 74 | 0% | 0% | 0% | dhcpg_task |
| 75 | 0% | 0% | 0% | dhcps_task |
| 76 | 0% | 0% | 0% | dhcpping_task |
| 77 | 0% | 0% | 0% | dhcpg_task |
| 78 | 0% | 0% | 0% | uart_debug_file_task |
| 79 | 0% | 0% | 0% | ssp_init_task |
| 80 | 0% | 0% | 0% | rl_listen |
| 81 | 0% | 0% | 0% | ikl_msg_operate_thread |
| 82 | 0% | 0% | 0% | bcmDPC |

| | | | | |
|-----|-----|-----|-----|------------------------|
| 83 | 0% | 0% | 0% | bcmL2X.0 |
| 84 | 3% | 3% | 3% | bcmL2X.0 |
| 85 | 0% | 0% | 0% | bcmCNTR.0 |
| 86 | 0% | 0% | 0% | bcmTX |
| 87 | 0% | 0% | 0% | bcmXGS3AsyncTX |
| 88 | 0% | 2% | 1% | bcmLINK.0 |
| 89 | 0% | 0% | 0% | bcmRX |
| 90 | 0% | 0% | 0% | mngpkt_rcv_thread |
| 91 | 0% | 0% | 0% | mngpkt_recycle_thread |
| 92 | 0% | 0% | 0% | stack_task |
| 93 | 0% | 0% | 0% | stack_disc_task |
| 94 | 0% | 0% | 0% | redun_sync_task |
| 95 | 0% | 0% | 0% | conf_dispatch_task |
| 96 | 0% | 0% | 0% | devprob_task |
| 97 | 0% | 0% | 0% | rdp_snd_thread |
| 98 | 0% | 0% | 0% | rdp_rcv_thread |
| 99 | 0% | 0% | 0% | rdp_slot_change_thread |
| 100 | 4% | 2% | 1% | datapkt_rcv_thread |
| 101 | 0% | 0% | 0% | keepalive_link_notify |
| 102 | 0% | 0% | 0% | rerp_msg_rcv_thread |
| 103 | 0% | 0% | 0% | ip_scan_guard_task |
| 104 | 0% | 0% | 0% | ssp_ipmc_hit_task |
| 105 | 0% | 0% | 0% | ssp_ipmc_trap_task |
| 106 | 0% | 0% | 0% | hw_err_snd_task |
| 107 | 0% | 0% | 0% | rerp_packet_send_task |
| 108 | 0% | 0% | 0% | idle_vlan_proc_thread |
| 109 | 0% | 0% | 0% | cmic_pause_detect |
| 110 | 1% | 1% | 1% | stat_get_and_send |
| 111 | 0% | 1% | 0% | rl_con |
| 112 | 75% | 80% | 90% | idle |

CPU LISR HISR CPU CPU
 5 1 5 5 1 5

| No | /1 |
|------|-------|
| 5Sec | 5 CPU |
| 1Min | 1 CPU |
| 5Min | 5 CPU |

| | LISR | CPU | HISR | CPU |
|------------|-----------------------|---------|------|-----|
| Windows IO | System Idle Process L | idle | CPU | |
| idle | CPU 75% | CPU 75% | | |

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55.2

55.2.1 memory-lack exit-policy

OSPF → RIP → PIM-SM → BGP →

memory-lack exit-policy (bgp|ospf|pim-sm|rip)

no memory-lack exit-policy

[illegible]

Итого: _____

lower (show memory 3 ↓ Л lower и Â и è

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й bgp Â БGP ~ б Ё ~ ‡ ↓ Л а

[illegible]

```
Ruijie(config)# memory-lack exit-policy bgp
```

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|---|-------------|--|
| 3 | 3 | |
| | show memory | |

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|---|-----------|---|
| 3 | 11 | |
| | 10.3(4b3) | 3 |

55.2.2 show memory

```
3 show memory ^
```

show memory

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```

IO          show memory          Â
Ruijie#show memory
System Memory Statistic:

```

Used Rate : 96%

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| lower | ш а

8 memory-lack exit-policy з Â |
| low | a
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55-8

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| | 3 | Â |
| & | a ¼
BGP,OSPF,RIP,LDP,PIM,ISIS | a ¼ Ÿ
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| | |
|--|---|
| | 1' Ю ã show memory protocols
Ruijie(config)# show memory protocols
===== |
| | protocol memory(byte) |
| | BGP 102000000 |
| | OSPF 24000000 |
| | RIP 10000000 |
| | PIM 50000000 |
| | LDP 20000000 |
| | Total 206000000 |

| | |
|-------------|---|
| 3 | 3 |
| show memory | |

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|-----------|----|
| 3 | 11 |
| 10.3(4b3) | 3 |

56

56.1

56.1.1 threshold set

à CPU Â CPU ~ ↓ 3 ~ ↑ ò CPU à
 CPU ~ syslog Â ~ ÿ MIB ↓ ~
 ↓ no

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1'

M1

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Ruijie(config)# **threshold set memory M1 70 90**

2'

γ 11

CPU

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Ruijie(config)# **threshold set cpu member 2 70 90**

3

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show threshold

3

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11

10.3(4b3)

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56.2

56.2.1 show threshold

Â

show threshold {cpu | memory | temperature} [M1 | M2 | slot *n* | member *n*]

| cpu memory temperature | ~ Б ~
~ memory ~
~ temperature ~ |
|----------------------------|--|
| M1 M2 slot <i>n</i> | ~ Æ ~
~ 11 ~
~ Æ ~ |
| member <i>n</i> | ~ Æ ~
~ n ~
~ 11 ~
~ Æ ~ |

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1'

M1CPU

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Ruijie# show threshold cpu M1

2'

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Ruijie# show threshold memory

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| 3 | |
| threshold set | 3 |

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| 10.3(4b3) | 3 |

57

57.1

57.1.1 clear logging

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clear logging

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Ruijie#

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clear logging

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| | ǎ | |
| ǎ | logging on | |
| | show logging | ǎ ʘ |
| | logging buffered | ǎ ʘ |

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57.1.2 more flash

FLASH

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57.1.4 logging console

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8 1 3 ~

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57.1.5 logging count

| <i>facility-type</i> | Syslog ~ é Â |
|----------------------|--------------|

Local7(23)

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Ю ^ 2~ Syslog ↓

| 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) |

й (local7) 23 Â

Ю Syslog ò kernel
 Ruijie(config)# **logging facility kern**

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| 3 | |
|------------------------|-------|
| logging console | 8 1 3 |

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| - | - |

57.1.7 logging file flash

FLASH ~ Ю 3 Â 1 FLASH
 ~ 3 no Â

logging file flash:filename [*max-file-size*] [*level*]

no logging file

| <i>Filename</i> | ~ 1 Â a ~ ~ ò txt Â |
|----------------------|--|
| <i>max-file-size</i> | ~ Â ÿ 128K 6M bytes
ò 128K Â |
| <i>level</i> | ~ Â 1 2
1 ~ ≠ 1 2 Â
FLASH ò 6 Â
1 Â |

a FLASH Â

3

Syslog Server a ~ 1 2

| FLASH Â | |
|-----------------------------------|--|
| ~ 1 ò ò txt ~ 1 1 Â | |
| FLASH 1 FLASH | |
| FLASH logging file flash ~ a Â | |

```

Ю FLASH ~ ~ J ñ trace.txt ~ ñ 64K,
ñ 6Â
Ruijie(config)# logging file flash:trace

```

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|--------------|---------|
| logging on | |
| show logging | щ щ ~ Л |
| more flash | FLASH |

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57.1.8 logging monitor

```

VTY ^ telnet ã SSH ~ Э
Ю 3 Â 3 no VTY Э Â

```

logging monitor *level*

no logging monitor

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| <i>level</i> | щ Â Л J ~ # Л
1 Â щ |
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Debugging (7)

```

VTY Э ~ "l 3 terminal monitor
VTY Â # logging monitor ð Â
Logging monitor ð VTY Â

```

```

Ю VTY Э ñ 6
Ruijie(config)# logging monitor informational

```



```
Ruijie(config)#logging rate-limit all 10 except warnings
```

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|--------------------|---|
| show logging count | |
| show logging | 6 |

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| - | - |

57.1.11 logging server

server Syslog Sever IO 3 Å Syslog
 Syslog Server 3 no Å

logging server {ip-address [vrf vrf-name] | ipv6 ipv6-address}

no logging server {ip-address [vrf vrf-name] | ipv6 ipv6-address}

| ip-address | ÿ IP ' |
|--------------|-------------|
| vrf vrf-name | ÿ VRF VPN ~ |

ipv6 ipv6-address

ÿ IPV6 ' ssTw <384 316.88 0.24 20.5

| | | |
|---|--------------|---------------|
| 3 | | |
| | logging on | |
| | show logging | ǎ Ѱ ~ Ќ |
| | logging trap | syslog server |

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|---|---|---|
| 3 | 1 | |
| | - | - |

57.1.12 logging source interface

~ Ю 3 Â 3 no 4
Â

logging source interface *interface-type interface-number*

no logging source interface

| | | |
|--|-------------------------|---|
| | | |
| | <i>interface-type</i> | |
| | <i>interface-number</i> | 1 |

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| | |
|--|--------------------------|
| | Ю Syslog Server IP IP Âй |
| | ~ Ќ 3 IP й IP ~ |
| | ÿ 4 Э IP 3 IP Â |
| | Э IP ~ ‡ IP Ўй IP |

Ю Loopback 0 й Syslog
Ruijie(config)# **logging source interface loopback 0**

| | | |
|---|---------|---------------|
| 3 | | |
| | logging | Syslog Server |

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57.1.13 logging synchronous

Ю б 1 П ~ 1 П ~ 3 no Â

logging synchronous

no logging synchronous

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Ruijie(config)#**line console**

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57.1.14 logging trap

3 no Syslog Server ~ Ю 3 Â

57.1.15 service sequence-numbers

$\Lambda \hat{A}$ $\mathbb{T} \ominus \Lambda^{\sim}$ Ю $\mathfrak{z} \hat{A}$ $\mathfrak{z}$ no $\downarrow$

service sequence-numbers

no service sequence-numbers

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Ю $\mathbb{T} \ominus \Lambda^{\sim}$
 Ruijie(config)# service sequence-numbers

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VTY
no A

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terminal monitor

terminal no monitor


```

IO          show logging
Ruijie# show logging
Syslog logging: enabled
Console logging: level debugging, 4 messages logged
Monitor logging: level informational, 0 messages logged
Buffer logging: level debugging, 6 messages logged
Timestamp debug messages: datetime
Timestamp log messages: disabled
Sequence log messages: enable
Trap logging: level debugging, 2 message lines logged,0 reserved,0
fail
logging to 202.101.11.22
logging to 192.168.200.112
Log Buffer (Total 4096 Bytes) : have written 680
00001 2004-11-17 10:20:59 Ruijie: %7:%LINK CHANGED: Interface
FastEthernet 0/0, changed state to up
00002 2004-11-17 10:20:59 Ruijie: %7:%LINE PROTOCOL CHANGE:
Interface FastEthernet 0/0, changed state to UP
00003 2004-11-17 10:57:18 Ruijie: %7:%LINK CHANGED: Interface
FastEthernet 0/1, changed state to administratively down
00004 2004-11-17 10:57:21 Ruijie: %7:%LINK CHANGED: Interface
FastEthernet 0/1, changed state to down
00005 2004-11-17 10:57:41 Ruijie: %7:%LINK CHANGED: Interface
FastEthernet 0/1, changed state to administratively down
00006 2004-11-17 10:57:43 Ruijie: %7:%LINK CHANGED: Interface
FastEthernet 0/1, changed state to down

```

| Syslog logging | enabled, disabled |
|-----------------|-------------------|
| Console logging | 8 1 3 ~ 7 |
| Monitor logging | VTY 3 ~ 7 |

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| | |
|--------------------------|-------------------|
| Buffer logging | ǎ џ ъ Ѵ |
| Timestamp debug messages | Debug |
| Timestamp log messages | Log |
| Sequence log messages | /1 |
| Trap logging | Syslog Server ъ Ѵ |
| Log Buffer | ǎ џ |

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| logging on | | |
| clear logging | ǎ џ | |

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57.2.2 show logging count

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show logging count

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Jul 6 10:29:57

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| logging count | π |
| show logging | 6
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| clear logging | ǎ ψ |

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| 3 | 1 | |
| | 10.4(1) | 3 7 SD' |
| | 10.4(2b4) | SD' 3 y usb 3 |

58.1.2 usb remove

usb remove *device-id*

| | | |
|-----------|--------------------|------------------|
| | | |
| device-id | й 1 Â USB ID 1 Â 1 | ↓ 7 show usb ↓ Â |

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USB ~ 3 ~ 7 Â

7 ~ ↓ Â ~

USB ~ ‡ 7 Â

Ю й Э USB Â

Ruijie# **usb remove 0**

OK, now you can pull out the device 0.

*Jan 1 00:18:16: %USB-5-USB_DISK_REMOVED: USB Disk <Mass Storage> has been removed from USB port 0!

А ↓ 7 USB Â

| | | |
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| 3 | 3 | |
| | - | - |

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| 3 | | |
| | 11 | |
| | 10.4(1) | 3 11 SD´ |
| | 10.4(2b4) | SD´ 3 Ÿ usb 3 |

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| member member | ID 1 2 3 member 1 |
|----------------------|-------------------|
| description | 31 |

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write

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2 1 red-giant

Ruijie(config)# device-description member 2 red-giant

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| show member | 1 |

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| - | - |

59.2

59.2.1 show member

show member [member]

| member | ID 1 2 3 |
|---------------|----------|

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3 1 2

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Ruijie# **show member**

Member Mac Address Priority Software Version
HardwareVersion Description

```

-----
1 00d0.f810.3323 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH
2 00d0.f822.33aa 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH
3 00d0.f822.33ae 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH
4 00d0.f822.33b0 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH
5 00d0.f822.33b2 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH
6 00d0.f824.23b4 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH
7 00d0.f833.44b4 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH
8 00d0.f855.33ae 1 RGOS 10.1.00(2),Release(12889) 1.0 SWITCH

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