



RG-S8600

IPv6

RGOS 10.3(5)

©2010



{x|y|...}

[x|y|...]

//

3.

/

/

1)

2)

3)

```

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

```

*

**command-alias=original-command*

```

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

```

Ruijie# **s?**

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

```

EXEC           "sv"   "show version"

```

Ruijie# **s?**

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

Ruijie# **s?**

show start-chat start-terminal-service

```

"ia"   "ip address"

```

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

A.B.C.D IP address

dhcp IP Address via DHCP

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

```

"ip address"

```

show aliases

```

"def-route"

```

```

"ip route 0.0.0.0 0.0.0.0 192.168.1.1"

```

Ruijie# **configure terminal**

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

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

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

```
Ruijie(config)# def-route?
% Unrecognized command.
Ruijie(config)# end
Ruijie# show aliases config
globe configure mode alias:
def-route                ip route 0.0.0.0 0.0.0.0
192.168.1.1
```

show aliases	

1.2 privilege

privilege **no**

privilege *mode* [**all**] {**level** *level* | **reset**} *command-string*
no privilege *mode* [**all**] [**level** *level*] *command-string*

mode CLI

[**all**]

level *level* 0-15

reset

command-string

privilege

CLI

privilege ?

CLI

config	

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

CLI 1 "test" reload

mode

EXEC

EXEC

Ruijie# **show aliases exec**

exec mode alias:

h	help
p	ping
s	show
u	undebug
un	undebug

alias	

2

2.1

CLI

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

2.1.1 **disable**

disable

disable [*privilege-level*]

privilege-level

/

disable

Ruijie# **disable 10**

enable	

2.1.2 enable

enable

2.1.3 enable password

enable password

no

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

no enable password

Password

EXEC

Level

0|7

0

7

encrypted-password

' 1 26
'

password security password
15 security 0 15
password
security 15 password password security
15 password security password
security
pw10

enable password	

2.1.6 password

```

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

```

```

password line
0|7 0 7
encrypted-password

```

line

line

line red

```

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

```

login	

2.1.7 login

AAA

line

AAA

VTY console

VTY

Ruijie(config)# **no aaa new-model**

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

Ruijie(config-line)# **password 0 normatest**

Ruijie(config-line)# **login**

password	line

2.1.8 login local

AAA

login local no

login local

no login local

line

AAA

```

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

```

username	

2.1.9 login authentication

AAA

AAA

no

login authentication {default | *list-name*}

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

default

list-name

line

AAA

AÊ â

AAA \$;X12Dïax 2`Àradnusthentication

2.1.10 username

username

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

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

no username *name*

name

password

0|7 0 7

encrypted-password

privilege-level

7

7

7

15

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

login local	

2.1.11 lock

EXEC

lock

lock

1. lock

2.

Locked

3.

line

lockable

line

```
Ruijie(config-line)# lockable
```

```
Ruijie(config-line)# end
```

```
Ruijie# lock
```

```
Password: <password>
```

```
Again: <password>
```

```
Locked
```

```
Password: <password>
```

```
Ruijie#
```



lockable

Q , È ü,É ð Ç% Â ðÁ€`•@¥ D!ÿQN0=ñf³â

no lockable

line

EXEC **lock**

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

lock	

2.1.13 telnet

 telnet EXEC
telnet

telnet *host* [*port*] [*keyword*]

Host IP
Port TCP 23
Keyword

--	--

/source-interface	telnet
--------------------------	--------

telnet

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

Show sessions	
exit	

2.1.14 ip telnet source-interface

IP Telnet

ip telnet source-interface

ip telnet source-interface *interface-name*

interface-name IP Telnet

telnet IP Telnet
 Telnet
no ip telnet
source-interface

Loopback 1 IP Telnet

Ruijie(config)# **ip telnet source-interface** *Loopback 1*

telnet	Telnet

2.1.15 enable service

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

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

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

no enable service

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

show service	

2.2

```
' clock set
' clock update-calendar
```

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

2.2.1 clock set

clock set

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

```
hh:mm:ss          24      :      :
day             1-31
month           1-12
year            1993-2035
```

clock set

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

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

show clock	

2.2.2 clock update-calendar

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

calendar

clock clock
Ruijie# clock update-calendar



LINE6.02c 0 Tw 0 Ts 1002.47488.5 <361D0E311FF514E3>.02cd()TjE488.5 786.02c 0 Tw 0 Ts.0057 10

2.2.5 session-timeout

LINE
session-timeout **no session-timeout** LINE

session-timeout *minutes* [*seconds*]

no session-timeout

minutes

seconds

0 min

LINE

LINE

LINE

line vty 0 5 30 :

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

2.2.6 show clock

show clock

show clock [**detail**]

detail

detail

show clock

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

clock set	

2.2.7 show running-config

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

```
10
```

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

2.2.10 show reload

```
reload show
show reload
```

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

2.2.11 prompt

```
no prompt prompt
```

prompt *string*

string

32

EXEC

RGOS

Ruijie(config)# **prompt** *RGOS*

Ruijie(config)# **end**

RGOS

2.2.12 banner motd

banner motd

no banner motd

banner motd *c message c*

c

message

Ruijie(config)

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

2.2.13 banner login

banner login

no banner login

banner login *c message c*

c
message

Ruijie(config)

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

2.2.14 speed

speed speed

no speed

speed speed

Speed *bps*
9600 19200 38400 57600 115200
9600

9600

57600 bps

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

2.2.15 show line

show line

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

console

```
vtty          vty
line-num      line
```

console

```
Ruijie# show line console 0
CON      Type      speed  Overruns
* 0      CON        9600  45927
Line 0, Location: "", Type: "vt100"
Length: 24 lines, Width: 79 columns
Special Chars: Escape Disconnect Activation
                ^^x      none      ^M
Timeouts:      Idle EXEC  Idle Session
                never      never
History is enabled, history size is 10.
Total input: 53564 bytes
Total output: 395756 bytes
Data overflow: 27697 bytes
stop rx interrupt: 0 times
```

2.2.16 write

write

write [memory | network | terminal]

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

network TFTP copy
running-config tftp

terminal **show running-config**

E

3 LINE

3.1 LINE

3.1.1 line

LINE

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

console	
vty	telnet/ssh
<i>First-line</i>	first-line
<i>Last-line</i>	last-line

LINE

LINE VTY 1 3 LINE

Ruijie(config)# **line vty** 1 3

3.1.2 line vty

VTY
VTY **no**

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

VTY 5 0--4

VTY

VTY 20 VTY 0--19

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

VTY 10 VTY 0—9

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

3.1.3 transport input

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

transport input {all | ssh | telnet | none}

default transport input

all	Line
ssh	Line SSH
telnet	Line Telnet
none	Line

```

                VTY                                TTY
NONE
  default transport input

```

Line

```

                Line                                VTY
VTY                                show running    Line

```

```

                default transport input    no transport inp
ut                LINE                    transpo
rt input none

```

```

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

```

show running	

RGOS10.1

3.1.4 access-class

```

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

```

--	--

LINE

4

4.1

	CLI	COPY
' Xmodem		copy xmodem
' Tftp		copy tftp

4.1.1 copy xmodem

xmodem

xmodem

copy flash: filename xmodem
copy xmodem flash: filename

filename

Xmodem

Xmodem

:

xmodem
xmodem

copy xmodem flash:"filename" **copy flash:"filename" xmodem**

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

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

4.1.2 copy tftp

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

TFTP

TFTP

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

```
          ip 192.168.12. 1  
          config.bak      ;          switch.bin  
          ip 192.168.12.1  
  
Ruijie# copy tftp://192.168.12.1/config.bak flash:  
config.text
```

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

5

5.1

- ' ping
- ' traceroute
- ' line-detect

5.1.1 ping

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

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

IP 2 5 100Byte

Ping

ping

ping

ping
2 5 100Byte
IP !
.
ping
ping
DNS

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

traceroute

DNS

traceroute

1 traceroute

Ruijie# **traceroute** 61.154.22.36

< press Ctrl+C to break >

Tracing the route to 61.154.22.36

1 192.168.12.1 0 msec 0 msec 0 msec

2 192.168.9.2 4 msec 4 msec 4 msec

3 192.168.9.1 8 msec 8 msec 4 msec

4 192.168.0.10 4 msec 28 msec 12 msec

5 202.101.143.130 4 msec 16 msec 8 msec

6 202.101.143.154 12 msec 8 msec 24 msec

7 61.154.22.36 12 msec 8 msec 22 msec

IP 61.154.22.36

1 6

2 traceroute

Ruijie# **traceroute** 202.108.37.42

< press Ctrl+C to break >

Tracing the route to 202.108.37.42

1 192.168.12.1 0 msec 0 msec 0 msec

2 192.168.9.2 0 msec 4 msec 4 msec

3 192.168.110.1 16 msec 12 msec 16 msec

4 * * *

5 61.154.8.129 12 msec 28 msec 12 msec

```

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

```

```

                                     IP
202.108.37.42                        1  17
      4

```

```
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

```

S8600

M8600_48GT_4SFP_POE_II

M8600_48GT_4SFP_E

M8600_48GT_4SFP_E_II

6

6.1

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

6.1.1 interface aggregateport

no

interface aggregateport *port-number*

port-number Aggregate port

port

aggregate port aggregate

aggregate port
interfaces aggregateport

show interfaces show

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

show interfaces	

S8600

6.1.3 interface vlan

virtual interface SVI switch
SVI **no**

interface vlan *vlan-id*
no interface vlan *vlan-id*

vlan-id VLAN ID

show interfaces **show interfaces vlan**

```
Ruijie(config)# interface vlan 2  
Ruijie(config-if)#
```

show interfaces	

```
S8600  
'                    2K    SVI  
'                    2K    IP
```

6.1.4 medium-type

no .

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

fiber
copper

Ap SVI

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

show interfaces	

```
24SFP/12GT      12  SFP      12  10/100/1000M BASE-T
```

SFP

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

show interfaces	

6.1.6 shutdown

no

shutdown
no shutdown

Ap SVI

show interfaces

Ap 1

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

Ap 1

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

clear interface	
show interfaces	

/

no shutdown

6.1.7 speed

no

10	10Mbps
100	100Mbps
1000	1000Mbps
10G	10Gbps
auto	

Ap	Ap
Ap	Ap
show interfaces	
SFP	10M 100M

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

show interfaces	

6.1.8 duplex

no

duplex {auto | full | half}

no duplex

auto
full
half

show interfaces

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

show interfaces	

6.1.9 flowcontrol

no

flowcontrol {auto | off | on}
no flowcontrol

auto
off
on

show interfaces

1/1

```
Ruijie(config)# interface gigabitethernet 1/1  
Ruijie(config-if)# flowcontrol on
```

show interfaces	

6.1.10 mtu

mtu

Mtu num

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

1500

mtu

```
Ruijie(config)# interface gigabitethernet 1/1  
Ruijie(config-if)# mtu 9216
```

show interfaces	

6.1.11 carrier-delay

carrier-delay

no

carrier-delay [*seconds*]

no carrier-delay

seconds

1 60

2

DCD Down Up

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



```
show interfaces
```

switch port trunk VLAN
 VLAN VLAN trunk port
VLAN VLAN **switchport trunk**
 VLAN

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





```

VLAN    VLAN ID    Trunk    native VLAN
  UNTAG

VLAN
Trunk VLAN 14094
Trunk VLAN VLAN

```

switchport

1/15

```

interface fastethernet 1/15
switchport trunk allowed vlan remove
end
interfaces fastethernet1/15 switchport
led

```

```

native vlan is 1
led

```

	show interfaces	
	switchport access	statics accessport VLAN

6.1.18 snmp trap link-status

```

Link    SNMP    LinkTrap
no      LinkTrap,

```

LinkTrap Ap SVI Link SNMP
LinkTrap,

Link trap

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

Link trap

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

```

Ruijie# show interfacesgigabitEthernet 0/1 switchport
Interface Switchport ModeAccess Native Protected VLAN
lists
-----
GigabitEthernet 0/1 enabled Access 11 Disabled ALL

```

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

7 Aggregate Port

7.1

7.1.1 port-group

```
Aggregate Port
Aggregate Port no
```

```
port-group port-group-number
no port-group
```

Aggregate Port

<i>port-group-number</i>	Aggregate Port Aggregate Port

```
AP VLAN trunk port
native VLAN AP
```

```
1/3 AP 3
```

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

S8600

```
' 8
' 128 AP
```

7.1.2 aggregateport load-balance

AP

no

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

no aggregateport load-balance

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

MAC

show aggregateport load-balance

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

--	--

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

S8600

7.2

7.2.1 show aggregateport

aggregateport

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

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

aggregate port

aggregate port

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

--	--

8 LACP

8.1

8.1.1 lacp port-priority

LACP

no

lacp port-priority *port-priority*

no lacp port-priority

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

32768

” ‘ ‘

8.1.2 port-group mode

LACP ID no
LACP

port-group key mode active | passive

no port-group

<i>Key</i>	ID, key
active	LACP
passive	LACP LACP LACP .

LACP

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

--	--

lacp port-priority

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

32768

”

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

port-group <i>key mode</i> active passive	LACP	ID
port-group <i>key mode</i>		

-	-

8.1.4 lacp system-priority


LACP no

lacp system-priority *system-priority*

no lacp system-priority

<i>system-priority</i>	LACP 0-65535

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



Local information:

Port	Flags	LACP port State	Priority	Oper Key	Port Number	Port State
Gi0/1	SA	bndl	4096	0x3	0x1	0x3d
Gi0/2	SA	bndl	4096	0x3	0x2	0x3d
Gi0/3	SA	bndl	4096	0x3	0x3	0x3d

Partner information:

Port	Flags	LACP port Priority	Dev ID	Oper Key	Port Number	Port State
Gi0/1	SA	61440	00d0.f800.0002	0x3	0x1	0x3d
Gi0/2	SA	61440	00d0.f800.0002	0x3	0x2	0x3d
Gi0/3	SA	61440	00d0.f800.0002	0x3	0x3	0x3d

Local information	LACP
Port	ID
Flags	'A' S' LACP LACPPDU
State	Down bndl sups

9 VLAN

9.1

9.1.1 vlan

```

VLAN
VLAN
vlan vlan-id
no vlan vlan-id
    
```

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

```

end          Ctrl+C
exit
    
```

```

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

show vlan	VLAN

```

S8600          4093  vlan
    
```

9.1.2 name

VLAN **no**

name *vlan-name*

no name

<i>vlan-name</i>	VLAN

VLAN

VLAN

show vlan **vlan**

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

show vlan	VLAN

9.1.3 switchport mode

access port **switch port** trunk port, 802.1Q **no**

switchport mode {**access** | **trunk**}

no switchport mode

access	switch port access port
trunk	switch port trunk port

switch port **access**

switch port access VLAN
switchport access vlan VLAN

switch port trunk VLAN
 VLAN VLAN VLAN trunk port
 VLAN **switchport trunk**

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

switchport access	statics accessport VLAN
switchport trunk	trunkport native VLAN Trunk VLAN

9.1.4 switchport access

access port VLAN
no VLAN

switchport access vlan *vlan-id*
no switchport access vlan

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

switch port access VLAN VLAN 1

```

          VLAN ID
    VLAN
VLAN ID      VLAN
              trunkport
    
```

```

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

switchport mode	switch port
switchport trunk	trunkport native VLAN Trunk VLAN

9.1.5 switchport trunk

```

trunkport native VLAN Trunk VLAN
no trunk
    
```

```

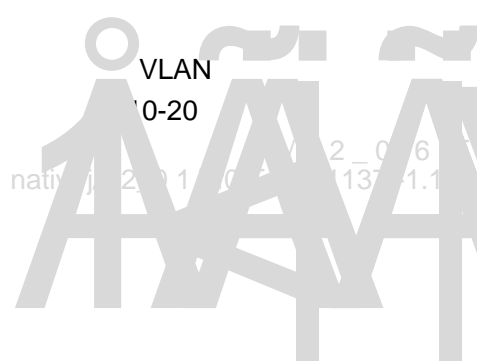
switchport trunk {allowed vlan { all | [add | remove | except]
vlan-list }| native vlan vlan-id}
no switchport trunk {allowed vlan | native vlan }
    
```

--	--

```

          Trunk      VLAN
vlan-list      VLAN
VLAN          VLAN ID
ID            -
    
```

allowed vlan *vlan-list*



VLAN all Native VLAN VLAN 1

Native VLAN

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

VLAN

Trunk VLAN 1 4094
 Trunk VLAN VLAN
 Trunk

show interfaces switchport

VLAN 2 1/15

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

show interfaces	
switchport access	statics accessport VLAN

9.2

9.2.1 show vlan

VLAN

show vlan [*id vlan-id*]

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

end

Ctrl+C

exit

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

name	VLAN
switchport access	Vlan

10 Super-vlan

10.1

10.1.1 supervlan

VLAN **supervlan**

supervlan

no supervlan

VLAN

end

Ctrl+C ¾



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

VLAN

no subvlan supevlan subvlan

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

show supervlan	supervlan

10.1.3 subvlan-address-range

subvlan ip

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

no subvlan-address-range

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

VLAN

end **Ctrl+C**

exit

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

show supervlan	supervlan

10.1.4 proxy-arp

VLAN ARP

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

VLAN

```
end                   Ctrl+C
exit
```

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

show supervlan	supervlan

10.2

10.2.1 show supervlan

SuperVLAN SubVLAN

show supervlan

show supervlan id *vlan-id*

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

Ruijie# **show supervlan**

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

```
-----
```

3	ON	4	ON
		5	ON

11 Protocol VLAN

11.1

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

11.1.1 protocol-vlan ipv4 addr mask addr vlan id

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

```
Ruijie(config)# protocol-vlan ipv4 192.168.100.3 mask  
255. 255.255.0 vlan 100
```

```
show protocol-vlan ipv4
```

```
no protocol-vlan ipv4 addr mask addr
```

```
no protocol-vlan ipv4
```

```
RGOS10.1
```

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

type

profile

num profile
type

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

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

RGOS10.1

11.1.3 protocol-vlan profile num vlan id

profile

num profile
id VLAN ID 1- VLAN

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

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

no protocol-vlan profile *num*

RGOS10.1

11.2

show protocol-vlan

11.2.1 show protocol-vlan

Protocol VLAN

show vlan protocol-vlan

Ruijie# **show protocol-vlan**

RGOS10.1

12 PrivateVLAN

12.1

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

12.1.1 private-vlan type

VLAN VLAN

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

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

community community VLAN

isolated isolated VLAN

primary primary VLAN

no VLAN

VLAN

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

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

show vlan private-vlan

RGOS10.1


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

```
show vlan private-vlan
```

no switchport private-vlan host-association

p_vid primary VID
s_vid secondary VID
no : VLAN

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

show vlan private-vlan

RGOS10.1

12.1.6 switchport private-vlan association trunk

private VLAN trunk primary VLAN
secondary VLAN

switchport private-vlan association trunk *p_vid s_vid*

no switchport private-vlan association trunk *p_vid s_vid*

p_vid primary VID
s_vid secondary VID
no : VLAN

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

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

```
show vlan private-vlan
```

RGOS10.3(5)

12.1.7 switchport private-vlan mapping

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

<i>p_vid</i>	primary VID
<i>svlist</i>	secondary VLAN list
no	secondaryVLAN

VLAN

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

```
show vlan private-vlan
```

RGOS10.1

12.2

Private VLAN

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

RGOS10.1

12.3.2 switchport hybrid native vlan

```
switchport hybrid native vlan vid
```

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

RGOS10.1

13 802.1Q Tunneling

13.1

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

13.1.1 switchport mode dot1q-tunnel

802.1Q tunneling

```
switchport mode dot1q-tunnel
no switchport mode
```

```
no 802.1Q tunneling
```

802.1Q tunneling

dot1q-tunnel

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

show vlan

RGOS10.1

13.1.2 switchport mode uplink

uplink

switchport mode uplink

no switchport mode

no uplink

uplink

uplink

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

show vlan

RGOS10.1

13.1.3 switchport dot1q-tunnel allowed vlan

dot1q-tunnel vlan

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

switchport dot1q-tunnel allowed vlan remove *v_list*

no switchport dot1q-tunnel allowed vlan

```

tagged : tag
untagged : tag
v_list: vlan id
no

```

```
vlan 1 untagged
```

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

```

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

```

```

tagged 3-6
ruijie(config)#end

```

show interface dot1q-tunnel

RGOS10.3

13.1.4

```
dot1q-tunnel vlan id
```

```

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

```

```

vid vlan id
no vlan 1

```

```
vlan 1
```

```
dot1q-tunnel          vid 8
```

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

```
show interface dot1q-tunnel
```

```
RGOS10.3
```

13.1.5 dot1q outer-vid

```
tunnel                vid
```

```
dot1q outer-vid vid register inner-vid v_list
```

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

```
vidTj/C
ruijie(con
```

RGOS10.3

13.1.6 dot1q relay-vid

access trunk hybrid vid

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

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

v_list vid

vid tag vid

no

tag ,Xdd œ ,X

```
vid          vid
no           vid

1.1.1.1     vid    3

Ruijie#configure
Ruijie(config)#ip access-list standard 2
Ruijie(config-std-nacl)#permit host 1.1.1.1
Ruijie(config-std-nacl)#exit
Ruijie(config)# interface gigabitEthernet 0/1
Ruijie(config-if)# switchport mode trunk
Ruijie(config-if)# traffic-redirect access-group 2
outer-vlan 3 in
Ruijie(config-if)# end
```

```
show traffic-redirect
```

RGOS10.3

13.1.8 traffic-redirect access-group acl inner-vlan

```
access trunk hybrid          vid

traffic-redirect access-group acl inner-vlan vid out
no traffic-redirect access-group acl inner-vlan

acl          acl
vid          vid
no           vid
```

1.1.1.2 vid 6

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

show traffic-redirect

RGOS10.3

13.1.9 traffic-redirect access-group acl nested-vlan

dot1q-tunnel vid

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

acl acl

vid vid

no vid

1.1.1.3 vid 9

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

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

show traffic-redirect

RGOS10.1

13.1.10 frame-tag tpid tpid

tpid

```

/
tag tag
inner-priority-trust enable
no inner-priority-trust enable

no tag tag

```

```

tag tag

ruijie#configure
ruijie(config)# interface gigabitEthernet 0/2
ruijie(config-if)# inner-priority-trust enable
ruijie(config-if)#end

```

```
show inner-priority-trust
```

```
RGOS10.1
```

13.1.12 l2protocol-tunnel

```

dot1q-tunnel

l2protocol-tunnel {stp|gvrp}
no l2protocol-tunnel {stp|gvrp}

```

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

```
show l2protocol-tunnel {gvrp|stp}
```

RGOS10.3

13.1.13 l2protocol-tunnel *proto-type* enable

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

```
stp      stp  
gvrp     gvrp  
no
```

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

```
show l2protocol-tunnel {gvrp|stp}
```

RGOS10.3

13.2

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

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

13.2.1 show dot1q-tunnel

dot1q-tunnel

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

intf-id

ruijie# **show**

```
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
```

RGOS10.3

13.2.3 show frame-tag tpid

tpid

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

intf-id

tpid

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

RGOS10.1

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

RGOS10.1

13.2.5 show registration-table

dot1q-tunnel vid

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

intf-id

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

RGOS10.3

13.2.6 show translation-table

access,trunk,hybrid vid

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

intf-id

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

RGOS10.3

13.2.7 show traffic-redirect

vid

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

```
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
```

RGOS10.3

13.2.8 show l2protocol-tunnel

show l2protocol-tunnel{gvrp|stp}

gvrp gvrp

stp stp

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

RGOS10.3

14 MAC

14.1

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

14.1.1 mac-address-table aging-time

no

mac-address-table aging-time *seconds*

no mac-address-table aging-time

seconds

300

show mac-address-table aging-time

show mac-address-table dynamic

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

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

14.1.2 clear mac-address-table dynamic

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



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

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

show mac-address-table static

MAC 00d0.f800.073c

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

VLAN
MAC

VLAN

VLAN1

160

```
Ruijie#configure terminal
```

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

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

```
Ruijie(config-vlan)#max-dynamic-mac-count 160
```



```

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

```

```

00d0.f800.073c VLAN 4

```

```

gigabitethernet 1/1

```

```

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

```

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

S8600

```

'   MAC           16K
'           MAC     1K

```

14.1.7 mac-address-table filtering

no

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

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

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

show mac-address-table filtering

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



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

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

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

14.1.9 snmp trap mac-notification

MAC no

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

added	
removed	

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

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

14.1.10 address-bind ip-address

ip mac .

address-bind *ip-address mac-address*

no address-bind *ip-address*

fa 0/1

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

show address-bind uplink	

RGOS10.1

14.1.13 address-bind ipv6-mode

ip IP

address-bind ipv6-mode compatible

address-bind ipv6-mode loose

address-bind ipv6-mode strict

	IPv4	IPv6
--	-------------	-------------

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

IP 192.168.5.2 00d0.f822.33aa
IPV6

```
Ruijie# configure t
Enter configuration commands, one per line. End with
CNTL/Z.
Ruijie(config)# address-bind 00d0.f822.33aa ip
192.168.5.2
Ruijie(config)# address-bind ipv6-mode compatible
```

14.1.14 mac-manage-learning uniform

MAC uniform .

MAC uniform
MAC
MAC

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

14.1.15 mac-manage-learning uniform learning-synchronization

uniform MAC .
no mac-manage-learning uniform learning-synchronization

uniform no MAC MAC

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

14.1.16 mac-manage-learning dispersive

MAC dispersive .

MAC dispersive
 MAC



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

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

14.2.2 show mac-address-table aging-time

show mac-address-table aging-time

```
Ruijie# show mac-address-table aging-time
Aging time      : 300
```

mac-address-table aging-time	

14.2.3 show mac-address-table count

show mac-address-table count

```
Ruijie# show mac-address-table count
Dynamic Address Count : 51
Static Address Count : 0
Filter Address Count : 0
Total Mac Addresses : 51
Total Mac Address Space Available: 8139
```

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

14.2.4 show mac-address-table dynamic

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

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

```
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

clear mac-address-table dynamic	

14.2.5 show mac-address-table filtering

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

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

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

Vlan	MAC Address	Type	Interface
1	0000.2222.2222	FILTER	Not available

MAC

14.2.7 show mac-address-table notification

14.2.8 show mac-address-table static

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

MAC

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

3.3.3.4 00d0.f811.1117

address-bind	

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

MAC

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

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

15 DHCP Snooping

15.1 DHCP snooping

DHCP snooping

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

15.1.1 ip dhcp snooping

```
DHCP Snooping
no
DHCP Snooping
[no] ip dhcp snooping
```

```
DHCP Snooping
DHCP snooping
show ip dhcp snooping
```

```
DHCP Snooping Private VLAN
```

```
DHCP snooping
```



```
Ruijie(config)# ip dhcp snooping vlan 1000
Ruijie(config)# end
```

ip dhcp snooping	DHCP Snooping

15.1.3 ip dhcp snooping bootp-bind

```

DHCP Snooping      Bootp
                   no          DHCP snooping      Bootp

```

[no] ip dhcp snooping bootp-bind

```

DHCP Snooping      Bootp
DHCP Snooping      Bootp          Bootp
DHCP Snooping      Bootp

```

```
DHCP Snooping      Bootp
```

```

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

```

show ip dhcp snooping	DHCP snooping

15.1.4 ip dhcp snooping verify mac-address

MAC
no MAC

[no] ip dhcp snooping verify mac-address

MAC DHCP CLIENT
MAC DHCP CLIENT MAC
MAC

DHCP MAC

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

show ip dhcp snooping	DHCP snooping

15.1.5 ip dhcp snooping information option

```

DHCP          option82
              no
    
```

[no] ip dhcp snooping information option

```

              DHCP          option82          DHCP
option82
    
```

```

DHCP          option82
    
```

```

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

show ip dhcp snooping	DHCP snooping

15.1.6 ip dhcp snooping database write-delay

```

              DHCP Snooping
FLASH          no
              FLASH
' ip dhcp snooping database write-delay time
' [no] ip dhcp snooping database write-delay

time          DHCP snooping          FLASH
    
```


DHCP

[no] ip dhcp snooping trust

UNTRUST

	DHCP	TRUST
TRUST	DHCP	UNTRUST
DHCP		

fastEthernet 0/1 TRUST

```
Ruijie# configure terminal
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# ip dhcp snooping trust
Ruijie(config-if)# end
Ruijie# show ip dhcp snooping
Switch DHCP snooping status    ENABLE
Verification of hwaddr field status  DISABLE
DHCP snooping database write-delay time: 0 seconds
DHCP snooping option 82 status: ENABLE
DHCP snooping Support ijie(co
```

DHCP Snooping VLAN
 CPP[CPU Protect Protocol] CPP
DHCP CPP DHCP
Snooping CPP

show ip dhcp snooping

S86 DHCP

1 100pps

Ruijie# **configure terminal**

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

Ruijie(config-if)# **ip 62.70.130.1/24** **arp 0200_62701304Df1e84D81588 02000691**

show ip dhcp snooping binding

15.3.1 show ip dhcp snooping

DHCP Snooping

show ip dhcp snooping

DHCP Snooping

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

DHCP snooping

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

show ip dhcp snooping binding	DHCP snooping

15.4.2 debug ip dhcp snooping

DHCP Snooping

debug ip dhcp snooping {event | packet}

DHCP snooping

DHCP snooping

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

16 IGMP Snooping

16.1

```

IGMP Snooping    profile
Profile
'   range
'   deny
'   permit

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

```

16.1.1 ip igmp profile

```

IGMP    profile
profile-number    profile
                igmp profile
ip igmp profile profile-number

```

no ip igmp profile *profile-number*

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

IGMP Profiles

SVGL

IGMP Filtering

profile

profile

1 profile

profile

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

Ruijie(config-profile)#

range	profile

16.1.2 range

profile

profile

profile

range

no

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

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

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

profile

low-ip-address high-ip-address
 profile deny

233.3.3.3 234.4.4.4 profile :

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

Ruijie(config-profile)# **range 233.3.3.3 234.4.4.4**

ip igmp profile	profile
deny	profile deny
permit	profile permit

16.1.3 deny

profile profile
 deny
deny

profile deny

profile

profile range

233.3.3.3 profile :

16.1.5 ip igmp snooping ivgl

```

    igmp snooping          ivgl          ip
igmp snooping ivgl    no ip igmp snooping    igmp snooping

ip igmp snooping ivgl
no ip igmp snooping
    
```

disable

```

                VLAN
            VLAN
        VLAN          VLAN

                igmp snooping    ivgl
    
```

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

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

16.1.6 ip igmp snooping svgl

```

    igmp snooping          SVGL          ip
igmp snooping svgl    no ip igmp snooping    igmp snooping

ip igmp snooping svgl
no ip igmp snooping
    
```



```
ip igmp snooping ivgl-svgl
no ip igmp snooping
```

```
disable
```

```
SVGL          IVGL  SVGL          IVGL  SVGL
              IGMP Profile
SVGL          VLAN
              VLAN
```

```
/
IVGL # SVGL # VLAN # profile
VLAN
```

```
0% 1/2 ZC@N0@MTB-SVG10.6
```

VLAN igmp snooping
ip igmp snooping vlan

<i>num</i>	1-3600

300s

PIM Hello

IGMP

500s

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

16.1.11 ip igmp snooping query-max-response-time

ip igmp snooping query-max-response-time IGMP
no ip igmp snooping query-max-response-time

ip igmp snooping query-max-response-time *num*
no ip igmp snooping query-max-response-time

<i>num</i>	IGMP 1-65535

10s

IGMP

0

```

Snooping
IGMP
IGMP
IGMP
0

```

```

IGMP Snooping
IGMPv3
IGMP
15s

```

```

Ruijie(config)# ip igmp snooping
query-max-response-time 15

```

16.1.12 ip igmp snooping vlan mrouter learn pim-dvmrp

```

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

```

```

ip igmp snooping vlan vid mrouter learn pim-dvmrp
no ip igmp snooping vlan vid mrouter learn pim-dvmrp

```

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

```

VLAN
VLAN
no

```

igmp

snooping

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

ip igmp snooping vlan mrouter interface	

16.1.13 ip igmp snooping vlan mrouter interface

```

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

```

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

IP

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


16.1.14 ip igmp snooping vlan static interface

```
igmp snooping
IGMP report
ip igmp snooping vlan static interface no

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


vlan1 224.3.3.3

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

QaadWRQ

--	--

ip igmp snooping vlan mrouter interface	
--	--

16.1.15 ip igmp snooping fast-leave enable

igmp snooping fast-leave
snooping fast-leave enable

no

ip igmp
igmp snooping]TJEi[ip <1FF5747

IGMP SNOOPING

IGMP

IGMP Sooping
IGMP SNOOPING

VLAN

igmp snooping

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

ip igmp snooping source-check default-server	IP

16.1.18 ip igmp snooping source-check default-server

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

<i>address</i>	

IP

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

<code>ip igmp profile</code>	profile

16.1.21 ip igmp snooping max-groups

`ip`

debug igmp-snp

16.2.1 show ip igmp snooping

igmp snooping

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

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

EXEC

fa0/1 100

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

Abbr:M - mrouter

D - dynamic

S - static

VLAN	Address	Member ports
1	233.3.3.3	Gi0/2(S)
2	234.4.4.4	Gi0/11(S)
1	233.4.4.4	Ag2(S)

16.2.2 show ip igmp profile

profile

show ip igmp profile

show ip igmp profile *profile-number*

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

EXEC

profile

fa0/1 100

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

Profile 1

Permit

range 224.0.1.0, 239.255.255.255

16.2.3 clear ip igmp snooping gda-table

EXEC

Ruijie# **clear ip igmp snooping gda-table**

16.2.4 clear ip igmp snooping statistics

EXEC

Ruijie# **clear ip igmp snooping gda-table**

16.2.5 debug igmp-snp

igmp no

debug igmp-snp
debug igmp-snp event
debug igmp-snp packet
debug igmp-snp msf
debug igmp-snp warning
undebug igmp-snp

undebg igmp-snp event

undebg igmp-snp packet

undebg igmp-snp msf

undebg igmp-snp warning

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

EXEC

17 PIM-Snooping

17.1 PIM-Snooping

PIM-Snooping

- ' **ip pim snooping**
- ' **ip pim snooping**
- ' **show ip pim snooping**
- ' **show ip pim snooping vlan**

17.1.1 ip pim snooping

	PIM-Snooping	ip pim snooping
no	PIM-Snooping	
ip pim snooping		
no ip pim snooping		

PIM-Snooping

Ruijie# ~~configure terminal~~ **configure terminal** 6(snooping)]TJ/C2_0 1 Tf0 Tc 7.726 0T

PIM-Snooping **ip pim snooping**
no PIM-Snooping

ip pim snooping
no ip pim snooping

PIM-Snooping

```
Ruijie# configure terminal  
Ruijie(config)# interface vlan 199  
Ruijie(config-if)# ip pim snooping
```

/

PIM-Snooping	VLAN	PIM
--------------	------	-----

17.1.3 show ip pim snooping

PIM-Snooping

show ip pim snooping

show ip pim snooping

PIM-Snooping

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

17.1.4 show ip pim snooping vlan

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

--	--

interface-number VLAN ID

18 MSTP

18.1

18.1.1 spanning-tree

MSTP no MSTP spanning-tree MSTP no
spanning tree

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

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

forward-time *seconds*

hello-time *seconds* BPDU

max-age *seconds* BPDU

spanning-tree

" **forward-time** **hello-time**

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

18.1.2 spanning-tree bpdudfilter

```
disabled                BPDUD filter                enabled
spanning-tree bpdudfilter [enabled | disabled]
```

```
enabled                BPDUD filter
Disabled               BPDUD filter
```

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

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

18.1.3 spanning-tree bpduguard

```
disabled                BPDUD Guard                enabled
spanning-tree bpduguard [enabled | disabled]
```

```
enabled                BPDUD Guard
disabled               BPDUD Guard
```

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

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

18.1.4 spanning-tree link-type

```
“ ” no
```

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

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

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

```
Shared shared
```

```
point-to-point
shared
```

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

```
/ BA20_
```

no spanning-tree max-hops

```
hop-count BPDU 1 40
```

```
hop-count 20
```

```

Region      Root Bridge      BPDU      Hot Count      Root
Bridge
BPDU              Hop Count      1          0
Hops      0 BPDU

```

```
max-hops Instance
```

```
MST Instance Max-hops 10
```

```
Ruijie(config)# spanning-tree max-hops 10
```

show spanning-tree mst

```
show spanning-tree MSTP
```

18.1.6 spanning-tree mode

```
STP no
```

```
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

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

```
show spanning-tree
```

18.1.7 spanning-tree mst configure

```
no MST MSTP Region
name revision vlan map
```

```
spanning-tree mst configuration
```

```
no spanning-tree mst configuration
```

```
instance vlan Vlan Instance 0
name
revision 0
```

```
end Ctrl+C
```

```
exit
```

```
MST
```

```
instance instance-id vlan vlan-range Vlan MST Instance
instance-id 0 64 vlan 1 4095 vlan-range
vlan VLAN ID VLAN ID
VLAN ID instance 10 vlan 2,3,6-9
VLAN 2 3 6 7 8 9 Instance 10
VLAN Instance 0 VLAN Instance
no no instance instance-id [vlan vlan-range] ( no
Instance 1 64)
name name MST 32
no name
revision version>
```

```

show           MST region

                                MST           VLAN 3, 5-10           MST
Instance 1

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

Ruijie(config-mst)# exit
Ruijie(config)#

```

```

                                VLAN 3   Instance 1           MST

```

```

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

```

```

                                Instance 1

```

```

Ruijie(config-mst)# no instance 1

```

```

                                MST           show

```

```

show spanning-tree mst           MST region

instance instance-id vlan vlan-range   Vlan           MST Instance

name           MST

revision       MST

show           MST           MST

```

18.1.8 spanning-tree mst cost

```

                                Instance           no

```

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

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

```
instance-id Instance          0 64
cost                1 200 000 000
```

Instance-ID 0

Interface

- 1000 Mbps—20000
- 100 Mbps—200000
- 10 Mbps—2000000

cost

Instance 3 400

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# spanning-tree mst 3 cost 400
```

show spanning-tree mst interface interface-id

show spanning-tree mst MSTP

spanning-tree mst port-priority

spanning-tree mst priority instance

18.1.9 spanning-tree mst port-priority

Instance

Region

no

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

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

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

```
Instance-id      0
priority         128
```

Region

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

Region

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

instance-id 0

priority 32768

Instance 20 8192

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

show spanning-tree mst instance interface interface-id

show spanning-tree mst MSTP

spanning-tree mst cost

spanning-tree mst port-priority Instance

18.1.11 spanning-tree reset

spanning-tree no

spanning-tree reset

Ruijie(config)# **spanning-tree reset**

show spanning-tree STP

show spanning-tree interface STP

18.1.12 spanning-tree tx-hold-count

STP TxHoldCount BPDU
no

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

no spanning-tree tx-hold-count

tx-hold-count TxHoldCount 1 10

3

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

show spanning-tree MSTP

18.1.13 spanning-tree pathcost method

no

spanning-tree pathcost method [long | short]

no spanning-tree pathcost method

long 802.1t path-cost

short 802.1d path-cost

802.1T Path-cost

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

show spanning-tree interface STP

18.1.14 spanning-tree portfast

```

Portfast disabled
Portfast
spanning-tree portfast [disabled]

disabled Portfast

```

```

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

```

```

show spanning-tree interface STP

```

18.1.15 spanning-tree portfast bpduguard default

```

BPDU guard no BPDU
guard
spanning-tree portfast bpduguard default
no spanning-tree portfast bpduguard default

```

BPDU Guard.

```

BPDU guard BPDU error-disabled
show spanning-tree

```

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

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

18.1.16 spanning-tree portfast bpdufilter default

```
BPDU filter no BPDU
filter
```

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

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

```
BPDU filter
```

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

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

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

18.1.17 spanning-tree portfast default

```
Portfast no
Portfast
```

```
spanning-tree portfast default
```

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

Portfast

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

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

18.1.18 spanning-tree tc- protection

```
tc- protection no tc-  
protection
```

```
spanning-tree tc- protection
```

```
no spanning-tree tc- protection
```

```
tc- protection
```

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

18.1.19 spanning-tree tc-protection tc-guard

```
tc- guard no tc- guard  
tc-guard tc
```

```
spanning-tree tc-protection tc-guard
```

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

tc-guard

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

18.1.20 spanning-tree tc-guard

```
tc-guard no tc-guard  
tc-guard tc
```

spanning-tree tc-guard

no spanning-tree tc-guard

tc-guard

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

18.1.21 spanning-tree guard root

```
root guard no root guard  
root guard
```

spanning-tree guard root

no spanning-tree guard root

root guard


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

18.1.24 spanning-tree guard none

```
guard no guard
spanning-tree guard none
no spanning-tree guard none
```

```
guard
```

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

18.1.25 spanning-tree autoedge

```
Autoedge disabled
Autoedge
spanning-tree autoedge [disabled]

disabled Autoedge
```

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

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

18.1.26 bpdu src-mac-check

```
                bpdu mac                no
            bpdu mac

bpdu src-mac-check H.H.H

no bpdu src-mac-check

H.H.H                mac                bpdu

no                bpdu
```

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

18.1.27 clear spanning-tree detected-protocols

```
                RSTP BPDU    BPDU

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

interface-id
```

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

show spanning-tree interface

STP

18.1.28 spanning-tree compatible enable

MSTI

18.2

18.2.1 show spanning-tree

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

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

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

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

18.2.2 show spanning-tree interface

STP

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

interface-id

```
bpdufilter      bpdufilter
portfast       portfast
bpduguard     bpduguard
link-type      linktype
```

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

```
spanning-tree bpdufilter          BPDU filter
spanning-tree portfast          portfast
spanning-tree bpduguard        BPDU guard
spanning-tree link-type          "          "
```

18.2.3 show spanning-tree mst

MST Instance

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

```
configuration      mst
```

instance-id Instance

interface-id

Instance

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

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

19 SPAN

19.1 monitor session

SPAN

no

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

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

no monitor session all

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

switch port routed port

SPAN
SPAN

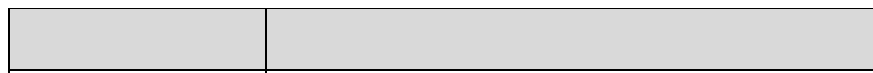
SPAN
disabled port

SPAN

show monitor

SPAN 1

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

**monitor session**

SPAN

20 RSPAN

20.1

20.1.1 monitor session

RSPAN

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

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

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

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

end Ctrl+C

exit

```
Ruijie(config)# monitor session 1 source interface
fastethernet 0/1
```

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

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

show monitor	

20.1.2 remote-span

RSPAN VLAN

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

Vlan

```
end          Ctrl+C
```

```
exit
```

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

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

show vlan	Vlan

21 IP

21.1

- ' ip address
- ' ip unnumbered

21.1.1 ip address

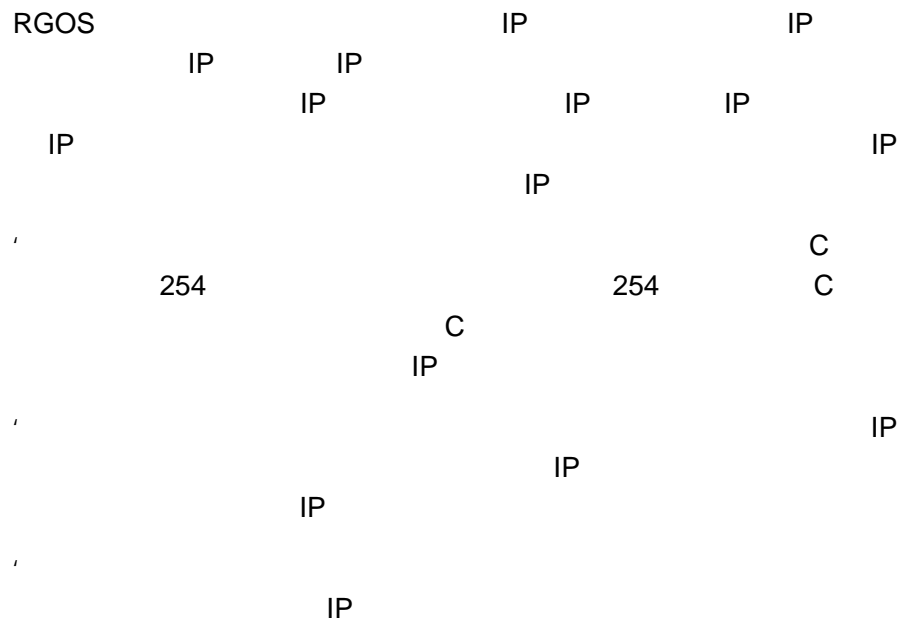
IP no IP

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

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

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

IP



show interface	

21.1.2 ip unnumbered

IP IP no

ip unnumbered *interface-type interface-number*

no ip unnumbered *interface-type interface-number*

<i>interface-type</i>	

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

21.2.1 arp

	ARP	IP	MAC
	no		MAC

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

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





clear arp-cache

arp

IP

5 ARP

no

arp retry times *number*

no arp retry times

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

ARP

ARP

5

ARP

V

p

"

u

Y

<i>number</i>	ARP <10-4096>

ARP

ARP
ARP

1000

ARP

arp trusted 1000

service trustedarp	ARP

21.2.5 arp trusted aging

ARP

no

arp trusted aging**no arp trusted aging**

GSN ARP

ARP

arp timeout

ARP

service trustedarp	ARP

21.2.6 arp unresolve

ARP
8192

no

arp unresolve *number*

no arp unresolve

<i>number</i>	ARP 8192 < 1-8192 >

ARP

8192

ARP

500

arp unresolved 500

21.2.7 arp gratuitous-send interval

arp no

arp gratuitous-send interval *seconds*

no arp gratuitous-send

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

ARP

ARP

SVI 1

ARP

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

SVI 1

ARP

```
Ruijie(config)# interface vlan 1
Ruijie(config-if)# no arp gratuitous-send
```

21.2.8 arp timeout

ARP ARP
no

arp timeout *seconds*

no arp timeout

<i>seconds</i>	0-2147483

3600

```

ARP
      ARP      IP      MAC      ARP
    ARP

```

```

FastEthernet 0/1      ARP
120

```

```

interface fastEthernet 0/1
arp timeout 120

```

clear arp-cache	ARP
show interface	

21.2.9 ip proxy-arp

ARP

```

      ARP
      IP   MAC
      IP
      MAC
      IP   ARP
      ARP
      ARP   MAC
      ARP
      FastEthernet 0
      ARP
interface fastEthernet 0
ip proxy-arp

```

21.2.10 service trustedarp

```

      ARP
no      ARP
service trustedarp
no service trustedarp

```

ARP

```

      ARP
      GSN
      STP
      MAC
1)  STP
2)  root port
   updown
3)  tc
      ARP
      GSN
      MAC
      ARP
      design
      ,
      service trustedarp
config
service trustedarp

```

21.3

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

21.3.1 ip broadcast-addresss

```

                                ip broadcast-addresss
no
ip broadcast-addresss ip-address
no ip broadcast-addresss ip-address

```

<i>ip-address</i>	IP

```

IP                255.255.255.255

```

```

IP                1                255.255.255.255
RGOS              IP
1
IP                0.0.0.0
ip broadcast-address 0.0.0.0

```

21.3.2 ip directed-broadcast

```

IP                ip
directed-broadcast      no
ip directed-broadcast [ access-list-number ]
no ip directed-broadcast

```

--	--

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

IP

172.16.16.255

IP

IP

IP

IP

1

no ip directed-broadcast RGOS

FastEthernet 0/1

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

21.4 IP

IP

- ' **clear arp-cache**
- ' **show arp**
- ' **show arp counter**
- ' **show arp timeout**
- ' **clear ip route**

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

21.4.1 clear arp-cache

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

ARP

NFPP(Network Foundation Protection Policy,)
 mac (IP) ARP
 clear arp 1s
 ARP

ARP
 clear arp-cache
 ARP 1.1.1.1
 clear arp-cache 1.1.1.1
 SVI1 ARP
 clear arp-cache interface Vlan 1

arp	ARP

21.4.2 show arp

ARP

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

<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	

show arp

Ruijie# **show arp**

Total Numbers of Arp: 7

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

ARP

Protocol	Internet
Address	IP

Age (min)

ARP

i

show arp counter

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

21.4.4 show arp detail

ARP

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

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

ARP

ARP

show arp detail

Ruijie# show arp detail

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

ARP

IP Address	IP
MAC Address	IP
Type	ARP
Age	ARP
Interface	IP
Port	ARP

-	-
---	---

--	--

10.3(5)

21.4.5 show arp timeout

ARP

show arp timeout

show arp timeout

```
Ruijie# show arp timeout
Interface          arp timeout(sec)
-----
VLAN 1             3600

ARP
```

21.4.6 clear ip route

IP IP

clear ip route

clear ip route { * | network [netmask] }

*	
<i>network</i>	
<i>netmask</i>	

192.168.12.0

```
clear ip route 192.168.12.0
```

show ip route	IP

21.4.7 show ip arp

ARP

show ip arp

show ip arp

```
Ruijie# show ip arp
Protocol Address      Age(min)Hardware      Type
Interface
Internet 192.168.7.233    23      0007.e9d9.0488    ARPA
FastEthernet 0/0
Internet 192.168.7.112  10      0050.eb08.6617    ARPA
FastEthernet 0/0
Internet 192.168.7.79   12      00d0.f808.3d5c    ARPA
FastEthernet 0/0
Internet 192.168.7.1    50      00d0.f84e.1c7f    ARPA
FastEthernet 0/0
Internet 192.168.7.215  36      00d0.f80d.1090    ARPA
FastEthernet 0/0
Internet 192.168.7.127 0        0060.97bd.ebee    ARPA
FastEthernet 0/0
Internet 192.168.7.195 57      0060.97bd.ef2d    ARPA
FastEthernet 0/0
Internet 192.168.7.183 --      00d0.f8fb.108b    ARPA
FastEthernet 0/0
```

ARP

--	--

Protocol	Internet
Address	IP
Age (min)	ARP “_”
Hardware	IP

Type

h,XGÅ@hH\$TF%@HC46HhH\$TF%4P'DauDh-UHx-UHv-UHx-

22 IP

22.1 IP

```
IP
' ip mask-reply
' ip mtu
' ip redirects
' ip source-route
' ip unreachable
```

22.1.1 ip mask-reply

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

```
ICMP
```

```
ICMP
```

```
ICMP
```

```
FastEthernet 0/1
```

```
ICMP
```

```
interface fastEthernet 0/1
ip mask-reply
```

22.1.2 ip mtu

```

IP MTU ip mtu
no
ip mtu bytes
no ip mtu

```

bytes	IP	68~1500

mtu

```

IP IP MTU RGOS IP MTU
mtu IP MTU
MTU MTU IP MTU
FastEthernet 0/1 IP MTU 512
interface fastEthernet 0/1
ip mtu 512

```



ICMP

RGOS

ICMP

FastEthernet 0/1

ICMP

```
interface fastEthernet 0/1
no ip redirects
```

22.1.4 ip source-route

RGOS

IP

ip

source-route no

ip source-route

no ip source-route

RGOS

IP

IP

IP

RFC 791

ICMP

RGOS

IP

IP

no ip source-route

22.1.5 ip unreachable

```
RGOS          ICMP          ip
unreachables no          ICMP

ip unreachable

no ip unreachable
```

```
RGOS
```

```
ICMP
```

```
RGOS
```

```
ICMP
```

```
ICMP
```

```
FastEthernet 0/1
```

```
ICMP
```

```
interface fastEthernet 0/1
no ip unreachable
```

23 DHCP

23.1 DHCP

DHCP

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

23.1.1 bootfile

```
                DHCP                                DHCP
bootfile        no
bootfile file-name
no bootfile
```

<i>file-name</i>	

DHCP

DHCP

DHCP

TFTP

DHCP

next-server

router.conf

bootfile router.conf

ip dhcp pool	DHCP DHCP
next-server	DHCP IP

23.1.2 client-identifier

DHCP

DHCP

client-identifier

no

client-identifier *unique-identifier*

no client-identifier

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

DHCP

```

DHCP
DHCP
IP
MAC
MAC
00d0.f822.33b4
GigabitEthernet
0/1
0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31
01
67.6967.6162.6974.4574.6865.726e.6574.302f.31
GigabitEthernet0/1
RFC1700 Address Resolution Protocol Parameters
    
```

DHCP

```

MAC
00d0.f822.33b4
DHCP

client-identifier
0100.d0f8.2233.b467.6967.6162.6974.4574.6865.726e.6574.302f.31
    
```

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



DHCP

DHCP DHCP DHCP
DHCP IP

192.168.12.1

default-router 192.168.12.1

ip dhcp pool	DHCP DHCP

23.1.5 dns-server

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

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

DNS

DHCP

DNS
DNS

DHCP
DNS

RGOS

DHCP
DHCP

DNS

DHCP

DNS

192.168.12.3

`dns-server 192.168.12.3`

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

23.1.6 domain-name

DHCP
no

DHCP

domain-name

domain-name *domain-name*

no domain-name

<i>domain-name</i>	DHCP

DHCP

DHCP

DHCP

i-net.com.cn

domain-name i-net.com.cn

dns-server	DHCP DNS
ip dhcp pool	DHCP DHCP

23.1.7 hardware-address

DHCP

DHCP

```
hardware-address 00d0.f838.bf3d
```

client-identifier	DHCP
host	IP DHCP
ip dhcp pool	DHCP DHCP

23.1.8 host

```

DHCP      IP      DHCP
host    no      DHCP    IP

```

```
host ip-address [ netmask ]
```

```
no host
```

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

```
IP
```

```
DHCP
```

```

DHCP      IP
A          255.0.0.0 B          255.255.0
C          255.255.255.0

```

```
DHCP
```

```

IP          192.168.12.91
255.255.255.240
host 192.168.12.91 255.255.255.240

```

client-identifier	DHCP
hardware-address	DHCP

ip dhcp pool

DHCP
DHCP

DHCP

23.1.10 ip dhcp excluded-address

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

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

IP IP DHCP DHCP
 DHCP IP DHCP

DHCP 192.168.12.100~150
 IP

`ip dhcp excluded-address 192.168.12.100 192.168.12.150`

ip dhcp pool	DHCP DHCP
network DHCP	DHCP

23.1.11 ip dhcp ping packet

DHCP
ip dhcp ping packet

ping
no

ip dhcp ping packet [*number*]

no ip dhcp ping packet

<i>number</i>	ping 0 10 0 ping ping

ping 2

DHCP DHCP IP ping

DHCP Ping

10

ping 3

ip dhcp ping packets 3

clear ip dhcp conflict	DHCP

ip dhcp ping timeout *milli-seconds*

no ip dhcp ping timeout

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

500

ping

ping 600ms

ip dhcp ping timeout 600

clear ip dhcp conflict	DHCP
ip dhcp ping packets	DHCP ping
show ip dhcp conflict	DHCP

23.1.13 ip dhcp pool

DHCP DHCP
ip dhcp pool **no** DHCP

ip dhcp pool *pool-name*

no ip dhcp pool *pool-name*

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

DHCP

DHCP

```
Ruijie(dhcp-config)#
```

```
IP          DNS
```

```
mypool0    DHCP
```

```
ip dhcp pool mypool0
```

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

23.1.14 lease

```
DHCP
```

```
DHCP
```

```
lease      no
```

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

```
no lease
```

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

DHCP

```

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

ip dhcp pool	DHCP DHCP

23.1.15 netbios-name-server

```

DHCP NETBIOS WINS DHCP
netbios-name-server no WINS
    
```

```

netbios-name-server ip-address [ ip-address2...ip-address8 ]
no netbios-name-server
    
```

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

WINS

DHCP

WINS
WINS

DHCP
WINS

DHCP

WINS

192.168.12.3

netbios-name-server 192.168.12.3



DHCP

```

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

```

WINS              WINS
                  NetBIOS      Hybrid
    
```

```

DHCP      NetBIOS
    
```

```
netbios-node-type h-node
```

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

23.1.17 network DHCP

```

DHCP              DHCP
network          no
network net-number net-mask
no network
    
```

<i>net-number</i>	DHCP IP
<i>net-mask</i>	DHCP IP

DHCP

DHCP

DHCP

192.168.12.4

next-server 192.168.12.4

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

23.1.19 option

no DHCP option DHCP option

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

no option

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

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

19 DHCP
IP 0 IP 1 IP
DHCP IP

option 19 hex 1

33 DHCP
DHCP 1
172.16.12.0 192.168.12.12 2 172.16.16.0
192.168.12.16

option 33 ip 172.16.12.0 192.168.12.12 172.16.16.0
192.168.12.16

	END 1
--	-------

dhcp pool DHCP DHCP **no ip**

 IP 192.168.12.100 DHCP
clear ip dhcp binding 192.168.12.100



ip dhcp ping packets	DHCP ping
show ip dhcp conflict	DHCP

23.2.3 clear ip dhcp server statistics

DHCP **clear ip dhcp**
server statistics
clear ip dhcp server statistics

DHCP DHCP
ip dhcp server statistics DHCP **clear**

DHCP
`clear ip dhcp server statistics`

show ip dhcp server statistics	DHCP

23.2.4 debug ip dhcp client

DHCP Client **debug ip dhcp client**
debug ip dhcp client
no debug ip dhcp client

dhcp client

dhcp

debug ip dhcp client

23.2.5 debug ip dhcp server

DHCP Server

debug ip dhcp server

debug ip dhcp server

no debug ip dhcp server

dhcp server

dhcp

debug ip dhcp server

23.2.6 show dhcp lease

```

DHCP          EXEC      show dhcp lease
show dhcp lease
    
```

```

          IP          IP
          IP
    
```

show dhcp lease

```

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

23.2.7 show ip dhcp binding

```

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

<i>ip-address</i>	IP

IP IP
IP

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
```

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

clear ip dhcp binding	DHCP

23.2.8 show ip dhcp conflict

DHCP EXEC **show ip dhcp conflict**
show ip dhcp conflict

DHCP

show ip dhcp conflict

```
Ruijie# show ip dhcp conflict
IP address      Detection Method
192.168.12.1    Ping
```

```
dhcpd excluded ipaddress
192.168.12.100
```

IP address	DHCP IP
Detection Method	
dhcpd excluded ipaddress	

DHCP

show ip dhcp server statisticsRuijie# **show ip dhcp server statistics**

```

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

```

```

Message                Received
BOOTREQUEST           216
DHCPDISCOVER          33
DHCPRREQUEST          25
DHCPCDECLINE          0
DHCPCRELEASE          1
DHCPCINFORM           150

```

```

Message                Sent
BOOTREPLY              16
DHCPCOFFER             9
DHCPCACK               7
DHCPCNAK               0

```

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

clear ip dhcp server statistics	DHCP

24 DHCP Relay

24.1 DHCP Relay

DHCP

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

24.1.1 service dhcp

no DHCP DHCP service dhcp

service dhcp

no service dhcp

DHCP

DHCP DHCP DHCP

DHCP

service dhcp

ip helper-address [vrf] A.B.C.D	DHCP server

24.1.2 ip helper-address

DHCP no

DHCP

```

/

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

service dhcp	DHCP

24.1.3 ip dhcp relay information option dot1x

```

dhcp option dot1x no
dhcp option dot1x
    
```

DHCP relay 802.1x

Ip dhcp relay information option dot1x

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

24.1.4 ip dhcp relay information option dot1x access-group

dhcp option dot1x acl no
dhcp option dot1x acl

ACL

ACL ACE

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

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

24.1.5 ip dhcp relay information option82

no **ip dhcp relay information option82**
ip dhcp relay information option82

option dot1x

Ip dhcp relay information option82

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

24.1.6 ip dhcp relay check server-id

ip dhcp relay check *server-id*

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

DHCP REQUEST

server-id option server

Ip dhcp relay check server-id

Service dhcp	DHCP

24.1.7 ip dhcp relay suppression

```

DHCP                DHCP                no
                   DHCP relay
    
```

```

DHCP request        relay
    
```

```

1 relay
    
```

```

Ruijie#
Ruijie# configure terminal
Ruijie(config)# interface fastEthernet 0/1
Ruijie(config-if)# ip dhcp relay suppression
Ruijie(config-if)# exit
Ruijie(config)#
    
```

service dhcp	DHCP

25 DNS

25.1

25.1.1 ip domain-lookup

DNS

no

DNS

ip domain-lookup**no ip domain-lookup**

DNS

DNS

DNS

DNS

Ruijie(config)# **ip domain-lookup**

show hosts	DNS

25.1.2 ip name-server

IP

no

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

<i>ip-address</i>	IP

DNS Server IP Server DNS
Server Server
Server DNS
6

no ip host host-name ip-address

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

show hosts	DNS

25.1.4 clear host

clear host [*host-name*]

<i>host-name</i>	“*”

```

DNS                                     1      ip host      2
                                         DNS

```

-IP

```
clear host *
```

show hosts	

25.1.5 show hosts

DNS

show hosts

DNS

```
Ruijie# show hosts
```

```
Name servers are:
```

```
static
```

```
host          type          address
```

```
switch        static        192.168.5.243
```

```
www.ruijie.com dynamic      192.168.5.123
```

ip host	IP
ip name-server	DNS

26 SNTP

26.1

```
' sntp enable
' sntp server
' sntp interval
```

26.1.1 sntp enable

```
SNTP no
Disable
[no] sntp enable
```

```
SNTP Disable
```

```
show sntp SNTP
```

```
Ruijie(config)# sntp enable
```

show sntp	SNTP
clock update-calendar	
clock set	

RGOS10.0

26.1.2 sntp server

SNTP Server SNTP NTP
 Server internet NTP Server

sntp server *ip-addr*
no sntp server

ip-addr NTP/SNTP IP

NTP/SNTP

show sntp SNTP

Ruijie(config)# **sntp server** 192.168.4.12

show sntp	SNTP
sntp enable	SNTP

RGOS10.0

26.1.3 sntp interval

SNTP Client NTP/SNTP Server

sntp interval *seconds*
no sntp interval

seconds 1-8192

1800s

show sntp SNTPRuijie(config)# **sntp interval 3600**

sntp enable	SNTP
show sntp	SNTP
clock update-calendar	

RGOS10.0

sntp enable

26.2

:

show sntp

26.2.1 show sntp

SNTP

show sntp

SNTP

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

snmp enable	SNTP
show snmp	SNTP

RGOS10.0

27 NTP

27.1 NTP

NTP

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

27.1.1 no ntp

ntp
no ntp

ntp

NTP

NTP
NTP

NTP

NTP

NTP

no ntp

ntp server	NTP

27.1.2 ntp access-group

NTP

no

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

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

peer	NTP

NOTE

ntp authentication-key ntp trusted-key

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

ntp authentication-key	
ntp trusted-key	

27.1.4 ntp authentication-key

NTP

NTP

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

md5 key-id
ntp trusted-key key-id

1024

ID 6

ntp authentication-key 6 md5 woooooop

ntp authenticate	
ntp trusted-key	
ntp server	NTP

27.1.5 ntp disable

NTP

ntp disable

NTP

NTP

NTP

IP

NTP

no ntp

27.1.6 ntp master

NTP

no

NTP

ntp master [*stratum*]

no ntp master



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

27.1.7 ntp server

NTP

NTP

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

no ntp server *ip-addr*

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

NTP

NTP
IP NTP

NTP server

IPv4 Ruijie(config)# ntp server 192.168.210.222

no ntp	NTP

27.1.8 ntp trusted-key

ID

ntp trusted-key *key-id*

no ntp trusted-key *key-id*

<i>key-id</i>	ID

NTP

ID

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

--	--

ntp authenticate	
ntp authentication-key	NTP
ntp server	NTP

27.1.9 ntp update-calendar

NTP

no

ntp update-calendar

no ntp update-calendar

NTP

NTP

NTP

NTP

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

27.2

' **debug ntp**

' **show ntp status**

27.2.1 debug ntp

NTP

debug ntp

no debug ntp

NTP

NTP

debug ntp

27.2.2 show ntp status

NTP

show ntp status

NTP

NTP

NTP

NTP

show ntp status

28 UDP-Helper

28.1

28.1.1 udp-helper enable

udp-helper enable	UDP	no
udp-helper enable	UDP	

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

<i>address</i>	UDP <div style="text-align: right;">&\$</div>

UDP

20
 , UDP-Helper
 UDP

no ip helper-address

UDP

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

ip forward-protocol	UDP

28.1.3 ip forward-protocol

UDP UDP no

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

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

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

29 SNMP

29.1

SNMP

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

29.1.1 no snmp-server

SNMP

no snmp-server

no snmp-server

SNMP

SNMP

SNMP

Ruijie(config)# no snmp-server

29.1.2 snmp-server chassis-id

SNMP

snmp-server host	SNMP

29.1.6 snmp-server host

```

SNMP      NMS
snmp-server host      no      SNMP

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

no snmp-server host host-addr

```

```

host-addr  SNMP
ipv6-addr  SNMP      ipv6
vrfname    vrf
version    snmp      V1  V2C  V3
auth | noauth | priv    V3
community-string          V3
port-num    snmp
notification-type          snmp

```

SNMP

snmp-server enable traps

```

NMS
SNMP
[      vrf      ]      vrf

```

SNMP

SNMP

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

snmp-server enable traps	

29.1.7 snmp-server location

SNMP

snmp-server

```
location no SNMP
```

```
snmp-server location text
```

```
no snmp-server location
```

```
text
```

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

byte-count 484 17876

1500

SNMP 1492

Ruijie(config)# **snmp-server packetsize 1492**

snmp-server queue-length	SNMP

29.1.9 snmp-server queue-length

snmp-server

queue-length

snmp-server queue-length *length*

length 1 1000

10

4

4

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

snmp-server packetsize	SNMP

29.1.10 snmp-server system-shutdown

```

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

```

SNMP

```

reload/reboot SNMP RGOS
NMS

```

SNMP

```
Ruijie(config)# snmp-server system-shutdown
```

29.1.11 snmp-server trap-source

```

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

```

```
interface SNMP
```

```
SNMP IP
```

SNMP IP
 SNMP IP
 0 IP SNMP

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

snmp-server enable traps	
snmp-server enable host	NMS

29.1.12 snmp-server trap-timeout

snmp-server
trap-timeout no
snmp-server trap-timeout seconds
no snmp-server trap-timeout

seconds

30

60

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

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

29.1.13 snmp-server user

```

SNMP
snmp-server user
no
snmp-server user username groupname {v1 | v2 | v3 [encrypted]
[auth {md5 | sha} auth-password ] [priv des56 priv-password]}
[access {num | name}]
no snmp-server user username groupname {v1 | v2c | v3 }

```

username

groupname

v1 | v2 | v3

SNMP

v3

encrypted

20

MD5

16

16

SHA

auth

md5

MD5

sha

SHA

auth-password:

32

priv

des56

56

DES

priv-password

32

snmpV3

md5

DES

```

Ruijie(config)# snmp-server user user-2 mib2user v3 auth
md5 authpasstr priv des56 despasstr

```

show snmp user	SNMP

29.1.14 snmp-server group

SNMP

```

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

                default          MIB

```

```

                MIB-2    oid  1.3.6.1
Ruijie(config)# snmp-server view mib2 1.3.6.1 include

```

show snmp view	SNMP

29.1.16 snmp-server if-index persist

```

                snmp-server if-index persist
no
snmp-server if-index persist
no snmp-server if-index persist

```

```

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

```

show run	

29.2

29.2.1 show snmp

SNMP

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

show snmp	SNMP	
show snmp mib		snmp mib
show snmp user	snmp	
show snmp view	snmp	
show snmp group	snmp	

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

```

SNMP

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

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

30 RMON

30.1

RMON

- ' **rmon collection stats** *index* [**owner** *owner-string*]
- ' **rmon collection history** *index* [**owner** *owner-string*] [**buckets** *bucket-number*] [**interval** *seconds*]
- ' **rmon alarm** *number* *variable* *interval* {**absolute** | **delta** }
rising-threshold *value* [*event-number*] **falling-threshold** *value*
[*event-number*] [**owner** *ownername*]
- ' **rmon event** *number* [**log**] [**trap** *community*] [*description-string*]
- ' **show rmon statistics**
- ' **show rmon history**
- ' **show rmon events**
- ' **show rmon alarms** *ion stat*/TT2 1 TfTf0 Tc 0 Tw 11.697 0 Td()

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

30.1.2 rmon collection history

no

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

RGOS

owner buckets interval

1

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

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

RGOS

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

MIB ifInNUcastPkts.6

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

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

30.1.4 r/C2_098 00 03.66 0E71m321.44 0.48 0.48 A20fE .634 0 Tj/TT0 1 Tf1 0 Tc

trap

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

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

30.2

30.2.1 show rmon statistics

show rmon statistics

```
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
    
```

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

30.2.2 show rmon history

show rmon history

```

Ruijie# show rmon history
Entry : 1
Data source : Gil/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
    
```

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

30.2.3 show rmon alarm

show rmon alarm

```

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

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

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

30.2.4 show rmon event

show rmon event

```
Ruijie# show rmon event
Alarm : 1
Interval : 1
Variable : 1.3.6.1.2.1.4.2.0
Sample type : absolute
Last value : 64
Startup80n-4 T22o Tw 0 Td[(fall.44 1.3.6.1.2.1.4.2.0 FTc 2.0 Td[ (
```

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

31 IPFIX

31.1 IPFIX

31.1.1 cache

IPFIX , **cache**
no

cache {**entries** number | **timeout** {**active** minutes | **inactive** seconds}}

no cache {**entries** | **timeout** {**active** | **inactive**}}

entries *number*

1024 131072.

timeout

active *minutes*

30

1 60

inactive *seconds*

15

10 600

4096

30

15

IPFIX

IPFIX

```

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

```

show ip flow cache	
show ip flow cache aggregation	

31.1.2 cache-timeout

top-talker

cache-timeout *milliseconds*

no cache-timeout

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

5,000ms

top-talker

top-talker

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

31.1.3 clear ip flow stats

clear ip flow stats

```

flow IP IPFIX show ip cache
clear ip flow stats

```

```

Ruijie# clear ip flow stats

```

show ip flow cache	
show ip flow cache aggregation	

31.1.4 enabled (aggregation cache)

```

IPFIX enabled
no
enabled
no enabled

```

IPFIX

IPFIX

protocol-port :

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

protocol-port :

```
Ruijie(config)# ip flow-aggregation cache
protocol-port
Ruijie(config-flow-cache)# no enabled
```

ip flow-aggregation cache	
cache	
export destination (aggregation cache)	
mask (IPv4)	
show ip flow cache aggregation	

'%%) **export**

IPFIX **export**
no

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

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

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

version [9 | 10] Version 9 Netflow V9
 version 10 IETF version 10

template refresh-rate timeout-rate

```

refresh-rate packets
                1 600                20
timeout-rate minutes
                1 3600               10
    
```

```

refresh-rate 20
timeout-rate 10
    
```

IPFIX

```

                                IPFIX
destination                                export
    
```

protocol-port

```

Ruijie(config)# ip flow-aggregation cache
protocol-port
Ruijie(config-flow-cache)# export destination
10.41.41.1 9992
Ruijie(config-flow-cache)# export destination
172.16.89.1 9992
Ruijie(config-flow-cache)# enabled
    
```

protocol-port

```

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

ip flow-aggregation cache	
cache	

export destination } ...
(aggregation cache)

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

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

31.1.7 flow-sampler-map

no

flow-sampler-map *sampler-map-name*

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

sampler-map-name

egress IPFIX **ip flow ingress** **ip flow**
 ingress service-policy

ip flow {**ingress** | **egress**}

flow-sampler

service-policy

2/2

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

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

flow-sampler	
mode random one-out-of	

31.1.8 ip flow egress

ip flow egress

no

ip flow egress

no ip flow egress

IPFIX

ip flow egress ip flow Ingress IPFIX

1/1 IP

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

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

ip flow-aggregation cache	
cache	
export destination (aggregation cache)	

ip flow-aggregation cache

no

no enabled

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

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

as AS

as-tos AS-Tos

destination-prefix destination-prefix

destination-prefix-tos destination-prefix-tos

prefix prefix

prefix-port prefix-port

prefix-tos prefix-tos

protocol-port protocol-port

protocol-port-tos protocol-port-tos

source-prefix source-prefix

source-prefix-tos source-prefix-tos

			IPFIX		export
destination					Tos
				Tos	Tos
IP	8		IP		

prefix prefix-port prefix-tos source-prefix
source-prefix-tos

prefix prefix-port prefix-tos destination-prefix
destination-prefix-tos

prefix

31.1.11 ip flow-cache entries

```
ip flow-cache entries
no
ip flow-cache entries number
no ip flow-cache entries

Number                               1024   580000.
        65536 (64K)

65536                               (64K)
```

```
580000 show ip cache flow
```

```
5, € %i•X.331 0 Td <01C4>Tj 0.53657Tf -0.0017336D1 C39240553 0 Td <47J<.44 T9E2
```

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

31.1.12 ip flow-cache timeout

ip flow-cache timeout
no

ip flow-cache timeout [**active** *minutes* | **inactive** *seconds*]

no ip flow-cache timeout [**active** | **inactive**]

active *minutes*

1 60

30

inactive *seconds*

10 600

15

30

15

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

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


refresh-rate *packets*

1 600

20 **-eets**

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

31.1.14 ip flow-top-talkers

ip flow-top-talker

top talker

ip flow-top-talkers

no ip flow-top-talkers

top talker

top number sort-by

[bytes | packets]

no

top-talker

Ruijie(config)#**ip flow-top-talkers**

31.1.15 mask (IPv4)

mask

no

mask {[destination | source] minimum *value*}

no mask {[destination | source] minimum }

destination

source

minimum

value 1 32

0 mask

IP

' ()

' TOS ()

' ()

' Prefix-port ()

' Prefix-TOS ()

' Source prefix ()

' Source prefix TOS ()

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

31.1.16 match

top-talker

no

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

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

byte-range IP

max-byte-number

min-byte-number

IP

1–4294967295

max *max-byte-number* IP

1–4294967295

min *min-byte-number* IP

1–4294967295

destination {**address** *ip-address* [*mask* | */nn*] | **as** *as-number* | **port** {*max-port-number min-port-number* | **max** *max-port-number* | **min** *min-port-number*}}

destination address IP

ip-address IP
mask IP 10 255.255.255.0
/nn CIDR IP mask 255.255.255.0
/24

destination as
as-number

destination port
max-port-number
min-port-number 0-65535
max *max-port-number* 0-65535
min *min-port-number* 0-65535

direction egress
direction ingress
input-interface *interface-type interface-number*

nexthop-address IP
ip-address IP
mask IP 10 255.255.255.0
/nn CIDR IP mask 255.255.255.0
/24

output-interface *interface-type interface-number*

packet-range IP
max-packets
min-packets
IP IP 1-4294967295
max *max-packets* IP 1-4294967295
min *min-packets* IP 1-4294967295

protocol
protocol-number 0-255
tcp tcp
udp udp

source address IP
ip-address IP
mask IP 10 255.255.255.0
/nn CIDR IP mask 255.255.255.0
/24

source as

```

as-number
source port
max-port-number
min-port-number
                                0-65535
max max-port-number              0-65535
min min-port-number              0-65535
tos      TOS
tos-byte      tos
dscp dscp      TOS      dscp
precedence precedence      TOS      precedence

```

sort-by

```
ip flow-top-talker
```

```
Ruijie(config-flow-top-talks)#match input-interface
fa 0/1
```

31.1.17 mode(Flow Sampler Configuration)

```

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

```

2/2

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

flow-sampler	

31.1.18 sort-by

31.1.19 top

top-talker no
top-talker

top *number*

no top

number top-talker 1-200

top-talker

top

Ruijie(config-flow-top-talks)#**top** 150

31.2 IPFIX

31.2.1 show flow-sampler

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

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

31.2.2 show ip flow cache

show ip flow cache

```
show ip flow cache
```

IP

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

Protocol	Total	Flows	Packets	Bytes	Packets
Active(Sec)	Idle(Sec)				
-----	Flows	/Sec	/Flow	/Pkt	/Sec
/Flow	/Flow				
TCP-BGP	71	0.0	1	49	0.0
2.5	15.8				
UDP-other	17	0.0	1	328	0.0
15.7					
ICMP	18966	6.7	10	28	72.9
					0.1

```

22.9
Total:      19054      6.7      10      28      72.9      0.1
22.9

```

```

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

```

clear ip flow stats	
show ip flow interface	IPFIX

31.2.3 show ip flow cache aggregation

show ip flow cache aggregation *mode*

```

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

```

as

destination-prefix-tos TOS

prefix

prefix-port

prefix-tos TOS

protocol-port

protocol-port-tos TOS

source-prefix

source-prefix-tos TOS

IP

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

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

31.2.4 show ip flow export

show ip flow export

show ip flow export

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

IP

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

31.2.6 show ip flow top-talkers

```
( match)
sort-by
show ip flow top-talkers
```

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


VRF

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

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

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

show ip route vrf

RGOS10.1

32.1.3 ip vrf

VRF VRF no

ip vrf *vrf-name*

no ip vrf *vrf-name*

vrf-name VRF

VRF

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

RGOS10.1

RGOS 10.3(4) S86 E MPLS
 VRF VRF

32.1.4 rd

rd rd_value

vrf rd VRF VRF VRF
 rd VRF
 VRF

rd_value

1) rd_value as_num nn

an_num nn

2) rd_value ip_addr:nn

ip_addr IP nn

rd vrf rd

vrf

vrf RD RD RD
 RD vrf RD

vrf RD RD

```
Ruijie(config)# ip vrf vrf1
Ruijie (config-vrf)# rd 100:1
```

ip vrf	vrf
show ip vrf	vrf

RGOS10.3(3)

32.1.5 route-target

[no] route-target {*import|export|both*} *rt_value*

vrf rt

import

32.1.6 ip vrf forwarding

```

VRF;          VRF          no
ip vrf forwarding vrf-name
no ip vrf forwarding vrf-name

vrf-name          VRF

VRF

```

VRF

```

Ruijie(config-if)# ip vrf forwarding redvrf

RGOS10.1

```

32.1.7 show ip vrf

```

VRF

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

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

VRF

```

VRF

```

'      brief
'      detail

```


33 RIP

33.1

33.1.1 address-family RIP

RIP

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

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

RIP

address-family

(config-router-af)#

VRF RIP

VRF

RIP

VRF

RIP

exit-address-family **exit**

vpn1 VRF

vrf

RIP

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

```

255.255.255.0
Ruijie(config)# router rip
Ruijie(config-router)# address-family ipv4 vrf vpn1
Ruijie(config-router-af)# network 192.168.1.0
Ruijie(config-router)# exit-address-family

```

exit-address-family	
ip vrf	VRF

33.1.2 auto-summary (RIP)

```

RIP                               auto-summary
no

```

```

auto-summary
no auto-summary

```

```

RIP
RIPv1  RIPv2

```

```

RIP

```

```

'   RIP
'   RIP
'

```

```

RIPv1                               RIPv2

```

RIPv2

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

version	RIP v1 v2 v1&v2

33.1.3 default-metric (RIP)

```
RIP default-metric  
no  
default-metric metric  
no default-metric
```

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

1

```
redistribute  
RIP  
RIP  
RIP default-metric  
RIP default-metric  
default-metric 1  
RIP OSPF  
RIP 3  
Ruijie(config)# router rip
```

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

redistribute	

33.1.4 default-information originate(RIP)

RIP

```
default-information originate no
```

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

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

always	RIP
metric <i>metric-value</i>	<i>metric-value</i> 1-15
route-map <i>map-name</i>	route-map , route-map

metric 1

RIP

default-information originate

always RIP

show ip rip database RIP

```

RIP
set metric
metric
route-map set metric
RIP

RIP

ip default-network
default-information originate

RIP
RIP
RIP

```

]

RIP

120

RIP

RIP Fastethernet 0/0
172.16

```
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
```

access-list	
prefix-list	

33.1.7 distribute-list out RIP

distribute-list out no

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

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

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

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

RIP

192.168.12.0/24

```

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

```

access-list	
prefix-list	
redistribute	

33.1.8 exit-address-family

exit-address-family

exit-address-family

no

exit

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

address-family	

33.1.9 ip rip authentication key-chain

```

RIP          RIP          ip rip
authentication key-chain      no
ip rip authentication key-chain name-of-keychain
no ip rip authentication key-chain

```

<i>name-of-keychain</i>	RIP

key chain

RIP

RIPv1

RIP

RIPv2

Serial 0

RIP

ripchain

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

```
Ruijie(config-if)# ip rip authentication key-chain
ripchain
```

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

33.1.10 ip rip authentication mode

RIP

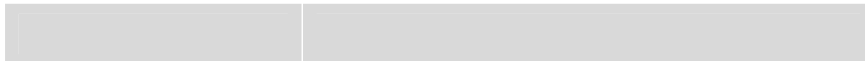
Serial 0

RIP

MD5

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

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



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

33.1.12 ip rip default-information

```

                RIP
default-information                      no                      ip rip

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

```

only	

ethernet0/0

```
Ruijie(config)# interface ethernet 0/0
Ruijie(config-if)# ip rip default-information only
```

default-information originate	RIP

33.1.13 ip rip receive enable

```
RIP
receive enable      no      RIP      ip rip
                  RIP      RIP      RIP
```

```
ip rip receive enable
no ip rip receive enable
```

RIP

```
no
default            RIP
                  RIP
```

Fastethernet 0/0 RIP

```
Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# no ip rip receive enable
```

ip rip send enable	RIP
passive-interface	RIP

no ip rip send enable

RIP

```

RIP
no
default
Fastethernet 0/0
RIP
Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# no ip rip send enable

```

ip rip receive enable	RIP
passive-interface	RIP

33.1.16 ip rip send version

```

RIP
ip rip receive version
RIP
no
ip rip send version [1] [2]
no ip rip send version

```

1	RIPv1
2	RIPv2

version


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

version	RIP

33.1.18 ip split-horizon (RIP)

```

RIP
no RIP
ip split-horizon
no ip split-horizon

IP

X.25

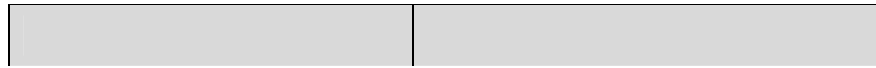
IP

RIP
neighbor
show ip rip
RIP

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

```

RIP



neighbor RIP

RIP

auto-summary	RIP

RIP IP neighbor
no

neighbor *ip-address*

no neighbor

<i>ip-address</i>	IP

RIPv1 IP 255.255.255.255 RIPv2
224.0.0.9

passive-interface

RIP

passive

33.1.22 offset-list(RIP)

RIP metric
offset-list no offset

offset-list *access-list-number* {in | out} *offset* [*interface-type*
interface-number]

no offset-list *access-list-number* {in | out} *offset* [*interface-type*
interface-number]

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

offset

```

RIP
offset-list
acl 7
RIP
metric 7
Ruijie(config-router)# offset-list 7 out 7
fastEthernet1/0
acl 8
RIP
metric 7
Ruijie(config-router)# offset-list 7 in 7
Ruijie(config-router)# offset-list 8 in 7 fastEthernet
1/0

```

33.1.23 output-delay

```

RIP
25
512
25

```

output-delay

```

RIP
30

```

```

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

```

33.1.24 passive-interface

```

passive-interface          no

```

```

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

```

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

```

passive

```

```

passive-interface default          passive
no passive-interface interface-type interface-num
passive

ip rip send enable          ip rip receive enable
RIP
passive          RIP          RIP
enable          ip rip send enable          ip rip receive

```

```

passive
passive ethernet0/0
Ruijie(config-router)# passive-interface default
Ruijie(config-router)# no passive-interface ethernet
0/0

```

ip rip receive enable	RIP
ip rip send enable	RIP

33.1.25 redistribute RIP

```

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

```

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

OSPF
ISIS level-2
metric 1
route-map

RIP

RIP

OSPF

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

30 180 120

RIP RIP

RIP **show ip rip**

RIP 10 30
invalid
invalid 90

```
Ruijie(config)# router rip
Ruijie(config-router)# timers basic 10 30 90
```

2Mbps

33.1.28 validate-update-source

RIP
validate-update-source no

validate-update-source
no validate-update-source

RIP

RIP
RIP

IP

RIPv1 RIPv2

RIPv1

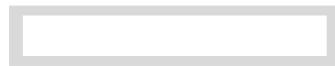
RIP
ip rip send version

ip rip receive version
RIP

RIP 2

Ruijie(config)# **router rip**

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



```

RIP
  rip      rip      metric  distance
VRF      VRF      VRF-id

```

RIP

```

Ruijie# show ip rip
Routing Protocol is "rip"
Sending updates every 10 seconds, next due in 4 seconds
Invalid after 20 seconds, flushed after 10 seconds

```

33.2.2 show ip rip database

RIP

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

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

RIP

RIP

```
Ruijie# show ip rip database
192.168.1.0/24    auto-summary
192.168.1.0/30    directly connected, Loopback 3
192.168.1.8/30    directly connected, FastEthernet 0/0
192.168.121.0/24  auto-summary
192.168.121.0/24  redistributed
[1] via 192.168.2.22, FastEthernet 0/1
```

RIP

192.168.121.0/24

```
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
```

--	--

show ip rip	
-------------	--

33.2.3 show ip rip external

RIP

show ip rip external

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

bgp connected isis ospf static	
vrf <i>vrf-name</i>	VRF RIP
<i>process-name</i>	ISIS
<1-65535>	OSPF

RIP

```
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
```

show ip rip	

33.2.4 show ip rip interface

RIP

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

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

RIP

```

Ruijie# show ip rip interface
FastEthernet 1/1 is down, line protocol is down
  RIP is not enabled on this interface
FastEthernet 1/0 is up, line protocol is up
  Routing Protocol: RIP
  Receive RIPv2 packets only
  Send RIPv2 packets only
  Passive interface: Disabled
  Split horizon: Enabled
  V2 Broadcast: Disabled
  Multicast register: Registered
  Interface Summary Rip:
    Not Configured
  Authentication mode: Text
  Authentication key-chain: ripk1
  Authentication text-password: ruijie
  Default-information: only, metric 5
  IP interface address:
    192.168.64.100/24

```

```

RIP BFD , :
Ruijie#show ip rip interface
VLAN 1 is up, line protocol is up
Routing Protocol: RIP
  Receive RIPv1 and RIPv2 packets
  Send RIPv1 packets only
  Receive RIP packet: Enabled
  Send RIP packet: Enabled
  Send RIP supernet routes: Enabled
  Passive interface: Disabled
  Split horizon: Enabled
  BFD: Enabled
  V2 Broadcast: Disabled
  Multicast registe: Registered
  Interface Summary Rip:
    Not Configured
  IP interface address:
2.2.2.111/24
```

RIP

RIP

Ruijie#

34 OSPF

34.1

34.1.1 area

```

no OSPF
area area-id
no area area-id
    
```

'	'
' UfYU!]X	' CGD: ID

OSPF

```

no OSPF
area authentication area default-cost area filter-list
area nssa
    
```

OSPF

1.

2. network area

OSPF 2

```

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

'	'
' bYhkcf_ UfYU	' CGD: CGD:

34.1.2 area authentication

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

'	'
' UfYU!]X	' CGD: I D
' aYggU[Y! X] [Ygh	' A8) aYggU[Y X] [Ygh)

RGOS message-digest
 OSPF message-digest
 MD5
 OSPF
ospf authentication-key ip
message-digest-key MD5 ip ospf

OSPF 0 MD5
backbone

```
Ruijie(config)# interface FastEthernet 0/0
Ruijie(config-if)# ip address 192.168.12.1
255.255.255.0
Ruijie(config-if)# ip ospf message-digest-key 1 md5
backbone

# OSPF

Ruijie(config)# router ospf 1
Ruijie(config-router)# network 192.168.12.0
0.0.0.255 area 0
Ruijie(config-router)# area 0 authentication
message-digest
```

,	,
]d U h\Ybh] V\h] cb! _Ym	cgdZ , CGD:

<i>cost</i>	STUB	NSSA
-------------	------	------

```

                ABR
            STUB
                NSSA
            ABR
                ABR

    OSPF
  stub area nssa
        area stub
nssa      area default-cost
                NSSA
                ABR
                area
                area
    
```

50

```

Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.0.0 0.0.255.255
area 0
Ruijie(config-router)# network 192.168.12.0 0.0.0.255
area 1
Ruijie(config-router)# area 1 stub
Ruijie(config-router)# area 1 default-cost 50
    
```

'	'
' UfYU ghi V	' CGD.
' UfYU bggU	' CGD. BGG5

34.1.4 area filter-list

ABR

intra-area

area *area-id* **filter-list** [**access** *acl-name* | **prefix** *prefix-name*] [**in** | **out**]
no area *area-id* **filter-list** [**access** *acl-name* | **prefix** *prefix-name*] [**in** | **out**]

<i>area-id</i>	
<i>acl-name</i>	

OSPF nssa area nssa
 no nssa nssa

area *area-id* **nssa** [**no-redistribution**] [**default-information-originate**
 [**metric** <0-16777214> | **metric-type** <1-2>]] [**no-summary**]

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

' UfYU] X	' BGG5
' bc! fYX] ghf] Vi h] cb	' bggU 56F bggU
' XYZU ` h!] bZcf aUh] cb! cf] [] bUhY	' + @G5 bggU BGG5 56F 5G6F
' bc! gi aaUf m	' bggU f156Fk @G5 bggU

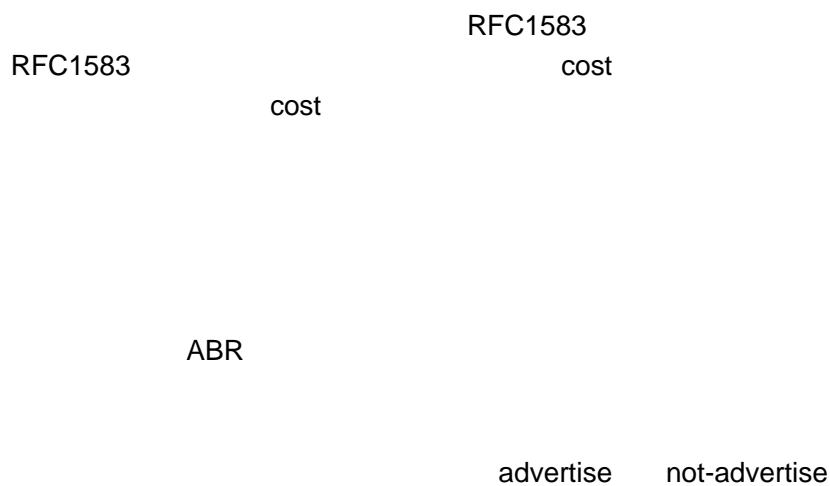
NSSA

default-information-originate Type-7 LSA
 nssa ABR ASBR ABR

Type-7 LSA

	NSSA		LSA
ABR	no-summary	ABR	NSSA
summary LSAs	Type-3 LSA		
area default-cost		NSSA	ABR

<i>ip-address</i>	
advertise not-advertise	
cost cost	



OSPF

172.16.16.0/20

```
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.0.0 0.0.15.255
area 0
Ruijie(config-router)# network 172.16.17.0 0.0.15.255
area 1
Ruijie(config-router)# area 1 range 172.16.16.0 255.255.240.0
```

34.1.7 area stub

OSPF

area stub no

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

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

<i>area-id</i>	STUB
no-summary	ABR ABR

OSPF

area stub ABR

```
Ruijie(config-router)# area 1 stub
```

authentication-key <i>key</i>	OSPF service password-encryption
message-digest-key <i>key-id md5 key</i>	OSPF MD5 MD5 service password-encryption
authentication	
message-digest	MD5
null	

```

dead-interval 40
hello-interval 10
retransmit-interval 5
transmit-delay 1
;

```

OSPF

ABR Stub Area NSSA ABR

```

router-id OSPF
show ip ospf neighbor

```

```

router-id
Loopback

```

```

area virtual-link
OSPF

```

area authentication

1

2.2.2.2

```
Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.0.0 0.0.15.255 area 0
Ruijie(config-router)# network 172.16.17.0 0.0.15.255area 1
    Ruijie(config-router)# area 1 virtual-link 2.2.2.2

    Ruijie(config)# router ospf 1                                À
    Ruijie(config-router)# network 172.16.17.0 0.0.15.255area 1
    Ruijie(config-router)#
```



```
Ruijie(config-router)# no compatible rfc1583
```

show ip ospf	ospf

34.1.12 default-information originate OSPF

OSPF

default-information originate **no**

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

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

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

```

redistribute      default-information      OSPF
ASBR
OSPF
default-information originate

always          OSPF

show ip ospf database      OSPF
0.0.0.0                    OSPF
show ip route

default-information originate
default-metric

OSPF                      1                      2
1          1          2          show ip route
1

STUB

OSPF                      OSPF
1          50

Ruijie(config)# router ospf 1
Ruijie(config-router)# network 172.16.24.0 0.0.0.255
area 0
Ruijie(config-router)# default-information originate
always metric 50 metric-type 1
    
```

show ip ospf database	OSPF
show ip route	IP

34.1.13 default-metric

```

OSPF
default-metric      no
    
```

default-metric *metric*

no default-metric

<i>metric</i>	OSPF

20

default-metric

redistribute

default-metric

default-information originate

OSPF

OSPF

50

```
Ruijie(config)# router rip
Ruijie(config-router)# network 192.168.12.0
Ruijie(config-router)# version 2
Ruijie(config-router)# exit
Ruijie(config)# router ospf
Ruijie(config-router)# network 172.16.10.0 0.0.0.255
area 0
Ruijie(config-router)# default-metric 50
Ruijie(config-router)#redistribute rip subnets
```

redistribute	
show ip ospf	ospf

34.1.14 distance ospf

OSPF

distance ospf {intra-area <1-255> | inter-area <1-255> | external <1-255>}

no distance ospf

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

110

OSPF

OSPF

OSPF

160

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

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

34.1.15 distribute-list in

LSA

distribute-list {listname | gateway plist-name | prefix plist-name }
in [interface-type num]

no distribute-list {listname | gateway plist-name | prefix plist-name }
in [interface-type num]

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



```

Ruijie(config)# access-list 3 permit 172.16.0.0
0.0.127.255
Ruijie(config)# router ospf 25
Ruijie(config-router)# redistribute rip metric 100
Ruijie(config-router)# distribute-list 3 in ethernet
1/0
Ruijie(config-router)# distribute-list 3 in ethernet
1/1
  
```

34.1.16 distribute-list out

```

redistribute
distribute-list {listname | gateway plist-name | prefix plist-name}
  
```

out [**bgp** | **connected** | **isis** *area-tag* | **ospf** *process-id*] **rip** | **static**]

<i>listname</i>	acl
gateway <i>plist-name</i>	gateway
prefix <i>plist-name</i>	prefix-list

[**bgp** | **connected** | **isis**
area-tag | **ospf**
process-id | **rip**


```

OSPFv2                16  TRAP                4
                       TRAP                    no
TRAP

```

```

enable traps [error [ifauthfailure | ifconfigerror | ifrxbadpacket |
virtifauthfailure | virtifconfigerror | virtifrxbadpacket] | lsa
[lsdbapproachoverflow | lsdboverflow | maxagelsa | originatelsa] |
retransmit [iftxretransmit | virtiftxretransmit] | state-change
[ifstatechange | nbrstatechange | virtifstatechange |
virtnbrstatechange]]

```

```

no enable traps [error [ifauthfailure | ifconfigerror | ifrxbadpacket |
virtifauthfailure | virtifconfigerror | virtifrxbadpacket] | lsa
[lsdbapproachoverflow | lsdboverflow | maxagelsa | originatelsa] |
retransmit [iftxretransmit | virtiftxretransmit] | state-change
[ifstatechange | nbrstatechange | virtifstatechange |
virtnbrstatechange]]

```



<p>error</p>	<p>error traps error traps ifauthfailure ifconfigerror ifrxbadpacket virtifauthfailu re virtifconfigerr or virtifrxbadpac ket</p>
	<p>34-23</p>

<p>lsa</p>	<p>lsa traps lsa traps lsdbapproach overflow lsdboverflow maxagelsa originatelsa</p>
	<p>34-24</p>

L

retransmit	retransmit traps retransmit traps ifxretransmit virtifxretrans mit
-------------------	---

state-change	state-change traps state-change traps ifstatechange nbrstatechang e virtifstatechan ge virtnbrstatech ange
---------------------	---

TRAP

snmp-server
enable traps ospf

MIB

snmp-server

TRAP

OSPFv2 100 TRAP

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

show ip ospf	OSPF
enable mib-binding	OSPFv2 MIB

34.1.19

```
Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# ip address 172.16.10.0
255.255.255.0
Ruijie(config-if)# ip ospf authentication
message-digest
```

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

34.1.20 ip ospf authentication-key

```
OSPF ip ospf
authentication-key no
ip ospf authentication-key key
no ip ospf authentication-key
```

Key	8

ip ospf authentication-key

OSPF
OSPF

OSPF

```

                OSPF                100Mbps/Bandwidth    Bandwidth
                bandwidth

                OSPF
'   64K          cost  1562
'   E1          cost   48
'   10M         cost   10
'   100M        cost

ip ospf cost          OSPF

                serial 1/0          OSPF          100

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

```

--	--

, LSA

LSA ,

LSA serial 1/0

```
Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip address 172.16.10.1
255.255.255.0
Ruijie(config-if)# encapsulation ppp
Ruijie(config-if)# ip ospf database-filter all out
```

34.1.23 ip ospf dead-interval

```
OSPF ip
ospf dead-interval no
ip ospf dead-interval seconds
no ip ospf dead-interval
```

<i>seconds</i>	

ip ospf hello-interval

```

OSPF          Hello          OSPF
              Hello
              hello          4          hello

              OSPF

              hello
    
```

```

serial 1/0    OSPF
30

Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip address 172.16.10.1
255.255.255.0
Ruijie(config-if)# encapsulation ppp
Ruijie(config-if)# ip ospf dead-interval 30
    
```

ip ospf hello-interval	OSPF Hello

34.1.24 ip ospf disable all

```

ospf

ip ospf disable all
no ip ospf disable all
    
```

network area

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
```

ip ospf dead-interval	OSPF

34.1.26 ip ospf message-digest-key

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
```

<i>Key</i>	16
<i>Key-id</i>	255

MD5

ip ospf message-digest-key

OSPF
OSPF

OSPF
authentication

area

ip ospf authentication

RGOS

MD5

OSPF MD5

OSPF

FastEthernet 0/0

OSPF

hello5

```
Ruijie(config)# interface Serial 1/0
Ruijie(config-if)# ip address 172.16.24.2
255.255.255.0
Ruijie(config-if)# ip ospf authentication
message-digest
Ruijie(config-if)# ip ospf message-digest-key 10 md5
hello10
Ruijie(config-if)# ip ospf message-digest-key 5 md5
hello5
```

```
Ruijie(config)# interface Serial1/0
Ruijie(config-if)# no ip ospf message-digest-key 10 md5
hello10
```

area authentication	OSPF
ip ospf authentication	

34.1.27 ip ospf mtu-ignore

```

no
mtu
ip ospf mtu-ignore
no ip ospf mtu-ignore

```


mtu

```

OSPF
MTU
,
MTU,
,
MTU
MTU

```

serial 1/0 MTU

```

Ruijie(config)# interface serial 1/0
Ruijie(config-if)# ip ospf mtu-ignore

```

34.1.28 ip ospf network

```

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

```

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

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

	X.25	OSPF
		X.25 map
frame-relay map	X.25	
OSPF	X.25	
		OSPF
,		
,		
	X.25	IP
broadcast	.	

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

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

DR/RDR

DR/BDR

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



fastethernet 0/0 0

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

Ruijie(config-if)# **ip ospf priority 0**

ip ospf network	OSPF

34.1.30 ip ospf retransmit-interval

LSU

ip ospf retransmit-interval no

ip ospf retransmit-interval seconds

no ip ospf retransmit-interval

<i>Seconds</i>	LSU 5

5

LSU LSU

ip ospf retransmit-interval

LSA

LSU

area

virtual-link

retransmit-interval

serial 1/0 LSU 10

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

area virtual-link	OSPF

34.1.31 ip ospf transmit delay

```
OSPF                  LSU                                  ip ospf
transmit delay                  no
ip ospf transmit delay seconds
no ip ospf transmit delay
```

Seconds	OSPF LSU 1

1

```
LSU                                  LSAs                          Age
ip ospf transmit delay
LSU                                  area
virtual-link                  retransmit-interval
RGOS          Age          3600          LSA
                                LSA
```

serial1/0 5

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

area virtual-link	OSPF

34.1.32 log-adj-changes

no default

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

detail	

Full detail Full

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

--	--

<code>show ip ospf</code>	<code>ospf</code>
---------------------------	-------------------

34.1.33 max-concurrent-dd

DD

`max-concurrent-dd <1-65535>`



```
cost]
no neighbor ip-address
```

<i>ip-address</i>	IP
poll-interval <i>seconds</i>	120 Non-broadcast(NBMA)
priority <i>priority</i>	Non-broadcast(NBMA)
Cost cost	, cost point-to-multipoint [non-broadcast]

```
RGOS
IP IP
NBMA
Hello OSPF Hello Hello
OSPF
0 Hello 0
DR/BDR DR/BDR DR/BDR
Hello
,
cost
OSPF IP
172.16.24.2 1 150
Ruijie(config)# router ospf 20
Ruijie(config-router)# network 172.16.24.0 0.0.0.255
area 0
```

```
Ruijie(config-router)# neighbor 172.16.24.2 priority 1  
poll-interval 150
```



```

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

Ruijie(config)# router ospf 20
Ruijie(config-router)# network 172.16.16.0
0.0.15.255 area 172.16.16.0
Ruijie(config-router)# network 192.168.12.0
0.0.0.255 area 1
Ruijie(config-router)# network 0.0.0.0 255.255.255.255
area 0
    
```

router ospf	OSPF

34.1.36 overflow database

```

                                OSPF    LSA
overflow database <0-4294967294> hard | soft
no overflow database
    
```

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

OSPF **hard** OSPF
soft

LSA 10 OSPF 10

```

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

34.1.37 overflow database external

external LSA

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

<i>max-dbsize</i>	external lsa AS 0-2147483647
<i>wait-time</i>	0-65535

external-LSA

external-LSA external-LSA

```

external-LSA          max-dbsize
external-LSA          external-LSA
wait-time             external-LSA
    
```

```

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

34.1.38 overflow memory-lack

```

                OSPF    OVERFLOW
no
overflow memory-lack
no overflow memory-lack
    
```

no	OVERFLOW OSPF

```

                OSPF    OVERFLOW
    
```

```

OSPF    OVERFLOW
    
```

```

                OSPF    OVERFLOW
    
```

```

OSPF                NULL
                   OVERFLOW
    
```

```

clear ip ospf process          OSPF
OSPF OVERFLOW
no          OSPF              OVERFLOW
                                OSPF
    
```

OSPF OVERFLOW

```

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

clear ip ospf process	OSPF
show ip protocols ospf	OSPF

34.1.39 passive-interface

no

```

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

<i>type number</i>	
default	

, OSPF

serial 1/0


```
Ruijie(config-router)# redistribute isis isis-001
level-1
```

Show run

```
router ospf 1
redistribute ospf 2 match external 1 internal subnets
redistribute isis isis-001 level-1-2
```

34.1.41 router ospf

```

        OSPF
no      OSPF
router ospf process-id [vrf vrf-name]
no router ospf process-id

```

<i>process-id</i>	ospf
<i>vrf-name</i>	<div style="text-align: center;">VRF</div> OSPF VRF

show ip protocols	

34.1.43 summary-address

OSPF

summary-address **no**

summary-address *ip-address net-mask* [**not-advertise** | **tag**
 <0-4294967295> |]

<i>ip-address</i>	IP
<i>net-mask</i>	
not-advertise	

OSPF
 OSPF

area rang area range OSPF
 summary-address OSPF
 NSSA **summary-address** **NSSA** **ABR**

100.100.0.0/16

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
```

area range	OSPF

34.1.44 timers lsa-group-pacing

LSA

no

timers lsa-group-pacing *seconds*

no timers lsa-group-pacing

<i>seconds</i>	LSA : 10-1800

: 240

LSA

120

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

```
Ruijie(config-router)#timers lsa-group-pacing 120
```



spf-delay *spf-holdtime*

OSPF

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

spf-delay 1000
spf-holdtime 5000
spf-max-waittime 10000

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

:

1 *spf-holdtime* *spf-delay* *spf-holdtime*
spf-delay

2 *spf-max-waittime* *spf-holdtime* *spf-max-waittime*
spf-holdtime

3 **timers throttle spf** **timers spf**

4 **timers spf** **timers throttle spf** **timers**
throttle spf

```

                    OSPF   SPF
                    5     1000   90000
                    5ms 1s 3s 7s 15s 31s 63s 89s 179s 179+90 .....
Ruijie(config)# router ospf 20
Ruijie(config-router)# timers spf 5 1000 90000
    
```

show ip ospf	ospf
timers spf	SPF 10.4 RGOS SPF timers throttle spf timers spf

34.2

34.2.1 show ip ospf

```

                    OSPF
                    show ip ospf
                    show ip ospf [process-id]
    
```

<i>process-id</i>	ospf

OSPF

show ip ospf

```
Ruijie# show ip ospf
Routing Process "ospf 1" with ID 1.1.1.1
Process uptime is 4 minutes
Process bound to VRF default
Conforms to RFC2328, and RFC1583Compatibility flag
isenabled
Supports only single TOS(TOS0) routes
Supports opaque LSA
This router is an ASBR (injecting external routing
information)
SPF schedule delay 5 secs, Hold time between two SPFs
10 secs
LsaGroupPacing: 240 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 4. Checksum 0x0278E0
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 4
External LSA database is unlimited.
Number of LSA originated 6
Number of LSA received 2
Log Neighbor Adjacency Changes : Enabled
Number of areas attached to this router: 1
Area 0 (BACKBONE)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 1
Area has no authentication
SPF algorithm last executed 00:01:26.640 ago
SPF algorithm executed 4 times
Number of LSA 3. Checksum 0x0204bf
Area 1 (NSSA)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 0
Number of fully adjacent virtual neighbors through this
area is 0
Area has no authentication
SPF algorithm last executed 02:09:23.040 ago
```

SPF algorithm executed 4 times
Number of LSA 6. Checksum 0x028638
NSSA Translator State isselected

OSPF BFD , "BFD is enabled",

```
Ruijie# show ip ospf
Routing Process "ospf 1" with ID 1.1.1.1
Process uptime is 4 minutes
Process bound to VRF default
Conforms to RFC2328, and RFC1583Compatibility flag
isenabled
Supports only single TOS(TOS0) routes
Supports opaque LSA
Supports Graceful Restart
This router is an ASBR (injecting external routing
information)
SPF schedule delay 5 secs, Hold time between two SPFs 10 secs
LsaGroupPacing: 240 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 4. Checksum 0x0278E0
Number of opaque AS LSA 0. Checksum 0x000000
Number of non-default external LSA 4
External LSA database is unlimited.
Number of LSA originated 6
Number of LSA received 2
Log Neighbor Adjacency Changes : Enabled
Graceful-restart disabled
Graceful-restart helper support enabled
Number of areas attached to this router: 1
BFD is enabled
Area 0 (BACKBONE)
Number of interfaces in this area is 1(1)
Number of fully adjacent neighbors in this area is 1
Area has no authentication
SPF algorithm last executed 00:01:26.640 ago
SPF algorithm executed 4 times
Number of LSA 3. Checksum 0x0204bf
Area 1 (NSSA)
```

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

Router ID	
Process uptime	OSPF router-id 0.0.0.0
Bound to VRF	OSPF VRF
Conforms to RFC2328	RFC2328
RFC1583Compatibility flag	RFC1583 RFC2328 ASBR
Support Tos	TOS0
Supports opaque LSA	opaque-LSA
Router Type	OSPF normal ABR ASBR
SPF Delay	SPF
SPF-holdtime	SPF
LsaGroupPacing	LSA
Incomming current DD exchange neighbors	incomming exstart
Outgoing current DD exchange neighbors	outgoing exstart
Number of external LSA	LSA
External LSA Checksum Sum	LSA

Number of opaque LSA	opaque-LSA
Opaque LSA Checksum Sum	opaque-LSA
Number of non-default external LSA	external-LSA
External LSA database limit	external-LSA
Exit database overflow state interval	overflow
Database overflow state	OSPF overflow
Number of LSA originated	LSA
Number of LSA received	LSA
Log Neighbor Adjency Changes	
Number of areas attached to this router	
Area type	, Default, Stub,NSSA
Number of interfaces in this area	
Number of fully adjacent neighbors in this area	Full
Number of fully adjacent virtual neighbors through this area	Full
Area authentication	
SPF algorithm last executed	SPF
SPF algorithm executed times	SPF
Number of LSA	LSA
Checksum Sum	LSA
NSSA Translator State	LSA NSSA External ABR OSPF
BFD is enabled	OSPF BFD

rs

SPF

rs

border-routers



FastEthernet 0/1	
ABR, ASBR	ASBR ABR ASBR ABR ASBR
Area 0.0.0.1	
select	ASBR select

34.2.3 show ip ospf database

OSPF **show ip ospf database**

LSAs

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

[link-state-id] **adv-router** *ip-address*

opaque-area	LSA
opaque-as	LSA
opaque-link	LSA
database-summary	OSPF LSA

OSPF

OSPF

show ip ospf database

```

Ruijie# show ip ospf database
      OSPF Router with ID (1.1.1.1) (Process ID 1)

          Router Link States (Area 0.0.0.0)
Link ID          ADV Router      Age  Seq#          CkSum
Link count
1.1.1.1          1.1.1.1          2   0x80000011  0x6f39 2
3.3.3.3          3.3.3.3          120 0x80000002  0x26ac 1

          Network Link States (Area 0.0.0.0)
Link ID          ADV Router      Age  Seq#          CkSum
192.88.88.27    1.1.1.1          120 0x80000001  0x5366

          Summary Link States (Area 0.0.0.0)
Link ID          ADV Router      Age  Seq#          CkSum
Route
10.0.0.0         1.1.1.1          2   0x80000003  0x350d
10.0.0.0/24
100.0.0.0        1.1.1.1          2   0x8000000c  0x1ecb
100.0.0.0/16

          Router Link States (Area 0.0.0.1 [NSSA])
Link ID          ADV Router      Age  Seq#          CkSum
Link count
    
```

```
1.1.1.1      1.1.1.1      2      0x80000001 0x91a2 1
```

Summary Link States (Area 0.0.0.1 [NSSA])

```
Link ID      ADV Router    Age  Seq#      CkSum
Route
100.0.0.0    1.1.1.1      2    0x80000001 0x52a4
100.0.0.0/16
192.88.88.0  1.1.1.1      2    0x80000001 0xbb2d
192.88.88.0/24
```

NSSA-external Link States (Area 0.0.0.1 [NSSA])

```
Link ID      ADV Router    Age  Seq#      CkSum
Route        Tag
20.0.0.0     1.1.1.1      1    0x80000001 0x033c E2
20.0.0.0/24  0
100.0.0.0    1.1.1.1      1    0x80000001 0x9469 E2
100.0.0.0/28 0
```

AS External Link States

```
Link ID      ADV Router    Age  Seq#      CkSum
Route        Tag
20.0.0.0     1.1.1.1      380  0x8000000a 0x7627
E2 20.0.0.0/24 0
100.0.0.0    1.1.1.1      620  0x8000000a 0x0854
E2 100.0.0.0/28 0
```

show ip ospf database

OSPF Router with ID	OSPF OSPF
Router Link States	
Net Link States	
Summary Net Link States	
NSSA-external Link States	
AS External Link States	
Link ID	
ADV Router	

Age	
Seq#	LSA
Cksum	
Link-Count	
Route	LSA
Tag	

show ip ospf database asbr-summary

```
Ruijie# show ip ospf database asbr-summary
OSPF Router with ID (1.1.1.35) (Process ID 1)
ASBR-Summary Link States (Area 0.0.0.1)
LS age: 47
Options: 0x2 (*|-|-|-|-|E|-)
LS Type: ASBR-summary-LSA
Link State ID: 3.3.3.3 (AS Boundary Router address)
Advertising Router: 1.1.1.1
LS Seq Number: 80000001
Checksum: 0xbe8c
Length: 28
Network Mask: /0
TOS: 0 Metric: 1
```

show ip ospf database asbr-summary

OSPF Router with ID	OSPF
AS Summary Link States	AS
LS age	
Options	
LS Type	
Link State ID	
Advertising Router	
LS Seq Number	

Checksum	
Length	
Network Mask	
TOS	TOS 0
Metric	

show ip ospf database external

```
Ruijie# show ip ospf database external
OSPF Router with ID (1.1.1.35) (Process ID 1)
AS External Link States
LS age: 752
Options: 0x2 (*|-|-|-|-|E|-)
LS Type: AS-external-LSA
Link State ID: 20.0.0.0 (External Network Number)
Advertising Router: 1.1.1.1
LS Seq Number: 8000000a
Checksum: 0x7627
Length: 36
Network Mask: /24
Metric Type: 2 (Larger than any link state path)
TOS: 0
Metric: 20
Forward Address: 0.0.0.0
External Route Tag: 0
```

show ip ospf database external



LS Seq Number	
Checksum	
Length	
Network Mask	

LS age	
Options	
LS Type	
Link State ID	
Advertising Router	
LS Seq Number	
Checksum	
Length	
Network Mask	
Attached Router	

show ip ospf database router

```

Ruijie# show ip ospf database router
OSPF Router with ID (1.1.1.1) (Process ID 1)
Router Link States (Area 0.0.0.0)
LS age: 322
Options: 0x2 (*|-|-|-|-|E|-)
Flags: 0x3 : ABR ASBR
LS Type: router-LSA
Link State ID: 1.1.1.1
Advertising Router: 1.1.1.1
LS Seq Number: 80000012
Checksum: 0x6d3a
Length: 48
Number of Links: 2

Link connected to: Stub Network
(Link ID) Network/subnet number: 100.0.1.1
(Link Data) Network Mask: 255.255.255.255
Number of TOS metrics: 0
TOS 0 Metric: 0
    
```

show ip ospf database router

OSPF Router with ID	OSPF
Router Link States	

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

Length

OSPF Router with ID	OSPF
Summary Net Link States	
LS age	
Options	
LS Type	
Link State ID	
Advertising Router	
LS Seq Number	
Checksum	
Length	
Network Mask	
TOS	TOS 0
Metric	

show ip ospf database nssa-external

```

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

show ip ospf database nssa-external

OSPF Router with ID	OSPF
NSSA-external	
Link States	

Advertising Router: 1.1.1.1
LS Seq Number: 8000000a
Checksum: 0x7627
Length: 36
Network Mask: /24
Metric Type: 2 (Larger than any link state path)
TOS: 0
Metric: 20
Forward Address: 0.0.0.0
External Route Tag: 0

show ip ospf database external

show ip ospf database database-summary

```
Ruijie# show ip ospf database database-summary
OSPF process 1:
Router Link States      : 4
Network Link States    : 2
Summary Link States    : 4
ASBR-Summary Link States : 0
AS External Link States : 4
NSSA-external Link States: 2
```

show ip ospf database database-summary

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


```

Designated Router (ID) 1.1.1.1, Interface Address
192.88.88.27
Backup Designated Router (ID) 3.3.3.3, Interface Address
192.88.88.72
Timer intervals configured,Hello 10,Dead 40,Wait
40,Retransmit 5
Hello due in 00:00:03
Neighbor Count is 1, Adjacent neighbor count is 1
Crypt Sequence Number is 70784
Hello received 1786 sent 1787, DD received 13 sent 8
LS-Req received 2 sent 2, LS-Upd received 29 sent 53
LS-Ack received 46 sent 23, Discarded 1
    
```

show ip ospf interface serial 1/0

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

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

34.2.5 show ip ospf neighbor

OSPF show ip ospf
neighbor

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

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

OSPF

show ip ospf neighbor

```
Ruijie# show ip ospf neighbor
OSPF process 1, 1 Neighbors, 1 is Full:
Neighbor ID      Pri   State           BFD State  Dead Time
Address          Interface
3.3.3.3          1    Full/BDR        Up         00:00:32
192.88.88.72    FastEthernet 1/0
```

```
Ruijie# show ip ospf neighbor detail
Neighbor 3.3.3.3, interface address 192.88.88.72
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 11 state changes
DR is 192.88.88.27, BDR is 192.88.88.72
Options is 0x52 (*|O|-|EA|-|-|E|-)
Dead timer due in 00:00:32
Neighbor is up for 05:11:27
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
Crypt Sequence Number is 0
Thread Inactivity Timer on
Thread Database Description Retransmission off
Thread Link State Request Retransmission off
Thread Link State Update Retransmission off
Thread Poll Timer on
BFD session state up
```

show ip ospf neighbor

Neighbor ID	
Pri	DR
State	
Dead Time	Dead

Address	
Interface	
interface address	
In the area	
via interface	
Neighbor priority	OSPF
State	OSPF FULL DR BDR DROTHER DR/BDR DR BDR
State changes times	
Dead Time	
DR	(Hello DR)
BDR	(Hello BDR)
Options	Hello E 0 STUB STUB
Dead timer due in	
Neighbor up time	
Database Summary List	DD
Link State Request List	LS
Link State Retransmission List	
Crypt Sequence Number	MD5
Thread Inactivity Timer	
Thread Database Description Retransmission	DD
Thread Link State Request Retransmission	LS
Thread Link State Update Retransmission	LS

Thread Poll Timer	Poll Timer
-------------------	------------

34.2.6 show ip ospf route

ospf

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

<i>process-id</i>	ospf ospf
count	ospf

```
Ruijie# show ip ospf route
OSPF process 1:
Codes: C - connected, D - Discard, O - OSPF,
IA - OSPF inter area N1 - OSPF NSSA external type 1,
N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
E2 100.0.0.0/24 [1/20] via 192.88.88.126, FastEthernet
1/0
C    192.88.88.0/24 [1] is directly connected,
FastEthernet 1/0, Area 0.0.0.1
```

show ip ospf route

codes	

[1]	cost
via	

34.2.7 show ip ospf summary-address

OSPF

show ip ospf summary-address

show ip ospf summary-address

NSSA ABR

show ip ospf summary-address

```
Ruijie# show ip ospf summary-address
Summary Address Summary Mask Advertise Status
Aggregated subnets
-----
202.101.0.0          255.255.0.0          advertise
Inactive 0
Ruijie#
```

Summary Address	
Summary Mask	

Advertise	
Status	
Aggregated subnets	

34.2.8 show ip ospf virtual-link

```

OSPF                               show ip ospf
virtual-link
show ip ospf [process-id] virtual-link
    
```


show ip ospf neighbor

show ip ospf virtual-links

```

Ruijie# show ip ospf virtual-links
Virtual Link VLINK0 to router 1.1.1.1 is up
Transit area 0.0.0.1 via interface FastEthernet 0/1
Local address 10.0.0.37/32
Remote address 10.0.0.27/32
Transmit Delay is 1 sec, State Point-To-Point,
Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
Hello due in 00:00:05
    
```

Adjacency state Full

Virtual Link VLINK0 to router	
Virtual Link state	.
Transit area	
via interface	
Local address	
Remote Address	
Transmit Delay	

35 BGP

35.1

35.1.1 address-family ipv4

```

          address-family IPv4      BGP
exit-address-family      BGP
address-family ipv4 [unicast]
no address-family ipv4 [unicast]

```

unicast	IPv4

BGP

BGP

BGP

IPv4

exit-address-family

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# address-family ipv4

```

exit-address-family	

35.1.2 address-family ipv4 vrf

```

vrf          address-family IPv4 VRF          BGP
              no
              exit-address-family          BGP

```

```
address-family ipv4 vrf vrf-name
```

```
no address-family ipv4 vrf vrf-name
```

vrf-name	vrf

```
vrf
```

```
BGP
```

```

PE CE
BGP          exit-address-family

```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# address-family ipv4 vrf vpn1

```

exit-address-family	

35.1.3 address-family vpnv4

```

PE          VPN
address-family VPN          exit-address-family
address-family VPN
address-family vpnv4 [unicast]
no address-family vpnv4 [unicast]

```

--	--

unicast	IPv4
----------------	------

vpn

BGP

vpn

PE

vpn

BGP

exit-address-family

```
Ruijie(config)# router bgp 65000
```

```
Ruijie(config-router)# address-family vpnv4
```

exit-address-family	

35.1.4 aggregate-address IPv4

BGP IPv4

no

aggregate-address *ip-address mask* [**as-set**][**ummary-only**]

no aggregate-address *ip-addres mask* [**as-set**][**summary-only**]

<i>ip-address</i>	
<i>mask</i>	
as-set	AS
summary-only	

BGP BGP IPv4 BGP IPv4 VRF

BGP

aggregate-address summary-only

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# aggregate-address 10.0.0.0
255.0.0.0 as-set
```

router bgp	BGP

35.1.5 bgp always-compare-med

BGP Multi Exit Discriminator MED

no

bgp always-compare-med

no bgp always-compare-med



```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# bgp always-compare-med
```

show ip bgp	BGP
bgp bestpath med confed	AS MED
bgp bestpath med missing-as-worst	MED
bgp deterministic-med	AS

35.1.6 bgp bestpath as-path ignore

```
no
bgp bestpath as-path ignore
no bgp bestpath as-path ignore
```

AS

BGP

BGP(1771)

show ip bgp	BGP

35.1.7 bgp bestpath compare-confed-aspash

ASPATH

ASPATH

no

```

router ID                                router ID
no
bgp bestpath compare-routerid
no bgp bestpath compare-routerid
    
```

EBGP peers

BGP

EBGP

```

peers
                                router ID
    
```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# bgp bestpath compare-routerid
    
```

show ip bgp	BGP
bgp router-id	BGP Router ID

35.1.9 bgp bestpath med confed

```

                                AS
MED                                no
bgp bestpath med confed [missing-as-worst]
no bgp bestpath med confed [missing-as-worst]
    
```

--	--

missing-as-worst	MED
-------------------------	-----

AS

MED

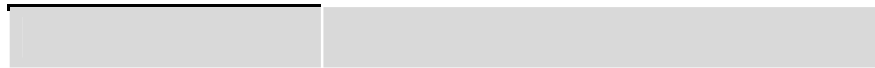
BGP

AS

MED

```
Ruijie(config)# router bgp 65000
```

```
Ruijie(config-router)# bgp bestpath med confed
```



0 MED MED MED

BGP

0 MED MED MED MED MED

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# bgp bestpath med
missing-as-worst
```

show ip bgp	BGP
bgp bestpath	

BGP

Ruijie#

Ruijie(config)# no bgp client-to-client

reflection

Ruijie(config)#

router ID

ID

BGP speakers
BGP speaker EBGP IBGP
BGP speakers EBGP
MED

BGP speakers
MED

EBGP

AS

15

15

```
Ruijie(config-router)# bgp confederation peers 65000  
65100
```

bgp confederation identifier	

35.1.15 bgp default ipv4-unicast

address family IPv4

no

bgp default ipv4-unicast

no bgp default ipv4-unicast

ipv4-unicast

BGP

BGP

address family ipv4

```
Ruijie(config-router)# bgp default ipv4-unicast
```


35.1.18 bgp enforce-first-as

```

                                AS_PATH                AS
UPDATE                          no
bgp enforce-first-as
no bgp enforce-first-as

```

BGP

```

                                UPDATE                AS

```

```
Ruijie(config-router)# bgp enforce-first-as
```

show ip bgp	BGP

35.1.19 bgp fast-external-fallover

```
#Qd1Rp 063'Sh,w, Uó , 9 } / BGPnoCÀK•Ó'—r CÃ X!%o Äfast-ext527
```

BGP

EBGP

```
Ruijie(config-router)# bgp faster-external-fallover
```

router bgp	EBGP

35.1.20 **bgp log-neighbor-changes**

```
no debug BGP  
no  
bgp log-neighbor-changes  
no bgp log-neighbor-changes
```

BGP

BGP

ipv4

peer ipv4

neighbor soft-reconfiguration inbound	BGP session () BGP
show ip bgp	BGP

35.1.23 clear ip bgp dampening

clear ip bgp [ipv4 unicast] dampening [address mask]

ipv4 unicast	IPv4
<i>address</i>	IP
<i>mask</i>	

BGP
BGP

Ruijie# **clear ip bgp dampening 192.168.0.0 255.255.0.0**

show ip bgp dampening dampened-paths	
bgp dampening	

35.1.24 clear ip bgp external

EBGP

```
clear ip bgp external [ipv4 unicast] [[soft] [in | out]]
```

ipv4 unicast	ipv4
in	soft
out	soft BGP speaker
soft in	
soft out	

BGP

```
Ruijie# clear ip bgp external in
```

clear ip bgp	BGP
show ip bgp neighbors	BGP

35.1.25 clear ip bgp flap-statistics

```
clear ip bgp flap-statistics [address[ mask]]
```

<i>address</i>	IP

<i>mask</i>	
-------------	--

soft out	
-----------------	--

vrf

BGP

```
Ruijie# clear ip bgp vrf my-vrf in
```

clear ip bgp	BGP
show ip bgp	BGP

35.1.28 default-information originate

no

[no] default-information originate

no

BGP

network
originate
IGP

default-information
network

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

network	
redistribute	

35.1.29 default-metric

BGP metric

no

default-metric *number*

no default-metric

<i>number</i>	metric 1.. 4294967295

no default-metric

BGP

BGP metric

metric

metric **redistribute metric**

metric

default-metric connected metric

0

```
Ruijie(config-router)# default-metric 45
```

redistribute	

35.1.30 distance bgp

BGP

no

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

no distance bgp [*external-distance internal-distance local-distance*]

<i>external-distance</i>	EBGP peers 1..255	
<i>internal-distance</i>	IBGP peers 1..255	
<i>local-distance</i>	peers network backdoor	IGP 1..255

```
external-distance 20
```

```
internal-distance 200
```

```
local-distance 200
```

BGP

BGP

1. *external-distance* IGP (OSPF RIP)

2. *internal-distance* *local-distance* IGP

```
Ruijie(config-router)# distance bgp 20 20 200
```

neighbor soft-reconfiguration inbound	BGP session () BGP
show ip bgp	BGP

35.1.31 exit-address-family

```

BGP address-family
exit-address-family

```

```
BGP address-family
```

```

bgp address-family
bgp

```

```
Ruijie(config-router-af)# exit-address-family
```

address-family ipv4	address-family ipv4

35.1.32 ip as-path access-list

```

AS no

```

ip as-path access-list *path-list-num* {**permit** | **deny**}

regular-expression

no ip as-path access-list *path-list-num*

<i>path-list-num</i>	AS AS 1---500
permit	
deny	
<i>regular-expression</i>	1..255

BGP

```
Ruijie(config-router)# ip as-path access-list 1 deny
^123$
```

neighbor filter-list	as-path
neighbor distribute-list	

35.1.33 neighbor activate

no

neighbor {*peer-address* | *peer-group-name*} **activate**

no neighbor {*peer-address* | *peer-group-name*} **activate**



peer-address

<i>peer-group-name</i>	32
<i>seconds</i>	: 1..600

IBGP : 15seconds

EBGP : 30seconds

BGP

BGP

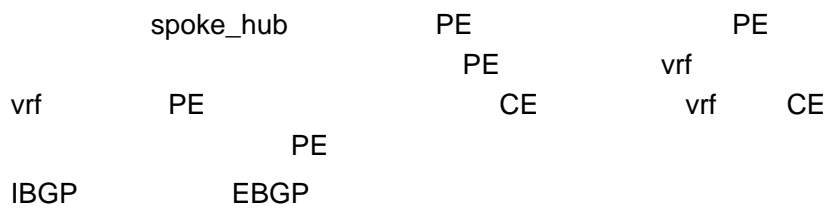
<i>number</i>	AS [1,10]	3
---------------	--------------	---

allowas-in

BGP

BGP IPv4

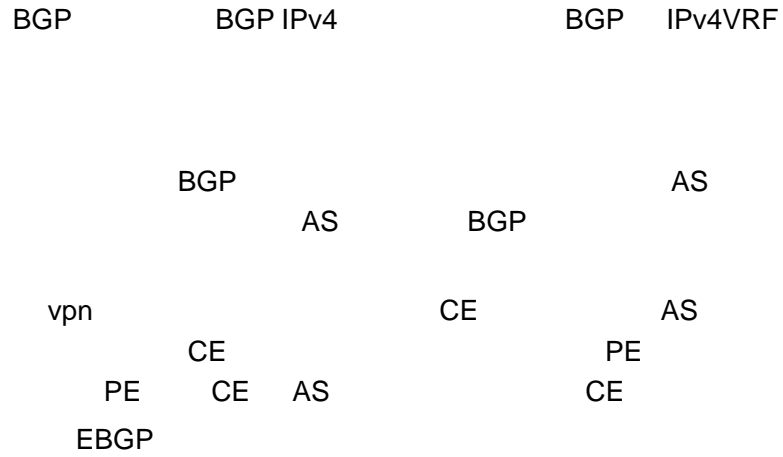
BGP IPv4VRF



Ruijie(config)#

<i>peer-group-name</i>	32
------------------------	----

as-override



```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.0.0.1 remote-as 100
Ruijie(config-router)# address-family ipv4 vrf vpn1
Ruijie(config-router-af)# neighbor 10.0.0.1
as-override
```



<i>peer-address</i>	
<i>peer-group-name</i>	32
<i>map-tag</i>	route map route map 32

BGP

<i>peer-group-name</i>	32
<i>access-list-number</i>	ACL
in	ACL
out	ACL

BGP BGP IPv4 BGP IPv6
 BGP IPv4 VRF BGP VPNv4

 (in) (out) neighbor
 prefix-list
 BGP
 neighbor distribute-list

```
Ruijie(config)# router bgp 60
```

```
Ruijie(config-router)# neighbor 10.1.1.1 remote-as 60
```


BGP

no

neighbor {*peer-address* | *peer-group-name*} **filter-list** *access-list-number* {**in** | **out**}

no neighbor {*peer-address* | *peer-group-name*} **filter-list** *access-list-number* {**in** | **out**}

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32
<i>access-list-number</i>	as-path list
in	as-path list
out	as-path list

BGP BGP IPv4 BGP IPv6
 BGP IPv4 VRF BGP VPNv4

BGP

neighbor filter-list

```
Ruijie(config)# ip as-path access-list 1 deny _123_
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1 remote-as 65100
Ruijie(config-router)# neighbor 10.0.0.1 filter-list 1 out
```

--	--

router bgp	BGP
neighbor remote-as	BGP
ip as-path access-list	AS_PATH list
match as-path	AS_PATH list

35.1.42 neighbor maximum-prefix

BGP

no

neighbor {*peer-address* | *peer-group-name*} **maximum-prefix**
maximum [*threshold*] [**warning-only**]

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

<i>peer-address</i>	IPv4 IPv6
<i>peer-group-name</i>	32
<i>maximum</i>	
<i>threshold</i>	
warning-only	BGP

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

BGP

warning-only

BGP

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
maximum-prefix 1000
```

router bgp	BGP
neighbor remote-as	BGP

35.1.43 neighbor next-hop-self

```
BGP
BGP speaker no
neighbor {peer-address | peer-group-name} next-hop-self
no neighbor {peer-address | peer-group-name} next-hop-self
```

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32

```
BGP BGP IPv4 BGP IPv6
BGP IPv4 VRF
```

(Frame Relay X.25)

BGP speakers

BGP

```
Ruijie(config)# router bgp 65000  
Ruijie(config-router)# neighbor 10.0.0.1 next-hop-self
```

BGP

password

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1 password
Red-Giant
```

router bgp	BGP
neighbor remote-as	BGP

35.1.45 neighbor peer-group (assigning members)

```
no          BGP          BGP
           BGP
neighbor peer-address peer-group peer-group-name
no neighbor peer-address peer-group peer-group-name
```

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32

BGP

**remote-as update-source local-as reconnect-interval times
advertisemet-interval default-originate next-hop-self remove-p
rivate-as send-community distribute-list out filter-list out p
refix-list out route-map out unsuppress-map route-reflector-c
lient**

EBGP peer-group IBGP
peer-group

Ruijie(config)# **router bgp 65000**

<i>prefix-list-name</i>	prefix-list 32
in	prefix list
out	prefix list

BGP BGP IPv4 BGP IPv6
 BGP IPv4 VRF BGP VPNv4

(in) (out) neighbor

distribute-list

BGP

neighbor prefix-list in

```
Ruijie(config)# ip prefix-list bgp-filter deny
10.0.0.1/16
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1 prefix-list
bgp-filter in
```

router bgp	BGP
neighbor remote-as	BGP
ip prefix-list	ip

35.1.48 neighbor remote-as

BGP () no
 ()

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

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

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32

```

BGP          BGP IPv4          BGP IPv6
      BGP IPv4 VRF

      EBGP
AS          AS          EBGP AS
      AS
AS          64512 65535
    
```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
remove-private-as
    
```

router bgp	BGP
neighbor remote-as	BGP

35.1.50 neighbor route-map

no

```

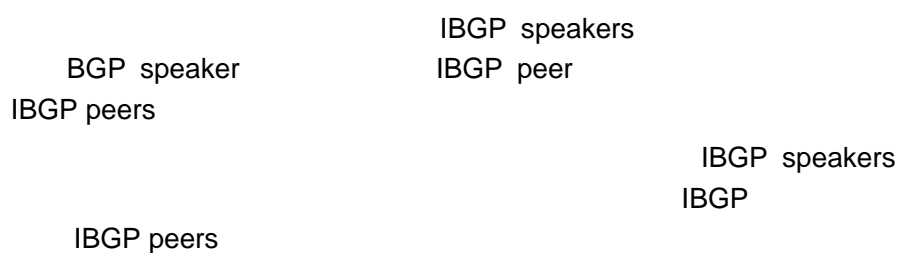
neighbor {peer-address | peer-group-name} route-map map-tag {in | out}
no neighbor {peer-address | peer-group-name} route-map map-tag {in | out}
    
```

--	--

hÚA Ÿ `# @ SÁ S"u Ö'pĭ TÂ #lë-Þ ÆðÔsm1 / ðÁ t !fØu ZŪÛ #r?#ÆP vQ ñ ÐU # || X~† P <30€ ,ÖÃ6Ñ Ö 0ÑÍÓP `4

<i>ip-address</i>	
<i>peer-group-name</i>	32

BGP



```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
route-reflector-client
  
```

router bgp	BGP
neighbor remote-as	BGP
bgp cluster-id	ID
bgp client-to-client reflection	

35.1.52 neighbor send-community

BGP **no**

```

neighbor {peer-address | peer-group-name} send-community
[both|standard|extended]
no neighbor {peer-address | peer-group-name} send-community
  
```

[both|standard|extended]

	EÄ
--	-----------

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32

BGP

BGP BGP ()

show ip bgp neighbors

BGP

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
soft-reconfiguration inbound
```

router bgp	BGP
neighbor remote-as	BGP
show ip bgp neighbors	BGP
clear ip bgp	BGP

35.1.55 neighbor soo, **no**

neighbor [*peer-address* | *peer-group-name*] **soo** **soo-value**

no neighbor [*peer-address* | *peer-group-name*] **soo**

<i>peer-address</i>	
<i>peer-group-name</i>	32
	soo soo_value
<i>soo-value</i>	1 soo_value as_num nn an_num
	*

neighbor [*peer-address* | *peer-group-name*] **timers** *keepalive* *holdtime*
no neighbor [*peer-address* | *peer-group-name*] **timers** *keepalive*
holdtime

<i>peer-address</i>	IPv4 IPv6
<i>peer-group-name</i>	32
<i>keepalive</i>	BGP message KEEPALIVE 0..65535
<i>holdtime</i>	BGP 0..65535

keepalive: 60

holdtime: 180

BGP

```

      keepalive      holdtime
      peer  peer-group      peer  peer
group
      BGP

```

Ruijie(config)# **router bgp** 65000

Ruijie(config-router)# **neighbor** 10.0.0.1 80 240

router bgp	BGP
timers bgp	<i>keepalive</i> <i>holdtime</i>

35.1.57 neighbor unsuppress-map

aggregate-address**no**

neighbor {*peer-address* | *peer-group-name*} **unsuppress-map**
map-tag

no neighbor {*peer-address* | *peer-group-name*} **unsuppress-map**

<i>peer-address</i>	
<i>peer-group-name</i>	32
<i>map-tag</i>	route-map route map 32

BGP

BGP

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# neighbor 10.0.0.1
unsuppress-map unspress-route
```

router bgp	BGP
neighbor remote-as	BGP
aggregate-address	
route-map	route-map

35.1.58 neighbor update-source

IBGP

BGP

BGP

no

neighbor {*peer-address* | *peer-group-name*} **update-source**
interface-type interface-index

no neighbor {*peer-address* | *peer-group-name*} **update-source**
interface-type interface-index

<i>peer-address</i>	IPv6	IPv4
<i>peer-group-name</i>	32	
<i>interface-type</i>		'

A

neighbor remote-as	BGP
--------------------	-----

35.1.59 neighbor version

no BGP BGP

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

<i>ip-address</i>	
<i>peer-group-name</i>	32
<i>number</i>	0...65535

0

32768

BGP

route-map set weight

Ruijie(config-router)# **neighbor** 10.1.1.1 **weight** 73

router bgp	BGP
neighbor remote-as	BGP

35.1.61 network(BGP)

BGP speaker no

network *network-number* **mask** *mask* [**route-map** *map-tag*]
[backdoor]
no network *network-number* **mask** *mask* [**route-map**] [**backdoor**]

<i>network-number</i>	
<i>mask</i>	
<i>map-tag</i>	route-map route map 32
backdoor	

BGP

IGP BGP

route-map

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# network 10.0.0.1 mask
255.255.0.0
```

router bgp	BGP
redistribute	
Network synchronization	Network

35.1.62 network synchronization

BGP speaker
no

network
network

network synchronization
no network synchronization

BGP

network

```
Ruijie(config)# router bgp 65000
Ruijie(config-router)# network synchronization
```

router bgp	BGP
redistribute	
network(BGP)	

35.1.63 redistribute

BGP

no

```
redistribute protocol-type [route-map map-tag] [metric metric-value]
no redistribute protocol-type [route-map map-tag] [metric
metric-value]
```



BGP

BGP

BGP

IPv4

BGP

IPv6

redistribute ospf *process-id* [**route-map** *map-tag*] [**metric** *metric-value*]
[match **internal** **external** [1|2] **nssa-external** [1|2]]

no redistribute ospf *process-id* [**route-map** *map-tag*] [**metric** *metric-value*]
[match {internal|external [1|2]**||nssa-external** [1|2]}}

<i>process-id</i>	OSPF
route-map <i>map-tag</i>	route-map route-map
metric <i>metric-value</i>	metric
match	OSPF
internal	OSPF internal ospf match
external [1 2]	OSPF external 1 2 1 2
nssa-external [1 2]	OSPF nssa-external 1 2 1 2

OSPF

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

/

no

redistribute

no

no

```
      OSPF                               match       OSPF
              route-map                   OSPF
              metric   route-map         metric     route-map
              route-map                   route-map
metric                               metric
```

```
Ruijie(config-router)# redistribute ospf 2 route-map
static-rmap
```

```
Ruijie(config-router)# no redistribute ospf 4 match
external route-map ospf-rmap
```

```
Ruijie(config-router)# no redistribute ospf 78
```



level-1-2

isis level-1

show ip protocols	

35.1.66 router bgp

BGP

BGP

no

BGP

router bgp *as-number*

no router bgp *as-number*

no synchronization

```

keepalive 60
holdtime 180
    
```

BGP

```

                keepalive          holdtime
                peer  peer-group          peer  peer
group
                BGP
    
```

```

Ruijie(config)# router bgp 65000
Ruijie(config-router)# timers bgp 80 240
    
```

neighbor timers	<i>keepalive holdtime</i>

35.2

35.2.1 show ip bgp

BGP

```

show ip bgp [{network | network-mask}] [longer-prefixes]
    
```

--	--

BGP

```
Ruijie# show ip bgp
Status codes: s suppressed, d damped, h history, * valid,
> b7.Ct 474- internal
```

bgp dampening	
clear ip bgp dampening	

35.2.3 show ip bgp community

community BGP

show ip bgp community *community-number* [**exact -match**]

<i>community-number</i>	AA:NN(/2 internet no-export local-as no-advertise
exact -match	

community

```
Ruijie# show ip bgp community local-as 111:12345
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Status Network      Next Hop      Metric  LocPrf  Path
-----
*> 211.21.21.0/24    110.110.110.10  0        1000    200
300
*> 211.21.23.0/24    110.110.110.10  0        1000    200
300
*> 211.21.25.0/24    110.110.110.10  0        1000    300
*> 211.21.26.0/24    110.110.110.10  0        1000    300
*> 211.21.27.0/24    110.110.110.10  0        1000    200
```

35.2.4 show ip bgp community-list

BGP

show ip bgp community-list *community-name* [exact-match]

<i>community-name</i>	
exact-match	

BGP

```
Ruijie# show ip bgp community-list my_comm
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Status Network      Next Hop      Metric  LocPrf  Path
-----
*> 211.21.21.0/24    110.110.110.10  0        1000    200
300
*> 211.21.23.0/24    110.110.110.10  0        1000    200
300
*> 211.21.25.0/24    110.110.110.10  0        1000    300
*> 211.21.26.0/24    110.110.110.10  0        1000    300
*> 211.21.27.0/24    110.110.110.10  0        1000    200
```

ip community-list	

35.2.5 show ip bgp dampening dampened-paths

show ip bgp dampening dampened-paths

BGP

```
Ruijie# show ip bgp dampening flap-statistics
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Status Network          From          Flaps  Duration
Reuse  Path
-----
h      192.168.64.0/24    110.110.110.10    2
00:19:17      1000 i
h      201.234.1.0/24      110.110.110.10    2
00:19:17      1000 ?
h      201.234.2.0/23      110.110.110.10    2
00:19:17      1000 ?
h      201.234.2.0/23      110.110.110.10    2
00:19:17      1000 ?
h      201.234.2.0/23      110.110.110.10    2
00:19:17      1000 ?
h      201.234.2.0/23      110.110.110.10    2
00:19:17      1000 ?
```

35.2.7 show ip bgp dampening parameters

BGP

```
show ip bgp dampening parameters
```

BGP

```
Ruijie (config-router)# bgp dampening 25 10000 10000 200
Ruijie# show ip bgp dampening parameters
dampening 25 10000 10000 200
Dampening Control Block(s):
Reachability Half-Life time      : 25 min
Reuse penalty                    : 10000
Suppress penalty                 : 10000
Max suppress time                : 200 min
Max penalty (ceil)              : 29800000
Min penalty (floor)             : 5000
```

35.2.8 show ip bgp filter-list

show ip bgp filter-list *path-list-number*

<i>path-list-number</i>	

```
Ruijie(config)# ip as-path access-list 5 permit .*
Ruijie# show ip bgp filter-list 5
BGP table version is 1, local router ID is 192.168.88.200
```

```

Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal,
S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete
Network      Next Hop      Metric LocPrf Weight Path
*> 192.168.88.0      0.0.0.0      32768 ?
Total number of prefixes 1

```

35.2.9 show ip bgp inconsistent-as

AS

show ip bgp inconsistent-as

AS

Ruijie# **show ip bgp inconsistent-as**

35.2.10 show ip bgp neighbors

BGP

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

<i>neighbor-address</i>	
received-routes	peer
routes	peer

advertised-routes	
-------------------	--

BGP

```
Ruijie# show ip bgp neighbors
BGP neighbor      : 12.12.12.2
Remote AS         : 100
Local AS          : 100
Neighbor type     : internal
BGP version       : 4
Remote ID         : 192.168.4.2
BGP state         : Established, up for 00:53:30
Min advertisement interval(secs): 15
Configured holdtime : 90
Configured keepalive : 30
Hold time         : 90
keepalive         : 30
Neighbor capabilities : ignore
Address family IPv4 Unicast: advertised , recieved
Route refresh     : advertised , recieved
Connections established : 1
Connections dropped : 0
Last reset       : never
Local host      : 12.12.12.1 Local port : 179
Remote host     : 12.12.12.2 Remote port : 1067
Maximum-Prefix limit : 4294967295
Threshold for warning : 0%
Accepted prefixes   : 0
Prefix advertised   : 6
Received messages   : 110
Sent messages       : 116
Received notifications : 0
Sent notifications  : 0
Route refresh received : 0
Route refresh sent   : 0

Ruijie# show ip bgp neighbors 15.15.15.5 routes
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
```

Status	Network	Next Hop	Metric	LocPrf
*>i	58.1.1.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.2.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.3.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.4.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.5.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.6.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.7.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.8.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.9.0/24	58.58.58.8		58
100	800 ?			
*>i	58.1.10.0/24	58.58.58.8		58
100	800 ?			
*>i	67.1.1.0/24	67.67.67.7		67
100	700 ?			
*>i	67.1.2.0/24	67.67.67.7		67
100	700 ?			
*>i	67.1.3.0/24	67.67.67.7		67
100	700 ?			
*>i	67.1.4.0/24	67.67.67.7		67
100	700 ?			
*>i	67.1.5.0/24	67.67.67.7		67
100	700 ?			
*>i	67.1.6.0/24	67.67.67.7		67
100	700 ?			

35.2.11 show ip bgp paths

```
show ip bgp paths
```

```
Ruijie# show ip bgp paths
```

35.2.12 show ip bgp quote-regexp

AS

BGP

```
show ip bgp quote-regexp regexp
```

<i>regexp</i>	AS

AS

BGP

```
Ruijie# show ip bgp quote-regexp "_300_"
Status codes: s suppressed, d damped, h history, * valid,
> best, i - internal
Origin codes: i - IGP, e - EGP, ? - incomplete
Network      Next Hop      Metric  LocPrf  Path
```

```

*> 211.21.21.0/24 110.110.110.10 0 1000 200
300
*> 211.21.23.0/24 110.110.110.10 0 1000 200
300
*> 211.21.25.0/24 110.110.110.10 0 1000 300
*> 211.21.26.0/24 110.110.110.10 0 1000 300

```

35.2.13 show ip bgp regexp

AS

BGP

```
show ip bgp regexp regexp
```

<i>regexp</i>	AS

AS

BGP

```

Ruijie# show ip bgp regexp _300_
Status codes: s suppressed, d damped, h history, * valid,
* 211.21.21.0/24(NextHopValid)Tj04Tj0Next09-103(Hop0003 Tc 0.002 M0.0

```

y
58.88.200, local AS number

Rcvd	MsgSent	TblVer	InQ
0	0	0	0

P	ad,"u Ý •¿
---	------------

<i>network</i>	
neighbor	
summary	
label	

<i>community-list-number</i>	
<i>community-list-name</i>	

```
Ruijie# show ip community-list  
Community-list standard local  
permit local-AS  
Community-list standard Red-Giant  
permit 0:10  
deny 0:20
```

36

36.1

36.1.1 distribute-list in

distribute-list in **no**

distribute-list {[*access-list-number* | *name*] | **prefix** *prefix-list-name*
[**gateway** *prefix-list-name*]} **in** [*interface-type* *interface-number*]

no distribute-list {[*access-list-number* | *name*] | **prefix** *prefix-list-name*
[**gateway** *prefix-list-name*]} **in** [*interface-type* *interface-number*]

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

OSPF

OSPF

RIP Fastethernet 0/0
172.16

```
router rip
network 200.168.23.0
distribute-list/T.Bh fastethernet 0/0
no auto-summary
!
access-list/T.permit/72.16.0.0 0.0.255.255
```

access-list	
prefix-list	

36.1.2 distribute-listout

distribute-listout **no**

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

<i>access-list-number</i>	
prefix <i>prefix-list-name</i>	
<i>interface</i>	()
<i>protocol</i>	()

AA:NN(

community-number

<i>network</i>	

0.0.0.0/0

default-network

connected

192.168.100.0

```
ip route 192.168.100.0 255.255.255.0 serial 0/1
ip default-network 192.168.100.0
```

200.200.200.0

200.200.200.0

```
ip default-network 200.200.200.0
```

show ip route	IP

36.1.5 ip prefix-list

ip prefix-list

no

```
ip prefix-list prefix-lis-name [ seq seq-number ] { deny | permit }
ip-prefix [ge minimum-prefix-length][le maximum-prefix-length]
no ip prefix-list prefix-lis-name[ seq seq-number ] { deny | permit }
ip-prefix [ge minimum-prefix-length][le maximum-prefix-length]
```

<i>prefix-list-name</i>	
<i>seq-number</i>	1 2147483647 5 5
deny	
permit	
<i>ip-prefix</i>	IP 0 32
<i>minimum-prefix-length</i>) ge
<i>maximum-prefix-length</i>) le

```

ip prefix-list          IP          permit deny
                                ge     le
                                ip-prefix
                                ip-prefix
                                ge
minimum-prefix-length  32          le          ip-prefix
                                maximum-prefix-length
                                minimum-prefix-length maximum-prefix-length ip-prefix
                                minimum-prefix-length maximum-prefix-length
ip-prefix              < minimum-prefix-length < maximum-prefix-length <=
32

```

```

                                OSPF          RIP
                                IP            IP
                                (            )
                                IP  201.1.1.0/24
                                )

```

```

Ruijie# configure terminal
Ruijie(config)# ip prefix-list pre1 permit 201.1.1.0/24
Ruijie(config)# router ospf
Ruijie(config-router)# distribute-list prefix pre1 out
rip
Ruijie(config-router)# end

```

36.1.6 ip prefix-list description

```

                                ip prefix-list description
                                no
ip prefix-list prefix-lis-name description descripton-text

```

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

```

                                OSPF          RIP
                                IP            IP
                                (            )
                                IP  201.1.1.0/24
                                )

```

```

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

```

ip prefix-list description

no

ip prefix-list sequence-number

(IP OSPF RIP
IP ÉEliö !4Ôce-i•à ë>T0jT1,7Rat(02s0P@<21A8,652x7Iro8

permanent	
<i>number</i>	
disable/enable	

1

OSPF 110
125 OSPF

vrf vrf

1 **show ip route weight**
weight WCMP

weight

WCMP 32
WCMP

route 0.0.0.0 0.0.0.0 Fastethernet 0/0

ip

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

show ip route	IP

36.1.9 ip routing

```
no ip routing
```

```
ip routing
```

```
no ip routing
```

```
IP
```

```
no ip routing
```

```
no ip routing
```

```
no ip routing
```

```
no ip routing
```

36.1.10 ip static route-limit

```
no ip static route-limit
```

```
ip static route-limit number
```

```
ip static route-limit number
```

--	--

<i>number</i>	1-10000
---------------	---------

1000

route-limit **ip static**
show running config

900

ip static route-limit 900

36.1.11 ipv6 prefix-list

IPv6 **ipv6**
prefix-list **no**
ipv6 prefix-list *prefix-lis-name* [**seq** *seq-number*] { **deny** | **permit** }
ipv6-prefix [**ge** *minimum-prefix-length*][**le** *maximum-prefix-length*]
no ipv6 prefix-list *prefix-lis-name* [**seq** *seq-number*] { **deny** | **permit** }
ipv6-prefix [**ge** *minimum-prefix-length*][**le** *maximum-prefix-length*]

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

36.1.12 ipv6 prefix-list description

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

<i>prefix-lis-name</i>	IPv6
<i>descripton-text</i>	IPv6

(IP 201.1.1.0/24 OSPF RIP IP

```
                OSPF                RIP
                IP                    IP
(                IP 201.1.1.0/24        )
```

```
Ruijie# configure terminal
Ruijie(config)# ipv6 prefix-list pre description Deny
routes from Net-A
```

36.1.14 match as-path

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

36.1.15 match community

```

set match 1 match 1

```

```

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

```

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

36.1.16 match interface

```

interface no match

```

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

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

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

match interface

```
      OSPF                                RIP                                RIP
                                OSPF
                                route maps
                                1          match          1
      set          match          match          set
```

```
                                OSPF                                RIP
      fastethernet 0/0  RIP
```

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
```

```
route-map redrip permit 10
match interface fastethernet 0/0
```

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

36.1.17 match ip address

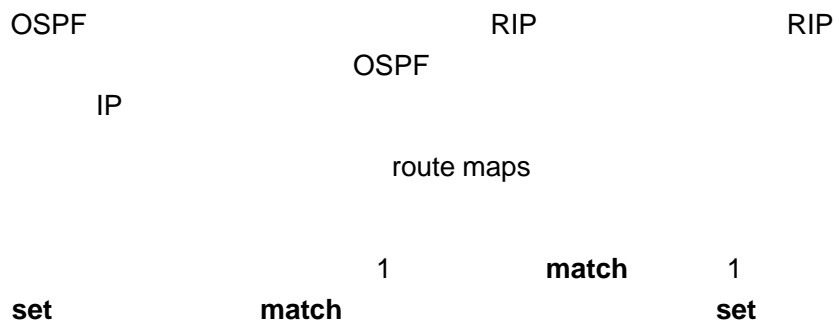
match ip address **no**

match ip address {*access-list-number* [*access-list-number...* |
access-list-name...] | *access-list-name* [*access-list-number...* |
access-list-name] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

no match ip address {*access-list-number* [*access-list-number...* |
access-list-name...] | *access-list-name* [*access-list-number...* |
access-list-name] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

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

match ip address



```

                                OSPF          RIP
                                10  RIP      OSPF
                                type-1      40

```

```

router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
access-list 10 permit 200.168.23.0
route-map redrip permit 10
match ip address 10
set metric 40
set metric-type type-1

```

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

36.1.18 match ip next-hop

```

IP
  match ip next-hop      no

```

```

match ip next-hop {access-list-number [access-list-number... |
access-list-name...] |access-list-name [access-list-number... |
access-list-name] | prefix-list prefix-list-name [prefix-list-name...]}

```

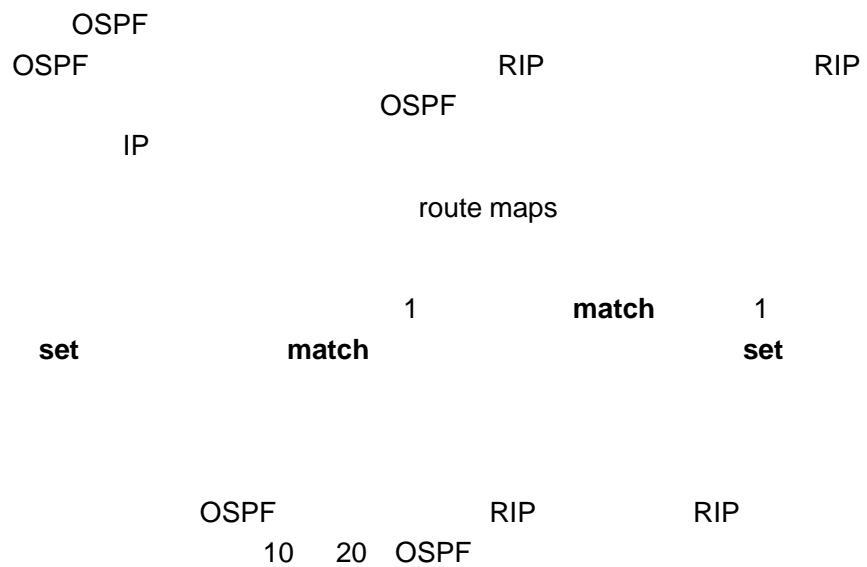
```

no match ip next-hop {access-list-number [access-list-number... |
access-list-name...] | access-list-name [access-list-number... |
access-list-name] | prefix-list prefix-list-name [prefix-list-name...]}

```

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

match ip next-hop



```

router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
access-list 10 permit 192.168.100.1
access-list 20 permit 172.16.10.1
route-map redrip permit 10
match ip next-hop 10 20

```

--	--

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

36.1.19 match ip route-source

IP

match ip route-source **no**

match ip route-source {*access-list-number* [*access-list-number...* |
access-list-name...] |*access-list-name* [*access-list-number...* |
access-list-name] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

no match ip route-source {*access-list-number* [*access-list-number...* |
access-list-name...] | *access-list-name* [*access-list-number...* |
access-list-name] | **prefix-list** *prefix-list-name* [*prefix-list-name...*]}

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

match ip route-source

OSPF

RIP

RIP

OSPF

IP

route maps

set

match

1

match

1

set

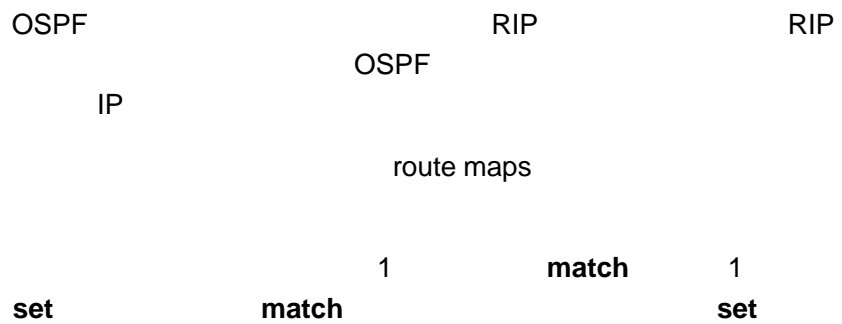
OSPF

RIP

match ipv6 address { *access-list-name* | **prefix-list** *prefix-list-name* }

no match ipv6 address

<i>access-list-name</i>	
prefix-list <i>prefix-list-name</i>	IPv6



10 OSPF RIP OSPF RIP
type-1 40

```
ipv6 router ospf
redistribute rip subnets route-map redrip
ipv6 access-list v6acl
10 permit ipv6 2620::/64 any
route-map redrip permit 10
match ipv6 address v6acl
set metric 30
```

ipv6 access-list	IPv6
match interface	
match ipv6 next-hop	IPv6
match ipv6 route-source	IPv6
match metric	
match route-type	
match tag	
set metric	
set metric-type	
set tag	

36.1.21 match ipv6 next-hop

IPv6

match ipv6 address **no**

match ipv6 next-hop { *access-list-name* | **prefix-list** *prefix-list-name* }

no match ipv6 next-hop

<i>access-list-name</i>	
prefix-list <i>prefix-list-name</i>	IPv6



--	--	--

match ipv6 route-source



36.1.22 match ipv6 route-source

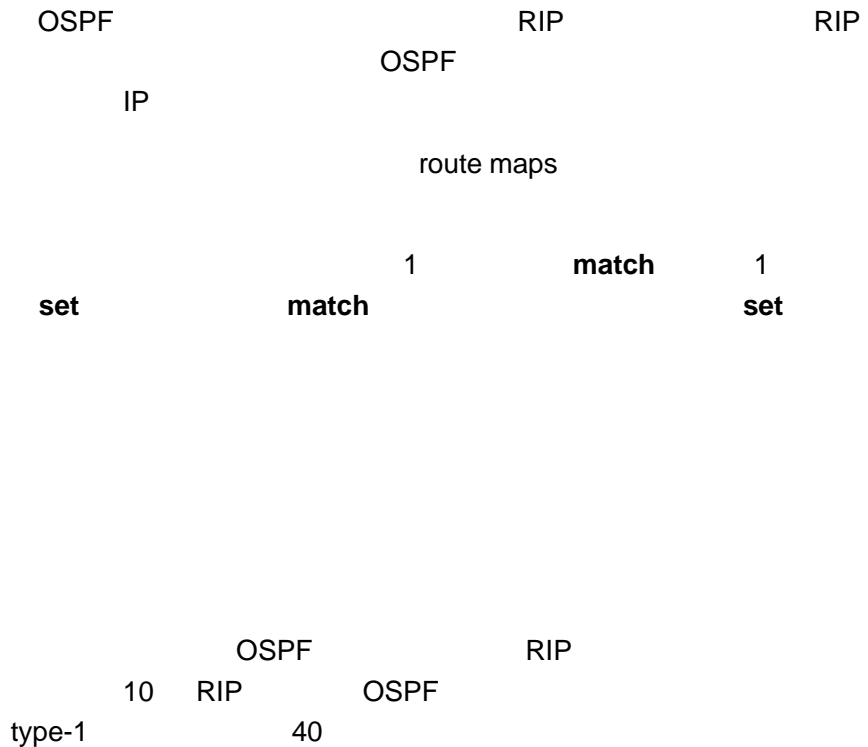
IPv6

match ipv6 address **no**

match ipv6 route-source { *access-list-name* | **prefix-list** *prefix-list-name* }

no match ipv6 route-source

<i>access-list-name</i>	
prefix-list <i>prefix-list-name</i>	IPv6



```

ipv6 router ospf
redistribute rip subnets route-map redrip
ipv6 access-list v6acl
10 permit ipv6 5200::/64 any
route-map redrip permit 10
match ipv6 route-source v6acl
set metric 50

```

ipv6 access-list	IPv6
match interface	
match ipv6 address	IPv6
match ipv6 route-source	IPv6
match metric	
match route-type	
match tag	
set metric	
set metric-type	
set tag	

36.1.23 match length

length **IP** **match**
length **no**

match length *min-length max-length*
no match length *min-length max-length*

<i>min-length</i>	IP
<i>max-length</i>	IP

1

serial 1/0 500
fastethernet 1/0

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

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

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

36.1.24 match metric

no match metric

match metric *metric*

no match metric



match ip next-hop	
match ip route-source	
match route-type	
match tag	

set ip precedence C2_0 1 Tf0 Tc 0 Tw 14.663 0.017 Td1412135447A107DA13D7143C32B0

¿

```

match origin incomplete
set community no-export

```

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

36.1.26 match route-type

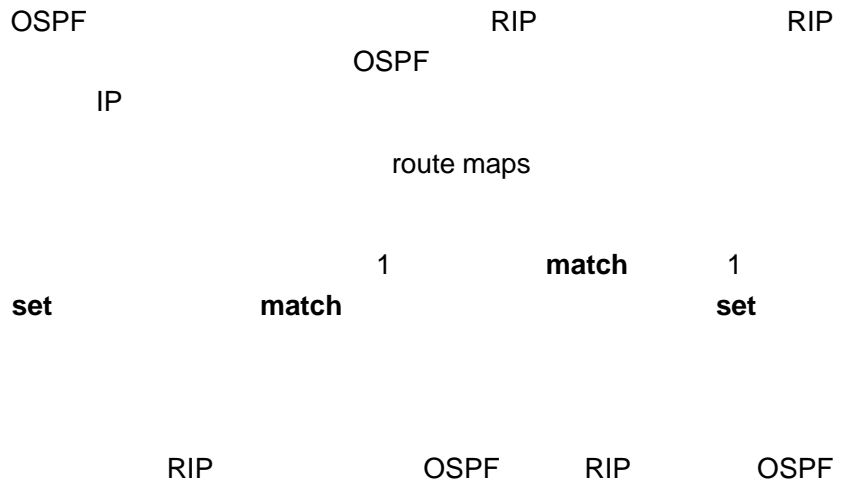
match route-type

no

match route-type {local | internal | external [type-1 | type-2] | level-1 | level-2}

no match route-type {local | internal | external [type-1 | type-2] | level-1 | level-2}

local	
Internal	OSPF
external	(BGP OSPF)
type-1 type-2	OSPF 1 2
level-1 level-2	ISIS 1 2



```

router rip
redistribute ospf route-map redrip
network 192.168.12.0

route-map redrip permit 10
match route-type internal
  
```

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

36.1.27 match tag

```

match tag no
  
```

match tag *tag* [...*tag*]

no match tag *tag* [...*tag*]

<i>tag</i>	

match tag

tag

OSPF

OSPF

RIP

RIP

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

36.1.28 maximum-paths

no

maximum-paths

OSPF

RIP

RIP

OSPF

IP

route maps

set

match

1

match

1

set

1)

10

sequence-number

100+90-1,1,Xs6p

Redistribute	

36.1.30 set aggregator as

match AS
set aggregator as no

set aggregator as *as-num ip_addr*

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

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

BGP

as,ip-addr

set community	COMMUNITY
set metric	
set metric-type	

36.1.31 set as-path prepend

```

match                AS_PATH
set as-path prepend  no

```

```

set as-path prepend as-number
no set as-path prepend [as-number]

```

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

```

AS_PATH
as-path 15 as

```

```

route-map set-as-path
match as-path 1
set as-path prepend 100 101 102

```

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

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

36.1.33 set community

match COMMUNITY
set community **no**

set community {*community-number*[*community-number ...*] **additive**

```

match as-path 1
set community 109:10

```

```

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

```

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

36.1.34 set dampening

```

match set
dampening no

```

```

set dampening half-life reuse suppress max-suppress-time
no set dampening

```

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

```

route-map tag
match as path 10
set dampening 30 1500 10000 120

```

```

router bgp 100
neighbor 172.16.233.52 route-map tag in

```

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

36.1.35 set extcommunity

```

match
set extcommunity no

```

```

set extcommunity {rt extend-community-value | soo
extend-community-value}

```

```

no set extcommunity {rt | soo}

```

rt	RT
soo	SOO

<i>extend-community-value</i>	
-------------------------------	--

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

```

set ip default next-hop ip-address weight

```

```
access-list 1 permit ip 1.1.1.1 0.0.0.0
access-list 2 permit ip 2.2.2.2 0.0.0.0
```

```
interface async 1
ip policy route-map equal-access
```

```
route-map equal-access permit 10
match ip address 1
set ip default next-hop 6.6.6.6
route-map equal-access permit 20
match ip address 2
set ip default next-hop 7.7.7.7
route-map equal-access permit 30
set default interface null0
```

route-map	
match ip address	

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

36.1.38 set ip next-hop

match
IP
set ip next-hop no

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>	IP
<i>weight</i>	

```

      set
      WCMP
      WCMP
      set ip next-hop
      ip address
      next-hop
      next-hop
      WCMP
      weight
      weight
      weight
      next-hop
      set
      WCMP
      weight
      weight
      1
      match

```

1

set

```

      serial 1/0
      10.0.0.0/8
      172.16.0.0/16
      192.168.100.1
      172.16.100.1

```

```

interface serial 1/0
ip policy route-map load-balance

```

```

access-list 10 permit 10.0.0.0 0.255.255.255
access-list 20 permit 172.16.0.0 0.0.255.255

```

```

route-map load-balance permit 10
match ip address 10
set ip next-hop 192.168.100.1

```

```

route-map load-balance permit 20
match ip address 20
set ip next-hop 172.16.100.1

```

```

route-map load-balance permit 30
set interface Null0

```

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

36.1.39 set ip next-hop verify-availability

IP

next-hop verify-availability **no** **set ip**

```

ip policy route-map load-balance

access-list 10 permit 10.0.0.0 0.255.255.255
access-list 20 permit 172.16.0.0 0.0.255.255

route-map load-balance permit 10
match ip address 10
set ip next-hop 192.168.100.1

route-map load-balance permit 20
match ip address 20
set ip next-hop 172.16.100.1

route-map load-balance permit 30
set interface Null0

```

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

36.1.40 set level

```

match
set level no

set level {level 1 | level 2 | level 1-2 | stub-area | backbone}
no set level

```

OSPF

RIP

backbone

```
router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0

route-map redrip permit 10
set level backbone
```

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

36.1.41 set local-preference

```
match LOCAL_PREFERENCE
set local-preference no
```

```
set local-preference number
```

```
no set local-preference
```

<i>number</i>	0..4294967295

match tag	
------------------	--

set metric-type

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

```

route-map redrip permit 10
set metric-type type-1

```

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

36.1.44 set next-hop

```

match IP
set next-hop no

```

```

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

```

<i>ip-address</i>	IP

egp	EGP
igp	IGP
Incomplete	

```

route-map SET_ORIGIN 10 permit
match as-path 1
set origin igp
route-map SET_ORIGIN 20 permit
match as-path 2
set origin egp

```

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

36.1.46 set originator-id

```

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

```



<i>tag</i>	

OSPF RIP
 100

```

router ospf
redistribute rip subnets route-map redrip
network 192.168.12.0 0.0.0.255 area 0
route-map redrip permit 10
set tag 100
  
```

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

36.1.48 set weight

match BGP
set weight no
set weight *number*
no set weight

<i>number</i>	0...65535

BGP

neighbor weight
32768

BGP

1.1.1.1 BGP in 100

```

router bgp 1
neighbor 1.1.1.1 route-map nei-rmap-in in
route-map nei-rmap-in permit 10
set weight 100

```

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

set metric-type	
-----------------	--

36.1.49 ip ref ecmp load-balance source

ECMP/WCMP

HASH(KEY(SIP,[DIP] [TCP/UDP Port] [UDF]))

Hash

HASH	2	CRC32_Upper	
CRC32_Lower	KEY	KEY @ @ @ HASH() Td(KEY)Tj	

show route-map

show route-map *route-map-name*

<i>route-map-name</i>	

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

route-map	
permit	permit
sequence 10	
Match clauses	deny permit set
Set clauses	match

36.2.2 show ip community-list

show ip community-list [*community-list-number*|*community-list-name*]

<i>community-list-number</i>	
<i>community-list-name</i>	

```
Ruijie# show ip community-list
Community-list standard local
permit local-AS
Community-list standard Red-Giant
permit 0:10
deny 0:20
```

36.2.3 show ip prefix-list

show ip prefix-list

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

prefix-name	

```
Ruijie# show ip prefix-list
ip prefix-list pre: 2 entries
seq 5 permit 192.168.64.0/24
seq 10 permit 192.2.2.0/24
```

36.2.4 show ip route

IP **show ip route**

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

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

show ip route

Ruijie# **show ip route**

Codes: C - connected, S - static, R - RIP, B - BGP
O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, su - IS-IS summary, L1 - IS-IS level-1, L2
- IS-IS level-2
ia - IS-IS inter area, * - candidate default

Gateway of last resort is no set

S 20.0.0.0/8 is directly connected, VLAN 1
S 22.0.0.0/8 [1/0] via 20.0.0.1
O E2 30.0.0.0/8 [110/20] via 192.1.1.1, 00:00:06, VLAN
1
R 40.0.0.0/8 [120/20] via 192.1.1.2, 00:00:23, VLAN
1
B 50.0.0.0/8 [120/0] via 192.1.1.3, 00:00:41
C 192.1.1.0/24 is directly connected, VLAN 1
C 192.1.1.254/32 is local host.

show ip route

O	C S R RIP B BGP O OSPF i IS-IS

	E1 OSPF	
	E2 OSPF	
	N1 OSPF NSSA	1
E2	N2 OSPF NSSA	2
	IA OSPF	1

Via 20.0.0.1	IP
00:00:06	
VLAN 1	

show ip route network

```
Ruijie# show ip route 30.0.0.0
Routing entry for 30.0.0.0/8
Distance 110, metric 20
Routing Descriptor Blocks:
*192.1.1.1, 00:01:11 ago, via VLAN 1, generated by OSPF,
extern 2
```

show ip route network



IPv6

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

adj_nodes	
res_adj	

37

37.1

37.1.1 ip policy route-map

ip policy route-map

no

ip policy route-map *route-map*

no ip policy route-map

<i>route-map</i>	

1

ACL

ACL

ACL

```

                                FE0
10.0.0.1                        196.168.4.6      20.0.0.1
                                196.168.5.6

```

```

access-list 1 permit 10.0.0.1
access-list 2 permit 20.0.0.1
route-map lab1 permit 10
match ip address 1
set ip next-hop 196.168.4.6
exit
route-map lab1 permit 20
match ip address 2
set ip next-hop 196.168.5.6
exit
interface FastEthernet 0/0
ip policy route-map lab1
exit

```

access-list	
route-map	
set ip next-hop	
set ip default next-hop	
set ip dscp	IP DSCP
match ip address	
match length	

route-map

37.1.2 ip policy

```

set ip next-hop
ip policy                      no

```

```

ip policy {load-balance|redundance}
no ip policy

```


38 IPv6

38.1

IPv6

- ' ping ipv6
- ' ipv6 address
- ' ipv6 enable
- ' ipv6 hop-limit
- ' ipv6 neighbor
- ' ipv6 source-route
- ' ipv6 route
- ' ipv6 ns-linklocal-src
- ' ipv6 nd ns-interval
- ' ipv6 nd reachable-time
- ' ipv6 nd prefix
- ' ipv6 nd ra-lifetime
- ' ipv6 nd ra-interval
- ' ipv6 nd ra-hoplimit
- ' ipv6 nd ra-mtu
- ' ipv6 nd managed-config-flag
- ' ipv6 nd other-config-flag
- ' ipv6 nd dad attempts
- ' ipv6 nd suppress-ra
- ' ipv6 redirects
- ' clear ipv6 neighbors
- ' tunnel destination
- ' tunnel mode ipv6ip
- ' tunnel source
- ' tunnel ttl

38.1.1 ping ipv6

IPV6

ping ipv6 [*ipv6-address*]

ipv6-address

ping

!	
.	
U	
R	
F	
A	
D	Down IPV6 ()
?	

Ruijie# **ping ipv6 fec0::1**

38.1.2 ipv6 address

IPV6 , no

ipv6 address *ipv6-prefix/prefix-length* [**eui-64**]

no ipv6 address [*ipv6-prefix/prefix-length*] [**eui-64**]

ipv6-prefix IPV6 , RFC2373
16

prefix-length IPV6 IPV6

S86 IPv6 [0,64] [128,128]

eui-64 IPV6 64 ID

eui-64 64 IPV6
Up

no ipv6 address

no ipv6 address ipv6-prefix/prefix-length eui-64
ipv6 address ipv6-prefix/prefix-length eui-64

```
Ruijie(config-if)# ipv6 address 2001:1::1/64
Ruijie(config-if)# no ipv6 address 2001:1::1/64
Ruijie(config-if)# ipv6 address 2002:1::1/64 eui-64
Ruijie(config-if)# no ipv6 address 2002:1::1/64 eui-64 X IPV6
```

ipv6 enable

no ipv6 enable

IPv6

2

,

IP
IP

IPv6

IPv6

```
hardware-address          XXXX.XXXX.XXXX
48   MAC   'X'
```

```

                    ARP                  IPV6
                    NDP
                    Reachble
clear ipv6 neighbors      (   NDP)

show ipv6 neighbors
```

```
Ruijie(config)# ipv6 neighbor 2001::1 vlan 1
00d0.f811.1111
```

show ipv6 interface	
clear ipv6 neighbors	

38.1.6 ipv6 source-route

```
IPv6          no
IPv6          -  !
```

0

IPv6

0

IPv6

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

38.1.7 ipv6 route

IPV6

no

```
ipv6 route ipv6-prefix/prefix-length {ipv6-address | interface-id [ipv6-address]}
```

```
no ipv6 route ipv6-prefix/prefix-length {ipv6-address | interface-id [ipv6-address]}
```

```
ipv6-prefix IPV6
```

RFC2373

```
prefix-length IPV6
```

'/'

```
S86
```

[0,64]

[128,128]

```
ipv6-address
```

RFC2373

```
interface-id
```

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

show ipv6 route	IPv6

38.1.8 ipv6 ns-linklocal-src

no ipv6 ns-linklocal-src

ipv6 ns-linklocal-src

no ipv6 ns-linklocal-src

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

38.1.9 ipv6 nd ns-interval

(NS)

no

ipv6 nd ns-interval *milliseconds*

no ipv6 nd ns-interval

milliseconds
1000-4294672953600000

(RA) 0()
1000ms(1)

(RA)

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

show ipv6 interface	

38.1.10 ipv6 nd reachable-time

NDP

no

ipv6 nd reachable-time *milliseconds*

no ipv6 nd reachable-time

milliseconds
0-3600000

(RA) 0()
30000ms(30)

```

(RA)
0
RFC4861
0.5 1.5

```

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

show ipv6 interface	

38.1.11 ipv6 nd prefix

```

(RA)
no
ipv6 nd prefix ipv6-prefix/prefix-length | default [ [ valid-lifetime
preferred-lifetime ] | [ at valid-date preferred-date ] | infinite |
no-advertise ] [ off-link ] [ no-autoconfig ]
no ipv6 nd prefix ipv6-prefix/prefix-length | default { [ off-link ]
[ no-autoconfig ] | [ no-advertise ] }

ipv6-prefix  IPV6          RFC2373
prefix-length  IPV6          '/'
valid-lifetime
preferred-lifetime
at valid-date preferred-date

infinite
default
no-advertise

```

off-link IPv6
(on-link)
on-link

no-autoconfig

IPv6 address

:

valid-lifetime: 2592000 (30)

preferred-lifetime: 604800 (7),

on-link

address (RA) ipv6

ipv6 nd prefix default

ipv6 nd prefix default

ipv6 nd prefix default

at *valid-date preferred-date*

2

0

SVI 1

```
Ruijie(config)#interface vlan 1
Ruijie(config-if)# ipv6 nd prefix 2001::/64 infinite
2592000
```

SVI 1 ()

```
Ruijie(config)# interface vlan 1
Ruijie(config-if)# ipv6 nd prefix default no-autoconfig
```

show ipv6 interface	ra-info

38.1.12 ipv6 nd ra-lifetime

```

(RA)
no
ipv6 nd ra-lifetime seconds
no ipv6 nd ra-lifetime

seconds                                0-9000

1800

```

```

“ ” (RA)

0 (RA) 0 (ra-interval)

```

```

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

```

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

38.1.13 ipv6 nd ra-interval

(RA)

38.1.14 ipv6 nd ra-hoplimit


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



```
show ipv6 interface
```

show ipv6 interface	

38.1.18 ipv6 nd suppress-ra

```

(RA)
(RA) no
ipv6 nd suppress-ra
no ipv6 nd suppress-ra

```

IPv6

ipv6 suppress-ra

```

Ruijie(conifgf)# interface vlan 1
Ruijie(config-if)# ipv6 nd suppress-ra

```

show ipv6 interface	ra-info

38.1.19 ipv6 redirects

```

IPV6
ICMPv6
no ICMPv6
ipv6 redirects
no ipv6 redirects

```

IPV6

ICMPv6

```

ICMPv6
  100      ICMPv6      (100pps)
    
```

```

Ruijie(config)# interface vlan 1
Ruijie(config-if)# ipv6 redirects
    
```

show ipv6 interface	

38.1.20 clear ipv6 neighbors

```

clear ipv6 neighbors
    
```

RDP

```

Ruijie# clear ipv6 neighbors
    
```

ipv6 neighbor	
show ipv6 neighbors	

38.1.21 tunnel mode ipv6ip

```

IPv6      IPV6      ,      no
    
```

tunnel mode ipv6ip [6to4 | isatap]

no tunnel mode

6to4

6to4

isatap

ISATAP

IPv6

(6to4 isatap)

IPv6 :

Ruijie(config)# **interface tunnel**

interface-type interface-number

IPv4

IPv4

IPv4 , IPv4
(6to4 isatap)

IPv6

```
Ruijie(config)# interface tunnel 1
Ruijie(config-if)# tunnel mode ipv6ip
Ruijie(config-if)# tunnel source vlan 1
Ruijie(config-if)# tunnel destination 192.168.5.1
```

tunnel mode	
tunnel destination	
tunnel ttl	TTL

38.1.24 tunnel ttl

IPv6 IPv4 TTL , no
128

tunnel ttl value

no tunnel ttl

value TTL

128

IPv6 IPv4 TTL

```
Ruijie(config)# interface tunnel 1  
Ruijie(config-if)# tunnel ttl 64
```

tunnel mode	
tunnel source	
tunnel destination	

38.2

38.2.1 show ipv6 route

IPV6

show ipv6 route [static

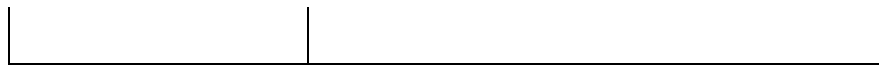
```
Ruijie# show ipv6 route
Codes: C - Connected, L - Local, S - Static, R - RIP,
B - BGP
      I1 - ISIS L1, I2 - ISIS L2, IA - IIS interarea
L   ::1/128
    via ::1, loopback 0
C   fa::/64
    via ::, vlan 1
L   fa::1/128
    via ::, loopback 0
C   2001::/64
    via ::, vlan 2
L   2001::1/128
    via ::, loopback 0
L   fe80::/10
    via ::1, Null0
C   fe80::/64
    via ::, vlan 1
```

SVI 1

```
Ruijie# show ipv6 neighbors vlan 1
IPv6 Address Linklayer Addr Interface
fa::1          00d0.0000.0002 vlan 1
fe80::200:ff:fe00:2 00d0.0000.0002 vlan 1
```

```
Ruijie# show ipv6 neighbors verbose
IPv6 Address Linklayer Addr Interface
2001::1       00d0.f800.0001 vlan 1
                State: Reach/H Age: - asked: 0
fe80::200:ff:fe00:1 00d0.f800.0001 vlan 1
                State: Reach/H Age: - asked: 0
```

IPv6 Address	IPV6
Linklayer Addr	Mac
Interface	
State	: state/H(R) STATE : INCOMP(Incomplete)— (NS) (NA). REACH(Reachable) — STALE— NUD(Neighbor Unreachability Detection) DELAY— STALE STALE DELAY DELAY_FIRST_PROBE_TIME seconds(5) DELAY PROBE (NS) NUD. PROBE— NUD RetransTimer milliseconds (NS)



```
INET6: 2001::1 , subnet is 2001::/64 [TENTATIVE]
Joined group address(es):
ff01:1::1
ff02:1::1
ff02:1::2
ff02:1::1:ff00:1
MTU is 1500 bytes
ICMP error messages limited to one every 10 milliseconds
ICMP redirects are enabled
ND DAD is enabled, number of DAD attempts: 1
ND reachable time is 30000 milliseconds
ND advertised reachable time is 0 milliseconds
ND retransmit interval is 1000 milliseconds
ND advertised retransmit interval is 0 milliseconds
ND router advertisements are sent every 200
seconds<240--160>
ND router advertisements live for 1800 seconds
CONFIDENTIAL
INET6: 2001::1 , subnet is 2001::/64
[TENTATIVE]
```

```

ND advertised reachable time is 0 milliseconds
ND advertised retransmit time is 0 milliseconds
ND advertised CurHopLimit is 64
Prefixes: (total: 1)
fec0:1:1:1::/64(Def,Auto,vltime: 2592000, pltime:
604800, flags: LA)
    
```

ra-info

RA timer is stopped (on)	
waits	
initcount	RA
RA(out/in/inconsistent)	out: in: inconsistent:
RS(input)	
Link-layer address	
Physical MTU	MTU
!M M	!M managed-config-flag M:
!O O	!O other-config-flag O:

ra-info (Prefix)

total	
fec0:1:1:1::/64	

Def	
Auto CFG	Auto IPV6 , CFG
!Adv	
vlltime	()
pltime	()
L !L	L on-link !L
A !A	A auto-config , !A

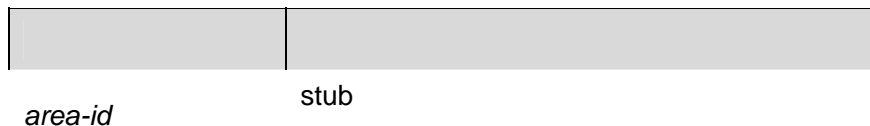
39 OSPFv3

39.1

39.1.1 area default-cost

stub ABR no stub NSSA

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



39.1.2 area range

no

area *area-id* **range** *ipv6-prefix/prefix-length* [**advertise**|**not-advertise**]

no area *area-id* **range** *ipv6-prefix/prefix-length*

	advertise not-advertise
<i>area-id</i>	IPv4

```

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

<i>area-id</i>	stub	NSSA		IPv6
<i>no-summary</i>		stub	ABR 3 LSA 3 LSA	ABR stub

Stub

OSPFv3

```

no area area-id stub
no area area-id ( )
stub ABR 3 LSA
stub NSSA ABR no-su
mmary 3 LSA NSSA
    
```

Stub 10 ABR Stub

```

ipv6 router ospf 1
area 10 stub
area 10 stub no-summary
    
```

area default-cost	Stub
show ipv6 ospf area	OSPFv3

39.1.4 area virtual-link

no

```

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

```

```

ipv6 router ospf 1
area 1 virtual-link 192.1.1.1

```

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

39.1.5 auto-cost

OSPF

no

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

no auto-cost [reference-bandwidth]

reference-bandwidth	Mbps
<i>ref-bw</i>	1-4294967 100Mbps

100Mbps

OSPFv3

no auto-cost reference-bandwidth

ipv6 ospf cost

10M

```

ipv6 router ospf 1
auto-cost reference-bandwidth 5

```

ipv6 ospf cost	
show ipv6 ospf	OSPFv3

39.1.6 clear ipv6 ospf process

OSPF

```
clear ipv6 ospf {process | process-id}
```

<i>process-id</i>	ospf <1-65535>

ospf

```

en
clear ipv6 ospf process

```

39.1.7 default-information originate

OSPF

```
default-information originate no
```

```

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

```

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

always	OSPF
metric <i>metric</i>	1 OSPF

metric-type *type*

```
default-information originate always
```

redistribute	
show ipv6 ospf	OSPFv3
show ipv6 ospf database	OSPFv3

39.1.8 default-metric

no

```
default-metric metric-value
```

```
no default-metric
```

<i>metric-value</i>	1-16777214 20

20

OSPFv3

redistribute

1. **default-information originate**

2. 20

metric 10

```
default-metric 10
```

redistribute	
show ipv6 ospf	OSPFv3

39.1.9 ipv6 ospf area

OSPFv3

no

ipv6 ospf *process-id* **area** *area-id* [**instance** *instance-id*]

no ipv6 ospf *process-id* **area** [**instance** *instance-id*]

<i>process-id</i>	ospf
area <i>area-id</i>	OSPFv3 IPv6
instance <i>instance-id</i>	OSPFv3

```

router ospf      OSPFv3
no ipv6 ospf area      OSPFv3
no ipv6 router ospf   OSPFv3
                    instance-id
                    OSPFv3

                    int fastethernet 0/0      OSPFv3

int fastethernet 0/0
ipv6 ospf 1 area 2 instance 2
    
```


39.1.11 ipv6 ospf dead-interval

```

hello                                no
ipv6 ospf dead-interval seconds [instance instance-id]
no ipv6 ospf dead-interval [instance instance-id]
    
```

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

```
ip ospf hello-interval 4
```

```
hello 4 hello
```

1. hello
- 2.

60s

```
ipv6 ospf dead-interval 60
```

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

39.1.12 ipv6 ospf hello-interval

OSPFv3

```
ipv6 ospf network point-to-point
```

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

39.1.15 ipv6 ospf priority**no****ipv6 ospf priority**

```

DR/BDR( / )
DR/BDR DR BDR
Router-ID DR BDR
DR/BDR
DR BDR
DR BDR
DR/BDR DR BDR
ipv6 ospf priority 0
    
```

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

39.1.16 ipv6 ospf retransmit-interval

```

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

LSA

LSA

LSA

10s

`ipv6 ospf retransmit-interval 10`

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

39.1.17 ipv6 ospf transmit-delay

LSA

no

`ipv6 ospf transmit-delay seconds [instance instance-id]`

`no ipv6 ospf transmit-delay [instance instance-id]`

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

1

LSA

LSA

`ipv6 ospf transmit-delay 2`

show ipv6 ospf interface	OSPFv3

39.1.18 ipv6 router ospf

OSPFv3 **no** OSPFv3

ipv6 router ospf *process-id*
no ipv6 router ospf *process-id*

<i>process-id</i>	OSPF

OSPFv3

OSPFv3 OSPFv3

OSPFv3

ipv6 router ospf 1

ipv6 ospf area	OSPFv3
show ipv6 ospf	OSPFv3

39.1.19 log-adj-changes

no default

log-adj-changes [detail]

no log-adj-changes [detail]

detail	

FULL

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

show ipv6 ospf	ospf

39.1.20 max-concurrent-dd

DD

max-concurrent-dd *number*
no max-concurrent-dd

<i>number</i>	, 1-65535.

```

max-concurrent-dd 4 4
DD
router ipv6 ospf 1
max-concurrent-dd 4

```

39.1.21 passive-interface

no

```

passive-interface {default | interface-type interface-number }
no passive-interface {default | interface-type interface-number }

```

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

OSPFv3

hello

OSPF

VLAN1 OSPFv3

```

passive-interface default
no passive-interface vlan 1

```

ipv6 ospf area	OSPFv3
show ipv6 ospf	OSPFv3
show ipv6 ospf neighbor	OSPFv3

39.1.22 redistribute

OSPFv3

no

redistribute *protocol* [**metric** *metric-value*] [**metric-type** *type-value*][**route-map** *map-tag*] [**match** [**internal** | [**external** | **nssa-external**

```

OSPF
    match
OSPF
OSPF
    route-map
        match
            tag metric metric-type
route-map
    set

route-map test
    match
metric 20 set metric 30
redistribute connect metric 10 route-map test
    metric 20 metric
    30
    
```

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

39.1.23 router-id

```

(Router ID)
no
Router ID Router ID

router-id router-id
no router-id
    
```

<i>router-id</i>	IPv4

OSPFv3

OSPFv3

```
spf-delay 5
spf-holdtime 10
```

OSPFv3

```
spf-delay spf-holdtime OSPF
```

```
timers spf 2 4
```

clear ipv6 ospf	OSPFv3
show ipv6 ospf	OSPFv3

39.2

39.2.1 show ipv6 ospf

OSPFv3

```
show ipv6 ospf [process-id]
```

<i>process- id</i>	ospf , 1-65535.

OSPFv3

```
Ruijie# show ipv6 ospf
Routing Process "OSPFv3 (1)" with ID 1.1.1.1
Process uptime is 24 minutes
SPF schedule delay 5 secs, Hold time between SPFs 10 secs
```

```

Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum Sum 0x0000
Number of AS-Scoped Unknown LSA 0
Number of LSA originated 11
Number of LSA received 4
Log Neighbor Adjency Changes : Enabled
Number of areas in this router is 2
Area BACKBONE(0)
Number of interfaces in this area is 1(1)
SPF algorithm executed 4 times
Number of LSA 3. Checksum Sum 0x1DDF1
Number of Unknown LSA 0

```

OSPFv3 BFD , "BFD is enabled",

```

Ruijie# show ipv6 ospf
Routing Process "OSPFv3 (1)" with ID 1.1.1.1
Process uptime is 24 minutes
SPF schedule delay 5 secs, Hold time between SPFs 10 secs
Minimum LSA interval 5 secs, Minimum LSA arrival 1 secs
Number of incoming current DD exchange neighbors 0/5
Number of outgoing current DD exchange neighbors 0/5
Number of external LSA 0. Checksum Sum 0x0000
Number of AS-Scoped Unknown LSA 0
Number of LSA originated 11
Number of LSA received 4
Log Neighbor Adjency Changes : Enabled
Number of areas in this router is 2
BFD is enabled
Area BACKBONE(0)
Number of interfaces in this area is 1(1)
SPF algorithm executed 4 times
Number of LSA 3. Checksum Sum 0

```

ipv6 router ospf	OSPFv3
default-information originate	

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

39.2.2 show ipv6 ospf database

OSPFv3

show ipv6 ospf [

```

Router-LSA (Area 0.0.0.0)
Link State ID  ADV Router      Age  Seq#      CkSum
Link
0.0.0.0        1.1.1.1      17  0x80000006 0x62a1    1
0.0.0.0        2.2.2.2      156 0x80000003 0x8653
1
Network-LSA (Area 0.0.0.0)
Link State ID  ADV Router      Age  Seq#      CkSum
0.0.0.5        2.2.2.2      157 0x80000001 0xf8f6
Router-LSA (Area 0.0.0.1)
Link State ID  ADV Router      Age  Seq#      CkSum
Link
0.0.0.0        1.1.1.1      17  0x80000002 0x0529
0
Inter-Area-Prefix-LSA (Area 0.0.0.1)

Link State ID  ADV Router      Age  Seq#      CkSum
0.0.0.1        1.1.1.1      77  0x80000002 0x83b4

                AS-external-LSA

Link State ID  ADV Router      Age  Seq#      CkSum
0.0.0.1        1.1.1.1      1  0x80000001 0x6035 E2
    
```

ipv6 router ospf	OSPFv3

39.2.3 show ipv6 ospf interface

OSPFv3

show ipv6 ospf interface [*interface-type interface-number*]

--	--

interface-type

```
Ruijie# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0

                                BFD                                BFD
enabled
```

```
Ruijie# show ipv6 ospf interface
FastEthernet 1/0 is up, line protocol is up
Interface ID 2
IPv6 Prefixes
fe80::2d0:22ff:fe22:2223/64 (Link-Local Address)
OSPFv3 Process (1), Area 0.0.0.0, Instance ID 0
Router ID 1.1.1.1, Network Type BROADCAST, Cost: 1
Transmit Delay is 1 sec, State BDR, Priority 1 BFD enabled
Designated Router (ID) 2.2.2.2
Interface Address fe80::c800:eff:fe84:1c
Backup Designated Router (ID) 1.1.1.1
Interface Address fe80::2d0:22ff:fe22:2223
Timer interval configured,Hello 10,Dead 40,Wait
40,Retransmit 5
Hello due in 00:00:02
Neighbor Count is 1, Adjacent neighbor count is 1
Hello received 26 sent 26, DD received 5 sent 4
LS-Req received 1 sent 1, LS-Upd received 3 sent 6
LS-Ack received 6 sent 2, Discarded 0
```



```
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
```

BFD

BFD session state up

```
Ruijie# show ipv6 ospf neighbor detail
```

```
Neighbor      2.2.2.2,      interface      address
fe80::c800:eff:fe84:1c
```

```
In the area 0.0.0.0 via interface FastEthernet 1/0
Neighbor priority is 1, State is Full, 6 state changes
DR is 2.2.2.2 BDR is 1.1.1.1
Options is 0x000013 (-|R|-|-|E|V6)
Dead timer due in 00:00:36
Database Summary List 0
Link State Request List 0
Link State Retransmission List 0
```

BFD session state up

ipv6 router ospf	OSPFv3
ipv6 ospf area	OSPFv3
area virtual-link	OSPFv3
show ipv6 ospf interface	OSPFv3

39.2.5 show ipv6 ospf route

OSPFv3

```
show ipv6 ospf [process-id] route[count]
```

<i>process-id</i>	OSPFv3 , 1-65535.
<i>count</i>	OSPFv3

OSPF

```

Ruijie# show ipv6 ospf route
OSPFv3 Process (1)
Codes: C - connected, D - Discard, O - OSPF, IA - OSPF
inter area, E1 - OSPF external type 1, E2 - OSPF external
type 2
Destination                                Metric
Next-hop
E2 2222::/64                                1/20
via fe80::c800:eff:fe84:1c, FastEthernet 1/0
O 3333::/64                                  11
via fe80::c800:eff:fe84:1c, FastEthernet 1/0, Area
0.0.0.0

```

ipv6 router ospf	OSPFv3

39.2.6 show ipv6 ospf topology

OSPFv3

```
show ipv6 ospf [process- id] topology [area area-id]
```

process- id	OSPFv3 , 1-65535.
area-id	

OSPFv3

```

Ruijie# show ipv6 ospf topology
OSPFv3 Process (1)
OSPFv3 paths to Area (0.0.0.0) routers
Router ID      Bits  Metric  Next-Hop
Interface
1.1.1.1        EB   --

```

```

2.2.2.2          E  1          2.2.2.2
FastEthernet 1/0

```

```

OSPFv3 paths to Area (0.0.0.1) routers
Router ID      Bits Metric   Next-Hop
Interface
1.1.1.1       B   --

```

ipv6 router ospf	OSPFv3
area range	OSPF

39.2.7 show ipv6 ospf virtual-links

OSPFv3

show ipv6 ospf [process- id] virtual-links

<i>process- id</i>	OSPFv3 , 1-65535.

OSPFv3

```

Ruijie# show ipv6 ospf virtual-links
Virtual Link VLINK1 to router 2.2.2.2 is down
Transit area 0.0.0.1 via interface FastEthernet 1/0,
instance ID 0
Local address *
Remote address 3333::1/128
Transmit Delay is 1 sec, State Down,
Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
Hello due in inactive
Adjacency state Down

```



40 IGMP

40.1 IGMP

```
' clear ip igmp group
' clear ip igmp interface
' ip igmp access-group
' ip igmp join-group
' ip igmp static-group
' ip igmp immediate-leave group-list
' ip igmp last-member-query-count
'
```

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

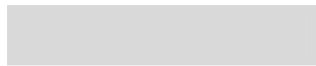
group-address

40.1.4 ip igmp join-group

no

ip igmp join-group *group-address*

no ip igmp join-group *group-address*



<i>group-address</i>	
----------------------	--

Eth0 236.6.6.6

```
Ruijie# configure terminal
Ruijie(config)# interface ethernet 0
Ruijie(config-if)# ip igmp static-group 236.6.6.6
Ruijie(config-if)# exit
```

40.1.6 ip igmp immediate-leave group-list

IGMPversion2 IGMPversion3

no

ip igmp immediate-leave group-list *access-list*

no ip igmp immediate-leave group-list

<i>access-list</i>	

IGMP

2s

IGMP

IGMP

```

Ruijie# configure terminal
Ruijie(config)# access-list 1 permit 225.192.20.0
0.0.0.255
Ruijie(config)# interface ethernet 0/1
Ruijie(config-if)# ip igmp immediate-leave group-list
1
Ruijie(config-if)# exit

```

ip igmp last-member-query-interval

40.1.7 ip igmp last-member-query-count

```

last-member-query-count leave
last-member-query-count
no

```

ip igmp last-member-query-count *number*

no ip igmp last-member-query-count

<i>number</i>	, <2-7>

last member query count 2

13.

ip igmp immediate-leave

40.1.9 ip igmp limit ()

igmp states

no

ip igmp limit ~~number~~ *except*

access-list]

no ip igmp limit

<i>number</i>	IGMP 1-16384
except	<i>access-list</i> limit
<i>access-list</i>	

no

ip igmp query-interval *seconds*

no ip igmp query-interval

<i>seconds</i>	s 1 18000

125

Ethernet 0

120s

Ruijie(config-if)# **ip igmp query-interval 120**

Ethernet 0

Ruijie(config-if)# **no ip igmp query-interval**

40.1.11 ip igmp query-max-response-time

no

ip igmp query-max-response-time *seconds*

no ip igmp query-max-response-time

<i>seconds</i>	s 1 25

10s

IGMPv2

Ethernet 0

20s

```
Ruijie(config-if)# ip igmp query-max-response-time 20
```

Ethernet 0

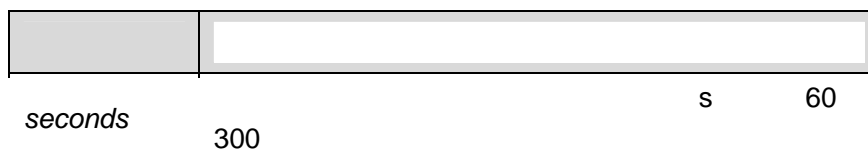
```
Ruijie(config-if)# no ip igmp query-max-response-time
```

40.1.12 ip igmp query-timeout

no

ip igmp query-timeout *seconds*

no ip igmp query-timeout



Ethernet 0

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

40.1.13 ip igmp robustness-variable

no

ip igmp robustness-variable *number*

no ip igmp robustness-variable

<i>number</i>	2-7

2

3

```
Ruijie# configure terminal
```

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

```
Ruijie(config-if)# ip igmp robustness-variable 3
```

40.1.14 ip igmp version

IGMP

no

ip igmp version {1 | 2 | 3}

no ip igmp version

--	--

{1 2 3}	<1-3>
-------------	-------

2.

igmp

igmp

2

```
Ruijie# configure terminal
Ruijie(config)# interface ethernet 0
Ruijie(config-if)# ip igmp version 2
```

40.1.15 ip igmp limit ()

igmp

no

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

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

IGMP
IGMP

300

Ruijie config # ip igmp limit 300

40.1.16 ip igmp proxy-service

mroute-proxy
mroute-proxy

ip igmp proxy-service

no ip igmp proxy-service

proxy-service

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

proxy-service

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

40.1.17 ip igmp mroute-proxy

```
ip igmp mroute-proxy interfname
```

```
no ip igmp mroute-proxy
```

<i>interfname</i>	

```
proxy-service
```

```
gmp
```

```
mroute-proxy
```

```
Ruijie(config-if)# ip igmp mroute-proxy fa 0/1
```

40.1.18 ip igmp ssm-map enable

```
igmp ssm-map
```

```
ip igmp ssm-map enable
```

```
no ip igmp ssm-map enable
```

```
ip igmp ssm-map static
```

```
igmp ssm-map
```

```
Ruijie(config)# ip igmp ssm-map enable
```

40.1.19 ip igmp ssm-map static

ssm-map

ip igmp ssm-map static *access-list a.b.c.d*

no ip igmp ssm-map static *access-list a.b.c.d*

<i>access-list</i>	Acl <1-99> <1300-1999> WORD
<i>a.b.c.d</i>	

ip igmp ssm-map enable

v3

ACL 11 192.168.2.2,

Ruijie(config)# **ip igmp ssm-map static 11 192.168.2.2.**

40.1.20 show ip igmp groups

IGMP

show ip igmp groups [*group-address* | *interface-type*

interface-number] [*detail*]

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

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

```
Ruijie# show ip igmp groups
IGMP Connected Group Membership
Group Address Interface Uptime Expires Last Reporter
224.0.1.1      eth2  00:00:09  00:04:17  10.10.0.82
224.0.1.24     eth2  00:00:06  00:04:14  10.10.0.84
224.0.1.40     eth2  00:00:09  00:04:15  10.10.0.91
224.0.1.60     eth2  00:00:05  00:04:15  10.10.0.7
239.255.255.250 eth2  00:00:12  00:04:15  10.10.0.228
239.255.255.254 eth2  00:00:08  00:04:13  10.10.0.84
```

```
Ruijie# show ip igmp groups 224.1.1.1 detail
Interface: eth1
Group: 224.1.1.1
Uptime: 00:00:42
Group mode: Include
Last reporter: 192.168.50.111
TIB-A Count: 2
TIB-B Count: 0
Group source list: (R - Remote, M - SSM Mapping)
Source Address Uptime v3 Exp Fwd Flags
192.168.55.55 00:00:42 00:03:38 Yes R
192.168.55.66 00:00:42 00:03:38 Yes R
```

40.1.21 show ip igmp interface

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

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

```
Ruijie# show ip igmp interface
Interface vlan 1(Index 4294967295)
IGMP Active, Non-Querier, Version 3 (default)
IGMP querying router is 0.0.0.0
IGMP query interval is 125 seconds
IGMP querier timeout is 255 seconds
IGMP max query response time is 10 seconds
Last member query response interval is 1000 milliseconds
Group Membership interval is 260 seconds
IGMP Snooping is globally enabled
IGMP Snooping is enabled on this interface
IGMP Snooping fast-leave is not enabled
IGMP Snooping querier is not enabled
IGMP Snooping report suppression is enabled
```

40.1.22 show ip igmp ssm-mapping

IGMP ssm-map

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

<i>A.B.C.D</i>	

IGMP ssm-map

ssm-map

```
Ruijie# sh ip igmp ssm-mapping  
SSM Mapping : Enabled  
Database    : Static mappings configured
```

233.3.3.3

```
Ruijie#show ip igmp ssm-mapping 233.3.3.3  
Group address: 233.3.3.3  
Database      : Static  
Source list   : 192.3.3.3  
               : 3.3.3.3
```

41 PIM-DM

41.1 PIM-DM

PIM-DM

```
' ip pim dense-mode
' ip pim neighbor-filter
' ip pim query-interval
' ip pim state-refresh disable
' ip pim state-refresh origination-interval
' show ip pim dense-mode interface
' show ip pim dense-mode neighbor
' show ip pim dense-mode nexthop
' show ip pim dense-mode mroute
```

41.1.1 ip pim dense-mode

```
no PIM-DM ip pim dense-mode
PIM-DM
```

```
ip pim dense-mode
no ip pim dense-mode
```

PIM-DM

```
Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/1
Ruijie(config-if)# ip pim dense-mode
```

/

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

/

ip pim neighbor-filter

- 1. ACL PIM
 ACL PIM
- 2. peering PIM
 PIM PIM
 PIM

41.1.3 ip pim query-interval

hello interval

§

41.1.4 ip pim state-refresh disable

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

```
ip pim state-refresh disable
```

```
no ip pim state-refresh disable
```

```
SR Cap                          Hello          Hello
```

```
                                PIM-DM
Ruijie# configure terminal
Ruijie(config)# ip pim state-refresh disable
```

```
ip pim state-refresh disable
                                PIM-DM
```

41.1.5 ip pim state-refresh origination-interval

```
                                PIM-DM          ip pim
state-refresh origination-interval
                                no
```

ip pim state-refresh origination-interval *interval-seconds*

no ip pim state-refresh origination-interval

<i>interval-seconds</i>	<1-100>

60

```
Ruijie# configure terminal
Ruijie(config)# interface fastethernet 0/1
Ruijie(config-if)# ip pim state-refresh
origination-interval 65
```

41.1.6 show ip pim dense-mode interface

PIM-DM **show ip pim dense-mode interface**

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

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

/ /

show ip pim dense-mode interface

```
Ruijie# show ip pim dense-mode interface
Address      Interface      VIFIndex  Ver/  Nbr
              Mode          Count
10.10.10.10  FastEthernet  0/45     3     v2/D     1
```

50.50.50.50 VLAN 4 2 v2/D 1

Address	PIM-DM IP
Interface	PIM-DM
VIF Index	VIF ID
Ver/Mode	PIM /
Nbr Count	PIM-DM

Neighbor-Address	
Interface	
Uptime/Expires	
Ver	PIM

41.1.8 show ip pim dense-mode nexthop

PIM-DM

show ip pim dense-mode nexthop

show ip pim dense-mode nexthop

/ /

PIM-DM

Ruijie# **show ip pim dense-mode nexthop**

```

Destination  Nexthop  Nexthop  Nexthop  Metric  Pref
              Num    Addr    Interface
1.1.1.111    1        50.50.50.1  VLAN 4    0       1
    
```

Destination	
Nexthop Num	
Nexthop Addr	

Nexthop Interface

p4 Tc 10.5 0 0 10.5 180.6 268.8803

PIM-DM

show ip pim dense-mode mroute

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



42 PIM-SM

42.1 PIM-SM

PIM-SM

- ' **clear ip mroute**
- ' **clear ip mroute statistics**
- ' **clear ip pim sparse-mode bsr rp-set**
- ' **ip multicast-routing**
- ' **ip pim accept-register list**
- ' **ip pim bsr-candidate**
- ' **ip pim cisco-register-checksum**
- ' **ip pim dr-priority**
- ' **ip pim ignore-rp-set-priority**
- ' **ip pim jp-timer**
- ' **ip pim mib**
- ' **ip pim neighbor-filter**
- ' **ip pim query-interval**
- ' **ip pim register-rate-limit**
- ' **ip pim register-rp-reachability**
- ' **ip pim register-source**
- ' **ip pim register-suppression**
- ' **ip pim rp-address**
- ' **ip pim rp-candidate**
- ' **ip pim rp-1 Tf-0.E0t**
- ' **ip pim sparse-mode**
- ' **ip pim spt-threshold**
- ' **ip pim ssm**
- ' **show debugging**
- ' **show ip pim sparse-mode bsr-router**

- ' **show ip pim sparse-mode interface**
- ' **show ip pim sparse-mode local-members**
- ' **show ip pim sparse-mode mroute**
- ' **show ip pim sparse-mode neighbor**
- ' **show ip pim sparse-mode nexthop**
- ' **show ip pim sparse-mode rp mapping**
- ' **show ip pim sparse-mode rp-hash**

42.1.1 clear ip mroute

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

*	
<i>group_address</i>	
<i>group_address</i> <i>source_address</i>	

```
Ruijie# clear ip mroute *
Ruijie# clear ip mroute 224.2.2.2
Ruijie# clear ip mroute 224.2.2.2 2.2.2.2
```

42.1.2 clear ip mroute statistics

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

*	

<i>group_address</i>	
<i>group_address</i> <i>source_address</i>	

```
Ruijie# clear ip mroute statistics *  
Ruijie# clear ip mroute statistics 224.2.2.2  
Ruijie# clear ip mroute statistics 224.2.2.2 2.2.2.2
```

PIM-SM
PIM-SM

ip pim sparse-mode

```
Ruijie(config)# ip multicast-routing
```

42.1.5 ip pim accept-register list

ip pim accept-register list *access-list*

<i>access-list</i>	access-list <2000 2699>	<100 199> acl

RP

RP

```
Ruijie(config)# ip pim accept-register list 100
Ruijie(config)# access-list 100 permit ip 192.168.195.0
0.0.0.255 225.1.1.1 0.0.0.255
```

access-list

42.1.6 ip pim bsr-candidate

ip pim bsr-candidate *interface-type interface-number*
[*hash-mask-length*][*priority-value*]

<i>interface-type interface-number</i>	
<i>hash-mask-length</i>	<0-32> RP HASH 10
<i>priority-value</i>	<0-255> BSR 64

BSR

```

PIM-SM
RP
BSR BSR
BSR BSR C-BSR BSR
PIM-SM 224.0.0.13 BSR
PIM BSR BSR
BSR BSR BSR
BSR BSR
IP
    
```

```

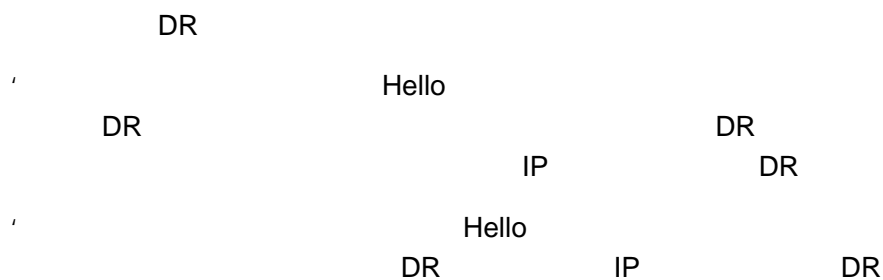
Ruijie# configure terminal
Ruijie(config)# ip pim bsr-candidate g 0/3
Ruijie(config)# ip pim bsr-candidate g 0/3 30 192
    
```

42.1.7 ip pim cisco-register-checksum

ip pim cisco-register-checksum [group-list access-list]

--	--

```
access-list <1 99> <1300 1999>
      acl
access-list group-list access-list
```



```

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

42.1.9 ip pim ignore-rp-set-priority

ip pim ignore-rp-set-priority

RP-SET RP

RP RP

```

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

42.1.10 ip pim jp-timer

ip pim jp-timer interval-seconds



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

Join/Prune

60s

Join/Prune

```
Ruijie# configure terminal
Ruijie(config)# ip pim jp-timer 50
```

42.1.11 ip pim mib

ip pim mib dense-mode

sparse-mode MIB

dense-mode MIB

```
Ruijie# configure terminal
Ruijie(config)# ip pim mib dense-mode
```

42.1.12 ip pim neighbor-filter

ip pim neighbor-filter *access_list*

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

PIM

PIM-SM

peering

```
Ruijie# configure terminal
Ruijie(config)# interface g 0/3
Ruijie(config-if)# ip pim neighbor-filter 14
Ruijie(config-if)# exit
Ruijie(config)# access-list 14 deny 192.168.1.5
0.0.0.255
```

access-list

```
Ruijie# configure terminal
Ruijie(config)# interface g 0/3
Ruijie(config-if)# ip pim query-interval 123
```

42.1.14 ip pim register-rate-limit

```
ip pim register-rate-limit rate
```

```
ip pim register-rate-limit rate
```

<i>rate</i>	register <1-65535>

```
yT@_8
```

RP

```
Ruijie# configure terminal  
Ruijie(config)# ip pim register-rp-reachability
```

42.1.16 ip pim register-source

```
ster-6(urce )]T/T0 1 Tf57 Tc 0 T0 177247 0 Td{y
```

ip pim register-suppression *seconds*

<i>seconds</i>	<11-21843>

60

DR
rp-register-kat

DR
RP

ip pim
RP keepalive

```
Ruijie# configure terminal
```

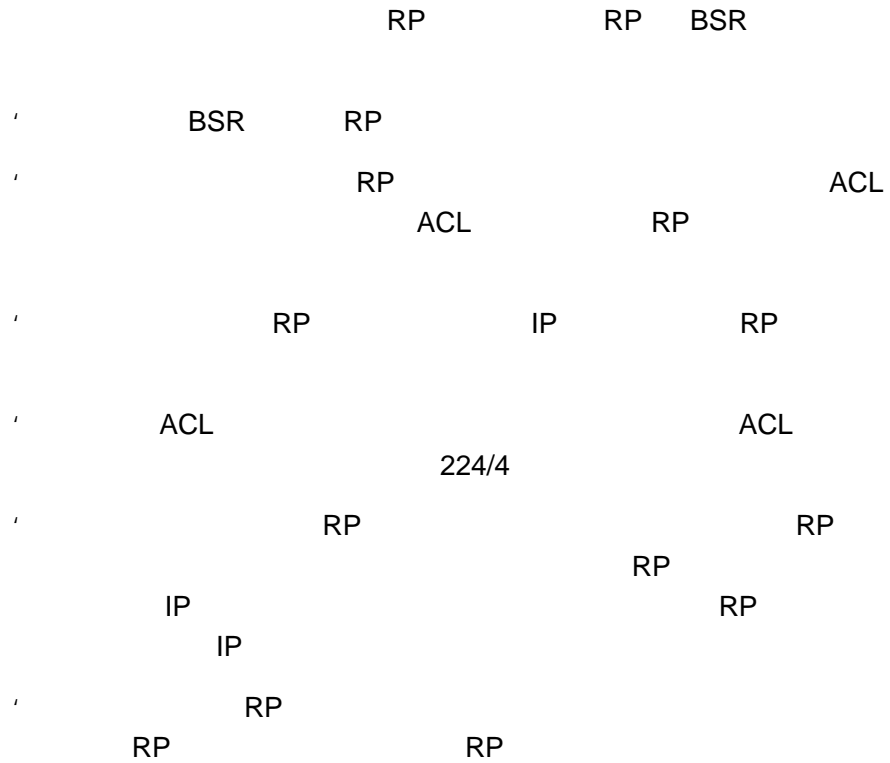
```
Ruijie(config)# ip pim register-suppression 100
```

42.1.18 ip pim rp-address

ip pim rp-address *rp-address* [*access_list*]

<i>rp-address</i>	RP	IP	
<i>access_list</i>	<1300-1999>	access-list	acl <1-99>
		acl	

RP



```
Ruijie# configure terminal
Ruijie(config)# ip pim rp-address 210.34.0.55
Ruijie(config)# ip pim rp-address 210.34.0.55 4
Ruijie(config)# access-list 4 permit 225.1.1.1
0.0.0.255
```

access-list

42.1.19 ip pim rp-candidate

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

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

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

RP

```

PIM-SM
BSR
BSR PIM
C-RP
RPT
BSR
RP
C-RP
RP
permit ace acl
deny
ace
Ruijie#
```

RP KAT

```
Ruijie# configure terminal  
Ruijie(config)# ip pim rp-register-kat 250
```

42.1.21 ip pim sparse-mode

ip pim sparse-mode

PIM-SM

PIM-SM

```
Ruijie# configure terminal  
Ruijie(config)# interface g 0/3  
Ruijie(config-if)# ip pim sparse-mode
```

/

PIM-SM

PIM-SM

PIM-SM

IGMP

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

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

PIM-SM

PIM-SM PIM-DM DVMRP

v4

42.1.22 ip pim spt-threshold

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

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

SPT

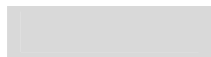
RPT SPT
 SPT group-list
 group-list SPT

```
Ruijie# configure terminal
Ruijie(config)# ip pim spt-threshold
Ruijie(config)# ip pim spt-threshold group-list 12
Ruijie(config)# access-list 12 permit 225.1.1.1
0.0.0.255
```

access-list

42.1.23 ip pim ssm

ip pim ssm { **default** / **range access_list**}



<i>default</i>	232/8		
<i>access_list</i>	acl	1-99	acl

SSM

PIM-SSM

PIM-SSM

232/8

```

Ruijie# configure terminal
Ruijie(config)# ip pim ssm default
                                10
Ruijie(config)# ip pim ssm range 10
Ruijie(config)# access-list 10 permit 232.0.0.1
0.0.0.255

```

access-list**42.1.24 show debugging****show debugging**

/ /

```

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

```

42.1.25 show ip pim sparse-mode bsr-router

show ip pim sparse-mode bsr-router

/ /

BSR .

```
Ruijie# show ip pim sparse-mode bsr-router
PIMv2 Bootstrap information
This system is the Bootstrap Router (BSR)
BSR address: 192.168.127.1
Uptime:      01d23h14m, BSR Priority: 64, Hash mask
length: 10
Next bootstrap message in 00:00:42
Role: Candidate BSR  Priority: 64, Hash mask length: 10
State: Elected BSR
Candidate RP: 30.30.100.200(GigabitEthernet 0/3)
Advertisement interval 60 seconds
Next Cand_RP_advertisement in 00:00:32
```

42.1.26 show ip pim sparse-mode interface

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

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

/ /

PIM SM

```
Ruijie# show ip pim sparse-mode interface detail
GigabitEthernet 0/3 (vif 2):
Address 30.30.100.200, DR 30.30.100.200
Hello period 30 seconds, Next Hello in 13 seconds
Triggered Hello period 5 seconds
Neighbors:
30.30.100.1
```

42.1.27 show ip pim sparse-mode local-members

```
show ip pim sparse-mode local-members
[interface-type interface-number]
```

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

/ /

PIM SM

IGMP

```
Ruijie# show ip pim sparse-mode local-members
PIM Local membership information
GigabitEthernet 0/3:
(*, 225.1.1.1) : Include
Loopback 1:
```

42.1.28 show ip pim sparse-mode mroute

```
show ip pim sparse-mode mroute [group_address | source_address]
```

<i>group_address</i>	A.B.C.D
<i>source_address</i>	A.B.C.D

/ /

42.1.29 show ip pim sparse-mode neighbor

show ip pim sparse-mode neighbor [*detail*]

<i>detail</i>	

/ /

```
Ruijie# show ip pim sparse-mode neighbor detail
Nbr 5.5.5.3 (VLAN 1)
Expires in 81 seconds
```

42.1.30 show ip pim sparse-mode nexthop

show ip pim sparse-mode nexthop

/ /

metric

42.1.31 show ip pim sparse-mode rp mapping

show ip pim sparse-mode rp mapping

/ /

RP

```
Ruijie# show ip pim sparse-mode rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4
RP: 30.30.200.1
Info source: 30.30.200.1, via bootstrap, priority 192
Uptime: 00:00:51, expires: 00:01:39
RP: 30.30.100.1
Info source: 30.30.200.1, via bootstrap, priority 192
Uptime: 00:19:14, expires: 00:01:38
Group(s): 224.0.0.0/4, Static
RP: 100.100.100.100
Uptime: 00:45:35
```

42.1.32 show ip pim sparse-mode rp-hash

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

<i>group-address</i>	

/ /

43

43.1

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

43.1.1 clear ip mroute

IP

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

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

230.0.0.1

Ruijie# **clear ip mroute** 230.0.0.1

show ip mroute	

43.1.2 clear ip mroute statistics

IP

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

<i>rpf-address</i>	
<i>interface-type</i> <i>interface-number</i>	
<i>distance</i>	0 RPF <1-255>

Distance Distance 0

RFF

ip

172.30.10.13

```
Ruijie(config)# ip mroute 172.16.0.0 255.255.0.0
172.30.10.13
```

43.1.4 ip multicast route-limit

ip multicast route-limit *limit* [*threshold*]

no ip multicast route-limit *limit* [*threshold*]

<i>limit</i>	1~2147483647 1024
<i>threshold</i>	2147483647.

limit 1024

threshold 2147483647

IPv6

500

Ruijie(config)# **ip multicast route-limit 500**

43.1.5 ip multicast ttl-threshold

TTL Time-To-Live

no

ip multicast ttl-threshold *ttl-value*

no ip multicast ttl-threshold

<i>ttl-value</i>	TTL , 0~255

ttl-value 1

TTL TTL
TTL TTL 0 TTL

TTL 5

Ruijie(config-if)# ip multicast ttl-threshold 5

43.1.6 ip multicast-routing

no

ip multicast-routing

no ip multicast-routing

IPv4

IPv4

SNOOPING SVGL S8606 S8610 S8614 IGMP
IVGL-SVGL IVGL-SVGL IGMP SNOOPING SVGL
IVGL-SVGL ip

show ip mroute [*group-address*] [*source-address*] [**dense**][**sparse**]
[**summary**] [**count**]

<i>group-address</i>	
<i>source-address</i>	
dense	PIMDM
sparse	PIMSM
summary	
count	

```
Ruijie# show ip mroute
IP Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder
installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(10.10.1.52, 224.0.1.3), uptime 00:00:31, stat expires
00:02:59
Owner PIM-SM, Flags: TF
Incoming interface: FastEthernet 2/1
Outgoing interface list:
FastEthernet 1/3
```

```
Ruijie# show ip mroute 10.10.1.52 224.0.1.3
IP Multicast Routing Table
Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder
installed
Timers: Uptime/Stat Expiry
Interface State: Interface (TTL)
(10.10.1.52, 224.0.1.3), uptime 00:03:24, stat expires
00:01:28
Owner PIM-SM, Flags: TF
Incoming interface: FastEthernet 2/1
Outgoing interface list:
```

FastEthernet 1/3

Ruijie# **show ip mroute count**

IP Multicast Statistics

Total 1 routes using 132 bytes memory

Route limit/Route threshold: 2147483647/2147483647

Total NOCACHE/WRONGVIF/WHOLEPKT rcv from fwd: 1/0/0

Total NOCACHE/WRONGVIF/WHOLEPKT sent to clients: 1/0/0

Immediate/Timed stat updates sent to clients: 0/0

Reg ACK rcv/Reg NACK rcv/Reg pkt sent: 0/0/0

Next stats poll: 00:01:10

Forwarding Counts: Pkt count/Byte count, Other Counts:

Wrong If pkts

Fwd msg counts: WRONGVIF/WHOLEPKT rcv

Client msg counts: WRONGVIF/WHOLEPKT/Imm Stat/Timed

Stat sent

Reg pkt counts: Reg ACK rcv/Reg NACK rcv/Reg pkt sent

(10.10.1.52, 224.0.1.3), Forwarding: 2/19456, Other: 0

Fwd msg: 0/0, Client msg: 0/0/0/0, Reg: 0/0/0

Ruijie# **show ip mroute summary**

IP Multicast Routing Table

Flags: I - Immediate Stat, T - Timed Stat, F - Forwarder
installed

Timers: Uptime/Stat Expiry

Interface State: Interface (TTL)

(10.10.1.52, 224.0.1.3), 00:01:32/00:03:20, PIM-SM,

Flags: T

Flags	I- T- F-
Timers:Uptime/Stat Expiry	
Interface State	
Owner	
Incoming interface	
Outgoing interface list	

Forwarding Counts Pkt count/Byte count,	/
Other Counts: Wrong If pkts	

ip multicast-routing	
ip pim dense-mode	PIM-DM
ip pim sparse-mode	PIM-SM

43.1.9 show ip rpf

RPF

show ip rpf {*source-address*}

<i>source-address</i>	

192.168.1.54 RPF

```
Ruijie# show ip rpf 192.168.1.54
RPF information for 192.168.1.54
RPF interface: VLAN 1
RPF neighbor: 0.0.0.0
RPF route: 192.168.1.0/24
RPF type: unicast (connected)
RPF recursion count: 0
Doing distance-preferred lookups across tables
Distance: 0
Metric: 0 RPF information for 192.168.1.54
RPF interface: VLAN 1
RPF neighbor: 0.0.0.0
RPF route: 192.168.1.0/24
RPF type: unicast (connected)
RPF recursion count: 0
Doing distance-preferred lookups across tables
```

Distance: 0
Metric: 0

43.1.10 show ip mvif

show ip mvif { *interface-type interface-number* }

']bhYfZUMV! hndY]bhYfZUMV! bi aVYf	

svi1

```
Ruijie# show ip mvif vlan 1
Interface          Vif      Owner      TTL   Local
Remote            Uptime
Idx  Module      Address      Address
VLAN 1          1      PIM-DM      2     192.168.1.1
0.0.0.0          00:13:16
```

43.2 IP

IP

```
Ruijie# debug nsm mcast all
```

43.2.2 debug nsm mcast fib-msg

no

```
debug nsm mcast fib-msg
```

```
Ruijie# debug nsm mcast fib-msg
```

43.2.3 debug nsm mcast vif

Ruijie# **debug nsm mcast vif**

43.2.4 debug nsm mcast register

no

debug nsm mcast register

Ruijie# **debug nsm mcast register**

43.2.5 debug nsm mcast stats

no

debug nsm mcast stats

```
Ruijie# debug nsm mcast stats
```



```
Ruijie(config-mpls-router)#advertise-labels for
bgp-routes
```

44.2 discovery targeted-hello

```
hello no
```

```
discovery targeted-hello {holdtime | interval} seconds
no discovery targeted-hello {holdtime | interval}
```

holdtime	hello
interval	hello
seconds	1-65535 holdtime 65535

```
hello 45 hello 5
1/9
```

config-mpls-router

```
target hello holdtime interval
```

```
LDP
targeted hello
```

```
Ruijie(config)# mpls router ldp
Ruijie(config-mpls-router)# discovery target-hello
holdtime 90
```

show mpls ldp parameters	LDP

44.3 label-merge

no

[no] label-merge**config-mpls-router**

DU

LDP

Ruijie(config)# **mpls router ldp**Ruijie(config-mpls-router)# **label-merge**

Show mpls ldp parameters	LDP
mpls ldp distribution-mode	

44.4 label-retention-mode

no

label-retention-mode {liberal | conservative}**[no] label-retention-mode**

--	--

liberal

LDP

```
Ruijie(config)# mpls router ldp
Ruijie(config-mpls-router)#label-retention-mode
liberal
```

show mpls ldp parameters	LDP

44.5 label-switching

MPLS
MPLS

MPLS

[no] label-switching

MPLS
MPLS

MPLS

MPLS

M8600-MPLS

MPLS

```
Ruijie(config)# interface Gi4/1
Ruijie(config-if)# label-switching
```

show mpls label-pool	

44.6 ldp router-id

```

LDP LSR ID          no
[no] ldp router-id A.B.C.D

```

A.B.C.D	

```

Router ID    LDP    LSR ID

config-mpls-router

```

```

ldp router-id          LDP          ldp router-id
transport-address     ldp router-id  LSR

```

```

Ruijie(config-mpls-router)# ldp router-id 10.10.10.30

```

show mpls ldp parameter	LDP

44.7 loop-detection

```

no
[no]loop-detection

```

```

config-mpls-router

```

```

LDP

```

```

Ruijie(config)# mpls router ldp

```

```
Ruijie(config-mpls-router)# loop-detection
```

show mpls ldp parameters	LDP
mpls ldp max-path-vector	LDP
mpls ldp max-hop-count	

44.8 lsp-control-mode

LDP no

```
lsp-control-mode {independent | ordered}
```

```
no lsp-control-mode
```

independent	
ordered	

```
config-mpls-router
```

LDP

LDP

```
Ruijie(config)# mpls router ldp
```

```
Ruijie(config-mpls-router)# lsp-control-mode ordered
```

show mpls ldp parameters	LDP

44.9 mpls ip

MPLS

no

```

MPLS
MPLS
MPLS
LDP
LDP
LSP
LDP
MPLS

```

```

Ruijie(config)# interface Gi4/1
Ruijie(config-if)# mpls ip

```

mpls ldp hello-interval	hello
mpls ldp hello-holdtime	hello

44.11 mpls ip fragment

```

IP
MPLS
MPLS MTU
[no] mpls ip fragment

```

```

IP
MPLS
MPLS MTU
MPLS
MTU
no mpls ip fragment
IP
MPLS
MPLS MTU

```

```

Ruijie(config)# no mpls ip fragment

```

mpls ip	MPLS

44.12 mpls ip icmp forward

PE ICMP
J 4 Z€Ě• ži¼> XP 0.0057 Tc 0 Tw 2.7833>-6<18791B5B>-68

no mpls ip ttl expiration

MPLS TTL

Ruijie(config)# **no mpls ip ttl expiration**

mpls ip	MPLS

44.14 mpls ip ttl propagate

MPLS IP TTL

mpls ip ttl propagate {public | vpn}

no mpls ip ttl propagate

public	TTL
vpn	TTL

TTL

```

MPLS TTL TTL TTL
' TTL TTL IP MPLS Push
Pop TTL IP MPLS TTL
TTL
' TTL Push
TTL 255 Pop IP MPLS
TTL
    
```

TTL

```
Ruijie(config)# no mpls ip ttl propagate public
```

mpls ip	MPLS

44.15 mpls ldp distribution-mode

LDP

no

```
mpls ldp distribution-mode {dod | du}
```

```
no mpls ldp distribution-mode
```

dod	
du	

LDP

hello

no

mpls ldp hello-holdtime <1-65535>

no mpls ldp hello-holdtime

<1-65535>	hello 65535

15

LDP Link Hello

Hello

5104o

<1-65535>	Hello
-----------	-------

5

hello-holdtime LDP
 LDP Link Hello
 Hello Holdtime **discovery targeted-hello**

LDP hello 10

```
Ruijie(config) # interface vlan 10
Ruijie(config-if)# mpls ldp hello-interval 10
```

mpls ldp hello-holdtime	hello
discovery targeted-hello	hello

```

                LDP                      LDP
LDP             Keepalive Holdtime      targeted-session holdtime
    
```

```

LDP             Keepalive                90
    
```

```

Ruijie(config) # interface vlan 10
Ruijie(config-if)# mpls ldp keepalive-holdtime 90
    
```

targeted-session holdtime	keepalive

44.19 mpls ldp max-hop-count

```

LDP                                                no
    
```

```

mpls ldp max-hop-count <1-255>
no mpls ldp max-hop-count
    
```

<1-255>	

254

```

                LDP
Hop Count
    
```

```

hop count 30
    
```

```
Ruijie(config) # interface vlan 10
Ruijie(config-if)# mpls ldp max-hop-count 30
```

loop-detection	LDP

44.20 mpls ldp max-label-requests

```
LDP                                no
```

```
mpls ldp max-label-requests <0-255>
no mpls ldp max-label-requests
```

<0-255>	

```
LDP
LDP                                0
```

```
LDP                                5
```

```
Ruijie(config) # interface vlan 10
Ruijie(config-if)# mpls ldp max-label-requests 5
```

mpls ldp distribution-mode	

44.21 mpls ldp max-path-vector

LDP

no

mpls ldp max-path-vector <0-254>

no mpls ldp max-path-vector

<0-254>	

254

LDP

LDP
LSR ID

LDP

LDP

LDP

10

Ruijie(config)# **interface vlan 10**

Ruijie(config-if)# **mpls ldp max-path-vector 10**

loop-detection	LDP

44.22 mpls ldp max-pdu

LDP

PDU

no

mpls ldp max-pdu <256-4096>

[no] mpls ldp max-pdu

--	--

<256-4096>	LDP	PDU
------------	-----	-----

4096

LDP

LDP

LDP

256

Ruijie(config)# **interface vlan 10**Ruijie(config-if)# **mpls ldp max-pdu 256**

44.23 transport-address

no

[no] **transport-address** [*interface*|*ipaddr*|*interface_name*]

interface	IP
<i>ipaddr</i>	IP
<i>interface_name</i>	IP

LDP LSR ID transport-address

config-mpls-router

Ruijie(config-mpls-router)#**transport-address****192.168.0.1**

show mpls ldp parameters	LDP

44.24 mpls mtu

mpls mtu

mpls mtu <64-6535>

no mpls mtu

<64-6535>	

mpls mtu MTU

MTU MPLS MTU MPLS
 MTU 8 MPLS MTU MPLS
 MPLS MTU MPLS
 IP MPLS MTU

MTU MTU mtu MTU

Ruijie(config)# **interface Gi4/1**
 Ruijie(config-if)# **mpls mtu 1510**

mpls ip	MPLS

44.25 mpls router ldp

LDP

no

LDP

[no] mpls router ldp

LDP

LDP

LDP

```
Ruijie(config)# mpls router ldp
Ruijie(config-mpls-router)
```

44.26 mpls static ftn

FTN

FTN

no

F

TN FTN

mpls static ftn *A.B.C.D/Mask* **out-label** *label* **nexthop** *interface-name nexthop-ip*

no mpls static ftn *A.B.C.D/Mask*

<i>A.B.C.D/Mask</i>	FEC
out-label <i>label</i>	FEC
nexthop <i>interface-name</i> <i>nexthop-ip</i>	FEC IP

```
Ruijie(config)# mpls static ftn 192.168.0.0/16
out-label 100 nexthop gi4/1 10.10.10.1
```

show mpls forwarding-table	FTN

44.27 mpls static l3vpn-ftn

L3 VPN FTN no FTN

```
mpls static l3vpn-ftn vrf-name A.B.C.D/Mask out-label label remote-pe ip-addr
```

```
mpls static l3vpn-ftn vrf-name A.B.C.D/Mask local-forward nexthop interface-name nexthop-ip
```

```
no mpls static l3vpn-ftn vrf A.B.C.D/Mask
```

vrf-name	FTN VRF FTN
A.B.C.D/Mask	Fec
out-label label	FTN LSP PE
remote-pe ip-addr	PE
local-forward nexthop interface-name nexthop-ip	FTN PE IP

```
IP vrf FTN FTN MPLS
IP VRF VRF FTN
0 FTN IP IP
```

```
Ruijie(config)# mpls static l3vpn-ftn 192.168.0.0/16
out-label 100 remote-pe 10.10.10.1
```

show mpls forwarding-table	FTN

44.28 mpls static l2vc-ftn

```

VC FTN          no          FT
N
mpls static l2vc-ftn vc_id vc_peer_ip out_label label
no mpls static l2vc-ftn vc_id vc_peer_ip

```

<i>vc_id</i>	vc id
<i>vc_peer_ip</i>	Vc PE IP
out_label <i>label</i>	VC FTN

```

vc          ftn          VC          AC
ftn          vc peer ip
PE LSP

```

```
Ruijie(config)# mpls static l2vc-ftn 1 10.10.10.1
out_label 21
```

show mpls l2vc ftn_table	vc ftn
show mpls forwarding-table	MPLS

44.29 mpls static ilm in-label

ILM ILM ILM no
 ILM

mpls static ilm in-label *in_label* **forward-action swap-label** *label*
nexthop *interface-name nexthop-ip* **fec** A.B.C.D/M

mpls static ilm in-label *in_label* **forward-action pop-l3vpn-nexthop**
op *vrf-name nexthop interface-name nexthop-ip* **fec** A.B.C.D/Mas
k

mpls static ilm in-label *in_label* **forward-action pop-l2vc-destport**
t *interface-name* **fec** *vc_id*

no mpls static ilm in-label *in_label*

<i>in_label</i>	ILM		
forward-action	ILM swap-label	ILM L3 VPN VRF	ILM ILM
	pop-l3vpn-nexthop	L2 VPN	ILM
	pop-l2vc-destport		
<i>label</i>	swap-label		
<i>vrf-name</i>	pop-l3vpn-nexthop VPN VRF		ILM
<i>interface-name</i>	pop-l2vc-destport		
nexthop <i>interface-name</i> <i>nexthop-ip</i>			IP
fec	ILM	FEC	
<i>A.B.C.D/Mask</i>		l3 vpn	fec
<i>vc_id</i>	l2vpn	fec	VC

ILM ILM MPLS
 IP ILM IP

IP

```
Ruijie(config)# mpls static ilm in-label 20
forward-action swap-label 30 nexthop gi4/2 10.10.10.1
fec 172.16.0.0/26
```

show mpls forwarding-table	MPLS

44.30 neighbor

```
ldp no ldp
[no] neighbor A.B.C.D
```

<i>A.B.C.D</i>	LSR Router ID

LDP

config-mpls-router

LDP

LSR

LDP

```
10.10.10.1 LSR
```

```
Ruijie(config)# mpls router ldp
Ruijie(config-mpls-router)# neighbor 10.10.10.1
```

show mpls ldp discovery	LDP

show mpls ldp neighbor	LDP
------------------------	-----

44.31 propagate-release

no

ftn

ilm

vc vc MPLS

ip ip mpls

detail mpls ;

vrf VRF MPLS ;

summary MPLS ;

MPLS , 122F0E>Tj/T31558>Tj/TT0 1 Tf4 0 Td(,n0r8CR2 T01D0>JTJ/TT

Prefix or Tunnel Id: IP ;

Outgoing interface:

Next Hop: 0

Ruijie# **sh mpls forwarding-table summary**

MPLS forwarding is ON

Enable count:1

ILM entrys:14

ILM changes:14

ILM failed changes :0

IP FTN entrys:0

IP FTN changes:4

IP FTN faild changes:0

L2 FTN entrys:0

L2 FTN changes:0

L2 FTN faild changes:0

In label packets:0

Out label packets:0

Send label packets:0

In ip packets:0

Out ip packets:0

Out ip statck packets:0

Forwarding packets:0

Fragment packets:0

Fragment error packets:0

Label error packets:0

Label failed packets:0

Ttl over packets:0

Buffer failed packets:0

Ip don't fragment packets:0

Other failed packets:0

44.33 show mpls label-pool

show mpls label-pool [*label_space*]

label_space

label_space

```
Ruijie# show mpls label-pool
label space: 0
label pool bucket size 512
min label 16, max label 1048575
label block used 2, free 2046
CLI:  0,  1  (Include label [16,1023], reserved)
LDP:  3,  4
```

	Label	Role
--	-------	------

```

192.168.4.0/24 remote binding: no outlabel lsr:
192.168.0.3:0
192.168.0.100/32 local binding: label: gen impl-null
192.168.4.0/24 local binding: label: gen impl-null

```

show mpls ldp neighbor	LDP

44.35 show mpls ldp discovery

LDP

show mpls ldp discovery

```

hello                                LDP      LDP      LDP
hello                                LDP      LDP      LDP

```

LDP

Ruijie# **show mpls ldp discovery**

Local LDP Identifier:

8.8.8.8:0

Discovery Sources:

Interfaces:

GigabitEthernet 2/1 (ldp): xmit/recv

LDP Ident: 10.30.10.10:0

GigabitEthernet 2/2 (ldp): xmit

Targeted Hellos:

8.8.8.8 -> 10.5.0.1 (ldp): active, xmit

8.8.8.8 -> 10.30.10.10 (ldp): active/passive,

xmit

2.2.2.2 -> 10.30.10.10 (ldp): passive, xmit/recv

LDP Ident: 10.30.10.10:0

Local LDP Identifier	LDP
Interfaces	LDP
xmit	LDP Hello
rcv	LDP Hello
Targeted Hellos	targeted Hello
active	LSR targeted Hello
passive	LSR targeted Hello LSR Targeted Hello

show mpls ldp interface	LDP

44.36 show mpls ldp neighbor

LDP

. W ñ Œ ! ” Q - D Ž õ - á ´ C I

Addresses bound to peer LDP Ident:

10.20.10.10 192.168.201.220 192.168.198.1
10.5.0.1



Targeted Session Keepalive HoldTime/Interval:
180/60 sec
Targeted Hello HoldTime/Interval: 90/10 sec

■
■

```

Session attach socket FD[2572], read thread is 0xc6019c0,
write thread is (nil)
LDP Peer Address:
192.168.4.1
192.168.0.2
192.168.3.2

```

44.39 show mpls summary

MPLS

show mpls summary

MPLS

MPLS

```

Ruijie# show mpls summary
Per label-space information: //
0
Label-space 0 is using minimum label: 16 and maximum
label: 1048575 //
Label-switching Interface: //
Interface Label space
GigabitEthernet 4/1 0
GigabitEthernet 4/2 0
Total number of mpls interface is 2

```

label-switching	

44.40 targeted-session holdtime

keepalive no

targeted-session holdtime <15-65535>

15-65535	

```

LDP                               LDP                               180
keepalive                          60    LDP                          1/3

```

config-mpls-router

```

LDP                               LDP                               LDP

```

```

Ruijie(config)# mpls router ldp
Router(config-mpls-router)# targeted-session holdtime
90

```

show mpls ldp parameters	LDP

vpn

Router

family VPN PE VPN address-
 s-family VPN exit-address-family address

```
Ruijie(config)# router bgp 100
Ruijie(config-router)# address-family vpnv4
```

neighbor activate	
exit-address-family	

45.3 clear ip bgp vrf

vrf

```
clear ip bgp vrf vrf-name [* | address] [[soft] [in | out]]
```

vrf-name	vrf
*	vrf BGP
address	vrf peer BGP
ipv4 unicast	ipv4
in	soft
out	soft BGP speaker
soft	
soft in	
soft out	

vrf BGP

```
Ruijie# clear ip bgp vrf my-vrf in
```

45.4 exit address-family

exit address-family

VRF vpn

```
Ruijie(config)# router bgp 100
Ruijie(config-router)# address-family vpnv4 unicast
Ruijie(config-router-af)# exit address-family
```

45.5 ip route static inter-vrf

[no] ip route static inter-vrf

VRF

VRF

no ip route static inter-vrf vrf
vrf

*Aug 7 10:58:34: %NSM-6-ROUTESACROSSVRF: **Un-installing route [x.x.x.x/8] from global routing table with outgoing interface x/x.**

Ruijie(config)# **no ip route static inter-vrf**

45.6 ip route vrf

[no] **ip route vrf** *vrf_name ip_addr mask interface next-hop-address* [global]

VRF no

<i>vrf_name</i>	VRF
<i>ip_addr</i>	
<i>mask</i>	
<i>interface</i>	
<i>next_hop</i>	
global	VRF

vrf VRF

global VRF

global vrf

vrf

global VRF no ip route static inter-vrf

```
Ruijie(config)# ip route vrf vrf1 10.10.10.0 255.255.255.0 gi3/1 192.168.18.1
```

45.7 ip vrf

```
[no] ip vrf vrf_name
```

VRF

```
vrf_name VRF
```

VRF

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

ip vrf forwarding	VRF
show ip vrf	VRF
rd	VRF rd
route-target	VRF rt

45.8 ip vrf forwarding

```
[no] ip vrf forwarding vrf_name
```

VRF

no

5 V, R F r T

no

neighbor {*peer-address* | *peer-group-name*} **activate****no neighbor** {*peer-address* | *peer-group-name*} **activate**

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32

ipv4

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

BGP VPNv4

ipv4

```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.0.0.1 remote-as 100
Ruijie(config-router)# address-family vpnv4
Ruijie(config-router-af)# neighbor 10.0.0.1 activate
```

router bgp	BGP
neighbor remote-as	BGP

45.11 neighbor allowas-in

PE PE PE AS
no AS

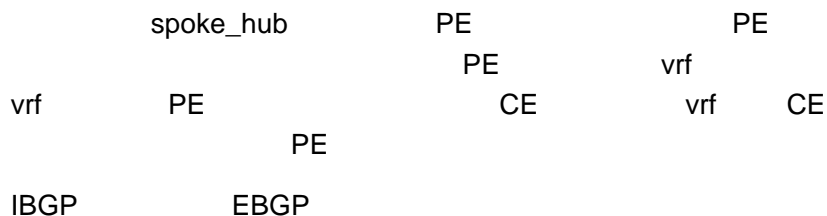
neighbor {*peer-address* | *peer-group-name*} **allows-in** *number*
no neighbor {[*peer-address* | *peer-group-name*] **allows-in**

<i>peer-address</i>	
<i>peer-group-name</i>	32
<i>number</i>	AS 3 [1 10]

allows-in

BGP VPN

BGP IPv4 VRF



```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.0.0.1 remote-as 100
Ruijie(config-router)# address-family ipv4 vrf vpn1
Ruijie(config-router-af)# neighbor 10.0.0.1 allows-in
```

router bgp	BGP

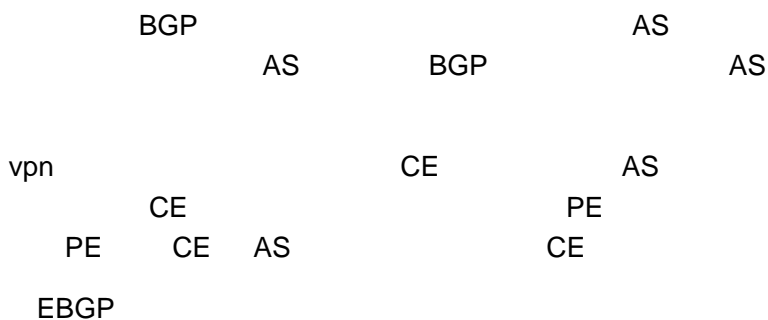
PE AS no

neighbor {*peer-address* | *peer-group-name*} **as-override**
no neighbor {*peer-address* | *peer-group-name*} **as-override**

<i>peer-address</i>	
<i>peer-group-name</i>	32

as-override

BGP IPv4 VRF



```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.0.0.1 remote-as 100
Ruijie(config-router)# address-family ipv4 vrf vpn1
Ruijie(config-router-af)# neighbor 10.0.0.1
as-override
```

router bgp	BGP
neighbor remote-as	BGP

45.13 neighbor description

() no

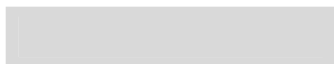
neighbor {*peer-address* | *peer-group-name*} **description** *text*
no neighbor {*peer-address* | *peer-group-name*} **description**

<i>peer-address</i>	
<i>peer-group-name</i>	32
<i>text</i>	() 80

BGP

BGP IPV4 vrf

```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.1.1.1 remote-as 80
Ruijie (config-router)# neighbor 10.1.1.1 description
xyz.com
```



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

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32
<i>as-number</i>	BGP () <1-65535>

BGP

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

-

G

<i>peer-address</i>	IPv6 IPv4
<i>peer-group-name</i>	32

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

()

()

BGP

```
Ruijie(config)# router bgp 60
Ruijie(config-router)# neighbor 10.0.0.1 shutdown
```

router bgp	BGP
neighbor remote-as	BGP
show ip bgp summary	BGP

45.16 neighbor soo

no

neighbor [*peer-address* | *peer-group-name*] **soo** *soo-value*

rd *rd_value*

rd_value RD

RD

RD 0:0.

VRF

RD VRF RD RD
vrf

VRF RD RD

```
Ruijie(config)# ip vrf vrf1
Ruijie(config-vrf)# rd 100:1
```

ip vrf	VRF
show ip vrf	VRF

45.18 redistribute

BGP

no

redistribute *protocol-type* [**route-map** *map-tag*] [**metric** *metric-value*]
no redistribute *protocol-type* [**route-map** *map-tag*] [**metric** *metric-value*]

<i>protocol-type</i>	connected static rip
route-map <i>map-tag</i>	route-map route-map

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

BGP
 BGP IPv4
 BGP IPv6
 BGP IPv4 VRF

IP

no
 no

metric

no redistribute

route-map route-map route-map route-map

metric metric

```
Ruijie(config-router)# redistribute static route-map
static-rmap
Ruijie(config-router)# no redistribute static
route-map static-rmap
Ruijie(config-router)# no redistribute static
```

show ip protocols	

45.19 redistribute ospf

no OSPF BGP

redistribute ospf *process-id* [**route-map** *map-tag*] [**metric** *metric-value*]
[match internal external [1|2] nssa-external [1|2]]
no redistribute ospf *process-id* [**route-map** *map-tag*] [**metric**
metric-value] [**match {internal|external [1|2]|nssa-external [1|2]}**]

<i>process-id</i>	OSPF
route-map <i>map-tag</i>	route-map route-map
metric <i>metric-value</i>	metric
match	OSPF
internal	OSPF internal ospf match
external [1 2]	OSPF external 1 2 1 2
nssa-external [1 2]	OSPF nssa-external 1 2 1 2

OSPF

BGP

BGP IPv4

BGP IPv6

BGP IPv4 VRF

/

```

no
redistribute no

```



```

OSPF
route-map match OSPF
metric route-map metric
route-map route-map route-map
metric route-map

```



```

Ruijie(config-router)# redistribute ospf 2 route-map
static-rmap
Ruijie(config-router)# no redistribute ospf 4 match
external route-map ospf-rmap
Ruijie(config-router)# no redistribute ospf 78

```

show ip protocols	

45.20 route-target

VRF RT

[no] route-target {import|export|both} rt_value

import	import RT
export	export RT
both	import export

Route-Target

VRF

VRF

RT

```
Ruijie(config)# ip vrf vrf1
Ruijie(config-vrf)# route-target import 100:1
Ruijie(config-vrf)# route-target export 100:2
Ruijie(config-vrf)# route-target both 100:4
```

ip vrf	vrf

45.21 show ip bgp vpnv4

VPN

```
show ip bgp vpnv4 all [network | neighbor [ address] | summary |
label]
show ip bgp vpnv4 vrf vrf_name [network | summary | label]
show ip bgp vpnv4 rd rd_value [network | neighbor [ address] |
summary | label]
```

network	
neighbor	or

Metric	
Localprf	
Path	AS-path
i	ORIGIN IGP
e	ORIGIN EGP
?	ORIGIN IGP EGP

45.22 show ip route vrf

VRF

show ip route vrf *vrf_name* [*A.B.C.D mask*] **bgp** | **connected** | **isis** | **ospf** | **rip** | **static**

<i>vrf_name</i>	VRF
<i>A.B.C.D mask</i>	
bgp	BGP
connected	
isis	ISIS
ospf	OSPF
rip	RIP
static	

```
Ruijie# show ip route vrf vrf1
Codes: C - connected, S - static, R - RIP, B - BGP
O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external
type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
```

```

i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2   ia
- IS-IS inter area
* - candidate default
B   192.168.0.1/32 , [200/0] via 192.168.0.2, 01:02:33
B   192.168.0.3/32 , [200/0] via 192.168.4.1 , 01:02:33
C   192.168.4.0/24 is directly connected ,eth1
    
```

show ip vrf	vrf

45.23 show ip vrf

VRF

show ip vrf [vrf-name]

vrf-name VRF

RF VRF VRF V

```

Ruijie# show ip vrf vrf1
VRF pe1 default RD 100 2
Interfaces
Eth0
Export VPN route-target communities
RT 100 30
No import VPN route-target community
No import route-map
    
```

ip vrf	VRF
rd	RD
route-target	RT

ip vrf forwarding	VRF
--------------------------	-----

46

46.1

- ' **storm-control**
- ' **switchport protected**
- ' **switchport port-security**
- ' **switchport port-security aging**
- ' **switchport port-security mac-address**
- ' **port-security arp-check**

46.1.1 storm-control

no

storm-control {**broadcast** | **multicast** | **unicast**} [{**level** *percent* | **pps** *packets* | *rate-bps*}]

no storm-control {**broadcast** | **multicast** | **unicast**} [{**level** *percent* | **pps** *packets* | *rate-bps*}]

broadcast

multicast

unicast

percent

20 20%

packets pps

packets per second

Rate-bps

64k-2M 64k

2-100M 1M

100M 8M

3

show interfaces

```
Ruijie(config)# interface gigabitethernet 1/1  
Ruijie(config-if)# switchport protected
```

show interfaces	

46.1.3 switchport port-security

no

switchport port-security [violation {protect | restrict | shutdown}]

no switchport port-security [violation]

port-security	
violation protect	
violation restrict	trap
violation shutdown	Trap

IP()
)

MAC
(

1

port-security aging static

show port-security

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport port-security aging time
8
Ruijie(config-if)# switchport port-security aging
static
```

show port-security	

46.1.5 switchport port-security mac-address

no

switchport port-security [**mac-address** *mac-address* [**ip-address** {*ip-address* | *ipv6-address*}]] | [**maximum** *value*]

no switchport port-security [**mac-address** *mac-address* [**ip-address** {*ip-address* | *ipv6-address*}]] | [**maximum**]

	'	
mac-address <i>mac-address</i>	'	
ip-address <i>ip-address</i>	'	ID
ip-address <i>ipv6-address</i>	'	IDJ*

maximum

```

ACL          IP          MAC
ACL          ACL        802.1x          IP
                    IP

```

```

                    gigabitethernet 1/1
00d0.f800.073c          IP          192.168.12.202

```

```

Ruijie# configure terminal
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# switchport mode access
Ruijie(config-if)# switchport port-security
Ruijie(config-if)# switchport port-security
mac-address 00d0.f800.073c ip-address 192.168.12.202

```

show port-security	

```

S8600          IP          1K          IP
          84

```

46.1.6 arp-check

```

ARP no          default

```

```

[no | default] arp-check

```

```

cpu          CPU

```

```

auto :

```

Arp-check

Arp

arp

Ruijie(config-if)# **arp-check**

show port-security	

46.2

' **show storm-control**

' **show port-security**

46.2.1 show storm-control

show storm-control [*interface-id*]

	'
<i>interface-id</i>	'

```
Ruijie# show storm-control gigabitethernet 1/1  
Interface Broadcast Control Multicast Control Unicast  
Control  
-----  
Gi1/1 Disabled Disabled Disabled
```

'	'
storm-control	'

46.2.2 show port-security

show port-security [address] [interface *interface-id*]

address	
interface <i>interface-id</i>	

```
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
```

switchport port-security	
switchport port-security aging	
switchport port-security mac-address	

47 802.1X

47.1 dot1x

```
dot1x
' dot1x auto-req
' dot1x auto-req packet-num
' dot1x auto-req req-interval
' dot1x auto-req user-detect
```

47.1.1 dot1x auto-req

```
802.1X dot1x auto-req
no
[no] dot1x auto-req
```

```
802.1x show dot1x auto-req
```

```
802.1x
Ruijie# configure terminal
Ruijie(config)# dot1x auto-req
Ruijie(config)# end
Ruijie(config)# show dot1x auto-req
Auto-Req: Enabled
User-Detect : Enabled
Packet-Num : 0
Req-Interval: 30 Second
```



<code>show dot1x auto-req</code>	
----------------------------------	--

47.1.2 dot1x auto-req packet-num

no

dot1x auto-req packet-num *num*

no dot1x auto-req packet-num

num

num = 0;

interval

s

30

show dot1x auto-req

show dot1x auto-req

```

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

```

show dot1x auto-req	

47.2 dot1x

dot1x

- ' **dot1x timeout quiet-period**
- ' **dot1x timeout re-authperiod**
- ' **dot1x timeout server-timeout**
- ' **dot1x timeout supp-timeout**
- ' **dot1x timeout tx-period**

47.2.1 dot1x timeout quiet-period

no

dot1x timeout quiet-period *seconds*
no dot1x timeout quiet-period

seconds

0 65535 s

10

show dot1x

seconds 0
65535

5

show dot1x 802.1x

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
```

show dot1x	802.1x

47.2.4 dot1x timeout supp-timeout

no

dot1x timeout supp-timeout seconds
no dot1x timeout supp-timeout

seconds 0
 65535

3

show dot1x 802.1x

10s

```
Ruijie# configure terminal
Ruijie(config)# dot1x timeout supp-timeout 10
Ruijie(config)# end
Ruijie# show dot1x
802.1X Status:      Enabled
Authentication Mode: EAP-MD5
Authed User Number: 0
Re-authen Enabled:  Disabled
Re-authen Period:   1000 sec
Quiet Timer Period: 1000 sec
Tx Timer Period:    3 sec
Supplicant Timeout: 10 sec
Server Timeout:     10 sec
Re-authen Max:      3 times
Maximum Request:    3 times
Filter Non-RG Supp: Disabled
Client Oline Probe: Disabled
Eapol Tag Enable:   Disabled
Authorization Mode:  Group Server
```

show dot1x	802.1x

47.2.5 dot1x timeout tx-period


```
Supplicant Timeout: 10 sec
Server Timeout:    10 sec
Re-authen Max:    3 times
Maximum Request:  3 times
Filter Non-RG Supp: Disabled
Client Oline Probe: Disabled
Eapol Tag Enable: Disabled
Authorization Mode: Group Server
```

show dot1x	802.1x

47.3.2 dot1x reauth-max

no

```
dot1x reauth-max count
no dot1x reauth-max
```

count

3

```
show dot1x      802.1x
```

```
Ruijie# configure terminal
Ruijie(config)# dot1x reauth-max 5
Ruijie(config)# end
Ruijie# show dot1x
```

```
802.1X Status:      Enabled
Authentication Mode: EAP-MD5
Authed User Number: 0
```

```

Re-authen Enabled:    Enabled
Re-authen Period:    1000 sec
Quiet Timer Period:   1000 sec
Tx Timer Period:      10 sec
Supplicant Timeout:   10 sec
Server Timeout:       10 sec
Re-authen Max:        5 times
Maximum Request:      3 times
Filter Non-RG Supp:   Disabled
Client Oline Probe:   Disabled
Eapol Tag Enable:     Disabled
Authorization Mode:    Group Server

```

show dot1x	802.1x

47.4 dot1x

- ' **dot1x probe-timer**
- ' **dot1x client-probe enable**

47.4.1 dot1x probe-timer

```

dot1x probe-timer{interval | alive}interval
no dot1x probe-timer

```

no

interval hello

alive

interval

Hello 20

 250

show dot1x

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

Show dot1x probe-timer	

```

Ruijie# show dot1x
802.1X Status:      Enabled
Authentication Mode: EAP-MD5
Authed User Number: 0
Re-authen Enabled:  Enabled
Re-authen Period:   1000 sec
Quiet Timer Period: 1000 sec
Tx Timer Period:    10 sec
Supplicant Timeout: 10 sec
Server Timeout:     10 sec
Re-authen Max:      5 times
Maximum Request:    3 times
Filter Non-RG Supp: Disabled
Client Oline Probe: Enabled
Eapol Tag Enable:   Disabled
Authorization Mode:  Group Server

```

show dot1x	dot1x

47.5 dot1x

dot1x

- ' **dot1x authentication**
- ' **dot1x auth-address-table**
- ' **dot1x auth-mode**
- ' **dot1x default**
- ' **dot1x dynamic-vlan enable**
- ' **dot1x guest-vlan enable**
- ' **dot1x eapol-tag**
- ' **dot1x max-req**
- ' **dot1x private-supplicant-only**
- ' **dot1x port-control auto**
- ' **dot1x port-control-mode**
- ' **dot1x stationarity enable**

47.5.1 dot1x authentication

AAA

AAA

no

dot1x authentication {default | *list-name*}

no dot1x authentication {default | *list-name*}

show dot1x

```

VLAN
Ruijie# configure terminal
Ruijie(config)# dot1x auth-fail max-attempt 5
Ruijie(config)# end
Ruijie#write

```

show dot1x	802.1x

-	-

47.5.4 dot1x auth-fail vlan

802.1x vlan

dot1x auth-fail vlan vid

no dot1x auth-fail vlan

<i>vid</i>	vlan vid

vlan

show dot1x interface

```

802.1x          vlan
Ruijie# configure terminal
Ruijie(config)# interface fa 0/1
Ruijie(config-if)# dot1x auth-fail vlan 2
Ruijie(config-if)# end
Ruijie#write

```

	show dot1x interface	802.1x
	-	-

47.5.5 dot1x auth-mode

802.1x

dot1x auth-mode {eap-md5 | chap | pap}

no dot1x auth-mode

eap-md5 802.1x EAP-MD5

chap 802.1x CHAP

pap 802.1x PAP

EAP-MD5

show dot1x 802.1x

802.1x

Ruijie# **configure terminal**

Ruijie(config)# **dot1x auth-mode chap**

Ruijie(config)# **end**

Ruijie#

show dot1x	802.1x

47.5.6 dot1x default

802.1x

dot1x default

show dot1x

802.1x

802.1x

```
Ruijie# configure terminal  
Ruijie(config)# dot1x default  
Ruijie(config)# end  
Ruijie# end
```

show dot1x	802.1x

47.5.7 dot1x dynamic-vlan enable

vlan

no

GÄ

show dot1x dynamic-vlan 802.1x

802.1x vlan

```
Ruijie# configure terminal
Ruijie(config)# interface gigabitEthernet 4/5
Ruijie(config-if)# dot1x dynamic-vlan enable
Ruijie(config)# end
Ruijie#
```

show dot1x	802.1x

47.5.8 dot1x guest-vlan

guest vlan **no**

dot1x guest-vlan *vid*
no dot1x guest-vlan

vid <1 - 4094>

1. **guest vlan** **dot1x dynamic-vlan enable**
guest vlan
2. **guest vlan**
vlan
3. **show running-config** 802.1x

802.1x guest vlan

```
Ruijie# configure terminal
Ruijie(config)# interface gigabitEthernet 4/5
Ruijie(config-if)# dot1x guest-vlan 10
```

```
Ruijie(config)# end
Ruijie#
```

show running-config	802.1x

47.5.9 dot1x eapol-tag

EAPOL TAG

```
dot1x eapol-tag
no dot1x eapol-tag
```

show dot1x 802.1x

802.1X tag

```
Ruijie# configure terminal
Ruijie(config)# dot1x eapol-tag
Ruijie(config)# end
Ruijie#
```

show dot1x	802.1x

47.5.10 dot1x mac-auth-bypass

MAC

```
dot1x mac-auth-bypass
```

no dot1x mac-auth-bypass



show run 802.1x

802.1x MAC

Ruijie# **configure terminal**

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

Ruijie(config-if)# **dot1x mac-auth-bypass timeout-activity 3600**

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

Ruijie#write

show dot1x port-control interface	802.1x
--	--------

```
Ruijie(config-if)# dot1x mac-auth-bypass violation
Ruijie(config-if)# end
Ruijie#write
```

show dot1x port-control interface	802.1x

-	-

47.5.13 dot1x max-req

DOT1X

DOT1X

DOT1X

no

dot1x max-req *count*

no dot1x ma87x-req

count

3

show dot1x

802.1x

802.1x

7

Ruijie# **configure terminal**

Ruijie(config)# **dot1x max-req 7**

Ruijie(config)# **end**

Ruijie#

show dot1x	802.1x

47.5.14 dot1x private-supplicant-only

no

dot1x private-supplicant-only
no dot1x private-supplicant-only

show dot1x private-supplicant-only 802.1x

```
Ruijie# configure t
Ruijie(config)# dot1x private-supplicant-only
Ruijie(config)# end
Ruijie#
```

show dot1x private-supplicant-only	

47.5.15 dot1x port-control auto

no

dot1x port-control auto
no dot1x port-control

802.1x

show dot1x 802.1x

802.1x

```
Ruijie# configure terminal
Ruijie(config)# interface g0/1
Ruijie(config-if)# dot1x port-control auto
Ruijie(config-if)# end
Ruijie#
```

show dot1x	802.1x

47.5.16 dot1x port-control-mode

802.1x

MAC

```
dot1x port-control-mode {mac-based | {port-based [single-host]} }
no dot1x port-control-mode
```

mac-based mac 802.1X

port-based 802.1X

single-host 802.1x

mac-based

```
show dot1x port-control          802.1x
single-host                      802.1x      show dot1x
port-control                    port-based  show running-config
dot1x port-control-mode port-based single-host
single-host                      default-user-limit
single-host                      single-host
default-user-limit              single-host
```

802.1x

```
Ruijie(config)# interface g 0/1
Ruijie(config-if)# dot1x port-control auto
Ruijie(config-if)# dot1x port-control-mode
port-based
Ruijie(config-if)# end
Ruijie#
```

802.1x

```
Ruijie(config)# interface g 0/1
Ruijie(config-if)# dot1x port-control auto
Ruijie(config-if)# dot1x port-control-mode
port-based single-host
Ruijie(config-if)# end
Ruijie#
```

port-based single-host

802.1x

802.1X

dot1x stationarity enable
no dot1x stationarity enable

802.1x

```
Ruijie# configure terminal
Ruijie(config)# dot1x stationarity enable
Ruijie(config)# end
Ruijie#
```

47.5.18 dot1x redirect url

802.1x

URL

```
URL http:// http://ruijie.net/web
http:// https://
url url no
url
```

```
dot1x redirect url [url-string]
```

```
[no ] dot1x redirect url
```

<i>url-string</i>	URL

 |

 |

 |

 |

```

1                ruijie.net/web
Ruijie(config)# dot1x redirect url http://ruijie.net/web
  
```

dot1x redirect for special tcp-destination port	web	ip	ip
dot1x redirect time-out			
dot1x redirect num for special source-ip			
show dot1x	dot1x		

 |

[REDACTED]

```

1          TCP          8443
Ruijie(config)#dot1x redirect for special tcp-destination port
8443

```

dot1x redirect url	
dot1x redirect time-out	
dot1x redirect num for special source-ip	
show dot1x	dot1x

-	-

47.5.20 dot1x redirect time-out

no (), 3 1-10

dot1x redirect time-out port *time-out-interval*

no dot1x redirect time-out port

<i>time-out-interval</i>	

3

```

1          5
Ruijie(config)# dot1x redirect time-out 5

```

--	--

dot1x redirect url

web

ip

ip

dot1x redirect time-out	
--------------------------------	--

show dot1x	
-------------------	--

	dot1x
--	-------

```
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#
```

dot1x auth-mode	802.1x

47.6.2 show dot1x auth-address-table

802.1X

```
show dot1x auth-address-table [address mac-addr] [interface  
interface-id]
```

mac-addr

interface

```
Ruijie# show dot1x auth-address-table  
interface:g3/1  
-----  
mac addr: 00D0.F800.0001  
Ruijie#
```

dot1x auth-mode	802.1x
dot1x max-req	

dot1x timeout server-timeout	
dot1x timeout supp-timeout	
dot1x timeout tx-period	

47.6.3 show dot1x auto-req

802.1x

show dot1x auto-req

```
Ruijie# show dot1x auto-req
Auto-Req: Disabled
User-Detect : Enabled
Packet-Num : 0
Req-Interval: 30 Seconds
Ruijie#
```

dot1x auth-mode	802.1x
dot1x max-req	
dot1x port-control auto	
dot1x reauth-max	

dot1x re-authentication	
dot1x timeout quiet-period	
dot1x timeout re-authperiod	
dot1x timeout server-timeout	
dot1x timeout supp-timeout	
dot1x timeout tx-period	

47.6.4 show dot1x private-supPLICANT-only

show dot1x private-supPLICANT-only

```
Ruijie# show dot1x private-supPLICANT-only
private-supPLICANT-only:: disabled
```

dot1x auth-mode	802.1x
dot1x max-req	
dot1x port-control auto	

dot1x reauth-max	
dot1x re-authentication	
dot1x timeout quiet-period	
dot1x timeout re-authperiod	
dot1x timeout server-timeout	
dot1x timeout supp-timeout	
dot1x timeout tx-period	

47.6.5 show dot1x max-req

show dot1x max-req

```
Ruijie# show dot1x max-req
max-req: 2 times
Ruijie#
```

dot1x auth-mode	802.1x
dot1x max-req	

dot1x port-control auto	
dot1x reauth-max	
dot1x re-authentication	
dot1x timeout quiet-period	
dot1x timeout re-authperiod	
dot1x timeout server-timeout	

dot1x timeout supp-timeout

'	'
' Xch% U h\! acXY	' , \$&" %
' Xch% aU ! fYe	'
' Xch% dcfh! Wtbhfc` U hc	'
' Xch% fYU h\! aU	'
' Xch% fY! U h\Ybh] W]h] cb	'
' Xch% h] aYci h ei] Yh! dYf] cX	'
' Xch% h] aYci h fY! U h\dYf] cX	'
' Xch% h] aYci h gYfj Yf! h] aYci h	'
' Xch% h] aYci h gi dd! h] aYci h	'
' Xch% h] aYci h hl ! dYf] cX	'

47.6.7 show dot1x probe-timer

show dot1x probe-timer

```
Ruijie# show dot1x probe-timer
Hello Interval: 20 Seconds
Hello Alive: 250 Seconds
Ruijie#
```

--	--

dot1x auth-mode	802.1x
dot1x max-req	
dot1x port-control auto	
dot1x reauth-max	
dot1x re-authentication	
dot1x timeout quiet-period	
dot1x timeout re-authperiod	
dot1x timeout server-timeout	
dot1x timeout supp-timeout	
dot1x timeout tx-period	

47.6.8 show dot1x re-authentication

show dot1x re-authentication

```
Ruijie# show dot1x re-authentication
reauth-enabled: disabled
Ruijie#
```

dot1x auth-mode	802.1x

.

' Xch% aU ! fYe	'
' Xc Xch% dcf% VUhfY U hc	' A'5B y ·hp>Gj „AxA• õ ,át-q @H ‡ 'z ,D „ G ` .át-q @h
' Xch% fYU h\! aU	'

Authed Static
Ruijie#

dot1x auth-mode	802.1x
dot1x max-req	
dot1x port-control auto	

```

Ruijie# show dot1x user id 1
User name: caikov
id: 1
Type: static
Mac address is 0013.2049.8272
Vlan id is 217
Access from port Gi0/13
User ip address is 192.168.217.64
Max user number on this port is 6000
COS on this port is 5
Up-bandwidth is 1024 kbps
Down-bandwidth is 1024 kbps
Authorization vlan is dep7
Authorization session time is 1000000 seconds
Authorization ip address is 192.168.217.64
Start accounting
Permit proxy user
Permit dial user
IP privilege is 2

```

dot1x auth-mode	802.1x
dot1x max-req	
dot1x port-control auto	
dot1x reauth-max	
dot1x re-authentication	
dot1x timeout quiet-period	
dot1x timeout re-authperiod	
dot1x timeout server-timeout	
dot1x timeout supp-timeout	
dot1x timeout tx-period	

47.6.12 show dot1x timeout

show dot1x timeout quiet-period
show dot1x timeout re-authperiod
show dot1x timeout server-timeout
show dot1x timeout supp-timeout
show dot1x timeout tx-period

```
Ruijie# show dot1x timeout quiet-period  
quiet-period: 60 sec
```

dot1x auth-mode	802.1x
dot1x max-req	
dot1x port-control auto	
dot1x reauth-max	
dot1x re-authentication	
dot1x timeout quiet-period	
dot1x timeout re-authperiod	
dot1x timeout server-timeout	
dot1x timeout supp-timeout	
dot1x timeout tx-period	

48 AAA

48.1

- ' **aaa authentication dot1x**
- ' **aaa authentication enable**
- ' **aaa authentication login**
- ' **aaa authentication ppp**
- ' **login authentication**

48.1.1 aaa authentication dot1x

```
AAA      802.1X      aaa  
authentication dot1x 802.1X      no  
802.1X
```

```
aaa authentication dot1x {default | list-name} method1 [method2...]
```

```
no aaa authentication dot1x {default | list-name} [method1 [method2...]]
```

```

AAA 802.1X
aaa authentication dot1x
802.1X

```

```

rds_d1x AAA 802.1X
RADIUS RADIUS

```

```

Ruijie(config)# aaa authentication dot1x rds_d1x group
radius local

```

aaa new-model	AAA
dot1x authentication	802.1X
username	

48.1.2 aaa authentication enable

```

AAA Enable
enable Enable
aaa authentication no

```

```

aaa authentication enable default method1 [method2...]

```

```

no aaa authentication enable default

```

```

default Enable
Enable

```

```

method 4

```

local	
none	
group	RADIUS

AAA Enable AAA Enable
aaa authentication enable
 Enable

Enable Enable

AAA Enable RADIUS RADIUS

Ruijie(config)# **aaa authentication enable default group
 radius local**

aaa new-model	AAA
enable	
username	

48.1.3 aaa authentication login

AAA Login **aaa**
authentication login Login no

aaa authentication login {default | list-name} method1 [method2...]

no aaa authentication login {default | list-name}

default Login

list-name Login

method 4

local	
none	
group	RADIUS TACACS+

AAA AAA Login

aaa authentication login

Login

Login

Login

list-1 AAA Login

RADIUS

RADIUS

```
Ruijie(config)# aaa authentication login list-1 group
radius local
```

aaa new-model	AAA
username	
login authentication	Login

48.1.4 aaa authentication ppp

AAA PPP **aaa**
authentication ppp PPP no

```
aaa authentication ppp {default | list-name} method1 [method2...]
```

```
no aaa authentication ppp {default | list-name}
```

```
default PPP
```

```
list-name PPP
```

```
method 4
```

local	
none	
group	RADIUS

```
AAA PPP AAA PPP
aaa authentication ppp
PPP
```

```
rds_ppp AAA PPP
RADIUS RADIUS
```

```
Ruijie(config)# aaa authentication ppp rds_ppp group
radius local
```

aaa new-model	AAA
ppp authentication	PPP
username	

- ' **aaa authorization commands**
- ' **aaa authorization config-commands**
- ' **aaa authorization console**
- ' **aaa authorization exec**
- ' **aaa authorization network**
- ' **authorization commands**
- ' **authorization exec**

48.2.1 aaa authorization commands

	NAS	CLI		AAA
			aaa authorization commands	no
AAA				
			aaa authorization commands <i>level</i> { default <i>list-name</i> } <i>method1</i> [<i>method2...</i>]	
			no aaa authorization commands <i>level</i> { default <i>list-name</i> }	

level 0~15

default

list-name

method 4

none	
group	TACACS+

AAA

AAA

14

14

TACACS+ 15

```
Ruijie(config)# aaa authorization commands 15 default
group tacacs+
```

aaa new-model	AAA
authorization commands	

48.2.2 aaa authorization config-commands

AAA

aaa authorization config-commands

no AAA

aaa authorization config-commands**no aaa authorization config-commands**

no

Ruijie(config)# **aaa authorization config-commands**

aaa new-model	AAA
aaa authorization commands	AAA

48.2.3 aaa authorization console

AAA

aaa authorization console

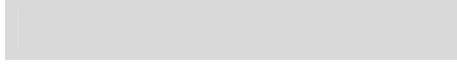
no

AAA

aaa authorization console

no aaa authorization console

Ruijie(config)# **aaa authorization console**



RADIUS Exec

```
Ruijie(config)# aaa authorization exec default group
radius
```

aaa new-model	AAA
authorization exec	
username	

48.2.5 aaa authorization network

```
AAA PPP SLIP
aaa authorization network no
AAA
```

```
aaa authorization network {default | list-name} method1 [method2...]
```

```
no aaa authorization network {default | list-name}
```

```
default Network
```

```
method 4
```

none	
group	RADIUS

RADIUS
RADIUS RADIUS RADIUS
RADIUS

RADIUS

Ruijie(config)# **aaa authorization network default group radius**

aaa new-model	AAA
aaa accounting	AAA
aaa authentication	AAA
username	

48.2.6 authorization commands

authorization commands no
authorization commands *level* {**default** | *list-name*}
no authorization commands *level*

level 0~15

default

list-name

AAA

```

                                cmd                15
TACACS+                          none
                                VTY 0 - 4

```

```
Ruijie(config)# aaa authorization commands 15 cmd group
tacacs+ none
```

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

```
Ruijie(config-line)# authorization commands 15 cmd
```

aaa new-model	AAA
aaa authorization commands	AAA

48.2.7 authorization exec

```

                                Exec
authorization exec                no                Exec

```

```
authorization exec {default | list-name}
```

```
no authorization exec
```

```
default                Exec
```

```
list-name                Exec
```

```
AAA Exec
```

```

Exec
    Exec

```

```

                                Exec
                                Exec
                                exec-1  Exec          RADIUS
                                none          VTY
0 - 4
Ruijie(config)# aaa authorization exec exec-1 group
radius none
Ruijie(config)# line vty 0 4
Ruijie(config-line)# authorization exec exec-1

```

aaa new-model	AAA
aaa authorization commands	AAA Exec

48.3

```

                                RADIUS
'   aaa accounting commands
'   aaa accounting exec
'   aaa accounting network
'   aaa accounting update
'   aaa accounting update periodic
'   accounting commands
'   accounting exec

```

48.3.1 aaa accounting commands

```

                                NAS
                                aaa accounting commands          no
aaa accounting commands level {default | list-name} start-stop
method1 [method2...]
no aaa accounting commands level {default | list-name}

```


aaa accounting exec NAS no Exec

aaa new-model	AAA
aaa authentication	AAA
accounting commands	Exec

48.3.3 aaa accounting network

```
aaa accounting network no
```

```
aaa accounting network {default | list-name} start-stop group radius
```

```
no aaa accounting network {default | list-name}
```

```
network DOT1X PPP
```

```
resource
```

```
list-name
```

```
start-stop
```

```
group
```

```
radius RADIUS
```

```
start-stop
```

```
RADIUS
```

```
Ruijie(config)# aaa accounting network default
start-stop group radius
```

aaa new-model	AAA
aaa authorization network	AAA
aaa authentication	AAA
username	

48.3.4 aaa accounting update

aaa accounting update
no

aaa accounting update
no aaa accounting update

AAA

AAA

```
Ruijie(config)# aaa new-model  
Ruijie(config)#
```

aaa new-model	AAA
aaa accounting network	

48.3.5 aaa accounting update periodic

```

periodic                               aaa accounting update
                                       no

```

```

aaa accounting update periodic interval
no aaa accounting update periodic

```

```

interval                               1

```

```

5 minutes

```

AAA

AAA

1

```

Ruijie(config)# aaa new-model
Ruijie(config)# aaa accounting update
Ruijie(config)# aaa accounting update periodic 1

```

aaa new-model	AAA
aaa accounting network	

48.3.6 accounting commands

```

accounting commands                    no
accounting commands level {default {

```

level 0~15

default

list-name

```
                                cmd          15      none
TACACS+
VTY 0 - 4
Ruijie(config)# aaa accounting commands
```

list-name


```
Ruijie(config)# aaa group server radius ss
Ruijie(config-gs-radius)# server 192.168.4.12
acct-port 5 auth-port 6
Ruijie(config-gs-radius)# end
Ruijie# show aaa group
Group Name: ss
Group Type: radius
Referred: 2
Server List:
IP Address: 192.168.4.12
Authentication Port: 6
Accounting Port: 5
Referred: 1
```

aaa group server	aaa
show aaa group	aaa

48.4.4 show aaa group

AAA

show aaa group

3C6Tj J /T080A 9.99

Referred: 2
Server List:
IP Address: 192.168.217.64
Authentication Port: 1812
Accounting Port: 1813
Referred: 1

aaa group server	AAA

48.5 AAA

- ' **aaa local authentication attempts**
- ' **aaa local authentication lockout-time**
- ' **aaa new-model**
- ' **clear aaa local user lockout**
- ' **debug aaa**
- ' **show aaa method-list**
- ' **show aaa user lockout**

48.5.1 aaa local authentication attempts

login

~~aaa login authentication (attempts) 4 (authentication) 1 .12 ref 0 g BT /~~

```
Ruijie# configure terminal
Ruijie(config)# aaa local authentication attempts 6
```

show running-config	
show aaa lockout	login

48.5.2 aaa local authentication lockout-time

login

aaa local authentication lockout-time *lockout-time*

lockout-time 1~2147483647

15

login

```
Ruijie# configure terminal
Ruijie(config)# aaa local authentication lockout-time
5
```

show running-config	
show aaa lockout	login

48.5.3 aaa new-model

```

AAA AAA aaa new-model
AAA no AAA
aaa new-model
no aaa new-model

```

```
AAA
```

```

AAA AAA AAA
aaa new-model AAA AAA AAA

```

```

AAA
Ruijie(config)# aaa new-model

```

aaa authentication	
aaa authorization	
aaa accounting	

48.5.4 clear aaa local user logout

```
clear aaa local user logout {all | user-name <word>}
```

```
<word> ID
```

```
Ruijie# clear aaa local user lockout all
```

show running-config	
show aaa lockout	login

48.5.5 debug aaa

AAA

no

debug aaa event

no debug aaa event

EXEC

48.5.6 show aaa method-list

AAA

show aaa method-list

AAA

AAA

```
Ruijie# show aaa method-list
Authentication method-list
aaa authentication login default group radius
aaa authentication ppp default group radius
aaa authentication dot1x default group radius
aaa authentication dot1x san-f local group angel group
rain none
aaa authentication enable default group radius
Accounting method-list
aaa accounting network default start-stop group radius
Authorization method-list
aaa authorizing network default group radius
```

aaa authentication	
aaa authorization	
aaa accounting	

48.5.7 show aaa user logout

```
show aaa user logout {all | user-name <word>}
```

```
<word>      ID
```

```
Ruijie# show aaa user logout all
```

show running-config	
show aaa lockout	login

49 RADIUS

49.1 RADIUS

RADIUS

```
' ip radiusradius source-interface
' radius-server attribute 31
' radius-server host
' radius-server key
' radius-server retransmit
' radius-server timeout
' radius-server dead-time
' radius attribute
' radius set qos cos
' radius vendor-specific extend
```

49.1.1 ip radius source-interface

```
radius ip radius
source-interface no RADIUS
ip radius source-interface interface
no radius source-interface
```

Interface radius

radius

```
radius nas
radius ip
radius
```

```

radius                radius    fastEthernet 0/0    ip
radius
Ruijie(config)# ip radius source-interface
fastEthernet 0/0
    
```

radius-server host	RADIUS
ip address	ip

49.1.2 radius-server attribute 31

```

RADIUS Calling-Station-ID    MAC
radius-server attribute 31    no
    
```

```

radius-server attribute 31 mac format {ietf | normal | unformatted}
no radius-server attribute 31 mac format
    
```

```

ietf:    ETF RFC3580    -
         00-D0-F8-33-22-AC
    
```

```

normal:    MAC
         .    00d0.f833.22ac
    
```

```

unformatted:
00d0f83322ac
    
```

unformatted

```

RADIUS                802.1x    IETF
                    Calling-Station-ID
    
```

radius-server host	RADIUS

49.1.3 radius-server host

RADIUS

radius-server

no

RADIUS

radius-server host *ip-address* [**auth-port** *port-number*] [**acct-port** *port-number*]

no radius-server host *ip-address*

ip-address RADIUS IP

auth-port RADIUS UDP

port-number RADIUS UDP 0

acct-port Radius UDP

port-number RADIUS UDP 0

RADIUS

RADIUS AAA

RADIUS

radius-server

RADIUS

RADIUS

Ruijie(config)# **radius-server host** *192.168.12.1*

aaa authentication	AAA

RADIUS

radius-server retransmit**no****radius-server retransmit** *retries***no radius-server retransmit***retries* RADIUS

3

AAA

RADIUS

4

Ruijie(config)# **radius-server retransmit 4**

radius-server host	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

49.1.6 radius-server timeout

RADIUS

radius-server timeout**no****radius-server timeout** *seconds***no radius-server timeout***seconds*

1-1000

5

10

```
Ruijie(config)# radius-server timeout 10
```

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS

49.1.7 radius-server deadtime

```

t
t      t
      deadtime  RGOS      RADIUS
      radius-server deadtime
no
radius-server deadtime minutes
no radius-server deadtime

minutes      1-1000

```

5

10

12	file-name-1	12
13	file-name-2	13
14	file-name-3	14
15	file-name-4	15
16	max up-rate	16
17	version to server	17
18	flux-max-high32	18
19	flux-max-low32	19
20	proxy-avoid	20
21	dailup-avoid	21
22	ip privilige	22
23	login privilige	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

RADIUS

16	max up-rate	75
17	version to server	17

qos cos dscp

Ruijie(config)# **radius set qos cos**

radius vendor-specific extend	Radius id

49.1.10 radius vendor-specific extend

id

radius vendor-specific extend
no radius vendor-specific extend

id

id

Ruijie(config)# **radius vendor-specific extend**

radius attribute	
radius set	qos cos

49.2 RADIUS

- ' **debug radius [event | detail]**
- ' **show radius server**
- ' **show radius parameter**
- ' **show radius vendor-specific**

49.2.1 debug radius

```
RADIUS                                no                                RADIUS
debug radius {event | detail}
no debug radius {event | detail}
```

EXEC

49.2.2 show radius server

```
RADIUS
show radius server
```

radius

```
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
```

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

49.2.3 show radius parameter

RADIUS

show radius parameter

radius

```
Ruijie# show radius parameter
Server Timeout: 5 Seconds
Server Deadtime: 5 Minutes
Server Retries: 3
Server Key: *****
```

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

49.2.4 show radius vendor-specific

RADIUS

show radius vendor-specific

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-directory       9
10      file-count           10
11      file-name-0          11
12      file-name-1          12
13      file-name-2          13
14      file-name-3          14
15      file-name-4          15
16      max up-rate          75
```

17	version to server	17
18	flux-max-high32	18
19	flux-max-low32	19
20	proxy-avoid	20
21	dailup-avoid	21
22	ip privilige	22
23	login privilige	42
24	limit to user number	50

radius-server host	RADIUS
radius-server retransmit	RADIUS
radius-server key	RADIUS
radius-server timeout	RADIUS

50 TACACS+

50.1 TACACS+

TACACS+

```
'  aaa group server tacacs+
'  server(TACACS+)
'  ip vrf forwarding(TACACS+)
'  ip tacacs source-interface
'  tacacs-server host
'  tacacs-server key
'  tacacs-server timeout
```

50.1.1 aaa group server tacacs+

TACACS+

TACACS+

```
aaa group server tacacs+ group-name
no aaa group server tacacs+ group-name
```


50.1.3 ip vrf forwarding(TACACS+)

```

TACACS+
)
ip vrf forwarding vrf-name
no ip vrf forwarding

vrf-name vrf

```

TACACS+

```

TACACS+ vrf

TACACS+ VRF vpn1
Ruijie(config)# aaa group server tacacs+ tac1
Ruijie(config-gs-radius)# server 1.1.1.1
Ruijie(config-gs-radius)# ip vrf forwarding vpn1

```

aaa group server tacacs+	TACACS+
server	TACACS+ server

50.1.4 ip tacacs source-interface

```

TACACS+

ip tacacs source-interface interface
no ip tacacs source-interface

Interface TACACS+

```

TACACS+

TACACS+

ip address	ip

50.1.5 tacacs-server host

TACACS+

IP

`tacacs-server host <ip address> <tacacs+>`

TACACS+

TACACS+

AAA

TACACS+

tacacs-server host	TACACS+
tacacs-server timeout	TACACS+

50.1.7 tacacs-server timeout

TACACS+

tacacs-server timeout *seconds*

no tacacs-server timeout

seconds

1-1000

5

EÝNM 6~AÄE;µ>Â đđÄÖáo đÄ5@Ä`µ´5'¼† B Ä Rd5

50.2.1 debug tacacs+

TACACS+	no	TACACS+
debug tacacs+		
no debug tacacs+		

51 SSH

51.1 SSH

SSH

- ' **crypto key generate**
- ' **crypto key zeroize**
- ' **ip ssh version**
- ' **ip ssh time-out**
- ' **ip ssh authentication-retries**

51.1.1 crypto key generate

crypto key generate {rsa | dsa}

rsa	RSA
dsa	DSA

SSH Server

```

SSH Server
enable service ssh-server
SSH 1  RSA  SSH 2  RSA
      RSA  SSH1  SSH2
DSA      SSH2
SSH
SSH Server
DSA

```

key zeroize **no crypto key generate** **crypto**

```
Ruijie# configure terminal  
Ruijie(config)# crypto key generate rsa
```



```
show ip ssh
```

```
Ruijie# configure terminal  
Ruijie(config)# crypto key zeroize rsa
```



```
Ruijie# configure terminal  
Ruijie(config)# ip ssh version 2
```

show ip ssh	SSH Server

RGOS10.1

51.1.4 ip ssh time-out

SSH Server

no**ip ssh time-out** *time***no ip ssh time-out**

<i>time</i>	

<code>show ip ssh</code>	ssh-server
--------------------------	------------

RGOS10.1

51.1.5 ip ssh authentication-retries

SSH Server

51.2 SSH

SSH

```
' show ip ssh
```

```
' show ssh
```

```
'
```

RGOS10.1

51.2.2 show ssh

SSH

show ssh

SSH SSH VTU

Ruijie# **show ssh**

RGOS10.1

51.2.3 show crypto key mypubkey

SSH Server

show crypto key mypubkey {rsa/dsa}



SSH Server

```
Ruijie# show crypto key mypubkey rsa
```

crypto key generate {rsa dsa}	DSA RSA

RGOS10.1

51.2.4 disconnect ssh

```
00W02+(A00HQp0(mprQh.Vq0MAcJM
```

show ssh	SSH
Clear line vty <i>line_number</i>	VTY

RGOS10.1

52 CPU

52.1

- ' **cpu-protect type** *packet-type* **pps** *pps_value*
- ' **cpu-protect type** *packet-type* **pri** *pri_value*

52.1.1 **cpu-protect type packet-type pps pps_value**

CPU

cpu-protect type { **arp** | **bpdu** | **dhcp** | **ipv6mc** |

```

pri_num  ID          0 7
          0

```

```

BPDU          7

```

```

Ruijie(config)# cpu-protect type bpdu pri 7
Set packet type bpdu pri 7.

```

cpu-protect type packet-type	
pps pps_value	

52.2

CPU

- ' **show cpu-protect mboard**
- ' **show cpu-protect slot slot-id**
- ' **show cpu-protect type packet-type**

52.2.1 show cpu-protect mboard

CPU

```

show cpu-protect mboard

```

CPU

S9610 CPU

```

Ruijie# show cpu-protect mboard
Type          Pps          Total          Drop

```

```

-----
arp          500      19      0
bpd         200      24      0
dhcp         0         0       0
gvrp         0         0       0
ipv6-mc      0         0       0
dvmrp        0         0       0
igmp         0         0       0
ospf         0         0       0
pim          0         0       0
rip          0         0       0
vrrp         0         0       0
unknow-ipmc  0         0       0
ttl1         0         0       0
...

```

show cpu-protect slot <i>slot-num</i>	CPU

52.2.2 show cpu-protect slot

CPP

show cpu-protect slot *slot_num*

slot_num 1-16

CPP

2 CPU

Ruijie(config)# **show cpu-protect slot 2**

```

Type          Pps      Total    Drop
-----
arp           200      200     15
bpd           200       8       0
dhcp          200       0       0

```

gvrp	200	0	0
ipv6-mc	200	0	0
dvmrp	200	0	0
igmp	200	0	0
ospf	200	0	0
pim	200	0	0
rip	200	0	0
vrrp	200	0	0
unknow-ipmc	200	0	0
tvl1	20	3	0

show cpu-protect mboard	CPU

52.2.3 show cpu-protect type

show cpu-protect type { arp | bpdu | dhcp | ipv6mc | igmp | rip | ospf | vrrp | pim | tvl1 | unknown-ipmc | dvmrp } *dvmrp*

show cpu-protect type bpdu

BPDU

```
Ruijie(config)# show cpu-protect type arp
Slot      Type      Pps      Total     Drop
-----
MainBoard bpdu      100      30        0
Slot-2    bpdu      100      30        0
```

show cpu-protect type <i>packet-type</i>	CPU

53

53.1

```
' system-guard enable
' system-guard isolate-time seconds
' system-guard same-dest-ip-attack-packets number
' system-guard scan-dest-ip-attack-packets number
' system-guard detect-maxnum number
' system-guard exception-ip ip mask
' clear system-guard [ interface interface-id [ ip-address
  ip-address ] ]
```

53.1.1 system-guard enable

no

```
system-guard enable
no system-guard enable
```

```
Ruijie(config-if)# system-guard enable
```

```
Ruijie(config-if)# no system-guard enable
```

system-guard same-dest-ip-attack-packets *number*
no system-guard same-dest-ip-attack-packets



number

<i>number</i>	IP		
	0	1000	10
	0		

10

100

```
Ruijie(config-if)# system-guard
scan-dest-ip-attack-packets 100
```

system-guard enable	

53.1.5 system-guard detect-maxnum number

no

system-guard detect-maxnum *number*

no system-guard detect-maxnum

<i>number</i>	IP		
	1	500	100
	0		

100

/20

200

Ruijie(config)# **system-guard detect-maxnum 200**

system-guard enable	

53.1.6 system-guard exception-ip ip mask

IP no

system-guard exception-ip ip mask

no system-guard exception-ip ip mask [all-eip]

<i>ip</i>	<i>ip</i>

```
Ruijie(config)# system-guard exception-ip  
192.168.5.145/24
```



53.2.1 show system-guari2 418.62 0.72 refBT/TT1Qterface 1Qterface-id]

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

```
Ruijie# show system-guard isolated-ip
interface ip-address isolate reason
remain-time(second)
-----
Fa 0/1 192.168.5.119 scan ip attack 110
Fa 0/1 192.168.5.109 same ip attack 61
```

system-guard enable	

53.2.3 show system-guard detect-ip [interface interface-id]

IP

show system-guard detect-ip [interface *interface-id*]

interface <i>interface-id</i>	

```
Ruijie# show system-guard detect-ip
interface ip-address same ip attack packets scan ip
attack packets
-----
Fa 0/1 192.168.5.118 0 8
Fa 0/1 192.168.5.108 12 2
```

--	--

system-guard enable	
----------------------------	--

53.2.4 show system-guard exception-ip [interface interface-id]

IP

show system-guard exception-ip [interface *interface-id*]

interface <i>interface-id</i>	

```
Ruijie# show system-guard exception-ip
Exception IP Address      Exception Mask
-----
255.255.255.0
192.168.4.11             255.255.255.0
```

system-guard enable	

54 DAI

54.1 VLAN DAI

```
ip arp inspection vlan
```

54.1.1 ip arp inspection vlan vlan-id

```

          vlan-id          VLAN  DAI
no          vlan-id          VLAN  DAI
          vlan-id          VLAN  DAI

```

```
ip arp inspection vlan vlan-id
```

```
no ip arp inspection vlan [vlan-id]
```

<i>vlan-id</i>	vlan

```
VLAN  DAI
```

```
DAI
```

```
VLAN 1  ARP
```

```
Ruijie(config)# ip arp inspection
```

```
Ruijie(config)# ip arp inspection vlan 1
```

show ip arp inspection vlan	VLAN DAI

54.2

54.2.1 ip arp inspection trust

```

trust          no          ip arp inspection
ip arp inspection trust
no ip arp inspection trust
    
```

```

ARP          DAI
ARP
    
```

gigabitEthernet 0/19

```

Ruijie(config)# interface gigabitEthernet 0/19
Ruijie(config-if)# ip arp inspection trust
    
```

show ip arp inspection interface	DAI

```

NFPP(          )          NFPP
DAI
    
```

54.3 DHCP Snooping

```

VLAN          DAI          ARP
          ARP
DHCP Snooping          .          DHCP Snooping
          DHCP Snooping          DHCP Snooping
    
```

55 IP Source Guard

55.1 IP Source Guard

IP Source Guard

· **ip source binding**

55.1.1 ip source binding

show ip source binding	IP

55.2 IP Source Guard

IP Source Guard

ip verify source

55.2.1 ip verify source

```

IP Source Guard
no IP Source Guard
[no] ip verify source [port-security]
port-security IP Source Guard IP + MAC
    
```

```

IP IP Source Guard
IP + MAC
DHCP Snooping
fastEthernet 0/1 IP Source Guard
Ruijie#
    
```

```
FastEthernet          0/1 ip          active
192.168.4.243        00d0.f801.0101 1
```

show ip verify source	IP Source Guard

55.3 IP Source Guard

```
IP Source Guard
' show ip verify source
' show ip source binding
' debug ip source bind
```

55.3.1 show ip verify source

IP Source Guard

```
show ip verify source [interface interface-id]
```

interface-id

IP Source Guard

“IP source guard is not configured on the interface FastEthernet 0/10”

IP Source Guard

```
inactive-no-snooping-vlan          DHCP Snooping
VLAN
```

```
inactive-trust-port              DHCP Snooping
```

```
active                            DHCP Snooping
```

```
Ruijie # show ip verify source
```

```

Interface          Filter-type      Filter-mode
Ip-address Mac-address  VLAN
-----
FastEthernet 0/1  ip             active        192.168.4.243
00d0.f801.0101  1
  
```

ip verify source	IP Source Guard

55.3.2 show ip source binding

IP

show ip source binding [*ip-address*] [

ip source binding	

55.3.3 debug ip source bind

IP Source Guard

debug ip source bind

IP Source Guard

IP Source Guard

Ruijie# **debug ip source bind**

56 NFPP

56.1

NFPP

```
'  cpu-protect sub-interface {manage|protocol|route} pps
'  cpu-protect sub-interface {manage|protocol|route} percent
```

ARP

```
'  arp-guard isolate timeout
'  arp-guard rate-limit
'  arp-guard attack-threshold
'  arp-guard scan-threshold
'  clear arp-guard users
'  clear arp-guard scan
```

56.1.1 cpu-protect sub-interface {manage|protocol|route} pps

```
cpu-protect sub-interface {manage | protocol | route} pps
pps_vaule
```

pps_vaule 1-8192

(manage)	3000	(route)
3000	(protocol)	3000

```
Ruijie(config)# cpu-protect sub-interface manage pps
200
```



cpu-protect sub-interface {manage protocol route} percent	
--	--

56.1.2 cpu-protect sub-interface {manage|protocol|route} percent

cpu-protect sub-interface {manage | protocol | route} percent
percent_vaule

percent_vaule 1 100

(manage) 30 (route)
25 (protocol) 45

```
Ruijie(config)# cpu-protect sub-interface manage  
percent 60
```

cpu-protect sub-interface {manage protocol / route} pps	
--	--

56.1.3 arp-guard isolate timeout

arp-guard isolate timeout [*seconds* | permanent]

seconds 0 [180, 86400] 0

permanent

0

```
Ruijie(config)# arp-guard isolate timeout 180
Ruijie(config)# interface g 0/1
Ruijie(config-if)# arp-guard isolate timeout permanent
```

show arp-guard configuration	

56.1.4 arp-guard rate-limit

arp-guard rate-limit *pps* {**per-src-ip** | **per-src-mac** | **per-port**}

*pps**per-src-ip* IP*per-src-mac* MAC*per-port*

IP	MAC	4
	100	

```
Ruijie(config)# arp-guard rate-limit 2 per-src-ip  
Ruijie(config)# arp-guard rate-limit 3 per-src-mac  
Ruijie(config)# arp-guard rate-limit 50 per-port
```

show arp-guard configuration	

56.1.5 arp-guard attack-threshold

arp-guard attack-threshold

User<IP=N/A,MAC=0000.0000.0004,port=Gi4/1,VLAN=1> is isolated.

T

RAP

Failed to isolate

user<IP=N/A,MAC=0000.0000.0004,port=Gi4/1,VLAN=1>.

- 1) 127
ARP
- 2) 1MB
%ARPGUARD-4-MEM_LIMIT:user table's size reached limit 1MB.
- 3) %ARPGUARD-4-ISOLATE_FAILED:
failed to isolate ARP DoS attacker.
- 4) %ARPGUARD-4-NO_MEMORY: failed to alloc memory..
- 5) CPU 30
TRAP

Ruijie(config)# **arp-guard attack-threshold 2 per-src-ip**
Ruijie(config)# **arp-guard attack-threshold 3 per-src-mac**
Ruijie(config)# **arp-guard attack-threshold 50 per-port**

show arp-guard configuration	
clear arp-guard users	
show arp-guard users	

56.1.6 arp-guard scan-threshold

arp-guard scan-threshold pkt-cnt

pkt-cnt

clear arp-guard users [vlan *vid*] [interface *interface-id*] [*ip-address* | *mac-address*]

vid

interface-id

ip-address IP

mac-address MAC

VLAN 1 g 0/1

Ruijie# **clear arp-guard users vlan 1 interface g 0/1**

arp-guard attack-threshold	
show arp-guard users	

56.1.8 clear arp-guard scan

ARP

arp-guard scan-threshold	
show arp-guard scan	ARP

56.2

56.2.1 show arp-guard configuration

show arp-guard configuration

```
Ruijie# show arp-guard configuration
Rate limit: 10000 pps per-src-ip, 1 pps per-src-mac, 100
pps per-port
Attack threshold:10000 pps per-src-ip, 1 pps per-src-mac,
200 pps per-port
Scan threshold:15 packets per 10 seconds
Global isolate timeout:10800 seconds
Local isolate timeout(second):Gi4/1    permanent
```

arp-guard isolate timeout	
arp-guard rate-limit	
arp-guard attack-threshold	
arp-guard scan-threshold	

56.2.2 show arp-guard users

```
show arp-guard users [statistics | [[vlan vid] [interface interface-id]  
[ip-address | mac-address]]]
```

statistics

vid

interface-id

ip-address IP

arp-guard attack-threshold	
clear arp-guard users	

56.2.3 show arp-guard scan

ARP

```
show arp-guard scan [statistics | [[vlan vid] [interface interface-id]  
[mac-address]]]
```

statistics ARP

vid

interface-id

mac-address

İ – DAÈ â Đ

arp-guard scan-threshold	
clear arp-guard scan	ARP

57 ACL

id	IP ACL: 1-99,1300-1999 IP ACL: 100-199,2000-2699 MAC ACL: 700-799 ACL: 2700-2899
name	ACL
sn	ACL ()
start-sn	
inc-sn	
deny	
permit	
prot	IPv6 ipv6, icmp, tcp,udp 0-255 IPv4 eigrp, gre, ipinip, igmp, nos, ospf, icmp, udp, tcp, ip IP 0-255 icmp/tcp/udp

fragment	
precedence precedence	0-7
time-range tm-rng-name	tm-rng-name
tos tos	0-15
cos cos	cos (0-7)
cos inner cos	tag cos
icmp-type	ICMP 0-255
icmp-code	ICMP 0-255
icmp-message	ICMP
operator port[port]	Operator lt- eq- gt- neq- range- port
src-mac-addr	
dst-mac-addr	
VID vid	vlan id
VID inner vid	tag vid
ethernet-type	0x
match-all tcpf	tcp flag
text	
in	
out	
{rule mask offset}+	rule mask offset “+”

AA AA AA AA AA BB BB BB BB BB CC CC DD DD
 DD DD EE FF GG HH HH HH II II JJ KK LL LL MM MM
 NN NN OO PP QQ QQ RR RR RR RR SS SS SS SS TT TT
 UU UU VV VV VV VV WW WW WW WW XY ZZ aa aa bb bb

A	MAC	0	O	TTL	34
B	MAC	6	P		35

C		12	Q	IP	36
D	VLAN tag	14	R	ip	38
E	DSAP()	18	S	ip	42
F	SSAP()	19	T	TCP	46
G	Ctrl	20	U	TCP	48
H	Org Code	21	V		50
I		24	W		54
J	IP	26	XY	IP	58
K	TOS	27	Z	flags	59
L	IP	28	a	Windows size	60
M	ID	30	b		62
N	Flags	32			

- ' **ip access-group**
- ' **mac access-group**
- ' **expert access-group**
- ' **ipv6 traffic-filter**

57.1.1 access-list

no

1) IP 1 - 99 1300 - 1999

access-list *id* {deny

destination-mac-address | **any**} [**precedence** *precedence*] [**tos** *tos*]
[fragments] [**time-range** *time-range-name*]

Expert

Internet Control Message Protocol (ICMP)

access-list *id* {**deny** | **permit**} **icmp** [**VID** [*out*][*inner in*]] {*source source-wildcard* | **host** *source* | **any**} {**host** *source-mac-address* | **any** }
 {*destination destination-wildcard* | **host** *destination* | **any**} {**host**
destination-mac-address | **any**} [*icmp-type*] [[*icmp-type* [*icmp-code*]]]
 | [*icmp-message*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**]
[time-range *time-range-name*]

Transmission Control Protocol (TCP)

access-list *id* {**deny** | **permit**} **tcp** [**VID** [*out*][*inner in*]] {*source source-wildcard* | **host** *Source* | **any**} {**host** *source-mac-address* | **any** }
[operator *port* [*port*]] {*destination destination-wildcard* | **host**
destination | **any**} {**host** *destination-mac-address* | **any**} [**operator** **port**
 [*port*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**] [**time-range**
time-range-name] [**match-all** *tcp-flag*]

User Datagram Protocol (UDP)

access-list *id* {**deny** | **permit**} **udp**[**VID** [*out*][*inner in*]] {*source source-wildcard* | **host** *source* | **any**} {**host** *source-mac-address* | **any** }
 [**operator** *port* [*port*]] {*destination destination-wildcard* | **host**
destination | **any**} {**host** *destination-mac-address* | **any**} [**operator** **port**
 [*port*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**] [**time-range**
time-range-name]

5)

access-list *list-remark text*

<i>id</i>	1-99	100-199	1300-1999	2000-2699
2700 – 2899	700 - 799			
Deny				ACE

Destination

destination-wildcard

- ' **urg**
- ' **ack**
- ' **psh**
- ' **rst**
- ' **syn**
- ' **fin**

- ' **critical**
- ' **flash**
- ' **flash-override**
- ' **immediate**
- ' **internet**
- ' **network**
- ' **priority**
- ' **routine**

- ' **max-reliability**
- ' **max-throughput**
- ' **min-delay**
- ' **min-monetary-cost**
- ' **normal**

ICMP

- ' **administratively-prohibited**
- ' **dod-host-prohibited**
- ' **dod-net-prohibited**
- ' **echo**
- ' **echo-reply**
- ' **fragment-time-exceeded**
- ' **general-parameter-problem**
- ' **host-isolated**
- ' **host-precedence-unreachable**
- ' **host-redirect**
- ' **host-tos-redirect**
- ' **host-tos-unreachable**
- ' **host-unknown**
- ' **host-unreachable**
- ' **information-reply**

- ' **information-request**
- ' **mask-reply**
- ' **mask-request**
- ' **mobile-redirect**
- ' **net-redirect**
- ' **net-tos-redirect**
- ' **net-tos-unreachable**
- ' **net-unreachable**
- ' **network-unknown**
- ' **no-room-for-option**
- ' **option-missing**
- ' **packet-too-big**
- ' **parameter-problem**
- ' **port-unreachable**
- ' **precedence-unreachable**
- ' **protocol-unreachable**
- ' **redirect**
- ' **router-advertisement**
- ' **router-solicitation**
- ' **source-quench**
- ' **source-route-failed**
- ' **time-exceeded**
- ' **timestamp-reply**
- ' **timestamp-request**
- ' **ttl-exceeded**
- ' **unreachable**

TCP

TCP

- ' **bgp**
- ' **chargen**
- ' **cmd**
- ' **daytime**
- ' **discard**
- ' **domain**
- ' **echo**
- ' **exec**
- ' **finger**
- ' **ftp**

```
' ftp-data
' gopher
' hostname
' ident
' irc
' klogin
' kshell
' login
' nntp
' pim-auto-rp
' pop2
' pop3
' smtp
' sunrpc
' syslog
' tacacs
' talk
' telnet
' time
' uucp
' whois
' www
      UDP      UDP
' biff
' bootpc
' bootps
' discard
' dnsix
' domain
' echo
' isakmp
' mobile-ip
' nameserver
' netbios-dgm
' netbios-ns
' netbios-ss
' ntp
```

' **pim-auto-rp**
' **rip**
' **snmp**
' **snmptrap**
' **sunrpc**
' **syslog**
' **tacacs**
' **talk**
' **tftp**
' **time**
' **who**
' **xmcp**

Ethernet-type

```
Ruijie(config)# access-list 102 permit tcp any any eq
domain
Ruijie(config)# access-list 102 permit udp any any eq
domain
Ruijie(config)# access-list 102 permit icmp any any echo
Ruijie(config)# access-list 102 permit icmp any any
echo-reply
```

3) MAC

```

MAC 00d0f8000c0c
100 1
Ruijie(config)# access-list 702 deny host 00d0f8000c0c
any aarp
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# mac access-group 702 in
```

4) Expert

```

Expert Extended ACL ACL
IP 192.168.12.3 MAC 00d0.f800.0044
TCP
Ruijie(config)# access-list 2702 deny tcp host
192.168.12.3 mac 00d0.f800.0044 any any
Ruijie(config)# access-list 2702 permit any any any any
Ruijie(config)# show access-lists
expert access-list extended 2702
10 deny tcp host 192.168.12.3 mac 00d0.f800.0044 any
any
10 permit any any any any
```

show access-lists	
mac access-group	MAC

RGOS10.0

57.1.2 ip access-list

```

no IP ACL IP ACL
ACL
```

ip access-list {extended | standard} {id | name}
no ip access-list {extended | standard} {id | name}

id IP 1-99 1300-1999 100-199
 2000-2699
name IP

ACL deny permit ACL
access-lists ACL **show ip**

ACL

```
Ruijie(config)# ip access-list extended 123
Ruijie(config-ext-nacl)# show ip access-lists
ip access-list extended 123
Ruijie(config-ext-nacl)#
```

ACL

```
Ruijie(config)# ip access-list standard std-acl
Ruijie(config-std-nacl)# show ip access-lists
ip access-list standard std-acl
Ruijie(config-std-nacl)#
```

show ip access-lists	IP

RGOS10.0

57.1.3 MAC access-list

MAC ACL no
 ACL

mac access-list extended {id | name}
no mac access-list extended {id | name}

Id MAC 700-799
 Name MAC

show mac access-lists ACL

MAC ACL

```
Ruijie(config)# mac access-list extended mac-acl
Ruijie(config-mac-nacl)# show mac access-lists
mac access-list extended mac-acl
Ruijie(config-mac-nacl)#
```

MAC ACL

```
Ruijie(config)# mac access-list extended 704
Ruijie(config-mac-nacl)# show mac access-lists
mac access-list extended 704
Ruijie(config-mac-nacl)#
```

show mac access-lists	mac

RGOS10.0

57.1.4 expert access-list

ACL ACL no
 ACL

expert access-list extended {id | name}
no expert access-list extended {id | name}

Id Expert 2700-2899
Name ACL

show expert access-lists ACL

ACL

```
Ruijie(config)# expert access-list extended exp-acl
Ruijie(config-exp-nacl)# show expert access-lists
expert access-list extended exp-acl
Ruijie(config-exp-nacl)#
```

ACL

```
Ruijie(config)# expert access-list extended 2704
Ruijie(config-exp-nacl)# show expert access-lists
expert access-list extended 2704
Ruijie(config-exp-nacl)#
```

show expert access-lists	

RGOS10.0

57.1.5 ipv6 access-list

IPV6 ACL **no**
 ACL

ipv6 access-list name
no ipv6 access-list name

Name ACL

show access-lists ACL

IPV6 ACL

```
Ruijie(config)# ipv6 access-list v6-acl
Ruijie(config-ipv6-nacl)# show access-lists
ipv6 access-list v6-acl
Ruijie(config-ipv6-nacl)#
```

show access-lists	IPV6

RGOS10.0

57.1.6 ip access-list resequence

ip ACL IPV6 ACL
no

ip access-list resequence {*id* | *name*} **start-sn inc-sn**
no ip access-list resequence {*id* | *name*}

id ACL

Name ACL

start-sn

show access-lists

ACL

ACL

```
Ruijie# show access-lists
ip access-list standard 1
10 permit host 192.168.4.12
20 deny any any
Ruijie# config
Ruijie(config)# ip access-list resequence 1 21 43
Ruijie(config)# exit
Ruijie# show access-lists
ip access-list standard 1
21 permit host 192.168.4.12
64 deny any any
Ruijie#
```

show access-lists	

RGOS10.0

57.1.7 deny

ACL05BA0 wy

```
[sn] deny icmp {source source-wildcard | host source | any}
{destination destination-wildcard | host destination | any} [icmp-type]
[[icmp-type [icmp-code]] | [icmp-message]] [precedence precedence]
[tos tos] [fragments] [time-range time-range-name]
```

Transmission Control Protocol (TCP)

```
[sn] deny tcp {source source-wildcard | host source | any} [operator
port [port]] {destination destination-wildcard | host destination | any}
[operator port [port]] [precedence precedence] [tos tos] [fragments]
[time-range time-range-name] [match-all tcp-flag]
```

User Datagram Protocol (UDP)

```
[sn] deny udp {source source-wildcard | host source | any} [operator
port [port]] {destination destination-wildcard | host destination | any}
[operator port [port]] [precedence precedence] [tos tos] [fragments]
[time-range time-range-name] [match-all udp-flag]
```



```

source-ipv6-address | any} [operator port [port]]
{destination-ipv6-prefix /prefix-length | host destination-ipv6-address |
any}[operator port [port]] [dscp dscp] [flow-label flow-label]
[fragments] [time-range time-range-name]

```

access-list

```

Sn   ACL
source-ipv6-prefix   IPv6
destination-ipv6-prefix   IPv6
prefix-length
source-ipv6-address   IPv6
destination-ipv6-address   IPv6
dscp
dscp                   0-63.
flow-label
flow-label             0-1048575.
protocol               IPV6           IPV6 | icmp | tcp | udp  <0-255>

```

ACL

```

ACL           ACL

```

```

Expert Extended ACL      ACL
IP      192.168.4.12      MAC      001300498272
TCP

```

```

Ruijie(config)# expert access-list extended 2702
Ruijie(config-exp-nacl)# deny tcp host
192.168.4.12 host 0013.0049.8272 any any
Ruijie(config-exp-nacl)# permit any any any any
Ruijie(config-exp-nacl)# show access-lists
expert access-list extended 2702
10 deny tcp host 192.168.4.12 host 0013.0049.8272 any
any
20 permit any any any any
Ruijie(config-exp-nacl)#

```

IP	ACL	IP	192.168.4.12
TCP	100	1	

```
Ruijie(config)# ip access-list extended ip-ext-acl
Ruijie(config-ext-nacl)# deny tcp host 192.168.4.12 eq
100 any
Ruijie(config-ext-nacl)# show access-lists
ip access-list extended ip-ext-acl
10 deny tcp host 192.168.4.12 eq 100 any
Ruijie(config-ext-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# ip access-group ip-ext-acl in
Ruijie(config-if)#
```

MAC	ACL	MAC	0013.0049.8272
	100	1	

```
Ruijie(config)# mac access-list extended mac1
Ruijie(config-mac-nacl)# deny host 0013.0049.8272 any
arp
Ruijie(config-mac-nacl)# show access-lists
mac access-list extended mac1
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
```

IP	ACL	IP	192.168.4.12
	1		

```
Ruijie(config)#
```

```
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# ipv6 traffic-filter v6-acl in
```

show access-lists	
ipv6 traffic-filter	IPV6
ip access-group	IP ACL
mac access-group	MAC ACL
ip access-list	IP ACL

[*icmp-type*] [[*icmp-type* [*icmp-code*]] | [*icmp-message*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**] [**time-range** *time-range-name*]

Transmission Control Protocol (TCP)

[*sn*] **permit tcp** {*source source-wildcard* | **host** *Source* | **any**} [*operator* **port** [*port*]] {*destination destination-wildcard* | **host** *destination* | **any**} [*operator* **port** [*port*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**] [**time-range** *time-range-name*] [**match-all** *tcp-flag*]

User Datagram Protocol (UDP)

[*sn*] **permit udp** {*source source-wildcard*|**host** *source* |**any**} [*operator* **port** [*port*]] {*destination destination-wildcard* |**host** *destination* | **any**} [*operator* **port** [*port*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**] [**time-range** *time-range-name*]

3) MAC

[*sn*] **permit** {**any** | **host** *source-mac-address*} {**any** | **host** *destination-mac-address*} [*ethernet-type*][**cos** [*out*] [*inner in*]]

4) Expert

[*sn*] **permit** [**protocol** | [*ethernet-type*][**cos** [*out*] [*inner in*]]] [**VID** [*out*][*inner in*]] {*source source-wildcard* | **host** *source* | **any**} {**host** *source-mac-address* | **any**} {*destination destination-wildcard* | **host** *destination* | **any**} {**host** *destination-mac-address* | **any**} [**precedence** *precedence*] [**tos** *tos*][**fragments**] [**time-range** *time-range-name*]

Ethernet-type cos

[*sn*] **permit** {*ethernet-type*| **cos** [*out*] [*inner in*]} [**VID** [*out*][*inner in*]]

{*source source-wildcard* | **host** *source* | **any**} {**host**

source-mac-address | **any**} {*destination destination-wildcard* | **host**

destination | **any**} {**host** *destination-mac-address* | **any**}

destination-mac-address | **any**][*icmp-type*] [[*icmp-type* [*icmp-code*]] |
[*icmp-message*]] [**precedence** *precedence*] [**tos** *tos*] [**fragments**]
[**time-range** *time-range-name*]

Transmission Control Protocol (TCP)

[*sn*] **permit tcp** [**VID** [*out*][*inner in*]]{*source source-wildcard* | **host**
Source | **any**} {**host** *source-mac-address*}

destination-ipv6-address | **any** } [*operator* **port** [**port**]] [**dscp**

```
Ruijie(config)# mac access-list extended 702
Ruijie(config-mac-nacl)# permit host 0013.0049.8272
any aarp
Ruijie(config-mac-nacl)# show access-lists
mac access-list extended
10 permit host 0013.0049.8272 any aarp702
Ruijie(config-mac-nacl)# exit
Ruijie(config)# interface gigabitethernet 1/1
Ruijie(config-if)# mac access-group 702 in
```

```
ip      ACL      IP
```

access-list

ACL

ip access-list	IP
-----------------------	----

RGOS10.0

57.1.10 remark

ACL ACE **no**

remark *text*

Text

ACL

ACL

```
Ruijie# ip access-list extended 102
Ruijie(config-ext-nacl)# remark first_remark
Ruijie(config-ext-nacl)# permit tcp 1.1.1.1 0.0.0.0
2.2.2.2 0.0.0.0
Ruijie(config-ext-nacl)# remark second_remark
Ruijie(config-ext-nacl)# permit tcp 3.3.3.3 0.0.0.0
4.4.4.4 0.0.0.0
Ruijie(config-ext-nacl)# end

Ruijie# configure terminal
Ruijie(config)# access-list 80 remark test_remark
```

show access-lists	

57.1.11 no sn

ACL

no sn**sn ACL**

ACL

ACL

ACL

```

Ruijie(config)# ipv6 access-list extended v6-acl
Ruijie(config-ipv6-nacl)# permit ipv6
host ::192.168.4.12 any
Ruijie(config-ipv6-nacl)# 12 deny ipv6 host any any
Ruijie(config-ipv6-nacl)# show access-lists
ipv6 access-list extended v6-acl
10 permit ipv6 host ::192.168.4.12 any
12 deny ipv6 any any
Ruijie(config-ipv6-nacl)# no 12
Ruijie(config-ipv6-nacl)# show access-lists
ipv6 access-list extended v6-acl
10 permit ipv6 host ::192.168.4.12 any
Ruijie(config-ipv6-nacl)#

```

show access-lists	
ip access-list	ip ACL
ipv6 access-list	IPV6 ACL
deny	ACL
permit	ACL

RGOS10.0

57.1.12 ip access-group

ip

```

access-group          no
ip access-group {id | name} {in | out}
no ip access-group { id | name} {in | out}
    
```

```

id   IP                1-199  1300-2699
name IP
in
out
    
```

ip access-group

```

fastEthernet0/0      120
    
```

```

Ruijie(config)# interface fastEthernet 0/0
Ruijie(config-if)#ip access-group 120 in
    
```

access-list	
show access-lists	
show ip access-list	IP 1-199 1300 – 2699 3000 3199

RGOS10.0

57.1.13 MAC access-group

MAC ACL

no

mac access-group {id | name}{in | out}
no mac access-group {id | name} {in | out}

id MAC 700-799
name MAC
in
out

ACL

show running-config

1 access-list accept_00d0f8xxxxxx_only Gigabit

```
Ruijie(config)# interface GigaEthernet 1/1
Ruijie(config-if)# mac access-group
accept_00d0f8xxxxxx_only in
```

show access-group	ACL

RGOS10.0

57.1.14 expert access-group

EXPERT ACL

no

expert access-group {id | name} {in | out}
no expert access-group {id | name} {in | out}

```

id Expert 2700-2899
name Expert
in
out

```

ACL
show access-group

```

1 access-list accept_00d0f8xxxxxx_only Gigabit
Ruijie(config)# interface GigaEthernet 0/1
Ruijie(config-if)# expert access-group
accept_00d0f8xxxxxx_only in

```

show access-group	ACL

RGOS10.0

57.1.15 ipv6 traffic-filter

IPV6 ACL no

```

ipv6 traffic-filter name {in | out}
no ipv6 traffic-filter name {in | out}

```

```

name IPV6
in
out

```

ACL
show ipv6 traffic-filter

```

access-list v6-acl Gigabit 1
Ruijie(config)# interface GigaEthernet 0/1
Ruijie(config-if)# ipv6 traffic-filter v6-acl in
    
```

show access-group	ACL

RGOS10.0

57.2

- :
- ' **show access-lists**
 - ' **show ip access-group**
 - ' **show expert access-group**
 - ' **show mac access-group**
 - ' **show ipv6 traffic-filter**
 - ' **show access-group**

57.2.1 show access-lists

```

ACL ACL
show access-lists [id | name]
    
```

id

name

acl *id* *name* ACL

```
Ruijie# show access-lists n_acl
ip access-list standard n_acl
Ruijie# show access-lists 102
ip access-list extended 102
Ruijie# show access-lists
ip access-list standard n_acl
ip access-list extended 101
mac access-list extended mac-acl
expert access-list extended exp-acl
ipv6 access-list extended v6-acl
```

ip access-list	IP ACL
mac access-list	MAC ACL
expert access-list	Expert ACL
ipv6 access-list	IPv6 ACL

RGOS10.0

57.2.2 show ip access-group

IP ACL

show ip access-group[interface <interface>]

<interface>

ACL

```
Ruijie# show ip access-group interface gigabitethernet
0/1
ip access-group aaa in
Applied On interface GigabitEthernet 0/1.
```

ip access-list	IP ACL

RGOS10.0

57.2.3 show expert access-group

Expert

RGOS10.0

RGOS10.0

57.2.4 show mac access-group

MAC

show mac access-group[interface <interface>]

<interface>

MAC ACL

MAC ACL

```
Ruijie# show mac access-group interface gigabitethernet
0/3
mac access-group mm in
Applied On interface GigabitEthernet 0/3.
```

mac access-list	MAC ACL

RGOS10.0

57.2.5 show ipv6 traffic-filter

IPV6

show ipv6 traffic-filter [interface <interface>]

<interface>

ACL

```
Ruijie# show ipv6 traffic-filter interface
gigabitethernet 0/4
ipv6 traffic-filter v6 in
Applied On interface GigabitEthernet 0/4.
```

ipv6 access-list	IPV6 ACL

RGOS10.0

57.2.6 show access-group

ACL

```
show access-group [interface <interface>]
```

<interface>

ACL

ACL

```
Ruijie# show access-group
ip access-list standard ipstd3
Applied On interface GigabitEthernet 0/1.
ip access-list standard ipstd4
Applied On interface GigabitEthernet 0/2.
ip access-list extended 101
Applied On interface GigabitEthernet 0/3.
ip access-list extended 102
Applied On interface GigabitEthernet 0/8.
```

ip access-group	ip
mac access-group	MAC
expert access-group	Expert
ipv6 traffic-filter	IPV6

RGOS10.0

57.3

- ' **security global access-group**

- ' **security access-group**

- ' **security uplink enable**

57.3.1 security global access-group

security global access-group {*id*|*name*}

no security global access-group

id ACL id

name ACL

```
Ruijie(config)#security global access-group 1
```

show secu-acl	

RGOS10.2

57.3.2 security access-group

security access-group {*id*|*name*}**no security access-group***id* ACL id*name* ACLRuijie(config-if)#**security access-group 1**

show secu-acl	

RGOS10.2

57.3.3 security uplink enable

security uplink enable**no security uplink enable**

```
Ruijie(config-if)#security uplink enable
```

show secu-acl	

RGOS10.2

58 VACL

58.1

```

Vlan access map                               map_name
  map_sn                                     map
      map
'      vlan access map                       map
  map_sn      map                           map   map
  map_sn      10
'      map_sn      vlan access map      map_name
  Map_name      map
'      map_sn      vlan access map
  map      map      map      map      map
'      map      6553      map

```

58.1.1 vlan access-map

```

      map                                     map
no
vlan access-map map_name [ map_sn ]
no vlan access-map map_name [ map_sn ]

map_name      map      100
map_sn      map      [0 - 65535]

```

vlan access map

```

Ruijie(config)# vlan access-map ddd 20
Ruijie(config-access-map)#

```

58.1.2 match ip/mac address

```

    ip acl      mac acl      vlan access map
ip acl      mac acl      vlan access map
no

```

```

match ip address { acl_name | acl_id }+
no match ip address { acl_name | acl_id }+
match mac address { acl_name | acl_id }+
no match mac address { acl_name | acl_id }+

```

```

+          acl,          8  acl

```

```

acl_name      acl;
acl_id      numbered acl;

```

```

Config-access-map      vacl

```

/

- 1) map ip acl map acl
- 2) map 8 acl
- 3) map acl
- 4) map ace acl acl
- 5) map ip acl (mac acl) ip
acl (mac acl) ip acl (mac acl) ip acl
(mac acl)
- 6) map ip acl (mac acl)
mac acl (ip acl) ip acl (mac acl)
mac acl (ip acl)

```

map  match

```

```

Ruijie(config)# vlan access-map dd
Ruijie(config-access-map)# match ip address 10 20 sp1
30 sp2
Ruijie(config-access-map)# exit
Ruijie(config)# vlan access-map dd 20
Ruijie(config-access-map)# match mac address 710 720 m1
760
Ruijie(config-access-map)# exit
Ruijie(config)#

```

58.1.3 action forward/drop/redirect

```

          map  actions          vacl
no          map          actions          forward

action forward
no action forward

          map  actions          vacl
no          map          actions          forward

action drop
no action drop

          map  actions          vacl
no          map          actions          forward

action redirect { GigabitEthernet | Aggregateport } {port_id}
no action redirect { GigabitEthernet | Aggregateport } {port_id}

action forward
action drop
action redirect

          map          forward          map

vacl

Ruijie(config-access-map)# action forward
Ruijie(config-access-map)# action drop
Ruijie(config-access-map)# action redirect
gigabitEthernet 0/50

```

58.1.4 vlan filter

map vlan map vlan
 no

vlan filter *map_name* **vlan-list** *vlan_id*
no vlan filter *map_name* **vlan-list** *vlan_id*

map_name map

vlan_id vlan id

```

Ruijie(config)# show vlan access-map
Vlan access-map aa 10
match mac address: 700, 710, m1, 720,
action: forward
Vlan access-map aa 20
match ip address: 10, 20, 30, sp1, sp2, 60, 50, 80,
action: drop
Vlan access-map dd 20
match mac address: 710, 720, m1, 760,
action: forward
Ruijie(config)#

```

show vlan access map { map_name }

```

Ruijie(config)# show vlan access-map dd
Vlan access-map dd 20
match mac address: 710, 720, m1, 760,
action: forward
Ruijie(config)#

```

58.2.2 show vlan filter

map vlan

show vlan filter

Show vlan filter <i>access-map</i>	map vlan
<i>map_name</i>	

```
show vlan filter vlan >015.874 1.446 Td<1DB9233-2.86 Tw 8.5836-1.44 0 371DB92
```

Configured on VLANs: 1, 5, 6,

Ruijie(config)#

IP-Precedence	0	1	2	3	4	5	6	7
DSCP	0	8	16	24	32	40	48	56

DSCP to CoS

CoS

mls qos cos *default-cos*

no mls qos cos

default-cos 0 7

no

CoS 0

```
Ruijie(config)# interface gigabitethernet 1/1  
Ruijie(config-if)# mls qos cos 7
```

show mls qos interface *interface-id*

59.2.3 Class Maps

ACL

ip access-list {**extended** | **standard**} { *acl-id* | *acl-name* }

mac access-list extended {*acl-id* | *acl-name*}

expert access-list extended {*acl-id* | *acl-name*}

ipv6 access-list extended *acl-name*

access-list *acl-id* ACL

class map class map

[no] class-map *class-map-name*

class map

[no] match access-group *acl-name* | *acl-id*

acl-name ACL

acl-id ACL id

class-map-name class map

no class-map *class-map-name* class map

no match access-group *acl-name*| *acl-id*

MAC ACL, me

Ruijie(config)# **mac access-list extended** me

ACL

Ruijie(config-ext-macl)# **permit host** 1111.2222.3333
any

ACL

Ruijie(config-ext-macl)# **exit**

class-map, cm

Ruijie(config)# **class-map** cm

ACL

Ruijie(config-cmap)# **match access-group** me

class-map

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

show mac access-lists

show ip access-lists

show class-map

59.2.4 Policy Maps

policy map policymap

[no] **policy-map** *policy-map-name*

policy map class-map ,

[no] **class** *class-map-name*

IP ipdscp IP

set ip dscp *new-dscp*

no set ip dscp

police *rate-bps burst-byte*[**exceed-action** {**drop** | **dscp** *dscp-value*}]

no police

policy-map-name **policy-map**

no policy-map *policy-map-name* **policy map**

class-map-name **class map**

no class *class-map-name*

~~new- **policy-map** *policy-map-name* **class** *class-map-name* **police** *rate-bps burst-byOS* **exceed-action** {**drop** | **dscp** *dscp-value*} **drop** *drop*~~

pol,icy map

policy map

service-policy {input | output} *policy-map-name*

no service-policy {input | output}

policy-map-name policymap

no policy map

Ruijie(config)# **interface fastEthernet**

show mls qos queueing

59.2.7 priority-queue cos-map

CoS

priority-queue cos-map *qid cos0 [cos1 [cos2 [cos3 [cos4 [cos5 [cos6 [cos7]]]]]]]*

no priority-queue cos-map

qid *id*
cos0 ... cos7 CoS
no

```
Ruijie(config)# priority-queue cos-map 1 0 1
```

show mls qos queueing

59.2.8 wrr-queue bandwidth

WRR

wrr-queue bandwidth *weight1 ... weightn*

no wrr-queue bandwidth

weight1...weightn *n* *n*

no

weight1: ...: weightn = 1:...:1

```
Ruijie(config)# wrr-queue bandwidth 1 2 3 4 5 6 7 8
```

```
show mls qos queueing
```

59.2.9 mls qos map cos-dscp

CoS DSCP

```
mls qos map cos-dscp dscp1...dscp8
```

```
no mls qos map cos-dscp
```

```
dscp
```

```
no
```

```
Ruijie(config)# mls qo 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
```

59.2.10 mls qos map dscp-cos

DSCP CoS

```
mls qos map dscp-cos dscp-list to cos
```

```
no mls qos map dscp-cos
```

```
dscp-list
```

cos

0 7

no

mls qos scheduler [sp | rr | wrr | drr]

no mls qos scheduler

sp

rr

wrr

drr

no

wrr

Ruijie(config)# **mls qos scheduler sp**

show mls qos scheduler

59.2.13 drr-queue bandwidth

DRR

drr-queue bandwidth *weight1...weight8*

no drr-queue bandwidth

weight1...weight8

no

Ruijie(config)# **drr-queue bandwidth 1 2 3 4 5 6 7 8**

show mls qos queueing

59.2.14 mls qos map ip-prec-dscp

ippre DSCP

mls qos map ip-prec-dscp dscp1...dscp8

no mls qos map ip-prec-dscp

dscp

no

```
Ruijie(config)# mls qos map ip-prec -dscp 8 10 16 18 24  
26 32 34
```

show mls qos maps dscp-cos maps,dscp-cos maps

ip-prec-dscp maps

wfq-queue bandwidth

wfq

wfq-queue *queue-id* bandwidth *min max*

no wfq-queue *queue-id* bandwidth

queue-id

min

max

min

kbps

max kbps

wfq

wfq

```
Ruijie(config)# mls qos scheduler wfq
Ruijie(config)# show mls qos scheduler
```

```
Ruijie(config-if)# wfq-queue 2 bandwidth 10 10240
Ruijie(config-if)# wfq-queue 4 bandwidth 7 10240
Ruijie(config-if)# show running
```

show mls qos scheduler	QOS

RGOS10.1

wfq-queue sp

wfq

(sp)

```
wfq-queue queue-id sp
no wfq-queue queue-id sp
```

queue-id

sp:

sp

wfq

sp+wfq

wfq

```
Ruijie(config)# mls qos scheduler wfq
Ruijie(config)# show mls qos scheduler
```

1 3

```
Ruijie(config)# wfq-queue 1 sp
Ruijie(config)# wfq-queue 3 sp
Ruijie(config)# show running
```

show mls qos scheduler	QOS

RGOS10.1

virtual-group

Aggregate Port

no

virtual-group *virtual-group-number*

no virtual-group *virtual-group-number*

<i>virtual-group-number</i>	128

Aggregate Port

24 48 24

1/3 3

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

show virtual-group	

RGOS10.1

59.3

•

59.3.1 show class-map

policy-name policy name

class-name class map

policy name

```
Ruijie# show policy-map
```

59.3.3 show mls qos interface

QoS

```
show mls qos interface interface-id [policers]
```

interface-id

policers police

QoS

```
Ruijie# show mls qos interface fastEthernet 0/1
```

59.3.4 show mls qos virtual-group

police

```
show mls qos virtual-group [virtual-group-number | policers]
```

virtual-group-number

policers police

police

ip-prec-dscp ip-prec-dscp maps

dscp-cos maps dscp-cos maps ip-prec-dscp maps

Ruijie# **show mls qos maps**

S8600 **cos-dscp dscp-cos ip-prec-dscp**

59.3.8 show mls qos rate-limit

show mls qos rate-limit [**interface** *interface-id*]

interface interface-id rate-limit

Ruijie# **show mls qos rate-limit**

.14375 173.88 50509 /C2_0 1summaryc 4.16 0 Td ()

rat 89.1 T

```
Ruijie# show virtual-group 1
```

```
Ruijie# show virtual-group summary
```

60 WRED

60.1 WRED

Queue1	Threshold1	CoS	0	1	2	3	4	5	6	7	
		WRED-drop	100%low		100%high						
		random-detectprobability	100%								
	Threshold2	CoS	NONE								
		WRED-drop	80% low		100%high						
		random-detectprobability	80%								
	Threshold3	CoS	S86								
		WRED-drop	S86								
		random-detectprobability	S86								
Queue2	Threshold1	CoS	S86								
		WRED-drop	S86								
		random-detectprobability	S86								
	Threshold2	CoS	S86								
		WRED-drop	S86								
		random-detectprobability	S86								
	Threshold3	CoS	S86								
		WRED-drop	S86								
		random-detect probability	S86								

/

no

wrr-queue random-detect min-threshold *queue_id* *thr1* [*thr2* *thr3*]

no wrr-queue random-detect min-threshold *queue_id*

<i>queue_id</i>	
<i>thr1</i>	
<i>thr2</i>	
<i>thr3</i>	

WRED

WRED

WRED

WRED

S86

S86 2

1

Ruijie(config-if)# **wrr-queue random-detect min-threshold** 1 68 69 70

-	-

-	-

60.2.3 wrr-queue random-detect probability

no

wrr-queue random-detect min-threshold *queue_id* *prob1* [*prob2* *prob3*]

no wrr-queue random-detect min-threshold *queue_id*

<i>queue_id</i>	
<i>prob1</i>	
<i>prob2</i>	
<i>prob3</i>	S86

WRED
WRED

WRED

WRED

S86

S86 2

1

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Ruijie(config-if)#**wrr-queue random-detect probability** 1 61 62 63

	Đ
--	---

WRED

<i>queue_id</i>	
<i>cos_value</i>	cos 1 8 0~7

cos

DSCP-CoS CoS-threshold

DSCP threshold

CoS threshold

WRED

RED

cos 1 6

cos

priority-queue cos-map

Ruijie(config-if)#wrr-queue cos-map 2 1 6

-	-

show queueing wred interface g0/1

```

-----
qid max_1 min_1 prob_1 max_2 min_2 prob_2 max_3 min_3 prob_3
-----
1 0 0 90 0 0 91 0 0 92
2 88 66 90 87 55 91 86 66 92
3 0 0 0 0 0 0 0 0 0
4 0 0 0 0 0 0 0 0 0
5 88 66 0 89 67 0 90 68 0
6 0 0 0 0 0 0 0 0 0
7 0 0 0 0 0 0 0 0 0
8 0 0 0 0 0 0 0 0 0

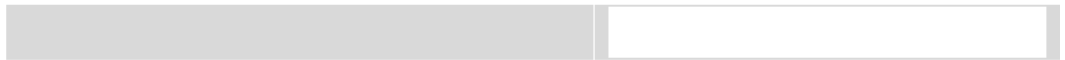
```

cos qid threshold_id

```

--- --- -----
0 1 1
1 2 1
2 3 1
3 4 2
4 5 1
5 6 3
6 7 2
7 8 1

```




```
vrrp 1 authentication x30dn78k
```



```
Ruijie(config-if)# vrrp group ip  
ipaddress [ secondary ]
```



Ruijie(config-if)# **vrrp group ip**

61.1.4 vrrp ip

```

VRRP
VRRP IP IP no
vrrp group ip ipaddress [secondary]
no vrrp group ip ipaddress [secondary]

group VRRP
ipaddress IP
secondary IP

VRRP

secondary IP IP no
VRRP IP IP
VRRP
1 IP 0 VRRP VRRP
10.0.1.20 IP 10.0.2.20

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

```

vrrp group preempt [delay seconds]

no vrrp group preempt [delay]

group VRRP

delay *seconds* Master

0

VRRP

VRRP

VRRP

VRRP

Master

VRRP

VRRP

Master

VRRP

VRRP

IP

VRRP

VRRP

VRRP

(200)

15

vrrp 1 preempt delay 15

vrrp 1 priority 200

Ruijie(config-if)# vrrp group ip <i>ipaddress [secondary]</i>	VRRP IP
Ruijie(config-if)# vrrp group priority <i>level</i>	VRRP

61.1.6 vrrp priority

VRRP

no

vrrp group priority *level*

no vrrp group priority

group VRRP

level VRRP

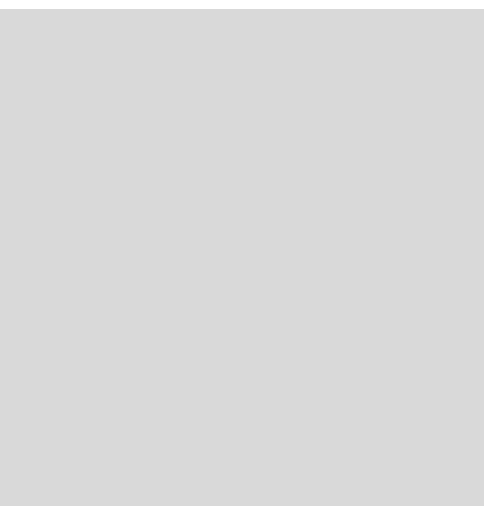
VRRP 100 VRRP VRRP

VRRP

VRRP 1 254

vrrp 1 priority 254

WçTİRđ đ \$€g% c SM°NÂ TÔĐ đ ÔPa -Òđ4Ã • Á À / ê F0E1 Rñĭ•ÊÝ^DAFd ~Íj ' (



VRRP
VRRP

VRRP

VRRP 4

vrrp 1 timers advertise 4

Ruijie(config-if)# vrrp group ip <i>ipaddress [secondary]</i>	VRRP IP
Ruijie(config-if)# vrrp group timers learn	

61.1.8 vrrp timers learn

no

vrrp group timers learn
no vrrp group timers learn

group VRRP

VRRP

VRRP

VRRP

VRRP

VRRP

Master

VRRP

Master

VRRP

VRRP 1

vrrp 1 timers learn

Ruijie(config-if)# vrrp group ip <i>ipaddress [secondary]</i>	VRRP IP
Ruijie(config-if)# vrrp group timers advertise [msec] interval	VRRP

61.1.9 vrrp track

```

VRRP          vrrp group track interface-type number
              VRRP IP          vrrp group track ip-address
              vrrp group track bfd      BFD          IP      no

```

```

vrrp group track [interface-type number] bfd interface-type
interface-number ipv4-address [priority]

```

```

vrrp group track ip-address [[[ interval interval-value ]
timeout timeout-value ] priority ]

```

```

vrrp group track [interface-type number] bfd interface-type
interface-number ipv4-address | ip-address]

```

```

group      VRRP

```

```

interface-type

```

```

number

```

```

ipv4-address      IPv4      bfd

```

```

interval-value

```

```

3

```

```

timeout-value

```

```

1

```

```

priority

```

```

10      VRRP

```

```

VRRP      VRRP
IP

```

(Routed Port SVI Loopback Tunnel)
IP ping

VRRP(5)

VRRP(5)

```
' debug vrrp events
' debug vrrp packets
' debug vrrp state
```

61.2.1 debug vrrp

```
VRRP          VRRP          VRRP
no
debug vrrp
no debug vrrp
```

VRRP

```
Ruijie# debug vrrp
Ruijie#
VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213
VRRP: Grp 1 Event - Advert higher or equal priority
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 1 state Master
-> Backup
VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 1 state Backup
-> Master
Ruijie#
```

Ruijie# debug vrrp errors	VRRP
Ruijie# debug vrrp events	VRRP
Ruijie# debug vrrp state	VRRP

61.2.2 debug vrrp errors

```
VRRP          no
```

debug vrrp errors
no debug vrrp errors

VRRP

VRRP

```
Ruijie# debug vrrp errors
Ruijie#
VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1
VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1
VRRP: Grp 1 Advertisement from 192.168.201.213 has
invalid virtual address 192.168.1.1
```

61.2.3 debug vrrp events

VRRP no

debug vrrp events
no debug vrrp events

VRRP

VRRP

```
Ruijie# debug vrrp events
VRRP: Grp 1 Event - Advert higher or equal priority
VRRP: Grp 1 Event - Advert higher or equal priority
VRRP: Grp 1 Event - Advert higher or equal priority
```

61.2.4 debug vrrp packets

VRRP no

debug vrrp packets
no debug vrrp packets

VRRP

VRRP

VRRP 1

Ruijie# **debug vrrp packets**

Ruijie#

VRRP: Grp 2 sending Advertisement checksum DD4D

VRRP: Grp 2 sending Advertisement checksum DD4D

VRRP: Grp 2 sending Advertisement checksum DD4D

VRRP

VRRP 1 IP VRRP 1

Ruijie# **debug vrrp packets**

Ruijie#

VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213

VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213

VRRP: Grp 1 Advertisement priority 120, ipaddr
192.168.201.213

61.2.5 debug vrrp state

VRRP

no

debug vrrp state

no debug vrrp state

VRRP

VRRP

```
Ruijie# debug vrrp state
Ruijie#
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 2 state Master
-> Backup
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 2 state Backup
-> Master

Ruijie# config terminal
Enter configuration commands, one per line. End with
CNTL/Z.

Ruijie(config)# interface fastethernet 0/0
Ruijie(config-if)# no shutdown
Ruijie(config-if)# end
Ruijie#
%VRRP-6-STATECHANGE: FastEthernet 0/0 Grp 2 state Master
-> Init
```

61.3

61.3.1 show vrrp

VRRP

```
show vrrp [ brief | group ]
```

```
brief                VRRP
group                VRRP
```

VRRP

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
```


E1/0 VRRP

```

Ruijie# show vrrp interface fastethernet 0/0
FastEthernet 0/0 - Group 1
State is Backup
Virtual IP address is 192.168.201.1 configured
Virtual MAC address is 0000.5e00.0101
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 100
Master Router is 192.168.201.213 , pritority is 120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec
FastEthernet 0/0 - Group 2
State is Master
Virtual IP address is 192.168.201.2 configured
Virtual MAC address is 0000.5e00.0102
Advertisement interval is 3 sec
Preemption is enabled
min delay is 0 sec
Priority is 120
Master Router is 192.168.201.217 (local), priority is
120
Master Advertisement interval is 3 sec
Master Down interval is 9 sec

```

Ruijie(config-if)# vrrp group ip ip address [secondary]	VRRP IP

62 BFD

62.1

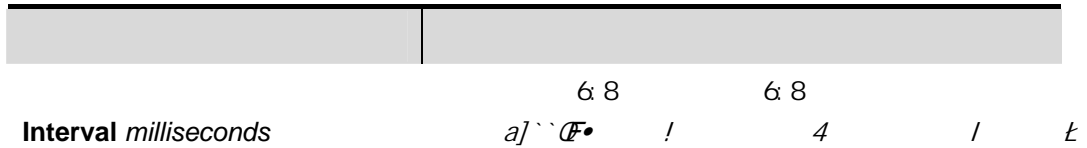
62.1.1 bfd

bfd
BFD
no

BFD

bfd interval *milliseconds* **min_rx** *milliseconds* **multiplier** *multiplier-value*

no bfd interval *milliseconds* **min_rx** *milliseconds* **multiplier** *multiplier-value*



```
Ruijie(config-if)# bfd interval 100 min_rx 100 multiplier 3
```

bfd all-interfaces	BFD
clear bfd	BFD
ip ospf bfd	OSPF BFD
ip rip bfd	RIP BFD

62.1.2 bfd all-interfaces

```
router (RIP,OSPF) bfd all-interfaces
      BFD          no
```

bfd all-interfaces

no bfd all-interfaces

-	-

6 8

```

                                BFD
                                [no] bfd all-interfaces
                                ip ospf bfd [disable] ip rip bfd [disable]
                                OSPF RIP          OSPF RIP BFD

```

```
# OSPF BFD
Ruijie(config)# router ospf 123
Ruijie(config-router)# bfd all-interface
```

bfd	BFD
ip ospf bfd	OSPF BFD
ip rip bfd	RIP BFD

62.1.3 bfd cpp

```
bfd cpp BFD no BFD
```

```
bfd cpp
no bfd cpp
```

-	-

BFD

BFD

BFD
BFD

BFD
BFD

BFD

BFD

```
# BFD
Ruijie(config)# bfd cpp
```

-	-

62.1.4 bfd echo

bfd echo echo no echo

```
bfd echo
no bfd echo
```

-	-

BFD echo

BFD echo echo
Interval milliseconds min_rx milliseconds

L3 AP
BFD ECHO , BFD no ip
redirects ICMP no ip deny land
DDOS (Land-based)
Echo BFD

```
# Routed Port    FastEthernet 0/2    echo
Ruijie(config)# interface fastEthernet 0/2
```

```
Ruijie(config)# no switchport
```

```
Ruijie(config-if)# bfd echo
```

bfd	BFD
ip redirects	ICMP
ip deny land	Land-based
bfd slow-timer	

62.1.5 bfd slow-timer

```
bfd slow-timer  
BFD
```

```
BFD  
BFD
```

```
ECHO  
"
```

```
Ruijie(config)# bfd slow-timer 14000
```

bfd echo	BFD Echo

62.1.6 bfd up-dampening

```
                ž                UP        ID  
bc  
bfd up-dampening [milliseconds]  
no bfd up-dampening
```

┌

┌

10.3(5)	

62.1.7 ip ospf bfd

```

        ip ospf bfd          OSPF      BFD
    disable                  no
ip ospf bfd [disable]
no ip ospf bfd
    
```

disable	fl t OSPF 6:8

```

X]gW Y          OSPF      6:8
    
```

```

        OSPF      BFD
        OSPF      [no] bfd all-interfaces
        BFD
        ip ospf bfd [disable]
    OSPF      BFD
    
```

```

# Routed Port      FastEthernet 0/2      OSPF      BFD
Ruijie(config)# interface FastEthernet 0/2
Ruijie(config-if)# no switchport
Ruijie(config-if)# ip ospf bfd disable
    
```

bfd	BFD
bfd all-interfaces	BFD

62.1.8 ip rip bfd

```

                ip rip bfd          RIP      BFD
disable          no
ip rip bfd [disable]
no ip rip bfd
    
```

disable	fl t FID 6 8

```

X] gU Y          RIP      6 8
    
```

```

                RIP      BFD
                RIP      [no] bfd all-interfaces
                BFD
                ip rip bfd [disable]
RIP      BFD
    
```

```

# Routed Port      FastEthernet 0/2          RIP      BFD
Ruijie(config)# interface FastEthernet 0/2
Ruijie(config-if)# no switchport
Ruijie(config-if)# ip rip bfd disable
    
```



```

Ruijie(config-if)# ip address 172.16.0.1 255.255.255.0
Ruijie(config-if)# bfd interval 50 min_rx 50 multiplier 3
Ruijie(config-if)# ip route static bfd FastEthernet 0/1 172.16.0.2

Ruijie(config-if)# ip route 10.0.0.0 255.0.0.0 FastEthernet
0/1 172.16.0.2

```

bfd	BFD

62.1.10 neighbor fall-over bfd

```

router address-family , neighbor fall-over BGP
BFD BGP , no

```

neighbor ip-address fall-over bfd

no neighbor ip-address fall-over bfd

<i>ip-address</i>	BGP

6 D 6 8

ID 6 8

```

# BGP BFD BFD 172.16.0.2
Ruijie(config)# router bgp 44000
Ruijie(config-router)# bgp log-neighbors-changes
Ruijie(config-router)# neighbor 172.16.0.2 remote-as 45000

```

```
Ruijie(config-router)# neighbor 172.16.0.2 fall-over bfd
Ruijie(config-router)# end
```

bfd	BFD

62.1.11 set ip next-hop verify-availability

```
Route-map          set ip next-hop verify-availability
BFD      TRACK      IP                               no
```

set ip next-hop verify-availability [*next-hop-address* [**track** number|**bfd** [*vrf vrf-name*]] *interface-type interface-number gateway*]]

no set ip next-hop verify-availability [*next-hop-address* [**track** number|**bfd** [*vrf vrf-name*]] *interface-type interface-number gateway*]]

<i>j fZ j fZ! bUaY</i>	fl Ț JF:
<i>bYl h! \cd! UXXfYgg</i>	fl Ț I D
hfUW	fl Ț HfUW
<i>bi aVYf</i>	fl ȚhfUW
VZX	fl Ț 6 8
<i>] bhYfZUW! hrøY</i> <i>] bhYfZUW! bi aVYf</i>	fl Ț
<i>[UhYkUm</i>	() IP BFD IP BFD

ID6 8

BFD BFD 172.16.0.2

Ruijie#**configure terminal**

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

Ruijie(config)# **route-map** Example1 **permit** 10Ruijie(config-route-map)# **match ip address** 1Ruijie(config-route-map)# **set ip precedence priority**Ruijie(config-route-map)#**set ip next-hop**
verify-availability 172.16.0.2 **bfd** FastEthernet 0/1
172.16.0.2Ruijie(config-route-map)#**end**

ID	6 8
JFFD	ž
ID	

```

#          VRRP    BFD          BFD
Ruijie#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Ruijie(config)#interface FastEthernet 0/1
Ruijie(config-if)#no switchport
Ruijie(config-if)#ip address 192.168.201.11 255.255.255.0
Ruijie(config-if)#bfd interval 50 min_rx 50 multiplier 3
Ruijie(config-if)#vrrp 1 priority 120
Ruijie(config-if)#vrrp 1 ip 192.168.201.1
Ruijie(config-if)#vrrp 1 bfd 192.168.201.12

Ruijie(config-if)#end

```

bfd	BFD

62.2

BFD

› [show bfd neighbors](#)

62.2.1 show bfd neighbors

6 8

```

show bfd neighbors [vrf vrf-name] [ipv4 ip-address [details]] [ipv6
ip-address [details]] | client {bgp|ospf|rip|vrrp|static-route} [ipv4
ip-address [details]] | ipv6 ip-address [details]] details]]

```

j fZ j fZ! blaY	() VRF
W]Ybh	()
V[d	BGP BFD
cgdZ	OSPF BFD
f]d	RIP BFD
j ffd	VRRP BFD
ghUh] Wfci hY	StaticRoute BFD
dVf	PBR BFD
]dj (]d! UXXYgg	IPv4
]dj *]d! UXXYgg	IPv6
XYhU]`g	

show bfd neighbors

Ruijie# show bfd neighbors

```

OurAddr      NeighAddr    LD/RD  RH    Holdown(mult)  State
Int
172.16.11.1  172.16.11.2 1/2    1     532 (3 )       Up
Ge2/1

```

show bfd neighbors details

Ruijie# show bfd neighbors details

```

OurAddr      NeighAddr    LD/RD  RH    Holdown(mult)  State
Int
172.16.11.1  172.16.11.2 1/2    1     532 (3 )       Up
Ge2/1

```

Local Diag: 0, Demand mode: 0, Poll bit: 0

MinTxInt: 200000, MinRxInt: 200000, Multiplier: 5

Received MinRxInt: 50000, Received Multiplier: 3

Holdown (hits): 600(22), Hello (hits): 200(84453)

Rx Count: 49824, Rx Interval (ms) min/max/avg: 208/440/332

Tx Count: 84488, Tx Interval (ms) min/max/avg: 152/248/196

Registered protocols: BGP

Uptime: 02:18:49

Last packet: Version: 1 - Diagnostic: 0

I Hear You bit: 1 - Demand bit: 0

Poll bit: 0 - Final bit: 0

Multiplier: 3 - Length: 24

My Discr.: 2 - Your Discr.: 1

Min tx interval: 50000 - Min rx interval: 50000

Min Echo interval: 0



OurAddr	IP
NeighAddr	IP
LD/RD	
RH	
Holdown(mult	hello
State	
Int	
Session state	echo
is UP and	echo (
being	Echo
Local Diag	
Demand	
Poll bit	
MinTxInt	
MinRxInt	
Multiplier	
Received	
Received	
Holdown (hits)	
Hello (hits)	hello
Rx Count	BFD
Rx Interval	
Tx Count	BFD
Tx Interval	

Registered

Uptime

UP

Last packet

BFD

-	-

63 RERP

63.1

RERP

RERP

```
' rerp enable
' rerp hello-interval
' rerp fail-interval
' rerp region
```

RERP

```
' ring
' edge-ring
' major-ring
```

63.1.1 rerp enable

RERP

```
rerp enable
no rerp enable
```

disable

RERP

RERP

```
Ruijie(config)# rerp enable
```

rerp region	RERP

63.1.2 rerp hello-interval

RERP

rerp hello-interval *interval*

no rerp hello-interval

interval

1-6

1

3

6

Ruijie(config)# **rerp fail-interval 6**

rerp hello- interval	

63.1.4 rerp region

RERP

RERP

rerp region *num***no rerp region** *num**num* , 1-64Ruijie# **rerp region 1**

--	--

rerp enable	RERP
--------------------	------

63.1.5 ring

RERP

vlan

ring *num* **role** [**master** | **backup** | **transit**] **ctrl-vlan** *vid* **primary-port**
interface *interface-id* **secondary-port** **interface** *interface-id*
no ring *num*

num *id***master** | **backup** | **transit****vid** *vlan***interface-id**

RERP

	RERP	,	RERP	
Master	Backup	RERP		trunk
native vlan	vlan			

```
Ruijie(config)# rerp region 1
Ruijie(config-rerp)# ring 1 role master ctrl-vlan 100
primary-port interface GigabitEthernet 0/1
secondary-port interface GigabitEthernet 0/2
```

rerp region	RERP
--------------------	------

63.1.6 edge-ring

RERP ring

```

edge-ring num role [primary-edge|secondary-edge] ctrl-vlan vid
shared-port interface interface-id sub-port interface
interface-id
no ring num

```

```

num id
primary-edge|secondary-edge
vid vlan
interface-id

```

RERP

```

RERP
RERP ring

```

```

Ruijie(config)# rerp region 1
Ruijie(config-rerp)# edge-ring 2 role primary-edge
ctrl-vlan 200 shared-port interface GigabitEthernet 0/1
sub-port interface GigabitEthernet 0/3

```

rerp region	RERP
ring	rerp

63.1.7 major-ring

```

major-ring num edge-ring-vlan vid

```

```

num id

```

RERP

vid *vlan*

RERP

majory-ring

```
Ruijie(config)# rerp region 1
```

```
Ruijie(config-rerp)# major-ring 1 edge-ring-vlan 100
```



rerp region

RERP

RER4n-5 2482n9f0 T5TjETq1.24

```

Ruijie# show rerp
rerp state : enable
rerp admin hello interval : 1(*1s)
rerp admin fail interval : 3(*1s)
rerp edge interval : 1(*300 ms)
rerp local bridge : 001a.a902.fe0b
-----
region 1
ring : 1
rerp oper hello interval : 1
rerp oper fail interval : 3
ring master : 001a.a902.fe0b
ctrl-vlan : 100
edge-vlan :
role : master
primary-port : Gi 0/4(forwarding)
secondary-port : Gi 0/21(down)

```

63.2.2 show rerp statistics

RERP

show rerp statistics region *num* ring *ring_id*

EXEC

:

```

Ruijie# sh rerp statistics region 1 ring 1
The statistics for region 1 ring 1 GigabitEthernet 0/4
TX hello packets      23, RX hello packets      0
TX edge-hello packets 0, RX edge-hello packets 0
TX flush packets      0, RX flush packets      0
TX down packets       0, RX down packets       0
TX up packets         0, RX up packets         0
TX major fail packets 0, RX major fail packets 0
TX major resume packets 0, RX major resume packets 0
TX sub complete packets 0, RX sub complete packets 0

The statistics for region 1 ring 1 GigabitEthernet 0/5
TX hello packets      23, RX hello packets      0
TX edge-hello packets 0, RX edge-hello packets 0
TX flush packets      0, RX flush packets      0

```

RERP

```
TX down packets      0, RX down packets      0
TX up packets        0, RX up packets      0
TX major fail packets 0, RX major fail packets 0
TX major resume packets 0, RX major resume packets 0
TX sub complete packets 0, RX sub complete packets 0
```

63.2.3 clear rerp statistics

RERP

clear rerp statistics

EXEC

63.2.4 debug rerp

RERP

no

64 REUP

64.1

REUP

- ' **mac-address-table move update receive**
- ' **mac-address-table move update transmit**

- ' **switchport backup interface *interface-id* [**preemption** {**mode** { **forced** | **bandwidth** | **off** } | **delay** *delay-time*}]**
- ' **mac-address-table update group**

64.1.1 switchport backup interface *interface-id*

REUP

switchport backup interface interface-id

no switchport backup

interface-id

ID

interface-id

fa 0/1

fa 0/2

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

Ruijie(config-if)# **switchport backup interface** *fa 0/2*

show interface switchport backup	

64.1.2 switchport backup interface *interface-id* preemption

REUP

switchport backup interface *interface-id* preemption mode { forced | bandwidth | off }

no switchport backup interface *interface-id* preemption mode { forced | bandwidth | off }

switchport backup interface *interface-id* preemption delay *delay-time*

no switchport backup interface *interface-id* preemption delay

interface-id ID

delay-time

show interface switchport backup	

64.1.3 mac-address-table move update receive

REUP MAC

mac-address-table move update receive

no mac-address-table move update receive

disable

MAC

MAC

MAC

MAC

Ruijie(config)# **mac-address-table move update receive**

mac-address-table move update transit	MAC

64.1.4 mac-address-table move update transit

REUP MAC

mac-address-table move update transit

no mac-address-table move update transit

disable

MAC

MAC

Ruijie(config)# **mac-address-table move update transit**

mac-address-table move update transit	MAC

64.1.5 mac-address-table update group

MAC

mac-address-table update group [*group-num*]

no mac-address-table update group

group-num : MAC ID

.4003321_0 1 Tf0.0057 Tcd[(grou)</TT0 1 Tf10 0 Td

MAC

```
Ruijie(config-if)# mac-address-table update group 2
```

show mac-address-table update group detail	MAC

64.2

- ± **show interfaces** [*interface-id*] **switchport backup** [detail]
- ± **show mac-address-table update group** [detail]

64.2.1 show mac-address-table update group [detail]

MAC

```
detail : MAC
```

MAC

EXEC

```
Ruijie# show mac-address-table update group detail
Mac-address-table Update Group:1
Received mac-address-table update message count:0
Group member  Receive Count    Last Receive Switch-ID
Receive Time
-----
Gi0/1          0                0000.0000.0000
Gi0/2          0                0000.0000.0000
```

64.2.2 show interfaces [*interface-id*] switchport backup [detail]

interface-id : ID
detail :

65 RLDP

65.1

RLDP

- › rldp detect-interval
- › rldp detect-max
- › rldp enable
- › rldp loop-detect enable

65.1.1 rldp loop-detect enable

RLDP

rldp loop-detect enable

no rldp loop-detect enable

┌

┌

┌

RLDP

RLDP

┌
└

Ruijie(config)# **rldp loop-detect enable**

┌
└

rldp port

RLDP



65.1.3 rldp detect-max

RLDP

rldp detect-max num

no rldp detect-max

	<i>num</i>	, 2-10

2

5
Ruijie(config)# **rldp detect-max 5**

	rldp detect-interval	

	-	-

65.1.4 rldp enable

RLDP

rldp enable

no rldp enable

|
|
|

|
|
|

|
|
|

RLDP

RLDP

|
|
|

Ruijie(config)# **rldp enable**

|



rldp port

RLDP

RLDP

	rldp port	RLDP
	-	-

65.1.6 rldp port

rldp

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	
	loop-detect	
	warning	
	shutdown-svi	shutdown svi
	shutdown-port	shutdown
	block	

┌
└

┌
└

RLDP

RLDP

fas 0/1

rldp

```
Ruijie(config)# interface fas 0/1
```

```
Ruijie(config-if)# rldp port loop-detect block
```

--	--	--

	rldp enable	rldp
	-	-

65.1.7 rldp reset

	rldp shutdown	disable	rldp
rldp reset			
	-		-
Ruijie# rldp reset			
	rldp enable		Rldp
	-		-

65.2

- > show rldp
- > debug rldp

65.2.1 show rldp

rldp

show rldp [interface *interface-id*]

<i>Interface-id</i>	

--	--

--	--

--	--

--	--

-	-

--	--

-	-

65.2.2 debug rldp

rldp

no

debug rldp [packet | event | error]

undebug rldp [packet | event | error]

packet	rldp
event	
error	

--	--

RLDP

66 DLDP

66.1

DLDP

- > [dldp](#)
- > [dldp passive](#)
- > [clear dldp](#)

66.1.1 dldp

DLDP

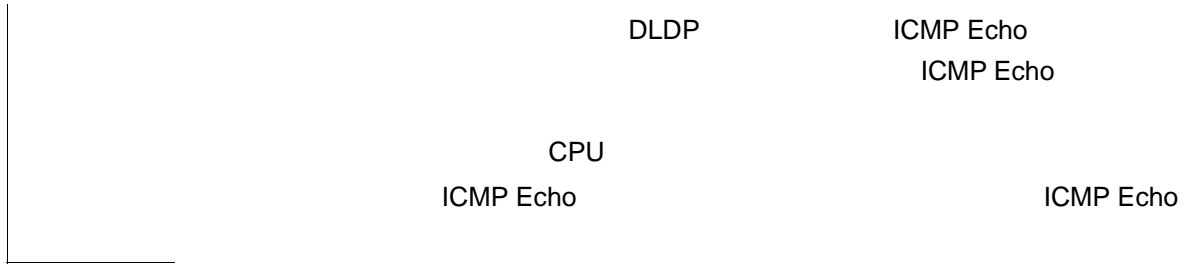
no

IP DLDP

dldp *ip-address* [**next-hop** *ipv4-address*] [**interval** *tick* | **retry** *retry-num* | **resume** *resume-num*]

no dldp *ip-address*

```
Ruijie(config)#interface vlan 1
Ruijie(config-if-VLAN 1)#ip address 10.83.132.1 255.255.255.0 //
vlan1 IP
Ruijie(config-if-VLAN 1)#dldp 10.83.132.10
2 10.83.131.10 DLDP
Ruijie#config
Ruijie(config)#interface vlan 1
Ruijie(config-if-VLAN 1)#ip address 10.83.132.1 255.255.255.0 //
vlan1 IP
Ruijie(config-if-VLAN 1)#dldp 10.83.131.10 next-hop 10.83.132.2 //
IP
3 10.83.132.10 DLDP
Ruijie#config
Ruijie(config)#interface vlan 1
Ruijie(config-if-VLAN 1)#no dldp 10.83.132.10
```



10.3(5)

-	-

66.3

66.3.1 clear dldp

dldp up/down

clear dldp [*interface interface-name* [*ip-address*]]

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

DLDP up/down IP
 up/down
 IP up/down up/down

1 up/down
 Ruijie#**clear dldp**
 2 interface vlan 1 up/down
 Ruijie#**clear dldp interface vlan 1**
 3 interface vlan 1 10.83.132.1 up/down
 Ruijie# **clear dldp interface vlan 1 10.83.132.1**

-	-

10.3(5)

	-	-

67

CPU

(AP)

```
Ruijie(config-if)# tp-guard port enable
```

```
Ruijie(config-if)# no tp-guard port enable
```

topology guard

67.2 TPP

67.2.1 show tpp

show tpp

tpp

```
Ruijie# show tpp
```

topology guard

68

68.1

- ' **redundancy**

- ' **auto-sync**
- ' **auto-sync time-period**
- ' **switchover timeout**

- ' **redundancy reload**
- ' **redundancy forceswitch**

68.1.1 redundancy

redundancy

redundancy

auto-sync auto-sync time-period switchover timeout

```
Ruijie# config terminal  
Ruijie(config)# redundancy  
Ruijie(config-red)# exit  
Ruijie(config)#
```

68.1.2 auto-sync

running-config startup-config

auto-sync { standard | running-config | startup-config}

no auto-sync { standard | running-config | startup-config}

standard

running-config

startup-config

auto-sync standard

standard

startup-config

Ruijie(config)# **redundancy**

Ruijie(config-rdnd)# **auto-sync startup-config**

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

Ruijie(config)#

startup-config

Ruijie(config)# **redundancy**

Ruijie(config-rdnd)# **no auto-sync startup-config**

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

Ruijie(config)#

68.1.3 auto-sync time-period

running-config startup-config

auto-sync time-period *value*

no auto-sync time-period

value

```
Ruijie# config terminal
Ruijie(config)# redundancy
Ruijie(config-red)# switchover timeout 4000
Ruijie(config-red)# exit
Ruijie(config)#
```

68.1.5 redundancy reload

```
privileged EXEC          redundancy reload      Slave
Master Slave
redundancy reload {peer | shelf}
t          2          }
```

```
Ruijie# redundancy forceswitch  
Proceed with switchover to standby PRE? [confirm] y
```

```
peer state = 37 -Standby Hot
```

```
...
```

68.2.2 show redundancy auto-sync

```
user EXEC    privileged EXEC    show redundancy
auto-sync    redundancy      (
              auto-sync    )
```

```
Ruijie> enable
Ruijie# show redundancy auto-sync
Redundancy auto-sync mode: auto-sync standard.
...
```

68.2.3 show redundancy switchover

```
user EXEC    privileged EXEC    show redundancy
switchover   redundancy      switchover
```

```
Ruijie> enable
Ruijie# show redundancy switchover
redundancy switch timeout is : 4000 ms.
...
```

69

69.1

- ' cd
- ' cp
- ' ls
- ' makefs
- ' mkdir
- ' mv
- ' pwd
- ' rm
- ' rmdir

69.1.1 cd

cd *DIRECTORY*

DIRECTORY

“ ”
..

“ ”
.

ls

tmp

Ruijie#

ls	

69.1.2 cp

cp dest {*DESTINE_FILE* | *DIRECTORY*} **sour** *SOURCE_FILE*
cp sour *SOURCE_FILE* **dest** {*DESTINE_FILE* | *DIRECTORY*}

DESTINE_FILE

DIRECTORY

SOURCE_FILE ()

cp

log.txt :

Ruijie# **cp sour** *log.txt* **dest** *../log_bak.txt*

69.1.3 ls

ls *PATHNAME*

PATHNAME

```
Ruijie# ls
      tmp
Ruijie# ls tmp
```

69.1.4 makefs

```
makefs dev DEVNAME fs FSNAME
makefs fs FSNAME dev DEVNAME
```

```
DEVNAME           (           )
FSNAME
```

```

a ( type file); b '?'
'?'
,
log.txt , config.txt,
,
Ruijie# mv sour tmp/log.txt dest ../config.txt
log.txt tmp
Ruijie# mv dest /mnt/tmp sour tmp/log.txt

```

69.1.7 pwd

pwd

pwd	

Ruijie# **pwd**

69.1.8 rm

rm *FILE*

FILE ()

,

log.txt

Ruijie# **rm** *log.txt*

rmdir	rm , ,

69.1.9 rmdir

rmdir *directory*

directory ,

rm

tmp

Ruijie# **rmdir** *tmp*

Ruijie# **ls**

70

70.1 CPU-LOG

- ' show cpu
- ' cpu-log

70.1.1 show cpu

CPU show cpu
show cpu

CPU 5 1
5 CPU 5
1 CPU

show cpu

```
Ruijie# show cpu
=====
      CPU Using Rate Information
CPU utilization in five seconds: 25%
CPU utilization in one minute  : 20%
CPU utilization in five minutes: 10%
NO   5Sec  1Min  5Min  Process
0    0%   0%   0%   LISR INT
1    7%   2%   1%   HISR INT
```

4	0%	0%	0%	printk_task
5	0%	0%	0%	waitqueue_process
6	0%	0%	0%	tasklet_task
7	0%	0%	0%	kevents
8	0%	0%	0%	snmpd
9	0%	0%	0%	snmp_trapd
10	0%	0%	0%	mtdblock
11	0%	0%	0%	gc_task
12	0%	0%	0%	Context
13	0%	0%	0%	kswapd
14	0%	0%	0%	bdflush
15	0%	0%	0%	kupdate
16	0%	3%	1%	ll_mt
17	0%	0%	0%	ll main process
18	0%	0%	0%	bridge_relay
19	0%	0%	0%	dlx_task
20	0%	0%	0%	secu_policy_task
21	0%	0%	0%	dhcpc_task
22	0%	0%	0%	dhcpsnp_task
23	0%	0%	0%	igmp_snp
24	0%	0%	0%	mstp_event
25	0%	0%	0%	GVRP_EVENT
26	0%	0%	0%	rldp_task
27	0%	2%	1%	rerp_task
28	0%	0%	0%	reup_event_handler
29	0%	0%	0%	tpp_task
30	0%	0%	0%	ip6timer
31	0%	0%	0%	rtadvd
32	0%	0%	0%	tnet6
33	2%	0%	0%	tnet
34	0%	0%	0%	Tarptime
35	0%	0%	0%	gra_arp
36	0%	0%	0%	Ttcptimer
37	8%	1%	0%	ef_res
38	0%	0%	0%	ef_rcv_msg
39	0%	0%	0%	ef_inconsistent_daemon
40	0%	0%	0%	ip6_tunnel_rcv_pkt
41	0%	0%	0%	res6t
42	0%	0%	0%	tunrt6
43	0%	0%	0%	ef6_rcv_msg
44	0%	0%	0%	ef6_inconsistent_daemon
45	0%	0%	0%	imid
46	0%	0%	0%	nsmd
47	0%	0%	0%	ripd
48	0%	0%	0%	ripngd
49	0%	0%	0%	ospfd

50	0%	0%	0%	ospf6d
51	0%	0%	0%	bgpd
52	0%	0%	0%	pimd
53	0%	0%	0%	pim6d
54	0%	0%	0%	pdmd
55	0%	0%	0%	dvmrpd
56	0%	0%	0%	vty_connect
57	0%	0%	0%	aaa_task
58	0%	0%	0%	Tlogtrap
59	0%	0%	0%	dhcp6c
60	0%	0%	0%	sntp_rcv_task
61	0%	0%	0%	ntp_task
62	0%	0%	0%	sla_deamon
63	0%	3%	1%	track_daemon
64	0%	0%	0%	pbr_guard
65	0%	0%	0%	vrrpd
66	0%	0%	0%	psnpd
67	0%	0%	0%	igsnpd
68	0%	0%	0%	coa_rcv
69	0%	0%	0%	co_oper
70	0%	0%	0%	co_mac
71	0%	0%	0%	radius_task
72	0%	0%	0%	tac+_acct_task
73	0%	0%	0%	tac+_task
74	0%	0%	0%	dhcpd_task
75	0%	0%	0%	dhcps_task
76	0%	0%	0%	dhcpping_task
77	0%	0%	0%	dhcpc_task
78	0%	0%	0%	uart_debug_file_task
79	0%	0%	0%	ssp_init_task
80	0%	0%	0%	rl_listen
81	0%	0%	0%	ikl_msg_operate_thread
82	0%	0%	0%	bcmDPC
83	0%	0%	0%	bcmL2X.0
84	3%	3%	3%	bcmL2X.0
85	0%	0%	0%	bcmCNTR.0
86	0%	0%	0%	bcmTX
87	0%	0%	0%	bcmXGS3AsyncTX
88	0%	2%	1%	bcmLINK.0
89	0%	0%	0%	bcmRX
90	0%	0%	0%	mngpkt_rcv_thread
91	0%	0%	0%	mngpkt_recycle_thread
92	0%	0%	0%	stack_task
93	0%	0%	0%	stack_disc_task
94	0%	0%	0%	redun_sync_task
95	0%	0%	0%	conf_dispatch_task

96	0%	0%	0%	devprob_task
97	0%	0%	0%	rdp_snd_thread
98	0%	0%	0%	rdp_rcv_thread
99	0%	0%	0%	rdp_slot_change_thread
100	4%	2%	1%	datapkt_rcv_thread
101	0%	0%	0%	keepalive_link_notify
102	0%	0%	0%	rerp_msg_rcv_thread
103	0%	0%	0%	ip_scan_guard_task
104	0%	0%	0%	ssp_ipmc_hit_task
105	0%	0%	0%	ssp_ipmc_trap_task
106	0%	0%	0%	hw_err_snd_task
107	0%	0%	0%	rerp_packet_send_task
108	0%	0%	0%	idle_vlan_proc_thread
109	0%	0%	0%	cmic_pause_detect
110	1%	1%	1%	stat_get_and_send
111	0%	1%	0%	rl_con
112	75%	80%	90%	idle

```

          3          5          1
          CPU      LISR  HISR
          5
          CPU
'   No
'   5Sec          5      CPU
'   1Min          1      CPU
'   5Min          5      CPU
          2          LISR  CPU      HISR
          CPU      CPU
          idle      CPU      Windows      System Idle Process
          75%      CPU      75%      idle      5      CPU

```

70.1.2 cpu-log

```

          CPU      ,      cpu-log
cpu-log log-limit low_num high_num

log-limit
low_num CPU
high_num CPU

```

```

          100%      90%

          CPU          CPU
          CPU          CPU
          CPU          CPU
          CPU          CPU

          CPU          70% CPU
          80%

ruijie(config)# cpu-log log-limit 70 80

          CPU          80%

Oct 20 15:47:01 %SYSCHECK-5-CPU_USING_RATE: CPU
utilization in one minute : 95% Using most cpu's task
is ktimer : 94%

          CPU          70%

Oct 20 15:47:01 %SYSCHECK-5-CPU_USING_RATE: CPU
utilization in one minute :68% Using most cpu's task
is ktimer : 60%
Oct 20 15:47:01 %SYSCHECK-5-CPU_USING_RATE: The CPU
using rate has down!

```

70.2

```

show memory
memory-lack exit-policy
show memory protocols

```

70.2.1 show memory

```

show

memory

show memory

```

worsen
OSPF RIP PIM-SM

policy (bgp|ospf|pim-sm|rip)

exit-policy

p	BGP OSPF PIM RIP

show memory protocols

/

show threshold	

70.3.2

> [show threshold](#)

show threshold

show threshold {cpu | memory | temperature} [M1 | M2 | slot *n* | member *n*]

cpu memory temperature	cpu CPU memory temperature
M1 M2 slot <i>n</i>	<i>n</i>
member <i>n</i>	<i>n</i>

```

1           M1    CPU
Ruijie# show threshold cpu M1

```

```

2
Ruijie# show threshold memory

```

threshold set	

71

71.1

71.1.1 logging on

no

logging on

no logging on

RGOS

Console

VTY

FLASH Syslog Server

1 Log

Ruijie(config)# **no logging on**

logging buffered	
logging	Syslog Server
logging file flash:	FLASH
logging console	

logging monitor	VTY (telnet)
logging trap	Syslog Server

71.1.2 terminal monitor

```

VTY
no
terminal monitor
terminal no monitor

VTY
VTY

VTY
VTY

```

no logging buffered

```
Ruijie(config)# logging buffered 10000 6
```

logging on	
show logging	
clear logging	

71.1.4 logging server

Syslog Sever

Syslog server

Syslog Server

no

logging server {*ip-address* [**vrf** *vrf-name*] | **ipv6** *ipv6-address*}

no logging server {*ip-address* [**vrf** *vrf-name*] | **ipv6** *ipv6-address*}

ip-address

IP

vrf vrf-name

VRF VPN

ipv6 ipv6-address

IPV6

syslog server

Syslog server

RGOS

5 Syslog Server

Syslog Server

202.101.11.1 syslog server

```
Ruijie(config)# logging server 202.101.11.1
```

IPV6

AAAA:BBBB::FFFF

```
Ruijie(config)# logging server ipv6 AAAA:BBBB::FFFF
```

logging on	
show logging	
logging trap	syslog server

71.1.5 logging file flash

```

FLASH
FLASH no
logging file flash:filename [max-file-size] [level]
no logging file

filename txt
max-file-size 128K 6M bytes
128K
level 1 FLASH 6

FLASH

Syslog Server
FLASH
txt

```

```

1.
2.
   txt
3.   15
      FLASH
16  FLASH

```

```

FLASH trace.txt
64K, 6
Ruijie(config)# logging file flash:trace

```

logging on	
show logging	
more flash	FLASH

71.1.6 logging console

```

no
logging console level
no logging console

level 0 7
1

Debugging (7)

```

show logging

6

Ruijie(config)# **logging console informational**

logging on	
show logging	

71.1.7 logging monitor

VTY telnet SSH no VTY

logging monitor *level*

no logging monitor

level

1

Debugging (7)

VTY terminal
monitor VTY
logging monitor

Logging monitor VTY

VTY 6

```
Ruijie(config)# logging monitor informational
```

logging on	
show logging	

71.1.8 logging trap

```
                Syslog Server
                no                Syslog Server

logging trap level
no logging trap

level

                                1

Informational(6)

                Syslog Server                logging
                Syslog Server                logging trap

show logging

                                6                202.101.11.22
                Syslog Server

Ruijie(config)# logging 202.101.11.22
Ruijie(config)# logging trap informational
```

--	--

logging on	
-------------------	--

2 Syslog

2

Numerical Code	Facility
0	kernel messages
1	user-level messages
2	mail system
3	system daemons
4	security/authorization messages
5	messages generated internally by syslogd
6	line printer subsystem
7	network news subsystem
8	UUCP subsystem
9	clock daemon
10	security/authorization messages
11	FTP daemon
12	NTP subsystem
13	log audit
14	log alert
15	clock daemon
16	local use 0 (local0)
17	local use 1 (local1)
18	local use 2 (local2)

```

19 local use 3 (local3)
20 local use 4 (local4)
21 local use 5 (local5)
22 local use 6 (local6)
23 local use 7 (local7)

```

```
RGOS (local7) 23
```

```
Syslog kernel
```

```
Ruijie(config)# logging facility kern
```

logging console	

71.1.12 logging count

```
no
```

```
logging count
```

```
no logging count
```

```
count
```

```
no logging
```

Ruijie(config)# **logging count**

show logging count	
show logging	

71.1.13 logging rate-limit

no

```
Ruijie(config)#logging rate-limit all 10 except warnings
```

show logging count	
show logging	

71.1.14 logging synchronous

```
no
```

```
logging synchronous
```

```
no logging synchronous
```

```
Ruijie(config)#  
Ruijie(config)#line console 0  
Ruijie(config-line)#logging synchronous
```

```
UP-DOWN
```

```
Ruijie#configure terminal  
Oct 9 23:40:55 %LINK-5-CHANGED: Interface  
GigabitEthernet 0/1, changed state to down  
Oct 9 23:40:55 %LINEPROTO-5-UPDOWN: Line protocol on  
Interface GigabitEthernet 0/1, changed state to DOWN
```

no

default

service timestamps *message-type* [*uptime* | *datetime* [*msec* | *year*]]

no service timestamps *message-type*

default service timestamps *message-type*

message-type
0 6

log debug log
debug 7

uptime * * * * 07:00:10:41

datetime Jul 27 16:53:07

msec : : .
Jul 27 16:53:07.299

year : : 2007
Jul 27 16:53:07

RTC

Uptime

Datetime

Log

Debug

Datetime

Ruijie(config)# **service timestamps debug datetime msec**

Ruijie(config)# **service timestamps log datetime msec**

Ruijie(config)# **end**

Ruijie(config)# **Oct 8 23:04:58.301 %SYS-5-CONFIG_I:**
Configured from console by console



71.1.18 more flash

FLASH

more flash:filename

Filename

FLASH

"//f2" "//f3"

FLASH

Ruijie# **more flash://f2/log.txt**

look up file in the extended flash://f2/log.txt

00004 2004-11-17 4:1:32 Ruijie: %5:Reload.2]TJuestd fb-6(ey-6(e)]TJ0

Ruijie# **clear logging**



```
00002 2004-11-17 10:20:59 Ruijie: %7:%LINE PROTOCOL  
CHANGE: Interface FastEthernet 0/0, changed state to UP  
00003 2004-11-17 10:57:18 Ruijie: %7:%LINK CHANGED:  
Interface FastEthernet 0/1, changed state to  
administratively down  
00004 2004-11-17 10:57:21 Ruijie: %7:%LINK CHANGED:  
Interface FastEthernet 0/1, changed state to down  
00005 2004-11-17 10:57:41 Ruijie: %7:%LINK CHANGED:  
Interface FastEthernet 0/1, changed state to  
administratively down  
00006 2004-11-17 10:57:43 Ruijie: %7:%LINK CHANGED:  
Interface FastEthernet 0/1, changed state to down
```



2BÖ

Syslog logging

Trap logging

Log Buffer

logging on	
clear logging	

71.2.2 show logging count

show logging count

logging

count show logging count

show logging

show logging count

```
Ruijie# show logging count
Module Name  Message Name Sev Occur      Last Time
=====
SYS          CONFIG_I      5  1          Jul 6 10:29:57
-----
SYS TOTAL                    1
```

00003 2004-11-17 10:57:18 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/1, changed state to
administratively down
00002 2004-11-17 10:20:59 Ruijie: %7:%LINE PROTOCOL
CHANGE: Interface FastEthernet 0/0, changed state to UP
00001 2004-11-17 10:20:59 Ruijie: %7:%LINK CHANGED:
Interface FastEthernet 0/0, changed state to up

logging on	
clear logging	
show logging	

72

72.1

' install

Slot : 2
User Status : installed
Software Status:87693e

```

Ruijie# show version module detail 2
Device : 1
Slot : 2
User Status : none
Software Status: none
Online Module :
Type :
Ports : 0
Version :
Configured Module :
Type :
Ports :
Version :
Ruijie#

```

install slot-num moduletype	
show version slots	

72.1.3 remove configuration module slot-num

remove configuration module *slot-num*

slot-num

```
Ruijie(config)# remove configure module 4
```

72.1.4 reset module slot-num

reset module *slot-num*

slot-num

Ruijie# **reset module 4**

72.2

72.2.1 show version module detail [module-num]

show version module detail [*module-num*]

module-num

```
Ruijie# show version module detail 2  
Device : 1  
Slot : 2  
User Status : none  
Software Status: none  
Online Module :  
Type :  
Ports : 0  
Version :  
Configured Module :  
Type :  
Ports :  
Version :  
Ruijie#
```

show version slots	

72.2.2 show version slots [slot-num]

show version slots [*slot-num*]

num

```
Ruijie# show version slots
Dev Slot  Configured Module Online Module  User Status
Software Status
--- ----  -
1 1      none           none
1 2 M8606-24SFP/12GT M8606-24SFP/12GT installed none
1 3 M8606-2XFP M8606-2XFP uninstalled cannot startup
1 4 M8606-24GT/12SFP M8606-24GT/12SFP installed ok
1 M1 M8606-CM M8606-CM                master
1  M2                none
```

show version moduel detail	

73

73.1

- ' **lcd trap-number** *num*
- ' **memory-rate rising-threshold** *num*

73.1.1 lcd trap-number num

no

lcd trap-number *num*

no lcd trap-number

num 1-1000

num 100

100

200

lcd trap-num *200*

73.1.2 memory-rate rising-threshold num

num 1-100

num 80

num 80 **show running-config** **memory-rate**
rising-threshold 80

Ruijie(config)# **memory-rate rising-threshold 60**

74

Disk Partitions

/dev/uba/disc0/part1
cd /mnt/uba

/mnt/uba

74.1.2 usb remove

usb remove *Device_ID*

Device_ID USB

usb

USB

usb

```
Ruijie# usb remove 778
```

```
OK, now you can pull out the device 778.
```

```
0:1:1:38 Ruijie: USB-5-USB_DISK_REMOVED: USB Device
```

```
<USB Mass Storage Device> Removed!
```

usb

75 POE

POE

- ' **Poe enable**
- ' **Poe-power lower lower**
- ' **Poe-power upper upper**
- ' **Poe disconnect-mode mode**

75.1

75.1.1 poe enable

no

poe enable

no poe enable

```
Ruijie(config-if)# poe enable  
Ruijie(config-if)# no poe enable
```

75.1.2 poe-power lower lower

no

poe-power lower *lower*

no poe-power lower

lower

45-47

POE 46

```
Ruijie# configure  
Ruijie(config)# poe-power lower 46  
Ruijie(config)# end  
Ruijie#
```

75.1.3 poe-power upper upper

no

```
poe-power upper upper  
no poe-power upper
```

upper 55-57

POE 56

```
Ruijie# configure  
Ruijie(config)# poe-power upper 56  
Ruijie(config)# end
```

75.1.4 poe disconnect-mode mode

no

```
poe disconnect-mode mode  
no poe disconnect-mode
```

mode [ac/dc]

POE dc

```
Ruijie# configure
```

```
Ruijie(config)# poe disconnect-mode dc
Ruijie(config)# end
```

75.2

POE

- ' show poe interfaces
- ' show poe powersupply

75.2.1 show poe interfaces

POE

show poe interfaces *interface-id*

poe

```
Ruijie# show poe interface gigabitethernet 0/2
Interface : Gi0/2
Port power enabled : ENABLE
Port connect status : OFF
Port PD Class : no PD devices
Port max power : 15.4 W
Port current power : 0 W
Port peak power : 0 W
Port current : 0 mA
Port voltage : 48 V
Port trouble cause : normal
```

75.2.2 show poe powersupply

POE

show poe powersupply

```
Ruijie# show poe powersupply
PSE Total Power :1200.0 W
PSE Total Power Consumption : 0 W
PSE Available Power : 1200.0 W
PSE Peak Value : 0 W
```